

Event Noise Management Plan

**Home Ground 2021
First Street
Manchester
M15 4FN**

For: Greater Manchester Arts Centre

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HOMEGROUND 2021

EVENT NOISE MANAGEMENT PLAN

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1. INTRODUCTION

- 1.1.1 Three Spires Acoustics (TSA) have been commissioned by Greater Manchester Arts Centre to produce a Noise Management Plan (NMP) for Homeground 2021, which is a temporary outdoor theatre and cultural event space located on a plot of open land at First Street, Manchester, M15 4FN.

This NMP provides an assessment of the event and details the noise management procedures and controls that will be implemented in order to minimise the effects of noise from the use of the event space and assist with compliance with local and national planning requirements.

1.2 Consultants Experience

- 1.2.1 Three Spires Acoustics is an acoustic consultancy specialising in providing advice to the entertainment industry and licensing authorities on matters relating to the management of sound and regulatory compliance at outdoor and indoor events.
- 1.2.2 The team of consultants has experience dealing with many outdoor concerts and events throughout the UK including; Parklife, Field Day, Bluedot, Lost Village Festival, and SW4 at Clapham Common amongst many others. Consultants have membership of the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH) and the Institute of Licensing (IOL) and several members of staff have a regulatory or sound engineering background.
- 1.2.3 Chris Hurst will be the principal consultant working on this project and has over 20 years experience working on behalf of local authorities and private clients dealing with concert noise control throughout the UK. Chris also part of the working party which has been formed by the Chartered Institute of Environmental Health (CIEH) to review and update the Code of Practice on Environmental Noise Control at Concerts 1995.

As well as the provision of sound and acoustic design/management for entertainment venues, the company deals with a range of noise and regulatory control issues and our staff have presented expert testimony at planning and licensing hearings.

1.2.4 Professional Associations

Members of The Institute of Acoustics (MIOA)

Members of The Institute of Licensing (AMIOL)

Members of the Chartered Institute of Environmental Health Officers (MCIEH)

