# APPENDIX C – REPRESENTATIONS FROM 'OTHER PARTIES'

# APPENDIX C1 – 'OTHER PARTIES' AGAINST APPLICATION

**Anderson Chanel**

**From:**
**Sent:** 25 March 2017 21:51
**To:** Licensing
**Cc:**
**Subject:** Alexandra Palace Grounds Licensing Act 2003 Representation
**Attachments:** Noise Council Code on Noise Control at Concerts.pdf; ATT00001.htm; NANR292 _Napier_Final_Report.pdf; ATT00002.htm

- We wish to make a representation in relation to the licence application for Alexandra Palace Grounds
- Our personal details are and
  contact emails - and
- We qualify to make representations because we live in the area which will be affected by the licence application.
- We are objecting to the licence application on the grounds of the prevention of public nuisance:
  - The application will result in a significant increase in the number of outdoor events with associated noise nuisance.
  - We wish to object because the total number of events at the high noise levels specified in the application will result in an unacceptable level of noise nuisance given the frequency of events specified in the application. Either the number of events needs to be reduced or the noise generated at the events needs to be reduced.
  - As a local resident I value the peace and quiet of this residential area and wish this to continue into the future, particularly in the evenings and weekends.
  - We accept that a balance has to be reached to meet the commercial needs of Alexandra Palace.
  - We submit that the licence application should only be granted if it complies with the "Code of Practice on Environmental Noise Control at Concerts" as produced by The Noise Council.
  - Details of the code of practice can be found at http://www.cieh.org/policy/noise_council_environmental_noise.html and we have attached a copy for information.
  - Specifically we would wish to object to any false distinction between events which have music as their primary purpose and those which do not have music as their primary purpose.
  - All external events which will create noise levels over and above background levels should be considered together. It is the impact in terms of noise nuisance which is important not the nature of the event.
  - As such all events should be captured within the guidelines laid down in the code of practice such that where events are taking place between 4 to 12 days per calendar year per venue the Music Noise Levels should not exceed the background noise level by more than 15dB(A) over a 15 minute period. This is particularly important in our neighbourhood where background noise levels are currently low.
  - We want the the number of events to be limited to 12 per year and for all events the noise levels not to exceed the background noise level by more than 15dB(A) over a 15 minute period . See code of guidance guidelines section 3.1 - Table one.
  - In addition to capture the impact of low frequency noise additional criteria should be set in line with the code of practice. The code of practice states that even if the above guiltiness are met that unreasonable disturbance may be occurring because of low frequency noise. The guidance suggests that a level up to 70dB in either of the 63Hz or 125Hz octave frequency is satisfactory. We wish this limit to be included in any approval in order to control low frequency noise nuisance.
  - We have also attached for information the Napier Research into Attitudes to Environmental Noise from Concerts -2011. This shows that the code of practice is very relevant to real life events which generate noise nuisance. It also shows how increasing noise levels leads to increased levels of annoyance and hence noise nuisance.

- We also wish to object on the ground of the nuisance which will be caused by the massive increase in the number of people arriving in the area.
    - The public transport service is totally inadequate to meet the demands of a significant number of visitors impacting on local residents who use public transport.
    - Because of the poor public transport links many will decide to come by car and this will have a major impact on both congestion and on parking.
    - Tha car parks at Alexandra Palace have a small capacity compared to the projected number of visitors at many events. As a result many will park on local roads which are already at capacity.
    - Many of the local roads do not have parking restrictions and even those that do will generally not have restrictions at the times of the outdoor events.
    -
    - Thank you for considering our representations -

# Code of Practice on Environmental Noise Control at Concerts

THE NOISE COUNCIL

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## 1.0 INTRODUCTION

1.1 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.

1.2 This Code of Practice has been prepared by the Noise Council through a Working Party comprising specialists who are experienced in the particular problems that can arise with environmental noise control at concerts and similar music events. A list of members of the working party is shown in Appendix II and a list of technical papers providing some background data and more detailed information is given in Appendix I.

1.3 Various guidelines and criteria are described in this document covering a range of events from the single occasional concert to a full season. It is believed that compliance with the guidelines and the other advice given here will enable successful concerts to be held whilst keeping to a minimum the disturbance caused by noise. It is recognised, though, that full compliance with this code may not eliminate all complaints, and local factors may affect the likelihood of complaints.

1.4 This Code is not designed to address the question of environmental noise arising from discotheques, clubs and public houses, nor environmental noise affecting noise sensitive premises which are structurally attached to the venue.

1.5 This Code is designed to assist those planning a music event, those responsible for licensing such events and those responsible for enforcing the nuisance provisions of the Environmental Protection Act 1990 (England and Wales) and the Control of Pollution Act 1974 (Scotland). It addresses the environmental problem of noise from the performance and sound checks only. Other environmental impacts of concerts and the question of meeting the requirements of the Noise at Work Regulations 1989 and the guidance given in the Health and Safety Executive's Guide to Health, Safety and Welfare at Pop Concerts and similar events are beyond the scope of this document.

1.6 Compliance with this Code of Practice does not of itself confer immunity from legal obligations.

1.7 The Noise Council is keen to receive accounts of the practical application of the Code in order to improve and enhance its content.

## 2.0 DEFINITIONS

| | |
|---|---|
| Background Noise Level: | The prevailing sound level at a location, measured in terms of the $L_{A90,T}$, on an equivalent day and at an equivalent time when no concert or sound checks are taking place. |
| dB(A): | The A-weighted sound pressure level whereby various frequency components of sound are weighted (equalised) to reflect the way the human ear responds to different frequencies. |
| Delay Tower: | An additional set of loudspeakers employed to provide a better spread of sound to the audience. |
| $L_{Aeq}$: | The equivalent continuous noise level which at a given location and over a given period of time contains the same A-weighted sound energy as the actual fluctuating noise at the same location over the same period. |
| $L_{A90,T}$: | The A-weighted sound pressure level exceeded for 90% of the measuring period (T). |
| Mixer: | The location where the main sound system is controlled. As well as ensuring the correct sound balance between the various performers, the overall level of sound for the audience is controlled at this location. |

| | |
|---|---|
| Music Event: | A concert or similar event where live or recorded music is performed by a solo or group of artists before an audience. |
| Music Noise: | The noise from the music and vocals during a concert or sound checks and not affected by other local noise sources. |
| Music Noise Level (MNL): | The $L_{Aeq}$ of the music noise measured at a particular location. |
| Noise Consultant: | A person given responsibility by the organiser of the event for monitoring noise levels in accordance with the prevailing conditions, and who has the ability and authority to make decisions and implement changes in noise level during the event. |
| Noise Monitoring Position: | The location of the microphone within the venue from which the level of sound is monitored and controlled. For outdoor venues, this location tends to be at the mixer. |
| Noise-sensitive Premises: | Includes premises used for residential purposes hospitals or similar institutions, education establishments (when in use), or places of worship (during recognised times and days of worship) or any premises used for any other purposes likely to be affected by the Music Noise. |
| Other Urban Venue: | An urban park or similar area which is not normally used for major organised events. |

| | |
|---|---|
| Rural Venue: | A park, open space or grounds of a country house in a rural area not normally used for major organised events. |
| Sound Engineer: | Person employed to control the sound quality of the music for the audience. |
| Urban Stadia or Arenas: | A regular venue for major sporting or similar events in an urban area. |

## 3.0 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 0900 and 2300.

**TABLE 1**

| Concert days per calendar year, per venue | Venue Category | Guideline |
|---|---|---|
| 1 to 3 | Urban Stadia or Arenas | The MNL should not exceed 75dB(A) over a 15 minute period |
| 1 to 3 | Other Urban and Rural Venues | The MNL should not exceed 65dB(A) over a 15 minute period |
| 4 to 12 | All Venues | The MNL should not exceed the background noise level[1] by more than 15dB(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 disturbance 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 5dB(A) over a fifteen minute period is recommended for events finishing no later than 2300 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 2300 and 0900 the music noise should not be audible within noise-sensitive premises with windows open in a typical manner for ventilation.

**Notes to Guideline 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 70dB in either of the 63Hz or 125Hz octave frequency band is satisfactory; a level of 80dB 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 (e.g. 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.

## 4.0 RECOMMENDED NOISE CONTROL PROCEDURE

4.1 This procedure has been developed over several years and found to provide an effective means of addressing the problem of environmental noise control at events. The main features of the procedure are set out below and references are made to various technical papers which give more details.

**Planning**

4.2 Determine the sound propagation characteristics between the proposed venue and those living nearby who might be affected by noise, and carry out an appropriate background noise survey. This should be undertaken by a competent person who is experienced in noise propagation and control, particularly from music events.

4.3 Check the viability of the event against the relevant guideline levels. This is achieved by determining from 4.2 above the sound level experienced by the audience which would allow the guidelines to be met. Research shows that the music noise level in the audience by the mixer position at pop concerts is typically 100dB(A), and that levels below 95dB(A) will be unlikely to provide satisfactory entertainment for the audience.

4.4 Prospective licensees should give the local authority as much notice as possible of the proposed event especially if more than one event is planned during a calendar year.

4.5 The local authority should make use of licensing conditions and statutory powers to implement the procedures described in this Code of Practice. Examples of possible conditions are given in Appendix III.

4.6 The Noise Consultant should be appointed.

## Before the Event

4.7 Install the loudspeaker system early enough to enable alignment and orientation to be optimised to minimise noise disturbance.

4.8 Carry out a sound test prior to each event to ascertain the maximum level that can prevail at the monitoring position to enable the guidelines to be met. This effectively calibrates the system, taking into account as far as possible prevailing weather conditions, and, for indoor events, the sound insulation of the venue.

**Notes to Guideline 4.8**

1. It should be remembered that the introduction of an audience to a venue increases the acoustic absorption present. This has the effect of reducing the sound level in the venue for a given amplifier setting compared with the sound test. This should be borne in mind when setting the limit levels.

## During the Event

4.9 Advertise and operate an attended complaint telephone number through which noise complaints can be channelled. This will enable an immediate response to the complaints to be given and the Noise Consultant to judge whether or not any adjustment to the music noise level is needed.

4.10 Establish a communication network between all those involved in noise

control. This should include the local police authority.

**Note to Guideline 4.10**

1. It is difficult to communicate effectively in noisy environments, especially in the vicinity of the mixer. It has been found helpful for those involved in the communication network to use head-sets with their two way radio systems.

4.11 Carry out noise monitoring within the venue at the noise monitoring position and at sample locations outside the venue throughout the event. If the event is employing one or more delay towers, additional noise monitoring may be needed inside the venue to control the sound output from them.

4.12 Although the limit value set at 4.8 above would be in terms of 15 minute $L_{Aeq}$, useful control can be exercised by monitoring the $L_{Aeq}$ over one minute periods. This enables an early warning to be obtained of possible breaches in the 15 minute limit. It is sometimes appropriate to set an additional control limit in terms of the one minute $L_{Aeq}$ (typically some 2-3dB(A) above the 15 minute value) and to use a level recorder display to assist the sound engineer in checking compliance with the limit. The Noise Consultant should advise the sound engineer of any breaches in the prescribed noise limit, to enable a reduction in level as appropriate. The sound engineer should also be advised of occasions when the limit has only just been met.

## APPENDIX I

### References


1. Noise Control Techniques and Guidelines for Open Air Concerts, J.E.T. Griffiths (ProcIOA, Vol. 7, Part 3, 1985).

2. A Noise Control Procedure for Open Air Pop Concerts, J.E.T. Griffiths, S.W. Turner and A.D. Wallis (ProcIOA, Vol 8, Part 4, 1986).

3. Noise Control in the Built Environment, edited by John Roberts and Diane Fairhall, Gower Technical, 1988 (Chapters 1, 2 and 3).

4. Environmental Noise Guidelines proposed for the new Health & Safety Executive Guide for Pop Concerts, J.E.T. Griffiths and A. Dove (ProcIOA, Vol 14, Part 5, 1992).

