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Project:

82 Fitzjohn's Avenue

Title:

Plant Noise Impact Assessment

quietly moving forward

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0	17/07/2023	Alex Oakes BSc(Hons)	Tim Meed BSc(Hons) MIOA
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2	01/08/2023	Alex Oakes BSc(Hons)	Tim Meed BSc(Hons) MIOA

CONTENTS:

1 INTRODUCTION

1.01 Environmental Equipment Corporation Limited has been commissioned by Slender Winter Partnership Ltd to undertake a noise assessment of a number of new plant items proposed to serve the residential dwelling of No 82 Fitzjohn's Avenue.

1.02 This noise assessment has been conducted in accordance with the policies and requirements of the London Borough of Camden Council (LBCC) and is based on a noise survey carried out at the site over a typical weekday period by Messrs paragon Acoustic Consultants.

1.03 This assessment includes:

- the setting of plant noise limits in accordance with the requirements of LBCC and national planning policy, standards and guidance; and
- the prediction of noise impacts at the worst affected noise sensitive receptors based on the proposed items of plant and their location.

1.04 This report is prepared solely for Slender Winter Partnership Ltd. Environmental Equipment Corporation Limited accepts no responsibility for its use by any third party. Note that the contents contained herein are produced for the purposes of review by relevant Planning Authority departments and do not constitute a detailed design or specification document to be used for the purposes of construction. Subsequent development of noise mitigation schemes shall engage EEC Ltd and Slender Winter Partnership Ltd so as to support the conclusions of this report.

1.05 Whilst every effort has been made to ensure that this report is easy to understand, it is necessarily technical in nature. To assist the reader, an explanation of the terminology used in this report is contained in Appendix A.

2 SITE

2.01 82 Fitzjohn's Avenue is an existing two storey detached residential dwelling currently undergoing redevelopment works. The site is located in a predominantly residential area of Hampstead.

2.02 On 12 January 2022, Full Planning Permission (ref. 2021/1787/P) was granted for the following:

"*Alterations and extensions including erection of 2 storey extensions, increased ridge height, alterations to fenestration, erection of dormer windows to roof and creation of sunken terrace, removal of existing pool house and erection of new orangery involving basement excavation for new pool, and other associated works; hard and soft landscaping including replacement sheds and garage and removal of trees.*"

2.03 The property is bound by the following:

- North – Educational facilities of Fitzjohn's Primary School;
- East – Royal Mail Hampstead delivery office, with further residential dwellings on Thurlow Road beyond;
- South – Residential dwelling of No 19 Thurlow Road; and
- West – Residential dwelling of No 84 Fitzjohn's Avenue.

2.04 The plant comprises three condensing units, being a single Mitsubishi PURY-P550YNW, a Mitsubishi PUZ-ZM71VHA and a Toshiba RAV-GM280. The plant items will be split between two locations, with the PURY-P550YNW being located towards the western extent of the property at ground level, in a purpose built acoustically treated masonry structure, and the PUZ-ZM71VHA

and RAV GM280 condensing units to be located on the proposed flat roof of the main house, as presented in Appendix B.

2.05 The closest noise sensitive receptors to the proposed plant items are the following:

- Rear top-floor windows of No 19 Thurlow Road;
- Fitzjohn's Primary School buildings to the north; and
- Rear windows of No 84 Fitzjohn's Avenue.

2.06 It is proposed that noise control will be introduced for each item of plant, with the two small condensing units individually housed in high-performance acoustic enclosures, and the larger Mitsubishi PURY-P550 unit housed independently in a purpose built masonry structure.

2.07 The 'Enclosure' to house the PURY-P550 unit will be of masonry construction on all four elevations, with a solid door. The unit will discharge and intake through high-performance attenuators hung from the ceiling of the structure, discharging/intaking vertically. A solid panelwork 'capping' will form the lid of the enclosure, with acoustic absorption applied internally to the faces of the masonry elevations.

3 GUIDANCE

3.01 Local and National Planning Policy is presented in Appendix C of this document.

3.02 The below extract is taken from LBCC's supplementary planning guidance for protection of Amenity dated January 2021 and provides guidance on how the Local Authority will assess acoustic reports:

"*When assessing acoustic reports, the council will consider the reported measurements against the noise thresholds set out in Appendix 3 of the Local Plan. The thresholds are expressed as 'effect levels', which sets out a hierarchy of expected changes in behaviour and impact on health and wellbeing in response to increasing noise levels (measured in decibels – dB) The 'effect levels' are summarised below and explained in detail in National Planning Practice Guidance (NPPG).*

- No observed effect level (NOEL) – the level below which no effect can be detected on health and quality of life.
- Lowest observable adverse effect level (LOAEL) – the level above which changes in behaviour (e.g. closing windows for periods of the day) and adverse effects on health (e.g. sleep disturbance) and quality of life can be detected.
- Significant observed adverse effect level (SOAEL) – the level above which adverse effects on health and quality of life occur. This could include psychological stress, regular sleep deprivation and loss of appetite."

