3-5 BEDFORD ROW, LONDON WC1R 4BU

Plant Noise Assessment

Reference: 12161.RP01.PNA.0
Prepared: 13 October 2022
Revision Number: 0

FREP 4 (Bedford Row) Limited
11-15 Wigmore Street
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Plant Noise Assessment

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	4 October 2022	Maxim Billingham	Joe Allen
1	Update following new plant arrangement	13 October 2022	Maxim Billingham	Joe Allen

Terms of contract:

RBA Acoustics Ltd have prepared this report in accordance with our Scope of Work 12161.ACB01.0 dated 6 September 2022. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.

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Contents

1. INTRODUCTION

RBA Acoustics has been commissioned by Frogmore to undertake a noise impact assessment in support of the planning application for the proposed refurbishment of 3-5 Bedford Row and 3-5 Jockey's Fields. The proposed development is for continuing commercial use of the building (Class E), together with external alterations to all elevations, and the erection of roof extensions at fourth, third and second floor levels, roof terraces at levels four and three and basement courtyard garden, green roofs, cycle parking, waste/recycling storage, plant and other associated works.

With regards to the external noise impact assessment, new items of building services plant are proposed to be installed externally to service the above property, following the removal of the existing plant. These items of plant have the potential for noise impact on the nearest noise sensitive adjacencies. As such, an assessment is required to demonstrate compliance with the London borough of Camden's noise control requirements at the nearby noise-sensitive receptors.

Measurements of the prevailing noise conditions at the site have been undertaken and used to determine atmospheric noise emission limits in accordance with Camden Council's requirements. An outline assessment has been undertaken of initial plant proposals in order to indicate the feasibility of the building services strategy. This report presents the results of the noise measurements, associated criteria and provides the outline assessment.

A summary of acoustic terminology is included in Appendix A.

2. SITE DESCRIPTION

The building at 3-5 Bedford Row and 3-5 Jockey's Fields WC1R 4BU is a commercial property, which is located in a commercial area. The site is a four-storey building, approximately 12 metres in height, and is bordered by Bedford Row to the west, and Jockey's Fields to the east. North and south borders of the site are adjacent to commercial-use properties.

The prevailing noise climate at the site was noted to be dominated by the traffic and pedestrian activity along Bedford Row, Sandland Street, and Jockey's Fields. As well as occasional aircraft noise, and some construction noise associated with the strip out works at the site.

The nearest, noise-sensitive residential receptors are detailed in Section 5.4. The site is shown in relation to its surroundings in the site plan in Figure 1 (Appendix B).

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

Monitoring of the prevailing background noise was undertaken over the following period:

17:00 hours, Thursday 15th September to 15:00 hours, Friday 16th of September 2022

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period. However, based on observations during the site visits and weather reports for the area, conditions were generally considered suitable for obtaining representative noise measurements, being predominantly dry with little wind.

Continuous measurements were made of the L_{A90}, L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes.

3.2 Measurement Locations

To determine the existing noise climate around the site measurements were undertaken at the following locations:

Measurement Position 1 – Bedford Row

Measurements at this position were undertaken with the microphone positioned on an A-frame to the west, which was positioned outside of first floor-level window of the property, such that the microphone was approximately 3 metres above the ground level and 1 metre from the façade, overlooking the Bedford Row.

The prevailing noise climate at this position was noted to be dominated by the traffic and pedestrian activity along Bedford Row and Sandland Street, as well as occasional aircraft noise. The measurements at this position were subject to façade reflections.

Measurement Position 2 – Inner Lightwell

Measurements at this position were undertaken with the microphone positioned on a tripod, which was position on the flat first floor-level roof, within the inner lightwell of 3-5 Bedford Row; such that the microphone was approximately 8 metres above the ground floor-level, overlooking the inner lightwell and in free-field conditions.

The prevailing noise climate at this position was noted to be dominated by the traffic and pedestrian activity along the nearby road and occasional aircraft noise, as well as some construction noise.

Measurement Position 3 – Jockey's Fields

Measurements at this position were undertaken with the microphone positioned on an A-frame to the east, which was positioned outside of first floor-level window of the property, such that the microphone was approximately 3 metres above the ground level and 1 metre from the façade, overlooking the Jockey's Fields.

The prevailing noise climate at this position was noted to be dominated by the traffic and pedestrian activity along Jockey's Fields and Bedford Row, as well as occasional aircraft noise. The measurements at this position were subject to façade reflections.

The measurement positions are also illustrated on the site plan in Figure 1 in Appendix B. The measurements of sound at these positions were considered to be representative of the noise climate as experienced at the nearest noise-sensitive receptors.

3.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix D.

The sound level meters were calibrated both prior to and on completion of the survey with no significant calibration drifts observed.

3.4 Results

The sound levels measured are shown as time-histories on the attached Graphs 1-6 (Appendix C), and full survey data is available in Appendix G.

The typical-lowest L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised in Table 1.

Table 1 – Measured Levels

Measurement Period	Measurement Position 1		Measurement Position 2		Measurement Position 3	
	Typical-Lowest $L_{A90,15min}$ (dB)	L_{Aeq} (dB)	Typical-Lowest $L_{A90,15min}$ (dB)	L_{Aeq} (dB)	Typical-Lowest $L_{A90,15min}$ (dB)	L_{Aeq} (dB)
Daytime (07:00 – 23:00)	46	56*	39	66	42	57*
Night-time (23:00 – 07:00)	40	50*	37	41	39	44*

*Measurements have been corrected to account for façade reflections.

"Typical-Lowest" Background Levels

When considering the existing background levels of a site, BS 4142:2014, Methods for Rating and Assessing Industrial and Commercial Sound" recommends assessing to the "typical" measured $L_{A90,\ 15mins}$ background levels, BS 4142:2014 goes on to state:

> *"In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."*

BS 4142:2014 suggests that statistical analysis is a suitable method to determine the "typical" background level. This can be carried out by calculating the level of the most-commonly occurring $L_{A90,\ 15mins}$ period during the proposed operating hours of equipment.

We generally consider that designing to the most-commonly occurring $L_{A90,\ 15mins}$ period is not sufficient during those slightly quieter periods. In our opinion, a more representative value would be the "typical-lowest" level, which can be determined statistically as the lowest rounded $L_{A90,\ 15mins\ level}$ which occurs for at least 10% of the assessment period.

4. PLANT NOISE CRITERIA

The requirements of Camden Council's Environmental Health Department regarding new building services plant are understood to be as follows.

> *"Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criteria"*

In line with the above requirements, where the rating level of the plant at the nearest noise sensitive receptor does not contain tonal elements, we would propose items of mechanical services be designed so that noise emissions from plant do not exceed the levels in Table 2 when assessed at the nearest noise sensitive location.

Table 2 – Plant Noise Criteria

Operating Period	Position 1 (Bedford Row)	Position 2 (Inner Lightwell)	Position 3 (Jockey's Fields)
Daytime (07:00 – 23:00)	36	29	32
Night-time (23:00 – 07:00)	30	27	29

Should the plant rating level at the nearest noise sensitive receptor contain tonal characteristics, in line with the London Borough of Camden's requirements, the criteria in Table 3 should apply at the receptors.

Table 3 – Plant Noise Criteria

Operating Period	Position 1 (Bedford Row)	Position 2 (Inner Lightwell)	Position 3 (Jockey's Fields)
Daytime (07:00 – 23:00)	31	24	27
Night-time (23:00 – 07:00)	25	22	24

In line with BS 4142: 2014, should the proposed plant be identified as having intermittent or other attention-grabbing characteristics, further penalties should be subtracted from any of the above proposed noise emission limits in line with BS 4142 methodology

Non-residential Receptors

We understand the property is located in predominantly commercial area, with a lot of commercial receptors in close proximity to the plant, which can be also greatly affected by the plant. Therefore, due to the nature of the area, the commercial properties will be considered as the nearest noise-sensitive receptors during the daytime hours.

