

St. Benedict's Church

Planning Noise Report

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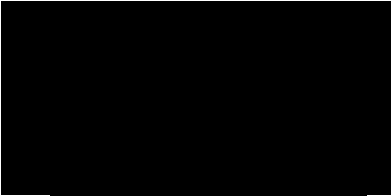
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Glossary

Term	Definition
Ambient Noise (as defined in BS 4142:2014+A1 2019)	Totally encompassing noise in a given situation at a given time; it is usually composed of noise from many sources, near and far.
Background Noise (as defined in BS 4142:2014+A1 2019)	A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval, T, measured using the Fast time weighting and quoted to the nearest whole number of decibels.
Decibel, dB	Decibel (dB) is a dimensionless unit commonly used to demonstrate sound levels. It is derived from the logarithm of the ratio between the measured level and the reference value. For sound pressure level (L_p) the reference value is 2×10^{-5} pascals. For sound power (L_w) reference value is 1×10^{-12} Watts.
$D_{nT,w}$	The Weighted Standardised Level Difference ($D_{nT,w}$) is defined in BS EN ISO 140-4:1998 (superseded by BS EN ISO 16283-1:2014+A1:2017 but still cited in The Building Regulations) BS EN ISO 717-1:2020. This performance describes the installed site performance of the composite separating constructions, including the partition element performance, the flanking path transmission and the reception room reverberation time factors. $D_{nT,w}$ target leads to a selection of adequate construction elements and methods to build the partition that are rated using weighted sound reduction index R_w . It is typically standardised to a reverberation time (T_0) of 0.5 seconds. In the instance of testing in schools, T_0 is taken as the room’s T_{mf} .
D_w	Weighted Level Difference: Single-number quantity that characterizes airborne sound insulation between rooms, but which is not adjusted to reference conditions
Flanking Noise	The transmission of sound around the perimeter or through holes within partitions (or barriers) that reduces the otherwise obtained sound transmission loss of a partition. Examples of flanking paths within buildings are ceiling plenum above partitions or raised floor cavities, ductwork, piping, and electrical conduit penetrations through partitions, back to back electrical boxes within partitions, window mullions, etc.
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
IANL	Indoor Ambient Noise Level. For schools Table 1 in BB93 (2015) specifies the upper limit for indoor ambient noise levels within teaching areas. The design criteria is set for a 30-minute average level (i.e. $L_{Aeq,30mins}$). However, where there is negligible change in the noise level, BB93 states that a much shorter time period (e.g. $L_{Aeq,5min}$) can be used. BB93 also states that for rooms identified having limits of $L_{eq,30min}$ 35 dBA or less, the noise should not regularly exceed $L_{1,30min}$ 55 dBA.
$L_{90,T}$ ($L_{A90,T}$)	Sound pressure level exceeded for 90% of the measurement period. Referred to as background noise level.
$L_{Ar,T}$	Rating Noise Level (as defined in BS 4142:2014+A12019), the specific noise level plus any adjustment for the characteristic features of the noise.
$L_{eq,T}$ ($L_{Aeq,T}$)	The equivalent continuous noise level of a time-varying noise. It is the steady noise level that, over the period under consideration, contains the same amount of sound energy as the time-varying noise over the same period.
$L_{Fmax,T}$ ($L_{AFmax,T}$)	The maximum sound pressure level measured during the measurement period T using the fast time constant.
L_p	The sound pressure level, in decibels, of a sound is 20 times the logarithm to the base of 10 of the ratio of the sound pressure to the reference pressure (2×10^{-5} pascals). The reference pressure shall be explicitly stated and is defined by standard.
Noise Rating (NR)	Curves developed by the International Organization for Standardization (ISO) to determine the acceptable indoor environment for hearing preservation, speech communication and annoyance. These can be compared to NC curves and also can be approximated to equivalent dBA levels.

Reverberation Time (RT)	Time required for the steady sound pressure level in an enclosed space to decay by 60 dB, measured from the moment the sound source is switched off. Reverberation time is described in ISO 354:2003.
R_w (C , C_{tr})	Weighted Sound Reduction Index: Single-figure value of sound reduction according to BS EN ISO 10140-2:2021 used for rating partition systems, door-sets or glazing, based on the values of sound reduction index R at different frequencies. The higher the R_w the better the performance.
Specific Noise Level (as defined in BS 4142:2014+A1 2019)	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.
T_{mf}	Mid Frequency Reverberation Time: Within BB93, the reverberation time criteria are set in terms of the averaged value of the 500 Hz, 1000 Hz and 2000 Hz frequency bands. The various levels for T_{mf} are specified within Table 6 of BB93 (2015) and are generally upper limits. Usually the specified mid-frequency reverberation times are for ‘finished but unoccupied and unfurnished rooms’.
Vibration	Force that oscillates about some specified reference point. Vibration is commonly expressed in terms of frequency such as cycles per second (cps), Hertz (Hz), cycles per minute (cpm) or (rpm) and strokes per minute (spm). This is the number of oscillations that occurs in that period. The amplitude is the magnitude or distance of travel of the force.
Weightings (as defined in BS EN 61672:2013):	A-Weighting: Frequency weighting devised to attempt to take into account the fact that human response to sound is not equally sensitive to all frequencies; it consists of an electronic filter in a sound level meter, which attempts to build in this variability into the indicated noise level reading so that it will correlate, approximately, with human response.). C-Weighting: One of the frequency weightings corresponding to the 100-phon contour and the closest to the linear or un-weighted value.

1 Introduction

1.1 Overview

Buro Happold acoustics have been commissioned by Manchester Vineyard to provide acoustic consultancy services related to the proposed conversion of the St Benedict's Church from a climbing centre into a Church with live music use.

This report is prepared to support a Planning Application for the site.

Local planning requirements have been reviewed by Buro Happold.

This report focuses on the potential impact of entertainment noise breakout from the proposed development. Noise assessments related to car park-associated vehicle movements, pedestrian ingress and egress, and potential building services installations are not included within the scope of this assessment.

1.2 Proposed development description

The development consists of an existing church at 19 St Benedict's Square, West Gorton, Manchester M12 5LG, which is currently operating as a climbing centre, and is proposed to be returned to its original use as a church with live music.

1.3 Scope & contents

The scope of this report is to provide information to the Local Planning Authority concerning the acoustic design of the scheme at the outline planning stage, with particular emphasis on assessing internal noise levels associated with live music, to ensure that such activities do not negatively affect nearby Noise Sensitive Receptors (NSRs).

This noise impact assessment considers the following:

- Pertinent acoustic criteria
- A description of the site and surrounding noise sensitive receptors and the proposed operating times of the church
- Noise survey methodology
- External noise levels/survey results
- Noise break-out assessment
- Estimation of the church building envelope sound insulation performance
- Recommended internal noise levels and other noise mitigation considerations
- Conclusions.



Figure 1—1 Aerial Image of the site and nearby noise sensitive receptors

2 Acoustic Design Criteria

2.1 Relevant guidance documentation

This report is informed by the following standards and guidelines:

- The National Planning Policy Framework, 2024 (NPPF)
- The Noise Policy Statement for England, 2010 (NPSE)
- Planning Practice Guidance, 2019 (ProPG)
- Manchester City Council – Planning and Noise Technical Guidance, October 2022
- British Standard (BS) 8233:2014 – Guidance on sound insulation and noise reduction for buildings
- BS 4142:2014+A1:2019 – Methods for rating and assessing commercial and industrial sound
- World Health Organisation (WHO) – Guidelines for community noise
- BS EN ISO 3382-1:2009 – Guidance on specific methods for measurement of reverberation time.

