

ProPG: Guidance for the Assessment of Sport and Leisure Noise

June 2026

This document is issued as a draft for consultation with all interested parties and will be updated based on feedback received. The draft may be withdrawn at any time once the consultation is finished in September 2026.



Chartered Institute of
Environmental Health



Contents

1	Acknowledgements	4
2	Background Information	5
3	Introduction	6
4	Scope	7
5	Policy	8
6	Review of Current Guidance and Best Practice	9
7	Typical Noise Sources from Sport and Leisure	12
	Football	
	Rugby	
	Hockey	
	Netball	
	Basketball	
	Skateboarding	
	Golf Driving Range	
	Tennis	
	Padel	
8	Summary of Recommended Approach	15
9	Situations Where an Assessment is Likely to be Required	16
10	Good Acoustic Design	17
	10.1 Recommended Approach to Good Acoustic Design	
	10.2 Maximising the spatial separation of noise source(s) and receptor(s)	
	10.3 Using existing topography and existing structures	
	10.4 Incorporating noise barriers	
	10.5 Using the layout of the scheme	
	10.6 Responding to the existing acoustic environment	
11	Recommendations for Assessment Criteria	21
	11.1 Guidance on the assessment of L_{Aeq}	
	11.2 Guidance on the assessment of L_{Amax}	

Contents

12	Prediction Methodologies	25
13	Noise Levels from Sporting Activities	26
	Basketball	27
	Football Match, five-a-side	29
	Football Match, 11-a-side	33
	Football Training Session	35
	Golf Driving Range	37
	Hockey Match	42
	Hockey Training	44
	Netball Match	49
	Padel Game	52
	Rugby Match	54
	Rugby Training	55
	Skateboarding	56

1. Acknowledgements

The preparation of this Professional Practice Guidance on Sport and Leisure Noise (ProPG) was undertaken by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH).

The authors of the guidance are:

- Daniel Oldaker, Acoustic Consultants Ltd (Chair of the WG)
- David Yates, Quantum Acoustics Ltd
- Anne Budd, New Acoustics Ltd
- Steve Summers, Accon UK Ltd
- Carol Bye, North Norfolk District Council (CIEH representative)
- Ismail Alli-Balogun, Carterhatch Architectural Acoustics Ltd
- Richard Cope, Bureau Veritas Group
- Chris Goff, Buro Happold Ltd (IOA representative)
- Thomas Goose, RSK Acoustics Ltd
- Luke Smith, JPM Acoustics Ltd
- Charley Vaughn, City of Wolverhampton Council
- Louise Morris, AtkinsRéalis Ltd
- Peter Gibson, South Cambridgeshire District Council

The Working Group would like to acknowledge the work of past members Jo Miller, Anne Thompson, Mark Hebblethwaite and the late Patrick Shortt; as well as AEC Ltd in undertaking the sport noise surveys.

2. Background Information

The Department for Culture, Media and Sport's Get Active strategy aims to improve health through the growth of sport and physical activity.

The strategy states "The health benefits of sport and physical activity are well known. Active people live healthier, longer and happier lives, with physical activity reducing the risk of disease, helping to support individuals to maintain a healthier weight, and giving wide-ranging musculoskeletal health benefits. It also has a significant role to play in helping prevent and manage many long-term health conditions. Getting active at a young age also aids the healthy development and function of muscles, bones and the cardio-respiratory system. Reducing the number of inactive children and adults reduces the burden on the NHS. Every year, active lifestyles prevent 900,000 cases of diabetes and 93,000 cases of dementia (the leading cause of death in the UK). This delivers a combined saving of £7.1 billion to the UK economy".

According to Sport England 'Measuring Impact' guidance, every £1 spent on sport and physical activity generates almost £4 in return across health and wellbeing, strengthening communities and the national economy.

With the development of sporting facilities to support the government's aims, it is essential that the potential adverse impacts of noise are considered within the planning balance.

3. Introduction

This ANC Good Practice Working Group (WG) has been tasked with the provision of Guidance on the assessment of sport and leisure noise.

This ProPG sets out the types of sounds typical of different sports, provides guidance on methods of prediction and assessment, and outlines good acoustic design and approaches to noise control.

The guidance also provides a database of standardised sports source noise levels from different sporting activities. The aim is to provide a standardised data set on sport and leisure noise sources, which can be utilised by acousticians as part of planning applications and other environmental noise assessments.

The appropriate use of this data set must be considered by acousticians both in terms of its scope and the limitations of the level of information provided. The data presented for each sport should not be considered as a definitive noise level and, where necessary, acousticians should gather their own data to support an assessment.

Sports and leisure activities for which noise data has been undertaken is as follows:

- Basketball
- Football (training)
- Football (matches)
- Golf driving range
- Hockey (match)
- Hockey (training)
- Netball
- Padel
- Rugby (match)
- Rugby (training)
- Skateboarding

The WG has attempted to consult with other organisations through contact and the issuing of questionnaires to members. Response from parties outside the working group was not substantial enough to draw any conclusions as to the view of the wider professions.

The recommendations within this document are formed from the professional opinions of the Working Group members and reflect their best practice.

The Working Group strongly encourages additional effects-based research on sport and leisure noise to be undertaken to support future sport-specific guidance and assessment.

4. Scope

This document provides guidance on the assessment of noise from outdoor sport and leisure activity in the UK. It provides guidance on minimising adverse impacts on residential amenity from noise, and includes advice on the prediction of noise levels from several typical outdoor amateur sports and leisure activities, namely:

- Basketball
- Football
- Golf driving range
- Hockey
- Netball
- Padel
- Rugby
- Skateboarding

Elements of this document may also be relevant to other similar sports, and/or to training sessions for professional teams. The guidance in this document is not intended to be used for professional sports matches or competitions, nor is it expected to be relevant to activities such as shooting, motorsports, equestrian activities or animal racing.

It does not consider ancillary noise sources such as:

- Fixed plant
- Crowds or fan areas
- Bars or catering
- Music or PA/VA systems
- Maintenance of the ground or facilities
- Transport, parking or other vehicle noise
- Unauthorised usage of the ground or facilities

It may be appropriate to consider these separately and the practitioner should determine and justify the appropriate assessment methodology.

Examples of noise levels that could be considered acceptable at human noise-sensitive receptors are given. It should be noted that the context of a site (including non-acoustic factors) is often a key factor in its acceptability to stakeholders, and may outweigh the advice on noise levels given in this document.

5. Policy

Planning policy within the UK is a devolved matter. Policy is set out in legislature:

- National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG) Noise in England
- The National Planning Framework 4 (NPF4), Planning Advice Note (PAN) 1/2011 and its accompanying Technical Advice Note (TAN) in Scotland
- The Planning Policy Wales (PPW) and the Noise and Soundscape Action Plan (NASAP) 2023-2028
- The Strategic Planning Policy Statement for Northern Ireland (SPPS) and the Noise Policy Statement for Northern Ireland (NPSNI)

Each of these planning policy frameworks has the following characteristics, with some variation in wording:

- Support for development with a positive impact on health, including leisure, outdoor sport and/or recreation
- Support for development of community facilities, assets and infrastructure
- The following approach to environmental noise:
 - Avoid significant adverse impacts
 - Mitigate and minimise adverse impacts
 - Where possible, contribute to the improvement of health and quality of life (except Scotland)
- Incorporation of the principle of the Agent of Change (*except Northern Ireland, although it is included within some local planning policy frameworks*)

In Wales, the NASAP 2023-2028 highlights the importance of considering the effect of development, including play and sports areas, on soundscape quality experienced by people “and other air-breathing vertebrate species, whether wild or domesticated”. The assessment of soundscape is highly contextual and, if this is required, it is recommended that the methodology described in the relevant BS/ISO standards and emerging national policy is followed. Assessment and design of soundscape in relation to sport and leisure noise is outside the scope of this document. Impacts on non-human receptors can vary substantially and are also outside the scope of this document.

6. Review of Current Guidance and Best Practice

Prior to this document, there was very limited guidance specifically for the assessment of noise from amateur sport and leisure in the UK.

For proposals to install new football pitches near existing residential dwellings, or vice versa, the guidance described in Sport England's Design Guidance Note 'Artificial Grass Pitch (AGP) Acoustics – Planning Implications' (August 2015) is commonly referred to. Based on measurements of different sporting activities (football, hockey and rugby), and different participant types (men, women, children), this guidance suggests a 'typical' noise emission level from an AGP of 58 dB $L_{Aeq(1hr)}$ at a distance of 10 metres from the sideline halfway marking. The guidance then provides recommendations for noise prediction mapping inputs, as well as theoretical best practice noise control measures.

In terms of assessment criteria, the AGP guidance refers to the WHO 'Guidelines for Community Noise' (1999) threshold of 50 dB $L_{Aeq(16hr)}$ for the 'onset of moderate annoyance', adjusting the time interval to 1-hour. It does so with a cautionary note that exceedance would not necessarily result in an adverse impact.

The AGP guidance states that in some circumstances the existing noise climate should be taken into account and gives examples of typical situations. For this, it references the noise change approach described in the draft 2002 IOA/IEMA guidance (subsequently published by IEMA in 2014).

A similar document from Sport Scotland 'Siting of Synthetic Grass Pitches – Guidance on Noise and Floodlighting' gives information on the variability between and within the different sports.

Other widely used environmental noise assessment methods in the UK either directly or implicitly omit sport and leisure noise from their scope.

British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' states that it is not intended to be applied to the rating and assessment of sound from recreational activities.

Section 1.1 of the CIEH document 'Clay Target Shooting: Guidance on the Control of Noise' states "The scope of this guidance is limited to clay target (pigeon) shoots. It should not be taken as having any application to other outdoor shooting events or other gun club activities".

Whilst the working group does not suggest that the parameters or assessment methods in these documents is specifically unsuitable for assessment of sport and leisure activities, the acceptability criteria of these evidence-based assessments cannot directly and reliably be applied to other noise types without specific research.

Assessment methodologies for specific sport and leisure activities have been produced by independent consultancies, some of which have been published in the Institute of Acoustics' 'Acoustics Bulletin' and presented at conference. Where these are used by other acousticians it will be for the users to validate the method and appropriateness.



In reference to the cause/effect relationship presented at Figure 2.1 of the IEMA Guidance, the noise from sport and leisure is considered to contribute to socio-physiological factors, including disturbance and annoyance that may eventually result in action (e.g., complaints). It is noted that behavioural indicators, such as annoyance, are subjective and prone to a significant number of variables, the detailed consideration of which are outside of the scope of this document.

The IEMA Guidance, and latterly the Noise Exposure Hierarchy published on the Planning Practice Guidance for Noise website, defines an ascending order of noise effects that is useful to reference in the determination of appropriate assessment thresholds. Essentially, the ambition for development, in line with the respective national development policies, should be to avoid exceeding the Lowest Observed Adverse Effect Level. As a worst case, to be considered as part of the overall planning balance, development should not cause a significant observed adverse effect, with observed adverse effects mitigated and reduced to a minimum.

As set out on the noise hierarchy and guideline values for community noise in the World Health Organisation's 'Guidelines for Community Noise' (1999) it is clear that simple audibility of a sound is not a method of determination of impact.

Whether a specific noise can be heard is dependent on other noise that may mask it, and the receptor position (for example within a building where sound reduction factors must be accounted for). For the latter, the design guidance for suitable internal acoustic amenity presented in British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' (BS8233) provides useful internal assessment criteria, taking account of different time periods, albeit unlikely that sports and leisure noise would need to be assessed within the night-time period (23:00-07:00). However, the time interval must be adjusted to the sport/activity under assessment (a one-hour period is recommended).

Whilst BS8233 provides comment on the impact of sporadic events affecting sleep disturbance at night there is no such consideration for disturbance during the day. Section 3.4 of the 'Guidelines for Community Noise' (WHO 1999) states, "For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 L_{Amax} more than 10-15 times per night (Vallet & Verbey 1991)" but, again, it does not consider the impact of maximum noise levels of rest or other living conditions.

Given the propensity for sporadic noise events from sporting activities (e.g., ball striking boards/posts/fencing, referee whistles, ball strikes on golf clubs/rackets/padels), other available guidance should be considered. It is therefore considered appropriate that a suitable threshold for sporadic noise events should be adopted.

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

7. Typical Noise Sources from Sport and Leisure

Noise from sport is generated by the people taking part and noise from the sporting activity. The contribution from each can be considered in terms of team sport, where communication between players is a significant and core part, or individual sport where noise from people is caused by exertion or reaction.

Noise generated by ancillary activities, for example, a car park or club house, could apply to any sport and would need to be considered based on the wider assessment of the proposed development, and is therefore outside the scope of this guidance.

Noise from spectators could occur in any sport although this is dependent on the facility and the user group. For example, an artificial football pitch could be used for everything from training in which there would be very few spectators (typically parents of junior players) to grass-roots football games with a small number of spectators who may celebrate a goal, or a local non-league team where spectators could be in the dozens or hundreds and may chant or shout in support of their team.

These three scenarios could take place on the same pitch but may take place at different times of day and for different durations, and as such it may be appropriate to consider these differently.

However, this guidance concentrates on the noise from the sporting activity itself, and the players taking part, along with referees and coaches, rather than noise from spectators.

The following sections set out typical sounds from different sport and leisure activities that may need to be considered, depending on the proposed scheme, to ensure a robust assessment of relevant noise sources, types and characteristics.

Football

Football is a team sport where communication between players using voice is core to the game. Referees and coaches can use whistles as part of a match or training.

On artificial pitches balls can hit perimeter fencing, which generates noise. This could be accidental (e.g. a missed shot on a full-size artificial pitch) or as part of the game, such as on a five-a-side pitch where perimeter rebound boards are part of the playing area.

Rugby

Rugby is a team sport where communication between players using voice is core to the game. Referees and coaches can use whistles as part of a match or training.

Unlike football, the likelihood or frequency of balls impacting the fence is not significant. However, artificial rugby pitches are also suitable for football (with the associated noise sources) and as such, it is important to gain a full understanding of the proposed use of the facilities.

Hockey

Hockey is a team sport where communication between players using voice is core to the game. Referees and coaches can use whistles as part of a match or training.

In addition to voice, the strike of hockey balls on sticks, perimeter strike boards and goal backboards generate noise.

Netball

Netball is a team sport where communication between players using voice is core to the game. Referees and coaches can use whistles as part of a match or training.

A bounce pass will result in the ball hitting the court surface and creating a noise. Consideration should be given to whether the noise from this is significant in terms of frequency or level compared to voice.

On internal courts, where the surface is smooth, footwear often squeaks on the floor as players move. On external courts where the surface is weather resistant and slip resistant tarmac this is less likely to occur.

Basketball

Basketball is a team sport where communication between players using voice is core to the game. Referees and coaches can use whistles as part of a match or training.

Bouncing the ball on the court surface is a core part of the game and this generates noise. Noise from balls hitting the backboard may also need to be considered and the type of construction can affect the noise generated.

On internal courts, where the surface is smooth, footwear often squeaks on the floor as players move. On external courts where the surface is weather resistant and slip resistant tarmac this is less likely to occur.

Skateboarding

Skateboarding is an individual sport where noise from voice is not significant. However, it is also often a social activity where participants talk when not taking part.

The main noise sources from skateboarding are from the interaction of the board and wheels with the surface of obstacles. This includes wheels rolling along the ground, the board grinding along obstacles and the board hitting the ground after a trick.

Golf Driving Range

Golf on a driving range comprises multiple bays in a linear form with each player hitting multiple balls in a minute. Club on ball impacts are the main source of noise although mis-hit balls impacting bay sides can create an additional noise source.

Golf in a driving range setting is an individual sport where noise from voice is not significant as part of the activity.

Within the UK the vast majority of driving ranges are partially enclosed within a building. The introduction of entertainment and social activities around the driving range has the potential to introduce a number of noise sources not directly associated with the sporting activity.

Tennis

Tennis can be played as singles or doubles with associated differences in communication and noise from voice. Voice can be for communication or sounds from exertion. Other primary sounds include the ball being struck by the racket.



Padel

Padel is a fast-growing sport that uses a solid padel to hit a padel ball (slightly smaller than a tennis ball, with less pressure, to reduce speed and bounce) with glazed screens around the court, which are part of the playing area. Padel is typically played as a doubles game with associated communication between players and discussion between rallies.

In addition to voice the main source of noise is ball-on-padel. Additionally, noise is generated when balls are hit against the screens.

DRAFT

8. Summary of Recommended Approach

As described next in this document, when considering noise from sport and leisure activities, whether that be the development of new facilities that may affect existing residential receptors, or a new noise-sensitive development near existing (or proposed) sport and leisure facilities, a phased approach should be adopted for the assessment.

Good Acoustic Design should be the starting point for all assessments, to determine the ideal location for sporting facilities and obvious restrictions to noise generation. The design process should be documented to demonstrate how this has been considered and why certain decisions were made, especially if in non-ideal locations in terms of acoustics.

An **Initial Noise Screening Assessment** should consider the potential for the facility to generate **adverse noise impacts**. Amongst other factors this screening assessment should take into account the timing and frequency of use of the facility, the sensitivity of receptors, the presence of other noise sources, and the distance between the facility and receptors. Professional judgment should determine whether a baseline sound level survey is required to inform this process.

Where there is potential for **adverse noise impacts**, a **Detailed Noise Impact Assessment** should be conducted that considers the absolute noise levels at the receptor location(s) from the activity under investigation, the existing noise climate, the characteristics of the noise and the sporadic elements contained therein.

If the activity is likely to result in sporadic sound events that are liable to heighten perceptibility this must be included in the assessment.

Outdoor sports and leisure facilities are typically not intended for use during night-time hours (23:00 – 07:00). Many do not include substantial lighting and are little used outside of daylight hours. In the experience of the Working Group, those with floodlights typically operate no later than 22:00.