BS 8233:2014 sets out the noise criteria for the external amenity space at 50 – 55 dBA. Therefore, for commercial receptors, we propose that noise emission from the proposed items of plant should be designed to a limit of 50-55 dB at the nearest affected commercial window. Assuming a correction for the partially open window, this should also result in internal noise levels of 35-40 dB which is at least 5dB lower than the recommended internal noise levels for open plan offices (45-50 dB) suggested by BS 8233:2014.

In line with BS 4142: 2014, should the proposed plant be identified as having intermittent or tonal characteristics, a further penalty should be subtracted from any of the above proposed noise emission limits.

5. PLANT NOISE ASSESSMENT

At this stage, final selections of building services plant have not been made. However, proposals for the plant have been outlined and an assessment has been carried out based on these proposals to outline the feasibility of the plant building services strategy with regard to external noise impact. This assessment has been based on the information provided to RBA by Synoptic (Consulting Engineers) Limited, the project M&E Consultants and is described in the following sections.

5.1 Proposed Plant Items

The following items of plant are currently outlined for the scheme:

Table 4 – Plant Types

Ref.	Proposed Location (Ref.)	Manufacturer/Model/Duty	Plant Type
CU.01	Lower Ground Level, Reception (L1)	Daikin RXYSQ6	Condenser Unit
AHU.01/AHU.02	Lower Ground Level (L2a)	Daikin ERQ125AV1	Air Handling Unit
VRV.01/VRV.03		Daikin REYQ16T	Variable Refrigerant Volume Unit
VRV.02		Daikin REYQ12T	
VRV.05/VRV.06		Daikin REYQ8T	
ASHP.01	First Floor-level, North Roof (L3b)	Amicus LAHP-20HT	Air Source Heat Pump
VRV.04		Daikin REYQ16T	Variable Refrigerant Volume Unit
VRV.07/VRV.08	Third Floor-level, North Roof (L3c)	Daikin REYQ8T	
VRV.09		Daikin REYQ14T	
AHU.03	Fourth Floor-level, East Roof (L2b)	NUAIRE xbc 65	Air Handling Unit
TEF.01/TEF.02	Fourth Floor-level, East and West Roof (L2 & L4)	AVTS-X	Extract Fan

We understand another air handling unit (AHU.04) is proposed to be located indoors at the lower ground floor level, with a small opening to the courtyard for ventilation. The details for this unit are to be confirmed at a later stage. However, the unit is considered to have a minimal impact onto the local noise climate due to mostly indoor location and will be attenuated as required to achieve the noise target criteria at the nearest noise-sensitive receptor.

The equipment locations are indicated on the site plan in Figures 1-5 in Appendix B.

5.2 Plant Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the unit. The associated plant noise levels are detailed as follows:

Table 5 – Plant Noise Levels

Unit	Parameter	Sound Pressure Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
CU.01	L_p at 1m	56	53	50	47	46	43	39	28	51
AHU.01/AHU.02 (Cooling)		60	53	52	50	46	40	33	22	51
AHU.01/AHU.02 (Heating)		63	55	54	51	48	43	37	31	53
VRV.01/VRV.03/VRV.04		70	68	67	62	57	53	47	42	64
VRV.02		59	66	60	61	53	49	44	37	61
VRV.05/VRV.06/VRV.07/VRV.08		60	58	58	57	51	46	48	38	58
VRV.09		65	68	64	59	54	50	47	39	61
ASHP.01	L_w	--								67
AHU.03 (Intake)		79	79	72	66	64	59	48	34	70
AHU.03 (Discharge)		85	85	79	75	72	69	61	55	78
AHU.03 (Radiated)		71	69	56	51	45	41	35	20	56
TEF.01/TEF.02 (Outlet)		78	74	73	74	73	67	63	57	77
TEF.01/TEF.02 (Radiated)		67	59	56	47	38	32	35	25	51

Octave band data is not available for the ASHP.01, so we have provided an example spectrum based on a similar sized unit.

Table 6 – Assumed Spectrum

Sound Level (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
72	71	70	65	60	55	50	45

Review of the octave band data for all the plant provides no indication of any tonal characteristics associated with the proposed plant. For the purposes of this assessment, we have assumed AHU.01 and AHU.02 units to be running in heating mode as the worst-case assessment.

The above plant is understood to operate only during the trading hours, therefore only daytime criteria is applicable.

5.3 Location of the Nearest Noise-Sensitive Receptors

Based on observations made on site we understand the nearest noise-sensitive receptors to the proposed plant to be as follows:

Receptor A – 13 Bedford Row, Level 1 (Residential)

The closest residential window to the plant is understood to be the rear, first-floor level window belonging to 13 Bedford Row, which is located approximately 65 metres to the north of the site.

44 Bedford Row (Residential)

The property located at 44 Bedford Row estimated to be located at a slightly closer distance from the proposed plant locations than Receptor A (approximately 45 metres to the west). However, we understand most of the items of plant at the site are proposed to be located within the inner lightwell or further back, resulting in more natural screening from the building. 44 Bedford Row windows are also noted to be overlooking Bedford Row and being more exposed to the traffic and pedestrian noise. Therefore, Receptor A is considered the worst-case residential receptor, and noise impact predicted at 44 Bedford Row is expected to be lower than at Receptor A.

Receptor B – 6-7 Bedford Row, Ground Level (Commercial)

The closest commercial window to the plant location "L1" is understood to be the ground level window belonging to 6-7 Bedford Row, which is located approximately 4 metres to the north of the proposed plant items.

Receptor C – 2 Jockey's Field, Level 1 (Commercial)

The closest commercial window to the plant location "L2" is understood to be the first level window belonging to 2 Jockey's Field, which is located approximately 5 metres from the proposed plant items.

Receptor D – 6-7 Bedford Row, Level 1 (Commercial)

The closest commercial window to the plant location "L3", is understood to be the first-floor level window belonging to 6-7 Bedford Row, which is located approximately between 5 and 11 metres to the north-west of the proposed plant location.

Receptor E – 6-7 Bedford Row, Level 4 (Commercial)

The closest commercial window to the plant location "L4" is understood to be the fourth-floor level window belonging to 6-7 Bedford Row, which is located approximately 8 metres to the north-east of the proposed plant location.

Our assessment of the potential noise impact has predicted noise due to the items of plant at the above receptors as the nearest, and therefore worst affected, residential receptors. Noise levels at other receptors will be lower than those at Receptors A to E, hence the potential impact will be further reduced. The receptors are also shown in the site plan in Figure 1 in Appendix B.

5.4 Calculation of Noise Levels at Nearest Noise-Sensitive Receptors

Our calculation method for predicting noise levels from the proposed plant at the nearest noise-sensitive receptors, based on the information above, is summarised below.

- Source Term SWL / SPL
- In-duct Losses (if applicable)
- Duct Attenuation (if applicable)
- Directivity
- Distance Attenuation
- Reflections
- Screening (if applicable)
- Mitigation (if applicable)

Calculation sheets are attached for further information in Appendix E.

Table 7 – Predicted Noise Levels

Predicted Noise Level (dB)	Prediction	Criterion
Receptor A (Residential)	22	29
Receptor B (Commercial)	24	55
Receptor C (Commercial)	40	
Receptor D (Commercial)	47	
Receptor E (Commercial)	36	

Noise from the proposed plant installations is within the Camden Council's criteria at all the receptors, and no further mitigation is required.

