

# **Brasserie Blanc 8 Charlotte Street**

## **ENVIRONMENTAL NOISE SURVEY & PLANT NOISE ASSESSMENT REPORT 18334/PNA3**

For:

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17 October 2012

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# REPORT 18334/PNA3

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## APPENDIX A

This report has been prepared by Hann Tucker Associates Limited (HTA) with all reasonable skill, care and diligence in accordance with generally accepted acoustic consultancy principles and the purposes and terms agreed between HTA and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by HTA unless expressly stated otherwise. This document contains confidential and commercially sensitive information and shall not be disclosed to third parties. Any third party relies upon this document at their own risk.

## 1.0 INTRODUCTION

New items of building services plant have been installed at Brasserie Blanc, Charlotte Street. The site lies within the London Borough of Camden and is surrounded by commercial and residential properties.

Hann Tucker Associates have therefore been commissioned to undertake a detailed environmental noise survey and propose suitable plant noise emission criteria based on the results of the survey and the requirements of the Local Authority.

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)  $L_{10}$ ,  $L_{90}$ ,  $L_{eq}$  and  $L_{max}$  environmental noise levels at a selected accessible position at the site before the plant was installed, thought to be representative of the nearest affected property.

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

To measure noise emissions from the installed plant.

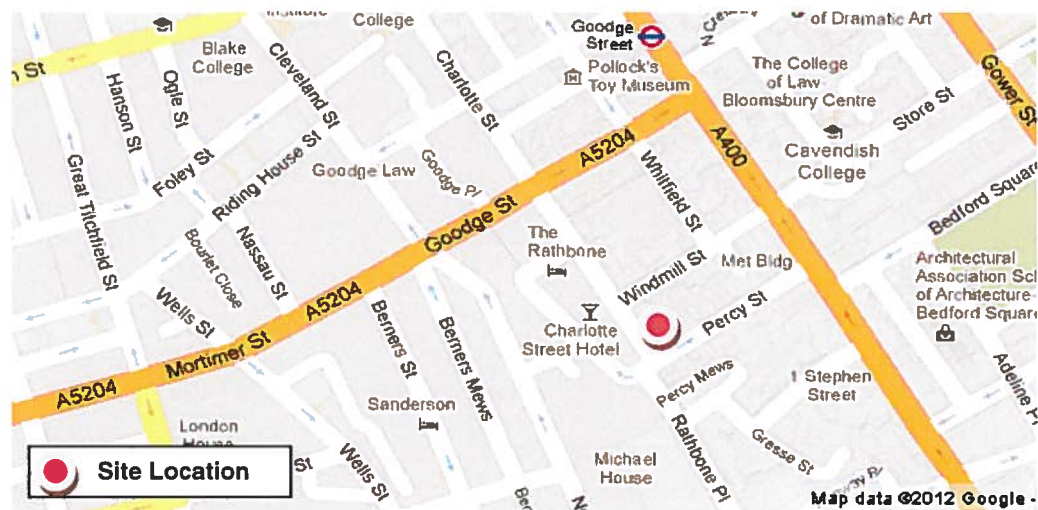
To assess the installed plant and comment on its acceptability.

These objectives are as set out in our letter dated 26 September 2012 and written instructions received.

## 3.0 SITE DESCRIPTION

### 3.1 Location

The site is located at 8 Charlotte Street and falls within the London Borough of Camden's jurisdiction. See Location Map below.



Location Map (maps.google.co.uk)

### 3.2 Description

The site comprises a terraced property bound to the West by Charlotte Street. Various commercial and residential properties adjoin the site in all other directions. See Site Plan below.



Site Plan (maps.google.co.uk)

## 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 Unmanned Survey

#### 5.1.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 10:15 hours on 20 June 2012 to 10:15 hours on 21 June 2012.

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 calm. The sky was generally clear. 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)  $L_{10}$ ,  $L_{90}$ ,  $L_{eq}$  and  $L_{max}$  sound pressure levels over 15 minute periods.

### 5.1.2 Measurement Position

The noise level measurements were undertaken at 1No. position at the development site.

The microphone was attached to a pole and positioned to the rear of the site at first floor level.

