6. Appendices

I. Acoustic Report by AAD

4M GROUP

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Ref: 21157/001/af

applied acoustic design

30 FERNCROFT AVENUE

LONDON

NW3 7PH

ENVIRONMENTAL NOISE SURVEY

& PLANT NOISE ASSESSMENT

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CONTENTS

1.0 Introduction

1.1 An environmental noise level survey to determine prevailing background noise levels has been undertaken at the location of 30 Ferncroft Avenue, London, NM3 7PH.

1.2 Noise level limits have been developed for the proposed mechanical services plant scheme, with regard to the planning policy requirements stipulated by the Local Authority.

2.0 Site Description

2.1 The site is a residential building, which is proposed to be redeveloped. The redevelopment proposal includes the addition of a basement extension that will contain a swimming pool and associated new mechanical services plant.

2.2 The site is surrounded by other residential properties with the closest most noise sensitive facades determined to be those associated with 51 and 53 Hollycroft Avenue, approximately 22 metres from the site boundary. The development site is also approximately 90 metres from a primary school (St. Margret's School) and 330 metres from a main A-road (Finchley Road).

2.3 Refer to Appendix 1 for site plan and the proposed mechanical services plant location.

3.0 Site Noise Survey

3.1 Instrumentation: NTI XL2-TA (Class 1) sound level meter (Serial No. A2A-08108-E0). This instrument was powered by an external battery and stored in a weather proof case. The instrument was checked for calibration prior and subsequent to use with a Larson Davis type CAL 250 calibrator whereupon no calibration drift was recorded. The instrument was used in accordance with manufacturer's instructions.

3.2 Location: The noise monitor was located near the site boundary in the direction of the nearest noise sensitive facades identified above.

3.3 Periods: Noise level monitoring was continuous from approximately 15:30 hours on Wednesday 9th June 2021 until approximately 12:15 hours Tuesday 15th June 2021. The meter was configured to monitor noise levels continuously in fifteen-minute intervals.

3.4 Weather: The prevailing weather conditions over the survey period were calm and dry. Wind speed, although not recorded, was considered to be less than 5 m/s throughout the survey period, based upon observed conditions at the time of deployment and collection of the equipment, and historical weather data.

3.5 Site Noise Characteristics: The background noise levels were dominated by traffic noise from vehicles using the surrounding roads and occasional birdsong. The data used for the assessment is considered to include a fair representation of the noise levels in the area.

3.6 Surveyor: Adam Freeman BSc (Hons), TechIOA

3.7 Results: The results of the measurements are summarised below in Table 1 showing the recorded values of background noise (L_{A90} dB). Refer to Appendix 1 for the measurement location and Appendix 2 for the survey measurement data in graph form.

Table 1: Noise Measurement Results, dB ($2x10^5$ Pa)

Description	Typical Background Noise Level
Daytime noise levels between 07:00 and 19:00	32 dB $L_{A90\ (15\ minutes)}$
Evening and night-time noise levels between 19:00 and 07:00	27 dB $L_{A90\ (15\ minutes)}$

3.8 Refer to Appendix 3 for glossary of terms

4.0 Plant Noise Criteria

4.1 The site falls into the jurisdiction of the London Borough of Camden. Their planning policies are set out in the Local Development Framework (LDF) document "*Camden Development Policies 2010-2025*". In particular Policy DP28 Noise and Vibration – Table on page 133 of the document. The requirements relevant to noise from mechanical services plant are set out 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$L_{Aeq'}$

4.2 Based on the policy wording set out above, the residual plant noise level arising from the operation of the proposed plant must be at least 5 dB lower than the prevailing typical background noise levels. The appropriate criteria are as follows:

Table 2: Plant Noise Limiting Criteria at nearest noise sensitive facade

Period	Maximum Plant Noise Level
Daytime (07:00 to 19:00)	27 dB L_{Aeq}
Evening (19:00 to 07:00)	22 dB L_{Aeq}

4.3 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.

5.0 Plant Noise Assessment

5.1 The new pool plant room design is yet to be finalised but it is understood the scheme is likely to include multiple items of equipment, including an air supply and extract air handling unit (AHU). The plant room is located within the property, with air intake and exhaust louvres located on the western façade at ground level. Current drawings indicate that the louvres are likely to be approximately 500mm x 500mm in size.

5.2 As detailed equipment and associated noise data has yet to be finalised it is proposed to set external plant noise limits at 1m from the intake and exhaust louvres, as presented below.