6. VIBRATION CONTROL

In addition to the control of airborne noise transfer, it is also important to consider the transfer of noise as vibration to adjacent properties (as well as to any sensitive areas of the same building).

We would typically advise that the items of plant units be isolated from the supporting structure by means of either steel spring isolators or rubber footings. For particularly sensitive locations, or when on lightweight structures the mounts should ideally be caged and be of the restrained type.

It is important the isolation is not "short-circuited" by associated pipework or conduits. To this end, any conduits should be looped, and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

7. CONCLUSION

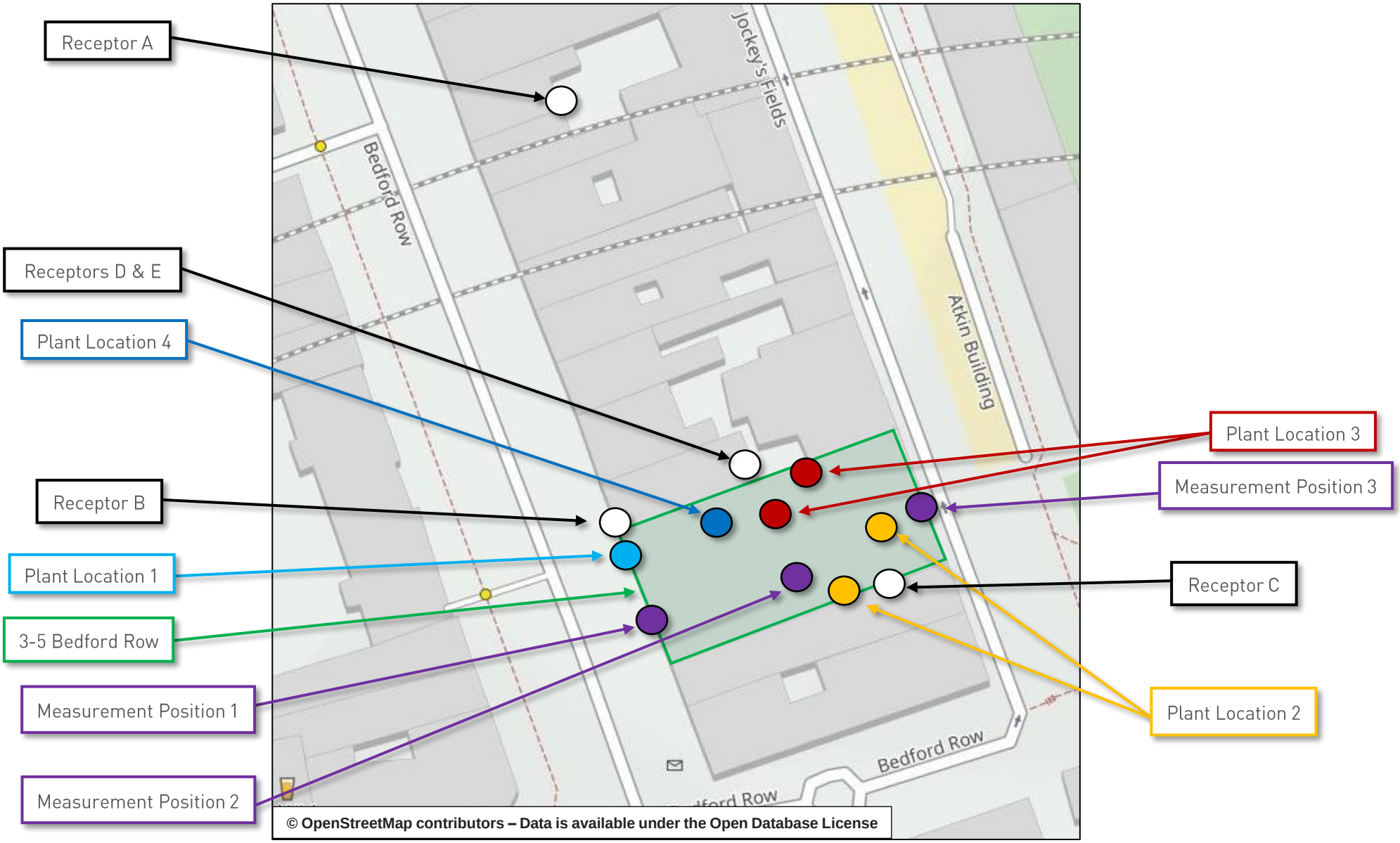
RBA Acoustics has undertaken noise monitoring at 3-5 Bedford Row and Jockey's Fields. The measured noise levels are presented within this report. The resultant noise levels have been used to determine the required criteria for atmospheric noise emissions from the proposed plant installations. An outline assessment has been undertaken based on current proposals for external building services plant.

The results of our assessment indicate atmospheric noise emissions from the proposed plant are within the criteria required by London borough of Camden for all the receptors, and as such should be considered acceptable in terms of noise.

Appendix A – Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
L_{eq}	The level of a notional steady sound which, over a stated period of time, T, would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, T, would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
L_{An} (e.g. L_{A10}, L_{A90})	The sound level exceeded for n% of the time. E.g. L_{A10} is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, L_{A90} is the level exceeded for 90% of the measurement period and is often used to describe the underlying background noise.
$L_{Amax,T}$	The instantaneous maximum A-weighted sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, e.g. sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the ambient level.

Appendix B – Site Plans



3-5 Bedford Row, LONDON WC1R 4BU

Site Plan showing Measurement Positions, Plant Locations, and the Nearest Receptors

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Figure 1

13 October 2022

Not to Scale

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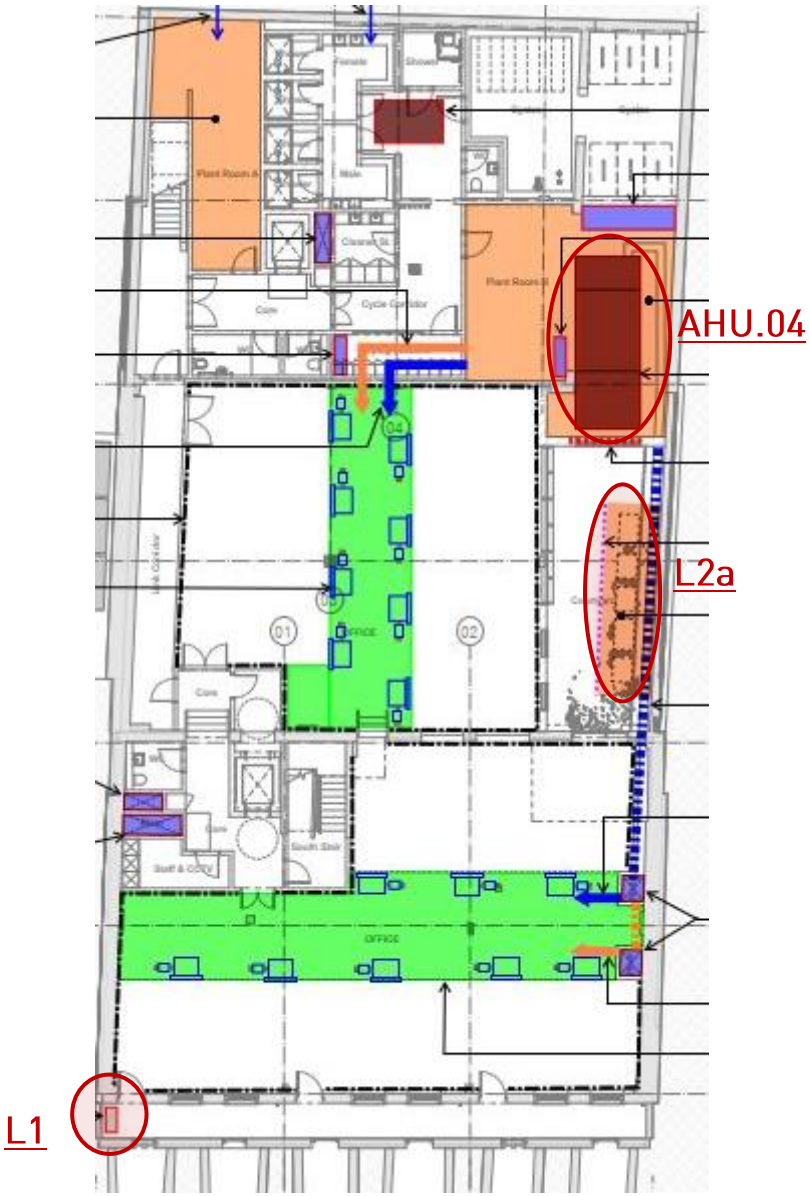

