NOISE IMPACT ASSESSMENT AND
NOISE MANAGEMENT PLAN

THE NEST BOX AT THE MAC'S FARM

(VARIATION OF CONDITIONS 4 AND 5 ON APPLICATION SDNP/22/0511/CND TO EXTEND THE HOURS MUSIC CAN BE PLAYED INDOORS FROM 22:00 HOURS TO 23:00 HOURS IN-LINE WITH THE PREMISES LICENCE AND TO INSTALL A NOISE LIMITER TO REDUCE SOUND LEVELS TO $L_{EQ,T}$ 86 DBA WITHIN THE BUILDING)

THE MAC'S FARM

MARCH 2024

NOISE IMPACT ASSESSMENT AND NOISE MANAGEMENT PLAN
THE NEST BOX AT THE MAC'S FARM

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Client: **The Mac's Farm**
Ditchling
BN6 8TG

Report by: **Anderson Acoustics Ltd.**
3 Trafalgar Mews
15-16 Trafalgar Street
Brighton
BN1 4EZ

[redacted]

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Author	Grady Cook Assistant Consultant BSc (Hons) AMIOA	[redacted]	5 March 2024
Reviewed	Callum Brewer Senior Consultant MSc MIOA		5 March 2024
Approved	Callum Brewer Senior Consultant MSc MIOA		5 March 2024

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5-0	Revision of noise management plan	GC	CB
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7-0	Minor typo	GC	CB

CONTENTS

1 INTRODUCTION AND SUMMARY

This report has been prepared by Anderson Acoustics Limited for The Mac's Farm in support of its application to the South Downs National Park Authority to vary Conditions 4 and 5 on SDNP/22/0511/CND to extend the hours music can be played indoors from 22:00 hours to 23:00 hours, inline with the premises licence and to install a noise limiter to reduce sound pressure levels to $L_{eq,T}$ 86 dBA within the building.

The Approval relates to the Farm's barn known as The Nest Box, which was subject to the "Change of use of part of an agricultural building to Class A3 (restaurants and cafes) and Class D2 (assembly and leisure)" under application SDNP/21/00865/PA3R. Condition 4 on this consent states:

> "There shall be no amplified or percussive music of any form played within or adjacent to the building for which the change of use is hereby authorised, after 22:00 hours on any day within the calendar year."
>
> Reason: In order to mitigate the noise impacts of the development."

Application SDNP/22/05011/CND then sought to vary Condition 2 of SDNP/21/00865/PA3R so that the Class A3 + D2 building could be used during the winter months without limitation to the ancillary campsite, that the building would be fitted with double glazed windows and that amplified music and speech would be carried out within the building with doors and windows closed.

Condition 4 was re-applied to this consent. Condition 4 on application SDNP/22/05011/CND states:

> "There shall be no amplified or percussive music of any form played within or adjacent to the building for which the change of use is hereby authorised, after 22:00 hours on any day within the calendar year."
>
> Reason: In order to mitigate the noise impacts of the development."

It is proposed to vary Condition 4 as follows:

> "There shall be no amplified or percussive music of any form played within the building for which the change of use is hereby authorised after 23:00 hours on any day, or adjacent to the building, after 22:00 hours on any day within the calendar year."

For the avoidance of doubt, the current planning application for the variation of Condition 4 proposes uses inside The Nest Box only.

Condition 5 on application SDNP/22/05011/CND states:

> "The use of the building between 1st October – 30th April in any calendar year shall be carried out, in accordance with the Noise Impact Assessment and Noise Management Plan hereby approved.
>
> The document includes the following measures:
>
> > Any live/amplified music to be sound checked and limited to be below 90 dBA (LAmax) at head height in the middle of the space through the installation of a cut off noise limiter. Patrons to be reminded to leave quietly following any evening events. Appropriate signage to be displayed in prominent areas.
> > Any complaints regarding noise levels should be logged and acted upon straight away. Details of the time and the action taken should be recorded and kept for reference purposes. The LA EP team should be advised on the next working day, should any complaints of excessive noise be received.

Background noise levels (sound pressure levels LA90 15 min) to be monitored during the relevant time period on a day prior to the event at specified points (the locations to be agreed with the Planning Authority in advance) on the boundary of the Farm (measured over at least one 15 minute period at each location). The measured levels should be recorded for future reference.
Noise levels (sound pressure levels, LAeq 15 min measured over at least one 15 minute period at each location, and then at least once each hour throughout the event at the downwind locations) are to be monitored during each event at specified points on the boundary of the Farm (the locations to be agreed with the Planning Authority in advance). The measured levels should be recorded for future reference.
The noise levels measured at the pre-approved points on the boundary of the Farm during the event must not exceed 50dB(A) (LAmax) and must be no higher than 5 dB(A) above the previously measured background level. If noise levels approach these limits then appropriate action must be taken immediately. Details of the time and any action taken should be recorded and kept for reference purposes.

The use of the application site shall thereafter accord with the measures set out in the approved Noise Management Plan.

Reason: to protect the amenities of the area and neighbouring dwellings and the tranquillity of the National Park."

It is proposed to vary the first point of Condition 5, as follows, so that it is in agreement with the proposed reduction of the internal noise limit of 86 dBA in the revised noise management plan.

"The use of the building between 1st October – 30th April in any calendar year shall be carried out, in accordance with the Noise Impact Assessment and Noise Management Plan hereby approved.

The document includes the following measures:

Any live/amplified music to be sound checked and limited to be below 86 dBA (LAmax) at head height in the middle of the space through the installation of a cut off noise limiter. Patrons to be reminded to leave quietly following any evening events. Appropriate signage to be displayed in prominent areas.
Any complaints regarding noise levels should be logged and acted upon straight away. Details of the time and the action taken should be recorded and kept for reference purposes. The LA EP team should be advised on the next working day, should any complaints of excessive noise be received.
Background noise levels (sound pressure levels LA90 15 min) to be monitored during the relevant time period on a day prior to the event at specified points (the locations to be agreed with the Planning Authority in advance) on the boundary of the Farm (measured over at least one 15 minute period at each location). The measured levels should be recorded for future reference.
Noise levels (sound pressure levels, LAeq 15 min measured over at least one 15 minute period at each location, and then at least once each hour throughout the event at the downwind locations) are to be monitored during each event at specified points on the boundary of the Farm (the locations to be agreed with the Planning Authority in advance). The measured levels should be recorded for future reference.
The noise levels measured at the pre-approved points on the boundary of the Farm during the event must not exceed 50dB(A) (LAmax) and must be no higher than 5 dB(A) above the previously measured background level. If noise levels approach these limits then appropriate action must be taken immediately. Details of the time and any action taken should be recorded and kept for reference purposes.

The use of the application site shall thereafter accord with the measures set out in the approved Noise Management Plan.

Reason: to protect the amenities of the area and neighbouring dwellings and the tranquillity of the National Park."

Accordingly, this report presents the assessment of the use of The Nest Box in terms of the potential for adverse noise impact on residential receptors in accordance with relevant guidance. As worst case, the following scenarios have been considered:

1 Raised voices inside and outside the building.
2 Live/amplified music inside the building, plus Scenario 1.

The sound levels calculated for Scenario 1 are well below the background conditions, whereby it is concluded that there is a very low risk of adverse noise impact.

The live/amplified music sound levels in Scenario 2 can be adequately controlled to not go above the background sound conditions at the noise-sensitive receptors, by no more than 5 dB, whereby guidance relevant to entertainment noise would be met. This is on the basis that an appropriate electronic 'power cut-off' type noise limiter is installed within the building.

At this level, the sound levels would still be notably below the ambient conditions and within guidance criteria relevant to external residential amenity areas. It is, therefore, concluded that the operation of The Nest Box would not result in an adverse noise impact providing sound levels within The Nest building are adequately controlled by an electronic noise limiting device.

With the above in mind, it is considered that noise should not be a factor in the determination of the planning application, as the specified controls should make the development acceptable in planning terms.

