

**LE CREUSET,
31 HEATH STREET, LONDON**

NOISE IMPACT ASSESSMENT

Report **11788-NIA-01**

Prepared on 28 November 2016

Issued For:

Le Creuset UK

Accounts Department

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11788-SP1	Indicative Site Plan
11788-TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	Acoustic Calculations

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Le Creuset UK to measure existing background noise levels at 31 Heath Street, London. The measured noise levels have been used to determine noise emission criteria for a proposed plant installation 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 SITE DESCRIPTION

Current proposals are to install a condenser on the flat roof at the rear of the property to service the ground floor retail unit. Proposed operating hours for the retail unit are as follows:

- Monday – Saturday: 10:00 to 18:00
- Sunday: 12:00 to 18:00

The nearest affected residential receiver is a minimum distance of 5m away. Locations are shown in attached site plan 11788-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Procedure

Measurements were undertaken at one position as shown on indicative site drawing 11788-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the site.

Continuous automated monitoring was undertaken for the duration of the survey between 15 November 2016 at 15:00 and 16 November 2016 at 16:00.

Weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

Background noise levels at the monitoring positions consisted of traffic and existing plant during installation and collection of equipment.

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

3.2 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

4.0 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 drawing 11788-SP1.

The measured noise levels are shown as a time history in Figure 11788-TH1, with ambient and background noise levels summarised in Table 4.1.

	Average ambient noise level $L_{Aeq: 5min}$ dB(A)	Minimum background noise level $L_{A90: 5min}$ dB(A)
Daytime (07:00 - 23:00)	52	42
Night-time (23:00 - 07:00)	43	34
Proposed Operating Hours	53	45

Table 4.1: Minimum background noise levels

5.0 NOISE CRITERIA

The *London Borough of Camden* criteria for noise emissions are as follows:

"The 'A' weighted sound pressure level from the plant, when operating at its noisiest, shall not at any time exceed a value of 10dB below the minimum external background noise, at a point 1 metre outside any window of any residential property."

It is understood that the proposed plant will be servicing a retail unit during the following operating hours:

- Monday – Saturday: 10:00 to 18:00
- Sunday: 12:00 to 18:00

We therefore propose to set the noise criteria at **35 dB(A)**, the value 10dB below the minimum measured background noise level during the operating hours.

6.0 DISCUSSION

6.1 Proposed Installation

The proposed plant installation comprises the following:

- Toshiba RAV-SP1104AT-E condenser unit

Noise emissions for the proposed plant units, as provided by the manufacturer, are shown in Table 6.1. Loudest modes of operation have been used in order to present a robust worst case assessment.

Unit	Sound Pressure Levels (at 1m, dB) in each Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Toshiba RAV-SP1104AT-E	51	53	49	48	45	40	34	26

Table 6.1: Manufacturer Noise Emissions Levels

The proposed plant location is on the first floor roof at the rear of the building which is shown on indicative site plan 11788-SP1.

The closest residential receiver has been identified as the window on the facade overlooking the flat roof, which is a minimum of 5m from the proposed plant location.

6.2 Proposed Mitigation Measures

In order to meet the proposed criteria stated in Section 5.0, it is recommended that an enclosure is installed around the plant. The enclosure should provide sufficient attenuation to achieve a maximum sound pressure level of 49 dB(A) when measured at 1m in all directions.

Based on the information provided, an enclosure meeting the sound reduction indices as stated in Table 6.2 should be suitable to achieve this.

Mitigation	Required Attenuation (dB) in each Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Louvred Enclosure	0	1	2	3	5	10	8	5

Table 6.2: Required Attenuation from Mitigation

6.3 Noise Impact Assessment

Taking into account all necessary acoustic corrections, the resulting noise level at the identified residential windows would be as shown in Table 6.3. Detailed calculations are shown in Appendix B.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to proposed plant)
Nearest Residential Property	35 dB(A)	35 dB(A)

Table 6.3: Noise levels and criteria at noise sensitive receivers

As presented in Table 6.3 and Appendix B, the proposed plant installation with acoustic enclosure would be expected to meet the requirements of the proposed criteria.

6.4 British Standard Requirements

Further calculations have been undertaken to assess whether the noise emissions from the proposed plant unit would be expected to meet recognised British Standard recommendations, in order to further ensure the amenity of nearby noise sensitive receivers.

British Standard 8233:2014 '*Sound insulation and noise reduction for buildings*' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS8233:2014 recommends 30dB(A) as being acceptable internal resting/sleeping conditions during night-time.

