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Project:

42 Bedford Square, London WC1B 3DN

Title:

Plant Noise Impact Assessment

quietly moving forward

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Client	Classic Design Investments Ltd
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Revision	Date	Author	Checked
0	04/03/2021	Adam Ford BA(Hons) MSc AMIOA MAES	Tim Meed BSc(Hons) MIOA

CONTENTS:

1 INTRODUCTION

1.01 Environmental Equipment Corporation Limited has been commissioned by Classic Design Investments Ltd to undertake a noise assessment of proposed new comfort cooling and ventilation plant to serve the residential dwelling of 42 Bedford Square, London.

1.02 This noise assessment has been conducted in accordance with the policies and requirements of the London Borough of Camden (LBC), the Appeal Decision notice (APP/X5210/A/14/2228630) and Listed Building Consent (2017/6975) for this development and is based on a noise survey carried out at the site over a typical weekday period. This assessment includes reference to the historic noise survey undertaken at the site by Messrs Hoare Lea Associates as available within the existing Planning documents.

1.03 This assessment includes:

- the setting of plant noise limits in accordance with the requirements of Appeal Decision Notice 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 Classic Design Investments 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 Classic Design Investments 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 42 Bedford Square is a four-storey terraced residential dwelling, located in a predominately residential area of Bloomsbury, London.

2.02 The property is bound by the following:

- North – Bedford Square Garden;
- East – Neighbouring terraced dwellings of Bedford Square, and Bedford Avenue;
- South – Dwellings of Bedford Avenue; and
- West – Dwellings of Bedford Square.

2.03 This application is for the installation of new comfort cooling and ventilation plant to serve 42 Bedford Square, which is to be to be located at roof level, as presented in Appendix B. Details of the proposed plant is outlined in Section 7.

2.04 The closest noise sensitive receptors to the proposed plant items have been identified as the following;

- The rooftop windows of 40 Bedford Square, at approximately 10m from the nearest plant items;

- The rooftop windows of 43 Bedford Square at approximately 10m from the nearest plant items; and
- The rear fourth-floor windows of 43 Bedford Square at approximately 3m from the nearest plant items (no line of sight).

2.05 41 Bedford Square, whilst closer to the proposed condenser units than number 40 is understood to be commercial in nature and considered less noise sensitive.

2.06 Number 43 Bedford Square is understood to be a school and is therefore noise sensitive during daytime hours only.

2.07 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 Local and National Planning Policy for the London Borough of Camden is presented in Appendix C of this document.

3.02 Design requirements for plant noise emissions at this property are defined within the Conditions of the Appeal Decision notice (APP/X5210/A/14/2228630).

3.03 Condition 5 of this notice states:

"Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will make a noise that has a distinguishable, discrete, continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) when the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the LA90, expressed in dB(A)."

4 MEASUREMENTS

4.01 Environmental noise measurements were carried out at the site over a weekday period, between 11:00 hours on Wednesday 26th May 2021 and concluded 08:00 hours the following day, to establish the existing noise levels at the site. The survey methodology and results are set out below.

4.02 Noise measurements have been carried out at the following position, as shown in Appendix B and described as:

- Position 1: located at a height of approximately 1.5 metres AFL at the rear of the roof of the property. The measurement was not located within 3.5 metres of any reflecting surfaces, other than the mounting surface.

4.03 This position is considered to be representative of the existing noise climate at the nearest and most affected noise sensitive receptors.

4.04 A previous noise survey has also been undertaken at this site as part of the permitted planning application by Messrs Hoare Lea Associates (REP-1004963-MB-130618-Noise report-Rev6 and REP_1005942_5A_MB_20150915_Acoustic specification_Rev01), undertaken between 14:30 29th May 2013 - 09:30 4th June 2013.

4.05 This survey was completed in a similar location to that outlined above, with additional details provided in Appendix D.

5 EQUIPMENT

5.01 The equipment used for the survey undertaken by EEC Ltd 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	30th September 2019
	Cal Certificate No.	U32975
½" MCE 212 Condenser Mic.	Serial No.	175307
	Calibration Date	30th September 2019
	Cal Certificate No.	32974
Calibrator CAL 21	Serial No.	34634297
	Calibration Date	25th March, 2021
	Cal. Certificate No.	U37495

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 The weather during the survey was suitable for noise measurement, it being dry with little wind for the duration of the survey.

6.02 Noise sources at the site include local and distant road traffic. There were no other significant sources of noise observed during the attended periods of the survey.

6.03 A list of the levels measured is included in Appendix E and represented graphically in Appendix F.

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.

