Sound Control Strategy
Cockfosters Festival 25 - 27th May 2019

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On behalf of: Fancy Fair Markets Limited
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1.0 Introduction

1.1 Big Sky Acoustics Ltd is one of the leading specialists of the control of noise in the licensed music and entertainment sector in the UK. The Principal Consultant at Big Sky Acoustics is Richard Vivian. He has over 25 years experience in precision sound measurement and control. He has developed sound management policies and provided real-time sound monitoring for events and prestigious venues throughout the UK.

1.2 Cockfosters Festival is organised and run by Fancy Fair Markets Limited and is a family fun event with various entertainment attractions held at the Bramley Sports Ground. This three-day event comprises of big top circus shows, trade and craft stalls, catering stalls, a full funfair and the labyrinth which is the largest inflatable assault course in the world. There will be various music throughout the event with an 80's music lounge bar featuring Ska Reggae and 80's pop. Music is programmed on each of the three days from 13:00hrs until 21:30hrs.

1.3 The Bramley Sports Grounds is predominantly a rugby training ground which has some facilities on the site. Located close to public transport links and main roads, the venue is easy to access and lends itself to an event of this type.

1.4 There will be noise monitoring throughout the event to ensure license conditions are adhered to and levels do not exceed the conditional limit which appears on the license. This will be carried out by Abby Freed (Health & Safety Advisor, Southwood Events Limited) throughout intervals of the day. There will also be monitoring provided by the audio visual company.

1.5 A sound propagation model has been developed for the event stage location on the event site and is used to predict the sound levels at residential property receptor positions. The model is based on theoretical prediction methods and practical experience of monitoring music events at locations across the UK. By adjusting the stage sound level the model can demonstrate that sound from music will be in compliance with industry guidance in areas where there are residential properties. The model can be further refined with real-time data as the event progresses.

1.6 A comprehensive set of measures are planned to control environmental noise beyond the perimeter of the site and to minimise off-site sound levels.

1.7 This document demonstrates that sound control is a fundamental management objective for the event organiser and both pre-emptive and re-active procedures will be in place to address any concerns regarding noise.

2.0 Assessment standards and guidance

2.1 The accepted guidance document for noise from infrequent outdoor music events is the 'Code of Practice on Environmental Noise Control at Concerts', The Noise Council, 1995, also known as 'The Pop Code'. The music noise level guidance pages from the code of practice are shown in Appendix D.

2.2 With regard to statute the provisions of the Environmental Protection Act 1990, the Noise Act 1996, The Clean Neighbourhoods and Environment Act 2005 and (for licensed premises) The Licensing Act 2003 provide protection to the general public from the effects of noise nuisance.

2.3 Management of statutory nuisance is set out in Part III of the Environmental Protection Act 1990. The act places a duty on a local authority to investigate complaints of statutory nuisance from people living within its area.

2.4 The Clean Neighbourhoods and Environment Act 2005 was introduced after consultation with stakeholders. Its purpose was to strengthen existing legislation to help District Councils deal more effectively with a wide range of problems associated with local environmental quality and introduces both extra powers, and extra flexibility to previous environmental legislation.

2.5 The Noise Act provides the assessment methodology that between the hours of 11pm and 7am the permitted level for noise within complainants' premises, with the windows shut, is 34 dB $L_{Aeq,5mins}$ if the underlying level of noise is no more than 24 dBA, or 10dBA above the underlying level of noise where this exceeds 24 dBA.

2.6 One of the four statutory objectives under the Licensing Act 2003 is the prevention of public nuisance. Public nuisance is not narrowly defined in the 2003 Act and retains its broad common law meaning. It is important to remember that the prevention of public nuisance could therefore include low-level nuisance, perhaps affecting a few people living locally, as well as major disturbance affecting the whole community. It may also include in appropriate circumstances the reduction of the living and working amenity and environment of other persons living and working in the area of the licensed premises. Licensing authorities should be aware of the need to avoid inappropriate or disproportionate measures that could deter events that are valuable to the community, such as live music. As with all conditions, those relating to noise nuisance may not be appropriate in certain circumstances where the provisions of the Environmental Protection Act 1990, the Noise Act 1996, or the Clean Neighbourhoods and Environment Act 2005 adequately protect those living in the area of the premises.

