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Napton Parish Council

Proposed Padel Courts

Acoustic Assessment

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Contents

Appendices

appendix A

Technical Terminology

Appendix B

Time History

Appendix C

Sound Level Contours

Appendix D

Report Limitations

1. Introduction

Peninsular Acoustics Limited, has been commissioned by Napton Parish Council (hereafter referred to as 'the Client') to undertake an acoustic assessment for the proposed construction of two Padel courts at the Napton Sports Field, Priors Marston Road, Napton on the Hill, CV47 8PH (hereafter referred to as 'the Site').

This report is necessarily technical in nature and therefore, to assist the reader, an acoustics glossary is provided in Appendix A.

1.1. Site Description

Existing Site

The Site is located in the village of Napton on the Hill, Warwickshire. The Site itself is multi-use sports facility, containing a cricket pitch in the south east; an artificial grass pitch in the west and tennis courts in the north. The Site is otherwise surrounded by existing residential amenity or open grassland.

Noise Sensitive Receptors

The nearest Noise Sensitive Receptors (NSRs) are outlined in Figure 1.1 but for completeness are:

- NSR 1: Dwellings off Collins Close, circa. 110m to the north of the Site;
- NSR 2: Detached property situated off Fell's Lane, circa. 90m to the south of the Site.
- NSR 3: Dwellings of St. Lawrence Close, circa. 115m to the south-west of the Site;
- NSR 4: Dwelling off Fell's Lane, circa. 90m to the west of the Site; and
- NSR 5: Dwelling off Fell's Lane, circa. 110m to the west of the Site;

Figure 1.1 Site Location, Noise Sensitive Receptors and Measurement Location

Development Proposals

Development proposals comprise the installation of two Padel courts to be located within the redline boundary shown in Figure 1.1, south of the existing tennis courts.

The masterplan can be seen in the noise contours included in Appendix C.

1.2. Scope of Works

The following scope of works has been undertaken:

- An environmental sound survey has been undertaken to determine existing sound levels at a location representative of the nearest NSRs;
- A 3D acoustic model of the Site and local environs has been created using Peninsular Acoustics source emission data informed by various verification surveys of existing Padel courts located within the UK;
- Sound levels at the nearest receptors have been predicted and consideration has been given to the character of Padel in comparison to the existing environment;

2. Application Context

2.1. National Planning Policy Framework

The NPPF sets out the Government's planning policies for England and how these are expected to be applied; the NPPF must be a material consideration in planning decisions. For conciseness, the NPPF states that planning policies and decisions:

- Should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to or being affected by noise pollution (Para 187);
- Should ensure that new development is appropriate for it's location considering effects on health and living conditions (Para 198); and
- Should, with respects to noise, mitigation and reduce to a minimum potential adverse impacts resulting from noise from new developments (Para 198).

2.2. Noise Policy Statement for England

The guidance of the Noise Policy Statement for England (NPSE) introduces the concepts of 'Effect Levels' which provide guidance on the impact noise might have on the quality of health life.

To assist with recognising when noise could be a concern, the NPSE 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 but not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. No perceived change in quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable but intrusive	Noise can be heard and causes minor changes in behaviour. 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. 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
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour 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. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid

2.3. National Standards and Guidance

The above qualitative documents are useful for placing noise assessments into context and the following documents discuss quantitative criteria for potential onset of 'annoyance'.

- BS 8233 and WHO Guidelines;
- SEDGN; and
- Dutch National Guidance 'Padel and Sound, January 2023.

BS 8233, WHO Guidelines and SEDGN

BS 8233 and the WHO Guidelines provide 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. The sound level criteria for external levels is suggested to be 50 – 55 dB $L_{Aeq, 16hr}$ externally and 35 dB internally during the daytime,

The levels can therefore be classified as LOAEL in accordance with the NPSE and whilst the time base for the values are given in 16 hour for common assessment daytime limits (07:00 – 23:00); when assessing the impact from sports, a 16-hour value is **not appropriate** and therefore, a time base of 1-hour is considered to be a more stringent assessment criteria, this is referenced in SEDGN.

SEDGN similarly advises a limit of 50 dB $L_{Aeq, 1hr}$ from the façade of a residential receptor, and whilst SEDGN was designed to assess the impact from an Artificial Grass Pitch (AGP), it correlates well to the potential onset of annoyance as referenced in the WHO guidelines.