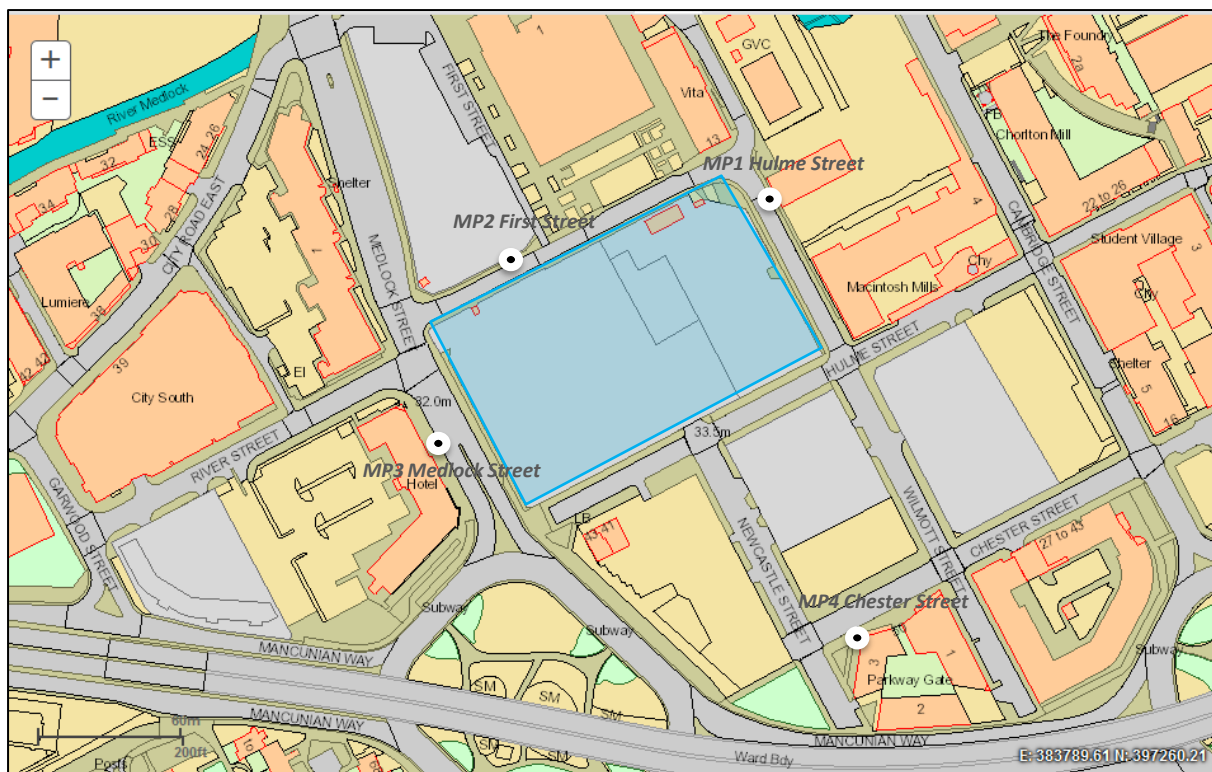
2. Site and Event Description

- 2.1.1 MCC's First Street Development Framework forms part of the councils regeneration plans for the First Street area of Manchester, Homeground 2021 is a "meanwhile land use" of an open piece of cleared land on First Street, Manchester, M15 4FN, whilst development plans are progressed through the planning system. The temporary use will enhance the area with cultural activities and help boost confidence in the City and provide its residents with some cultural relief, which has been long awaited during the Covid 19 Pandemic lock down.
- 2.1.2 The area is considered to be of a mixed use commercial and residential area, including commercial premises such as the Premier Inn Hotel, student accommodation and existing residential accommodation on Hulme Street, as well a number vacant plots awaiting redevelopment. The A57(M) flyover and A5013 traverse the south of the site and dominate the acoustic environment. Figure 1 below presents a Google aerial photograph of the site and Figure 2 presents a map of the site and locality.
- 2.1.3 The proposal is for a outdoor theatre and cultural event space including theatrical performances, cabaret, art and children's entertainment, with a food and beverage area within the site. The site would operate on a daily basis from May 28th to 1st September 2021, with a capacity of 800-1000 customers, with COVID social distancing measures being in place initially and until restrictions are removed later in the year. Daily shows would take place and primarily include theatrical performances and occasional cabaret performances including live and recorded music. The site has two stages, the Showground Stage and the Manchester Stage and a small corporate marquee which will include background music for corporate clients.

Figure 1. Aerial Photograph of the site



Figure 2. Map of Area & Noise Assessment Locations



2.2 Acoustic Environment

- 2.2.1 The area around the site is that of an urban city location with major road and rail networks close to existing commercial/industrial and residential properties. The acoustic environment is dominated by transportation noise from road vehicles using these arterial routes as well as construction and commercial premises related noise.
- 2.2.2 DEFRA has published strategic noise map data that provide a snapshot of the estimated noise from major road and rail sources across England in 2012. The data was developed as part of implementing the Environmental Noise Directive. The noise contour map for the area around the site is presented in Figure 3 below and includes the modelled LAeq,16hour noise contours for the major road. Note that the contours do not include industrial or construction noise so the actual levels are likely to be higher.
- 2.2.3 The map indicates that the closest student and commercial accommodation to the south and east of the site are likely to experience noise exposure from daytime transportation noise between 60dB to 70dB LAeq,16hour, with residential and commercial accommodation to the west and north of the site between 55dB to 65dB LAeq,16hour.

Figure 3. DEFRA Noise Contour Map (LAeq,16hour)



2.2.4 Reference to the environmental acoustic assessment undertaken by Cundall in 2018 for the Plot 9 development at First Street broadly aligns with the DEFRA strategic noise maps and is detailed in Table 1 below.

Table 1. Cundall Measured LAeq,T Levels 2018

Location	LAeq,T	LAeq,T Range
MP1 Hulme Street	62	61-66
MP2 First Street	65	64-67
MP3 Medlock Street	72	71-73

3. LEGISLATIVE FRAMEWORK

3.1 National Policy

3.1.1 National planning guidance is now contained within the National Planning Policy Framework (NPPF) 'the Framework' (March 2012, revised February 2019) and the Noise Policy Statement for England - NPSE (March 2010). Previously planning guidance on noise was contained within PPG24 (Planning Policy Guidance: Planning and Noise - PPG24, this guidance has now been withdrawn.

3.2 National Planning Policy Framework (NPPF) 2019

3.2.1 The NPPF was amended in February 2019 but keeps a similar emphasis regarding conserving and enhancing the natural environment.

3.2.2 Chapter 15 section 180 states:

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3.2.3 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:

- 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;
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and
- limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

3.3 Noise Policy Statement for England 2010

3.3.1 The NPPF affirms that National Policy Statements form part of the overall framework of national planning policy, and should be a material consideration in decisions on planning applications. The Noise Policy Statement for England (NPSE) came into force in 2010 and states

3.3.2 Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life and;
- where possible, contribute to the improvement of health and quality of life

3.3.3 The noise aims of the NPPF widely reflect those contained in the NPSE. The NPSE does however include some new concepts within the explanatory note in assessing noise impacts and uses established concepts from toxicology currently being applied to noise impacts including:

- NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level there is no detectable effect on health and quality of life due to the noise.
- LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur

- 3.3.4 The NPSE confirms that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise and in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times of the day

4. Noise Guidance And Standards

4.1 Local Authority Noise Policy Guidance

- 4.1.1 Manchester City Council's guidance on planning and noise are outlined in section 3.0 of MCC's Planning & Noise Technical Guidance document (December 2015). Section 3.6.1.2 of the document relates to noise limits for entertainment noise when structurally detached from receiving buildings and states.
- 4.1.2 "A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:
- 4.1.3 *Entertainment noise (LAeq) should be controlled to 10 dB below the background noise level (LA90) without the entertainment noise present, in each octave band at the nearest noise sensitive location.*
- 4.1.4 The MCC guidance does not apply a risk based approach to venues and there seems to be no differentiation between permanent venues operating year round compared to small scale community lead events in a mean while event space, such as the event in question. Therefore MCC's guidance related to open air concerts and events is considered more appropriate for the event in question.

4.2 Local Guidance – MCC Guidance on noise control for open air concerts and events 2018.

- 4.2.1 The MCC guidance provides information for event organisers, noise consultants, residents and other interested parties and states that events with capacities less than 4999 as designated as small events.
- 4.2.2 The guidance generally refers to the Code of Practice on Environmental Noise Control at Concerts 1995 (CoP) and replicates that Music Noise Limit (MNL) table within the guidance.
- 4.2.3 **Cumulative Event Days**- Section 4.12 of the guidance states;

If your event, or the total number of events held at the venue exceeds three days in any year then the maximum noise level recommended in Table 1, Section 3.0 should be

reduced. This is regardless of whether these events were organised by you or somebody else

- 4.2.4 The CoP detailed below, also has further guidance on multiple events days as is discussed in more detail at section 4.3.

