Date: 22 May 2015

Ref: 15204/001/lwt

AAD
applied
acoustic
design

51-52 TOTTENHAM COURT ROAD

ENVIRONMENTAL NOISE SURVEY

AND

PLANT NOISE CRITERIA

Client: Dome Assets Ltd

Report Author: .....
L Tjellesen
Senior Consultant

Approved By: .....
P Mansfield
Director

THE GREEN BUSINESS CENTRE
THE CAUSEWAY
STAINES
MIDDLESEX
TW18 3AL

TELEPHONE: 01784 464404
FACSIMILE: 01784 465447
E MAIL: mail@aad.co.uk

CONTENTS

1.0 Brief

1.1 Undertake an environmental noise level survey at 51-52 Tottenham Court Road to establish existing levels of background noise affecting closest adjacent third party properties in connection with new additional roof plant.

1.2 Establish limiting plant noise criteria for the new plant in order to meet the current requirements of London Borough of Camden.

2.0 Site Description

2.1 The buildings at 51-52 Tottenham Court Road currently contain occupied offices and retail units at ground floor level.

2.2 The site is surrounded on all sides primarily by other office buildings and retail units located on adjacent roads; Tottenham Court Road (north east/east), Whitfield Street (north west/west) and Windmill Street (south, south east), as shown in figure 1.

2.3 The proposed development consists of conversion of existing premises into residential, offices and retail including the provision of new rooftop plant. Plant noise emission to the nearest noise sensitive receivers, will need to be controlled to appropriate limits as discussed here.

2.4 The nearest noise sensitive receivers are potentially identified as residential units at lower floor levels of the building to the rear of 51-52 Tottenham Court Road, see figure 1. It may require a further investigation of actual location of the residential units when assessing the proposed mechanical plant.

3.0 Survey Details

3.1 Instrumentation: Larson Davis type 824 sound level meter (S/N1341). The instrument was calibrated immediately prior to the commencement of the survey, and upon completion. No calibration drift was recorded.

3.2 Location: The microphone was located on the roof of 52 Tottenham Court Road to the north furthest away from existing plant (condenser unit). The microphone was attached to a tripod approximately 0.5 m above the parapet of the roof and 2.0 m from the roof edge. The measurement location is indicated on figure 1.

3.3 Period: Monitoring was continuous from approximately 13:45 on Thursday 13th May 2015 until approximately 14:45 on Monday 18th May 2015. The instrument was set up to monitor noise levels continuously in fifteen-minute intervals.

3.4 Weather: The prevailing weather conditions during the survey were predominantly dry and clear, though some light rain did occur towards the end of the of the survey period. Wind speeds was considered to be above 5 m/s in periods during the survey period based on the prevailing weather conditions, however, it is considered to have had a negligible influence on the general noise climate.

3.5 Site Noise Characteristics: The general ambient and background noise levels are dominated and characterised by road traffic noise coming from Tottenham Court Road. It is thought that no unusual events occurred during the survey period, and the data includes a fair representation of background noise levels in the area.

3.6 Surveyor: Lise Tjellesen MIOA

3.7 Survey Results: The results of the automated surveys are presented in graphical format in figure 2, showing the recorded values of $L_{Aeq,15min}$ and $L_{A90,15min}$. A glossary of terms is included as figure 3.

4.0 Planning Conditions

4.1 Planning consents issued by London Borough of Camden generally include several conditions which relate to noise and vibration issues. At time of writing, the standard condition which is considered likely to apply to this development are as follows;

> *Noise levels at a point 1 m external to sensitive facades shall be at least 5 dBA 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 attenuation should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10 dBA below the L_{A90}, expressed in dBA. The applicant is therefore required to undertake a full acoustic background noise assessment, the full details of which shall be submitted to the Council, in order that the design criteria for the acoustic enclosure of plant/equipment can be properly assessed.*
>
> *For each of the octave band of centre frequencies 63Hz-8kHz inclusive, noise levels from ALL plant/equipment (measured in L_{Aeq}) when in operation shall at all times add not more than 1 decibel to the existing background noise level L_{A90}, expressed in dBA, in the same octave band as measured 1 metre external to sensitive facades.*

5.0 Plant Noise Criteria

5.1 Limiting noise level criteria for new plant will be considered here in three distinct periods, related to the probable operating periods of the plant; i.e. daytime (07:00 to 19:00), evening (19:00 to 23:00) and night-time (23:00 to 07:00) hours.

