

Five Guys
17 Piccadilly
Manchester
M1 1LS

**Plant Noise
Survey**

On behalf of

**chapman
ventilation**

Project Reference: 89694 | Revision: 00 | Date: 23rd March 2022

Document Information

Project Name : Five Guys, Piccadilly, Manchester
Project Reference : 89694
Report Title : Plant Noise Survey
Doc Reference : 89694/PNS
Date : 23rd March 2022

	Name	Qualifications	Initials	Date
Prepared by:	Kartikeyan Subramaniam	MEng(Hons), AMIOA	KS	23 rd March 2022
Reviewed and approved by:	Dean Bowden	BSc(Hons), MIOA	DMB	24 th March 2022
For and on behalf of Noise Solutions Ltd				

Revision	Date	Description	Prepared	Reviewed/ Approved

Noise Solutions Ltd (NSL) disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence within the terms of the Contract with the Client and generally in accordance with the appropriate ACE Agreement and taking account of the manpower, resources, investigations and testing devoted to it by agreement with the Client. This report is confidential to the Client and NSL (Noise Solutions Ltd) accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

© Noise Solutions Ltd (NSL) 2022

Reg no. 3483481 Trading office 5 Oriel Court, Omega Park, Alton, GU34 2YT

Contents

1.0	Introduction	1
2.0	Site details.....	1
3.0	Nearest noise sensitive receptors	1
4.0	Design criteria	1
5.0	Plant noise survey and assessment.....	2
	Plant noise survey methodology	2
	Results.....	2
6.0	Summary	3

Appendices

Appendix A	Acoustic terminology
Appendix B	Photographs of site showing areas of interest

1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by Chapman Ventilation Ltd to undertake a noise survey to establish noise emissions from existing plant serving the Five Guys store located on Piccadilly in Manchester.
- 1.2. Since the installation of the plant, a commissioning survey was performed to assess the impact of the installed plant on the local environment.
- 1.3. A glossary of acoustic terminology is given in [Appendix A](#).

2.0 Site details

- 2.1. The restaurant occupies the basement and ground floor of a seven-storey building on the corner of Piccadilly and Oldham Street in Manchester.
- 2.2. Ground floor premises on this street are a mixture of restaurants, fast-food and general retail shops all with residential flats above.
- 2.3. New plant has been installed comprising an air handling unit (AHU1), a kitchen extract fan (EF1), general and toilet extract fans (EF2 – EF3) and four air conditioning (AC) units (ACU1 to ACU4). The termination points are at first floor level at the rear of the building with the fans themselves within the building. Air conditioning (AC) units will be installed alongside the extract ducts.
- 2.4. The AC units, kitchen, general and toilet extract fans and supply AHU may operate between 07.00 and 01.00 hours daily and will be switched off outside of those hours.

3.0 Nearest noise sensitive receptors

- 3.1. The site is in a mixed residential and commercial area. The nearest and most affected residential receptor to the extract louvres and AC units is the north facing second floor flat above the restaurant (Receptor R1). The most affected residential receptor to the AHU is the west facing second floor flat above the restaurant (Receptor R2).
- 3.2. [Appendix B](#) contains an aerial photograph showing the site and surrounding area and views of the louvre and receptor locations.

4.0 Design criteria

- 4.1. The original NSL noise impact assessment report (reference: 89694/NIA dated 21st December 2020) set the following plant noise emissions criteria for the site:

Table 1 Plant rating noise level limits at nearest receptors

Period	Cumulative plant rating noise level, dB(A)
Operating hours (07.00 – 01.00 hours)	48

5.0 Plant noise survey and assessment

Plant noise survey methodology

- 5.1. Noise Solutions Ltd attended site between 22.00 hours on Monday 21st March and 00.30 hours on Tuesday 22nd March 2022 to measure noise emissions from installed plant.
- 5.2. Measurements of sound pressure levels were undertaken with the microphone positioned at 1m from Receptors R1 and R2. Measurements were taken with each item of plant operating in isolation at each receptor.
- 5.3. Measurements of plant noise emissions were undertaken over short durations (30 seconds) to minimise the influence of extraneous sources (e.g., car pass-bys, passing aircraft, etc.).
- 5.4. Both broadband and one-third octave band frequency data was measured. The measured L_{A90} noise measurements have been used in this assessment since noise from the plant was constant during operation and, again, this minimised influence from extraneous sources.
- 5.5. Details of the noise monitoring equipment used during the survey are detailed in the following table.

Table 2 Details of noise monitoring equipment

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Svantek 971 / 111624	18/06/2021	Factory conformation certificate
Condenser microphone	ACO Pacific 7052E / 80036		
Preamplifier	Svantek SV 18 / 112639		
Calibrator	Svantek SV 33B / 83850	20/10/2021	1500814-1

- 5.6. Weather conditions during the survey were still with a temperature of 10°C. Road surfaces in the surrounding area were dry with clear skies. Weather conditions were unlikely to have affected the results of the plant noise survey.

Results

- 5.7. The results of the various plant noise measurements are summarised in Table 3 below. Measurements were taken at R1 and R2.

