Chartered Building Consultancy

Acoustic South East

Planning Noise Assessment – Change of Use

Report by: Scott Castle BSc (Hons) CEnvH, MCIEH MIOA

Date: 26/02/2025

Project: J3958

Issue 1

Site: **Stonehouse Farm, Lot 8, Handcross.**

Client: **Lake Investments Limited**

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1 Introduction and Executive Summary

Acoustic South East have been appointed to undertake an acoustic assessment to support a planning application for a change of use. Specifically, the two agricultural buildings located to the North of the site are proposed to become offices and B2/B8 use for a specific tenant.

Standards and guidance referenced for this assessment include:

- BS4142:2014-A1:2019 – Methods for Rating and Assessing Industrial and Commercial Sound
- BS5228:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites (Part 1 – Noise)
- National Planning Policy Framework (NPPF), 2024
- Planning Noise Advice Document Sussex, November 2023.

A class 1 sound level meter was used to assess the site soundscape between 29th November to 5th December 2024.

IMMI noise modelling software was used to create the existing two agricultural buildings located to the North of the application site. Area sound sources were used to construct an office with an internal sound pressure level of 65dB $L_{Aeq,T}$ and for the larger B2/B8 building, an internal soundscape of 85dB $L_{Aeq,T}$ which would represent a noisy worst case workshop use with employees wearing hearing protection.

The noise break out from the two change of use buildings would generate a Rating Level or $L_{Ar,Tr}$ of 24dB at the nearest residential property. This is 22dB below the measured background and will not be audible.

A worst case hour of vehicle movements using the shared access track was also considered and this generates a $L_{Ar,Tr}$ of 47dB (which includes a 3dB character correction) at the nearest residential receptor. This is 1dB above the measured background sound pressure level and must be considered in line with the contextual factors discussed in section 9 of the report.

With the vehicle movements considered against the measured ambient soundscape, these are also comfortably below the 59-60dB L_{Aeq},07:00-19:00 hours measured dataset.

Based on the information presented, the change of use for the two agricultural buildings to offices/B2/B8 should not have any adverse impact. Planning permission should not be withheld on noise grounds.

2 Caveat

The findings and outcomes contained within the report are based on the plans and assumptions provided to us by the client. It is critical that the report is read in its entirety to ensure that the information provided and the calculations thereafter remain correct and may be relied upon.

3 Context, Noise Criteria & Noise Assessment Methodology

3.1 Context

This assessment supports a change of use application being made to Horsham District Council. The application proposes change of use from the currently vacant anaerobic digestion plant (AD) to offices and B2/B8 uses.

The site is located to the North of the B2110 Handcross road, which is a 50mph road.

Access to the site is via a long driveway (352m) which slopes down towards to the site to the North.

The buildings are currently open to the elements and are proposed to be reclad and weatherproofed.

The proposed use is storage and distribution for a commercial aerospace end tenant.

It is relevant to note that the current AD site retains planning consent and will have had vehicles utilising the site access track and passing Hillcrest Farm for site access and egress.

Combined with the tenant farmer who uses the access track for their land, it is reasonable to expect that vehicles will and have passed Hillcrest Farm in the course of their day to day activities.

3.2 Site Location

The application site is detailed in red in Figure 1. Topography and terrain also play a role with approximately a 22m change in levels from the roadside access to the site.

Figure 1. Site Location and Existing (Left) and Proposed(Right)