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



Plan Showing Unmanned Measurement Position (maps.google.co.uk)

### 5.1.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Latest Verification
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3542	LD calibration on 24/02/2012
Type 1 ½" Condenser Microphone	PCB	377B02	104675	LD calibration on 24/02/2012
Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 02/03/2012

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

## 5.2 Manned Survey

### 5.2.1 Procedure

Fully manned environmental noise monitoring was undertaken from approximately 09:00 hours to 10:00 hours on Thursday 27 September 2012 in order to establish noise emissions from the installed plant.

During the survey period the wind conditions were calm. The sky was clear. There was no rain during the survey. Road surfaces were dry throughout the survey period.

Measurements were taken of the A-weighted (dBA)  $L_{eq}$  sound pressure levels. Atypical noises were excluded as far as reasonably possible. The noise levels measured are therefore assumed to be representative of the noise climate during the hour in which the measurements were taken

### 5.2.2 Measurement Positions

The noise level measurements were undertaken at 5No. positions around the development site. The measurement positions are described in the table below.

Position No	Description
A	The microphone was positioned approximately 1 metre from the kitchen extract fan casing.
B	The microphone was positioned approximately 1 metre from the kitchen extract fan grille.
C	The microphone was positioned approximately 1 metre from the kitchen supply fan.
D	The microphone was positioned approximately 1 metre from the roof mounted Danfoss CU's.
E	The microphone was positioned approximately 1 metre from the roof mounted Toshiba CU's.

Please find attached our Site Plan 18334/SP1 showing the measurement positions.

### 5.2.3 Instrumentation

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

Equipment	Model	Serial Number	Calibration Date
Precision Sound Analyser Meter	Brüel & Kjær Type 2260	2274840	University of Salford calibration on 25/10/2010
½ " Microphone	Brüel & Kjær Type 4189	2275232	University of Salford calibration on 25/10/2010
Sound Level Calibrator	Brüel & Kjær Type 4231	2308993	University of Salford calibration on 27/10/2011

The sound level meter was fitted with a Brüel and Kjær microphone windshield.

The sound level meter was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred.

## 6.0 RESULTS

The results of our unmanned survey have been plotted on Time History Graphs 18334/TH1 to 18334/TH2 enclosed, presenting the 15 minute A-weighted (dBA)  $L_{10}$ ,  $L_{90}$ ,  $L_{eq}$  and  $L_{max}$  levels at the measurement position throughout the duration of the survey.

The lowest measured  $L_{A90(15 \text{ min})}$  noise levels are presented in the Table below.

Lowest Measured $L_{A90(15 \text{ min})}$ (dB re $2 \times 10^{-5}$ Pa)	
Proposed Daytime Plant Operation Hours (09:00 – 00:00 hours)	24 hours
49	44

## 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 local road traffic and nearby construction works.

## 8.0 PLANT NOISE EMISSION CRITERIA

We understand that the requirements of Camden Council are as follows:

*"Noise levels at a point 1 metre external to sensitive façades shall be at least 5dBA less than the existing background measurement ( $L_{A90}$ ), expressed in dBA 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 10dBA below the  $L_{A90}$ , expressed in dBA."*

On the basis of the above and the survey results we thus propose the following plant noise emission limits to be achieved at 1m from the façades of the nearest neighbouring buildings:

Plant Noise Emission Criteria (dB re $2 \times 10^{-5}$ Pa)	
Proposed Daytime Plant Operation Hours (09:00 – 00:00 hours)	24 hours
44	39

It should be noted that the above plant noise emission limits are subject to approval from Camden Council.

## 9.0 PLANT NOISE ASSESSMENT

We understand that the following item of plant has been installed at Brasserie Blanc.

Plant Description	Location	Qty
Kitchen Extract Fan	Rear façade	1
Kitchen Supply Fan	Rear façade	1
Danfoss CU	Roof	2
Toshiba CU	Roof	3

### 9.1 Plant Noise Emissions

Whilst undertaking our manned survey, we measured the following plant noise levels on site.

