

Seven Dials Court + 3-11 Shorts Gardens London

Environmental Noise Survey and Plant Noise Assessment Report

25806/PNA1/Rev5

08 January 2020

For:

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Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	23/07/2018	-	Giovanni De Rienzo Senior Consultant BSc(Hons), AMIOA	Gareth Evans Associate BSc(Hons), MIOA
1	26/07/2018	Re-issued following comments from Fresson & Tee	Giovanni De Rienzo Senior Consultant BSc(Hons), AMIOA	Gareth Evans Associate BSc(Hons), MIOA
2	13/11/2019	Revised assessment to include replacement condenser units	Giovanni De Rienzo Principal Consultant BSc(Hons), MIOA	Gareth Evans Associate BSc(Hons), MIOA
3	18/11/2019	Added acoustic louvre specification	Giovanni De Rienzo Principal Consultant BSc(Hons), MIOA	Gareth Evans Associate BSc(Hons), MIOA
4	19/11/2019	Updated following comments from Fresson & Tee	Giovanni De Rienzo Principal Consultant BSc(Hons), MIOA	Gareth Evans Associate BSc(Hons), MIOA
5	08/01/2020	Updated following comments from Rolfe Judd		
			Giovanni De Rienzo Principal Consultant BSc(Hons), MIOA	Gareth Evans Associate BSc(Hons), MIOA



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1.0 Introduction

Existing ductwork at Seven Dials Court + 3-11 Shorts Gardens, London is proposed to be replaced and re-located. New condenser units also are proposed to replace existing units. Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey and plant noise assessment report to support the planning application.

This report presents the methodology and findings of our noise survey.

2.0 Objectives

To establish by means of an unmanned 24 hour survey the existing environmental noise levels on-site, using fully computerised noise monitoring equipment.

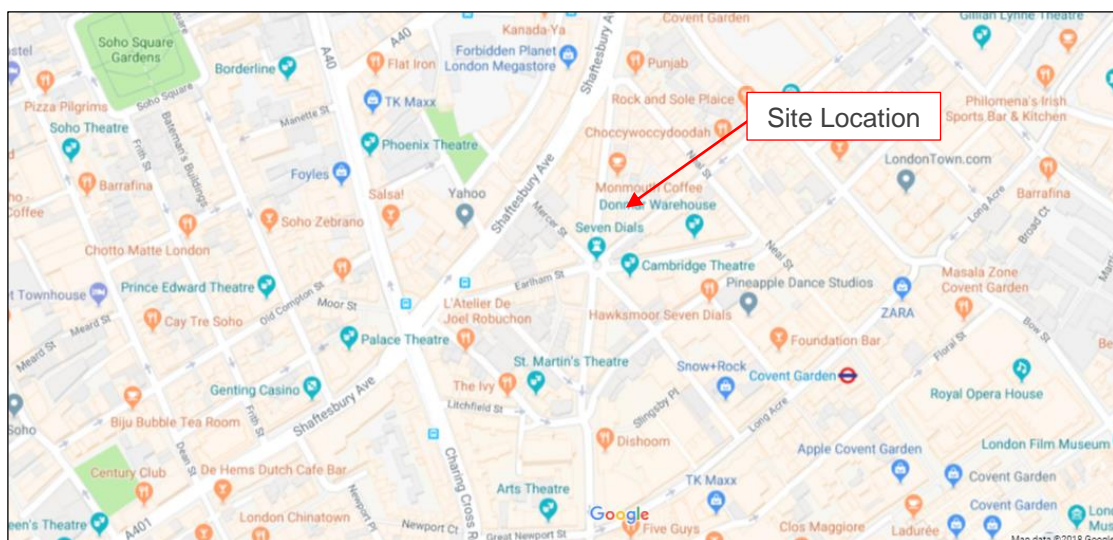
To present plant noise emission criteria on the basis of Local Authority requirements and the survey results.

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

3.0 Site Description

3.1 Location

The site is located at Seven Dials Court + 3-11 Shorts Gardens, London, and falls within the jurisdiction of London Borough of Camden. The location is shown in the Location Map below.