Dutch National Guidance Document

Finally, the Dutch National Guidance document 'Padel and Sound' was produced in the Netherlands as a response to the growing nature of the sport and the noise constraints around it. The document suggests ways of modelling Padel noise, which, in Peninsular Acoustics' experience has been found to not be as accurate as the modelling methodology presented herein.

With respects to criteria and assessment methods, the guidance, and subsequent appendix, suggests the following:

- A fixed $L_{Aeq, 1hr}$ criteria of 50 dB during the daytime, 45 dB during the evening and 40 dB during the night-time for urban environments; and
- A fixed L_{AFmax} criteria of 70/65/60 dB during the daytime, evening and night-time.

However, the idea of a fixed criteria is not considered to be appropriate in the UK due to the relative sound levels already experienced by residential receptors. For example, a proposed padel court in a city centre environment is likely exposed to higher existing noise level than a rural existing tennis club.

As such, a relative change in comparison to the existing sound level is considered more appropriate as an assessment metric.

3. Assessment Methodology

3.1. Bespoke Assessments

The nature of padel, and all other sports, is that the game does not produce the same sound level each time. There is invariably a change in sound level based upon players ability, age, sex and other factors.

Unlike transportation sources, there is no significant scientific research regarding how sound from padel impacts people or at what level annoyance is potentially caused. As such, this assessment is not intended to determine exactly what sound level will be experienced every time a match is played but instead provide an overview of how padel being introduced to the local area will potentially impact the nearby NSRs.

Subjectively, the sound characteristics which cause most annoyance are the balls hitting the rackets and people shouting. Objectively, this manifests itself as individual sound events which are more audible where ambient sound levels are lower. However, annoyance comes from a range of factors including sound level, occurrence but also includes psychoacoustic features such as the knowledge that a new court is there; preconceived ideas of the noise impact from padel; and the fact that the sport is new and different.

However, for the purposes of being able to objectively assess the noise impact, this report has opted for an initial assessment considering both the L_{Aeq} from a padel match compared against the existing ambient environment; and the L_{AFmax} from individual events against the existing ambient environment. This will be supplemented by a description of likely impact in respect of existing conditions.

3.2. Source Sound Levels

Peninsular Acoustics has previously measured sound levels from a variety of existing padel courts. The matches have included single and mixed sex matches of different abilities and were taken over hour-long matches with four players. Dominant noises from a Padel match include:

- Ball hitting the rackets (most dominant);
- Player's shouting;
- Ball hitting the metal fence along the side of the court;
- Ball hitting the glass at the end of the court.

Sound Level Meters (SLMs) were installed at defined distances from the side and end boundary of the court at a height of 1.5m above local ground levels. Due to the glass elements, which are installed at either end of the court in a 'U' shape, significant acoustic screening is afforded at either end of the court in the nearfield, dissipating around 30m away. The sides of the court are open with a metal cage construction allowing sound to propagate more freely.

Table 3.1: Peninsular Acoustics Library Data

Parameter	Value
Ambient Sound Level (Sides)	57 – 61 dB $L_{Aeq, 1hr}$ @ 5m
Ambient Sound Level (Ends)	54 – 58 dB $L_{Aeq, 1hr}$ @ 5m
Maximum Sound Level (Ends and Sides)	69 – 72 dB $L_{Afmax, 1sec}$ @ 5m