Item of Plant	Measured Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
Kitchen Extract Fan Breakout @ 1m	56	57	52	47	44	42	34	32	50
Kitchen Extract Grille @ 1m	62	60	55	55	53	51	47	32	58
Kitchen Supply Fan @ 1m	65	63	60	62	52	48	42	37	61
2No. Danfoss CU @ 1m	65	65	55	50	47	44	40	33	54
3No. Toshiba CU @ 1m	61	62	56	50	47	43	39	33	54

### 9.2 Daytime Plant (09:00 - 00:00 hours)

The installed plant is operating during the hours of 09:00 to 00:00.



## 9.2.1 Lower Ground Plant

### Kitchen Extract Fan

The kitchen extract fan is mounted on the rear facade of the restaurant. The neighbouring windows are approximately 3 metres away. Our calculations are presented below.

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
Kitchen Extract Fan Breakout @ 1m	56	57	52	47	44	42	34	32	50
Distance Loss 3 metres	-10	-10	-10	-10	-10	-10	-10	-10	-10
Calculated Noise Level at Neighbouring Facade	46	47	42	37	34	32	24	22	40

Our calculations indicate that the installed plant should be considered to be achieving the daytime requirements of the Local Authority outlined in Section 8.0.

### Supply Fan

The kitchen supply fan is mounted on the rear facade of the restaurant. The neighbouring windows are approximately 2 metres away. Our calculations are presented below.

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
Kitchen Supply Fan @ 1m	65	63	60	62	52	48	42	37	61
Distance Loss 3 metres	-6	-6	-6	-6	-6	-6	-6	-6	-6
Calculated Noise Level at Neighbouring Facade	59	57	54	56	46	42	36	31	55

Our calculations indicate that the installed plant is considered to be exceeding the daytime requirements of the Local Authority outlined in Section 8.0.

### Combined Noise Levels (Lower Ground)

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
Calculated Noise Level at Neighbouring Facade (All lower ground plant running)	59	57	54	56	46	42	36	31	55

Our calculations indicate that the installed plant is considered to be exceeding the daytime requirements of the Local Authority outlined in Section 8.0 during the proposed operating hours. The cause for this exceedence is the kitchen supply fan. Please see Section 10.0 for our mitigation advice.

## 9.2.2 Roof Mounted Plant

### Kitchen Extract Grille

The kitchen extract fan is mounted on the rear facade of the restaurant and ducted to discharge at roof level. The neighbouring windows are approximately 4 metres away. Our calculations are presented below.

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
Kitchen Extract Grille @ 1m	62	60	55	55	53	51	47	32	58
Distance Loss 3 metres	-10	-10	-10	-10	-10	-10	-10	-10	-10
Directivity	-1	-3	-4	-6	-22	-22	-22	-22	
Calculated Noise Level at Neighbouring Facade	51	47	41	39	21	19	15	-	39

Our calculations indicate that the installed plant should be considered to be achieving the daytime requirements of the Local Authority outlined in Section 8.0.

### Danfoss CU

The 2No. Danfoss CU's are installed on the flat roof area to the rear of the restaurant. The neighbouring windows are approximately 5 metres away. Our calculations are presented below.

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
2No. Danfoss CU @ 1m	65	65	55	50	47	44	40	33	54
Distance Loss 5 metres	-14	-14	-14	-14	-14	-14	-14	-14	-14
Calculated Noise Level at Neighbouring Facade	51	51	41	36	33	30	26	19	40

Our calculations indicate that the installed plant should be considered to be achieving the daytime requirements of the Local Authority outlined in Section 8.0.

### Toshiba CU

The 3No. Toshiba CU's are installed on the flat roof area to the rear of the restaurant. The neighbouring windows are approximately 5 metres away. Our calculations are presented below.

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
3No. Toshiba CU @ 1m	61	62	56	50	47	43	39	33	54
Distance Loss 5 metres	-14	-14	-14	-14	-14	-14	-14	-14	-14
Calculated Noise Level at Neighbouring Facade	50	48	42	36	33	29	25	19	40

Our calculations indicate that the installed plant should be considered to be achieving the daytime requirements of the Local Authority outlined in Section 8.0.