2.7 In summary, the only defined statutory objective limit level for noise from licensed premises or a temporary event is that defined as the *permitted level* under the Noise Act 1996. However in minimising the likelihood of any inconvenience to local residents it is important that efforts are made to ensure that noise levels are kept below that which could give rise to permitted level being exceeded in a complainant's premises. The Pop Code introduces its own specific guidance levels and it is noteworthy that daytime levels in the guidance may be considered high by some complainants and this reflects the infrequent nature of events. However the night-time levels, by comparison are strictly limited.

3.0 Sound control measures

3.1 Operational measures have been proposed to control environmental sound levels and to reduce overall levels beyond the audience areas. A particular emphasis is placed on finishing the event at the prescribed finish time ensuring that noise levels in the community are strictly controlled beyond 21:30hrs.

3.2 On and off-site sound monitoring will be carried out during the event by the Health & Safety Advisor.

3.3 Real-time sound monitoring allows reactive control of noise ensuring that any noise issues that arise off-site due to changing conditions are rectified on site with revised sound system limits. They also assist with engaging with the local community.

3.4 Regular off-site monitoring positions will include five locations shown in Figure 1. Additional monitoring positions will be selected as conditions dictate.

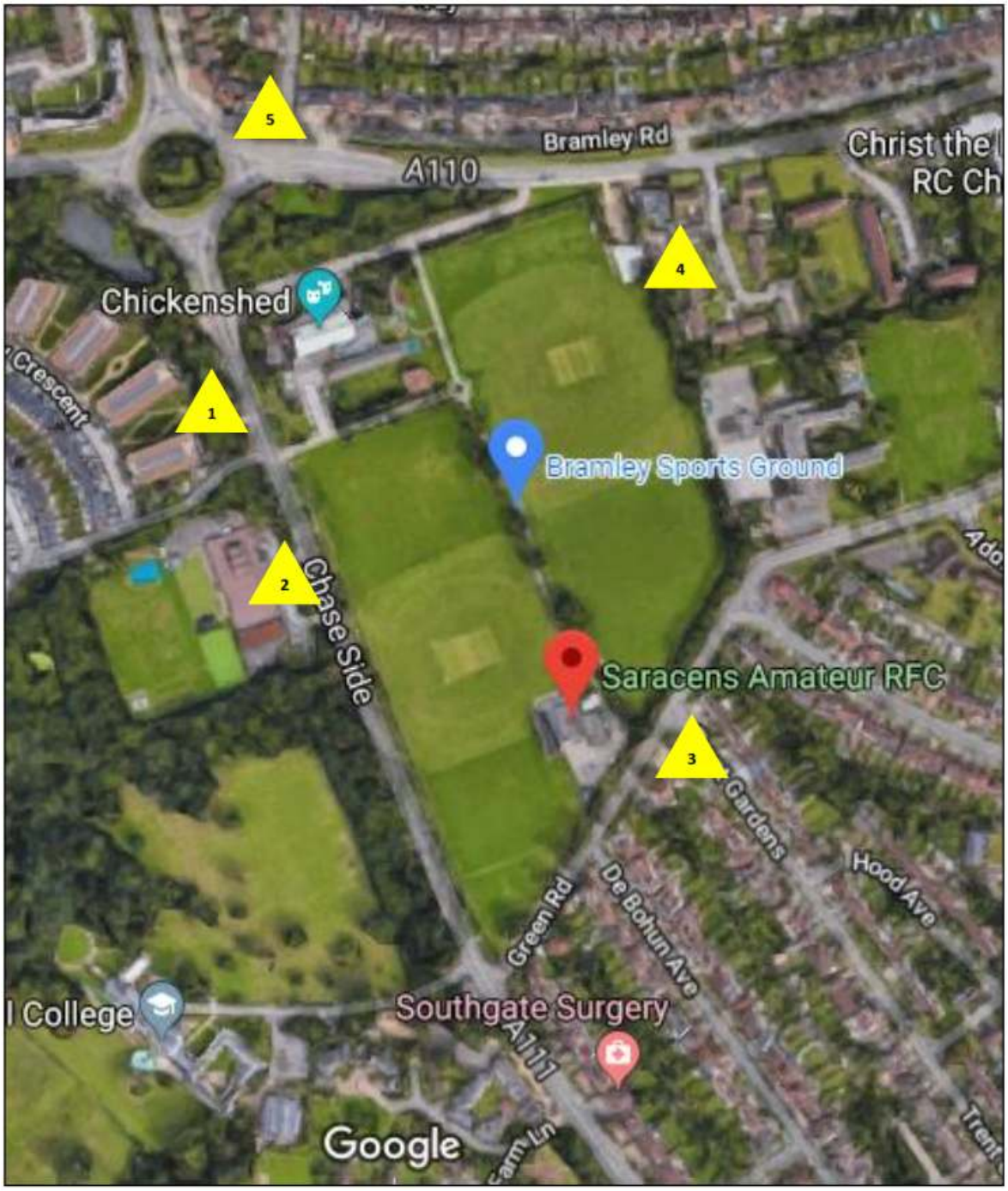

Figure 1: Off-site noise monitoring positions as proposed by event organiser

3.5 Noise data from the prediction model provides a useful starting-point for acceptable operating sound limits at the stage that can then be tailored for the specific sound system design, stage layout and real-time meteorological conditions.

3.6 Communication from the Health & Safety Advisor to the sound stage system technician should be clear and concise ensuring a fast response and adjustment of sound levels.

3.7 Sound monitoring and control must not only consider music noise but should extend to all noise sources including plant operation and vehicle movements. Preventative measures will be taken to minimise or eliminate all such noise.

4.0 Working with the local community

4.1 A dedicated number will be set up and available for local residents to contact should there be a complaint about noise. This will be held with the event team and the number is 07741 911183. The phone line will be at all times there is event activity on the site on both event days.

4.2 Any additional complaints reported by environmental health officers or police officers will also be logged and investigated.