4.3 Code of Practice on Environmental Noise Control at Concerts 1995

- 4.3.1 The introduction to the CoP states:

Large music events involving high powered amplification are held in sporting stadia, arenas, open air sites and within lightweight buildings. These events give pleasure to hundreds and in some cases thousands of people. However, the music from these events can cause disturbance to those living in the vicinity. The purpose of this code is to give guidance on how such disturbance or annoyance can be minimised.

- 4.3.2 This is an important factor as the CoP predates the introduction of the Licensing Act 2003 where the relevant objective to noise, is the promotion of the prevention of public nuisance. It has therefore been argued that the threshold described in the CoP of “minimising disturbance or annoyance” is at a lower threshold than that the Licensing Act 2003 requires.
- 4.3.3 The Code of Practice first published in 1995, addresses environmental noise control at concerts and similar large music events involving high powered amplification when held in sporting stadia, arenas, open air sites and within lightweight buildings. Various guidelines and criteria are described. For events held between 0900 and 2300 the Music Noise Level (MNL) when assessed at the prediction stage or measured during sound checks or concerts should not exceed the levels detailed in Table 1 below;

Table 2. Guideline Music Noise Limits

Concert days per Year	Venue Category	Guideline
1 To 3	Urban Stadia & Arenas	The MNL should not exceed 75dB(A) over a 15minute period
1 To 3	Other Urban & Rural Venues	The MNL should not exceed 65dB(A) over a 15minute period
4 To 12	All Venues	The MNL should not exceed the background noise level by more than 15dB(A) over a 15 min period

4.4 Multiple Event Days

- 4.4.1 Note 5 to Table 1 of the CoP states;

For indoor events used for up to about 30 events days per Calendar year, an MNL not exceeding the background level noise by more than 5dB(A) over a fifteen minute period is recommended for events finishing no later than 23.00.

4.5 Low Frequency Noise Criteria

- 4.5.1 The above 1995 CoP does not specify limits for low frequencies although there is a footnote with some helpful guidance. Whilst this is only a footnote, there have been an increasing number of council's who have adopted these low frequency limits.
- 4.5.2 The conclusions of the research behind the footnote state that:
- I. At open air venues, the increase over background 'A' weighted criterion works well at minimizing complaints near to a venue.
 - II. The 'A' weighted criterion can underestimate annoyance at greater distances from the venue (in excess of 2km) as the mid to high frequency energy is quickly attenuated with respect to low frequency and the expectation of people living some distance from the event being that the concert should be inaudible
 - III. Sound pressure levels in excess of 80dB in the 63Hz or the 125 Hz octave bands recorded in excess of 2km from the concert, are likely to give rise to complaints of low frequency noise. Levels below 70dB are likely to be acceptable.
- 4.5.3 We have been informed that the vast majority of shows will be theatrical performances with occasional cabaret style performances which may include live and recorded music, therefore it is considered that low frequency noise will not be a relevant issue and an informal requirement can be imposed to control such aspects of the sound emissions, if required.

4.6 Post Covid Cultural Reconstruction of the Events Sector

- 4.6.1 In a letter to local authorities dated 15th April 2021, the Secretary of State for Housing, Communities and Local Government stated.

I would urge you local authorities to show pragmatism and proportionality at all times, doing everything you can to help businesses prosper again

- 4.6.2 It is considered that the flexibility shown to the construction sector around planning relaxations may be also extended to the events sector. The event in question is a short term use of a "mean while site" for a community based outdoor theatre and cultural event space, which will host events lasting a few hours each day.

4.7 Proposed Entertainment Noise Limits (ENL's)

- 4.7.1 Proposed ENL's are detailed in Table 2 below. These have been based on the guidance within the CoP, which recommends an MNL of background level (LA90,T) +5dB(A) for multiple event days. It is considered reasonable to assume that background levels within the First Street area will be no greater than 5dB below the typical ambient noise levels, due to the relatively constant traffic flow along Mancunian Way and therefore an ENL, no greater than the existing ambient noise level, with a lower cut off of 65dB(A), is considered reasonable for this event space once context is taken into account.

- 4.7.2 Due to the relatively high levels of traffic noise in the area it will be necessary to maintain an entertainment level of at least 85dB(A) in order that traffic noise does not interfere with performances and audience enjoyment. These levels are considered relatively modest when compared to traditional concert music sound levels. Therefore, any requirement to reduce the MNL below the proposed 65dB(A) (residential and 70dB(A) (commercial) level will likely undermine the viability of the event space for its proposed meantime use. It is also noted that commercial buildings on First Street have sealed windows and glazing is likely to offer sound reduction of at least 30dB(A). The residential block on Hulme Street is likely to have been required to install acoustically treated ventilation due to the high levels of traffic noise, therefore restricting open windows for purge ventilation only. Standard thermal glazing will offer a sound reduction performance of at least 30dB(A), with the resultant internal levels with windows closed, for both residential and commercial, will therefore align with national and local guidance.

Table 3. Proposed Music Noise Limits

Locations	Theatrical Performances Noise Limits LAeq,15mins dB(A)	Cabaret Performances Noise Limits LAeq,15mins dB(A)
MP1 Hulme Street (residential)	65	70
MP2 First Street (commercial/student)	70	75
MP3 Medlock Street (commercial)	70	75
MP4 Chester Street (student)	70	75

Note: The Music Noise Level (MNL) value is the LAeq,15minute, due to entertainment measured at a the boundary with representative noise sensitive receptor locations detailed in Table 2 above and Figure 2 (page 7) .