6.05 For reference, the results of Messrs Hoare Lea Associates historic survey have also been included below.

Position	Period	Average $L_{Aeq,T}$ – dB	Minimum L_{A90} – dB
1	Day time (0700-1900 hrs)	52	45
	Evening (1900-2300 hrs)	48	45
	Night-time (2300-0700 hrs)	46	41
Historic Hoare Lea Associates Survey	Day time (0700-2300 hrs)	49	42
	Night-time (2300-0700 hrs)	46	41

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

6.06 Minor variation is shown between the current (2021) and historic (2013) noise surveys undertaken at the site. The 2021 survey demonstrates an increase in daytime and evening background noise levels of 3 dB, however minimum night-time background noise levels were measured to have not changed from those previously recorded.

7 PLANT ASSESSMENT

7.01 This application is for the installation of new comfort cooling and ventilation plant to serve the residents of 42 Bedford Square, to be located at roof level. Table 5.1 below details the proposed plant and stated acoustic emissions. A copy of the proposed site plan is included in Appendix B for reference.

7.02 Copies of the manufacturer's plant data sheets, where available, are included in Appendix G.

Unit Reference	Plant Model	Location	Stated Acoustic Emissions, dBA	Notes
CU.1	1. LG ARUB80LTE4 Condenser	Front of roof	49 dBA @ 1m (Low noise mode)	Fixed low noise operation
CU.2	Samsung AM220JXVHGR/ET Condenser	Front of roof	49 dBA @ 1m (Low noise mode)	Fixed low noise operation
CU.3	Samsung AM050KXMDEH/EU Condenser	Front of roof	46 dBA @ 1m (Low noise mode)	Fixed low noise operation
CU.4	LG UU18W.UED1 Condenser	Front of roof	48 dBA @ 1m	-
CU.5	Daikin RZAG35A Condenser	Centre of roof	48 dBA @ 1m	-
HRU.1	RIS 400 PE 0.9 EKO 3.0 Heat Recovery Unit	Rear of roof	51 dBA L_W – Casing	At target duty.
			67 dBA L_W – Exhaust	
			58 dBA L_W – Fresh Air	
EF.1	Helios SB EC 200 Silentbox Extract Fan	Rear of roof	55 dBA L_W – Casing	At target duty.
			75 dBA L_W - Exhaust	

Table 7.1: Proposed Plant and Published Noise Emissions

7.03 As this plant serves a residential dwelling, it is expected that all plant items may operate over a 24-hour period.

7.04 Condenser units CU.1, CU.2, and CU.3 will operate in a fixed low-noise mode at all times. The emission levels stated above have been advised following discussions with the project Mechanical Services Consultants.

7.05 CU.5 will be mounted behind a local acoustic screen, offering noise reduction towards the front of the dwelling.

7.06 HRU.01 and EF.01 will incorporate in-line duct attenuation to both the atmosphere and job-side ducts. These attenuators will offer no less than 20 dB reduction of duct-borne noise emissions.

7.07 As the plant is proposed to be mounted on the roof of a residential dwelling, all items will include effective neoprene in shear or captive spring vibration isolation mounts. The final design and specification of these mounts is subject to the fixing arrangements, however these will offer a minimum 98% efficiency at the plant's operational duty.

7.08 Based on the requirements of Condition 5 of the planning permissions, and the lowest measured background noise level in each time period, Table 5.2 sets out the recommended noise limits that the proposed items of plant should meet.

7.09 Please note, that in accordance with the requirements of Condition 5 of the permissions, the proposed noise limits are based on being 5 dB below the lowest measured background noise level during the survey.

Location	Period	Measured Existing $L_{A90,T}$	Proposed Noise Limit L_{Ar}
42 Bedford Square	Day	45 dB	40 dB
	Evening	45 dB	40 dB
	Night	41 dB	36 dB

Table 7.2: Suggested Plant Noise Emission Limits Based on Lowest Measured L_{A90}, Free-field dB

7.10 Note that the proposed units are expected to display none of the characteristics whereby the acoustic correction should be applied, as defined under the terms of Condition 5.

7.11 Assuming the proposed items meet the noise limits set out in Table 7.2 noise will be below the Lowest Observable Adverse Effect level (LOAEL), approaching the NOEL, with respect to the NPPF.

7.12 Predicted noise levels have been calculated at the closest noise sensitive windows, the roof windows of both 40 and 43 Bedford Square, and the rear fourth-floor windows of 43 Bedford Square. Due to the layout of the site and intervening structures, it is expected that the roof windows of the neighbouring dwellings will only be affected by noise emissions from CU.1, CU.2, CU.3 and CU.4. The rear windows of 43 Bedford Square will be affected by CU.5, HRU.1 and EF.1.

7.13 Other residential receptors located further from the site will be subject to lower noise levels than those predicted at the above locations.