4.3 Investigation of a noise complaint can include a visit to the local resident if they wish and assessment of the sound from that location by a competent person on the events team. Results from any sound measurement equipment and subjective evaluation will be recorded.

4.4 Where action is deemed necessary the source of the sound will be identified and corrective measures will be taken as quickly as possible.

4.5 It is important to reassure the public that this is a three-day event with rigid licensing controls over the operation including a defined finishing time programmed as 21:30 and not exceeding 22:00hrs. It is not an unlicensed party (rave) nor is it a nightclub with inadequate soundproofing causing ongoing disturbance on a nightly basis with no end. It is a well publicised event and residents are aware of the event in advance. Controls will be put in place to minimise disturbance so far as is reasonably practical. It is also recognised that local residents have a right not to be unduly disturbed by reason of noise regardless of the nature of an event.

5.0 Sound system specification

5.1 The site is open and relatively flat. A degree of masking noise, particularly in the daytime, is afforded by the local road network.

5.2 Consideration will been given to sound system design and configuration ensuring that sound is concentrated in the audience area and sound propagation off site is limited where possible by good system design.

5.3 Loudspeakers will be configured to provide controlled directivity ensuring a smooth even response across the proposed audience area while controlling dispersion beyond the main audience area. Mid-hi loudspeakers will be configured to ensure a coverage pattern directed down onto the audience areas thereby reducing the amount of sound that is *thrown* beyond the audience area.

5.4 Bass loudspeakers will be ground stacked and arrayed for smoothest coverage in the audience area. Bass loudspeakers will be mono summed.

5.5 In addition to the normal safety controls on the sound system system such as amplifier clip limiters, an additional compressor-limiter will be fitted across the desk L+R output to provide overall maximum level control for the system. Threshold and compression ratios will be set in agreement with the Environmental

Health Officer on site at the start of an event and this will define a maximum sound level beyond which the system will not be able to operate.

5.6 Specific control of low frequency energy is achieved through parametric EQ.

5.7 Line checks will be carried out with the sound system operating at low power levels. Full power technical checks will not be permitted before the event start time.