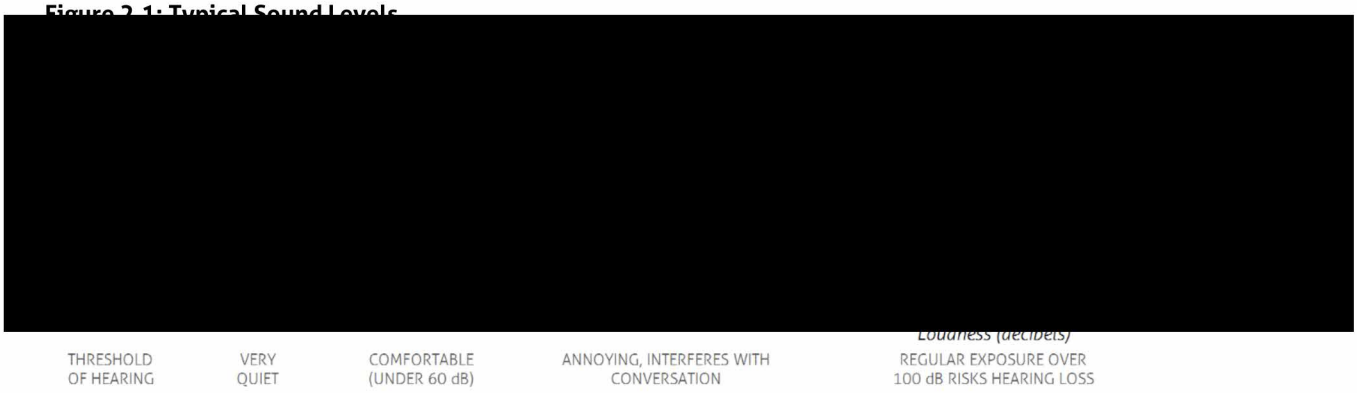
Notwithstanding this, the revised Noise Management Plan in Section 8 is presented such that the risk of adverse noise impact is kept to a practicable minimum and to reflect the variation of Condition 4 so that it is in accordance with Point 1 of Condition 5.

2 GLOSSARY

Sound can be measured by a sound level meter or other measuring system. Noise is related to a human response, and is routinely described as unwanted sound, or sound that is considered undesirable or disruptive.[1] Care has been taken in this document to use the most relevant of these terms (whereby 'sound' is used predominantly); however, in most reference documents, and, indeed, generally, 'sound' and 'noise' are used interchangeably. Consequently, just because the term 'noise' is used doesn't necessary mean a negative effect exits or will occur, and the context of the accompanying text should be taken into account.

Human hearing is 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). An indication of the range of sound levels commonly found in the environment is given below.

Figure 2.1: Typical Sound Levels



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 sound in a manner that approximates the response of the human ear, a weighting mechanism is used, which reduces the importance of lower and higher frequencies in a similar manner to human hearing.

The weighting mechanism that best corresponds to the response of the human ear (though not necessarily perfectly) is the 'A'-weighting scale. This is widely used for environmental sound measurement, and the levels are denoted as dBA, dB(A) or L_{Aeq}, L_{A90} etc. according to the metric being measured or determined (see the Definitions over leaf).

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 dBA increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dBA is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. Where other changes occur (associated with the change in sound level), such as additional vehicle movements on a road, which can be seen, then these may result in changes in sound level being more noticeable than they might otherwise be.

Further to such visual clues, and any other non-acoustical factors that affect people's response (such personal characteristics, and social, residential or environmental factors), the subjective response to a sound is dependent not only upon the sound pressure level and component frequencies, but also its intermittency. Consequently, various metrics have been developed to try and correlate people's attitudes to different sounds with the sound level and its fluctuations. The metrics used in this document, as per the relevant guidance, are defined overleaf.

[1] Taken from the Foreword to BS 4142:2014 *Methods for rating and assessing industrial and commercial sound.*

Ambient sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.

Area source: A sound source that covers a particular area to which a sound power level (see below) is applied. It can be used to represent numerous sources spread out over a large area (such as a car park) or a surface of a building or enclosure from which sound radiates.

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.

Background sound: Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location.

Calibration: The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The calibration of the system should also be checked in the field using a portable calibrator before and after each short term measurements, and periodically for longer term monitoring.

Context: The circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understood. When considering context, pertinent factors include: the absolute level of sound; the character and level of the residual sound compared to the character and level of the specific sound; evidence on human response to the sound; and the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

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 $\log_{10}$ (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 20 µPa.

Dwelling: A building used for living purposes. A mobile home used for permanent living should be included in an assessment. If calculations are being conducted for compensation purposes, then some mobile homes are dealt with under the Highways Noise Payments and Moveable Homes Regulations.

Fast time-weighting (F): Averaging time used in sound level meters. Defined in BS EN 61672-2:2013 *Electroacoustics. Sound level meters. Pattern evaluation tests*.

$L_{AF90,T}$: The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time fast time-weighting (F). Generally used to describe the 'background' sound conditions.

$L_{eq,T}$: A sound level index called the equivalent continuous sound 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. Where the value is A-weighted, is will be presented '$L_{Aeq,T}$' or 'dBA $L_{eq,T}$', otherwise is should be an un-weighted (or linear) value.

Point source: A sound source whose dimensions are small compared to the propagation distances involved. Due to the Inverse Square Law, the sound level pressure level decreases by 6 dB every time the distance between the measurement point and the source is doubled.

Rating Level, $L_{Ar,Tr}$: The equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$, see also Specific Level) of the sound, plus any adjustment for the characteristic features of the sound.

Sound power level, L_W: Sound power measured on a decibel scale, relative to a reference value of 10^{-12} W.

Sound pressure level (sound level), L_p: The sound level is the sound pressure relative to a standard reference pressure of 20 µPa ($20x10^{-6}$ Pascals) on a decibel scale.

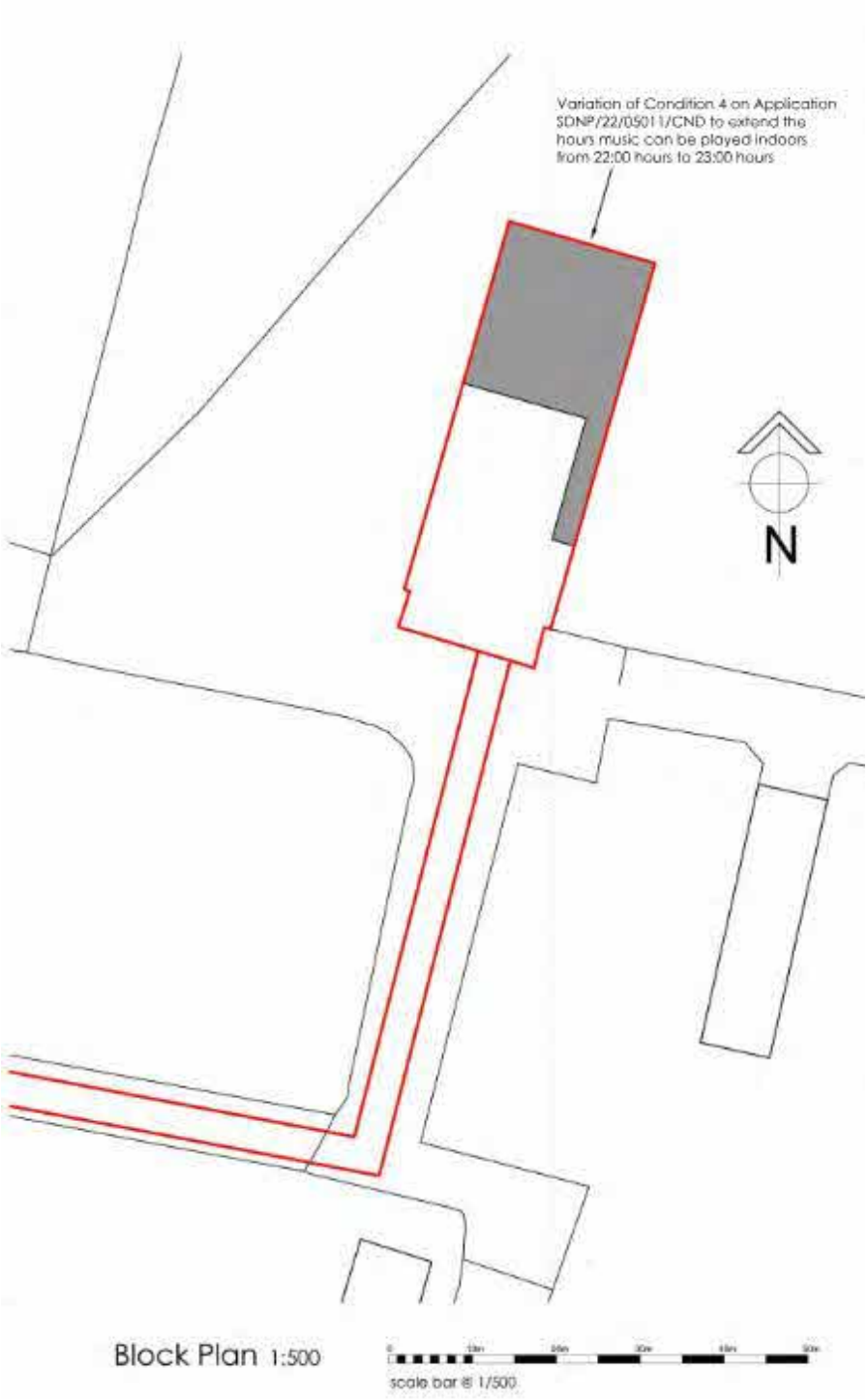
Specific sound level, $L_s = L_{Aeq,Tr}$: Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Specific sound source: Sound source being assessed.