Table 3 Summary of plant noise measurements at each receptor

Plant	Measured specific plant noise L _(A) 90 levels (dB)	
	R1	R2
All off (residual)	48	46
Kitchen Extract only	46	43
Supply intake only	≤38	43
Toilet extract only	40	≤36
General extract only	35	≤36
ACU1-ACU4 only	32	38
Cumulative plant noise total	48	47

- 5.8. Table 4, below, assesses the measured external plant noise rating levels against the operating hours emissions criteria specified within Table 1.

Table 4 Assessment of predicted rating levels at the nearest noise sensitive receptors

Receptor	Period	Predicted rating level at receptor, L _{Aeq} (dB)	Criterion (dB)	Difference
R1	Operating hours (07.00 – 01.00 hours)	48	48	0
R2	Operating hours (07.00 – 01.00 hours)	47	48	-1

- 5.9. The noise level measurements demonstrate that cumulative noise emissions from the plant items will comply with the proposed limits at the nearest noise sensitive properties.

6.0 Summary

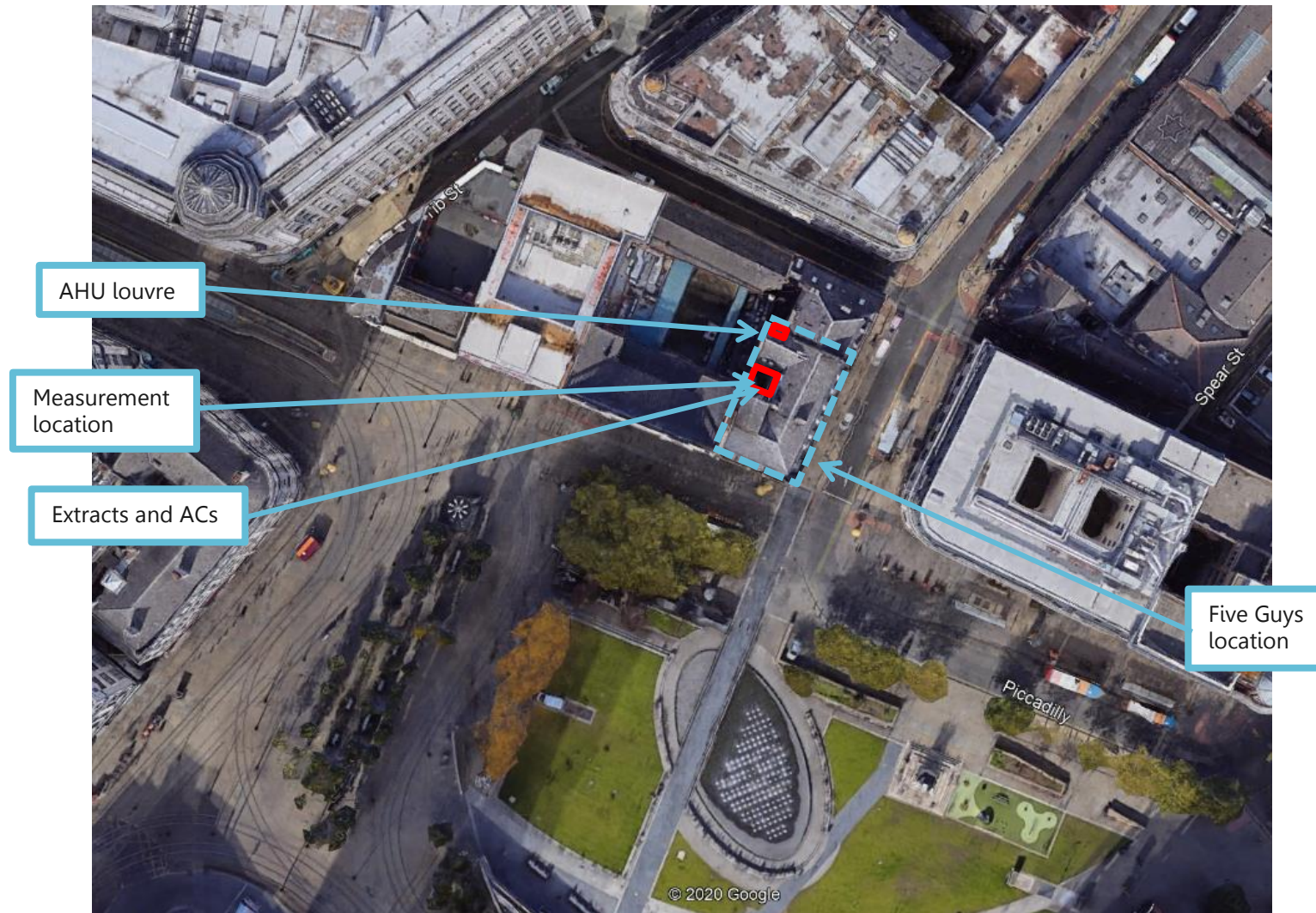
- 6.1. Noise Solutions Ltd (NSL) has been commissioned by Chapman Ventilation Ltd to undertake a noise survey to establish noise emissions from existing plant serving the Five Guys store located on Piccadilly in Manchester.
- 6.2. NSL have attended site to undertake plant noise readings externally at the nearest residential windows in order to determine compliance, or otherwise, with local authority requirements.

- 6.3. The results of the survey indicate that noise from ventilation systems and the condensing units are within the plant rating noise level criteria at the closest and most affected residential windows.

Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A-weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

Appendix B Photographs of site showing areas of interest



Photographs Courtesy of Google Earth

