Noise impact assessment
Temporary use of the North Yard for Big Screen Events
The Stables Market, Chalk Farm Road, NW1 8AH

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On behalf of: The Camden Market Management Company Limited
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Executive summary

An assessment of the impact of noise from the proposed temporary use of a cinema screen in The North Yard of The Stables Market has been carried out.

The proposed screen location is contained within the market complex and substantially shielded from residential properties by buildings in all directions. The sound system used in conjunction with the screen will consist of three small professional loudspeakers which will be configured using a digital amplifier and locked so that a pre-defined maximum sound level cannot be exceeded. Operational controls including a detailed Event Management Plan and regular assessment of sound levels around the site will be implemented.

This assessment has considered both national and local planning policy, licensing policy and other relevant standards and guidance. The operation of big screen events at this location will not have a negative impact on residential amenity, or adversely impact on the licensing objectives, as activity is contained within the market site, all amplified sound is controlled by a tamper-proof gain control within the digital amplifiers, and best-practice operational policies will be in place to ensure any noise generating activity is minimised.

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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, the Audio Engineering Society and the Institute of Licensing.

1.3 I have 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, at Planning Hearings and at Public Inquiries on many occasions.

2.0 Introduction

2.1 Big Sky Acoustics Ltd was instructed by Steph Dye of The Camden Market Management Company Limited, to carry out an assessment of the impact of noise from the proposed temporary use of a cinema screen in the North Yard of the Stables Market.

2.2 The proposal is to create the *'North Yard Summer Series'* which would be a series of film, food and community events attracting a local London audience, including families during the day and an older audiences in the evening.

2.3 The North Yard is an enclosed yard, lined with restaurants and cafés. The series of events will run in line with the standard opening hours of the restaurants.

2.4 Events will be staged within the time-window of 10:00hrs to 22:00hrs.

2.5 This report was prepared following detailed discussions with the management team at Camden Market and a technical discussion with the production company supplying the sound system for the screen. I have carried out numerous noise measurement surveys and observations in the market area (pre-Covid-19).

2.6 A glossary of acoustical terms used in this report is provided in Appendix A. All sound pressure levels in this report are given in dB re: 20µPa.

3.0 Site and surrounding area

3.1 The location of the site is shown in Appendix B.

3.2 I am familiar with the North Yard on the market site having visited the area many times including in a professional capacity to carry out noise assessments at the site and inspections of other premises in the immediate area.

3.3 The noise climate at this location is characterised by continuous traffic, rail noise, commercial aircraft and significant pedestrian footfall as well as general activity in the market area. Daytime and early evening activity on the market site is primarily retail and food led, and in the summer there is significant footfall from visitors to Camden. The commercial office space in the area also contributes to daytime footfall. There is activity in the evening associated with restaurants, bars and other leisure uses both on the market estate and in the wider Camden area.

3.4 It is important when assessing the impact of noise from a new licensable activity in an area that the concept of *additional* noise associated with the new activity is taken into account. The incremental change to noise levels caused by the normal operation of the big screen where there is already established noise and activity, and where there is substantial shielding provided by the structure of the market buildings that surround the site, would be so small as to be undetectable at residential properties when it is screened and masked by the existing noise in the area.

4.0 Criteria

NPPF

4.1 The revised National Planning Policy Framework (NPPF) was published by the Ministry of Housing, Communities and Local Government on 24 July 2018 (last updated 19 February 2019) and sets out the government's planning policies for England and how these are expected to be applied. This revised Framework replaces the previous NPPF published in March 2012.

4.2 References to noise can be found in Section 15 titled "Conserving and enhancing the natural environment". The NPPF states at Paragraph 170 sub-paragraph (e) *"Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans".*

4.3 The NPPF states at Paragraph 180 that *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting*

from noise from new development - and avoid noise giving rise to significant adverse impacts on health and the quality of life; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason".