5.8 The sound system will be assessed for sound propagation off-site. In order to minimise disturbance it is recommended these initial checks occur during the early part of the opening set. Technical crews must be aware that a certain amount of system tuning and configuration may be required by the Event Team during the early part of an event as levels are optimised.

5.9 Beyond the scheduled performance times the sound system must be completely switched off. In order to achieve this it is the responsibility of the stage manager to ensure that the act performing the final set will be given a countdown of 20 minutes, 10 minutes, 5 minutes, and 1 minute to ensure the set finishes on time. No further amplified music will occur beyond the scheduled finish time for the event.

6.0 Sound propagation model

6.1 The propagation model uses typical average operating levels for the stage to assess the feasibility of the site. Meteorological conditions can introduce significant variability in off-site conditions which will dictate actual stage levels during the event.

6.2 Operating levels are comfortably within Pop Code guideline levels. All music is programmed to finish by 21:30hrs.

Figure 2: Receptor locations for initial monitoring

Cockfosters Festival; 25 - 27th May 2019						
Bramley Sports Ground, Green Road, London N14 4AB						
Noise propagation model:	Provisional stage levels					
	Prepared by: Richard Vivian, Big Sky Acoustics Ltd					
	Last revision: 16 April 2019					
		Day		**Night (after 21:30)**		
Stage nominal operating levels	**Genre**	**Max dBA @ FOH**		**Max dBA @ FOH**		**Comments**
Main Stage	Main music stage	98		0		Stage times 13:00-21:30
Monitoring Position Receptor 1						
	Separation distance/m	**Noise contribution, day**		**Noise contribution, night**		
Main Stage	195	52.2		0.0		
al contribution at Position North West:		**52**	**dBA**	**0**	**dBA**	New build flats with balconies. Off axis to stage.
Monitoring Position Receptor 2						
Main Stage	130	55.7		0.0		
Total contribution at Position West:		**56**	**dBA**	**0**	**dBA**	Oak Tree School (non-resi). Off axis to stage. Some LF issues due to proximity.
Monitoring Position Receptor 3						
Main Stage	190	52.4		0.0		
al contribution at Position South East:		**52**	**dBA**	**0**	**dBA**	End of The Fairway. 30's build houses. Road noise. Behind stage.
Monitoring Position Receptor 4						
Main Stage	250	50.0		0.0		
al contribution at Position North East:		**50**	**dBA**	**0**	**dBA**	Bramley Close. Quieter 70s development away from roads.
Monitoring Position Receptor 5						
Main Stage	310	48.2		0.0		
Total contribution at Position North:		**48**	**dBA**	**0**	**dBA**	Significant spearartion distance and road noise here. 30s semis.

Figure 3: Simplified propagation modal

7.0 Summary

7.1 This document presents the Sound Control Strategy for the Cockfosters Festival 2019 at Bramley Sports Ground. A range of sound management tools will be implemented during the preparation and operation of events.

7.2 This first event will be continuously monitored by the Event Team who will work in close co-operation with officers from Enfield Council.

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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 i 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.

