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REPORT TITLE:

16 Vine Hill, Clerkenwell Environmental Noise Survey and Assessment

CLIENT DETAILS:

European Urban Architecture

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1. Introduction

Pace Consult has been commissioned by European Urban Architecture to undertake a noise survey and assessment to aide in support of the proposed new plant installation on the roof of 16 Vine Hill, Clerkenwell, EC1R 5EA.

This report assesses the acoustic requirements of the proposed development based on environmental noise survey data measured at the site and has been prepared in accordance with relevant Local Authority guidance, standards or policies as well as national standards and guidelines including British Standard BS4142: 1997, Method for Rating Industrial Noise affecting Mixed Residential and Industrial Areas.

The site is shown in appendix one to the rear of this report.

The development is residential and is situated on Vine Hill; it is surrounded by commercial and residential properties. The main noise source in the area is traffic noise from Clerkenwell Road.

2. Assessment Methodology

Perception

Noise is defined as unwanted sound. Human ears are able to respond to sound over the frequency range of about 20 Hz to 20 kHz and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, and is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates to the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear. To help understand the range of noise levels which may be encountered, an indication of the level of some common sounds on the dB(A) scale is given in the table below.

Table 1 - Common Sounds on the dB(A) Scale

dB(A)	Description
140	Threshold of pain
120	Jet take off at 50 metres
100	Maximum noise levels on an underground platform
80	Kerbside of a busy urban street
60	Busy general office
40	Residential area at night
20	Background in a TV and recording studio
0	Threshold of hearing

Furthermore, the perception of noise may be determined by a number of other factors, both acoustic and non-acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In addition, the time of day and other acoustic features such as tonality may be important, as may the disposition of the affected individual receptor. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that corresponds to the response of the human ear is the A-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90}, etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) of a steady source is generally regarded as the minimum difference needed to perceive a change.

Legislation and Policy

The impact of potential noise emission from the proposed development is assessed in compliance with BS 4142:1997 and the following noise levels measured/determined:

a. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development; or at a location where background conditions can be argued to be similar.

b. The rating noise level resulting from the proposed noise-source. This can be based upon reference to similar installations or sites, or determined by calculation.

British Standard BS4142: 1997, Method for Rating Industrial Noise affecting Mixed Residential and Industrial Areas

BS4142 is intended to be used for assessment of whether noise from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises is likely to give rise to complaints from people residing in nearby dwellings. The Standard states that:

'It (BS4142) may be found helpful in certain aspects of environmental planning and may be used in conjunction with recommendations on noise levels and methods of measurement published elsewhere.'

The procedure contained in BS4142 for assessing the likelihood of complaints is to compare the measured or predicted noise level from the source in question, the 'specific noise level', at the assessment position with the background noise level. Where the noise contains a 'distinguishable, discreet, continuous note (whine, hiss, screech, hum etc.) or if there are distinct impulses in the noise (bangs, clicks, clatters or humps), or if the noise is irregular enough to attract attention' then a correction of 5 dB is added to the specific noise level to obtain the 'rating level'. British Standard, BS7445: Part 2: 1991: Description and measurement of environmental noise - Guide to the acquisition of data pertinent to land use contains a more objective method of assessing whether a sound is tonal. It states:

'In some practical cases, a prominent tonal component may be detected in one-third octave spectra if the level of a one-third octave band exceeds the level of the adjacent bands by 5dB or more.'

To assess the likelihood of complaints, the measured background noise level is subtracted from the rating noise level. BS4142 states:

'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance. At a difference below 5 dB, the lower the value the less likelihood there is that the complaints will occur. A difference of -10 dB is a positive indication that complaints are unlikely.'

However, in addressing the potential for noise intrusion the standard also states that:

'For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low.'

Camden Council

Clare Sheppard of Camden Council's Environmental Health Department has informed us that their criteria for plant noise in the Camden area is 5dBA below background, or 10dBA below if the noise is tonal or intermittent. This is in-line with BS4142:1997 and indicates that there is less likelihood that complaints will occur at this level.

