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**28- 30 HANWAY STREET, LONDON
PLANT NOISE IMPACT ASSESSMENT**

Technical Report: R5293-1 Rev 1

Date: 4th June 2015

For: KRT Developments
c/o Washbourne Field Planning
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0	Approved for Issue	Reuben Peckham	Stephen Gosling
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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been retained to undertake an assessment of the potential noise impact from plant at a new mixed used (commercial and residential) development at 28-30 Hanway Street, London, W1. The proposals include provision of plant and services which will be installed on the roof of the proposed new building.
- 1.2 The assessment has been undertaken following ambient noise surveys at the site undertaken between 21st and 28th May 2015.
- 1.3 All sound pressure levels quoted in this report are in dB relative to 20 μ Pa. All sound power levels are quoted in dB relative to 10^{-12} Watts. A glossary of the acoustic terminology used in this report is provided in Appendix A.

2.0 SITE DESCRIPTION

- 2.1 The site is located in a mixed residential and commercial area in the Borough of Camden in London.
- 2.2 It is proposed to redevelop the site to comprise office space on the basement, ground and first floors with a flat on each of the second, third and fourth (penthouse) floors. The roof space will include a private terrace to the penthouse flat together with a communal roof garden.
- 2.3 Existing residential properties are located nearby and include the adjacent (neighbouring) house at 32 Hanway Street.
- 2.4 Road traffic noise and existing plant operating in the nearby area are the dominant sources of background noise at the site.
- 2.5 Figure 1 shows an aerial image of the site and surroundings. Figure 2 shows the proposed roof terrace/ plant layout.

3.0 STANDARDS AND GUIDANCE

NPPF

3.1 The National Planning Policy Framework (NPPF) [Reference 1] was published by the Department for Communities and Local Government in 2012. 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.

3.2 The NPPF refers to the Noise Policy Statement for England (NPSE) [Reference 2] 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.

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 In 2014 the Planning Practice Guidance (PPG) was finalised [Reference 3]. This is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The PPG states that noise can override other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.
- 3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system. Table 1 is reproduced from the NPPG and summarises the noise exposure hierarchy, based on the likely average response.

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observable Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extension and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non auditory	Unacceptable Adverse Effect	Prevent

Table 1: PPG Noise Exposure Hierarchy

3.6 In general terms it is considered that a noise impact with an effects level which is lower than SOAEL is acceptable (providing the effect is mitigated to a minimum). There is currently, however, a major discontinuity between the above guidance and objective technical criteria for use in planning noise impact assessments. For this site it is considered that the appropriate (technical and objective) standard for use in assessing the noise impact is those of British Standard 4142 [Reference 4]. These are described below.

Local Planning Authority, Camden Council

3.7 London Borough of Camden's Development Policy DP28 'Noise and Vibration' provides guidance on the control of noise and vibration through planning. The policy states "*Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted*".

3.8 Specifically in relation to plant and machinery, Policy DP28 states "The Council will only grant permission for plant and machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds."

3.9 The London Borough of Camden's requirements for noise from fixed plant are stated in Table E of DP28 which states that, for noise from plant and machinery, at 1 metre external to a sensitive façade the noise level should be 5 dB below the minimum external background noise level (dB LA90, 15 min). Where noise from the plant has a distinctive tonal or impulsive nature, the limits should be reduced by a further 5 dB (i.e. 10 dB below the minimum external background noise level). The daytime period is assessed between 07:00-19:00 hours, evening period between 19:00-23:00 hours and night time period between 23:00-07:00 hours.

4.0 ASSESSMENT METHODOLOGY

4.1 The following assessment methodology has been used:

- i. A background noise survey has been undertaken to determine existing levels of background noise at the nearest residential property plant operating hours;
- ii. Calculations of the noise level from plant at the nearest proposed residential properties from manufacturers data;
- iii. An assessment of the likely noise impact has been undertaken in accordance with Camden Council's requirements.

5.0 ENVIRONMENTAL NOISE SURVEYS

Background Survey

- 5.1 Ambient noise surveys were undertaken to determine the existing noise level at the site. Noise monitoring equipment was located on the second floor balcony on the northern façade of the building (at a location considered acoustically representative of the nearest residential properties to the site). The instrumentation was located in free field conditions. Measurements were undertaken in samples of 5 minutes in terms of the overall free-field A-weighted L_{eq} , L_{90} and $L_{max,f}$ noise levels. Noise measurements were undertaken between 21st and 28th May 2015.
- 5.2 The survey location is shown in Figure 1.
- 5.3 The survey was undertaken with the following instrumentation:
- Rion NL32 Class 1 accuracy sound level meter;
 - Bruel and Kjaer Type 4231 Class 1 accuracy acoustic calibrator.
- 5.4 The instrumentation was calibrated before and after the surveys in accordance with the manufacturer's instructions. No significant drift in calibration was recorded. All instruments were fitted with environmental weather shields during the surveys.
- 5.5 Weather conditions during the survey were generally fine and dry. Wind speeds were lower than 5 m/s during the measurements.
- 5.6 The results of the background noise survey are shown graphically in Appendix B and summarised in Table 2 (15 minute periods in accordance with Camden Council's criteria).
- 5.7 In this instance it is considered that the typical noise level is representative (24Acoustics determines the typical noise level to be the average minus one standard deviation). This method is considered suitable and is shown in Table 2.

