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TOWN AND COUNTRY PLANNING ACT 1990
(AS AMENDED)

PLANNING STATEMENT

Retention of x2 air conditioning units.

On behalf of Mr. Justin Randall

6 Rosecroft Avenue, London, NW3 7QB

CONTENTS

APPENDICES

1 SITE AND SURROUNDINGS

1.1 The application site comprises a three-storey semi-detached dwelling, located along Rosecroft Avenue.

1.2 The surrounding area is predominantly residential in character and is consistent with late 19th/early 20th architectural character established in the area.

1.3 Whilst the application site it not a listed building, it is located within Redington/Frognal conservation area.

2 RELEVANT PLANNING HISTORY

2.1 Planning application (ref:2018/2707/P) details of facing materials required by condition 2 of planning permission 2018/1371/P dated 06/06/2018 for: demolition of existing conservatory and rear extension, erection of single storey side and rear extension at ground floor level ; installation of cycle storage area and associated works at ground/first floor levels all associated with the use as a residential dwelling (Class C3). Granted, date: 07/08/2018.

2.2 Planning application (ref:2018/3267/P) Details of tree protection as required by condition 5 of planning permission 2018/1371/P dated 20.06.2018; for demolition of existing conservatory and rear extensions, erection of single storey side and rear extension at ground floor level; installation of 3 x roof lights to the rear elevation; installation of cucle storage area and associated works at ground/first floor levels all associated with the use as a residential dwelling (Class C3). Granted, date: 16/07/2018.

2.3 Planning application (ref: 2018/1039/P) Demolition of existing conservatory and rear extensions, erection of single storey side and rear extension at ground floor level; installation of 3 x roof lights to the rear elevation; installation of cycle storage area and associated works at ground/first floor levels all associated with the use as a residential dwelling (Class C3). Granted with Conditions, date: 12/03/2018.

3 PROPOSED DEVELOPMENT

3.1 Relocation and retention of x2 Air-conditioning units.

3.2 The proposed units would be relocated to the top of the three-storey building, on the flat roof.

4 PLANNING POLICY

4.1 MHCLG's National Planning Policy Framework (2019)
4.2 MHCLG's National Planning Practice Guidance (Online)
4.3 GLA The London Plan (2016)
4.4 The Camden Local Plan (2017)
4.5 Redington/Frognal Conservation area statement (2000)
4.6 CPG: Energy Efficiency and Adaptation (2019)

5 MATERIAL CONSIDERATIONS

Character and Appearance

5.1 The London Plan (2016) policies 7.4 and 7.8 require developments to be of the highest quality design; to respect the character and appearance of the host property and surrounding area; to conserve and enhance heritage assets.

5.2 In addition to this, the NPPF attaches great importance to the creation of high-quality development and places which is fundamental to planning.

5.3 The Camden local plan (2017) policy D1 states that high quality design is imperative in ensuring the local context and character is respected and should improve the quality and character of an established area.

5.4 Policy D2 of the Camden Local Plan (2017) states that where appropriate, development should preserve and enhance Camden's rich and diverse heritage assets and their surrounding settings, including conservation area.

5.5 The installation of air-conditioning units on residential properties has become increasingly more common place within the last few years as residents seek to enhance their quality of life and improve their private amenity spaces.

5.6 On the basis that the air-conditioning units are appropriately designed and do not result in noisy or visual harm to the neighboring occupants, this is considered to be acceptable in principle for the above reasoning.

5.7 The air conditioning units are modest in size, the first unit; measuring 340 mm in depth, 958mm in width and 734mm in height. The second unit measures 485mm in depth, 940mm in width and 823mm in height.

5.8 The proposed development is of relatively small size and therefore would not harm the visual amenity of the property.

5.9 This is further protected with the air conditioning units being relocated on the flat roof of the dwelling and being set further aback. This ensures the air-conditioning units are not visible from the streetscape and thus preserving the street-scene. Please see appendix 1 of this statement which demonstrated the area of relocation.

5.10 Essentially the proposed development is a relatively small addition to the property which will have no impact on the character and appearance of no.6 Rosecroft Avenue or the immediate local vicinity. On this basis, the proposal is in accordance with the London Plan (2016), policies 7.4 and 7.8, the NPPF and the Local Plan of Camden council (2017).

Impact on Surrounding Amenity

5.11 The London Plan (2016) Policy 7.6 and 7.15 required new development to avoid significant adverse noise impacts on health and quality of life.

5.12 The Camden Local Plan (2017) Policy A1 states that development should protect the quality of life of occupiers and neighbors and will only be permitted if there is little harm to amenity.

5.13 Policy A4 of the Camden Local Plan (2017) further states the importance of ensuring that noise and vibration is controlled and managed to avoid harm to amenity.

5.14 The NPPF states in paragraph 180 a) that new development should mitigate and reduce to a minimum potential adverse impact resulting from noise to avoid giving rise to significant adverse impacts on health and the quality of life.

5.15 The applicant previously had the air-conditioning units on the south boundary wall in the alleyway. However, due to the noise impact assessment, the applicant proposes the air-conditioning units to be placed on the roof of the property, which would ensure an adequate distance away from neighboring properties and thus protect neighboring amenity. The air-conditioning units will be placed high above on the third-storey roof and will be further set in, which will guarantee at least 3m distance from the neighboring property. In this regard, the harm has been extremely mitigated.

5.16 Equally, visual amenity will be protected as the units will be set back from the street and therefore not visible from any of the neighbouring properties as well as the front of the house.

5.17 Please see submitted noise impact assessment for more information.

5.18 The proposed development will have no amenity impact in regard to additional noise in the area due to the proposed movement of the

units. Furthermore, the proposal will not have an adverse impact on the visual amenity of the street scape, as it would not be visible from the street. Therefore, the proposal is in accordance with the London Plan (2016) policies 7.6 and 7.15; Camden Local Plan (2017), policies A1 and A4; NPPF.

Energy Efficiency

5.19 Whilst the proposed development is only for one dwellinghouse and is not 500sqm and above, The Energy efficiency and adaptation planning guidance (2019) states that developments should consider the environmental impact and explore passive measures of cooling to prior the development, to ensure the cooling/heating method is appropriate to the dwellinghouse.

5.20 Please refer to appendix 3 of this statement, where ACC & Maintenance LTD has produced a letter stating that alternative cooling methods have been explored, however, are not appropriate/viable. In this regard, the proposed development accords with the Energy Efficiency and Adaptation (CPG) (2019) and policy CC2 of the Camden Local Plan (2017).

