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Hathersage Skate Park
Noise Assessment

Hathersage Parish Council

April 2014
Project no: AM20140414_HSP

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Executive Summary

Acoustic Dimensions (AD) has assessed noise for a proposed skate park at King George V Playing Field in Hathersage. We have compared skate park noise with measured site noise levels and with relevant noise criteria.

We have assessed noise under recommendations in British Standard 8233:1999 – '*7.6.1.2 Design criteria and limits for intrusive external noise*' which is linked with World Health Organization '*Guidelines for community noise*'.

We provide an assessment of skate park noise in accordance with British Standard 4142:1997 '*Method for rating industrial noise affecting mixed residential and industrial areas*'. This is for reference purposes only. We also discuss the reasons why BS 4142 is not well suited to the assessment of skate park noise. This method of assessment is unrepresentative and is often used against proposals for the construction of skate parks.

Guidelines in BS 8233 and WHO are appropriate for the assessment skate park noise on the basis of comparing continuous equivalent noise levels (dB $L_{Aeq,1hr}$ and dB $L_{Aeq,16hr}$).

Our conclusion is that noise from the proposed skate at King George V Playing Field is unlikely to cause significant and unreasonable disturbance to nearby residents as an activity within the appropriate recreational context.

We also provide a review of a previous noise assessment undertaken by Acoustic Design Technology (ADT) for the proposed skate park.

1.0 Introduction

1.1 We compare calculated skate park noise levels to our measurements of existing ambient noise at the Hathersage site and to relevant criteria. Our assessment is based on calculated source noise levels from measurements made at similar skate parks built with concrete.

1.2 We measured noise levels at the King George V Playing Field (the site) on 12 March 2014. Details are provided in Appendix A.

1.3 Discussion on the relevant guidance and criteria for the assessment of skate park noise is provided in Appendix B. We have spoken with Simon Bell, Environmental Health Officer at Derbyshire Dales District Council to agree the methodology of our assessment. The details of this conversation are also in Appendix B.

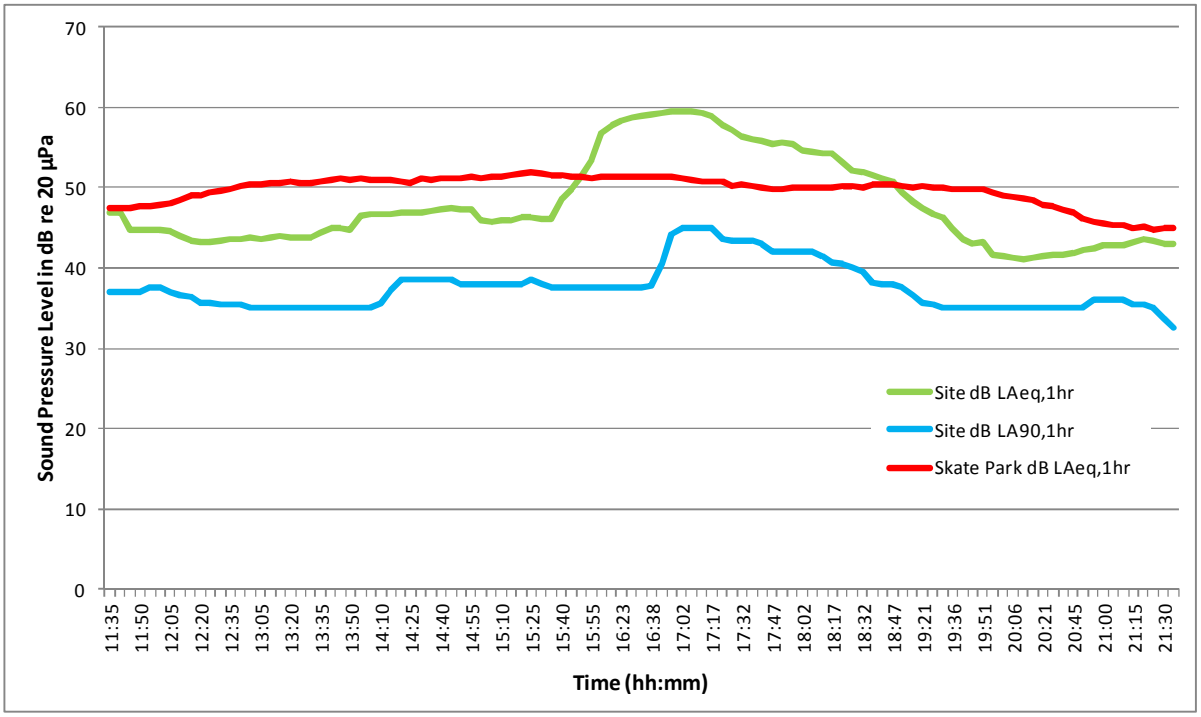
1.4 Information to support our assessment is given in Appendix C.

1.5 We review and comment on the noise assessment by Acoustic Design Technologies (ADT) in Appendix D.

2.0 Assessment

BS8233

2.1 We compare the calculated skate park noise levels with the measured site noise in terms of one-hour continuous equivalent noise levels (dB $L_{Aeq,1hr}$).



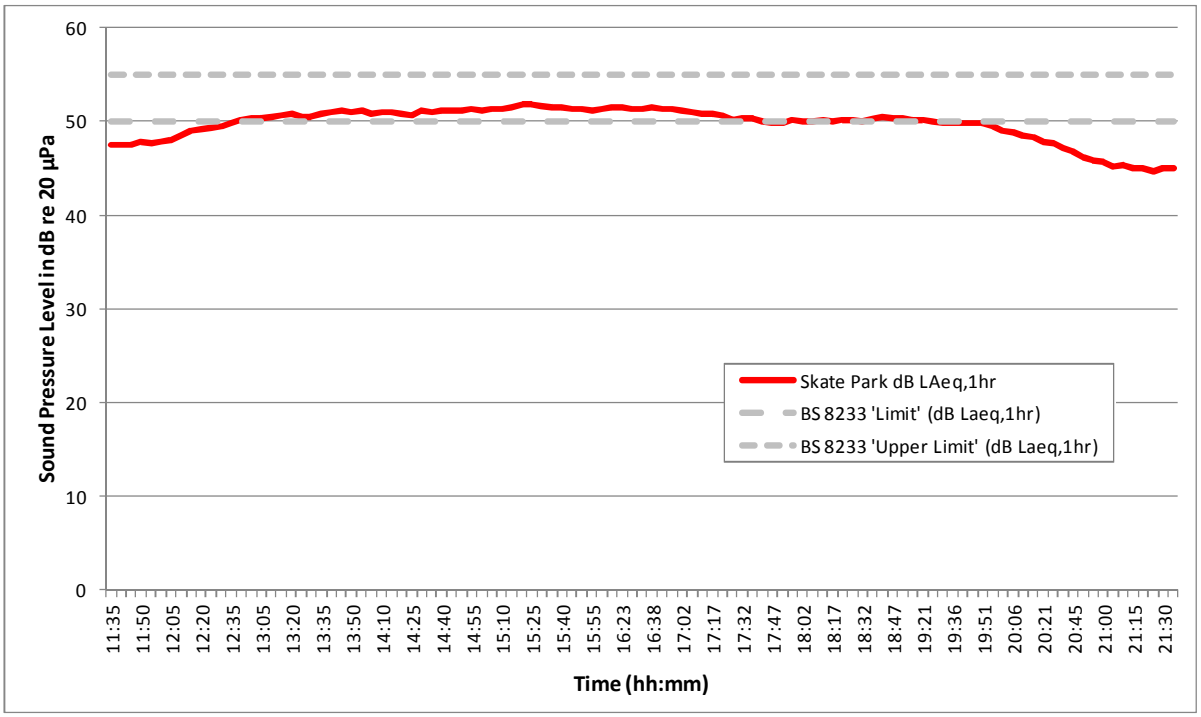
One-hour assessment (using rolling averages) of skate park noise compared to measured ambient noise levels (dB $L_{Aeq,1hr}$)

2.2 We assess the noise using a one-hour reference time interval (dB $L_{Aeq,1hr}$) as this is '*appropriate to the activity*' under BS 8233:1999. This provides a more stringent assessment compared to WHO guidelines which recommends a 16-hour '*time base*'.

