MEC Consulting Group

ACOUSTIC AIR

Carisbrooke Tennis Club, Leicester
Acoustics Assessment
February 2025

Report Ref: 29371-ENV-0401 Rev A

Carisbrooke Tennis Club, Leicester
Acoustics Assessment
February 2025

REPORT REF: 29371-ENV-0401 Rev A

CLIENT: Carisbrooke Tennis Club Limited

ENGINEER: MEC Consulting Group Ltd
The Old Chapel
Station Road
Hugglescote
Leicestershire
LE67 2GB

Tel: 01530 264 753
Email group@m-ec.co.uk

REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Prepared By	Checked By	Approved By
February 2025	-	First issue	**Harry Johnson** BSc (Hons) AMIOA Senior Acoustic Consultant	**Martin Hamer** MSc MIOA Associate Acoustic Consultant	**Tim Rose** BA (Hons) MCIHT MTPS Regional Director
February 2025	A	Addressing Client comments	**Harry Johnson** BSc (Hons) AMIOA Senior Acoustic Consultant	**Martin Hamer** MSc MIOA Associate Acoustic Consultant	**Tim Rose** BA (Hons) MCIHT MTPS Regional Director

CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 MEC Consulting Group Ltd (MEC) has been commissioned by Carisbrooke Tennis Club (hereafter referred to as 'the Client') to undertake an Acoustics Assessment to support a planning application for proposed floodlights at Carisbrooke Tennis Club, Leicester (hereafter referred to as 'the Site').

Site Description

1.2 The Site is located within the residential suburban area of Knighton. The Site is located off Kenwood Road and is bounded by residential properties the north, east and south and Leicester Bowling Club to the west.

1.3 The Site includes a total of 10 tennis courts and 4 pickle ball courts, along with a club house which contains a bar.

1.4 Of the 10 tennis courts, the 3 courts directly in front of the club house already have floodlighting installed.

1.5 A plan showing the redline boundary of the 3 courts (Courts 6,7 and 8) on which the floodlights are proposed, is presented in Figure 1.1.

Figure 1.1: Approximate Redline Boundary

1.6 Without floodlights, these courts are subsequently limited by daylight hours and as a result, are not able to operate during evening periods. This is particularly more relevant during winter periods when daylight is more limited.

1.7 Therefore, the additional floodlighting will allow the courts to remain in operation for an extended period during winter months. It is noted that the Client has advised that the lights are intended to operate up to 20:00 where required.

1.8 Given the extended operating times during the winter, the Client has requested an acoustic assessment to determine the potential impacts on the Nearest Sensitive Receptors (NSRs) and where necessary to provide mitigation options to minimise any impacts.

Assessment Scope

1.9 This assessment seeks to determine the impact arising from the extended operation of courts 6, 7 and 8 and where necessary provide mitigation to minimise any adverse impacts predicted on existing residential receptors within the vicinity of the Site. The following scope of works has been undertaken:

- MEC has undertaken an acoustic survey to determine the existing acoustic environment, including sound levels emanating from the tennis courts;
- An acoustic model has been calibrated using the survey data;
- Using an acoustic model and calculations, sound levels at the most exposed receptors have been predicted;
- The sound levels have been compared against the guidance contained within the NPPF[1], NPSE[2], with quantifiable comparisons sought from guidance in BS 8233[3], WHO[4] and SEDGN[5]; and
- Where required, appropriate mitigation measures have been provided to demonstrate compliance with the relevant standards.

Disclaimer

1.10 MEC has completed this report for the benefit of the individuals referred to in Paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.

1.11 MEC accepts no responsibility or liability for:

- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
- The issue of this document to any third party with whom approval for use has not been agreed.

[1] National Planning Policy Framework, December 2023.
[2] Noise Policy Statement for England, March 2010.
[3] BS 8233:2014 *'Guidance on sound insulation and noise reduction for buildings.'*
[4] World Health Organisation Guidelines (WHO) Community Noise, WHO Vol. 2, Issue 1, 1995, and Guidelines for Community Noise, 2000.
[5] Sports England Design Guidance Note – Artificial Grass Pitch (AGP) Acoustics, Planning Implications, 2015.

2.0 STANDARDS AND GUIDANCE

General

2.1 An acoustic glossary is provided in **Appendix A** to assist the reader.

Summary of Guidance and Standards

2.2 The guidance and standards relevant to the assessment are presented below:

- National Planning Policy Framework (NPPF) 2024;
- Noise Policy Statement for England (NPSE) 2010;
- BS 8233:2014 *'Guidance on sound insulation and noise reduction for buildings'*;
- World Health Organisation (WHO) *"Guidelines for Community Noise"*; and
- The Sport England Design Guidance Note (SEDGN), Artificial Grass Pitch (AGP) Acoustics – Planning Implications, New Guidance for 2015.

2.3 For conciseness, the guidance and standards most appropriate to this assessment are summarised in this section.

National Planning Policy Framework 2024

2.4 The latest National Planning Policy Framework (NPPF), issued by the Ministry of Housing, Communities and Local Government in 2024, sets out the Government's planning policies for England and how these are to be expected to be applied. The NPPF must be taken into account in the preparation of local and neighbourhood plans, and is to be a material consideration in planning decisions.

2.5 Paragraph 187 of the NPPF advises that, with respect to noise, planning policies and decisions should contribute to and enhance the natural and local environment by *"...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution..."*.

2.6 Further, paragraph 198 advises that "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should.

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; and

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.7 The NPPF's footnote to point a) above explicitly refers to the Explanatory Note to the *Noise Policy Statement for England* (Department for Environment, Food & Rural Affairs, 2010).

Noise Policy Statement for England 2010

2.8 The guidance of the Noise Policy Statement for England (NPSE) applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise, but does not apply to noise in the workplace (occupational noise). It introduces the concepts of 'No Observed Effect Level' (NOEL), which is the level below which there is no detectable effect on health and quality of life due to the noise; the 'Lowest Observed Adverse Effect Level' (LOAEL), which is the level above which adverse effects on health and quality of life can be detected; and the 'Significant Observed Adverse Effect Level' (SOAEL), which is the level above which significant adverse effects on health and quality of life occur.