An informal low frequency MNL of 80dB(C) at all NSR's is recommended.

4.8 Entertainment Noise Predictions

- 4.8.1 In order to determine the sound propagation characteristics between the proposed event space and those living nearby who might be affected by noise, music noise propagation modelling has been undertaken using d&b audiotechnik “noizcalc” proprietary software. Figures 4 to 7 presents the noise contour maps for the proposed layout. It is noted that due to the limited size of the event space it is not proposed to operate the stages simultaneously.

- 4.8.2 The modelling has included the following assumptions :

- d&b audiotechnik Array Calc used to provide the speaker array based on Showground Stage and (provided by system provider) Manchester Stage , A Series example for small sized festival set up including Line Array Flown System at 5m and 6 Nos sub bass cabinets.
- Terrain data from Google MAPS
- Theatrical Performances both stages 85dB(A) –Outdoor Theatrical performance spectrum applied

- Cabaret Performances both stages 89dB(A) - Rock/Pop standard spectrum applied
- Grid Height 1.5m, Hard ground.
- 3.4m to 5m (eastern side) permitter fencing (hoarding) around the site with Entrance Gate Open.
- Uncertainty +/- 3dB

Figure 4. Showground Stage - Outdoor Theatre Noise Contour Map



Figure 5. Showground Stage - Cabaret Noise Contour Map

