Noise Impact Assessment of a Dog Day Care Facility

Client: Bruce's Doggy Day Care

Site Address: Battlers Green Farm
Common Lane
Radlett
WD7 8PH

Date: 21/05/2021

Version	1	2	3
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Executive Summary

The Proposed Development is at Battlers Green Farm, Common Lane, Radlett, WD7 8PH. The Site currently will have the capacity for 130 dogs spread around the different areas, including indoors areas such as the nursery.

It is important to understand that there are no standards or guidance that are specifically designed for assessing a development of this type. The 'CIEH Clay Pigeon Shooting Noise Guidelines' are frequently used due to the impulsive nature of a dog's bark being similar in character to the noise of a gunshot, and BS8233:2014 is used to calculate appropriate internal noise levels in dwellings. For the purposes of this assessment both BS8233:2014 and CIEH guidelines have been used.

Assessment Methods

It is thought that it is extremely unlikely for more than two dogs to bark at precisely the same time on site. For this reason, in order to assess real-world worst-case noise levels, two dog barks have been modelled at the most exposed areas in relation to each NSR (Noise Sensitive Receptor) in turn. The results of the modelling must of course be considered alongside the frequency of barking events. However, this can only be controlled by the dog management plan and staff on site. Both average and maximum noise level emissions have been assessed and the predicted noise levels have been compared to environmental measurements taken on site. The results of the assessments can be seen in the sections below.

CIEH Garden Noise Level Assessment

An assessment has been carried out in relation to criteria stated in 'CIEH clay pigeon shooting guideline noise levels. The predicted noise level in the centre of the most exposed garden is 48 dB L_{Amax}, which is 7 dB below the level at which the CIEH document claims *'annoyance is less likely to occur'.* This indicates that there is no risk that the predicted noise level at the center of the garden generates annoyance.

BS8233:2014 L_{Amax} and L_{Aeq} Open Window Assessments

The aim of these assessments was to predict internal noise levels within the surrounding dwellings and compare them to the criteria stated in BS8233. The assessments consider the effect of an open window at each dwelling, which is stated to provide 15 dB of attenuation.

The assessments show appropriate internal noise levels can be achieved at the nearest NSRs (Noise Sensitive Receptors) with the assumed situations. This is a positive indication that dog barks should not be detrimental to the amenity of local residents, however, this again must be considered alongside the dog management plan and the strict control of barking events.

Environmental L_{Amax} and L_{Aeq} Assessments

The predicted noise emissions have been assessed against the statistically most repeated $L_{Amax,1min}$ and $L_{Aeq,1min}$ values measured at the proposed site. The noise levels in the gardens are predicted to be below the statistically most repeated values, indicating that the dog noise is likely to be inaudible at the NSRs. However, it depends on the context. The ambient noise levels were measured during the proposed opening hours of the site and therefore these are considered to be representative. Having all the above in consideration, it is expected that the majority of average events will be louder than a dog bark at the NSRs.

WHO Guidelines Assessment

The 'WHO Guidelines for Community Noise' criterion for noise in external amenity areas is 50 – 55dB $L_{Aeq,16hour}$. However, these guidelines are typically used to assess steady continuous noise effects on residential dwellings from noise sources such as traffic. Considering the lack of other relevant standards, this noise criterion does provide a good indication of appropriate external noise levels. The external L_{Aeq} noise levels are predicted to be at least 23 dB below the upper noise criteria in the garden areas of the NSRs, indicating that external noise levels should be acceptable considering two single dog barks.

In summary, it is predicted that appropriate internal and external noise levels can be achieved considering the noise levels from two barking events, however, this is heavily reliant on the effectiveness of the staff at managing the dogs correctly to reduce the possibility of excessive barks. In order to reduce the possibility of annoyance at the closest NSRs the frequency of barking must be limited as much as practicable.

The findings of this report will require written approval from the Local Authority prior to work commencing.

1. Introduction

1.1 Overview

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for a dog day care facility ('the Proposed Development') on Battlers Green Farm, Common Lane, Radlett, WD7 8PH ('the Site').

The Applicant is preparing a planning application ('the Application') to be submitted to Hertsmere Borough Council.

Accordingly, the following technical noise assessment has been produced to accompany the Application to the Local Authority.

This report details the existing background sound climate at the nearest receptors, as well as the sound emissions associated with the Proposed Development.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

1.2 Scope & Objectives

The scope of the noise assessment can be summarized as follows:

- Baseline sound monitoring survey to evaluate the prevailing sound levels at the nearest sensitive receptor ('NSR') to Site;
- Detailed sound modelling, acoustic calculation and analysis in accordance with ISO9613 – 1 prediction methodology to predict sound levels at the NSR;
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the proposed sources; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England and Wales, BS8233:2014 and other relevant standards.

1.3 Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

- National Planning Policy Framework (2019)
- Noise Policy Statement for England
- ISO 9613-2 Attenuation of sound during propagation outdoors
- BS8233:2014 `Guidance on sound insulation and noise reduction for buildings'
- CIEH 'Clay Pigeon Shooting Noise Guidelines'

2. Site Description & Background Information

2.1 Site & Surroundings

The site is located at the rear of Battlers Green Farm. The immediate area is predominately commercial with residential and empty farmable area. To the north-east, are several commercial premises as Westons Fish Bar, Blacks of Sopwell or Battlers Green Veterinary Centre. To the west, north and south is empty farmable land. To the south-east runs the Common Lane, providing light to moderate levels of traffic flow. The closest NSRs (Noise Sensitive Receptors) to the Proposed Development are located to the south east boundary of the site, along the Common Lane road. The dominant source of noise in the area was found to be traffic noise from vehicles travelling along the Common Lane and other noise sources secondary in nature, such as the noise coming from the commercial premises.

