## REPORT TITLE:

36 Flask Walk, London – Environmental Noise Survey and Plant Noise Assessment

## CLIENT DETAILS:

Vidhur Mehra

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## REPORT REFERENCE:

PC-15-0026-RP1-RevB

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# Contents

# 1. Introduction

Pace Consult Limited was commissioned to undertake a noise survey and assessment to aide in support of the proposed plant installations at 36 Flask Walk, London, NW3 1HE.

This report assesses the predicted noise impacts of the proposed development on the surrounding area based on environmental noise survey data measured on site. It has been prepared in accordance with relevant Local Authority guidance, standards or policies as well as national standards and guidelines including British Standard BS4142: 2014, Method for Rating and Assessing Industrial and Commercial Sound.

The site is shown in figure 1 to the rear of this report.

The development is a refurbished residential property with a proposed extension to the third floor. The proposed plant is to be positioned on the roof of the second floor. The main noise source in the area is traffic noise.

# 2. Assessment Methodology

## 2.1 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.

## 2.2 Legislation and Policy

The impact of potential noise emission from the proposed development is assessed in compliance with BS 4142:2014 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.

## 2.3 British Standard BS4142: 2014, Method for rating and assessing industrial and commercial sound

BS4142 has recently been revised and the 1997 edition has been replaced. The standard sets out a methodology for the assessment of whether noise from factories, industrial premises or fixed installations and sources of an industrial/commercial nature.

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 correct background noise level for the worst case time of operation.

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 or clatters), or if the noise is irregular enough to attract attention’ then a range of correction factors can be added to the specific noise level as appropriate to obtain the ‘rating level’.

As this is a prescriptive report prior to plant installation, overall rating noise levels will be specified for the new installation. Compliance with the rating value will be necessary to

provide evidence that significant adverse impact has been avoided as required by the NPSE.

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

*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessment and arriving at decisions, therefore, it is essential to place the sound in context.*

*Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (See Clause 8) from the rating level (see Clause 9) and consider the following.*

*a) Typically the greater the difference, the greater the magnitude of the impact.*

*b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*

*c) A difference of around 5dB is likely to be an indication of an adverse impact, depending on the context.*

*d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

*Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.*

*1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

   *Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*

   *Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*

*2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as;*

   *i) Façade sound insulation treatment*

   *ii) Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*

   *iii) Acoustic screening.*

In summary, the BS4142: 2014, 'Methods for rating and assessing industrial and commercial sound' would indicate that compliance with the wider aims of the NPSE is achieved when a rating level does not exceed the background sound level for the given time of operation.

## 2.4 Camden Council

Camden Council has set noise criteria and these are detailed in the Camden Development Policies 2010, Local Development Framework. The requirements are shown below.

**Table E: Noise levels from plant and machinery at which planning permission will not be granted**

| 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 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, 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$L_{Aeq'}$ |

In this instance the Local Authority criteria are more onerous than BS4142:2014 and therefore they will take precedence in this assessment.

# 3. Noise Survey Details

A noise survey was carried out at the proposed site between the 2nd and 3rd February 2015.

The noise levels measured are representative of the existing noise climate at the facades of nearest sensitive receptors.

During the survey the noise monitor was positioned out of the second floor window of 36 Flask Walk with a view of the road, opposite and in line with the nearest sensitive receptors. 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 4142:2014 'Method for rating and assessing industrial and commercial sound'.

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 traffic noise.

Measurements were made with a calibrated precision grade sound level meter which achieves the requirements of BS EN 61672: 2003. The meter was calibrated before and after the noise survey and no significant drift was noted.

The noise parameters $L_{Aeq}$, $L_{A90}$ and $L_{Amax(fast)}$ 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 Figure 1.

# 4. Summary of Lowest Background Levels (LA90)

The plant noise assessment is based on the existing background noise levels at the nearest sensitive receiver.

The results of the lowest background noise measurements are presented in table 2 below. A full set of noise data is presented in Appendix 1.

| **Table 2 : MP1 Day-time** | |
|---|---|
| Time | Lowest $L_{A90,T}$ dB |
| Day Time (07:00 – 23:00) | 38.4 |
| Night Time (23:00 – 07:00) | 32.1 |

Average noise levels recorded over a 24 hour period are presented in table 3 for information purposes.

| **Table 3 : MP1 Night-time** | | | |
|---|---|---|---|
| Time | Log Average $L_{Aeq,T}$ dB | Average $L_{Amax}$ dB | Average $L_{A90,T}$ dB |
| Day Time<br>0700 - 2300 | 54 | 68 | 44 |
| Night Time<br>2300 - 0700 | 42 | 52 | 36 |

# 5. Noise Limits at the Nearest Residential Receivers

The noise impact of items of plant and fixed installation has been determined in accordance to the guidance contained in BS4142: 2014, 'Method for rating and assessing industrial and commercial sound' in compliance with Local Authority requirements.