Day and Date	Period and Noise Level, dB					
	Day (07:00- 19:00)		Evening (19:00- 23:00)		Night (23:00- 07:00)	
	L _{Aeq} , 12 hr	L _{A90} , 15 min (Min)	L _{Aeq} , 4 hr	L _{A90} , 15 min (Min)	L _{Aeq} , 8 hr	L _{A90} , 15 min (Min)
Thursday 21/5/2015	63	52	59	52	54	45
Friday 22/5/2015	63	50	60	54	56	44
Saturday 23/5/2015	60	48	60	52	55	44
Sunday 24/5/2015	59	48	57	49	53	43
Monday 25/5/2015	56	47	59	49	52	43
Tuesday 26/5/2015	64	50	55	50	52	44
Wednesday 27/5/2015	63	50	66	52	53	44
Thursday 28/5/2015	61	53				
Average	62		60		53	
Minimum		47		49		43

Table 2: Measured Ambient/ Background Noise Levels – Free Field Conditions

Plant Noise Limits

5.8 Based on the limit criteria as described in Paragraphs 3.7-3.9, the following noise limits have been derived for plant at the development. The rating noise level from proposed plant should not exceed the following limits at the nearest residential property:

Daytime noise limit (07:00 – 23:00 hours)	44 dB L _{Aeq} , 15 min;
Night-time noise limit (23:00 – 07:00 hours)	38 dB L _{Aeq} , 15min.

6.0 CALCULATIONS AND NOISE IMPACT ASSESSMENT

- 6.1 Plant to be installed includes five Daikin condenser units which will be installed in the area between the communal and penthouse roof terraces and a Daikin condenser unit which will be installed within a louvred space on the third floor of the building.
- 6.2 Figure 2 shows the proposed plant locations and layout.
- 6.3 Source-term sound power data for the plant has been obtained from the plant manufacturers, Daiken. This is shown in Table 3 below.

Code	Location	Daiken Model No	Sound Power Level, L _{WA} , dB
B/ AC	Roof Terrace	RXYWQ6P8Y1	66
G/ AC	Roof Terrace	RXYWQ6P8Y1	66
1/ AC	Roof Terrace	RXYWQ6P8Y1	66
2/ AC	Roof Terrace	5 MXS90E	68
3/ AC	3 rd Floor Plant Space	5 MXS90E	68
4/ AC	Roof Terrace (penthouse)	RXYWQ6P8Y1	66

Table 3: Plant Source Term Sound Power Data

- 6.2 The plant offers the potential to operate at all times and, for the purposes of the assessment, has been assumed to operate on a 24/ 7 basis.
- 6.3 The results are summarised below:
- Penthouse Terrace: 43 dB L_{Aeq};
 - Hanway Place Flats: 37 dB L_{Aeq}.
- 6.4 The calculations indicate that the plant noise level on the Penthouse roof terrace during the day (with the Penthouse condenser unit switched off) will be lower than the derived noise limit of 44 dB L_{Aeq} and the noise level at the Hanway Place flats will be lower than the derived night-time noise limit of 38 dB L_{Aeq} and will therefore be compliant with Camden Council's noise criteria at all times.
- 6.5 The calculations assume that an impervious barrier with a minimum surface density of 10 kg/ m² and height of at least 1.5 m will be installed on the penthouse terrace which will act as an acoustic barrier.

- 6.6 Furthermore, in order to achieve compliance, additional attenuation should be provided by the louvres to the 3rd floor plant room ventilation openings. The louvres should achieve the minimum sound reduction performance as shown in Table 4 below.

