



**Greyfriars Church
Reading**

Plant Noise Assessment Report

13 May 2021

For
Ash Contracting Ltd
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SUMMARY

A new ventilation fan proposed as part of the refurbishment and extension works at Greyfriars Church in Reading. A planning conditions specifies external noise requirements for new items of building services plant, requiring a background noise survey and plant noise assessment to be undertaken.

A noise survey has been undertaken by **auricl** to determine background noise levels that are representative of the nearest noise sensitive properties.

An external plant noise limit has been proposed, to be achieved at the nearest residential properties, based on the noise survey data and the planning condition requirements.

A noise assessment has been undertaken to predict noise emissions associated with the proposed ventilation fan at the nearest noise sensitive property.

The predicted noise levels comply with the planning condition requirements during the proposed hours of operation.

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1.0 Introduction

A new ventilation fan proposed as part of the refurbishment and extension works at Greyfriars Church in Reading. A planning conditions specifies external noise requirements for new items of building services plant, requiring a background noise survey and plant noise assessment to be undertaken.

auricl has been instructed to undertake a background noise survey and acoustic assessment of noise emissions from the new roof plant, in relation to the planning condition requirements.

This report presents the methodology and results of a noise survey to determine background noise levels that are representative of the nearest noise sensitive properties, as well as an acoustic assessment of the plant to address the planning condition requirements.

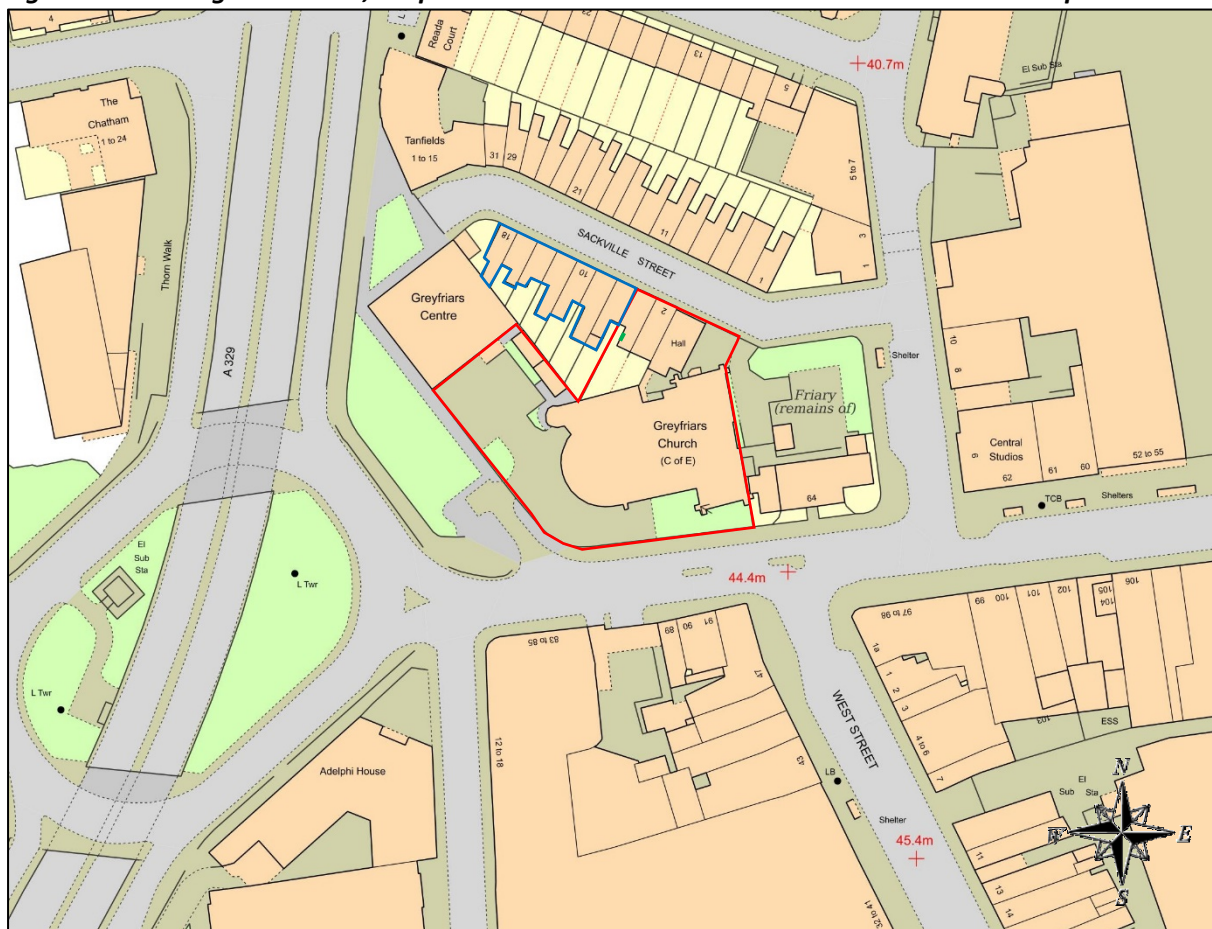
2.0 Description of Site and Proposals

The site is occupied by Greyfriars Church and an adjacent building, located between Friar Street (to the south) and Sackville Street (to the north) in the centre of Reading. Residential properties are located adjacent to the site to the north-west.

A ventilation fan is proposed within the building, exhausting air at roof level. The fan is proposed to operate between 09:00 – 17:00 hours, Monday to Friday.

