1 Birkenhead Street

Environmental Noise Survey and Plant Noise Assessment Report

23852/PNA1 Rev1

29 March 2017

For:
Lonprop Establishment
c/o Fresson & Tee
1 Sandwich Street
London
WC1H 9PF

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Hann Tucker Associates

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Document Control

Rev	Date	Comment	Prepared by	Authorised by
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1	29/03/2017	Change of plant		
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Attachments

1.0 Introduction

It has been proposed install new building services plant at 1 Birkenhead Street.

Hann Tucker Associates have therefore been commissioned to undertake a detailed 24 hour fully automated environmental noise survey of the site to establish the currently prevailing noise climate and propose plant noise emission criteria, based on the results of the survey and the requirements of the Local Authority.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window.

This report presents the survey methodology and findings.

2.0 Objectives

To establish, by means of detailed 24 hour daytime and night-time fully automated environmental noise monitoring, the existing A-weighted (dBA) L_{90}, L_{eq} and L_{max} environmental noise levels at a selected accessible position, thought to be representative of the nearest affected property.

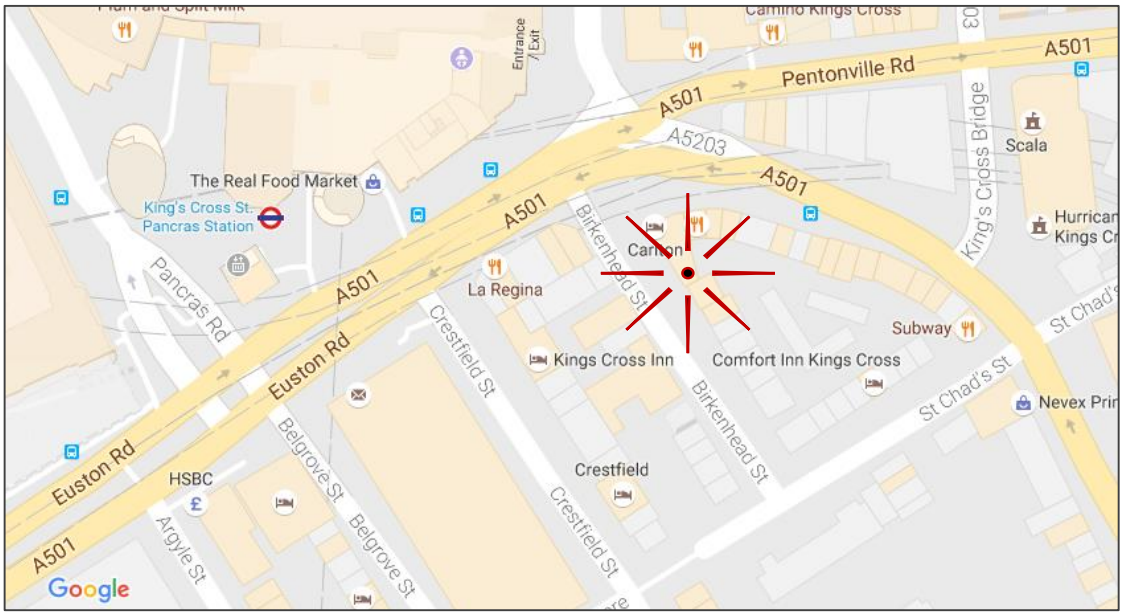
Based on the results of the noise survey, and with reference to the requirements of the Local Authority, to recommend suitable plant noise emission criteria.

To assess the proposed plant and comment on its acceptability.

3.0 Site Description

3.1 Location

The site is located at 1 Birkenhead Street and falls within London Borough of Camden's jurisdiction. See Location Map below.



Location Map (Google Maps)

3.2 Description

The property is a ground plus three storey building overlooking Birkenhead Street to the west. Adjacent to the north is Carlton Hotel. To the east is The Mews, 1a Birkenhead Street which comprises commercial property. Adjacent to the south is 3 Birkenhead Street which is a residential property. The area is predominantly residential dwellings of similar height. Subjectively, the main noise source was from vehicles on surrounding roads and nearby building services plant. The nearest noise sensitive window is the neighbouring property at 3 Birkenhead Street.