#### Combined Noise Levels (Roof Mounted Plant)

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
Calculated Noise Level at Neighbouring Facade (All lower ground plant running)	55	54	46	42	36	33	29	22	44

Our calculations indicate that the installed plant are considered to be achieving the daytime requirements of the Local Authority outlined in Section 8.0.

### 9.3 24 Hour Plant

The following plant operates up to 24 hours a day.

#### Danfoss CU

The 2No. Danfoss CU's are installed on the flat roof area to the rear of the restaurant. The neighbouring windows are approximately 5 metres away. Our calculations are presented below.

Item of Plant	Sound Pressure Level (dB re $2 \times 10^{-5}$ Pa At Octave Centre Band Frequency (Hz))								dBA
	63	125	250	500	1k	2k	4k	8k	
2No. Danfoss CU @ 1m	65	65	55	50	47	44	40	33	54
Distance Loss 5 metres	-14	-14	-14	-14	-14	-14	-14	-14	-14
Calculated Noise Level at Neighbouring Facade	51	51	41	36	33	30	26	19	40

Our calculations indicate that the installed plant is considered to be marginally (1dBA) exceeding the 24 hour requirements of the Local Authority outlined in Section 8.0.

## 10.0 MITIGATION MEASURES

### 10.1 Kitchen Supply Fan

As demonstrated in our calculations in Section 9.0, the kitchen supply fan is considered to be exceeding the requirements of the Local Authority by 11dBA. In order that the installed plant be capable of achieving the requirements of the Local Authority we would advise the fan be clad with a mass layer cladding.

The proposed cladding should comprise 50mm mineral wool with 2No. layers of solid board with a have a minimum mass per unit area of at least 10kg/m<sup>2</sup>. This could be achieved using 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.

### 10.2 Danfoss CU

Our calculations in Section 9.3 demonstrate that the 2No. Danfoss CU are considered to be exceeding the requirements of the Local Authority by 1dBA. 1dBA is considered an imperceptible change in loudness. It is also within the measurement tolerance of the sound level meter used to measure the installed plant.

The neighbouring windows overlook the installed plant meaning that a screen would offer no acoustic benefit. The only steps that could therefore be taken are;

- Relocate the installed plant (at least 6m from neighbouring façade)
- Enclose the installed plant (offering 1dBA attenuation)
- Change the installed plant (1dBA quieter than the installed)

Given the marginal exceedance of the night-time criteria and the difficulty/cost involved in mitigating the plant by 1dBA, it may be considered acceptable to allow this minor exceedance of the very worst case criteria. This is subject to approval by Camden Council.

## 11.0 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 in conjunction with the Local Authority.

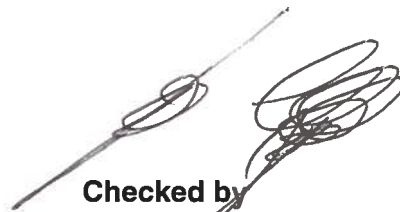
An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window.

The assessment indicates that the majority of the installed plant currently achieves the requirements of the Local Authority at the nearest noise sensitive window.

Mitigation advice has been given for the plant which exceeds the Local Authority criteria.



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**Checked by  
John Gibbs  
Director  
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## Appendix A

The acoustic terms used in this report are as follows:

**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.

**dBA** : 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 dBA level.

Because of being a logarithmic scale noise 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<sub>10</sub> & L<sub>90</sub>**: If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L<sub>n</sub> indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L<sub>10</sub> is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L<sub>90</sub> is the average minimum level and is often used to describe the background noise.