Table 3: Plant Noise Limits at 1m

Noise Source	Plant Noise Limit at 1m $L_{Ar,Tr}$	
	Daytime / Evening (07:00-23:00)	Night-time (23:00-07:00)
Intake Louvre	48 dB	43 dB
Exhaust Louvre	48 dB	43 dB

5.3 Provided the limits set out above can be realised, the following assessment can be made:

Table 4 – Plant Nosie Assessment - Daytime

Description	A-weighted Calculation
Daytime Assessment	
Intake Air-Louvre limit at 1m	**48 dB**
Distance attenuation (plane source radiation, 22m, with ground reflection)	-27 dB
Building Reflections	+3 dB
Predicted L_p at 1m from receiver	**24 dB**
Exhaust Air-Louvre limit at 1m	**48 dB**
Distance attenuation (plane source radiation, 22m, with ground reflection)	-27 dB
Building Reflections	+3 dB
Predicted L_p at 1m from receiver	**24 dB**
Total predicted L_p at 1m from the Nearest Noise Sensitive Facade	**27 dB**
Prevailing Background Noise Level	**32 dB**
Difference	**-5 dB**

Table 5 – Plant Nosie Assessment – Night Time

Description	A-weighted Calculation
Night Time Assessment	
Intake Air-Louvre limit at 1m	**43 dB**
Distance attenuation (plane source radiation, 22m)	-27 dB
Building Reflections	+3 dB
Predicted L_p at 1m from receiver	**19 dB**
Exhaust Air-Louvre limit at 1m	**43 dB**
Distance attenuation (plane source radiation, 22m)	-27 dB
Building Reflections	+3 dB
Predicted L_p at 1m from receiver	**19 dB**
Total predicted L_p at 1m from the Nearest Noise Sensitive Facade	**22 dB**
Prevailing Background Noise Level	**27 dB**
Difference	**-5 dB**

5.4 It should be noted that the above noise limits do not include for any acoustic feature corrections. 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 shown above must be reduced by 5 dB.

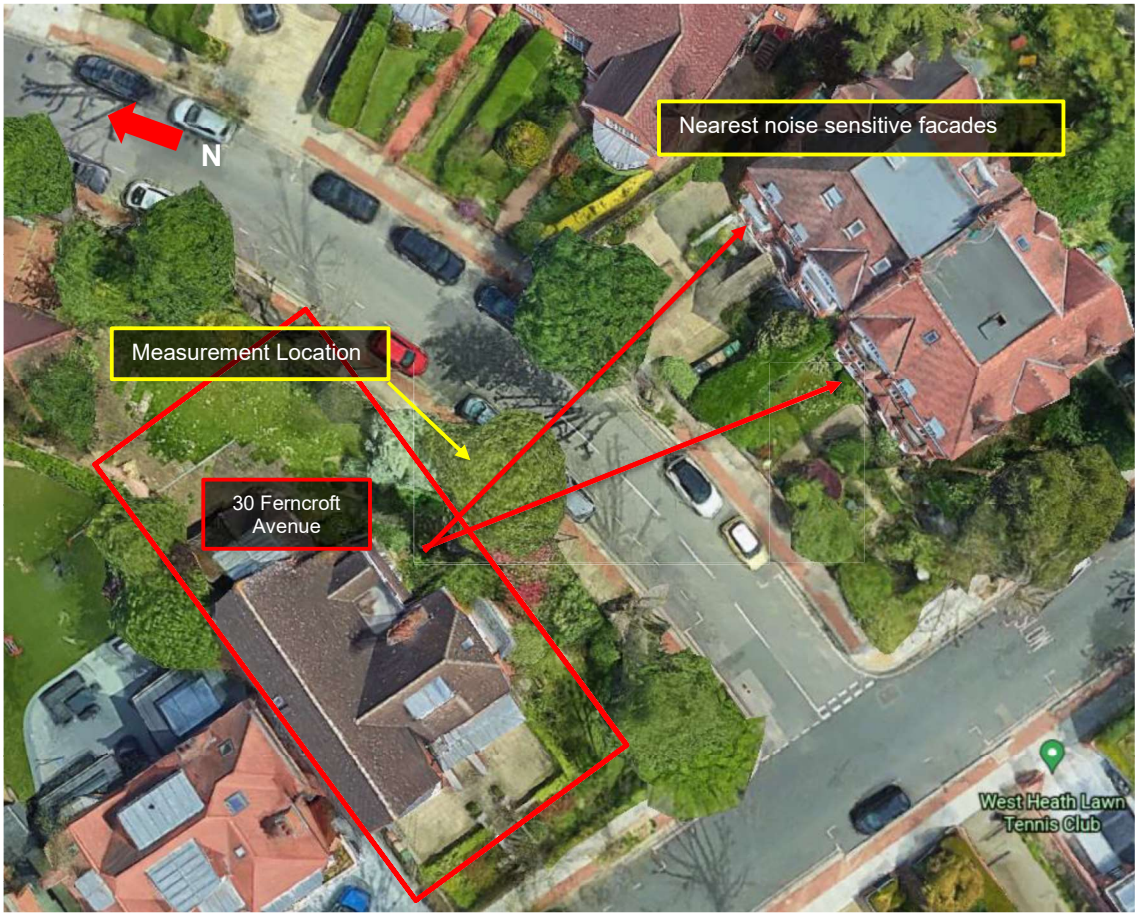
6.0 Conclusion

6.1 A noise survey at 30 Ferncroft Avenue, London, NM3 7PH has been undertaken to establish prevailing levels of background noise at and around the site.

