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**245 TOTTENHAM COURT ROAD,
CAMDEN**

NOISE IMPACT ASSESSMENT

Technical Report: R4587-1 Rev 0

Date: 4th March 2013

For: Greggs of London
Gould Road
Twickenham
Middlesex
TW2 6RT

24 Acoustics Document Control Sheet

Project Title: 245 Tottenham Court Road, Camden – Noise Impact Assessment

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Document Status and Approval Schedule

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CONTENTS	PAGE
1.0 Introduction	4
2.0 Site Description	4
3.0 Criteria	5
4.0 Noise Measurements and Results	7
5.0 Plant Noise Assessment	9
6.0 Conclusions	10
References	11
Figure 1 Ariel image of site and nearest receptors	12
Figure 2 Site layout and measurement position	13
Appendix A Acoustic Terminology	14
Appendix B Measured Noise Levels	16
Appendix C Calculated Noise Levels	17

1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been instructed by Greggs of London to undertake a plant noise impact assessment at 245 Tottenham Court Road, Camden.
- 1.2 This report presents the results of the assessment, following site visits and a background noise survey undertaken between 22nd and 26th February 2013.
- 1.3 All noise levels in this report are presented in dB relative to 20 μ Pa.

2.0 SITE DESCRIPTION

- 2.1 245 Tottenham Court Road is located in a mixed retail and commercial area with ambient noise levels controlled by local road traffic, commercial activities and existing plant. Existing plant noise in the rear delivery yard area, however, the dominant source of ambient noise levels in the nearby area at the rear of the proposed shop.
- 2.2 As part of proposed works to install a Greggs bakery in the ground floor of 245 Tottenham Court Road, Camden it is proposed to fit air conditioning plant for the purpose of heating and cooling and air extraction/ventilation plant for the bakery and staff areas. The condenser units will be located externally on the rear façade at ground floor level. The extraction/ventilation systems will vent via a louvre above the door on the rear façade at ground floor level. The rear of 245 Tottenham Court Road exits into a loading and delivery area with access to underground parking. This rear yard area contains a large number of existing plant units and is used primarily for commercial activities. Existing plant is located on the rear façade of 245 Tottenham Court Road but is not currently operational.
- 2.3 It is understood that several residential windows face into the rear delivery yard area at the rear of 245 Tottenham Court Road. The closest windows to the proposed plant, however, are office windows which are located on both sides of the delivery yard. The nearest office window is at first floor directly above the proposed plant at a distance of approximately 3.5m. Additionally, office windows are located opposite to the proposed plant at first floor level a distance of approximately 5.5m. Ducting for the extraction and condenser units is proposed to run through the structure of the building. The condenser units are to be mounted on anti vibration mounts at ground floor level on the rear facade. Plant is proposed to run only during operational hours of the store.

- 2.4 Figures 1 and 2 show the site layout, proposed location of the condenser units, proposed location of the extract and the nearest sensitive windows.

3.0 CRITERIA

National Planning Policy Framework (NPPF)

- 3.1 The National Planning Policy Framework (NPPF) [Reference 1] was published by the Department for Communities and Local Government in draft format in July 2011 and in its final form on 27th March 2012, and is now effective. This document is intended to replace specific guidance contained within the planning policy guidance and statement documents which are currently in force. This document therefore supersedes PPG 24 [Reference 2] which previously provided guidance on noise relating to planning and new development. For noise the NPPF policy states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions, while recognising that many developments will create some noise; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

- 3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 3] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

- 3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

- 3.4 The NPPF and NPSE documents do not refer to specific noise criteria. When considering the impact of noise from new plant 24 Acoustics considers that the spirit of the requirements of the NPPF and NPSE will be complied with if criteria from British Standard 4142:1997 [Reference 4] are adopted.

BS 4142

- 3.5 BS 4142 [Reference 4] provides a method for rating the effects of industrial noise on mixed residential and industrial areas. The standard advocates a comparison between the typical measured L_{A90} background noise level and L_{Aeq} noise level from the source being considered. For rating purposes if the noise source is tonal, intermittent or otherwise distinctive in character, a rating correction of +5 dB is applied. The standard states that a difference between the rating noise level and the background level of +10 dB indicates that 'complaints are likely', a difference of +5 dB is of 'marginal significance' and a difference of -10 dB is a 'positive indication that complaints are unlikely'.

