

48 Grays Inn Road
London
WC1X 8LT

**Plant Noise
Impact Assessment**

On behalf of



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Document Information

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Executive Summary

Noise Solutions Limited (NSL) has been commissioned by Ambient Solutions Limited to assess the potential noise impact of new plant associated with 48 Grays Inn Road.

The results of the assessment demonstrate that the cumulative plant noise emissions will comply with the proposed limits without the need for mitigation measures.

Therefore, the local authority should have no grounds to refuse the planning application in relation to fixed plant noise emissions.

1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned by Ambient Solutions Limited to undertake a noise impact assessment relating to the proposed installation of new air conditioning and fresh air units at 48 Grays Inn Road.
- 1.2. This report presents the survey methodology, findings, plant noise emission criteria and assessment.
- 1.3. For an explanation of the acoustic terminology used in this report please refer to [Appendix A](#).

2.0 Objectives

- 2.1. To establish, by means of detailed 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.
- 2.2. Based on the results of the noise survey, to propose suitable plant noise emission criteria in accordance with the typical condition imposed by the London Borough of Camden.
- 2.3. To undertake a plant noise impact assessment based on the manufacturer's declared plant noise emissions and outline possible mitigation measures if deemed necessary.

3.0 Site location

- 3.1. The surrounding area is residential and commercial in use. The new air conditioning unit will be located on a 3rd floor balcony at the rear of the building.
- 3.2. The nearest noise sensitive properties to the new air conditioning unit (AC) serving the building are the flats located in Courtfield House, directly opposite the plant.
- 3.3. [Appendix B](#) contains an aerial photograph showing the site and surrounding area.
- 3.4. The site is within the London Borough of Camden.

4.0 Details of development proposals

- 4.1. It is proposed to install a new Mitsubishi PUMY-P VKM(-BS) air conditioning unit on the 3rd floor of the building and a Mitsubishi SAF250E6 fresh air unit on the 4th floor. It is understood that the plant will run from 8am to 5.30pm
- 4.2. [Appendix C](#) contains a table with the manufacturer's published sound pressure levels for the proposed plant.

5.0 Existing noise climate

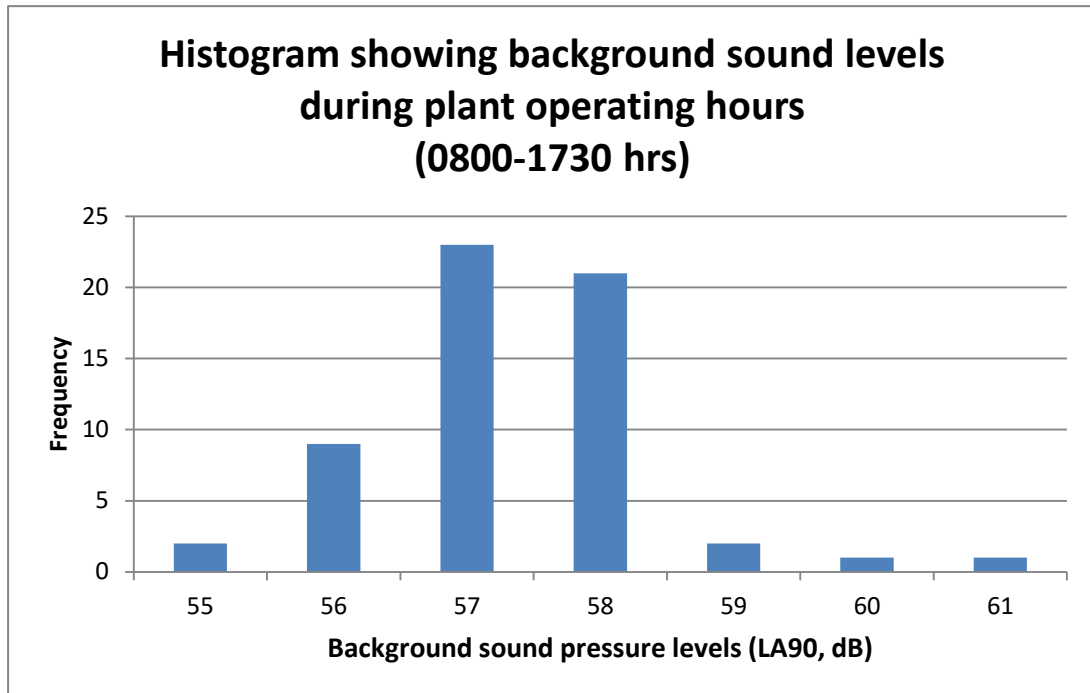
- 5.1. An environmental noise survey was undertaken to establish the prevailing noise levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate. The results of the noise survey have been summarised in Table 1, below. The full set of measurement results and details of the survey methodology can be found in [Appendix D](#).