3. Noise Survey Details

A noise survey was carried out at the proposed site between 1st May and 2nd May 2012.

The noise levels measured are representative of existing noise climate at the facades of the development and the level incident on surrounding sensitive receptors.

The survey was carried at a position on the roof of 16 Vine Hill, overlooking the street below. Measurements were taken in accordance with the principles of BS 7445:2003 Parts 1 (2003) & 2-3(1991), 'Description and Measurement of Environmental Noise', and BS 4142:1997 Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas.

The climatic conditions during the noise surveys were cold with light winds (< 2m/s). There was no occasion of rain during measurements, hence conditions were considered conducive to undertake environmental noise measurement. Subjectively, the site and surrounding buildings experience noise predominantly from surrounding transportation network.

Measurements were made with calibrated precision grade sound level meters which achieve the requirements of BS EN 61672: 2003.

The noise parameters L_{Aeq}, L_{A90}, L_{A10} and L_{Amax} have been monitored and the relevant values obtained for day and night-time periods. Measurements were taken in third octaves but noise limits later in this report are to be set as single figure 'A' weighted values rather than octave or third octave levels.

The measurement position, MP1, is shown in Appendix one.

4. Summary of Lowest Background Levels (L90)

The results of the background noise measurements are presented in table 3 below.

Table 2 : MP1 Day-time	
Time	Lowest $L_{A90,T}$ dB
Day Time (22.20)	47.2

Table 3 : MP1 Night-time	
Time	Lowest $L_{A90,T}$ dB
Night Time (03:30)	37.8

Average noise levels recorded over a 24 hour period

Table 4 : MP1 Night-time			
Time	Log Average $L_{Aeq,T}$ dB	Average L_{Amax} dB	Average $L_{A90,T}$ dB
Day Time 0700 - 2300	59.8	70.7	52.0
Night Time 2300 - 0700	51.9	64.7	42.4

5. Assessment of Noise from mechanical plant

Noise impact of items of plant and fixed installation has been determined in accordance to the guidance contained in BS4142: 1997, 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas' in compliance with Local Authority requirements.

Camden Council requires that plant noise does not exceed 5dB below background. We have assessed the installation in accordance with BS4142:1997 which indicates that complaints will be less likely to occur at this level. The penalty of 5dB for tonal/intermittent plant as discussed in BS4142 would also apply.

Assessment in accordance with the principles of BS 4142 states that where there is a difference of -5 dB then complaints are less likely. It is assumed that the proposed plant will be running 24 hours a day, therefore the criteria is based on the lowest background level recorded during the night-time period, this is presented in table 3.

Table 5: Summary of the recommended Noise Rating Level dB

Location	Period	Recommended Rating Noise Level $L_{Ar,\,T}$ (dB)
MP1 Roof of 16 Vine Hill	Night Time	32.8

For circumstances where plant items emit noise with an audible tone or operate intermittently, 5dB should be removed from the values above, as per the requirements for assessment under the provisions of BS4142: 1997 '*Method for rating industrial noise affecting mixed residential and industrial areas*'.

BS4142 states within its scope:

The method is not suitable for assessing the noise measured inside buildings or when the background and rating noise levels are both very low.