With loudest external levels of 35 dB(A), the window itself would need to provide 5 dB attenuation in order for acceptable conditions to be met. According to BS8233:2014, a typical facade with partially open window offers 15 dB attenuation.

It can therefore be predicted that, in addition to meeting the requirements of the set criteria, the emissions from the proposed plant would be expected to meet the most stringent recommendations of the relevant British Standard, with neighbouring windows partially open. Predicted levels are shown in Table 6.4.

Receiver	Design Range – <i>For resting/sleeping conditions in a bedroom, in BS8233:2014</i>	Noise Level at Receiver (due to plant installation)
Inside Residential Window	30 dB(A)	20 dB(A)

Table 6.4: Noise levels and criteria inside nearest residential space

7.0 CONCLUSION

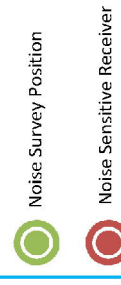
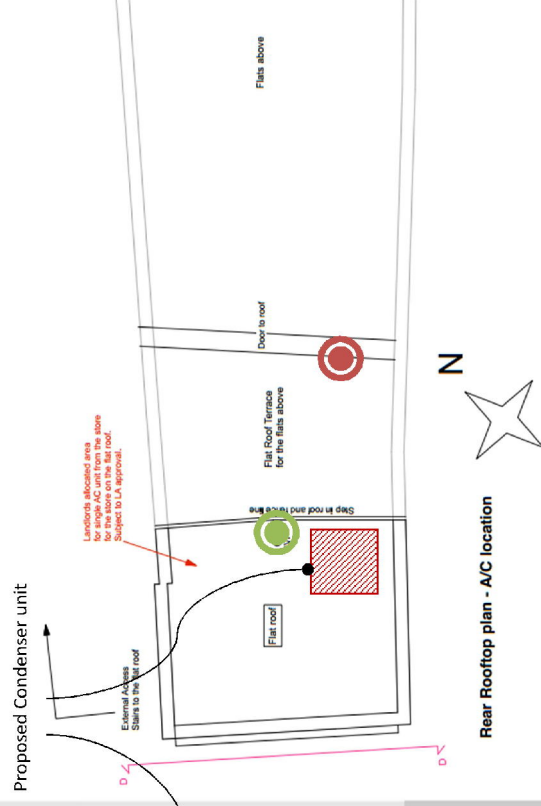
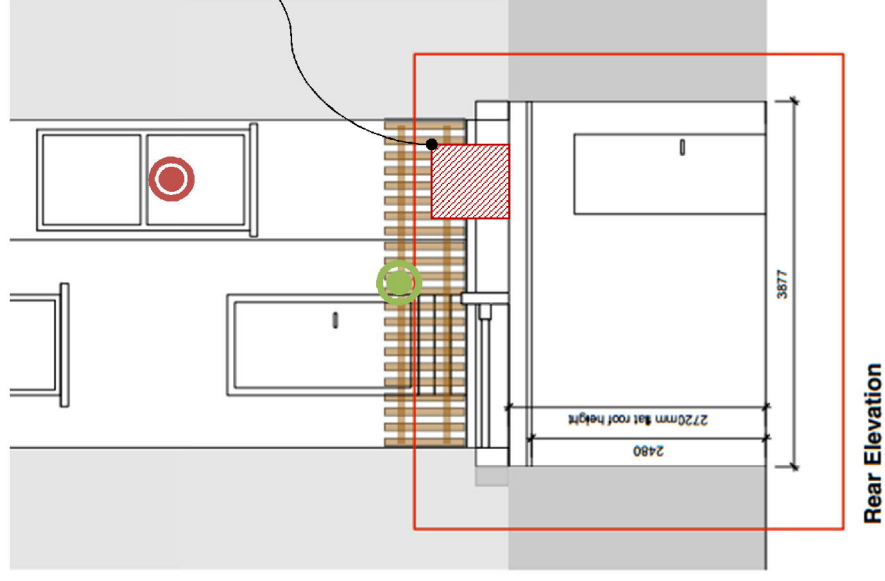
An environmental noise survey has been undertaken at Le Creuset, 31 Heath Street, London. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant units in accordance with the requirements of the London Borough of Camden.

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

Calculations show that noise emissions from the proposed plant units should meet the requirements of the London Borough of Camden with the recommended mitigation installed as stated herein.