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Methodology

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 12:00 hours on Wednesday 23 November 2016 to approximately 14:00 hours on Thursday 24 November 2016.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the wind conditions were moderate. The sky was generally patchy cloud. 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.

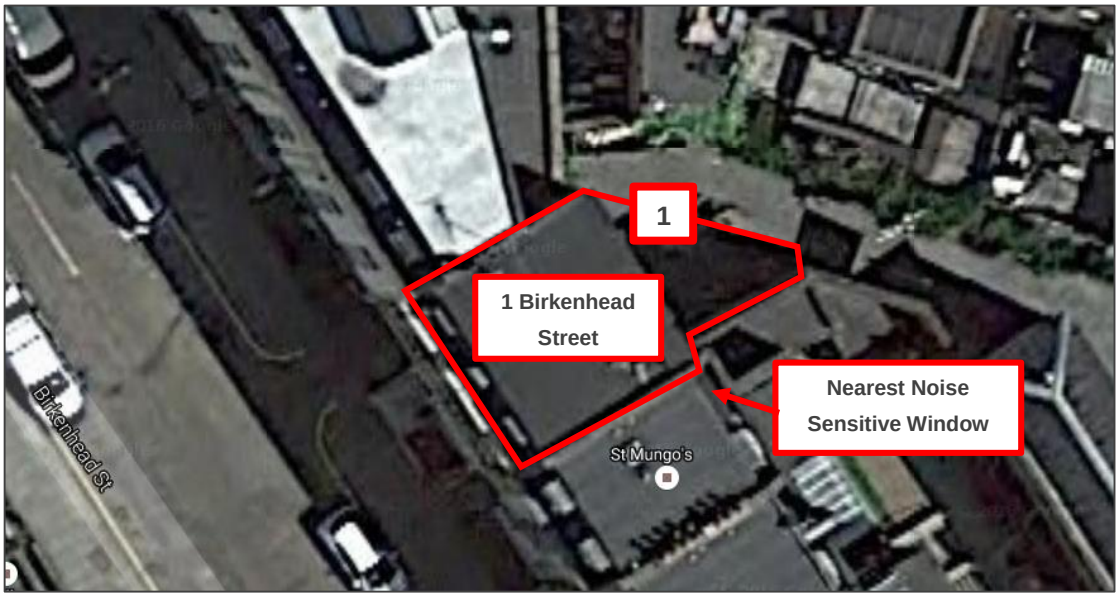
Measurements were taken continuously of the A-weighted (dBA) L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Position

The noise level measurements were undertaken at a single position at the development site. The measurement position is described in the table below.

Position No	Description
1	The sound level meter was located to the east in the rear courtyard. The microphone was attached to a pole approximately 2m above ground level and approximately 1m from a reflecting wall.

The position was selected in order to assess the lowest noise level at the development site for subsequent use in setting plant noise emission criteria and is shown on the plan below.



Sound Level Meter Location (Google)

5.3 Instrumentation

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

Position	Description	Manufacturer	Type	Serial Number	Latest Verification
1	Type 1 Data Logging Sound Level Meter	Larson Davis	824	3839	HT calibration on 13/07/2016
	Type 1 ½" Condenser Microphone	PCB	377B02	LW135744	HT calibration on 13/07/2016
-	Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 09/06/2016

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 environmental case with the microphone connected to the sound level meter via extension cable. The microphone was fitted with a windshield.

6.0 Results

The results have been plotted on Time History Graph 23852/TH1.01 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 following table presents the lowest L_{A90} from the survey period.

Position	Lowest Measured L_{A90} (dB re 2 x 10^{-5} Pa)		
	Daytime (07:00 – 23:00)	Night-Time (23:00 – 07:00)	24 Hours
1	49dBA	44dBA	44dBA

7.0 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise sources were noted to be from vehicles on surrounding roads and nearby building services plant.