5.2 A-weighted noise level assessment

5.2.1 The typical lowest value of background noise level ($L_{A90,15min}$) measured over the three assessment periods are shown in table 1;

Table 1 : Minimum background noise levels

Period	Minimum Background Noise Level
Daytime (07:00 to 19:00)	$L_{A90,15min}$ 58 dB
Evening (19:00 to 23:00)	$L_{A90,15min}$ 58 dB
Night-time (23:00 to 07:00)	$L_{A90,15min}$ 47 dB

5.2.2 To comply with the likely planning requirements, the residual plant noise level must be at least 5 dB lower than these background noise levels, and the appropriate limits are therefore as shown in table 2:

Table 2 : Limiting plant noise level criteria – A-weighted noise levels

Period	Maximum Plant Noise Level
Daytime (07:00 to 19:00)	L_{Aeq} 53 dB
Evening (19:00 to 23:00)	L_{Aeq} 53 dB
Night-time (23:00 to 07:00)	L_{Aeq} 42 dB

5.2.3 If the proposed plant is likely to emit any distinguishable, discrete continuous notes (whine, hiss, screech, hum), or possess any distinct impulses (bangs, clicks, clatters, thumps), then the values of L_{Aeq} shown above must be reduced by 5 dB.

5.3 Octave band noise level assessment

5.3.1 The representative octave band sound pressure levels associated with the overall noise levels from table 1 are shown in table 3;

Table 3 : Typical octave band background noise levels

Period	octave band centre frequency (Hz							
	63	125	250	500	1k	2k	4k	8k
	L_{90} sound pressure level, dB re $2x10^{-5}$ Pa							
07:00 – 19:00	61	56	53	57	54	48	40	26
19:00 – 23:00	61	56	53	57	54	48	40	26
23:00 – 07:00	56	51	45	44	43	39	33	20

5.3.2 To comply with the likely planning requirements, the spectra shown above must be increased by no more than 1 dB in any octave band by the new plant, assessed as the value of L_{eq}. In practice, this means that the value of L_{eq} per octave shall be at least 5 dB less than the value of L_{90}.

5.3.3 In order to achieve the requirements of London Borough of Camden, the residual plant noise level at 1 m from the nearest affected noise sensitive façade should be no more than that shown in table 4;

Table 4 : Limiting plant noise level targets – octave band noise levels

Period	octave band centre frequency (Hz							
	63	125	250	500	1k	2k	4k	8k
	L_{eq} sound pressure level, dB re $2x10^{-5}$ Pa							
07:00 – 19:00	56	51	48	52	50	43	35	21
19:00 – 23:00	56	51	48	52	50	43	35	21
23:00 – 07:00	51	46	40	39	38	34	28	15

6.0 Conclusion

6.1 An environmental noise survey at 51-52 Tottenham Court Road has been carried out in order to establish existing levels of background noise affecting closest adjacent third party properties.

6.2 Based on measured background noise levels limiting plant noise criteria that comply with planning conditions of London Borough of Camden have been determined for use when assessing noise emission from proposed new mechanical services plant.

