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TECHNICAL MEMO

Project	Central Saint Giles Screen Noise Tests
To	Central Saint Giles
From	Robert Miller, Director, F1 Acoustics Company Limited
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Reference	1944/TechnicalMemoNoise/Rev0

1 INTRODUCTION

F1 Acoustics Company Limited has been appointed by Central Saint Giles to provide a baseline noise survey; source noise measurements; an assessment of entertainment noise levels; and this technical memo outlining the survey methodology, criteria and assessment, for a summer screen located in the piazza area of Central Saint Giles, London.

2 NOISE SURVEY METHODOLOGY

Noise surveys have been undertaken to measure the source sound levels of the screen during operation and baseline measurements without the screen operating. The attended baseline noise survey was undertaken in the area of Central Saint Giles on Tuesday 11th July 2023 at three locations around the piazza representative of the nearest noise sensitive premises at ground floor level. The source noise survey on Friday 8th March 2024 measured a similar speaker as used for the screen in operation at 5 m with BBC Radio 4 (speech) as the source to represent sporting commentary and some additional baseline measurements without the screen operational. The source measurements were taken on balconies of the residential noise sensitive premises to the west side of the piazza.

The noise surveys were undertaken with a Rion NL-52 class 1 sound level meter, which was checked for calibration before and after the surveys with a Rion NC-75 sound level calibrator. No significant deviation of the calibration levels were recorded (less than ±0.5 dB). Table 2.1 shows the noise measurement instrumentation details.

Table 2.1: Noise Measurement Instrumentation Details

Measurement	Sound Level Meter	Calibration Check at Start		Calibration Check at End	
		Sound Level Calibrator	Calibration Sound Level at 1 kHZ, dB	Sound Level Calibrator	Calibration Sound Level at 1 kHZ, dB
Baseline 11/07/2023	Rion NL-52 (F1AC-069)	Rion NC-75 (F1AC-070)	94.0	Rion NC-75 (F1AC-070)	94.0
Source and Baseline 08/03/2024	Rion NL-52 (F1AC-066 & F1AC-069)	Rion NC-75 (F1AC-070)	94.0	Rion NC-75 (F1AC-070)	93.9

The noise survey locations are presented in Figure 2.1.

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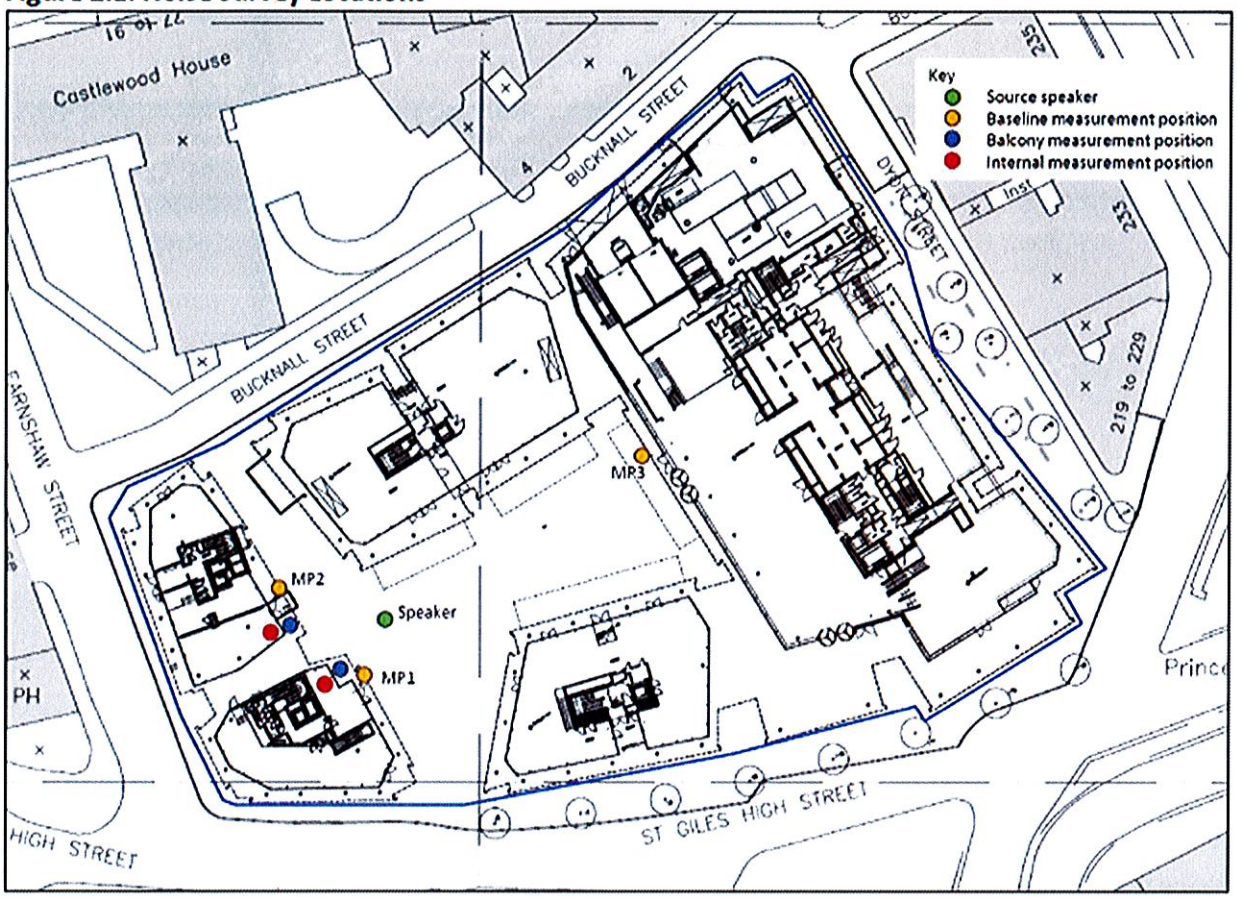
Figure 2.1: Noise Survey Locations