9. Situations Where an Assessment is Likely to be Required

Whether a noise impact assessment is required will depend on a number of factors, including the scope of the proposed scheme, the existing use of the site and the hours of operation.

A noise impact assessment will likely be required where:

- The development introduces a new noise-generating activity to the site
- The scheme increases the hours of use of the site
- The scheme intensifies the use of the site

These must be considered on a case-by-case basis.

For example, if a school converts an existing grass pitch to an artificial pitch but it is only for use by the school during school hours then a noise impact assessment is not likely to be required. The scheme is not introducing a new noise source or extending the hours of use. Whilst it could increase the intensity of use of the pitch (as it is a more robust surface), this will be limited by the school needs and is typical of noise from a school site.

However, if the same artificial pitch were to be floodlit and let out to community groups in the evening then a noise impact assessment would likely be required as the development introduces a new noise source in the evening.

Site location, existing noise environment and distances to noise-sensitive receptors will also influence the need for a noise impact assessment. Specific advice in this regard is outside the scope of this document although some guidance can be found for different sporting activities from relevant sporting bodies.

10. Good Acoustic Design

High quality sports facilities are crucial to the physical health, mental well-being and social cohesion of local communities and are a vital component in sustainable community planning. However, the enjoyment of these facilities ought not to significantly impact the health or quality of life in others, and undermine the benefits to the community as a whole.

It is important, therefore, that facilities are designed intentionally and appropriately with the potential for adverse noise effects in mind.

This section provides a broad framework for the approach to good acoustic design of sports facilities and makes recommendations on the various relevant aspects, including noise mitigation measures.

For managed sport facilities, there are also operational measures that can be employed to reduce noise, which would generally be collated in a Noise Management Plan.

10.1 Recommended Approach to Good Acoustic Design

The desired outcomes of a good acoustic design process are that a development is optimised to minimise noise impacts, sustainably, and in a manner which is cognisant of other aspects of the design.

Whilst there should be a focus on good acoustic design as early as possible, the intention is not for it to be isolated to a single point in the development design. Rather, it should be an iterative process, responding to design constraints and opportunities as they emerge.

From the earliest opportunity, and throughout the design process, it is recommended that consideration is given to the following measures. These are proposed in order of preference first.

- Maximising the spatial separation between noise source(s) and receptor(s)
- Using existing topography and existing structures (that are likely to last the expected life of the proposed development) to screen receptors from significant sources of noise within the development site
- Incorporating noise barriers as part of the scheme to screen receptors from significant sources of noise within the development site
- Using the layout of the scheme to reduce noise propagation in the direction of receptors
- Responding to the existing acoustic environment

The Local Planning Authority should be satisfied that a good acoustic design process has been followed, and this should be evidenced in new development proposals.

Evidence of this process should not necessarily be limited to the measures that have been employed but should also include layout or mitigation options that have been explored but not considered practicable.

For example, there may be instances in particularly constrained environments where the means to optimise the development from an acoustic standpoint are limited. In such circumstances, a good acoustic design process could be considered to have been followed if limited noise mitigation or noise-related design measures are ultimately taken forward with reasoning for why the site design could not be optimised further.

10.2 Maximising the spatial separation of noise source(s) and receptor(s)

One of the simplest noise control measures is distance.

For purpose-built sports facilities with sufficient space available, there may be opportunities to maximise setback distances between sources of noise and receptors.

In instances where sports facilities are proposed as part of larger sites, such as those for mixed-use developments, it may be feasible for them to be located a significant distance from receptors. However, care should also be taken to ensure that the location of facilities does not result in noise impacts for any proposed noise-sensitive elements within the development itself.

10.3 Using existing topography and existing structures

In addition to distance, the topography of, or existing structures within a site can be highly effective at reducing noise. Sources of noise should be located in such a way as to make use of the screening effect afforded by land features or structures, where available.

For example, where new sports facilities are proposed at an existing school, it may be possible to use existing school buildings as a way of screening receptors from noise, or, on repurposed brownfield sites, existing noise control features such as mounds or acoustic fences may be retained and modified. Whatever the circumstances may be, there should be a reasonable expectation that the features or structures which are relied upon would be retained and of sufficient quality for the lifecycle of the development.

There may be instances in which features or structures beyond the development boundary would be expected to be retained for the development lifecycle, such as an elevated sections of road between the sports facilities and receptors. However, the developer and Local Planning Authority would need to be satisfied of this being the case. Features beyond the development boundary cannot ordinarily be relied upon, and opportunities outside of the developer's control should be considered cautiously.

Noise impacts can be both reduced or exacerbated where the facilities are located on land that is noticeably higher or lower in relation to receptors. With careful design consideration, the intervening slope of land can be used to provide a degree of screening to receptors. However, without due regard, an overlooked development can result in receptors that are greatly exposed to development noise. The amount of noise benefit or disbenefit is dependent on a number of factors including:

- the height difference between the noise source and receptors
- the distances of the sources and receptors from the slope
- the gradient of the slope

The use of modern noise modelling software, in the hands of a suitably qualified acoustician, will enable the prediction of acoustic conditions in a number of different scenarios, thus allowing different approaches to be explored.

10.4 Incorporating noise barriers

Noise barriers, in the broadest sense, can take many forms and are both effective and highly adaptable as a means of noise control.

Supplementary Document 2 'Good Acoustic Design of ProPG: Planning & Noise New Residential Development' recommends that the following are considered when designing a noise barrier (all other factors being equal):

- The closer the noise barrier is to the noise source, the more effective the barrier
- The lower the height of the development, the more effective the barrier
- The taller the barrier, the greater the noise reduction
- Barriers are more effective when the source and barrier is elevated relative to the receiver
- Wider barriers tend to be more effective
- Any holes or discontinuities in a barrier wall will significantly reduce its noise reduction ability
- Material used should have a suitable surface density, e.g. a high-performance barrier must have a surface density of at least 20kg/m^2

Barriers are especially effective at reducing noise for single-storey receptors or those located at ground level. Since sports facilities typically operate during daytime and evening hours, this can be particularly beneficial in low-density residential areas, where receptors are typically (though not always) situated at the ground floor. However, in higher density, urban areas, it is often the case that sports facilities are overlooked by apartments where receptors are located above the ground floor.

Whilst barriers are generally less effective under such circumstances, some noise reduction may still be achieved above ground floor level through the use of cantilever, or cranked, barriers. There are, of course, limits to the amount of noise reduction that can be achieved using such barriers, particularly for a noise source covering a larger floor area (e.g. AGPs) or receptors that are elevated. As with all good acoustic design, the impetus should be in achieving an optimised acoustic environment through measures that are reasonable and practicable. If little acoustic benefit is likely to be derived through a proposed design feature, at significant cost and with compromises to the design as a whole, then alternatives should be explored.

The effectiveness of barriers can also be greatly influenced by their placement relative to the site's topography, and developers should be mindful of this as the design evolves. Generally speaking, a taller barrier would be expected to provide greater noise reduction, all other factors being equal, however, a shorter barrier that is appropriately located (e.g. at the brow of a slope) can be more effective than a taller barrier that's poorly located (e.g. lower down or at the foot of a slope). As a result, barriers that have been designed in the preliminary stages of a development should be kept under review to ensure that they remain effective in response to other design considerations, which may result in changes in land form within the site.

It is also important to ensure that the placement of a barrier does not create a new source of noise, for example, being located in a position where it will be hit by balls and create a new rebound surface.

10.5 Using the layout of the scheme

Whether a development is intended solely for the purpose of providing sport facilities, or if facilities are proposed as part of a wider scheme, or in addition to existing premises, noise reductions can often be achieved by appropriate consideration of the layout.

For developments where new buildings are proposed, significant reductions in noise can be achieved by locating the proposed buildings between the sources of noise and the likely worst-affected receptors. For commercial sports facilities, there are often non-sensitive buildings (changing rooms, other indoor activity spaces etc.) that could provide sound shielding. However, when locating buildings, developers should be mindful of noise being reflected in the direction of other receptors, particularly where space is a significant constraint.

For larger developments there may also be opportunities to strategically locate non-sensitive elements or ancillary spaces such as landscaped areas nearer to receptors. However, in addition to sports activity noise, designers should be mindful to locate likely congregation points away from receptors where possible, as noise from large groups of patrons outside of sports activities can also result in impacts. Congregation points will vary depending on the type of facilities but can often be influenced by the site layout.

Where possible, the most significant sources of noise should be located away from receptors that are elevated (apartment buildings etc.), as it is often most challenging to control noise effectively at these locations. In circumstances where there are receptors in a number of directions around the development, it would be preferable to locate the most significant sources of noise nearer to receptors that are lower in height (e.g. low density properties) where other form of noise control, such as barriers or mounds, may be more effective.

10.6 Responding to the existing acoustic environment

In highly constrained environments, where options to reduce noise are limited, potential impacts may be minimised through a design that is guided by the local existing acoustic environment. For example, where existing noise levels are higher in a particular area of the site, it may be advantageous to position the most significant sources of noise there, rather than in quieter areas where they could be more noticeable.

Time-based restrictions could also be applied, limiting hours of use to periods when existing noise levels are higher, or providing periods of respite from noise during the quietest periods or when there is a potentially greater effect.

However, care should be taken not to exacerbate existing problems in high-noise areas. This point is reflected in **PPG - Noise**, which cautions that:

“In cases where existing noise-sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring, even though little to no change in behaviour would be likely to occur.”

11. Recommendations for Assessment Criteria

Based on the review of current guidance and best practice it is the opinion of the Working Group that noise from sport and leisure is most appropriately assessed using the equivalent noise level ($L_{Aeq,T}$) parameter alongside assessment of specific sporadic and short-term events using the L_{Amax} parameter.

The following sections set out the reasoning and recommended criteria for these parameters.

It was acknowledged by the Working Group that for sport and leisure noise with sound characteristics specific to that activity, consideration of character in addition to the above-mentioned parameters may further assist in the assessment of potential adverse effects.

However, it was felt that this was beyond the scope of this document and would be more appropriately considered for specific sports and activities in future work.

11.1 Guidance on the assessment of L_{Aeq}

Calculation advice for L_{Aeq}

In the majority of cases, a reference time period of one hour is recommended to align with Sport England's AGP guidance, however, there may be specific circumstances where a different time period may be more suitable. Principally, the assessor should be guided by the likely duration of the activity and take care that potential impacts are not under- or over-estimated by selecting a time period that is inappropriate.

Calculations should be carried as an area source for L_{Aeq} noise levels for pitch-based sports, or as a number of point sources or a vertical area source for sports or activities with specific location, whichever source type represents the specific sport the best. The height of sources can be particularly important.

Absolute Noise Level – L_{Aeq} consideration

The recommendation of this Working Group is that a criterion follows the recommendations of the WHO Guidelines for reasonable enjoyment of external spaces of 50 dB $L_{Aeq,T}$. It is suggested that this can generally be adopted in the assessment of sports facilities in terms of average noise levels.

However, there may be specific circumstances where this criterion may need to be adjusted, such as when the noise under consideration has significant specific characteristics and/or other noise parameters that should be considered in conjunction with the L_{Aeq} .

A reference time period of one hour is recommended to align with Sport England's AGP guidance, however, there may be specific circumstances where this reference time period may need to be adjusted.

Comparative Noise Level – L_{Aeq} consideration

Sport England guidance suggests situations where consideration of the existing noise climate could be considered in terms of noise impact. This includes areas where existing noise levels are high or where there are existing sports facilities and additional provision is proposed.

Furthermore, as noted in previous sections, care should be taken not to exacerbate existing problems in high-noise areas as reflected in PPG – Noise.

Where the character of the specific sporting sounds is a key part of the assessment due to the type of activity it may be necessary to consider the character of the existing ambient noise climate, as well as absolute noise levels, to quantify this.

The analysis of baseline sound survey data should include evaluation of the typical L_{Aeq} levels during the times that the proposed facility will be in use. If the L_{Aeq} noise level during specific times of day (e.g. the first and last hours of opening) are significantly different to the average then these specific hours should be subject to a separate assessment in addition to the typical impact assessment for standard operating hours.

The duration of the assessment period can be key and should be determined by the assessor taking into account the specific context of the site. It is often advisable to discuss such parameters with the environmental protection department of the local planning authority before completing the assessment.

In terms of difference or change in noise levels, documents such as the IEMA guidelines (and in Scotland the TAN to PAN 1/2011 as referenced in the Sports Scotland Guidance) provide objective criteria.

The IEMA table is provided below for reference.

Long-term Impact Classification	Short-term Impact Classification	Sound level change dB L_{pAeqT} (positive or negative) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3 dB and < 5 dB
Moderate	Major	≥ 5 dB and < 10 dB
Major		≥ 10 dB

The context of the proposals should always be considered with the proposed times of operation; e.g. daytime only, evening periods, overnight, whether weekend use is proposed, school hours only, when it is light only (i.e. no floodlights) as well as the presence of other similar noise sources in the area etc. This list is not intended to be exhaustive but provides examples of contextual considerations.

11.2 Guidance on the assessment of L_{Amax}

Many of the sports or sports facilities considered in this guidance incorporate activities or exhibit characteristics that result in regular impulsive noises. These include:

- Football played on Multi-Use Games Areas (MUGA) or five-a-side pitches where the ball strikes a metal goal or fence
- Basketball – ball bounces and backboard strikes
- Hockey – hockey sticks striking the ball and backboard strikes
- Padel – ball strikes by the padel or against the screens
- Skate parks – Board slaps, grinds etc produce a range of impulsive noise characteristics
- Golf driving ranges – the noise generated is a series of impulses
- Whistles used in team sports result in short-duration, high-level sounds

There is no definitive published guidance that provides guideline noise levels for impulsive noise sources that are generally applicable to sport or leisure activities. However, this Working Group considers that it is appropriate to provide guidance on maximum levels, considering the noise characteristics of many of the sports and activities described above.

The WHO Guidelines for Community Noise provide a guideline level in terms of L_{Amax} of 60 dB applying to the external sound level outside bedrooms in order to prevent sleep disturbance, assuming windows are partially open. This applies to the night-time period, which is defined as the hours 23:00 to 07:00 in the United Kingdom.

The Guidelines for Community Noise do not include any daytime criteria for L_{Amax} that apply to residential environments or outdoor living areas. However, it can be noted that in terms of period noise levels, the daytime WHO guideline for dwellings indoors is 35 dB $L_{Aeq,16h}$ and the night-time guideline is 30 dB $L_{Aeq,8h}$. On this basis it could be reasonable to consider a 5 dB difference between night-time and daytime L_{Amax} criteria and therefore a daytime criterion of 65 dB L_{Amax} outside dwellings could be considered as a guideline indicating the potential onset of 'moderate annoyance'.

Another guidance document indicates a similar criterion may be applicable to impulsive noises from sports and leisure facilities. 'Clay Target Shooting: Guidance on the Control of Noise' (CTSG) published by the Chartered Institute of Environmental Health provides advice on methods to minimise noise annoyance from clay target shooting. The guidance includes a recommended method for the measurement and assessment of clay target shooting noise. The measurement methodology involves obtaining a series of shot noise level readings. Each shot level corresponds to the maximum value caused by the shot in a continuous series of short L_{Aeq} , ($L_{Aeq,100ms}$ or $L_{Aeq,125ms}$) measurements. From these shot level readings, the Shooting Noise Level (SNL) is determined from the logarithmic average of the 25 highest shot levels over a 30-minute period measured at an external location representative of an affected dwelling.

The CTSG suggests that there is no fixed SNL at which annoyance starts to occur. However, in general, it has been shown that annoyance is less likely to occur at a mean SNL below 55 dB(A), and highly likely to occur at a mean SNL above 65 dB(A). Experience shows that the highest short L_{Aeq} values from an impulsive event is typically numerically similar to the $L_{Amax,F}$ obtained from the same event, within +/- 2 dB.

Given the absence of more specific guidance on assessing maximum noise levels, the CTSG assessment methodology has been applied in numerous noise assessments for a range of sports facilities such as skate parks, MUGAs, all-weather sports pitches, hockey pitches etc.

The methodology has been adopted on occasion for both for noise impact assessments to support planning applications and for noise assessments considering noise complaints from residents affected by impulsive noise. Such uses have, for example, included assessments of impulsive noise from MUGAs or similar facilities, and in assessments for skate parks. In many cases the suggested annoyance criteria have been applied to L_{Amax} values, with a criterion of 65 dB $L_{Amax,F}$ adopted as the threshold to indicate annoyance is highly likely to occur.

Whilst the guidance from which it is derived is not intended for use with wider sport and leisure activities, the prevalence and acceptance of the use of this criterion in previous schemes provides some confidence as to the general acceptability of the criterion. Accordingly, until further research is carried out into the acceptable levels, the Working Group will consider this criterion as an acceptable starting point in the assessment of the impact of $L_{Amax,F}$ noise levels.

The recommendation of this Working Group is that a criterion of 65 dB $L_{Amax,F}$ can generally be adopted in the assessment of sports facilities where there will be frequently occurring impulsive events or short-term sound events such as from a referee's whistle. However, there may be specific circumstances where this criterion may need to be adjusted. This could include locations where the ambient sound climate includes frequent events with a high sound level, such as from transportation sources, or very high ambient sound levels in terms of $L_{Aeq,T}$.

Detailed noise predictions will need to take into account the different source characteristics of sources associated with maximum sound levels. The noise modelling will need to predict levels at the most exposed receptors for the element(s) of the proposed facility that will generate the highest maximum noise levels. For example, this could be a MUGA goal, weldmesh fence or a backboard in the case of basketball or hockey.

12. Prediction Methodologies



The prediction of noise propagation from sport and leisure areas typically uses established algorithms (e.g., ISO 9613-2) based on sound emission measurements at similar sites. This methodology is common and best practice when assessing other environmental noise sources, and established protocol within a number of technical standards (e.g., BS 4142:2014+A1:2019 applying to the assessment of commercial and industrial noise sources).