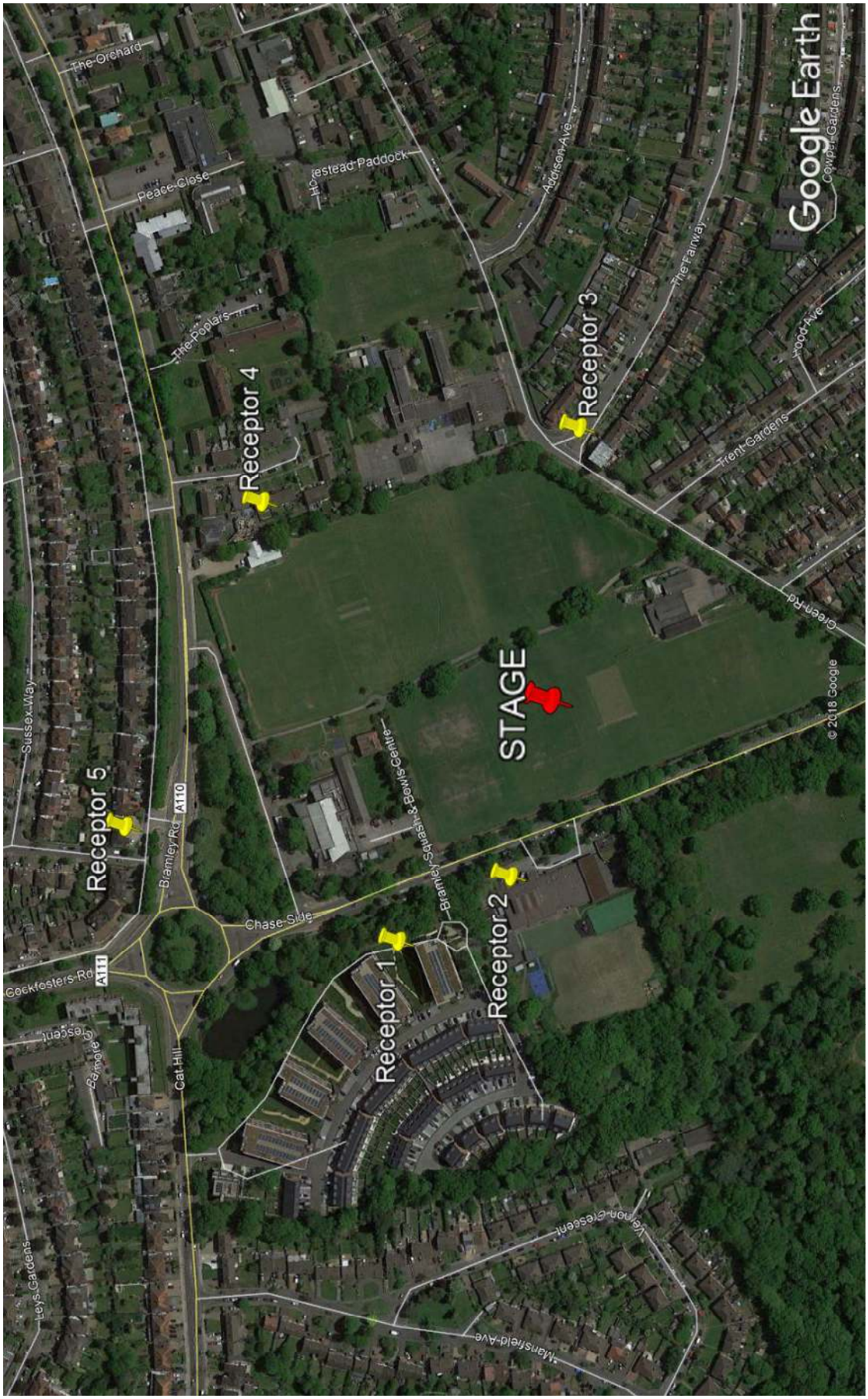
L_{Amax} is the maximum A-weighted sound pressure level during the monitoring period. If fast-weighted it is averaged over 125 ms , and if slow-weighted it is averaged over 1 second. Fast weighted measurements are therefore higher for typical time-varying sources than slow-weighted measurements.

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.