5. A Survey of Sound Levels at Pop Concerts, J.E.T. Griffiths (HSE Contract Research Report No 35/1991).

6. Inaudibility - an Established Criterion, A.W.M. Somerville (ProcIOA, Vol 13, Part 8, 1991).

7. Noise Control at All-night Acid House Raves, K. Dibble (ProcIOA, Vol 13, Part 8, 1991).

8. A study of Low Frequency Sound from Pop Concerts, J.E.T. Griffiths, J. Staunton and S. Kamath (ProcIOA, Vol 15, Part 7, 1993)

## APPENDIX II

**Noise Council Working Party Membership**

| | |
|---|---|
| S.W. Turner* | Technical Director, TBV Science |
| A. Somerville* | Department of Environmental Health, City of Edinburgh District Council |
| A.D. Wallis* | Cirrus Research Limited |
| J. Bickerdike | Leeds Polytechnic |
| K. Dibble | Ken Dibble Acoustics |
| J.E.T. Griffiths | Director, Travers Morgan Environment |
| S.S. Kamath | Director, Pollution & Scientific, London Borough of Brent. |
| J. Sargent | Building Research Establishment |
| J. Staunton | Associate, Travers Morgan Environment |

*** Full members of the Noise Council**

## APPENDIX III

### Sample Conditions Concerning
### Environmental Noise Control at Concerts

1.0 The licensee shall appoint a suitably qualified and experienced noise control consultant+, to the approval of the Licensing Authority, no later than..... weeks prior to the event. The noise control consultant+ shall liaise between all parties including the Licensee, Promoter, sound system supplier, sound engineer and the licensing authority etc. on all matters relating to noise control prior to and during the event.

2.0 If not already carried out, the noise control consultant+ shall carry out a survey to determine the background noise levels (as defined by the Code of Practice on Environmental Noise Control at Concerts) at..... locations around the venue representative of the noise sensitive premises likely to experience the largest increase in noise/highest noise level* as a result of the concert. The information obtained from this survey shall be made available to the licensing authority..... weeks prior to the event.

3.0 A noise propagation test shall be undertaken at least..... hours prior to the start of the event in order to set appropriate control limits at the sound mixer position. The sound system shall be configured and operated in a similar manner as intended for the event. The sound source used for the test shall be similar in character to the music likely to be produced during the event.

4.0 The control limits set at the mixer position shall be adequate to ensure that Music Noise Level (MNL) shall not at any noise sensitive premises exceed.....dB(A) over a 15 minute period/the background noise level by more than .....dB(A) over a 15 minute period* throughout the duration of the concert.

5.0 The control limits set at the mixer position shall be adequate to ensure that the MNL shall not at any noise sensitive premises exceed.....dB(A) over a 15 minute period/the background noise level by more than .....dB(A) over a 15 minute period* throughout any rehearsal or sound check for the event.

6.0 The Licensee shall ensure that the promoter, sound system supplier and all individual sound engineers are informed of the sound control limits and that any instructions from the noise control consultant+ regarding noise levels shall be implemented.

7.0 The appointed noise control consultant+ shall continually monitor noise levels at the sound mixer position and advise the sound engineer accordingly to ensure that the noise limits are not exceeded. The Licensing Authority shall have access to the results of the noise monitoring at any time.

8.0 Rehearsals and sound checks are permitted only between the following hours:

.....hrs to.....hrs.

9.0 Music from the event is permitted only between the following hours:
.....hrs to.....hrs.

Note: Suitable noise conditions should also be considered with respect to minimising noise exposure to the audience and people working at the event as advised in the HSE document "Guide to Health, Safety and Welfare at Pop Concerts and Similar Events".

*delete as appropriate.

+i.e. the Noise Consultant

## THE NOISE COUNCIL

The Noise Council was established by a group of professional bodies concerned with problems relating to noise and vibration in the community and industrial environments. Its aims and objectives are to promote and respond to issues relating to noise and vibration, and to make independent technical and scientific expertise available to international and national agencies, central and local government, commerce and industry.

The Founding Bodies are:

- The Chartered Institute of Environmental Health
- The Institute of Acoustics
- The Royal Environmental Health Institute of Scotland
- The Institute of Occupational Safety & Health


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# RESEARCH INTO ATTITUDES TO ENVIRONMENTAL NOISE FROM CONCERTS

## (NANR 292)

September 2011

The Queen's Anniversary Prizes 2009

Institute for Sustainable Construction

Edinburgh Napier University

bpc
building performance centre

## Acknowledgements

We are grateful to the Department for Environment, Food and Rural Affairs for their support in sponsoring this research project. We would wish to express our thanks to Nicola Robertson, Professor Sean Smith, Clement Luciani and other members of the BPC team for their assistance during the project. We also express our thanks to Ipsos MORI for their assistance and advice during the project.

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# Contents

## 1.0 Introduction

1.1 The Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations commissioned research contract NANR 292 to assist a future review of the Noise Council's Code of Practice on Environmental Noise Control at Concerts.

1.2 To inform the review process Ipsos MORI and Edinburgh Napier University's, Building Performance Centre have been appointed to carry out a social study of attitudes to music noise of those residing in the vicinity and those attending such events.

1.3 The study is based around 10 concert events held across the UK between May and September 2010.

1.4 To compliment the social study Defra have let a secondary contract (NANR 297) to undertake noise monitoring at the events where the social studies were to be undertaken.

1.5 The purpose of this report is to analyse the results of the social study together with the event noise to determine potential correlations that will help inform the review of the Noise Council's Code of Practice on Environmental Noise Control at Concerts.

1.6 The UK Noise Council Code of Practice on Environmental Noise at Concerts (1995) has, over the last 17 years, been widely adopted and utilised by local authorities and concert promoters. It has provided a framework to achieve a workable balance between the local authorities' obligation to protect noise-sensitive premises, and the local authorities' obligation to facilitate and licence public entertainment events.

1.7 The key guidance from the code, which is reproduced below, provides a framework for setting limits on the Music Noise Level based on the type of venue and number of events to be held each year.

1.8 *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 facade any noise sensitive premises for events held between the hours of 0900 and 2300.*

| *Concert days per calendar year, per venue* | *Venue Category* | *Guideline* |
|---|---|---|
| *1 to 3* | *Urban Stadia or Arenas* | *The MNL should not exceed 75dB(A) over a 15 minute period* |
| *1 to 3* | *Other Urban and Rural Venues* | *The MNL should not exceed 65dB(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* |

1.9 The Code of Practice event category and guidance Music Noise Level for each of the ten events included in the project are presented in Table 1 overleaf.

| Table 1: Code of Practice, Event Classification | | |
|---|---|---|
| **Event** | **Venue Category** | **Guideline MNL** $L_{Aeq\ 15min}$ |
| 12/5/2010 Green Day, LCCC, Manchester | Urban Stadia | 75 dB |
| 26/6/2010 Pink, Hampden Park, Glasgow | Urban Stadia | 75 dB |
| 24/6/2010 Pink, Ricoh Arena, Coventry | Urban Stadia | 75 dB |
| 7/8/2010 Pride, Preston Park, Brighton | Other Urban | 65 dB |
| 12/9/2010 Help for Heroes, Twickenham, London | Urban Stadia | 75 dB |
| 11/9/2010 Proms, Singleton Park, Swansea | Other Urban | 65 dB |
| 30&31 /5/2010 Evolution, Baltic Sq, Newcastle | Other Urban | 65 dB |
| 19/6/2010 Green Day, Wembley Stadium, London | Urban Stadia | 75 dB |
| 31/7/2010 Mowtown, Kenwood House, London | Other Urban | 65 dB |
| 12/5/2010 KISS, Wembley Arena, London | Indoor venue | N/A |

1.10 Whilst covered by the Code of Practice general guidance, no specific guideline MNL is given for purpose built indoor concert venues which host over 30 events per year, such as Wembley Arena.

## 2.0 Analysis Methodology

2.1 We have been supplied with the noise levels measured at the mixing desk for each event and the noise levels measured during the event at positions representative of the residential areas around each venue.

2.2 Meteorological data for each event has been gathered from the nearest Met Office weather station to the event.

2.3 We have also been supplied with the social survey response data from each event.

2.4 For those living near the venue, the pertinent section of the social survey to correlate to the measured noise level are Question 17 and the follow on Question 18:

**Q17 Did you hear music from the event, inside your home?**

**Q18 To what extent, if at all, were you annoyed by noise from the event?**

2.5 The music audibility response rate to Question 17 for each event is presented in Table 2.

| Table 2: Q17 Music Audibility Response Rate | | | |
|---|---|---|---|
| **Event** | **% of respondents who could hear music and expressed an opinion on subjective annoyance** | **% of respondents stating music inaudible / not heard** | **Total number of respondents** |
| Green Day, Manchester | 75 | 25 | 174 |
| Pink, Glasgow | 60 | 40 | 181 |
| Pink, Coventry | 47 | 53 | 220 |
| Pride, Brighton | 70 | 30 | 125 |
| Help for Heroes, Twickenham | 48 | 52 | 145 |
| Proms, Swansea | 43 | 57 | 170 |
| Evolution, Newcastle | 36 | 64 | 275 |
| Green Day, Wembley Stadium | 32 | 68 | 168 |
| Mowtown, Kenwood House | 31 | 69 | 123 |
| KISS, Wembley Arena | 14 | 86 | 144 |

2.6 To allow an analysis of the whole data set, the assumption has been made that respondents who could not hear the music noise were 'not annoyed' by music noise. An analysis has also been undertaken of the 'audible response' sub set for each event.

2.7 The data-sets have been integrated into graphical form by constructing a noise model of each event. This enabled a geographical representation of the survey responses alongside the measured music noise levels presented as a noise contour map. In addition, by using the noise model to calculate the noise level at each respondent location, each survey response was able to be specifically linked to an estimated music noise level (eMNL) enabling investigation of a dose-response relationship[1] between music noise and subjective response.

[1] *a dose-response relationship describes the change in effect of someone (in this case, annoyance) we might see as a result of differing levels of exposure (or doses) to a stressor (in this case, noise).*

## 3.0 Concert Noise Measurements

3.1 Noise measurements were undertaken at the mixing desk within each venue, except Pride in Brighton where there was no front of house mixing desk. At Pride the measurements were made approximately 10m from the side of the stage. The typical levels recorded during the main act are presented in Table 3.

**Table 3: Mixing Desk Noise Levels**

| Event | Distance from mixing desk to stage | Typical event Mixer Level $L_{Aeq\ 15min}$ | Venue Category |
|---|---|---|---|
| Green Day, Manchester | 40m | 100 dB | Urban Stadia |
| Pink, Glasgow | 65m | *Est 98 dB* | Urban Stadia |
| Pink, Coventry | 50m | 98 dB | Urban Stadia |
| Pride, Brighton | - | 96 dB | Other Urban |
| Help for Heroes, Twickenham | 40m | 88 dB | Urban Stadia |
| Proms, Swansea | 40m | *Est 85 dB* | Other Urban |
| Evolution, Newcastle | 40m | 89 dB | Other Urban |
| Green Day, Wembley Stadium | 40m | 101 dB | Urban Stadia |
| Mowtown, Kenwood House | 40m | 88 dB | Other Urban |
| KISS, Wembley Arena | Indoor venue | 104 dB | Indoor venue |

3.2 Event levels were not available for two events. It is expected that the mixing desk level at Pink in Glasgow would be similar to Pink in Coventry. Based on the levels measured around the venue and the distance to the loudspeaker stacks, it is estimated that the Proms event in Swansea is likely to have a mixing desk level of around 85 dBA.

3.3 In terms of the Code of Practice event categories, the Help for Heroes concert was the quietest of the Urban Stadium events with a MNL approximately 10 dB lower than the other Stadium events. Conversely the Pride, Brighton event was significantly louder than the rest of the 'Other Urban' events with a MNL approximately 10 dB higher.

3.4 Noise measurements were undertaken at a series of residential locations within approximately 1 km distance from each concert venue.

3.5 The noise survey data, which covers three 5 minute measurement periods at each position, has been assessed. Most of the noise measurements included audio data, which enabled post-measurement selection of suitable measurement periods most representative of music noise from the concert venue. Periods with high background[2] noise levels have been discounted from the analysis and the remaining periods have been averaged and tabulated into the following Tables of this Section.

3.6 Whilst this selection process has reduced the influence of intermittent background sources, some measurement positions were still affected by significant background noise or otherwise had very low music noise levels. Measurement positions which have an estimated Music Noise Level $L_{Aeq}$ 5 to 10 dBA below the ambient measured level have been highlighted with an '<'; positions where the music was not audible and was therefore likely to be $L_{Aeq}$ 10 dBA below the measured level have been highlighted with an '<<'.

[2] i.e. noise not associated with the event

Green Day, Manchester

3.7 The measured noise levels for each measurement location are given in Table 4, along with an indication of the significance of the concert music content on the measured level.