This process is therefore considered appropriate for the determination of noise levels from sport and leisure at sensitive receptor locations.

Reliable prediction of noise levels, however, is dependent on the source emission data input within the model or calculations. Whilst not exhaustive, the WG has sought to develop a reliable standardised data set of sports source noise levels.

13. Noise Levels from Sporting Activities

The information provided in the following pages was collated on behalf of the ANC during 2022 and 2023 to provide example source noise measurements for a range of common sports and leisure activities.

All data presented were collected in dry conditions with wind speeds below 5 m/s. Any influence of weather conditions on the measurements is mentioned in field notes.

The data is intended to be used only when source measurements of the specific activities is not possible due to the variable nature of such noise sources.

Details of the survey procedures and limitations of the data are presented for each example measurement, and each data sheet is expected to be taken as a whole, as opposed to cherry picking single noise measurements.

It is the responsibility of the acoustician using the provided information to determine and demonstrate that the data is suitable for the selected use. Where the data provided does not provide the information required for the acoustician to fully assess the potential adverse effects additional survey work should be undertaken specific to the scope of their assessment.

The ANC accepts no responsibility for the use of the data and in all cases professional judgement should be applied as to the application of the source data.

Basketball

This summary contains details of a noise survey for basketball match play by 6-8 players (male adults) lasting a total of 45 minutes. Note that only one hoop of the court was used during the noise measurements. The site is a macadam court surface with mesh fencing surrounding the perimeter. Figure 13.1 shows the site along with measurement positions:

- Position A – 5m from the halfway line
- Position B – 5m behind the centre of the southern goal line

Figure 13.1: Site layout and monitoring locations

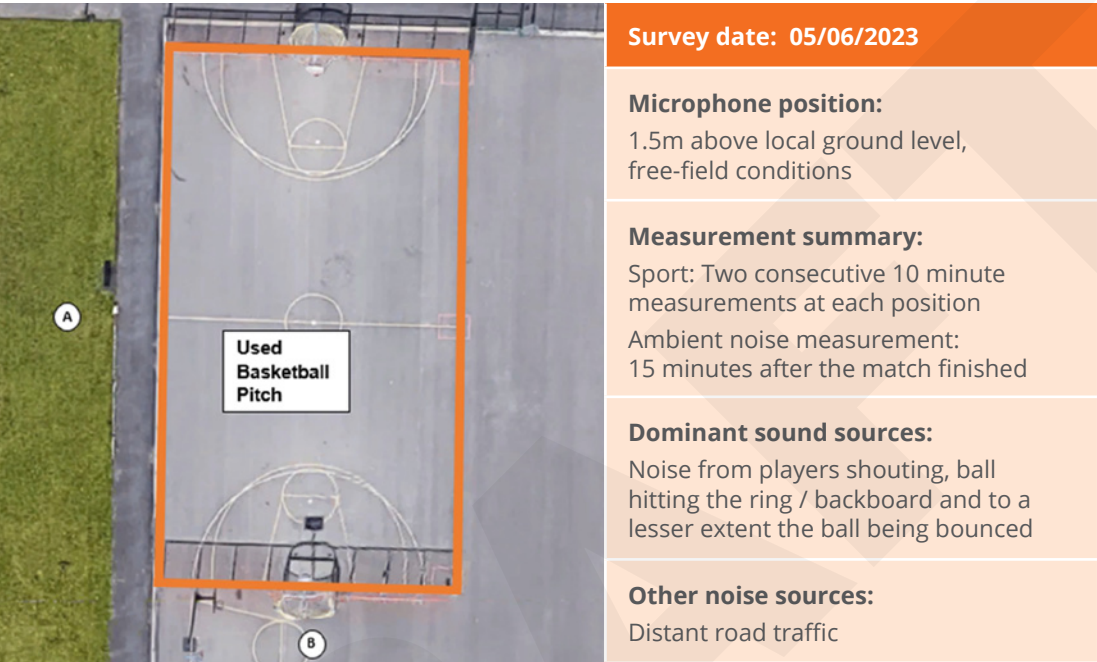


Table 13.1: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20µPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	60 – 61 L _{Aeq,10min} 60	60 L _{Aeq,10min} 60	50 – 80 10 th %ile = 68	L _{Aeq,15min} 45.6
B	59 – 61 L _{Aeq,10min} 60	59 – 60 L _{Aeq,10min} 60	48 – 84 10 th %ile = 69	
Survey date: 05/06/2023				

The maximum noise levels at both measurement positions were due to players shouting, and to a lesser extent the ball being bounced. At position B, the ball hitting the ring / backboard also caused maximum noise levels. No spectators were present during the entire survey. A whistle was not used during the noise measurements.

Basketball

This summary contains details of a noise survey for a basketball match (x6/8 teenage players) lasting a total of 20 minutes. The site is a flat court with a macadam surface, with no surrounding perimeter fence or walls. Figure 13.2 shows site along with measurement positions:

- Position A – 5m from the halfway line
- Position B – 5m behind the centre of the goal line

Figure 13.2: Site layout and monitoring locations

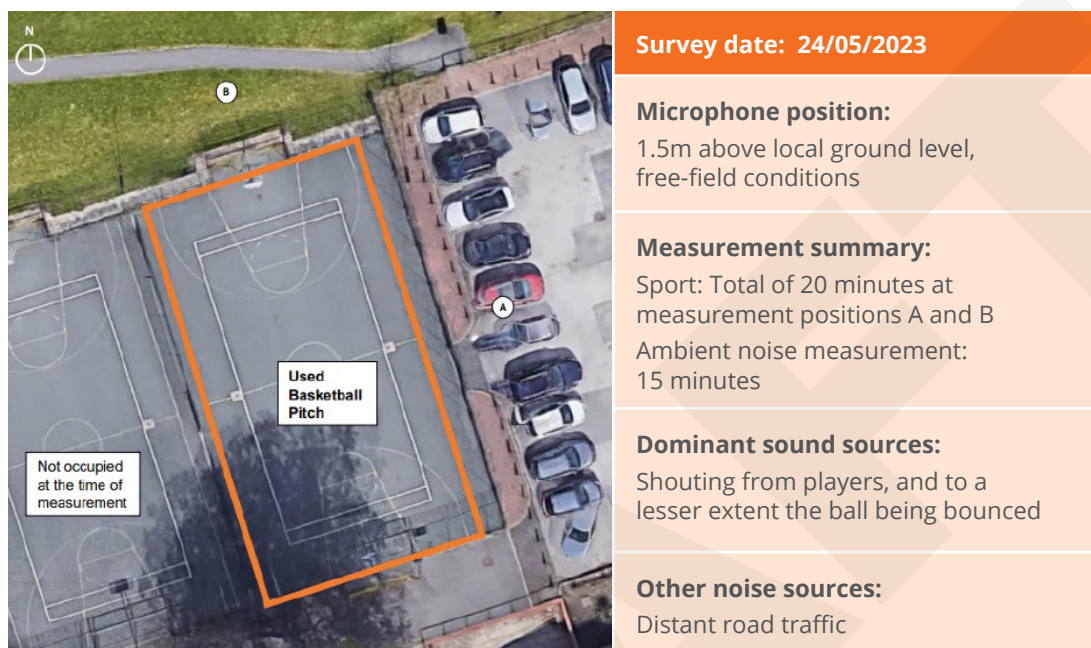


Table 13.2: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	59 – 61 L _{Aeq,20min} 60	60 – 61 L _{Aeq,20min} 60	51 – 82 10 th %ile = 67	L _{Aeq,15min} 45
B	61 – 64 L _{Aeq,20min} 62	62 – 63 L _{Aeq,20min} 62	52 – 88 10 th %ile = 70	
Survey date: 24/05/2023				

Based on observations from the surveyor on site, it is to be noted that the dominant noise sources at both locations were players shouting and, to a lesser extent, the ball being bounced. It was noted that only one hoop was in play during the measurements. The adjacent court was unoccupied at the time of measurements and background noise was not significant.

Football Match, five-a-side

This summary contains details of a noise survey for five-a-side football matches (children) each lasting 17 minutes. The site is a 3G pitch with a mesh fence located along the southwestern and southeastern boundaries only, near to both measurement locations (see Figure). This is because the match was played on a portion of a larger pitch. Figure 13.3 shows the site along with measurement positions:

- Position A – 10m from the halfway line
- Position B – 10m from the centre of the goal line
- Ambient Measurement Location – not stated

Figure 13.3: Site layout and monitoring locations

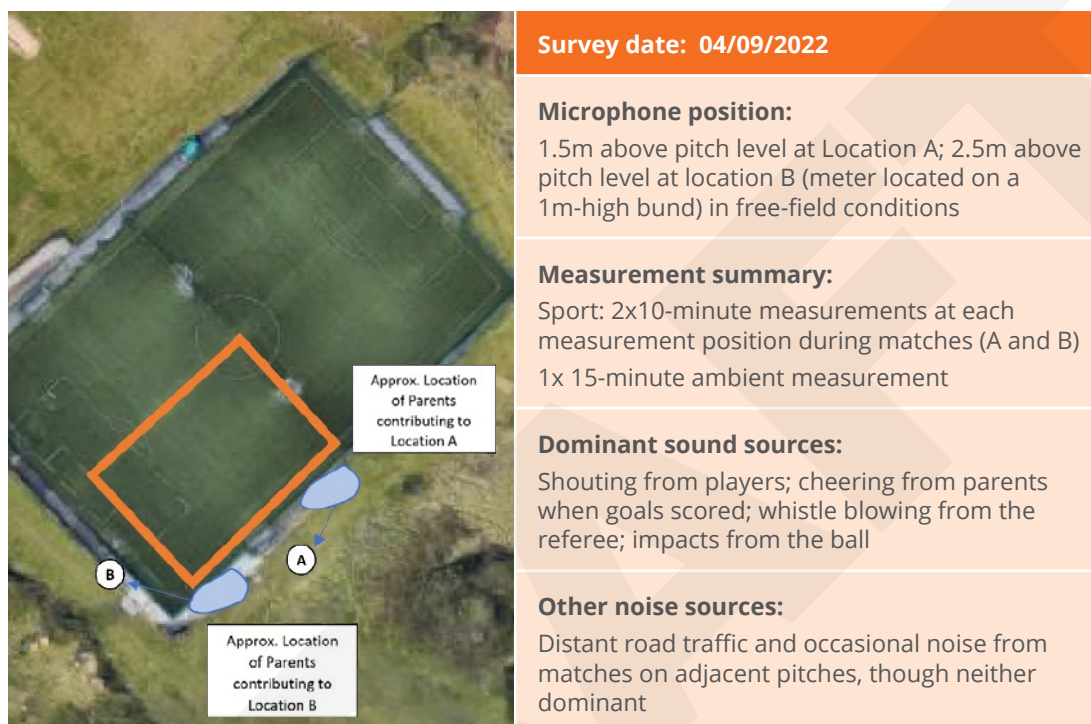


Table 13.3: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)				Ambient / background noise level
	L _{Aeq,1min} ¹	L _{Aeq,5min} ¹	L _{Aeq,10min} ²	L _{Amax,1s} ³	
A	63 – 72	67 – 68	67 – 68 L _{Aeq} = 68	57 – 88 10 th %ile = 62	L _{Aeq,15min} 50 L _{A90,15min} 45
B	58 – 65	62 – 64	63	49 – 80 10 th %ile = 58	
Survey date: 04/09/2022					

¹ range of values from both measurement periods combined (i.e. A1+A2 and B1+B2)

² measurements were 10 minutes each. Values presented are the L_{Aeq}, for each measurement and the logarithmic average of both (if both measurements yielded the same result only a single value will be presented)

³ taken from 1 second data

Football Match, five-a-side

This summary contains details of a noise survey for a five-a-side football match (adults). The site is a 3G pitch with a mesh fence located along the southwestern boundary only, near to Location B (see Figure). This is because the match was played on a portion of a larger, full-sized pitch. Figures 13.4 and 13.5 show the site along with measurement positions:

- Position A – 5m from the halfway line
- Position B – 5m from the centre of the goal line
- Ambient Measurement Location – as indicated on Figure

Figure 13.4 / Figure 13.5: Site layout and monitoring locations



Table 13.4: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)				
	L _{Aeq,1min} ¹	L _{Aeq,5min} ¹	L _{Aeq,10min} ²	L _{Amax,1s} ³	Ambient / background noise level
A	56 – 72	60 – 66	61 – 64 L _{Aeq} = 63	50 – 95 10 th %ile = 55	L _{Aeq,15min} 45 L _{A90,15min} 42
B	55 – 65	58 – 63	59 – 62 L _{Aeq} = 61	79 – 84 10 th %ile = 53	
Survey date: 21/02/2023					

¹ range of values from both measurement periods combined (i.e. A1+A2 and B1+B2)

² measurements were 10 minutes each. Values presented are the L_{Aeq}, for each measurement and the logarithmic average of both (if both measurements yielded the same result only a single value will be presented)

³ taken from 1 second data

Based on observations from the surveyor on site, it is to be noted that the dominant noise sources at positions A and B were players shouting.

At Location A, noise generally from players shouting. Sports complex building located approx. 20m away, though no mention of noise from the premises; at Location B, noise from players shouting and impact noise from ball on fence.

Football Match, five-a-side

This summary contains details of a noise survey for a five-a-side football game (adults). The site is a 3G artificial pitch with surrounding 1.2m high rebound boards around the pitch with standard fencing and suspended nets above the boards. Figure 13.6 shows site along with measurement positions:

- Position A – 5m from the halfway line
- Position B – 5m behind the centre of the northeast goal line

Figure 13.6: Site layout and monitoring locations



Table 13.5: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	58 – 60	59 – 60	48 – 81 10 th %ile = 67	L _{Aeq,15min} 45
B	59 – 64	61 – 62	49 – 88 10 th %ile = 68	
Survey date: 29/03/2023				

Based on observations from the surveyor on site, it is to be noted that noise from the adjacent pitch affected measurements at position B although this was not dominant.

Football Match, 11-a-side

This summary contains details of a noise survey for a full-sized (11-a-side) football game (adults) lasting a total of 90 minutes. The site is a flat grass pitch with no surrounding perimeter fence or walls. Figure 13.7 shows site along with measurement positions:

- Position A – 10m from the halfway line
- Position B – 30m from the halfway line
- Position C – 10m behind the centre of the south goal line
- Position D – 30m behind the centre of the south goal line

Figure 13.7: Site layout and monitoring locations

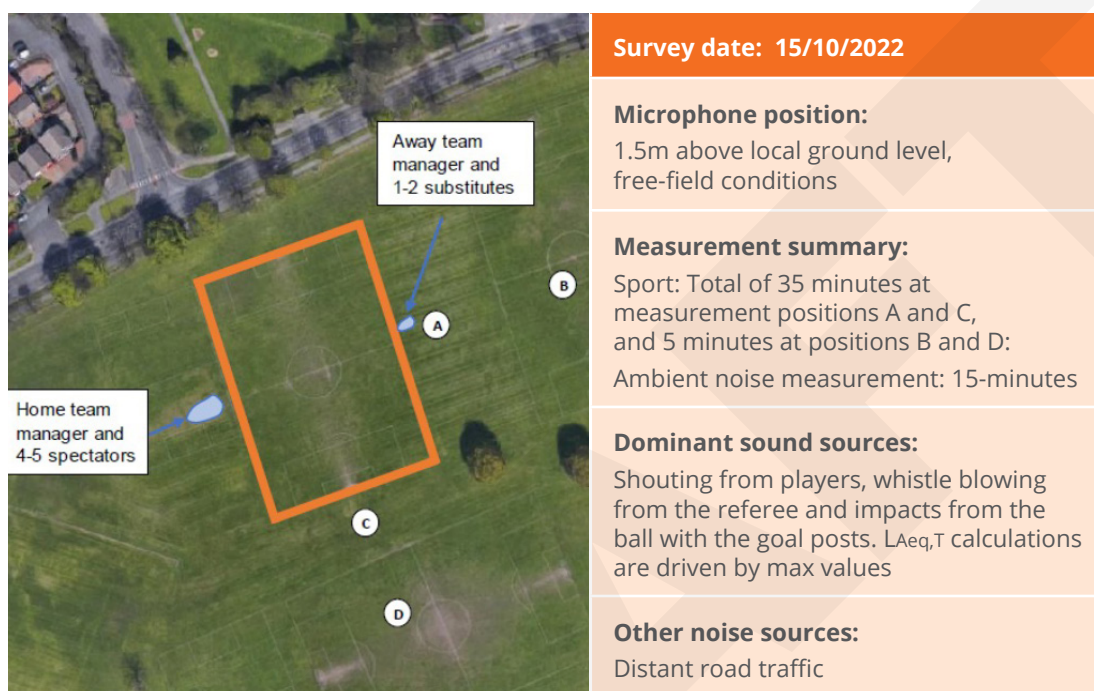


Table 13.6: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20µPa (Fast, Free-field)			
	L _{Aeq} ,5min	L _{Aeq} ,10min	L _{Amax} ,T	Ambient noise level
A	61 – 66 L _{Aeq} ,35min 63	63 – 63 L _{Aeq} ,30min 63	49 – 87 10 th %ile = 71	L _{Aeq} ,15min 48
B	58	n/a	50 – 72 10 th %ile = 65	
C	57 – 61 L _{Aeq} ,35min 60	59 – 61 L _{Aeq} ,30min 60	49 – 80 10 th %ile = 68	
D	56	n/a	49 – 76 10 th %ile = 64	
Survey date: 15/10/2022				

Based on observations from the surveyor on site, it is to be noted that the dominant noise sources at positions A and B occasionally changed to the away team manager and substitute players. Positions B and D couldn't be further than 30m away from their reference positions without being affected by other noise sources.