6 CONCLUSION

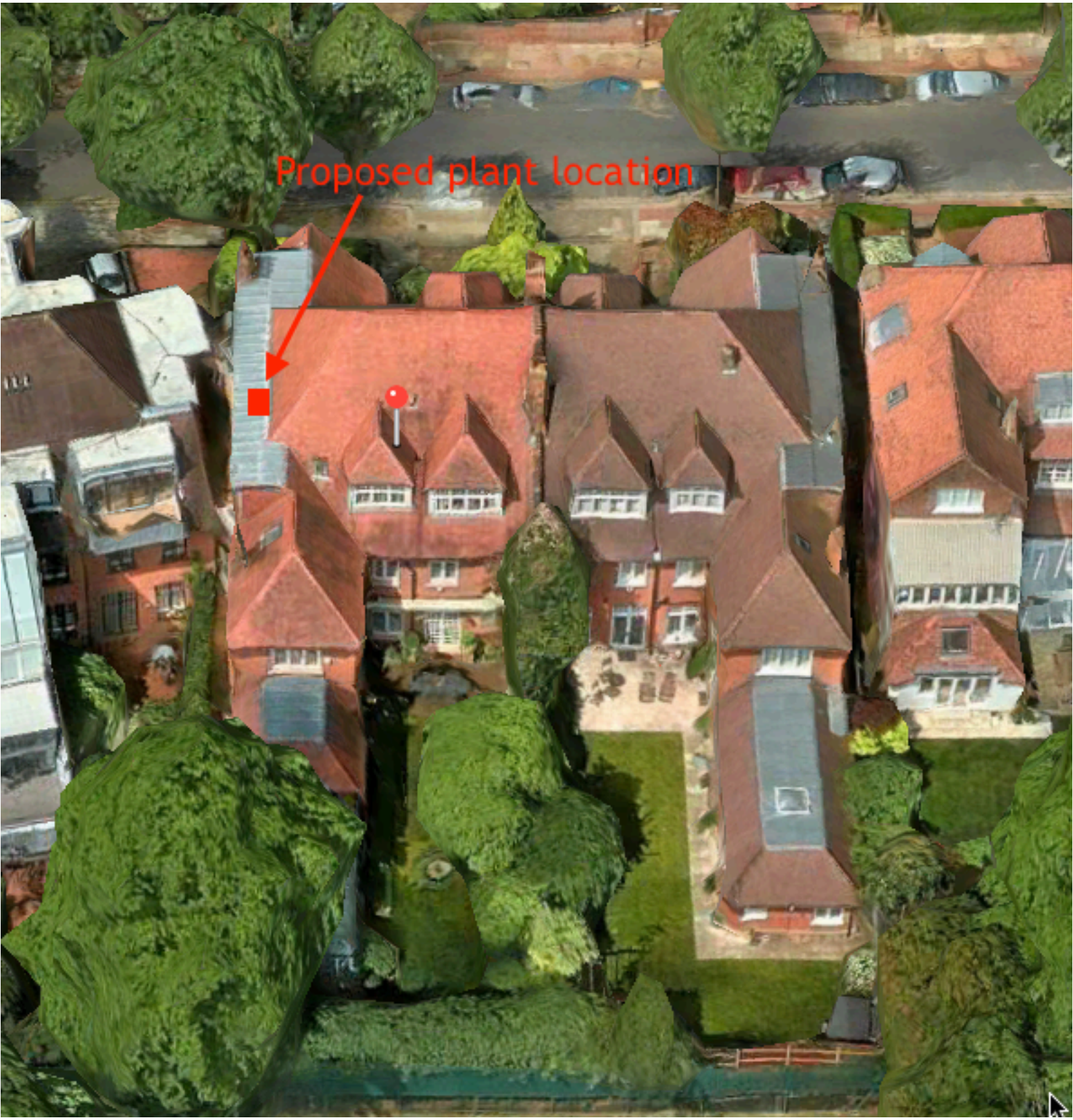
6.1 The proposed development is in keeping with the character and appearance of the host property and surrounding area.

6.2 The proposed development protects the amenity of neighbouring occupants as the units would not produce harmful noise level.

6.3 The proposed development is in accordance with the London Plan (2016) policies 7.4, 7.8 and 7.15; LB Camden local Plan (2016) policies D1, D2, A1 and A4; NPPF and the Redington/Frognal conservation area appraisal and therefore the development passes the conservation area test.

APPENDIX 1 –

The proposed location of air-conditioning units.


Proposed plant location

APPENDIX 2 –

Sound report for the relocation of the air-conditioning units.

DOCUMENT REFERENCE: HA/AB623/V1

NOISE IMPACT ASSESSMENT: RELOCATION OF EXISTING AIR CONDITIONING UNITS

6 ROSECROFT AVENUE, CHILDS HILL, LONDON NW3 7QB

ACOUSTICS

Our Ref	HA/AB623/V1
Site Address	6 Rosecroft Avenue, Childs Hill, London NW3 7QB
For	Mr Justin Randall
Client Address	6 Rosecroft Avenue, Childs Hill, London NW3 7QB
Date of Report	2 October 2019
Author	Mr Leo Hawkins PGdip (IOA) BSC (Hons) AMIOA
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EXECUTIVE SUMMARY

- Mr Justin Randall instructed Healthy Abode Ltd t/a as HA Acoustics to undertake a noise impact assessment for the proposed relocation of existing Air Conditioning Units (ACU's) at 6 Rosecroft Avenue, Childs Hill, London NW3 7QB.

- HA Acoustics has undertaken an environmental noise survey at the site in order to determine prevailing background noise levels that are representative of the nearest noise sensitive receptors (NSR). The nearest NSR to proposed plant relocation is the northern (side) façade of a neighbouring residential property (4 Rosecroft Avenue) at third floor level, located approximately 4 metres from the proposed plant relocation.

- An unattended baseline noise survey and assessment has been undertaken in line with the guidance contained in BS 4142:2014, measurements being taken over continuous 15-minute periods with all plant switched off.

- The unattended survey was conducted on Friday 6th September 2019 – Wednesday 11th September 2019, at a fixed monitoring point, located within the side alley between the two properties in a position representative of the NSR.

- Further attended monitoring was undertaken on Wednesday 11th September 2019, at a fixed monitoring position, located approximately 1m from the air conditioning units, to calculate the specific sound level of the units in operation.