2.3 The levels shown above are calculated using a rolling 1-hour sample period which covers the duration of our survey on 12 March 2014.

2.4 The next graph compares the calculated one-hour skate park noise levels (dB $L_{Aeq,1hr}$) to recommended noise level limits given in BS 8233 which states:

'... In gardens and balconies etc. it is desirable that the steady noise level does not exceed 50 dB $L_{Aeq,T}$ and 55 dB LAeq,T should be regarded as the upper limit. The time period, T, should be appropriate to the activity'.



One-hour assessment (using rolling averages) of skate noise park compared to BS 8233 recommended noise level limits (dB $L_{Aeq,1hr}$)

2.5 Skate park noise levels are calculated according to the method described in Appendix C.

2.6 Our assessment indicates that noise from the proposed skate park (dB $L_{Aeq,1hr}$) could exceed the recommended lower 'limit' of 50 dB $L_{Aeq,1hr}$ given in BS 8233 by 2 dB during periods of peak activity. Skate park noise would be lower than the 'upper limit' of 55 dB $L_{Aeq,1hr}$ given in the standard.

2.7 Our assessment under BS 8233 is a like-for-like comparison of continuous equivalent noise levels (dB $L_{Aeq,1hr}$) in accordance with the standard.

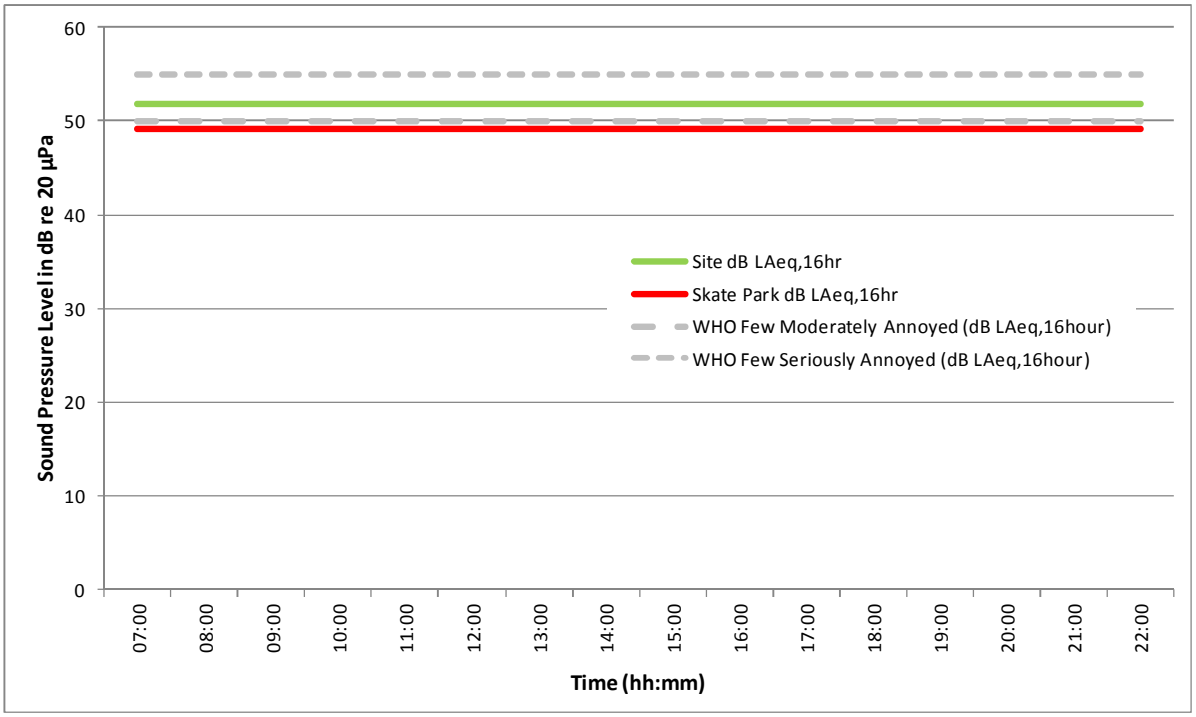
World Health Organization

2.8 WHO 'Guidelines for community noise' recommends two level limits for outdoor noise:

'*To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB LAeq for a steady continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB LAeq.*'

2.9 WHO makes reference to a 16-hour '*time base*' (dB $L_{Aeq,16hr}$) for outdoor noise and we have assessed skate park noise accordingly. The 16-hour (daytime) interval is 07:00-23:00.

2.10 In the next graph we compare calculated skate park noise, measured existing site noise and the recommended limits for outdoor noise given in WHO '*Guidelines for community noise*'.