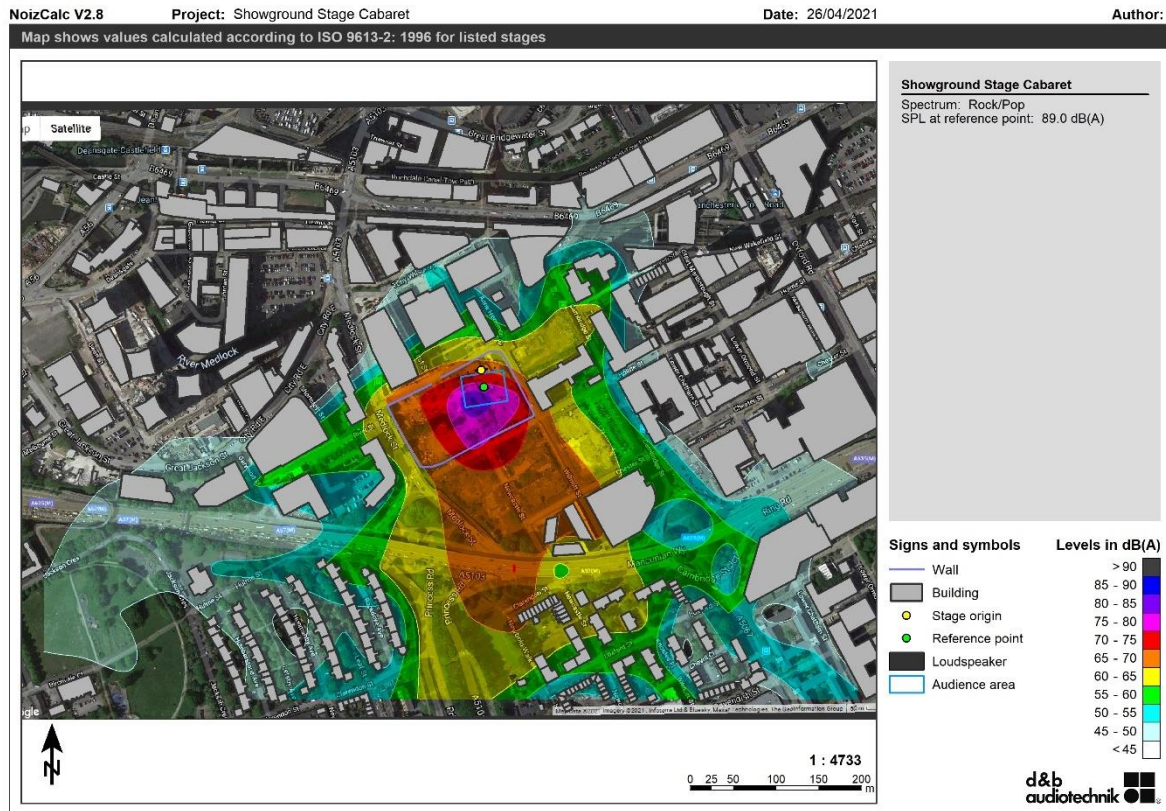


Figure 6. Manchester Stage – Outdoor Theatre Noise Contour Map

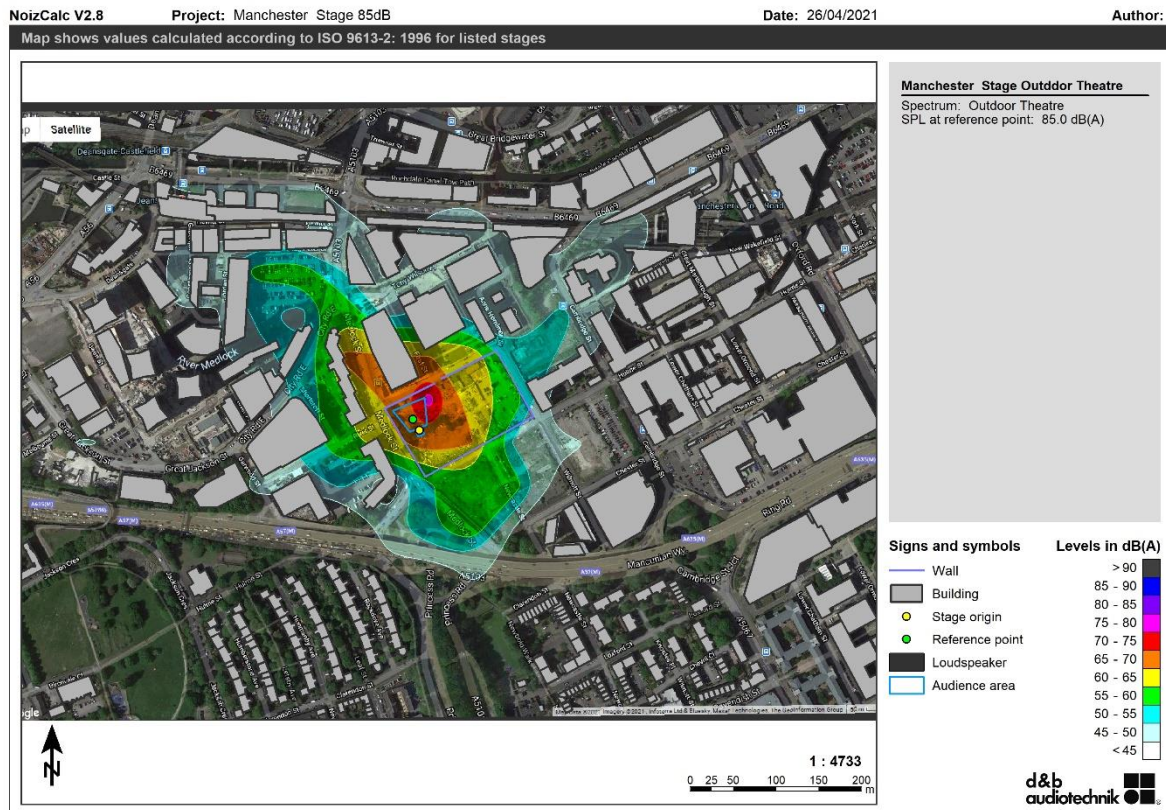


Figure 7. Manchester Stage – Cabaret Noise Contour Map

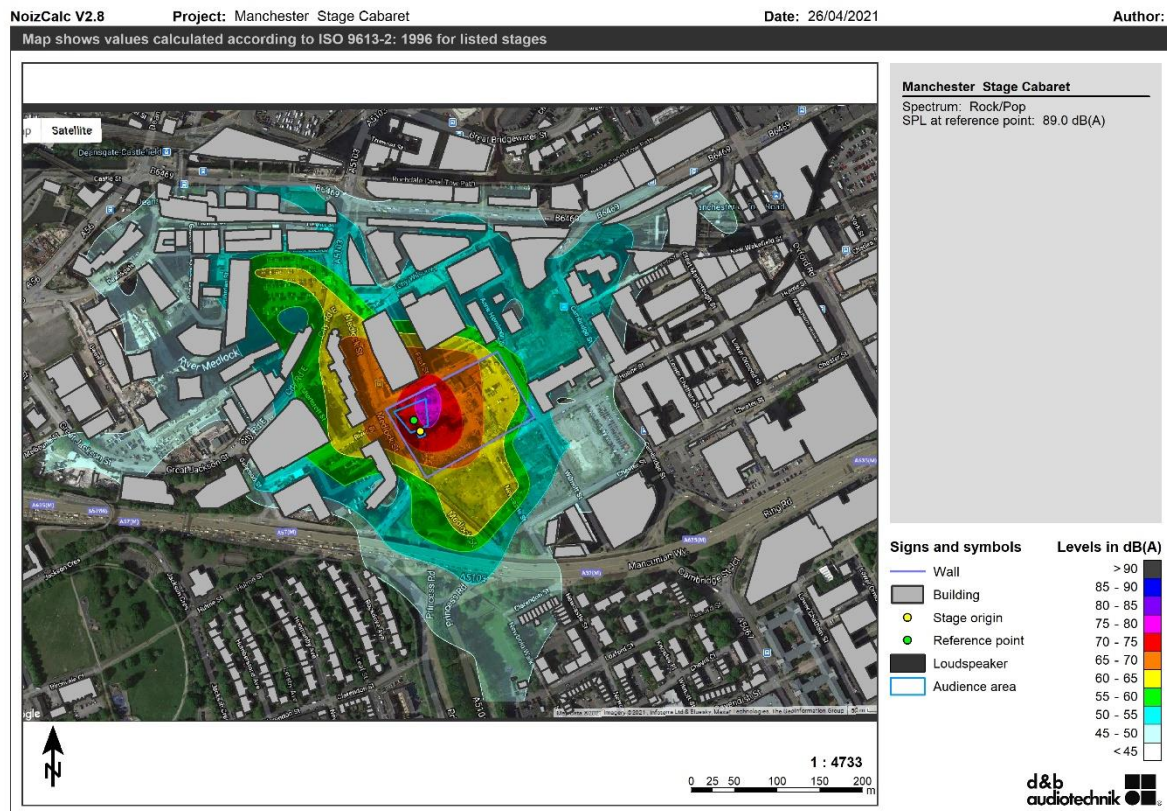


Table 4. Predicted Sound Levels

Locations	Outdoor Theatre Showground Stage dB(A)	Cabaret Showground Stage dB(A)	Outdoor Theatre Manchester Stage dB(A)	Cabaret Manchester Stage dB(A)
MP1 Hulme Street	60-65	65-70	50-55	50-55
MP2 First Street	60-65	65-70	65-70	65-75
MP3 Premier Inn Medlock Street	55-60	60-65	55-65	55-70
MP4 Chester Street	60-65	65-70	Below 45	45-50

- 4.8.3 The noise modelling validates the site for use as a meantime event space with entertainment noise predicted to be at or below 65dB LAeq,15minute at all permanent residential receptor locations for theatrical performances and between 65-70 for the occasional cabaret performances. Commercial premises on First Street and Medlock Street may receive marginally higher levels between 65-70 for theatrical performances and between 70-75 for cabaret performances.
- 4.8.4 Once the sound system provider has been appointed, further detailed sound system design can be undertaken and used in further iterations of the model with the objective to reduce noise spillage into community areas around the site.