Local Authority Requirements

- 3.6 The Local Planning Authority, London Borough of Camden, advises that noise arising from fixed plant should be assessed in line with the Camden Unitary Development Plan (UDP). The Sustainable Development Policy SD8A within the UDP [Reference 5] provides guidance relating to disturbance from plant and machinery. SD8A states:

"The Council will only grant planning permission for plant or machinery, including ventilation or air handling equipment, if it can be operated without causing a loss to local amenity and does not exceed the thresholds set out in Appendix 1 - Noise and Vibration (Table E)."

- 3.7 Table E in Appendix 1 of the UDP details noise levels from plant and machinery at which planning permission will not be granted. Noise level requirements from Table E are shown below in Table 1.

Noise description and location of measurement	Period	Time	Noise Level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) < LA90
Noise that has a distinguishable discrete and night continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dB(A) < LA90
Noise that has distinct impulses (bangs, clicks, and night clatters, thumps) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dB(A) < LA90
Noise at 1 metre external to sensitive façade where LA90 > 60dB	Day, evening and night	0000-2400	55dB(A)

Table 1: Noise level criteria from Camden UDP Appendix 1 Table E

4.0 NOISE MEASUREMENTS AND RESULTS

- 4.1 Background noise measurements were undertaken between 22nd and 26th February 2013 at ground floor level in the rear yard area of 245 Tottenham Court Road. The monitoring location is shown in Figure 1.
- 4.2 The sound level meter was set up to monitor noise levels continuously and store data in five minute samples (using fast time weighting) in terms of the overall A-weighted L_{eq} and L_{90} sound pressure levels. These levels were then averaged to calculate 15 minute values for evening and night time periods and hourly values for daytime periods as specified in BS 4142. Measurements were taken in free field conditions at a height of approximately 2m above ground floor level in the rear yard area. An environmental wind shield was fitted.

4.3 The following instrumentation was used during the survey:

- Rion NL32 (Type 1) precision grade sound level meter;
- Brüel and Kjær Type 4231 acoustic calibrator.

4.4 Calibration was checked before and on completion of the measurements and no drift was recorded. Weather conditions during the survey were mostly overcast but dry. It is therefore considered that weather conditions did not affect the noise measurements. Noise measurements were made in accordance with BS 7445: 1991 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use' [Reference 6].

Results

4.5 The results of the environmental survey are presented Table 2 below showing the average ($L_{Aeq, 1\text{hour}}$ daytime, $L_{Aeq, 15\text{min}}$ evening and night-time) and minimum background ($L_{A90, 1\text{hour}}$ daytime, $L_{A90, 15\text{min}}$ evening and night-time) values and in graphical format in Appendix B.

Date	Daytime		Evening		Night-time	
	Average $L_{Aeq, 1\text{hour}}$	Minimum $L_{A90, 1\text{hour}}$	Average $L_{Aeq, 15\text{min}}$	Minimum $L_{A90, 15\text{min}}$	Average $L_{Aeq, 15\text{min}}$	Minimum $L_{A90, 15\text{min}}$
22/02/2013	-	-	62.4	61.2	62.1	61.1
23/02/2013	62.6	61.3	62.7	61.3	62.2	61.3
24/02/2013	62.6	61.5	62.7	61.6	62.5	61.3
25/02/2013	64.4	61.6	62.5	61.0	61.8	60.4
26/02/2013	58.8	60.6	-	-	-	-
Noise Level	63	61	63	61	62	60

Table 2: Summary of Environmental Noise Survey Results

4.6 Existing condenser units on the rear façade of 245 Tottenham Court Road were not operational during the ambient noise survey. However, the rear delivery yard is subject to high levels of plant noise from existing plant units operated by other offices and commercial properties in the area. Measured ambient noise levels are considered representative of noise levels in the rear delivery area.