Football Match, 11-a-side

This summary contains details of a noise survey for a full-sized (11-a-side) football game (adults) lasting a total of 90 minutes. The site is a flat grass pitch with a 2m masonry wall positioned either side of the ground to provide a division to nearby houses. Figure 13.8 shows the site along with measurement positions:

- Position A – 10m from the halfway line
- Position B – 10m behind the centre of the southern goal line

Figure 13.8: Site layout and monitoring locations

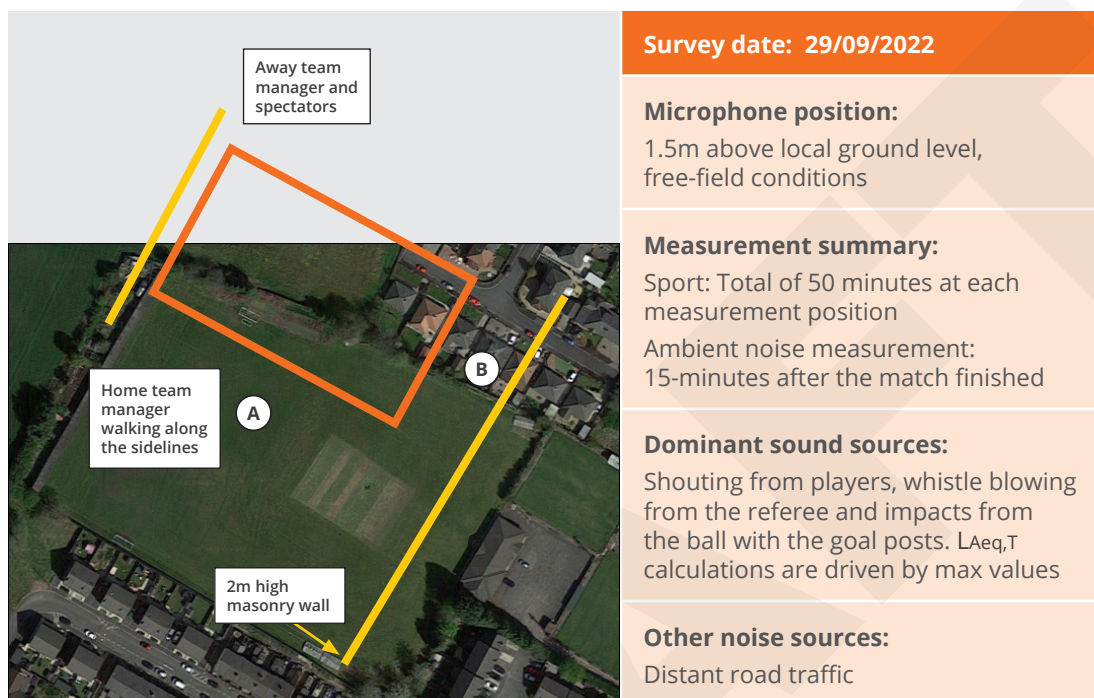


Table 13.7: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq} ,5min	L _{Aeq} ,10min	L _{Amax} ,T	Ambient noise level
A	60 – 67 L _{Aeq} ,50min 63	60 – 65 L _{Aeq} ,40min 64	50 – 83 10 th %ile = 72	L _{Aeq} ,15min 49
B	61 – 66 L _{Aeq} ,50min 63	61 – 65 L _{Aeq} ,40min 64	50 – 90 10 th %ile = 71	
Survey date: 24/09/2022				

Based on observations from the surveyor on site it is to be noted that a group of 8-10 spectators were present and did not contribute to any noise measurements taken at Position A, however, they did contribute at position B following the scoring of goals. Shouting from the home team manager was the dominant noise source during measurements taken at Position A. Location areas can be observed in Figure 1.

Football, Training Session

This summary contains details of a noise survey for a football training session (male adults). The site is a flat grass pitch located approximately 500m west of the A57. Figure 13.9 shows the site along with measurement positions:

- Position A1 – 5m from pitch, nearest to activity
- Position A2 – 5m from pitch, nearest to activity

Figure 13.9: Site layout and monitoring locations

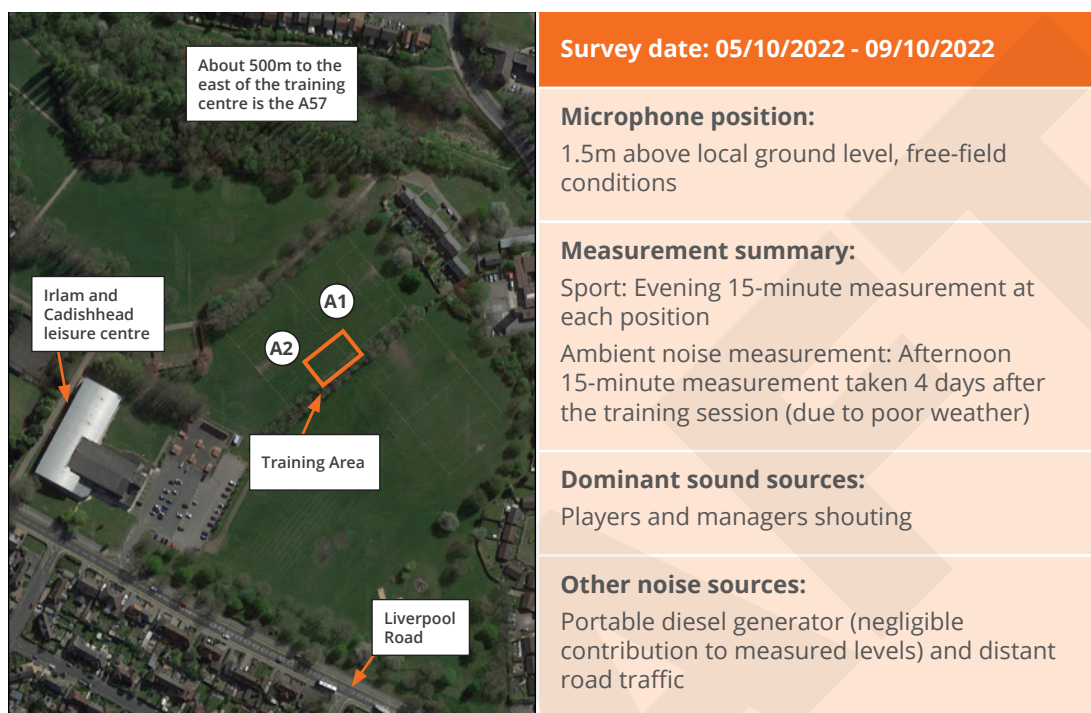


Table 13.8: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A1	63 – 67 L _{Aeq,15min} 66	64 – 66 L _{Aeq,15min} 66	55 – 90 10 th %ile = 72	–
A2	68 – 69 L _{Aeq,13min} 69	68 – 69 L _{Aeq,13min} 69	54 – 87 10 th %ile = 78	
Survey date: 05/10/2022				
	–	–	–	L _{Aeq,15min} 53.2
Survey date: 09/10/2022				

Based on observations from the surveyor on site it is to be noted that 12 players took part in the training session. The manager kept moving along the perimeter of the training area and sometimes was in the midst of the players. Sessions included a two-touch passing game with 3 groups containing 4 trainees each (A1) and a technical dribbling drill with 4 groups containing 3 trainees each (A2). The session did not include shooting practice.

Due to the weather getting worse on the day of the training session, the ambient noise measurement was undertaken 4 days after the main noise measurements, but a conscious effort was put into making sure there were minimal changes to the surrounding conditions / noise sources. The measurement position for the ambient noise measurement was not identified.

Football, Training Session

This summary contains details of a noise survey for a football training session (male adults). The site is a flat artificial grass pitch, surrounded by rebound mesh fencing. Figure 13.10 shows the site along with measurement positions:

- Position A1 – 5m from pitch, nearest to activity
- Position A2 – 5m from pitch, nearest to activity

Figure 13.10: Site layout and monitoring locations

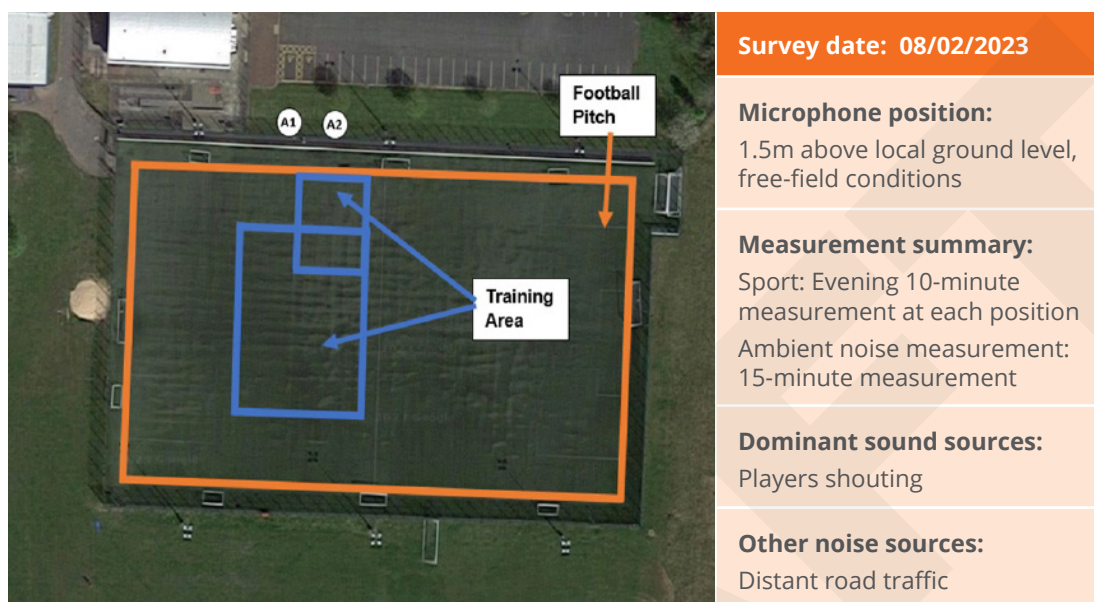


Table 13.9: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	LAeq,5min	LAeq,10min	LAmaz,T	Ambient noise level
A1	62 – 63 LAeq,10min 62	62 LAeq,10min 62	43 – 81 10 th %ile = 71	LAeq,15min 40.3
A2	63 – 64 LAeq,10min 64	64 LAeq,10min 64	42 – 85 10 th %ile = 73	
Survey date: 08/02/2023				

Based on observations from the surveyor on site it is to be noted that 10 players took part in the training. Sessions included a dribbling and crossing session (A1) and a passing session (A2). The training area for measurement position A1 covered a significantly larger area than for the measurement position A2.

Golf Driving Range

This summary contains details of a noise survey for a driving range session with measurements taking place between 10:02 and 10:47 on 19/02/23. The site is a flat grassed range with netted fencing surrounding the perimeter. During the measurements, 6 to 8 out of the 12 available bays were occupied. Figure 13.11 shows the site along with measurement positions:

- Position A1, A2 and A3 – 10m from the end bay

Figure 13.11: Site layout and monitoring locations

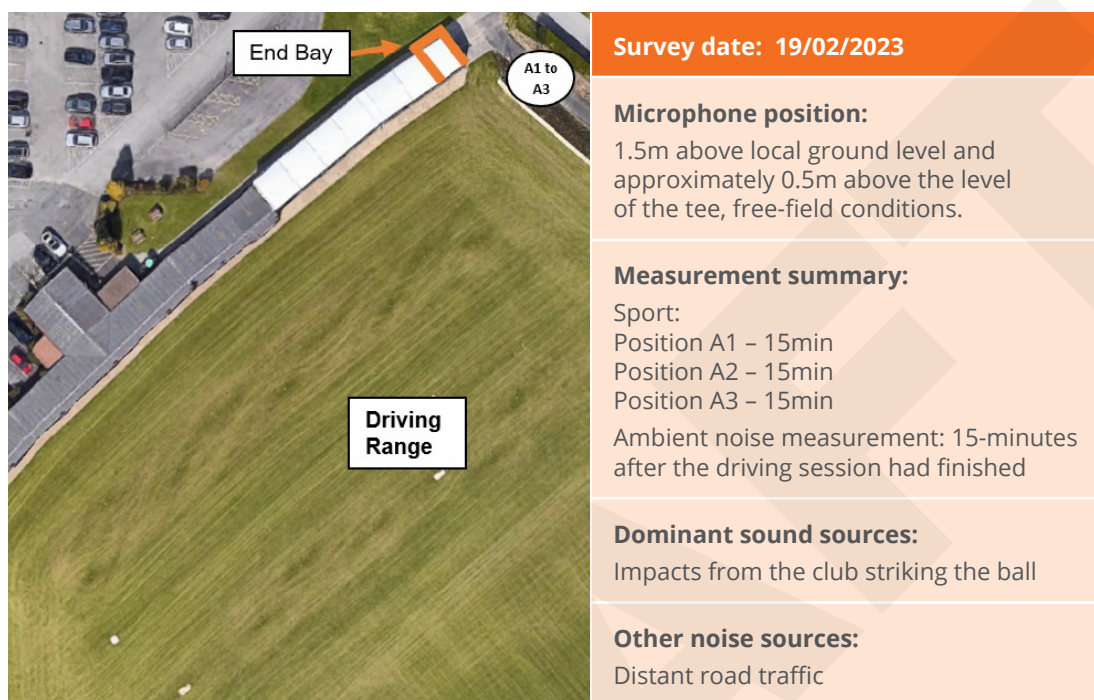


Table 13.10: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,1min}	L _{Aeq,T}	L _{Amax,T}	Ambient / background noise level
A1	48 – 54	L _{Aeq,15min} 52	38 – 74 10 th %ile = 59	L _{Aeq,15min} 42 L _{A90,15min} 37
A2	50 – 59	L _{Aeq,15min} 55	37 – 82 10 th %ile = 63	
A3	48 – 55	L _{Aeq,15min} 52	37 – 75 10 th %ile = 62	
Survey date: 19/02/2023				

Based on observations from the surveyor on site, striking of the ball typically resulted in maxima of 65 – 75 dB LA_{Fmax}. Higher maxima of around 81 dB LA_{Fmax} occurred when balls struck the wooden boards between the bays.

Golf Driving Range

This summary contains details of a noise survey for a driving range session with measurements taking place between 14:33 and 15:37 on 25/03/23. The site is a flat grassed range with netted fencing surrounding the perimeter. During the measurements, 16 to 18 out of the 28 available bays were occupied. Figure 13.12 shows the site along with measurement positions:

- Position A1, A2 and A3 – 10m from the end bay

Figure 13.12: Site layout and monitoring locations

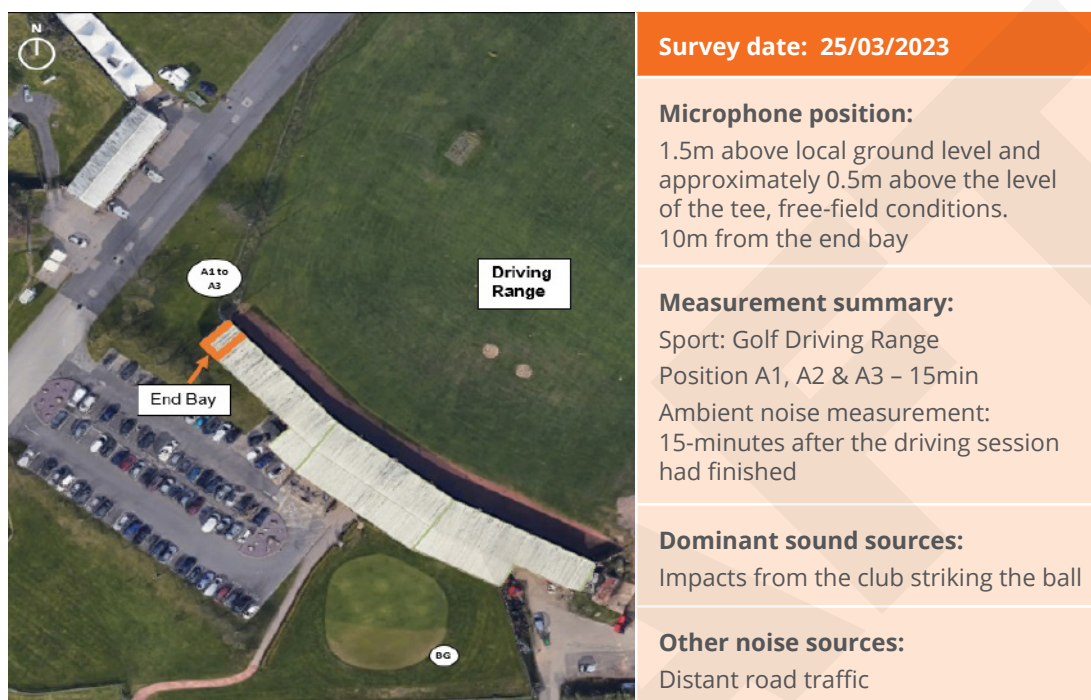


Table 13.11: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,1min}	L _{Aeq,T}	L _{Amax,T}	Ambient / background noise level
A1	51 – 62	L _{Aeq,15min} 56	45 – 82 10 th %ile = 49	L _{Aeq,15min} 45 L _{A90,15min} 41
A2	52 – 57	L _{Aeq,15min} 54	44 – 78 10 th %ile = 49	
A3	52 – 59	L _{Aeq,15min} 56	44 – 80 10 th %ile = 48	
Survey date: 25/03/2023				

Based on observations from the surveyor on site, striking of the ball typically resulted in maxima of 63 – 82 dB L_AF_{max}.