2.2 English Planning Policy on Noise Impact – The NPPF and NPSE

The NPPF is the overarching Planning Policy document that applies to all new developments in England. The guidance and assessment criteria given (or referred to) in this document can, therefore, be applied to all other standards in terms of assessing the suitability of granting Planning Permission concerning noise impact.

The NPPF states that planning policies and decisions should aim to:

“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; and

identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

With specific reference to noise impact, the NPPF document refers to the Noise Policy Statement for England (NPSE). The NPSE provides guidance, which enables decisions to be made regarding the acceptable noise burden to place on society, using three key phrases – the No Observed Effect Level (NOEL), the Lowest Observed Adverse Effect Level (LOAEL) and the Significant Observed Adverse Effect Level (SOAEL).

To provide a consistent frame of reference (and to allow a view to be taken on the suitability of the application regarding the relevant planning guidance), the levels or criteria given in other relevant documents used in the assessment can be re-framed as shown in Table 2—1.

Table 2—1 NOAEL, LOAEL and SOAEL

Effect Level	Description
NOEL	The NOEL is the level of noise impact below which no effect can be detected, and there would be no discernible negative effect on health or quality of life.
LOAEL	The LOAEL is the lowest level of noise impact above which adverse effects on health or quality of life can be detected. Designing noise impacts to be equal-to-or-less-than, the LOAEL should see that any adverse effects on health or quality of life are negligible.
SOAEL	The SOAEL is the level above which significant adverse effects on health and quality of life occur. Designs should always seek to avoid a noise impact, which would be categorised as a SOAEL.

2.3 Planning Practice Guidance (2019)

The National Planning Practice Guidance (PPG) “advises on how planning can manage potential noise impacts in the new development” and provides guidelines that are in line with the NPPF.

The PPG states that local planning authorities should take account of the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur
- whether or not an adverse effect is occurring or likely to occur
- whether or not a good standard of amenity can be achieved.

This guidance introduced the additional concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level), presented in

Table 2—2.

Factors to be considered in determining whether noise is a concern are identified including the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, the character of the noise, and cumulative effects.

Regarding mitigating noise effects on residential development, the PPG highlights that effects may be partially offset if residents have access to a relatively quiet façade as part of their dwelling or a relatively quiet amenity space (private, shared, or public).

Table 2—2 Planning Practice Guidance (PPG 2019)

Perception	Example Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not so much that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in the behaviour and/or attitude. E.g. turning up volume of television; speaking more loudly; where there is no alternative means of ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of live.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in the behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in the acoustic character of the area	Significant Observed Adverse Effect	Avoid through the use of appropriate mitigation whilst taking into account the social and economic benefit
Present and very disruptive	Extensive and regular changes in the behaviour and/or inability to mitigate the effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent through use of appropriate mitigation

2.4 BS 8233:2014

This standard recommends internal ambient noise levels for dwellings, such that for steady external noise sources, the limits in Table 2—3 are not exceeded.

Table 2—3 Indoor 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/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

2.5 Local Planning Policy

This section summarises the relevant local policy framework relating to noise, as set out in Manchester City Council’s Planning and Noise Technical Guidance (October 2022). The guidance draws on national and international documents including the NPSE, NPPF, PPG, WHO guidelines, BS 8233, and BS 4142, which collectively inform the assessment and management of environmental noise within the planning process.

Manchester City Council’s Citywide Development Control Policies provide specific policy requirements relating to potential noise impacts from new development. Policy DC26: Development and Noise sets out how the Council will manage noise-generating proposals to protect residential and other sensitive uses. Additional guidance relevant to entertainment venues is provided in Section 3.7.1.2 of the Technical Guidance

2.5.1 Policy DC26.1

Policy DC26.1 states that the Council intends to use the development control process to reduce the impact of noise, considering in particular the effects of new development proposals that are likely to generate noise. This includes assessing the potential for adverse impacts on nearby noise-sensitive receptors and ensuring appropriate mitigation is incorporated where required.

2.5.2 Policy DC26.3

Policy DC26.3 specifies that developments likely to result in unacceptably high noise levels will not be permitted in residential areas. The policy places a strong emphasis on safeguarding residential amenity and preventing unreasonable noise exposure arising from new or intensified activities.

2.5.3 Policy DC26.4

Under Policy DC26.4, where the Council considers that a proposed development may generate potentially unacceptable noise levels, the applicant will be required to submit a noise impact assessment. The assessment must identify the likely impacts and detail measures to satisfactorily address them. Acceptable forms of mitigation may include:

- Engineering solutions, such as reducing noise at source, improving sound insulation, or introducing acoustic screening;
- Layout solutions, using site or building configuration to minimise noise exposure;
- Administrative controls, including limits on operating hours, restrictions on specific activities, or the adoption of defined noise limits.

2.5.4 Section 3.7.1.2 Entertainment venues

Section 3.7.1.2 of the Manchester Technical Guidance provides specific criteria for assessing proposals involving entertainment venues. It states that assessments should consider both the overall noise level (L_{Aeq}) and the 63 Hz and 125 Hz octave band levels (L_{eq}), as these low-frequency components are often dominant in amplified music.

The guidance recommends that applicants use representative noise levels from typical venues of the type proposed, clearly justifying the chosen source levels and referencing their origin. Indicative source levels provided within the document include:

- L_{Aeq} 95 dB for bars;
- L_{Aeq} 105 dB for nightclubs;

with typical ranges in the low-frequency 63 Hz and 125 Hz octave bands of up to L_{eq} 115 dB and L_{eq} 110 dB, respectively.

Assessments should be undertaken using Z-weighted (linear) levels.

For a new entertainment venue that is structurally detached from other building uses, the guidance proposes the following criterion to ensure inaudibility within nearby residential properties (with windows open):

- *Entertainment noise ($L_{Aeq,5min}$) should be controlled to 5 dB below the typical background noise level (L_{A90}) in each octave band at the nearest noise-sensitive location.*

The guidance also states that an additional condition may apply, requiring that:

- *Music noise levels in the 63 Hz and 125 Hz octave centre frequency bands should not exceed 47 dB and 41 dB ($L_{eq,5min}$), respectively, within habitable rooms.*

3 Proposed development information

3.1 Proposed use and operational times

The site is proposed for use as a church. As part of regular worship services, live music is proposed.

The worship music is based on a standard five-piece band configuration. No individual instrument amplifiers will be used; instead, sound reinforcement will be provided via a public address (PA) system. A drum kit will be located within an enclosed drum booth fitted with a roof.

Primary services are proposed on Sunday mornings, with site activity and associated noise expected between 07:30 and 14:00. During this period, noise sources will include vehicle arrivals and departures, as well as pedestrian movement within the car park and surrounding areas.

Sound checks are expected to commence at approximately 08:45. The main service will take place between 10:30 and 12:00. The church will remain open to the public thereafter, with attendees expected to vacate the site by approximately 14:30.