Assessment

4.7 Based upon the requirements of the Local Planning Authority, noise from the plant should not exceed the following level at the nearest noise sensitive window:

07:00 - 19:00 hours	less than 55 dB $L_{Aeq, 1 \text{ hour}}$
19:00 - 23:00 hours	less than 55 dB $L_{Aeq, 15 \text{ min}}$
23:00 - 07:00 hours	less than 55 dB $L_{Aeq, 15 \text{ min}}$

5.0 PLANT NOISE ASSESSMENT

5.1 The proposed plant will comprise two Mitsubishi outdoor units (model: PUHZ-RP140VKA/YKA and PUHZ-RP71VHA4) installed on the rear façade at ground floor level. The ventilation/kitchen extraction system will vent via a louvre on the rear façade at ground floor level as shown in Figure 1.

5.2 The manufacturer's stated plant noise levels are detailed in Table 3 below:

Model	Sound Power Level (dB) per Octave Band Frequency, Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
Mitsubishi PUHZ-RP71VHA4 (Heating)	65	63	58	52	51	47	40	36	56
Mitsubishi PUHZ-RP140VKA/YKA (Heating)	67	64	63	57	54	50	44	37	60
K 315L Extract Fan – without silencer (Outlet)	88	83	80	72	70	69	62	58	77

Table 3: Plant sound power levels

5.3 Calculations have been undertaken to determine the noise level at 1m from the nearest noise sensitive receptors. The plant is located in an area surrounded by office windows which for this assessment have been considered the nearest sensitive receptors due to the increased distance to the nearest residential properties in the rear yard area. Calculations have been undertaken to assess the two closest office windows, directly above the proposed plant at a distance of approximately 3.5m and on the opposite wall of the delivery yard at a distance of approximately 5.5m from the proposed plant. The proposed condenser units operate in two modes, heating and cooling; the heating mode presents the highest level and has therefore been used in the calculations to provide a worst case scenario prediction. Plant will run continuously when operational and will not contain a tonal or intermittent noise character. Therefore no penalty has been applied to the plant noise level. Calculations were completed using single octave data as shown in full in Appendix C.