4.9 Event Space Management

- 4.9.1 In order to ensure that Premises Licence condition requirements are achieved and adhered to the following operational noise control procedures will be implemented at First Street event site. It is envisaged that TSA will undertake attended site compliance monitoring for the first weekend of events. Noise management control will then be undertaken by venue management with periodic audits undertaken by TSA and compliance reports provided as required.

4.10 Community & Stake Holder Liaison

- 4.10.1 It is understood that residents and regulatory authorities will be informed of a contact telephone number (that will be attended by event management staff throughout events) to enable them to register a comment/complaint with respect to noise or other aspects of the operation of the venue. A copy of the residents letter will be included in a future iteration of the NMP, once details are known.
- 4.10.2 Liaison will take place with the Local Authority's Licensing and Environmental Health Departments to agree aspects such as complaint logging and assessment and contact protocols.

4.11 Sound Control Procedures

- 4.11.1 First Street Event Management staff will work closely with both the sound system engineers and liaise directly with MCC, Environmental Health and Licensing Officers as required.

4.12 Sound System Design

- 4.12.1 The sound system provider has yet to be appointed, however the system design will incorporate;
- I. Use of Line Array sound system to increase audience focus and reduce noise pollution.
 - II. Sound systems will be designed to reflect the audience size and type of music.
 - III. Use of cardioid arrangement of the sub bass array will be deployed to assist in the reduction of low frequency noise on all stages e.g. sub bass systems rear rejection can be reduced by up 20dB compared with ordinary point source ground stack systems.
 - IV. Use of noise modelling techniques to provide optimum location and orientation of external stages to reduce noise pollution issues as required.
 - V. Use of local acoustic barriers behind the stage area will also be investigated.

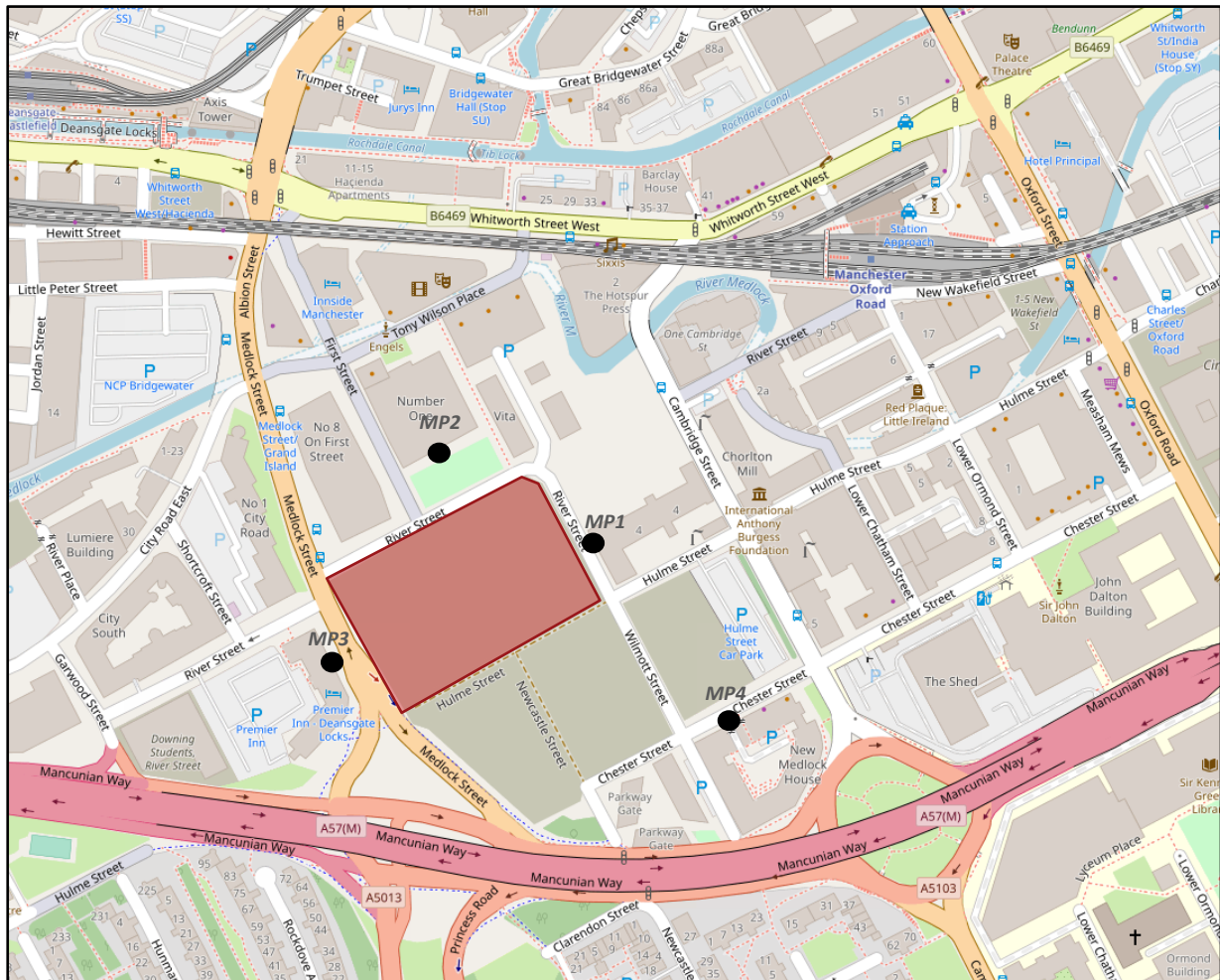
4.13 Sound Propagation and Pre-Event Tests