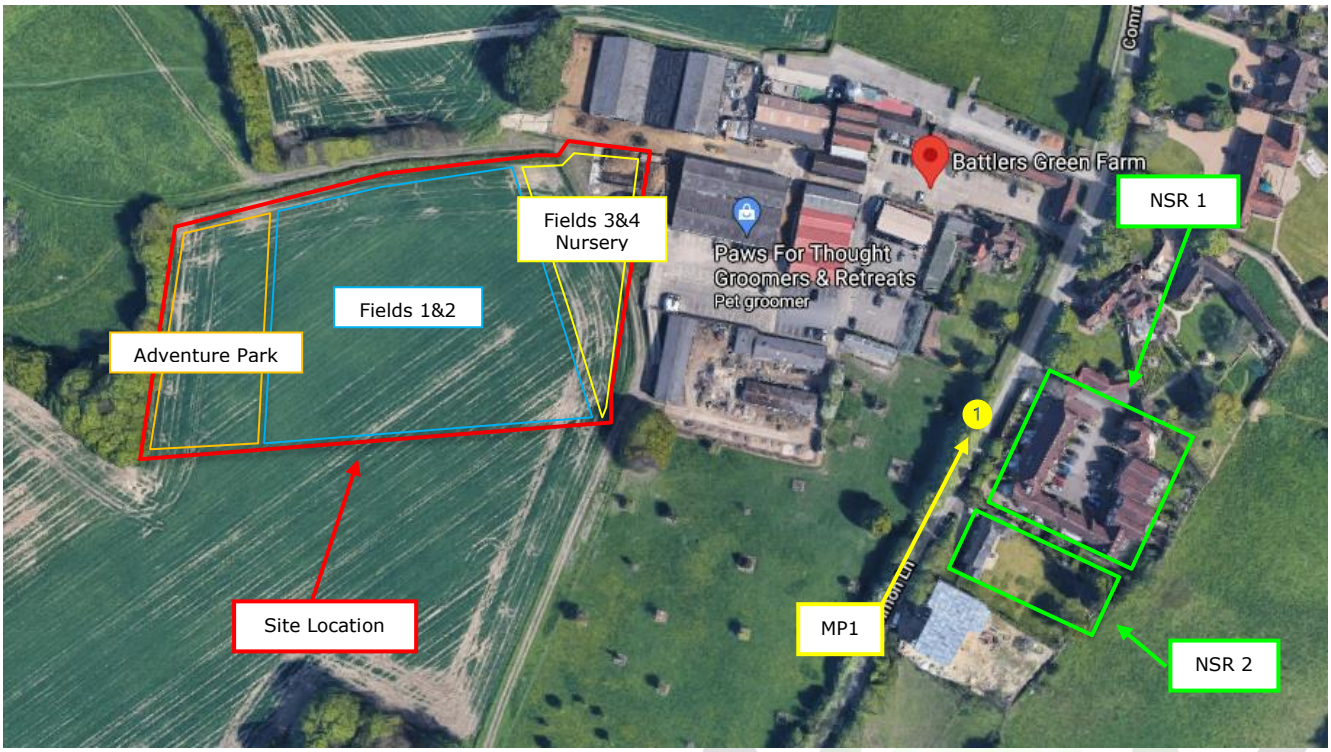


Figure 1.0 – Site and Surroundings

2.2 Background

The site is currently agricultural ground that will be converted into a dog day care site with a dog nursery & welfare/reception building. The Site will have the capacity for 130 dogs. The number of dogs on the Site is not proposed to increase.

The facility is open from 7.30am – 6pm on Monday-Friday. Members of the public or potential walk-in customers can come to the site to enquire about the service during the opening times and 15 members of the staff on site. Site plans are included in Appendix C.

Bruce's Doggy Day Care has introduced a detailed Dog Handling Policy that seeks to minimise the risk of workers, visitors and others being bitten or harmed by dogs in their care. To further minimise

this risk, the Directors have in place a very strict admission and attendance policy for dogs in their care, including the commitment to only accept social dogs that attend at least once per week on an ongoing basis and to not accept breeds that are not suitable to the daycare environment.

The Dog Handling Policy is held by the Operations Director. The policy covers a range of issues, all relating to the safe management and handling of the dogs at the daycare centre and collection areas.

Items covered within the Dog Handling Policy include:

- Approaching a dog
- Signs that a dog is distressed, and dealing with a distressed dog
- Signs that a dog is content and comfortable
- Correct use of the lead and crates
- Lifting dog and taking dogs in and out of the doggy buses
- Collecting the dog from the owner's home
- Minimizing barking and giving dogs calm enjoyment at day care
- Looking after dogs off-site

The following section outlines the key steps for Noise Minimization:

Minimizing barking and giving dogs quiet enjoyment at day care

A quiet dog is a calm dog. Keeping dogs calm at day care is essential to ensuring both human and canine safety, welfare and mental wellbeing. Some dogs are not comfortable in a noisy environment, and it is unpleasant for staff. The following steps should be taken to minimise any barking.

- Introduce new dogs gradually, with only one or two dogs at a time to ensure a calm and slow introduction.
- Split the dogs into groups of small, large and puppies to ensure all dogs are calm and well matched.
- If a dog is found to bark regularly, they should not be allowed to continue at day care.
- Scent related activities should be done daily, usually in the morning, as the dogs' noses-to-the-ground distracts and engages their minds to ensure they are not barking.
- Dogs must never be left unattended or unsupervised.
- High energy games (e.g. ball games, Frisbee) must never take place, as an excitable environment can cause barking, which could escalate into something further.
- If any two dogs start to play boisterously, you should intervene and calm the dogs to ensure they do not bark.

3. Environmental Noise Survey

In order to characterise the sound profile of the area of the proposed development, a long-term environmental sound survey was carried out from the 22/04/2021 to the 26/04/2021.

3.1 Measurement Methodology

For the long-term monitoring, the sound level meter was attached to a telegraph post approximately 3.5m from the ground. The monitoring position was chosen in order to collect representative sound levels of the area during the day and night time periods over the week and weekend. The position was representative of the sound levels at the NSRs. The location of the measurement positions can be found in Figure 1.0.

3.2 Measurement Equipment

Piece of Equipment	Serial No.	Calibration Deviation
CESVA SC420 Class 1 Sound Level Meter	T238593	≤0.5
CESVA CB006 Class 1 Calibrator	901013	

Table 1.0 – Measurement Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.5 dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

3.3 Weather Summary

As the long-term environmental noise survey was carried out over a un-manned period no localized records of weather conditions were taken, however, during the setup and collection of the equipment the weather was calm with wind speeds less than 5m/s and no precipitation. All measurements have been compared with met office weather data for the area, specifically the closest functioning weather station near the site (Watford Weather Station). When reviewing the time history of the noise measurements, any time period that was thought to be affected by the local weather conditions has been omitted. The analysis of the noise data includes statistical and percentile values which aid in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each period during the entire measurement.