3-5 BEDFORD ROW, LONDON WC1R 4BU

Lower Ground Level Plan showing Proposed Plant Locations

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Figure 2

13 October 2022

Not to Scale

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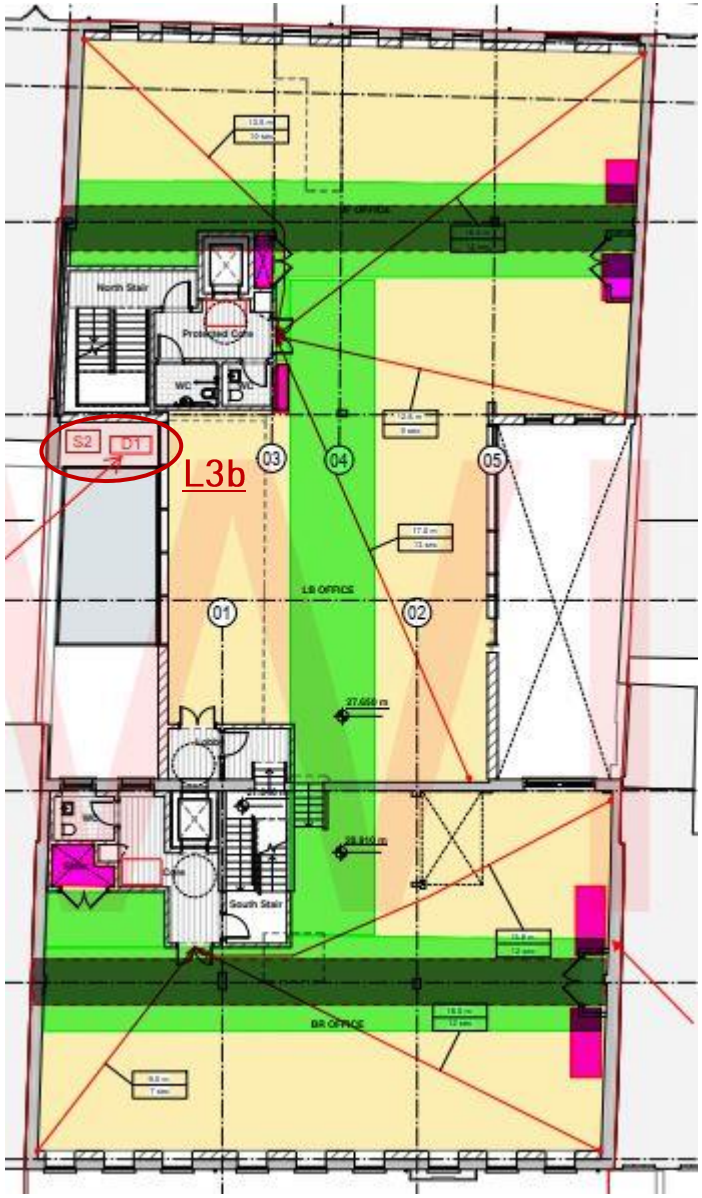

3-5 BEDFORD ROW, LONDON WC1R 4BU

First Floor Level Plan showing Proposed Plant Locations

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Figure 3

13 October 2022

Not to Scale

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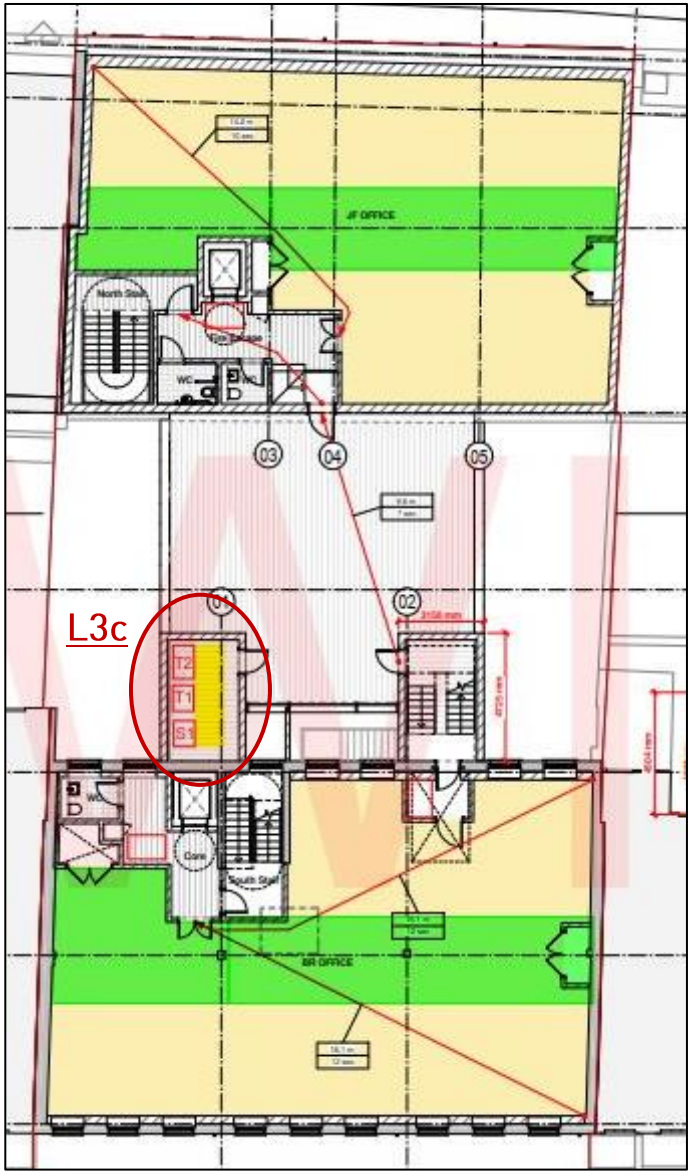