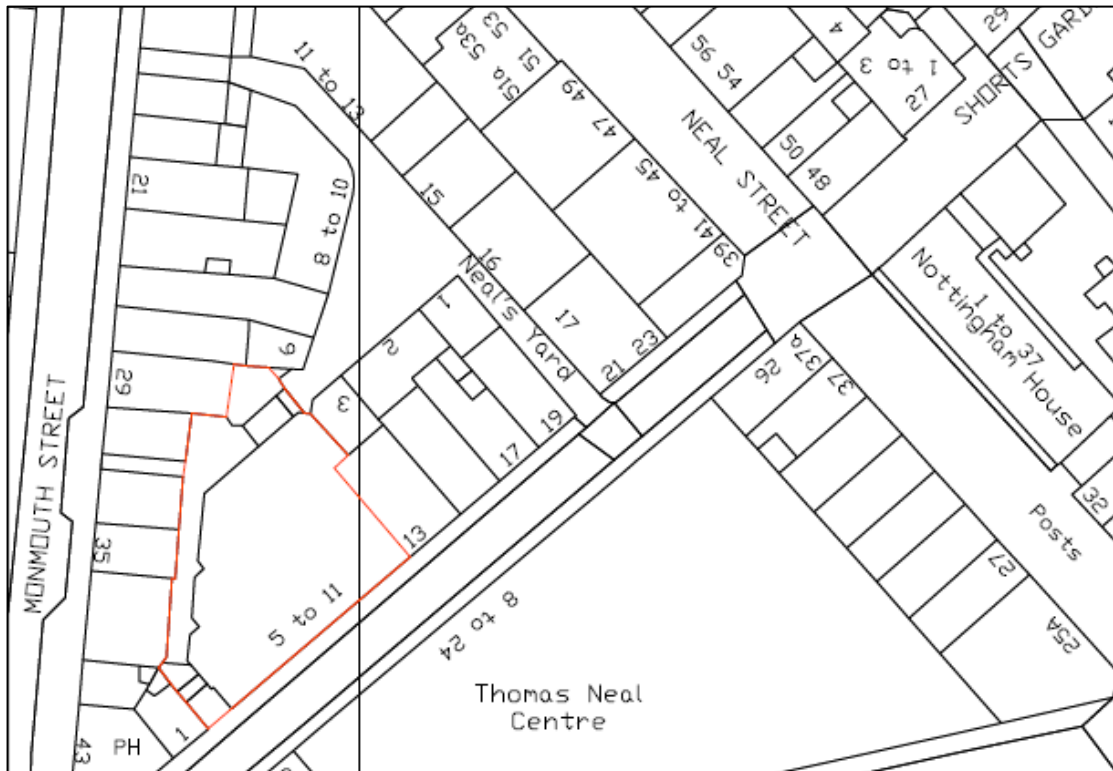
Location Map (maps.google.co.uk)



3.2 Description

The site is bordered to the south east by Shorts Gardens, to the north by Neal's Yard, and to the West by Monmouth Street. The area is predominantly occupied by ground floor commercial units with residential dwellings above (known as Seven Dials Court).

The site is shown in the Site Plan below.