Weather Conditions – Watford Weather Station				
Time period	**Air temp (^{0}C)**	**Rainfall (mm/h)**	**Wind Speed (m/s)**	**Wind Direction**
Day 1 - 22/04/2021 - 00:00 – 23:59	0.6 – 15.3	0.0	0.0 – 2.05	E
Day 2 - 23/04/2021 - 00:00 – 23:59	0.3 – 16.6	0.0	0.0 – 2.2	E
Day 3 - 24/04/2021 - 00:00 – 23:59	1.9 – 17.7	0.0	0.0 – 3.6	ENE
Day 4 - 25/04/2021 - 00:00 – 23:59	3.0 – 14.6	0.0	0.1 – 2.75	E
Day 5 - 26/04/2021 - 00:00 – 23:59	3.3 – 14.3	0.0	0.0 – 2.35	E

Table 2.0 – Meteorological Data

3.4 Results

3.4.1 Summary Results

The following table shows a summary of the sound survey results; L_{Aeq}, L_{Amax}, L_{A90} and the L_{A10} for the measurement period.

Measurement Position - MP1				
Measurement Time Period ('t')	**$L_{Aeq,t}$**	**$L_{Amax,t}$**	**$L_{A90,t}$**	**$L_{A10,t}$**
Day 1 - 22/04/21 - 10:46 – 23:00	58.0	97.0	46.0	60.0
Night 1 - 22/04/21 - 23:00 – 07:00	54.0	81.0	36.0	57.0
Day 2 - 23/04/21 - 07:00 – 23:00	62.0	101.0	48.0	62.0
Night 2 - 23/04/21 - 23:00 – 07:00	51.0	80.0	37.0	55.0
Day 3 - 24/04/21 - 07:00 – 23:00	57.0	86.0	47.0	59.0
Night 3 - 24/04/21 - 23:00 – 07:00	53.0	89.0	33.0	56.0
Day 4 - 25/04/21 - 07:00 – 23:00	56.0	93.0	44.0	57.0
Night 4 - 25/04/21 - 23:00 – 07:00	53.5	87.0	34.0	55.9
Day 5 - 26/04/21 - 07:00 – 14:53	59.0	84.0	56.0	63.0

Table 3.0 – Sound Survey Summary Results

The following table shows a summary of the $L_{Amax,1minute}$ measurements taken during the proposed operational hours.

Measurement Position - MP1			
Measurement Period ('t')	**$L_{AFMax,1min}$**	**SMR* $L_{AFMax,1min}$**	**No. of Exceedances**
Day 1 - 22/04/21 - 10:46 – 18:00	97.0	71.0	156.0
Day 2 - 23/04/21 - 07:30 – 18:00	101.0	70.0	295.0
Day 5 - 26/04/21 - 07:30 – 14:52	98.0	70.0	217.0

Table 4.0 – Maximum Sound Level Summary Results – MP1

**Statistically Most Repeated*

The following table shows a summary of the $L_{Aeq,15minute}$ measurements taken during the proposed operational hours.

Measurement Position - MP1					
Measurement Period ('t')	**$L_{Aeq,t}$**	**Min. $L_{Aeq,1min}$**	**Max. $L_{Aeq,1min}$**	**SMR $L_{Aeq,1min}$**	**Exceedances**
Day 1 - 22/04/21 - 10:46 – 18:00	56.0	42.0	80.0	60.0	77.0
Day 2 - 23/04/21 - 07:30 – 18:00	61.0	42.0	81.0	58.0	244.0
Day 5 - 26/04/21 - 07:30 – 14:52	68.0	39.0	83.0	59.0	163.0

Table 5.0 – Background Sound Level Summary Results

4. Noise Assessment

4.1 BS8233:2014 L_{Amax} Assessment

In the following section, the L_{Amax} level measured of a dog bark at 1m of the Sound Level Meter has been used (refer to Nova Acoustics Ltd report 4193GU Addendum). It is considered that this L_{Amax} value is representative of the maximum level of a medium to large size dog bark at 1 metre. This is shown in the table below.

Dog Bark Noise Levels - L_{Amax}		
Description	**L_{Amax} (dB)**	**L_{wA} (dB)**
Measured Dog Bark	95.0	103.0

Table 6.0 – Dog Bark L_{Amax} Levels

In order to assess real-world and worst-case noise levels, two dog barks have been modelled in various positions around the site at the same time. The results of the modelling must of course be considered alongside the frequency of barking events. However, this can only be controlled by the dog management plan and staff on site.

The specific sound level at the NSRs has been calculated using SoundPlan 8.2, which undertakes its calculation in accordance with the guidance given in IS09613 – 1:1993 and ISO9613 – 2:1996.

The following assumptions have been made within the calculation software:

- To accurately model the land surrounding the development the topographical data has been taken from Google Maps, it is assumed this has an accuracy within the last 3 years.
- The ground between the source and receiver has been modelled as a mix of 'soft' and 'hard'.
- The sound levels indicated in the table above have been used to calibrate the sound model.
- An average dog height of 0.5m has been assumed.
- A grid height of 1.5m has been used for the sound map.

The sound maps showing the predicted noise levels incident on NSRs from Field 1, Field 2 and the Adventure Park can be seen in the Figures below.

