



Happy Valley Recreation
Limited

St Lawrence House, Reading

Noise Impact Assessment

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Executive Summary

Air & Acoustic Consultants Limited have been commissioned by Happy Valley Recreation Limited to undertake a noise impact assessment to address planning condition no. 6 associated with planning approval ref: PL/23/1091 for the Change of Use to allow flexible use Including Class E and Class F(1) Non-residential Institutions of St Lawrence House, Abbey Square, Reading, as well as proposed new louvres within the façades of the building related to the building services plant.

In line with the conditioned requirements an assessment of the sound insulation scheme and noise emissions from the building services plant and internal activity has been conducted.

It is considered that the proposed sound insulation scheme for the ground floor is capable of meeting the conditioned requirement of 55 dB ($D_{ntw} + C_{tr}$), which has in turn been demonstrated to control internal activity to conditioned requirements. Music level noise limits have also been established to ensure that music levels do not exceed these thresholds.

Internal activity sound break out via the ground floor and lower ground floor façades has also been reviewed and demonstrated to be controlled to conditioned requirements in the receptors above for both open and closed residential window scenarios.

An environmental noise survey has been conducted to establish baseline background sound levels at the identified local receptors. An assessment of building services noise emissions has been conducted inline with these levels and demonstrated capable of being controlled to conditioned limits at local receptor windows.

It is considered, therefore, that condition no.6 can successfully be discharged and the proposed new louvres are acceptable in respect of environmental noise considerations.

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1 Introduction

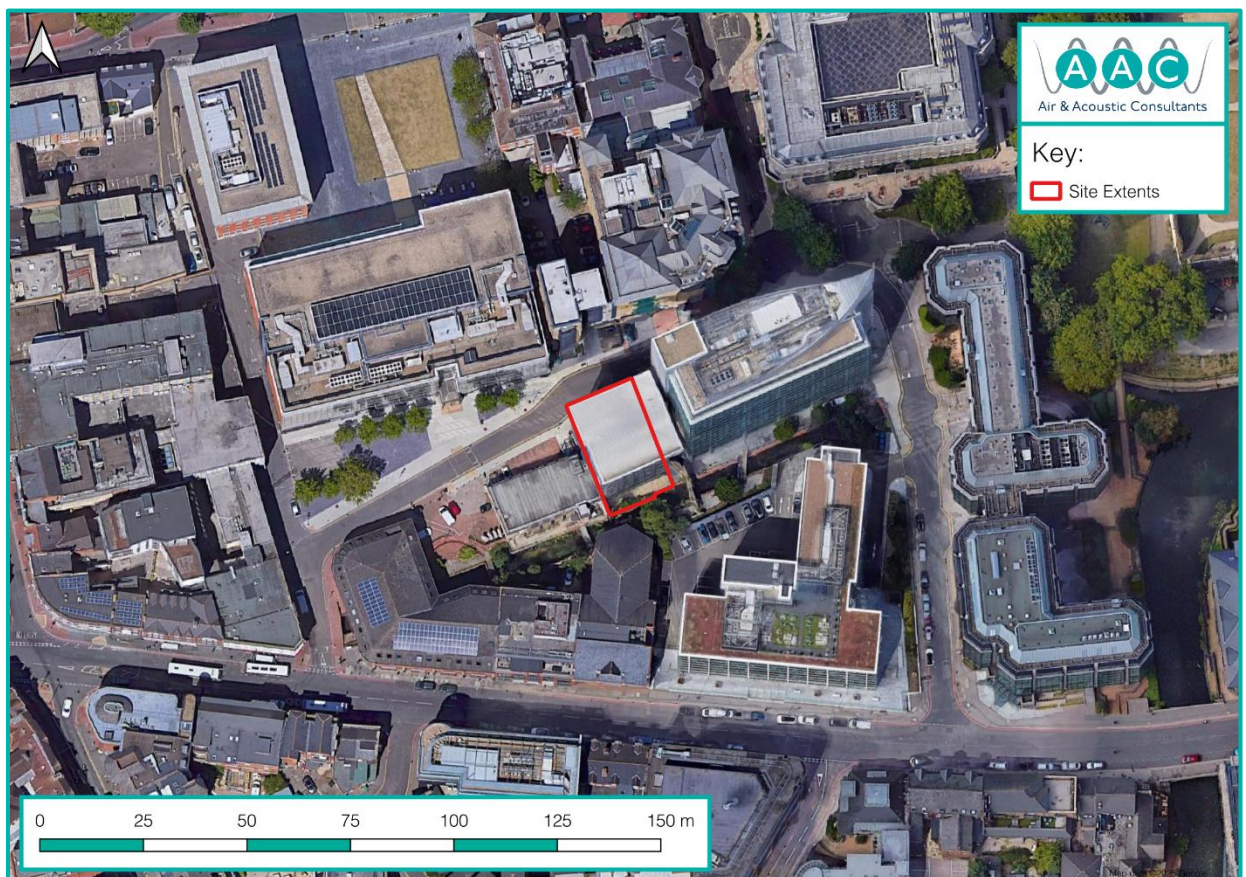
1.1 Brief

- 1.1.1 Air & Acoustic Consultants Limited have been commissioned by Happy Valley Recreation Limited to undertake a noise impact assessment to address planning condition no.6 associated with planning approval ref: PL/23/1091 for the Change of Use to allow flexible use Including Class E and Class F(1) Non-residential Institutions of St Lawrence House, Abbey Square, Reading, as well as the proposed new louvres within the façades of the building related to the building services plant.
- 1.1.2 It is proposed that the ground floor will be a Cafe/Bakery with commercial kitchen with a recreation use for games at lower ground floor.
- 1.1.3 To assist with the understanding of this report a glossary of acoustic terms is provided in [Appendix A](#).

1.2 Consented Site

- 1.2.1 The consented site is in the centre of Reading, consisting of ground and lower ground floors. Residential dwellings are positioned on upper floors from first floor onwards throughout the building. The nearby vicinity includes a mixture of commercial and residential properties.
- 1.2.2 The National Grid Reference for the centre of the site is, SU 71865 73446 (British National Grid Coordinates E: 471865, N: 173446). The site and the surrounding area are shown in [Figure 1.1](#).

Figure 1.1: Site Location



1.3 Planning Condition

1.3.1 Planning Condition no.6 states:

Prior to first occupation of any Class E(b) or E(d) use a detailed scheme for protecting the dwellings from noise emissions from the commercial/business/service use or non-residential institution hereby approved and informed by an assessment of the likely noise emissions from the approved commercial use, shall be submitted to and approved in writing by the Local Planning Authority. The scheme itself shall be design, specified and constructed so that the sound insulation performance of the separating floor/ceiling between the uses achieves a minimum airborne sound insulation performance of greater than or equal to 55 dB (Dntw +Ctr) and ensures that the noise levels within the property do not exceed the values specified in BS8233:2014 with appropriate penalties and adjustments for the character of noise. The scheme shall make suitable provision for insulation from structure borne noise.

Thereafter, the development shall not be carried out other than fully in accordance with the approved scheme which shall be completed before any part of the accommodation hereby approved is first occupied and shall be retained and maintained as such at all times thereafter.

REASON: In order to safeguard the amenity of occupiers of the residential accommodation in accordance with Policies CC8 and EN16 of the Reading Borough Local Plan 2019. "

- 1.3.2 In regards to this condition, this noise impact assessment considers noise emissions from the site i.e. operational noise breakout, plant noise emissions, and a review of sound insulation performances from the floor construction separating the ground floor bakery café from first floor residential receptors. It also considers the noise emissions associated with the new louvres included within the planning application submission. Based on the expected performance of the separating construction, levels of noise transmission from the bakery cafe into the residences are also predicted. Results of the assessment are aligned with the conditioned requirements.

2 Legislation and Policy Context

2.1 Introduction

- 2.1.1 The prediction and assessment of the potential noise impacts on the proposed development have been considered against the conditioned requirements cited above, which references the following relevant policy and guidance regarding noise.

2.2 Local Planning Policy

Reading Borough Local Plan

- 2.2.1 The Reading Borough Local Plan¹ was adopted by Reading Borough Council (RBC) on 4th November 2019 and sets out the planning policies for developments within the jurisdiction up to 2036, and is the main consideration in deciding planning applications.
- 2.2.2 The Local Plan has the following policies which relate to noise and the associated planning condition.
- 2.2.3 Policy CC8: *Safeguarding Amenity* states:

“Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

[..]

- *Noise and disturbance;*

[..]

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy.

As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable.

Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes.”

- 2.2.4 Policy EN16: *Pollution and Water Resources* states:

“Development will only be permitted where it would not be damaging to the environment and sensitive receptors through land, noise or light pollution; where it would result in no deterioration in, or ideally enhance, ground and surface water quality; and where adequate water resources, sewerage and wastewater treatment infrastructure will be in place to support the proposed development prior to occupation.

¹ Reading Borough Council, 2019. *Reading Borough Local Plan*.

Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution. Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes."

[...]"