3 THE NEST BOX

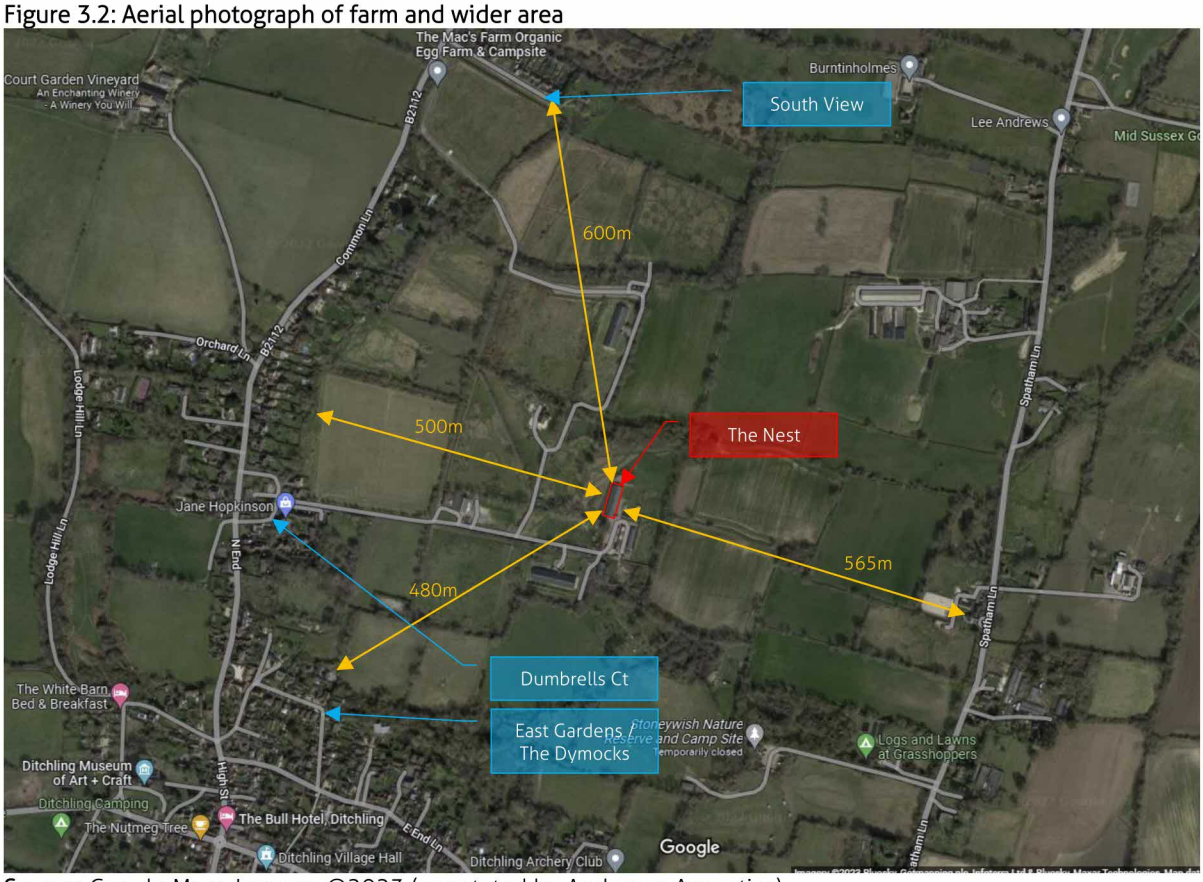
The above referenced applications relate specifically to the venue on the farm known as The Nest Box, which is shown in the following figures.

Figure 3.1: The Nest Box location plan and block plan



Source: 3-D Architecture Limited (Rev.B)

Figure 3.2: Aerial photograph of farm and wider area



Source: Google Maps Imagery ©2023 (annotated by Anderson Acoustics)

Figure 3.3: The Nest Box (north (front) and east (side) elevations)

Source: Anderson Acoustics (image captured May 2022)

Figure 3.4: The Nest Box (north end)

Source: Anderson Acoustics (image captured January 2022)

The building can be seen to be constructed with a steel frame, with the roof, comprising steel roofing sheets and insultation boards, representing the largest component. The side walls (approximately 2.5m high on the inside, 2m on the outside – the upper section above the windows being boxed-in), being a combination of double-leaf brickwork and double-leaf timber panelling, with double-glazing to be installed in the currently open areas prior to any events relevant to the assessment being held. The outer end wall is double-leaf timber panelling, with a pair of large timber doors. The inner end wall, separating the space from the toilets and storage areas in the southern half of the building, is a combination of brick and timber construction.

In addition to the main doors in the end wall, there are doors at the ends of the side walls, adjacent to the inner separating wall. The doors in the east elevation are used routinely, the others are not.

4 EXSITING AND PROPOSED USES

4.1 Existing Uses

As per the Prior Approval (ref. SDNP/21/00865/PA3R), The Nest Box is used for uses that come under Use Classes A3 and D2 (now E and F.2 since the changes in classes in September 2020). In practice, this can mean:

Café and restaurant.
Local food lunches/nights (food cooked and produced locally with the story of the food and how it was grown and cooked etc.).
Meetings/training/education/recreation/leisure/private bookings.
Pop-up local shops/craft/farmers markets.
Live music.

It is understood that, whilst there have been noise-related complaints about other open air events at the Farm, and that there were a number of objections to application (ref. SDNP/22/05011/CND), including on the grounds of noise, no noise related complaints have been received regarding the use of The Nest Box following the grant of consent for A3/D2 use.

4.2 Proposed Uses

The proposed uses are essentially the same as the above, where the variation of Condition 4 would extend the hours music can be played indoors from 22:00 hours to 23:00 hours, inline with the premises licence and Condition 5 would be varied to allow for the installation of a noise limiter which would ensure sound pressure levels do not exceed $L_{eq,T}$ 86 dBA within the building.

5 ASSESSMENT GUIDANCE

5.1 Introduction

There is no single source of guidance covering the assessment of the existing and proposed uses, but where BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* is considered the best fit, especially where sense-checked against related advice in BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* and the *Code of Practice on Environmental Noise Control at Concerts* (1995). The key guidance from these three documents is presented below.

5.2 BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

As per the title, BS 4142 provides methods for rating and assessing sound/noise of an industrial or commercial nature in relation to residential premises. The assessment methodology evaluates the "specific sound level" of each industrial or commercial sound source, corrects, where required, for distinguishable features to derive the "rating level", and compares this with the "background sound level".

The advice is that the background sound level ($L_{AF90,T}$) should be derived from continuous measurement of normally not less than 15 minute intervals over the period of interest, and that it should not be the lowest level, but representative of typical conditions at the noise-sensitive receiver(s) relevant to the period(s) of operation.

The specific sound level ($L_S = L_{Aeq,Tr}$) is obtained (by measurement or calculation) over a reference period of 1 hour in terms of the daytime (07:00 to 23:00) and 15 minutes during the night-time (23:00 to 07:00).

The rating level ($L_{Ar,Tr}$) is the specific sound level corrected to account for any acoustic features present in the sound in question, as experienced at the receptor, such as distinguishable, discrete, continuous note (a whine, hiss, screech or hum etc.) or distinct impulses (bangs, clatters or thumps etc.). Where no correction is warranted, the rating level is equal to the specific sound level.

The "subjective method" to calculate the rating level incorporates the following corrections (particularly appropriate for new sources that cannot be measured in-situ):

- up to +6 dB due to tonality, subjectively this might be +2 for a tone that is just perceptible, +4 where it is clearly perceptible and +6 where it is highly perceptible;
- up to+9 dB for impulsivity, subjectively this might be +3 for impulsivity that is just perceptible, +6 where it is clearly perceptible and +9 where it is highly perceptible; and
- up to +3 dB for other acoustic features that are neither tonal nor impulsive, though readily distinctive at the receptor.