**Table 4: Ambient noise levels measured in residential areas, Green Day, Manchester**

| Name | $L_{Aeq}$ |
|---|---|
| Railway Road | < 54.7 |
| Barlow Road | 57.1 |
| Gorse Avenue | 61.3 |
| Great Stone Road | 73.6 |
| Trent Bridge Walk | 66.6 |
| Kings Road | 59.5 |
| Ayres Road | 61.5 |
| Addison Crescent | 51.8 |
| Sutherland Road | 48.0 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

Pink, Glasgow

3.8 The measured noise levels for each measurement location are given in Table 5, along with an indication of the significance of the concert music content on the measured level.

**Table 5: Ambient noise levels measured in residential areas, Pink, Glasgow**

| Name | $L_{Aeq}$ |
|---|---|
| Ardmory Avenue | 52.6 |
| Battlefield Avenue | << 52.8 |
| Broadwood Drive | << 49.0 |
| Cumming Drive | 67.2 |
| Green Holme Street | << 48.4 |
| Kingshurst Avenue | < 49.8 |
| Kingswood Drive | 53.0 |
| Myrtle View Road | 58.6 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

3.9 The three positions where the MNL was 10 dBA less than background were the first three measurements made, all in the early part of the evening between 18.00hrs and 20.00 hrs. There are no mixing desk levels available for this event, but it has been confirmed by the event monitoring contractor that aa support act was performing at a subjectively lower music level than the main act.

Pink, Coventry

3.10 The measured noise levels for each measurement location are given in Table 6, along with an indication of the significance of the concert music content on the measured level.

**Table 6: Ambient noise levels measured in residential areas, Pink, Coventry**

| Name | $L_{Aeq}$ |
|---|---|
| Allied Close | 54.7 |
| Arbury Avenue | 58.4 |
| Beacon Rd J/W St Luke's | < 56.7 |
| Farndale Avenue | < 53.6 |
| Grindle Road | 55.1 |
| John Shelton Drive | << 49.1 |
| Whitmore Park Road | << 54.0 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

Pride, Brighton

3.11 The measured noise levels for each measurement location are given in Table 7, along with an indication of the significance of the concert music content on the measured level.

**Table 7: Ambient noise levels measured in residential areas, Pride, Brighton**

| Name | $L_{Aeq}$ |
|---|---|
| Argyle Road | 62.8 |
| Bevant Road | 59.0 |
| Ditchling Rise | 60.1 |
| Herbert Road | 59.7 |
| North Road | 53.5 |
| Port Hall Road | < 57.6 |
| Preston Drove | 67.3 |
| Preston Park Avenue | 72.5 |
| Reigate Road | << 57.8 |
| Rookery Close | 68.4 |
| Rugby Road | 60.5 |
| Waldegrave Road | 62.1 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

Help for Heroes, Twickenham

3.12 The measured noise levels for each measurement location are given in Table 8, along with an indication of the significance of the concert music content on the measured level.

**Table 8: Ambient noise levels measured in residential areas, Help for Heroes, Twickenham**

| Name | $L_{Aeq}$ |
|---|---|
| Arnold Crescent | 46.9 |
| Beaumont Place | 54.5 |
| Cole Park Gardens | 48.9 |
| Duke of Cambridge Close | < 52.9 |
| Gainsborough Gardens | < 46.4 |
| Godfrey Avenue | 46.2 |
| Lime Grove | 51.5 |
| Marlow Crescent | 54.3 |
| Stanhope Terrace | 49.9 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

Proms, Swansea

3.13 The measured noise levels for each measurement location are given in Table 9, along with an indication of the significance of the concert music content on the measured level.

**Table 9: Ambient noise levels measured in residential areas, Proms, Swansea**

| Name | $L_{Aeq}$ |
|---|---|
| Admirals Walk | < 45 |
| Eversley Rd | 45.9 |
| Kimberley Rd | 43.2 |
| Park View Terrace | 46.9 |
| Roger Beck Way | < 45.6 |
| Sketty Avenue | 43.3 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

Evolution, Newcastle

3.14 The measured noise levels for each measurement location are given in Table 10, along with an indication of the significance of the concert music content on the measured level.

**Table 10: Ambient noise levels measured in residential areas, Evolution, Newcastle**

| Name | $L_{Aeq}$ |
|---|---|
| Baltic Quay | 59.2 |
| Barker Street | << 56.5 |
| Brinkburn Street | << 53.3 |
| Brock Street | < 54.6 |
| Chaucer Close | << 52.4 |
| Dean Street | << 60 |
| Howards Street | < 63.9 |
| Mulgrave Terrace | << 52.1 |
| Quayside | < 62.8 |
| St Ann's Street | 54.9 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

3.15 The music from the event was only audible at a few of the measurement positions. This is likely to be due to a combination of factors:

- The music levels at the mixer desk were relatively low, approximately 10 dB below the typical concert level.
- The event was held in the centre of Newcastle with a number of major road networks around the event site.
- This event was the only one measured during the daytime period when traffic and background noise is generally higher.

Green Day, Wembley Stadium

3.16 The measured noise levels for each measurement location are given in Table 11, along with an indication of the significance of the concert music content on the measured level.

**Table 11: Ambient noise levels measured in residential areas, Green Day, Wembley Stadium**

| Name | $L_{Aeq}$ |
|---|---|
| Empire Court | < 57.2 |
| Jesmond Avenue | 53.5 |
| Linden Avenue | 50.3 |
| Manor Drive | 50.9 |
| Park View | 54.2 |
| Tokyngton Community | 61.4 |
| Vivian Avenue | 53.3 |
| Windsor Crescent | << 60.1 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

Mowtown, Kenwood House

3.17 The measured noise levels for each measurement location are given in Table 12, along with an indication of the significance of the concert music content on the measured level.

**Table 12: Ambient noise levels measured in residential areas, Mowtown, Kenwood House**

| Name | $L_{Aeq}$ |
|---|---|
| Bunkers Hill | << 45.1 |
| Fitzroy Park | 51.7 |
| Spainiards Close | < 45.9 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

KISS, Wembley Arena

3.18 The measured noise levels for each measurement location are given in Table 13, along with an indication of the significance of the concert music content on the measured level.

**Table 13: Ambient noise levels measured in residential areas, KISS, Wembley Arena**

| Name | $L_{Aeq}$ |
|---|---|
| Alexandra Court | << 53.1 |
| Dagmar Road | << 46.0 |
| Empire Court | << 51.9 |
| Forum House, Engineer Way | << 55.4 |
| Raglan Court | < 47.9 |

*< indicates MNL 5 to 10 dB less, << indicates MNL over 10 dB less*

3.19 The music was only audible at one of the measurement positions and was not dominant at this position. This was due to the high level of sound insulation provided by the enclosed arena building.

## 4.0 Analysis of Concert Noise Responses

Concert Noise Maps

4.1 Noise mapping was performed using SoundPLAN 6.4 noise mapping software. An Ordnance Survey street map was used as a mapping base onto which the event noise levels were overlaid from the noise survey data. The propagating noise levels from the venue are shown on the maps using coloured bands, each of which has a 5 dB bandwidth.

4.2 The noise maps were optimised by an iterative procedure to provide the best possible agreement with measured sound levels at the positions which were identified as most representative of the Music Noise Level.

4.3 Whilst the maps present the best possible agreement, it is not possible for the maps to accurately reflect all the measured noise levels as some of the locations are affected by localised attenuation from buildings and other geographical features. Due to project constraints such features are not included within the noise-response maps, therefore a general limit to their accuracy exists when considering precise locations.

4.4 Details of the noise monitoring and survey respondent locations are shown on the noise maps as PDF annotations. Information about each annotation can be viewed by selecting the respective annotation marker when viewing the PDF file in Adobe Reader.

4.5 Noise monitoring locations are identified as blue arrows and are annotated with the location and measurement results.

4.6 Information about each of the interview responses was entered onto the plan as an annotation, at locations determined using the full address supplied by Ipsos MORI. Each coloured 'star' annotation shows the post code location and subjective response to Survey Question 17 and 18 if the music was audible.

The respondent location 'star' markers are categorised into five colours representing the response to Questions 17 and 18 i.e. Very, Fairly, Not Very, Not at All Annoyed and Inaudible/Can't remember.

4.7 Where there are a number of respondents in close proximity to one another, it is easier to interpret the survey responses by zooming in to the location through Adobe Reader.

4.8 Whilst the data analysis uses the exact respondent address, in order to maintain anonymity for the respondents, the survey annotation positions have been randomly distributed within 20m of the true survey location and utilise 'stars' as opposed to arrows to indicate the respondent location without precisely identifying them.

4.9 The noise maps for each event are presented in Appendix A. To print the noise maps with annotations it is necessary to have Acrobat Adobe Reader version 10 or the full Acrobat Adobe package.

4.10 As weather conditions such as wind direction can affect noise propagation, the maps also include details of the wind strength and direction. The full weather data is also reproduced in Appendix B.

Dose Response Relationship

4.11 A dose-response relationship has been investigated by linking the social survey response data and the estimated MNL determined from the noise map.

4.12 The following sections present analysis tables for each event and a summary of all 10 event responses collated. The dose response relationships are presented in both 5 dB and 10 dB bands.

4.13 The full responses to Q17 and Q18 are analysed together, initially based on all respondents including those who could not hear the music. There are a wide

variety of reasons why any individual respondent may have not heard the music, such as:

- High external background noise, traffic etc
- High internal background noise, television etc
- Living room or bedrooms on facades facing away from event
- High level of sound insulation from building facade
- Hearing deficiency

4.14 The responses to Q18 are then analysed separately to look at the opinions of just those who heard the music.

4.15 There are a large number of potential variables which affect an individual's perception to music noise from an event, as listed below. Further discussion can be found on pages 35 to 42 of the Ipsos Mori report.

- Prior knowledge of event
- Windows open / closed during the event
- Children in household
- Music taste
- Shift-work
- Age/hearing ability
- Previous experience of noise from venue
- Background noise level

Augmented dose response relationship

4.16 Following the establishment of the dose response for the measured event noise levels, predictions have been made of the likely change in the percentage of the population either "Fairly Annoyed" or "Very Annoyed" by the concert noise for a theoretical reduction in event noise level.

4.17 Predicting this change has been achieved by re-mapping the population within each noise category to the respective response rate for the new noise band they would have been exposed to. For example, when considering a 5 dB reduction in noise, the new -5dB band responses are calculated by applying the response proportions from the previously adjacent lower band. Responses for the new lowest category (eMNL < 35 dB) would be assigned to be "not annoyed".

4.18 For each of the individual events an assessment of the likely change in annoyance rates if the music noise level was lower has been produced. However these predictions are individual to the particular events and therefore have not been collated for all events.

## Overall Analysis of All 10 Concerts

4.19 The results from the ten individual events have been collated in order to provide an overall assessment of resident's dose response to music noise from concerts.

4.20 Table 14a show the percentage of all respondents giving a subjective response within each of the 5 dB estimated noise exposure bands.