4.4 The comments about *adverse impacts on health and quality of life* are referenced (in the NPPF at footnote 60) to the Noise Policy Statement for England (NPSE) published by the Department for Environment, Food & Rural Affairs in 2010. The NPSE is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

4.5 The NPSE sets out the Government's long-term vision to *'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development'* which is supported by the following aims:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life.*

4.6 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as *'the level above which significant adverse effects on health and quality of life occur'*. The following guidance is provided within the NPSE: *'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.'*

4.7 The Planning Practice Guidance (PPG) on Noise published by Ministry of Housing, Communities & Local Government in March 2014 (last updated 22 July 2019) is written to support the NPPF with more specific planning guidance on how planning can manage potential noise impacts in new development.

4.8 The PPG reflects the NPSE and states at Paragraph 001 that noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced).

4.9 The PPG clarifies at Paragraph 002 that it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern.

4.10 The PPG expands upon the concept of SOAEL (together with Lowest Observed Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in

the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.

4.11 Figure 1 is reproduced from PPG Paragraph 005 and summarises the noise exposure hierarchy, based on the likely average response.

Perception	**Examples of Outcomes**	**Increasing Effect Level**	**Action**
No Observed Effect Level (NOEL)			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Figure 1: PPG Noise Exposure Hierarchy Table (revision date: 22 07 2019)

4.12 The PPG at Paragraph 005 considers that a noise impact with an effects level which is lower than SOAEL is acceptable but that consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise). When the significant observed adverse effect level boundary is crossed noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused. At the highest extreme, noise exposure would cause extensive and sustained adverse changes in behaviour and/or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided.

The London Plan

4.13 Strategic planning in London is the shared responsibility of the Mayor of London, 32 London boroughs and the Corporation of the City of London. Under the legislation establishing the Greater London Authority (GLA), the Mayor has to produce a spatial development strategy (SDS) – which has become known as 'the London Plan' – and to keep it under review. Boroughs' local development documents have to be 'in general conformity' with the London Plan, which is also legally part of the development plan that has to be taken into account when planning decisions are taken in any part of London unless there are planning reasons why it should not.

4.14 The management of noise is about encouraging the right acoustic environment in the right place at the right time – to promote good health and a good quality of life within the wider context of achieving sustainable development. It is important that noise management is considered as early as possible in the planning process, and as an integral part of development proposals. In certain circumstances it can also mean preventing unacceptable adverse effects from occurring. Managing noise includes improving and enhancing the acoustic environment and promoting appropriate soundscapes. This can mean allowing some places or certain times to become noisier within reason, whilst others become quieter, and where appropriate could include considering the noise sensitivity of receptors at internationally important nature conservation sites. Noise management includes promoting good acoustic design of buildings whenever opportunities arise. See, for example, the guidance on planning and design in Section 5 of BS 8223:2014. It will include traditional and innovative noise reduction measures in otherwise unacceptable situations. It can also encompass deliberately introducing wanted sounds designed

to mitigate the adverse impact of existing sources of noise or to enhance the enjoyment of the public realm or the protection of relative tranquillity and quietness where such features are valued. The Mayor's published Ambient Noise Strategy contains policies and proposals on noise related to road and rail traffic, aircraft, water transport and industry. The London Plan addresses the spatial implications of the Ambient Noise Strategy.

4.15 The London Plan states that development proposals should seek to manage noise by:

a. avoiding significant adverse noise impacts on health and quality of life as a result of new development;

b. mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens on existing businesses;

c. improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);

d. separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation;

e. where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles;

f. having particular regard to the impact of aviation noise on noise sensitive development;

g. promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.

Camden Local Plan Policies A4 and A1

4.16 The Local Plan was adopted by Camden Council on 3 July 2017 and has replaced the Core Strategy and Camden Development Policies documents as the basis for planning decisions and future development in the borough. Noise and vibration can have a significant impact on amenity, quality of life and well being. Local Plan Policies A4 (Noise and vibration) and A1 (Managing the impact of development) seek to protect residents of both existing and new residential developments and the occupiers of other noise-sensitive developments from the adverse effects of noise and vibration.

4.17 Appendix 3 of the Local Plan supports these policies and sets out expected

standard in terms of noise and vibration. A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion.

