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Project:



**76 Lawn Road**

Title:

**Plant Noise Impact Assessment**

quietly moving forward



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## 1 INTRODUCTION

- 1.01 Environmental Equipment Corporation Limited has been commissioned by Cousins & Cousins to undertake a noise assessment of a single condenser unit to serve a residential property at 76 Lawn Road.
- 1.02 This noise assessment has been conducted in accordance with the policies and requirements of The London Borough of Camden Council (LBCC) and, in light of the ongoing Covid-19 restrictions in the UK, adopts the *Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments by the Association of Noise Consultants [ANC] and the Institute of Acoustics [IOA] Version 6* dated 12<sup>th</sup> January 2021.
- 1.03 This assessment includes a description of relevant metrics by which to determine the impact of proposed plant noise at the most affected noise sensitive receivers; this includes an assessment using LBCC's "traffic light system" as well as adopting guidance from the National Planning Policy Framework.
- 1.04 This report is prepared solely for Cousins & Cousins. 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 Cousins & Cousins 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 76 Lawn Road is a detached three-storey residential property located in a quiet residential area of Belsize Park.

It is proposed that a lower ground floor is excavated to serve as a lightwell/courtyard for an annex. It is proposed that a single condenser unit is installed underneath the staircase leading down to basement habitable rooms.

- 2.02 The property is bound by the following:

North	75 Lawn Road a three-storey high residential property;
East	Lawn Road with four-storey residential properties beyond;
South	77 Lawn Road a four-storey (including lower-ground-floor level) residential property; and
West	The rear gardens of three-storey residential properties along Downside Crescent.

A plan view and aerial view of the site is marked up and presented in Appendix B.

- 2.03 The closest noise sensitive receptors to the proposed plant items are the east-facing first-floor windows of 77 Lawn Road.
- 2.04 All other noise sensitive receptors are at a greater distance from the proposed location of the units or are protected by more screening by the intervening structures, and as such will be subject to lower levels of noise.

## 3 GUIDANCE

- 3.01 LBCC's Local Plan outlines a framework within which the Authority assesses the acceptability of mechanical services noise as it affects existing residential amenity. Proposals are categorised using a traffic light system as follows:

- **Green** Where noise is considered to be at an acceptable level (plant noise is -10dB with respect to the background noise level) LOAEL (Lowest Observed Adverse Effect Level)
- **Amber** A range over which the impact of the noise could be considered adverse to varying degrees though maybe acceptable when considered in context (plant noise ranges between -5dB to +5dB with respect to the background noise level) LOAEL – SOAEL
- **Red** Where noise is observed to have a significant adverse effect (plant noise is greater than 5dB above the background noise level) SOAEL (Significant Observed Adverse Effect Level)

- 3.02 Plant noise levels are assessed in accordance with *BS4142:2014: 'Methods for rating and assessing industrial and commercial sound'*.

- 3.03 It is noted that normally, where plant noise rating level is 10 dB or more less than the background noise, this is usually considered as the NOEL (no observed effect level) rather than LOAEL (lowest observed adverse effect level). In the context of the background noise the LOAEL is commonly adopted as the point at which the introduction of a new noise would lead to a background increase greater than 1 dB, however such incremental changes are not generally perceptible in the general population so the impact of such a change would be considered to be 'minor' in the short term and 'negligible' in the long term.

## 4 MEASUREMENTS

- 4.01 Environmental noise measurements were carried out over a weekday period, between 1600 hours on Wednesday 13<sup>th</sup> January 2021 and concluded 1630 hours Friday 15<sup>th</sup> January 2021, to establish the existing noise levels at the site. The survey methodology and results are set out below.
- 4.02 The survey was undertaken during a nationwide lockdown imposed due to the ongoing Covid-19 Pandemic. The restrictions imposed during the measurement period are expected to have resulted in subdued noise levels based on restrictions on the opening of non-essential retail and hospitality along with public movement. Therefore, the noise levels recorded are expected to be a likely worst-case background noise level.
- 4.03 Noise measurements have been carried out at the following position, as shown in Appendix B and described as being located 1.5 m from the side façade of the property and 1.5m from ground level. This location was therefore within 3.5 metres of a reflecting surface. However, based on the direction and nature of the controlling noise sources the levels recorded at the measurement location are expected to be representative of the levels experienced at the noise sensitive receptor and therefore no correction for localised façade reflections are felt to be necessary to the recorded data. The noise level incident on the nearest window would be similarly influenced by noise from traffic flow along Lawn Road and the surrounding roads.