3-5 BEDFORD ROW, LONDON WC1R 4BU

Third Floor Level Plan showing Proposed Plant Locations

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Figure 4

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Not to Scale

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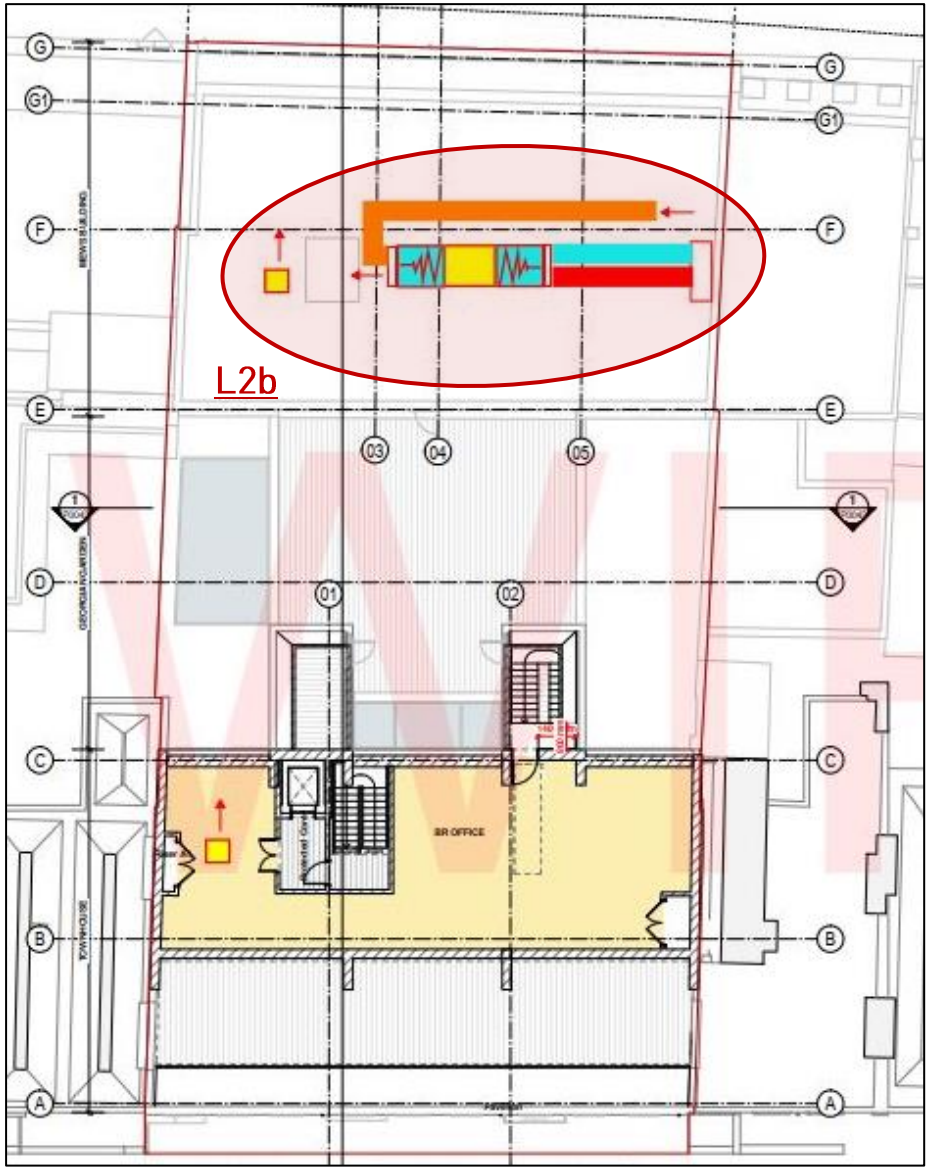

3-5 BEDFORD ROW, LONDON WC1R 4BU

Fourth Floor Level Plan showing Proposed Plant Locations

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Figure 5

13 October 2022

Not to Scale

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Appendix C – Graphs

3-5 Bedford Row, Frogmore

L_{Aeq} Time History

Measurement Position 1, Bedford Row - Thursday 15th September to Friday 16th September 2022

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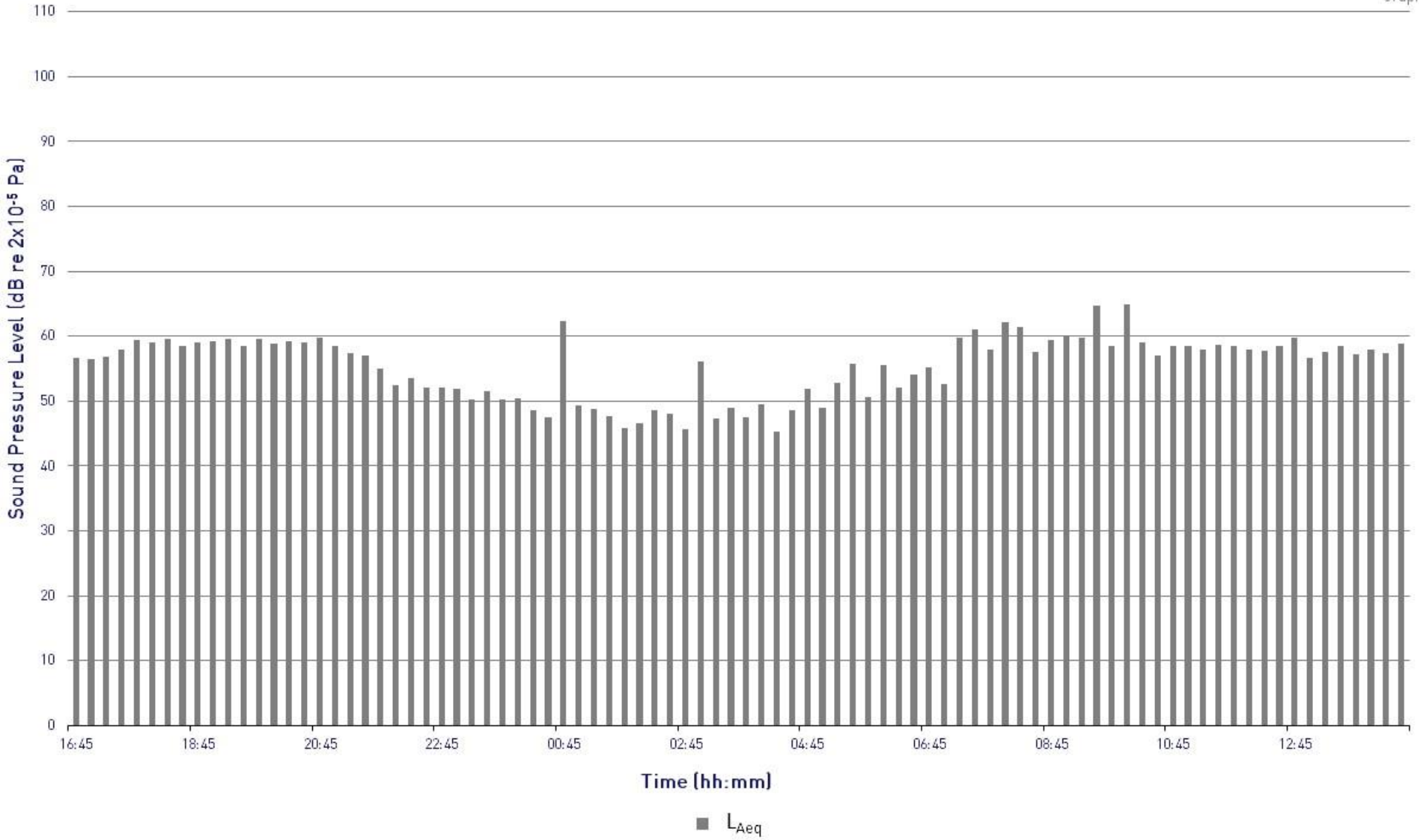
Graph 1



3-5 Bedford Row, Frogmore

$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 1, Bedford Row - Thursday 15th September to Friday 16th September 2022