An "initial estimate" of the impact of the specific sound is calculated by subtracting the background sound level from the rating level. The following advice applies:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

> Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Key is the statement “depending on context”, since the significance of the sound in question depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur.

Where the initial estimate of the impact needs to be modified due to the context, the assessment should take into account all pertinent factors, including:

- the absolute level of sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether dwellings will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Helpfully, BS 4142 includes some example assessments, which include the following statements:

> “Although the plant noise is somewhat different in character to the residual acoustic environment the rating level of 30 dB is low and will have little impact on residents using their patio during the evening.”

> “In addition to the rating/background sound level comparison…Other guidance, such as BS 8233, might also be applicable...”

An assessment, therefore, is effectively in two parts. The first part results in an initial indication of the impact, which is subsequently considered in terms the context unique to the situation at hand; and where this second part may require consideration of alternative guidance and metrics. Alternatively, the context can be considered upfront, and a specific threshold (or set of thresholds) determined accordingly in place of the default values presented in points a) to d) quoted above.

5.3 BS 8233 Guidance on sound insulation and noise reduction for buildings

The core method in BS 4142 (outlined above) compares the sound in question with the background conditions (i.e. part one of an assessment). When it comes to part two – taking into account context – it is in keeping with the BS 4142 guidance to also consider the significance of the absolute level of the commercial/industrial sound. This is typically done in terms of the absolute noise thresholds given in BS 8223. This provides guideline values for internal and external noise levels for dwellings.

It states that, “In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4.” This table is reproduced as Table 5.1 below.

Table 5.1: BS 8233 indoor ambient noise levels for dwellings

Activity	Location	07-23 (Daytime)	23-07 (Night-time)
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

For habitable rooms, therefore, the lower guideline value is 35 dB $L_{Aeq,16h}$ during the daytime period. Assuming a partially open window providing 15 dB (during use for cooling, for example), the

equivalent external level/limit would be in the order of 50 dB. This is a free-field level unaffected by any façade-reflected sound.

In respect of sound levels within outdoor amenity areas, the guidance in BS 8233 is that, "it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments…".

BS 8233 does caution that the (internal) guideline values are for sources without a specific character, and that where any such characteristics are present, "lower noise levels might be appropriate." Accordingly, when it comes to commercial/industrial sound of any nature, some reduction in the standard values would be considered prudent. Either way, external levels of less than 50 dB during the day can be seen to be relatively low.

5.4 Code of Practice on Environmental Noise Control at Concerts (1995)2

The Code of Practice (often referred to as the Pop Code) was prepared by the Noise Council through a Working Party comprising specialists experienced in the particular issues that can arise with environmental noise control at concerts and similar music events. Indeed, most of the guidance is geared towards both music- and external-based events, which is not strictly relevant here, but where it does include the guidance that:

> "For indoor venues used for up to about 30 events per calendar year an [sic] MNL [Music Noise Level, dB $L_{Aeq,T}$] not exceeding the background noise by more than 5 dB(A) over a fifteen minute period is recommended for events finishing no later than 23.00 hours."

5.5 Guidance Summary

Based on the guidance in BS 4142 for an "initial estimate of impact", a rating level the same as the background sound level is an indication of a low impact, depending on the context; the Pop Code indicates a MNL (equivalent to the specific sound level) 5 dB above the background sound level could be acceptable; and, based on the guidance in BS 8233, external levels of less than 50 dB during the day would be lower than the default external noise criteria for dwellings.

Ultimately, therefore, the potential for noise impact depends on a combination of the background sound level(s), the site-specific contextual factors and/or the absolute sound levels. Particularly key here is that we are not talking about conditions that would prevail all day, every day, but rather on a limited and occasional basis. This is why, subject to further consideration of context, the "initial estimate of impact" within BS 4142, which is more geared towards "industrial and commercial" sites, is more stringent that the Pope Code, which, to some extent at least, takes the frequency of occurrence into account.

[2] Strictly, it is understood this document was withdrawn by the Chartered Institute of Environmental Health (CIEH) in 2018, but with no equivalent document to replace it.

6 BASELINE SOUND LEVELS

6.1 Survey Details

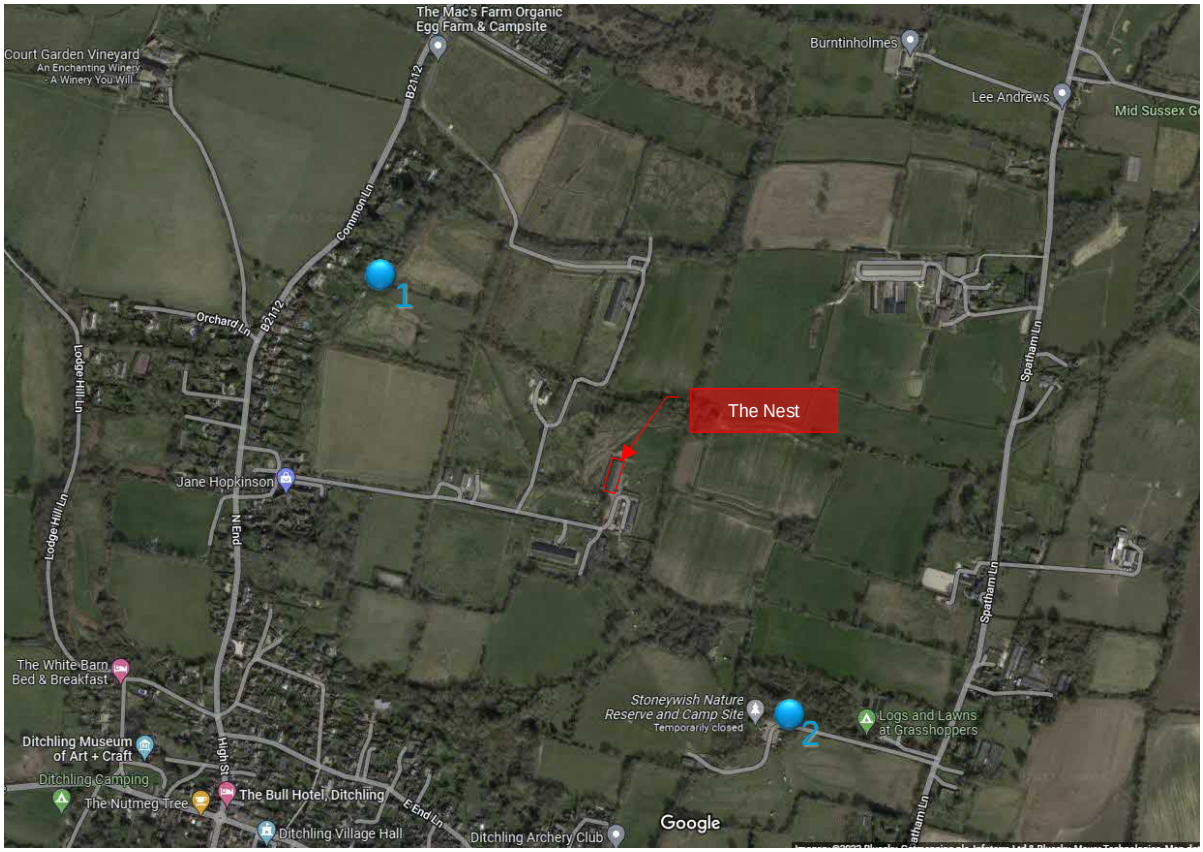
Continuous unattended sound level measurements were obtained over a period of seven days between Thursday 20th and Wednesday 26th January 2022 at the two locations shown and described below.

Table 6.1: Survey positions and equipment details

Position	Mic. height and acoustic conditions	Equipment	Serial no.	Date calibrated	Calibration certification number
1. At the end of the rear garden of 16 Common Lane BN6 8TJ	Approx. 2 m above the ground, in free-field conditions	Rion NL-32 sound level meter	341523	27/10/20	UCRT20/2040
2. Stoneywish Nature Reserve and Camp Site, Spatham Lane BN6 8XH	Approx. 2.5 m above the ground, in free-field conditions	Rion NL-32 sound level meter	613595	26/10/20	UCRT20/2038
N/A		Rion NC-74 calibrator	34304643	24/05/21	1500367-1

The measurement chain was calibrated before and after the survey using the acoustic calibrator listed above. The level was checked at the end of the survey with no significant drift observed.