Figure 1: Site plan and survey location

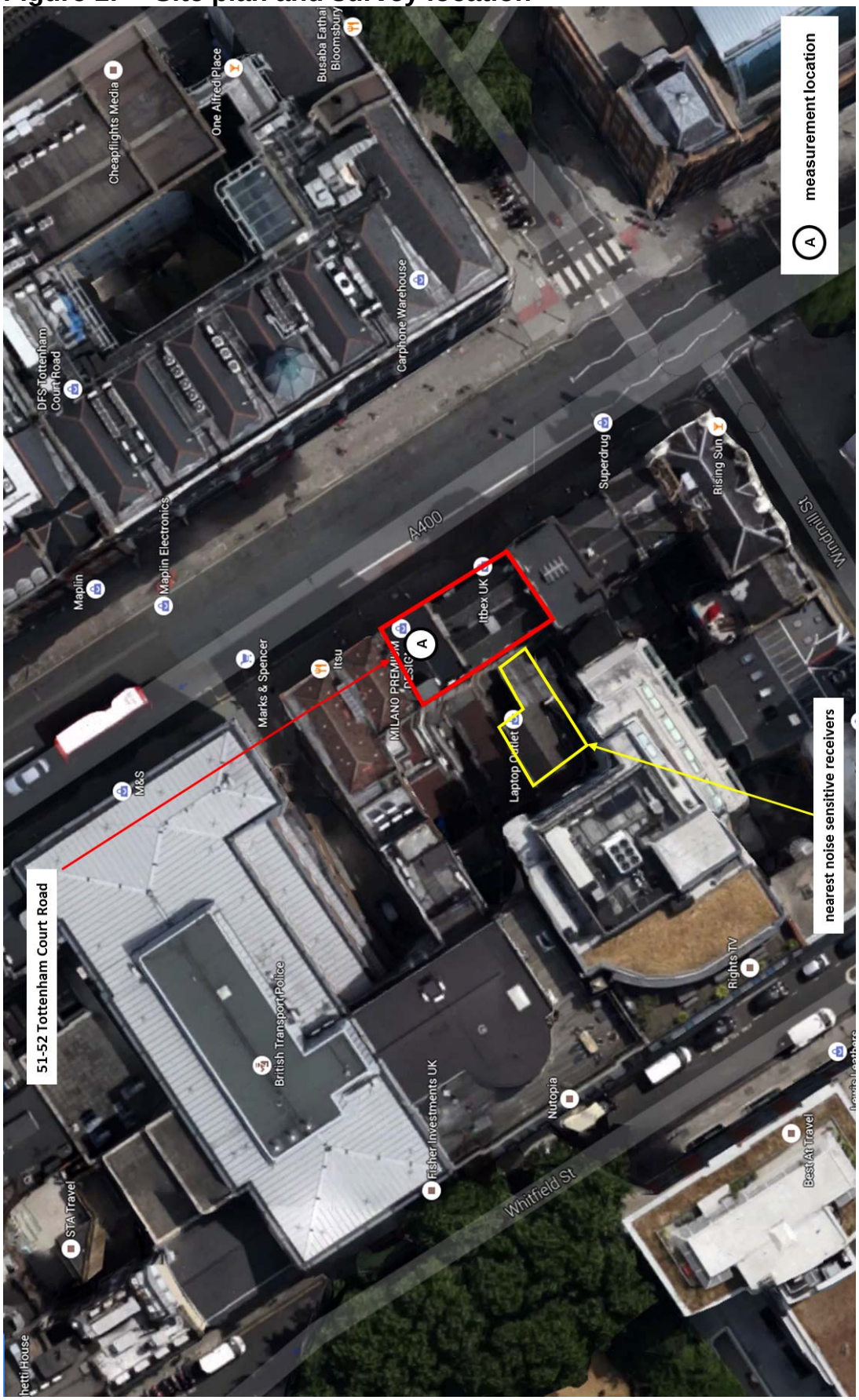

Figure 2: Survey data

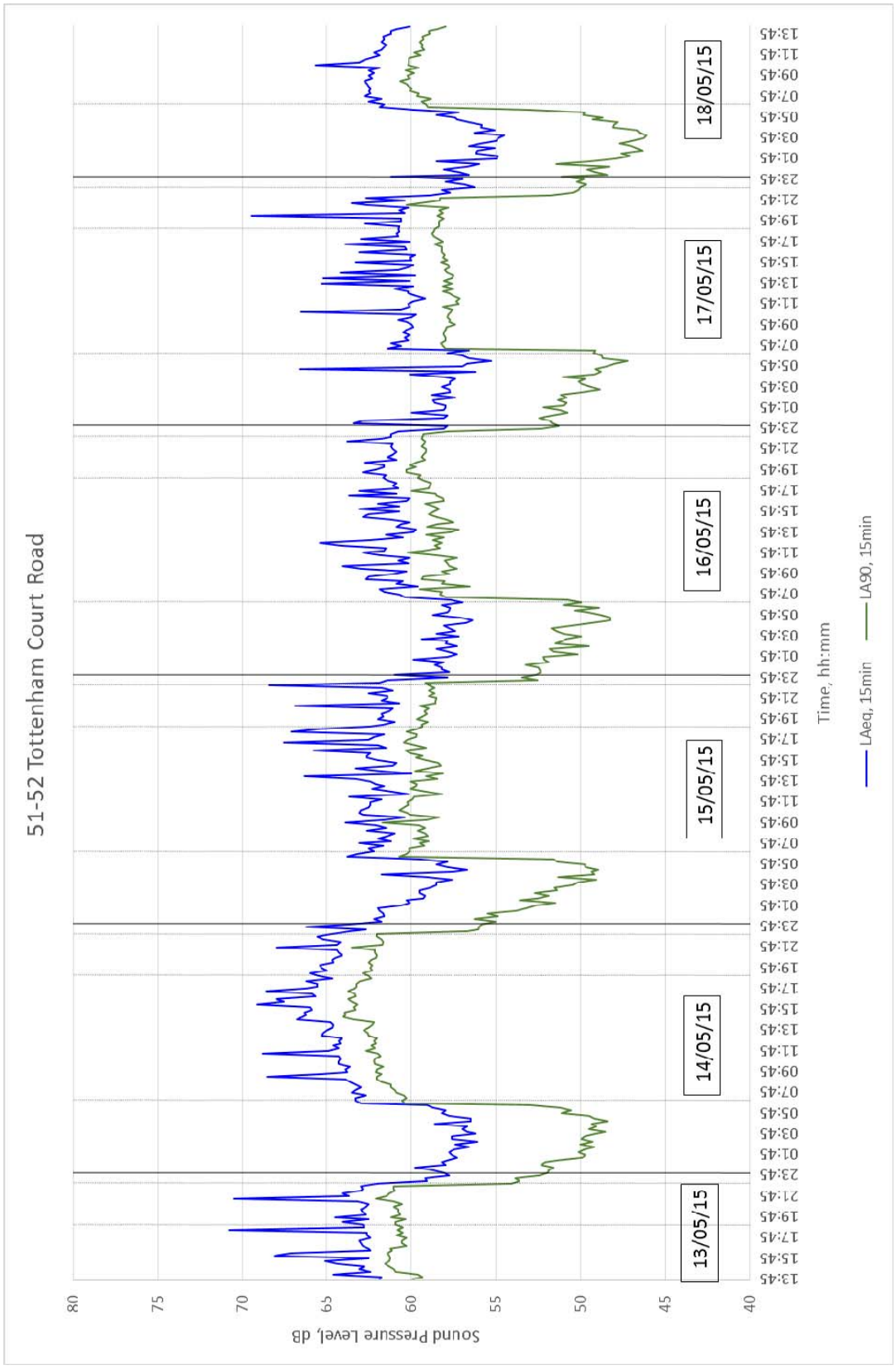

Figure 3 : Glossary of Terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (Lp) the reference quantity is $2x10^{-5}$ N/m^2. The sound pressure level existing when microphone measured pressure is $2x10^{-5}$ N/m^2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (Lp) or Sound Power Level (Lw).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A weighting	Arithmetic corrections applied to values of Lp according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of Lp actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of Lp actually measured.
$L_{n,T}$	Lp which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.
Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:1997.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:1997.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dBA penalty for any tonal, impulsive or irregular qualities, ref. BS4142:1997.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1m from the façade of the nearest affected sensitive property.