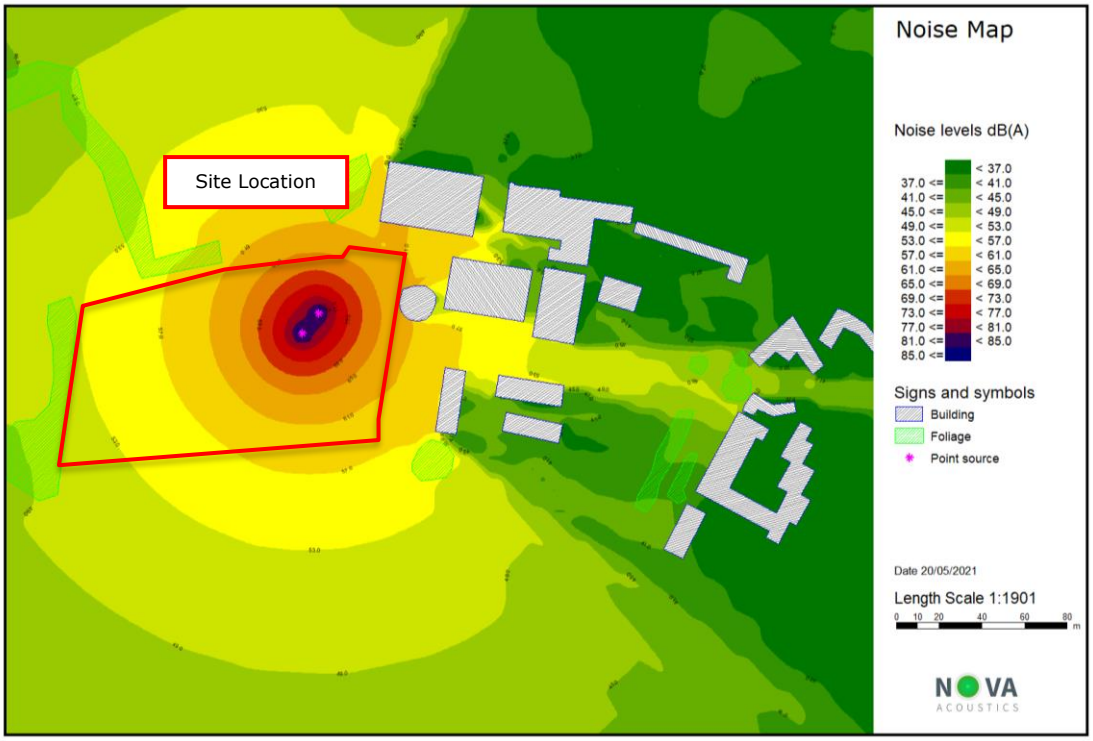


Figure 2.0 – Specific Sound Level Map – Field 1 - L_{Amax}

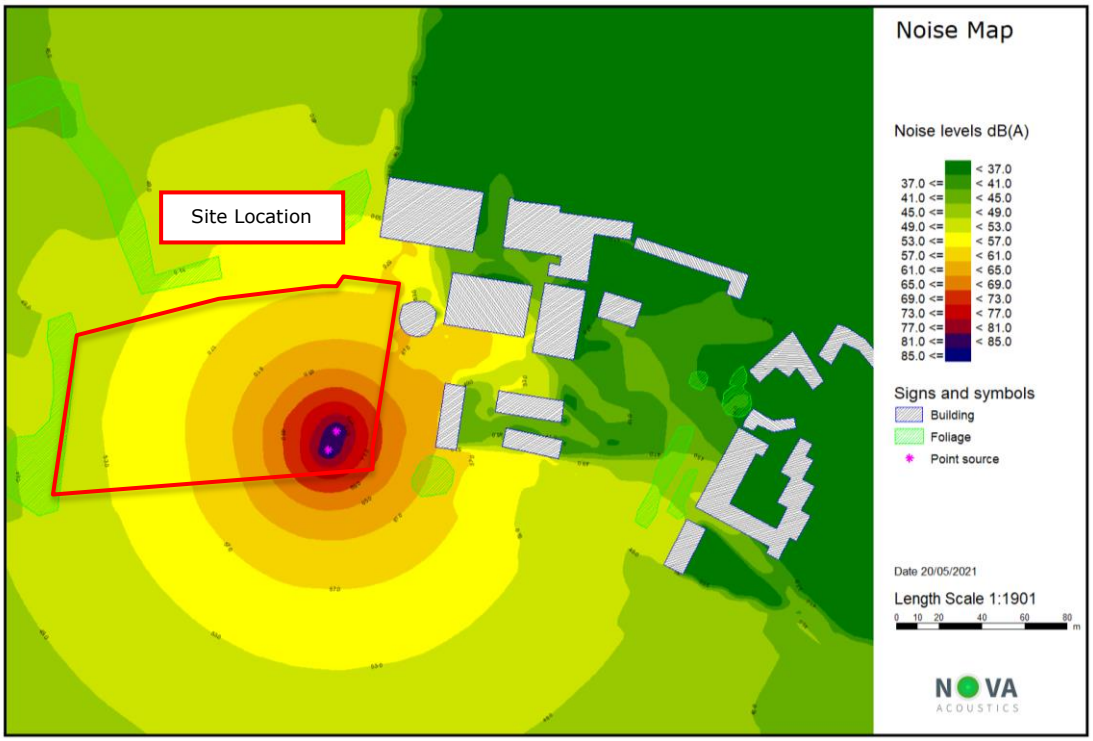


Figure 3.0 – Specific Sound Level Map – Field 2 - L_{Amax}

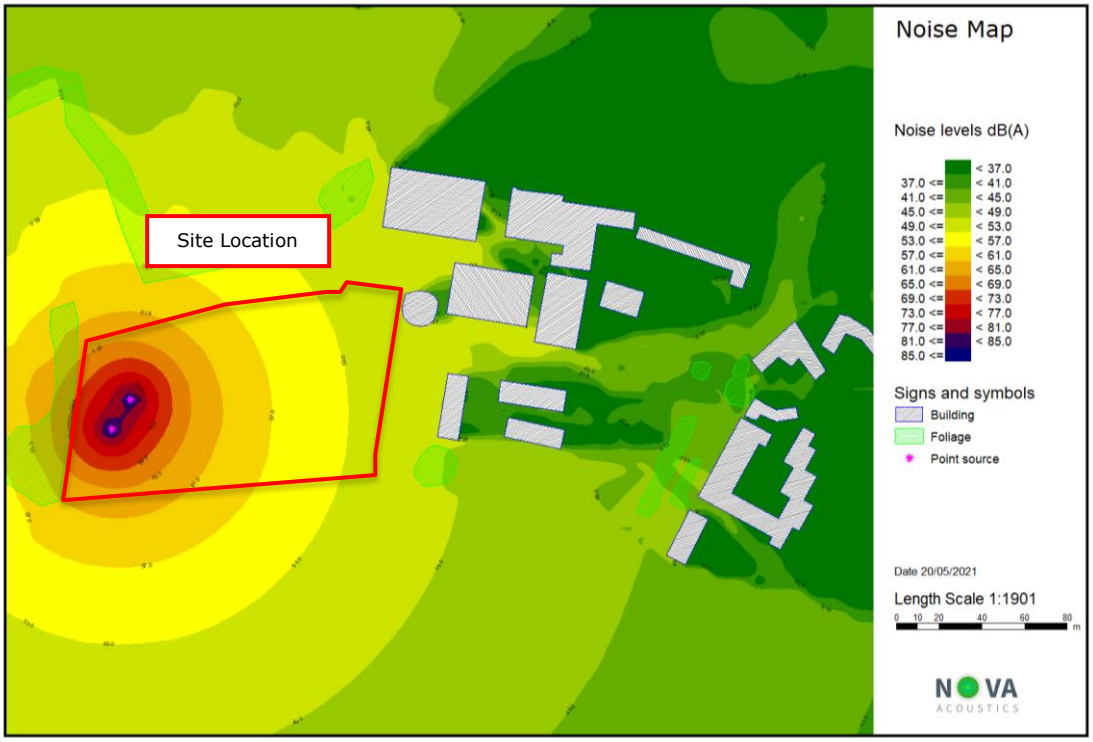


Figure 4.0 – Specific Sound Level Map – Adventure Park - L_{Amax}

The following table shows the highest predicted maximum noise levels at the NSRs. In all cases, the façade noise levels are taken from the most exposed positions of the facades and the centre of the gardens.