Figure 6.1: Aerial photograph showing the survey locations



Source: Google Maps Imagery ©2023 (annotated by Anderson Acoustics)

Figure 6.2: Position 1 (rear garden of 16 Common Lane BN6 8TJ)

Figure 6.3: Position 2 (at the Stoneywish Nature Reserve and Camp Site, Spatham Lane BN6 8XH)

6.2 Weather Conditions

At the time of setting up and collecting the equipment, the conditions were calm and dry, with temperatures typical for the time of year, at around 5º on the first day and 11º on the last day. Indeed, based on data at the time obtained from the BBC Weather website, conditions remained calm and dry throughout the survey, with daytime temperatures of typically 1º to 6º and night-time condition around zero degrees.

Wind direction was variable, whereby a range of conditions were monitored in this regard.

The conditions, therefore, were conducive to the reliable measurement of sound (without the potential localised influence of wind or rain).

6.3 Results

The sound level meters were set to record the 15-minute L_{Aeq} (ambient) and L_{AF90} (background) levels, together with the highest L_{AFmax} levels each 15-minute period, for the duration of the survey. The full results are shown in the time-history graphs presented in Appendix A, with a summary of the L_{Aeq} and L_{AF90} levels presented in the tables below. Tables 6.2 and 6.3 present the L_{Aeq} levels for each position, whilst Tables 6.4 and 6.5 presented the L_{AF90} levels for each position.

The data between midday and 11pm are presented as most relevant to times when The Nest Box would be, used.

Separately, the daily and daily average levels have been condition formatted in Microsoft Excel using the default Red – Yellow – Green colours to show the range in levels across the hours and days. They are not related to any particular thresholds – just a comparison of the data presented.

Table 6.2: Summary of afternoon and evening ambient (L_{Aeq}) levels at Position 1 (16 Common Lane)

16 Common Lane BN6 8TJ													
Day	Logarithmic average of the $L_{Aeq,15min}$ levels (dB) per hour (hh)												Average (12-23)
	12	13	14	15	16	17	18	19	20	21	22	23	
Thu 20/01	45	46	47	45	45	45	46	43	41	40	40	34	43
Fri 21/01	45	43	43	47	44	43	43	41	39	42	39	39	42
Sat 22/01	47	49	65	49	51	41	43	39	45	37	37	36	45
Sun 23/01	46	50	43	45	43	45	38	37	37	36	39	30	41
Mon 24/01	45	43	43	43	44	65	40	39	39	44	35	29	42
Tue 25/01	43	46	43	46	44	39	42	44	40	37	36	32	41
Average	45	46	47	46	45	47	42	40	40	40	38	33	42

Table 6.3: Summary of afternoon and evening ambient (L_{Aeq}) levels at Position 2 (Stoneywish)

Stoneywish Nature Reserve and Camp Site, Spatham Lane BN6 8XH													
Day	Logarithmic average of the $L_{Aeq,15min}$ levels (dB) per hour (hh)												Average (12-23)
	12	13	14	15	16	17	18	19	20	21	22	23	
Thu 20/01	50	46	49	47	47	44	41	42	39	40	38	40	44
Fri 21/01	45	45	48	48	43	45	42	40	38	39	39	40	43
Sat 22/01	46	49	44	48	50	41	41	39	37	38	37	36	42
Sun 23/01	46	47	46	45	43	40	38	43	37	38	36	37	41
Mon 24/01	47	46	46	43	44	46	39	37	38	37	36	37	41
Tue 25/01	47	48	46	42	45	43	38	43	38	36	38	35	42
Average	47	47	47	46	45	43	40	40	38	38	37	38	42

It can be seen from the above that:

The levels and patterns are reasonably similar between the two positions.

Daytime ambient levels (midday-7pm) ranged from 40 to 47 dB $L_{Aeq,T}$.

Evening ambient levels (7-11pm) ranged from 33 to 40 dB $L_{Aeq,T}$.

The overall average for the period midday to 11pm for both positions is 42 dB.

Table 6.4: Summary of afternoon and evening background (L_{AF90}) levels at Position 1 (16 Common Lane)

16 Common Lane BN6 8TJ													
Day	Arithmetic average of the $L_{AF90,15min}$ levels (dB) per hour (hh)												Average (12-23)
	12	13	14	15	16	17	18	19	20	21	22	23	
Thu 20/01	40	40	39	41	42	40	40	38	36	34	32	29	38
Fri 21/01	38	38	38	40	40	39	39	37	35	32	31	31	37
Sat 22/01	38	40	42	42	39	36	34	35	31	27	27	25	35
Sun 23/01	36	36	34	36	34	32	31	29	27	27	26	22	31
Mon 24/01	36	36	35	38	38	37	36	33	28	30	27	23	33
Tue 25/01	37	38	36	38	38	35	31	34	30	28	27	24	33
Average	38	38	37	39	39	37	35	34	31	30	28	26	34

Table 6.5: Summary of afternoon and evening background (L_{AF90}) levels at Position 2 (Stoneywish)

Stoneywish Nature Reserve and Camp Site, Spatham Lane BN6 8XH													
Day	Arithmetic average of the $L_{AF90,15min}$ levels (dB) per hour (hh)												Average (12-23)
	12	13	14	15	16	17	18	19	20	21	22	23	
Thu 20/01	39	37	38	39	41	39	41	35	35	35	35	34	37
Fri 21/01	40	40	39	41	41	40	39	38	37	35	37	36	39
Sat 22/01	38	39	37	38	40	38	36	36	34	32	30	32	36
Sun 23/01	36	36	37	37	35	37	34	33	34	34	34	32	35
Mon 24/01	39	39	37	39	39	38	36	35	33	32	31	33	36
Tue 25/01	37	38	39	39	39	36	35	34	33	34	35	33	36
Average	38	38	38	39	39	38	37	35	34	34	34	33	36

It can be seen from the above that:

- As with the ambient ($L_{Aeq,T}$) levels, the levels and patterns are reasonably similar between the two positions.
- Daytime background levels (midday-7pm) ranged from 35 to 39 dB $L_{AF90,T}$ (some 5 to 8 dB lower than the ambient levels).
- Evening ambient levels (7-11pm) ranged from 26 to 35 dB $L_{AF90,T}$ (some 5 to 7 dB lower than the ambient levels).
- The overall average for the period midday to 11pm is 34 dB for position 1 and 36 dB for position 2 (9 and 7 dB lower than the equivalent ambient levels, respectively).

Whilst a range of wind directions occurred during the survey, and other meteorological conditions to some degree (though, conditions were generally fairly neutral), with a range in ambient and background conditions revealed above, it is possible that other conditions could be experienced at other times, but where significant differences are perhaps unlikely.

7 EVENT SOUND LEVELS

7.1 Assessment Scenarios

On the whole, we would not describe the events as “noisy” and would not have anticipated the requirement for a noise assessment given the location, but where one has previously been requested by the Council’s Specialist Adviser (Environmental Protection) it has been provided.

Typically, both internally and externally, the main source of sound will be people speaking, in conversation and/or in a group/teaching setting, and where, therefore, there is likely to be laughter/raised voices on occasion, too. But, of course, well away from receptors, as shown in Figure 3.2.

In terms of the list of uses presented in Section 4, the worst-case scenarios are anticipated to be any live music nights, which will not necessarily be significant in practice, being held within the building (and with the building being well away from receptors).

Accordingly, the following scenarios have been considered:

1 Raised voices inside and outside the building. More specially, at 1.5m high, 18 raised voices have been assumed outside the northern half of the east elevation, up to, and including, the eastern half of the north elevation; and 10 raised voices have been assumed within the northern half of the building.
2 Live/amplified music inside the building, plus Scenario 1.

As per the requirements of Condition 2 on SDNP/22/05011/CND, all doors and windows are to be kept closed during periods where amplified music and speech is carried out within the building. Following discussions with Mac’s Farm, it was advised that their team will always be working on events to ensure doors and windows are kept closed during these periods.

With this in mind, in order to assess the worst-case scenario, so to provide the most robust assessment, it is considered reasonable to assume that the main doors in the north elevation are closed, and with the door on the east elevation open. This scenario would be considered representative of the transitory instances of guest ingress and egress during periods where speech and music is being played. Whereas in practice, there would be significantly lower levels of noise break out from the closed doors and windows which are unlikely to be audible at the noise sensitive receptors.