Camden Planning Guidance - Amenity

4.18 The Council has prepared this guidance to support the policies in the Camden Local Plan 2017. It is a formal Supplementary Planning Document (SPD), which is therefore a "material consideration" in planning decisions. The section on Noise & Vibration within the CPG provides guidance regarding the application of Local Plan Policies A4 Noise and vibration and A1 Managing the impact of development, which seek to protect residents of both existing and new residential developments and the occupiers of other noise-sensitive developments from the adverse effects of noise and vibration. Appendix 3 of the Local Plan supports these policies and sets out expected standard in terms of noise and vibration.

4.19 The CPG explains that when assessing acoustic reports, the Council will consider the reported measurements against the noise thresholds set out in Appendix 3 of the Local Plan. The thresholds are expressed as 'effect levels', which sets out a hierarchy of expected changes in behaviour and impact on health and wellbeing in response to increasing noise levels (measured in decibels - dB). The 'effect levels' are summarised below and explained in detail in National Planning Practice Guidance (NPPG). The table detailing each 'effect level' from NPPG is also set out in Appendix 1 to this guidance for ease of reference.

Licensing Act 2003

4.20 The Licensing Act 2003 requires Camden Council, in its role as Licensing Authority, to carry out its various licensing functions so as to promote the following four licensing objectives:

- The prevention of crime and disorder
- Public safety
- The prevent of public nuisance
- The protection of children from harm

4.21 Each objective is of equal importance. It is important to note that there are no other licensing objectives, therefore these four are of paramount importance at all times. The Licensing Authority must base its decisions, in relation to determining applications and attaching any conditions to licences, on the promotion of these licensing objectives.

4.22 The Licensing Act 2003 further requires this Licensing Authority to publish a Statement of Licensing Policy (SLP) that sets out the policies the Licensing Authority will generally apply to promote the licensing objectives when making decisions on applications made under the Act. The current SLP replaces a previous SLP published on 31 January 2016 and covers the period from 31 January 2017 to 30 January 2022.

Other relevant legislation

4.23 In addition to the protection afforded under planning controls and the Licensing Act 2003 members of the public are protected from noise that is a nuisance.

4.24 The Environmental Protection Act 1990 part III deals with statutory nuisance which includes noise. This Act allows steps to be taken to investigate any complaints which may then result in the issuing of an abatement notice and a subsequent prosecution of any breach of the notice. A statutory nuisance is a material interference that is prejudicial to health or a nuisance.

4.25 The Clean Neighbourhoods and Environment Act 2005 deals with many of the problems affecting the quality of the local environment and provides local authorities with powers to tackle poor environmental quality and anti-social behaviour in relation to litter, graffiti, waste and noise. A fixed penalty notice can be issued when noise exceeds the permitted level as prescribed under the Noise Act 1996 as amended by the Clean Neighbourhoods and Environment Act 2005. The permitted noise level using A-weighted decibels (the unit environmental noise is usually measured in) is 34dBA if the underlying level of noise is no more than 24dBA, or 10dBA above the underlying level of noise if this is more than 24dBA.

British Standard 8233

4.26 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 in the table shown below.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Figure 2: Indoor ambient noise levels for dwellings (from BS8233 Table 4)

Operational objectives

4.27 The management team at Camden Market Management Company Limited are keen to continue to promote good relationships with all commercial and residential neighbours. Therefore, in addition to all statutory obligations, it is a primary

operational objective that noise from the normal operation of this temporary event does not have a detrimental impact on the neighbourhood.

5.0 Balancing planning and licensing noise conditions

5.1 The guidance issued under Section 182 of the Licensing Act 2003 is clear in its general principles (Para 1.16) that *"[licence conditions] should not duplicate other statutory requirements or other duties or responsibilities placed on the employer by other legislation"*. Therefore if the objective of the prevention of public nuisance is satisfactorily upheld because there already exist tests of nuisance through The Environmental Protection Act 1990; The Noise Act 1996; and The Clean Neighbourhoods and Environment Act 2005, then additional conditions on a premises licence that merely duplicates these statutory requirements should not be necessary according to Home Office guidance.

