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3 FIRECREST DRIVE, LONDON

NOISE IMPACT ASSESSMENT

Report **8421-NIA-01**

Prepared on 21 August 2013

Issued For:

Shakib & Co
Ground Floor
Ginsburg Yard
Back Lane
London
NW3 1EW

committed to CSCS Platinum award

ISO 17025

ISO 9001

Institute of Acoustics sponsoring organisation

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1.0 INTRODUCTION

Clement Acoustics has been commissioned by Shakib & Co, Ground Floor, Ginsburg Yard, Back Lane, London NW3 1EW to measure existing background noise levels at 3 Firecrest Drive, London NW3 7ND. The measured noise levels will be used to determine noise emission criteria for the proposed plant units in agreement with the planning requirements of the London Borough of Camden.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 Procedure

Measurements were undertaken at the position shown in indicative site plan 8421-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receivers.

Continuous automated monitoring was undertaken for the duration of the survey between 14:30 on 6 August and 15:30 on 7 August 2013. Weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

Background noise levels at the monitoring position consisted of traffic noise from surrounding roads.

The measurement procedure generally complied with BS7445:1991. *Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*.

2.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

3.0 RESULTS

The $L_{Aeq:\ 5min}$, $L_{Amax:\ 5min}$, $L_{A10:\ 5min}$ and $L_{A90:\ 5min}$ acoustic parameters were measured at the location shown in site plan 8421-SP1. The measured noise levels are shown as a time history in Figure 8421-TH1.

Minimum background noise levels are shown in Table 3.1.

	Minimum background noise level $L_{A90:\ 5min}$ dB(A)
Daytime (07:00 - 23:00)	34
Night-time (23:00 - 07:00)	31

Table 3.1: Minimum background noise levels

4.0 NOISE CRITERIA

The London Borough of Camden's general criterion for noise emissions of new plant installations is as follows:

> *"Design measures should be taken to ensure that specific plant noise levels at a point 1 metre external to sensitive façades are at least 5dB(A) less than the existing background measurement (L_{A90}) when the equipment is in operation. Where it is anticipated that equipment will have a noise that has distinguishable, discrete continuous note[...], special attention should be given to reducing the noise at any sensitive façade by at least 10dB(A) below the L_{A90} level."*

We therefore propose to set the noise criteria as shown in Table 4.1 in order to comply with the above requirements. In order to provide a more robust assessment, the criterion of 10dB below background will be used in this assessment.

	Daytime (07:00 to 23:00)	Night-time (23:00 to 07:00)
Noise criterion at nearest residential receiver (10 dB below minimum L_{A90})	24 dB(A)	21 dB(A)

Table 4.1: Proposed Noise Emissions Criteria

Since the proposed plant unit is for residential use and could potentially be used at any time, the night time criterion of 21dB(A) will be used in this assessment.

5.0 DISCUSSION

The plant installation is comprised of the following units:

- 1 No. Mitsubishi Condenser Unit type: MXZ-4D72VA
- 1 No. Mitsubishi Condenser Unit type: MXZ-4D83VA

The associated spectral noise emissions levels, as provided by the manufacturer, are shown in Table 5.1. Loudest modes of operation have been used in order to present a robust assessment.

	Sound Pressure Level (dB) in each Frequency Band at 1m							
Unit	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Mitsubishi Condenser Unit type: MXZ-4D72VA	59	57	55	51	48	43	36	29
Mitsubishi Condenser Unit type: MXZ-4D83VA	49	55	49	50	44	40	40	28

Table 5.1 Manufacturer's Sound Pressure Levels at 1m

The proposed plant unit will be installed on the rear facade wall of 3 Firecrest Drive as shown in indicative site plan 8421-SP1.

The closest noise sensitive window likely to be affected by noise emissions from the proposed plant unit is the adjacent residential property, approximately 10 metres away.

In order to meet the set noise emissions criterion by the London Borough of Camden, we would recommend applying certain mitigation measures to the installed unit as detailed below.

5.1 Proposed Mitigation Measures

We would propose the use of an acoustic enclosure around the unit, with ventilation to the unit provided by a louvered panel. As the weakest part of the enclosure, the louvred panel would need to meet specified attenuation levels, as shown in Table 5.2.

	Required Attenuation (dB) in each Frequency Band							
Mitigation	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Enclosure Louvred Panel	12	10	12	13	16	19	20	18

Table 5.2 Spectral attenuation required by proposed enclosure

5.2 Noise Impact Assessment

Taking all necessary acoustic corrections into consideration, including the above mitigation measures, noise levels expected at the closest residential window would be as shown in Table 5.3. Detailed calculations are shown in Appendix B.