In terms of source sound levels, the following have been used:

Table 7.1: Source sound level data

Source	Sound pressure level at octave-band centre frequency, $L_{eq,T}$, dB							Overall level, $L_{Aeq,T}$, dB
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Raised voice at 1m [1]	-	56	62	66	62	57	51	67
Live/amplified music in front of stage [2]	95	86	83	80	81	81	77	86

1 ANSI S3.5-1997 (R2007) *Methods for the calculation of the speech intelligibility index*.
2 Frequency spectrum based on historical data held by Anderson Acoustics which has been shifted.

In terms of the sound insulation performances of the building elements, the following have been assumed, as derived using the proprietary software, INSUL.

Table 7.2: Assumed sound insulation performances of building elements

Element	Sound reduction index (SRI) per Octave-band Frequency, dB							dB R_w
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
Roof (0.7mm steel with 50mm insulation)	10	14	18	23	23	23	39	24
Brick areas (103mm)	30	43	36	41	49	54	55	46
Timber areas (2x 25mm softwood with 50mm cavity)	20	17	12	30	35	42	56	29
Doors (25mm softwood)	15	19	23	27	25	26	34	27
Glazing (6/12/6mm double glazing)	19	20	19	29	38	34	45	31

7.2 Noise Model Construction

A 3D computer noise model of the site and surrounding area has been constructed using the proprietary software, CadnaA®. The open source OpenStreetMap data were imported in the first instance to initiate the model in the correct geographical location. Following which, 1m resolution height contours were then imported based on the LiDAR Composite DTM (Digital Terrain Model) 1m height points from the Defra data services platform. The ground cover has been modelled as acoustically soft/absorptive throughout. The only building included in the model is The Nest Box barn itself.

Point sources have been added to the model for the raised voices outside, as per the description of Scenario 1 and the data in Table 7.1 above. For the internal sources (i.e. the music and raised voices), area sources have been applied to the relevant surfaces of the building that account for the internal sound levels (as per Table 7.1) and the sound insulation performance of the relevant element (as per Table 7.2). A correction of +10 dB has been applied to the raised voice sound levels to account for the assumption of 10 such instances inside.

The model was run to calculate the sound levels at the nearest dwellings in accordance with the procedures within ISO 9613-2:1996 *Acoustics— Attenuation of sound during propagation outdoors— Part 2: General method of calculation*. Calculation points were entered into the model in the vicinity of a sample of the dwellings identified earlier, at 4m above the ground to represent the first floors as likely worst-case. The resultant levels are equivalent to free-field levels, and thus directly comparable to the survey data and BS 8233 criteria.

As per standard procedure, the model assumes sound propagation conditions consistent with moderately adverse wind velocities and directions. It is not readily possible (or routine) to model the effect under alternative meteorological conditions; however, it's safe to say that sound levels are more likely to be less than calculated on account of differences in meteorological conditions than higher. Likewise, it is not feasible to put a value on the possible degree of uncertainty, but where every effort has been made to keep this to a practicable minimum, whilst erring on the side of caution.

7.3 Calculated Specific Sound Levels

The calculated sound level contours for the two scenarios at a height of 1.5m above the ground are presented in Appendix B. These show the spread of sound from The Nest Box. When reviewing the contours, it should be borne in mind that they only show sound from the site, and not from any other sources.

In addition to the contours, the sound levels at the calculation points are presented in Table 7.3. As before, the data are condition formatted to show the range in levels. The colours are not related to any particular thresholds – just a comparison of the data presented.

Table 7.3: Calculated Specific Sound Levels, dB $L_{Aeq,T}$ (free-field)

Calculation Point (see Appendix B)	Scenario	
	1. Raised voices inside and outside the building	2. Live/amplified music inside the building, plus Scenario 1
South View	17	25
Common Lane	21	30
Dumbrells Court Road	19	27
East Gardens & The Dymocks	18	26
Farm Lane	21	27
Spatham Lane	20	27

7.4 Assessment

It can be seen from Table 7.3 that the calculated sound levels for Scenario 1 range from 17 to 21 dB ($L_{Aeq,T}$). Since these are well below the ambient and background sound levels presented in Tables 6.2 to 6.5, it can be concluded that there is a very low risk of adverse noise impact since they are unlikely to be discernible.

The only levels that require further consideration are those for Scenario 2, which can be seen from Table 7.3 to range from 25 to 30 dB ($L_{Aeq,T}$).

Based on the guidance in BS 4142 for an "initial estimate of impact", a rating level the same as the background sound level is an indication of a low impact, depending on the context, whilst the Pop Code indicates a MNL (equivalent to the specific sound level) 5 dB above the background sound level could be acceptable.

Additionally, BS4142: 1997, despite being superseded, is still mentioned in several Local Authority policy documents and generally referenced when background noise levels are very low. The scope of the superseded standard stated that the method described therein may not be suitable when background noise levels were very low (below 30 dBA), due to being overly onerous.

It can be seen from Table 6.4 that the hourly averages of the background sound levels between 12 and 11pm range from 26 to 39 dB at Position 1 (i.e. 16 Common Lane), with an overall average of 34 dB. Whereas, between the hours of 12 and 10pm, background sound levels ranged between 28 to 39dB in the same position.

Therefore, the specific sound levels could be above the background sound levels at times where doors are open for ingress and egress, particularly between 10pm and 11pm, by 4dB. This falls within the IOA Pop Code guidance and specific sound levels would be below the background sound levels.

Furthermore, it is important to note that Table 7.3 presents a worst-case scenario, with doors open, which will not represent the typical situation, given that windows and doors would be kept closed during periods of amplified music and speech to adhere with the requirements of Condition 2 on SDNP/22/05011/CND.

The specific $L_{Aeq,T}$ sound levels would also fall comfortably below the BS 8233 criteria range (50-55 dB $L_{Aeq,16hours}$) for external amenity areas.

Strictly, the BS 4142 assessment requires consideration of the need for a character correction to determine the rating level from the specific sound level; and since the Scenario 2 sound levels are close to the background levels at times, it's likely a correction could apply. However, the fact remains that the Pop Code guidance should be met and that sound levels would be well below both the ambient levels and BS 8233 criteria.

Overall, therefore, it is considered that the proposed operation of The Nest Box would not result in an adverse noise impact, providing the aforementioned 'cut-off type' noise limiter is installed to prevent levels exceeding a sound pressure of $L_{eq,T}$ 86 dBA when assessed at head height in the middle of the room.

Notwithstanding this, Noise Management Controls are presented in Section 8 of this report, to assist with keeping operational sound levels to a practicable minimum. This includes guidance in terms of use of windows and doors.

8 NOISE MANAGEMENT CONTROLS

All relevant staff to be briefed on the following prior to each event:

- All events to finish by 11pm.
- Any live/amplified music to be sound checked and limited using a 'cut-off type' noise limiter to ensure levels do not exceed 86 dBA at head height in the middle of the space.
- Doors and windows, to be closed during live music or events requiring amplified speech.
- Patrons to be reminded to leave quietly following any evening events. Appropriate signage to be displayed in prominent areas.
- The prevailing background sound levels should be measured the day before an event, or on a day in the week prior to the event which has suitable weather conditions for noise monitoring.
- Hourly monitoring of noise levels should be carried out throughout events.

8.1 General Operating Principles of Noise Limiter

The purpose of the noise limiter is to ensure noise levels within a room do not exceed a pre-defined operating noise level when noise amplification systems are used. As a cut-off type noise limiter is used, once the maximum permissible noise level is exceeded for approximately 20 seconds, the electrical power to the equipment associated with the sound amplification system will be cut-off.

The noise limiter includes a large traffic light style LED display which indicates when the maximum permissible noise level is exceeded. In order to avoid the scenario of cutting off the power during performances, this traffic-light display should be clearly visible to performers so that they are aware if noise levels need to be reduced.

In the event of an exceedance, the unit has a reset button which needs to be pressed to reinstate power. The unit also includes an option to have a remote reset button if the main unit is to be located at high-level.

The noise limiter has a built-in microphone and also includes the option to have a remote microphone, if there is a large distance between the stage and the recommended location of the microphone.