6.2 Noise emission criteria for plant associated with the development proposal have been derived, based upon London Borough of Camden's planning policy (DP28 Noise and Vibration) for plant and machinery.

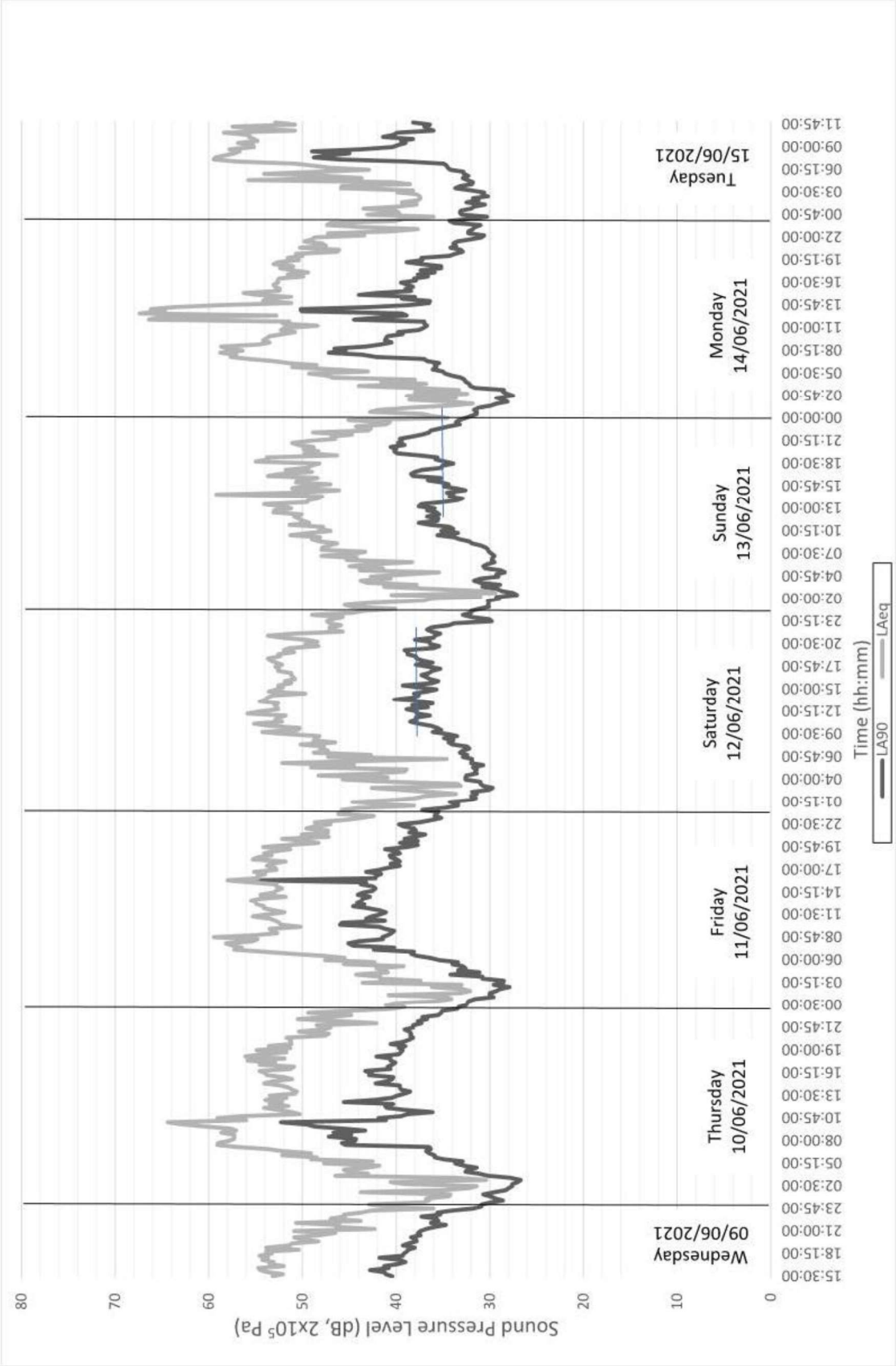
6.3 Full plant selections are not yet available at this stage; plant noise limits have therefore been set at a distance of 1m from the louvres of the proposed plant room in order to comply with the relevant criteria.