- Due to the nature of residential air conditioning units, the operation of the mechanical plant has the potential to be operational anytime (24/7). Therefore, the noise criteria will be set at 10dB below night-time background levels.

- The typical night-time background noise level has been calculated at 32dB $L_{A90,T}$.

- **Following relocation and attenuation** the Units have been calculated as creating a rating noise level of **18dB $L_{Ar,Tr}$** at 1m from the NSR. In accordance with BS 4142:2014 guidance, the noise impact from the operation of the ACU's ***"is an indication of the specific sound source having a low impact"*** at the NSR.

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Appendices

1. INTRODUCTION

1.1. Mr Justin Randall instructed Healthy Abode Ltd t/a HA Acoustics to undertake a noise impact assessment at 6 Rosecroft Avenue, Childs Hill, London NW3 7QB for submission as part of documentation to be provided to the Local Authority, London Borough of Camden Council following a noise complaint.

1.2. In response to the noise complaint, 6 Rosecroft Avenue is proposing to relocate the existing Air Conditioning Units. The plant is currently located on the side of the premises at ground floor level, and is proposed to be positioned on top of the third floor flat roof of the premises, to reduce the impact of the plant on the nearby noise sensitive receptor.

1.3. The purposes of this report are:

1.3.1. To determine prevailing environmental noise levels affecting surrounding properties due to nearby noise sources (e.g. road traffic);

1.3.2. Based on the above, to present noise emission limits in accordance with the requirements of BS 4142:2014, and

1.3.3. To undertake an assessment to demonstrate compliance with the Local Authority noise requirements.

2. SITE DESCRIPTION

2.1 6 Rosecroft Avenue, Childs Hill, London (hereafter referred to as 'the site') is a three storey residential premises at ground floor level with residential premises located directly adjacent to either side.

2.2 The local area is predominantly residential in nature. The site fronts onto Rosecroft Avenue. Finchley Road (A598) is located approximately 400m to the west of the site. St Margaret's Independent School is located approximately 215m to the south of the site.

2.3 The nearest noise sensitive receptor (NSR) to the proposed plant location is noted to be the northern façade of 4 Rosecroft Avenue, located approximately 4 metres from the proposed plant relocation with partial line-of-sight to the nearest window.

2.4 A site plan can be found in Appendix A (SP1) showing the noise monitoring positions, noise sensitive receiver, existing plant location and proposed plant relocation position.

2.5 At the time of installation and collection of the monitoring equipment, the dominant noise sources emanated from road traffic and some residential activity noise. These noise sources are considered normal to the site location. No significant abnormal noise sources were identifiable. It is considered that the measured noise levels are reasonable given the location of the measurement position.

3. ENVIRONMENTAL NOISE SURVEY METHODOLOGY

3.1 Unattended Noise Survey

3.2 An unmanned environmental noise survey was undertaken at a single measurement location at the southern border of the site. The survey was undertaken between 11:30 hours on Friday 6th September 2019 and 11:30 hours on Wednesday 11th September 2019.

3.3 The sound level meter (SLM) was mounted approximately 1.5 metres above ground level to the south facade. The SLM was positioned approximately 1 metre from the side facades of the property. The position is not considered to be in 'free-field' conditions, therefore acoustic corrections of -3dB have been applied to the measurement data. The position is considered to be representative of background noise levels at the nearest identified NSR. The monitoring position is identified in **orange** in Appendix A.

3.4 The equipment used for the unattended noise survey is summarised in Table 3.1.

Equipment	Description	Quantity	Serial Number
Larson Davis LxT SE	Class 1 automated logging sound level meter	1	0004960
377BO2 microphone	Class 1 ½" microphone	1	168839
Larson Davis CAL200	Class 1 Calibrator	1	14432

Table 3.1 Description of Equipment used for Unattended Noise Survey

3.5 Ambient, background and maximum noise levels (L_{Aeq}, L_{A10} L_{A90} and L_{AmaxF} respectively) were measured throughout the noise survey in consecutive 15-minute periods.

3.6 The noise survey and measurements were conducted, wherever possible, in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures*'. Measurements were made generally in accordance with ISO 1996-2:2007 '*Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*'.

3.7 Weather conditions throughout the entire noise survey period were noted to be mild to warm (approximately 8-21° Celsius), generally dry, with cloudy skies (approximately 50-100% cloud cover) and a light wind (<5m/s). These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were maintained throughout the whole survey period and are considered reasonable for undertaking environmental noise measurements.

3.8 The noise monitoring equipment was calibrated before and after the noise survey period. No significant drift was recorded. Equipment calibration certificates can be provided upon request.

3.9 **Attended Noise Survey**

3.10 An attended noise survey was undertaken at a single measurement location, positioned within the side alley of the property, located 1m from the existing plant. The survey was undertaken on Wednesday 11th September 2019, measuring continuous 1-minute periods. Manual measurements were undertaken to ascertain the specific level of the sound source.

3.11 One measurement was taken between 11:33 and 11:44 with all plant turned on at full capacity; a second measurement was taken between 11:47 and 11:53 with all plant turned off.

3.12 The sound level meter (SLM) was mounted on a tripod, approximately 1.5 metres above ground level. The position is not considered to be in 'free-field' conditions, therefore acoustic corrections of -3dB have been applied to the measurement data. The monitoring position is identified in **green** in Appendix A.

3.6 The equipment used for the attended survey is summarised in Table 3.2.

Equipment	Description	Quantity	Serial Number
Svantek 977	Class 1 automated logging sound level meter	1	69701
ACO Pacific 7052E	Class 1 ½" microphone	1	71699
Larson Davis CAL200	Class 1 Calibrator	1	14432

Table 3.2 Description of Equipment used for Attended Noise Survey

3.13 The noise survey and measurements were conducted, wherever possible, in accordance with BS7445-1:2003 '*Description and measurement of environmental noise. Guide to quantities and procedures'*. Measurements were made generally in accordance with ISO 1996-2:2007 '*Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*'.

3.14 Weather conditions throughout the entire noise survey period were noted to be warm (approximately 20° Celsius), dry, with cloudy skies (approximately 90% cloud cover) and a light wind (<5m/s). These weather conditions were checked against and confirmed by the use of the Met Office mobile application available on smart phone technology. These conditions were maintained throughout

the whole survey period and are considered reasonable for undertaking environmental noise measurements.