To summarise, the following should be considered to ensure optimal operation of the noise limiter

- Performers are made aware there is a noise limiter and that the LED display is clearly visible to them whilst performing
- The reset button should be accessible to reinstate power
- Equipment used by performers should always use power which is controlled by the noise limiter to avoid exceeding the maximum permissible noise levels. This may mean that a designated stage area and power outlets will need to be provided
- The microphone of the noise limiter should be at a location where it is out of reach and cannot be tampered with
- The noise limiter unit itself should be accessible by members of staff for maintenance
- A suitability qualified electrician should install the unit
- Care should be made to ensure the unit does not compromise and fire safety or other life-saving systems reliant on electrical power
- It is recommended that the noise limiter is calibrated by a suitably qualified acoustician

The maximum permissible noise limits should adhere to the following levels:

Table 8.1: Maximum permissible noise limits

Octave-band centre frequency, $L_{eq,T}$, dB							Overall level, $L_{Aeq,T}$, dB
63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	
95	86	83	80	81	81	77	86

9 CONCLUDING STATEMENT

It is concluded that the increase in hours music can be played from 22:00 – 23:00 hours, in line with the premises licence, should not result in an adverse noise impact providing a noise limiter is installed to prevent internal noise within The Nest exceeding a sound pressure level of LAmax 86 dBA.

It is also proposed to vary Point 1 of Condition 5 such that it states:

"Any live/amplified music to be sound checked and limited to be below 86 dBA (LAmax) at head height in the middle of the space."

In practice, this variation would result in lower internal noise levels than the previous consent, therefore resulting in an even lower noise impact for a majority of the consented operational hours of The Nest.

APPENDIX A

BASELINE SURVEY RESULTS

Figure A1: Position 1 (Rear garden of 16 Common Lane, BN6 8TJ)

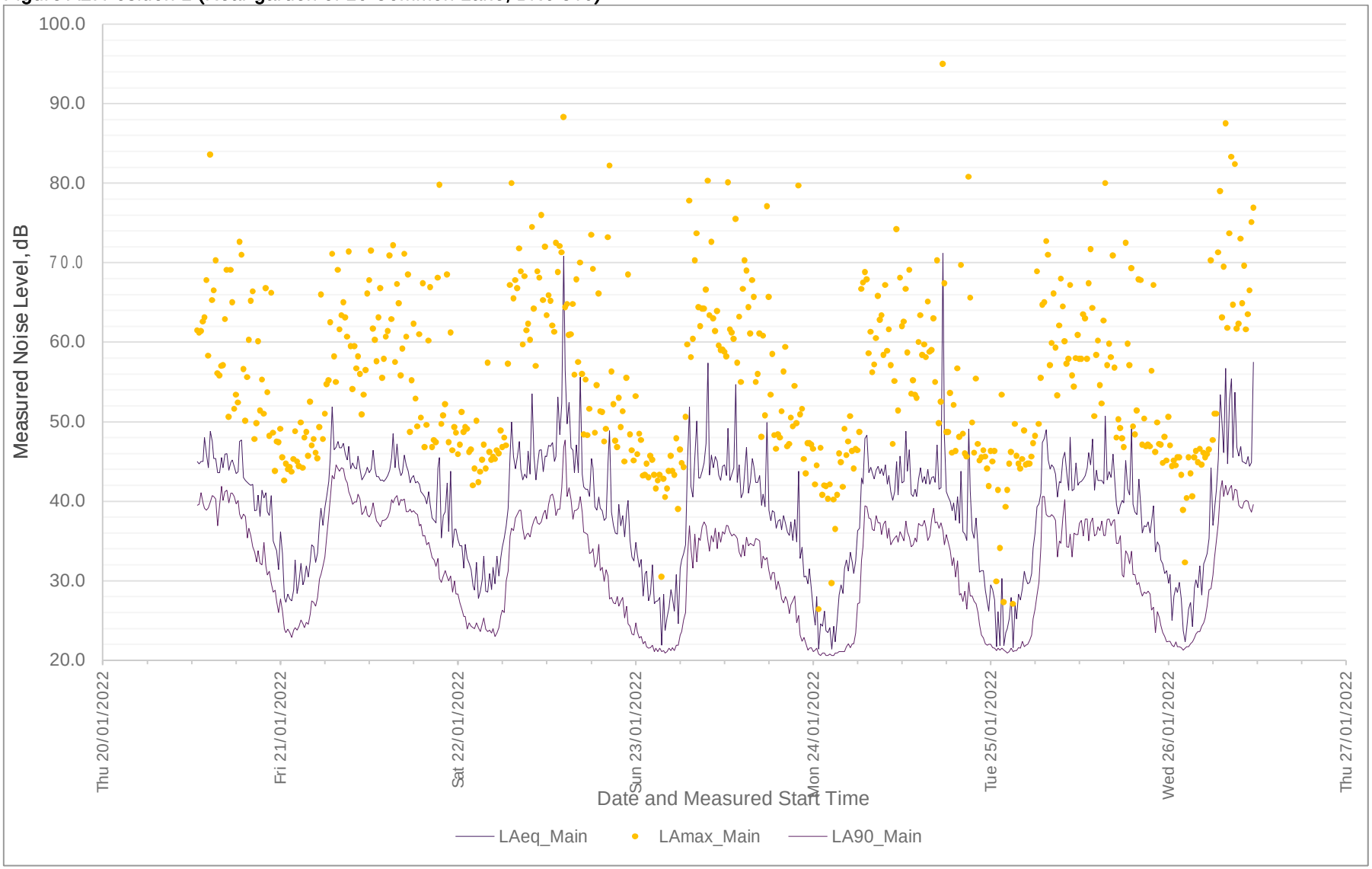
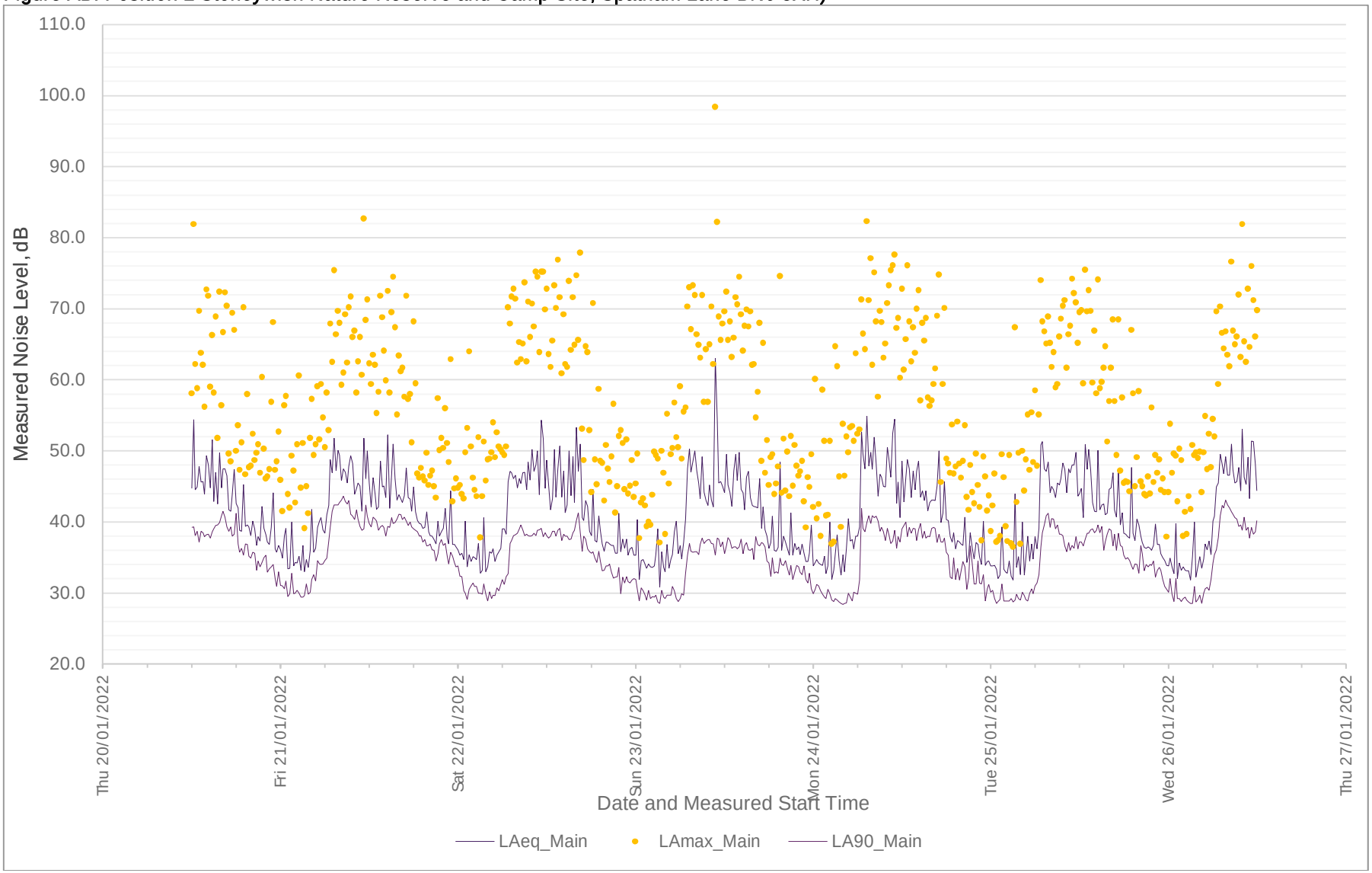