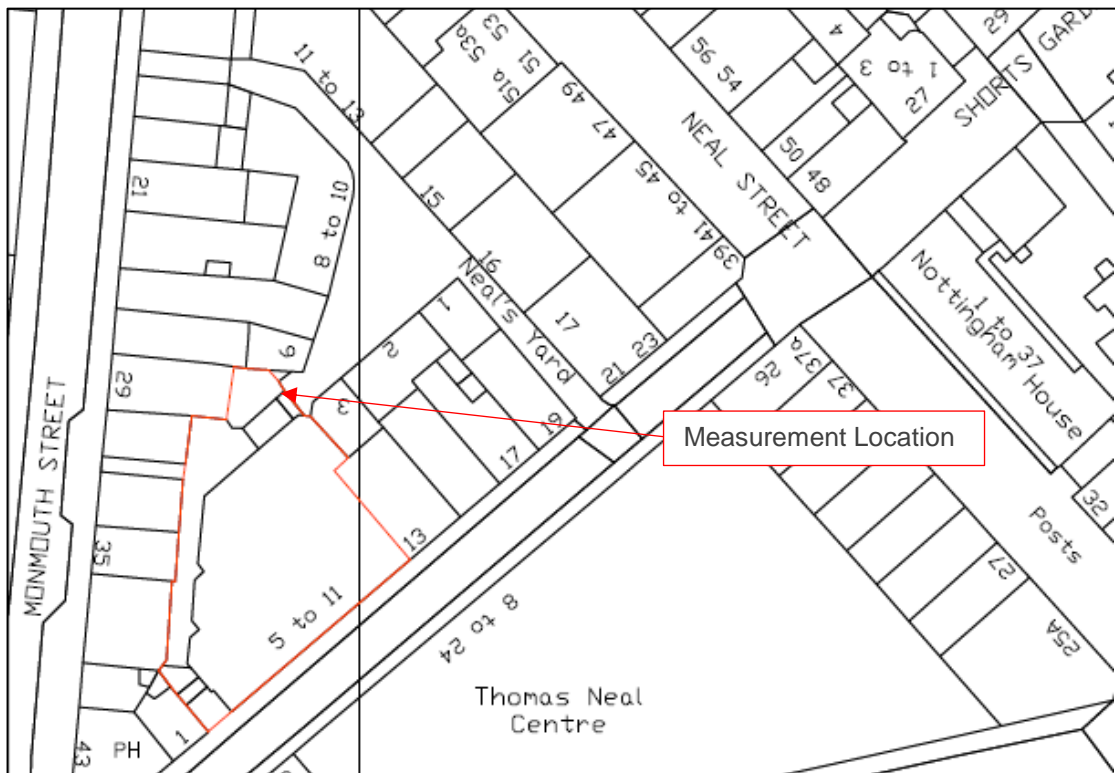


During the periods we were on site the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar to this. These conditions are considered suitable for obtaining representative measurement results.

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

5.2 Measurement Position

The microphone was attached to an extendable pole which was secured to existing railing close to the existing ductwork. The microphone was located approximately 1.5 metres from any large reflective surface. The position is shown on the plan below.



Plan Showing Unmanned Measurement Position (image provided by Rolfe Judd)

5.3 Instrumentation

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



Description	Manufacturer	Type	Serial Number	Calibration
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	67976	Calibration on 30/01/2018
Type 1 Preamp	Svantek	SV18	71473	Calibration on 30/01/2018
Type 1 Data Logging Sound Level Meter	Svantek	971	80232	Calibration on 30/01/2018

The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1dB).

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.

6.0 Results

The results have been plotted on Time History Graph 25806/TH1 enclosed presenting the 15 minute A-weighted (dBA) L_{90} , L_{eq} and L_{max} levels at the measurement position throughout the duration of the survey.

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

Modal 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
55dB	48dB

7.0 Discussion Of Noise Climate

During the periods we were on site the dominant noise sources was noted to be road traffic from the surrounding road network.



8.0 Relevant Planning Policies and Guidance

8.1 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.

8.2 National Planning Policy Framework (NPPF)

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.”

8.3 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.		
		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.		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.		Prevent



8.4 The London Plan

The London Plan, published in 2011 with minor revisions in 2013, 2015 and 2016, provides an overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. The Plan brings together the Mayor's strategies, including policy on a range of environmental issues, such as climate change, air quality, noise and waste. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

Policy 7.15 specifically relates to noise and states:

"Development proposals should seek to reduce noise by:

- a) Minimising the existing and potential; adverse impacts of noise on, from, within, or in the vicinity of, development proposals;*
- b) Separating new noise sensitive development from major noise sources wherever practicable through the use of distance, screening, or internal layout in preference to sole reliance on sound insulation;*
- c) Promoting new technologies and improving practices to reduce noise at source."*

London Plan – Housing Supplementary Planning Guidance

The Housing SPG 2016 highlights the elements of the London Plan that are relevant to housing development, and where applicable, provides more detail. The SPG states:

"Noise – Baseline

Standard 5.3.1 (and Policy 7.15) – The layout of adjacent dwellings and the location of lifts and circulation spaces should seek to limit the transmission of noise to sound sensitive rooms within dwellings.

Policy 7.15 Reducing Noise and Enhancing Soundscapes requires development proposal to seek to reduce noise and manage the effects of noise. It is another important aspect of retreat and privacy in a dwelling. Noise from the street and adjoining properties can cause stress, sleep disturbance and friction between neighbours as recognised in the NPPF154.