2.2.5 Policy EN17: *Noise Generating Equipment* states:

"Where noise generating equipment is proposed, the noise source specific level (plant noise level) should be at least 10dBA below the existing background level as measured at the nearest noise sensitive receptor."

3 Assessment Approach

3.1 Operational Impacts

[BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings²](#)

- 3.1.1 BS 8233:2014 draws on the results of research and experience to provide information on the design of buildings to provide internal acoustic environments appropriate to their functions. It deals with control of noise from outside of the building, noise from plant and services within it, and room acoustics in non-critical situations.
- 3.1.2 BS 8233:2014 defines a range of indoor ambient noise levels for spaces when they are unoccupied. A summary of the noise levels recommended in BS 8233:2014, for rooms used for resting and sleeping, has been replicated in [Table 3.1](#) below and represents levels for sources without a specific acoustic character.

Table 3.1: Desirable Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq, 16hour}$	-
Dining	Dining room	40 dB $L_{Aeq, 16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hour}$	30 dB $L_{Aeq, 8hour}$
External Noise	Amenity Spaces	50 – 55 dB $L_{Aeq, 16hour}$	-

- 3.1.3 BS 8233:2014 provides the following guidance regarding acceptable noise levels in external amenity areas:

“7.7.3.2 Design criteria for external noise

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq, T}$, with an upper guideline value of 55 dB $L_{Aeq, T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.”

- 3.1.4 The values shown in [Table 3.1](#), above, are generally regarded as the LOAEL for steady sound, i.e. no adverse impacts due to the sound would be expected if noise levels fall below these values. If the sound has certain characteristics, it could be appropriate to consider a lower value as the LOAEL.
- 3.1.5 BS 8233:2014 also states that:

“Where development is necessary or desirable the internal target levels can be relaxed by up to 5dB and reasonable internal conditions achieved.”

² BSI. BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.

3.1.6 BS 8233:2014 contains examples of how to calculate internal sound levels for residential properties affected by external noise sources. The simple method involves a subtraction of the window performance in R_w from the external sound levels to attain an internal sound level and this can be acceptable when the resulting internal sound levels are more than 5 dB lower than the sound level criteria. Where this is not the case the guidance provides a rigorous method of calculating internal sound levels which uses sound insulation performance data for all façade elements and the acoustic effects of the room itself. The rigorous method is suitable for line sources such as roads.

[BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound³](#)

3.1.7 BS 4142:2014+A1:2019 is used to rate and assess sound of an industrial and/or commercial nature including:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and;
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

3.1.8 The purpose of the assessment procedure is to determine the likelihood and significance of any potential impacts that may result from sound of an industrial and/or commercial nature.

3.1.9 BS 4142:2014+A1:2019 defines noise from industrial sources at the assessment location as the specific sound level and this is the term used in this report to refer to noise which occurs currently or is predicted to occur due to commercial or industrial operations.

3.1.10 Certain acoustic features can increase the significance of impacts over those expected from a simple comparison between the specific sound level and the background sound level. BS 4142:2014+A1:2019 includes allowances for a rating penalty to be added if the specific sound level contains tonal, impulsive or intermittent characteristics. There is also an allowance for features that are neither tonal, impulsive or intermittent but are readily distinctive. After any applicable penalties have been added to the specific noise level the result is termed the rating level.

3.1.11 The difference between the rating level and the background sound level provides an initial assessment of the magnitude of the noise impacts for affected noise sensitive receptors. The assessment criteria given by BS 4142:2014+A1:2019 are as follows:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where

³ BSI. *BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.*

the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.1.12 During the daytime, BS 4142:2014+A1:2019 requires that noise rating levels be assessed over 1-hour periods. However, during the night-time, noise rating levels are required to be assessed over 15-minute periods.

3.1.13 Where the initial estimate of the impact needs to be modified due to context, BS 4142:2014+A1:2019 states that all pertinent factors should be taken into consideration, including:

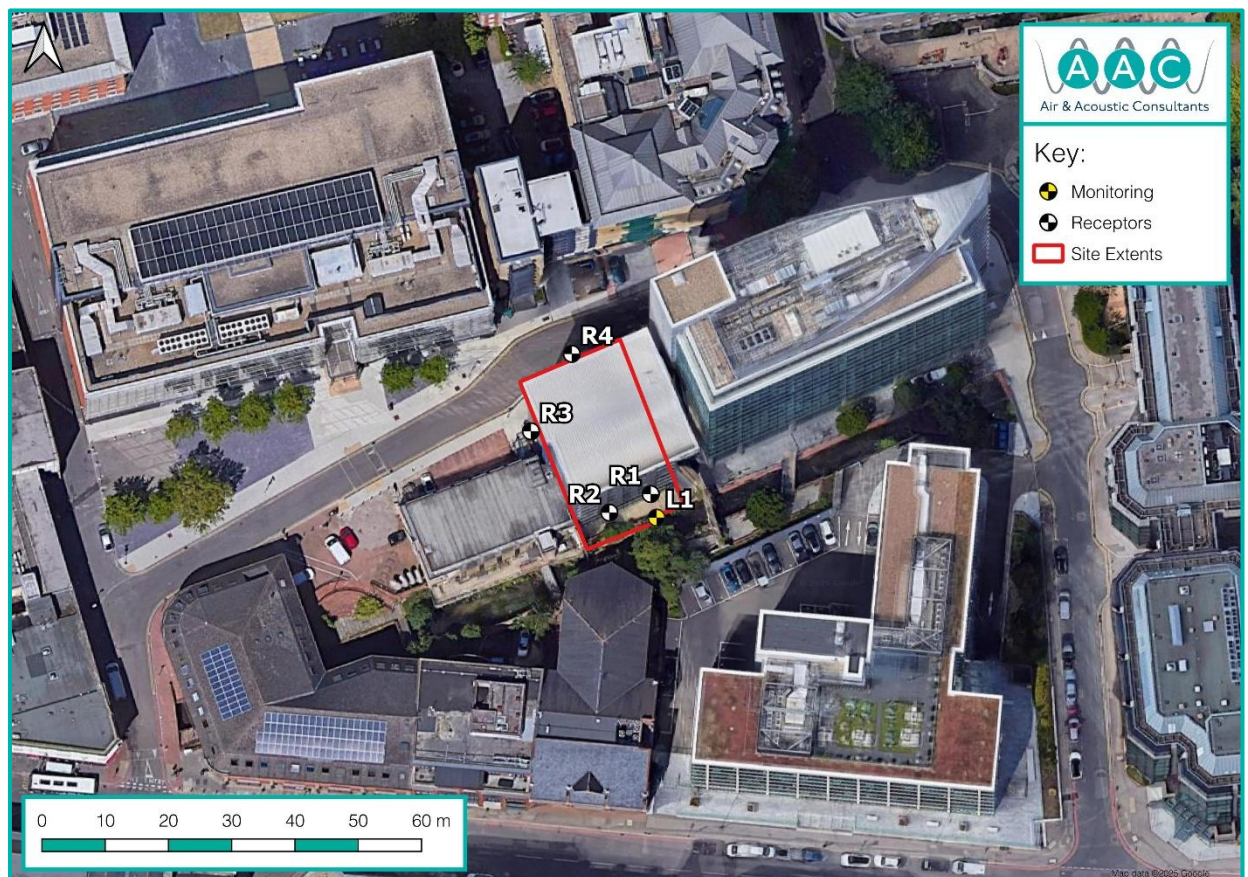
- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or external acoustic conditions.

4 Baseline Conditions

4.1 Noise Monitoring

- 4.1.1 An unattended baseline noise survey was undertaken between Tuesday 5th August and Friday 8th August 2025. The survey consisted of one measurement location as illustrated in [Figure 4.1](#).
- 4.1.2 The sound level meter captured background sound levels at a location which is representative of the noise sensitive residential at and surrounding St Lawrence House and where the ground floor kitchen and low ground floor MVHR intake / exhausts will terminate.
- 4.1.3 It was not possible to safely or securely install a sound level meter to the north on Abbey Square, however it is deemed that the receptor to the south of the building presents a reasonable representation of background noise levels in the area; most likely a robust, worst case scenario due to the screening from the surrounding road network.

Figure 4.1: Noise Monitoring Location



- 4.1.4 All measurements were taken using a class 1 sound level meter, the details of which is set out in [Table 4.1](#).

Table 4.1: Noise Measurement Equipment

Equipment Type	Manufacturer	Model	Serial Number	Calibration Due
Sound Level Meter		Model LxT1	4473	
Pre-Amplifier	Larson Davis	PRMLxT1	36007	12/2026
Microphone		377BO2	153565	
Calibrator	Larson Davis	Cal 200	19869	02/2025

*SLMs are calibrated every 2-years and sound calibrators are calibrated every year

- 4.1.5 Calibration checks were performed at the start and end of the survey; no significant drift in calibration was observed. The calibration deviation over the course of the survey is set out in [Table 4.2](#) and the recorded deviations are small enough that the data can be considered reliable.

Table 4.2: Calibration Deviation Recorded in Sound Level Meters During Survey Period

Sound Level Meter Serial Number	Calibration Deviation on Collection (dB)
4473	0.03

- 4.1.6 The weather conditions during the survey were generally suitable for acoustic measurements, with no heavy rainfall or average wind speeds above 5 m/s.