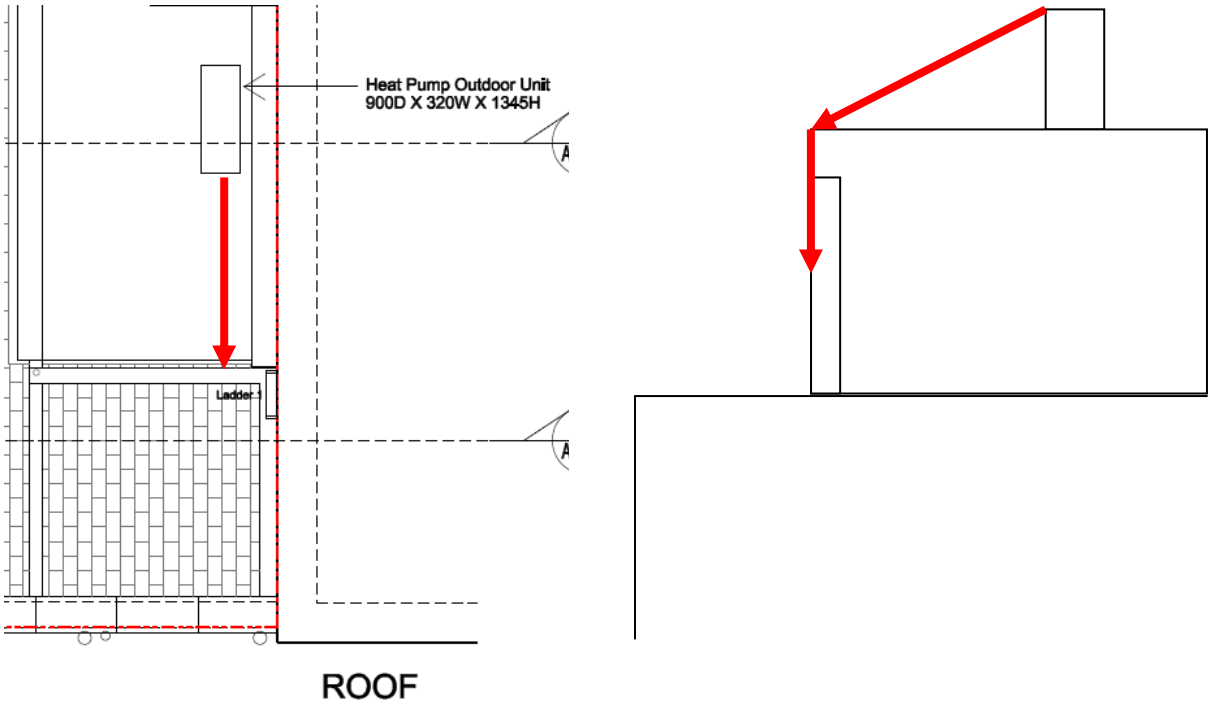
NOTE. For the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low.

The background noise conditions surrounding this site are considered very low indicating that assessment under the provisions of BS4142 is not suitable. The background noise

levels recorded in the early hours of the morning at the nearest residential receptor is L_{A90} = <37dBA, the rating noise level requested by the local authority would equate to a noise level of 32dBA which is therefore significantly beyond the scope of BS4142 which suggests is not suitable where rating noise levels are below 35dB.

In these circumstances it is often the case that noise emission values are considered on the individual application conditions rather than the application of a 'one size fits all' design approach.

Table 5 (above) shows the recommended noise rating at the nearest residential properties resulting from any plant that is installed. This is 5dB below the background noise level (lowest L90).



The sketches above show the noise path to the nearest residential receptor, the third floor terrace door and clerestory window of 16 Vine Hill. We expect this noise path to give a sound reduction of **16dBA** due to the shading effect of the roof plus **8dBA** through distance attenuation. There is a window above the plant; on the façade of No. 18 Vine Hill, this is a commercial store room and so is not considered a sensitive receiver.

The proposed condensing unit is a Daikin VRV III, the noise level provided for this equipment is 50dBA. We assume this level to be measured at 1m from the plant however this is not stated in the document provided.

The noise levels of the plant and expected reductions are summarised in the table below.

Period	Recommended Noise Rating	Plant Noise Level	Noise Attenuation (Shading + Distance)	Expected Noise Level at Receiver
Night-time	28dBA*	50dBA	24dBA	26dBA

* Note: The condensing unit is expected to be intermittent; BS4142 says that 'if the noise is irregular enough to attract attention' then a correction of 5 dB is added to the specific noise level to obtain the 'rating level'.'

The resulting noise level at the nearest residential receptor is expected to fall within the criteria set out by Camden Council in accordance with BS4142:1997 and therefore we do not expect that any mitigation will be required.