In addition to Sunday services, the church is also intended to operate during weekdays as a meeting space and for smaller, mid-week evening services. These events may include limited live music and are anticipated to occur predominantly between 19:00 and 21:30.

3.2 Considerations relating to the existing climbing walls

The existing internal climbing walls remain in-situ and will influence the level of noise breakout from the building, as they provide an additional degree of sound insulation. Once removed, an increase in noise breakout is anticipated, particularly at lower façade levels.

It is understood that the climbing walls have not been removed at this stage. The works to remove them are to be the subject of an application for Listed Building Consent in due course. As a result, the noise survey was undertaken with the climbing walls in place.

At a later stage of design development, further consideration should be given to the operational noise levels associated with church use once the climbing walls are removed, in order to refine and, if necessary, update the guidance provided within this assessment.

3.3 Consultation with the Local Authority

As part of discussions with the local authority, the Environmental Health Officer (EHO) requested that the noise surveys cover the opening times proposed by the applicant. In addition, the surveys are required to include background noise measurements during the quietest relevant periods.

4 Noise Survey

4.1 Introduction

An environmental noise survey was undertaken on Tuesday 31 March 2026, Wednesday 1 April 2026, and Sunday 5 April 2026 at St Benedict’s Church. The survey comprised continuous automated measurements undertaken to the rear of the church, along with short-term attended measurements at the nearest noise-sensitive receptors.

In addition, synchronous measurements of noise breakout from the church were undertaken on Thursday 19 March 2026 using a public address (PA) system, with simultaneous internal and external sound level meter measurements.

The noise survey was undertaken for the following purposes:

- To obtain representative background ($L_{90,T}$) noise levels at the nearest noise-sensitive receptors in the absence of music noise; and
- To measure ambient noise levels at the nearest noise-sensitive receptors arising from music noise breakout along the church façade.

The results of the survey have been used to inform an assessment of the existing sound insulation performance of the church building envelope, to comment on the likelihood of noise-related disturbance arising from music noise, and to identify appropriate internal noise limits and/or mitigation measures to ensure compliance with local authority requirements.

4.2 Noise Survey Equipment Used

A list of equipment used during the noise survey is presented in Table 4—1.

Table 4—1 Environmental noise survey equipment

Item	Manufacturer / Model	Serial Number
Sound Level Meter	Larson Davis 831	0004096
Pre-amplifier	Larson Davis PRM831	036955
Microphone Capsule	Larson Davis 377B02	317802
Sound Level Meter	Larson Davis 831	0004097
Pre-amplifier	Larson Davis PRM831	077193
Microphone Capsule	Larson Davis 377B02	311325
Sound Level Meter	Larson Davis LxT	7081
Pre-amplifier	Larson Davis PRMLxT1L	77677
Microphone Capsule	Larson Davis 377B02	338177
Sound Level Meter	NTi XL2	A2A-11257-E0
Pre-amplifier	NTi M4260	11257
Microphone Capsule	NTi M4260	5982
Sound Level Meter	Larson Davis LxT	3816
Pre-amplifier	Larson Davis PRMLxT1L	55700
Microphone Capsule	Larson Davis 377B02	305122
Sound Level Meter	NTi XL2	A2A-20609-E1
Pre-amplifier	NTi M4261	55700
Microphone Capsule	NTi M4261	305122
Site Calibrator	Larson Davis LD-CAL200	15680

4.3 Weather Conditions

Weather conditions during the noise survey were generally suitable for the purposes of measurement.

On 19 March wind speeds were typically below 5 m/s, with dry road conditions and no precipitation recorded.

During the evening of 31 March and Wednesday 1 April, wind speeds were also generally below 5 m/s, with dry conditions throughout.

On Sunday 5 April, higher wind speeds were recorded during parts of the day, with peak values of up to approximately 15 m/s. Attended measurements on this date were, however, only undertaken during intermittent periods of reduced wind activity. All sound level meters were fitted with appropriate windshields, and measurements were closely monitored to avoid periods where wind-induced noise was apparent.

Data obtained during periods of elevated wind have not been relied upon for the assessment of background noise. On this basis, the results used within this report are considered representative of typical conditions and not materially affected by prevailing weather conditions.

4.4 Measurement Locations

Numerous measurement locations were adopted during the environmental noise survey. All measurements were undertaken in a free-field environment.

Continuous automated measurements were undertaken at location LT1 every 5 minutes on:

- Tuesday 31 March 2026 from 19:00 to 21:30
- Wednesday 1 April 2026 from 19:00 to 21:30
- Sunday 5 April 2026 between 07:15 to 15:00

Short term attended measurements of 5 minutes in duration were taken at locations ST1 to ST5, at the nearest noise sensitive receptors.

Details of the measurement locations are described below and are annotated in Figure 4—1

- Location **ST1** Short-term measurements approximately 10 m to the north of the church.
- Location **ST2** Short-term measurements approximately 15 m to the west of the church.
- Location **ST3** Short-term measurements approximately 25 m to the east of the church.
- Location **ST4** Short-term measurements approximately 35 m to the south of the church.
- Location **ST5** Short-term measurements approximately 60 m to the west of the church.
- Location **LT1** Long-term (unattended) noise measurement located within the site boundary approximately 30 m to the south of the church. This was placed at a height of 1.8 m. Additional short-term measurements were also taken at this location.

Locations ST1, ST2, ST3 and LT1 have a direct line of sight to the church façade, whereas locations ST4 is partially screened by a fence at the perimeter of the parking space and ST5 is screened by other buildings/constructions.



Figure 4—1 Annotated arial image showing measurement locations (Source: Google Earth).

4.5 Nearby Noise Sensitive Receivers

A summary of the nearby Noise Sensitive Receptors (NSRs) considered in this report is listed below:

- **NSR 1** – Residential dwellings on Bennett Street – 16 m North of the church façade.
- **NSR 2** – Residential dwellings on St Benedict's Square – 16 m West of the church façade.
- **NSR 3** – Residential dwellings on Gregory Street – 12 m South of the church façade.
- **NSR 4** – Residential dwellings on St Benedict's Square – 38 m South of the church façade.

The nearby NSRs are annotated in Figure 4—2.



Figure 4—2 Annotated Aerial Image Showing Noise Sensitive Locations (Source: Google Earth)

4.6 Methodology

4.6.1 Continuous automated noise monitoring

A single long-term noise logger was deployed at location LT1, located in the south-east corner of the church car park, as shown in Figure 4—3. The logger recorded continuous broadband and octave band ambient noise levels (L_{Aeq}) and background noise levels (L_{A90}) in 5-minute intervals, enabling the characterisation of the site noise environment during typical weekday and weekend operational hours, when music is expected to be played.



Figure 4—3 Long term Measurement (LT1) setup to the south end of the car park

4.6.2 External background noise measurements (no music)

Short-term sample measurements were undertaken at five locations, as outlined in Section 4.4. Measurements were carried out during periods aligned with the proposed operating hours of the development, when music and audio content are expected to be played. These were as follows:

- Weekday evening (19:00-21:30)
- Sunday morning (07:30-14:30).

These measurements captured background noise (L_{A90}) levels in the absence of music/programme content. These measurements generated spectral L_{eq} and L_{90} octave band levels at 5-minute intervals.