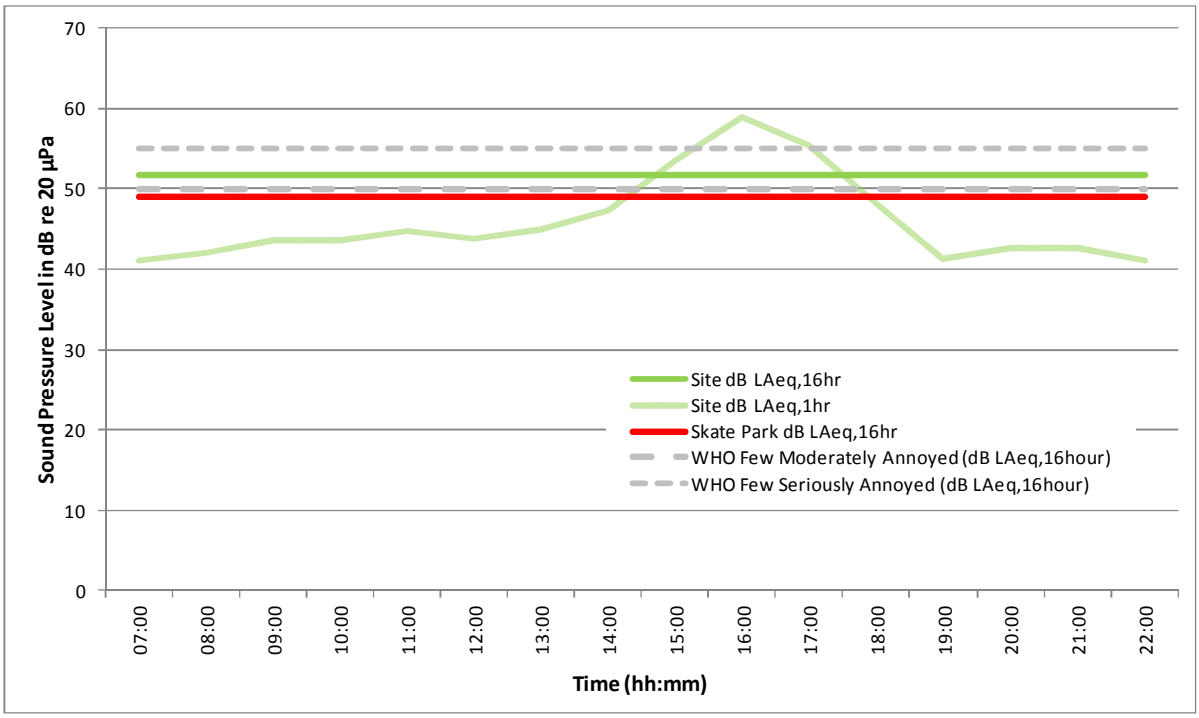


Sixteen-hour assessment of skate park noise compared to site ambient noise level and WHO criteria for outdoor noise (all dB $L_{Aeq,16hr}$)

2.11 The calculated sixteen-hour skate park noise level (49 dB $L_{Aeq,16hr}$) is lower than the measured site noise level (52 dB $L_{Aeq,16hr}$) and lower than the WHO recommended limit for outdoor noise (50 dB $L_{Aeq,16hr}$) which is suitable to '*protect the majority of people from being moderately annoyed during the daytime*'.

2.12 When the calculated skate park noise is compared to the site ambient noise using a one-hour '*time base*' (dB $L_{Aeq,1hr}$) over the daytime period (07:00-23:00), this shows that skate park noise could be higher or lower than the ambient site noise depending on the level of other activity at the park or nearby lido.

2.13 In the next graph we show how one-hour skate park noise levels (dB $L_{Aeq,1hr}$) can vary to give the calculated sixteen-hour levels (dB $L_{Aeq,16hr}$).



Sixteen-hour (dB $L_{Aeq,16hr}$) and one-hour (dB $L_{Aeq,1hr}$) noise levels

2.14 The above graph shows how noise levels assessed using a 16-hour reference time interval ('time base') can mask changes in noise levels over shorter periods that are significant to the character or typical use of a site. This is especially relevant to King George V Playing Field where noise from recreational activities is the dominant source.

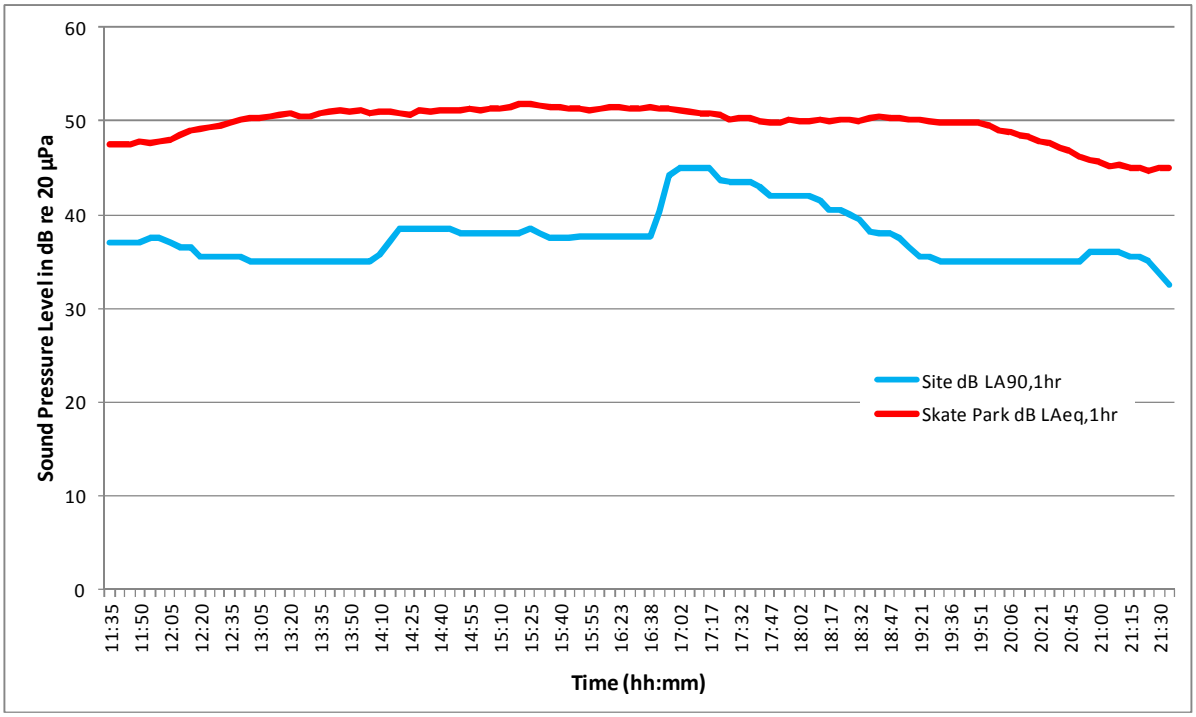
2.15 **Noise from the proposed skate park can achieve the appropriate limits recommended in BS 8233 '*7.6.1.2*' and WHO guidance.**

BS 4142:1997

2.16 Recent correspondence from Derbyshire Dales District Council suggests that noise from the proposed skate park should be assessed under BS 4142:1997 '*Method for rating industrial noise affecting mixed residential and industrial areas*' (we will confirm this in due course).

2.17 Skate park noise is an intermittent recreational noise. Strictly, BS 4142:1997 is applicable to industrial or commercial noise that may run continuously. Skate park noise is not continuous in duration and does not have the character of industrial or commercial noise. Current draft revisions to BS 4142 state that the method should not be applied to the assessment of noise from recreational activities.

2.18 As per BS 4142, we compare calculated skate park noise levels (Specific Noise, dB $L_{Aeq,1hr}$) with the measured background noise level (dB $L_{A90,1hr}$).



One-hour assessment (rolling averages) of skate park noise compared to background noise level (dB L_{A90})