7.14 Tables 7.3 – 7.6 present the results of worst-case plant noise predictions at the worst-case locations.

Item	Noise Level	Notes
CU.1, CU.2, CU.3 and CU.4	54 dBA	Cumulative sound pressure level at 1m
Local reflections	-	No local reflections
Spherical area Losses over 10m metres	- 20 dB	Distance to closest window
Screening	-5 dB	Obstructed line of sight to roof windows
Total Noise Level	29 dBA	40 Bedford Square

Table 7.3: Roof windows of 40 Bedford Square Plant Noise Calculation

Item	Noise Level	Notes
CU.1, CU.2, CU.3 and CU.4	54 dBA	Cumulative sound pressure level at 1m
Local reflections	-	No local reflections
Spherical area Losses over 10m metres	- 20 dB	Distance to closest window
Screening	-	Potential line of sight to roof windows
Total Noise Level	34 dBA	43 Bedford Square

Table 7.4: Roof windows of 43 Bedford Square Plant Noise Calculation

Item	Emission Level, dBA	Reflections, dB	Spherical Losses, dB	Screening, dB	Attenuation, dB	Immission Level, dBA
CU.5	48 @ 1m	-	-14 (5m)	-8	-	26
HRU.1 Casing	51 Lw	+3	-21 (3m)	-8	-	25
HRU.1 Fresh Air	58 Lw	+3	-21 (3m)	-8	-20	12
HRU.1 Exhaust	67 Lw	+3	-21 (3m)	-8	-20	21
EF.1 Casing	55 Lw	+3	-21 (3m)	-8	-	29
EF.1 Exhaust	75 Lw	+3	-21 (3m)	-8	-20	29
Total Immission Level – Rear of 43 Bedford Square					**34 dBA**	

Table 7.5: Rear fourth-floor windows of 43 Bedford Square Plant Noise Calculation

Property	Period	Proposed Noise Limit L_{Ar}	Predicted $L_{Aeq,T}$	Exceedance of noise limit
40 Bedford Square	Daytime	40 dB	29 dB	-11 dB
	Evening	40 dB	29 dB	-11 dB
	Night-time	36 dB	29 dB	-7 dB
43 Bedford Square	Daytime	40 dB	34 dB	-6 dB
	Evening	40 dB	34 dB	-6 dB
	Night-time	36 dB	34 dB	-2 dB
Rear of 43 Bedford Square	Daytime	40 dB	34 dB	-6 dB
	Evening	40 dB	34 dB	-6 dB
	Night-time	36 dB	34 dB	-2 dB

Table 7.6: Assessment of Predicted Noise Levels Based on Proposed Noise Limit, Free-field dB(A)

7.15 It can be seen from the above tables that the noise limits are not exceeded during any period of the plant's proposed operation.

7.16 Additionally, noise levels at the façade of the nearest residential dwelling, 40 Bedford Square, will be sufficiently below the background noise levels so as to be classified as achieving the NOEL.

7.17 Assuming that the proposed plant, noise control equipment and fixed-duty low noise operation is included in the installation, predicted noise levels will meet the requirements of the Planning Permissions during all periods of operation and at the closest noise sensitive receptors.

7.18 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.

8 CONCLUSIONS

8.01 Classic Design Investments Ltd has appointed Environmental Equipment Corporation Limited to undertake a noise assessment of the proposed new comfort cooling and ventilation systems proposed to serve 42 Bedford Square.

8.02 The assessment has been carried out in accordance with national planning guidance and the requirements of the London Borough of Camden, including Condition 5 of the permissions for this development, and is based on an environmental noise survey conducted at the site over a typical weekday period.

8.03 A noise assessment has been undertaken to evaluate the potential noise impact of the proposed condensers at the closest existing noise sensitive receptors.

8.04 Predictions have shown that the noise criterion of Condition 5 is met at all assessment locations during all periods of the proposed plant's operation assuming that the low noise modes, acoustic screening and in-line duct attenuation outlined above are included in the installation.

8.05 Assessing the site in accordance with the principles of the National Planning Policy Framework has shown that predicted noise levels at the nearest residential dwelling would be below the level at which no effects are observed to occur, the NOEL. Noise levels outside of 43 Bedford Square would be approaching the NOEL.

8.06 On the basis of this assessment, it is considered that noise does not pose a material constraint to the operation of the proposed new plant.