Camden Council requires that plant noise does not exceed 5dB below background. The installation has been assessed in accordance with BS4142:2014 which indicates that complaints will be less likely to occur at this level.

The proposed plant may run at any time of day or night and therefore the criteria is based on the lowest background level recorded during the 24 hour survey period, this is presented in table 5.

**Table 5: Summary of the recommended Noise Rating Level dB**

| Location | Period | Rating Noise Level $L_{Ar,\,T}$ (dB) |
|---|---|---|
| MP1 | 24 hours | 27 |

Note: 5dB would need to be removed from the rating noise level above should the noise source have a distinguishable discrete continuous note or have distinct impulses.

Note: BS4142:2014 specifies varying corrections for tonality and impulsivity; however the Camden requirements have been used as the most onerous criteria.

# 6. Assessment of Noise from Mechanical Plant

## 6.1 Mechanical Plant

The following external plant noise sources are to be located on the building: 1 No. DVM S Eco AM050FXMDGH.

The manufacturer noise data for the proposed units is shown below.

| Model Name | | | | AM050FXMDGH |
|---|---|---|---|---|
| Power Supply | | | Φ, #, V, Hz | |
| Mode | | | - | |
| Performance | HP | | HP | 5.00 |
| | Capacity (Nominal) | Cooling | kW | 14.00 |
| | | Heating | | 16.00 |
| | SEER | | | |
| | EER | | | 3.80 |
| | COP | | | 4.43 |
| Power | Power Input (Nominal) | Cooling [1] | kW | 3.68 |
| | | Heating [2] | | 3.61 |
| | Max. Current | | A | |
| | Fuse Rating | | | 16 |
| COP | Nominal Cooling | | - | 3.80 |
| | Nominal Heating | | - | 4.43 |
| Fan | Air Flow Rate | | CMM | |
| | | | l/s | |
| Piping Connections | Liquid Pipe | | Φ, mm | |
| | | | Φ, inch | |
| | Gas Pipe | | Φ, mm | |
| | | | Φ, inch | |
| | Installation Limitation | Max. Length | m | 150(175) |
| | | Max. Height | | 50.0(40.0) |
| Refrigerant | Type | | - | |
| | Factory Charging | | kg | |
| Sound [3] | Sound Pressure | | dB(A) | 51.0 |
| | Sound Power | | | 67.0 |
| External Dimension | Net Weight | | kg | |
| | Net Dimensions (WxHxD) | | mm | 940 x 1,210 x 330 |
| Operating Temp. Range | Cooling | | °C | |
| | Heating | | | -20.0 ~ 26.0 |

## 6.2 Mechanical Plant Noise Levels at Nearest Residential Receiver:

The nearest residential receiver is directly opposite the proposed development on Flask Walk; this is approximately 16m from the proposed plant. The following table shows the expected plant noise levels and the nearest residential receiver.

| |
|---|
| Project - 36 Flask Walk |
| Reference - PC-15-0031 |

Summary of Atmospheric Noise calculations from M & E Plant to the nearest residential window directly opposite the proposed development

| Source Plant Reference | Lp @ | Distance | Screening By Building | Distance | Dist Correction | Lp at distance |
|---|---|---|---|---|---|---|
| | | | | | | |
| DVM AM050FXMDGH | 51 | 1.0m | 0.0 dB(A) | 16m | -24.1 | 26.9 dB(A) |

| | | |
|---|---|---|
| | Total | 26.9 dB(A) |
| | | (32dBA Measured L90) |

Note: The noise source is not expected to be tonal or contain distinct impulses.

As can be seen in the above calculation summary, noise from the condenser unit is expected to be 5dB below the measured background noise level.

To ensure a robust assessment, the plant noise level to the adjacent property to 36 Flask Walk has also been assessed. The expected noise level at this dwelling as is shown in the table below.

| |
|---|
| Project - 36 Flask Walk |
| Reference - PC-15-0031 |

Summary of Atmospheric Noise calculations from M & E Plant to the nearest residential window directly opposite the proposed development

| Source Plant Reference | Lp @ | Distance | Screening By Building | Distance | Dist Correction | Lp at distance |
|---|---|---|---|---|---|---|
| | | | | | | |
| DVM AM050FXMDGH | 51 | 1.0m | 18.0 dB(A) | 4m | -12.0 | 21.0 dB(A) |

| | | |
|---|---|---|
| | Total | 21.0 dB(A) |
| | | (32dBA Measured L90) |

Note: The noise source is not expected to be tonal or contain distinct impulses.

