



8 Savoy Court Firecrest Drive Hampstead

Environmental Noise Survey and Plant Noise Assessment Report

26282/PNA1

23 January 2019

For:
XUL Architecture
33 Belsize Lane
London
NW2 5AS



Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

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Hann Tucker Associates

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Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	23/01/2019	-	[REDACTED]	[REDACTED]
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1.0 Introduction

A refurbishment to the third floor flat, 8 Savoy Court, Hampstead is proposed including the installation of 2No. external condensers.

Hann Tucker Associates have therefore been commissioned to undertake a 24-hour environmental noise survey in order to establish prevailing background noise. Plant noise criteria have been set based on the results of the survey and the requirements of the Local Authority. A plant noise assessment has been carried out to assess the suitability of the proposed plant.

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 one secure and accessible on-site position, 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 by neighbours.

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

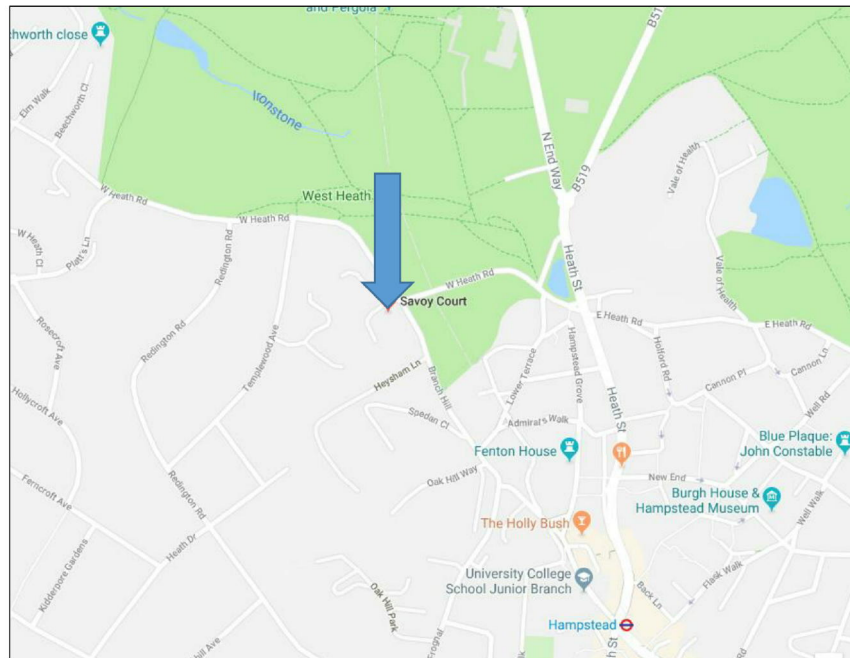
To advise on noise control measures, if required with reference to the requirements of the Local Authority.



3.0 Site Description

3.1 Location

The site is located at 8 Savoy Court, Firecrest Drive. The location is shown in the Location Map below.



Location Map (Map data © 2019 Google)

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

3.2 Description

The site is a flat within a 5No. storey residential building. The building is located on a predominantly residential road and is in close proximity to the West Heath to the northeast.

The site is shown in the Site Plan below.



Site Plan (Imagery © 2019 The Geoinformation Group, Map data © 2019 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. 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."

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 aims listed in paragraph (b) 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 following paragraphs are from the NPPF (revised July 2018):

“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."

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 comes under the jurisdiction of the London Borough of Camden, the Local Authority requirements are outlined as below in *Camden Local Plan 2017: Appendix 3*

“A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ (BS 4142) will be used. For such cases a ‘Rating Level’ of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion.



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"

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".

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.

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 to 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 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.

6.0 Survey Methodology

The survey was undertaken by Daniel Stuart BSc(Hons), AMIOA.

6.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 10:30 hours on 17 January 2019 to 10:30 hours on 18 January 2019.

