



Application for a premises licence for the concourse
outside of the West Stand toward Britannia Gate
Stamford Bridge, Fulham Road, SW6 1HS

Technical review of
Noise Management Strategy document dated 23rd October 2022

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1.0 Qualifications and experience

- 1.1 My name is Richard Vivian. I am the founder and director of Big Sky Acoustics Ltd. Big Sky Acoustics is an independent acoustic consultancy that is engaged by local authorities, private companies, public companies, residents' groups and individuals to provide advice on the assessment and control of noise.
- 1.2 I have a Bachelor of Engineering Degree with Honours from Kingston University, I am a Member of the Institution of Engineering & Technology, the Institute of Acoustics and the Institute of Licensing.
- 1.3 I have over thirty years of experience in the acoustics industry and have been involved in acoustic measurement and assessment throughout my career. My professional experience has included the assessment of noise in connection with planning, licensing and environmental protection relating to sites throughout the UK. I have given expert evidence in the courts, in licensing hearings, in planning hearings and inquiries on many occasions.

2.0 Introduction

- 2.1 Big Sky Acoustics Ltd was instructed by Mr Gareth Hughes of Keystone Law Limited, acting on behalf of Kate Reardon, to carry out a technical review of the noise evidence prepared for the applicant by Mr Simon Joynes of Joynes Nash Ltd.
- 2.2 In order to address the most significant issues I have not sought to rebut all the points in Mr Joynes' evidence with which I disagree. The fact that I do not expressly rebut a point is not an indication that I accept it.

3.0 The application

- 3.1 The premises licence application is for the following licensable activities within a marquee proposed to be erected on the concourse outside of the West Stand toward Britannia Gate at Stamford Bridge:
 - The playing of amplified live music from 10:00-01:00hrs seven days a week.
 - The provision of hot food and drink from 23:00-01:00hrs seven days a week.
 - The supply of alcohol from 10:00-01:00hrs seven days a week.
 - The premises to be open from 10:00-01:30hrs seven days a week.

4.0 The site and surrounding area

- 4.1 I am familiar with the site location and the wider area.
- 4.2 I have carried out noise assessments in the area around this application site, and across the wider borough of Hammersmith & Fulham, for many years.