Note: The screening affect of the building was calculated in accordance with the Maekawa method.

As can be seen in the above calculation summary, noise from the condenser unit is expected to be 11dB below the measured background noise level.

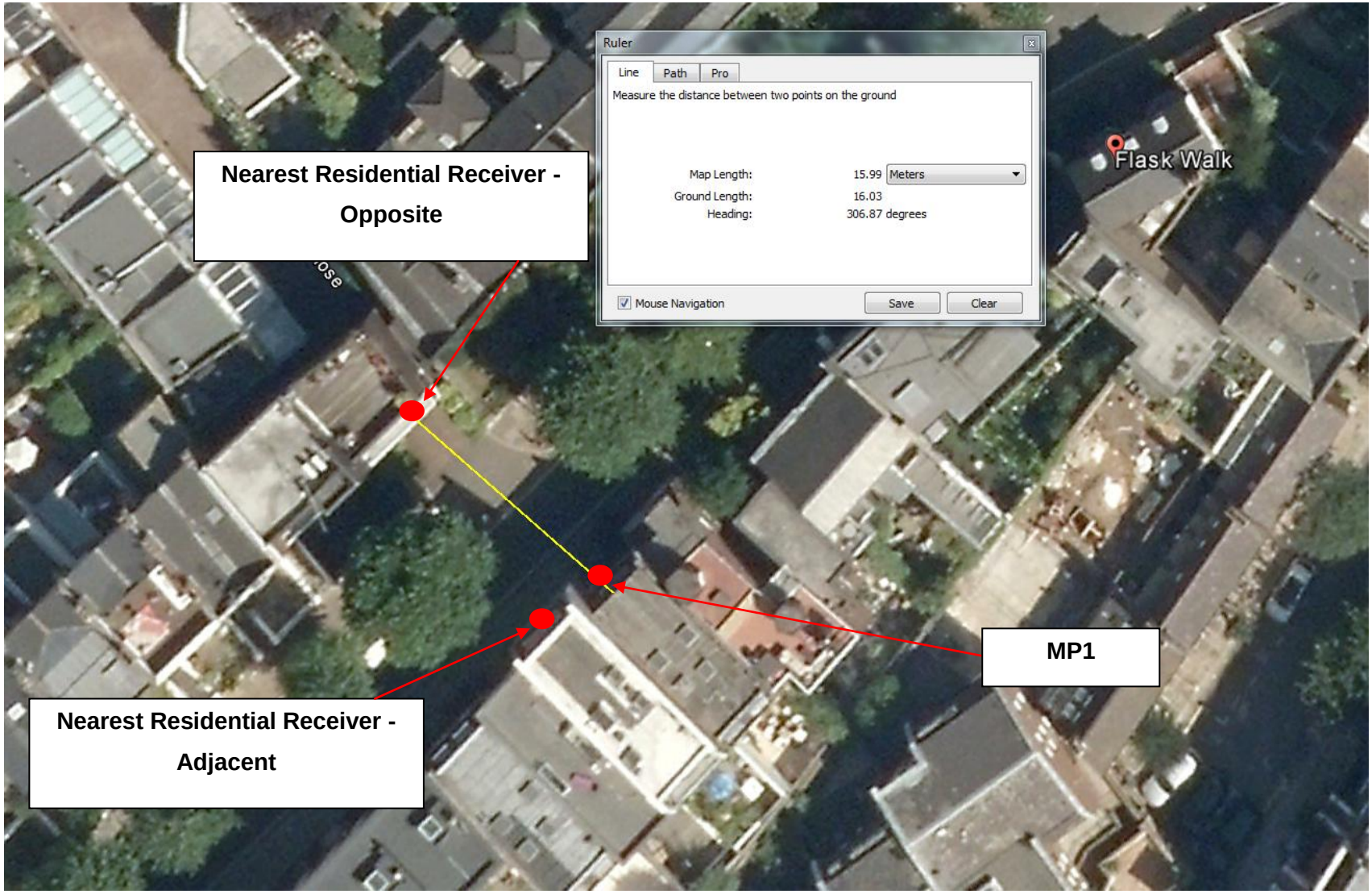
# 7. Conclusions

The effects and impact of noise relating to background noise and the impact of plant noise from the proposed condenser unit at 36 Flask Walk 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.