Figure 2. Current Buildings

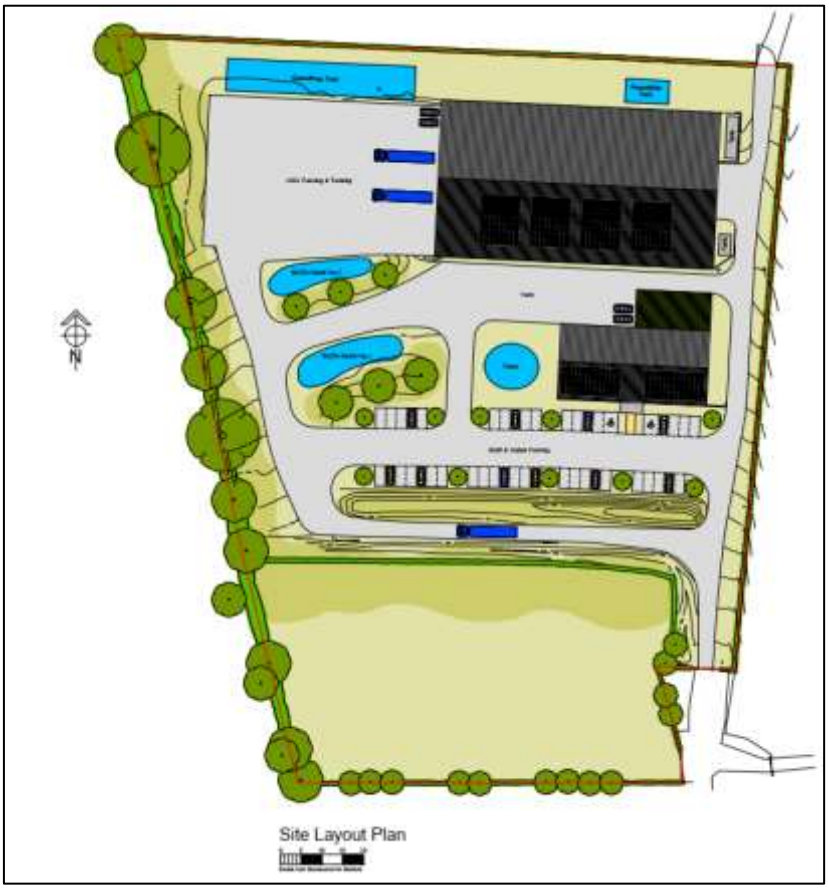

Figure 3. Proposed Buildings

3.3 Soundscape

The soundscape noted from visits to set up and decommission the survey equipment consist of road traffic noise and bird song. Note that the survey equipment was located parallel to the nearest noise sensitive receptor approximately 35m from Handcross Road.

3.4 Closest Residential Receptor

The closest residential property is that of Hillcrest Farm located approximately 412m to the South. To the north of Hillcrest Farm is horse paddocks and a sand school and farm buildings.

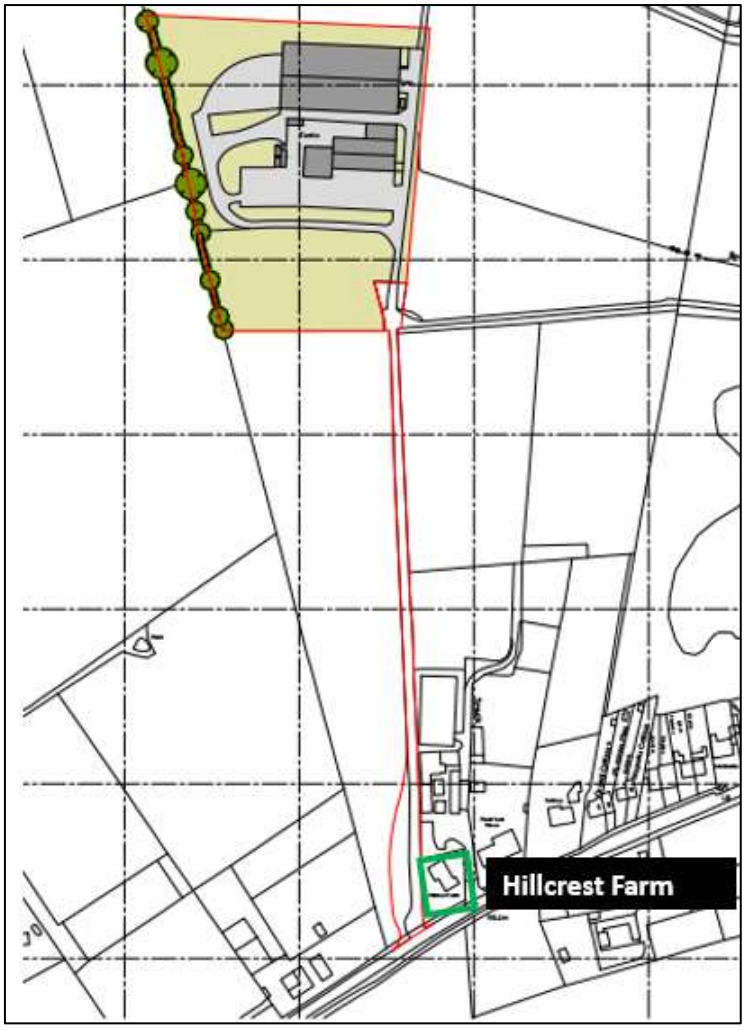

Figure 4. Closest Residential Property

3.5 Proposed Hours of Use

The buildings are proposed to be used from 07:00-19:00 hours.

3.6 Proposed Vehicle Movements

In a worst-case hour, 20 cars, 1 van and 1 articulated lorry might well visit the site.

3.7 Planning Policy and Relevant Standards

3.7.1 National Planning Policy Framework, December 2024

The National Planning Policy Framework (Dec 2024) defines the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.