## 5 EQUIPMENT

- 5.01 The equipment used for the survey was as follows:-

- 01dB Metravib Black Solo Integrating Sound Level Meter conforming to Class 1 BS EN 61672, Type 1 BS EN 60804 & BS EN 60651: 1994;
- 01dB Metravib MCE 212 Condenser Microphone, PRE 21 S Pre-amp and Connecting Leads;
- 01dB Outdoor Microphone Kit and a
- Tripod.

- 5.02 The equipment holds current UKAS or equivalent accreditation and serial numbers as follows:

Sound Level Meter 01dB Black Solo	Serial No.	65736
	Calibration Date	30 <sup>th</sup> September 2019
	Cal Certificate No.	U32975
½" MCE 212 Condenser Mic.	Serial No.	175307
	Calibration Date	30 <sup>th</sup> September 2019
	Cal Certificate No.	32974
Calibrator CAL 21	Serial No.	34634297
	Calibration Date	6 <sup>th</sup> February, 2020
	Cal. Certificate No.	U33985

N.B. Copies of calibration certificates are available upon request.

- 5.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

## 6 RESULTS

- 6.01 During the survey there rain showers on the morning of Thursday 4<sup>th</sup>. Outside of these times the weather during the survey was mostly dry and suitable for noise measurement, with the roads drying up and with only light winds prevalent.

- 6.02 Noise sources at the site included local and distant road traffic. This is expected to be partially subdued due to the Lockdown restrictions imposed at the time of the survey due to the Covid-19 Pandemic.
- 6.03 A list of the levels measured is included in Appendix D and represented graphically in Appendix E.
- 6.04 A summary of the time averaged ambient levels and lowest measured background levels over the measurement periods are shown in Table 6.1. The minimum  $L_{A90}$  is the lowest fifteen-minute measurement in the specified period.

Position	Period	Average $L_{Aeq,T}$ – dB	Minimum $L_{A90}$ – dB
First-floor level at south of property	Day time (0700-1900 hrs)	53	37
	Evening (1900-2300 hrs)	50	37
	Night-time (2300-0700 hrs)	49	36

**Table 6.1: Free-Field Measured Ambient and Lowest Background Noise Levels**

## 7 PLANT NOISE IMPACT ASSESSMENT

- 7.01 It is proposed that a *Daikin RXYSCQ5TMV1B* condenser unit is installed underneath a staircase leading to a lower ground floor lightwell.
- 7.02 The proposed unit has a manufacturer's stated sound power level of 69 dB(A). Copies of the manufacturer's plant data sheets are included in Appendix F. The unit does not display any obvious characteristics whereby an acoustic feature correction should be applied.
- 7.03 The unit will be located within bespoke acoustic housing specifically designed to reduce noise emissions by 18 dB. The unit will also be set to operate with a low noise mode during the night-time hours (2300–0700) reducing the maximum sound power level to 64 dB(A).
- 7.04 Predicted noise levels have been calculated at the most affected noise sensitive windows, the first-floor eastern-elevation windows of 77 Lawn Road.
- 7.05 Other residential receptors located further from the site will be subject to lower noise levels than those predicted at the above locations.
- 7.06 Table 7.1 presents the results of worst-case plant noise predictions at the worst-case locations.

Item	Noise Level		Notes
	Day/ Evening	Night	
<i>Daikin RXYSCQ5TMV1B</i> unit	69 dB(A)	64 dB(A)	Sound Power Level
Noise Control	- 18 dB		Bespoke acoustic housing
Reflections	+ 6 dB		Reverberant build up within lightwell
Conformal area losses over 8.5 metres	- 30 dB		Distance to closest window
Total Noise Level	27 dB(A)	22 dB(A)	77 Lawn Road

**Table 7.1: First-floor east-facing windows of 77 Lawn Road Plant Noise Calculation**

- 7.07 Putting the above calculated plant noise into context using relevant guidance discussed in Section 3 of this report, the following should be considered.
- 7.08 Based on the standard requirements of LBCC and as described in sections 3.02 – 3.04, the LOAEL or **Green** rating is achieved when plant noise is at least 10 dB below the lowest measured background noise level in each time period.
- 7.09 Following the guidance of the NPPF and NPSE achieving 10 dB below the background would be considered equivalent to the NOEL.
- 7.10 The following table summarises the calculated plant noise emission levels for the day/evening and night time periods and compares them to the background noise and compliance with the relevant standards, guidance and policy discussed above.