2.9 In March 2014, the Department for Communities & Local Government updated its on-line planning guidance to assist with interpretation of the original NPPF and the NPSE. The guidance covered general matters such as relevance of noise issues, noise concerns and factors, how to determine impacts, and mitigation. To assist with recognising when noise could be a concern, the guidance summarises the noise exposure hierarchy as follows, based on the likely average response.

Table 2.1: Noise Exposure Hierarchy Based on Likely Average Response

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable 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
Lowest Observed Adverse Effect Level			
Noticeable 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
Significant Observed Adverse Effect Level			
Noticeable 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

BS 8233 & WHO Guidelines

2.10 BS 8233 provides recommendations for the control of noise in and around buildings. The guidance provided includes appropriate internal and external noise level criteria which are applicable to residential buildings exposed to steady external noise sources.

2.11 Whilst BS 8233 is principally intended to assist in the design of new dwellings, the guideline values can also be used to determine potential disturbance from new noise sources.

2.12 Furthermore, BS 8233 criteria is based upon the World Health Organisation (WHO) *"Guidelines for Community Noise"* document. The WHO Guidelines provides values that are deemed to be classified as "health effects" which means the levels are the lowest that would result in any potential psychological, physiological or sociological effect.

2.13 They can therefore be classified, in accordance with the NPSE as the Lowest Observed Adverse Effect Level (LOAEL). The guideline values are presented Table 2.2.

Table 2.2: WHO Guideline Values

Value	Guidance	Location
55 dB $L_{Aeq,T}$	Potential for serious annoyance in the daytime and evening.	External
50 dB $L_{Aeq,T}$	Potential for moderate annoyance in the daytime and evening.	External
35 dB $L_{Aeq,T}$	Acceptable level to avoid speech disturbance internally during the daytime and evening.	Internal

2.14 For the $L_{Aeq,T}$ criteria, the time base (T) given is 16 hours for daytime limits. When assessing the impact, this 16-hour value results in an averaging of hourly variations and as such, isn't strictly appropriate as a time base for the assessment of sports. As such, the assessment presented herein is carried out based upon a 1-hour time base which results in a more stringent assessment than the quantitative criteria.

The Sport England Design Guidance Note

2.15 Whilst SEDGN was designed to assess the impact from an Artificial Grass Pitch (AGP), the character and type of noise from sporting activity at an AGP would not be too dissimilar to that from a tennis court and therefore, the guidance contained within SEDGN is considered appropriate for the assessment of a tennis court.

2.16 The SEDGN reports that with no specific acoustic criteria for the impact of sound from an AGP, the WHO Guidelines are considered the most relevant and the most commonly applied for the assessment of AGP noise.

2.17 With regards to residential dwellings, the guidance recommends that an external sound level of 50 dB, at 1m from the façade, should ideally not be exceeded, such that internal acoustic criteria are still satisfied when considering a partially open window.

2.18 This external value is the same as the WHO guidance that to avoid *'moderate annoyance'* during the daytime and evening, the noise level for outdoor living areas should not exceed 50 dB $L_{Aeq,\ T}$ where T is 16 hours ranging from 07:00 – 23:00 and is also referenced in BS 8233 for external amenity areas.

2.19 However, the 16-hour assessment period is considered to be too long for the assessment of shorter sound levels, such as those from an AGP, and therefore, the SEGDN states the following:

"*For an artificial grass pitch, a 16-hour assessment period may not truly reflect the noise impact as it takes into account times of use and non-use. It is suggested an appropriate assessment time period is for one hour,* $L_{Aeq,1hr}$ *as this is typically the time period for a community sports session on an AGP."*

2.20 However, the SEGDN presents a caveat based upon relevant acoustic research which has indicated that exceedance of the 50 dB value does not necessarily result in a significant noise impact and that significant impacts do not occur until much higher levels of exposure are reached. Therefore, in conclusion the SEGDN advises that in some instances, where higher baseline sound levels are present, it is more appropriate to consider the predicted change in sound level whereby a 'slight' impact could occur if the change in sound level is less than or equal to 3 dB.

2.21 This will be discussed within the assessment section of this report.

3.0 ENVIRONMENTAL SOUND SURVEY

3.1 An environmental sound survey was undertaken between Friday 10th and Tuesday 14th January 2025. The survey was undertaken in full accordance with the guidance set out in BS 7445[6].

3.2 A Sound Level Meter (SLM) was installed at the following location:

- Continuous Measurement 1 (CM1): on the Site/NSR garden boundary, approximately 8m from the nearest court.

3.3 A monitoring location plan is provided in Figure 3.1.

Figure 3.1: Measurement Positions

Equipment

3.4 Measurements were taken using Class 1 integrating/averaging SLM housed in environmental protection apparatus. The SLM was installed in a free field position at a height of 2m above local ground level (0.2m above the garden fence height of the NSR), and field calibrated before and after the survey using a Class 1 calibrator, with no significant drift in calibration noted.

[6] BS 7445-1:2003 'Description and measurement of environmental noise, Part 1: Guide to quantities and procedures.'

3.5 The SLM was set up to capture the following parameters at a minimum: L_{Aeq} and L_{AFmax} values, and full details of the equipment used to undertake the survey are presented in Table 3.1.

Table 3.1: Equipment and Calibration Details

Measurement Position	Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
CM1	Sound Level Meter	Type NOR140	1407773	27/03/2025
	Pre-Amplifier	Type 1209	23168	
	Microphone	Type 1225	413180	
	Calibrator	Norsonic 1255	125525772	18/11/2025

Meteorological Conditions

3.6 During equipment setup, weather conditions were cold, with north easterly winds of less than 1 m/s.

3.7 During collection, weather conditions were noted to be overcast and dry, with south westerly winds of less than 1 m/s.