2.3.35 All dwellings should be built with acoustic insulation and tested to current Building Regulations standards 155. However, acoustic insulation should not be relied upon as the only means of limiting noise and the layout and placement of rooms within the building should be considered at an early stage in the design process to limit the impact of external noise on bedrooms and living rooms. The impact of noise should also be considered in the placement of private external spaces."



8.5 Local Planning Policy

The site comes under the jurisdiction of Camden Borough Council, which outlines its requirements as below in *Camden Local Plan 2017: Appendix 3*:

Note: NOAL – No Observed Effect Level, LOAEL- Lowest Observed Averse Effect Level, SOAEL – Significant Observed Adverse Effect Level.

“...a ‘Rating Level’ of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion.

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 window (façade)	Day	‘Rating level’ 10dB below background	‘Rating level’ 9dB below and 5dB above background	‘Rating level’ greater than 5dB above background
Dwellings **		Night	‘Rating level’ 10dB below background and no events exceeding 57dB _{L_{Amax}}	‘Rating level’ 9dB below and 5dB above background or noise events between 57dB and 88dB _{L_{Amax}}	‘Rating level’ greater than 5dB above background and/or events exceeding 88dB _{L_{Amax}}

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

***Levels are given for dwellings, however, levels are use specific and different levels will apply dependant on the use of premises”*



8.6 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*”.

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.

8.7 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.

8.8 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 to 07:00
Resting	Living Rooms	35dB L _{Aeq,16hour}	-
Dining	Dining Room/Area	40dB L _{Aeq,16hour}	-
Sleeping (Daytime Resting)	Bedroom	35dB L _{Aeq,16hour}	30dB L _{Aeq,8hour}

8.9 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 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.



9.0 Plant Noise Emission Criteria

On the basis of the aforementioned acoustic standards and guidance, together with the results of the environmental noise survey, we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive residential window with all plant operating simultaneously.

Plant Noise Emission Criteria (dB re 2x10 ⁻⁵ Pa)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
45dBA	38dBA

The above criteria are to be achieved with all plant operating simultaneously.

If plant contains tonal or impulsive characteristics the external design criteria should be reduced by 5dBA.

It should be noted that the above are subject to the final approval of the Local Authority.

10.0 Plant Noise Assessment

10.1 Proposed Plant

We understand the proposed plant comprises the following:

Plant Description	Location	Qty	Plant Make	Model Number
Kitchen Extract Fan	Rear of building	1	Systemair	MUB/T 062 630D4 IE2
Restaurant Condensing Units	Behind acoustic louvres at base of larger rooflight	4	Daikin	RXYSQ-8TY1
Retail Condensing Units	Behind acoustic louvres at base of larger rooflight	1	Daikin	RXYSQ-8TY1
	located within dead end area	1	Daikin	RXYSQ-6TY1

10.2 Plant Noise Data

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

Plant Description	Sound Power Level (dB re 10 ⁻¹² W) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
MUB/T 062 630D4 IE2	75	77	81	83	82	79	74	67



Plant Description	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) At 1 metre at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
RXYSQ-8TY1	60	63	55	52	49	48	42	34
RXYSQ-6TY1	56	54	51	47	46	43	39	27