Period	Measured Existing $L_{A90,T}$	Calculated Plant Noise Level at Receiver $L_{eq}$	LBCC rating system	
			Calculated noise relative to background	LBCC Rating
Day	37 dB	27 dB(A)	- 10 dB	<b>Green</b>
Evening	37 dB	27 dB(A)	- 10 dB	<b>Green</b>
Night	36 dB	22 dB(A)	- 14 dB	<b>Green</b>

**Table 7.2: Plant noise compliance**

- 7.11 Assuming that the proposed plant and noise control equipment and measures specified in section 7.03 are included in the installation, the below ratings are achieved at the most affected noise sensitive receptors:

**Local Planning Policy** In accordance with LBCC's policy the assessed noise levels would fall in to the category '**Green** - *Where noise is considered to be at an acceptable level (plant noise is -10 dB with respect to the background noise level) LOAEL.*

**BS4142** In accordance with BS4142, the assessed noise could be classified as being below the No Observed Effect Level or NOEL.

## 8 CONCLUSIONS

- 8.01 Cousins & Cousins has appointed Environmental Equipment Corporation Limited to undertake a noise assessment for a proposed condenser unit to serve a residential property at 76 Lawn Road.
- 8.02 The assessment has been based on relevant metrics based on the requirements of the LBCC, and adopts guidance from National Planning Policy Framework. This is based on an environmental noise survey conducted at the site over a mid-week period.
- 8.03 A noise assessment has been undertaken to evaluate the potential noise impact of the proposed condenser at the most affected existing residential receptors using guidance from relevant standards.
- 8.04 Plant noise ratings have been assessed based on the methodology contained in BS4142. Using the results of a background noise survey and based on the “traffic light” metric adopted by LBCC, the resultant noise level will achieve a ‘Green’ rating.
- 8.05 Predictions have shown that the ‘Green’ rating is achieved at all assessment locations during all periods of the condenser’s proposed operation, assuming, noise control equipment and measures specified in section 7.03 are installed and implemented.
- 8.06 Assessing the site in accordance with the principles of the National Planning Policy Framework, predicted noise levels would be below the level at which no effects are observed to occur, the NOEL.
- 8.07 On the basis of this assessment, it is considered that noise does not pose a material constraint to the operation of the condenser unit.



**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.
$L_{A90,t}$	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**



**APPENDIX C**

**PLANNING POLICY  
AND GUIDANCE**



## PLANNING POLICY AND GUIDANCE

### Planning Policy Camden Borough Council

London Borough of Camden's planning policy is set out in a range of documents that constitute its 'development plan'. This includes its Local Plan and Camden Planning Guidance (CPG) documents. The Local Plan was adopted on 3 July 2017 and has replaced the 'Core Strategy' and 'Camden Development Policy' documents; as the basis for planning decisions and future development in the borough. The CPG for amenity spaces has been adopted January 2021.

Policy A4 – *Noise and Vibration* outlines the following aims:

*The Council will seek to ensure that noise and vibration is controlled and managed.*

*Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:*

- a. development likely to generate unacceptable noise and vibration impacts; or*
- b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.*

*We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.*

Appendix 3 of the Local Plan outlines noise thresholds for both noise generating and noise sensitive developments and identifies three basic design criteria upon which the acceptability of any proposal is likely to be assessed:

- Green – where noise is considered to be at an acceptable level.
- Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.
- Red – where noise is observed to have a significant adverse effect.