3.15 The noise monitoring equipment was calibrated before and after the noise survey period. No significant drift was recorded. Equipment calibration certificates can be provided upon request.

4. EXTERNAL NOISE EMISSION CRITERIA

4.1. National Planning Policy Framework

4.2. In March 2012, the National Planning Policy Framework (NPPF) came into force and was revised in 2018. This document replaces a great many planning guidance documents, which previously informed the planning system in England.

4.3. The NPPF sets out the Government's economic, environmental and social planning policies for England and these policies articulate the Government's vision of sustainable development. It states: *'...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...'*

4.4. The Noise Policy Statement for England (NPSE) published 2010 applies to *'all forms of noise, including environmental noise, neighbour noise and neighbourhood noise'.*

4.5. **Paragraph 180 of the NPPF (2018) considers noise, stating:**

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment as well as the potential sensitivity of the site or the wider are to impacts that could arise from the development. In doing so they should:

- *A) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *B) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for the recreational and amenity value for this reason; and*
- *C) limit the impact of light pollution from artificial light n local amenity, intrinsically dark landscapes and nature conservation."*

4.6. National Planning Policy is guided by the NPPF. With regard to noise, the terms 'significant adverse impact' and 'other adverse impacts' are defined in the explanatory notes of the 'Noise Policy Statement for England' (NPSE). These state that there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

- 'NOEL – No Observed Effect Level, this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise, and
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

4.7. Extending these concepts for the purpose of this NPSE leads to the concept of SOAEL - significant observed adverse effect level. This is the level above which significant adverse effects on health and quality of life occur'. However, no specific noise limits for LOAEL and SOAEL have been defined. Therefore, guidance from other acoustic standards must be employed to determine suitable levels within the overall principal of the National Planning Policy Framework; such as BS 4142:2014.

4.8. **Local Authority requirements**

4.9. The proposed site lies within the jurisdiction of the Local Authority, London Borough of Camden Council. An acoustic report is required due to the Council receiving a noise complaint in regards to the existing system.

4.10. Camden Councils noise criteria requirements are set out in the Camden Local Plan (2017) document, with specific noise levels for industrial and commercial noise sources provided in Appendix 3: 'Noise thresholds' (presented below in table 4.1):

> *'A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS4142) will be used. For such cases a 'Rating Level' of 10dB below background (15dB if tonal components are present) should be considered as the design criterion).'*

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL_{Amax}

Table 4.1 Criterion provided in Appendix 3: 'Noise thresholds' of the Camden Local Plan (2017)

4.11. It is understood that the plant has the potential to be operational for 24 hours. The noise criteria will therefore be set 10dB below the typical background night-time levels. In this case the criteria to be met is a maximum rating noise level of 22dB $L_{Ar,Tr}$, when measured at 1m from the NSR.

4.12. **BS4142:2014**

4.13. BS 4142:2014 "Methods for Rating and Assessing Industrial and Commercial Sound" presents a method for assessing the significance and possible adverse impact due to an industrial or commercial noise source, based on a comparison of the source noise levels and the background noise levels, both of which are measured or predicted at a noise sensitive receiver e.g. a residential property.

4.14. The specific noise level due to the source is determined, with a series of corrections for tonality, impulsivity, intermittency or any other unusual characteristic. This can result in a maximum total correction of +21dB being added if the new noise source demonstrates all the above characteristics. The background noise level is then subtracted from the rating level and a comparison made.

4.15. The significance of the new noise source and the likelihood of any adverse impact is determined in accordance with the following advice:

"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.

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *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."*

5. NOISE SURVEY RESULTS

5.1. Unattended Noise Survey Results

5.2. The ambient and background noise levels at the measurement positions as seen in Appendix A are provided below and have been based on an analysis of the monitoring data. A summary of the data results is provided in Table 5.1. The time history can be seen in Appendix B1 (TH1)

	Ambient Noise Level $L_{Aeq, 15min}$	Typical Background Noise Level $L_{A90, 15min}$
Day (07:00 – 23:00)	47dB*	35dB*
Night (23:00 – 07:00)	38dB*	32dB*

*includes -3dB facade noise correction

Table 5.1 Summary of typical noise measurement data

5.3. These noise levels are considered normal to the site location. No significant abnormal noise sources were identifiable during installation or collection of the equipment. It is considered that the measured noise levels are reasonable given the location of the measurement position.

5.4. Attended Noise Survey Results

5.5. The octave band and overall ($L_{Aeq,T}$) noise levels at the measurement position as seen in Appendix A are shown in Table 5.2 and have been based on an analysis of the monitoring data.

Measurement Position	Plant Condition	1/1 $L_{Zeq,T}$ Octave Band Data (Hz)								
		63	125	250	500	1000	2000	4000	8000	$L_{Aeq,T}$
MMP1	On	54	48	44	44	43	41	38	32	**48**
	Off	53	47	41	41	39	37	34	28	**44**

Table 5.2 Summary of attended measurement data (all data includes a -3dB façade correction)

5.6. During the measurements, it was noted that there was a lot of road traffic noise from Rosecroft Avenue. Whilst in operation the plant was subjectively listened to. The plant was considered to have a very steady broadband (non-tonal) output, with no distinguishing characteristics.

6. NOISE IMPACT ASSESSMENT

6.1 It is proposed to relocate two(2) existing Daikin Air Conditioning Units (1x Daikin 5MXM90N and 1x Daikin RXYSCQ5-TV1) from their current location within the alley way to on top of the flat roof of the property at third floor level. Calculations have been undertaken to gain the specific noise level of the plant using information provided by the client, manual measurements and from manufacturer specifications.

6.2 The manufacturer's technical data provides higher sound pressure level figures than those measured on site. It is assumed that the plant was not operating at maximum duty due to weather conditions for the manual measurements. For robustness, the levels provided by the manufacturer have been utilised in the acoustic calculations.

6.3 Table 6.1 provides the manufacturers data reference sound pressure level per unit.

Plant Make/Model	Reference Sound Pressure Level at 1m*
Daikin 5MXM90N	52dB(A)
Daikin RXYSCQ5-TV1	52dB(A)

* Manufacturer's specifications are provided in Appendix C.

Table 6.1 Mechanical Plant Details

6.4 Table 6.2 provides the frequency spectral data of the plant. Taken from the manufacturers provided details (see appendix C).