4.2 Unattended Noise Survey Results

- 4.2.1 A summary of the long-term measured sound levels at L1 is presented in [Table 4.3](#). The data is presented as average levels for the daytime and night-time periods calculated from 15-minute sound indices.

Table 4.3: Noise Measurement Results – L1, Unattended Long-Term

Date	Period	Average Measured Sound Levels (dBA)	
		L _{Aeq}	L _{A90} *
05/08/2025	Day 07:00 - 23:00	56.3	45
	Night 23:00 - 07:00	45.9	44
06/08/2025	Day 07:00 - 23:00	58.7	48
	Night 23:00 - 07:00	46.3	44
07/08/2025	Day 07:00 - 23:00	59.0	50
	Night 23:00 - 07:00	46.1	44
08/08/2025	Day 07:00 - 23:00	58.9**	50**
	Night 23:00 - 07:00	-	-
Overall	Day 07:00 - 23:00	58.5	50
	Night 23:00 - 07:00	46.1	44

*Modal data presented

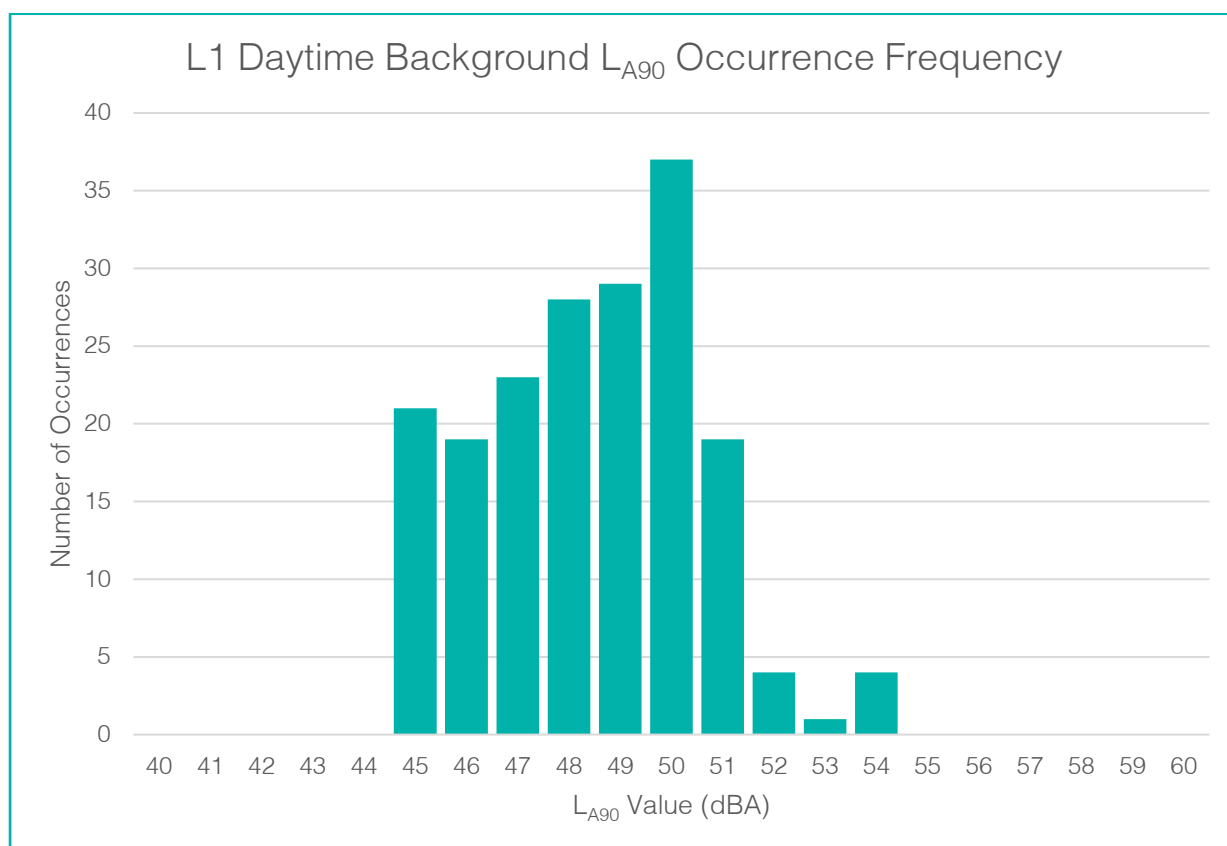
**Partial Data Set

- 4.2.2 Time history graphs for the entire monitoring period are given in [Appendix B](#) and include the L_{Aeq}, L_{A90} and L_{AFmax} for each 15-minute period.

4.3 Background Sound Levels

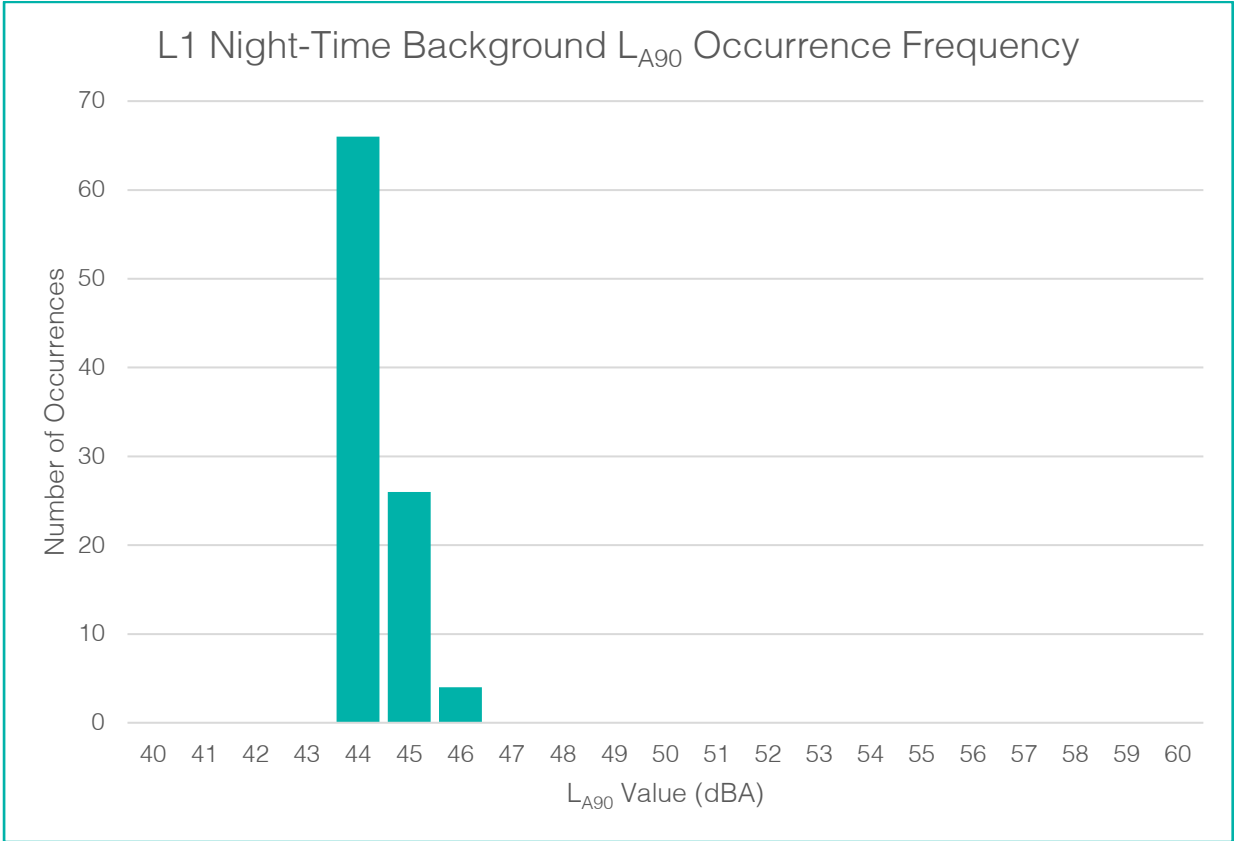
- 4.3.1 As part of an assessment of building services noise emissions and following the guidance of BS 4142:2014+A1:2019, a representative background sound level must be determined. Typically, the modal $L_{A90,15min}$ value from the relevant time period is used.
- 4.3.2 Frequency distribution data of measured background sound levels is presented graphically in [Figure 4.2](#) and [Figure 4.3](#) for daytime and night-time periods respectively.

Figure 4.2: Occurrence Frequency of $L_{A90,15min}$ during daytime period between 07:00 and 23:00 at L1



- 4.3.3 While there may be a range of levels that could be considered typically representative of the $L_{A90,15min}$ at this site, the most commonly occurring daytime $L_{A90,15min}$ level is 50 dB(A), which has been adopted as the representative daytime background sound level.