Dog Bark Location	NSR	Façade Noise Level (L_{Amax} dB)	Garden Noise Level (L_{Amax} dB)
Field 1	1	46.0	41.0
	2	46.0	26.0
Field 2	1	46.0	48.0
	2	49.0	28.0
Adventure Park	1	43.0	46.0
	2	45.0	25.0

Table 7.0 – Predicted Noise Levels - L_{Amax}

4.1.1 Internal Noise Level Assessment

In the following section, the predicted maximum sound levels incident on the NSRs from 2 no. dog barks are compared with the internal noise level criteria presented within BS8233:2014. BS8233:2014 does not specifically provide any criteria for internal maximum noise levels during the daytime, however, the standard does provide appropriate internal maximum noise levels during the night time (45 dB $L_{AFMax,}$) with further consideration being taken for the frequency of maximum

events. This criterion is implemented to minimise sleep disturbance and provide an adequate environment for sleep and rest in a typical person. Therefore, it is not deemed to be appropriate to apply this objective criterion to daytime maximum noise events. It is however noted that there are no specific objective criteria that we are aware of to assess the suitability of maximum internal noise events during the day. Therefore, any decision would have to be solely based on subjective impression of the effect level. For this reason, we present the following objective criteria considering the internal sound levels presented in BS8233:2014: The difference between the average noise level criteria is 5 dB considering the day time and night time, and if the same difference was applied to the maximum noise criteria the associated maximum would be 50 dB $L_{AFMax,DAY.}$ This would provide an internal noise criteria of 50 dB $L_{AFMax,DAY}$, dependent on the frequency of events. Subsequently, the external noise criteria and façade sound level would be 65 dB $L_{AFMax,DAY,}$ when considering the attenuation provided by an open window. The results of the modelling can be seen in the table below.

NSR	Façade Noise Level (L_{Amax} dB)	Attenuation of an Open Window (dB)	Expected Internal Level (dB)	BS8233 Criteria ($L_{Amax,16hour}$)	Highest Exceedance of BS8233 (dB)
1	43.0 – 46.0	-15.0	28.0 – 31.0	50.0 dB	-19.0
2	43.0 – 49.0	-15.0	28.0 – 34.0	50.0 dB	-16.0

Table 8.0 – BS8233 Internal L_{Amax} Noise Level Analysis

Discussion

The BS8233:2014 assessment shows that the maximum dog bark noise levels from the Proposed Development are predicted to comply with the proposed internal BS8233:2014 criteria at the NSRs.

It is also important to note that ProPG states that 10 maximum noise events occurring during the night time are an acceptable baseline to avoid sleep disturbance, however, there is no criterion for the frequency of maximum noise events during the daytime. The only method to control the frequency of maximum events (barks) is through appropriate training and control by the dog handlers.

CIEH Clay Pigeon Shooting Noise Guidelines

The CIEH Clay Pidgeon Shooting Noise Guidelines are recommendations designed to help describe and control the effects of noise from clay pigeon shooting. The guidelines can be applied in this situation as the impulsive nature of a dog's bark is similar in character to the noise of a gunshot. Whilst it is understood that these guidelines are not directly applicable to noise from dogs, as with the other standards assessed to, it provides further guidance to the decision-maker.

The guidelines state,

"*…research suggests that there is no fixed shooting noise level at which annoyance starts to occur. Annoyance is less likely to occur at a mean shooting noise level (mean SNL) below 55 dB(A), and highly likely to occur at a mean shooting noise level (mean SNL) above 65dB(A).*"

As can be seen in the table above, the highest predicted garden noise level is 48.0 dB in the garden of NSR1. According to the CIEH guidance, this is below the level at which 'annoyance is less likely to occur' by 7 dB.

4.1.2 Environmental L_{Amax} Comparison

In the following section, the predicted L_{Amax} garden noise levels are compared with the noise levels measured during the proposed operational period. In order to provide a robust assessment, the sample period has been set to 1 minute. The table below shows the measured statistically most repeated $L_{Amax,1min}$ levels compared with predicted garden noise levels.

Measurement Position - MP1			
Garden Location	**Predicted L_{Amax}(dB)**	**SMR $L_{AFMax,1min}$ (dB)**	**Maximum Exceedance**
NSR1	41.0 - 48.0	70.0	-22.0
NSR2	25.0 – 28.0	70.0	-42.0

Table 9.0 – Maximum Sound Events Analysis

Discussion

As can be seen in the table above, the garden noise levels are below the statistically most repeated $L_{Amax,1min}$ by at least 22.0 dB. This means that the maximum noise levels due to a dog barking are considered inaudible at the most exposed NSR's garden, depending on the context. Therefore, it is expected than the majority of average events should be louder than a dog bark at the NSRs.

4.2 BS8233:2014 L_{Aeq} Assessment

The following section analyses the $L_{Aeq,1second}$ level measured of a dog bark (refer to Nova Acoustics Ltdreport 4193GU Addendum). It is considered that this $L_{Aeq,1second}$ value is representative of the average noise level of a medium to large sized dog bark at 1 metre. This is shown in the table below.

Dog Bark Noise Levels		
Description	**$L_{Aeq,1second}$ (dB)**	**L_{wA} (dBA)**
Measured Dog Bark	82.0	90.0

Table 10.0 – Dog Bark L_{Aeq} Levels

In order to assess the worst-case noise levels at each NSR, again multiple scenarios have been modelled in various positions around the site. Again, a dog height of 0.5m has been assumed. The

sound maps showing the predicted noise levels incident on NSRs from Field 1, Field 2 and the Adventure Park can be seen in the Figures below.