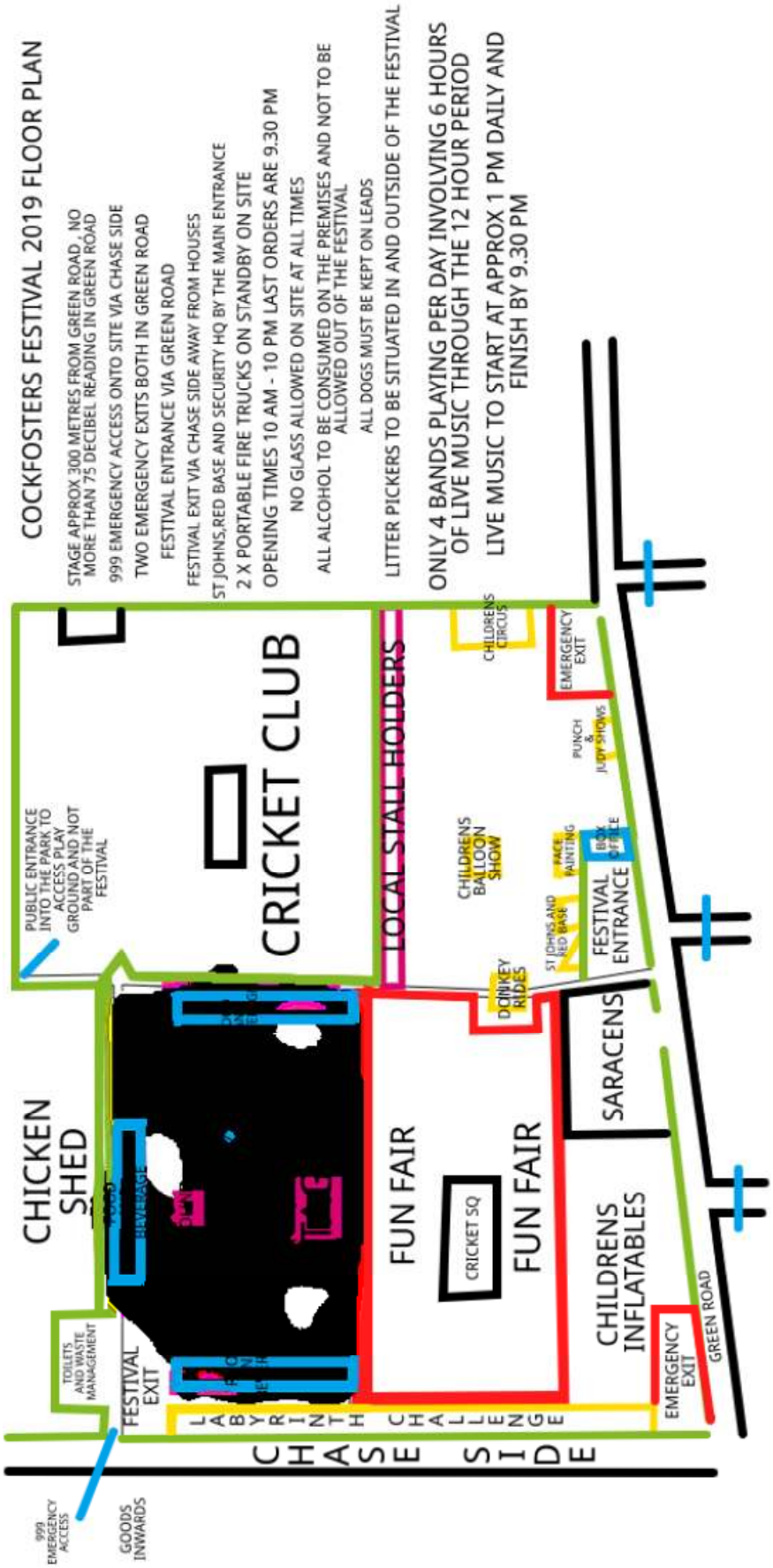
Example noise levels:

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 - Site location



Appendix C - Site plan



Appendix D - The Pop Code, guidelines

3. GUIDELINES

3.1 The Music Noise Levels (MNL) when assessed at the prediction stage or measured during sound checks or concerts should not exceed the guidelines shown in Table 1 at 1 metre from the façade of any noise sensitive premises for events held between the hours of 09.00 and 23.00.

TABLE 1

Concert days per calendar year, per venue	Venue Category	Guideline
1 to 3	Urban Stadia or Arenas	The MNL should not exceed 75 dB(A) over a 15 minute period
1 to 3	Other Urban and Rural Venues	The MNL should not exceed 65 dB(A) over a 15 minute period
4 to 12	All Venues	The MNL should not exceed the background noise level by more than 15 dB(A) over a 15 minute period

Notes to Table 1

1. The value used should be the arithmetic average of the hourly L_{A90} measured over the last four hours of the proposed music event or over the entire period of the proposed music event if scheduled to last for less than four hours.

2. There are many other issues which affect the acceptability of proposed concerts. This code is designed to address the environmental noise issue alone.