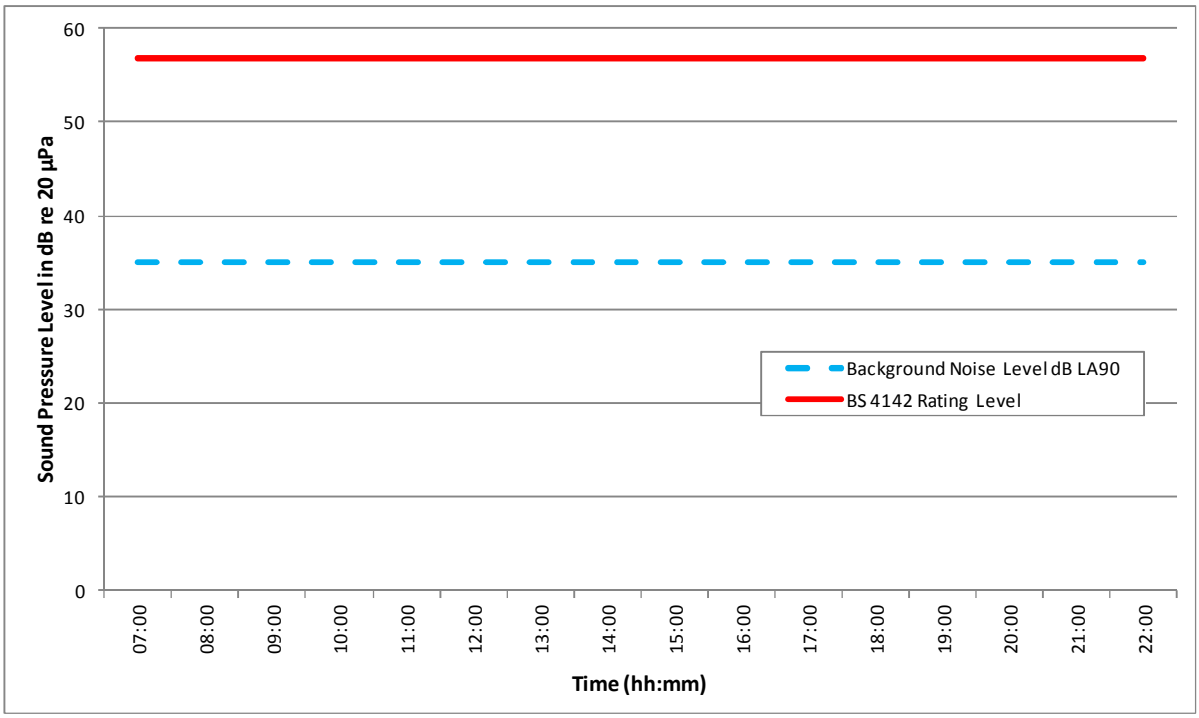
2.19 The Specific Noise (from the skate park) and the Background Noise Levels above are calculated using a rolling one-hour sample period which covers the duration of our survey on 12 March 2014.

2.20 The graph shows that skate park noise (dB $L_{Aeq,1hour}$) would typically be higher than the background noise level (dB $L_{A90,1hour}$).

2.21 An assessment under BS 4142 compares skate park noise in a single hour (perhaps at midday under peak use) to the background noise which is determined by the typically quietest period. This can produce an unrepresentative assessment of skate park noise.

2.22 We compare the BS 4142 Rating Level to the Background Noise Level (estimated for the 16-hour period based on our measurements).

2.23 The Specific Noise and subsequent Rating Level (skate park noise, dB $L_{Aeq,1hour}$) is weighted for likely levels of use of the skate park at different times.



BS 4142 assessment of skate park noise compared with background noise level (dB L_{A90})

2.24 The calculated Specific Noise (skate park noise) for a one-hour reference time interval with high occupancy of the skate park is 52 dB $L_{Aeq,1hour}$.

2.25 With addition of a +5 character correction, the Rating Level is 57 '*dB*'. The Rating Level is 22 dB higher than the typically low Background Noise Level.

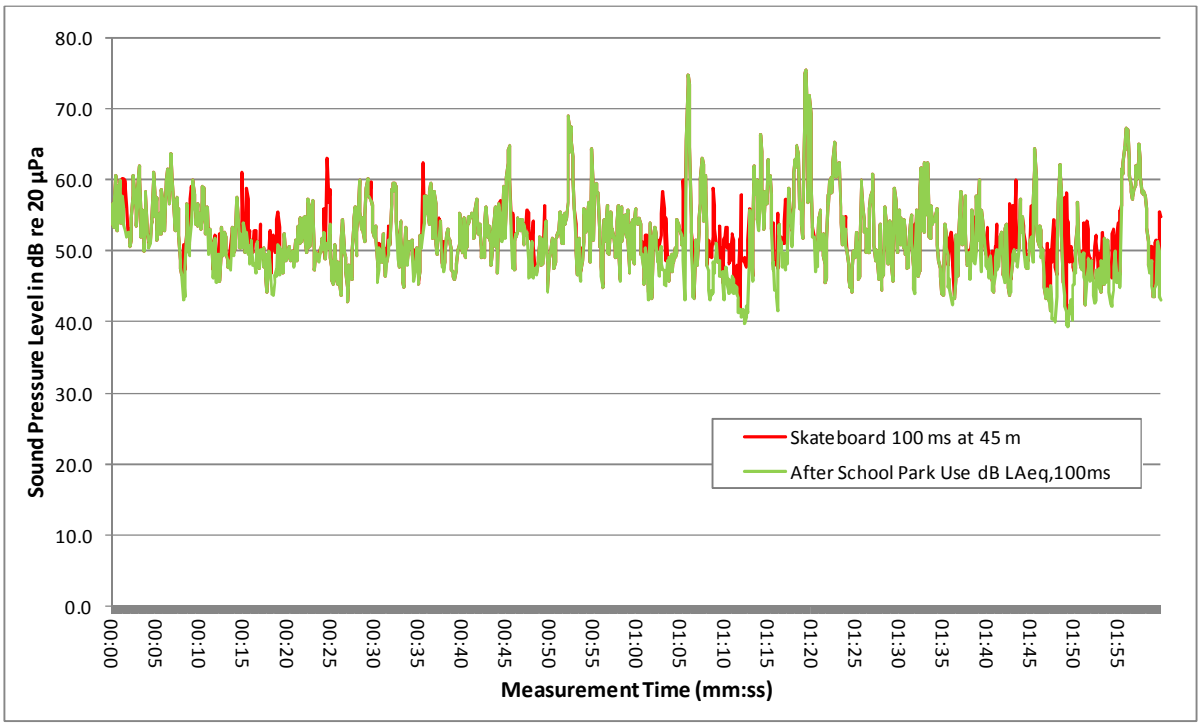
2.26 BS 4142 produces an Assessment Level of 22 dB for which the method indicates that '*complaints are likely*'.

2.27 BS 4142 is not well suited to the assessment of skate park noise and produces a misleading assessment that conflicts with other established guidance.

100 ms Continuous Equivalent Noise Levels (dB $L_{Aeq,100ms}$)

2.28 To assess maximum noise levels from the proposed skate park we have used the 100 ms continuous equivalent noise level (dB $L_{Aeq,100ms}$).