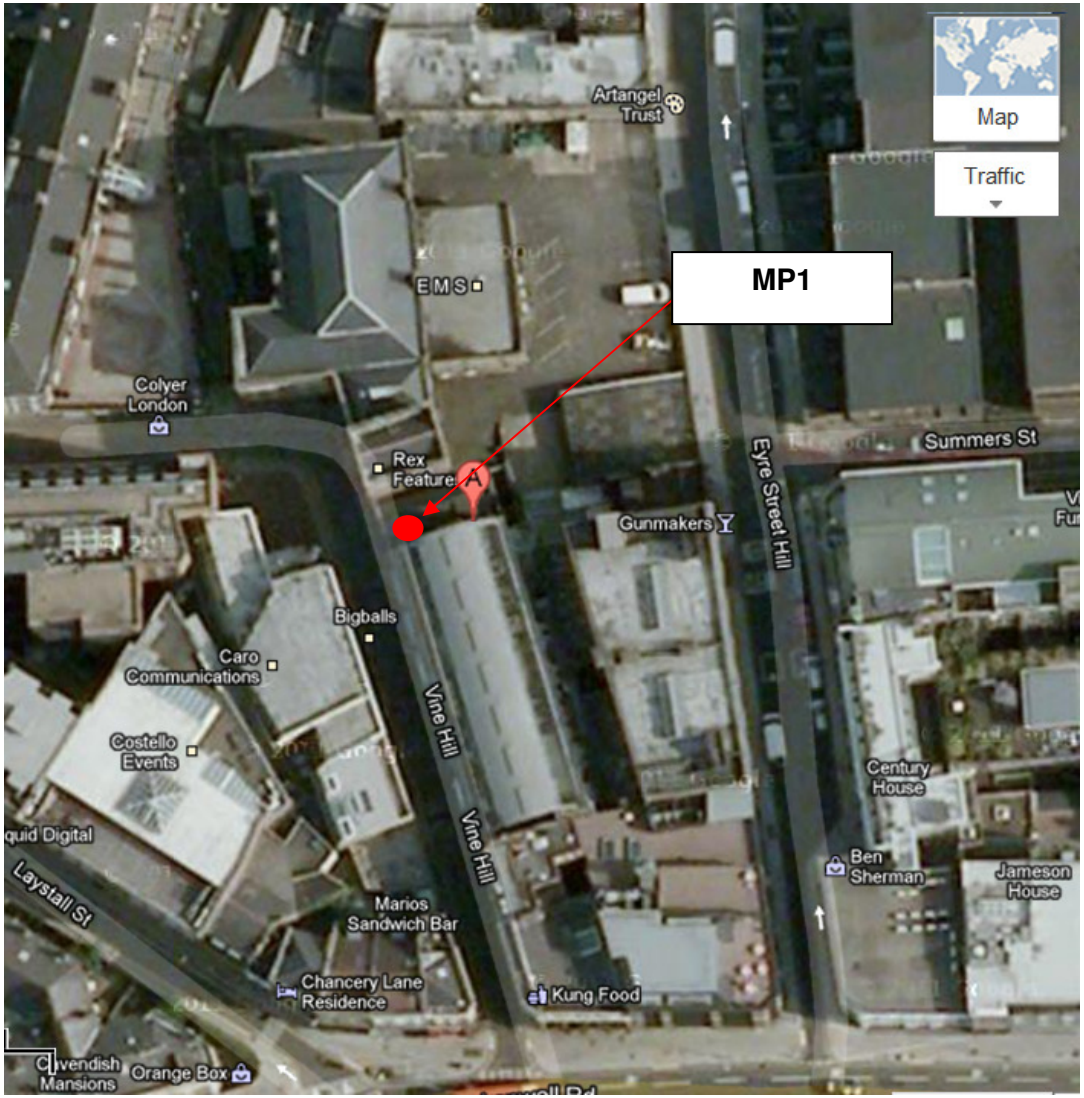
6. Conclusions

The effects and impact of noise relating to background noise and the impact of plant noise from the roof of 16 Vine Hill have been assessed. Throughout, the assessment has been undertaken with reference to Local Authority criteria and relevant British Standards and national guidance on noise impacts.

