



Top Park, Bury
Noise impact assessment

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1 Summary

- 1.1 This report is prepared in support of a Planning Application for a new Artificial Grass Pitch and extension to the existing carpark and pavilion at Top Park, Bury.
- 1.2 Assessment criteria have been proposed based on Sport England and other guidance considered appropriate.
- 1.3 Existing noise levels at the nearest noise sensitive receptors have been measured during the hours of the proposed operation of the AGP.
- 1.4 Source noise levels associated with the pitch have been taken from published measurements of all-weather Artificial Grass Pitches. Source noise levels from the car park have been determined using the guidance of RLS-90 and measurements previously undertaken by Apex Acoustics.
- 1.5 Noise propagation to the nearest residential noise sensitive receptors is calculated using environmental noise modelling software, CadnaA. Assumptions are made on a potential worst-case operation of the AGP to ensure prudence in the assessment. In practice, noise levels are likely to be lower than predicted for most of the time when the pitch is in use.
- 1.6 The outcome of the assessment indicates that the criteria published by Sport England and WHO are achieved at the nearby noise sensitive receptors.
- 1.7 The modelled specific noise level is also assessed against the existing acoustic environment. The change is anticipated to result in no impact upon the receptors when considering the long-term impacts in accordance with IEMA guidance.
- 1.8 On the basis of the details contained in this report, the development is considered acceptable from a noise impact perspective.

2 Introduction

- 2.1 A new Artificial Grass Pitch (AGP) and extension to the existing carpark and pavilion has been proposed at Top Park, Bury.
- 2.2 Apex Acoustics has been commissioned to undertake an assessment of the potential noise associated with the AGP and parking facilities in support of a Planning Application.
- 2.3 The proposed location of the AGP is shown in Figure 1. A layout showing the locations of the AGP and car parking facilities are shown in Figure 2.
- 2.4 The proposed operating hours of the AGP are understood to be as follows:
- Monday to Friday: 08:00 – 22:00 hours
 - Saturdays, Sundays and Bank Holidays: 09:00 – 21:00 hours, with activities on site typically finishing by 17:00 hours.
- 2.5 The scope of our instruction includes:
- Review guidance documentation to propose appropriate assessment criteria;
 - Measurement of the existing noise environment during periods representative of the proposed operational periods of the AGP, at a location representative of the nearest noise-sensitive receptors;
 - Determine source noise levels representative of the proposed use of the AGP using Sport England guidance;
 - Determine source noise emissions from the car parking facilities using the guidance of RLS-90 and historical measurements undertaken by Apex Acoustics;
 - Calculate noise propagation using proprietary noise modelling software to the noise-sensitive receptors and assess the impact; and
 - Propose noise mitigation measures where necessary to reduce impact at the noise sensitive receptors.
- 2.6 The noise-sensitive receptors are identified as the residential properties around the perimeter of the field.
- 2.7 This assessment is based on the layout proposed by the client, and acoustic modelling described in this report.



Figure 1: Proposed location of the AGP and associated facilities, with measurement positions in green



Figure 2: Site layout with AGP and car parking facilities

3 Planning policy and noise criteria

3.1 Noise Planning Policy Framework (NPPF)

3.2 The National Planning Policy Framework (NPPF), Reference 1, sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced. In respect of noise, Paragraph 174, 185 and 187 of the NPPF states the following:

3.3 Paragraph 174:

"e) 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 or land instability..."

3.4 Paragraph 185:

"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 life⁶⁵ [See Explanatory Note to the Noise Policy Statement for England];

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;"

3.5 Paragraph 187:

"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed. "

3.6 Noise Policy Statement for England (NPSE)

3.7 The Noise Policy Statement for England, Reference 2, states three policy aims as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;*
- mitigate and minimise adverse impacts on health and quality of life; and*
- where possible, contribute to the improvement of health and quality of life."*

3.8 The NPSE defines adverse noise impact as follows:

- No Observed Effect Level (NOEL)
This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- Lowest Observed Adverse Effect Level (LOAEL)
This is the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL)
This is the level above which significant adverse effects on health and quality of life occur

3.9 The first two aims of the NPSE require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

3.10 Available guidance

3.11 There is not currently a standardised method for assessing noise from field-based sporting activities.

3.12 The most relevant guidelines have been reviewed and reasonable criteria proposed for the assessment of potential noise associated with the AGP.