NPPG does not define any of the above effect levels numerically.

In accordance with the current National Planning Policy the noise impact from new plant should be assessed in line with the requirements of 'BS4142:2014: Methods for rating and assessing industrial and commercial sound'. The methodology provided can be used to assess the likelihood of any adverse impacts numerically based on the noise emitted as it affects noise sensitive receivers, including any corrections for the character of the noise against existing background noise levels.

Appendix 3 of the Local Plan includes noise threshold values adopted in the Borough when assessing the day-to-day operation of plant as it affects existing residential amenity, a copy of which is included in Appendix C of this report.

SCHOOL BUILDINGS

3.03 The methods described in BS4142:1024 use external noise levels to assess the likely effects of noise emissions from fixed industrial plant on residential receivers. In this case it is considered reasonable that the adjacent school (Fitzjohn's Primary School - the closest building to the proposed plant location) be assessed in-line with the guidelines provided in *Building Bulletin 93 (BB 93) Acoustic Design of Schools*.

3.04 BB 93 specifies upper limits for indoor ambient noise levels in terms of $L_{Aeq,30\ minutes}$ during normal teaching hours. An extract of Table 1 can be seen below:

Type of room	Room classification for the purpose of airborne sound insulation in Tables 3a and 3b		Upper limit for the indoor ambient noise level $L_{Aeq,30mins}$ dB	
	Activity noise (Source room)	Noise tolerance (Receiving room)	New build	Refurbish-ment
Ensemble room [1] Recording studio[1]	Very high	Low	30	35
Control room - for recording[1] Control room - not for recording	High Average	Low Medium	35	40
Lecture room	Average	Medium	35	40
Teaching space intended specifically for students with special hearing and communication needs[2]	Average	Low	30	35
SEN calming room	High	Low	35	35

Building Bulletin 93 Table 1 Extract

3.05 In view of the details presented above it is considered reasonable to adopt a noise criterion of 35 dB $L_{Aeq,\ 30\ minutes}$ for the school building located to the north of the sites under consideration.

3.06 It is also reasonable to consider the reduction given by a partially open window which will be applied to the external noise level 1m from the school window. BS8233: "Guidance on sound insulation and noise reduction for buildings" states that a value of 10dB should be allowed for.

3.07 In light of the above accepted guidance, a plant noise level limit of 45dB(A) at 1m from openable school windows is considered to maintain acceptable internal ambient noise levels within the school premises.

4 RESULTS

4.01 A pre-works background noise survey had previously been undertaken by Messrs Paragon Acoustic Consultants in July of 2020. A summary of the time averaged ambient levels and lowest measured background levels over the proposed plant operational periods are shown in Table 4.1. The minimum L_{A90} is the lowest fifteen-minute measurement in the specified period.

4.02 Noise monitoring took place between the following dates / times:

- Start : 20/07/2020 approximately 1300 hours
- End : 22/07/2020 approximately 1020 hours

4.03 Noise monitoring was generally unmanned and was undertaken at the locations as described below:

- **MP1**: Within the grounds of 82 Fitzjohn's Avenue

Measurement Position	Daytime/Evening 0700-2300 $L_{A90,(15min)}$	Night-time 0700-2300 $L_{A90,(15min)}$
MP1 measurement position (grounds of Fitzjohn's Avenue 82)	37 dB	31 dB

Table 4.1: Free-Field Measured Ambient and Lowest Background Noise Levels

4.04 Tabulated and graphical results of the background noise survey carried out by Messrs Paragon Acoustics can be found in their report ref – 4670_ENS_A a copy of which is included in Appendix D, along with equipment details and calibration certificates.

5 NORMAL USE PLANT ASSESSMENT

5.01 This application includes the installation of a number of condensing units to serve the residential dwelling of 82 Fitzjohn's Avenue. Two of the condensing units will be installed within acoustic enclosures on a proposed flat roof to be constructed on the northern elevation of the dwelling, with the third unit to be installed in a purpose built, acoustically treated ground level masonry structure.

5.02 It is proposed that all three units will be installed with noise control. It is also proposed that the PURY-P550 unit (cooling only) will operate at 70% duty throughout the night-time hours of 2300-0700 to afford a 9dB broadband reduction in noise emissions.