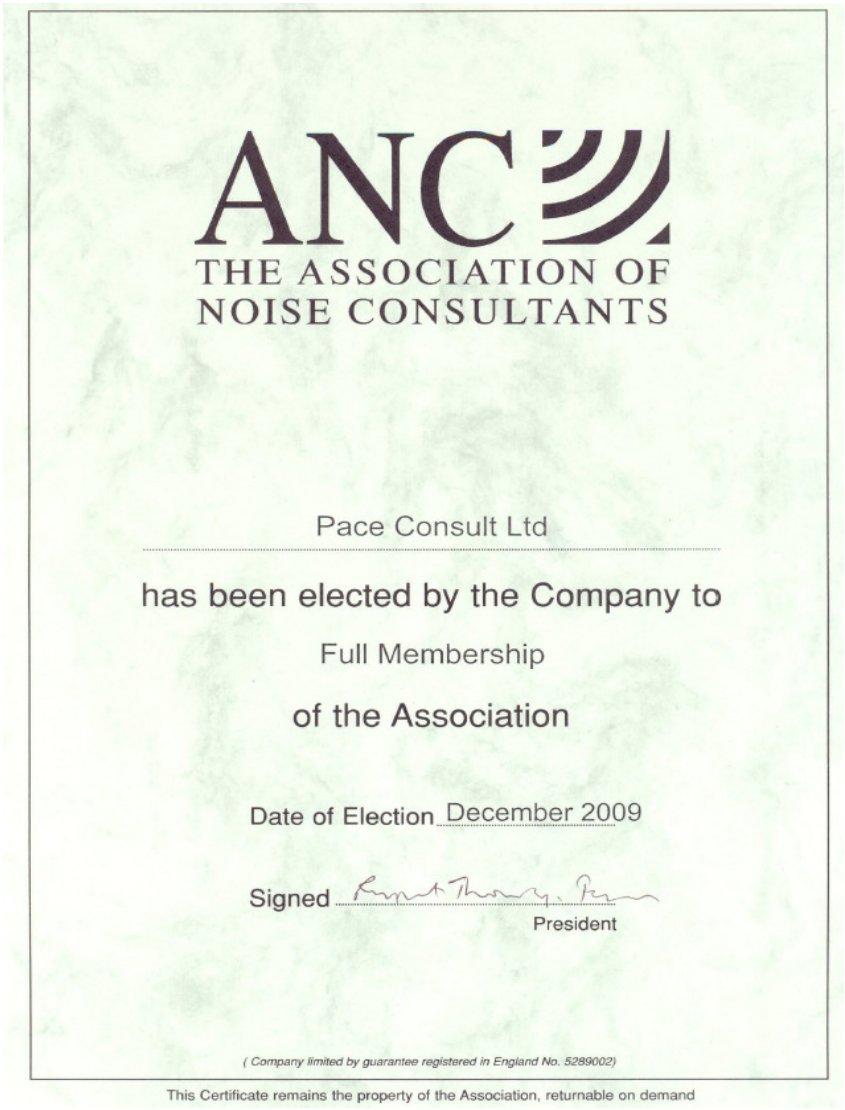
To minimise risk of noise nuisance to the surrounding community plant noise target design levels have been recommended. The effects of the proposed condensing unit have been assessed.

It has been determined that the use of BS4142: 1997 '*Method for rating industrial noise affecting mixed residential and industrial areas*' is not suitable overnight surrounding this development due to very low background noise conditions. Despite this, the resulting noise level at the nearest residential receptor is still below the required level and we do not expect that any mitigation will be required.

7. Appendix 1 – Site Location:



8. Appendix 3 – ANC Accreditation



ANC

THE ASSOCIATION OF NOISE CONSULTANTS

Pace Consult Ltd

has been elected by the Company to

Full Membership

of the Association

Date of Election December 2009

Signed

President

(Company limited by guarantee registered in England No. 5289002)

This Certificate remains the property of the Association, returnable on demand