8.0 Plant Noise Emission Criteria

1 Birkenhead Street falls within the London Borough of Camden. We understand the London Borough of Camden's advice relating to noise emissions from air conditioning plant is as follows:

"Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (L_{A90}), expressed in dB(A) when all plant/equipment are in operation. Where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10dB(A) below the L_{A90}, expressed in dB(A)".

In order to meet the above advice, noise emissions from the proposed plant should not exceed a level of 5dB below the lowest measured $L_{A90(15min)}$. Therefore, based on the results of the noise survey and the advice above, we recommend the following plant noise emission levels to be achieved with all plant running simultaneously at 1m external to the nearest noise sensitive façade.

Position	Plant Noise Emission Criteria (dBA re:$2x10^{-5}$Pa)		
	Daytime (07:00 – 23:00 hours)	Night Time (23:00 – 07:00 hours)	24 Hours
1	44 dBA	39 dBA	39 dBA

It should be noted that the above criteria are subject to final approval by the London Borough of Camden.

9.0 Plant Noise Assessment

We understand that the following item of plant are to be installed on the 4th floor roof.

Plant Description	Location	Qty	Plant Make	Model Number
Condensers	4th Floor Roof	5	Mitsubishi Electric	MXZ-4D72VA

9.1 Plant Noise Emissions

We understand the manufacturer's noise data for the equipment measured at 1m is as follows:

Plant Model Number	Sound Pressure Level (dB re 2 x10^{-5} W) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
MXZ-4D72VA	66	54	53	52	47	42	36	30	53

9.2 Location of Plant

We understand it is proposed to install the condensers on the 4th floor roof of the property. The nearest noise sensitive window is the 2nd floor window of 3 Birkenhead Street approximately 6m away. This window is screened from the proposed roof pant by the building edge.

9.3 Mitigation Measures

In order to control plant noise emissions in line with the proposed criterion, we recommend installing a screen as per our Acoustic Specification for Acoustic Screen (Appendix B).

9.4 Plant Noise Impact Assessment

The following tables present our calculations relating to the proposed plant installation.

	Sound Pressure Level at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
AC Condenser	66	54	53	52	47	42	36	30	53
5 No. Off	+7	+7	+7	+7	+7	+7	+7	+7	
Cumulative Noise Level	**73**	**61**	**60**	**59**	**54**	**49**	**43**	**37**	**60**
Distance Loss at 6m	-10	-10	-10	-10	-10	-10	-10	-10	
Barrier Loss	-8	-10	-12	-15	-18	-20	-20	-20	
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	
Resultant Noise Level at Window	**58**	**44**	**41**	**37**	**29**	**22**	**16**	**10**	**39**

We understand that the proposed unit will be operational during daytime and night-time hours. 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 8.0.

10.0 Conclusions

A detailed 24 hour daytime and night-time fully automated 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 recommended based on the results of the noise survey and with reference to 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 indicate that the proposed plant, in conjunction with the propose mitigation measures, should be capable of achieving the requirements of the Local Authority.

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. 30dB + 30dB = 33dB, 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 chpange of 3dBA is just perceptible.

$L_{90,T}$ — 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.

Sound Pressure Level L_p (Sound Level) - 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 L_w - 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).

Appendix B

ACOUSTIC SPECIFICATION FOR

ACOUSTIC SCREEN

Acoustic screening shall extend:

- continuously around all sides of the plant area.
- from the roof up to a minimum height equal to the highest part of the plant
- no more than 1m from the plant

The screen shall be imperforate (solid) and have a minimum mass per unit area of at least 10kg/m^2. This could be achieved using 1.3mm galvanised steel sheet or two or more layers of a wide range of materials including, for example, plywood or equivalent sheeting board to a suitable thickness required to achieve the mass per unit area. All junctions should be staggered.

Doors, access panels and service penetrations shall be treated so as to maintain the acoustic performance of the assembled screen.

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

The complete structure shall be wind and weather resistant to standards agreed with the Client.