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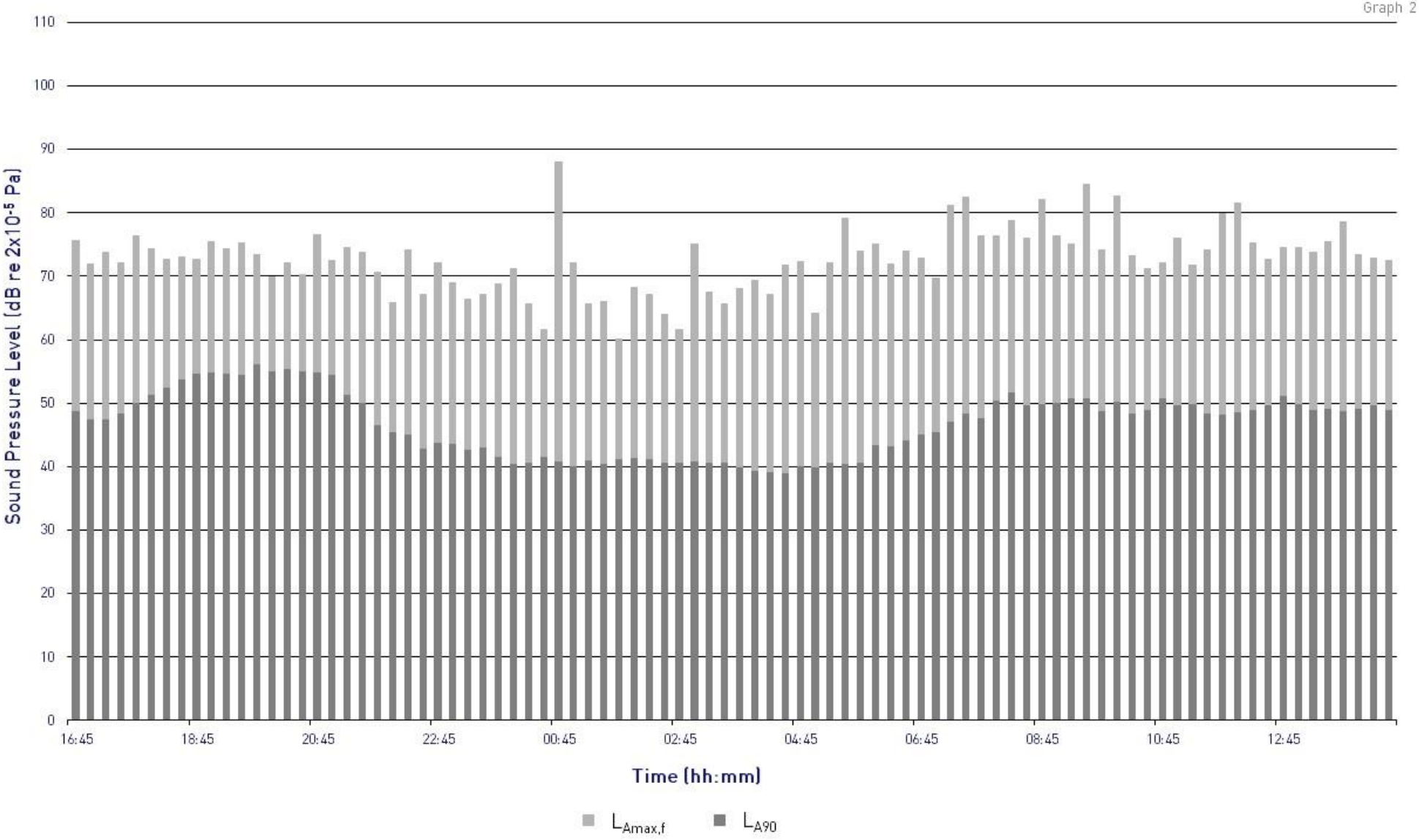
Graph 2



3-5 Bedford Row, Frogmore

L_{Aeq} Time History

Measurement Position 2, Inner Lightwell - Thursday 15th September to Friday 16th September 2022

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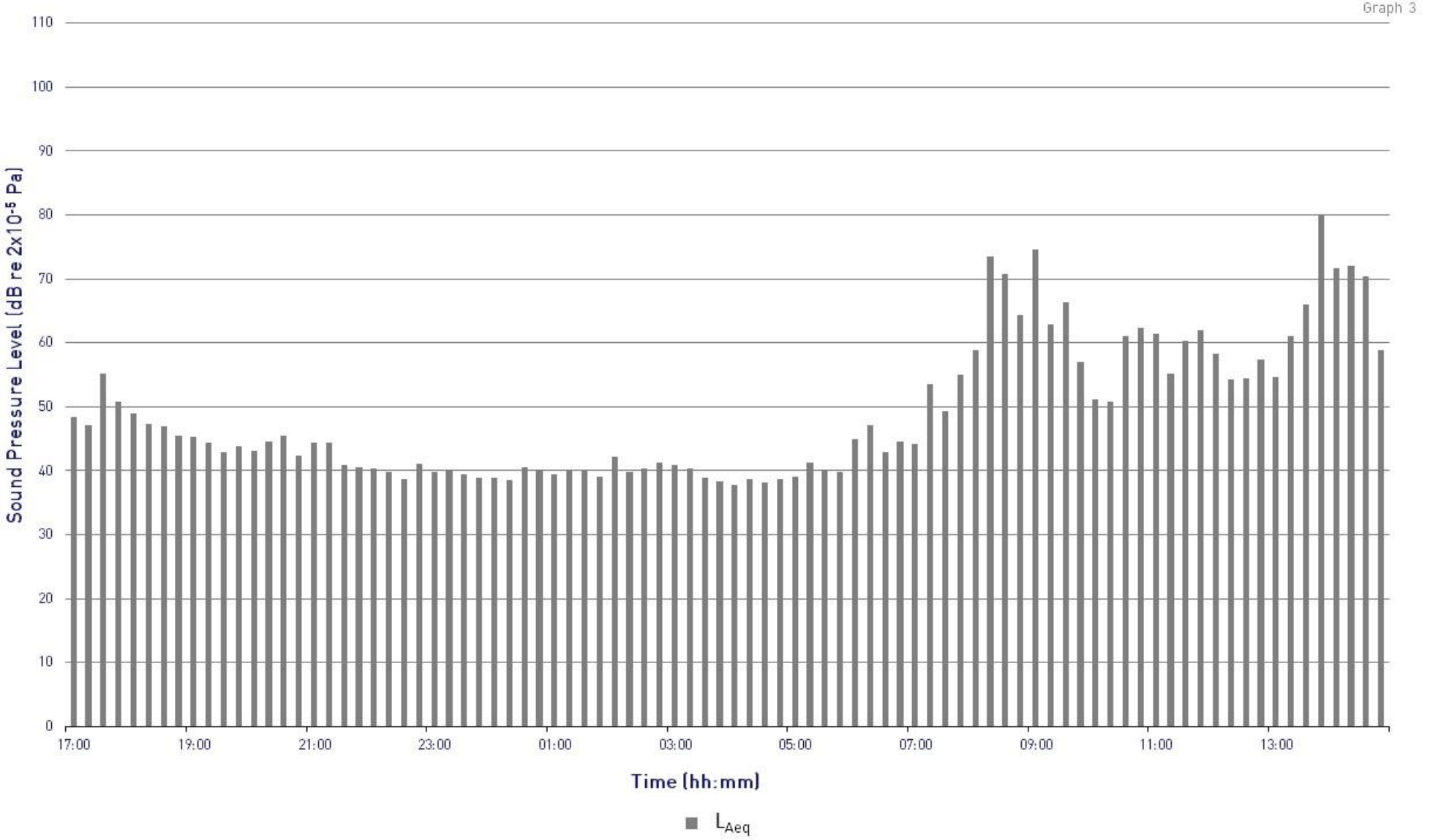
Graph 3