3. In locations where individuals may be affected by more than one venue, the impact of all the events should be considered.

4. For those venues where more than three events per calendar year are expected, the frequency and scheduling of the events will affect the level of disturbance. In particular, additional discharges can arise if events occur on more than three consecutive days without a reduction in the permitted MNL.

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.

6. Account should be taken of the noise impact of other events at a venue. It may be appropriate to reduce the permitted noise from a concert if the other events are noisy.

7. For venues where just one event has been held on one day in any one year, it has been found possible to adopt a higher limit value without causing an unacceptable level of disturbance.

3.2 For events continuing or held between the hours 23.00 and 09.00 the music noise should not be audible within noise-sensitive premises with windows open in a typical manner for ventilation.

Notes to Guidelines 3.2

1. The use of inaudibility as a guideline is not universally accepted as an appropriate method of control. References 6 & 7 (Appendix 1) set out the various issues. This guideline is proposed as there is insufficient evidence available to give more precise guidance.

2. Control can be exercised in this situation by limiting the music noise so that it is just audible outside the noise sensitive premises. When that is achieved it can be assumed that the music noise is not audible inside the noise sensitive premises.

3.3 The nature of music events means that these guidelines are best used in the setting of limits prior to the event (see 4.0).

3.4 Assessment of noise in terms of dB(A) is very convenient but it can underestimate the intrusiveness of low frequency noise. Furthermore, low frequency noise can be very noticeable indoors. Thus, even if the dB(A) guideline is being met, unreasonable disturbance may be occurring because of the low frequency noise. With certain types of events, therefore, it may be necessary to set an additional criterion in terms of low frequency noise, or apply additional control conditions.

Notes to Guideline 3.4

1. It has been found that it is the frequency imbalance which causes disturbance. Consequently there is less of a problem from the low frequency content of the music noise near to an open air venue than further away.

2. Although no precise guidance is available the following may be found helpful (Ref.8): A level up to 70 dB in either of the 63 Hz or 125 Hz octave frequency band is satisfactory; a level of 80 dB or more in either of those octave frequency bands causes significant disturbance.

3.5 Complaints may occur simply because people some distance from the event can hear it and that, consequently, they feel the music must be loud even though the guidelines are being met. In fact topographical and climatic conditions can be such that the MNL is lower at locations nearer to the venue.

3.6 Although care has been taken to make these guidelines compatible with what occurs at existing venues, this may not be the case at every location. Where arrangements are satisfactory with either higher or lower noise levels than those contained in the guidelines, these limits should continue.

3.7 It has been found that if there has been good public relations at the planning stage between the event organisers and those living nearby, annoyance can be kept to a minimum.

3.8 The music noise level should be measured using an integrating-averaging sound level meter complying with type 2 or better of BS6698. The background noise level should be measured using a sound level meter complying with type 2 or better of BS5969. Time weighting F (fast response) should be used.

3.9 When measuring L_{Aeq} in order to determine the music noise level, care must be taken to avoid local noise sources influencing the result. When the local noise is intermittent, a series of short term L_{Aeq} measurements should be made of the music noise while the local source is absent or has subsided to typically low or mean minimum values. An average of these short term readings will give an estimate of the music noise level. A further option would be to measure the A-weighted sound pressure level on a sound level meter complying with type 2 or better of BS5969 with the time weighting set to S (slow response) when the music is loudest and not influenced by local noise. If the local source is continuous, make a measurement of the L_{Aeq} of the local source when the music is not occurring, and make a correction to the measured L_{Aeq} when the music is occurring to obtain an estimate of the music noise level.

3.10 The nature of many concerts requires the sound volume level to be increased during the event to enhance the performance. The prevailing noise control restrictions should be borne in mind so that the sound volume at the start of the event is not too high, hence allowing scope for an increase during the event.

3.11 Some concerts are accompanied by associated activities (eg fairgrounds) which can be noisy. These should be taken into account when setting the limit for the music noise level.

3.12 When monitoring the music noise level, the sound of the audience applause can be a significant contributor. It is not possible to address this issue precisely; instead it is recommended that any such effect be noted.