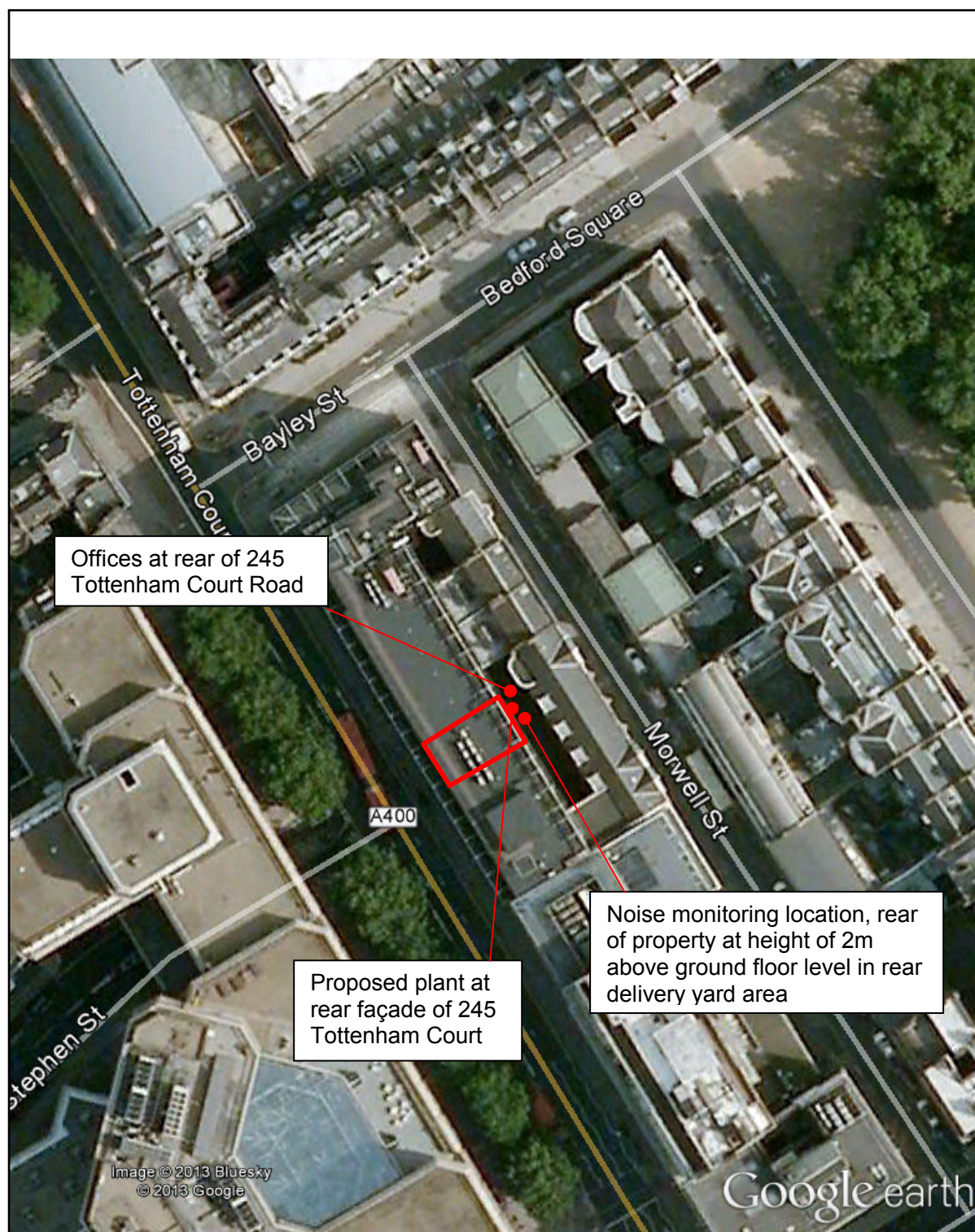
- 5.4 Calculations indicate that, with the proposed plant installed, the noise level at the first floor office at the rear of 245 Tottenham Court Road above the proposed plant would be 53 dB L_{Aeq} . Calculations indicate that, with the proposed plant installed, the noise level at the first floor office in the rear delivery yard directly opposite the proposed plant would be 53 dB L_{Aeq} . Noise levels from the proposed plant at the assessment properties are below the established limits, as described in Section 4.6. On this basis noise from the proposed plant is considered to cause no loss of amenity at the nearest sensitive properties.