5.03 Please note, that in accordance with the requirements of LBCC in regard to fixed plant noise levels, the proposed noise limits are based on being 10 dB below the measured minimum background noise level at noise sensitive receptors. To provide the most robust assessment, garden areas are considered to occupied and therefore noise sensitive during the daytime periods. Night-time noise emissions are assessed at the closest or most affected noise sensitive facades.

5.04 Based on the standard requirements of the London Borough of Camden Council, the lowest measured background noise level in each time period and the guidance of BB93, Table 6.1 sets out the recommended noise limits that the proposed items of plant should meet.

Location	Period	Measured Existing $L_{A90,T}$	Proposed Noise Limit L_A
Residential Gardens and noise sensitive windows	Day / Evening	37 dB	27 dB
Noise sensitive windows	Night	31 dB	21 dB
School windows	Daytime	37 dB	45 dB

Table 5.1: Suggested Plant Noise Emission Limits Based on Lowest Measured L_{A90}, Free-field and BB93 internal ambient noise limits dB

5.05 Limits are set on the basis that the proposed plant in this instance is expected to display none of the characteristics whereby the acoustic correction should be applied.

5.06 Assuming the proposed items meet the noise limits set out in Table 6.1 noise will be below the NOEL with respect to the NPPF.

5.07 The below table presents the manufacturer stated sound pressure levels for the proposed plant. Copies of the manufacturer's plant data sheets are included in Appendix B.

Plant Item	Sound Power Level	
	DAY	NIGHT
Mitsubishi PUZ-ZM71VHA	60 dB(A)	60 dB(A)
Mitsubishi PURY-P550YNW	84 dB(A)	75 dB(A)
Toshiba RAV-GM280	80 dB(A)	80 dB(A)

Table 5.2: Manufacturer Stated Sound Power Levels for External Condensing Units

5.08 It is proposed that all three condensing units will be housed in high-performance acoustic enclosures, installed upon suitable antivibration mounts also to mitigate structure borne noise generation.

5.09 The propagation of noise from the proposed site due to the condenser operation has been modelled using CadnaA software produced by Datakustik. Calculations are undertaken using the General Method of Calculation from ISO9613-2:1996. Within the noise model buildings and the immediate topography have been represented along with a maximum of three order of reflection,

ground absorption of 0.5, representative of the mix of hard and soft landscaping around the site and air humidity of 70% and temperature of 10 deg C.

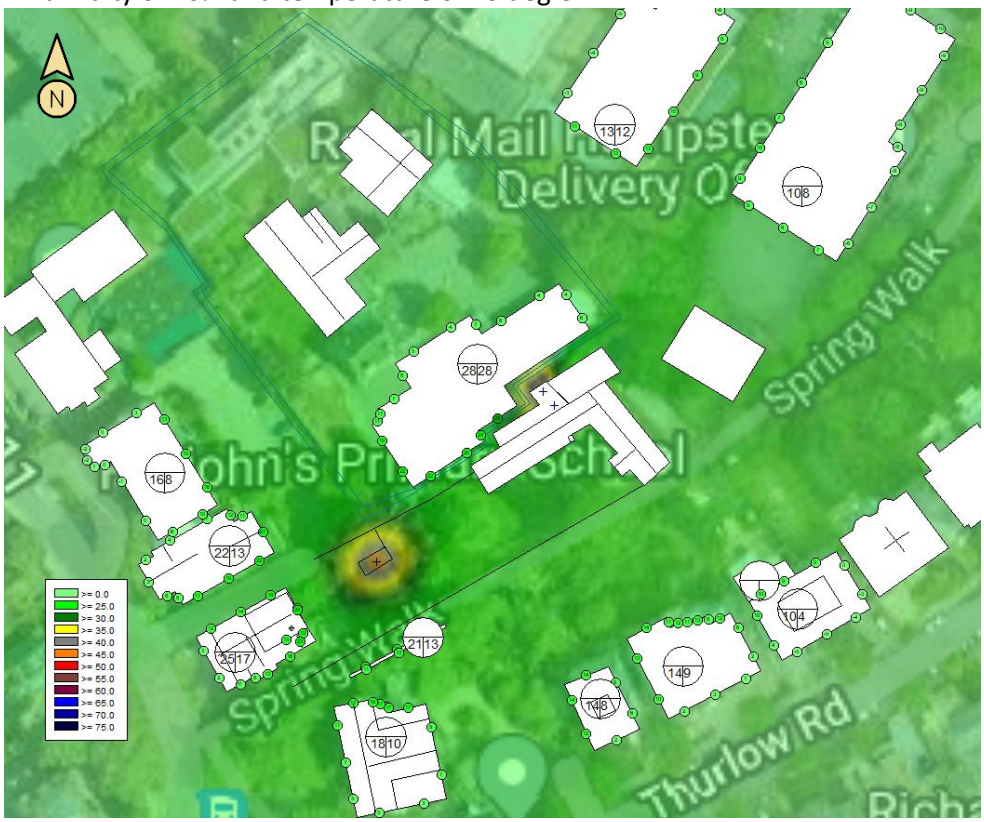


Figure 1: Condensing units CadnaA Noise Model (Attenuation Applied)