Figure 4.3: Occurrence Frequency of $L_{A90,15min}$ during night-time period between 23:00 and 07:00 at L1



4.3.4 While there may be a range of levels that could be considered typically representative of the $L_{A90,15min}$ at this site, the most commonly occurring night-time $L_{A90,15min}$ level is 44 dB(A), which has been adopted as the representative night-time background sound level.

5 Operational Impact Assessment

5.1 Sound Insulation Review

- 5.1.1 It is understood that the existing separating construction between the ground floor & first floor is a concrete slab. The exact dimensions of the slab are unknown, however, an indicative thickness of 200mm has been assumed. It was also observed that the underside of the slab is currently lined with thermal insulation which is not expected to have a significant impact on the acoustic performance.
- 5.1.2 The base construction would be expected to achieve a minimum acoustic performance of approximately D_w 50 dB, where further sound control would be required to meet the conditioned requirement of 55 dB ($D_{ntw} + C_{tr}$).
- 5.1.3 To meet the requirements of condition no. 6, a resiliently hung acoustic ceiling will be installed throughout the ground floor space. The ceiling will comprise 2no. layers of 12.5mm dense (min. 12.5 kg/m²) plasterboard (dense vinyl board within the kitchen space) resiliently hung from the slab above with 150mm of rockwool insulation (min density of 40kg/m³) insulation with a min cavity of 600mm (700mm within the kitchen area).
- 5.1.4 It is considered that this construction can be capable of achieving the conditioned performance of 55 dB ($D_{ntw} + C_{tr}$) with indicative spectral D_w values presented in [Table 5.1](#) for the plasterboard, 150mm insulation, 600mm cavity configuration.

Table 5.1: Sound Level Reduction Values Adopted for Sound Transmission Assessment

Party Element	Sound Level Reduction (dB) at 1/1 Octave Band Frequencies (Hz)								Overall $D_{ntw} + C_{tr}$
	63	125	250	500	1 k	2 k	4 k	8 k	
1F Slab	31	48	52	56	65	69	69	69	57

5.2 Sound Transmission

- 5.2.1 It is understood that music will be played within the ground floor bakery café to provide ambience rather than high volume music, however there will also be noise associated with patrons speaking, potentially with raised voices. Reference library noise data, representative of a lively bakery café setting with music have been used as a worst case scenario to predict noise transmission via the first floor slab construction, as presented in [Table 5.2](#).

Table 5.2: Source Noise Levels Adopted for Sound Transmission Assessment

Activity	1/1 Octave Band Frequencies (Hz)								Overall dB(A)
	63	125	250	500	1 k	2 k	4 k	8 k	
Lively Restaurant with music	79	87	87	83	85	79	70	68	88

- 5.2.2 This data includes music with groups of people speaking with a raised voice, which is considered to present a robust, worst case scenario.

1F Slab

- 5.2.3 Based on the expected construction performance and anticipated noise levels within the bakery café, it is expected that noise transfer from the bakery café will be controlled to L_{eq} 30 dBA within residential areas above.
- 5.2.4 It is understood that the bakery café will only operate within the daytime periods as defined in BS8233. However, the results demonstrate that noise can be controlled to conditioned levels during both day and night time periods, if required.
- 5.2.5 Any speakers will be fixed via isolated mounts or installed on wall linings only to minimise structure borne transmission of music.

Façade

- 5.2.6 An assessment of noise break-out via the GF and LGF frontage has been conducted to estimate the level of noise transmission via this path to the residential receptors directly above.
- 5.2.7 The GF and LGF frontages comprise large areas of glazing. Although the exact specification of the glazing is unknown a sound reduction performance for a 10mm pane rated with a weighted sound reduction of R_w 29 dB has been adopted to provide an assessment of noise break-out. Based on this performance and the internal noise levels presented above, it is predicted that internal activity will be controlled to L_{eq} 40 dBA at the closest first floor external facades from both the GF and LGF facades.
- 5.2.8 Assuming standard thermal double glazing providing a weighted sound reduction of R_w 28 to 30 dB, this would result in internal noise levels of L_{eq} 18 dBA, which, cumulatively with the noise transmission via the first floor slab would still result in noise transfer from the bakery café being controlled to L_{eq} 30 dBA within residential areas above overlooking the street.
- 5.2.9 In a scenario where windows are open, an acoustic loss of 10 to 15 dB may be expected, which would result in internal levels of L_{eq} 23 to 28 dBA within first floor residences overlooking the bakery café. When assessed cumulatively with the noise transmission via the first floor slab, this would result in noise transfer from the bakery café being controlled to L_{eq} 31 to 32 dBA within residential areas overlooking the street above.
- 5.2.10 It is understood that the bakery café will only operate within the daytime periods as defined in BS8233 and, therefore, it is demonstrated that noise can be controlled to conditioned levels within the flats.
- 5.2.11 If it were desirable to operate the bakery café during the night time period as defined in BS8233, it would be necessary to introduce music limits within the bakery café where the limits presented in [Table 5.3](#) would be introduced and maintained.

Table 5.3: Limited Music Levels to meet night-time BS8233 levels

Activity	1/1 Octave Band Frequencies (Hz)								Overall dB(A)
	63	125	250	500	1 k	2 k	4 k	8 k	
Limited Music Levels	75	83	83	79	81	75	66	64	84

5.3 Plant Noise Emissions

- 5.3.1 The potential adverse effects of plant sound emissions experienced at the closest noise sensitive receptors have been assessed in line with the conditioned requirements.

5.3.2 The typical background sound levels for daytime and night-time periods have been determined in [Section 4.3](#), repeated below for ease.

- Daytime L_{A90} 50 dB; and
- Night-time L_{A90} 44 dB

5.3.3 The proposed plant associated with the site are presented below:

- 1no. CVAT/4-6000/450 ND PTC Kitchen Supply Fan at GF;
- 1no. ILHT/4-400 Kitchen Extract Fan at GF; and
- 2no. UTZ-BD100C MVHR Unit at GF & LGF.
- 2no. Fujitsu AJY162LELDH external condensing units at LGF.

5.3.4 The internal plant items are ducted out to atmosphere via the façade at the locations presented in [Figure 5.1](#) and [Figure 5.2](#). External condenser locations are marked in red on [Figure 5.2](#).

5.3.5 It has been confirmed by the client that the external condensers will operate at low noise mode 2, the data for which has been provided by the manufacturer and cited below.