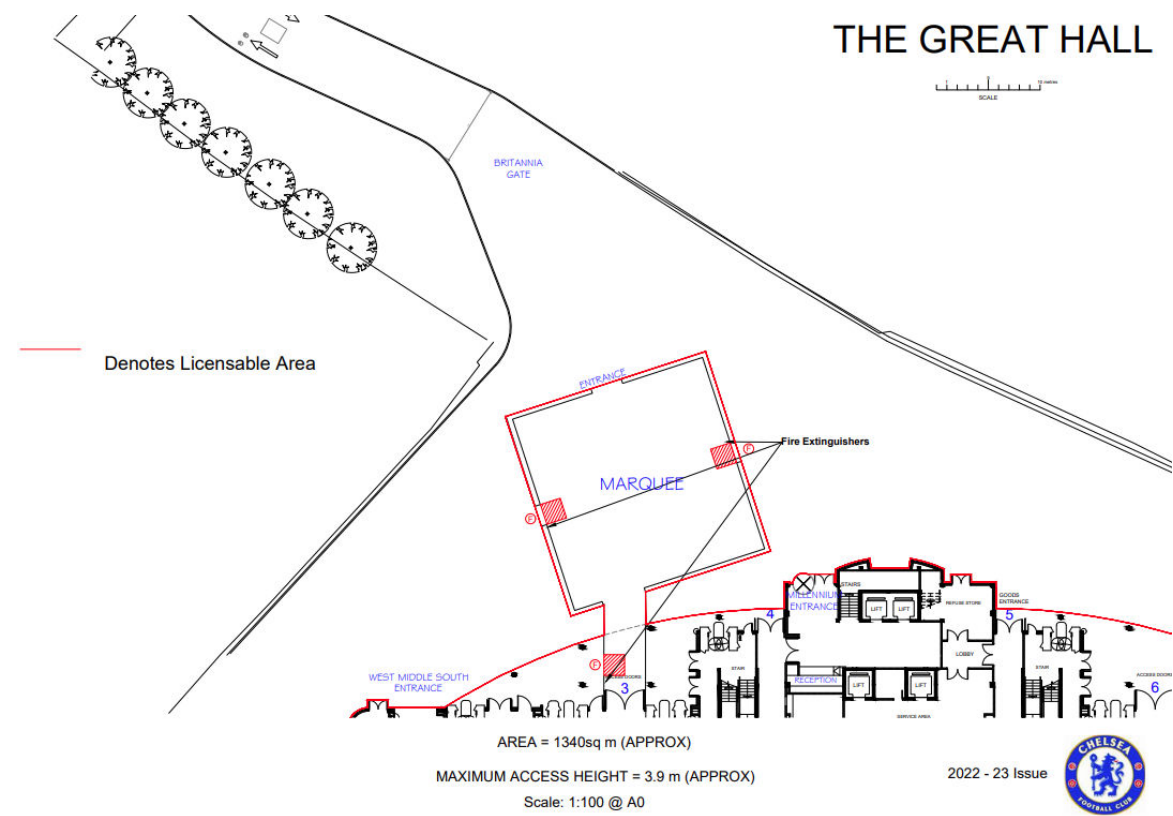


Figure 1: Proposed location of marquee (as presented in application).