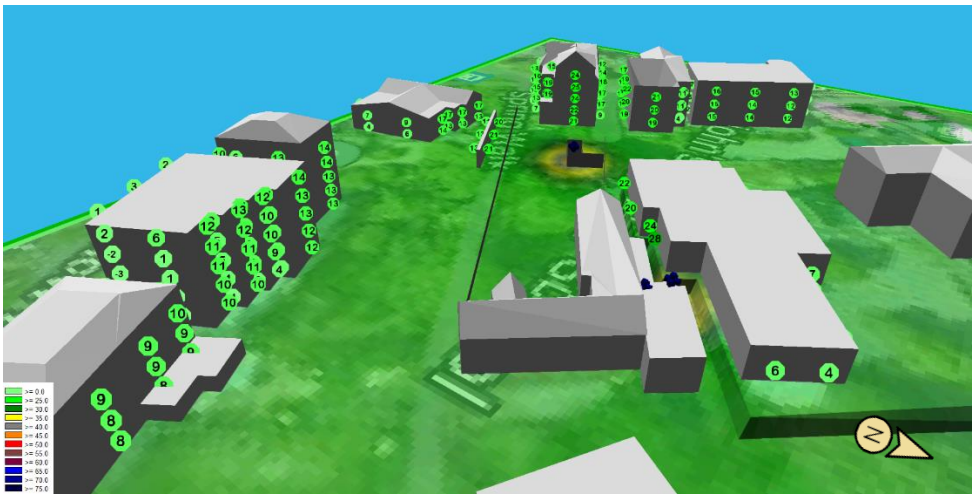


Figure 2: Condensing units CadnaA Noise Model (DAYTIME Attenuation Applied) View towards 84 Fitzjohn's Avenue

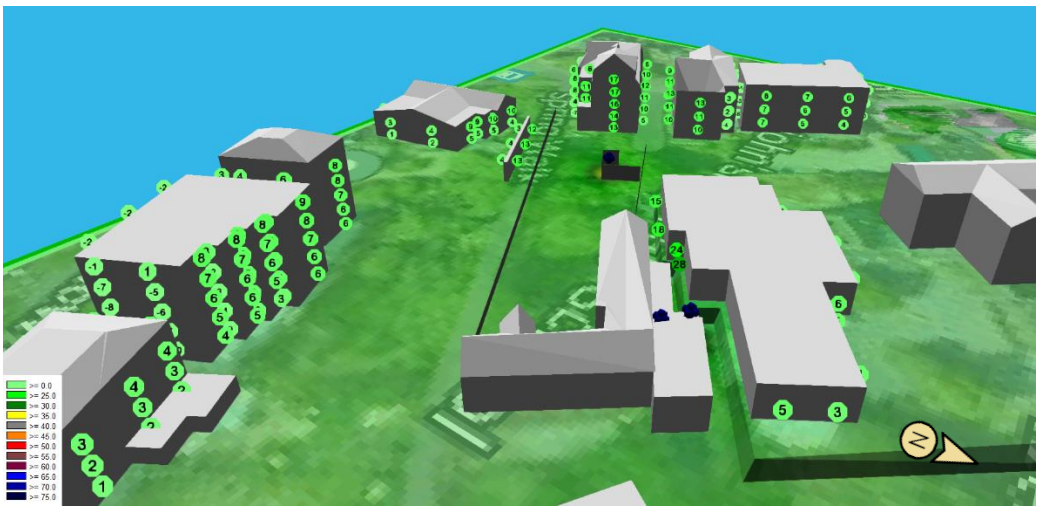


Figure 3: Condensing units CadnaA Noise Model (NIGHT TIME Attenuation Applied) View towards 84 Fitzjohn's Avenue

5.10 Table 6.3 below presents a summary of resultant noise levels at the closest noise sensitive receivers, after the proposed noise control scheme has been applied.