	Frequency Spectral Data (Hz) at 1m								
	LZFeq 63	LZFeq 125	LZFeq 250	LZFeq 500	LZFeq 1000	LZFeq 2000	LZFeq 4000	LZFeq 8000	dB(A)
Daikin 5MXM90N	57	56	55	5	46	42	34	26	52
Daikin RXYSCQ5-TV1	51	53	51	52	47	41	34	27	52

Table 6.2 Spectral sound data

6.5 Detailed calculations to predict the noise level of the plant at 1metre from the NSR following relocation and attenuation are given in Appendix D.

6.6 There is only a partial line of sight between the proposed plant location and the NSR. This screening is conservatively estimated to provide 5dB noise attenuation. This will be accounted for in the calculations.

6.7 A 'penalty' addition has been added to the fans for intermittency as the operation is considered to have defined on/off conditions which may be noticeable at the NSR. A penalty has not been applied for tonality as spectral data of the fans show no significant tonal characteristics and were subjectively considered to be broadband in nature with no tonality noticed onsite. Penalty additions have not been applied for impulsiveness or any other unusual characteristics as plant of this type generally do not generate such features.

6.8 In order to meet the noise criteria of 22dB $L_{Ar,Tr}$ at the NSR, the plant requires mitigation. It is recommended that acoustic enclosures are installed around the plant units. The enclosures should provide sufficient attenuation to achieve a cumulative maximum sound pressure level of 37 dB(A) when measured at 1m in all directions. Table 6.3 gives recommendations of an enclosure that should be suitable to achieve this.

	Frequency Spectral Sound Reduction L_{ZFeq} (Hz) at 1m							
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**
Acoustic enclosure	10	12	19	26	33	35	34	35

Table 6.3 Proposed Mitigation

6.9 The relocated plant with acoustic enclosures incorporated would be expected to meet the requirements of the proposed criteria.

6.10 Detailed calculations to predict the noise level of the plant at 1metre from the NSR following relocation and attenuation are given in Appendix D. The rating noise level at 1m from the NSR is calculated at **18dB $L_{Ar,Tr}$** and **14dB(A) below** the assessed background noise level (32dB $L_{A90,T}$). In accordance with BS 4142:2014 guidance, the rating noise ***"is an indication of the specific sound source having a low impact"*.**

6.11 Vibration from plant is not expected. However, as a precaution, all plant should be installed with anti-vibration isolators Anti-vibration mounts are widely available from system suppliers/installers and shall need to be installed in accordance with the type, make and model of the mechanical plant specified.

Anti-vibration mounts are often in pedestal rubber mountings. Examples of these are MPO and MP1, and ISL Maxi pedestal vibration mounts. These types of anti-vibration and shock isolators are industry standard and commonplace on air conditioning and ventilation systems. They are designed to provide medium to high frequency isolation from vibration and noise via high resilience rubber. Once type, location, manufacturer make and model of proposed mechanical plant is known, the M+E contractor shall be able to advise upon the specific anti-vibration isolators required to ensure no adverse impact occurs.

6.12 As BS 4142:2014 advises, the impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:

6.12.1 The assessment is undertaken at the most affected existing residential windows. The impact on all other nearby residential windows will be lower due to screening and distance attenuation.

6.12.2 It should be noted that the above assessment is based on the plant operating simultaneously and at maximum duty. Given that the plant will not operate simultaneously at maximum capacity all of the time, the above assessment is considered to be representative of the worst case.

6.13 British Standard 8233:2014 '*Sound insulation and noise reduction for buildings – Code of Practice*' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS8233:2014 recommends 30dB(A) as being acceptable internal resting/sleeping conditions during night-time. According to BS8233:2014, the façade of a residential dwelling; with a window partially open for ventilation offers 15 dB attenuation. Therefore, taking into account this reduction for a partially open window the internal noise level with the plant operating would be 7dB(A) which is lower than the acceptable internal noise level as seen under BS8233: 2014; and significantly lower than the background. Therefore, complaints are extremely unlikely.

7. UNCERTAINTY

7.1 The levels of uncertainty in the data and calculations are considered to be low given the robust exercise undertaken in noise monitoring and the confidence in the statistical analysis.

7.2 All measurements taken on-site by instrumentation are subject to a margin of uncertainty. This is relatively small, with a sound level meter manufacturers margin of uncertainty at +/-1.1dB. It is due to the tolerances associated with the Class 1 sound level meter and calibrator equipment used to measure background.

7.2.1 The meter and calibrator used have a traceable laboratory calibration and were field calibrated before and after the measurements.

7.3 Manufacturers' data for the plant is likely to be robust. Detailed calculations and resultant noise levels at the residential location are considered to be confidently predicted.

7.4 Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method.

8. CONCLUSION

8.1. A noise assessment has been undertaken at 6 Rosecroft Avenue, Childs Hill, London NW3 7QB. A baseline environmental noise survey was undertaken at a fixed monitoring point, representative of the nearest noise sensitive receptor.