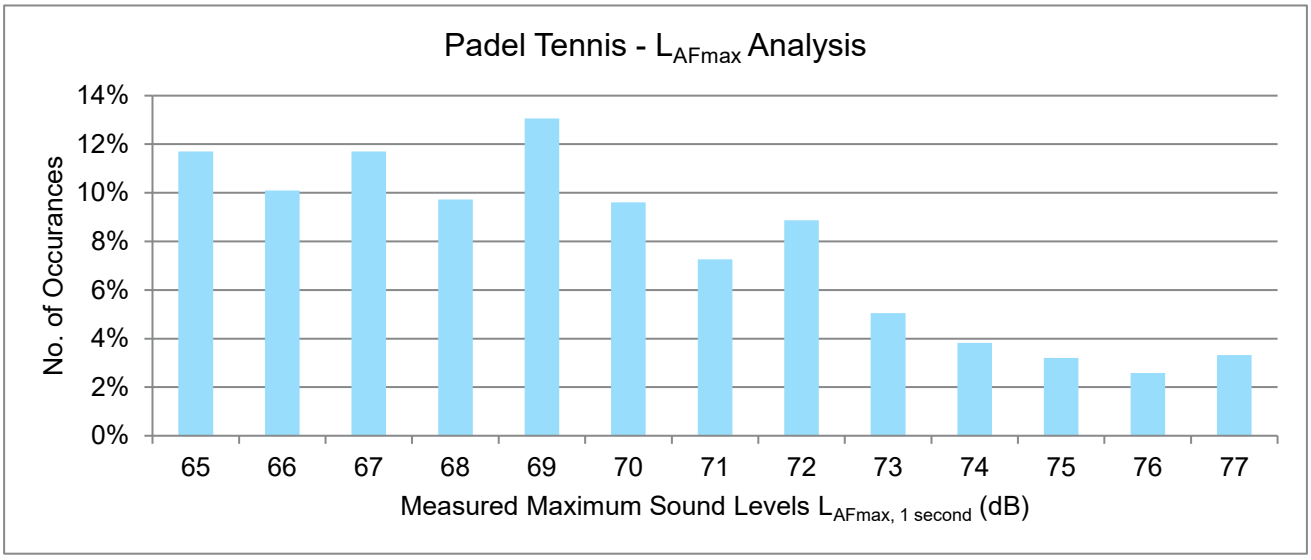
3.2.1. Maximum Sound Level Discussion

Padel is different from traditional tennis in that there are an increased number of racquet hits during a rally, the ball can bounce off walls (which then radiate sound) and due to the fast-paced nature, a greater level of participant shouting is observed.

L_{AFmax} levels are driven from overhead shots which are used to attempt to end a rally and score the point; statistical analysis on the $L_{AFmax, 1sec}$ values from several hour-long matches has been considered with the results shown in Figure 3.1.

The values presented are measured at 5m from the court edge and there is a clear distribution of sound centres around 65 dB through to 72 dB with many racket hits falling around 69 dB $L_{AFmax, 1sec}$.

Figure 3.1: L_{AFmax} Analysis



3.3. Baseline Acoustic Conditions

Existing sound levels were monitored in a location (see Figure 1.1) representative of nearby NSRs between Thursday, 24th July and Monday, 28th July. The weekend was chosen to understand the impact on potentially quieter periods.

The acoustic conditions at the Site were subjectively quiet, dominated largely by community noise and occasional road traffic off Butt Hill and Vicarage Road, however, road traffic was extremely limited.

No windspeeds greater than 5m/s or rainfall was witnessed during Site attendance and so sound levels are considered to be representative of typical conditions in the area.

For conciseness, the sound levels measured in the survey are presented in Table 3.2 and are separated into daytime and evening periods based upon the proposed opening hours. Padel matches last one hour and therefore, this data has been analysed on an hour-by-hour basis.

Statistical analysis has been used to derive assessment criteria from the survey results.

Table 3.2 Survey Results

Time Period	Representative Ambient Sound Level
08:00 - 19:00	43 dB $L_{Aeq,\ 1hr}$
19:00 - 22:00	40 dB $L_{Aeq,\ 1hr}$