3-5 Bedford Row, Frogmore

$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 2, Inner Lightwell - Thursday 15th September to Friday 16th September 2022

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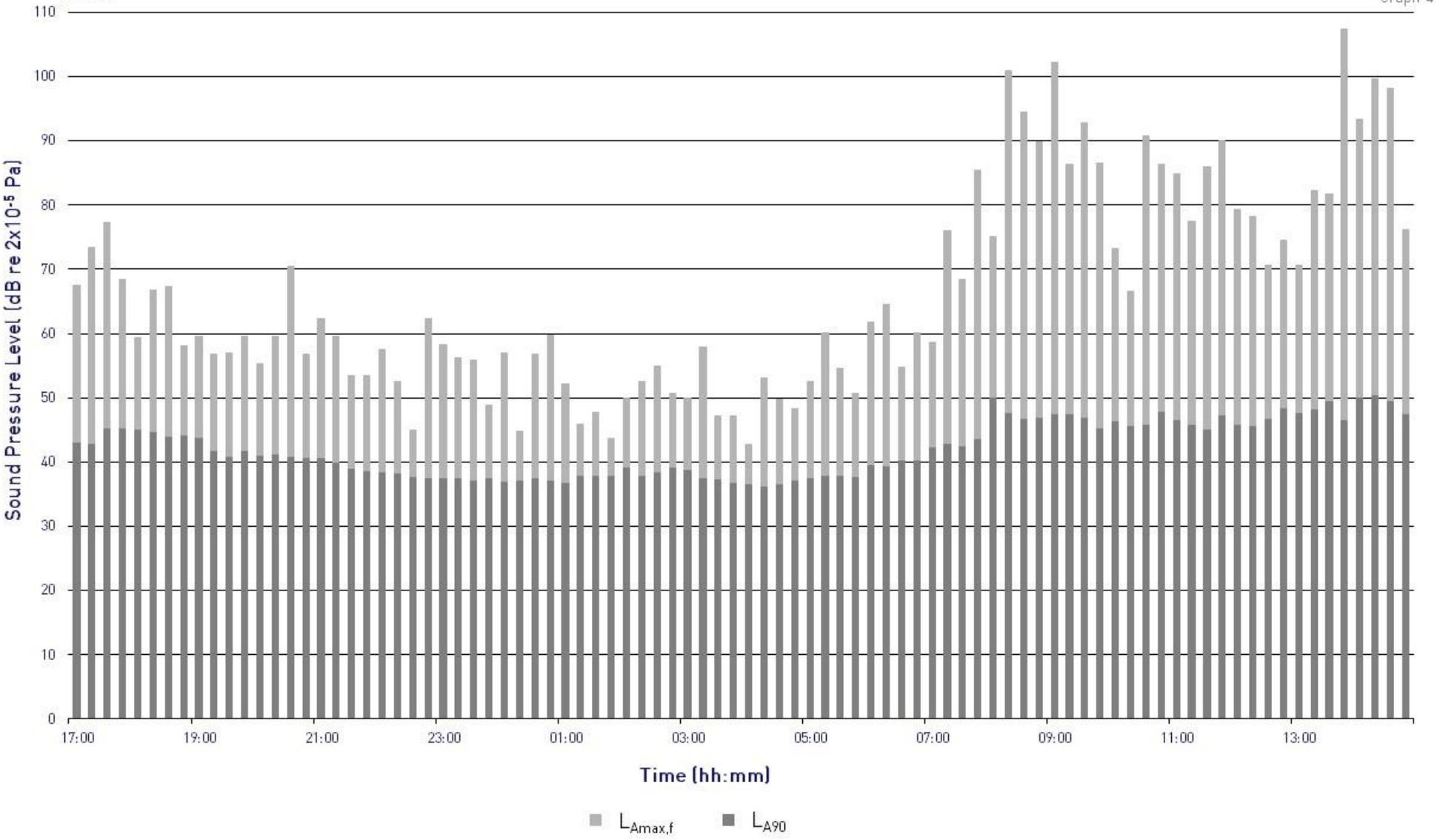
Graph 4



3-5 Bedford Row, Frogmore

L_{Aeq} Time History

Measurement Position 3, Jockey's Fields - Thursday 15th September to Friday 16th September 2022

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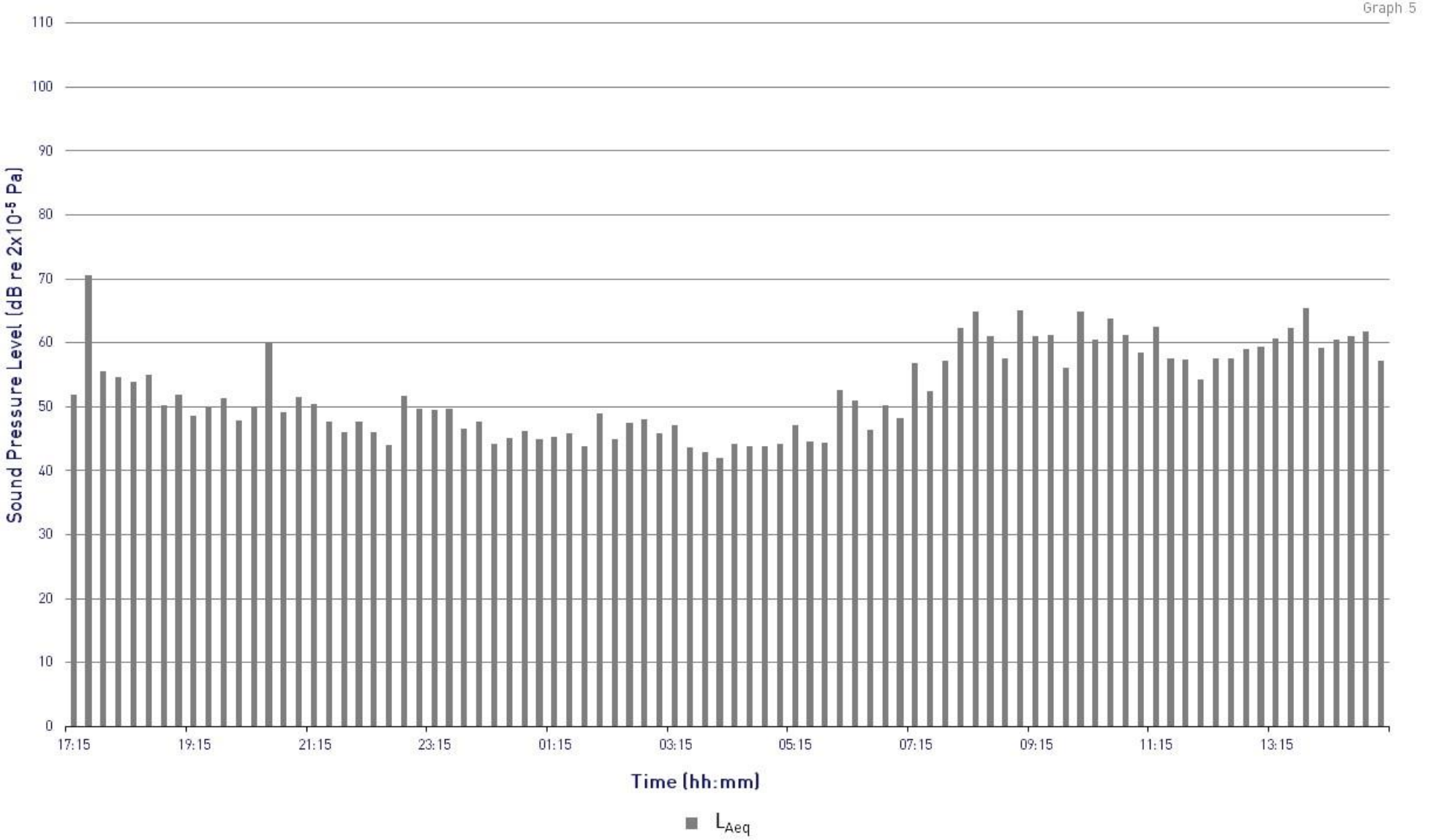
Graph 5