Unit	Sound Reduction Index (dB) per Octave Band Frequency, Hz							
	63	125	250	500	1k	2k	4k	8k
Plant Room Ventilation Louvres	8	9	12	15	21	26	24	19

Table 4: Plant Room Ventilation Louvres, Sound Reduction Performance

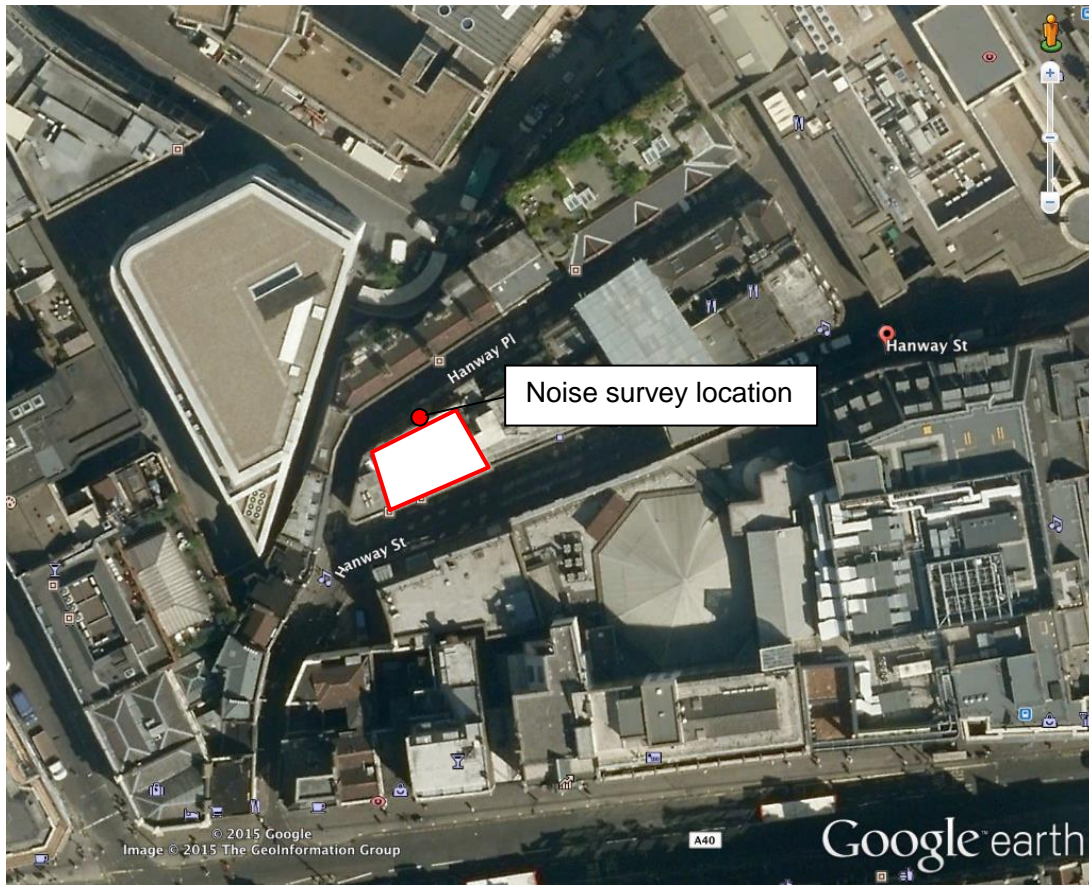
- 6.7 On this basis, considering appropriate mitigation, it is considered that the noise impact from the proposed plant will be lower than LOAEL (as defined in the PPG/ NPSE) and therefore will not adversely affect the health or quality of life of the occupants of the neighbouring properties.