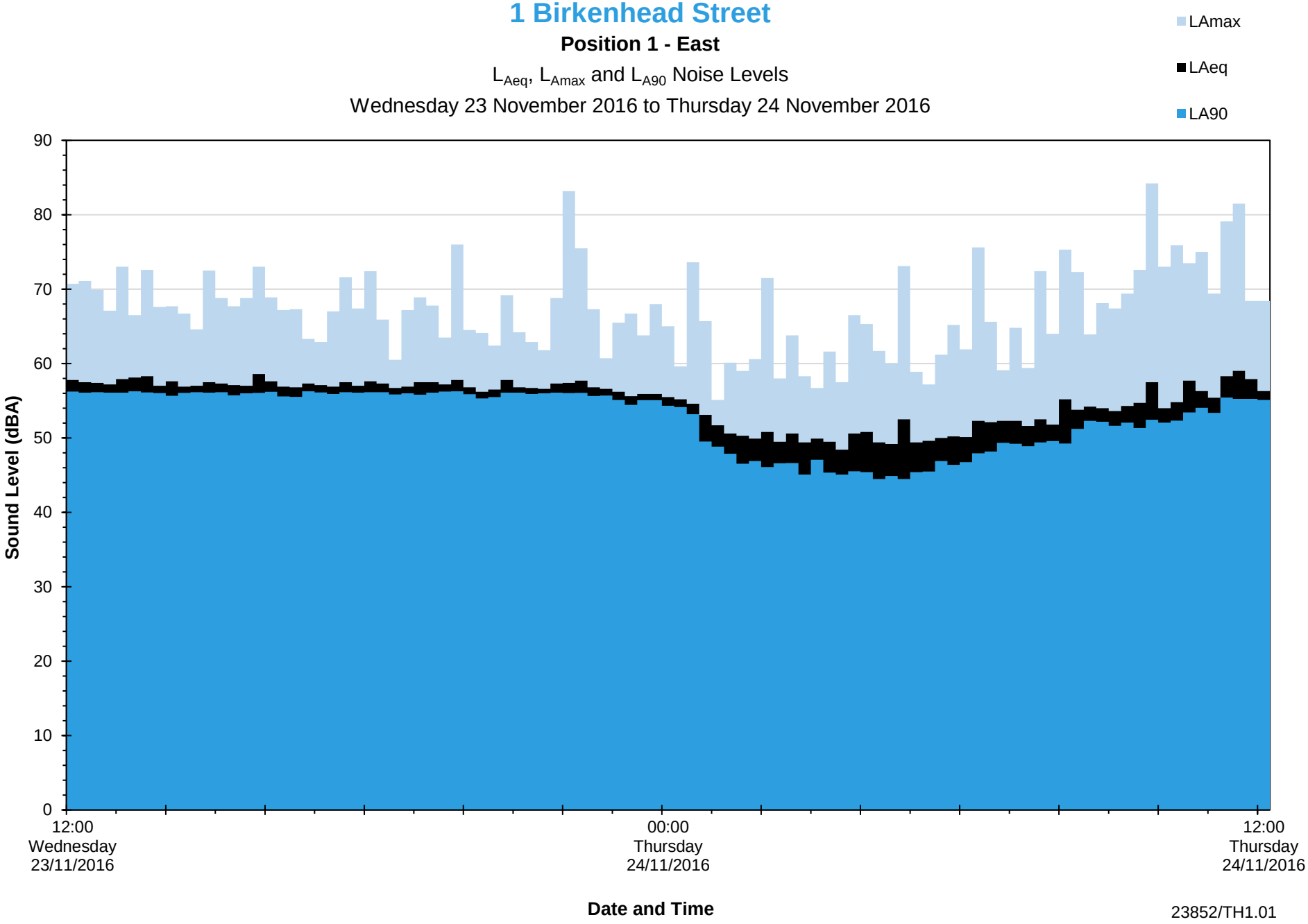
The exact design of the screen will be agreed with and approved by Hann Tucker Associates.

1 Birkenhead Street

Position 1 - East

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

Wednesday 23 November 2016 to Thursday 24 November 2016



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