Location	Period	Resultant Noise Level	Proposed Noise Limit L_A	Exceedance
Most Affected Garden No 19 Thurlow Road/ No 84 Fitzjohn's Avenue	Day / Evening	21 dB(A)	27 dB(A)	- 6 dB
Noise sensitive windows Rear windows of No 84 Fitzjohn's Avenue	Day/Evening	25 dB(A)	27 dB(A)	- 2 dB
Noise sensitive windows Rear windows of No 84 Fitzjohn's Avenue	Night	17 dB(A)	21 dB(A)	- 4 dB
Fitzjohn's Primary School	Day	28 dB(A)	45 dB(A)	- 17 dB

Table 6.3: Resultant Noise Levels (After Noise Control) at the Closest Noise Sensitive Receivers

5.11 It can be seen from the above tables that the noise limits are not exceeded during any period at any noise sensitive receiver.

5.12 Assuming that the proposed plant and noise control scheme are included in the installation, predicted noise levels will meet the requirements of the Local Authority during all periods of operation and at the closest noise sensitive receptors.

5.13 The proposed scheme of vibration isolation will also mitigate the transfer of vibration to the supporting and connecting structures and ensure that the airborne sound mitigation design is not compromised.

5.14 With respect to the NPPF, achieving the noise limits would be classified as being below the NOEL.

6 CONCLUSIONS

6.01 Slender Winter Partnership Ltd has appointed Environmental Equipment Corporation Limited to undertake a noise assessment of mechanical services plant proposed to serve the residential dwelling of No 82 Fitzjohn's Avenue.

6.02 The assessment has been carried out in accordance with national planning guidance and the requirements of the London Borough of Camden Council and is based on an environmental noise survey conducted at the site over a mid-week period by Messrs Paragon Acoustics.

6.03 A noise assessment has been undertaken to evaluate the noise immission levels of the proposed emergency and normal use plant at the closest existing residential receptors.

6.04 Plant noise limits for the normal use plant have been set based on the methodology contained in BS4142, BB 93, the results of a background noise survey and the requirements of the London Borough of Camden Council. In accordance with associated guidance, the noise limits have been set so as to be at least 10dB less than the background noise at all times. Absolute noise limits have therefore been given at the closest and most affected noise sensitive receivers.

6.05 Predictions have shown that the noise criteria are met at all assessment locations during both day and night-time periods, assuming, the proposed noise control scheme is included in the installation.

6.06 Assessing the site in accordance with the principles of the National Planning Policy Framework has shown that predicted noise levels for the normal use plant would be below the level at which no effects are observed to occur, the NOEL.

6.07 The proposed plant equipment complies with the relevant regional and local requirements in respect of noise and is therefore acceptable in principle.