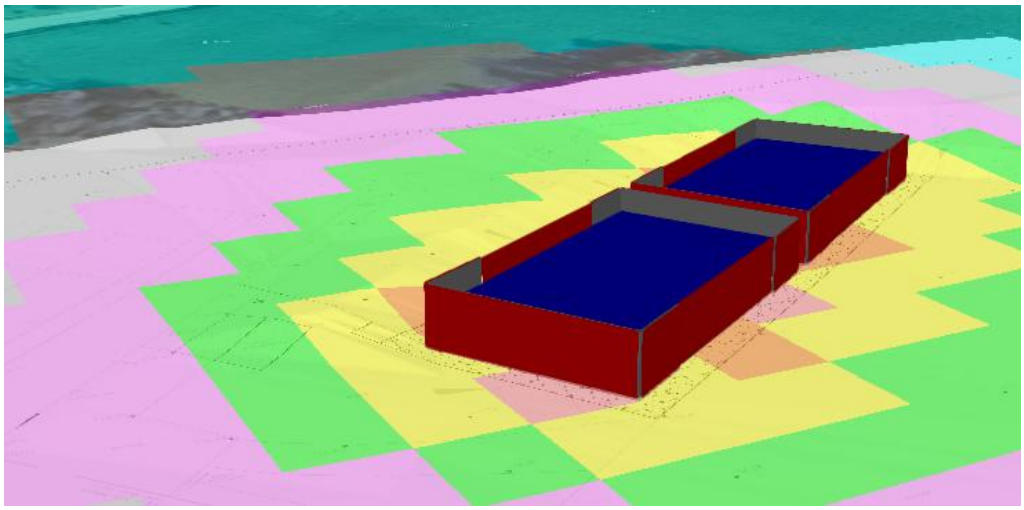
3.4. Acoustic Modelling

A 3D acoustic model of the Site and environs has been created using CadnaA® modelling software. 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[1].

The modelling assumptions pertinent to the assessment are ground absorption set to 1 (Arable Land); first order reflections included in the modelling and topography included from DEFRA.

The model has been created using a combination of vertical area, horizontal area and point sources which have been calibrated such that the values measured by Peninsular Acoustics and presented in Table 3.1 are accurate.

Figure 3.2: Acoustic Model



To assess the impact from padel noise, virtual receivers have been placed at the most exposed façade of each NSR. Where an NSR comprises multiple dwellings, impact at the most exposed property is presented herein.

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

4. Assessment

4.1. Predicted Sound Levels

The results of the acoustic modelling are presented in the tables below with an assessment made against a daytime and evening scenario.

Table 4.1: Ambient Sound Level Assessment Results ($L_{Aeq,\ 1hr}$ dB)

NSR	Modelled Sound Level $L_{Aeq,1hr}$ dB	Comparison Against Daytime Ambient, dB	Comparison against Evening Ambient, dB	Below other Relevant Guidance?[(a)]
1	29	-14	-11	Yes
2	29	-14	-11	Yes
3	25	-18	-15	Yes
4	28	-15	-12	Yes
5	30	-13	-10	Yes

[(a)] Other relevant guidance includes BS 8233, SEDGN and the Dutch national padel gudiance document.

The results shown above indicate that the $L_{Aeq,1hr}$ sound levels are unlikely to impact on the existing ambient sound level. At all times, ambient noise levels from padel noise fall significantly below the measured ambient noise levels at the Site and are compliant with the values given in the other relevant guidance shown in Section 2.

However, as mentioned, sound from discrete noise events is likely to be more audible given the nature of the sport and so the $L_{AFmax,1sec}$ results compared against the existing ambient environment are shown below.

Table 4.2 Maximum Sound Level Assessment Results ($L_{AFMax,1sec}$ dB)

NSR	Modelled Sound Level $L_{Aeq,1hr}$ dB	Comparison Against Daytime Ambient, dB	Comparison against Evening Ambient, dB	Below other Relevant Guidance?[(a)]
1	42	-1	+2	Yes
2	42	-1	+2	Yes
3	38	-5	-2	Yes
4	39	-4	-1	Yes
5	42	-1	+2	Yes

[(a)] Other relevant guidance includes BS 8233, SEDGN and the Dutch national padel gudiance document.

Maximum noise levels will always be above the ambient sound level within the same time period, however, the degree of maximum level over the sound level prior to a new noise source being introduced can give an indication as to the potential impact on residential amenity.

Results show that during the daytime, modelled maximum sound levels $L_{AFMax,1sec}$ at each NSR will fall beneath the existing ambient noise levels.

During the evening, marginal exceedances of up to 2 dB may occur.

4.2. Summary

For all NSRs, the $L_{Aeq,\ 1hr}$ predictions are below the existing ambient sound level, meaning that the average sound during matches is likely to not pose an adverse impact on the existing acoustic environment.

During the daytime period, discrete noise events are also predicted to be below the existing ambient and so the impact is also predicted to be very low.