Figure 4—4 Short term Measurement deployment (ST3 and ST2)

4.6.3 Synchronous music noise measurements

Internal measurements

The purpose of these measurements was to characterise the façade sound insulation performance of the church by quantifying noise breakout during periods when live music is proposed to be played.

To achieve this, internal measurements of spectral ambient music noise levels (L_{Aeq}) were undertaken on 19 March 2026 from 12:55 to 14:36. The measurements were conducted using a temporary sound system, which was considered representative of the system proposed for installation as part of the development.

These internal noise levels were measured at the front-of-house mixing position. Continuous measurements were recorded using 1-minute logging intervals and were time-synchronised with simultaneous external measurements at the nearest noise-sensitive receptors, as described in the following section.

The sound system used for playback comprised two high-powered full-range point-source loudspeakers and two high-powered cardioid subwoofer units, enabling the generation of full-spectrum broadband sound.

The loudspeakers were positioned approximately 10 m apart within the main worship space, adjacent to the southern climbing wall. They were orientated towards the northern wall and set perpendicular to the climbing wall located behind. This configuration represents, as closely as practicable, the anticipated location and deployment of the permanent sound system proposed for the development. The loudspeaker layout is illustrated in Figure 4—5.

The reference audio material used during the measurements consisted of pink noise and representative music playback. Pink noise was played at an average broadband level of 96 dBA, and music was played at 98 dBA.

External measurements

Synchronous measurements of spectral ambient noise (L_{eq}) were undertaken by two engineers at the at the locations shown in Figure 4—1 while music or pink noise was being played within the church. These measurements were undertaken using 1-minute intervals using two separate sound level meters.

4.6.4 External measurements (without music)

Additional external measurements, undertaken without music playback, were carried out on the same day prior to the commencement of music tests. These measurements were used to characterise the existing noise climate in the absence of music and to provide additional context for the prevailing noise environment.



Figure 4—5 Loudspeaker deployment used for noise measurement.

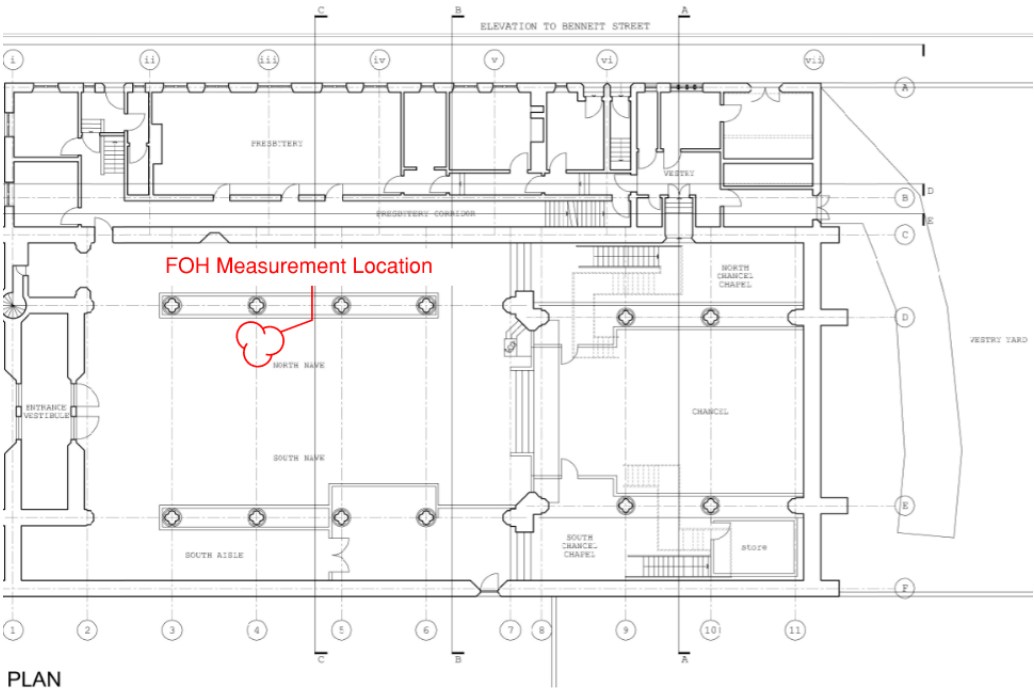


Figure 4—6 Front of house (FOH) Measurement location.

4.6.5 Anecdotal evidence from noise breakout measurements

During the breakout testing, the programme material was mainly audible along the door on the west façade and through windows on the upper facades, corresponding to the nave. Music was subjectively more noticeable than pink noise as expected, due to impulsive and tonal elements.

4.6.6 Reverberation time measurements

Additional measurements of reverberation time (T_{20}) were done. These were measured using interrupted pink noise signals at various positions throughout the main space of the church and following guidance included in BS 3382-1. The measurement locations are as follows:

- Location L1 North aisle at the main entrance side.
- Location L2 North aisle centrally located.
- Location L3 Centre of room at the Chancel side.
- Location L4 Centre of the Nave.
- Location L5 In-Front of the small stairs.
- Location L6 Centre of the Chancel on the mezzanine.
- Location L7 South side of the Chancel on the mezzanine (Nave side).

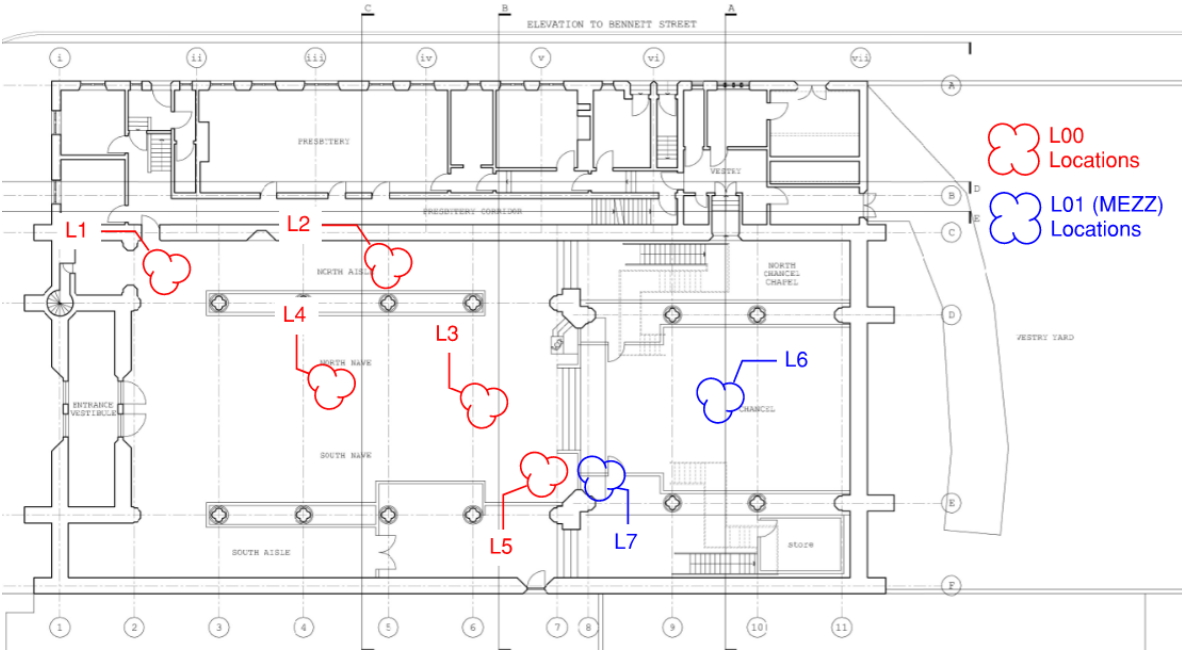


Figure 4—7 Reverberation time measurement locations.