6.0 CONCLUSIONS

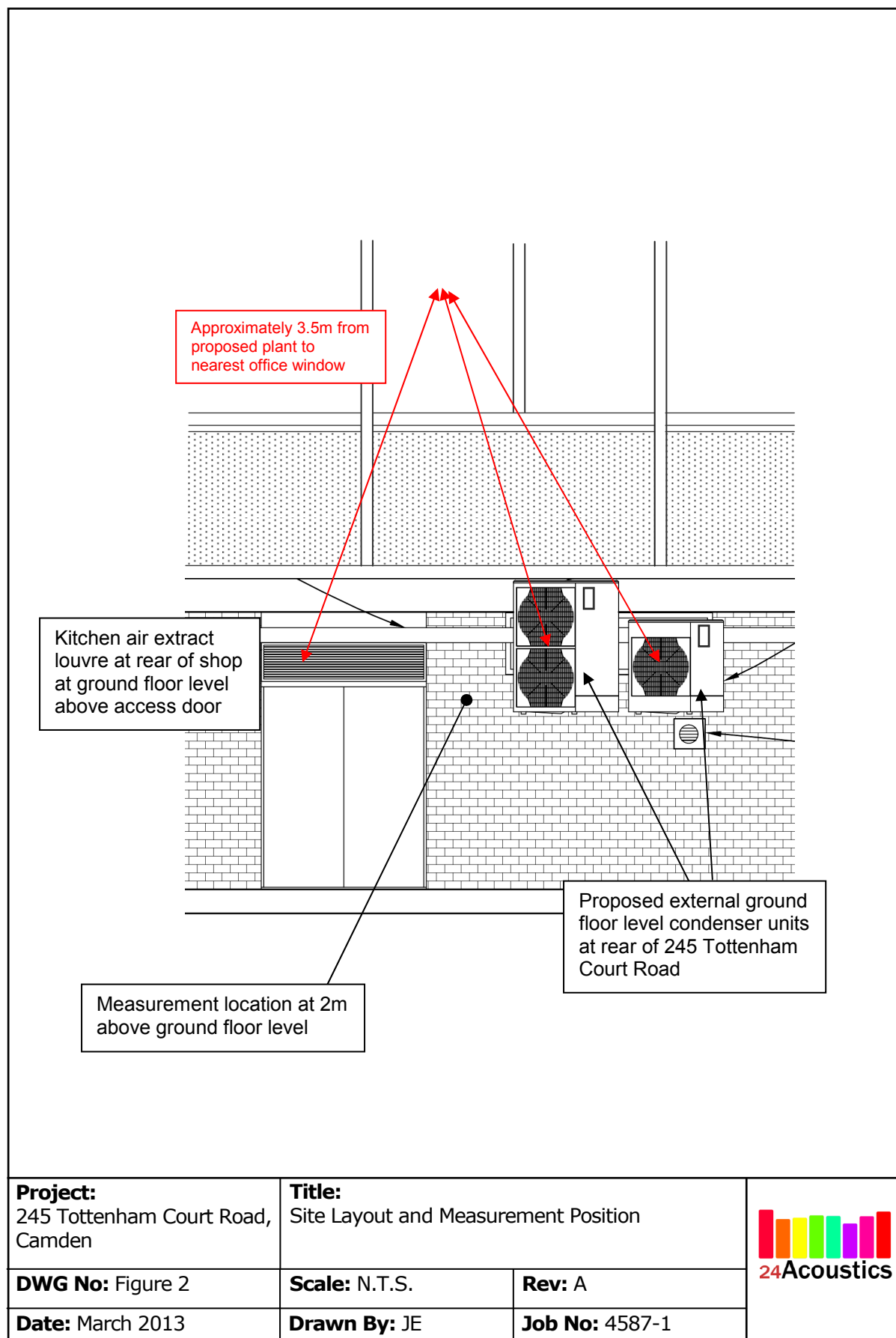
- 6.1 An assessment of background noise levels has been carried out at 245 Tottenham Court Road under the requirements of the Local Planning Authority, London Borough of Camden.
- 6.2 Based upon the survey results and Local Planning Authority guidance, limiting criteria applicable to noise from the installation of external plant have been established. In addition, calculations have been undertaken which demonstrate that noise from the proposed plant and extraction system will not exceed the established noise limits at the nearest sensitive receptors.

REFERENCES

1. Department for Communities and Local Government. The National Planning Policy Framework (NPPF), 2012.
2. Department of the Environment. Planning Policy Guidance (PPG) 24, Planning and Noise, September 1994.
3. Department for Environment, Food and Rural Affairs. Noise Policy Statement for England (NPSE), 2010
4. British Standards Institution. British Standard 4142. Method for Rating Industrial noise affecting mixed residential and industrial areas, 1997.
5. London Borough of Camden, Unitary Development Plan, 2006
6. British Standards Institution. British Standard 7445: 1991 'Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use'



Project: 245 Tottenham Court Road, Camden	Title: Ariel image of site and nearest receptors.		 24Acoustics
DWG No: Figure 1	Scale: N.T.S.	Rev: A	
Date: March 2013	Drawn By: JE	Job No: 4587-1	



APPENDIX A: ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level.

It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dBA is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dBA. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dBA corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 [1] as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T , has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