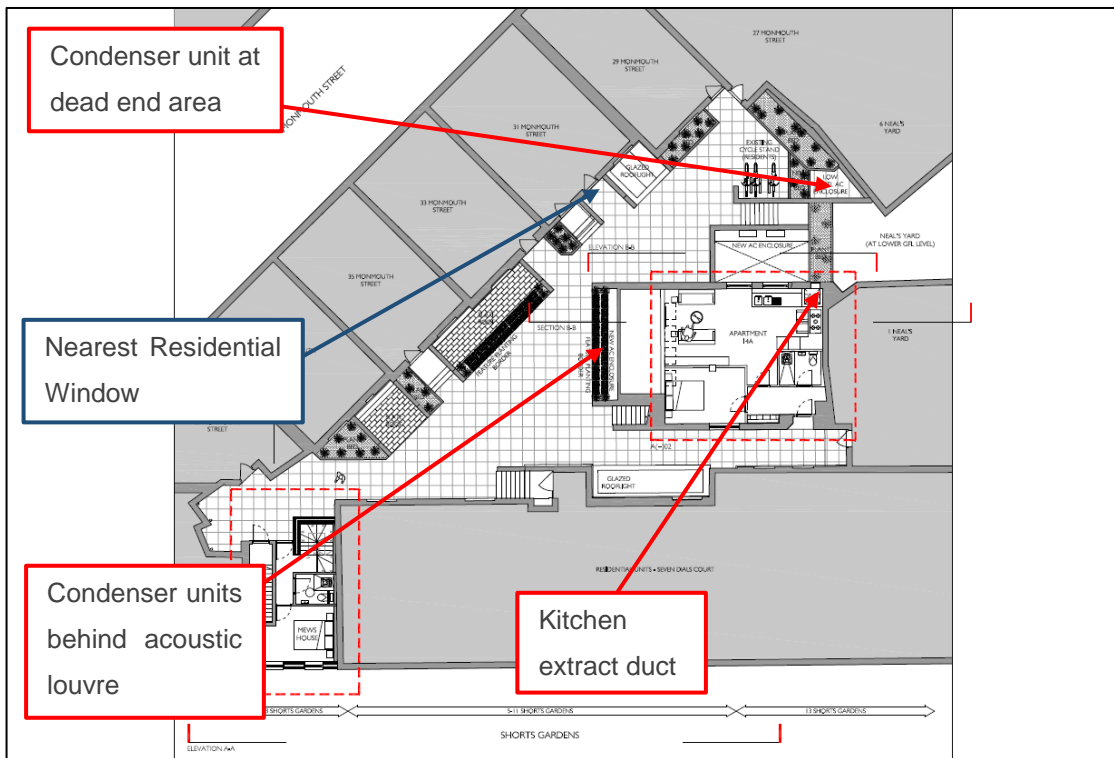
10.3 Nearest Noise Sensitive Window

We understand the proposed replacement ductwork for the Kitchen Extract Fan will run parallel to the location of the existing ductwork. The ductwork is proposed to discharge at roof level as it does currently.

With the above in mind we believe the nearest noise sensitive window is located adjacent to the proposed ductwork at 2nd floor level.

5No. condenser units are proposed to be located behind an acoustic louvre, which is replacing the existing timber louvres. There is an additional retail condenser unit located at the dead end area, which will be slightly screened from the nearest windows by planters and existing walls.

See drawing below:



First floor plan showing plant locations (Drawing provided by Trehearne Architects)



10.4 Mitigation Measures

10.4.1 Extract Duct

In order to control plant noise emissions in line with the proposed criterion, we recommend installing an attenuator at basement level / as close to the kitchen extract fan as possible to control fan outlet noise levels.

The attenuator should meet the following insertion losses:

Attenuator Insertion Loss dB (Hz)							
63	125	250	500	1k	2k	4k	8k
6	13	23	37	43	44	35	20

The above insertion losses could typically be achieved with a 35% free area 1500mm attenuator.

10.4.2 Acoustic Louvre

The acoustic louvres should fully replace the existing timber louvres and should be positioned such that the condenser units do not have direct line of sight with the windows overlooking the area. They shall be at least 300mm deep and should provide, in their as-installed condition, the following minimum combined sound reduction indices (SRI's) when tested in accordance with BS 2750 Part 3 – 1980 (ISO 140 Part 3 – 1995).

Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
5	7	10	12	14	16	13	12

The louvre frame shall be constructed from a suitable gauge of galvanised mild steel, or aluminium, supporting louvre blades of like material. The acoustic material in the blades shall be packed to a density of not less than 45kg/m³ and be inert, rot and vermin proof, non-hygroscopic incombustible mineral fibre. This shall be faced with glass fibre cloth, or other approved infill protection membrane, and retained on the lower blade face by perforated galvanised mild steel or aluminium (not "expamet" or similar derivative) having a minimum thickness of 0.5mm fixed at 200mm (max) centres.

All junctions between the acoustic screen and adjacent structures shall be made good and sealed with a heavy grout and/or non-hardening dense mastic.



The supplier shall ensure that the assembled enclosure is designed and constructed to withstand site operating conditions such as wind and snow loads, etc., as appropriate, and is suitably weatherproofed.

The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.

Any deviations from the above specification must be agreed by, and confirmed in writing to, Hann Tucker Associates.

10.5 Plant Noise Impact Assessment

The following tables summarise our predictions of atmospheric noise emissions to the nearest noise sensitive residential window.

