



**3-4 Kings Walk, King Street
Reading**

Plant Noise Assessment Report

16 November 2022

For
Bombay Brothers Limited

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SUMMARY

A new extract fan is proposed at the rear of 3-4 Kings Walk, off King Street in Reading. The Reading Borough Council requirements specify 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 Reading Borough Council requirements.

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

The predicted noise levels comply with the Reading Borough Council requirements during the proposed hours of operation.

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1.0 Introduction

A new extract fan is proposed at the rear of 3-4 Kings Walk, off King Street in Reading. The Reading Borough Council requirements specify 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 Reading Borough Council 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 Reading Borough Council requirements.

2.0 Description of Site and Proposals

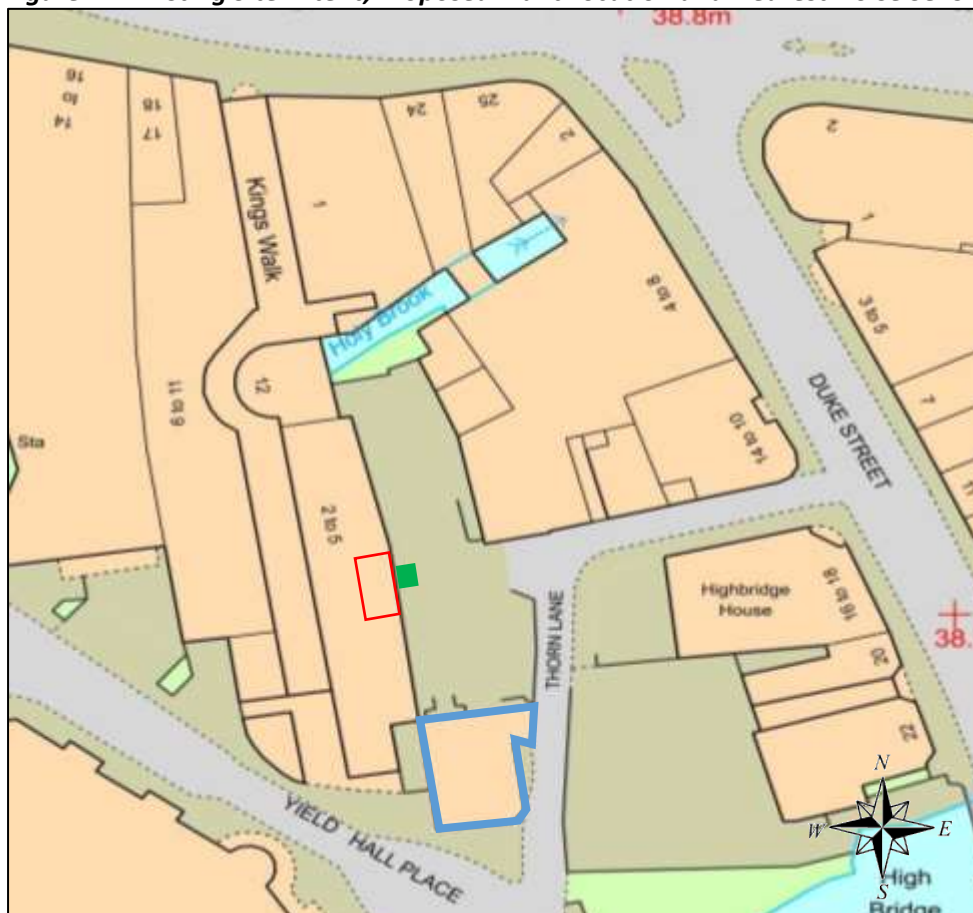
The site is located at Unit 3-4 within the Kings Walk shopping arcade, between King Street (to the north) and Yield Hall Place (to the south) in the centre of Reading.

The site is bounded by the Hotel Ibis Styles car park and an adjacent residential building.

A new extract fan and associated ductwork are proposed on the eastern façade of the building overlooking the Hotel Ibis Styles car park, exhausting air at roof level. The fan is proposed to operate between 09:00 – 22:30 hours, Monday to Friday daily.