5.2 Similarly planning guidance has, for a long time, stated that additional planning conditions which duplicate the effect of other legislation should not be imposed, and current planning practice guidance is clear that conditions requiring compliance with other regulatory requirements will not meet the test of necessity and may not be relevant to planning.

5.3 The pragmatic approach to specifying relevant requirements for noise control conditions would be that more general noise criteria relating to the principle of use of the site are applied under the planning regime; these may include boundary noise conditions or plant operating level limits. More specific requirements relating to licensable activities such as hours of operation or the requirement for noise management procedures are more suitable for implementation and enforcement through the licensing process.

6.0 Existing noise levels in the surrounding area

6.1 Reference to library data[1] held at our officers demonstrates that background noise levels in the early evening in residential roads surrounding the site has been recorded as 54-61dB L_{A90}. Later in the evening levels fall to 48-54dB L_{A90} on quieter residential roads.

7.0 Predicted noise of patrons using North Yard

7.1 The British Beer & Pub Association document titled: *"Effective Management of Noise from Licensed Premises"* provides the following guidance:

[1] Multiple noise surveys in the immediate area from 2017-2020 carried out by Big Sky Acoustics Ltd.

Use of Outside Areas

This noise source, usually shouting or loud voices, is likely to be especially noticeable at night, when noise levels in the external environment are relatively low. In most circumstances people arriving at and leaving the premises will not cause any disturbance, but it does happen and must be acknowledged. It is not only people that cause a disturbance. Their vehicles can also create noise through stereos, slamming doors, revving engines, the horn or screeching tyres for example. Noise can also arise from beer gardens and play areas.

How to control this type of noise:

- *For new-builds and refurbishments consider the positioning of exits from the building and outside areas such as car parks in relation to noise-sensitive premises.*
- *Where noise-sensitive premises may overlook the frontage of a licensed premises then an alternative exit-route possibly onto a rear or side street may minimise disturbance.*
- *Post notices close to exit doors advising that there are residential properties nearby and asking patrons to leave quickly and quietly.*
- *If music has been playing consider reducing the volume and/or playing slower, more mellow music as the evening draws to a close. This often quietens people down before they leave.*
- *For new-builds access roads, car parks and play areas should be kept as far away as possible from noise sensitive properties.*
- *Natural screening should be used and, where appropriate, screening provided by the premises should be utilised.*

7.2 In order to assist in the understanding of actual noise levels produced by people outdoors it is important to understand the effects of the noise source (i.e. people talking) and how that noise level increases as the number of people talking increases.

7.3 Referring to data held in our own library; normal conversation is typically in the range of 55-60dBA when measured at 1 metre. In assessing typical conditions then I have considered that individual dining zones outside each of the 8 food premises will consist of seating arrangements that allow for no greater than 25 people per zone.

7.4 In normal conversation no more than 50% of them would be talking (there will be at least one listener for each talker). If we now consider people to be talking at the upper end of the normal speaking range, and look at a worst case scenarios of half of the people talking concurrently at 60dBA then in order to calculate the total noise level we logarithmically sum 13 sources of 60dB as follows:

$$\sum = 10\log\left(n \times 10^{\left(\frac{60}{10}\right)}\right)$$

where n is the number of people talking

7.5 The formula above gives a value for total sound pressure level for a group of 25 people to be 71dBA[2].

7.6 It is important to remember that this is a worst-case value, when 50% of the people are talking simultaneously and loudly. In reality general lulls in the conversation, smoking, or conversations where there are more than one listener to each talker mean that less than 50% of an average group will be talking simultaneously. I have also observed that groups in close proximity to each other when dining talk with more hushed voices than groups of people spread out when, for example, seated at large tables in a pub beer garden.

7.7 71dBA is the predicted noise from 25 people talking loudly outside when measured at 1 metre. Sound is attenuated in air and this effect is noticeable as the listener moves away from the source.

7.8 In calculating distance attenuation, the noise of people talking is assumed to be a number of discreet point sources and therefore is attenuated by 6dB with each doubling of distance. So if the noise source is 71dBA at 1 metre then at 2 metres it becomes 65dBA, at 4 metres 59dBA.