Figure 2.1 shows the approximate site extent in **red**, the proposed plant location in **green** and the nearest noise sensitive properties in **blue**.

Figure 2.1 Existing Site Extent, Proposed Plant Location and Nearest Noise Sensitive Properties



3.0 Planning Condition Requirements

The planning condition relating to external noise emissions from building services plant states the following:

“No mechanical plant shall be installed until a noise assessment of the proposed mechanical plant has been submitted and approved by this Council. The assessment shall be carried out in accordance with the relevant recommendations of appropriate British Standards or other recognised Codes of Good Practice. The predicted rating level, $L_{A,T,r}$ (specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to sensitive facades shall be at least 10dB below the existing background sound level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation. The plant shall only be installed in accordance with the assessment and shall thereafter be maintained so that it operates to the same standard”.

4.0 Noise Survey Methodology

An unmanned environmental noise survey was undertaken at the site between Friday 30 April 2021 and Tuesday 4 May 2021, to assess existing background noise levels at the nearest noise sensitive properties to the proposed plant.

L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over 15-minute intervals.

Noise levels were measured at one position at roof level on top of the ground floor extension to 2-4 Sackville Street, as indicated in **purple** on Figure 4.1.

Figure 4.1 Site Plan Indicating Measurement Location



The equipment used for the noise survey is described in Table 4.1.

Table 4.1 Description of Equipment used for Noise Survey

Item	Make & Model	Serial Number
Type 1 sound level meter	01 dB FUSION	12032
Type 1 ½" microphone	GRAS 40 CD	330829
Calibrator	01 dB CAL21	86020

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

Due to the nature of the noise survey, i.e. unmanned, we are unable to comment on the weather conditions throughout the entire noise survey period. However, at the beginning of the survey period, there was noted to be very little cloud with dry, still and clear conditions. These conditions are understood to be representative of the majority of the survey period and are considered appropriate for undertaking environmental noise measurements.

5.0 Noise Survey Results

Appendix B presents a time history graph showing the L_{Aeq} and L_{A90} sound pressure levels measured at each position throughout the noise survey, taking into account the corrections described above.

The lowest background noise level measured during the proposed operating hours (09:00 – 17:00 hours, Monday to Friday) was **54 dB L_{A90} (1 hour)**.

We would consider the measured levels to be reasonable, taking into account the location of the measurement position and the dominant nearby noise sources.

Due to the nature of the unmanned noise survey, we are unable to comment on the exact noise climate throughout the entire survey period, however, at the beginning and end of the survey period, the daytime noise climate at the measurement position was noted to be affected by road traffic noise emanating from the nearby A329 Caversham Road and Friar Street.

6.0 Plant Noise Emissions

This section presents our assessment and calculations of noise emissions from the proposed plant, in relation to the planning condition requirements.

6.1 Noise Limit

Based on the measured background noise levels and the planning condition requirements, the external plant noise limit is **44 dB $L_{Ar,Tr}$** during the proposed operating hours (09:00 – 17:00 hours, Monday to Friday).

The noise limit is to be achieved at a distance of 1m from the nearest noise sensitive property.

6.2 Proposed Plant

A ventilation fan is proposed to be located internally at second floor level within the new ground floor extension to the rear/south of 2-4 Sackville Street. The fan will exhaust air at high level via the existing chimney.

The fan manufacturer's sound power levels for the exhaust are shown in Table 6.1.

Table 6.1 Manufacturer's Noise Data for Proposed Fan

Sound Power Level (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1K	2K	4k	8K
79	86	73	63	61	57	49	43

The fan is understood to operate at 60% of its full duty, resulting in at least an 8 dB/octave reduction in sound power levels.

The manufacturer's noise data shows a possible tone in the 125Hz octave band, therefore a + 4dB character correction has been added as part of this assessment, in accordance with BS 4142: 2014.

6.3 Nearest Noise Sensitive Properties

We have considered the nearest noise sensitive property to be the adjacent residential properties at 6 Sackville Street, with the nearest window being approximately 8m from the exhaust grille.

6.4 Plant Noise Predictions

Our plant noise emission calculations are presented in Table 6.2.

Table 6.2 Plant Noise Calculations

Element	Level (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1K	2K	4k	8K
In-Duct Sound Power Level	79	86	73	63	61	57	49	43
Reduction to 60% Duty	-8	-8	-8	-8	-8	-8	-8	-8
Grille End Reflection	-13	-8	-4	-2	0	0	0	0
Directivity	0	+0.5	+1	+1.5	+1.5	+2	+3	+3
Distance Attenuation	-31	-31	-31	-31	-31	-31	-31	-31
Screening Attenuation	0	0	0	0	0	0	0	0
Predicted Sound Pressure Level at Nearest Noise Sensitive Property	24	39	31	23	23	20	13	7
Acoustic Feature Correction – Tonality*	+4							
Rating Level	33							
Noise Limit	44							

* Correction for clearly perceptible tone at 125Hz, based on BS 4142: 2014 guidance

It can be seen that the predicted noise level associated with the proposed ventilation fan complies with the planning condition requirements.

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing (20×10^{-6} Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
A-weighting (L_A or dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T (typically T= 16 hours for daytime periods, T = 8 hours for night-time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
L_{A90} (15 min)	The noise level exceeded for 90% of the time (also referred to as the background noise level), measured over a 15 minute period

Appendix B – Time History Graph