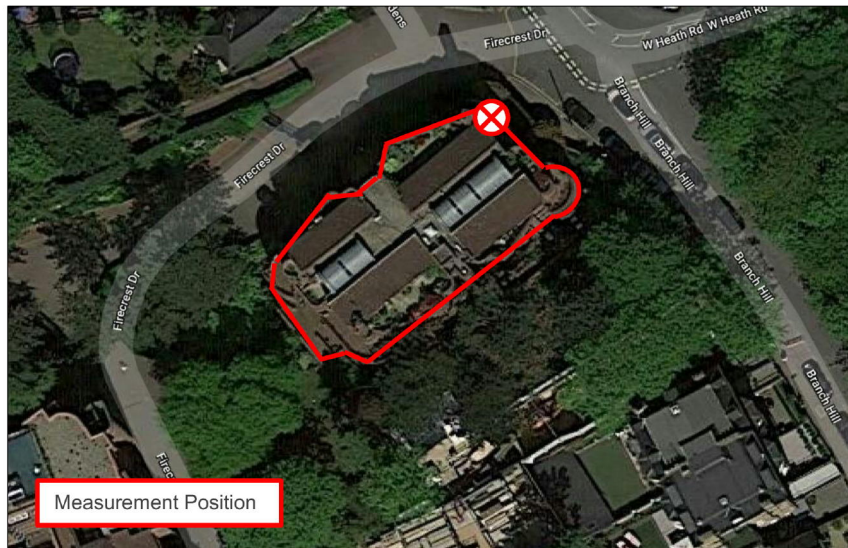
During the periods we were on site the wind conditions were moderate. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were calm and clear. These conditions are considered suitable for obtaining representative measurement results.

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



6.2 Measurement Position

The microphone was attached to a pole in free field approximately 3m above the third floor terrace.



Plan Showing Measurement Position (Imagery © 2019 The GeoInformation Group, Map data © 2019 Google)

6.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Position 1 Type 1 ½" Condenser Microphone	Bruel & Kjaer	4189	2470594	20/06/2018
Position 1 Preamp	Larson Davis	PRM902	3936	20/06/2018
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3157	20/06/2018
Type 1 Calibrator	Larson Davis	CAL200	3082	08/08/2018



The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. 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.

7.0 Results

The results have been plotted on Time History Graph 26282/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_{A90} (15 min) measurements recorded during the survey are presented in the table below:

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	24 Hours
51 dBA	44 dBA	44 dBA

8.0 Discussion Of Noise Climate

During the periods we were on site the dominant noise sources was traffic from West Heath Road.

9.0 Plant Noise Emission Criteria

The site lies within the jurisdiction of the London Borough of Camden. Their advice regarding criteria for atmospheric noise emissions from building service plant is outlined in the sections above, which conclude:

“For such cases a “Rating Level” of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion”

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)
41 dBA	34 dBA

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 Impact Assessment

We understand the proposed plant comprises 2No. Mitsubishi MXZ-4E83-VA condensers.

10.1 Plant Noise Data

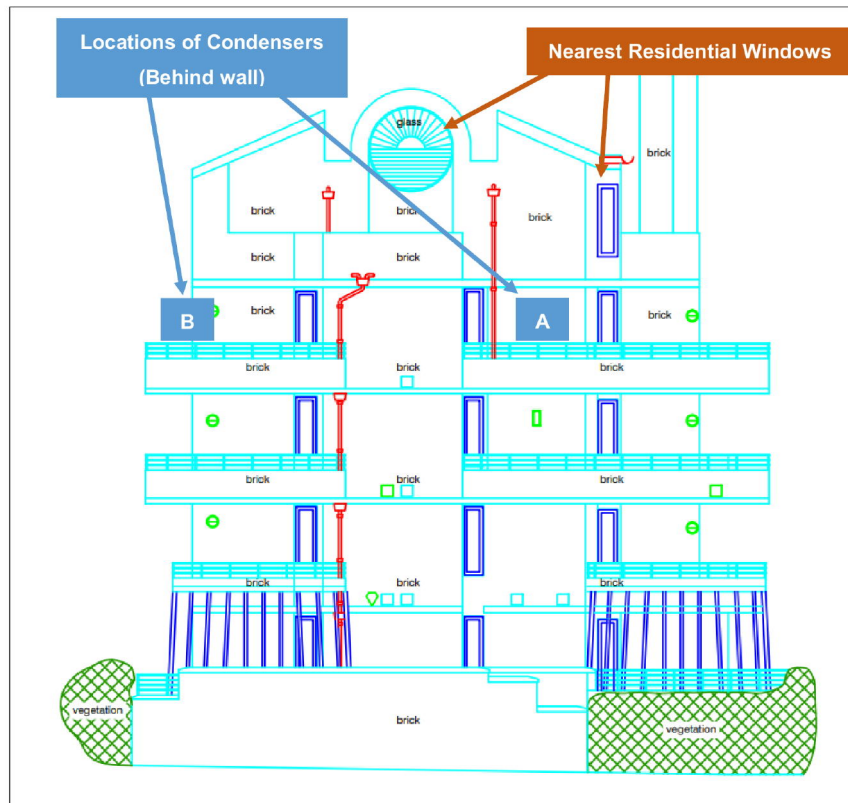
We understand the manufacturer's noise data for the equipment to be as follows:

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	
Condensers	53	58	53	49	45	41	34	28	51

10.2 Location of Plant

We understand it is currently proposed that 1No. condenser is located on the terrace outside the living/dining area and 1No. on the terrace outside the master bedroom.

These locations, along with the nearest residential receivers are shown on the plan overleaf.



Plan Showing Plant Location (Drawing © Interlocks Surveys Limited Ref. 180726 ELE)

10.3 Mitigation Measures

Plant noise emissions from the unit installed at position A will require mitigation due to the close proximity and more direct line of sight to the window of the penthouse above. We would recommend one of the following mitigation measures be implemented to control noise within Local Authority criterion.

10.3.1 Option 1 - Relocation of plant

We would recommend that both condensers are to be located at position B. In this position mitigation is provided to the penthouse windows as it is screened by the existing façade. The amount of screening is included in our plant noise assessment overleaf.



10.3.2 Option 2 - Acoustic Enclosure

We understand a relocation of plant may not be possible. In this case, we would recommend the condenser at position A is supplied inside an acoustic enclosure. A specification for this can be found attached to this report.

10.4 Plant Noise Impact Assessment

We understand that the proposed units will be operational during both daytime and night-time hours.

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

10.4.1 Option 1 – Relocation of Plant

This table summarises atmospheric noise emissions at the penthouse window with 2No. condensers located on the bedroom terrace.

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m	53	58	53	49	45	41	34	28	51
Correction for 2No.	+3	+3	+3	+3	+3	+3	+3	+3	
Distance Correction	-9	-9	-9	-9	-9	-9	-9	-9	
Barrier Correction	-9	-11	-13	-16	-19	-20	-20	-20	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	41	44	37	30	23	18	11	5	33

10.4.2 Option 2 – Acoustic Enclosure

In this option there will be 1No. condenser located on the bedroom terrace, the atmospheric noise would therefore be 3dB less onerous.

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Calculated Noise Level at Receptor	38	41	34	27	20	15	8	2	30



For this option the second condenser is to be located at plant position A, on the living/dining room terrace. The table below summarises our predictions of atmospheric noise at the nearest penthouse window.

	Sound Pressure Level (dB re 2×10^{-5} Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m With Acoustic Enclosure	43	48	43	39	35	31	24	18	41
Distance Correction	-6	-6	-6	-6	-6	-6	-6	-6	
Barrier Correction	-5	-5	-5	-5	-6	-7	-8	-10	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Calculated Noise Level at Receptor	35	40	35	31	26	21	13	5	33

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

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 requirements.

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 attenuation, should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive residential window.

Appendix A

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

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

8 SAVOY COURT
SPECIFICATION FOR
SMALL ACOUSTIC ENCLOSURE

The condenser unit in position A shall be supplied complete with acoustic treatment which shall achieve adequate levels of attenuation to ensure that the following limiting sound pressure levels are not exceeded when measured at a distance of 1m (free field over a reflecting plane) under any load conditions.

Duty/Time	A-weighted Limiting Sound Pressure Level @ 1m (dB re 2 x 10 ⁻⁵ Pa)
Day 07:00 – 23:00 hours	47
Night – 23:00 – 07:00 hours	41

Furthermore they shall not exhibit any significant tonal content.