4.7 Results

The results of the noise survey by Buro Happold are presented in the sub-sections below.

All spectral data (octave band) is presented as Z-weighted values in line with the guidance set by Manchester City Council.

4.7.1 Continuous automated noise monitoring (without music)

Table 4—2 presents the measured average noise levels for two typical weekdays (Tuesday 31 March and Wednesday 1 April) and one day of the weekend (Sunday 5 April), used to characterise the church opening times when music is expected to be played. The continuous time history graphs for these measurements are included in Appendix A.

$L_{Aeq,T}$ and $L_{A90,T}$ are the measured values over the whole period (Start to end). The Minimum $L_{A90,5min}$ refers to the minimum measured background level over a 5-minute period.

Table 4—2 Measured broadband noise levels during proposed operational times at Location LT1

Location	Date	Start Time (hh:mm)	End Time (hh:mm)	$L_{Aeq,T}$ dB	$L_{A90,T}$ dB	Minimum $L_{A90,5min}$ dB
LT1	Tuesday 31/03/2026	19:00	21:30	50	46	45
	Wednesday 01/04/2026	19:00	21:30	52	48	46
	Sunday 05/04/2026	07:15	15:00	55	50	48

The corresponding octave band levels for the minimum measured background noise levels within these periods are presented in Table 4—3.

Table 4—3 Minimum octave band background noise levels

Day	Time	Octave band $L_{90,5min}$ dB								Broadband $L_{A90,5min}$ dB
		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Tuesday 31/03/2026	21:15	44	43	39	37	39	35	37	40	45
Wednesday 01/04/2026	19:00	48	44	41	39	41	37	37	40	46
Sunday 05/04/2026	08:30	48	46	42	43	44	38	35	39	48

4.7.2 Attended background noise measurements at the nearest receptors (without music)

The measured octave-band background noise levels at the nearest noise-sensitive receptors are summarised in the following section. These data have been used to characterise the background noise climate at the receptors during the proposed opening hours.

Noise levels are presented for a representative weekday (Tuesday) in Table 4—4 and for a weekend day (Sunday) in Table 4—5.

Table 4—4 Octave band background noise levels – Tuesday 31 March 2026

Location	Time	Octave band L_{90} , dB								Broadband $L_{A90,5min}$ dB
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8kHz	
ST1										
	18:35	52	48	45	42	44	39	36	39	48
	19:25	52	47	46	42	44	40	36	39	48
ST2										
	18:45	47	44	42	41	42	37	36	39	46
	19:35	53	44	45	42	43	39	37	39	47
ST3										
	18:55	48	46	41	40	41	37	36	39	46
	19:45	49	43	37	36	37	35	35	39	44
ST4										
	19:05	47	43	41	40	43	38	36	39	47
	19:55	48	43	41	39	40	36	36	39	45
ST5										
	19:15	47	42	41	40	41	37	36	39	46
	20:05	46	41	41	40	40	37	36	39	45

Table 4—5 Octave band background noise levels – Sunday 5 April 2026

Location	Time	Octave band L_{90} , dB								Broadband, $L_{A90,5min}$ dB
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8kHz	
ST1										
	07:50	54	46	42	41	42	38	37	40	47
	08:55	51	45	41	42	42	38	37	40	47
	14:05	57	51	47	46	47	41	38	40	51
ST2										
	08:00	54	45	42	41	43	38	37	40	47
	09:05	52	46	42	41	43	39	37	40	47
	14:25	52	50	47	46	45	39	37	40	49
ST3										
	08:15	54	45	40	39	39	36	37	40	45
	09:15	53	46	41	40	41	37	37	40	46
	14:35	56	49	45	44	44	39	38	40	49
ST4										
	08:25	49	44	42	41	43	38	37	40	47
	09:25	46	43	42	42	44	40	37	40	48
	14:45	49	45	43	42	43	37	37	40	47
ST5										
	08:35	49	42	41	41	43	38	37	40	47
	09:40	46	40	40	40	42	37	37	40	46
	14:55	51	45	43	43	43	37	37	40	47

4.7.3 Synchronous music noise levels

The synchronous measurements for pink noise and music are presented in Table 4—6 and Table 4—7 respectively. Internal noise levels are shown in red text and the synchronous measurement at the receptors are shown in black immediately below.

Table 4—6 Synchronous measurements using pink noise – Thursday 19 March 2026

Location	Time	Octave band L_{eq} , dB								Broadband, $L_{Aeq,5min}$ dB
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Internal	13:20	92	98	94	93	91	90	87	83	96
ST1		62	59	56	55	56	51	45	46	60
ST2		62	56	51	49	49	44	37	31	53
Internal	13:30	91	96	92	92	89	88	86	82	95
ST3		61	55	50	47	46	42	36	36	50
Internal	13:10	92	98	94	93	91	90	87	83	97
ST4		65	59	53	50	51	47	41	31	55
ST5		59	52	49	47	47	48	44	42	53
LT1		59	57	55	49	45	40	32	21	51

Table 4—7 Synchronous measurements using music – Thursday 19 March 2026

Location	Time	Octave band L_{eq} , dB								Broadband, $L_{Aeq,5min}$ dB
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Internal	14:30	96	102	97	96	92	87	83	78	97
ST1		68	63	59	56	57	53	48	45	61
Internal	14:19	97	103	98	96	92	88	84	79	98
ST2		67	60	56	53	52	47	41	34	57
Internal	14:24	98	103	98	96	94	90	86	79	99
ST3		62	64	51	48	48	44	35	28	53
Internal	14:15	96	102	98	96	91	88	83	78	97
ST4		68	62	53	47	43	37	29	23	51
Internal	14:20	97	103	98	96	94	90	86	79	99
ST5		61	54	52	48	48	45	42	42	53
Internal	14:25	97	104	98	96	93	89	85	79	98
LT1		63	64	60	52	47	41	30	20	55

4.7.4 Reverberation time measurements

The spatially averaged measured reverberation time of the church is shown in Table 4—8.

Table 4—8 Reverberation time T₂₀

Reverberation time, T ₂₀ , s							
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
1.4	1.4	1.4	1.6	1.7	1.5	1.1	0.7

5 Assessment

5.1 Façade sound insulation

An estimate of the building envelope sound insulation performance is derived by taking the difference from the synchronous internal measurements and the external measurements at the nearest noise sensitive receptor outlined in Section 4.7.3

The calculated sound insulation performance is indicated as a level difference *D*, in dB for each octave band, and the broadband single figure rating is indicated as *D_w* in dB. These are set out in Table 5—1 and Table 5—2 for pink noise an music respectively. These values incorporate inherent attenuation due to distance between the façades and the receptor locations.