In the context of National Planning Policy Framework and Noise Policy Statement for England, Camden Council consider the above criteria to fall into three associated categories in terms of their noise 'effects':

- |                  |       |
|------------------|-------|
| • LOAEL          | Green |
| • LOAEL to SOAEL | Amber |
| • SOAEL          | Red   |

Table C of Appendix 3 defines the target noise levels for mechanical services plant and machinery:

**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 <sub>Amax</sub>	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L <sub>Amax</sub>	'Rating level' greater than 5dB above background and/or events exceeding 88dBL <sub>Amax</sub>

\*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 19<sup>th</sup> June 2019) 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 170 in Section 15 of the NPPF (2019), 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 180 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**

**SURVEY RESULTS**  
**(TABULAR)**

EC 18112 - 76 Lawn Road

Amy Gunning

Tabulated Noise data

Sheet 1 of 3

Time	L <sub>Aeq</sub>	L <sub>AMax</sub>	L <sub>A90</sub>
16:00	55	76	43
16:15	51	66	42
16:30	51	67	42
16:45	52	73	41
17:00	50	66	41
17:15	50	67	41
17:30	50	66	41
17:45	51	70	41
18:00	50	66	40
18:15	50	68	40
18:30	47	66	40
18:45	47	67	40
19:00	48	64	40
19:15	51	74	41
19:30	50	69	40
19:45	42	53	40
20:00	48	66	40
20:15	47	66	40
20:30	48	67	40
20:45	46	68	39
21:00	48	69	39
21:15	45	67	38
21:30	46	64	38
21:45	41	55	38
22:00	43	65	38
22:15	46	71	37
22:30	44	65	37
22:45	43	62	38
23:00	46	69	37
23:15	39	50	37
23:30	43	64	38
23:45	46	68	38
00:00	47	60	41
00:15	47	58	43
00:30	43	55	40
00:45	44	61	40
01:00	48	71	42
01:15	46	57	40
01:30	47	71	40
01:45	50	70	46
02:00	53	70	48
02:15	48	68	42
02:30	50	72	42
02:45	50	67	40
03:00	53	73	41
03:15	53	73	42
03:30	53	68	44
03:45	53	73	44

Time	L <sub>Aeq</sub>	L <sub>AMax</sub>	L <sub>A90</sub>
04:00	53	67	47
04:15	52	68	47
04:30	52	67	46
04:45	53	68	45
05:00	51	69	41
05:15	46	64	40
05:30	52	68	39
05:45	53	69	41
06:00	52	65	48
06:15	51	65	45
06:30	52	70	43
06:45	52	67	46
07:00	52	68	42
07:15	46	66	42
07:30	49	69	43
07:45	51	68	43
08:00	52	72	44
08:15	55	72	48
08:30	56	81	47
08:45	52	68	44
09:00	54	69	47
09:15	54	71	45
09:30	54	76	44
09:45	53	76	44
10:00	51	76	43
10:15	52	69	43
10:30	53	70	43
10:45	53	70	44
11:00	55	71	43
11:15	54	72	43
11:30	51	68	43
11:45	54	71	43
12:00	53	73	42
12:15	55	76	42
12:30	52	70	40
12:45	52	70	41
13:00	54	73	40
13:15	54	73	42
13:30	55	76	41
13:45	56	74	43
14:00	56	74	42
14:15	53	70	40
14:30	51	67	41
14:45	53	68	42
15:00	51	70	41
15:15	51	67	40
15:30	54	69	42
15:45	53	69	41