3.8 Past weather data has also been reviewed on www.timeanddate.com which indicates the weather remained dry with low wind speeds (<5 m/s) throughout the entire survey period.

3.9 It can therefore be concluded that there were no adverse meteorological conditions that could influence the survey outcome.

Observations

3.10 Whilst on site, it was noted that the acoustic environment is generally relatively quiet with birdsong and distant road traffic being the audible noise sources in absence of people playing tennis.

3.11 When people were playing on the courts, the sound associated with the ball hitting the racquet and the voices of the players became the dominant source. This predominantly occurred more towards the baseline rather than towards the net.

3.12 The ground level of the tennis courts was noted to be approximately 1.2m higher than the ground level of the NSR gardens. As a result, the top of 1.8m high garden fencing located on the NSR garden boundaries sits approximately 0.5m above ground level of the tennis court.

3.13 Following the survey, the Client provided the court booking timetable which showed play occurred on the courts between 09:00 and 15:00 on Saturday 10th and between 09:00 and 16:00 on Sunday 11th January.

Results

3.14 A time history graphs for CM1 presented in **Appendix B.**

Operational Sound Levels

3.15 Table 3.2 provides summary of measured $L_{Aeq,1hr}$ sound levels at CM1 during time which the courts were operational.

Table 3.2: Summary of Operational Sound Levels at CM1, dB

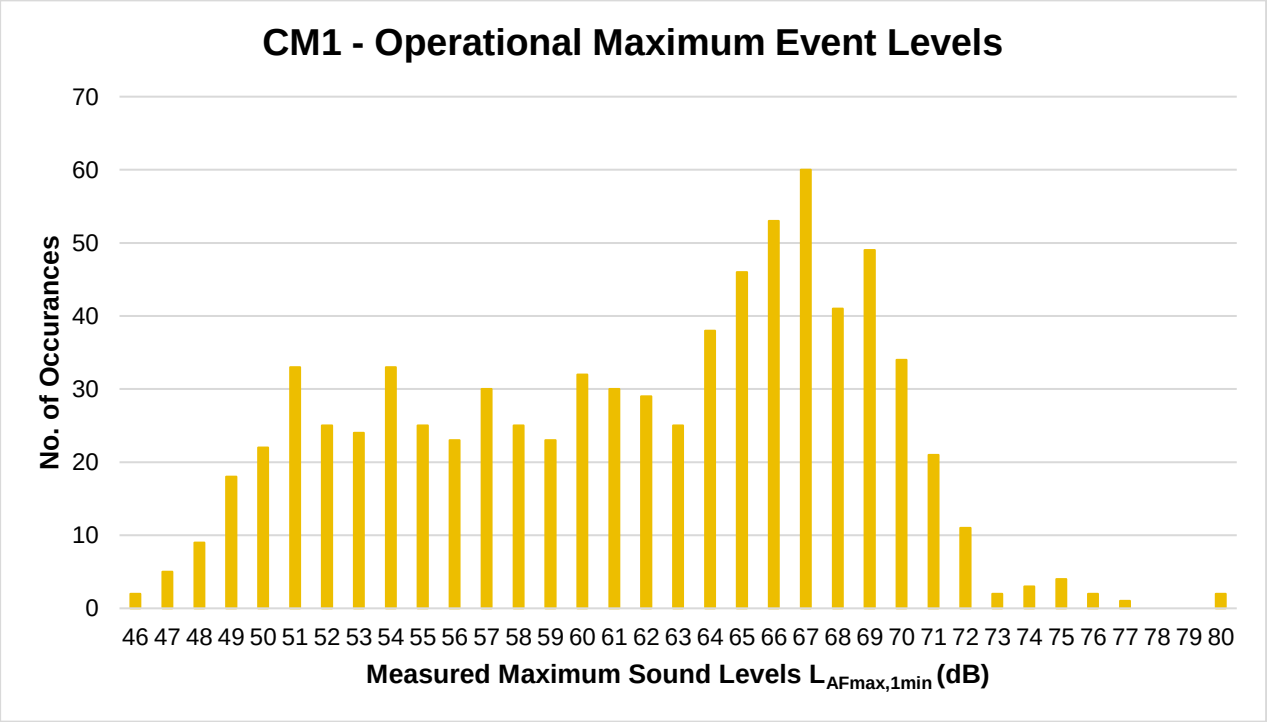
Time	Saturday 11th $L_{Aeq,1hr}$	Sunday 12th $L_{Aeq,1hr}$
09:00 – 10:00	54	47
10:00 – 11:00	53	49
11:00 – 12:00	48	52
12:00 – 13:00	45	53
13:00 – 14:00	46	56
14:00 – 15:00	43	56
15:00 – 16:00	-	52

3.16 The operational $L_{Aeq,1hr}$ sound levels at CM1 range between 43 dB and 56 dB. In order to provide a robust assessment, the highest recorded $L_{Aeq,1hr}$ of 56 dB will be used for the calibration of the acoustic model.

3.17 $L_{AFmax,1min}$ sound levels have been analysed during the operational time periods in order to determine the typical maximum event levels emanating from the tennis courts.

3.18 The resulting analysis is presented in Figure 3.2.

Figure 3.2: Analysis of Operational Maximum Event Levels, CM1



3.19 Analysis of the $L_{AFmax,1min}$ sound levels during the court operations, demonstrates a prevailing maximum sound level of 67 dB which occurred 60 times during the operational periods. Audio recordings indicate that the vast majority of the maximum event sound levels are as a result of either, the tennis racquet hitting the ball, voices of the players or footfall.

3.20 This level is therefore considered appropriate to use for the purpose of the assessment.

Residual Sound Levels

3.21 With the introduction of the floodlights on the tennis courts, it has been advised that the courts would then be able to operate until 20:00 during winter months. Therefore, the residual sound levels from 16:00 to 20:00 have been analysed in order to determine the existing acoustic environment without the courts in operation.

3.22 It is noted that, as there were no other dominant sources present on Site (in absence of the tennis), the sound levels from this position can be used to determine the baseline sound levels at the NSRs.