APPENDIX A

GLOSSARY OF TECHNICAL TERMS

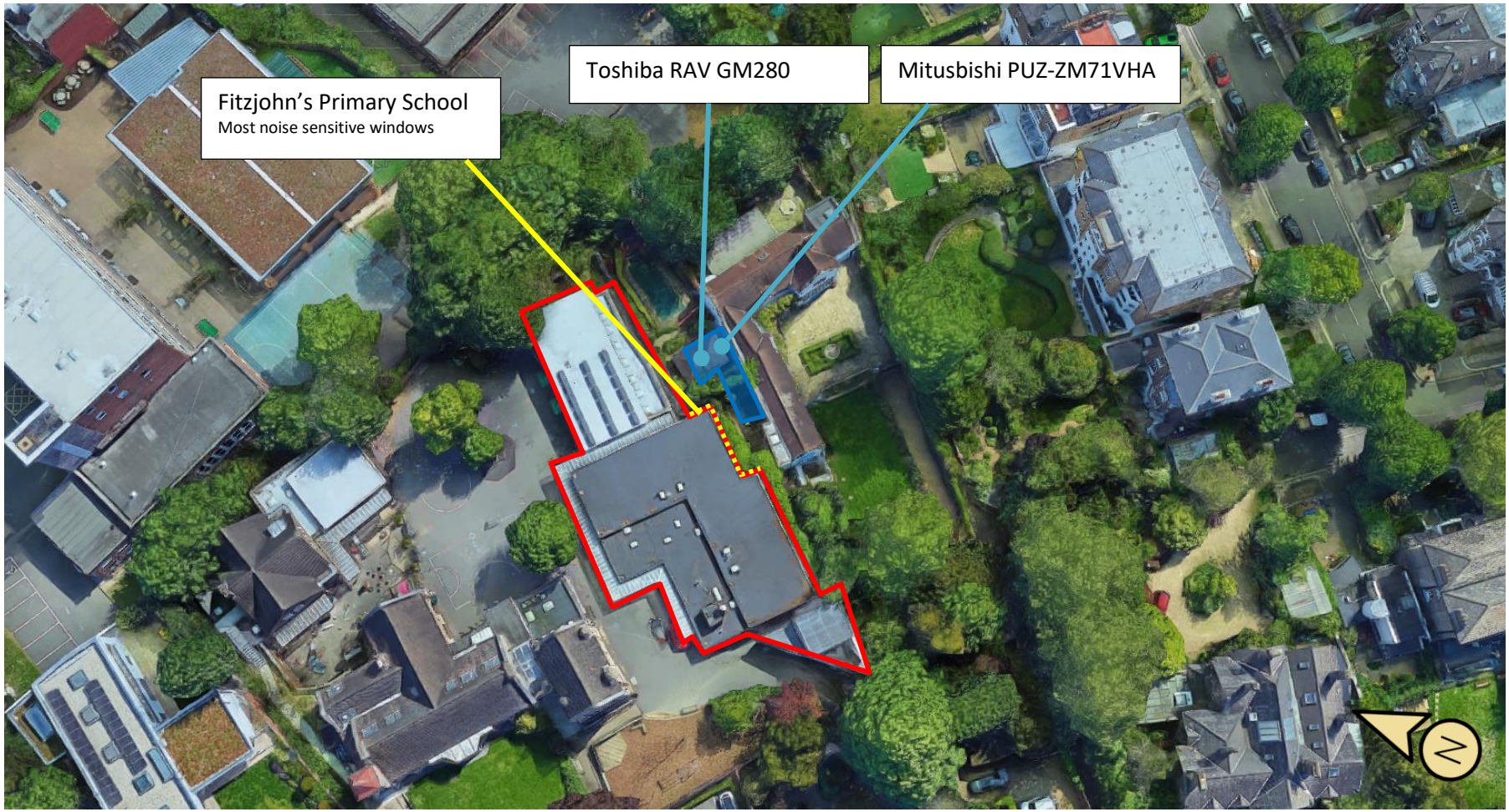
ACOUSTIC TERMINOLOGY

Absorption Classes	The sound absorption of a material is rated from Class A to Class E, where Class A materials provide the highest level of sound absorption.
Ambient Noise Levels	Noise levels measured in the absence of noise requiring control, frequently measured to determine the situation prior to the additional of a new noise source.
dB	Decibel. The logarithmic unit of sound level.
dBA	A-weighted decibel. The A-weighting approximates the response of the human ear.
$D_{nT,w}$	Weighted standardized level difference. A single number quantity of the sound level difference between two rooms. $D_{nT,w}$ is typically used to measure the on-site sound insulation performance of a building element such as a wall, floor or ceiling. Measured in accordance with BS EN ISO 16283-1 and weighted in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	The weighted element-normalized level difference. A single number rating of the sound reduction provided by a sound passing through an individual element. $D_{n,e,w}$ is typically used to define the sound insulation provided by ventilators. Measured in accordance with BS EN ISO 10140-2:2010 and rated in accordance with BS EN ISO 717-1.
Flanking	Transmission of sound energy through paths adjacent to the building element being considered. For example, sound may be transmitted around a wall by travelling up into the ceiling space and then down into the adjacent room.
Frequency	Sound can occur over a range of frequencies extending from the very low, such as the rumble of thunder, up to the very high such as the crash of cymbals. Sound is generally described over the frequency range from 63Hz to 4kHz, roughly equal to the range of frequencies on a piano.
Impact Sound	Sound produced by an object impacting directly on a building structure, such as footfall noise or chairs scrapping on a floor.
$L_{Aeq,t}$	The equivalent continuous sound level measured in dBA. This is commonly referred to as the average noise level. 't' is the interval time for the measurement. Typically 't' of 16hrs and 8hrs is used for day and night time ambient noise respectively or 't' is defined by the period of interest in BS4142 assessments.
$L_{A90,t}$	The noise level exceeded for 90% of the measurement period, measured in dBA. This is commonly referred to as the background noise level.
$L'_{nT,w}$	Weighted, standardized impact sound pressure level. A single number rating of the impact sound insulation of a floor/ceiling when impacted on by a standard "tapper" machine. The lower the $L'_{nT,w}$, the better the acoustic performance. Measured in accordance with BBS EN ISO 140-7 and rated in accordance with BS EN ISO 717-2.
NR	Noise Rating. A single number rating which is based on the sound level in the octave bands 31.5Hz – 8kHz inclusive, generally used to assess noise from mechanical services in buildings.
Octave Band	Frequencies are often grouped together into octaves for analysis. Octave bands are labelled by their centre frequency which are: 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz and 4kHz.
Reverberation Time (T_{mf})	Reverberation time is used for assessing the acoustic qualities of a space. It is defined as the time it takes for an impulse to decay by 60dB. T_{mf} is the arithmetic average of the reverberation time in the mid frequency bands (500Hz, 1kHz and 2kHz).
R_w	Weighted sound reduction index. A single number rating of the sound insulation performance of a specific building element. R_w is measured in a laboratory. R_w is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete. Measured in accordance with BS EN ISO 10140-2:2010 and rated in accordance with BS EN ISO 717-1.
Sound Absorption	When sound hits a surface, some of the sound energy is absorbed by the surface material. Sound absorption refers to the ability of a material to absorb sound, rated from 0, complete reflection, to 1, complete absorption.
Sound Insulation	When sound hits a surface, some of the sound energy travels through the material. 'Sound insulation' refers to the ability of a material to prevent the travel of sound.
Structure-borne transmission	Transmission of sound energy as vibrations via the structure of a building.