3.13 Sport England guidance on Artificial Grass Pitches (AGP)

3.14 Sport England issued the guidance Artificial Grass Pitch (AGP) Acoustics - Planning Implications, Reference 3, in 2015.

3.15 The guidance suggests the consideration of the criteria set out by The National Planning Policy Framework and Local Planning Authority planning policies.

3.16 This guidance also refers to the WHO guidelines to achieve ambient outdoor noise levels and states the following:

“The determining noise criteria for AGPs proximity to residential properties, to avoid moderate annoyance in the daytime and evenings, as set by The World Health Organisation’s ‘Guidelines for Community Noise’: = 50 dB $L_{Aeq(1\text{ hour})}$ upper noise limit external to residential properties and within external living areas”

3.17 This guidance is considered most relevant for artificial grass pitches, or sports pitches, that may be used on a commercial basis.

3.18 The noise levels are consistent with the WHO Guidelines for Community Noise, Reference 4, and BS 8233, Reference 5, guideline levels but assessed over a shorter time period.

3.19 WHO guidelines

3.20 WHO Guidelines for Community Noise provides guideline values for community noise in specific environments.

3.21 For dwellings, the guidance states the following:

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

3.22 BS 8233 guidance is consistent with that of the WHO.

3.23 IEMA

3.24 IEMA guidance, Reference 6, addresses the key principles of a noise impact assessment and can be used to assess all development proposals where noise impacts are likely to occur. This guidance is also referenced within the Sports England document for use where there are changes to existing natural grass pitches or existing noise residual noise levels are high.

3.25 It provides guidance on assessing the long-term noise impact based on the change in noise levels, as shown in Table 1.

Long-term impact classification	Change in noise level at a sensitive noise receptor
None / not significant	Less than 2.9 dB L_{Aeq} change in sound level
Minor	A 3 to 4.9 dB L_{Aeq} change in sound level
Moderate	A 4.9 to 9.9 dB L_{Aeq} change in sound level
Major	Greater than 10 dB L_{Aeq} change in sound level

Table 1: Effect due to change of noise level

3.26 It is proposed to assess the change in $L_{Aeq,T}$ noise levels due to the proposed use of the AGP following this guidance.

3.27 Assessment of noise impacts from car parking

3.28 BS 8233 and the World Health Organisation (WHO) Guidelines for Community Noise present appropriate guideline limits for time averaged and maximum internal ambient noise levels in dwellings when assessing noise from to transportation sources.

3.29 The upper limits for averaged sound pressure levels and maximum noise events from the above guidance are considered suitable for the assessment of noise from the car park and such have been adopted. Due to the nature of how the AGP will be used, a shorter time period of 1 hour is considered more appropriate for the assessment of time averaged noise levels.

3.30 Assessment criteria

3.31 Following the review of available guidance, a summary of the assessment criteria adopted for this assessment is shown in Table 2.

Noise source	Guidance	Parameter	Criteria
AGP	Sports England & WHO	$L_{Aeq,1hr}$	≤ 50 dB
	IEMA	$L_{Aeq, 1\text{ hr}}$ increase	≤ 5 dB
Car parking	ProPG, BS 8233 & WHO	$L_{Aeq,1hr}$	≤ 50 dB externally to allow for ≤ 35 dB to be achieved inside with windows open
		L_{AFmax}	≤ 60 dB externally to allow for ≤ 45 dB to be achieved inside with windows open

Table 2: Assessment criteria

4 Existing acoustic environment

- 4.1 The existing acoustic environment was measured from 12:42 hours on 7th September 2023.
- 4.2 Measurements were undertaken over a 24-hour period to determine existing noise levels at the nearest residential receptors during the proposed operational hours.
- 4.3 A second long-term measurement position was set up at Position 2, however the equipment was interfered with by residents and therefore a short-term survey at the location was required.
- 4.4 The short-term measurement was taken from 13:28 hours on 8th September 2023 for a 30-minute period.
- 4.5 The measurement positions are shown in Figure 1.
- 4.6 The microphones were located 2.5 metres above ground level and away from other reflecting surfaces such that the measurements are considered free-field.
- 4.7 Data was recorded in single-octave band frequencies at one-second intervals throughout the measurement period.
- 4.8 The most significant noise sources during both measurement periods were noted to be road traffic noise on the surrounding road networks.
- 4.9 The equipment used is listed in Table 3.