**Table 14a: Subjective response to noise levels (5dB categories) all events, all respondents**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 55% | 25% | 11% | 9% | 1725 |
| < 40 | 78% | 16% | 3% | 3% | 460 |
| 40 - 45 | 59% | 27% | 10% | 4% | 293 |
| 45 - 50 | 51% | 27% | 10% | 12% | 222 |
| 50 - 55 | 52% | 31% | 9% | 8% | 252 |
| 55 - 60 | 39% | 31% | 17% | 13% | 262 |
| 60 - 65 | 32% | 30% | 22% | 16% | 137 |
| 65 - 70 | 27% | 38% | 14% | 21% | 56 |
| > 70 | 8% | 23% | 38% | 33% | 40 |

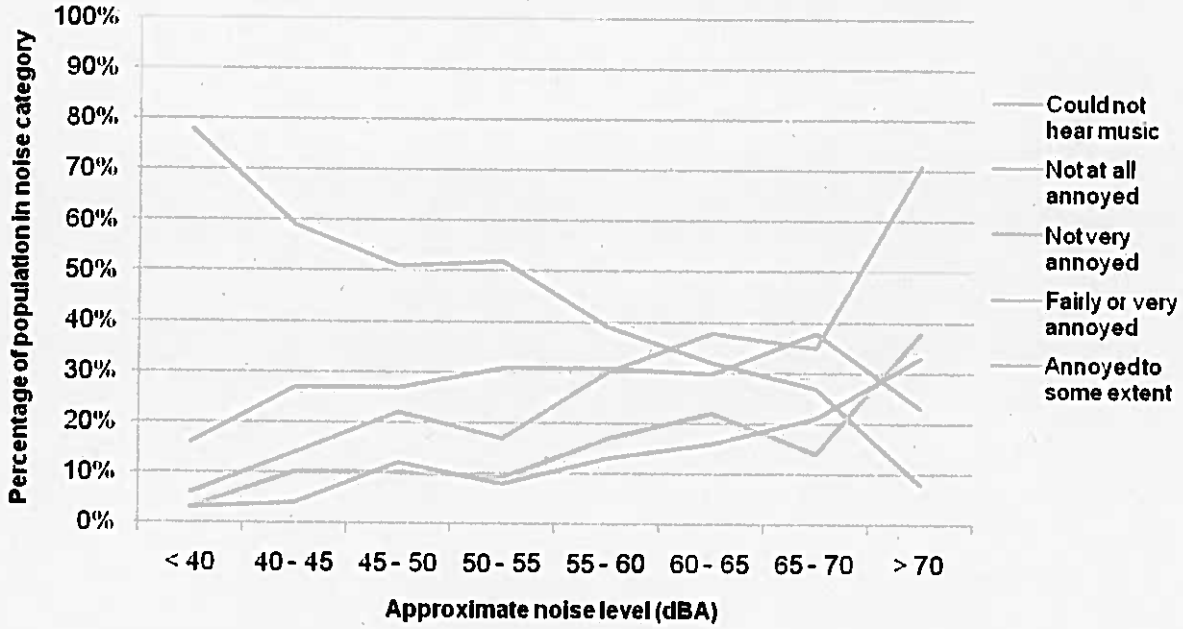
4.21 Table 14b represents the data with the 'Not very annoyed' and 'Fairly or very annoyed' combined to present a category of 'Annoyed to some extent'.

**Table 14b: Subjective response to noise levels (5dB categories) all events, all respondents**

| Estimated noise level (dBA) | Subjective response | | | Number of respondents |
|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Annoyed to some extent | |
| Overall | 55% | 25% | 20% | 1725 |
| < 40 | 78% | 16% | 6% | 460 |
| 40 - 45 | 59% | 27% | 14% | 293 |
| 45 - 50 | 51% | 27% | 22% | 222 |
| 50 - 55 | 52% | 31% | 17% | 252 |
| 55 - 60 | 39% | 31% | 30% | 262 |
| 60 - 65 | 32% | 30% | 38% | 137 |
| 65 - 70 | 27% | 38% | 35% | 56 |
| > 70 | 8% | 23% | 71% | 40 |

4.22 Chart 14 shows the percentage of all respondents giving a subjective response within each of the 5 dB estimated noise exposure bands.

**Chart 14: Subjective response to noise levels. all events. 5 dB bands**




4.23 The 5 dB bands present a clear linear dose response relationship, the only anomaly is in the 45 to 50 dB band where slightly higher number of residents are annoyed than in the higher 50-55 dB band.

4.24 The tables also gives a clear guide on the percentage of residents that will be aware of the music for any given external level. Again this presents a good linear correlation, with the music inaudibility reducing as the noise levels increase.

4.25 There is a clear increase in annoyance response above a MNL of 55 dB and a similar reduction in the number of people that did not notice or could not hear the music.

4.26 Table 14b indicates that at around a MNL of 60 dB the percentage of respondents 'annoyed to some extent' rises above both the 'not annoyed' and 'inaudible' categories.

4.27 The events surveyed were all managed in accordance with the best practice guidelines contained in the current Code of Practice and all employed an acoustic consultant to oversee the control of music levels. The overall results therefore indicate the typical percentage of residents that may be annoyed at concerts operated under the Code of Practice. However it should be noted that the results may not reflect annoyance rates at concerts without an acoustic consultant monitoring the MNL during the event.

4.28 Whilst 9% of all respondents were fairly or very annoyed by the music noise, it should be noted that only 1% of residents actually complained about the noise disturbance. The most common reasons for not making a complaint were that they "had nothing to complain about" (53%) or "event did not have sufficient impact to complain "(33%). This finding is similar to many other areas of impact where simply being annoyed does not necessarily trigger a complaint.

4.29 Table 15a shows the percentage of all respondents giving a subjective response within each of the 10 dB estimated noise exposure bands.

**Table 15a: Subjective response to noise levels (10dB categories) all events, all respondents**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 55% | 25% | 11% | 9% | 1725 |
| < 35 | 83% | 10% | 3% | 4% | 216 |
| 35 - 45 | 66% | 24% | 7% | 4% | 537 |
| 45 - 55 | 52% | 29% | 9% | 10% | 474 |
| 55 - 65 | 36% | 31% | 19% | 14% | 399 |
| > 65 | 19% | 31% | 24% | 26% | 96 |

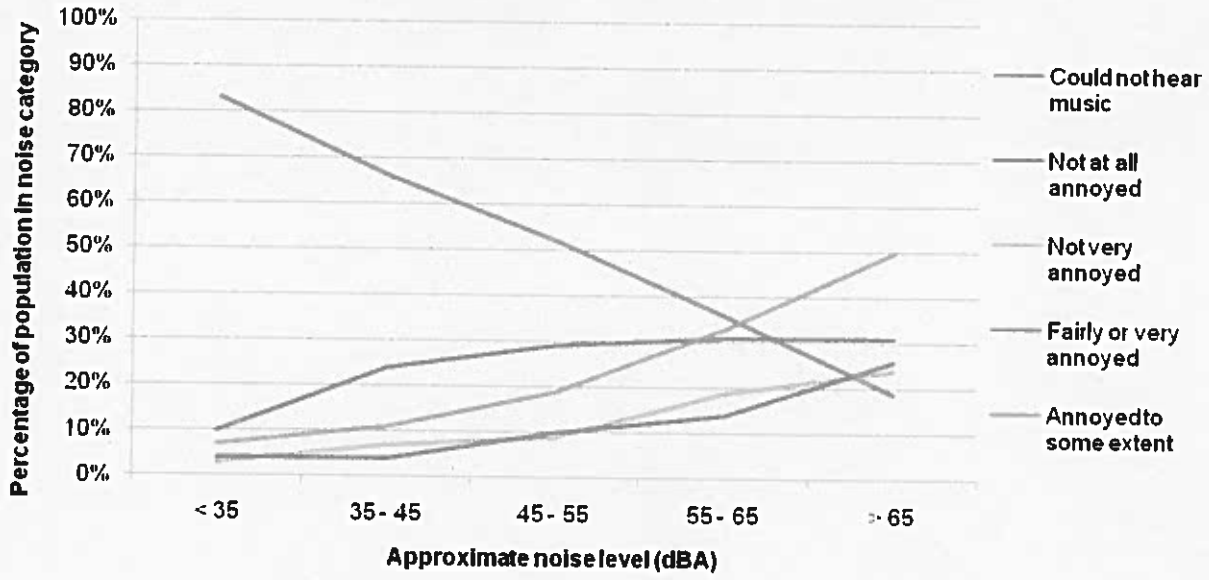
4.30 Table 15b represents the data with the 'Not very annoyed' and 'Fairly or very annoyed' combined to present a category of 'Annoyed to some extent'.

**Table 15b: Subjective response to noise levels (10dB categories) all events, all respondents**

| Estimated noise level (dBA) | Subjective response | | | Number of respondents |
|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Annoyed to some extent | |
| Overall | 55% | 25% | 20% | 1725 |
| < 35 | 83% | 10% | 7% | 216 |
| 35 - 45 | 66% | 24% | 11% | 537 |
| 45 - 55 | 52% | 29% | 19% | 474 |
| 55 - 65 | 36% | 31% | 33% | 399 |
| > 65 | 19% | 31% | 50% | 96 |

4.31 Chart 15 shows the percentage of all respondents giving a subjective response within each of the 10 dB estimated noise exposure bands.

**Chart 15: Subjective response to noise levels. all events. 10 dB bands**



4.32 The 10 dB table shows a slightly more linear response than the 5dB tables as the larger bandwidths smooth the anomalies in the smaller bands.

4.33 The results indicate that even at higher music levels at the residential properties there was still a significant proportion of the population in the immediate vicinity of an event that did not hear the music. The reasons for this are discussed in section 4.12.

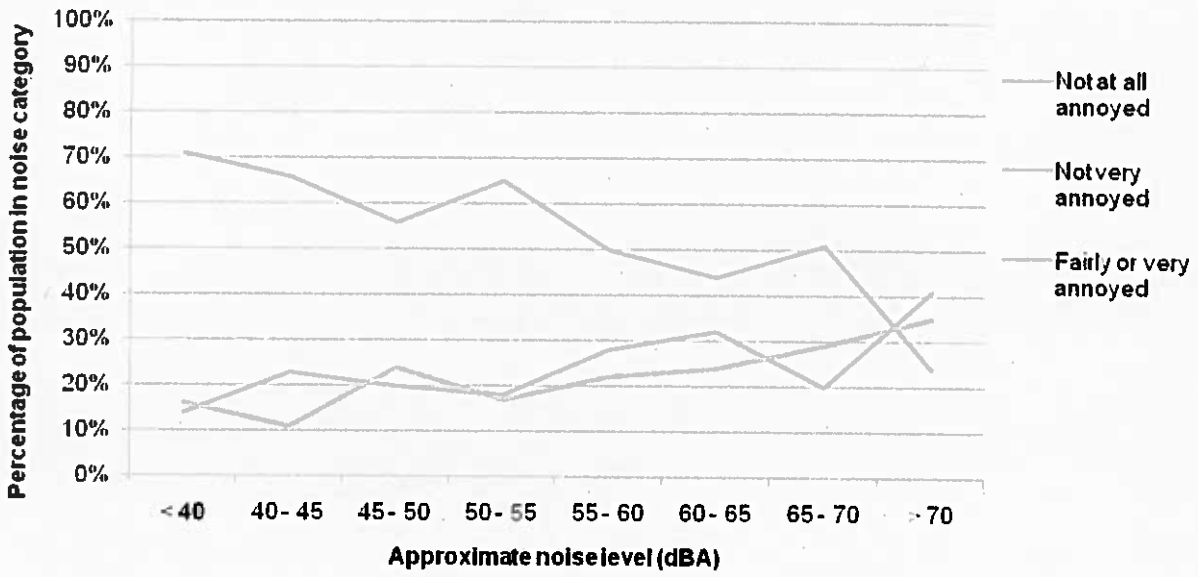
4.34 Therefore a dose response relationship has been established for just the residents who heard the music and expressed an opinion on how annoying it was.

4.35 The results given in Table 16 and Chart 16 show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB estimated noise exposure bands.

**Table 16: Subjective response to *audible* music (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | Number of respondents |
|---|---|---|---|---|
| | Not at all | Not very annoyed | Fairly or very annoyed | |
| Overall | 57% | 23% | 20% | 784 |
| < 40 | 71% | 14% | 16% | 102 |
| 40 - 45 | 66% | 23% | 11% | 120 |
| 45 - 50 | 56% | 20% | 24% | 109 |
| 50 - 55 | 65% | 18% | 17% | 120 |
| 55 - 60 | 50% | 28% | 22% | 161 |
| 60 - 65 | 44% | 32% | 24% | 93 |
| 65 - 70 | 51% | 20% | 29% | 41 |
| > 70 | 24% | 41% | 35% | 37 |

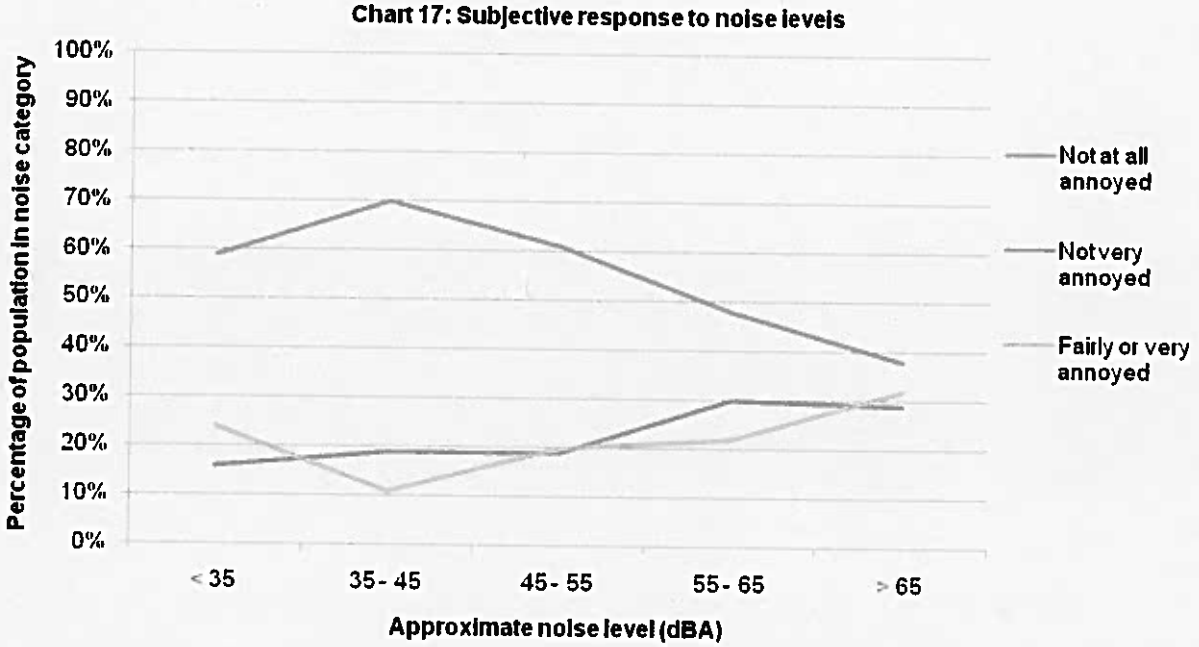
**Chart 16: Subjective response to audible noise levels. all events. 10 dB bands**




4.36 Again with the exception of the 45-50 dB band the results show a clear linear dose response to increasing music levels.