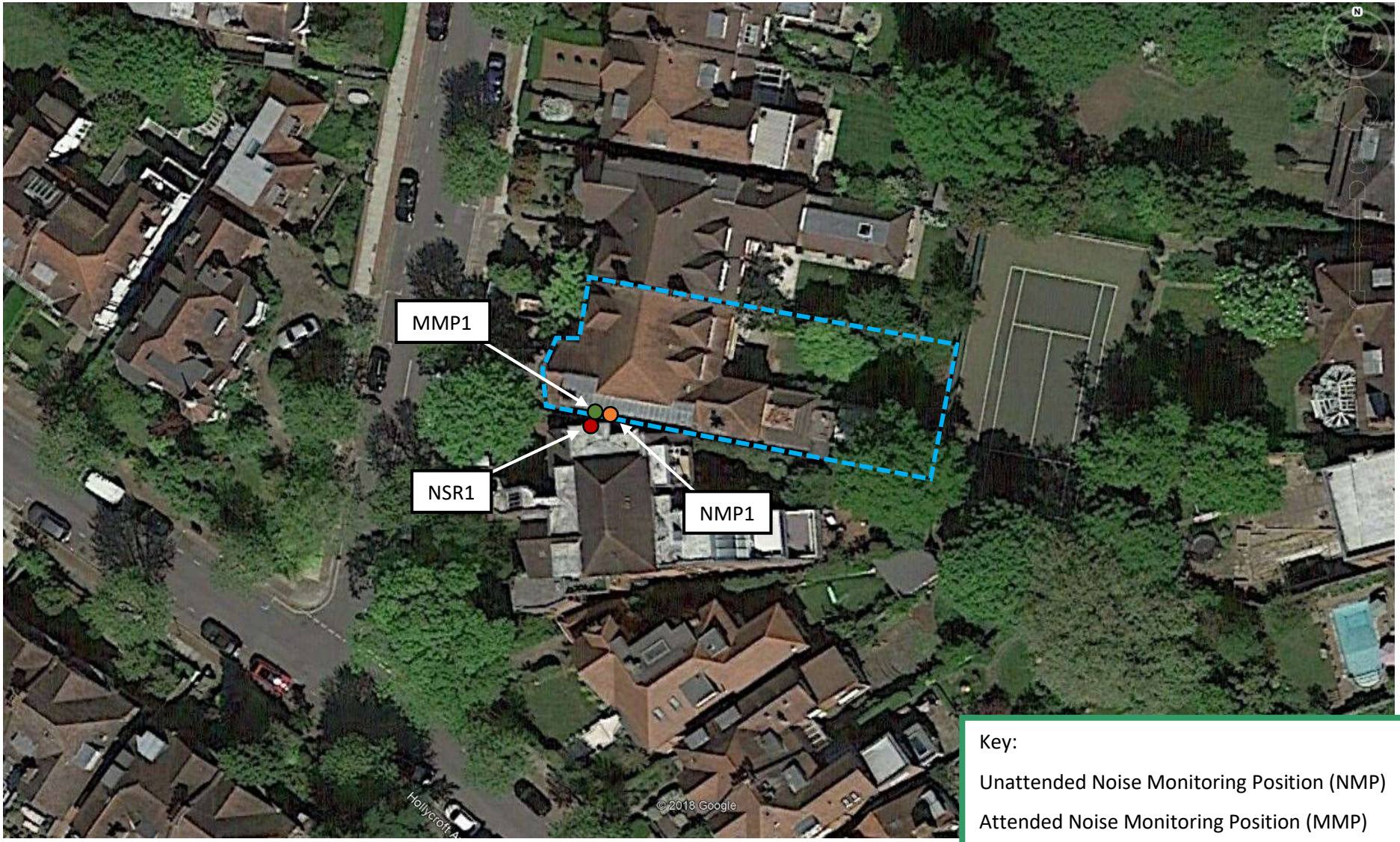
8.2. Further attended measurements of the plant in operation were also taken at a single fixed monitoring location, positioned 1m from the plant to ascertain the specific noise level of the plant and determine if the plant had any noise characteristics.

8.3. Following on-site measurement of pre-existing noise levels, calculations have been made of the noise rating level of the proposed relocation point for the plant at the NSR. From this assessment, together with information from the plant manufacturer, the potential noise impact has been determined.

8.4. The rating noise level from the plant, following relocation and mitigation, at 1m from the NSR are predicted to be **22dB $L_{Ar,Tr}$,** which is **10dB(A) below** the assessed background noise level (32dB $L_{A90,T}$) and in line with the Local Authority's noise criteria (22dB $L_{A90,T}$). In accordance with BS 4142:2014, noise levels from the plant "***is an indication of the specific sound source having a low impact"*** at the NSR.

8.5. Considering the results of the noise survey, the illustrative layouts and the calculations, the predicted resultant noise levels from the proposed plant are predicted to meet appropriate and reasonable guidance and the relevant noise criteria. Therefore, an adequate level of protection against noise for occupants of the nearest noise sensitive receptor is afforded; including when factoring in potential uncertainty.