EC 18112 - 76 Lawn Road

Amy Gunning

Tabulated Noise data

Sheet 2 of 3

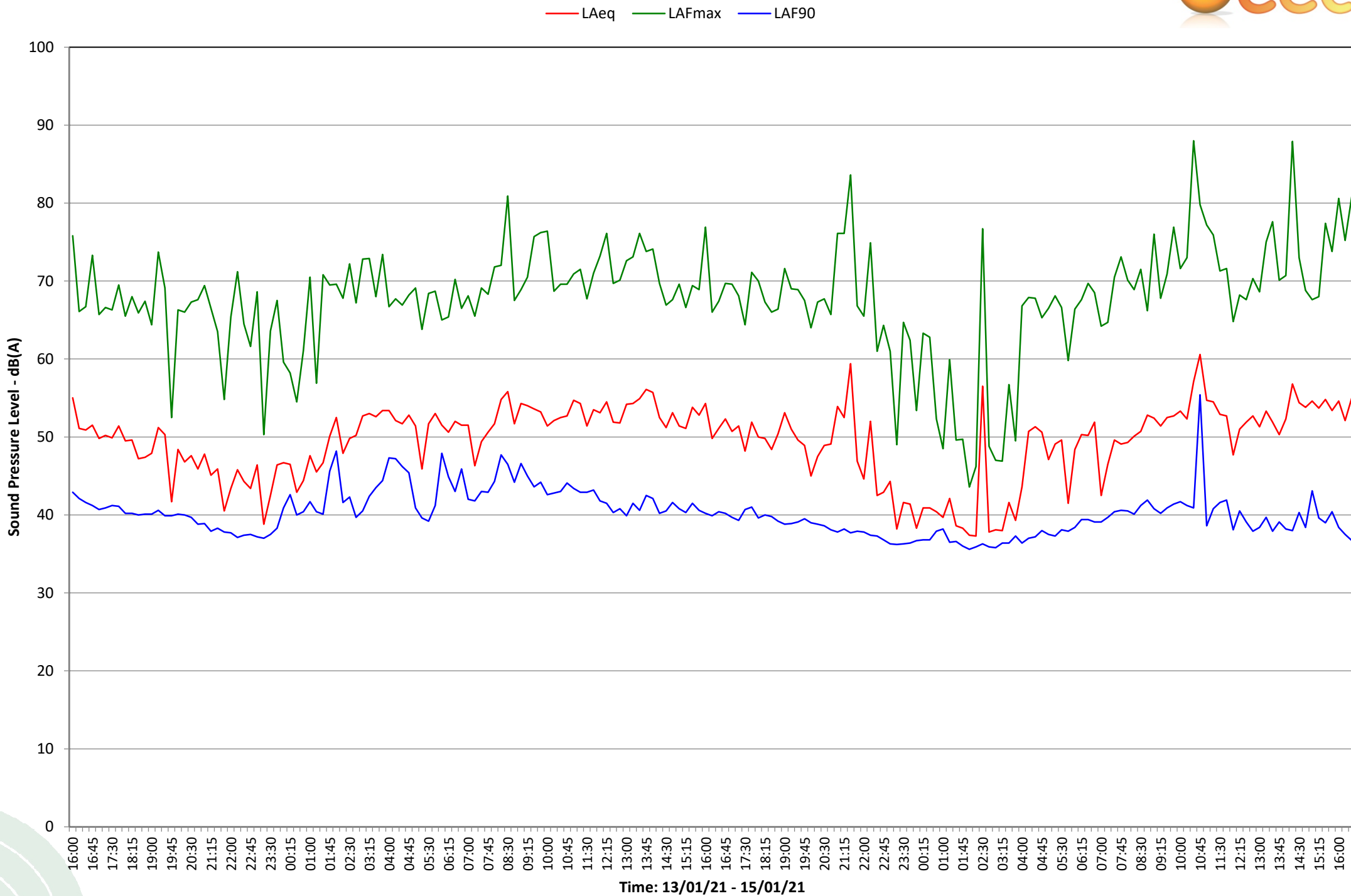
Time	L <sub>Aeq</sub>	L <sub>AMax</sub>	L <sub>A90</sub>
16:00	54	77	40
16:15	50	66	40
16:30	51	67	40
16:45	52	70	40
17:00	51	70	40
17:15	51	68	39
17:30	48	64	41
17:45	52	71	41
18:00	50	70	40
18:15	50	67	40
18:30	48	66	40
18:45	50	66	39
19:00	53	72	39
19:15	51	69	39
19:30	50	69	39
19:45	49	68	40
20:00	45	64	39
20:15	48	67	39
20:30	49	68	39
20:45	49	66	38
21:00	54	76	38
21:15	53	76	38
21:30	59	84	38
21:45	47	67	38
22:00	45	66	38
22:15	52	75	37
22:30	43	61	37
22:45	43	64	37
23:00	44	61	36
23:15	38	49	36
23:30	42	65	36
23:45	41	62	36
00:00	38	53	37
00:15	41	63	37
00:30	41	63	37
00:45	40	52	38
01:00	40	49	38
01:15	42	60	37
01:30	39	50	37
01:45	38	50	36
02:00	37	44	36
02:15	37	46	36
02:30	57	77	36
02:45	38	49	36
03:00	38	47	36
03:15	38	47	36
03:30	42	57	36
03:45	39	50	37