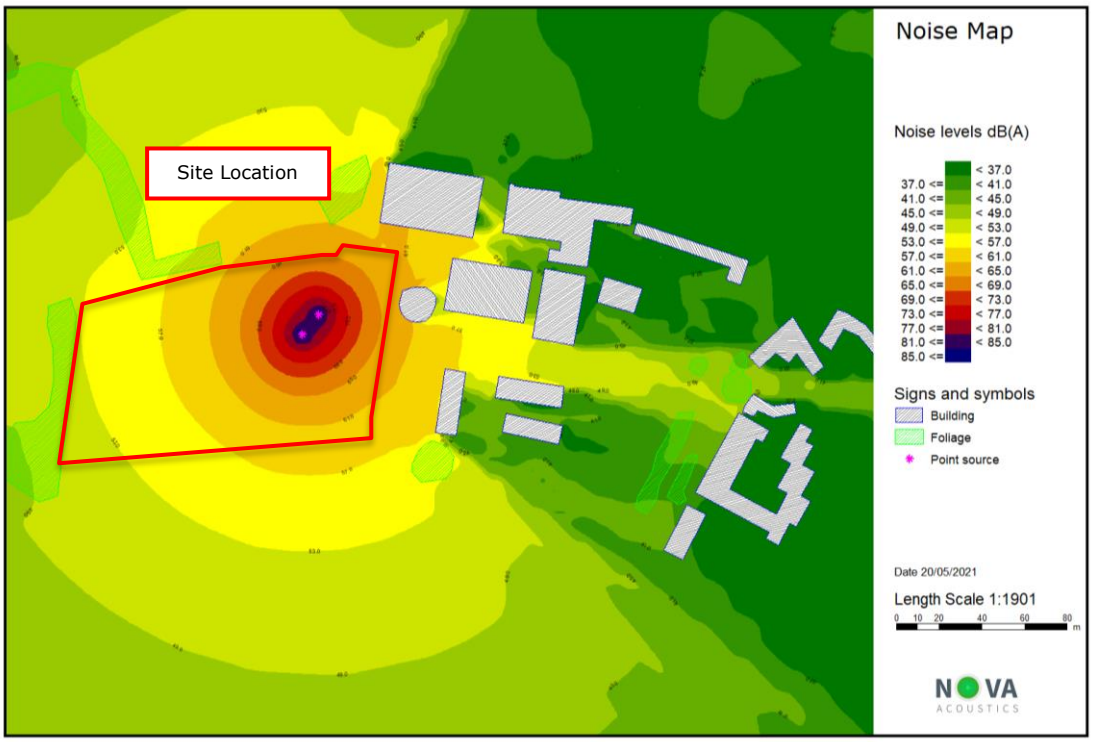


Figure 5.0 – Specific Sound Level Map – Field 1 - L_{Aeq}

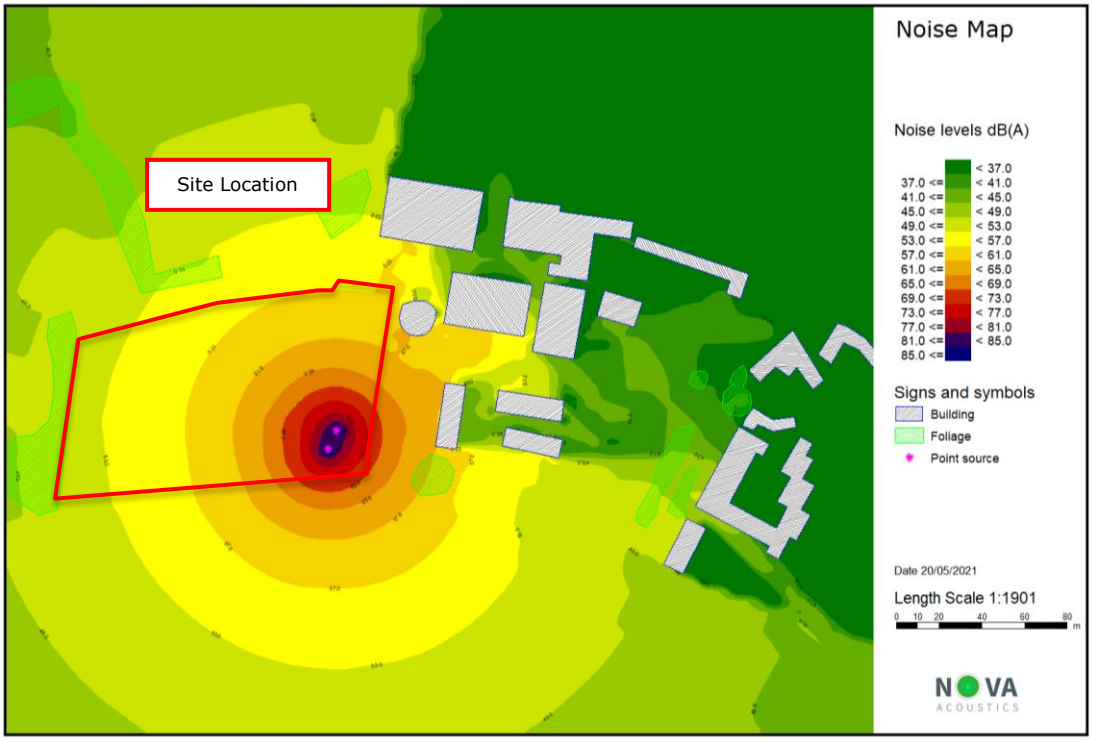


Figure 6.0 – Specific Sound Level Map – Field 2 - L_{Aeq}

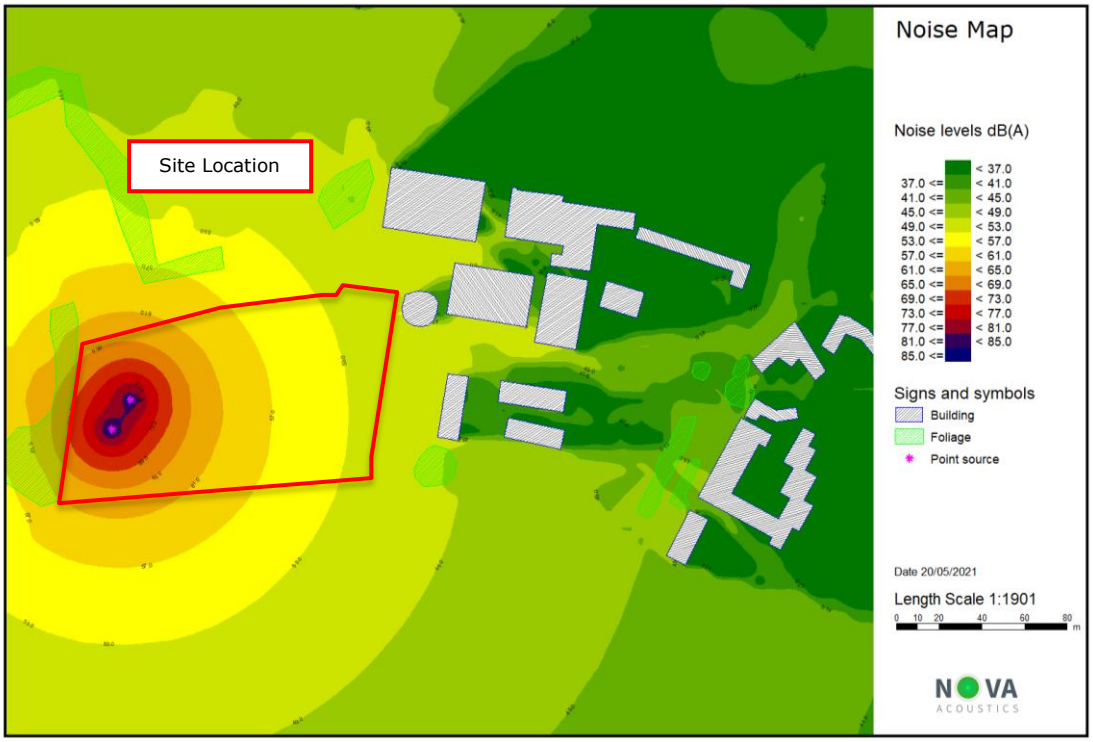


Figure 7.0 – Specific Sound Level Map – Adventure Park - L_{Aeq}

The following table shows the highest predicted $L_{Aeq,1second}$ noise levels at the NSRs. In all cases, the noise levels are taken from the most exposed positions of the facades and the centres of gardens.

Dog Bark Location	NSR	Façade Noise Level (L_{Aeq} dB)	Garden Noise Level (L_{Aeq} dB)
Field 1	1	33.0	28.0
	2	33.0	13.0
Field 2	1	33.0	35.0
	2	36.0	15.0
Adventure Park	1	30.0	33.0
	2	32.0	12.0

Table 11.0 – Predicted Noise Levels - L_{Aeq}

4.2.1 Internal Noise Level Assessment - L_{Aeq}

In the following section, the predicted average sound levels incident on the NSRs from single dog barks are compared with the internal noise level criteria presented within BS8233:2014. It is stated in BS8233:2014 that internal noise levels should not exceed 35 dB during the day time period. Subsequently, the façade sound level should not exceed 50 dB L_{Aeq} when considering the attenuation provided by an open window.

NSR	Façade Noise Level (L_{Aeq} dB)	Attenuation of an Open Window (dB)	Expected Internal Level (dB)	BS8233 Criteria ($L_{Aeq,16hour}$)	Highest Exceedance of BS8233 (dB)
1	30.0 – 33.0	-15.0	15.0 - 18.0	35.0 dB	-17.0
2	32.0 – 36.0	-15.0	17.0 - 21.0	35.0 dB	-14.0

Table 12.0 – BS8233 Internal L_{Aeq} Noise Level Analysis

Discussion

The BS8233:2014 L_{Aeq} noise assessment shows that the average noise due to 2 no. dog barks is not expected to exceed the criteria at the most exposed NSRs.

4.2.2 Environmental L_{Aeq} Comparison

In the following section, the predicted L_{Aeq} garden noise levels are compared with the statistically most repeated L_{Aeq} noise levels taken during the measurement period. In order to provide a robust assessment, the sample period has been set to 1 minute.

Measurement Position - MP1			
Garden Location	Predicted L_{Aeq} Levels (dB)	Statistically most Repeated $L_{Aeq,1min}$ (dB)	Maximum Exceedance
NSR1	28.0 - 35.0	58.0	-23.0
NSR2	12.0 - 15.0	58.0	-43.0

Table 13.0 – Average Sound Events Analysis

Discussion