When considering individual maximum sound level events during the evening, at NSRs 1, 2 and 5, the are minor exceedances of up to 2 dB $L_{AFMax,1sec.}$ This is an indication that whilst on occasion individual racket hits may be audible, they will not be intrusive.

As discussed in Section 3, whilst this assessment seeks to objectively compare predicted levels against existing levels; the type of play, location of player and quality of player will have an overall impact on the level of sound emanating from the court.

Therefore, when considering the numerical results, the overall conclusion is that padel may be audible on occasion in the evening, subject to the intensity of the match being played, but that the limited

As such, when considering context, and the NPSE, the overall conclusion is that sound is unlikely to be regularly heard, or when it potentially may will be unlikely to cause any change in behaviour or attitude, meaning there is unlikely to be a perceived change in quality of life.

This is considered to fall under the **No Observed Adverse Effect** and no mitigation measures are required.

5. Conclusions

Peninsular Acoustics Limited has been appointed by Napton Parish Council to undertake an acoustic assessment to support the planning application for two padel courts at Napton Sports Field, Priors Marston Road, Napton on the Hill, CV47 8PH.

Using in-house library data and baseline environmental sound survey data, an assessment against baseline sound levels, BS 8233, WHO Guidelines, SEDGN and the Dutch National Guidance Document on Padel Noise has been undertaken to provide considerations of sound from the proposed Padel Courts against a variety of different guidelines.

The results of the modelling have demonstrated that due the setback distance from nearby receptors, noise impact from the proposed development will typically be low at the nearest residential receptors and whilst discrete noise events may be audible on occasion, they will unlikely cause an adverse impact that would result in any material change in behaviour. Therefore, in accordance with the NPSE an effect level of **NOAEL** is predicted.

In summary, based upon the findings of this study, it can be concluded that the Site is suitable for the intended use and no mitigation measures are required.

Limitations applicable to this report are contained in Appendix D.