- 4.13.1 TSA staff will undertake the initial sound propagation tests during the first weekend of events, in order to set FOH limits which will be adhered to for the remainder of events from May 2021 onwards. Propagation testing will involve playing pre-recorded music and broadcast sound through the sound systems and measuring sound levels simultaneously at the FOH positions within the site and at the specified monitoring locations. The sound system can then be fine-tuned by using the PA characteristics and Digital Signal Processing, such that the maximum attenuation can be achieved from inside to outside the site and a maximum level can also be set at the mixer positions in order that Premise Licence conditions can be complied with. All pre-event line checks will be at reduced sound levels wherever possible and sound checks will be limited in time and duration and agreed in advance with MCC.

4.14 Sound Monitoring Control

- 4.14.1 For all events noise entertainment sound levels (LAeq & LCeq) will be monitored at the FOH/mixing desk positions for both stages in order that the pre-defined limit levels are adhered to.
- 4.14.2 Offsite monitoring will be undertaken at the specified community receptor locations in order to ensure guideline limit levels are adhered to. A dedicated technician or member of the management team, will undertake periodic monitoring, times to be agreed with MCC. Personnel will have direct line of communication to the sound engineer/venue management staff within the site to ensure noise limits are not exceeded.
- 4.14.3 Details of all measurements for every event will be kept in a measurement log, including exceedances and intervention request. Where any complaints have been received, these will be included in the log along with details of noise control measures that followed. The details from the log will be included in a periodic and /or final compliance report which will be issued to the council within 14days of the end of the events.

Figure 8. Noise Monitoring Locations



4.15 Other Sources of Noise

- 1) Site generators will be located in a position to minimise the noise impact within the perimeter of the site boundary. Acoustic Screens will be used where required.
- 2) The events management team will inform all concession stall holders of the noise constraints that are required. The event management team will ensure that all music ceases at the relevant hour for all concessions and bars, as required by the Premises Licence.

4.16 Patron Noise

4.16.1 Patron noise during ingress and egress can, if not managed effectively, cause noise disturbance to the surrounding community. Engine No 4 are very experienced at logistical crowd management and the following measures are a brief overview of some of the measures that will be undertaken to limit impact from patron noise. Further details will be provided within the event management plan.

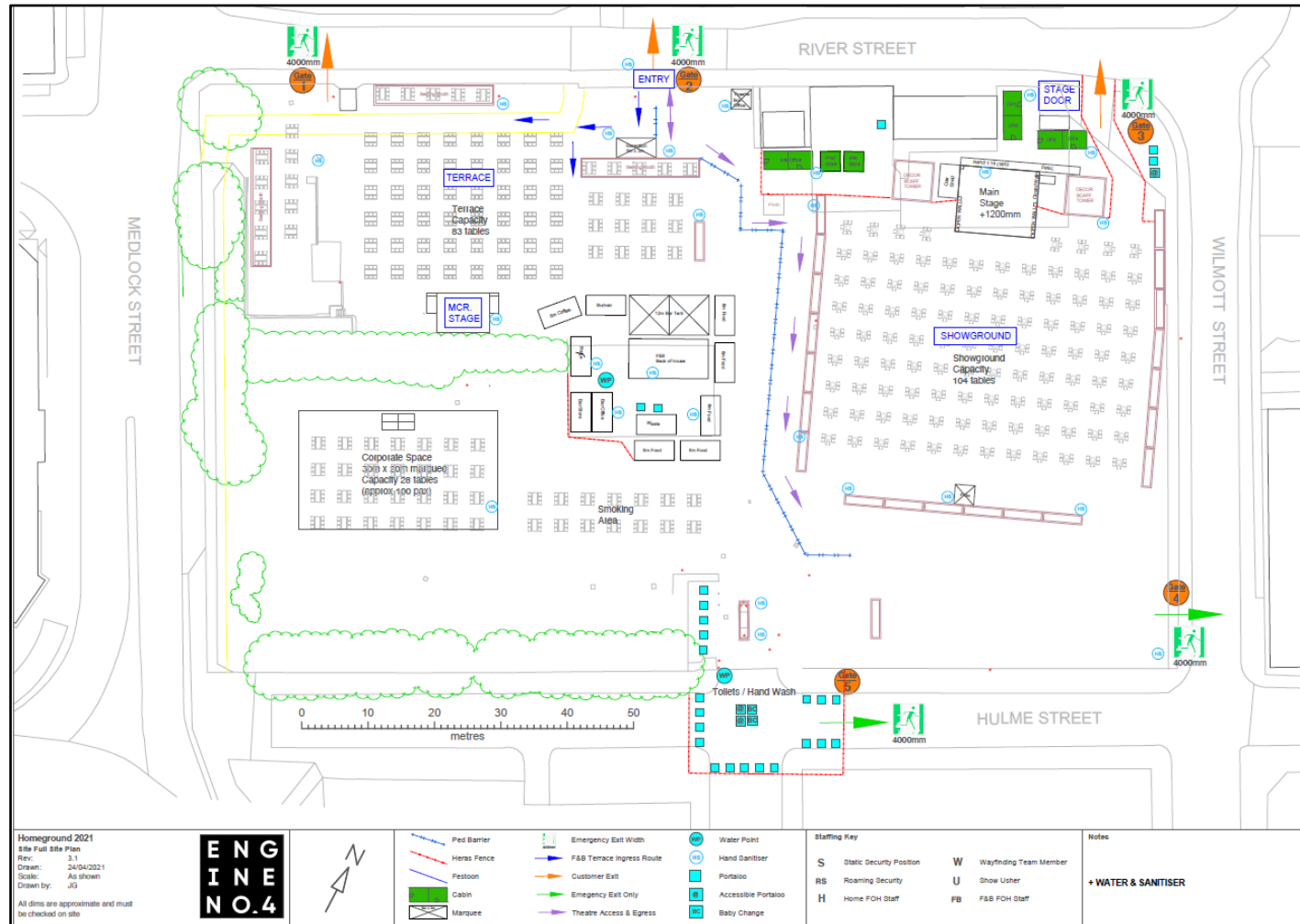
- Routing to avoid ingress/egress past residential areas where practicable
- Marshalling of audience to ensure quick ingress and egress.
- Signage to inform audience of behavioural requirements
- Training of marshals to encourage good behaviour in audience