APPENDIX A

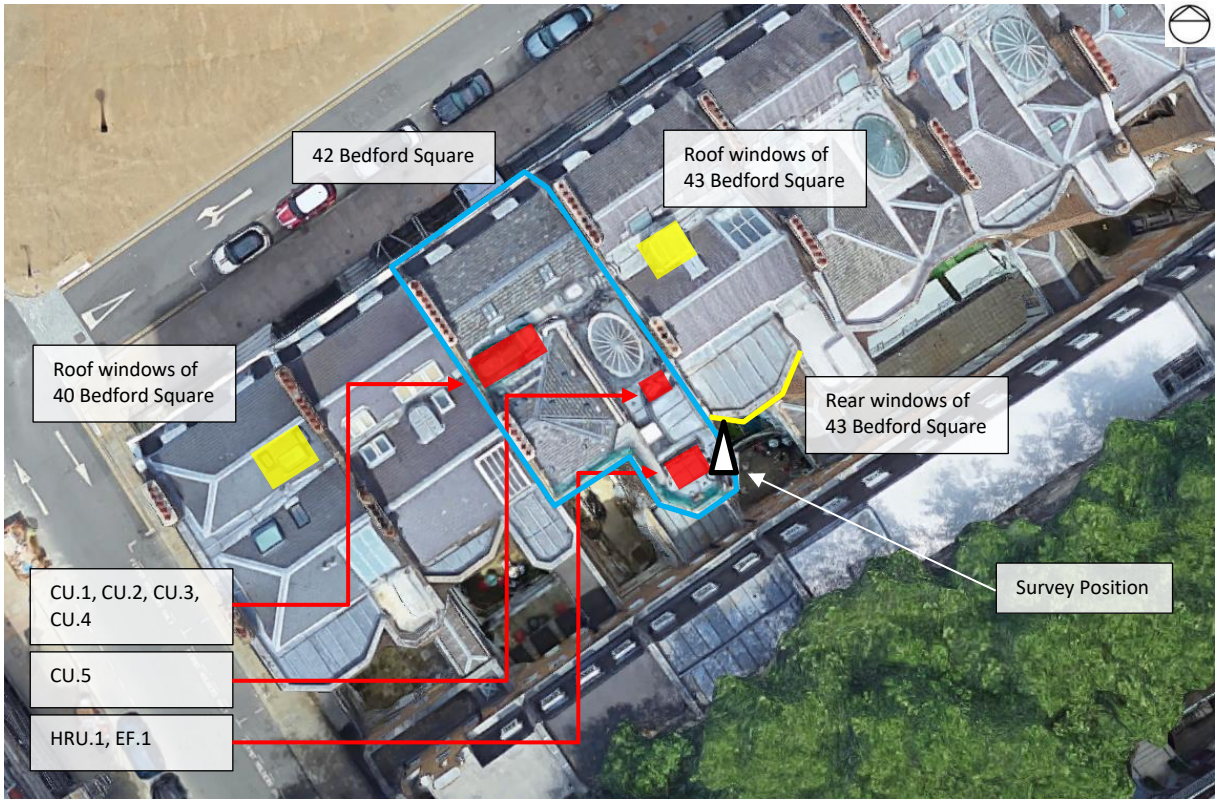
GLOSSARY OF TECHNICAL TERMS

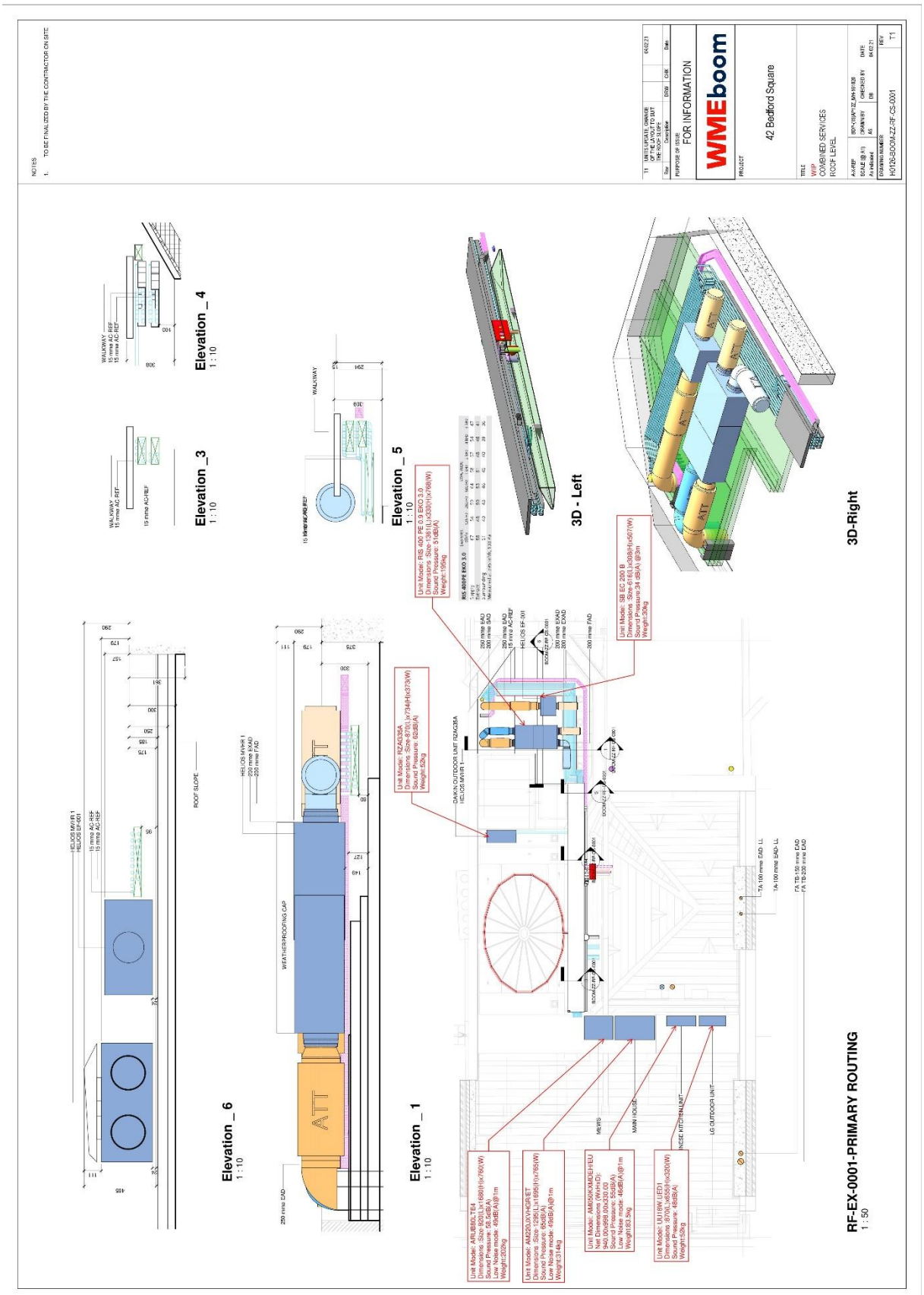
ACOUSTIC TERMINOLOGY

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 which is most often 30 minutes when demonstrating compliance with BB93.
$L_{A90,t}$	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 PLANS &