Figure 5.1: GF Building Services Plan

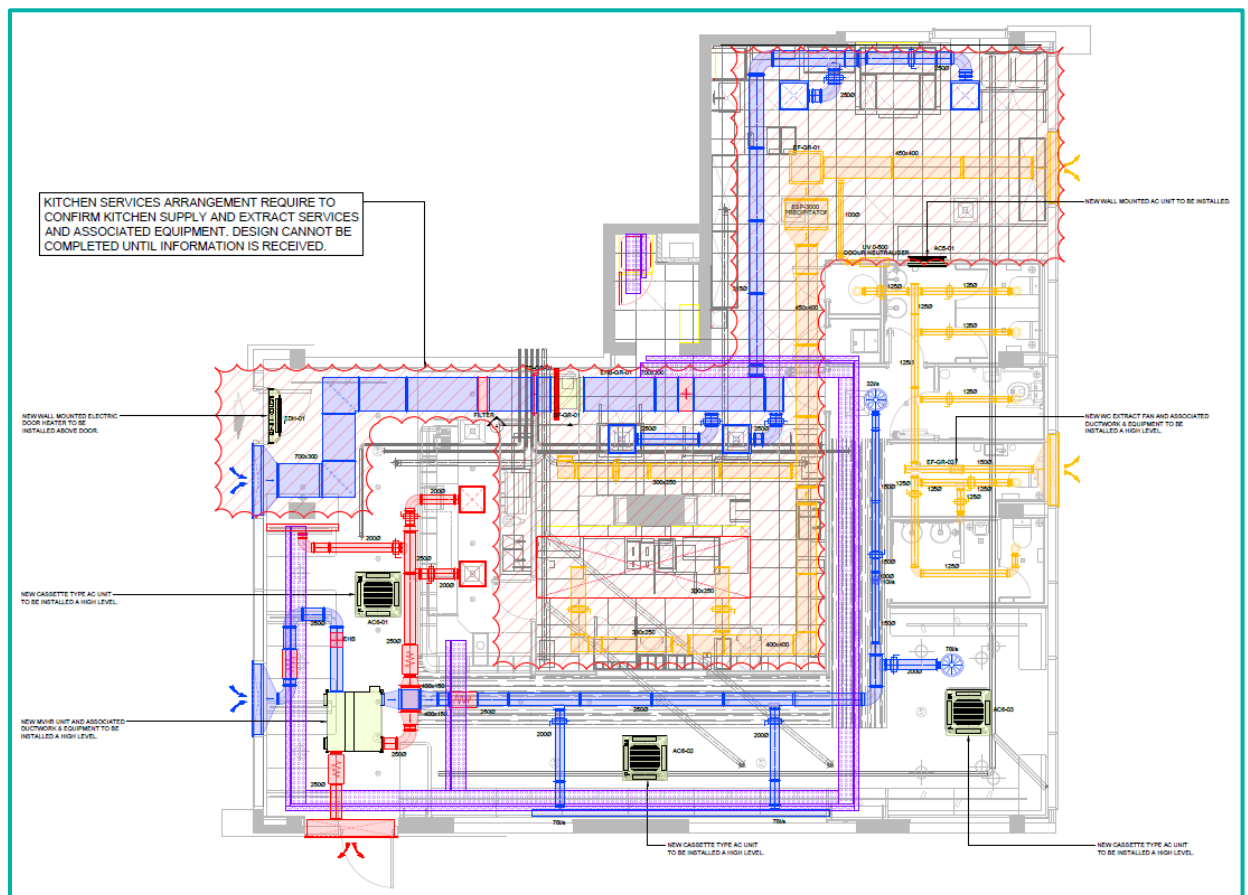
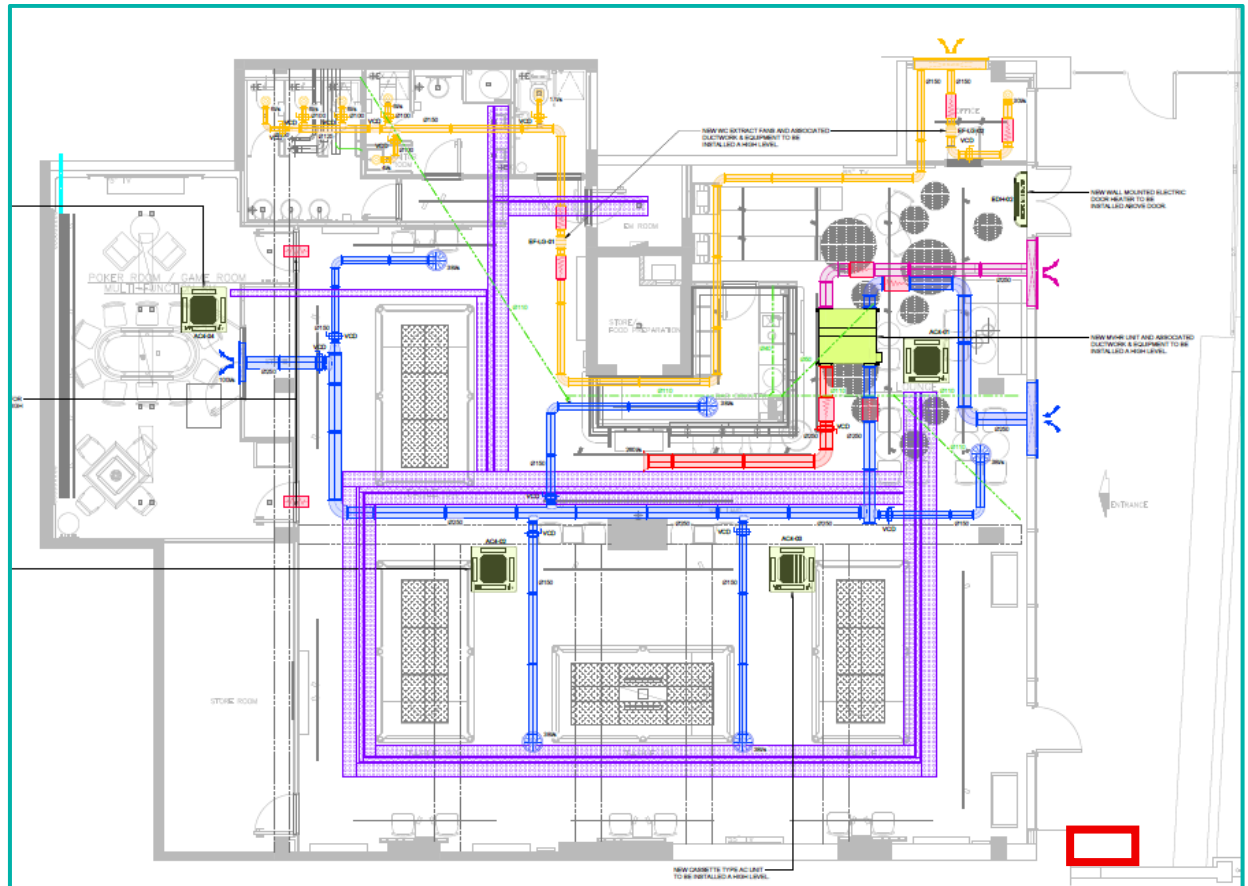


Figure 5.2: LGF Building Services Plan



5.3.6 Manufacturer noise data for these units have been provided, as presented in [Table 5.4](#).

Table 5.4: Sound Sources Used in the Commercial Noise Assessment

Plant	Sound Power Level (dB) at Octave Band Centre Frequencies (Hz)								Overall dB
	63	125	250	500	1 k	2 k	4 k	8 k	
Kitchen Extract – Intake (Lw)	51	69	66	67	69	70	64	56	76
Kitchen Extract – Exhaust (Lw)	53	77	80	79	81	78	73	66	86
Kitchen Supply – Intake (Lw)	49	68	69	70	68	66	61	57	76
Kitchen Supply – Exhaust (Lw)	55	70	72	74	75	72	64	55	80
MVHR - UTZ-BD100C (Lp)									39
Fujitsu AJY162LELDH Low Noise Mode 2 (Lw)	73	63	62	67	58	58	59	53	75

5.3.7 Spectral data for the MVHR is not provided by the manufacturer. For the purposes of this assessment, spectral data for a similar unit has been adopted, scaled to match the single figure value. It should also be noted that the data provided by the manufacturer is sound pressure data measured beneath the unit with all branches discharging into the same room. Typically for ductborne sound from such units, in-duct sound power levels (as provided for the kitchen extract and supply fans) would be more suitable.

5.3.8 In order to estimate the in-duct sound power level of the MVHR, the following assumptions have been made:

- Sound pressure measurements taken at a 1.5 m distance from the duct termination;
- Sound measured is from the loudest contributor only (typically the exhaust branch);
- The measurement room is not significantly reverberant;
- End reflections associated with a 150mm diameter duct termination; and
- Directivity associated with a circular 150mm diameter duct to a 135 degree measurement position.

5.3.9 Factoring in these losses, in combination with the scaled example spectra mentioned previously, the following octave band in-duct sound power levels have been derived:

Table 5.5: Derived In-Duct Sound Power Levels

Plant	Sound Power Level (dB) at Octave Band Centre Frequencies (Hz)								Overall dB
	63	125	250	500	1 k	2 k	4 k	8 k	
MVHR - UTZ-BD100C (Lw)	59	54	46	44	45	46	40	32	61

5.3.10 The assumptions listed above are considered to be an overestimation of the in-duct sound power of the unit but in the absence of more precise data from the manufacturer have been adopted to represent a robust, worst case scenario.

5.3.11 Due to the location of the duct-terminations and inherent distance between them, it is considered appropriate to assess the noise from each individual duct at the closest receptors, calculations and results of which are presented below.

Table 5.6: Predicted noise emissions from GF Kitchen Extract Fan Exhaust at Receptor 1 (R1)

GF Kitchen Extract to R1	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Kitchen Extract Exhaust (Lw)	53	77	80	79	81	78	73	66	85
Lw to Lp @ 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation Loss (35% FA, 600mm)	-3	-6	-10	-14	-20	-19	-14	-13	
Number of	0	0	0	0	0	0	0	0	
Surface Area Correction	6	6	6	6	6	6	6	6	
Rathe Decay	-26	-26	-26	-26	-26	-26	-26	-26	
Directivity	1	1	1	1	-4	-7	-7	-7	
End Reflection	-8	-4	-1	0	0	0	0	0	
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	
Specific sound level at receptor	10	35	37	33	25	19	20	14	33
Conditioned Target									34

Table 5.7: Predicted noise emissions from GF Kitchen Supply Fan Intake at Receptor 4 (R4)

GF Kitchen Supply to R4	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Kitchen Supply Intake (Lw)	51	69	66	67	69	70	64	56	74
Lw to Lp @ 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation Loss (none required)	0	0	0	0	0	0	0	0	
Number of	0	0	0	0	0	0	0	0	
Surface Area Correction	6	6	6	6	6	6	6	6	
Rathe Decay	-26	-26	-26	-26	-26	-26	-26	-26	
Directivity	1	1	1	1	-4	-7	-7	-7	
End Reflection	-8	-4	-1	0	0	0	0	0	
Screening Loss	-10	-10	-10	-10	-10	-10	-10	-10	
Specific sound level at receptor	6	28	28	30	28	25	20	12	32
Conditioned Target									34

Table 5.8: Predicted noise emissions from GF MVHR Intake at Receptor 2 (R2)

GF MVHR Intake to R2	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
MVHR Intake (Lw)	59	54	46	44	45	46	40	32	51
Lw to Lp @ 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation Loss (none required)	0	0	0	0	0	0	0	0	
Number of	0	0	0	0	0	0	0	0	
Surface Area Correction	6	6	6	6	6	6	6	6	
Distance Loss	-10	-10	-10	-10	-10	-10	-10	-10	
Directivity	0	0	0	-1	-4	-6	-10	-13	
End Reflection	-14	-9	-5	-2	-1	0	0	0	
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	
Specific sound level at receptor	22	22	19	19	18	17	8	0	23
Conditioned Target									34