Equipment	Model	Serial no.
Sound Level Meter	XL2	A2A-05832-E0
Calibrator	Larson Davis CAL 200	9462

Table 3: Equipment used

- 4.10 Both meter and calibrator have current calibration certificates traceable to national standards. The sound level meter has been calibrated within the last two years and calibrator has been calibrated within the last year in accordance with the guidance of BS 4142; calibration certificates are available on request.
- 4.11 The equipment was field-calibrated before and after the measurements with no significant drift in sensitivity noted.
- 4.12 The measured existing residual $L_{Aeq,T}$ levels are shown in Table 4.
- 4.13 The measured levels at Position 1 were adjusted to match the measured levels at Position 2 to obtain representative background noise levels for the daytime and evening periods.
- 4.14 The calculated noise levels at Position 2 have been used to assess the impact from the proposed development since the levels are significantly lower than those at Position 1.

- 4.15 The difference in noise levels was calculated using the following equation:

$$\begin{aligned}
 & \text{Measured noise level at Position 1 between 13:30 – 14:00 hours} \\
 & \quad - \text{Measured noise level at Position 2 between 13:30 – 14:00 hours} \\
 & \quad = \text{Difference in noise level}
 \end{aligned}$$

- 4.16 Measured levels from Position 1 were then adjusted using the calculated difference in noise level to determine the noise levels at Position 2.

Measurement period	Position 1 $L_{Aeq,T}$ (dB)	Calculated difference	Position 2 $L_{Aeq,T}$ (dB)
Daytime (08:00 – 19:00 hours)	73	22	51
Evening (19:00 – 22:00 hours)	72	22	50

Table 4: Measured and calculated existing sound levels based on proposed opening hours

- 4.17 During the measurement periods, activities associated with the existing Top Park facilities were taking place and have been included in the existing background noise level calculations.

5 Source noise levels

5.1 Artificial grass pitch (AGP)

5.2 The most significant noise sources associated with use of AGP are from players shouting and whistles during matches.

5.3 Based on a study of AGPs by an Environmental Health Officer published by the Institute of Acoustics, Reference 8, the $L_{Aeq,T}$ values at 10 m from the pitch boundary for the majority of sites studied are within the range of 56 dB to 58 dB.

5.4 Sports England guidance also states that “A typical free-field noise level from an AGP at 10 m from side line halfway marking is 58 dB $L_{Aeq,1hr}$ ”. These noise levels include noise from the voices of the players and the spectators.

5.5 Therefore in this assessment, the noise source has been calibrated to achieve 58 dB $L_{Aeq,T}$ at 10 m from the side line of the proposed AGP.

5.6 Car parking facilities

5.7 The most significant sources associated with use of the car park are vehicle movements and door / boot slams.

5.8 The $L_{Aeq,1hr}$ noise emissions from the car park are calculated using the guidance of RLS-90, which is implemented within noise modelling software CadnaA, Reference 9. The following assumptions are made regarding the use of the car park:

- 26 no. car parking spaces proposed;
- In a worst case hour, all car parking spaces are assumed to be used.

5.9 L_{AFmax} noise emission from vehicle doors / boots slamming are taken from historical measurements undertaken by Apex Acoustics, and are presented in Table 5.

Source	Sound power level, dB L_{WA}
Car doors / boots slamming	95

Table 5: Sound power level L_{WA} of car doors / boots slamming, based on Apex historical measurements

5.10 Pavilion

5.11 It is understood that the pavilion will be used for changing rooms and as a space for parents to socialise whilst their children are training.

5.12 Based on the size, proposed uses of the pavilion and existing noise levels, it is not anticipated that the noise impact from the pavilion on the nearest noise sensitive receptors will have an adverse impact.

6 Noise transmission and propagation

6.1 Noise transmission and propagation is modelled to the NSRs based on the noise source data detailed, using proprietary software, CadnaA.

6.2 This models noise propagation outdoors according to ISO 9613-2, Reference 10.

6.3 The model parameters and assumptions are summarised in Table 6.

Parameter	Details
Site location and layout	Architects' drawings, Reference 11
Topography	Modelled with no changes in topography
Building heights	3 m per storey + 2 m roof (residential properties)
Receptor positions	On the façade closest to the source at a height of 1.5 m and 4 m to represent ground and first floor window heights respectively
Building and barrier absorption coefficient	0.21 to represent a reflection loss of 1 dB
G, Ground factor	Soft ground, G=1
Max. order of reflections	Three

Table 6: Modelling parameters and assumptions

6.4 $L_{Aeq,T}$ levels due to the AGP are modelled as an area source. A receiver at 10 m from the side line at 1.5 m high is used to calibrate the sound power level of each pitch to achieve 58 dB $L_{Aeq,T}$.