Golf Driving Range

This summary contains details of a noise survey for a driving range session with measurements taking place between 12:23 and 15:34 on 19/02/23. The site is a flat grassed range with netted fencing surrounding the perimeter. During the measurements, 4 to 5 out of the 9 available bays were occupied. Figure 13.13 shows the site along with measurement positions:

- Position A1, A2 and A3 – 10m from the end bay

Figure 13.13: Site layout and monitoring locations

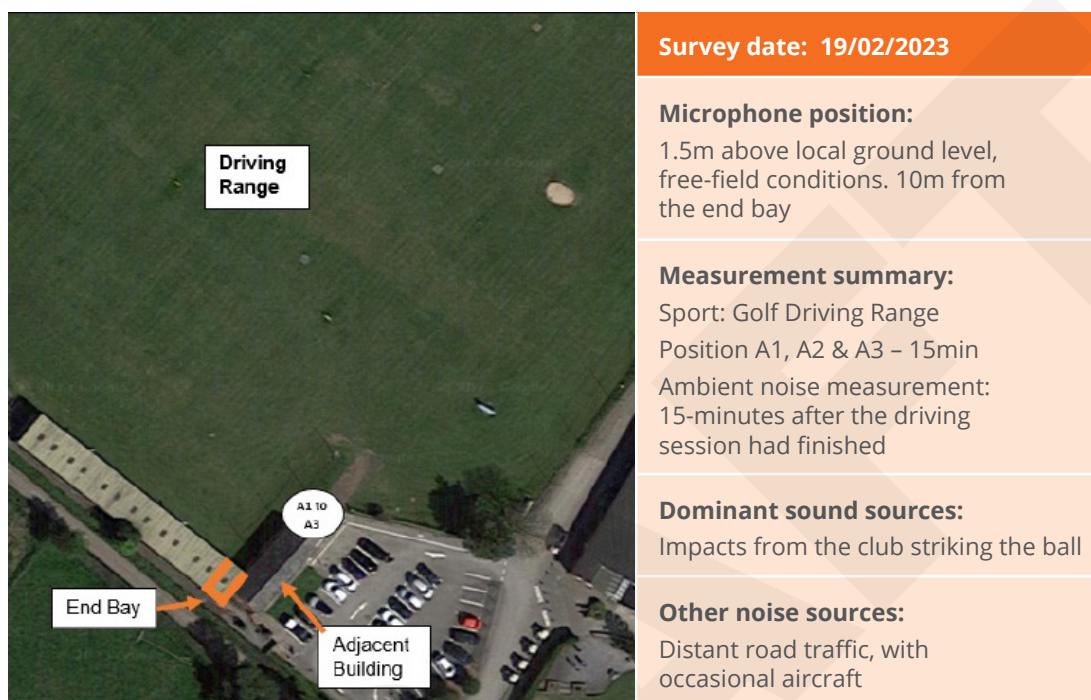


Table 13.12: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,1min}	L _{Aeq,T}	L _{Amax,T}	Ambient / background noise level
A1	46 – 62	L _{Aeq,15min} 57	41 – 85 10 th %ile = 44	L _{Aeq,15min} 42 L _{A90,15min} 40
A2	44 – 57	L _{Aeq,15min} 52	40 – 81 10 th %ile = 42	
A3	47 – 54	L _{Aeq,15min} 52	39 – 75 10 th %ile = 41	
Survey date: 19/02/2023				

Based on observations from the surveyor on site, striking of the ball typically resulted in maxima of 65 – 85 dB L_AF_{max}.

Golf Driving Range

This summary contains details of a noise survey for a driving range session with measurements taking place between 14:09 and 15:13 on 19/02/23. The site is a flat grassed range with netted fencing surrounding the perimeter. During the measurements, 12 to 14 out of the 16 available bays were occupied. Figure 13.14 shows the site along with measurement positions:

- Position A1, A2 and A3 – 10m from the end bay

Figure 13.14: Site layout and monitoring locations

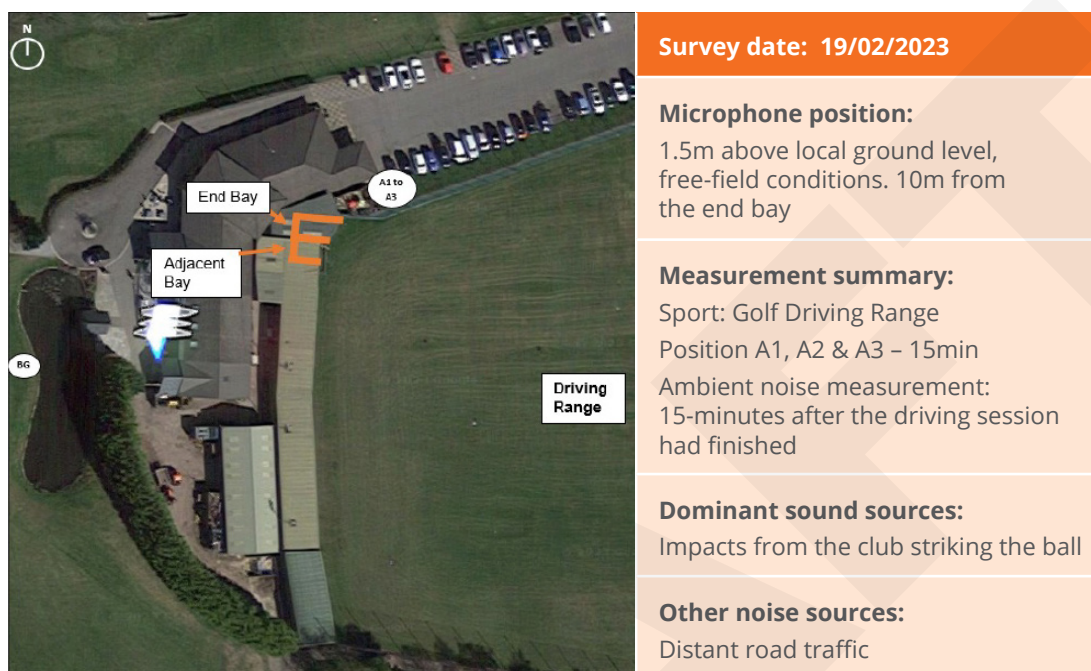


Table 13.13: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,1min}	L _{Aeq,T}	L _{Amax,T}	Ambient / background noise level
A1	48 – 58	L _{Aeq,15min} 54	40 – 80 10 th %ile = 44	L _{Aeq,15min} 42 L _{A90,15min} 38
A2	51 – 57	L _{Aeq,15min} 55	39 – 79 10 th %ile = 44	
A3	50 – 57	L _{Aeq,15min} 55	41 – 78 10 th %ile = 44	
Survey date: 19/02/2023				

Based on observations from the surveyor on site, striking of the ball typically resulted in maxima of 65 – 80 dB L_AF_{max}.

Golf Driving Range

This summary contains details of a noise survey for a driving range session with measurements taking place between 13:18 and 14:22 on 25/02/23. The site is a flat grassed range with netted fencing surrounding the perimeter. During the measurements, 14 to 16 out of the 18 available bays were occupied. Figure 13.15 shows the site along with measurement positions:

- Position A1, A2 and A3 – 10m from the end bay

Figure 13.15: Site layout and monitoring locations

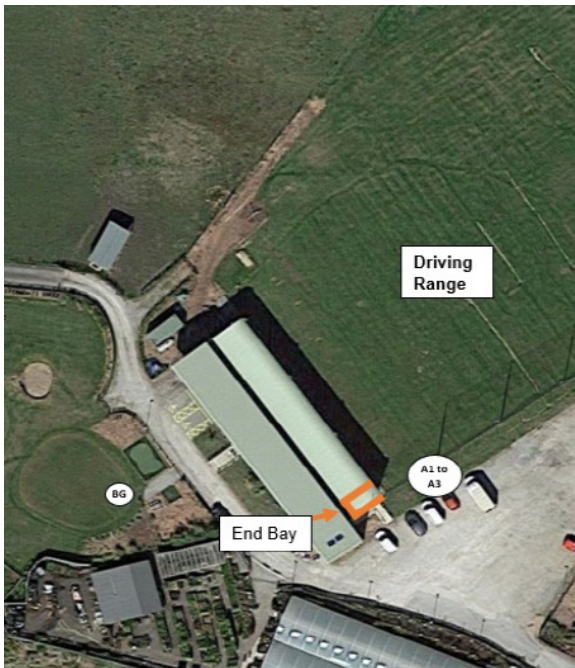
	Survey date: 25/02/2023
	Microphone position: 1.5m above local ground level, free-field conditions. 1.5m above tees on the ground floor bays and 1.5m below tees on the first floor bays. 10m from the end bay
	Measurement summary: Sport: Golf Driving Range Position A1, A2 & A3 – 15min Ambient noise measurement: 15 minutes after the driving session had finished
	Dominant sound sources: Impacts from the club striking the ball Other noise sources: Distant road traffic

Table 13.14: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,1min}	L _{Aeq,T}	L _{Amax,T}	Ambient / background noise level
A1	55 – 67	L _{Aeq,15min} 60	42 – 91 10 th %ile = 52	L _{Aeq,15min} 41 L _{A90,15min} 34
A2	57 – 64	L _{Aeq,15min} 59	42 – 84 10 th %ile = 50	
A3	55 –61	L _{Aeq,15min} 58	39 – 83 10 th %ile = 44	
Survey date: 25/02/2023				

Based on observations from the surveyor on site, striking of the ball typically resulted in maxima of 64 – 91 dB L_AF_{max}.

Hockey Match

This summary contains details of a noise survey for a full-sized (11-a-side) hockey game (adults) lasting a total of 70 minutes. The site is a flat 2G sand-filled pitch with mesh fencing surrounding the perimeter. Figure 13.16 shows the site along with measurement positions:

- Position A – 10m from the halfway line
- Position B – 10m behind the centre of the southern goal line

Figure 13.16: Site layout and monitoring locations

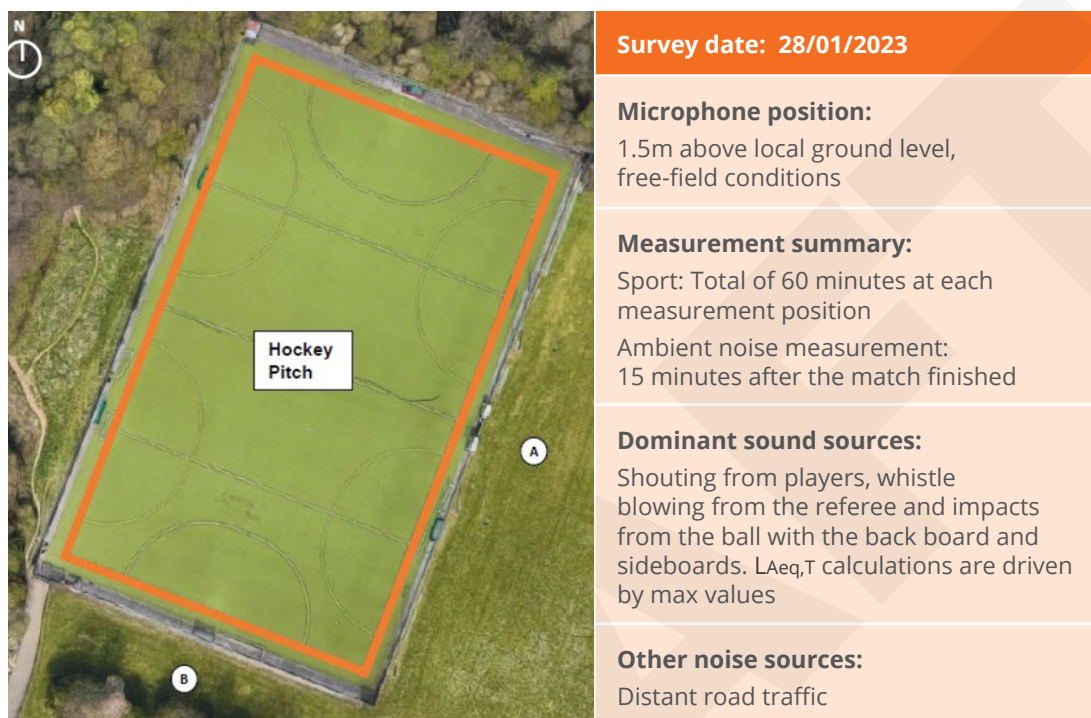


Table 13.15: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	56 – 61 L _{Aeq,1hour} 58	57 – 61 L _{Aeq,1hour} 58	37 – 83 10 th %ile = 67	L _{Aeq,15min} 38
B	55 – 68 L _{Aeq,1hour} 61	56 – 65 L _{Aeq,1hour} 61	38 – 92 10 th %ile = 66	
Survey date: 28/01/2023				

Based on observations from the surveyor on site, it is to be noted that there was a 4 dB variation in the overall 30min noise level (L_{Aeq}) of the two measurements at position B due to one team being dominant in the opposition half during the majority of the game. No spectators were present during the entire survey. The whistle was blown approximately 8-10 times in each measurement period.

Hockey Match

This summary contains details of a noise survey for a full-sized (11-a-side) hockey game (adults) lasting a total of 70 minutes. The site is a flat 2G sand-filled pitch with mesh fencing surrounding the perimeter. Figure 13.17 shows the site along with measurement positions:

- Position A – 10m from the halfway line
- Position B – 10m behind the centre of the southern goal line

Figure 13.17: Site layout and monitoring locations

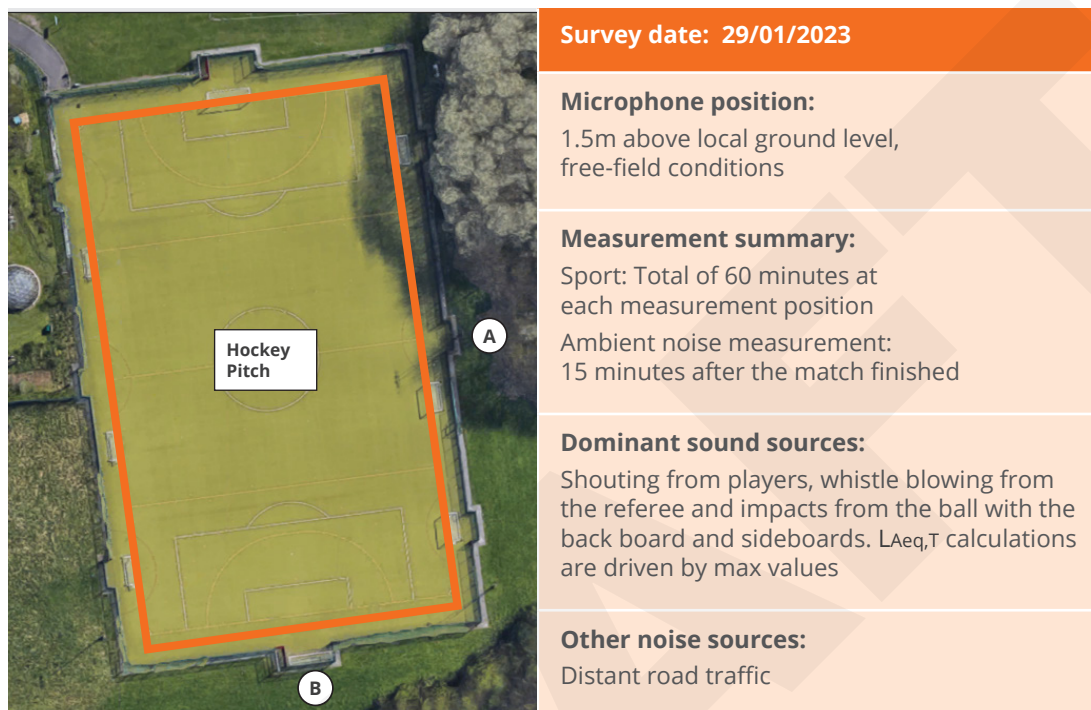


Table 13.16: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq} ,5min	L _{Aeq} ,10min	L _{Amax} ,T	Ambient noise level
A	58 – 62 L _{Aeq} ,1hour 61	60 – 62 L _{Aeq} ,1hour 61	44 – 87 10 th %ile = 69	L _{Aeq} ,15min 42
B	53 – 62 L _{Aeq} ,1hour 59	55 – 61 L _{Aeq} ,1hour 59	44 – 91 10 th %ile = 67	
Survey date: 29/01/2023				

Based on observations from the surveyor on site, it is to be noted that there was a 3 dB variation in the overall 30min noise level (LAeq) in the two measurements at Position B due to one team being dominant in the opposition half during the majority of the game. No spectators were present during the entire survey. The whistle was blown approximately 10-12 times in each measurement period.