MEASUREMENT LOCATION





APPENDIX C

PLANNING POLICY AND GUIDANCE

PLANNING POLICY AND GUIDANCE

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 19th 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.

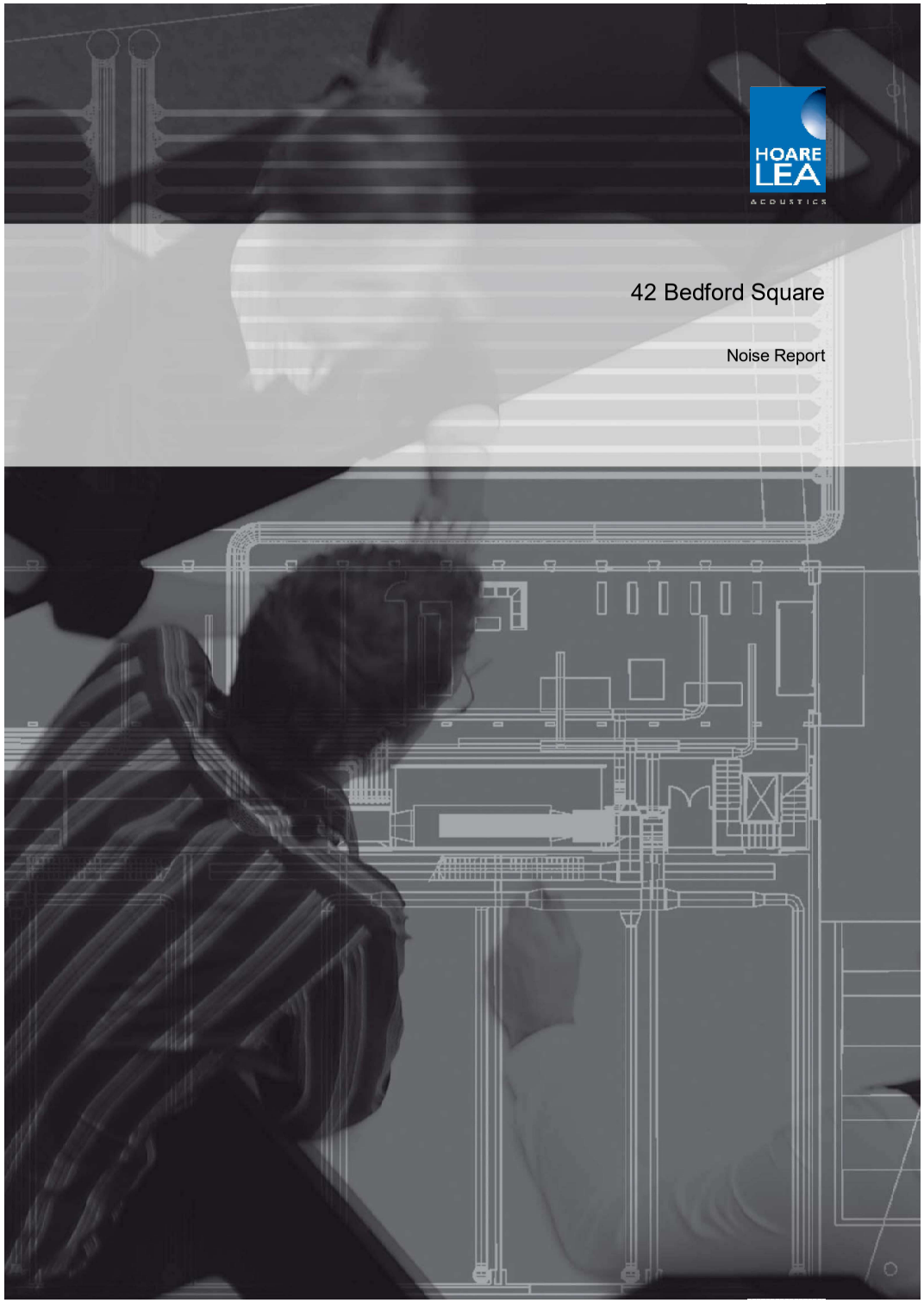
BS 4142 goes onto state that:

'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 DETAILS
MESSRS HOARE LEA ASSOCIATES



APPENDIX B – NOISE SURVEY DETAILS

List of equipment used

Fixed noise monitor

Equipment	Make and Model	Serial No.	Calibration Cert.	Date of calibration expiration
Sound Level Meter	Rion NL-31	841830	06500	01/05/2014
Microphone	Rion UC-59	307209	06500	01/05/2014
Calibrator	B&K 4231	2445715	06948	28/01/2014

Attended measurements

Equipment	Make and Model	Serial No.	Calibration Cert.	Date of calibration expiration
Sound Level Meter	Rion NA-28	1260200	06042	18/08/2013
Microphone	Rion UC-59	00280	06042	18/08/2013

Instruments were checked for sensitivity both before and after the survey and found to be within acceptable tolerances.

Results

A graph plotting the results over the survey period is presented on the next page.

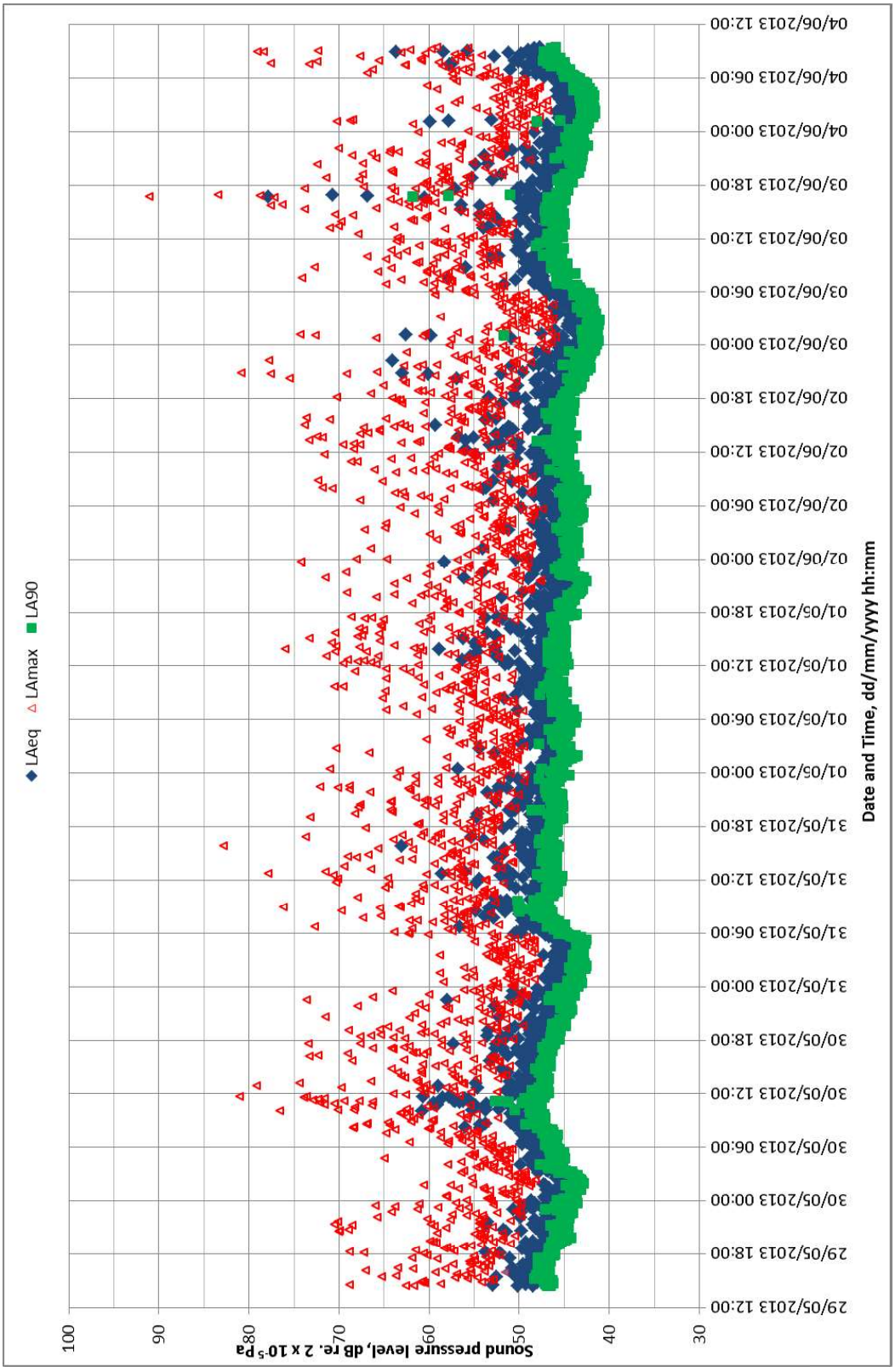


Figure 2 Noise survey results from fixed noise monitor

APPENDIX E

SURVEY DETAILS
TABULAR

EC 07419 - 42 Bedford Square

Classic Design Investments Ltd

Tabulated Noise data