4.37 Table 17 and Chart 17 show the percentage of respondents giving a subjective response to the audible concert music within each of the 10 dB estimated noise exposure bands.

| Table 17: Subjective response to *audible* music (10dB categories) | | | | |
|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | Number of respondents |
| | Not at all | Not very annoyed | Fairly or very annoyed | |
| Overall | 57% | 23% | 20% | 784 |
| < 35 | 59% | 16% | 24% | 37 |
| 35 - 45 | 70% | 19% | 11% | 185 |
| 45 - 55 | 61% | 19% | 20% | 229 |
| 55 - 65 | 48% | 30% | 22% | 254 |
| > 65 | 38% | 29% | 32% | 78 |




4.38 The tables and charts above indicate a general link between increasing music noise levels and the percentage of people annoyed. However, it is not a completely linear correlation and it is likely that other external factors (such as those listed in 4.15) complicate this relationship.

4.39 It appears that a significant percentage of the population will form an opinion on the music's subjective annoyance irrespective of the actual level of music.

4.40 The opinion formed will be influenced by the factors highlighted in section 4.14 and are also likely to be influenced by other concert related factors such as annoyance from additional event traffic, attendees littering etc, see pages 51 and 52 of Ipsos Mori report.

4.41 Table 18a below presents a summary of the percentage of all interviewees 'annoyed' set against the event Music Noise Level and the Code of Practice venue category. The venues are listed in order of percentage of annoyance, high to low. The Wembley Arena event has been excluded from the list as it does not fit into any specific C of P category.

**Table 18a: Comparison of annoyance response against MNL and C of P venue category**

| Event | % all respondents 'fairly' or 'very annoyed' | Typical event MNL at mixing desk $L_{Aeq\ 15min}$ | Venue Category |
|---|---|---|---|
| Green Day, Manchester | 29% | 100 dB | Urban Stadia |
| Green Day, Wembley Stadium | 11% | 101 dB | Urban Stadia |
| Pride, Brighton | 11% | 96 dB | Other Urban |
| Pink, Glasgow | 10% | *Est 98 dB* | Urban Stadia |
| Pink, Coventry | 8% | 98 dB | Urban Stadia |
| Mowtown, Kenwood House | 5% | 88 dB | Other Urban |
| Evolution, Newcastle | 5% | 89 dB | Other Urban |
| Help for Heroes, Twickenham | 4% | 88 dB | Urban Stadia |
| Proms, Swansea | 2% | *Est 85 dB* | Other Urban |

4.42 From the table above it is important to note the Help for Heroes event as having a lower sound level than other stadium events and the Pride, Brighton event as having a higher sound level than other 'Other Urban' amongst this sample.

4.43 The results of this analysis are interesting, suggesting that for these 'Urban' events there is a correlation between the mixing desk level and the percentage of people that will be annoyed. The table indicates that in general, approximately 10% of the population were 'fairly' or 'very annoyed' by any 'Urban' events with a mixer desk MNL of around 100 dB. This dropped to approximately 5% of the population annoyed by any 'Urban' events with a mixer desk MNL of around 90 dB.

4.44 This suggests that it may be the level of music noise and not the type of venue that is significant within an urban environment and therefore a review of the Code of Practice may wish to consider whether different criteria are required for different urban venues, as is currently the case.

4.45 Unfortunately the project did not have the opportunity to survey any rural venues to test the dose response of these types of events. An option for future research would be to undertake a similar survey of rural venues.

4.46 Table 18b below presents the corresponding response from the Ipsos Mori survey of the concert attendees who expressed an opinion on the level of music within the venue.

| Table 18b: Comparison of attendees music level response against Mixer desk level | | | | |
|---|---|---|---|---|
| Event | Typical event MNL at mixing desk $L_{Aeq\ 15min}$ | Too quiet | Just right | Too loud |
| Kiss, Wembley Arena | 104 dB | 9% | 77% | 12% |
| Green Day, Manchester | 100 dB | 23% | 73% | 3% |
| Green Day, Wembley Stadium | 101 dB | 18% | 78% | 3% |
| Pride, Brighton | 96 dB | 10% | 79% | 9% |
| Pink, Glasgow | *Est 98 dB* | 7% | 88% | 5% |
| Pink, Coventry | 98 dB | 4% | 79% | 14% |
| Mowtown, Kenwood House | 88 dB | 21% | 76% | 2% |
| Evolution, Newcastle | 89 dB | 34% | 66% | 0% |
| Help for Heroes, Twickenham | 88 dB | 14% | 79% | 6% |
| Proms, Swansea | *Est 85 dB* | 17% | 77% | 4% |

4.47 Table 18b indicates that a significant percentage of the concert attendees at events with a mixer desk music level below 90 dBA considered the music level to be too low.

4.48 At the events with a music level of around 100 dB there is significant variances in opinions between events, this is likely to be due to differences in music type and audience demographic. These issues are discussed further in the Ipsos Mori report, page 85.

4.49 Further dose response analysis has been carried out to look at the Code of Practice event category groupings to identify any differences between venue types.

4.50 Table 19a and 19b show the percentage of all respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands for the stadium events.

| Table 19a: Subjective response to noise levels (5dB categories) Stadium Events (Manchester, Coventry, Wembley Stadium, Hampden, Twickenham) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| < 40 | 78% | 14% | 4% | 3% | 97 |
| 40 - 45 | 51% | 31% | 13% | 6% | 159 |
| 45 - 50 | 51% | 27% | 9% | 13% | 174 |
| 50 - 55 | 53% | 29% | 9% | 9% | 166 |
| 55 - 60 | 35% | 31% | 18% | 16% | 173 |
| 60 - 65 | 32% | 23% | 23% | 23% | 79 |
| 65 - 70 | 13% | 27% | 20% | 40% | 15 |
| > 70 | 4% | 17% | 43% | 35% | 23 |

| Table 19b: Subjective response to noise levels (10dB categories) Stadium Events (Manchester, Coventry, Wembley Stadium, Hampden, Twickenham) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| < 35 | 70% | 20% | 5% | 5% | 20 |
| 35 - 45 | 61% | 25% | 10% | 5% | 236 |
| 45 - 55 | 52% | 28% | 9% | 11% | 340 |
| 55 - 65 | 34% | 29% | 19% | 18% | 252 |
| > 65 | 8% | 21% | 34% | 37% | 38 |

4.51 Table 20a and 20b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 and 10 dB estimated noise exposure bands for the stadium events.

| Table 20a: Subjective response to *audible* noise (5dB categories) Stadium Events (Manchester, Coventry, Wembley Stadium, Hampden, Twickenham) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| < 40 | 86% | 14% | 21 |
| 40 - 45 | 88% | 12% | 78 |
| 45 - 50 | 73% | 27% | 86 |
| 50 - 55 | 81% | 19% | 78 |
| 55 - 60 | 75% | 25% | 113 |
| 60 - 65 | 67% | 33% | 54 |
| 65 - 70 | 54% | 46% | 13 |
| > 70 | 64% | 36% | 22 |

| Table 20b: Subjective response to *audible* noise (10dB categories) Stadium Events (Manchester, Coventry, Wembley Stadium, Hampden, Twickenham) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| < 35 | 83% | 17% | 6 |
| 35 - 45 | 88% | 12% | 93 |
| 45 - 55 | 77% | 23% | 164 |
| 55 - 65 | 72% | 28% | 167 |
| > 65 | 60% | 40% | 35 |

4.52 Table 21a and 21b show the percentage of all respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands for the 'Urban Other' events.

| Table 21a: Subjective response to noise levels (5dB categories) Urban/Other Events (Kenwood, Swansea, Brighton, Newcastle) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| < 40 | 73% | 20% | 4% | 2% | 255 |
| 40 - 45 | 66% | 26% | 6% | 3% | 116 |
| 45 - 50 | 40% | 47% | 7% | 7% | 30 |
| 50 - 55 | 51% | 35% | 8% | 6% | 86 |
| 55 - 60 | 46% | 30% | 16% | 8% | 89 |
| 60 - 65 | 33% | 40% | 21% | 7% | 58 |
| 65 - 70 | 32% | 41% | 12% | 15% | 41 |
| > 70 | 12% | 29% | 29% | 29% | 17 |

| Table 21b: Subjective response to noise levels (10dB categories) Urban/Other Events (Kenwood, Swansea, Brighton, Newcastle) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| < 35 | 81% | 13% | 4% | 2% | 129 |
| 35 - 45 | 66% | 27% | 5% | 2% | 242 |
| 45 - 55 | 48% | 38% | 8% | 6% | 116 |
| 55 - 65 | 41% | 34% | 18% | 7% | 147 |
| > 65 | 26% | 38% | 17% | 19% | 58 |

4.53 Table 22a and 22b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 and 10 dB estimated noise exposure bands for the 'Urban Other' events.

| Table 22a: Subjective response to *audible* noise (5dB categories) Urban/Other Events (Kenwood, Swansea, Brighton, Newcastle) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| < 40 | 91% | 9% | 68 |
| 40 - 45 | 93% | 8% | 40 |
| 45 - 50 | 89% | 11% | 18 |
| 50 - 55 | 88% | 12% | 42 |
| 55 - 60 | 85% | 15% | 48 |
| 60 - 65 | 90% | 10% | 39 |
| 65 - 70 | 79% | 21% | 28 |
| > 70 | 67% | 33% | 15 |

| Table 22b: Subjective response to *audible* noise (10dB categories) Urban/Other Events (Kenwood, Swansea, Brighton, Newcastle) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| < 35 | 88% | 12% | 25 |
| 35 - 45 | 93% | 7% | 83 |
| 45 - 55 | 88% | 12% | 60 |
| 55 - 65 | 87% | 13% | 87 |

4.54 The tables indicate that the stadium events give higher levels of annoyance for the same level of music noise at the residential properties. This may be linked to perception of how loud the music must be within a stadium by residents compared to an unenclosed park, i.e. the louder the music is believed to be at the event the more disturbing it is perceived to be by the resident.

4.55 There may also be a link between the more frequent general use of the stadiums and reducing tolerance to additional music events.

4.56 The following sections present the individual analysis for each event.

Green Day, Manchester

4.57 The relevant noise map BPC5077-E1 produced for the Green Day Manchester event is presented in Appendix A.

4.58 There is a general visual correlation between the annoyance ratings and the noise level, i.e. properties closer to the venue tend to display higher levels of annoyance although there is also significant variation between adjacent households assumed to be exposed to similar noise levels.

4.59 The annoyed responses are evenly distributed around the venue with no area demonstrating particularly strong reaction.