Time	L <sub>Aeq</sub>	L <sub>AMax</sub>	L <sub>A90</sub>
04:00	44	67	36
04:15	51	68	37
04:30	51	68	37
04:45	51	65	38
05:00	47	67	38
05:15	49	68	37
05:30	50	67	38
05:45	42	60	38
06:00	48	66	38
06:15	50	68	39
06:30	50	70	39
06:45	52	69	39
07:00	43	64	39
07:15	47	65	40
07:30	50	71	40
07:45	49	73	41
08:00	49	70	41
08:15	50	69	40
08:30	51	72	41
08:45	53	66	42
09:00	52	76	41
09:15	51	68	40
09:30	53	71	41
09:45	53	77	41
10:00	53	72	42
10:15	52	73	41
10:30	57	88	41
10:45	61	80	55
11:00	55	77	39
11:15	55	76	41
11:30	53	71	42
11:45	53	72	42
12:00	48	65	38
12:15	51	68	41
12:30	52	68	39
12:45	53	70	38
13:00	51	69	38
13:15	53	75	40
13:30	52	78	38
13:45	50	70	39
14:00	52	71	38
14:15	57	88	38
14:30	54	73	40
14:45	54	69	38
15:00	55	68	43
15:15	54	68	40
15:30	55	77	39
15:45	53	74	40



**APPENDIX E**  
**SURVEY RESULTS**  
**(GRAPHICAL)**

# Noise Level Time History at 76 Lawn Road





**APPENDIX F**  
**PUBLISHED PLANT NOISE DATA**

## 2 Specifications

2-1 Technical Specifications					RXYSCQ4TV1	RXYSCQ5TV1
Capacity range				HP	4	5
Cooling capacity	Nom.	35°CDB		kW	12.1 (1)	14.0 (1)
Heating capacity	Nom.	6°CWB		kW	12.1 (2)	14.0 (2)
	Max.	6°CWB		kW	14.2 (2)	16.0 (2)
Power Input - 50Hz	Cooling	Nom.	35°CDB	kW	3.43 (1)	4.26 (1)
	Heating	Nom.	6°CWB	kW	3.18 (2)	3.19 (2)
		Max.	6°CWB	kW	4.14 (2)	5.00 (2)
Capacity control	Method				Inverter controlled	
EER at nom. capacity	35°C AHRI			kW/kW	3.53 (1)	3.29 (1)
COP at nom. capacity	6°CWB			kW/kW	3.81 (2)	3.58 (2)
COP at max. capacity	6°CWB			kW/kW	3.43 (2)	3.20 (2)
Maximum number of connectable indoor units						64 (3)
Indoor index connection	Min.				50	62.5
	Nom.					-
	Max.				130	162.5
Dimensions	Unit	Height		mm		823
		Width		mm		940
		Depth		mm		460
	Packed unit	Height		mm		995
		Width		mm		1,030
		Depth		mm		580
Weight	Unit			kg		94
	Packed unit			kg		106
Packing	Material					Carton
	Weight			kg		3.8
Packing 2	Material					Wood
	Weight			kg		5.8
Packing 3	Material					Plastic
	Weight			kg		1.1
Casing	Colour					Daikin White
	Material					Painted galvanized steel plate
Heat exchanger	Type					Cross fin coil
	Fin	Treatment				Anti-corrosion treatment
Compressor	Quantity					1
	Type					Hermetically sealed swing compressor
	Crankcase heater			W		33
	Model					Inverter
Fan	Quantity					1
	Air flow rate	Cooling	Nom.	m³/min		91
	External static pressure	Max.		Pa		-
	Discharge direction					Horizontal
	Type					Propeller fan
Fan motor	Quantity					1
	Output			W		200
	Model					Brushless DC motor
Sound power level	Cooling	Nom.		dBA	68 (4)	69 (4)
Sound pressure level	Cooling	Nom.		dBA	51 (5)	52 (5)
Operation range	Cooling	Min.~Max.		°CDB		-5~46
	Heating	Min.~Max.		°CWB		-20~15.5
Refrigerant	Type					R-410A
	GWP					2,087.5
	Charge			TCO <sub>2</sub> eq		7.7
				kg		3.7
Refrigerant oil	Type					Synthetic (ether) oil FVC50K
	Charged volume			l		1.4