6.5 The AGP is assumed to be in use continuously over a one-hour period to represent its worst-case operation.

6.6 $L_{Aeq,T}$ levels due to the car parking facilities are modelled using the guidance of RLS-90, based on the assumptions detailed in para 5.8. The modelling assumes that all car parking spaces will be used within a worst-case hour period.

6.7 Sound power levels for maximum noise events from car doors and boots slamming, based on Apex historical data, have been used to attribute sound power levels to a point source. The point source representing the boot slam has been positioned at the closest parking space to the NSRs to represent a worst-case impact on the NSR.

7 Noise impact assessment

7.1 AGP noise contours

7.2 The modelled $L_{Aeq,1hr}$ noise contours at 1.5 m height, representative of ground floor window height, are presented in Figure 3.

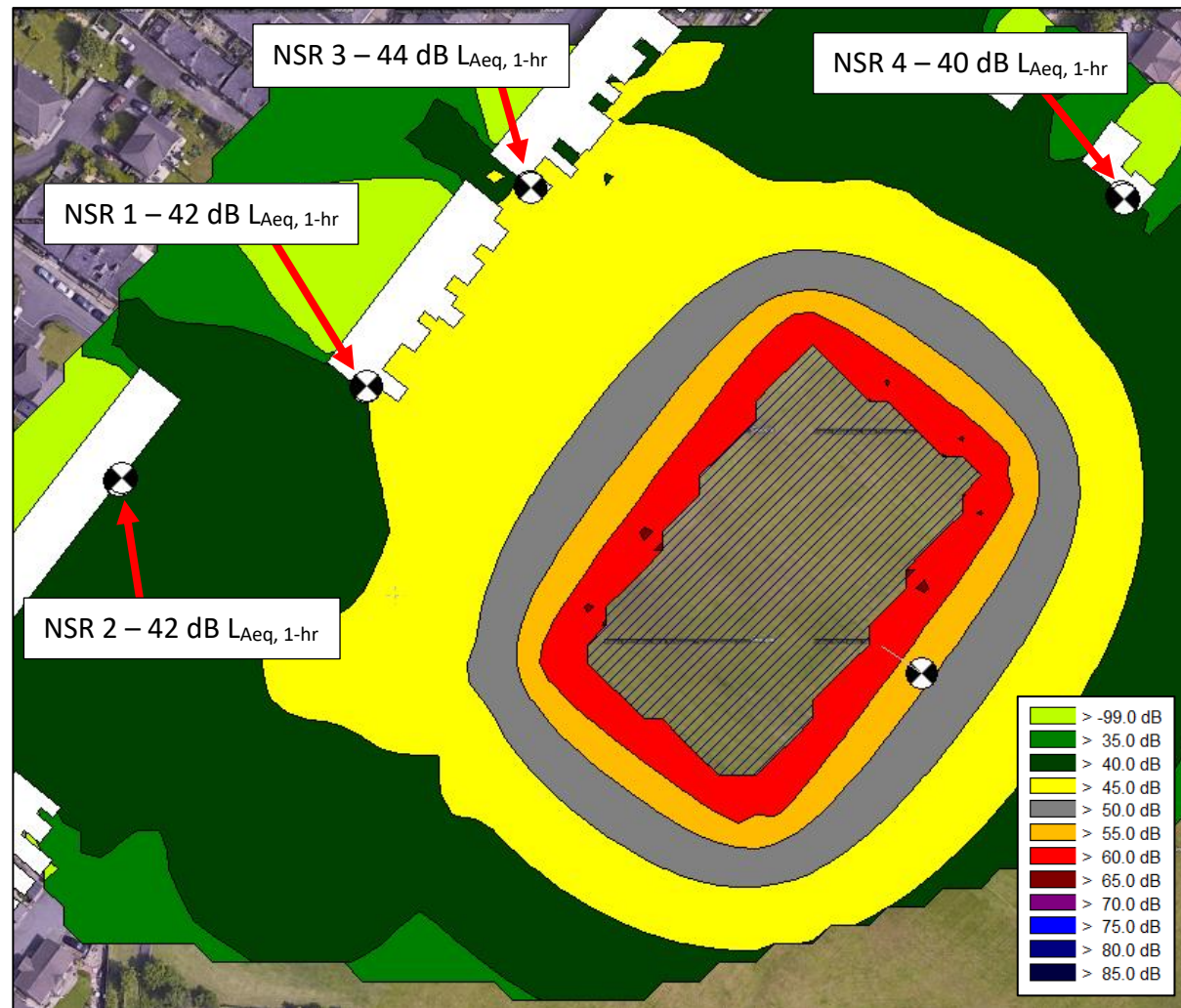


Figure 3: AGP calculated $L_{Aeq,1hr}$ noise contours at 1.5 m height

7.3 Car park noise contours

7.4 The modelled $L_{Aeq,1hr}$ noise contours at 1.5 m height, representative of ground floor window height, are presented in Figure 4; the modelled L_{AFmax} contours from the worst-case position are shown in Figure 5.

7.5 It is understood that the existing carpark consists of 45 no. spaces, and a further 26 no. spaces are proposed as part of the development.