3.23 Table 3.3 provides summary of measured $L_{Aeq,1hr}$ residual sound levels at CM1 during the extended operating times.

Table 3.3: Summary of Residual Sound Levels at CM1, dB

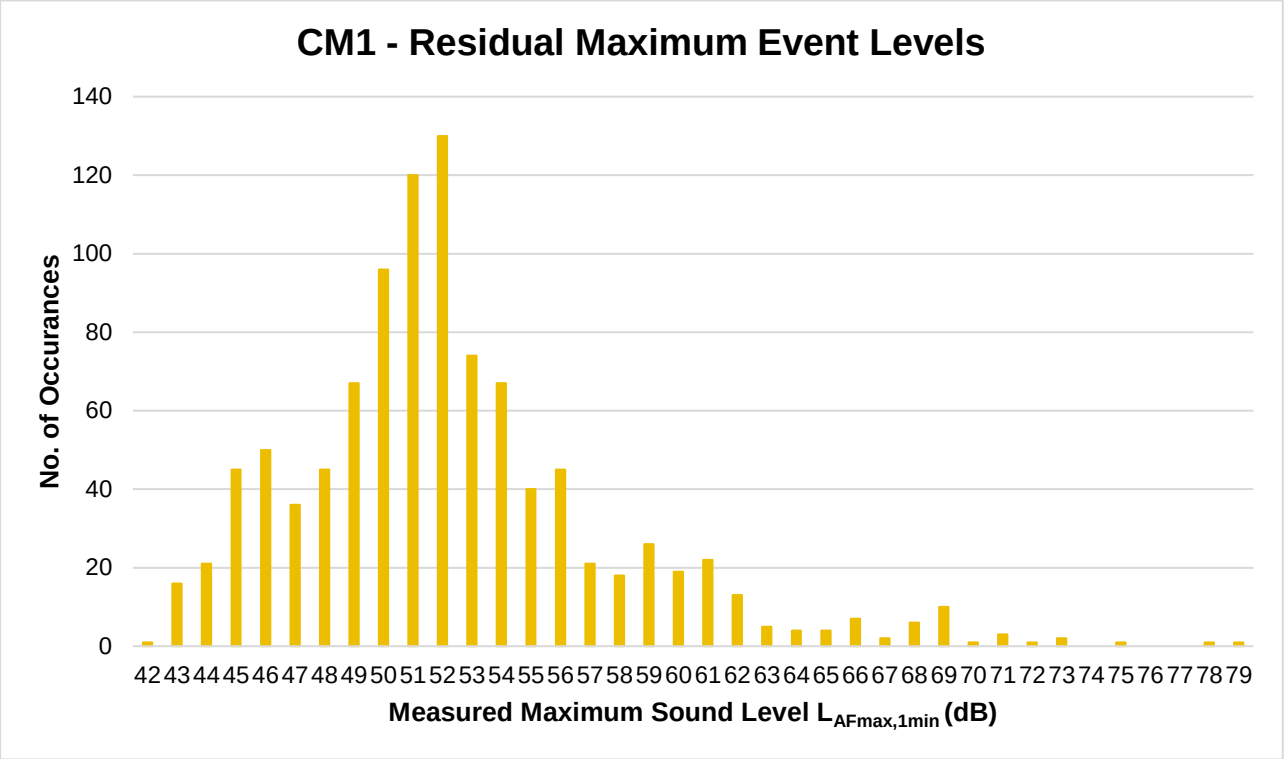
Time	Friday 10th $L_{Aeq,1hr}$	Saturday 11th $L_{Aeq,1hr}$	Sunday 12th $L_{Aeq,1hr}$	Monday 13th $L_{Aeq,1hr}$
16:00 – 17:00	-	44	50	48
17:00 – 18:00	-	45	47	48
18:00 – 19:00	-	45	52	48
19:00 – 20:00	48	44	46	51

3.24 As shown in Table 3.3, the residual $L_{Aeq,1hr}$ ranges from 44 dB and 52 dB during the extended operating times. The most commonly occurring $L_{Aeq,1hr}$ was 48 dB which occurred 4 times on two separate days. As such, 48 dB is considered representative for the residual sound levels at the NSRs.

3.25 $L_{AFmax,1min}$ sound levels have been analysed during the time periods of 16:00 and 20:00 in order to determine the typical maximum event levels without the courts in operation.

3.26 The resulting analysis is presented in Figure 3.3.

Figure 3.3: Analysis of Residual Maximum Event Levels $L_{AFmax,1min}$, CM1



3.27 Analysis of the residual $L_{AFmax,1min}$ sound levels, demonstrates a prevailing maximum sound level of 52 dB which occurred 130 times. This level is therefore considered appropriate to use for the purpose of the assessment.

4.0 ASSESSMENT METHODOLOGY

4.1 This assessment has been undertaken through the creation of a 3D acoustic model of the Site and environs within Datakustik CadnaA® modelling software.

4.2 CadnaA® considers various inputs, including topography, buildings and road noise sources, and calculates sound levels in accordance with national and international standards; in this case, the relevant UK standards are the procedures set out within ISO 9613-2[7].

Modelling Parameters

4.3 The modelling assumptions and input information for the acoustic model are as follows:

- Digital Terrain Model – Lidar 0.5m (Environment Agency, downloaded on 14th January 2025);
- Open Street Map data (publicly available);
- Ground absorption for the Site = 0.5 (mixed ground);
- First order reflections included in the modelling;
- Temperature set to 10°C; and
- Relative humidity set to 70%

4.4 For the purpose of the ambient sound level assessment, an area source at 1.5m height has been included in the model in an area representative of where tennis is played over the 3 courts. As indicated in paragraph 3.16, this has been calibrated to a $L_{Aeq,1hr}$ sound level of 56 dB. The $L_{Aeq,1hr}$ sound levels have then been calculated in the NSR external amenity areas.

