



57 LONDON ROAD,
COWPLAIN PO8

Plant Noise
Assessment

Reference: 9682.RP01.PNA.0
Prepared: 10 September 2019
Revision Number: 0

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	10 September 2019	Matt Wildman	Torben Andersen

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The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and again will need to be developed in to full working drawings by the lead designer to incorporate all other design disciplines.

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1.0 INTRODUCTION

It is proposed to locate new items of plant on the roof and external façade of 57 London Road, Cowplain. As part of the planning application, Havant Borough Council requires consideration be given to atmospheric noise emissions from the proposed equipment at the nearest noise-sensitive property.

RBA Acoustics have been commissioned to undertake attended measurements of the prevailing noise conditions at the site and to determine the atmospheric noise emissions in accordance with Havant Borough Council's requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 General

In accordance with the requirements of the Local Authority, monitoring of the prevailing background noise was undertaken over the following periods:

8:00 to 11:00 on 29 August 2019

During the survey periods the weather conditions were generally appropriate for the noise measurement exercise, it being dry with light winds.

Measurements were made of the L_{A90} and L_{Aeq} noise levels over sample periods of 10 minutes to represent noise levels in each hourly period. These were considered to be a good indicator of typical noise levels over the proposed plant operating hours.

2.2 Measurement Locations

Position 1

Measurements were undertaken at Position 1 with the microphone positioned 1 meter in front of the shop front. This measurement position was considered as being representative of the noise climate as experienced at the front windows of the closest residential receptor, above the shop. The prevailing noise climate was noted to be traffic noise from London Road passing in front of the shop.

Position 2

Measurements were undertaken at Position 2 with the microphone positioned approximately 5 meters away from the proposed plant location to the rear of the property. This measurement position was considered as being representative of the noise climate as experienced at the closest noise sensitive window to the fan unit. The prevailing noise climate was noted to be traffic noise and cars pulling into the car park to the rear.

The measurement positions are also illustrated on the site plan in Figure 1 in Appendix D.

2.3 Instrumentation

Details of the instrumentation used to undertake the survey are provided in Appendix B.

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

3.0 RESULTS

The measured L_{A90} and L_{Aeq} dB noise levels measured are summarised below.

Table 1 – Measured Levels

Measurement Period	Position 1		Position 2	
	L_{90} (dBA)	L_{eq} (dBA)	L_{90} (dBA)	L_{eq} (dBA)
8:00 – 9:00	58	70	40	49
9:00 – 10:00	57	69	42	50
10:00 – 11:00	58	69	43	49

4.0 CRITERIA

The requirements of Havant Borough Council Environmental Health Department regarding new building services plant are understood to be as follows.

"Any noise generated by new building services plant should be designed to a level of 5dB below typical background noise level measured 1m from the nearest affected noise sensitive façade"

It is understood that the proposed plant items will be in operation from 7:00 to 17:00 7 days a week.

In line with the above requirements, using the lowest measured $L_{A90, 10 \text{ min}}$ at positions 1 and 2, we would propose items of mechanical services be designed so that noise emissions from the plant do not exceed the following levels when assessed at the nearest noise sensitive locations:

- Position 1: 52 dB
- Position 2: 35 dB

In line with BS 4142: 2014, should the proposed plant be identified as having intermittent or tonal characteristics, a further penalty should be subtracted from any of the above proposed noise emission limits.

It should be noted that the above requirements are applied at the nearest residential adjacencies and alternative criteria should be incorporated if there are also commercial properties affected by the proposed plant installations

5.0 ASSESSMENT

Our assessment has been based upon the following information:

5.1 Proposed Plant Items

Table 2 – Plant Information

Manufacturer/Model/Duty	Plant Type
Helios GBD450 /4	Kitchen Extract Fan
FlaktWoods WSE 450	Splitter Silencer

5.2 Position of Units

It is understood the fan and silencer will be located on the external façade of the northern face of the building, leading up to the discharge located on the roof. The equipment positions are indicated on the site plan in Figure 1 and photographs in Appendix D.

5.3 Noise Levels

Information regarding the noise levels of the proposed Kitchen Extract Fan has been provided by Helios. The associated plant noise levels are detailed as follows:

Table 3 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)						
		125	250	500	1k	2k	4k	8k
Helios GBD 450 /4	Case Breakout	72	65	54	47	43	38	32
	Discharge	76	78	74	67	64	61	56

Review of the octave band data provides no indication of any tonal characteristics associated with the proposed plant.