APPENDIX B

SITE PLAN
&
MEASUREMENT LOCATION


No 94 Fitzjohns Avenue
Paragon Acoustics Measurement Location
82 Fitzjohn's Avenue
No 19 Thurlow Road
Mitsubishi PURY-P550YNW
N


Fitzjohn's Primary School
Most noise sensitive windows
Toshiba RAV GM280
Mitusbishi PUZ-ZM71VHA
N

APPENDIX C

PLANNING POLICY AND GUIDANCE

Camden Local Plan Appendix 3 – Noise Thresholds

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

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}

*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

**levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

National Planning Policy Framework and the Noise Policy Statement for England

The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) on 27th March 2012 (as amended on 20th July 2021) and upon its publication, the majority of planning policy statements and guidance notes were withdrawn, including Planning Policy Guidance 24 Planning and Noise, which previously presented the government's overarching planning policy on noise.

Paragraph 174 in Section 15 of the NPPF (2021), entitled Conserving and enhancing the natural environment, states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability…"*

Paragraph 185 in Section 15 also states that:

> *"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 area 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 their recreational and amenity value for this reason…"*

The Department for Environment Food and Rural Affairs published the Noise Policy Statement for England (NPSE) in March 2010. The explanatory note of NPSE defines the following terms used in the NPPF:

> *"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.*
>
> *LOAEL – Lowest Observed Adverse Effect Level*
>
> *This is the level above which adverse effects on health and quality of life can be detected.*
>
> *2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*
>
> *SOAEL – Significant Observed Adverse Effect Level*
>
> *This is the level above which significant adverse effects on health and quality of life occur."*

The NPSE does not define any of the above effect levels numerically.

The NPSE presents the Noise Policy Aims as:

> *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy and sustainable development:*

avoid significant adverse impacts on health and quality of life;

mitigate and minimise adverse impacts on health and quality of life; and

where possible, contribute to the improvement of health and quality of life."

It can be seen that the first two bullet points are similar to Section 11 of the NPPF, with a third aim that seeks to improve health and quality of life. The NPSE later expands on the Noise Policy Aims, stating:

2.23 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (paragraph 1.8).

2.24 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

2.25 This aim (the third aim)*, seeks where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."*

It is clear that noise described in the NPSE as SOAEL that would lead to significant adverse effects should be avoided, although there is no definition as to what constitutes a significant adverse effect. Similarly, noise should be mitigated where it is high enough to lead to adverse effects, termed the LOAEL, but not so high that it leads to significant adverse effects.

British Standard 4142

To assess the acceptability of the resultant noise levels we have consulted the relevant standards. BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' has been used to assess the likelihood any adverse impacts based on the resultant noise level from the new plant item, including any corrections for the character of the noise against the existing background noise level.

BS4142 gives guidance on assessing the likelihood of adverse impacts by calculating a 'rating level' of the new noise source and comparing its magnitude at noise sensitive locations to the existing or underlying background noise level. The background noise level is subtracted from the 'rating level' to assess the likelihood of complaints:

- The greater the difference the greater the likelihood of complaints.
- A difference of around +10dB or more is an indication of a significant adverse impact, depending on the context.
- A difference of +5dB 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 noise level, the less likely it is that the specific sound source will have an adverse impact or 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 sound impact, depending on the context.

This assessment is carried out over a one hour period for the daytime and a fifteen minute period for the night-time. For the purposes of the standard it states that daytime and night-time are typically 07:00 to 23:00 hours and 23:00 to 07:00 hours respectively.

The 'rating level' of the noise source is obtained taking the following factors into consideration:

- The new plant noise (the specific noise) is measured or predicted in terms of L_{Aeq}.
- An additional correction shall be included if the noise contains a distinguishable, discrete continuous note, if the noise contains distinct impulses or if the noise is irregular enough to attract attention. The value for any tonal noise can be an addition of up to 6dB and for impulsive noise of up to 9dB.