4.5 To calculate the maximum sound levels at the NSRs, a point source in a representative location of where the closest player may be typically standing when playing, has be included in the model and calibrated to an $L_{AFmax,1min}$ sound level of 67 dB as discussed in paragraph 3.19. The resulting $L_{AFmax,1min}$ sound level calculated at the NSR external amenity area has then been assumed to be the same at the other NSRs given that the distances between the nearest court and amenity areas remain the same for each NSR. It is therefore considered that this provides a robust scenario.

Nearest Sensitive Receptors

4.6 The three NSRs that have been included in the assessment are identified in Figure 4.1.

[7] ISO 9613-2 *'Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.*

Figure 4.1: Nearest Sensitive Receptors

Model Outputs

4.7 The acoustic model has been used to predicted sound levels at the NSRs for the following scenarios:

- Daytime $L_{Aeq,1hr}$ external sound levels at ground floor (1.5m) height; and
- Daytime $L_{AFmax,1min}$ external sound levels at ground floor (1.5m) height.

4.8 A number of virtual receivers have been placed in the acoustic model in locations representative of external amenity areas for dwellings situated to the south of the courts in order to inform the assessment.

4.9 Sound level contour maps for the above scenarios are presented in **Appendix C**.

5.0 ASSESSMENT

Ambient Sound Level Assessment

5.1 In order to determine the likely impact at the NSRs, the operational ambient sound levels within the external amenity areas of the NSRs have been compared to the sound levels measured at CM1 when no courts were in operation.

5.2 The results are presented in Table 5.1.

Table 5.1: External Ambient Sound Level Numerical Assessment, dB

Assessment	NSR1 $L_{Aeq,1hr}$	NSR2 $L_{Aeq,1hr}$	NSR3 $L_{Aeq,1hr}$
With Courts [A]	48	49	48
Without Courts [B]	48	48	48
Difference [C = A – B]	0	+1	0

5.3 The results show that with the courts in operation, sound levels are predicted to stay the same within the external amenity areas of NSR1 and NSR3, with a marginal increase of 1 dB at NSR2.

5.4 In the consultant's opinion this change is minimal and would therefore unlikely be noticeable at the NSRs. As such, the outcome of this is considered to have 'No Observed Effect' on the NSRs in accordance with NPSE.

5.5 Additionally, the ambient sound levels for the 1-hour time base remain below the 50 dB WHO Guidelines, BS 8233 criteria and the SEDGN noise guideline values. This is shown by drawing 29371_04_120_01 found in **Appendix C**.

Maximum Sound Level Assessment

5.6 In absence of any daytime L_{AFmax} criteria, the above process has been repeated for maximum sound levels and results have been presented in Table 5.2.

Table 5.2: External Maximum Sound Level Numerical Assessment, dB

Assessment	NSR1 $L_{AFmax,1min}$	NSR2 $L_{AFmax,1min}$	NSR3 $L_{AFmax,1min}$
With Courts [A]	57	57	57
Without Courts [B]	52	52	52
Difference [C = A – B]	+5	+5	+5

5.7 As shown in Table 5.2, maximum sound levels are predicted to increase by 5 dB within external amenity areas of the NSRs. Such a change, would be regarded as noticeable; however, it is important to take into account some contextual factors to determine whether the noise will be intrusive in accordance with NPSE.

Context

Existing Acoustic Environment

5.8 It should be recognised that the sound emanating from the courts would not be out of character for the area. The NSRs are already exposed to sound emanating from the tennis club, of which it is particularly important to note that the courts are able to operate until 20:00 for a large proportion of the year due to less restrictions arising from lack of daylight.

Internal Sound Levels

5.9 Whilst the external maximum sound levels would indicate a noticeable change, it is important to consider that occupants of the NSRs would unlikely be located in the external amenity areas from 16:00 to 20:00 during the winter months. This is largely due to the weather conditions and the fact that it would be dark during the evening hours. Occupants would more likely be located indoors. Subsequently, the façade insulation performance of the NSRs should be taken into account. As a worst case, assuming an open window provides an external to internal sound level reduction of 9 dB[8], the ambient and maximum sound level numerical assessments have been recreated based on the internal sound levels.

5.10 The resulting numerical assessments based on internal sound levels are presented in Table 5.3.

Table 5.3: Internal Sound Level Numerical Assessment, dB

Assessment	Ambient Sound Levels			Maximum Sound Levels		
	NSR1 $L_{Aeq,1hr}$	NSR2 $L_{Aeq,1hr}$	NSR3 $L_{Aeq,1hr}$	NSR1 $L_{AFmax,1min}$	NSR2 $L_{AFmax,1min}$	NSR3 $L_{AFmax,1min}$
With Courts [A] [(a)]	39	40	39	48	48	48
Without Courts [B]	48	48	48	52	52	52
Difference [C = A – B]	-9	-8	-9	-4	-4	-4
[(a)] 9 dB taken off external sound level						

5.11 The results in Table 5.3 show that internal ambient and maximum sound levels with the courts in operation fall between 4 and 9 dB below the sound levels without the courts in operation.

5.12 Therefore, when taking into account these contextual factors, it is considered that the change in sound levels may be ‘Noticeable and not intrusive’, leading to ‘No observed adverse effect’ in accordance with NPSE. As such, no specific mitigation measures are required.

[8] Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O July 2022 v1.0

6.0 SUMMARY AND CONCLUSIONS

6.1 MEC has been commissioned by Carisbrooke Tennis Club to undertake an Acoustics Assessment to support a planning application for proposed floodlights at Carisbrooke Tennis Club, Leicester.

6.2 Detailed assessments of the proposed tennis courts have been undertaken through an acoustic modelling exercise giving consideration to the NPPF, NPSE and quantifiable criteria outlined in BS 8233, WHO Guidelines and SEDGN.

Ambient Sound Level Assessment

6.3 With the extended operating times during winter months as a result of the courts being lit, the ambient sound level assessment shows that sound levels in external amenity areas of existing residential receptors will unlikely be noticeable and therefore will have 'No Observed Effect' on the NSRs in accordance with NPSE.