5. Conclusion

5.1.1 Three Spires Acoustics Ltd have produced a Event Noise Management Plan for Homeground 2021, which is a proposed temporary outdoor theatre and cultural event space, located on a plot of open land at First Street, Manchester, M15 4FN

It is considered that the site is a viable site for the proposed meantime use and that the Noise Management Plan adequately details the noise management methodology that will be implemented in order to demonstrate how the operation of the events will align with local and national planning policy once context is taken into account.

Appendix A: Site Plan TBC



Appendix B: Comment/Compliant Form

First Street Events 2021	Noise Complaint/Comment
Date and Time Complaint Received	
Name of Complainant	
Address of Complainant	
Telephone number and email of complainant	
Location of noise disturbance (address)	
Time disturbance noted	
Nature of complaint(Vocal, Bass, Music in General- Inside or outside)	
Additional Comment	
Visit Requested	
Action Taken	

Appendix C: Residents Letter

Appendix D: Glossary of Terms

‘A’ weighting (dB(A)): A frequency dependent correction which weights sound to correlate with the sensitivity of the human ear to sounds of different frequencies.

Ambient Noise: A measure of the typical noise (excluding any unusual events) present at a site, or in a room. This is usually described in terms of $L_{Aeq,T}$.

Audible: Sound that can be heard or is perceptible by the human ear.

Background Noise: A measure of the underlying noise (excluding any unusual events) which is present at a site before a new noise source is introduced. This is usually described in terms of the $LA90$ level: the sound pressure level exceeded for 90% of the time.

Decibel (dB): A unit used for many acoustic quantities to indicate the level of sound with respect to a reference level.

External Amenity Space: An outdoor area near to a residential building which is designed and intended primarily for leisure and recreational use by the occupants of the dwelling. This will include gardens, patios, balconies, roof gardens and terraces.

Hertz: The tonal quality of a sound is described and measured in terms of the frequency content and is commonly expressed as octave or third octave bands, the latter being the division of the octave bands into three for finer analysis, across the frequency spectrum. The smaller the octave band or third octave band centre frequency number defined in terms of Hz, the lower the sound. For example 63 Hz is lower than 500 Hz and is perceived as a deeper sound. The attenuation due to air absorption and natural barriers increases with frequency i.e. low frequencies are always the most difficult to control

Inaudible: Sound that cannot be heard or is imperceptible to the human ear.

$LA90,T$: Sound pressure level exceeded for 90% of the measurement period “T” or ‘background level’.

$L_{Aeq,T}$: Equivalent continuous sound pressure level measured over the time period “T”

L_{Amax} : The maximum RMS A weighted sound pressure level

Music Noise Level (MNL): The L_{eq} of music noise measured at a particular location.

Noise: Unwanted sound.

Noise assessment: A basic evaluation of an acoustic environment by a suitably qualified person to assist in the determination of a planning application..

Noise impact: the noise level of the source under consideration, and/or any change in noise levels due to the scheme, and/or the relationship between the noise level of the source under consideration and a descriptor of the existing noise climate; at a receptor or group of receptors.

Noise effect: the consequence of the noise impact e.g. annoyance, sleep disturbance, speech interference, disruption of learning/teaching, health consequences, fauna displacement etc. Noise

impact and noise effect are related to each other and the noise effect is related to the magnitude of the noise impact as well as other factors e.g. sensitivity of the receptor, duration of the noise, how frequently it occurs, the time of day or night it occurs, whether the noise is temporary, reversible or permanent etc.

Noise level (Lp): the logarithmic measure of the RMS sound pressure of a sound relative to a reference value that represents the threshold of hearing. It is measured in decibels (dB) e.g. $L_p = 20 \lg(p/p_0)$ dB re 20 μ Pa for air.

Noise sensitive premises / developments: Principally comprising residential premises, hospitals, schools and hotels. Other premises and sites may be deemed to be noise sensitive depending upon circumstances.

Typical sound pressure levels