Table 5.9: Predicted noise emissions from GF MVHR Exhaust at Receptor 3 (R3)

GF MVHR Exhaust to R3	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
MVHR Exhaust (Lw)	59	54	46	44	45	46	40	32	51
Lw to Lp @ 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation Loss (none required)	0	0	0	0	0	0	0	0	
Number of	0	0	0	0	0	0	0	0	
Surface Area Correction	6	6	6	6	6	6	6	6	
Distance Loss	-10	-10	-10	-10	-10	-10	-10	-10	
Directivity	0	0	0	-1	-4	-6	-10	-13	
End Reflection	-14	-9	-5	-2	-1	0	0	0	
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	
Specific sound level at receptor	22	22	19	19	18	17	8	0	23
Conditioned Target									34

Table 5.10: Predicted noise emissions from LGF MVHR Intake at Receptor 2 (R2)

LGF MVHR Intake to R2	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
MVHR Intake (Lw)	59	54	46	44	45	46	40	32	51
Lw to Lp @ 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation Loss (none required)	0	0	0	0	0	0	0	0	
Number of	0	0	0	0	0	0	0	0	
Surface Area Correction	6	6	6	6	6	6	6	6	
Distance Loss	-10	-10	-10	-10	-10	-10	-10	-10	
Directivity	0	0	0	-1	-4	-6	-10	-13	
End Reflection	-14	-9	-5	-2	-1	0	0	0	
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	
Specific sound level at receptor	22	22	19	19	18	17	8	0	23
Conditioned Target									34

Table 5.11: Predicted noise emissions from LGF MVHR Exhaust at Receptor 2 (R2)

LGF MVHR Exhaust to R2	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
MVHR Exhaust (Lw)	59	54	46	44	45	46	40	32	51
Lw to Lp @ 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Attenuation Loss (none required)	0	0	0	0	0	0	0	0	
Number of	0	0	0	0	0	0	0	0	
Surface Area Correction	6	6	6	6	6	6	6	6	
Distance Loss	-10	-10	-10	-10	-10	-10	-10	-10	
Directivity	0	0	0	-1	-4	-6	-10	-13	
End Reflection	-14	-9	-5	-2	-1	0	0	0	
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	
Specific sound level at receptor	22	22	19	19	18	17	8	0	23
Conditioned Target									34

5.3.12 Due to the orientation of the exhaust and intake ductwork, terminating beneath the building edge of the residential units above, the residential areas benefit from acoustic screening that has been factored into the assessment. It is considered that conditioned requirements can be met for the Kitchen Supply Intake, MVHR intake and MVHR exhaust without the need for further in-duct silencers.

- 5.3.13 Calculations indicate that a silencer will be required for the kitchen extract exhaust where it has been shown that a silencer providing the following insertion losses (as a minimum) will control noise emission to conditioned levels at the closest receptors.

Table 5.12: Minimum In-Duct Silencer Insertion Losses for Kitchen Extract Exhaust

Kitchen Extract Exhaust	Sound Power Level (dB) at Octave Band Centre Frequencies (Hz)							
	63	125	250	500	1 k	2 k	4 k	8 k
Silencer (e.g. 35% FA, 600mm length)	-3	-6	-10	-14	-20	-19	-14	-13

- 5.3.14 An assessment of noise emission from externally located condensers are presented below, which factor in a line of sight screening from the residential layout above, directivity associated with sound propagation up to the residential units above.
- 5.3.15 Due to the location of the duct-terminations and inherent distance between them, it is considered appropriate to assess the noise from each individual duct at the closest receptors, calculations and results of which are presented below.

Table 5.13: Predicted noise emissions from LGF Condensing Units at Receptor 2 (R2)

LGF Condensers to R2	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Fujitsu AJY162LELDH Low 2	73	63	62	67	58	58	59	53	67
Lw to Lp @ 1m	-8	-8	-8	-8	-8	-8	-8	-8	
Number of	3	3	3	3	3	3	3	3	
Directivity	-1	-2	-6	-9	-9	-9	-9	-9	
Screening Loss	-5	-5	-5	-5	-5	-5	-5	-5	
Distance Loss	-16	-16	-16	-16	-16	-16	-16	-16	
Specific sound level at receptor	47	36	31	32	23	23	24	18	33

- 5.3.16 A summary of predicted noise emissions from the building services plant is provided below in [Table 5.14](#).

Table 5.14: Predicted Commercial Noise Impacts at Sensitive Receptors

Receptor	Specific Level $L_{A_r, Tr}$	Conditioned Requirement	Difference	Condition Met
R1	33	34	-1	Yes
R2	34	34	0	Yes
R3	23	34	-11	Yes
R4	32	34	-2	Yes

- 5.3.17 It is considered, therefore, that conditioned levels can be met from the proposed building services scheme.

6 Conclusion

- 6.1.1 Air & Acoustic Consultants Limited have been commissioned by Happy Valley Recreation Limited to undertake a noise impact assessment to address planning condition no.6 associated with planning approval ref: PL/23/1091 for the Change of Use to allow flexible use Including Class E and Class F(1) Non-residential Institutions of St Lawrence House, Abbey Square, Reading, as well as proposed new louvres within the façades of the building related to the building services plant.
- 6.1.2 An assessment of operational activity along with sound insulation design of the ground to first floor separating slab and building services noise
- 6.1.3 In line with the conditioned requirements an assessment of the sound insulation scheme and noise emissions from the building services plant and internal activity has been conducted.
- 6.1.4 It is considered that the first floor slab separating the ground floor and first floor residents is capable of meeting the conditioned requirement of 55 dB ($D_{ntw} + C_{tr}$), which has in turn been demonstrated to control internal activity to conditioned requirements. Music level noise limits have also been established to ensure that music levels do not exceed these thresholds.
- 6.1.5 Sound break out via the ground floor and lower ground floor facades has also been reviewed and demonstrated to be controlled to conditioned requirements in the receptors above for both open and closed residential window scenarios.
- 6.1.6 An environmental noise survey has been conducted to establish baseline background sound levels at the identified local receptors. An assessment of building services noise emissions has been conducted in line with these levels and demonstrated capable of being controlled to conditioned limits at local receptor windows.
- 6.1.7 It is considered, therefore, that condition no.6 can successfully be discharge, and it is demonstrated that the proposed new louvres are acceptable in respect of environmental noise considerations and can be approved.

Appendices



APPENDIX A – DEFINITION OF TERMS

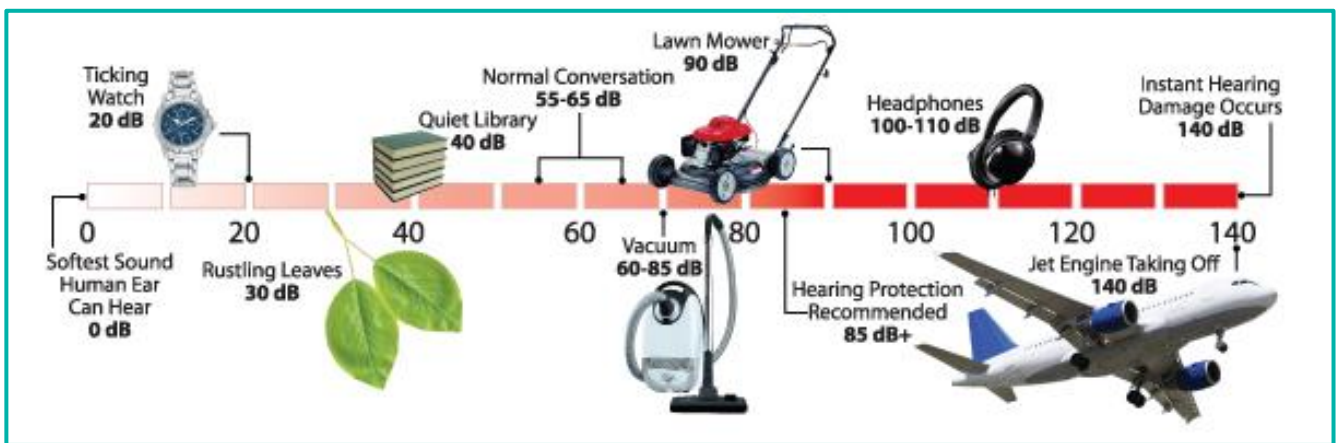
Sound Pressure - Sound, or sound pressure, is a fluctuation in air pressure over static ambient pressure.

Sound Pressure Level - The sound level is the sound pressure relative to a standard reference pressure of 20 μPa (2×10^{-5} Pascals) on a decibel scale.

Decibels dB - Noise is commonly defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

The decibel scale is logarithmic and therefore when two noise sources are present together, they must be combined logarithmically, therefore, when two sound sources of the same sound pressure level are combined the resultant level is 3 dB(A) higher than the single source. However, in subjective terms, the ear can distinguish a difference in 'loudness' between two simple noise sources when there is a 3 dB(A) difference between them. For simple sources, when two sounds differ by 10 dB(A) one is said to be twice as loud as the other.