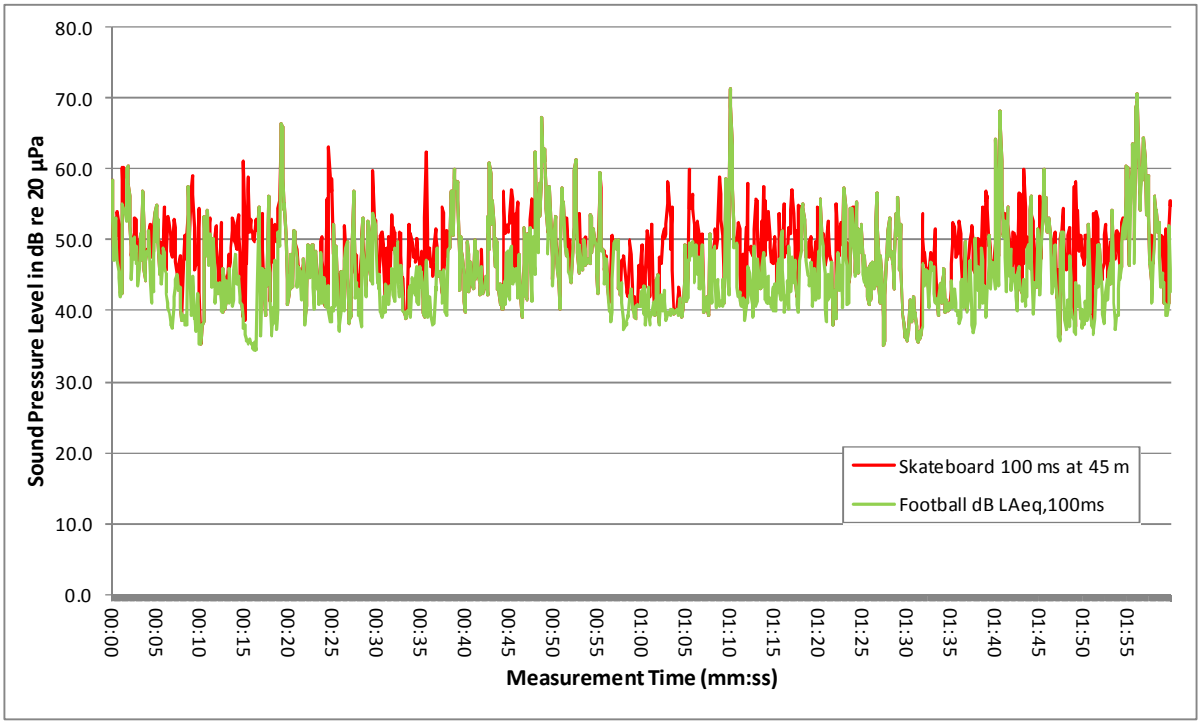
2.29 In the next graph we compare measured skate park noise (dB $L_{Aeq,100ms}$) to measured ambient levels (dB $L_{Aeq,100ms}$) after the school period with the King George V Playing Field in use by children.



Measured skate board noise (dB $L_{Aeq,100ms}$) compared to noise during existing after school park use

2.30 As part of our survey at King George V Playing Field we measured noise levels caused by a small group of people using the nearby 5-a-side pitch. The people arrived at approximately 21:00 hours to use the pitch which is enabled after dark by flood lights.

2.31 The main impact type noise is created by the football hitting the perimeter fence and boarding of the 5-a-side pitch. This is similar in character to skate park noise and can generate higher noise levels.



Measured football noise (dB $L_{Aeq,100ms}$) at Location 3 near to Hathersage 5-a-side pitch

2.32 We measured the football noise levels at Measurement Location 3 shown in Appendix A. This location is taken to be representative of the house immediately adjacent to the pitch. We have compared football noise with our measured levels for skateboarding (dB $L_{Aeq,100ms}$) which are corrected to a distance of 45 m.

2.33 Maximum skateboarding noise levels (dB $L_{Aeq,100ms}$) are comparable to levels caused by other typical activities at the King George V Playing Field.

3.0 Discussion

3.1 Our assessment shows that skate park noise can achieve reasonable limits during periods of peak active use.

3.2 Peak periods of use will be infrequent and are likely to coincide with times when King George V Playing Field is typically used by children. Our assessment shows that ambient noise levels during times when the park, the football pitch and the adjacent lido are occupied can significantly exceed noise levels calculated for the skate park. As such, noise from the skate park does not constitute a significant addition to the existing noise climate of the site.

3.3 We have assessed noise from the proposed skate park at King George V Playing Field using:

- BS 8233 – comparison of one-hour continuous equivalent noise levels (dB $L_{Aeq,1hr}$)
- WHO guidelines – comparison of sixteen-hour continuous equivalent noise levels (dB $L_{Aeq,16hr}$)
- Comparison of maximum noise to similar activities at the site using the one-hundred millisecond continuous equivalent noise level (dB $L_{Aeq,100ms}$).

3.4 It is plausible that an acoustician will be employed in due course to assess noise from the proposed skate park and present objections to the current proposals. In this case, they may make reference to existing precedents in law and the following standards:

- BS 4142 – comparison of the Rating Level (skate park noise) to the site Background Noise Level (dB L_{A90})
- Chartered Institute of Environmental Health 2003 '*Clay target shooting: Guidance on the control of noise*'.

3.5 Based on our experience, BS8233 and WHO '*Guidelines for community noise*' provide reasonable foundations for the assessment of skate park noise.

3.6 Standards, such as BS 4142 and Chartered Institute of Environmental Health 2003 '*Clay target shooting'* do not provide a reasonable assessment.

3.7 Noise from skate parks can sometimes be reduced by screening such as by solid fences or by earth bunds.

3.8 Based on the findings of our site survey and our understanding of the proposed skate park design, **it is unlikely that screening by earth bunds would be effective**.

3.9 Effective screening requires all lines of sight to be broken between source and receiver locations i.e. between the skate park and nearby houses. The topography of the site means this is not feasible. Further, it is likely that a solid fence of sufficient height to provide effective screening would be inappropriate for the setting.

Appendix A: Survey

Site and Surroundings

The proposed skate park would be located to next to the bowls green at King George V Playing Field (the site) in Hathersage. The site is adjacent to the Hathersage lido.

The site is surrounded on all sides by houses which screen road and rail traffic noise. The dominant sources of noise affecting the site will vary depending on whether the park is in use. During periods where the site and lido and empty, the background noise is determined by road and rail traffic which is not visible. Noise levels at the site will be higher when the lido and children's play area are occupied.

Noise from houses and gardens was occasionally audible during our time spent at the site. This noise was mainly due to DIY work or gardening.

A railway line runs through Hathersage to the south/southwest of the site which carries local and national train services. Railway noise was audible at the site throughout the day and evening.

Method

We made attended noise measurements with a Class 1 sound level meter on 12 March 2014 between 10:40 and 21:30.

Measurements were made at representative locations and times as suitable to characterise noise at the site.

We chose the following measurement locations.

Site and Measurement Locations

The majority of our measurements used to characterise noise at the site were made at **Location 1**.

Location 2 was used to make sample measurements which demonstrate that the background noise does not vary significantly across the site.

Location 3 was used to make sample measurements of children using the 5-a-side football pitch during the evening.

We used the following equipment:

Equipment Item	Serial Number
B&K type 2238 sound level meter	2448204
B&K type 4231 sound calibrator	2450834