Kitchen Extract Duct/Fan

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Systemair MUB/T 062 630D4 IE2 - Outlet (SWL)	75	77	81	83	82	79	74	67	
Proposed Attenuator Insertion Loss	-6	-13	-23	-37	-43	-44	-35	-20	
Duct Corrections	-2	-3	-3	-4	-4	-4	-4	-4	
Grille End Reflection	-9	-4	-2	0	0	0	0	0	
Distance Correction at 2.5 metres (SWL to SPL)	-19	-19	-19	-19	-19	-19	-19	-19	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	42	41	37	26	19	15	19	27	33

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Systemair MUB/T 062 630D4 IE2 - Outlet (SWL)	75	77	81	83	82	79	74	67	
Proposed Attenuator Insertion Loss	-6	-13	-23	-37	-43	-44	-35	-20	
Typical Duct Loss	-7	-10	-15	-20	-28	-32	-33	-35	
Distance Correction at 1 metre (SWL to SPL)	-11	-11	-11	-11	-11	-11	-11	-11	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	54	46	35	18	3	-5	-2	4	33

**Condenser Units**

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Restaurant Condensing Units behind louvres @1m	60	63	55	52	49	48	42	34	56
Cumulative addition for 4No. units	+6	+6	+6	+6	+6	+6	+6	+6	
Total noise level for all Restaurant Condensing Units @1m	66	69	61	58	55	54	48	40	62
Acoustic Louvre loss	-5	-7	-10	-12	-14	-16	-13	-12	
Distance Correction at 7 metres	-19	-19	-19	-19	-19	-19	-19	-19	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	45	46	35	30	25	22	19	12	34

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Retail Condensing Unit behind louvres @1m	60	63	55	52	49	48	42	34	56
Acoustic Louvre loss	-6	-7	-9	-11	-13	-16	-19	-20	
Distance Correction at 7 metres	-19	-19	-19	-19	-19	-19	-19	-19	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	38	40	30	25	20	16	7	-2	29

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Retail Condensing Unit in dead end area @1m	56	54	51	47	46	43	39	27	51
Screening Correction from plant pots and existing walls	-5	-5	-5	-5	-5	-5	-5	-5	
Distance Correction at 9 metres	-21	-21	-21	-21	-21	-21	-21	-21	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	33	31	28	24	23	20	16	4	28

**Total Noise Level of all Plant at Nearest Noise Sensitive Window**

We understand that the kitchen extract fan and restaurant condenser units are likely to run during both daytime and night-time hours (worst-case scenario). The retail condenser units will run during daytime hours only (07:00-23:00). We have therefore undertaken 2No. calculations to determine the total plant noise level of daytime and night-time plant.

Daytime (07:00 – 23:00)

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Duct grille at receptor	42	41	37	26	19	15	19	27	33
Duct breakout at receptor	54	46	35	18	3	-5	-2	4	33
Restaurant condensing units at receptor	45	46	35	30	25	22	19	12	34
Retail condensing unit behind louvres at receptor	38	40	30	25	20	16	7	-2	29
Retail condensing unit in dead end area at receptor	33	31	28	24	23	20	16	4	28
Total noise level of all daytime plant at receptor	55	50	41	33	28	25	23	27	39

Night-time (07:00 – 23:00)

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Duct grille at receptor	42	41	37	26	19	15	19	27	33
Duct breakout at receptor	54	46	35	18	3	-5	-2	4	33
Restaurant condensing unit behind louvres at receptor	45	46	35	30	25	22	19	12	34
Total noise level of all night-time plant at receptor	55	50	41	32	26	23	22	27	38

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



11.0 Conclusions

A detailed environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

Plant noise emission criteria have been set based on the requirements of the Local Authority.

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, in conjunction with the proposed mitigation measures, should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive 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. $30\text{dB} + 30\text{dB} = 33\text{dB}$, not 60dB).
dBA	<p>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</p> <p>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.</p>
$L_{90,T}$	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).

Seven Dials Court

Position 1

L_{Aeq} , L_{Amax} and L_{A90} Noise Levels

Tuesday 10 July 2018 to Wednesday 11 July 2018

■ L_{Amax}

■ L_{Aeq}

■ L_{A90}