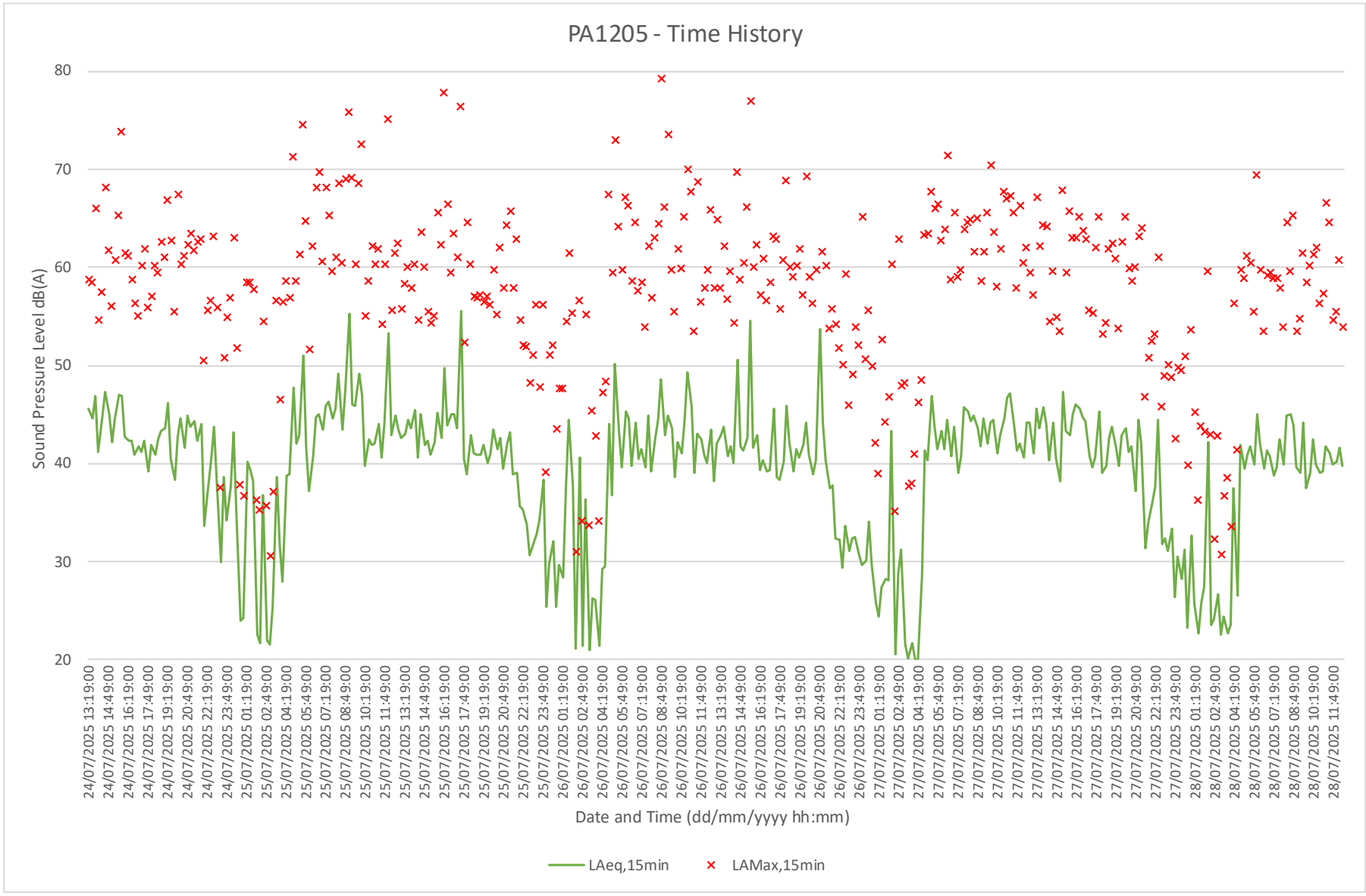
Appendix A

Technical Terminology

Noise	Typically defined as unwanted, unpleasant or disturbing sound
Frequency (Hz)	The number of oscillations in acoustic pressure per second. It represents the 'tone' of the sound. Often determined in octave bands
Maximum sound pressure level (L_{Fmax})	The maximum or highest sound pressure level measured with a 'fast' time weighting
Equivalent continuous sound pressure level ($L_{eq,\,T}$)	The average of the total sound energy over a specified time period (T). L_{eq} represents the equivalent sound level that a fluctuating source would have compared to a steady source with the same total sound energy over a specific time period. Commonly used as a descriptor of human perception of sound over time.
Ambient Noise	Encompassing sound, at a given place, being usually a composite of sounds from many sources near and far.
'A' weighting	Frequency-dependent weighting based on the response of the human auditory system which has been found to correlate well with the subjective response to sound. Denoted by the use of the letter 'A'. For example, dBA denotes an 'A' weighted sound level in decibels, or L_{Amax} denotes an 'A' weighted maximum sound pressure level.
Internal Ambient Noise Level (IANL)	The noise level within a room or enclosed space. Usually determined as an equivalent continuous sound pressure level over a specific time period ($L_{Aeq,T}$, dB)
Façade level	The sound pressure level measured close to a building façade that includes contribution from both the incident sound and the sound reflected from the façade. Normally taken to be 3dB higher than the equivalent free-field level, when located at 1 metre from a façade.
Free-field level	A measured sound pressure level that is independent of any contributions due to reflections from nearby surfaces and is therefore representative of the direct path only.
Point Source	A noise source whose dimensions are small compared to the propagation distances involved.