Figure A.1: Examples of Typical Noise Levels



Noise Level Indices - Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so several different noise indices have been defined, according to how the averaging or statistics are carried out.

'A-Weighted Decibels dB(A) - The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high-frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise-measuring instrument. The weighting which is most used, and which correlates best with the subjective response to noise, including that of music, is the dB(A) weighting. This electronic filter matches the variation in the frequency sensitivity of the meter to that of the human ear. This is an internationally accepted standard for noise measurements.

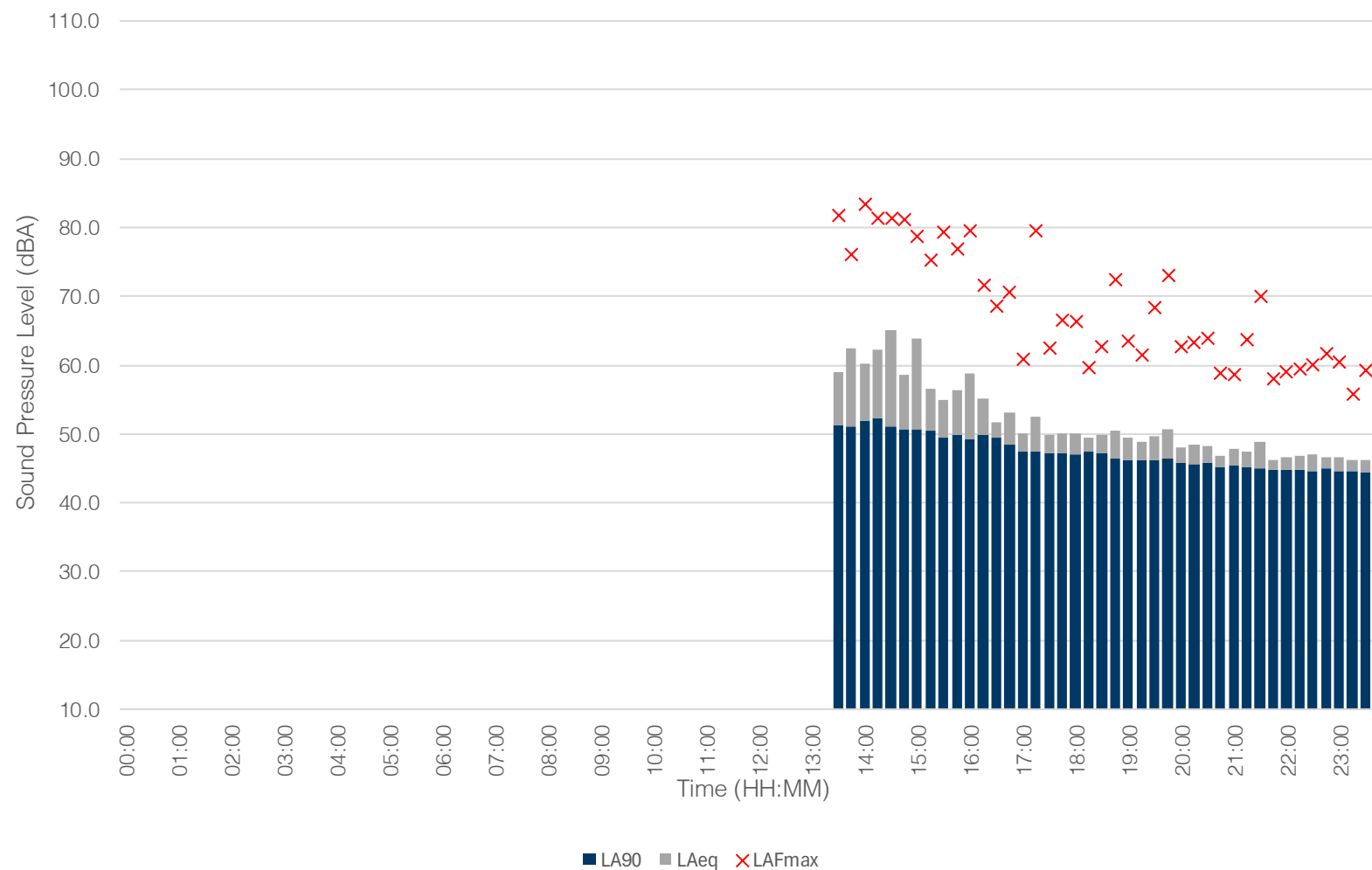
Table A.1: Other Standard Noise Units:

Symbol	Name	Definition
$L_{Aeq,T}$	Equivalent Continuous Sound Level	The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. The L_{Aeq} provides a single value to express the average sound energy over the measurement period and is the most widely used indicator for environmental noise.
$L_{Amax,T}$	maximum 'A' weighted noise level	This is the maximum 'A' weighted noise level recorded during the measurement period, (T).
$L_{A90,T}$	the 'A' weighted noise level	This is the 'A' weighted noise level exceeded for 90% of the measurement period (T). This is normally used to describe the background noise.
$L_{A10,T}$	the A-weighted noise level exceeded for 10% of time	This is the 'A' weighted noise level exceeded for just 10 % of the measurement period, (T). This is normally used to describe traffic noise.
$L_{A90,T}$	the A-weighted noise level exceeded for 90% of the time	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} , can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$D_{n,c,w}$	Laboratory Insulation Rating	A single-number rating of the laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it.
$D_{nf,w}$	Weighted normalised flanking level difference	A single-number that quantifies the in-situ airborne sound insulation between rooms, when the transmission only occurs through a specified flanking path.
$D_{nT,w}$	Weighted standardized level difference	Single-number quantity that characterizes the in-situ airborne sound insulation between rooms.
R_w	Weighted sound reduction index.	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies in a laboratory.
C_{tr}	Low-Frequency Correction	Correction term applied against the sound insulation single-number values (R_w , D_w and $D_{nT,w}$) to provide a weighting against low-frequency performance.