Table 5—1 Estimated sound insulation performance using pink noise

Façade facing	Level difference, D, dB								Weighted level difference, D _w , dB
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
ST1	29	39	38	38	34	38	42	37	37
ST2	30	42	43	44	42	46	50	52	44
ST3	30	41	43	45	44	46	50	46	45
ST4	27	39	41	43	40	42	46	51	42
ST5	33	46	44	47	44	42	43	41	43
LT1	33	40	39	44	46	49	55	62	45

Table 5—2 Estimated façade sound insulation performance with music

Façade facing	Level difference, D, dB								Weighted level difference, D _w , dB
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
ST1	28	39	38	39	35	34	35	33	36
ST2	30	43	42	43	40	41	43	45	41
ST3	36	40	47	48	45	46	51	52	46
ST4	28	40	45	49	49	51	54	55	47
ST5	37	49	47	48	47	46	44	37	46
LT1	34	39	37	44	46	48	55	60	43

The lowest façade performance is observed at position ST1, which corresponds with receptor NSR1 to the north. This is likely attributable to noise breakout from the upper nave glazing from the west and north facades and from the door at the west façade, as this receptor has a direct line of sight to both features.

Façade positions ST2 and ST5 correspond with receptor NSR2 to the west of the church. At position ST5, an increase in level difference is observed at low frequencies, which is attributable to the greater distance from the church and the presence of additional screening.

The façades facing position ST3 and LT1 to the south correspond with different sides of receptor NSR3, with ST3 aligning partially with the north-facing windows of the dwellings and LT1 aligning with the west-facing windows of the dwellings. The calculated level differences for these two assessment positions are generally consistent, with the exception of the 250 Hz octave band, where an improvement of approximately 10 dB is observed at position ST3.

Overall, the estimated façade performance is considered to provide a reasonable level of acoustic separation. It should be noted, however, that internal walls are likely contributing additional attenuation and assisting in the control of noise breakout.

5.2 Assessment against Local Authority criteria

The background noise levels at the nearest noise-sensitive receptors are presented in Table 4—4 and Table 4—5 at different times of day corresponding to periods when the venue is expected to operate with music.

Manchester City Council requires that entertainment noise levels (*L_{Aeq}* music noise levels) are controlled to at least 5 dB below the background noise level (*L_{A90}*) in each octave band at the nearest noise-sensitive receptor. For this assessment, the minimum background noise level measured during the relevant periods was adopted, in line with the Environmental Health Officer (EHO) requirements.

For simplicity, only the music noise measurements have been considered in the assessment, as these are generally louder at the receptors than those using pink noise and are more representative of the proposed activity noise for the proposed church. The music playback levels used in the assessment correspond to those shown in Table 4—7.

Full details of the assessment calculations are provided in Table B 1 and Table B 2 in Appendix B. The entertainment noise level differences relative to the criteria are summarised in Table 5—3 and Table 5—4.

Positive differences indicate instances where the assessment criterion is not met, and negative values indicate where the criteria is achieved.

Table 5—3 Assessment of entertainment noise vs. minimum background noise – typical weekday

Location	Exceedance of MCC criteria, dB							
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
ST1	+21	+21	+18	+19	+18	+18	+17	+11
ST2	+25	+21	+19	+17	+15	+15	+10	0
ST3	+19	+23	+15	+13	+12	+12	4	-7
ST4	+25	+24	+17	+13	+8	+6	-2	-11
ST5	+20	+18	+16	+13	+13	+13	+11	+8
LT1	+24	+26	+26	+20	13	+11	-2	-15

Table 5—4 Assessment of entertainment noisevs. minimum background noise on Sunday

Location	Exceedance of MCC criteria, dB							
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
ST1	+22	+23	+23	+19	+20	+20	+16	+10
ST2	+20	+19	+19	+17	+14	+13	+9	-1
ST3	+13	+24	+16	+14	+14	+13	+3	-8
ST4	+24	+23	+16	+11	+5	+4	-3	-12
ST5	+20	+19	+17	+13	+11	+13	+10	+7
LT1	+20	+23	+23	+14	+8	+8	0	-14

Based on the above, additional control of noise breakout is required to achieve the adopted criteria. For the most exposed receptors, this results in the noise level reductions set out below.

Table 5—5 Additional noise level reductions to achieve the local authority criteria

Additional noise level reduction, dB							
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
25	26	26	20	20	20	17	11

The above can be achieved by controlling internal noise levels to a fixed limit and/or incorporating additional mitigation. This is discussed in detail in the following section.

5.2.1 Recommended mitigation

To achieve compliance with the criteria, internal noise levels would need to be limited such that they do not exceed the limits set out in Table 5—6.

Table 5—6 Maximum internal noise level in the absence of additional mitigation

Reverberant internal noise levels, L_{eq} , dB								Broadband, $L_{Aeq,5min}$ dB
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
71	76	71	76	71	67	66	67	77

However, these noise limits are not considered appropriate for church services featuring live music. To allow sufficient flexibility for engaging and fit-for-purpose services, a hybrid approach is recommended whereby internal activity noise levels are increased and compensated for through additional mitigation to the building envelope.

For a typical church service comprising live music with amplified vocals, a drum kit, and a public address (PA) system, the reverberant internal noise levels set out in Table 5—7 are considered appropriate.

Table 5—7 Recommended internal reverberant noise levels

Internal reverberant noise levels, L_{eq} , dB								Broadband, $L_{Aeq,5min}$ dB
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
87	89	86	89	90	91	87	85	96

Operation at these levels would require improvements to the overall sound insulation performance of the building envelope. The minimum uplift in sound insulation required to maintain compliance at the nearest noise-sensitive receptors is set out in Table 5—8.

Ultimately, these levels are subject to further refinement and shall be established through commissioning testing upon completion of the fit-out, to demonstrate compliance with MCC criteria.

Table 5—8 Minimum uplift of the building envelope sound insulation

Sound Insulation performance, D_w , dB								Weighted level difference, D_w , dB
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
12	13	14	12	18	23	20	18	18

These requirements could be achieved through a combination of acoustic measures, including:

- Secondary glazing to any windows facing the nave;
- Formation of lobbies to external doors serving the nave, incorporating acoustically rated internal door sets;

- Appropriate sealing of all service penetrations connecting to the exterior; and
- The use of attenuators on any ducted mechanical ventilation systems serving the space.

The sound insulation performance of the existing wall and roof construction should be reviewed as the design progresses, and following removal of the climbing walls, to determine whether additional mass enhancement (e.g. internal linings) is required.

Detailed guidance on mitigation measures is beyond the scope of this assessment and is recommended to be developed as the design progresses and following completion of strip-out works..

5.2.2 Assessment of low frequency internal noise levels within adjacent dwellings

The incorporation of the above mitigation measures is expected to enable compliance with the Manchester City Council criteria, resulting in internal noise levels of $L_{Aeq,5min}$ 47 dB and 41 dB within adjacent habitable rooms at 63 Hz and 125 Hz, respectively.