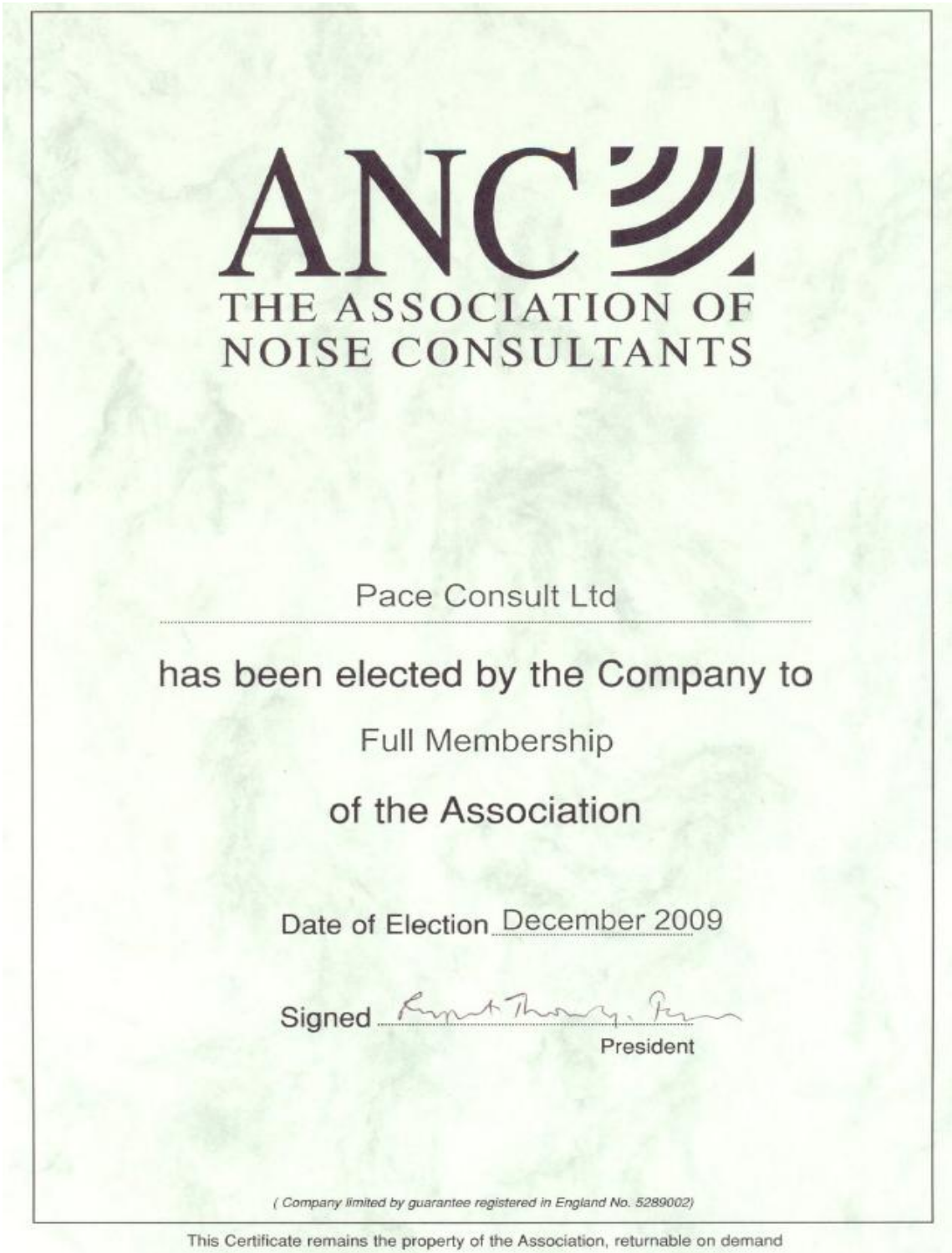
To minimise the risk of noise nuisance to the surrounding community plant noise target design levels have been calculated based on measured background noise levels and local authority guidance. The effects of the proposed condenser units have been assessed.

The expected plant noise levels at the nearest residential receivers are 5dB & 11dB below the lowest background measurement during the 24 hour period. This is therefore compliant with the Local Authority's plant noise requirements.

Figure 1 – Site Location:



# Appendix 1 – 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