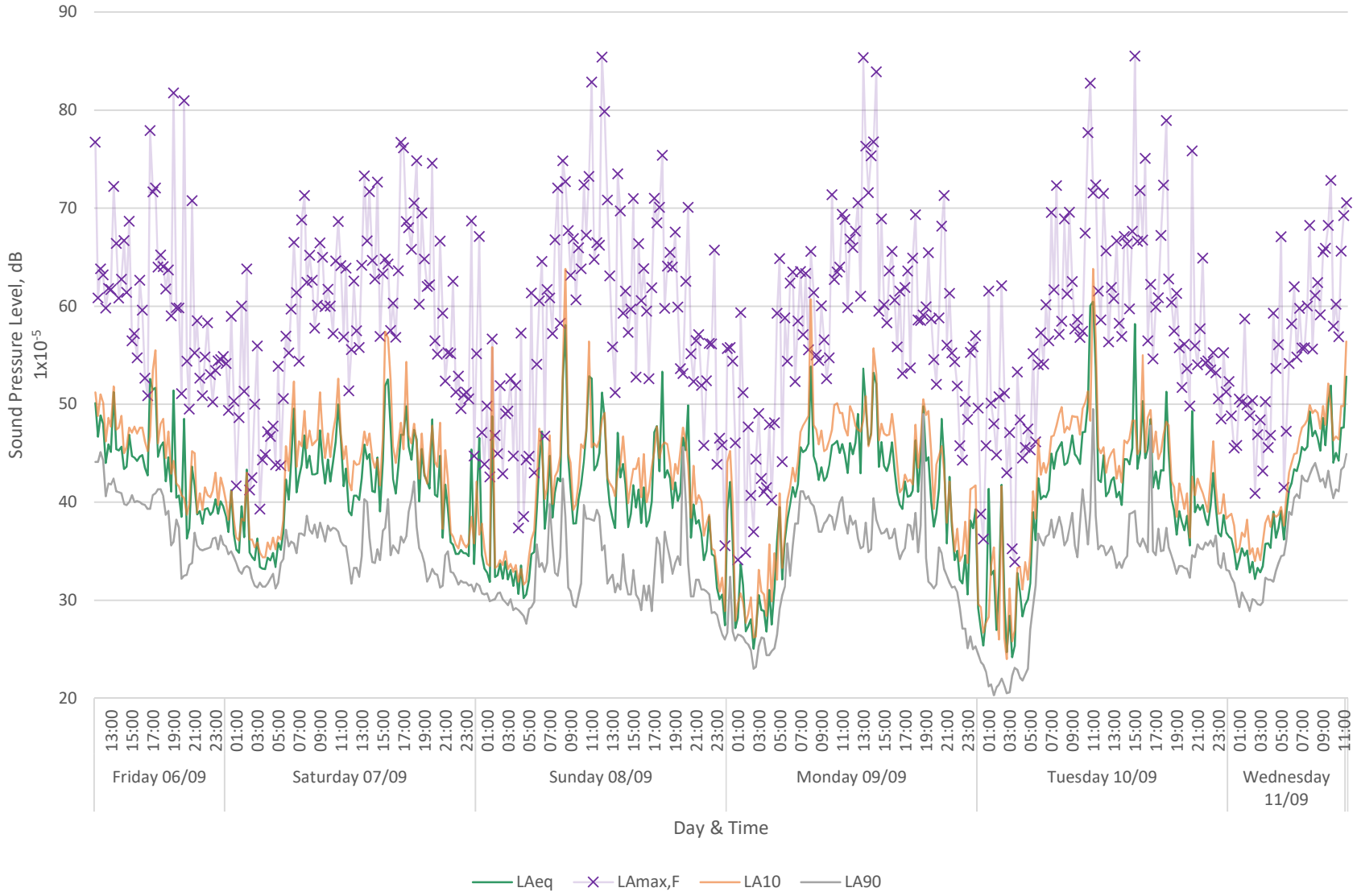
Appendix A – Site Plan



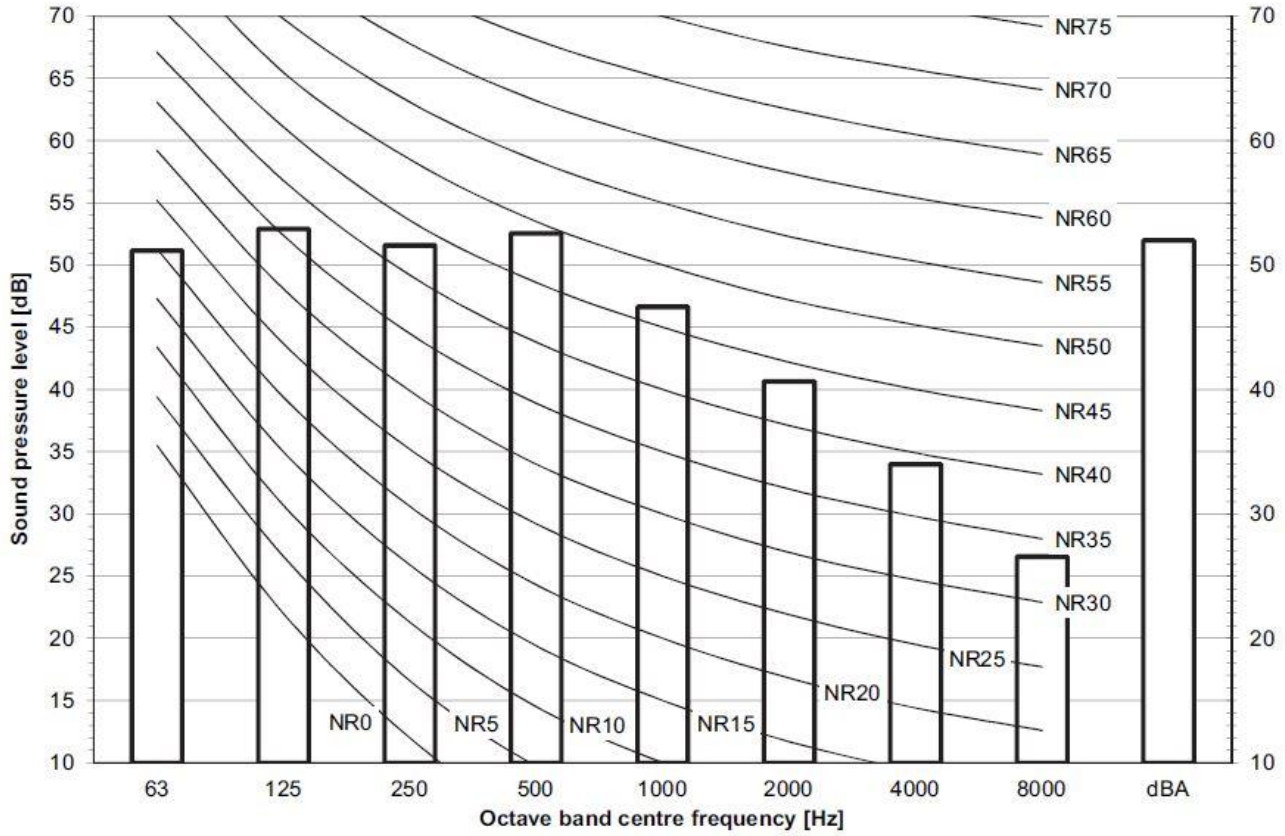
Appendix A – Site Plan

Appendix B - Time History (TH1)

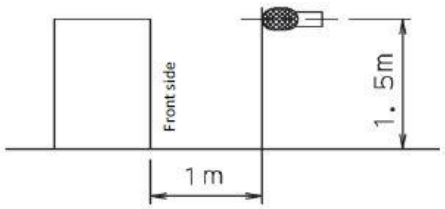
6 Rosecroft Avenue, Childs Hill, London NW3 7QB
Friday 6th September 2019 - Wednesday 11th September 2019