As can be seen in the table above, the highest garden noise levels are below the lowest statistically most repeated $L_{Aeq,1min}$ by at least 23 dB. This means that the maximum noise levels due to a dog barking are considered inaudible at the most exposed NSR's garden, depending on the context.

It is stated in the WHO guideline criteria that noise levels in garden areas should not exceed 50 – 55 dB during the day time period. As can be seen in the table above, the predicted garden level is within the criteria.

4.3 Conclusion

The nearest noise sensitive receptors to the site have been identified to be the residential properties to the south-east of the site. Noise survey work has been undertaken to assess the appropriateness of the dog day care use in terms of residential amenity.

The BS8233:2014 assessment shows that the maximum dog bark noise levels from the Proposed Development are predicted to comply with the proposed internal BS8233:2014 criteria at all two noise sensitive receptors. Furthermore, the measurements conclude that a two-dogs bark will not exceed the criteria of BS8233:2014 at the more exposed nearest noise sensitive receptors from within the properties assuming the windows are open.

As can be seen in sections 4.1.2 and 4.2.2 of this report, the noise levels in the gardens are predicted to be significantly below the statistically most repeated values in all the cases, indicating that the dog noise will likely be inaudible at the NSRs. The ambient noise levels were measured during the proposed operational times of the site and that, in such a location, the noise emissions should be representative of the events taking place in the area. Taking all this into account, it is expected that the majority of average events should be louder than a dog bark at the NSRs.

The 'WHO Guidelines for Community Noise' criterion for noise in external amenity areas is 50 – 55dB $L_{Aeq,16hour}$. These guidelines are typically used to assess steady continuous noise effects on residential dwellings from noise sources such as traffic. Considering the lack of other relevant standards, this noise criterion does provide a good indication of appropriate external noise levels. The external L_{Aeq} noise levels are predicted to be at least 23 dB below the upper noise criteria in the garden areas of the NSRs indicating that external noise levels should be acceptable considering two dogs barking at the same time.