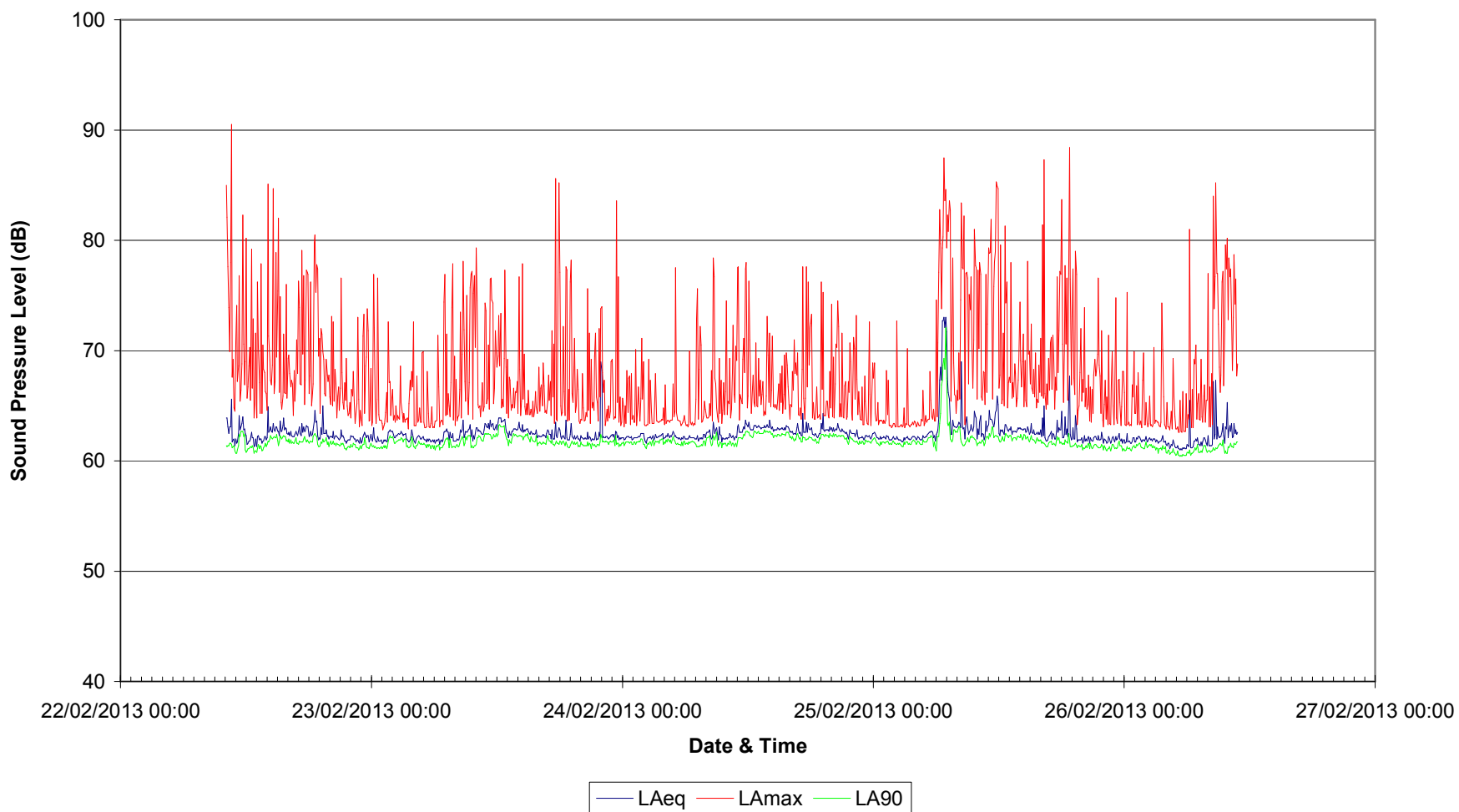
This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B: MEASURED NOISE LEVEL