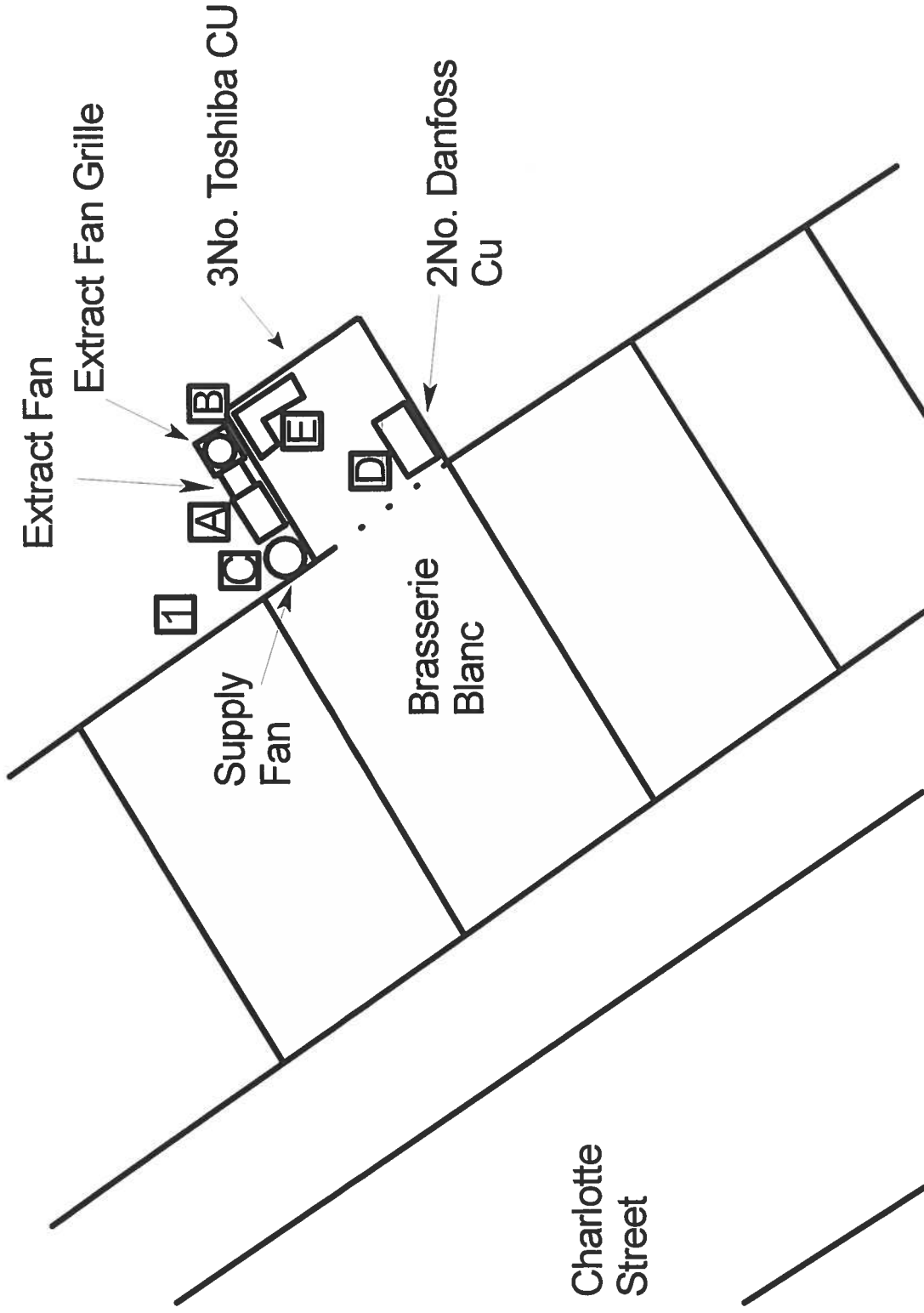
It is common practice to use the L<sub>10</sub> index to describe traffic noise, as being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic noise.

**L<sub>eq</sub>** : The concept of L<sub>eq</sub> (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

L<sub>eq</sub> 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 (e.g. 1 hour).

The use of digital technology in sound level meters now makes the measurement of L<sub>eq</sub> very straightforward.

**L<sub>max</sub>** : L<sub>max</sub> is the maximum sound pressure level recorded over the period stated. L<sub>max</sub> is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L<sub>eq</sub> noise level.