6.4 Furthermore, the ambient sound levels for the 1-hour time base remain below the 50 dB WHO Guidelines, BS 8233 criteria and the SEDGN noise guideline values.

Maximum Sound Level Assessment

6.5 When assessing the maximum sound levels from the courts, the outcome of the external assessment shows a predicted increase of 5 dB which would be considered a noticeable change. However, various contextual factors have been discussed which demonstrate that the sound emanating from the three courts would unlikely be intrusive.

Context

Existing Acoustic Environment

6.6 It has been highlighted that the NSRs are already exposed to sound emanating from the tennis club, particularly through summer months during which courts are able to operate until 20:00 due to daylight hours.

Internal Sound Levels

6.7 It should also be recognised that during winter months it is unlikely that occupants of the NSRs would be located in the external amenity areas due to the weather conditions and the fact that it would be dark during the evening hours. Subsequently, the façade insulation performance of the dwellings should be considered.

6.8 Assuming a worst case external to internal sound level reduction of 9 dB provided by an open window, the resulting ambient and maximum sound level numerical assessments would indicate that the internal sound levels with the courts in operation would fall between 4 dB and 9 dB below the sound levels without the courts in operations (shown in Table 5.3).

Summary

6.9 When taking into account these contextual factors, it is considered that the predicted change in sound levels would have 'No observed adverse effect' in accordance with NPSE. As such, no specific mitigation measures are required.

6.10 In summary, based upon the assessment presented within this report, the Site is considered suitable for the installation of floodlights.

MEC
Consulting Group

APPENDICES

APPENDIX A

GLOSSARY OF TECHNICAL TERMS

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurements, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Typical sound levels found in the environment

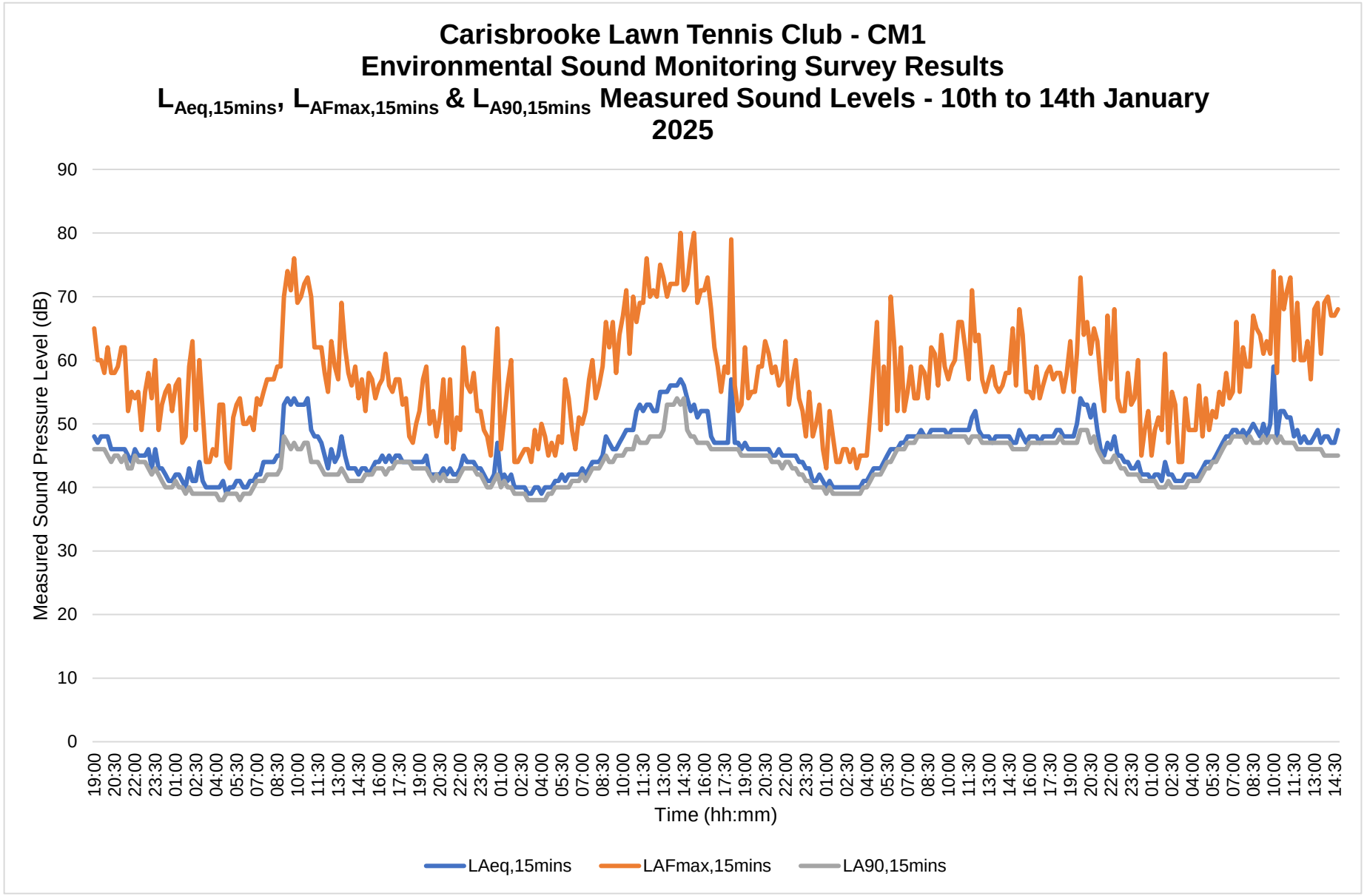
Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside a factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft taking off
140 dB(A)	Threshold of pain

Descriptor	Terminology
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20μPa (20x10-6 Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting (dB(A))	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq, T}$	A noise level index called the equivalent continuous noise level over the time period, *T*. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{AFmax, T}$	A noise level index defined as the maximum noise level during the measurement period. L_{Max} is sometimes used for the assessment of discrete loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. It is typically measured using the 'fast' sound level meter response.
$L_{90, T}$	A noise level index. The noise level exceeded for 90% of the time over the period, *T*. *L*90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10, T}$	A noise level index. The noise level exceeded for 10% of the time over the period, *T*. *L*10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building facade.
Fast/Slow Time Weighting	Averaging times used in sound level meters.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit
One-third Octave Band	A frequency band in which the upper limit is 21/3 times the frequency of the lower limit.
Rating Level	The specific sound level, plus any adjustment for characteristic feature of sound in BS 4142.
Specific Sound Level	The A-weighted L_{eq} sound level produced by a sound source during a specified period of time. Commonly known as the sound source under investigation as defined in BS 4142.
Typical Maximum Level	The 90th percentile maximum event level (L_{AFmax}) measured during a period. Used for assessing night-time maximum levels under typical and overheating conditions.