7.9 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.

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

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.

7.10 Attenuation due to distance means that a separation distance of just 16 metres from the noise source to the receiver position will reduce the noise to below the lowest measured background noise level on a quiet residential street in the area.

7.11 A further, and in this case substantial, attenuation of the noise source is achieved by the insertion of any physical barrier that obscures line-of-sight to the receptor position and this is achieved by all the existing buildings in the North Yard that effectively *cocoon* the event space.

7.12 Inside a residential property all external noise sources are attenuated by the glazing, by the distance from the noise source to the window, and by any physical obstruction of clear line of sight to the noise source. Calculations indicate that the resultant noise level will be significantly below the background noise level at

[2] Alternative calculation method according to Growcott, D (Consideration of Patron Noise from Entertainment Venues, Australian Association of Acoustical Consultants Guideline, Australia, 2009) using $L_{Aeq} = 21*\log(N)+43$ gives 72.4dBA.

residential properties and comfortably in compliance with the relevant standards and guidance, and subjectively inaudible.

8.0 Recommendations for noise control - remedial works

8.1 The site layout and structure already provides screening and containment of noise. No additional works are required at this time.

9.0 Recommendations for noise control - operational

9.1 A range of conditions are proposed on the premises licence application to control noise. Operational policies for noise management, adopting all the best practice applied at other sites in Camden, will be implemented at the site. These policy documents will be regularly reviewed and updated.

10.0 Recommendations for noise control - sound system

10.1 The sound equipment consists of small professional loudspeakers to provide left, centre (dialogue) and right channels for the screen. The loudspeakers specified are D&B E12 mounted 3m off the floor mounted. The E12 is a 2-way co-axial compact loudspeaker and has a nominal dispersion (h x v) of 80° x 50°, frequency response (-5 dB) of 50 Hz-18kHz. No additional sub-bass loudspeakers will be used.

10.2 The system will be checked to ensure that the maximum operating level does not impact on residential amenity at the nearest noise sensitive properties. Assessment should be carried out, wherever possible, from the nearest noise sensitive property itself at a time when ambient noise is at its lowest (but within normal operating hours of the premises). Maximum operating level will be set, locked in the tamper-proof digital processor and documented.

11.0 Conclusions

11.1 Big Sky Acoustics Ltd was instructed by Steph Dye of The Camden Market Management Company Limited, to carry out an assessment of the impact of noise from the proposed temporary use of a cinema screen in the North Yard of the Stables Market.

11.2 This assessment has considered both national and local planning policy, licensing policy and other relevant standards and guidance. Noise from patrons and noise from the controlled big screen sound system will not be detectable at residential properties. Noise will therefore not have a negative impact on residential amenity, or adversely impact on the licensing objectives, as activity is contained within the market site, all amplified sound is controlled by a tamper-proof gain control within

the digital amplifiers, and best-practice operational policies will be in place to ensure any noise generating activity is minimised. With these controls in place there will be No Observed Effect at residential properties from this proposal.

11.3 Given the location, style of operation, effective management of the site as already demonstrated by the applicant, and a willingness to take on board further controls if necessary, it is my professional opinion that the application will not adversely impact on the licensing objectives or have a noticeable effect at residential properties as the controlled activities within the market site would not result in a detectable increase in noise levels at residential properties.

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Appendix A - Glossary

Sound Pressure Level and the decibel (dB)
A sound wave is a 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 and in order to cope with this wide range 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 levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 140 dB (threshold of pain). If two sources of the same sound pressure level are combined the resultant level is 3dB higher than a single source.

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 or dB(A). 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 sound that has a notable low frequency content such as amplified music.

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. Some commonly applied noise indices 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 over a given time period. Because the averaging process used is logarithmic the L_{eq} is dominated by the higher levels during the measurement period.

L_{Aeq} The A-weighted equivalent continuous sound pressure level. This is commonly used as the preferred parameter for the assessment of environmental noise.

L_{Ceq} The C-weighted equivalent continuous sound pressure level includes low frequencies and is useful for the 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	130
Chainsaw	110
Live music	96-106
Symphony orchestra	98
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