**Title :** Site Plan Showing  
Approximate Location  
of Plant and  
Measurement Positions

**Job :** Brasserie  
Blanc

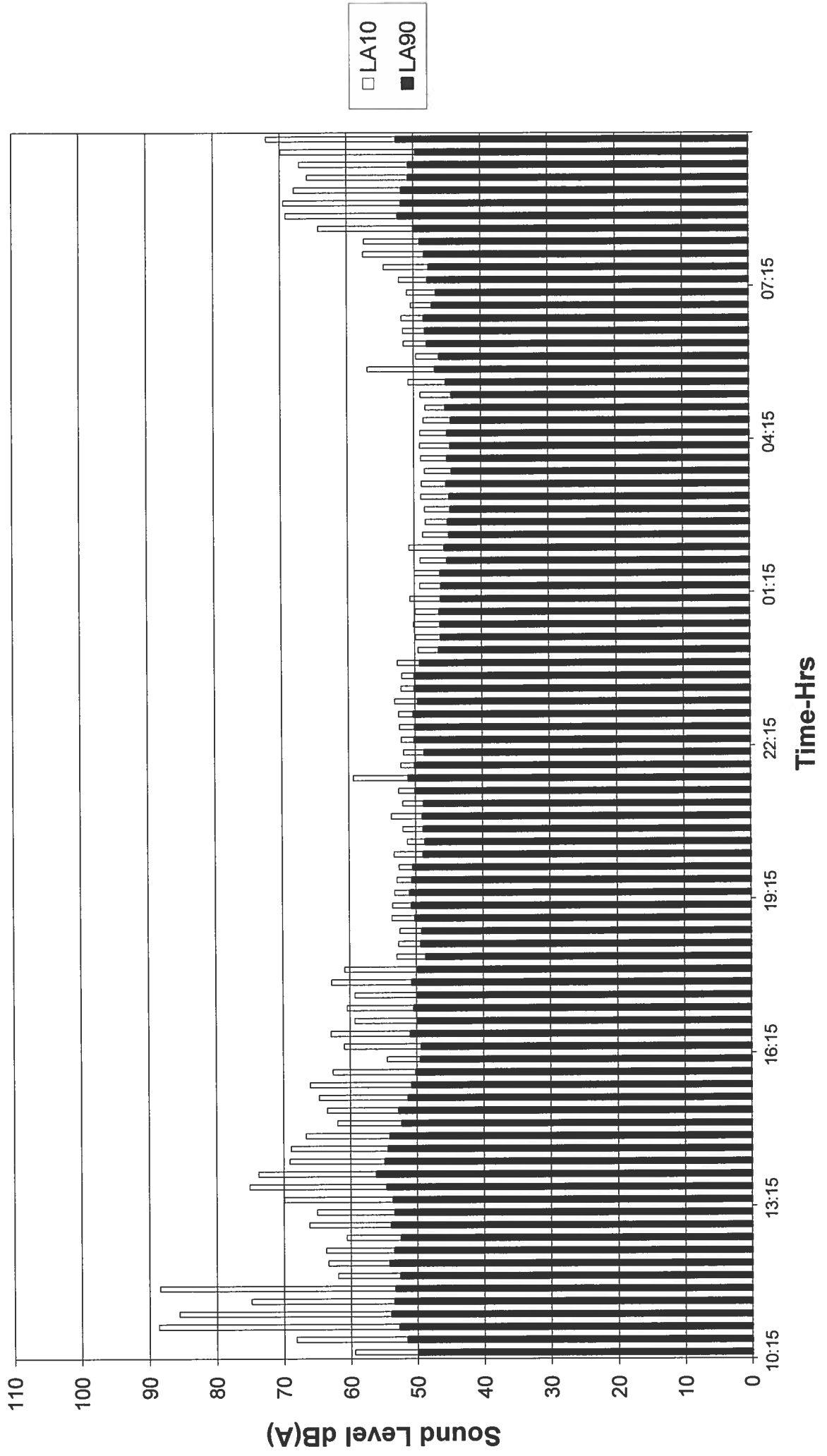
**Figure :** 18334/SP1

**Date :** 17/10/2012  
**Scale :** N.T.S.



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**Brasserie Blanc**  
**Position 1**  
**L<sub>A10</sub> and L<sub>A90</sub> Noise Levels**  
**20/06/2012 - 21/06/2012**





**Brasserie Blanc**  
**Position 1**  
 **$L_{Aeq}$  and  $L_{Amax}$  Noise Levels**  
**20/06/2012 - 21/06/2012**