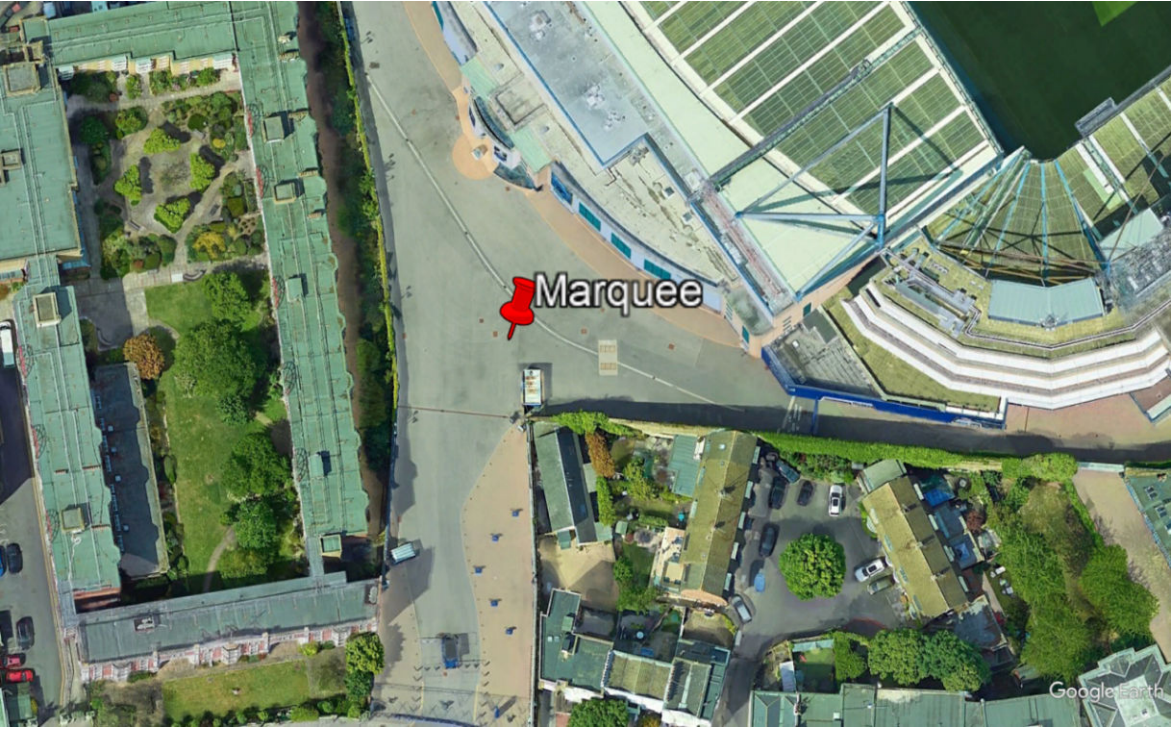


Figure 2: Marquee location marked on aerial image (North up).



Figure 3: View of properties on Fulham Road looking north along Hilary Close, with further properties at the end of Hilary Close that are closer to the marquee location. The West Stand is in the background.



Figure 4: View of the approximate location of the marquee. Roofs of residential properties on Hilary Close can be seen (note Velux roof windows visible), as can windows of rear façades of properties on Fulham Road. Britannia Road is in the background across the Fulham Road.

5.0 Noise Management Strategy by Mr Simon Joynes

- 5.1 The following comments given are not exhaustive and are intended to inform in respect of the technical aspects of the Noise Management Strategy document presented by Mr Joynes in his report dated 23rd October 2022 and marked as Version 1.2, with the status: "*Client Draft*".
- 5.2 In section 3 of his report Mr Joynes explains that the marquee's primary focus will be for "*corporate events, including functions, experiential, hospitality event or social activities*".
- 5.3 Mr Joynes correctly identifies there are a number of noise sensitive receptors in the vicinity and names residential units on Fulham Road, and the flats in the Sir Oswald Stoll Foundation¹ which is adjacent to, and overlooks, the proposed marquee site. He also mentions the residential properties situated in Hilary Close which almost abut the application site and are partially screened by a wall.
- 5.4 Mr Joynes does not provide an indication of the separation distance to these nearby properties from the proposed marquee location. This is important information when predicting noise levels from a noise source as sound is attenuated over distance and therefore, if the separation distance is large enough, noise from activity in the marquee may have a reduced impact at residential properties at larger distances due to this physical separation.
- 5.5 Reference to an OS Map for this location gives the separation distance from the proposed marquee site to these closest noise sensitive properties as:
- Sir Oswald Stoll Mansions: 20 metres with clear line of sight from windows. There are approximately 174 windows in this development that overlook the application site.
 - Hilary Close: 25 metres to the rear façades of residential properties with partial line of sight obscured by a wall.
 - Fulham Road: 30 metres to the rear façade of these properties with clear line of sight to second and third floor windows from the application site.
- 5.6 Mr Joynes does not provide any evidence that he has visited the site. He does not provide any photographs, or any description of the noise climate at the site. There is no noise measurement survey data provided for the site or estimate of the typical ambient noise levels to be expected at residential façades at this location.
- 5.7 In section 5 of his report Mr Joynes makes some noise control proposals. His approach is inconsistent suggesting first that noise complaints should be responded to in a "*timely manner*", but then that an independent noise consultant should attend any unresolved complaints within "*5 working days*".
- 5.8 In section 6 he comments on the risks of amplified music and advises that "*any amplified music will be ambient/incidental music*".

¹ The Sir Oswald Stoll Mansions are 157 flats providing housing for veterans who have served in the British Armed Forces or Reserve Forces or the Merchant Navy under Arms and have support needs due to physical disability, mental health issues, substance misuse issues, homelessness or ongoing health conditions.