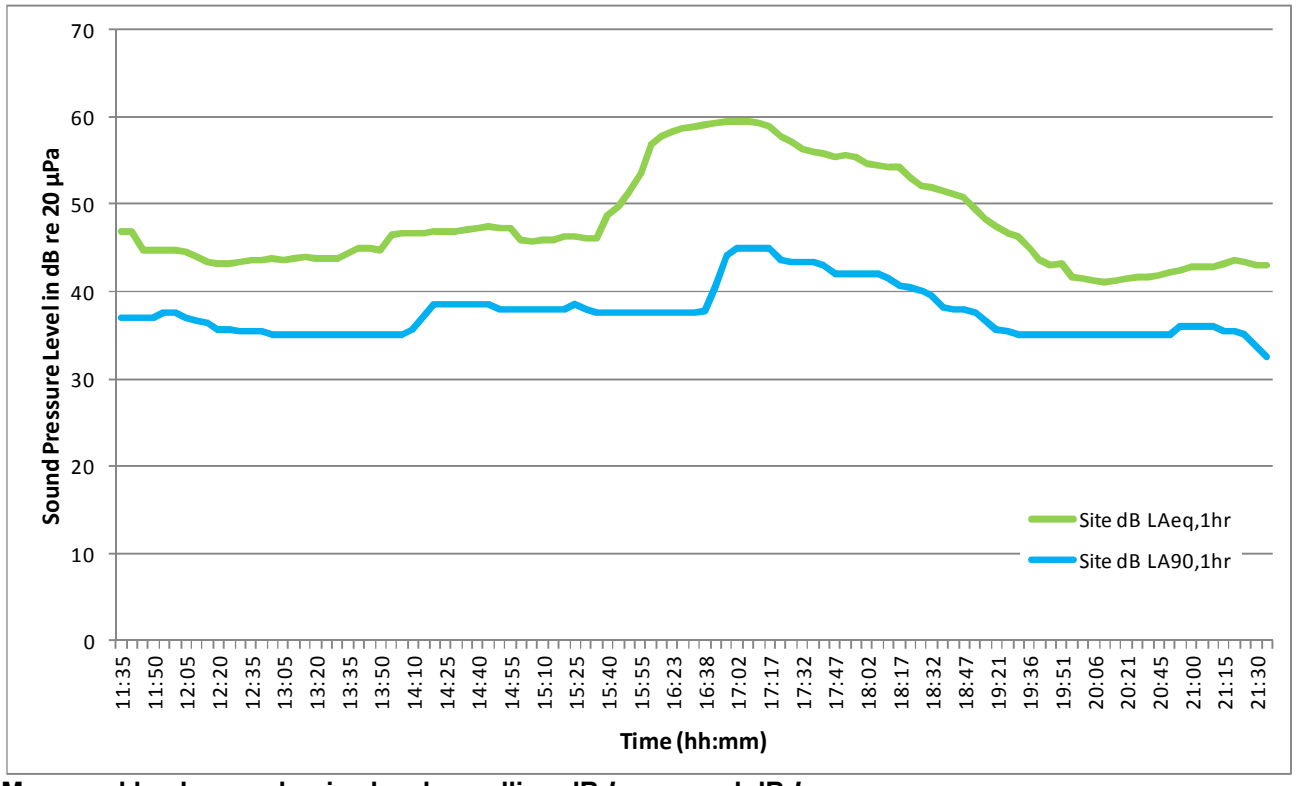
Equipment

The sound level meter was field calibrated at the start and end of the survey. No significant drift in the sensitivity of the sound level meter was observed. The accuracy of the sound calibrator used can be traced to National Physical Laboratory standards.

Weather conditions at the time of our survey did not significantly affect the measured results. There was little to no wind and no periods of rain. The daytime temperature was approximately 9 °C. The evening temperature was approximately 5 °C.

Results

We have plotted the measured site noise levels.



Measured background noise levels – rolling dB $L_{Aeq,1hr}$ and dB $L_{A90,1hr}$

We measured noise levels on a week day during school term-time.

Noise levels up to approximately 15:30 are representative of typically quiet conditions at the site where there are few if any people using the park. Noise levels are typically determined by distant road and railway traffic or general activity at nearby houses.

Our results show that noise levels after 15:30 increase significantly. This change was caused by children using the park after school.

Further details about our survey and measured noise levels can be provided on request.

Appendix B: Guidance and Criteria

DERBYSHIRE DALES DISTRICT COUNCIL

We spoke with Simon Bell, Environmental Health Officer at Derbyshire Dales District Council on Thursday 10 April 2014 to agree the methodology of our assessment.

We agreed with Simon Bell that it is appropriate to compare calculated skate park noise levels to the measured site noise at significant times of the day and also to noise level limits recommended in British Standard 8233:1999 and World Health Organization '*Guidelines for community noise*'.

We agreed it was not appropriate to assess noise from the proposed skate park under BS 4142. However, it was agreed that an assessment of this type should be included to demonstrate why the methodology is not well suited to the assessment of skate park noise.

CASE LAW PRECEDENT

Derbyshire Dales District Council has suggested that an assessment for the proposed skate park should be made under BS 4142:1997

Recreational noise i.e. noise from skate parks is not similar to industrial noise. The (mis)application of this standard has legal precedent in the case of *Richardson vs Devizes Town Council* which references three tests to assess the likelihood of annoyance due to noise from skate parks. The three documents cited are:

- World Health Organization '*Guidelines for community noise*'
- BS 4142:1997 '*Method for rating industrial noise affecting mixed residential and industrial areas*'.
- Chartered Institute of Environmental Health '*Clay target shooting: Guidance on the control of noise*'

We discuss the reasons why we think the guidance in each of these documents is/is not applicable to the assessment of skate park noise. Where necessary, we recommend alternative assessment criteria.

British Standard 8233:1999 and World Health Organization

BS 8233:1999

British Standard 8233:1999 'Sound insulation and noise reduction for buildings – Code of practice' gives recommendations in accordance with World Health Organization 'Guidelines for community noise' concerning noise affecting residential dwellings.

With reference to '*7.6.1.2 design criteria and limits for intrusive external noise*', BS 8233 says:

'*For dwellings, the main criteria are reasonable resting sleeping conditions in bedrooms and good listening conditions in other rooms. Occupants will usually tolerate levels of anonymous noise such as that from road traffic, than noise from neighbours which may trigger complex emotional reactions that are disproportionate to the noise level.*

'... In gardens and balconies etc. it is desirable that the steady noise level does not exceed 50 dB $L_{Aeq,T}$ and 55 dB LAeq,T should be regarded as the upper limit. The time period, T, should be appropriate to the activity.'

We consider noise from skate parks to be anonymous.

WORLD HEALTH ORGANIZATION

World Health Organization '*Guidelines for community noise*' includes the following:

'*Annoyance to community noise varies with the type of activity producing the noise. Speech communication, relaxation, listening to radio and TV are all examples of noise-producing activities. During the daytime [07:00-23:00], few people are seriously annoyed by activities with LAeq levels below 55 dB; or moderately annoyed with LAeq levels below 50 dB. Sound pressure levels during the evening and night should be 5-10 dB lower than during the day...It is emphasized that for intermittent noise [as from skate parks] it is necessary to take into account the maximum sound pressure level as well as the number of noise events. Guidelines or noise abatement measures should also take into account residential outdoor activities.*'

WHO '*Guidelines for community noise*' does not specify a limit for maximum noise levels in relation to outdoor noise:

Table 1: Guideline values for community noise in specific environments.

Specific environment	Critical health effect(s)	L_{Aeq} [dB(A)]	Time base [hours]	L_{Amax} fast [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-

WHO guidelines for outdoor noise

WHO '*Guidelines for community noise*' does make reference to maximum noise levels in relation to sleep disturbance and recommends that outside levels should not exceed 60 dB L_{AFmax}. The proposed skate park will not be artificially lit and so disturbance during the eight-hour night-time should not be considered an issue.

BRITISH STANDARD 4142:1997

British Standard 4142:1997 '*Method for rating industrial noise affecting mixed residential and industrial areas*' is used for the assessment of noise from **industrial sources** – chiefly, external building services plant or similar.

BS 4142 provides guidance to assess the likelihood of complaints relating to industrial noise. The standard uses a method of rating which compares noise from new sources (the Specific Noise) with the existing background noise level in the area (the Background Noise Level). Unusually for any scientific method of comparison, the method of measurement of the Specific Noise and the Background Noise are different yet the result is expressed in the standard as a dB quantity whereas technically it is unitless.