The following paragraphs are relevant within NPPF Section 15 (Conserving and enhancing the natural environment) states the following:

Paragraph 187(e) - Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability, and

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

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

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

Paragraph 200– Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

3.7.2 BS4142:2014-A1:2019 - Methods for rating and assessing industrial and commercial sound

This document provides a means of assessing the impact of industrial or commercial sound upon nearby noise-sensitive receptors, including residential properties.

It does this by comparing the Rating Level of the noise from the industrial or commercial source with the pre-existent L_{90} background noise level affecting the same noise-sensitive premises. The Standard provides guidance that:

a) Typically, the greater the difference, the greater the magnitude of the impact.

b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5dB 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 noise level, this is an indication of the specific sound source having a low impact, depending on the context.

3.7.3 Planning Noise Advice Document Sussex, November 2023

The document, which all Sussex local authorities are signed up (including Horsham) provides guidance on reporting. The parameters have been followed.

3.8 Methodology

A class 1 sound level meter has been used to measure the site soundscape and specifically background sound pressure levels at the approximate location of the Hillcrest Farmhouse boundary.

Noise modelling software has been used to replicate the site terrain and the position of the two buildings, albeit with significant improvements made to clad and weatherproof the buildings. Area sound sources were generated inside the noise modelling to utilise internal sound pressure levels for the office building as well as the new B2/B8 building. The noise model was then run to detail noise break out from the buildings, as well as vehicular access using the single access track to the site.

4 Site Survey

A class 1 sound level meter was set up and ran continuously with a 100-millisecond resolution from 29th November 2024 to 5th December 2024. The data was post-processed using dBTrait into $L_{Aeq,15minutes}$ and $L_{A90,15minute}$ periods to inform both ambient ($L_{Aeq,T}$) and background sound pressure levels ($L_{A90,15minutes}$).

The sound level meter was freefield, battery operated and secured in position inside a locked peli-case. The meter was field calibrated at the beginning and end of the survey at 1000Hz (114dB) without any significant drift occurring.

The rationale for positioning of the survey was to be representative of the nearest residential property, Hill Crest Farm. The survey location can be seen in Figure 4 below.