Table 1 Summary of noise survey results

Measurement period	Range of noise levels over measurement period (dB)			
	L _{Amax} (15mins)	L _{Aeq} (15mins)	L _{A10} (15mins)	L _{A90} (15mins)
Plant operating hours (08.00 - 17.30 hours)	61 - 83	57 - 65	58 - 68	55 - 61
Other times (17.30 - 08.00 hours)	57 - 83	54 - 65	55 - 69	53 - 58

- 5.2. The background sound levels for the proposed plant operating period were assessed using statistical analysis of the measured L_{A90,15min} values.
- 5.3. The results of the analysis of the measured L_{A90,15min} values during the proposed hours of plant operation are shown in the histogram below.

Figure 1 Histogram of background daytime sound pressure levels



5.4. Additional statistical analysis has been undertaken. As shown in Table 2, the mean, median, and modal values have been calculated:

Table 2 Statistical analysis of $L_{A90,15min}$ levels during the daytime period

dB, L_{A90} daytime period	
Mean	57
Median	57
Mode	57

5.5. A value of 57 dB L_{A90} is therefore considered to be representative of the background sound level, during the proposed plant operating hours.

6.0 Proposed noise limits

London Borough of Camden

6.1. Appendix C of the London Borough of Camden's local plan states that the rating level of the impact outside the nearest bedroom window (façade) should be 10 dB below background level and that no events should exceed 57 dBL_{Amax} .

- 6.2. Taking into account the criteria of the local council, the plant rating noise level in this case should be no higher than **47 dB L_{Ar,Tr}**.

7.0 Plant noise impact assessment

- 7.1. The impact of the proposed new plant has been assessed at the nearest noise-sensitive receptor. As the unit will be operative only during the hours of 08.00-17.30, an assessment of its impact only during these hours has been undertaken.
- 7.2. Table 3, below, summarises the results of the plant noise impact assessment. Calculations can be found in [Appendix E](#).

Table 3 Plant noise impact assessment

Receptor	Period	Plant	Predicted noise levels at receptor window, L _{Aeq} (dB)	Noise criterion at receptor window (dB)	Difference (dB)
R1. Flats opposite proposed plant location	08.00 to 17.30	PUMY-P VKM(-BS) and fresh air unit	45	47	-2

- 7.3. The predictions demonstrate that cumulative noise emissions from the proposed plant will comply with the proposed limits without the need for mitigation measures.

8.0 Summary

- 8.1. Noise Solutions Ltd (NSL) has been commissioned by Ambient Solutions Limited to undertake a plant noise impact assessment for the new AC unit and fresh air unit to be installed at 48 Grays Inn Road in London.
- 8.2. An environmental sound survey was undertaken at the site in order to establish the typical background sound levels around the site.
- 8.3. The noise emission levels for each proposed AC unit option have been predicted at the most affected noise sensitive receptor and assessed using the typical requirements of the local authority.
- 8.4. The results of the assessment demonstrate that ambient noise levels at the most affected noise sensitive windows will meet the proposed criteria without the need for mitigation measures.

- 8.5. Noise from the proposed plant should not, therefore, be reason for refusal of planning permission.

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 exceeded for 90% of the time over the period T. Generally used to describe background noise level.

Appendix B Aerial photograph of site showing relevant points



Image © Google, 2017

Appendix C Manufacturer plant noise emissions

Plant item	Make/Model	Quantity	Period	Sound Pressure Level	
				dBA	Distance (m)
AC unit	Mitsubishi AC unit PUMY-P VKM(-BS)	1	Running period (08:00 – 17:30 hours)	52	1
Fresh air unit	Mitsubishi SAF250E6	1	Running period (08:00 – 17:30 hours)	22	1

Appendix D Environmental sound survey

Details of environmental sound survey

- D.1 Measurements of the existing background sound levels were undertaken from 16.30 hours on Thursday 9th November 2017 to 11.45 hours on Friday 10th November 2017.
- D.2 The sound level meter was programmed to record the A-weighted Leq, L90 L10 and Lmax noise indices for consecutive 5-minute sample periods for the duration of the survey.

Measurement position

- D.3 The sound level metre was positioned on the 3rd floor balcony at the rear of 48 Grays Inn Road at the proposed location of the plant. The location is shown in Appendix B. The measurements of the survey were undertaken in accordance with BS 7445-2:1991 '*Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use*'.











Equipment

- D.4 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change (+/-0.2 dB) in the calibration level was noted.

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Rion NL-52 / 00654035	09/10/2017	TCRT17/1660
Condenser microphone	Rion UC-59 /08290		
Preamplifier	Rion NH-25 / 54080		
Calibrator	Rion NC-74 /34535932	09/10/2017	1657