4.60 Tables 23a and 23b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 23a: Subjective response to noise levels (5dB categories) Green Day, Manchester**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 25% | 31% | 15% | 29% | 174 |
| < 40 | 82% | 18% | 0% | 0% | 11 |
| 40 - 45 | 22% | 33% | 0% | 44% | 9 |
| 45 - 50 | 26% | 36% | 11% | 26% | 53 |
| 50 - 55 | 33% | 33% | 13% | 20% | 30 |
| 55 - 60 | 20% | 34% | 20% | 25% | 44 |
| 60 - 65 | 0% | 18% | 27% | 55% | 22 |
| > 65 | 0% | 25% | 25% | 50% | 4 |

| Table 23b: Subjective response to noise levels (10dB categories) Green Day, Manchester | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 25% | 31% | 15% | 29% | 174 |
| 35 - 45 | 55% | 25% | 0% | 20% | 20 |
| 45 - 55 | 29% | 35% | 12% | 24% | 83 |
| 55 - 65 | 14% | 29% | 23% | 35% | 66 |
| > 65 | 0% | 25% | 25% | 50% | 4 |

4.61 Table 24a and 24b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 24a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 62% | 38% | 130 |
| < 40 | 100% | 0% | 2 |
| 40 - 45 | 43% | 57% | 7 |
| 45 - 50 | 64% | 36% | 39 |
| 50 - 55 | 70% | 30% | 20 |
| 55 - 60 | 69% | 31% | 35 |
| 60 - 65 | 45% | 55% | 22 |
| > 65 | 50% | 50% | 4 |

| Table 24b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 62% | 38% | 130 |
| 35 - 45 | 56% | 44% | 19 |
| 45 - 55 | 66% | 34% | 60 |
| 55 - 65 | 60% | 40% | 58 |
| > 65 | 50% | 50% | 4 |

4.62 The tables clearly indicate a link between increasing music noise levels and the percentage of people annoyed. However, it is not a directly linear correlation and it is likely that other external factors (such as those listed in 3.17) complicate this relationship.

4.63 From Tables 23a and 24a, there is a clear increase in annoyance response above $L_{Aeq}$ 60 dB and a similar reduction in the number of people that did not notice or could not hear the music.

4.64 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 25a and 25b below for 5 dB and 10 dB categories respectively.

| Table 25a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories | | |
|---|---|---|
| **Event noise level reduction from 100 dBA** | **Estimated level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1km radius** |
| 0 | 74 | 29% |
| -5 | 69 | 30% |
| -10 | 64 | 20% |
| -15 | 59 | 26% |

| Table 25b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories | | |
|---|---|---|
| **Event noise level reduction from 100 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1km radius** |
| 0 | 74 | 29% |
| -10 | 64 | 22% |
| -20 | 54 | 20% |

4.65 The tables indicate that a reduction of approximately 6% points could be achieved at this venue for each 5 dBA drop in MNL.

4.66 It is also worth noting that 73 % of the concert attendees thought the Mixer Desk level at around $L_{Aeq}$ 100 dB was 'just right', not 'too loud' or 'too low'. If the reduced MNL was achieved by reducing the noise at source, it is likely that a greater proportion of the audience would find the level 'too low'. For this event 23% of the attendees felt the music was already too quiet.

Pink, Glasgow

4.67 The relevant noise map BPC5077-E2 produced for the Pink, Glasgow event is presented in Appendix A.

4.68 There is a general visual correlation between the annoyance ratings and the noise level, i.e. properties closer to the venue tend to display higher levels of annoyance although there is also significant variation between adjacent households assumed to be exposed to similar noise levels.

4.69 There was a concentration of annoyed residents to the south east of the stadium.

4.70 Tables 26a and 26b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 26a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 40 | 32 | 18 | 10 | 181 |
| < 40 | 75% | 25% | 0% | 0% | 8 |
| 40 - 45 | 34% | 45% | 19% | 2% | 47 |
| 45 - 50 | 83% | 17% | 0% | 0% | 23 |
| 50 - 55 | 71% | 29% | 0% | 0% | 14 |
| 55 - 60 | 27% | 36% | 24% | 13% | 45 |
| 60 - 65 | 39% | 22% | 22% | 17% | 23 |
| 65 - 70 | 0% | 33% | 33% | 33% | 3 |
| > 70 | 0% | 22% | 39% | 39% | 18 |

| Table 26b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 40 | 32 | 18 | 10 | 181 |
| < 35 | 100% | 0% | 0% | 0% | 1 |
| 35 - 45 | 39% | 43% | 17% | 2% | 54 |
| 45 - 55 | 78% | 22% | 0% | 0% | 37 |
| 55 - 65 | 31% | 31% | 24% | 15% | 68 |
| > 65 | 0% | 24% | 38% | 38% | 21 |

4.71 There is a significant drop in the percentage that could not hear the music in the 40-45 dB band. This is principally due to the number of residents interviewed on Prospecthill Circus which were almost a kilometre away from the venue but had a clear line of site to the venue across Toryglen Park, therefore noise was not being attenuated by intervening buildings.

4.72 Table 27a and 27b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 27a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 83% | 17 | 109 |
| < 40 | 100% | 0% | 2 |
| 40 - 45 | 97% | 3% | 31 |
| 45 - 50 | 100% | 0% | 4 |
| 50 - 55 | 100% | 0% | 4 |
| 55 - 60 | 82% | 18% | 33 |
| 60 - 65 | 71% | 29% | 14 |
| 65 - 70 | 67% | 33% | 3 |
| > 70 | 61% | 39% | 18 |

| Table 27b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 83% | 17 | 109 |
| 35 - 45 | 97% | 3% | 33 |
| 45 - 55 | 100% | 0% | 8 |
| 55 - 65 | 79% | 21% | 47 |
| > 65 | 62% | 38% | 21 |

4.73 The tables clearly indicate a link between increasing music noise levels and the percentage of people annoyed. However, it is not a directly linear correlation and it is likely that other external factors (such as those listed in 3.17) complicate this relationship.

4.74 There is a clear increase in annoyance response above $L_{Aeq}$ 55 dB and a similar reduction in the number of people that did not notice or could not hear the music.

4.75 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 28a and 28b below for 5 dB and 10 dB categories respectively.

**Table 28a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories**

| Event noise level reduction from Est 98 dBA | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1km radius |
|---|---|---|
| 0 | 78 | 10% |
| -5 | 73 | 6% |
| -10 | 68 | 2% |
| -15 | 63 | 2% |

**Table 28b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories**

| Event noise level reduction from Est 98 dBA | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1km radius |
|---|---|---|
| 0 | 78 | 10% |
| -10 | 68 | 2% |
| -20 | 58 | 1% |

4.76 The tables indicate that a reduction of approximately 4% points could be achieved at this venue for each 5 dBA drop in MNL.

4.77 It is also worth noting that 88% of the concert attendees thought the Music Noise Level estimated at around $L_{Aeq}$ 100 dB was 'just right', not 'too loud' or 'too low'. . If the reduced MNL was achieved by reducing the noise at source, it is likely that a greater proportion of the audience would find the level 'too low'. For this event only 7% of the attendees felt the music was already too quiet.

Pink, Coventry

4.78 The relevant noise map BPC5077-E3 produced for the Pink, Coventry event is presented in Appendix A.

4.79 There is no visual correlation between the annoyance ratings and the noise level. There are a considerable number of properties close to the venue that did not hear the music despite the map indicating relatively high music levels. This may be due to a shadowing effect of the stadium reducing the noise level close to the venue which is not reflected in the modelling. Alternatively the background noise may have been high as a result of the dual carriage way that runs between the venue and the properties to the west.

4.80 It is also noted that there are a number of respondents approximately 1km to the south west of the venue that were annoyed, despite the predicted low level at this distance. This may be due to weather conditions during the event, as there was a northerly wind and no cloud cover which can give rise to temperature inversions which can reflect sound back down to the ground some distance from the source.

4.81 Tables 29a and 29b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 29a: Subjective response to noise levels (5dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 53 | 28 | 11 | 8 | 220 |
| < 40 | 55% | 24% | 10% | 10% | 29 |
| 40 - 45 | 53% | 24% | 16% | 8% | 38 |
| 45 - 50 | 52% | 27% | 12% | 10% | 52 |
| 50 - 55 | 58% | 27% | 9% | 5% | 55 |
| 55 - 60 | 45% | 33% | 9% | 12% | 33 |
| 60 - 65 | 54% | 46% | 0% | 0% | 13 |

| Table 29b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 53 | 28 | 11 | 8 | 220 |
| < 35 | 69% | 19% | 6% | 6% | 16 |
| 35 - 45 | 49% | 25% | 16% | 10% | 51 |
| 45 - 55 | 55% | 27% | 10% | 7% | 107 |
| 55 - 65 | 48% | 37% | 7% | 9% | 46 |

4.82 Tables 30a and 30b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 30a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 83% | 17% | 103 |
| < 40 | 77% | 23% | 13 |
| 40 - 45 | 83% | 17% | 18 |
| 45 - 50 | 80% | 20% | 25 |
| 50 - 55 | 87% | 13% | 23 |
| 55 - 60 | 78% | 22% | 18 |
| 60 - 65 | 100% | 0% | 6 |

| Table 30b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 83% | 17% | 103 |
| < 35 | 80% | 20% | 5 |
| 35 - 45 | 81% | 19% | 26 |
| 45 - 55 | 83% | 17% | 48 |
| 55 - 65 | 83% | 17% | 24 |

4.83 The tables do not indicate any link between increasing music noise levels and the percentage of people annoyed.

4.84 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 31a and 31b below for 5 dB and 10 dB categories respectively.

**Table 31a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories**

| Event noise level reduction from 98 dBA | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1km radius |
|---|---|---|
| 0 | 67 | 8% |
| -5 | 62 | 8% |
| -10 | 57 | 7% |
| -15 | 52 | 6% |

**Table 31b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories**

| Event noise level reduction from 98 dBA | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1km radius |
|---|---|---|
| 0 | 67 | 8% |
| -10 | 57 | 6% |
| -20 | 47 | 2% |

4.85 The tables do not indicate that annoyance rates would be significantly lower if music levels were reduced.

4.86 It is also worth noting that 79 % of the concert attendees thought the Music Noise Level at around $L_{Aeq}$ 98 dB was 'just right', though 14% thought it was 'too loud' the highest of the 10 events.. If the reduced MNL was achieved by reducing the noise at source, it is likely that a greater proportion of the audience would find the level 'too low'. Though for this event only 4% of the attendees felt the music was too quiet.

Pride, Brighton

4.87 The relevant noise map BPC5077-E4 produced for the Pride, Brighton event is presented in Appendix A.

4.88 There is a general visual correlation between the annoyance ratings and the noise level, i.e. properties closer to the venue tend to display higher levels of annoyance although there is also significant variation between adjacent households assumed to be exposed to similar noise levels.

4.89 The responses are relatively evenly spread around the venue with no particular area displaying non typical reactions to the music. There is however generally more audibility to the east, which was downwind of the venue.

4.90 Tables 32a and 32b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 32a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 30% | 40% | 19% | 11% | 125 |
| 50 - 55 | 64% | 36% | 0% | 0% | 14 |
| 55 - 60 | 36% | 36% | 19% | 8% | 36 |
| 60 - 65 | 26% | 44% | 23% | 7% | 43 |
| 65 - 70 | 11% | 56% | 17% | 17% | 18 |
| > 70 | 14% | 21% | 29% | 36% | 14 |

| Table 32b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 30% | 40% | 19% | 11% | 125 |
| 45 - 55 | 64% | 36% | 0% | 0% | 14 |
| 55 - 65 | 30% | 41% | 22% | 8% | 79 |
| > 65 | 13% | 41% | 22% | 25% | 32 |

4.91 Table 33a and 33b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 33a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 84% | 16% | 88 |
| 50 - 55 | 100% | 0% | 5 |
| 55 - 60 | 87% | 13% | 23 |
| 60 - 65 | 91% | 9% | 32 |
| 65 - 70 | 81% | 19% | 16 |
| > 70 | 58% | 42% | 12 |

| Table 33b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 84% | 16% | 88 |
| 45 - 55 | 100% | 0% | 5 |
| 55 - 65 | 89% | 11% | 55 |
| > 65 | 71% | 29% | 28 |

4.92 The tables indicate a link between increasing music noise levels and the percentage of people annoyed.

4.93 There is a clear increase in annoyance response above $L_{Aeq}$ 65 dB and a substantial reduction in the number who could not hear the music.