Unusual acoustical features in industrial noise (whines, hisses, impulsive or irregular noises) require the addition of a single + 5 dB correction to the Specific Noise Level. The corrected Specific Noise Level is the *Rating Level*.

The BS 4142 assessment is determined by arithmetically subtracting the measured Background Noise Level from the calculated Rating Level. A difference of around + 10 '*dB*' or more indicates that complaints about noise are likely. A difference of + 5 '*dB*' is said to be of marginal significance. If the Rating Level is more than 10 'dB' below the Background Noise Level, it is a positive indication that complaints are unlikely.

The Forward to BS 4142:1997 states:

'*The user is reminded that this standard is not based on substantive research but rather on accumulated experience.*'

No further references are provided that would allow verification of the '*accumulated experience*' to test whether it is reasonable for the method of determining the likelihood of complaints regarding industrial noise to be applied directly to the assessment of skate park noise.

Section 1.0 of BS 4142:1997 states:

'*This British Standard describes methods for determining at the outside of a building:*

a) *noise levels from factories, or industrial premises, or fixed installation, or sources of an industrial nature in commercial premises; and*
b) *background noise level*

The standard also describes a method for assessing whether the noise referred to in (a) is likely to give rise to complaints from people residing in the building.'

BS 4142 states the following with reference to measurement (and calculation) of the specific noise:

'*6.3.6 Determine the specific noise level by calculation alone if measurement is not practicable, for example if the source is not yet in operation.*

6.3.7 ...Ensure that the measurement time intervals are long enough to obtain representative values of the equivalent continuous A-weighted sound pressure level.

Note1. The time interval T, may contain intervals, T_i, where the noise is off and the noise level is deemed to be 0 dB.

6.3.8 Take the measurement [calculation] of the specific noise level over a time interval Tm, which reflects all significant temporal and level variations of the specific noise.'

Note. If the noise is steady, a short sample measurement will be sufficient. If it is cyclic or intermittent or varies randomly, a longer sample will be required to characterize it. It may be necessary to investigate the noise over relatively long periods to select an appropriate, representative measurement time interval.'

Consideration of a character correction under BS 4142:1997:

'*8.1 Certain acoustic features can increase the likelihood of complaint over that expected from a simple comparison between the specific noise level and the background noise level. Where present at the assessment location, such features are taken into account by adding 5 dB to the specific noise level to obtain a rating level.*

8.2 Apply a 5 dB correction if one or more of the following features occur, or are expected to be present for new or modified sources:

- *the noise contains distinguishable, discrete, continuous note (whine, hiss, screech, hum etc);*
- *the noise contains distinct impulses (bangs, clicks, clatters, or thumps).*
- *the noise is irregular enough to attract attention.*'

Noise from skate parks can include bangs and clatters so under a BS 4142 assessment, a +5 dB character correction should be applied.

DRAFT REVISIONS TO BS 4142:2014

BS 4142:1997 is expected to be revised in 2014. A draft of this version is currently available for consultation.

The document scope in the draft 2014 versions clarifies:

'*The standard is not applicable to the measurement and rating of sound levels from the following sources:*

i) vehicle traffic on the public highway;
ii) aircraft in flight;
iii) passing trains and trams, etc;
iv) boats on open seas;
v) recreational activities, including all forms of motorsport;
vi) mineral extraction;
vii) wind farms;
viii) music and other entertainment events and venues;
ix) shooting grounds;
x) construction and demolition;
xi) animals;
xii) people; and
xiii) *public address systems.*'

The use of a skate park constitutes a recreational activity.

CHARTERED INSTITUTE OF ENVIRONMENTAL HEALTH

Chartered Institute of Environmental Health 2003 '*Clay target shooting: Guidance on the control of noise*' gives specialist guidance concerning noise from clay target shooting.

'*Planning permission should not usually be granted for a major shoot if the mean SNL (shot noise level) exceeds 55 dB where the background level is less than 45 dB.*'

It should be noted that Section 1.1 of the document says:

'*The scope of this document is limited to clay target (pigeon) shoots. It should not be taken as having any application for other shooting events or other gun club activities.*'

By extension of this statement, the guidance in the document should not be applied to the assessment of noise from skate parks.

CIEH is often cited as a method by which to assess maximum noise from skate parks. However, we (and the authors of the standard) do not consider this applicable to skate park noise.

FIELDS IN TRUST

Fields in Trust '*Planning and design for outdoors sports and play*' provides guidance on the design of skate parks and BMX tracks as '*Neighbourhood Equipped Areas for Play*' (NEAPs)

The document provides a general recommendation to incorporate a minimum buffer zone of 30 m between activity areas and nearby dwellings. The approximate minimum distance between the skate park at Hathersage and the nearest dwellings is 45 m.

Specific recommendations for skate parks are:

'*Consideration must be carefully given to the buffer zones to nearest dwellings and this may need to be greater than the 30 meters recommended for a NEAP. Topography, orientation, sound-deadening and materials used in design all have a bearing on sound reduction.*'

NATIONAL PLANNING POLICY FRAMEWORK (2012) AND NOISE POLICY STATEMENT FOR ENGLAND (2010)

The National Planning Policy Statement says that policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from a noise from new development, including through the use of conditions.
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The NPPF makes reference to the Noise Policy Statement for England (NPSE 2010). This gives outline guidance on the acceptable burden of noise on society using three phrases:

- No Observed Effect Level (NOEL)
- Lowest Observed Adverse Effect Level (LOAEL)

- Significant Observed Adverse Effect Level (SOAEL)

The NPPF and NPSE are current guidance but do not make a significant contribution towards the understanding or application of other standards or guidance.

ISO 9613-2:1996

We have used International Standards Organization (ISO) 9613-2 '*Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*' as the basis of our calculations, in particular to assess the effects of sound propagation over porous ground.

Appendix C: Supporting Information

Source Noise Levels

We measured source noise levels for skateboarding at two parks in Coventry. Both parks are built with concrete.

Action	Location (Coventry)	Duration	d (m)	dB $L_{Aeq,T}$	dB L_{AE}	Notes
Rolling	War Memorial Park	00:00:10	2	76	86	Skateboarder rolling back and forth - twice past the microphone
Rolling	War Memorial Park	00:00:27	2	77	91	Skateboard rolling past then jump on to grind box
Rolling	War Memorial Park	00:01:42	2	72	92	Skateboarder rolling back and forth past the microphone
Rolling	War Memorial Park	00:00:13	2	75	86	Skateboarder rolling past with trick jump then roll past again
Rolling	War Memorial Park	00:01:20	2	73	92	Skateboarder rolling past back and forth past the microphone
Rolling	Holbrooks Park	00:01:03	2	77	95	Rolling past in front of the microphone - board on to the coping each time
Rolling	Holbrooks Park	00:00:31	2	77	92	Back and forth with jumps on the edges
Rolling	Holbrooks Park	00:00:28	2	76	91	Back and forth in the 6 ft bowl with contact between board and coping
Tricks	War Memorial Park	00:00:23	2	77	91	Skateboard on to grind box and then jump on to floor at approx 1 m
Tricks	Holbrooks Park	00:00:07	2	83	91	Small run up with '*Pop Shove-It*' trick
Tricks	Holbrooks Park	00:00:12	2	79	89	Small run up with '*Pop Shove-It*' trick with photograph
Tricks	Holbrooks Park	00:00:08	2	85	94	Small run up with '180 trick'
Tricks	Holbrooks Park	00:00:27	2	81	95	'*360 flip*' and '*Big Spin*'
Tricks	Holbrooks Park	00:00:18	2	80	93	'*360 tail flip*' plus a '*Big Spin*' on the way back

Measured skateboarding noise levels

Our source measurements of skateboard noise were made with the help of a semi-professional skater who was 15 years old.