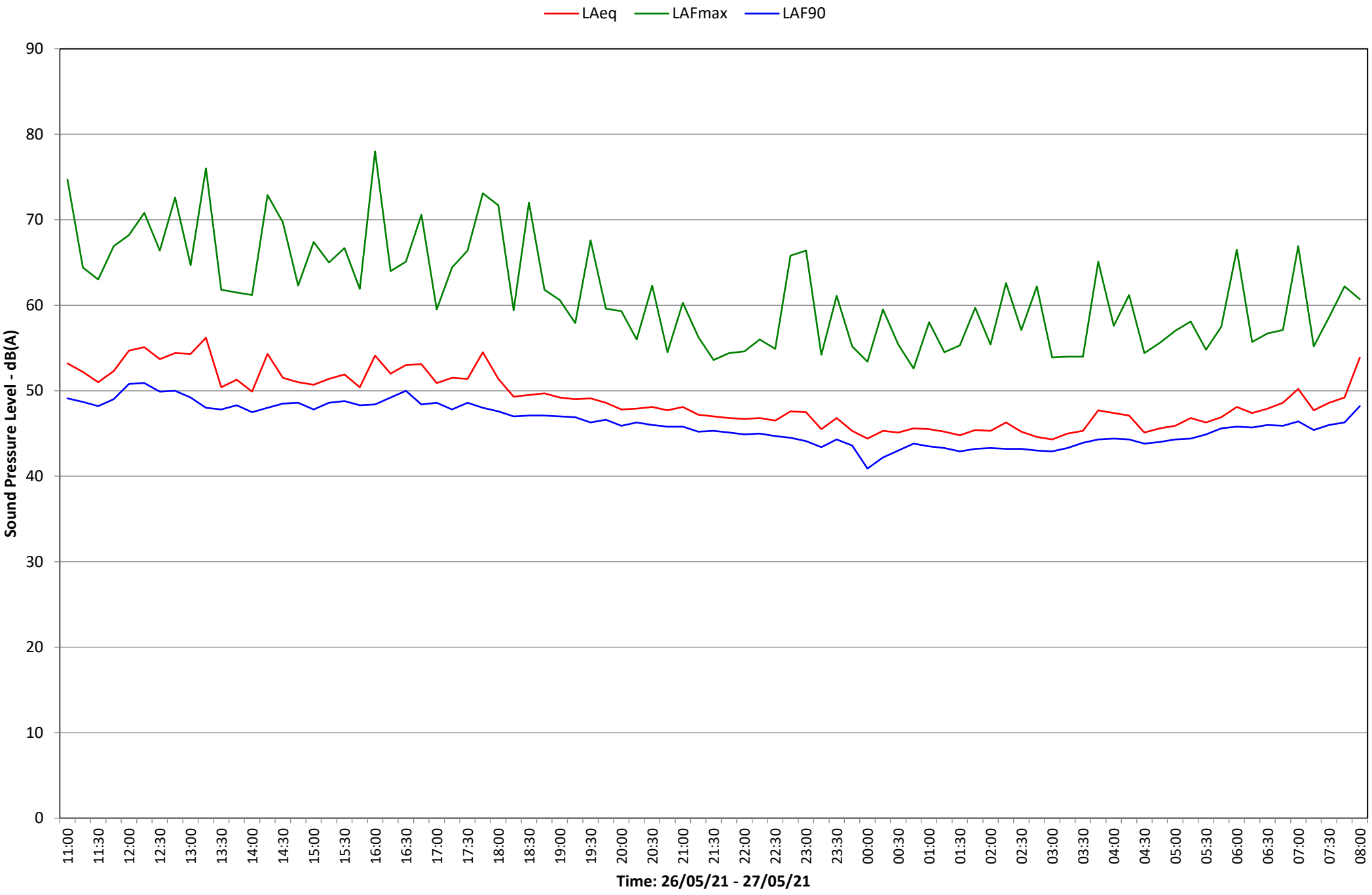
Time	L_{Aeq}	L_{AMax}	L_{A90}
11:00	53	75	49
11:15	52	64	49
11:30	51	63	48
11:45	52	67	49
12:00	55	68	51
12:15	55	71	51
12:30	54	66	50
12:45	54	73	50
13:00	54	65	49
13:15	56	76	48
13:30	50	62	48
13:45	51	62	48
14:00	50	61	48
14:15	54	73	48
14:30	52	70	49
14:45	51	62	49
15:00	51	67	48
15:15	51	65	49
15:30	52	67	49
15:45	50	62	48
16:00	54	78	48
16:15	52	64	49
16:30	53	65	50
16:45	53	71	48
17:00	51	60	49
17:15	52	64	48
17:30	51	66	49
17:45	55	73	48
18:00	51	72	48
18:15	49	59	47
18:30	50	72	47
18:45	50	62	47
19:00	49	61	47
19:15	49	58	47
19:30	49	68	46
19:45	49	60	47
20:00	48	59	46
20:15	48	56	46
20:30	48	62	46
20:45	48	55	46
21:00	48	60	46
21:15	47	56	45
21:30	47	54	45
21:45	47	54	45
22:00	47	55	45
22:15	47	56	45
22:30	47	55	45
22:45	48	66	45

Time	L_{Aeq}	L_{AMax}	L_{A90}
23:00	48	66	44
23:15	46	54	43
23:30	47	61	44
23:45	45	55	44
00:00	44	53	41
00:15	45	60	42
00:30	45	55	43
00:45	46	53	44
01:00	46	58	44
01:15	45	55	43
01:30	45	55	43
01:45	45	60	43
02:00	45	55	43
02:15	46	63	43