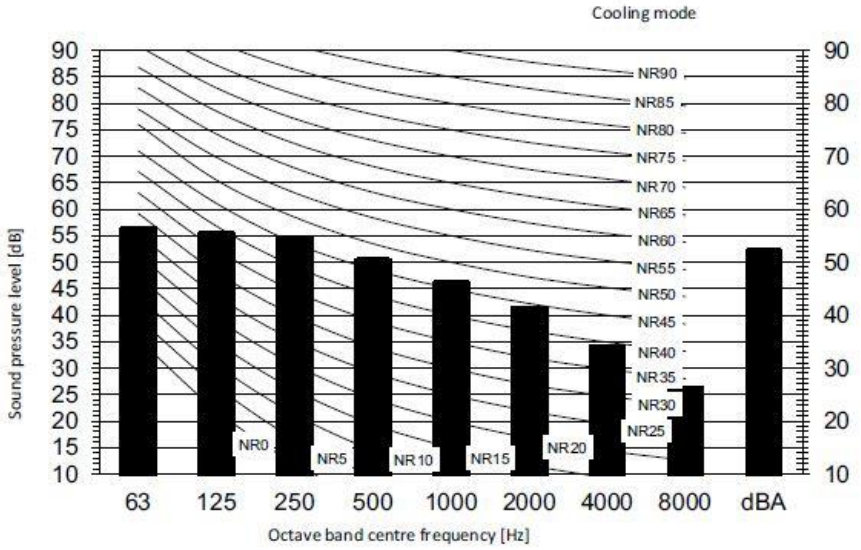
RXYSCQ5TV1

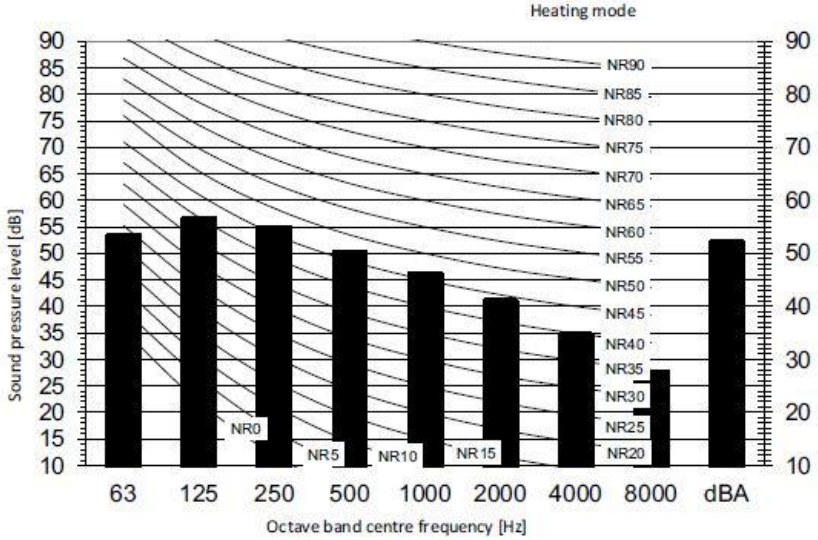


Notes
- Data is valid at free field condition.
- Data is valid at nominal operation condition.
- dBA = A-weighted sound pressure level (A scale according to IEC).
- Reference acoustic pressure 0 dB = 20 µPa



5MXM-M





Legend

dBA = A-weighted sound pressure level (A scale according to IEC).

A Scale

B High-tap

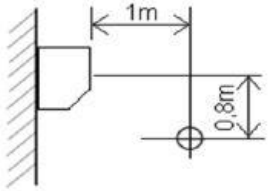
Cooling Total dB

A	B
dBA	52

Heating Total dB

A	B
dBA	52

Location of microphone



Notes

1. Operating conditions: power source 220-240 V/220 V 50/60 Hz; JIS standard
2. Background noise already taken into account.
3. Operating noise varies depending on operation and ambient conditions.
4. The operation noise measuring method is in accordance with JISC9612.
5. Measuring location: anechoic chamber

Appendix D - Acoustic Calculations
Manufacturer's Data of Relocated Units with Attenuation

Noise Sensitive Receiver 1

Source: 1x Daiking 5MXM90N, 1x Daiking RXYSCQ5-TV1

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
1x Daikin 5MXM-M (Lp at 1m)	57	56	55	51	46	42	34	26	**52**
Acoustic Enclosure Attenuation	-10	-12	-19	-26	-33	-35	-34	-35	
1x Daikin RXYSCQ5-TV1 (Lp at 1m)	51	53	51	52	47	41	34	27	**52**
Acoustic Enclosure Attenuation	-10	-12	-19	-26	-33	-35	-34	-35	
Cumulative Sound Pressure Level with Attenuation	**48**	**46**	**37**	**28**	**17**	**10**	**3**	**-5**	**34**
Distance attenuation (3m)	-10	-10	-10	-10	-10	-10	-10	-10	
Partial line-of-sight	-5	-5	-5	-5	-5	-5	-5	-5	
BS4142 Penalty for Intermittancy	3	3	3	3	3	3	3	3	
Calculated level at NSR	**36**	**34**	**26**	**17**	**5**	**-2**	**-9**	**-17**	**22**

	Day	Night
SOAEL (Red)	**>40**	**>37**
LOAEL to SOAEL (Amber)	**26 - 40**	**23 - 37**
LOAEL (Green)	**25**	**22**
Camden Noise Criteria Target	**n/a**	**22**

BS8233: Internal Night Time Levels

	Frequency Spectral Data (Hz)								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Calculated level at NSR	36	34	26	17	5	-2	-9	-17	22
Partially Open Window Attenuation	-15	-15	-15	-15	-15	-15	-15	-15	
Calculated level in Internal Receiver	21	19	11	2	-10	-17	-24	-32	7

BS8233 Night Time Criteria	**30**

APPENDIX 3 –

Letter from AAC Service & Maintenance LTD stating the appropriate use of air-conditioning units for the property

AAC SERVICE & MAINTENANCE LTD
UNIT 6, MALLOW PARK, WATCHMEAD, WELWYN GARDEN CITY, HERTS AL7 1GX
TEL: 01707 32 55 66 FAX: 01707 32 55 44
EMAIL: INFO@AAC.UK.NET WWW.AAC.UK.NET
REGISTERED IN ENGLAND AT 42 LYTTON ROAD, BARNET, HERTFORDSHIRE, EN5 5BY. COMPANY REG NO 5966183.

J Randall
6 Rosecroft Avenue
London NW3 7QB

Dear Mr Randall

Cooling/Airconditioning

We understand that cooling is required at the property in certain rooms where a comfortable ambient temperature cannot be achieved through other means. As requested, we have looked at the cooling options available to you at the property. We have considered the following passive measures in accordance with CPG and none are possible and/or viable at the property:

· Water based cooling systems - N/A
· Evaporation cooling - N/A
· Ground source cooling - N/A
· Exposed concrete slabs - N/A
· Natural 'stack effect'- N/A

We therefore recommend installation of the following Daikin system/specs/efficiency.

1. Master bedroom – Daikin FXNQ63AZVEB VRV
2. 1st floor bedroom – FNA50AZVEB Energy label A+
3. 1st floor rear bedroom – Daikin FXNQ40AZVEB VRV
4. 2nd floor bedroom – Daikin FDXM50F3V1B Energy label A+
5. 2nd floor rear bedroom – Daikin FXDQ40AZVEB VRV
6. Study – Daikin FDXM25F3V1B3 Energy label A+

Condenser one – Daikin RXYSCQ5TMV1B Seasonal Efficiency Cooling 303.4%

Condenser two – Daikin 5MXM90NZV1B Multi split system

Yours sincerely

Alex Collins

AAC Service and Maintenance Ltd