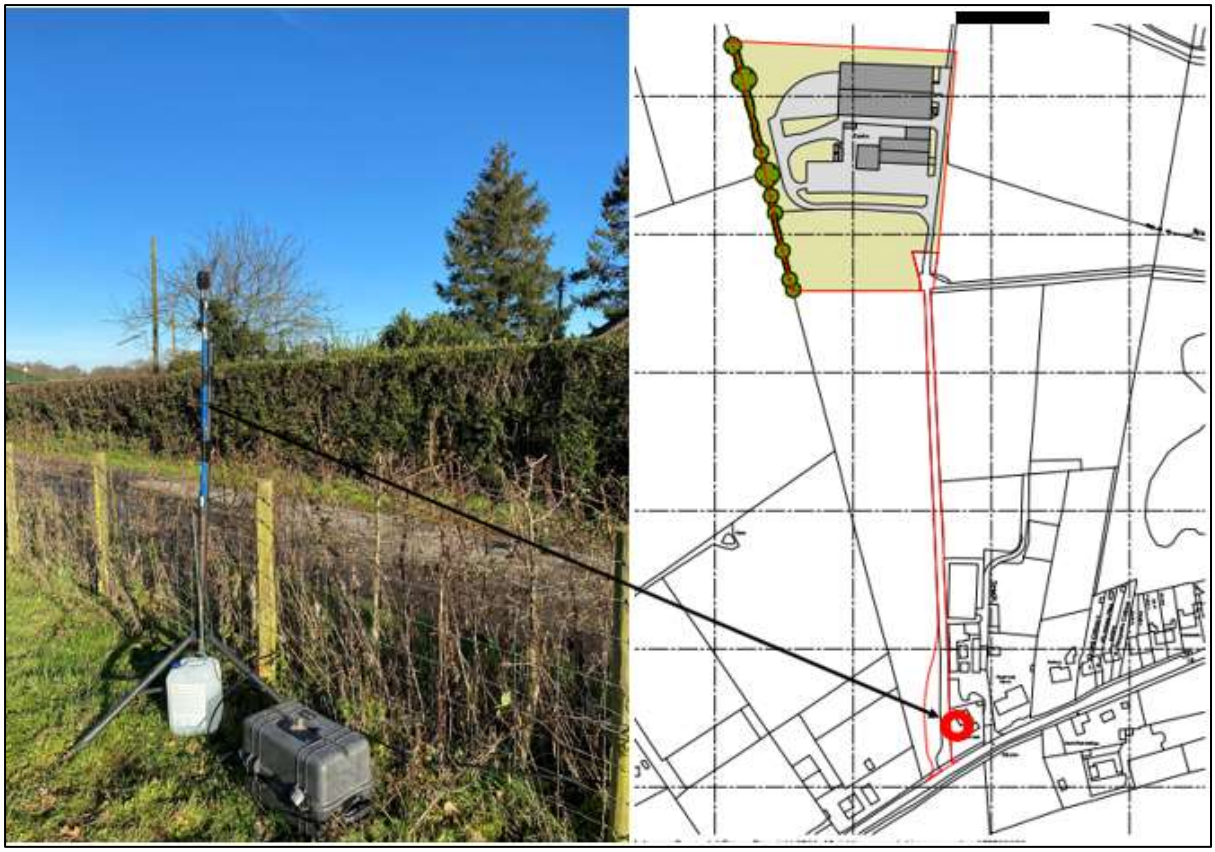

Figure 5. Sound Survey Location

Survey(s) carried out by	Scott Castle BSc (Hons) CEnvH, MCIEH MIOA
Equipment Used	01dB Black Solo- Class 1 Sound Level Meter (Unattended)
Equipment Used	Norsonic Acoustic Calibrator – Serial No. 31699
Location	Long Term Background – Monopole Mounted, 2.2m above ground level, Located at objective.contact.weeds (WhatThreeWords),TQ22765/27850
Duration	29 November to 5th December 2024

Table 1. Survey Details

5 Measured Site Soundscape

The results below relate to the freefield survey data measured parallel to Hill Crest Farmhouse.

5.1 Measured $L_{Aeq,T}$

Figure 5, below, details the logarithmic average of the measured ambient sound levels at the survey position between 07:00 and 19:00 hours.

Logarithmic External Freefield Average Sound Pressure Levels L_{Aeq} - Daytime period 07:00 - 19:00					
Sat 30th Nov	**Sun 1st Dec**	**Mon 2nd Dec**	**Tue 3rd Dec**	**Wed 4th Dec**	**Thu 5th Dec**
58.7	59.2	59.4	58.7	59.5	59.7

Figure 6. Measured Ambient Noise Level

The received soundscape adjacent to the Hill Crest Farmhouse remains relatively consistent with 59 to 60dB $L_{Aeq,T}$ (rounded) for both weekdays and weekends.

5.2 Measured Background Sound Pressure Levels ($L_{A90,15minutes}$)

The measured modal and representative background for the Hillcrest Farmhouse is 46dB $L_{A90,15minutes}$ for 07:00 to 19:00 hours.