Receiver	24 Hour Criterion	Noise Level at Receiver (due to proposed plant unit)
Nearest Noise Sensitive Receiver	21 dB(A)	21 dB(A)

Table 5.3: Noise levels and criteria at nearest noise sensitive receiver

As shown in Appendix B and Table 5.3, transmission of noise to the nearest sensitive window due to the effects of the proposed plant installation would be expected to meet the noise emissions criteria set by the London Borough of Camden, provided the specified mitigation measures are adopted.

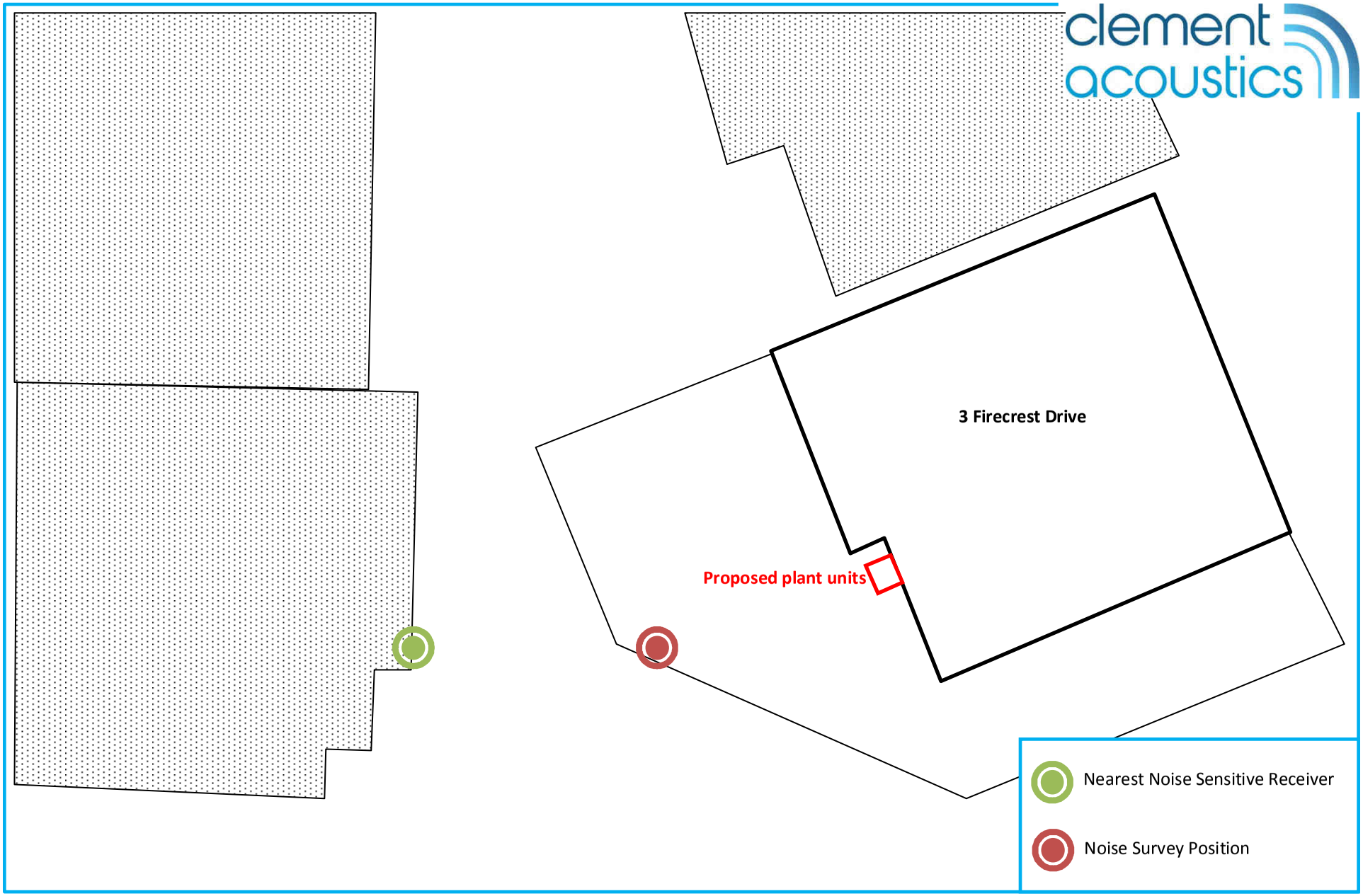
6.0 CONCLUSION

An environmental noise survey has been undertaken at 3 Firecrest Drive, London NW3 7ND. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant installation in accordance with the requirements of the London Borough of Camden.

A noise impact assessment has then been undertaken using manufacturer noise data to predict noise levels due to the current proposal at nearby noise sensitive receivers.

Calculations show that noise emissions from the proposed plant unit would meet the requirements of the London Borough of Camden, provided the specified mitigation measures are adopted.