BS 4142 goes onto state that:

'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 assessments and arriving at decisions, therefore, it is essential to place the sound in context.'

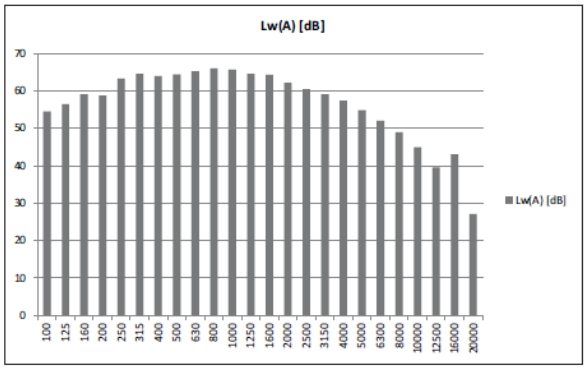
BS4142 has been referenced in setting noise limits for any fixed plant proposed as part of the proposed development.

APPENDIX D

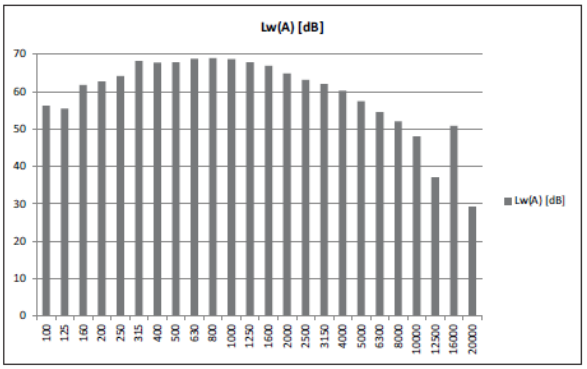
PUBLISHED PLANT NOISE DATA

RAV-GM2801AT8-E

Cooling

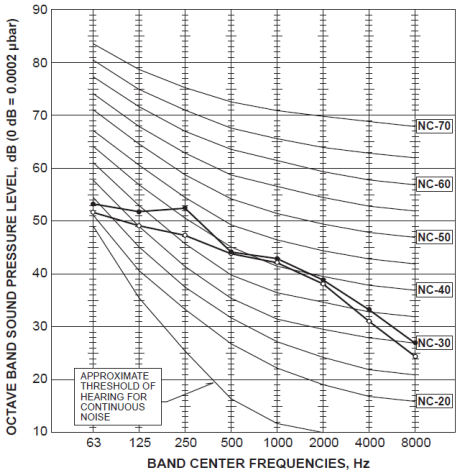


Heating



PUZ-ZM60VHA
PUZ-ZM71VHA

MODE	SPL(dB)	LINE
COOLING	47	
HEATING	49	



1. SPECIFICATIONS

Outdoor units

Model				PURY-P550YNW-A (-BS)
Power source				3-phase 4-wire 380-400-415 V 50/60 Hz
Cooling capacity (Nominal)		*1	kW	63.0
			kcal/h	54,200
			BTU/h	215,000
	Power input		kW	16.03
	Current input		A	27.0-25.7-24.7
	EER		kW/kW	3.93
Temp. range of cooling	Indoor		W.B.	15.0~24.0°C (59~75°F)
	Outdoor		D.B.	-5.0~52.0°C (23~126°F)
Heating capacity (Max)		*2	kW	69.0
			kcal/h	59,300
			BTU/h	235,400
	Power input		kW	17.91
	Current input		A	30.2-28.7-27.6
	COP		kW/kW	3.85
(Nominal)		*3	kW	63.0
			kcal/h	54,200
			BTU/h	215,000
	Power input		kW	14.44
	Current input		A	24.3-23.1-22.3
	COP		kW/kW	4.36
Temp. range of heating	Indoor		D.B.	15.0~27.0°C (59~81°F)
	Outdoor		W.B.	-20.0~15.5°C (-4~60°F)
Indoor unit connectable	Total capacity			50~150%
	Model/Quantity			P15~P250/2~50
Sound pressure level (measured in anechoic room) *4			dB <A>	66.0/70.0
Sound power level (measured in anechoic room) *4			dB <A>	83.5/89.0

COOLING

	PWL	PURY-P			YNW					
	Model	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	dBA
100%	P550	79.5	79.5	79	79	79	77.5	72	64.5	83.5
70%	P550	80	75.5	75	70	69	67	63	54.5	74.5

dB Reduction vs 100%
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