**Ambient Noise Survey - 245 Tottenham Court Road, Camden
22nd February - 26th February 2013**



**APPENDIX C1: CALCULATED NOISE LEVELS – FIRST FLOOR, OFFICE ABOVE, REAR OF
245 TOTTENHAM COURT ROAD**

Unit	63	125	250	500	1k	2k	4k	8k	dB(A)	Comments
Unit Lw										
1) Mitsubishi PUHZ-RP71VHA4	65.0	63.0	58.0	52.0	51.0	47.0	40.0	36.0	56	Max heating condition
2) Mitsubishi PUHZ-RP140VKA/YKA	67.0	64.0	63.0	57.0	54.0	50.0	44.0	37.0	60	Max heating condition
3) K315L Extract fan unit	88.2	83.2	79.7	72.2	70.0	68.8	62.0	58.1	77	Unweighted manufacturers data
Distance Loss										
1) Mitsubishi PUHZ-RP71VHA4	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0		Distance to nearest window = 4.0m
2) Mitsubishi PUHZ-RP140VKA/YKA	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1		Distance to nearest window = 3.2m
3) K315L Extract fan unit	-18.9	-18.9	-18.9	-18.9	-18.9	-18.9	-18.9	-18.9		Distance to nearest window = 3.5m
Screening and other losses										
1) Mitsubishi PUHZ-RP71VHA4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		None
2) Mitsubishi PUHZ-RP140VKA/YKA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		None
3) K315L Extract fan unit	-11.0	-6.0	-3.0	-1.0	0.0	0.0	0.0	0.0		Vent via extract louvre above rear door
Directivity										
1) Mitsubishi PUHZ-RP71VHA4	0.0	-0.5	-1.0	-4.0	-5.0	-6.0	-6.0	-6.0		Condenser fan axis 90deg from office window
2) Mitsubishi PUHZ-RP140VKA/YKA	0.0	-0.5	-1.0	-4.0	-5.0	-6.0	-6.0	-6.0		Condenser fan axis 90deg from office window
3) K315L Extract fan unit	0.0	-0.5	-1.0	-5.0	-6.0	-8.0	-8.0	-8.0		Fan axis 90deg from office window
Levels at nearest sensitive window										
1) Mitsubishi PUHZ-RP71VHA4	45.0	42.5	37.0	28.0	26.0	21.0	14.0	10.0	33	Level from condenser unit
2) Mitsubishi PUHZ-RP140VKA/YKA	48.9	45.4	43.9	34.9	30.9	25.9	19.9	12.9	39	Level from condenser unit
3) K315L Extract fan unit	58.4	57.8	56.8	47.4	45.1	41.9	35.2	31.3	52	Level from air extract fan
Total									53	Combined Level from plant

**APPENDIX C2: CALCULATED NOISE LEVELS – FIRST FLOOR, OFFICE DIRECTLY
OPPOSITE PROPOSED PLANT, REAR OF 245 TOTTENHAM COURT ROAD**

Unit	63	125	250	500	1k	2k	4k	8k	dB(A)	Comments
Unit Lw										
1) Mitsubishi PUHZ-RP71VHA4	65.0	63.0	58.0	52.0	51.0	47.0	40.0	36.0	56	Max heating condition
2) Mitsubishi PUHZ-RP140VKA/YKA	67.0	64.0	63.0	57.0	54.0	50.0	44.0	37.0	60	Max heating condition
3) K315L Extract fan unit	88.2	83.2	79.7	72.2	70.0	68.8	62.0	58.1	77	Unweighted manufacturers data
Distance Loss										
1) Mitsubishi PUHZ-RP71VHA4	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8		Distance to nearest window = 5.5m
2) Mitsubishi PUHZ-RP140VKA/YKA	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8		Distance to nearest window = 5.5m
3) K315L Extract fan unit	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8	-22.8		Distance to nearest window = 5.5m
Screening and other losses										
1) Mitsubishi PUHZ-RP71VHA4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		None
2) Mitsubishi PUHZ-RP140VKA/YKA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		None
3) K315L Extract fan unit	-11.0	-6.0	-3.0	-1.0	0.0	0.0	0.0	0.0		Extract via louvre above rear access door
Directivity										
1) Mitsubishi PUHZ-RP71VHA4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		None
2) Mitsubishi PUHZ-RP140VKA/YKA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		None
3) K315L Extract fan unit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		None
Levels at nearest sensitive window										
1) Mitsubishi PUHZ-RP71VHA4	42.2	40.2	35.2	29.2	28.2	24.2	17.2	13.2	34	Level from condenser unit
2) Mitsubishi PUHZ-RP140VKA/YKA	44.2	41.2	40.2	34.2	31.2	27.2	21.2	14.2	37	Level from condenser unit
3) K315L Extract fan unit	54.4	54.4	53.9	48.5	47.2	46.0	39.2	35.4	53	Level from air extract fan
Total									53	Combined Level from plant