The calculated noise levels at the nearest dwelling, NSR3, are presented in Table 5-9 and are considered to represent a reasonable worst-case scenario. The calculation methodology is summarised as follows:

- The closest noise-sensitive receptor is NSR3, located to the south of the church, with habitable room windows approximately 12 m from the nave façade.
- The assessment is based on the recommended internal activity noise levels at 63 Hz and 125 Hz (From Table 5—7).
- Façade sound insulation performance has been derived from the façade-facing measurement position LT1 (From Table 5—2) , which represents the closest alignment with the NSR3 windows.
- A distance correction has been applied to account for the reduced separation distance between the LT1 measurement position and the NSR3 windows. For robustness, this has been calculated assuming point-source propagation ($20 \log_{10}(1/r)$).
- Additional attenuation has been applied to account for the recommended uplift in façade sound insulation performance (From Table 5—8).
- A –5 dB correction has been applied to represent sound transmission through an open window, which is considered a conservative assumption.

Table 5—9 Calculated internal noise levels at most exposed noise sensitive receptor

	Octave band centre frequency	
	63 Hz	125 Hz
Recommended Internal noise level, L_{eq} , dB	87	89
Existing façade performance losses, D , dB (including distance attenuation to $d = 30$ m at measurement position LT1) From	-34	-39
Distance correction offset to nearest window ($d = 12$ m), dB $20 \cdot \log(12/30)$	+8	+8
Losses from recommended façade performance uplift, dB	-12	-13
External L_{eq} at receptor, dB	49	45
Losses from open window, dB	-5	-5
Internal noise level L_{eq} within dwelling	44	40

5.2.3 Further considerations of reverberation control

The current reverberation time within the church is not excessive (see Table 4—8); however, this is largely attributable to the presence of existing absorptive elements, including foam and plastic floor matting and the hollow construction of the climbing walls. These elements provide useful mid- and low-frequency absorption and reduce the effective acoustic volume of the space.

Once these elements are removed, an increase in reverberation time is anticipated. As the scheme progresses, the specification and extent of absorptive finishes should therefore be carefully considered as part of the fit-out strategy.

Appropriate acoustic treatment will be required to control reverberant noise build-up, support speech intelligibility, and assist in reducing noise breakout from the building.

6 Conclusions

An environmental noise survey was undertaken at St Benedict’s Church on Tuesday 31 March 2026, Wednesday 1 April 2026, and Sunday 5 April 2026. The survey comprised continuous unattended measurements undertaken to the rear of the church, together with short-term attended measurements at the nearest noise-sensitive receptors, to characterise background noise conditions during the proposed hours of operation.

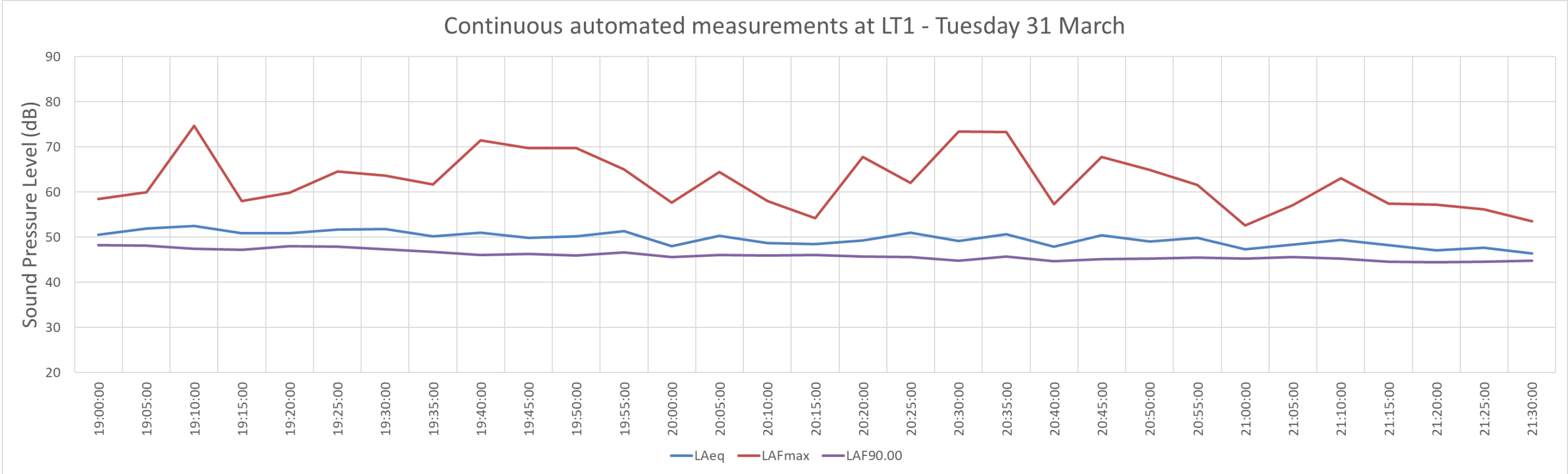
In addition, synchronous internal and external measurements of noise breakout from the church were undertaken on 19 March 2026 using a public address (PA) system with music and pink noise playback.

The results of these measurements have been used to assess the existing sound insulation performance of the church building envelope and to inform appropriate internal noise limits and mitigation measures required to achieve compliance with local authority requirements.

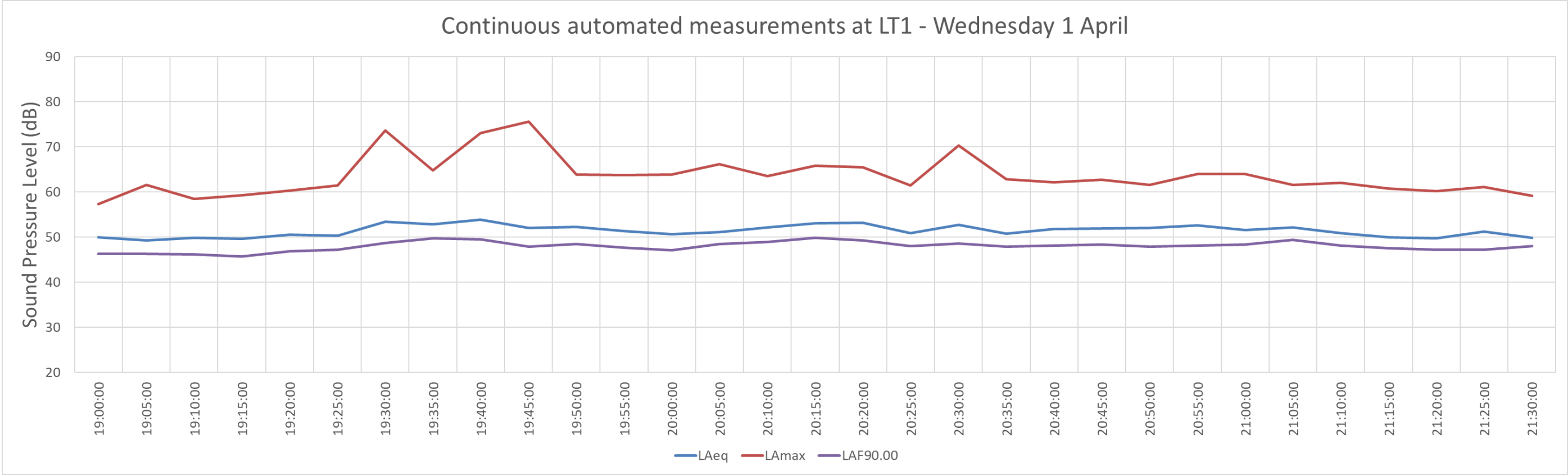
It should be noted that the existing internal climbing walls currently contribute to the acoustic performance of the space. As their removal is proposed as part of the scheme, further assessment is recommended to be undertaken once these elements have been stripped out, as this is expected to affect the reverberant conditions and the sound insulation performance of the building envelope.