7.6 The 26 no. proposed spaces are considered as part of the assessment.

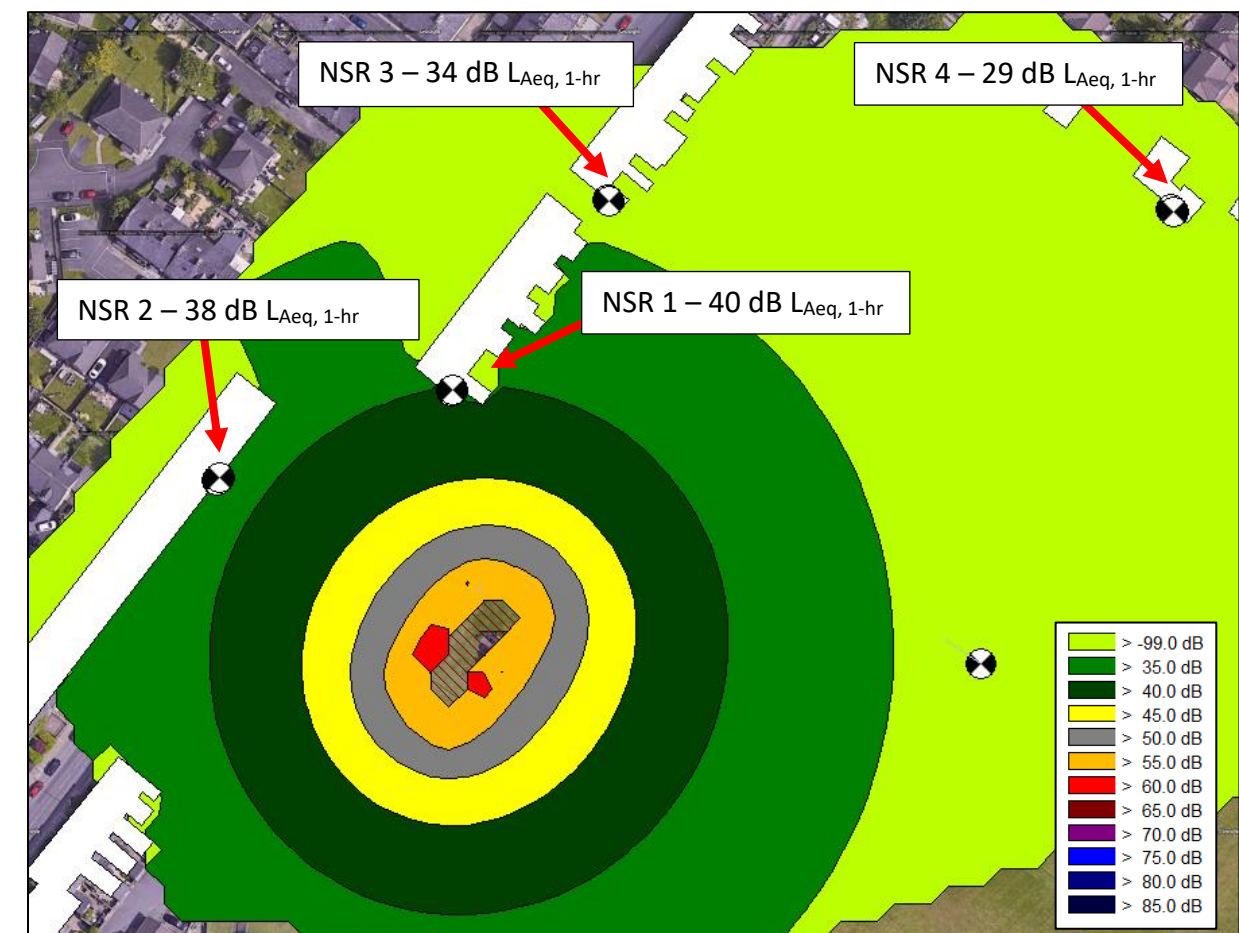


Figure 4: Car park calculated $L_{Aeq,1hr}$ noise contours at 1.5 m height

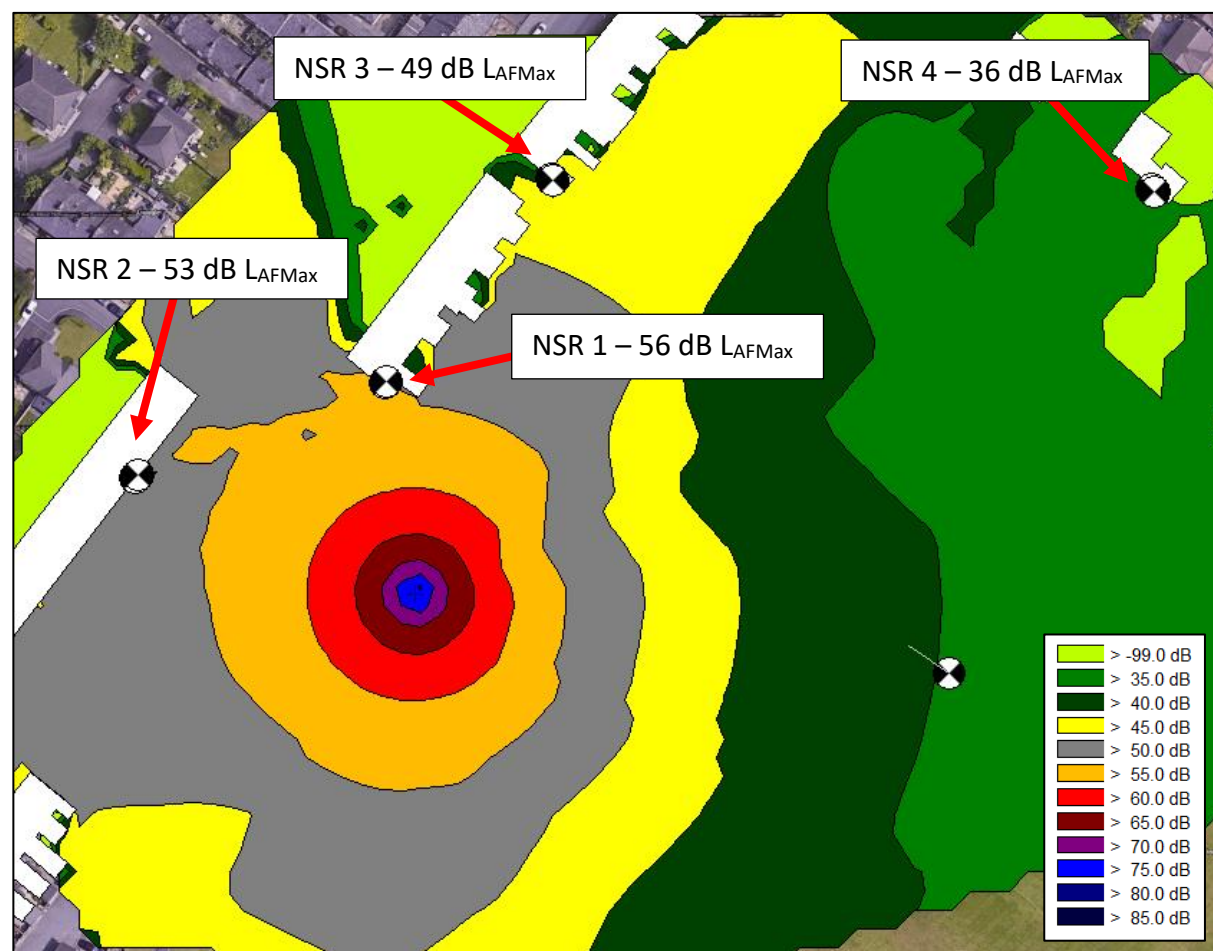


Figure 5: Car park calculated $L_{A_{fmax}}$ noise contours at 1.5 m height, worst case

7.7 Results

7.8 The calculated specific noise levels from the AGP at the worst affected noise sensitive receptor are shown in Table 7.