- 5.9 Section 7 proposes that traditional speaker systems will not be used but instead *"directional or zone array systems will be deployed to provide a narrow beam of focussed sound to a desired area"*. No indication is given as to where this *"narrow beam"* starts or ends. It is not clear to me what technical solution Mr Joynes is proposing as he makes no suggestion of any equipment specification, makes no reference to any manufacturer or model numbers, and provides no information as to where the speakers will be located or how they will be controlled. There are no photographs or drawings of how this system will be installed and no indication of the source sound levels produced by such a system. Critically there is no prediction of the sound levels that would be experienced at noise sensitive façades of the residential properties.
- 5.10 Section 8 is a meandering discussion on the subjective word *inaudibility* with no concluding definition as to what it could mean, or what an acceptable level at a noise sensitive receptor would be. Mr Joynes only suggestion is that *"should any residences contact the venue to enquire of noise or make a complaint, they are offered the opportunity for consultants at an appropriate time to attend their property during an event to observe the noise and make any necessary improvements"*.
- 5.11 At Section 9.0 Mr Joynes states that *"venues are from time to time expected to receive complaints"*.
- 5.12 The Noise Monitoring Procedure at Section 10 is vague and suggests boundary checks of noise levels once an hour but provides no indication of how those checks are carried out and what is being checked other than *"any form of impact"*. If Mr Joynes is suggesting there should be a boundary noise condition then I would expect him to propose that noise level, in decibels, stating how it will be measured and how the noise sources will be controlled so that in normal operation it would not be exceeded.
- 5.13 In Section 11 Mr Joynes suggests that there is no mechanism for evaluating or controlling crowd noise. This is at odds with common practice amongst professionals working in this field as the noise from people talking can readily be modelled as a number of discreet sources and that noise level increases as the number of people talking increases. International standards² provide references for human speech sound levels and the total sound level from a crowd can then be derived from the logarithmically sum of multiple sources. Academic papers³ also provide peer-reviewed studies of crowd-noise investigations and calculation methods for predicting crowd noise. This is a common methodology that is regularly applied in the assessment of crowd noise from licensed premises.
- 5.14 Using the formula $L_{Aeq} = 21 \cdot \log(N) + 43$ a crowd of 400 people talking at typical speech levels is predicted to generate noise of a 98dB.

² ISO 9921:2003 Ergonomics - Assessment of speech communication, Annex A, Table A1 shows the vocal effort of a male speaker and related A-weighted speech level (dB re 20 µPa) at 1 m in front of the mouth. The table indicates that relaxed vocal effort is 54dB, and normal vocal effort is 60dB.

³ Growcott, D (Consideration of Patron Noise from Entertainment Venues, Australian Association of Acoustical Consultants Guideline, Australia, 2009)

- 5.15 Sound is attenuated in air and in a free field for every doubling of distance from a noise source the sound pressure level L_p will be reduced by 6 decibels. This is calculated using the following formula:

$$\begin{aligned}L_{p2} - L_{p1} &= 10 \log (R_2 / R_1)^2 \\ &= 20 \log (R_2 / R_1)\end{aligned}$$

where

L_{p1} = sound pressure level at location 1 (dB)

L_{p2} = sound pressure level at location 2 (dB)

R_1 = distance from source to location 1

R_2 = distance from source to location 2

A "free field" is defined as a flat surface without obstructions.

- 5.16 The calculation predicts a resultant noise level from crowd noise of 72dB at the façade of the Sir Oswald Stoll Mansions, 70dB at the rear façades of Hillary Close with line of sight to the marquee, and 68dB at the rear façades of properties on Fulham Road. Such high noise levels at this location would be clearly noticeable, would require residents to keep all windows and doors shut, and even with typical glazing closed this would still result in internal levels significantly in excess of the relevant British Standard⁴ for acceptable internal ambient noise level in dwellings.
- 5.17 The remainder of Mr Joynes' report appears to have been extracted from a festival-style noise management plan with references to generators, off-site monitoring, stage managers, and arenas: all terms which are not relevant to this application.