MEC
Consulting Group

APPENDICES

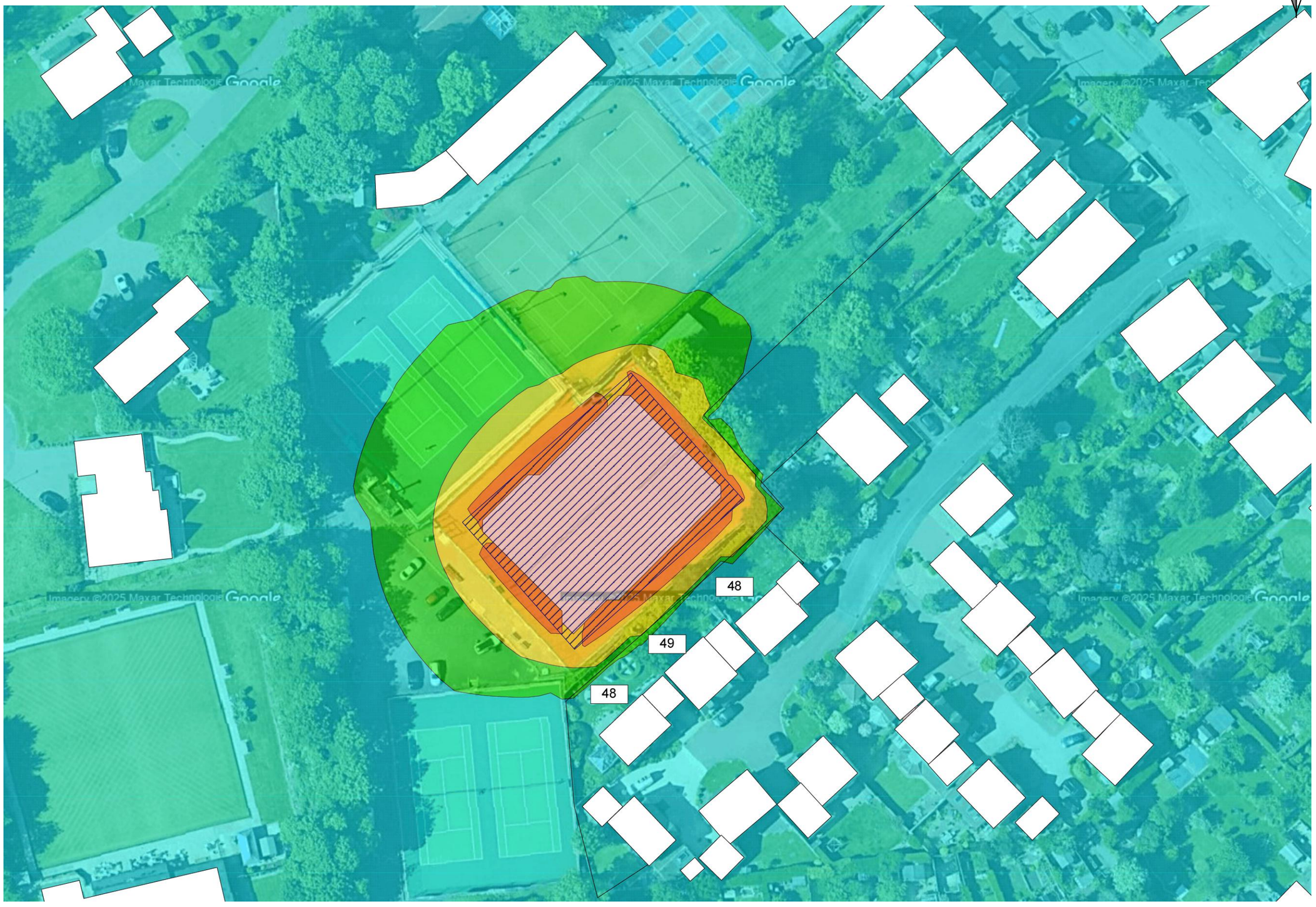
APPENDIX B


Carisbrooke Lawn Tennis Club - CM1
Environmental Sound Monitoring Survey Results
LAeq,15mins, LAFmax,15mins & LA90,15mins Measured Sound Levels - 10th to 14th January 2025
Measured Sound Pressure Level (dB)
90
80
70
60
50
40
30
20
10
0
19:00
20:30
22:00
23:30
01:00
02:30
04:00
05:30
07:00
08:30
10:00
11:30
13:00
14:30
16:00
17:30
19:00
20:30
22:00
23:30
01:00
02:30
04:00
05:30
07:00
08:30
10:00
11:30
13:00
14:30
16:00
17:30
19:00
20:30
22:00
23:30
01:00
02:30
04:00
05:30
07:00
08:30
10:00
11:30
13:00
14:30
Time (hh:mm)
LAeq,15mins
LAFmax,15mins
LA90,15mins

MEC
Consulting Group

APPENDICES

APPENDIX C



NOTES:

1. DO NOT SCALE THIS DRAWING.

KEY

- 0–50dB(A)
- 50–55dB(A)
- 55–60dB(A)
- 60–65dB(A)
- 65–70dB(A)
- 70–75dB(A)
- 75–80dB(A)
- >80dB(A)
- Tennis Court Area Source