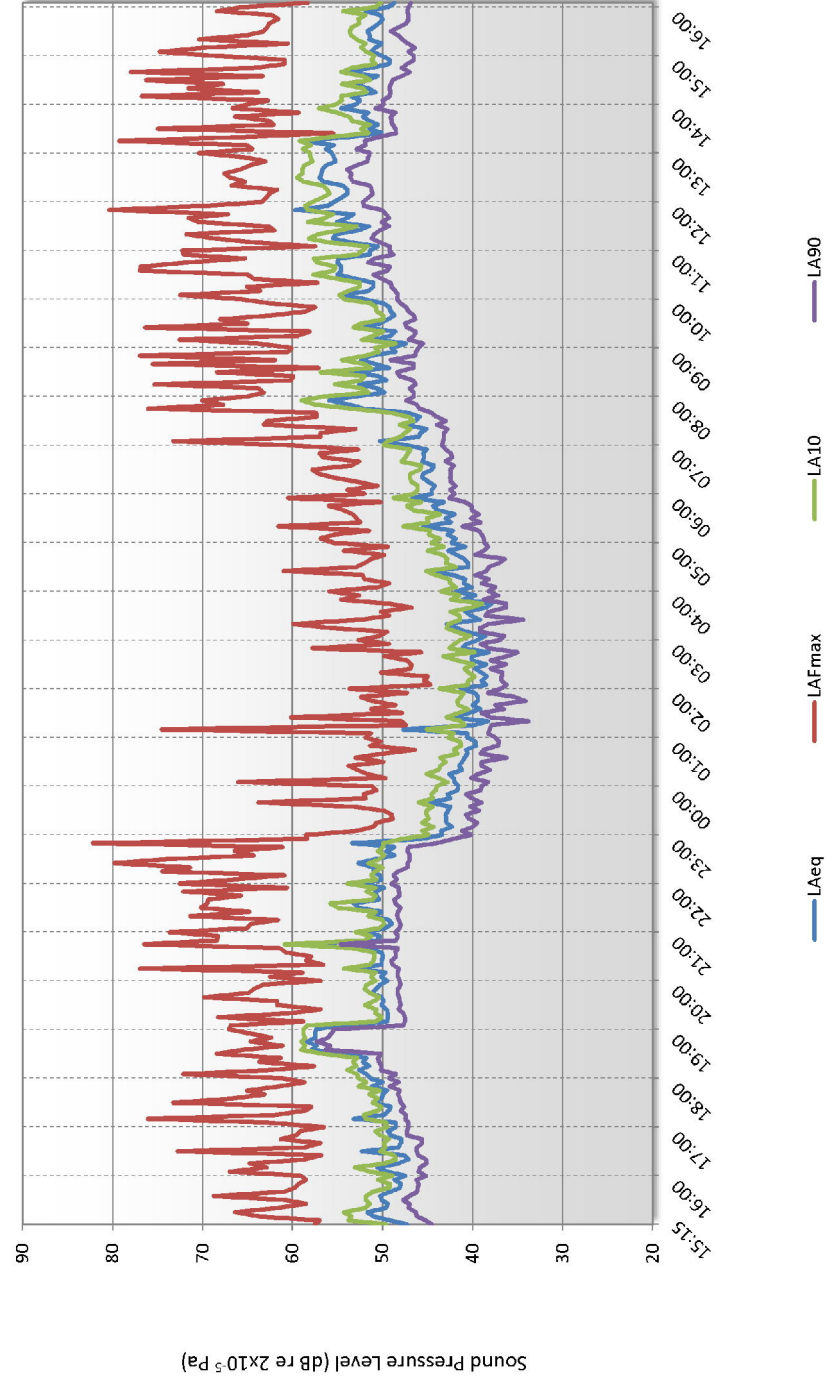
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Le Creuset, 31 Heath Street, London

Environmental Noise Time History
15 November to 16 November 2016



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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Le Creuset, 31 Heath Street, 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 1 metre Toshiba RAV-SP1104AT-E	51	53	49	48	45	40	34	26	50
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (5m)	-14	-14	-14	-14	-14	-14	-14	-14	
Proposed louvred enclosure	0	-1	-2	-3	-5	-10	-8	-5	
Sound pressure level at receiver	40	41	36	34	29	19	15	10	35

Design Criterion 35

BS 8233 ASSESSMENT CALCULATION

Receiver: Inside Nearest Residential Window

Source: Proposed plant installation

	Frequency, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Sound pressure level outside window	40	41	36	34	29	19	15	10	35
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	25	26	21	19	14	4	0	-5	20

Design Criterion 35