Figure AB: Position 2 Stoneywish Nature Reserve and Camp Site, Spatham Lane BN6 8XH)



APPENDIX B

EVENT SOUND LEVEL CONTOUR PLOTS

Figure B1: Scenario 1 Sound Level Contours at 1.5m above ground level

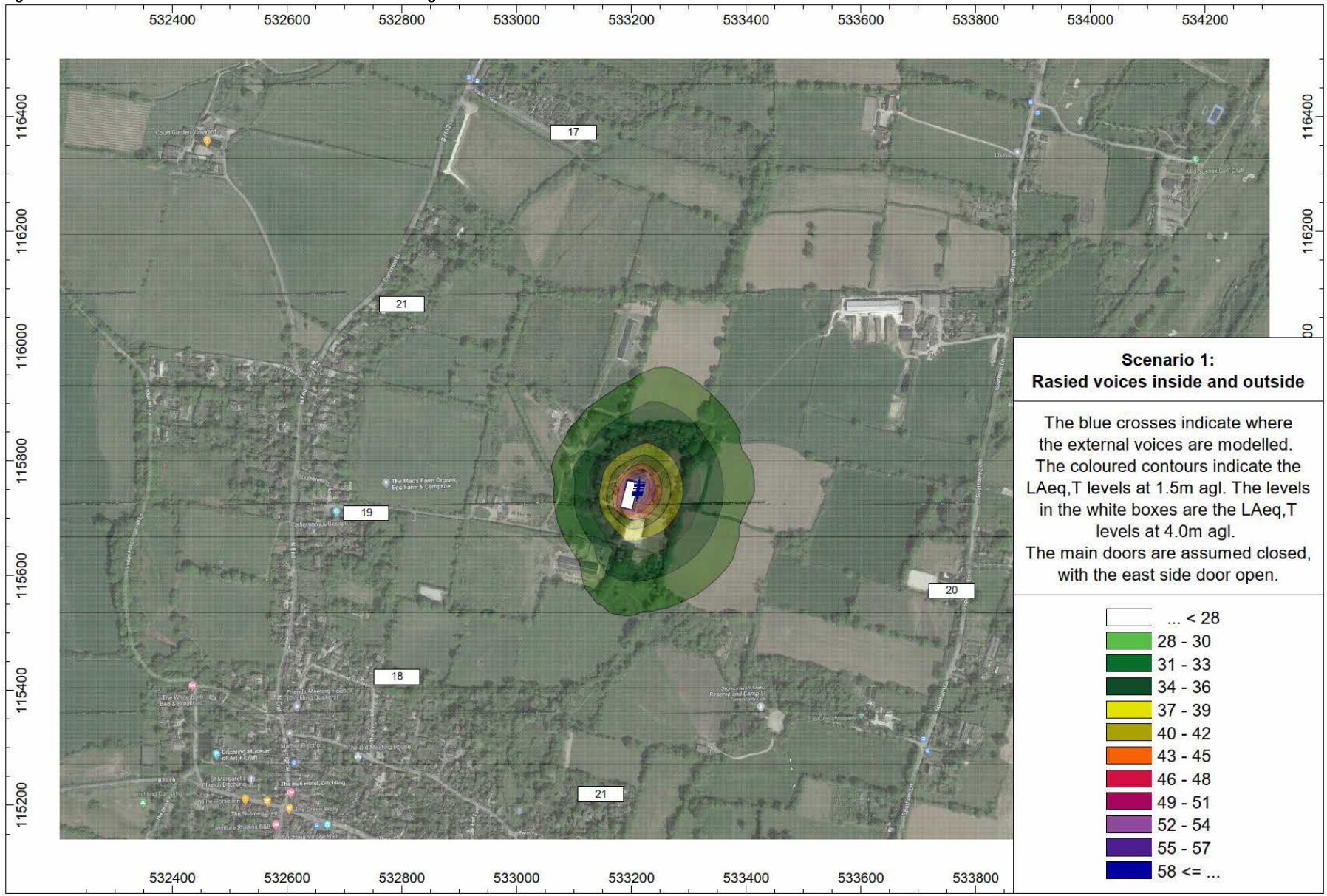
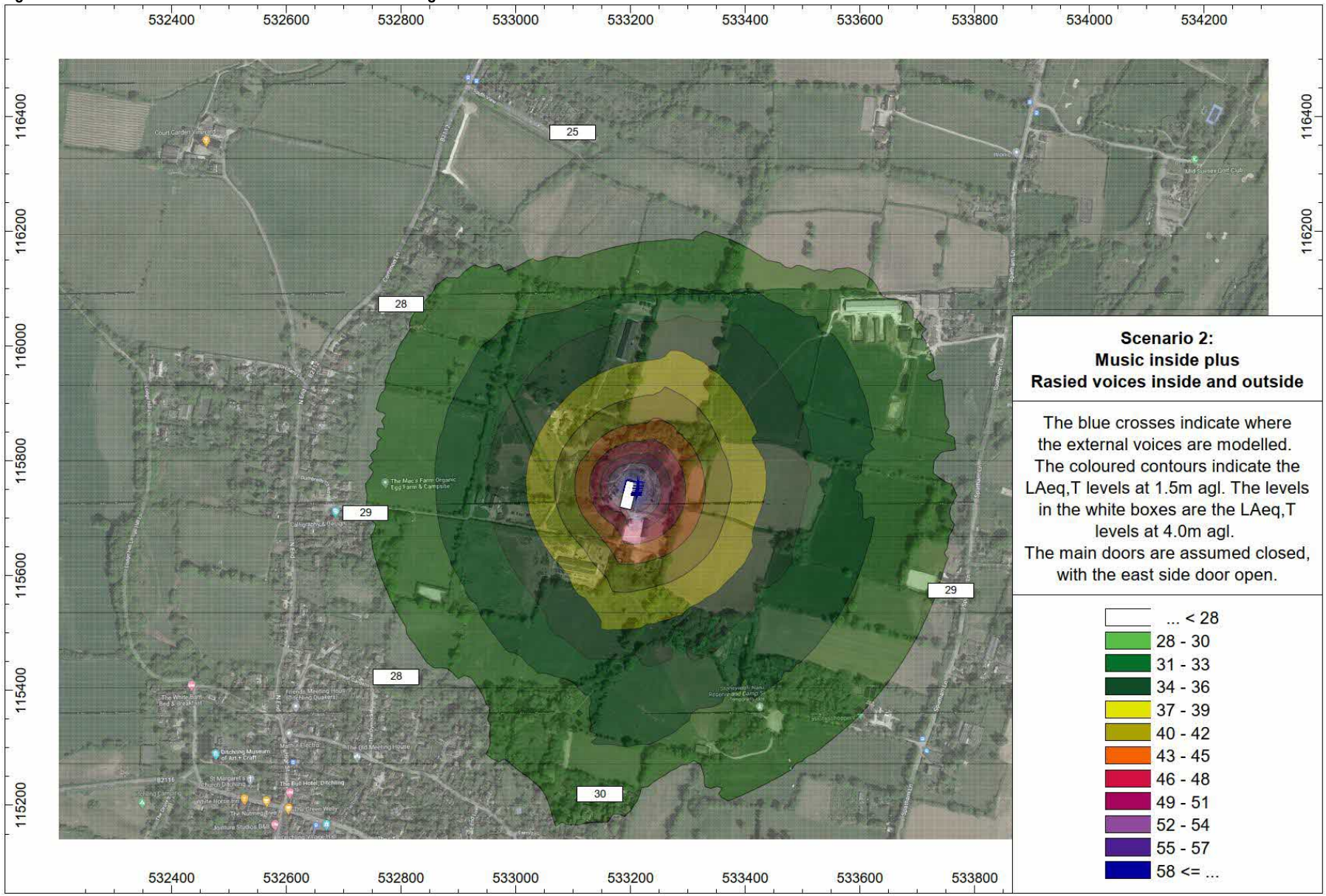


Figure B2: Scenario 2 Sound Level Contours at 1.5m above ground level



REPORT END