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
-		HJ	MH	TR	17.01.25

PROJECT:
CARISBROOKE TENNIS CLUB, LEICESTER

DRAWING TITLE:
DAYTIME AMBIENT SOUND LEVELS LAeq,1hr

CLIENT:
CARISBROOKE TENNIS CLUB LTD

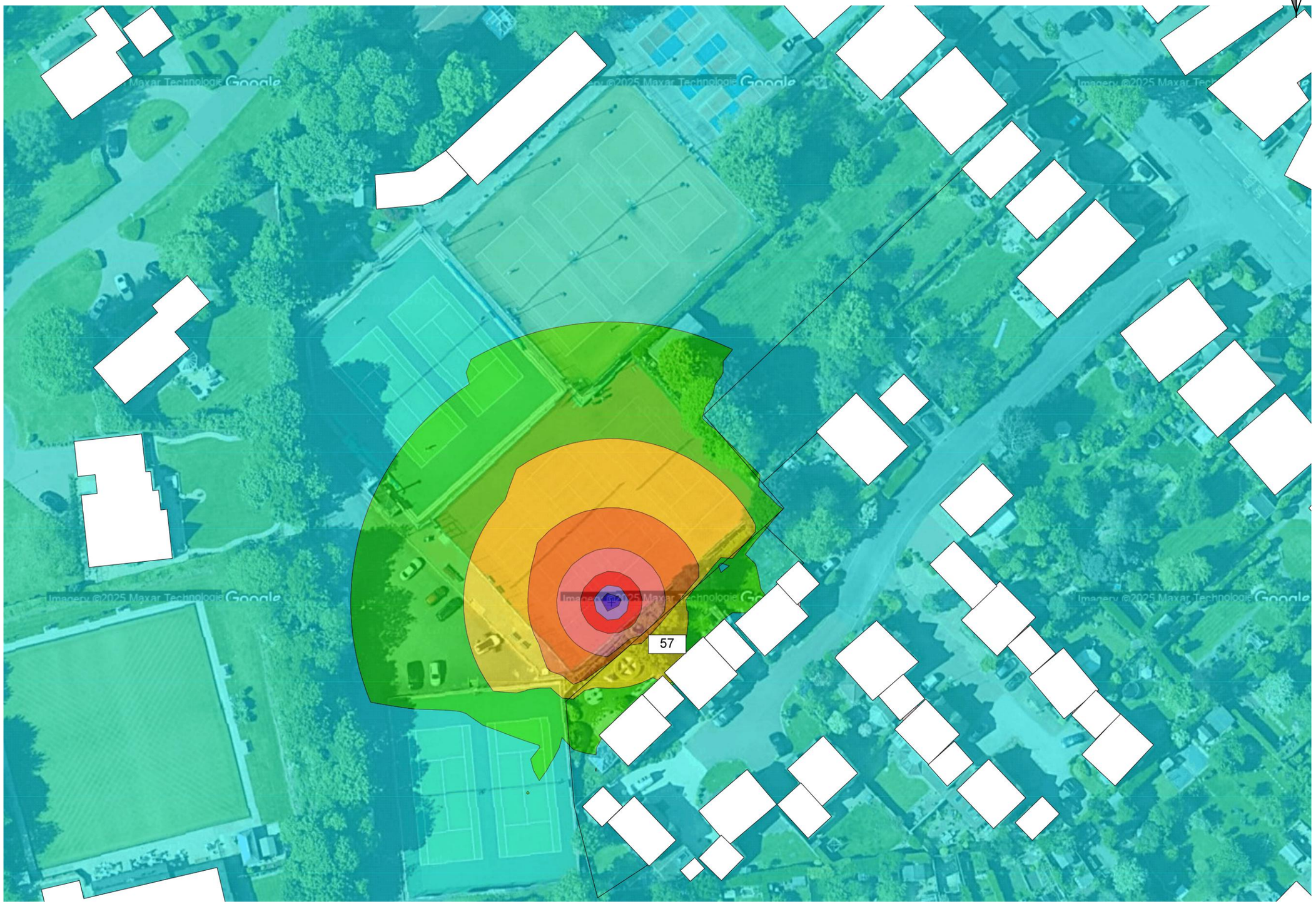
DRAWING NUMBER:
29371_04_120_01

REVISION:	SHEET SIZE:	SCALE:
-	A3	NFS

STATUS:
FOR INFORMATION / APPROVAL

MEC Consulting Group
Birmingham | Brighton | Leicester

Telephone: 01530 264 753
Email: group@m-ec.co.uk
Website: www.m-ec.co.uk



NOTES:

1. DO NOT SCALE THIS DRAWING.

KEY

- 0–50dB(A)
- 50–55dB(A)
- 55–60dB(A)
- 60–65dB(A)
- 65–70dB(A)
- 70–75dB(A)
- 75–80dB(A)
- >80dB(A)
- Point Source

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
-		HJ	MH	TR	17.01.25

PROJECT:
CARISBROOKE TENNIS CLUB, LEICESTER

DRAWING TITLE:
DAYTIME MAXIMUM SOUND LEVELS LAFmax,1min

CLIENT:
CARISBROOKE TENNIS CLUB LTD

DRAWING NUMBER:
29371_04_120_02

REVISION:	SHEET SIZE:	SCALE:
-	A3	NFS

STATUS:
FOR INFORMATION / APPROVAL

MEC Consulting Group
Birmingham | Brighton | Leicester

Telephone: 01530 264 753
Email: group@m-ec.co.uk
Website: www.m-ec.co.uk

- CIVIL ENGINEERING
- TRANSPORT
- FLOOD RISK & DRAINAGE
- STRUCTURES
- GEO-ENVIRONMENTAL
- ACOUSTIC AIR
- UTILITIES
- GEOMATICS
- LIGHTING
- EXPERT WITNESS

MEC
Consulting Group

E: group@m-ec.co.uk
W: www.m-ec.co.uk