Figure 2.1 shows the approximate site extent in **red**, the approximate location of the proposed extract fan and ductwork in **green** and the nearest noise sensitive residential properties in **blue**.

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



Reading Borough Council has advised the following noise requirements for the proposed extract fan:

Reading Borough Council's standard plant noise requirements are as follows:

“The predicted specific sound level ($L_{Aeq,Tr}$) (with reference to BS:4142) as measured at a point 1 metre external to the nearest noise-sensitive facade shall be at least 10dB below the pre-existing background sound level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation. The predicted rating level, $L_{A,Tr}$ (specific sound level plus any adjustment for the characteristic features of the sound) as measured at a point 1 metre external to the nearest noise-sensitive façade (habitable window of a dwelling) shall not exceed the pre-existing background sound level, $L_{A90,T}$ when all plant/equipment (or any part of it) is in operation.”

A manned environmental noise survey was undertaken at the site between 22:00 and 22:30 hours on Tuesday 8 November 2022, to assess existing background noise levels at the nearest noise sensitive properties to the proposed plant, at a time when existing background noise levels would be at their lowest (within the operating proposed operating period of the fan).

Noise levels were measured at one position at ground level as indicated in **purple** on Figure 4.1.

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 CAL31	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.

The weather during the survey was generally dry and low wind speeds. These conditions are considered appropriate for undertaking environmental noise measurements.

5.0 Noise Survey Results

The lowest background noise level between 22:00 and 22:30 hours was **49 dB L_{A90,T}**.

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

The noise climate at the measurement position was noted to be affected by other plant items associated with nearby commercial uses and the Hotel Ibis Styles service area.

6.0 Plant Noise Emissions

This section presents our assessment and calculations of noise emissions from the proposed extract fan, in relation to Reading Borough Council requirements.

6.1 Noise Limit

Based on the measured background noise levels and the Reading Borough Council requirements, the external plant noise limit is **39 dB L_{A,T}** during the proposed operating hours (09:00 – 22:30 hours).

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

6.2 Proposed Plant

An extract fan and associated ductwork are proposed to be located externally on the eastern façade of the building, overlooking the Hotel Ibis Style car park. The fan will exhaust air at high level via a ducted 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
72	70	65	65	64	64	59	53

The manufacturer's noise data show the plant to be non-tonal in acoustic character, therefore no character correction has been added as part of this assessment.

6.3 Nearest Noise Sensitive Properties

We have considered the nearest noise sensitive property to be the residential properties to the south on Thorn Lane, as indicated on Figure 2.1, with the nearest window being approximately 20m from the exhaust grille.

6.4 Plant Noise Predictions

Our plant noise emission calculations are presented in Tables 6.2 and 6.3 and summarised in Table 6.4.

Table 6.2 Plant Noise Calculations – Exhaust Grille

Element	Level (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1K	2K	4k	8K
In-Duct Sound Power Level	72	70	65	65	64	64	59	53
Grille End Reflection	-9	-5	-2	-1	0	0	0	0
Directivity	-1	-2	-3	-5	-6	-6	-6	-6
Distance Attenuation	-39	-39	-39	-39	-39	-39	-39	-39
Predicted Sound Pressure Level at Nearest Noise Sensitive Property	23	25	21	20	19	19	14	8
	25 dB L _{pA}							

Table 6.3 Plant Noise Calculations – Fan Casing

Element	Level (dB)
Fan Casing Sound Pressure Level at 3m	49
Acoustic Reflections	+3
Distance Attenuation	-16
Predicted Sound Pressure Level at Nearest Noise Sensitive Property	36

Table 6.4 Plant Noise Calculations – Summary

Element	Level (dB)
Fan Exhaust Grille Noise Level	25
Fan Casing Noise Level	36
Total Predicted Sound Pressure Level at Nearest Noise Sensitive Property	36
Noise Limit	39

It can be seen that the total predicted noise level associated with the proposed extract fan complies with the Reading Borough Council 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