A source sound level of the screen was measured during all measurements at the nearest noise sensitive premises at 5 m from the speaker. 5 minute baseline measurements were taken before each source measurement for ambient corrections and 15 minute measurements were taken for the baseline sound measurements around the piazza. The L_N (percentile sound level) is calculated from the $L_{p,100msec}$ (fast time-weighted).

The three properties that were used for the source measurements were:

- Property 1 – 1st Floor, 5 Central Saint Giles Piazza, 9.3 m from speaker to corner of balcony
- Property 2 – 2nd Floor, 5 Central Saint Giles Piazza, 11.2 m from speaker to corner of balcony
- Property 3 – 2nd Floor, Matilda Building, 14.3 m from speaker to corner of balcony

The meteorological conditions were monitored throughout the duration of the noise survey. There were no periods considered unsuitable for noise monitoring during the survey.

3 NOISE SURVEY RESULTS

During the baseline noise surveys the piazza, passing pedestrians, local road traffic noise from the A40 and distant construction work were audible. During the source noise measurements, the same sources as the baseline with the addition of speech from the speaker was audible. The baseline noise survey results are presented in Table 3.1 and the source noise levels are presented in Table 3.2.

Table 3.1: External Measured Baseline Noise Levels

Location	Start Time	Duration (T)	Ambient $L_{Aeq,T}$, dB	Background $L_{A90,T}$, dB
MP1	11/07/2023 15:00	15 min	62.5	55.6
MP2	11/07/2023 15:20	15 min	60.4	55.3
MP3	11/07/2023 15:40	15 min	60.5	55.6
MP1	08/03/2024 15:55	15 min	61.5	54.8

The baseline results show all three locations have similar ambient and background sound levels. Even on different days and times of the year. The baseline sound levels were monitored after the lunch-time busy period representative of the afternoon/evening period. The average baseline ambient sound level in the piazza is $L_{Aeq,15min}$ 61 dB and the baseline background sound level is $L_{A90,15min}$ 55 dB.

Table 3.2: Source Noise Levels and Associated Baseline Noise Levels 8th March 2024