Appendix A – Continuous automated measurements

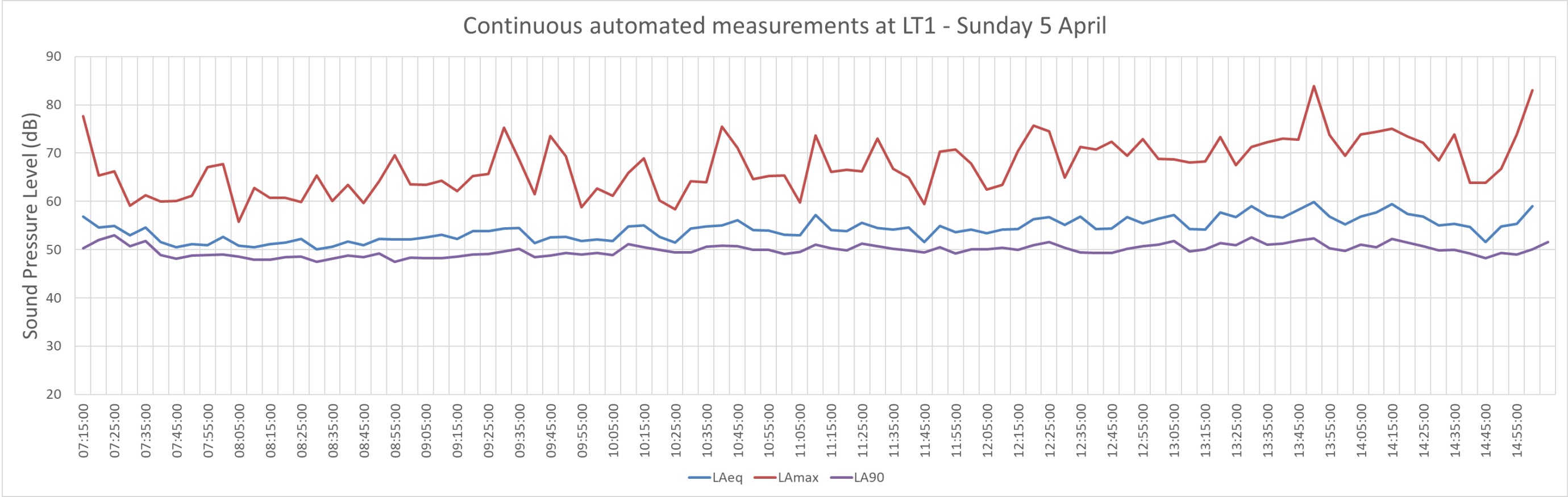
A.1 Tuesday 31 March 2026 (period from 19:00 to 21:30 when music playback is proposed)



A.2 Wednesday 1 April 2026 (period from 19:00 to 21:30 when music playback is proposed)



A.3 Sunday 5 April 2025 (period from 07:30 to 15:00 when music playback is proposed)



Appendix B – Local authority noise level assessment

Table B 1 Relative level difference from entertainment noise and criteria for a typical weekday

Location	Octave band centre frequency, dB							
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
ST1								
L _{Aeq} (music)	42	47	51	53	57	54	49	44
L _{A90}	26	31	37	39	44	41	37	38
Criteria (L _{A90} -5 dB)	21	26	32	34	39	36	32	33
L _{Aeq} - Criteria	21	21	18	19	18	18	17	11
ST2								
L _{Aeq} (music)	40	44	47	50	52	48	42	33
L _{A90}	21	28	33	38	42	38	37	38
Criteria (L _{A90} -5 dB)	16	23	28	33	37	33	32	33
L _{Aeq} - Criteria	25	21	19	17	15	15	10	0
ST3								
L _{Aeq} (music)	36	48	43	45	48	45	36	26
L _{A90}	22	30	32	37	41	38	37	38
Criteria (L _{A90} -5 dB)	17	25	27	32	36	33	32	33
L _{Aeq} - Criteria	19	23	15	13	12	12	4	-7
ST4								
L _{Aeq} (music)	42	46	44	44	43	38	30	22
L _{A90}	22	27	32	36	40	37	37	38
Criteria (L _{A90} -5 dB)	17	22	27	31	35	32	32	33
L _{Aeq} - Criteria	25	24	17	13	8	6	-2	-11
ST5								
L _{Aeq} (music)	35	38	43	45	48	46	43	41
L _{A90}	20	25	32	37	40	38	37	38
Criteria (L _{A90} -5 dB)	15	20	27	32	35	33	32	33
L _{Aeq} - Criteria	20	18	16	13	13	13	11	8
LT1								
L _{Aeq} (music)	37	48	51	49	47	42	31	19
L _{A90}	18	27	30	34	39	36	38	39
Criteria (L _{A90} -5 dB)	13	22	25	29	34	31	33	34
L _{Aeq} - Criteria	24	26	26	20	13	11	-2	-15

Table B 2 Relative level difference from entertainment noise and criteria for a typical weekend (Sunday)

Location	Octave band centre frequency, dB							
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
ST1								
L _{Aeq} (music)	42	47	51	53	57	54	49	44
L _{A90}	25	29	32	39	42	39	38	39
Criteria (L _{A90} -5 dB)	20	24	27	34	37	34	33	34
L _{Aeq} - Criteria	22	23	23	19	20	20	16	10
ST2								
L _{Aeq} (music)	40	44	47	50	52	48	42	33
L _{A90}	26	30	33	38	43	40	38	39
Criteria (L _{A90} -5 dB)	21	25	28	33	38	35	33	34
L _{Aeq} - Criteria	20	19	19	17	14	13	9	-1
ST3								
L _{Aeq} (music)	36	48	43	45	48	45	36	26
L _{A90}	28	29	31	36	39	37	38	39
Criteria (L _{A90} -5 dB)	23	24	26	31	34	32	33	34
L _{Aeq} - Criteria	13	24	16	14	14	13	3	-8
ST4								
L _{Aeq} (music)	42	46	44	44	43	38	30	22
L _{A90}	23	28	33	38	43	39	38	39
Criteria (L _{A90} -5 dB)	18	23	28	33	38	34	33	34
L _{Aeq} - Criteria	24	23	16	11	5	4	-3	-12
ST5								
L _{Aeq} (music)	35	38	43	45	48	46	43	41
L _{A90}	20	24	31	37	42	38	38	39
Criteria (L _{A90} -5 dB)	15	19	26	32	37	33	33	34
L _{Aeq} - Criteria	20	19	17	13	11	13	10	7
LT1								
L _{Aeq} (music)	37	48	51	49	47	42	31	19
L _{A90}	22	30	33	40	44	39	36	38
Criteria (L _{A90} -5 dB)	17	25	28	35	39	34	31	33
L _{Aeq} - Criteria	20	23	23	14	8	8	0	-14

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