Exceedances in excess of the measurement tolerance for a Type 1 sound level meter shall constitute a failure.

The enclosed outer panels shall be constructed from galvanized sheet steel having a minimum thickness of 1.6mm and fixed at 300mm (max) centres. The enclosure inner panels shall be constructed from punch-perforated (round-hole) galvanised sheet steel facing, having a minimum thickness of 0.7mm fixed at 300mm (max) centres. Flattened-expanded (“Expamet”) sheet shall not be used, unless all edges of the sheet are mechanically fixed to the panel casing and galvanised steel cover strips are used to prevent rivet heads pulling through the perforated sheet (trapping the Expamet between two solid steel layers).

The inert, rot and vermin proof, non-hygroscopic and non-combustible mineral wool or glass fibre acoustic medium shall be packed to a density of not less than 48kg/m³. This shall be faced with a glass fibre cloth, or other approved infill protection membrane. Panels shall be constructed and assembled so that no egress of the acoustic medium will occur under the operating conditions.

Doors, access panels, windows and ventilation ducts or electrical cable penetrations shall be treated so as to maintain the specified acoustic insulation of the assembled enclosure.

Demountable sections shall be designed to allow easy disassembly and reassembly by unskilled personnel without affecting the acoustic performance.

The supplier shall ensure that the assembled enclosure is designed and constructed to withstand site operating conditions such as wind and snow loads, roof mounted plant, etc., as appropriate, and if outside, to be 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.

SUITABLE SUPPLIERS
Of
ACOUSTIC ENCLOSURES

Name & Address	Telephone Number	Contact
Environ Technologies Ltd Regus House 1010 Cambourne Business Park Cambourne CB3 6DP	0870 383 3344	Steve Cox
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QuietStar Limited 1 Glen Road Fleet Hampshire GU51 3QS	01252 674327	Luke Willis

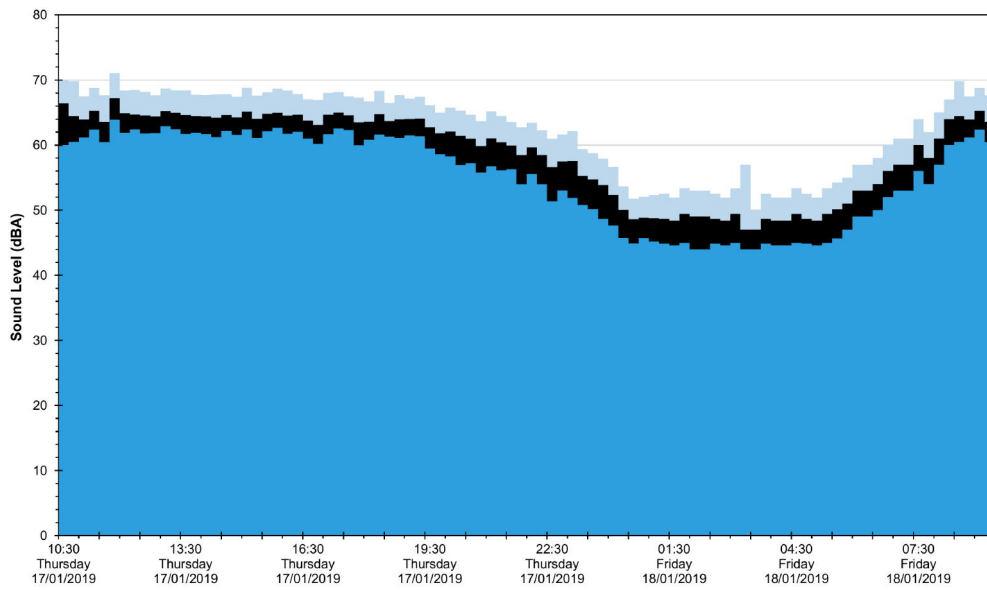
8 Savoy Court, Hampstead

Position 1

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

Thursday 17 January 2019 to Friday 18 January 2019

■ L_{max} ■ L_{eq}
■ L_{90}



Date and Time

26282/TH1