APPENDIX B – NOISE MONITORING TIME HISTORIES

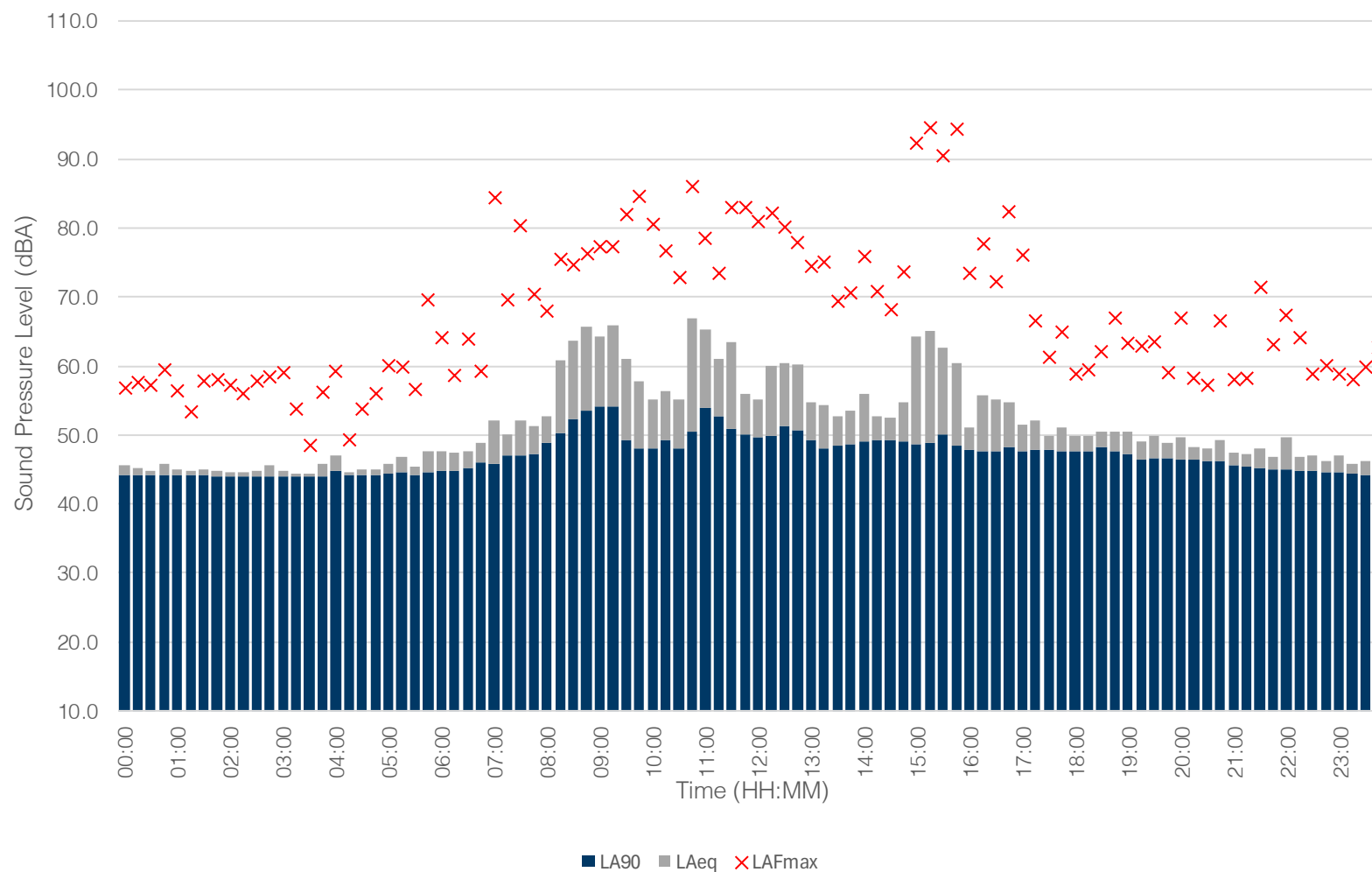
Time History Graph B.1

Project Name:	St Lawrence House
Measurement Location:	L1
Survey Date:	05/08/2025



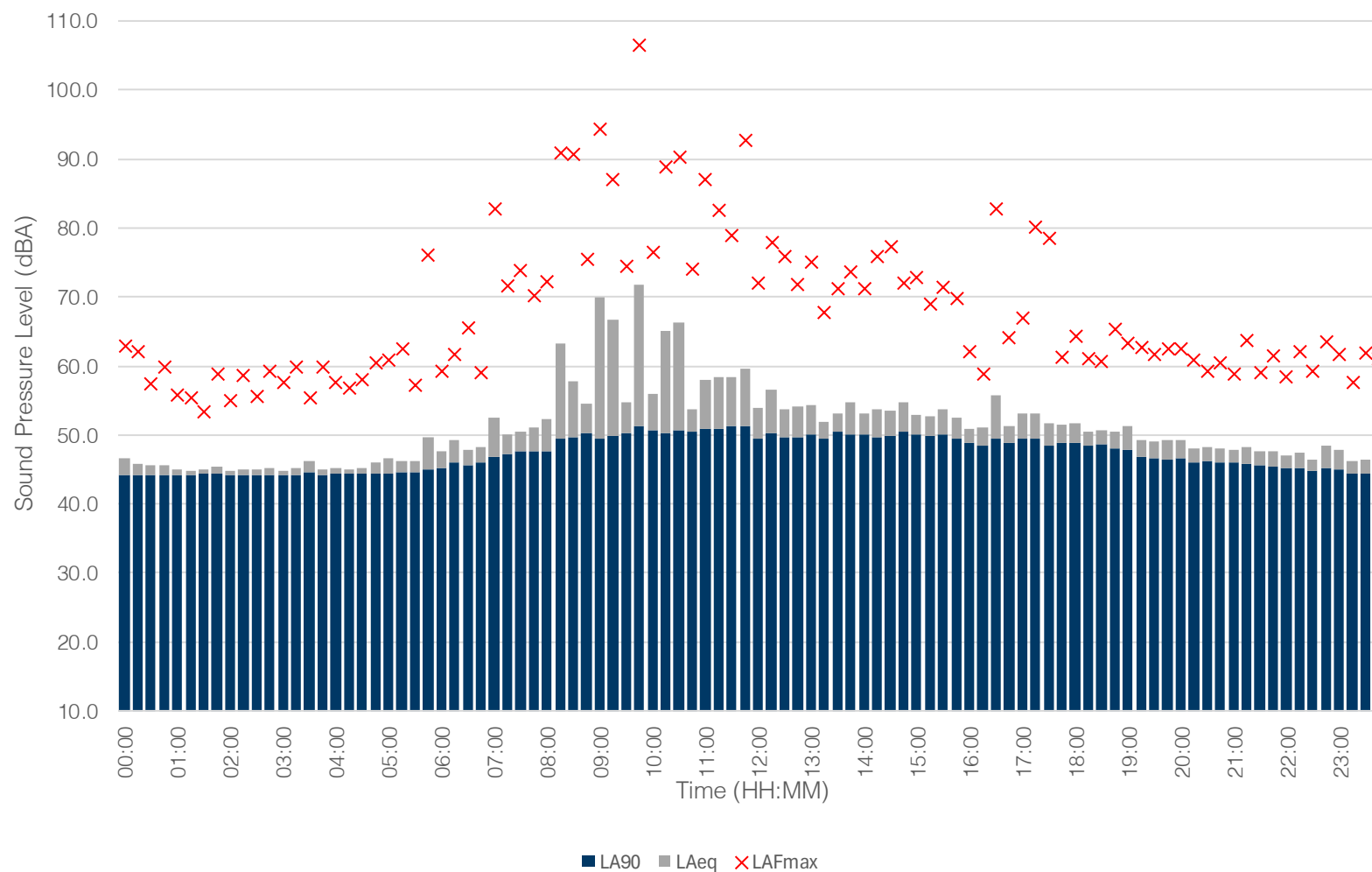
Time History Graph B.2

Project Name:	St Lawrence House
Measurement Location:	L1
Survey Date:	06/08/2025



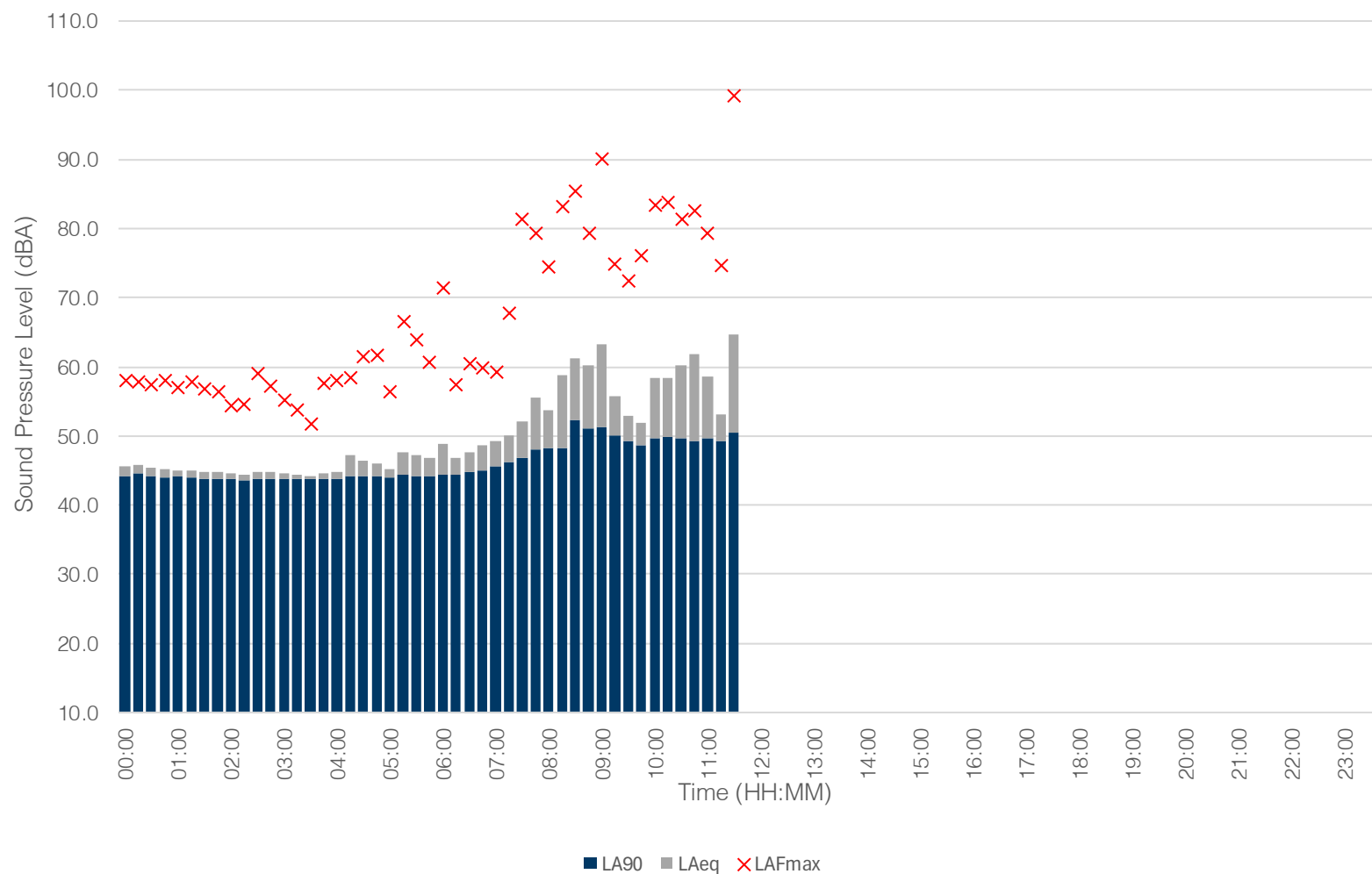
Time History Graph B.3

Project Name:	St Lawrence House
Measurement Location:	L1
Survey Date:	07/08/2025



Time History Graph B.4

Project Name:	St Lawrence House
Measurement Location:	L1
Survey Date:	08/08/2025





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