Weather Conditions

- D.5 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

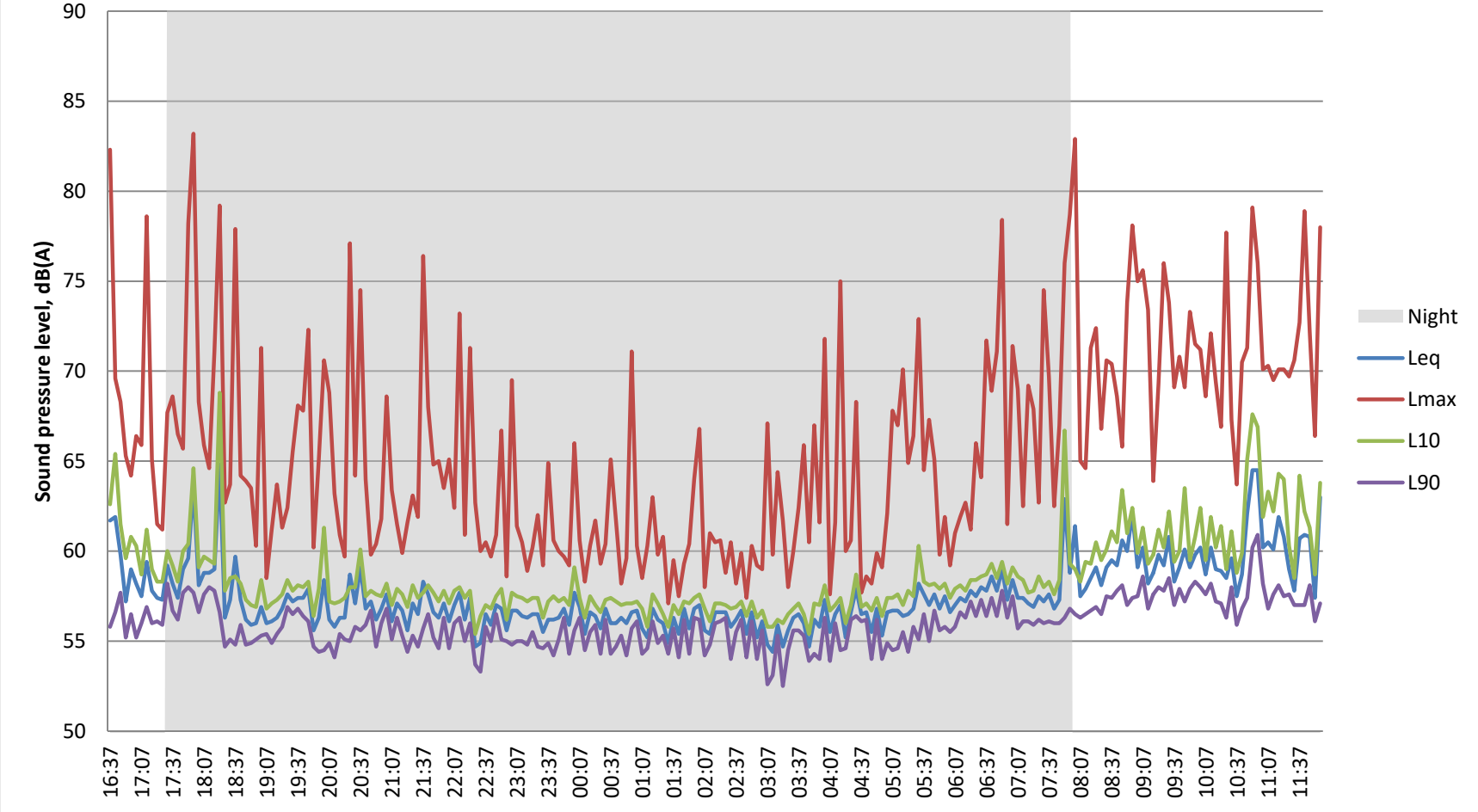
Weather Conditions				
Measurement Location	Date	Description	Beginning of Survey	End of Survey
As indicated in Appendix B	9 th /10 th November 2017	Temperature (°C)	11	12
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Cloud Cover</p> <p>Symbol Scale in oktas (eighths)</p> <p> 0 Sky completely clear</p> <p> 1</p> <p> 2</p> <p> 3</p> <p> 4 Sky half cloudy</p> <p> 5</p> <p> 6</p> <p> 7</p> <p> 8 Sky completely cloudy</p> <p> (9) Sky obstructed from view</p> </div>		Precipitation:	No	No
		Cloud cover (oktas - see guide)	8	7
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	No	No
		Wind Speed (m/s)	3.6	18
		Wind Direction	W	W
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

**Slight precipitation that does not affect the results of the survey*

Results

- D.6 The results of the survey are considered to be representative of the typical prevailing sound pressure levels at the façades of the nearest noise sensitive receptors to the proposed plant area during the quietest times at which the plant will operate.

48 Gray's Inn Road 9th -10th November 2017



Appendix E Plant noise impact assessment

Receptor R1 Residential premises next door to the plant area

Plant item	Period	Source noise level		Distance correction		Directivity (dB)	BS 4142 Correction (dB)	Cumulative plant noise level at R1 L _{Aeq} (dB)
		Noise level, L _{Aeq} (dB)	Reference distance (m)	Distance to receptor (m)	Correction (dB)			
AC unit	08.00	52	1	3	-10	0	3	45
Fresh Air Unit	17.30	22	1	3	-10	0	3	15
							Cumulative	45