Appendix B

Time History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70
60
50
40
30
20
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24/07/2025 19:19:00
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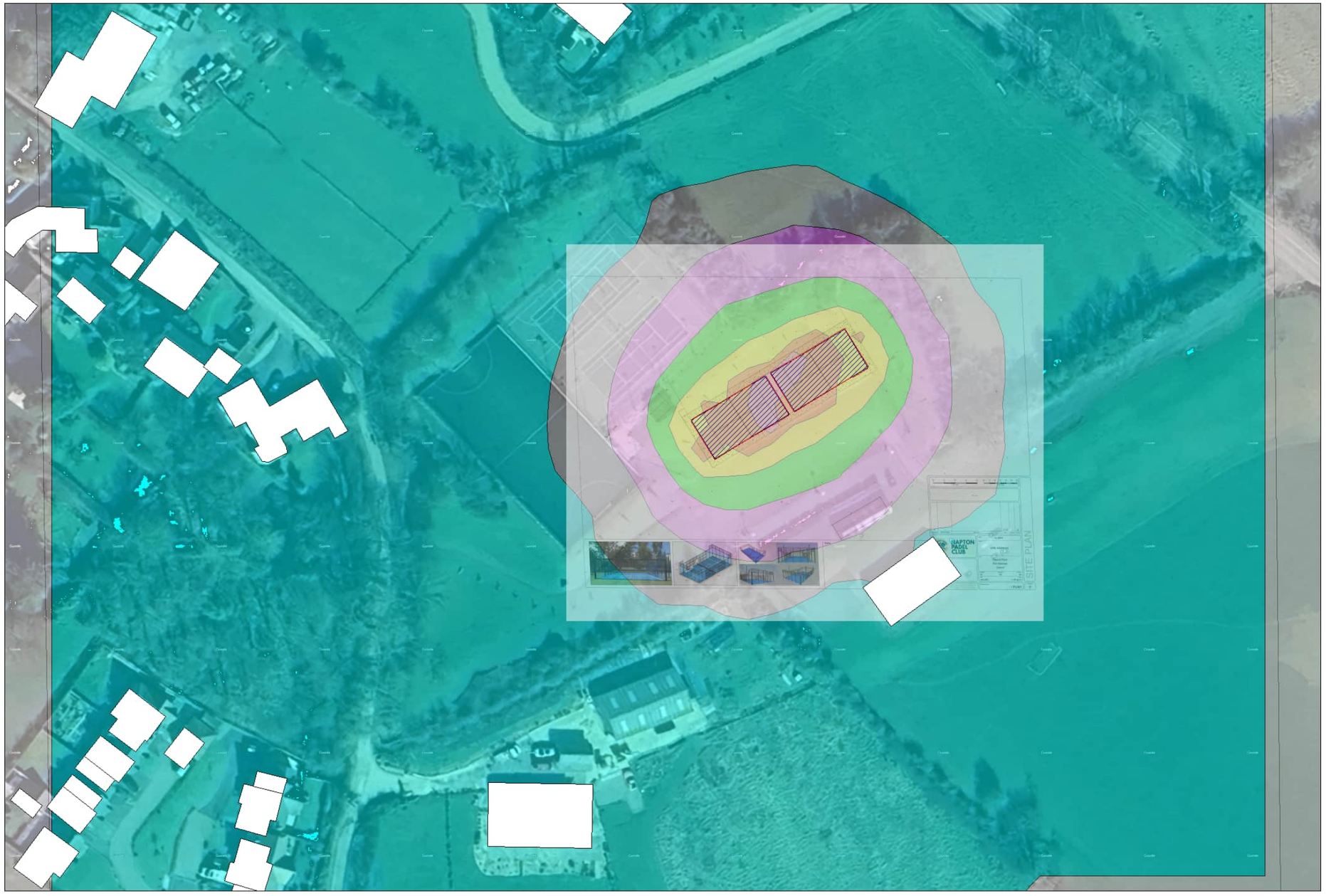
LAeq,15min
LAMax,15min

Appendix C

Sound Level Contours



Sound Level Contour Maps

- < 40 dB(A)
- 40 - 45 dB(A)
- 45 - 50 dB(A)
- 50 - 55 dB(A)
- 55 - 60 dB(A)
- 60 - 65 dB(A)
- 65 - 70 dB(A)
- 70 - 75 dB(A)
- 75 - 80 dB(A)
- > 80 dB(A)

05/08/25	P01	For Planning	GM
DATE	REV	COMMENTS	BY

Project: Napton Padel
Ref: Proposed Courts Ambient Sound Levels
DWG: PA1205-ACO-001-P01