Good management on site of the dogs and operating in accordance with the Bruce's Doggy Day Care's Dog Handling Policy at set out at section 2.2 of the report will ensure that dog barking is kept to a minimum and that the use of the site for up to 130 dogs will not cause an adverse impact on neighbour's amenity.

Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound 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.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is 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. L90 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. L10 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
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

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

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the

time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}.

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,15mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms.

Appendix B – Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

National Planning Policy Framework (2019)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2019. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 170e, it states:

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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 180 states:

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:

- *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;*
- *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

Noise Policy Statement for England

Paragraph 180 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

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;*
- *Where possible, contribute to the improvement of health and quality of life.*

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

NOEL – No Observed Effect Level

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. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

BS8233:2014 `Guidance on sound insulation and noise reduction for buildings'

The British Standard BS8233:2014, Guidance on Sound insulation and noise reduction for buildings provides additional guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organization; specifically, WHO Guidelines on Community Noise, 1999. The criteria desirable levels of steady state, "anonymous" noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below:

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	--
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	--
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 14.0 - BS8233 Criteria for Internal Noise Levels in Dwellings

It is noted, however, that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

The standard also recommends that for traditional external amenity areas, such as gardens, it is desirable that external noise levels do not exceed 50 dB $L_{Aeq,T}$, and that 55 dB $L_{Aeq,T}$ would be acceptable in noisier environments. However, it is recognised that these values may not be achievable in all areas where development is desirable and in such locations, development should be designed to achieve the lowest practicable levels.

General recommendations for mitigation to enable these targets to be achieved are provided, including the use of bunds and barriers to reduce external noise and space planning and sound insulation for the control of internal noise levels.

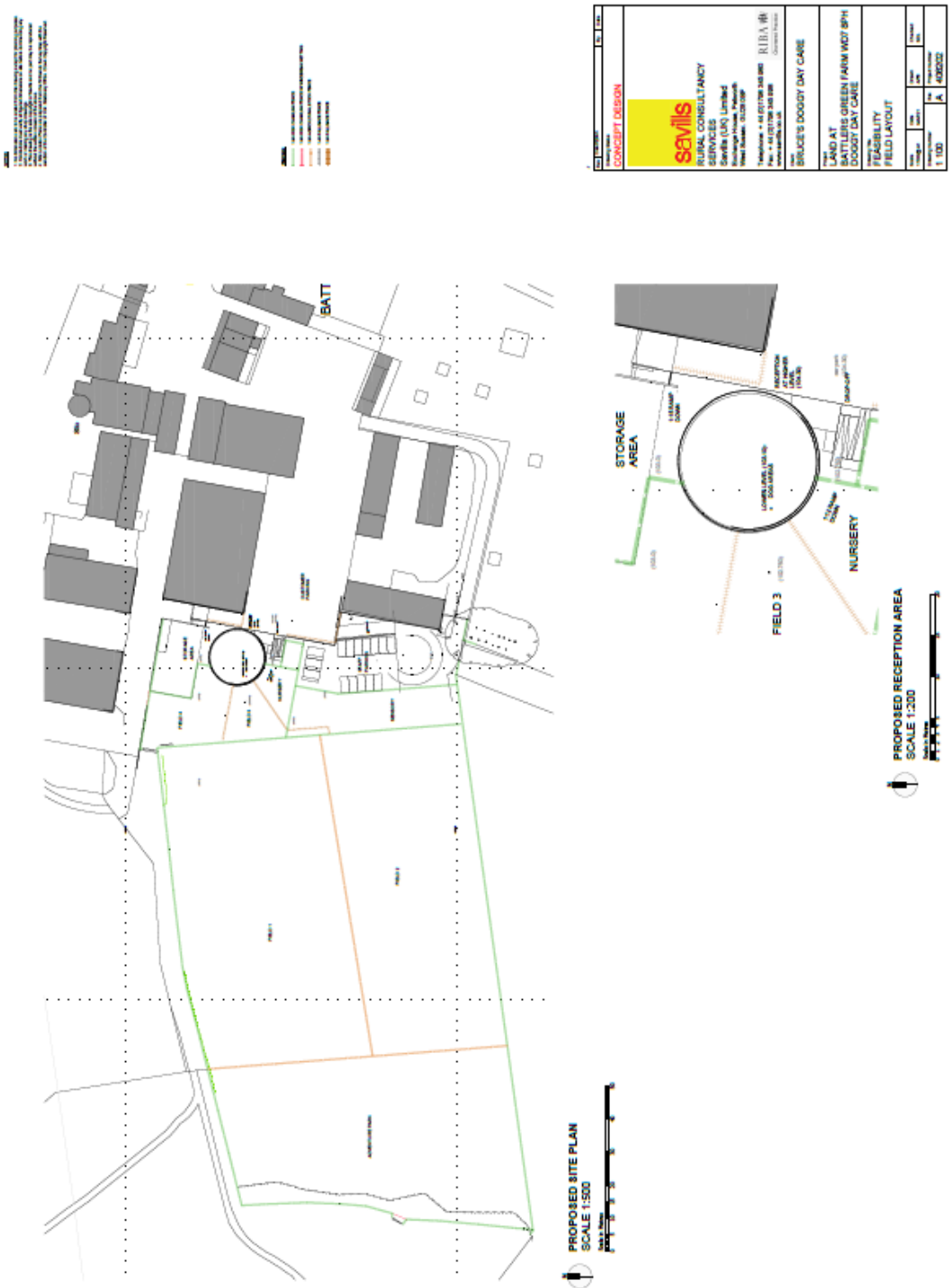
For this assessment, the above criteria are considered to be the LOAEL as defined in the NPSE above.

ISO 9613-2 Attenuation of sound during propagation outdoors

The ISO 1996 series of standards specifies methods for the description of noise outdoors in community environments. Part 2 of ISO 9613 is intended to enable noise levels in the community to be predicted from sources of known sound emission. The method is general in the sense that it may be applied to a wide variety of noise sources, and cover most of the major mechanisms of attenuation.

This standard provides guidance on the outdoor propagation of sound. It is widely used to establish the different attenuations that occur during the transmission of the sound from the sources to the receivers. The total attenuation is the sum of the following: geometrical divergence, atmospheric absorption, ground effect, barriers, and miscellaneous other effects.

Appendix C – Site Plans



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Appendix D – Environmental Sound Survey