4.94 The music noise level at the nearest residential property was significantly above the other park events. This is likely to be why the annoyance rate for all respondents at 11%, is higher than the other park venues and was more typical of the Stadium annoyance response rate.

4.95 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 34a and 34b below for 5 dB and 10 dB categories respectively.

| Table 34a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories | | |
|---|---|---|
| **Event noise level reduction from 96 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 750km radius** |
| 0 | 73 | 11% |
| -5 | 68 | 6% |
| -10 | 63 | 3% |
| -15 | 58 | 1% |

| Table 34b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories | | |
|---|---|---|
| **Event noise level reduction from 96 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 750m radius** |
| 0 | 73 | 11% |
| -10 | 63 | 3% |
| -20 | 53 | 1% |

4.96 The tables indicate that a 5 dBA reduction in desk levels would significantly reduce the annoyance rates.

4.97 It is also worth noting that 79 % of the concert attendees thought the Music Noise Level at around $L_{Aeq}$ 96 dB was 'just right', not 'too loud' or 'too low' though 9% of concert attendees thought the music was 'too loud', the ighest percentage of all the 'Urban other' events. If the reduced MNL was achieved by reducing the noise at source, it is likely that a greater proportion of the audience would find the level 'too low'. For this event 10% of the attendees felt the music was too quiet.

Help for Heroes, Twickenham

4.98 The relevant noise map BPC5077-E5 produced for the Help for Heroes, Twickenham event is presented in Appendix A.

4.99 There is a general visual correlation between the event audibility and the noise level, i.e. properties closer to the venue tend to display higher levels of audibility.

4.100 This was the only event were there were no very annoyed respondents. There was only six fairly annoyed respondents, who's response does not seem to be linked to the distance from the venue. The fairly annoyed respondents were however all located to the east of the stadium, particularly the north east, this may be weather related.

4.101 Tables 35a and 35b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 35a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 52% | 32% | 12% | 4% | 145 |
| < 40 | 89% | 7% | 4% | 0% | 27 |
| 40 - 45 | 55% | 34% | 9% | 2% | 44 |
| 45 - 50 | 53% | 42% | 0% | 5% | 19 |
| 50 - 55 | 25% | 70% | 5% | 0% | 20 |
| 55 - 60 | 30% | 50% | 0% | 20% | 10 |
| 60 - 65 | 41% | 12% | 41% | 6% | 17 |
| 65 - 70 | 33% | 33% | 33% | 0% | 3 |
| > 70 | 20% | 0% | 60% | 20% | 5 |

| Table 35b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 52% | 32% | 12% | 4% | 145 |
| < 35 | 0% | 100% | 0% | 0% | 1 |
| 35 - 45 | 69% | 23% | 7% | 1% | 70 |
| 45 - 55 | 38% | 56% | 3% | 3% | 39 |
| 55 - 65 | 37% | 26% | 26% | 11% | 27 |
| > 65 | 25% | 13% | 50% | 13% | 8 |

4.102 Table 36a and 36b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 36a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 91% | 9% | 70 |
| < 40 | 100% | 0% | 3 |
| 40 - 45 | 95% | 5% | 20 |
| 45 - 50 | 89% | 11% | 9 |
| 50 - 55 | 100% | 0% | 15 |
| 55 - 60 | 71% | 29% | 7 |
| 60 - 65 | 90% | 10% | 10 |
| 65 - 70 | 100% | 0% | 2 |
| > 70 | 75% | 25% | 4 |

| Table 36b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 91% | 9% | 70 |
| < 35 | 100% | 0% | 1 |
| 35 - 45 | 95% | 5% | 22 |
| 45 - 55 | 96% | 4% | 24 |
| 55 - 65 | 82% | 18% | 17 |
| > 65 | 83% | 17% | 6 |

4.103 There does not appear to be a strong link between increasing music noise levels and the percentage of people annoyed.

4.104 There is a clear increase in annoyance response above $L_{Aeq}$ 55 dB.

4.105 The annoyance rates for this event were very low. This is likely to be mainly due to the music noise level being relatively low for a stadium event and probably lower than residents are normally accustomed to for music events at this venue. It is also likely however that the charitable nature of the event will have reduced the number of people willing to express annoyance.

4.106 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 37a and 37b below for 5 dB and 10 dB categories respectively.

| Table 37a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories | | |
|---|---|---|
| **Event noise level reduction from 88 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1km radius** |
| 0 | 77 | 4% |
| -5 | 72 | 3% |
| -10 | 67 | 1% |
| -15 | 62 | 1% |

| Table 37b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories | | |
|---|---|---|
| **Event noise level reduction 88 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1km radius** |
| 0 | 77 | 4% |
| -10 | 67 | 1% |
| -20 | 57 | 1% |

4.107 It is also worth noting that 79 % of the concert attendees thought the Music Noise Level at around $L_{Aeq}$ 88 dB was 'just right', though 14% thought it was already 'too low'

Proms, Swansea

4.108 The relevant noise map BPC5077-E6 produced for the Proms, Swansea event is presented in Appendix A.

4.109 There were significantly higher levels of audibility to the north east of the venue. This may be due to the wind coming from a westerly direction..

4.110 Tables 38a and 38b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 38a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 57% | 34% | 7% | 2% | 170 |
| < 40 | 53% | 37% | 7% | 2% | 83 |
| 40 - 45 | 69% | 23% | 7% | 1% | 70 |
| 45 - 50 | 33% | 60% | 0% | 7% | 15 |
| 50 - 55 | 0% | 100% | 0% | 0% | 2 |

**Table 38b: Subjective response to noise levels (10dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 57% | 34% | 7% | 2% | 170 |
| < 35 | 35% | 50% | 10% | 5% | 20 |
| 35 - 45 | 64% | 28% | 7% | 2% | 133 |
| 45 - 55 | 29% | 65% | 0% | 6% | 17 |

4.111 Table 39a and 39b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 39a: Subjective response to *audible* noise (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | Number of respondents |
|---|---|---|---|
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 95% | 5% | 73 |
| < 40 | 95% | 5% | 39 |
| 40 - 45 | 95% | 5% | 22 |
| 45 - 50 | 90% | 10% | 10 |
| 50 - 55 | 100% | 0% | 2 |

**Table 39b: Subjective response to *audible* noise (10dB categories)**

| Estimated noise level (dBA) | Subjective response | | Number of respondents |
|---|---|---|---|
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 95% | 5% | 73 |
| < 35 | 92% | 8% | 13 |
| 35 - 45 | 96% | 4% | 48 |
| 45 - 55 | 92% | 8% | 12 |

4.112 The tables do not indicate a strong link between increasing music noise levels and the percentage of people annoyed. This is likely to be a factor of the relatively low music level at this event.

4.113 Due to the very low annoyance rate for this event and the distribution of these responses the response re-mapping cannot be accurately carried out for this event. It is worth noting though that 77 % of the concert attendees thought the Music Noise Level estimated at around $L_{Aeq}$ 85 dB was 'just right', though 17% thought it was 'too low'.

Evolution, Newcastle

4.114 The relevant noise map BPC5077-E7 produced for the Evolution, Newcastle event is presented in Appendix A.

4.115 There is a general visual correlation between the annoyance ratings and the noise level, i.e. properties closer to the venue tend to display higher levels of annoyance although there is also significant variation between adjacent households assumed to be exposed to similar noise levels.

4.116 There were a significant number of interviews conducted in three blocks of flats to the south of the main stage in Gateshead. None of these properties heard the music. This is likely to be due to high levels of traffic noise from the adjacent duel carriageway.

4.117 Tables 40a and 40b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 40a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 64% | 23% | 8% | 5% | 275 |
| < 40 | 81% | 14% | 2% | 2% | 85 |
| 40 - 45 | 81% | 15% | 4% | 0% | 26 |
| 45 - 50 | 80% | 20% | 0% | 0% | 5 |
| 50 - 55 | 54% | 31% | 9% | 6% | 65 |
| 55 - 60 | 53% | 26% | 13% | 8% | 53 |
| 60 - 65 | 53% | 27% | 13% | 7% | 15 |
| 65 - 70 | 48% | 30% | 9% | 13% | 23 |
| > 70 | 0% | 67% | 33% | 0% | 3 |

| Table 40b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 64% | 23% | 8% | 5% | 275 |
| < 35 | 88% | 7% | 2% | 2% | 43 |
| 35 - 45 | 76% | 19% | 3% | 1% | 68 |
| 45 - 55 | 56% | 30% | 9% | 6% | 70 |
| 55 - 65 | 53% | 26% | 13% | 7% | 68 |
| > 65 | 42% | 35% | 12% | 12% | 26 |

4.118 Table 41a and 41b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 41a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 86% | 14% | 99 |
| < 40 | 88% | 12% | 16 |
| 40 - 45 | 100% | 0% | 5 |
| 45 - 50 | 100% | 0% | 1 |
| 50 - 55 | 87% | 13% | 30 |
| 55 - 60 | 84% | 16% | 25 |
| 60 - 65 | 86% | 14% | 7 |
| 65 - 70 | 75% | 25% | 12 |
| > 70 | 100% | 0% | 3 |

| Table 41b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 86% | 14% | 99 |
| < 35 | 80% | 20% | 5 |
| 35 - 45 | 94% | 6% | 16 |
| 45 - 55 | 87% | 13% | 31 |
| 55 - 65 | 84% | 16% | 32 |
| > 65 | 80% | 20% | 15 |

4.119 The tables indicate a link between increasing music noise levels and the percentage of people annoyed. However, it is not a directly linear correlation and it is likely that other external factors (such as those listed in 4.14) complicate this relationship.

4.120 There is an increase in annoyance response above $L_{Aeq}$ 65 dB.

4.121 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 42a and 42b below for 5 dB and 10 dB categories respectively.

| Table 42a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories | | |
|---|---|---|
| Event noise level reduction from 89 dBA | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1.5km radius |
| 0 | 75 | 5% |
| -5 | 70 | 3% |
| -10 | 65 | 1% |
| -15 | 60 | 1% |

| Table 42b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories | | |
|---|---|---|
| **Event noise level reduction from 89 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1.5km radius** |
| 0 | 75 | 5% |
| -10 | 65 | 3% |
| -20 | 55 | 1% |

4.122 It is also worth noting that 66 % of the concert attendees thought the Music Noise Level at around $L_{Aeq}$ 89 dB was 'just right', though 34% thought the level was 'too low', the highest percentage of the 10 events.

Green Day, Wembley Stadium

4.123 The relevant noise map BPC5077-E8 produced for the Green Day, Wembley Stadium event is presented in Appendix A.

4.124 There is a general visual correlation between the annoyance ratings and the noise level, i.e. properties closer to the venue tend to display higher levels of annoyance although there is also significant variation between adjacent households assumed to be exposed to similar noise levels.

4.125 The majority of annoyed respondents were located to the south of the stadium in the Tokyngton district. This is likely to have been influenced by the moderate northerly wind during the event.

4.126 Tables 43a and 43b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 43a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 67% | 11% | 11% | 11% | 168 |
| < 40 | 95% | 5% | 0% | 0% | 22 |
| 40 – 45 | 90% | 5% | 5% | 0% | 21 |
| 45 – 50 | 67% | 7% | 15% | 11% | 27 |
| 50 – 55 | 66% | 11% | 11% | 13% | 47 |
| 55 – 60 | 51% | 17% | 20% | 12% | 41 |
| 60 – 65 | 50% | 25% | 0% | 25% | 4 |
| 65 – 70 | 20% | 20% | 0% | 60% | 5 |

| Table 43b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 67% | 11% | 11% | 11% | 168 |
| < 35 | 100% | 0% | 0% | 0% | 2 |
| 35 - 45 | 93% | 5% | 2% | 0% | 41 |
| 45 - 55 | 66% | 9% | 12% | 12% | 74 |
| 55 - 65 | 51% | 18% | 18% | 13% | 45 |
| > 65 | 20% | 20% | 0% | 60% | 5 |

4.127 Table 44a and 44b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 44a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 67% | 33% | 54 |
| < 40 | 100% | 0% | 1 |
| 40 – 45 | 100% | 0% | 2 |
| 45 – 50 | 67% | 33% | 9 |
| 50 – 55 | 63% | 38% | 16 |
| 55 – 60 | 75% | 25% | 20 |
| 60 – 65 | 50% | 50% | 2 |
| 65 – 70 | 25% | 75% | 4 |

| Table 44a: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 67% | 33% | 54 |
| 35 – 45 | 100% | 0% | 3 |
| 45 – 55 | 64% | 36% | 25 |
| 55 – 65 | 73% | 27% | 22 |
| > 65 | 25% | 75% | 4 |

4.128 The tables clearly indicate a link between increasing music noise levels and a reduction the percentage who did not hear the music. However there is not such strong annoyance correlation.