Report by	Checked by
Max Foster TechIOA	**Duncan Martin MIOA**



8421-SP1 Indicative site plan showing noise monitoring position and nearest noise sensitive receiver **Date:** 02 September 2013

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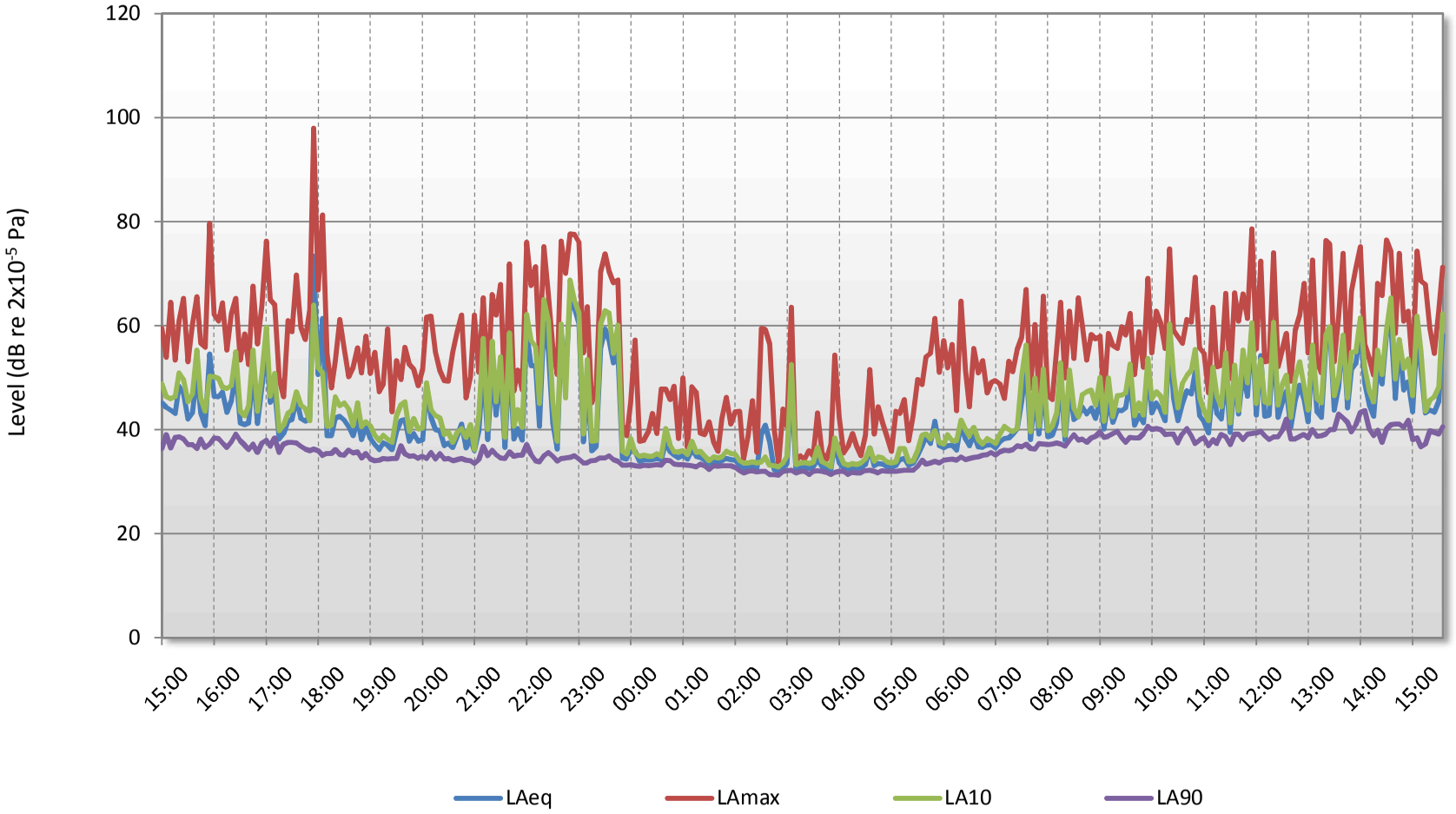
Environmental Noise Time History
6 August to 7 August 2013



8421-TH1

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B

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3 FIRECREST DRIVE, LONDON

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Receiver: Nearest Residential Receiver
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Manufacturer provided sound pressure level at 1m									
Mitsubishi Condenser Unit type: MXZ-4D72VA	59	57	55	51	48	43	36	29	53
Mitsubishi Condenser Unit type: MXZ-4D83VA	49	55	49	50	44	40	40	28	51
Cumulative level from both plant units at 1m	**59**	**59**	**56**	**54**	**50**	**45**	**42**	**32**	**55**
Attenuation required by acoustic enclosure, dB	-12	-10	-12	-13	-16	-19	-20	-18	
Distance correction to receiver, dB (10m)	-20	-20	-20	-20	-20	-20	-20	-20	
Sound pressure level at nearest noise sensitive receiver window	**27**	**29**	**24**	**21**	**14**	**6**	**2**	**0**	**21**

Design Criterion	**21**