Based on data available for a similar model of silencer, predicted noise levels were calculated using the attenuation data as follows:

Table 4 – Silencer Attenuation

Unit	Attenuation (dB) at Octave Band Centre Frequency (Hz)						
	63	125	500	1k	2k	4k	8k
FlaktWoods WS 600	2	5	8	12	15	15	11

5.4 Location of Nearest Habitable Residential Windows

The closest residential windows to the proposed plant location are advised as being bathroom windows. Due to the nature of a bathroom's occasional use, calculations based on these receptors have been excluded.

Receptor 1

The closest habitable residential window to the plant will be on the adjacent face of the building approximately 4m to the right of the fan unit and 4m from the discharge located on the roof. This window is advised as being a kitchen or dining room window of the flat.

Receptor 2

The residential windows on the front face of the building are advised as being the bedroom windows and therefore the most acoustically sensitive area of the flat. The window will be approximately 9m from the proposed fan unit location and 9m from the extract located on the roof. Screening provided by a section of the building itself and the roof as well as the dominance of traffic noise from London Road will result in considerable attenuation of the plant noise at this receptor.

5.5 Calculation of Noise Levels at Nearest Residential Window

Our calculation method for predicting noise levels from the proposed plant at the nearest residential windows, based on the information stated above, is summarised below.

- Source Term SPL / SWL
- 20LogR Distance Attenuation
- Directivity
- Reflections

Calculation sheets are attached for further information in Appendix C.

The results of the calculations indicate the following noise levels at the nearest affected residential windows:

Table 5 – Predicted Noise Levels

Operating Period	Receptor 1		Receptor 2	
	Prediction	Criterion	Prediction	Criterion
Daytime (07:00 – 19:00)	28 dB	35 dB	22 dB	52dB

Predicted noise levels from the proposed unit are below the criteria for maximum plant noise levels at the nearest sensitive receptors, therefore it can be assumed that no mitigation is necessary.

6.0 VIBRATION CONTROL

In addition to the control of airborne noise transfer, it is also important to consider the transfer of noise as vibration to adjacent properties (as well as to any sensitive areas of the same building).

We would typically advise that condensing units and AHUs be isolated from the supporting structure by means of either steel spring isolators or rubber footings. For particularly sensitive locations, or when on lightweight structures the mounts should ideally be caged and be of the restrained type.

It is important the isolation is not "short-circuited" by associated pipework or conduits. To this end, any conduits should be looped and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

7.0 CONCLUSION

Measurements of the existing background noise levels at 57 London Road, Cowplain have been undertaken. The results of the measurements have been used in order to determine the required criteria for atmospheric noise emissions from the future plant installations.

The results of the assessment indicate atmospheric noise emissions from the plant are within the criteria required by Havant Borough Council. As such, the proposed plant installations should be considered acceptable.

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g. L_{A10} , L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B - Instrumentation

The following equipment was used for the measurements

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1406255	U31223	12 March 2021
Norsonic Pre Amplifier	1209	20491		
Norsonic ½" Microphone	1225	225529	31222	12 March 2021
Norsonic Sound Calibrator	1251	34391	U31221	12 March 2021

Appendix C – Plant calculations

A summary of the noise levels at each receiver from the proposed plant item is provided below, both with and without mitigation measures applied.

Received Levels at Receptor 1

Unit	Noise Source	Lp @ 1m (dBA)	Distance Loss & Screening (dB)	Received Level (dBA)	Total Received Level (dBA)
Helios GBD450 /4	Case Breakout	52	24	25	28
	Discharge	65	40	25	

Received Levels at Receptor 2

Unit	Noise Source	Lp @ 1m (dBA)	Distance Loss & Screening (dB)	Received Level (dBA)	Total Received Level (dBA)
Helios GBD450 /4	Case Breakout	52	33	19	22
	Discharge	65	46	19	

Appendix D – Site Plan and Photographs

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Measurement Position 2



57 London Road, Cowplain P08
Site Plan
Project 9682

Figure 1
10 September 2019
Not to Scale





Proposed Discharge Location

Receptor 1

Proposed Fan Location



57 London Road, Cowplain PO8
Proposed fan location and Receptor 1
Project 9662
10 September 2019



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Receptor 2

57 London Road, Cowplain PO8
Front of Shop and Receptor 2
Project 9682
10 September 2019



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