Location	Position	Baseline Ambient $L_{Aeq,5min}$, dB	Baseline Background $L_{A90,5min}$, dB	Source 100 Hz to 5 kHz (corrected for ambient) $L_{Aeq,T}$, dB
Property 1	Balcony	Source: 56.7 Balcony: 54.1	Source: 51.5 Balcony: 49.5	Source 5 m: 75.7 (4 min) Balcony: 64.5 (4 min)
	Internal	Source: 66.1 Internal: 30.4	Source: 53.1 Internal: 26.2	Source 5 m: 76.0 (3 min) Internal: 28.0 (3 min)
Property 2	Balcony	Source: 61.6 Balcony: 54.2	Source: 56.0 Balcony: 51.6	Source 5 m: 75.0 (4 min) Balcony: 62.3 (4 min)
	Internal	Source: 67.0 Internal: 28.3	Source: 59.8 Internal: 23.4	Source 5 m: 75.0 (3 min) Internal: 28.3 (3 min)
Property 3	Balcony	Source: 61.4 Balcony: 58.0	Source: 54.6 Balcony: 51.8	Source 5 m: 74.3 (2 min) Balcony: 60.7 (2 min)
	Internal	Source: 60.3 Internal: 27.7	Source: 54.0 Internal: 26.1	Source 5 m: 73.5 (2 min) Internal: 22.7 (2 min)

The results show that the screen sound level at 5 m in front of the speaker for the tests was $L_{Aeq,5min}$ 73 to 75 dB. The baseline ambient and background 5 minute measurements taken at the speaker test position show similar sound levels to the 15 minute baseline measurements shown in Table 3.1. The difference between the background sound levels in the middle of the piazza and on the residential balconies is 3 to 4 dB. The difference between the sound level at 5 m in front of the speaker and on the balconies ranged from 11 dB at the closest balcony (property 1) to 13 dB at the furthest balcony measured (property 3). The difference between the sound level on the balconies compared to inside the residential property with the windows and doors closed was in the range of 34 to 38 dB.

4 RELEVANT NATIONAL GUIDANCE AND STANDARDS

Entertainment noise from screens has no specific guidance or standards to be assessed to, however the Code of Practice on Environmental Noise Control at Concerts (CPENCC) may be relevant considering the sources of noise are both identifiable and for the purposes of entertainment. In a footnote to Table 1 of the CPENCC discussing music noise level (MNL) limits it states:

"5. For indoor venues used for up to about 30 events per calendar year an MNL not exceeding the background noise by more than 5 dB(A) over a fifteen minute period is recommended for events finishing no later than 23:00 hours."

As the screen is not used for music but primarily for the live screening of sporting events with commentary the nature of the sound may be less intrusive and therefore this proposed limit will be suitable for more than 30 days for screenings finishing before 23:00.

Therefore, the criteria for the entertainment noise sound level from the screen will be $L_{Aeq,15min}$ 56 dB at the nearest noise sensitive premises balconies (5 dB above the average measured background sound level $L_{A90,15min}$ 51 dB on balconies).

5 ASSESSMENT OF ENTERTAINMENT NOISE LEVELS

At the closest balcony to the screen and speakers the sound propagation attenuation was measured to be 11 dB from 5 m in front of the speaker to the middle of the balcony. Considering a 6 dB increase for two speakers operating at the same time (coherent sound sources) a 6 dB increase in diffuse piazza sound level can be expected. Therefore, the maximum sound level at 5 m in front of both speakers (operating one at a time if tested) is $L_{Aeq,15min}$ 61 dB to achieve the criteria discussed in Section 4. Table 5.1 shows the predicted sound level at the three balconies tested.

Table 5.1: Entertainment Noise Calculation

Receptor Location	Source Entertainment Noise Level, $L_{Aeq,15min}$, dB	Source Noise Level Distance, m	Coherent source additional speaker correction, dB	Propagation attenuation (measured), dB	Entertainment Noise at Receptor Location, $L_{Aeq,15min}$, dB
Property 1 Balcony	61	5	+6	-11	56
Property 2 Balcony	61	5	+6	-13	54
Property 3 Balcony	61	5	+6	-13	54

The results shown in Table 5.1 show that the screen can achieve the entertainment noise criteria proposed in Section 4 at the nearest noise sensitive premises. Based on this assessment the entertainment noise of the screen should not exceed $L_{Aeq,15min}$ 61 dB at 5 m from the speakers.

Based on difference between the balcony and internal source measurements taken during the tests, the internal entertainment noise with windows and doors closed is expected to be less than $L_{Aeq,15min}$ 22 dB which is lower than all the baseline background sound levels measured inside the properties during the tests.

ADDENDUM

There are no revisions to the existing detailed technical acoustic report from F1 Acoustics Ltd, as the anticipated noise levels will remain consistent with those previously evaluated. Consequently, the conclusions and recommendations of the original report continue to remain valid.

I am also aware that a sound measurement device is present onsite, to continuously monitor noise levels and ensure compliance with the assessed parameters.

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