NSR	Calculated noise level, dB		
	Existing	Calculated AGP $L_{Aeq,1hr}$	Increase in $L_{Aeq,T}$ noise level with noise from AGP included
NSR 3	52	44	08:00 – 09:00 hours: + 0.7 dB
	51		09:00 – 10:00 hours: + 0.7 dB
	52		10:00 – 11:00 hours: + 0.6 dB
	51		11:00 – 12:00 hours: + 0.8 dB
	51		12:00 – 13:00 hours: + 0.8 dB
	52		13:00 – 14:00 hours: + 0.6 dB
	50		14:00 – 15:00 hours: + 0.9 dB
	50		15:00 – 16:00 hours: + 0.9 dB
	51		16:00 – 17:00 hours: + 0.7 dB
	51		17:00 – 18:00 hours: + 0.8 dB
	51		18:00 – 19:00 hours: + 0.8 dB
	50		19:00 – 20:00 hours: + 1.0 dB
	51		20:00 – 21:00 hours: + 0.8 dB
	50		21:00 – 22:00 hours: + 1.1 dB

Table 7: Calculated pitch noise levels without mitigation

7.9 The specific $L_{Aeq,1hr}$ noise level at the identified NSR is calculated to be below the Sports England and WHO criterion of 50 dB $L_{Aeq,1hr}$ without requiring mitigation.

7.10 The calculated increase in the residual noise level from the AGP indicates that no significant long-term effects upon the nearest noise sensitive receptors would result from introducing noise associated with the use of the AGP.

7.11 The calculated specific noise levels from the car parking facilities at the noise sensitive receptors are shown in Table 7.

Car parking scenario	NSR	Calculated noise level façade, dB		Calculated internal noise level based on 15 dB level difference, dB	
		L _{Aeq,1hr}	L _{AFmax}	L _{Aeq,1hr}	L _{AFmax}
Worst case car parking space	NSR 1	40	56	25	41

Table 8: Calculated car park noise levels based on worst case car parking space

7.12 Both L_{Aeq,1hr} and L_{AFmax} noise impacts from the car parking facilities comply with the upper criteria proposed for the majority of nearby noise sensitive receptors.

7.13 L_{Aeq, 1hr} calculations are based on one car movement (arrival and departure) per parking space an hour. This is considered to be worst case.

8 Conclusion

8.1 Noise levels affecting the residential NSRs due to the proposed use of the proposed AGP and car parking facilities have been calculated.

8.2 The outcome of the assessment indicates that criteria published by Sports England and WHO are achieved. A comparison of the specific noise impact against the existing residual level, using the guidance of IEMA, indicates that no significant long-term effects would be expected.

8.3 Therefore, on the basis of the details and mitigation proposals contained in this report, the development is considered acceptable from a noise impact perspective.

9 References

- 1 National Planning Policy Framework, Department for Communities and Local Government, March 2021.
- 2 Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, March 2010.
- 3 Design Guidance Note: Artificial Grass Pitch (AGP) Acoustics – Planning Implications, New Guidance for 2015, Sports England.
- 4 Guidelines for community noise, WHO, 1999.
- 5 BS 8233:2014 Guidance on sound insulation and noise reduction for buildings.
- 6 Guidelines for Environmental Noise Impact Assessment, Institute of Environmental Management & Assessment (IEMA), 2014.
- 7 The development and evaluation of an assessment methodology for the prediction and identification of noise impact from Multi Use Games Areas, Masters Derby: University of Derby, Fallon, R., 2012.
- 8 The assessment of noise from all weather sports pitches, Charley Vaughan, IOA Acoustics Bulletin Vol 43 No 1 January/February 2018.
- 9 CadnaA environmental noise modelling software, version 2022, Datakustik GmbH.
- 10 ISO 9613: Acoustics - Attenuation of sound during propagation outdoors.
- 11 Steve Wells Associates, Proposed Site Plan. Drawing no. 205-087-1008