3-5 Bedford Row, Frogmore

$L_{Amax,f}$ and L_{A90} Time History

Measurement Position 3, Jockey's Fields - Thursday 15th September to Friday 16th September 2022

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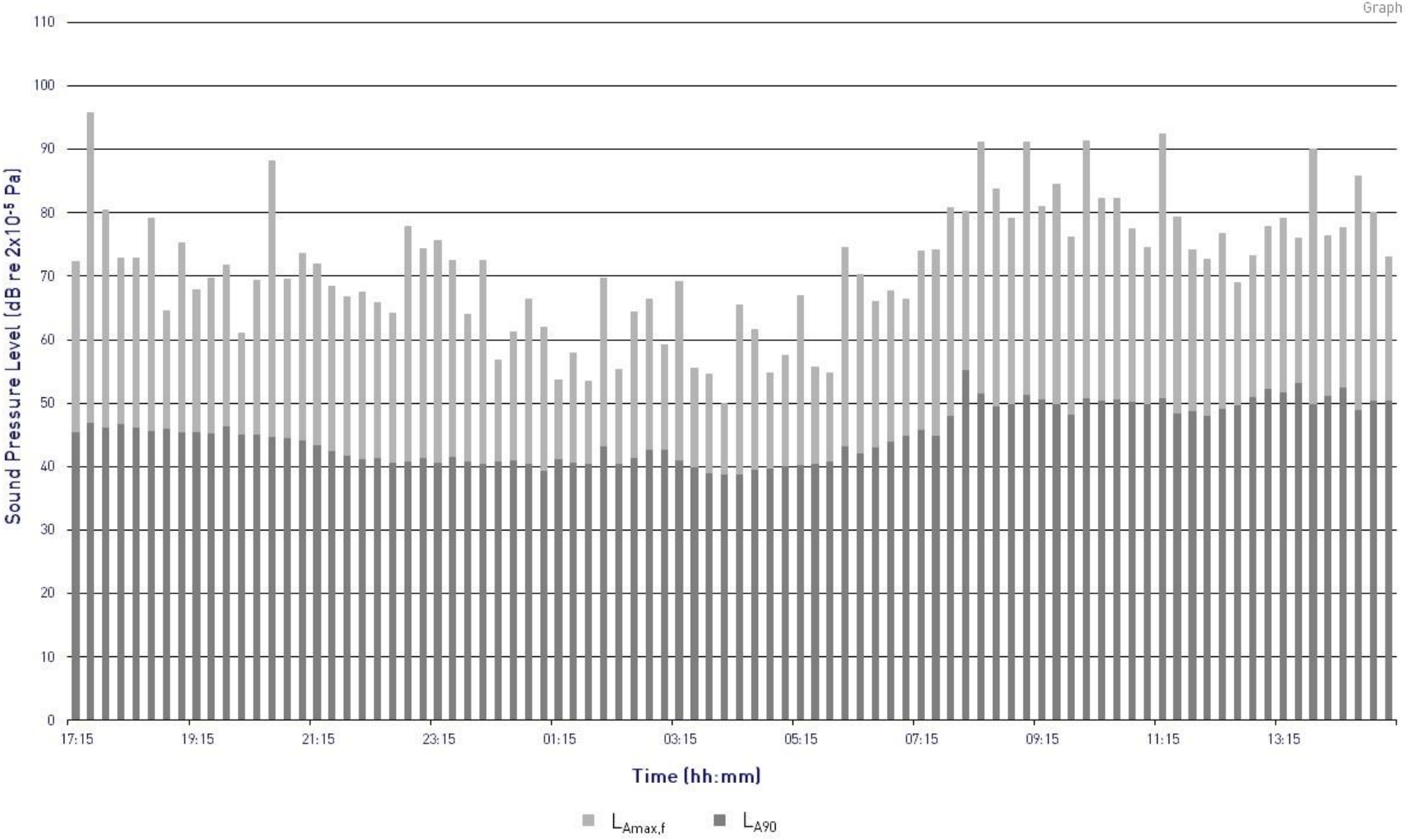
Graph 6



Appendix D – Instrumentation

The following equipment was used for the measurements.

Table D1– Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Expiry Date
Norsonic Type 1 Sound Level Meter	Nor140	1406255	U37581	7 April 2023
Norsonic Pre Amplifier	1209	20491		
Norsonic ½" Microphone	1225	225529	37580	7 April 2023
Norsonic Sound Calibrator	1251	34391	U37579	7 April 2023
Norsonic Type 1 Sound Level Meter	Nor140	1406407	U39107	4 October 2023
Norsonic Pre Amplifier	1209	20688		
Norsonic ½" Microphone	1225	226839	39106	4 October 2023
Norsonic Sound Calibrator	1251	34482	U39105	4 October 2023
Norsonic Type 1 Sound Level Meter	Nor140	1403226	U36698	5 January 2023
Norsonic Pre Amplifier	1209A	12066		
Norsonic ½" Microphone	1225	168180	36697	5 January 2023
Norsonic Sound Calibrator	1251	31988	U36696	4 January 2023

Appendix E – Plant Calculations

Table E1 – Example Calculation, CU.01 to Receptor B

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
L_p at 1m	56	53	50	47	46	43	39	28	51
Reflections	+6	+6	+6	+6	+6	+6	+6	+6	-
Distance loss (5m)	-14	-14	-14	-14	-14	-14	-14	-14	-
Screening (Lightwell Edge)	-11	-13	-16	-19	-20	-20	-20	-20	-
Noise level at Receptor B	**37**	**32**	**26**	**20**	**18**	**15**	**11**	**0**	**24**

*Possible discrepancies within one dB are subject to the number rounding.

Appendix F – CDM Considerations

The likelihood the harm will occur can be assessed by applying an indicative score (from 1 to 5) as follows:

1 – Remote (almost never)
2 – Unlikely (occurs rarely)
3 – Possible (could occur, but uncommon)
4 – Likely (recurrent but not frequent)
5 – Very likely (occurs frequently)

The severity of harm can be assessed by applying an indicative score (from 1 to 5) as follows:

1 – Trivial (e.g. discomfort, slight bruising, self-help recovery)
2 – Minor (e.g. small cut, abrasion, basic first aid need)
3 – Moderate (e.g. strain, sprain, incapacitation for more than 3 days)
4 – Serious (e.g. fracture, hospitalisation for more than 24 hours, incapacitation for more than 4 weeks)
5 – Fatal (single or multiple)

The rating value is obtained by multiplying the two scores and is then used to determine the course of action.

Table F1 – Risk Ratings

Rating Bands (Severity x Likelihood)		
Low Risk (1 – 8)	Medium Risk (9 -12)	High Risk (15 – 25)
May be ignored but ensure controls remain effective	Continue, but implement additional reasonable practicable controls where possible	Avoidance action is required; therefore alternative design solutions must be examined. Activity must not proceed until risks are reduced to a low or medium level

The following hazards pertinent to our design input have been identified and control measures suggested:

Table F2 – Risk Assessment

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Vibration Isolators	Injury to hands	Contractors	3	3	9	Care needs to be taken during adjustment. Follow manufacturers guidance	1	3	3

L: Likelihood S: Severity R: Rating

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