These levels, as they are for a semi-professional skater, are typically higher than for others. Skaters who are younger, weigh less and who are less experienced will not be able to regularly generate noise levels to the same extent as those we have measured.

Our calculations are based on measurements of noise caused by a single skateboarder which are corrected to account for different factors such as number of people and duration of use of the proposed skate park.

Calculations and Estimation Expected Use

To calculate the one-hour and sixteen-hour equivalent continuous noise levels (dB $L_{Aeq,T}$), we have estimated occupancy of the skate park over the course of a day.

To model temporal variation in the noise, we assign a random percentage value between 25% and 100% to the number of people using the skate park in any five-minute period. For example, between 12:00 and 13:00 our assessment the skate park will be fully occupied i.e. four skaters active on the park. For a specific five-minute period, our system could assign a weighting of 50% which means that 2 people would be assumed to be skating the park in that period.

Our estimation of skate park use is based on observations and experience. This system distinguishes between occupancy and active use.

We also estimate the number of active skaters over the course of the day. This allows our assessment to illustrate how the skate park is likely to receive less use during early morning and late evening periods. For calculation of sixteen-hour skate park noise (dB $L_{Aeq,16hr}$), our assessment accounts for continuous activity, to differing extent, between 07:00 and 23:00. This is unlikely to occur regularly and even on days of high active use of the skate park, there are likely to be significant periods of inactivity.

We have calculated the maximum continuous equivalent noise level (dB $L_{Aeq,5mins}$) at the nearest dwellings for full active use of the proposed skate park. We consider the maximum active use to be 4 people skating continuously and simultaneously for five minutes. This level is 54 dB $L_{Aeq,5mins}$. The conditions of use required to achieve this noise level over the course of a full one-hour period are unlikely to occur but the value highlights what is the noise level expected for maximum active use.

We have calculated noise levels at the nearest dwellings only. The minimum distance between the proposed skate park and dwellings is approximately 45 m. Our calculations assume a receiver point at 1st floor level.

The majority of the dwellings bordering the site are elevated above the level of the skate park. As such, our calculations do not include any correction for screening due to sunken design of the skate park or potential for earth bunds.

Sound propagation is over soft/porous ground. We have applied a ground cover correction of -2 dB in general accordance with ISO 9613-2 equation (10).

Our assessment considers use by skateboarders only. We expect that the skate park would also be used by BMX, scooter riders and possibly by people on roller skates/blades. These activities all typically generate significantly lower noise levels than generated by skateboarders.

Our records of noise measurements from skate parks shows that specific noise from scooters can be 6 dB lower than skateboarding noise for short-term continuous equivalent noise level measurements (dB $L_{Aeq,T<2min}$). The reasons for this include that scooters use wheels made with a softer compound of polyurethane compared to skateboard wheels. Scooters are typically used by younger and less experienced skate park visitors because they require less skill to operate successfully i.e. without falling off. BMX bikes have pneumatic tyres and noise caused by this equipment at skate parks can also be significantly less than noise levels generated by skateboarding.

Times and conditions of use

The skate park will be used outside of school hours with periods of typically high activity expected during the day at weekends and during school holidays.

People will not use the skate park in the dark or in wet or icy weather conditions because skating is universally recognised as being unsafe at these times.

The skate park will therefore be unused for significant periods of time where it will have zero noise impact.

Appendix D: Review of ADT Report Dated 12 November 2013

Summary

We have reviewed a report by Acoustic Design Technologies (ADT) for the proposed skate park in Hathersage. A summary of our comments is as follows:

ADT does not report noise levels measured at King George V Playing Field. We cannot say whether a site survey was conducted but assume not as there is no mention in the report.

The ADT report includes corrections for screening in some instances. Due to the topography of the site, many of the nearby houses overlook the area of the proposed skate park, even at ground level, and it is unreasonable to assume that screening by a bund 1.5 m in height will be effective in any circumstances.

ADT compare calculated skate park noise levels (dB $L_{Aeq,1hr}$) with recommended limits for external intrusive noise given in WHO '*Guidelines for community noise*'. WHO limits include a 16-hour reference time interval (dB $L_{Aeq,16hr}$). There is potential for comparison on this basis to be misleading due to significant variations in the site noise over the course of a typical day.

Guidance and Criteria

In Section 2.3 '*Strategy for Noise Impact Assessment*', ADT state:

'*Following discussions with the environmental health department at Derbyshire Dales District Council, it was agreed that the environmental noise impact would be most effectively assessed against the absolute noise criteria set out in the World Health Organi[z]ation 'Community Noise' document.'*

This forms the basis of ADT's assessment and report which does not consider other important standards, guidance and case law.

We agree that WHO '*Guidelines for community noise*' are appropriate and should form part of an assessment of noise from the proposed skate park at Hathersage.

However, it is important to acknowledge existing case law in this field. This is significant for Hathersage Parish Council as existing case law is likely to form the basis of a noise assessment should one be commissioned by those who object to the proposals for a skate park at King George V Playing Field.

Site Survey

We understand that ADT did not complete a site survey as part of their assessment. Drawing number 1996/SP1 references 'measurement positions' but we understand this to be a typographical error.

ADT's assessment methodology is based World Health Organization guidance which does not necessarily include/require comparison of specific noise (skate park noise) with the existing noise climate.

This means that specific features or changes in the existing noise climate at the site have not been taken into consideration in ADT's assessment. This includes differences in continuous equivalent noise levels when the King George V Playing Field is in use by children compared to when unoccupied.

Source Noise Levels

The source noise levels used in ADT's assessment are comparable those we have used to assess skate park noise and are reasonable for the expected use of the proposed skate park at King George V Playing Fields.

Assessment

We agree with ADTs assessment that 'environmental noise impact should be reasonable'.

ADT compare calculated skate park noise levels (dB $L_{Aeq,1hr}$) with limits given in World Health Organization 'Guidelines for community noise' which are 50 and 55 dB $L_{Aeq,16hr}$. This compares noise levels dissimilar '*time bases*' which is questionable from a technical perspective and serves to undermine the ADT assertion that

'*the worst case predicted $L_{eq,1hour}$ of 50 dB(A) is below the outdoor criterion for 'serious annoyance just below the threshold of moderate annoyance*".

Our graph in Section 2.0 which compares noise levels with one-hour and sixteen-hour '*time bases*' shows how this non-equivalent comparison can be misleading and why it should be avoided.

The ADT report discusses the effects of screening by the recessed design of the skate park, garden fences and earth bunds. This inclusion of screening effects in the ADT assessment is undermined by the fact that a site visit was not undertaken.

Based on our site survey, we are confident that screening cannot be used effectively to break all lines of sight between the proposed skate park and nearby dwellings. This is influenced much by the topography of the site.

Excluding the inclusion of screening effects, the ADT method to calculate skate park noise seems reasonable.