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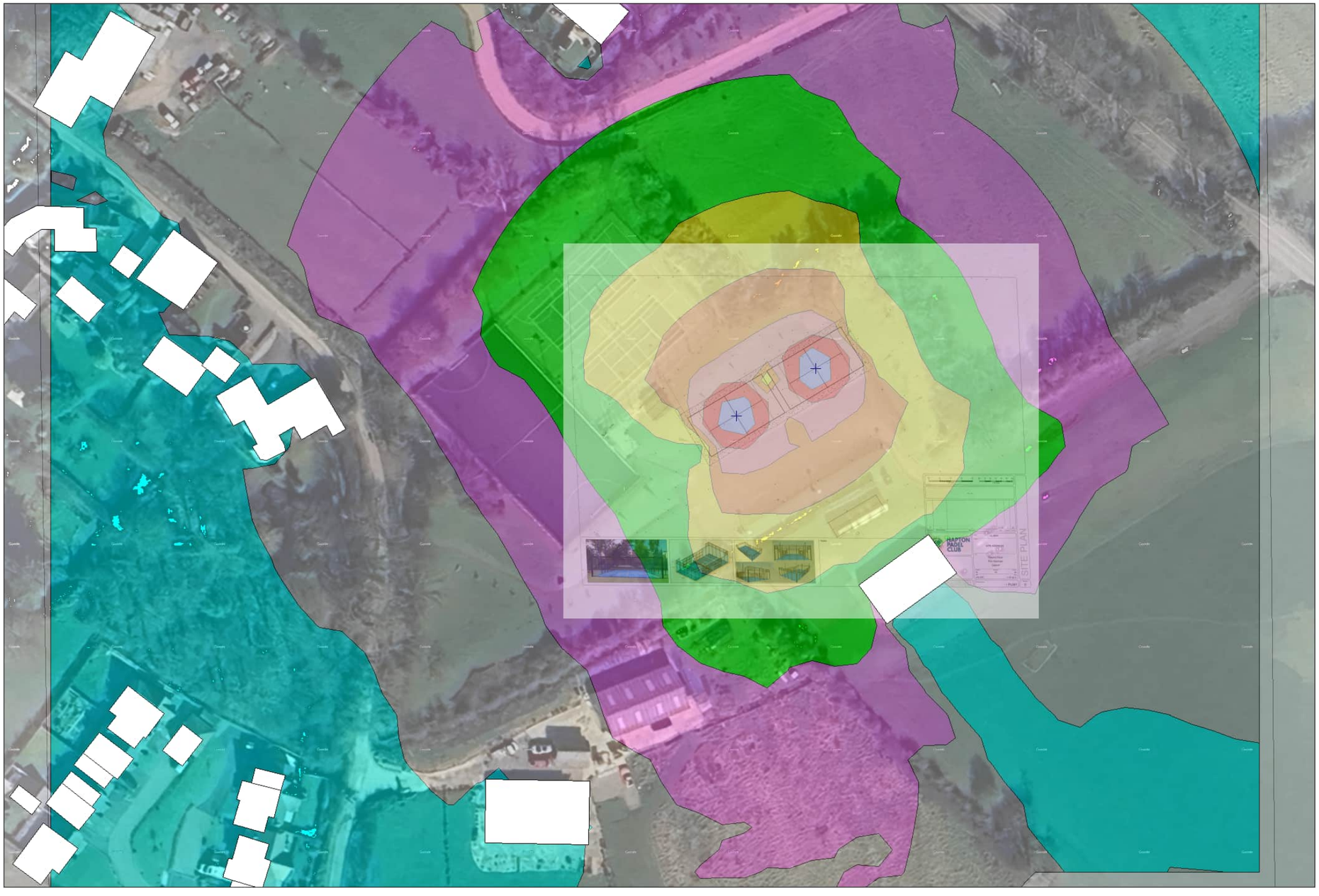
Notes
1. Do not scale this drawing.
2. Sound levels presented as $L_{Aeq,\ 1hr}$ values.



Sound Level Contour Maps

- < 40 dB(A)
- 40 - 45 dB(A)
- 45 - 50 dB(A)
- 50 - 55 dB(A)
- 55 - 60 dB(A)
- 60 - 65 dB(A)
- 65 - 70 dB(A)
- 70 - 75 dB(A)
- 75 - 80 dB(A)
- > 80 dB(A)

05/08/25	P01	For Planning	GM
DATE	REV	COMMENTS	BY

Project: Napton Padel
Ref: Proposed Courts Maximum Sound Levels
DWG: PA1205-ACO-002-P01

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Notes
1. Do not scale this drawing.
2. Sound levels presented as $L_{AFMax,\ 1sec}$ values.

Appendix D

Report Limitations

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The findings and opinions expressed are relevant to the dates of the site works and design drawings/specifications and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations Peninsular Acoustics Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

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