Hockey Training

This summary contains details of a noise survey for a hockey training session (adults). The site is a flat 2G sand-filled pitch surrounding by traditional fencing with padding at the bottom. Figure 13.18 shows the site along with measurement positions:

- Position A – 5m behind the relocated goal line at the northern quarter line (east)

Figure 13.18: Site layout and monitoring locations

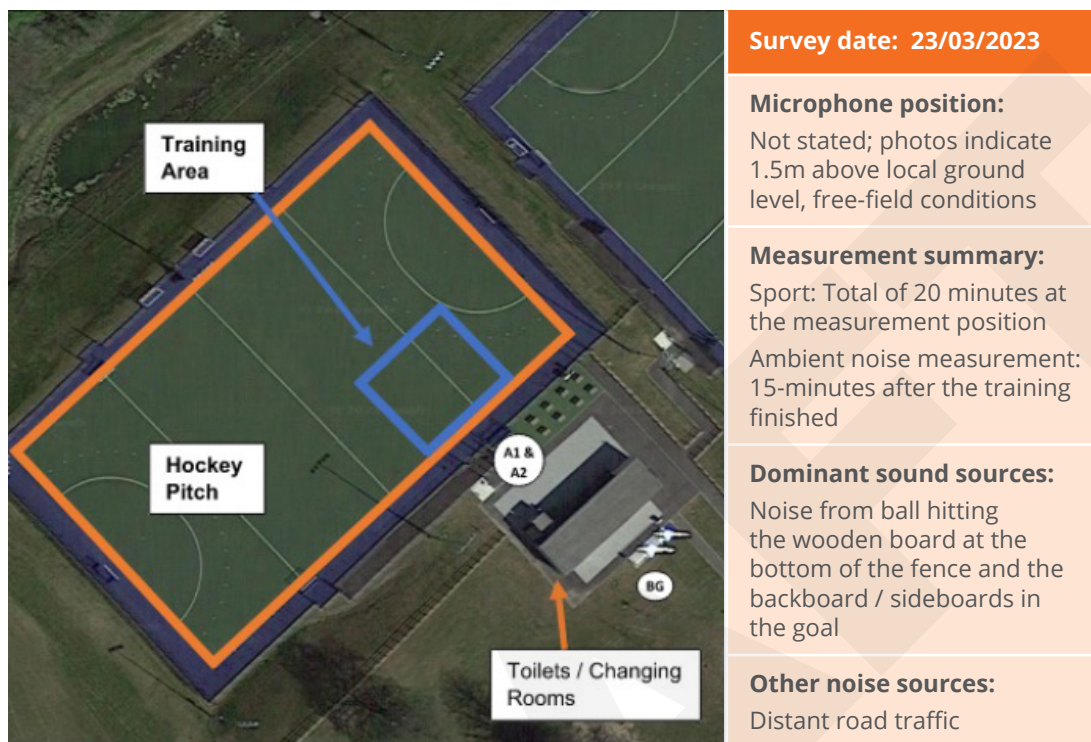


Table 13.17: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	71 – 74	73	48 – 101 10 th %ile = 81	L _{Aeq,15min} 44
Survey date: 23/03/2023				

Based on observations from the surveyor on site, it is to be noted that measurements were dominated by the ball striking the backboard/sideboard/fencing. Whistles were used once or twice per measurement period.

Hockey Training

This summary contains details of a noise survey for a 7-a-side hockey training session (adults and children). The site is a flat 2G sand-filled pitch surrounded by traditional fencing with wooden boards at the bottom. Figure 13.19 shows the site along with measurement positions:

- Position A1 – 5m from the halfway line (west),
- Position A2 – 5m from the halfway line (east),
- Position B – 5m behind the centre of the southern goal line

Figure 13.19: Site layout and monitoring locations

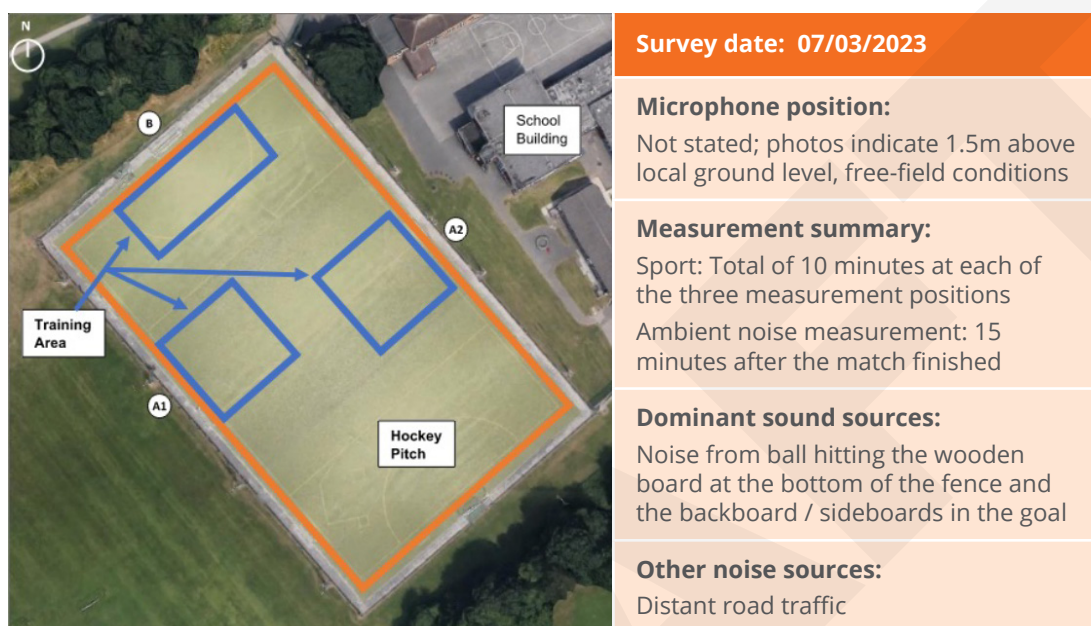


Table 13.18: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq} ,5min	L _{Aeq} ,10min	L _{Amax} ,T	Ambient noise level
A1	71 – 72	72	49 – 96 10 th %ile = 81	L _{Aeq} ,15min 46
A2	65 – 72	70	49 – 94 10 th %ile = 79	
B	78 –79	79	46 – 106 10 th %ile = 84	
Survey date: 07/03/2023				

Based on observations from the surveyor on site, it is to be noted that three practice sessions were happening simultaneously and rotating position for the A measurements. B measurements were dominated by the ball striking the backboard. Whistles were not used during this session.

Hockey Training

This summary contains details of a noise survey for a 7-a-side hockey training session (adults and children). The site is a flat 2G sand-filled pitch surrounded by traditional fencing with wooden boards at the bottom. Figure 13.20 shows the site along with measurement positions:

- Position A1 – 5m from the halfway line (west)
- Position A2 – 5m from the halfway line (east)
- Position B – 5m behind the centre of the southern goal line

Figure 13.20: Site layout and monitoring locations

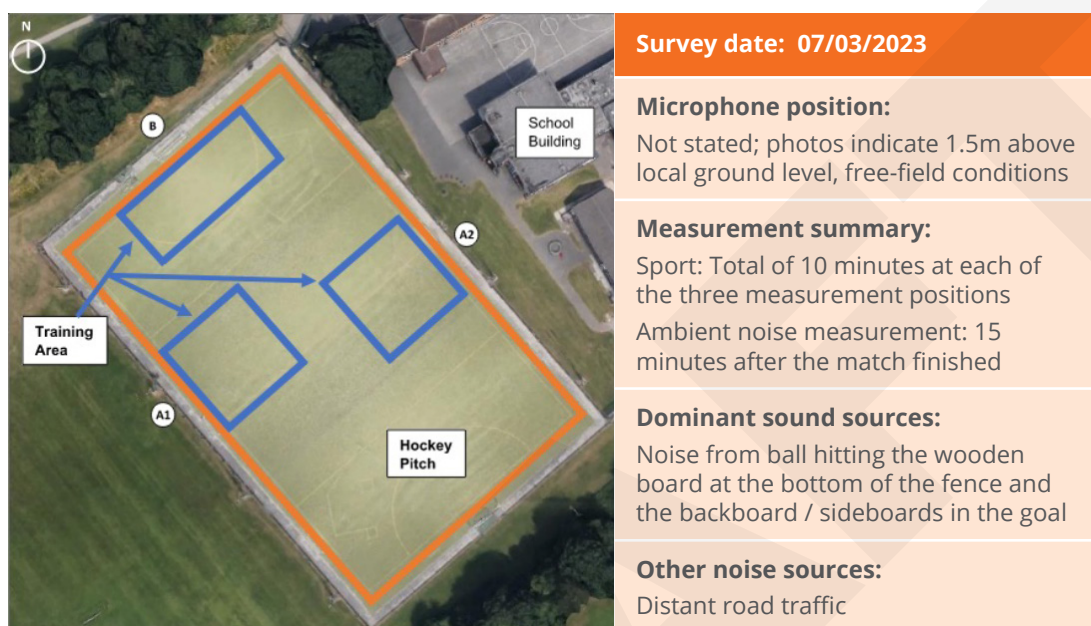


Table 13.19: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A1	71 – 72	72	49 – 96 10 th %ile = 81	L _{Aeq,15min} 46
A2	65 – 72	70	49 – 94 10 th %ile = 79	
B	78 –79	79	46 – 106 10 th %ile = 84	
Survey date: 07/03/2023				

Based on observations from the surveyor on site, it is to be noted that three practice sessions were happening simultaneously and rotating position for the A measurements. B measurements were dominated by the ball striking the backboard. Whistles were not used during this session.

Hockey Training

This summary contains details of a noise survey for a hockey training session (adults) with measurements taking place between 19:19 and 19:50 on 06/02/23. The site is a flat 2G sand-filled pitch with mesh fencing surrounding the perimeter. Figure 13.21 shows the site along with measurement positions:

- Position A – 5m from the edge of the pitch. Distance to main area of activity not stated (passing session)
- Position B1 – 5m behind the centre of the southern goal line (shooting practice)
- Position B2 – 5m from the edge of the activity area (dribble/shoot session)

Figure 13.21: Site layout and monitoring locations

	Survey date: 06/02/2023
	Microphone position: 1.5m above local ground level, free-field conditions
	Measurement summary: Sport: 10min for each measurement position Ambient noise measurement: 15 minutes after the training session had finished
	Dominant sound sources: Impacts from the ball with the backboard and sideboards; impacts of ball on sticks and sticks coming together
	Other noise sources: Distant road traffic

Table 13.20: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq} ,1min	L _{Aeq} ,10min	L _{Amax} ,T	Ambient / background noise level
A	58 – 64	63	47 – 86 10 th %ile = 56	L _{Aeq} ,15min 44 L _{A90} ,15min 41
B1	55 – 79	75	44 – 100 10 th %ile = 54	
B2	51 –82	76	45 – 106 10 th %ile = 53	
Survey date: 06/02/2023				

Results at B1 and B2 broadly similar, though slightly higher both in LAeq and LAFmax at B2. This is expected given that activities at B1 included dribbling which is likely to generate lower levels of noise compared to shooting, which was the sole activity at B2. No spectators were present during the entire survey and no whistles were used.

Hockey Training

This summary contains details of a noise survey for a hockey training session (14 adults) with measurements taking place between 19:26 and 20:20 on 07/02/23. The site is a flat 2G sand-filled pitch with mesh fencing surrounding the perimeter. Figure 13.22 shows the site along with measurement positions:

- Position A1 – 5m from the edge of the pitch, nearest to activity (passing practice)
- Position A2 – 5m from the edge of the pitch, nearest to activity (passing practice)
- Position B – 5m behind the centre of the eastern goal line (shooting practice)

Figure 13.22: Site layout and monitoring locations

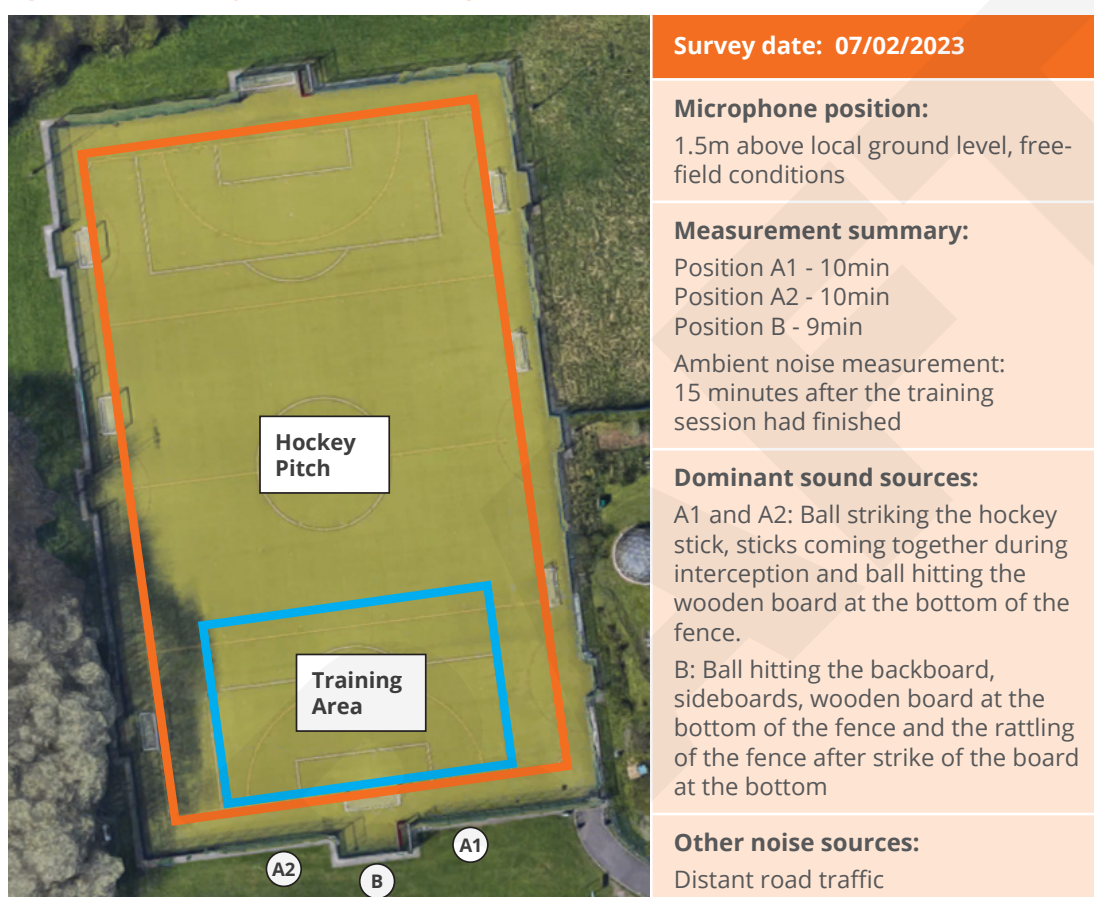


Table 13.21: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,1min}	L _{Aeq,T}	L _{Amax,T}	Ambient / background noise level
A1	62 – 68	L _{Aeq,10min} 65	48 – 88 10 th %ile = 74	L _{Aeq,15min} 42 L _{A90,15min} 38
A2	48 – 68	L _{Aeq,10min} 64	44 – 94 10 th %ile = 71	
B	54 –80	L _{Aeq,9min} 76	44 – 104 10 th %ile = 84	
Survey date: 07/02/2023				

No spectators were present during the entire survey. A whistle was used approximately 2-4 times in each measurement period.

Netball Match

This summary contains details of a noise survey for a netball match (x12 adult players). The site is a flat court with a macadam surface, surrounding perimeter walls at low level with chain-link fencing above chest-height. Figure 13.23 shows site along with measurement positions:

- Position A – 5m from the halfway line,
- Position B – 5m behind the centre of goal line

Figure 13.23: Site layout and monitoring locations

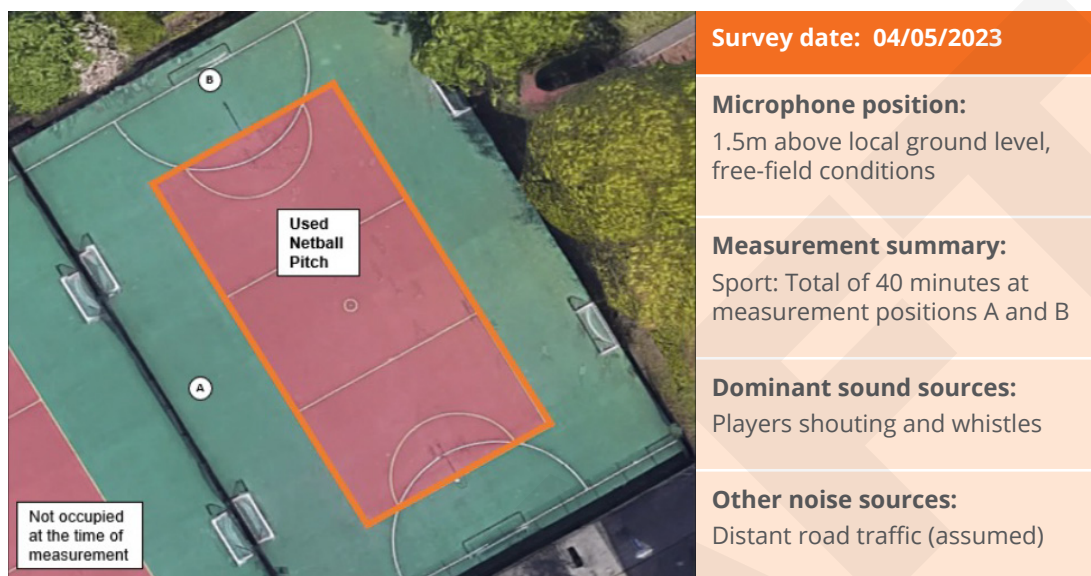


Table 13.22: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	59 – 61 L _{Aeq,20min} 60	59 – 60 L _{Aeq,20min} 60	51 – 84 10 th %ile = 54	Not measured due to rain (estimated to be 42 – 47 dB L _{A90,15min})
B	56 – 58 L _{Aeq,20min} 57	57 L _{Aeq,20min} 57	49 – 78 10 th %ile = 52	
Survey date: 04/05/2023				

Based on observations from the surveyor on site, it is to be noted that the dominant noise source at both monitoring positions, A and B, was that of players shouting and whistles. The adjacent pitch was not occupied at the time of measurement.