6.0 Discussion

- 6.1 No evidence is given that Mr Joynes has visited the site and he does not make any reference to the existing noise levels at the site. With the exception of match days, the dominant sources of noise in the area are road traffic and some commercial aircraft activity in the day and evening. Later into the evening, and at night, noise levels at the façades of properties facing the application site will have dropped to the extent that people will be able to sleep with their windows open for ventilation and not be disturbed.
- 6.2 The applicant's noise management strategy report meanders though a selection of vague suggestions for noise control which may have some relevance to a one-off festival-type event, but do not promote relevant best-practice processes for this application where licensable activities are sought, out of doors, for regular use of the site throughout the year.
- 6.3 Mr Joynes gives no indication of noise source levels for the sound system, attenuation due to distance separation to the noise sensitive receptors, and therefore the resultant noise levels at receptor positions. Without this information it

⁴ BS8233:2014 states that for steady external noise sources, it is desirable that the internal ambient noise level in dwellings does not exceed the guideline values of 35 dB L_{Aeq} during the day and 30dB L_{Aeq} at night.

is not possible for officers, residents, or the licensing sub-committee, to assess the potential impact from the proposed licensable activities.

- 6.4 In section 6 of his report Mr Joynes states that any amplified music will be ambient/incidental music. This statement appears at odds with other elements of the application which speak of corporate events, including functions, experiential, hospitality event or social activities. However his statement is to be welcomed amongst the contradictions of his report as the use of low-level background music, at such a level that would not be classed as regulated entertainment, is a sensible approach: the physical structure or a marquee provides little, if any, attenuation of sound and therefore only very low-level music would be acceptable at this location.
- 6.5 Mr Joynes' failure to calculate crowd noise, particular of a large crowd of up to 400 people, is a significant shortcoming of the report. My own calculations indicate that crowd noise alone is so significant as to have a marked and detrimental impact on a number of residents near to the application site.
- 6.6 Mr Joynes also fails to reference the Hammersmith & Fulham Statement Of Licensing Policy⁵. A marquee provides very little attenuation to noise and effectively no attenuation of low frequency sounds from music. Mr Joynes, sensibly, does not suggest otherwise. A marquee should therefore be treated as an outside space. The H&F SLP states that *"Licensees and certificate holders should take reasonable steps to prevent the occurrence of ... public nuisance immediately outside their premises, for example on the pavement, in a beer garden or in a smoking area, to the extent that these matters are within their control"* (page 30). The SLP recommends in the section on public nuisance, *"Limiting the number of people permitted to use a garden or other open-air areas, including those for the use of smoking, at any one time"* (page 39, b, vi.). The SLP also advises *"Restricting the use of a garden or other open-air areas, including those for the use of smoking, after a particular time e.g. 11:00pm (or such earlier time as may be considered appropriate)"* (page 39, b, vii.). Finally the advice from the SLP on external areas is *"External areas such as gardens can be the source of noise disturbance to surrounding premises. Consider limiting the use of the garden to a reasonable time and number of people"* (page 40, n.). It is essential that the caution with which outside spaces are considered in the SLP is extended to the use of marquees as, in acoustic terms, a marquee is an outside space as it provides insignificant levels of attenuation to sound.

7.0 Conclusions

- 7.1 Big Sky Acoustics Ltd was instructed by Mr Gareth Hughes of Keystone Law Limited, acting on behalf of Kate Reardon, to carry out a technical review of the noise evidence prepared for the applicant by Mr Simon Joynes of Joynes Nash Ltd.
- 7.2 The failure of Mr Joynes to reference existing noise levels at this location and to predict the source noise levels from use of the marquee, including the noise from

⁵ London Borough of Hammersmith & Fulham Statement of Licensing Policy 2022 - 2027

amplified music and speech, and also from crowd noise, does not assist the licensing committee in evaluating the impact from noise. This application introduces a significant new noise into the area at times outside the traditional match-day noises, and this new noise source is in close proximity to residential façades. The proposal would likely result in noise at a level that would be a statutory nuisance, and a public nuisance, and there is no numerical evidence presented by Mr Joynes to indicate that this would not be the case or that it could be controlled.