4.129 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 45a and 45b below for 5 dB and 10 dB categories respectively.

| Table 45a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories | | |
|---|---|---|
| Event noise level reduction from 101 dBA | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1km radius |
| 0 | 69 | 11% |
| -5 | 64 | 8% |
| -10 | 59 | 4% |
| -15 | 54 | 1% |

| Table 45b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories | | |
|---|---|---|
| **Event noise level reduction from 101 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1km radius** |
| 0 | 69 | 11% |
| -10 | 59 | 4% |
| -20 | 49 | 0% |

4.130 The tables indicate that a reduction of approximately 4% points could be achieved at this venue for each 5 dBA drop in MNL.

4.131 It is also worth noting that 78 % of the concert attendees thought the Music Noise Level at around $L_{Aeq}$ 101 dB was 'just right', not 'too loud' or 'too low'. . If the reduced MNL was achieved by reducing the noise at source, it is likely that a greater proportion of the audience would find the level 'too low'. For this event 18% of the attendees felt the music was already too quiet.

Mowtown, Kenwood House

4.132 The relevant noise map BPC5077-E9 produced for the Mowtown, Kenwood House event is presented in Appendix A.

4.133 There is a general visual correlation between the audibility and the noise level, i.e. properties closer to the venue tend to display higher levels of audibility. There is generally more audibility to the east of the venue as this area was downwind during the event.

4.134 Tables 46a and 46b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 46a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 69% | 21% | 5% | 5% | 123 |
| < 40 | 85% | 10% | 2% | 2% | 87 |
| 40 - 45 | 35% | 50% | 5% | 10% | 20 |
| 45 - 50 | 30% | 40% | 20% | 10% | 10 |
| 50 - 55 | 0% | 60% | 20% | 20% | 5 |

| Table 46b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 69% | 21% | 5% | 5% | 123 |
| < 35 | 89% | 6% | 3% | 2% | 66 |
| 35 - 45 | 54% | 37% | 2% | 7% | 41 |
| 45 - 55 | 20% | 47% | 20% | 13% | 15 |

4.135 Table 47a and 47b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 47a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 84% | 16% | 38 |
| < 40 | 85% | 15% | 13 |
| 40 - 45 | 85% | 15% | 13 |
| 45 - 50 | 86% | 14% | 7 |
| 50 - 55 | 80% | 20% | 5 |

| Table 47b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 84% | 16% | 38 |
| < 35 | 86% | 14% | 7 |
| 35 - 45 | 84% | 16% | 19 |
| 45 - 55 | 83% | 17% | 12 |

4.136 The low number of people who were annoyed with this event and the wide dispersion of these respondents results in a poor correlation of levels with annoyance.

4.137 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 48a and 48b below for 5 dB and 10 dB categories respectively.

| Table 48a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories | | |
|---|---|---|
| Event noise level reduction (dBA) | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1.5km radius |
| 0 | 59 | 5% |
| -5 | 54 | 3% |
| -10 | 49 | 1% |
| -15 | 44 | 0% |

| Table 48b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories | | |
|---|---|---|
| **Event noise level reduction from 88 dBA** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1.5km radius** |
| 0 | 59 | 5% |
| -10 | 49 | 2% |
| -20 | 39 | 0% |

4.138 It is also worth noting that 76 % of the concert attendees thought the Music Noise Level at around $L_{Aeq}$ 88 dB was 'just right', not 'too loud' or 'too low'. . If the reduced MNL was achieved by reducing the noise at source, it is likely that a greater proportion of the audience would find the level 'too low'. For this event 21% of the attendees felt the music was already too quiet.

KISS, Wembley Arena

4.139 The relevant noise map BPC5077-E10 produced for the Kiss, Wembley Arena event is presented in Appendix A.

4.140 There is no obvious visual correlation between the annoyance ratings and the noise level. The vast majority of the respondents did not hear any music, this is due to the high level of insulation provided by the arena building.

4.141 In the Tokyngton area approximately a kilometre to the south east of the Arena there is a grouping of four very and fairly annoyed respondents. This is on the far side of Wembley stadium. This is difficult to explain as the music level at these properties should have been under 20 dBA within the properties even with their windows open. It is suspected that they were perhaps exposed to a different music noise source that evening, or were perhaps giving a general response to noise from the Stadium rather than the arena.

4.142 Tables 49a and 49b present the percentage of respondents giving a subjective response within each of the 5 dB and 10 dB estimated noise exposure bands.

**Table 49a: Subjective response to noise levels (5dB categories)**

| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
|---|---|---|---|---|---|
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 86 | 4% | 4% | 6% | 144 |
| < 40 | 88% | 6% | 0% | 6% | 108 |
| 40 - 45 | 89% | 0% | 6% | 6% | 18 |
| 45 - 50 | 72% | 0% | 22% | 6% | 18 |

| Table 49b: Subjective response to noise levels (10dB categories) | | | | | |
|---|---|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | | | Number of respondents |
| | Could not hear music | Not at all annoyed | Not very annoyed | Fairly or very annoyed | |
| Overall | 86% | 4% | 4% | 6% | 144 |
| < 35 | 91% | 1% | 0% | 7% | 67 |
| 35 - 45 | 85% | 8% | 2% | 5% | 59 |
| 45 - 55 | 72% | 0% | 22% | 6% | 18 |

4.143 Table 50a and 50b show the percentage of respondents giving a subjective response to the audible concert music within each of the 5 dB and 10 dB estimated noise exposure bands.

| Table 50a: Subjective response to *audible* noise (5dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 55% | 45% | 20 |
| < 40 | 46% | 54% | 13 |
| 40 - 45 | 50% | 50% | 2 |
| 45 - 50 | 80% | 20% | 5 |

| Table 50b: Subjective response to *audible* noise (10dB categories) | | | |
|---|---|---|---|
| Estimated noise level (dBA) | Subjective response | | Number of respondents |
| | Not at all or not very annoyed | Fairly or very annoyed | |
| Overall | 55% | 45% | 20 |
| < 35 | 17% | 83% | 6 |
| 35 - 45 | 67% | 33% | 9 |
| 45 - 55 | 80% | 20% | 5 |

4.144 The tables do not indicate any link between increasing music noise levels and the percentage of people annoyed.

4.145 The results of the response re-mapping following the methodology described in section 4.16 are shown in Tables 51a and 51b below for 5 dB and 10 dB categories respectively.

| Table 51a. Indicative community annoyance with varying music noise levels Response re-mapping method, 5 dB categories | | |
|---|---|---|
| Event noise level reduction from 104 dBA | Noise level at nearest property (dBA) | % population 'fairly' or 'very annoyed' within 1km radius |
| 0 | 50 | 6% |
| -5 | 45 | 4% |
| -10 | 40 | 2% |
| -15 | 35 | 1% |

| Table 51b. Indicative community annoyance with varying music noise levels Response re-mapping method, 10 dB categories | | |
|---|---|---|
| **Event noise level reduction from 104 (dBA)** | **Noise level at nearest property (dBA)** | **% population 'fairly' or 'very annoyed' within 1km radius** |
| 0 | 50 | 6% |
| -10 | 40 | 4% |
| -20 | 30 | 1% |

4.146 It is also worth noting that 77 % of the concert attendees thought the Music Noise Level at around $L_{Aeq}$ 104 dB was 'just right', thought 12% thought it was 'too loud'. If the reduced MNL was achieved by reducing the noise at source, it is likely that a greater proportion of the audience would find the level 'too low'. For this event 9% of the attendees felt the music was too quiet.

## 5.0 Conclusions

5.1 The dose response analysis has indicated a clear link between music noise levels and levels of annoyance of residents living near venues used for music events. The overall 10 event relationship for all respondents ranges from 4% 'fairly' or 'very' annoyed at music levels under 35 dBA rising to 26% annoyed with music levels over 65 dBA.

5.2 Looking at those 'annoyed to some extent' the relationship for all respondents ranges from 7% at music levels under 35 dBA rising to 50% annoyed with music levels over 65 dBA.

5.3 The relationship also gives a clear guide on the percentage of residents that will be aware of the music for any given external level. Again this presents a good linear correlation, with the music awareness increasing as the noise levels increase.

5.4 There is a clear increase in annoyance response above a MNL of 55 dB and a similar reduction in the number of people that did not notice or could not hear the music.

5.5 At around a MNL of 60 dB the percentage of respondents 'annoyed to some extent' rises above both the 'not annoyed' and 'inaudible' categories.

5.6 The results indicate that even at higher music levels at the residential properties there was still a significant proportion of the population in the immediate vicinity of an event that did not hear the music.

5.7 It also appears that a significant percentage of the population will form an opinion on the music's subjective annoyance irrespective of the actual level of music.

5.8 The opinion formed will be influenced by the factors highlighted in section 4.14 and are also likely to be influenced by other concert related factors such as annoyance from additional event traffic, attendees littering etc.

5.9 As would be expected, a number of the maps indicate that the residents living downwind of an event are more likely to hear the noise from the event.

5.10 The tables indicate that the stadium events give higher levels of annoyance for the same level of music noise at the residential properties. This may be linked to perception of how loud the music must be within a stadium by residents compared to an unenclosed park, i.e. the louder the music is believed to be at the event the more disturbing it is perceived to be by the resident.

5.11 Whilst 9% of all respondents were fairly or very annoyed by the music noise, it should be noted that only 1% of residents actually complained about the noise disturbance. The most common reasons for not making a complaint were that they "had nothing to complain about" (53%) or "event did not have sufficient impact to complain "(33%). This finding is similar to many other areas of impact where simply being annoyed does not necessarily trigger a complaint.

5.12 Annoyance rates for urban venues appear to be linked to music noise level rather than venue type, suggesting that the Code of Practice perhaps does not need to differentiate between these types of venues.

5.13 For each of the individual events an assessment of the likely change in annoyance rates if the music noise level was lower has been produced. However these predictions are individual to the particular events and therefore have not been collated for all events.

# Appendix A. Noise-Response Maps

Noise Maps - BPC 5077-E1 to E10 are contained in a separate PDF file.

| Event | Map Reference |
|---|---|
| Green Day, Manchester | BPC 5077-E1 |
| Pink, Glasgow | BPC 5077-E2 |
| Pink, Coventry | BPC 5077-E3 |
| Pride, Brighton | BPC 5077-E4 |
| Help for Heroes, Twickenham | BPC 5077-E5 |
| Proms, Swansea | BPC 5077-E6 |
| Evolution, Newcastle | BPC 5077-E7 |
| Green Day, Wembley Stadium | BPC 5077-E8 |
| Mowtown, Kenwood House | BPC 5077-E9 |
| KISS, Wembley Arena | BPC 5077-E10 |

Please note, in order to print the annotations shown on the noise maps, the user must be using either Adobe Acrobat (full version) or Adobe Reader 10, for which a free download is available on the internet (at get.adobe.com/reader). Printing of PDF annotations is not supported in Adobe Reader versions 9 and below. In addition, the "Print notes and pop-ups" option must be enabled within the commenting tab in the application's preferences.

# Appendix B. Event Meteorological Data

| Event Weather Data | | | |
|---|---|---|---|
| **Event** | **Temperature °C** | **Wind direction & Speed** | **Cloud cover** |
| Green Day, Manchester | 20 | 4m/s ENE | Clear |
| Pink, Glasgow | 21 | 3m/s WSW | Partly Cloudy |
| Pink, Coventry | 15 | 4m/s NNE | Clear |
| Pride, Brighton | 18 | 3m/s SW | Scattered cloud |
| Help for Heroes, Twickenham | 16 | 2m/s NNW | Partly Cloudy |
| Proms, Swansea | 15 | 5m/s W | Scattered cloud |
| Evolution, Newcastle 30th | 10 | 7m/s N | Partly Cloudy |
| Evolution, Newcastle 31st | 10 | 1m/s ESE | Partly Cloudy |
| Green Day, Wembley Stadium | 14 | 4m/s N | Partly Cloudy |
| Mowtown, Kenwood House | 21 | 5m/s W | Partly Cloudy |
| KISS, Wembley Arena | 10 | 3m/s NE | Clear |

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www.airtest.org.uk


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