Netball Match

This summary contains details of a noise survey for a netball match (x12 adult players). The site is a flat court with a macadam surface, surrounding perimeter walls at low level with chain-link fencing above chest-height. Figure 13.24 shows site along with measurement positions:

- Position A – 5m from the halfway line,
- Position B – 5m behind the centre of goal line

Figure 13.24: Site layout and monitoring locations

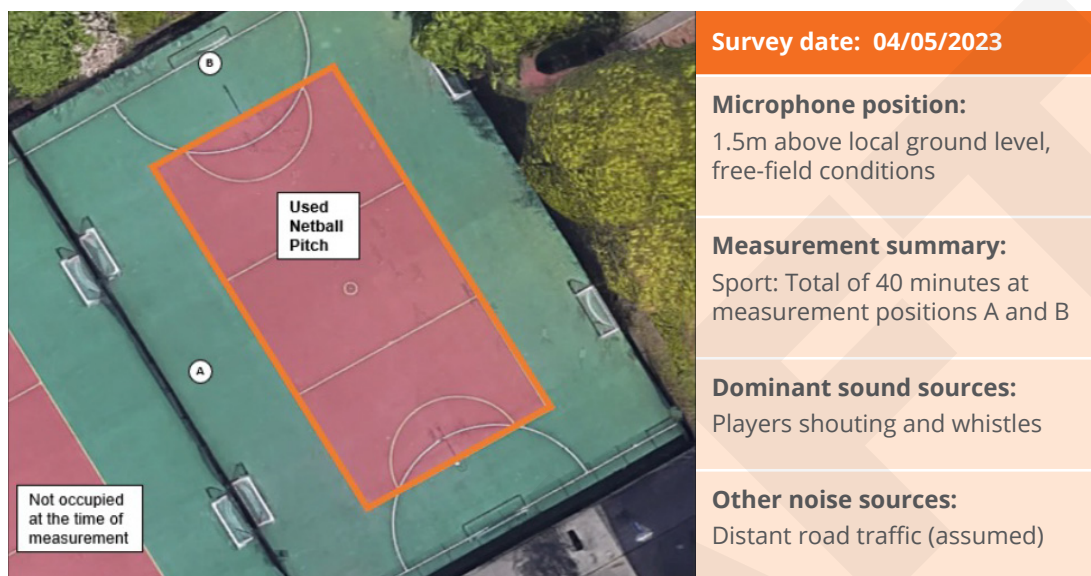


Table 13.23: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	59 – 61 L _{Aeq,20min} 60	59 – 60 L _{Aeq,20min} 60	51 – 84 10 th %ile = 54	Not measured due to rain (estimated to be 42 – 47 dB L _{A90,15min})
B	56 – 58 L _{Aeq,20min} 57	57 L _{Aeq,20min} 57	49 – 78 10 th %ile = 52	
Survey date: 04/05/2023				

Based on observations from the surveyor on site, it is to be noted that the dominant noise source at both monitoring positions, A and B, was that of players shouting and whistles. The adjacent pitch was not occupied at the time of measurement.

Netball Match

This summary contains details of a noise survey for a netball match (x12 adult players) lasting a total of 20 minutes. The site is a flat court with a macadam surface, with no surrounding perimeter fence or walls. Figure 13.25 shows site along with measurement positions:

- Position A – 5m from the halfway line,
- Position B – 5m behind the centre of goal line

Figure 13.25: Site layout and monitoring locations

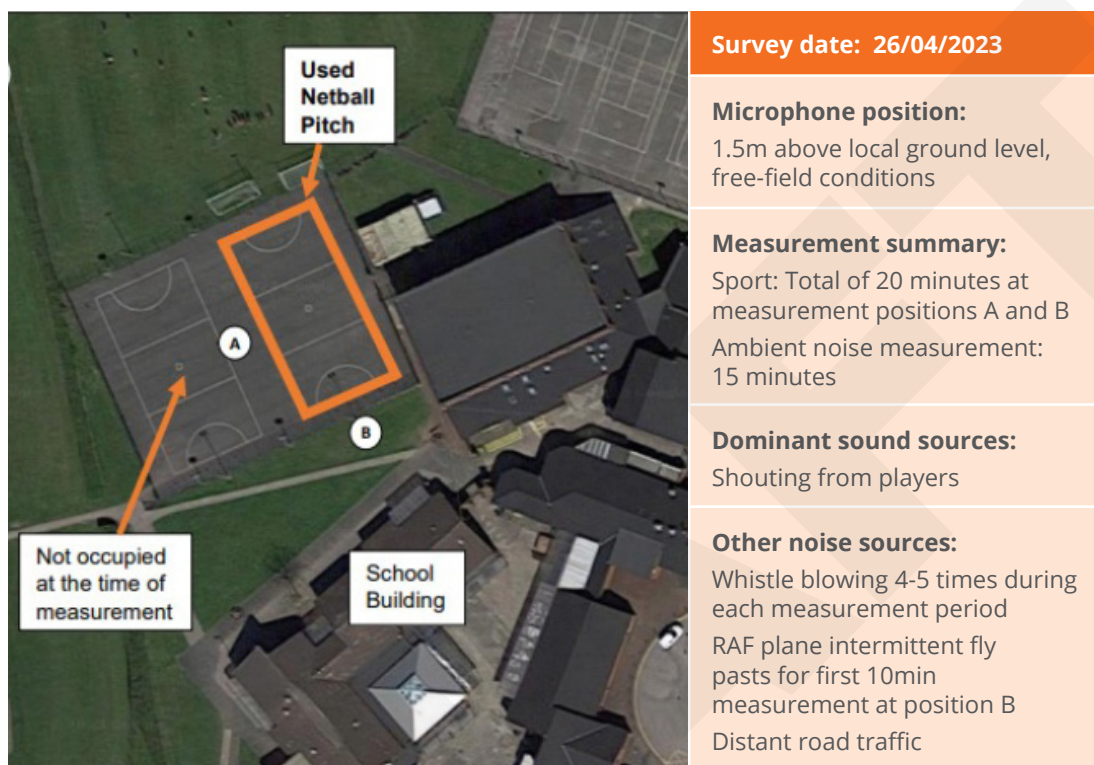


Table 13.24: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	56 – 61 L _{Aeq,20min} 59	58 – 60 L _{Aeq,20min} 59	40 – 85 10 th %ile = 67	L _{Aeq,15min} 44
B	57 – 60 L _{Aeq,20min} 58	45 – 49 L _{Aeq,20min} 58	37 – 83 10 th %ile = 65	
Survey date: 26/04/2023				

Based on observations from the surveyor on site, it is to be noted that the dominant noise source at both monitoring positions A and B was that of players shouting. An RAF plane flyover was intermittent during the first 10-minute period of monitoring undertaken at position B. The adjacent pitch was not occupied at the time of measurement and background noise was not significant.

Padel Game

This summary contains details of a noise survey for a 2v2 padel game (adults) with two matches, each lasting around 15 minutes. The site consists of two synthetic sand dressed pitches with 3m high glass walls around the perimeter with an opening on one side for entrance and exit. Figure 13.26 shows site along with measurement positions:

- Position A – 5m from the centre of court
- Position B – 5m behind the centre of rebound wall

Figure 13.26: Site layout and monitoring locations

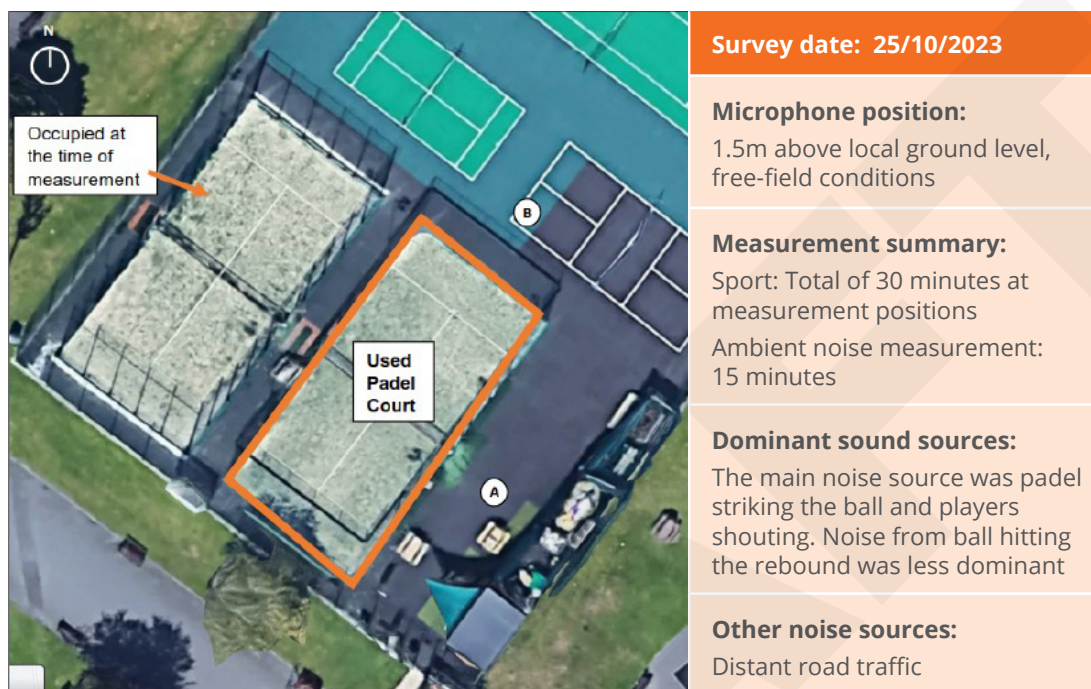


Table 13.25: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	58 – 62 L _{Aeq,30min} 60	60 – 61 L _{Aeq,20min} 60	68 – 76 10 th %ile = 71	L _{Aeq,15min} 47
B	52 – 53 L _{Aeq,30min} 52	52 – 52 L _{Aeq,20min} 52	50 – 66 10 th %ile = 64	
Survey date: 25/10/2023				

Based on observations from the surveyor on site, it is to be noted that the dominant noise sources at position A was due to players striking the wall and from players shouting. There was some noise from children audible during the measurements at Location A. The dominant noise source at location B was due to padel striking the ball, players shouting and from balls hitting the rebound wall.

Padel Game

This summary contains details of a noise survey for a doubles games of padel (4 adults). The site is a standard padel court with a rebound wall. Figure 13.27 shows site along with measurement positions:

- Position A – 5m from the halfway line
- Position B – 5m behind centre of rebound wall

Figure 13.27: Site layout and monitoring locations

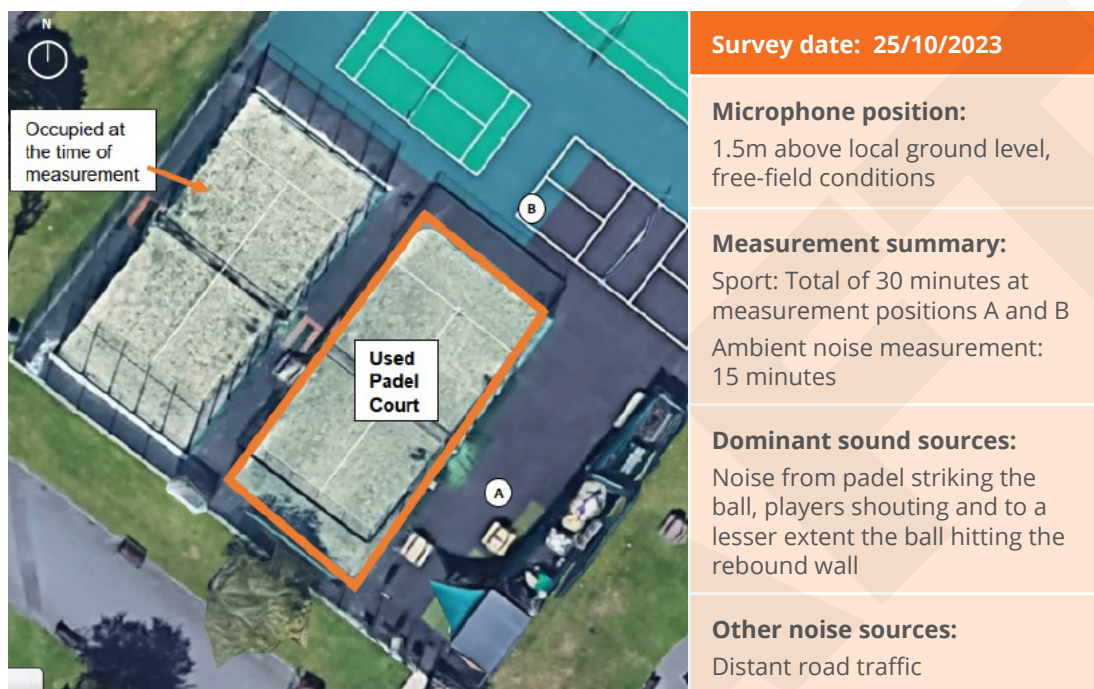


Table 13.26: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	59 – 62 L _{Aeq,30min} 60	59 – 60 L _{Aeq,30min} 60	47 – 85 10 th %ile = 70	L _{Aeq,15min} 47
B	52 – 55 L _{Aeq,30min} 54	52 – 55 L _{Aeq,30min} 54	44 – 75 10 th %ile = 62	
Survey date: 25/10/2023				

Rugby Match

This summary contains details of a noise survey for a full-sized (15-a-side) rugby game (adults) lasting a total of 80 minutes. The site is a flat grass pitch with no surrounding perimeter fence or walls. Figure 13.28 shows the site along with measurement positions:

- Position A – 10m from the halfway line
- Position B – 10m behind the centre of the southern goal line

Figure 13.28: Site layout and monitoring locations

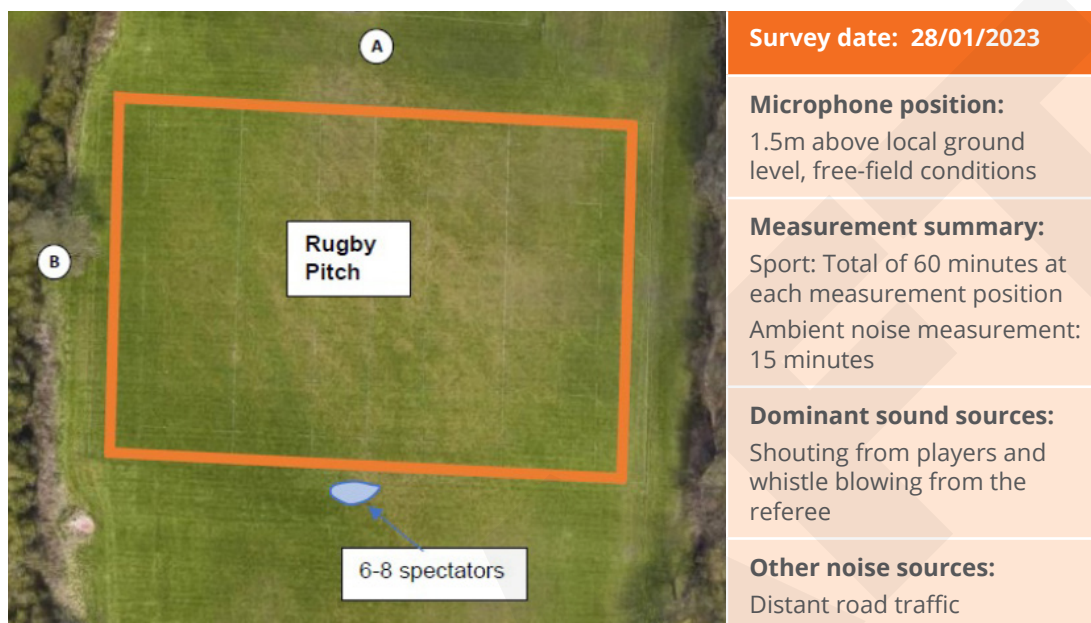


Table 13.27: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A	58 – 64 L _{Aeq,1hour} 61	60 – 62 L _{Aeq,1hour} 61	41 – 85 10 th %ile = 69	L _{Aeq,15min} 38
B	61 – 66 L _{Aeq,1hour} 61	54 – 65 L _{Aeq,1hour} 61	39 – 89 10 th %ile = 66	
Survey date: 28/01/2023				

Based on observations from the surveyor on site, it is to be noted that a group of 8-10 spectators were present, positioned on the opposite side of position A, which did not contribute to measured noise levels. While in position B, there was a 6 dB variation in the overall 30-minute noise level (L_{Aeq}) in the two measurements at this location due to one team being dominant in the opposition half during the majority of the game.