7.0 CONCLUSIONS

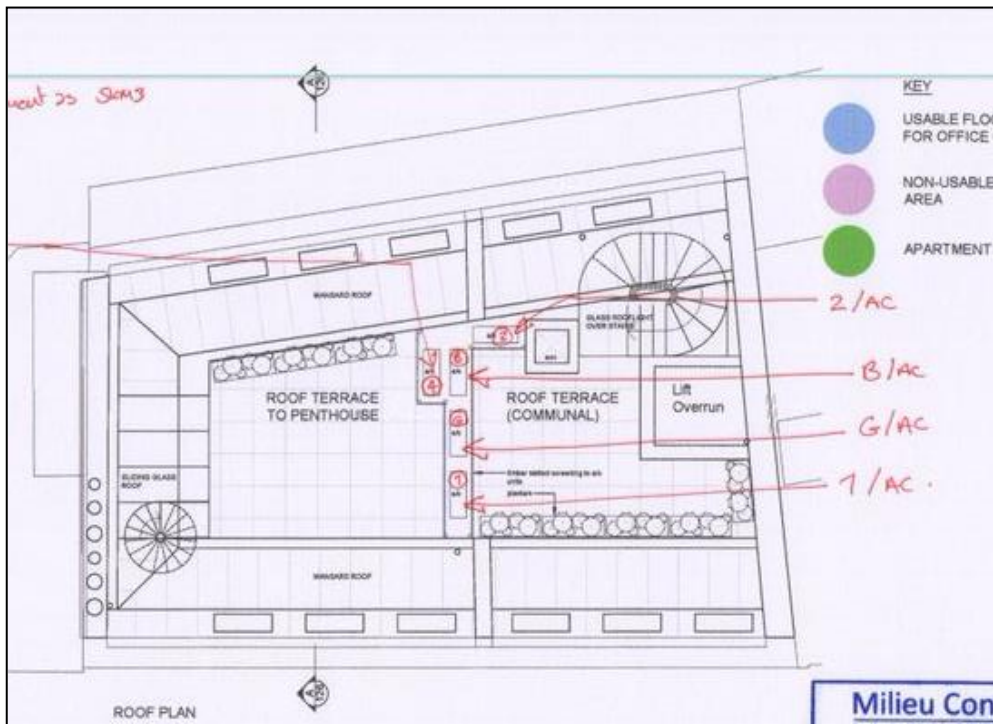
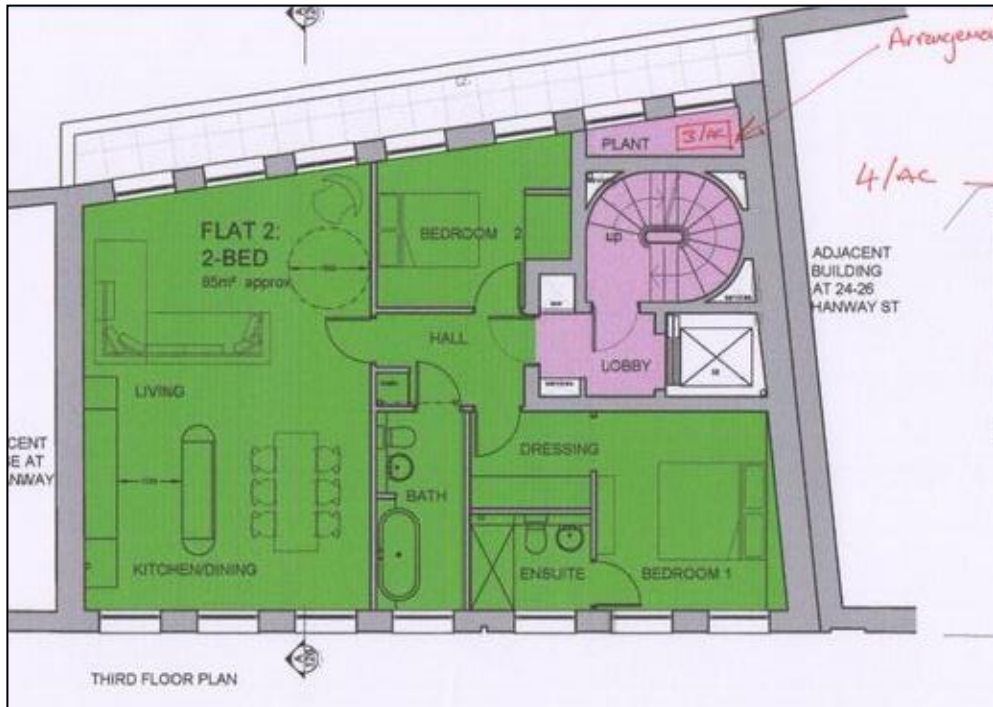
- 7.1 24 Acoustics Ltd has been retained to undertake an assessment of the potential noise impact from plant at a new mixed used (commercial and residential) development at 28-30 Hanway Street, London, W1. The proposals include provision of plant and services which will be installed on the roof of the proposed new building.
- 7.2 The assessment has been undertaken following ambient noise surveys at the site undertaken between 21st and 28th May 2015.
- 7.3 The assessment has indicated that noise impact from the plant at the nearest residential properties will fall below the defined plant noise limits stipulated by Camden Council and is therefore considered acceptable.


REFERENCES

1. National Planning Policy Framework, Department for Communities and Local Government, 2012.
2. Noise Policy Statement for England, Defra, 2010.
3. Planning Practice Guidance, Department of Communities and Local Government, March 2014.



Project: 28- 30 Hanway Street	Description: Site Location		 24Acoustics www.24acoustics.co.uk
DWG No: Figure 1	Scale: N.T.S.	Rev: A	
Date: June 2015	Drawn By: RP	Job No: 5293-1	



<p>Project: 28- 30 Hanway Street</p>	<p>Description: Proposed Plant Location</p>		 24Acoustics www.24acoustics.co.uk
<p>DWG No: Figure 2</p>	<p>Scale: N.T.S.</p>	<p>Rev: A</p>	
<p>Date: June 2015</p>	<p>Drawn By: JE</p>	<p>Job No: 5293-1</p>	

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 – AMBIENT NOISE SURVEY RESULTS

Figure B1: 28 - 30 Hanway Street, London Noise Survey 21st - 28th May 2015