- 7.3 No details are provided of the proposed loudspeaker system, where it would be located and how it would be controlled. There are no details of the source noise level (i.e. how loud it would be) or calculations of the noise level from 400 people in a marquee. Mr Joynes does state, in Section 6 of his report, that **"any such provision will be ambient/incidental music"** and that is a point on which we agree: anything louder than the lowest level background music, would not be acceptable. It is not clear why the application is applying for regulated entertainment in the form of live and recorded music when the applicant's own expert's recommendation is to only have ambient/incidental music in the marquee.
- 7.4 Mr Joynes makes no reference to Hammersmith & Fulham's SLP, but the SLP is clear that both numbers of patrons, and hours of use, are important considerations when it comes to the use of outdoor spaces. I am not aware of any pub beer garden in the Borough that would allow 400 patrons, and regulated entertainment, until 01:00hrs and certainly nothing of this size and scale within 20 metres of residential properties.
- 7.5 My professional opinion is that the application as presented would have the potential to cause changes in behaviour such as closing windows, not being able to use external amenity spaces such as gardens, and not being able to rest or sleep in rooms with façades facing the application site even with windows closed. There remains a possibility that a marquee could be used during the daytime for low-key events without amplified speech and music, but a detailed survey of the site would still be required to demonstrate that such a use would promote the licensing objectives and that information is not in front of the committee at this time.
- 7.6 The location of a marquee for events with up to 400 people at a close proximity to residential properties is very likely to be detrimental to the licensing objectives and result in noise that will be a public nuisance. No satisfactory evidence is presented by Mr Joynes to suggest that the prevention of public nuisance objective would be upheld and therefore the application should be refused.



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Appendix A - Terminology

Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 140 dB (threshold of pain).

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz. Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

A-weighting

The ear does not respond equally to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dBA. A change of 3dBA is the minimum perceptible under normal everyday conditions, and a change of 10dBA corresponds roughly to doubling or halving the loudness of sound.

C-weighting

The C-weighting curve has a broader spectrum than the A-weighting curve and includes low frequencies (bass) so it can be a more useful indicator of changes to bass levels in amplified music systems.

Noise Indices

When a noise level is constant and does not fluctuate over time, it can be described adequately by measuring the dB level. However, when the noise level varies with time, the measured dB level will vary as well. In this case it is therefore not possible to represent the noise level with a simple dB value. In order to describe noise where the level is continuously varying, a number of other indices are used. The indices used in this report are described below.

- L_{eq}** The equivalent continuous sound pressure level which is normally used to measure intermittent noise. It is defined as the equivalent steady noise level that would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic the L_{eq} is dominated by the higher noise levels measured.
- L_{Aeq}** The A-weighted equivalent continuous sound pressure level. This is increasingly being used as the preferred parameter for all forms of environmental noise.
- L_{Ceq}** The C-weighted equivalent continuous sound pressure level includes low frequencies and is used for assessment of amplified music systems.
- L_{Amax}** is the maximum A-weighted sound pressure level during the monitoring period. If fast-weighted it is averaged over 125 ms, and if slow-weighted it is averaged over 1 second. Fast weighted measurements are therefore higher for typical time-varying sources than slow-weighted measurements.
- L_{A90}** is the A-weighted sound pressure level exceeded for 90% of the time period. The L_{A90} is used as a measure of background noise.

Example noise levels:

Source/Activity	Indicative noise level dBA
Threshold of pain	140
Police siren at 1m	130
Chainsaw at 1m	110
Live music	96-108
Symphony orchestra, 3m	102
Nightclub	94-104
Lawnmower	90
Heavy traffic	82
Vacuum cleaner	75
Ordinary conversation	60
Car at 40 mph at 100m	55
Rural ambient	35
Quiet bedroom	30
Watch ticking	20

Appendix B - Application site