Rugby Training

This summary contains details of a noise survey for a rugby training session (adult males). The site is a flat grass pitch with no surrounding perimeter fence or walls. Figure 13.29 shows the site along with measurement positions:

- Position A1 – 5m from the pitch, nearest to the activity
- Position A2 – 5m from the pitch, nearest to the activity (the second session covered a smaller area than the first)

Figure 13.29: Site layout and monitoring locations

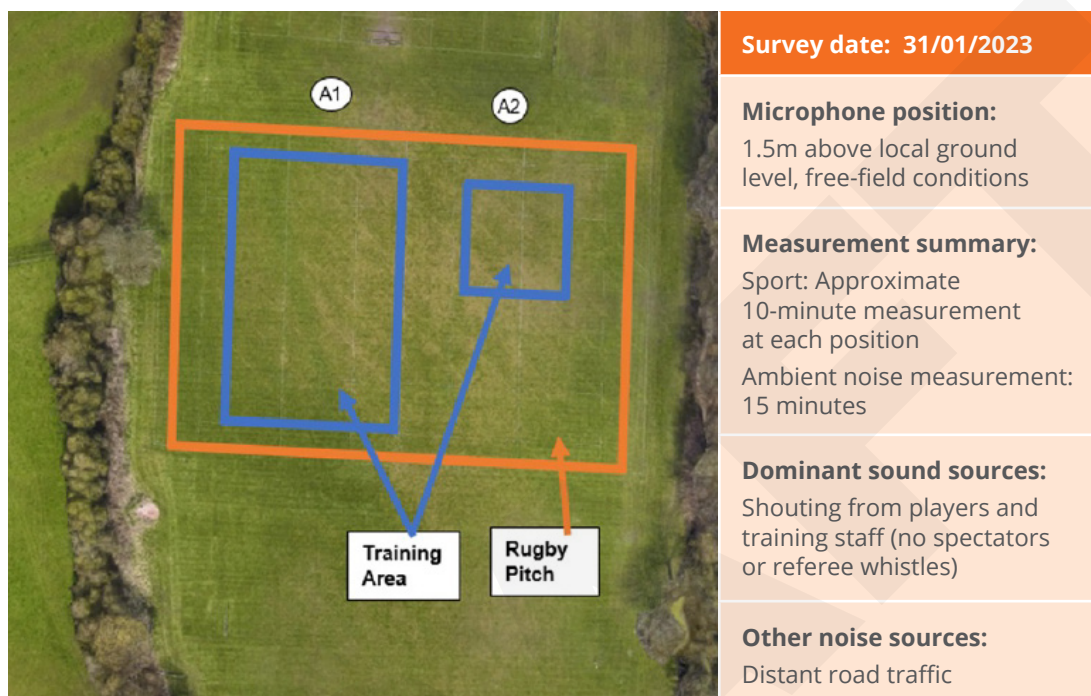


Table 13.28: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A1	55 – 57 L _{Aeq,12min} 57	56 L _{Aeq,12min} 57	44 – 77 10 th %ile = 66	L _{Aeq,15min} 41.9
A2	55 – 60 L _{Aeq,11min} 58	58 L _{Aeq,11min} 58	44 – 78 10 th %ile = 66	
Survey date: 31/01/2023				

Based on observations from the surveyor on site, it is to be noted that no spectators were present. All of the highest L_{Amax,T} levels (approximately those above 70 dB) were caused by noise from players and training staff shouting. It is also noted that the measurement for position A1 was for a session covering a significantly larger area of the field than the measurement for position A2.

Skateboarding

This summary contains details of a noise survey for a skate park. The site is a concrete construction containing a number of ramps for participants, within a wider recreational area including some playing fields. Figure 13.30 shows the site along with measurement position:

- Position A – 10m from the edge of the skate park surface

Figure 13.30: Site layout and monitoring locations

	Survey date: 13/07/2023
	Microphone position: 1.5 m above local ground level, free-field conditions
	Measurement summary: Sport: Two consecutive 15-minute measurements at position A (denoted A1 and A2) Ambient noise: 15-minute measurement at a nearby proxy location, approximately 75m southwest of position A
	Dominant sound sources: Noise from skaters trying tricks and falling off skateboards and impact from skateboard hitting the ramp after a jump
	Other noise sources: Distant road traffic, birdsong

Table 13.29: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{AFmax,1sec}	Ambient noise level
A1	58 – 62 L _{Aeq,15min} 59	61 L _{Aeq,15min} 59	45 – 85 10 th %ile = 68	L _{Aeq,15min} 42.4
A2	56 – 58 L _{Aeq,15min} 57	57 L _{Aeq,15min} 57	45 – 85 10 th %ile = 65	
Survey date: 13/07/2023				

Noise levels during the two sessions were due to skaters trying tricks and falling off skateboards and impact from skateboards hitting the ramps after jumps. It was noted that there were around 4-7 people on the skate park with 4-6 skaters and 1 scooter / bike during both sessions.

All L_{Amax,T} levels above 77 dB at measurement position A1 and above 75 dB at measurement position A2 are due to impacts from skateboards hitting the surface after a jump/trick.

Skateboarding

This summary contains details of a noise survey for a skate park. The site is a concrete construction containing a number of ramps for participants, within a wider area of playing fields. Figure 13.31 shows the site along with measurement positions:

- Position A – 10m from the edge of the skate park surface

Figure 13.31: Site layout and monitoring locations

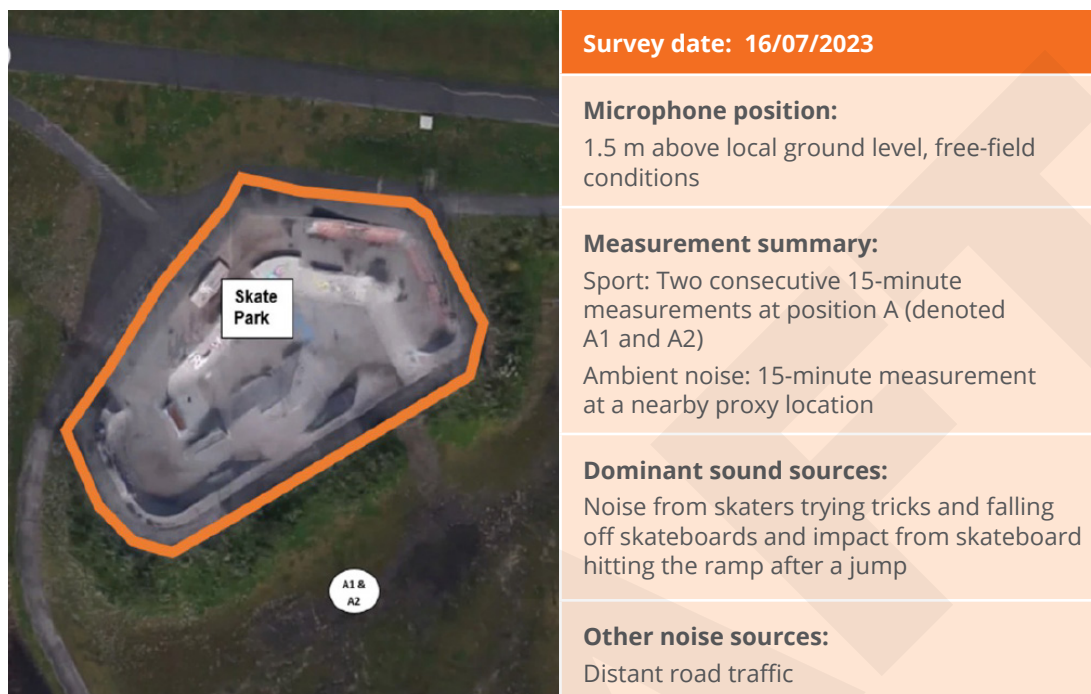


Table 13.30: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{AFmax,1sec}	Ambient noise level
A1	58 – 64 L _{Aeq,15min} 61	62 L _{Aeq,15min} 61	47 – 83 10 th %ile = 67	L _{Aeq,15min} 45.6
A2	58 – 61 L _{Aeq,15min} 59	60 L _{Aeq,15min} 59	51 – 78 10 th %ile = 68	
Survey date: 16/07/2023				

Noise levels during the two sessions were due to skaters trying tricks and falling off skateboards and impact from skateboards hitting the ramps after jumps. It was noted that there were around 8-10 people on the skate park with 4-5 skaters and 4-5 scooter riders during both sessions.

All L_{Afmax,T} levels above 75 dB at measurement position A1 and above 73 dB at measurement position A2 are due to impacts from skateboards hitting the surface after a jump/trick.

Skateboarding

This summary contains details of a noise survey for a skate park. The site is a concrete construction containing a number of ramps for participants, at the edge of a wider area of playing fields. Figure 13.32 shows the site along with measurement positions:

- Position A – 10m from the edge of the skate park surface

Figure 13.32: Site layout and monitoring locations

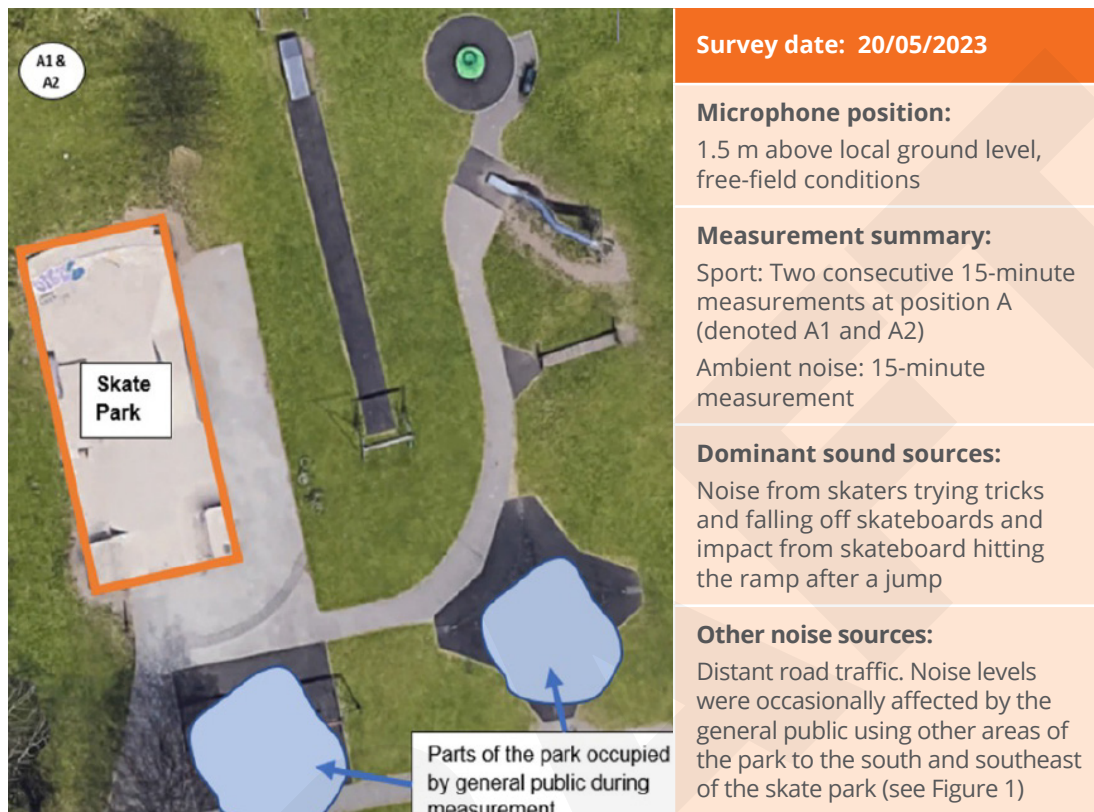


Table 13.31: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{AFmax,1sec}	Ambient noise level
A1	60 – 63 L _{Aeq,15min} 62	61 – 62 L _{Aeq,15min} 62	50 – 81 10 th %ile = 70	L _{Aeq,15min} 50.8
A2	62 – 64 L _{Aeq,15min} 63	62 – 63 L _{Aeq,15min} 63	53 – 81 10 th %ile = 70	
Survey date: 20/05/2023				

Noise levels during the two sessions were due to skaters falling off skateboards and impacts from skateboards hitting the ramps after a jump. It was noted that there were around 7-10 skaters during both sessions. Noise levels were occasionally affected by the general public using certain parts of the park (to the south and southeast of the skate park). Please note that all 7-10 skaters were adults and subsequently a high number of skateboard tricks were being performed.

Most of the highest L_{Afmax,T} levels are due to impacts from skateboards hitting the surface after a jump/trick, however, one was due to a participant falling off a skateboard, and some were caused by unrelated activity from the general public.

Skateboarding

This summary contains details of a noise survey during a children's play session. The site has metal ramps on a tarmac base with (acoustically transparent) bow top metal perimeter fencing that is typical for children's play areas. Figure 13.33 shows the site along with measurement positions:

- Position A1 – 10m from the edge of the skate park
- Position A2 – 10m from the edge of the skate park

Figure 13.33: Site layout and monitoring locations

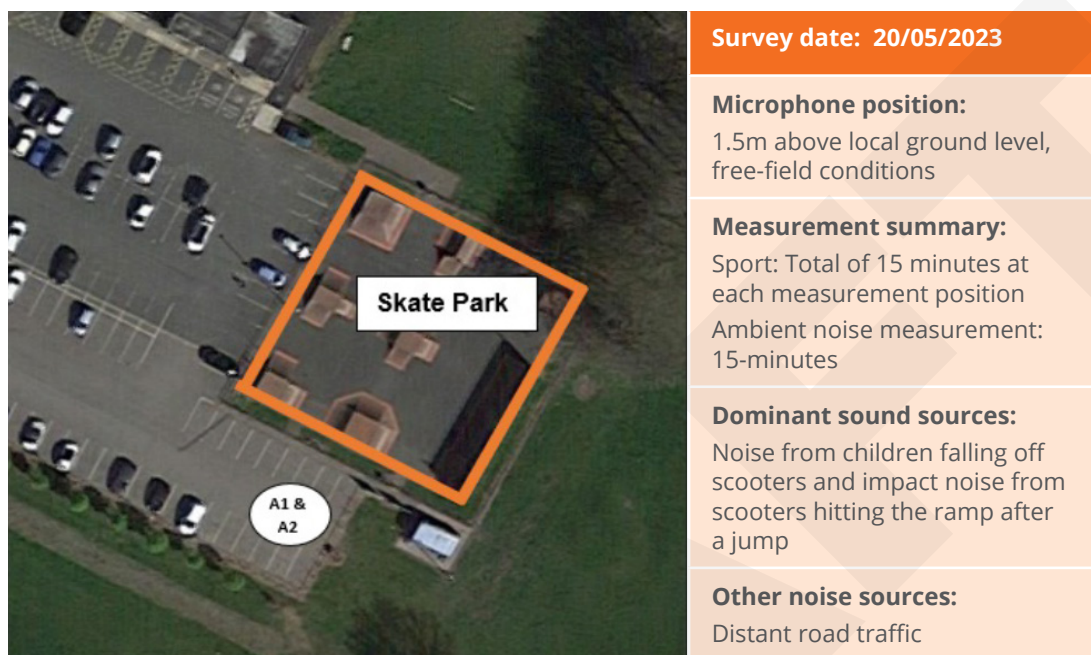


Table 13.32: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A1	58 – 63 L _{Aeq,15min} 60	58 L _{Aeq,15min} 60	49 – 75 10 th %ile = 53	L _{Aeq,15min} 45
A2	57 – 67 L _{Aeq,15min} 63	58 L _{Aeq,15min} 63	46 – 84 10 th %ile = 52	
Survey date: 20/05/2023				

Based on observations from the surveyor on site, it is to be noted that a group of 8-10 scooter riders were present. There were no skateboarders present during the survey period.

Skateboarding

This summary contains details of a noise survey in which both adults and children were skating. The site has a concrete surface with no surrounding perimeter fence or walls. Figure 13.34 shows the site along with measurement positions:

- Position A1 – 10m from the edge of the skate park
- Position A2 – 10m from the edge of the skate park

Figure 13.34: Site layout and monitoring locations

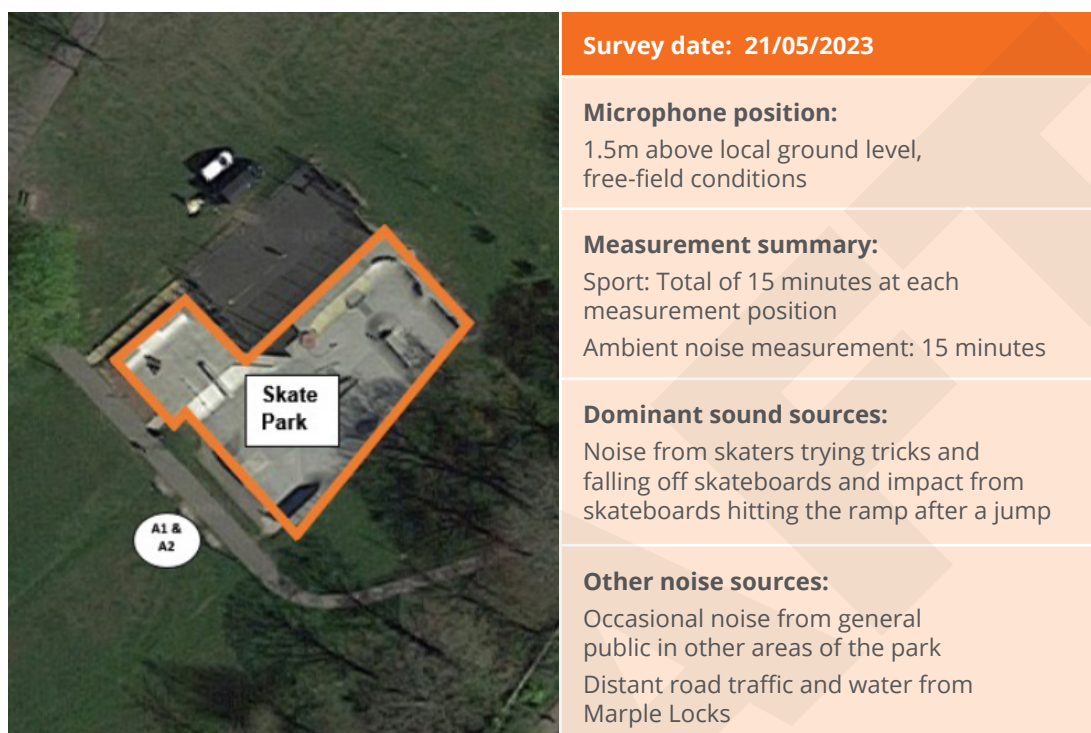


Table 13.33: Summary of derived sound levels at monitoring locations

Position	Sound Pressure Level, dB re: 20μPa (Fast, Free-field)			
	L _{Aeq,5min}	L _{Aeq,10min}	L _{Amax,T}	Ambient noise level
A1	51 – 53 L _{Aeq,15min} 52	52 L _{Aeq,15min} 52	42 – 75 10 th %ile = 46	L _{Aeq,15min} 48
A2	52 – 54 L _{Aeq,15min} 53	53 L _{Aeq,15min} 53	42 – 76 10 th %ile = 47	
Survey date: 21/05/2023				

Based on observations from the surveyor on site, it is to be noted that a group of 6-9 people were present (3-4 skaters and 3-5 scooter/bike riders).