02:30	45	57	43
02:45	45	62	43
03:00	44	54	43
03:15	45	54	43
03:30	45	54	44
03:45	48	65	44
04:00	47	58	44
04:15	47	61	44
04:30	45	54	44
04:45	46	56	44
05:00	46	57	44
05:15	47	58	44
05:30	46	55	45
05:45	47	58	46
06:00	48	67	46
06:15	47	56	46
06:30	48	57	46
06:45	49	57	46
07:00	50	67	46
07:15	48	55	45
07:30	49	59	46
07:45	49	62	46
08:00	54	61	48

APPENDIX F

SURVEY DETAILS
GRAPHICAL

Noise Level Time History at 42 Bedford Square



APPENDIX G

PUBLISHED PLANT NOISE DATA

RIS 400PE EKO 3.0	Lwa total, dB(A)	LWA, dB(A) 125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Supply	67	54	59	64	58	57	54	47
Extract	58	48	50	53	51	48	46	41
Surrounding	51	40	43	46	45	40	39	36
Measured at 395 m³/h, 100 Pa								

HRU.1 – Published Acoustic Data

Sound

Sound Pressure Level			34 dB(A) at 3m						
Spectrum	**Hz**	**Total**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
LwA Intake	dB(A)	65	60	61	57	49	43	41	38
LwA Extract	dB(A)	75	63	70	68	67	68	62	53
LwA Breakout	dB(A)	55	42	53	50	41	40	38	32

EF.1 – Published Acoustic Data