Appendix 1: Site Plan & Measurement Locations



Source – Google Maps

Appendix 2: Noise Survey Results



Appendix 3: Glossary of Terms

Term	Description	Explanation
	Noise	Unwanted sound. In the explanation given below the words 'sound' and 'noise' can often be used interchangeably, depending on context.
dB	The decibel scale	The decibel (or dB) scale is the scale on which sound pressure levels are commonly measured. It is a logarithmic scale and is used for convenience to compress the audible range of sound pressures into a manageable range, from 0 dB to 140 dB. The zero of the scale, 0 dB, corresponds to the threshold of hearing, 0.00002 Pa, and the upper limit, 140 dB, corresponds to 20 Pa, the threshold of pain.
	Sound pressure	Sound is a disturbance or fluctuation in air pressure, and sound pressure, measured in pascals (Pa), is used as a measure of the magnitude of the sound. The human ear can detect sound pressures in the range from 0.00002 Pa to 20 Pa. This is an enormously wide range and so for convenience sound pressures are commonly measured on a decibel (dB) scale.
Lp	Sound pressure level	Instantaneous value of Sound Pressure Level (Lp).
	Sound power	The sound energy radiated per unit time by a sound source, measured in watts (W)
L_w	Sound power level	Sound power measured on a decibel scale: $L_W = 10\log(W/W_0)$, where W_0 is the reference value of sound power, 10^{-12} W.
f	Frequency	The frequency of a musical note is what gives it its pitch. It is the number of cycles of the fluctuating sound pressure which occur each second, and is measured in cycles per second, or Hertz (Hz). The human ear can detect frequencies in the range of 20 to 20 000 Hz. Most sounds and noises are a mixture of all frequencies, called broad-band noise.
	Octave bands Octave band spectra	In order to investigate the frequency content of broad band sounds, called its frequency spectrum, measurements of sound pressure are carried out over a range of frequency bands. The most common method is to split the audio frequency range into 8 or 9 octave bands. An octave is a frequency range from one particular frequency to double that frequency.
	Free-field	A free field sound level measurement is one which is unaffected by the presence of any sound reflecting surfaces. In an outdoor situation this is usually taken to mean with no sound reflecting surfaces within 3 m. of the source.
	Facade correction Factor	The difference between the façade level and the free field level (in the absence of the façade) is called the façade correction factor.
A	A-weighting	One of the three frequency weightings (A, C and Z) used in sound level meters, and defined in BS EN ISO 61672-1; a very widely used method of producing a single figure measure of a broad band noise which takes into account, in an approximate way at least, the frequency response of the human hearing system. The idea is that sound levels measured in this way should give an indication of the loudness of the sound.
L_A (dBA)	A- weighted sound pressure level	The value of the sound pressure level, in decibels, measured using an A-weighting electronic circuit built into the sound level meter. The vast majority of noise measurements are carried out in this way.
$L_{Aeq,T}$	Equivalent continuous sound level	It represents a measure of the 'average' sound level over the measurement period. It corresponds to the steady level of sound which, over the same period of time, T, would contain the same amount of (A-weighted) sound energy as the time varying noise. Also known as the Average sound level. This is the most common method of measuring time varying noise, and within certain limits gives the best correlation with human response to noise, for example with annoyance.

$L_{AN,T}$	Statistical percentile noise levels	$L_{AN,T}$ is the noise level, usually A-weighted, which is exceeded for N% of the measurement period, T. The most commonly used values are $L_{A10,T}$ used for the measurement and assessment of traffic noise, and $L_{A90,T}$, commonly used as a measure of background noise. $L_{A1,T}$ and $L_{A99,T}$ are also occasionally used to give an indication of the highest and lowest noise levels occurring during the measurement time interval.
	Background noise	Ambient noise which remains at a given site when occasional and transient bursts of higher level ambient noise levels have subsided to typically low levels; it is the noise normally present for most of the time at a given site. It is usually described by the L_{A90} value.
$L_{A90,T}$	Background noise level	Defined in BS 4142 as the value of the A-weighted residual noise at the assessment position that is exceeded for 90 % of a given time interval, T, (i.e. $L_{A90,T)}$ measured using time weighting, F, and quoted to the nearest whole number of decibels. (Also see under residual noise). Background noise itself often varies with time and so the $L_{A90,T}$ is almost universally used as the best measure of the 'more or less always present' noise level which underlies short term variations from other sources of noise.
	Specific Noise Source	The noise source under consideration when assessing the likelihood of adverse impact using BS4142:2014.
	Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:2014.
$L_{ar,Tr}$	Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a rating penalty for any tonal, impulsive or irregular qualities, ref. BS4142:2014.
T_r	Reference time interval	Specified interval over which the specific sound level is determined, ref. BS4142:2014.
	Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound, ref. BS4142:2014.
$L_r = L_{Aeq,T}$	Residual Sound Level	Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T, ref. BS4142:2014.