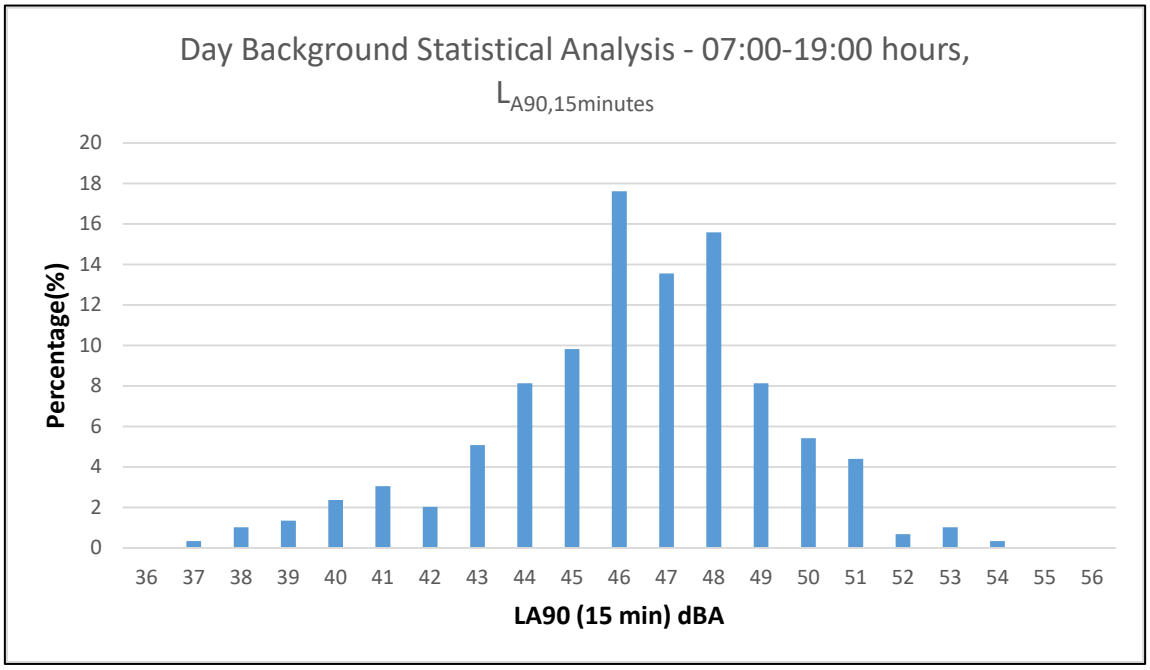

Figure 7. Measured Background Sound Pressure Levels

6 Measured Vehicle SELs and Calculated $L_{Aeq,T}$

As stated in section 3.6 above, in a worst-case hour, it would be reasonable to expect 1 van, 20 vehicles and an articulated lorry. Given the distance of the access road/track being 352m it is not likely that the vehicle will be heard for the whole time period, only when passing the residential property.

Two techniques were used to consider how the passing vehicles might impact the residential property. This is capable of being compared against ambient and background noise levels. These were to use a line source within the noise model and consider SELs of vehicle passes and also a haul route calculation from BS5228:2014-A1-2019.

6.1 SELs

For the articulated lorry, a Leyland DAF horse carrier was measured over a 100m pass. For the 20 vehicle movements, an average of a Fiat 500 and a Ford Ranger were applied and for a van, a ford transit pass was assessed, also across a 100m pass. The SELs are comprised of multiple vehicular passes and measurement in good weather conditions.

An SEL calculation was determined for each vehicle type using the following formula.

$$L_{Aeq}=SEL-10Log(T)+10log(N)$$

T is the time period in seconds, for this instance, a worst-case hour is 3600 seconds.

N is the number of vehicular passes

With the L_{Aeq} identified, the line source as a direct path between Handcross Road and the lower electric gate, was then calibrated against the numerical value in column 4 below.

The noise modelling software was then run to consider the line source impact against Hill Crest Farm House. The worst-case receptor value, was then recorded in Column 5. The column 5 values were then summed to consider the whole impact of the hour at the residential property.

Assessment of Worst Case Hour					
Vehicle	**SEL**	**Number**	**L_{Aeq} to Calibrate Line Source**	**Worst case L_{Aeq} at receptor**	**Anti-log**
Artic Lorry	85.8	1	50	40.6	11481.54
20 Vehicles	72.5	20	50.1	40.7	11748.98
1 Van	73.5	1	37.9	28.5	707.9458
Sum of Vehicle Movements at Receptor Location					**43.8**

Figure 8. SEL Calculated Values

The predicted L_{Aeq} can then be compared against the measured $L_{Aeq,T}$ for the daytime period. In this instance, 44dB rounded is compared against 59dB $L_{Aeq,T}$ for the ambient soundscape and accordingly, is not likely to be a problem. It is also possible to compare 44dB against the measured background of 46dB $L_{A90,15minutes}$ 07:00-19:00 hours. Again, it is clear that the 44dBA is below the background sound level for the reference period, which indicates that there is unlikely to be a problem.

6.2 Haul Route Calculation

A haul route calculation has been considered from BS5228:2014-A1:2019. This uses a number of fixed variables.

F.2.5.2 Method

For mobile items of plant that pass at intervals (such as earth-moving machinery passing along a haul road), it is possible to predict an equivalent continuous sound level using the following method.

a) *Stage 1*. The general expression for predicting the $L_{Aeq,T}$ alongside a haul road used by single engined items of mobile plant is:

$$L_{Aeq,T} = L_{WA} - 33 + 10\log_{10}Q - 10\log_{10}V - 10\log_{10}d \quad \text{(F.6)}$$

where:

L_{WA} is the sound power level of the plant, in decibels (dB);

Q is the number of vehicles per hour;

V is the average vehicle speed, in kilometres per hour (km/h);

d is the distance of receiving position from the centre of haul road, in metres (m).

Estimates of the $L_{Aeq,T}$ from a haul road used by other types of mobile plant with twin engines can be made by adding a further 3 dB(A) to the $L_{Aeq,T}$ calculated using equation (F.6).

The sound power level for the articulated truck was taken from https://www.transport.gov.scot/media/42094/appendix-a171-typical-construction-plant-and-noise-levels.pdf

The variables for consideration for a worst-case arctic truck pass would be as follows:

L_{WA} = 110dB (Articulated Truck)

Distance to the nearest receptor – 5metres

V= Speed limit in km/hour – 8km/hour

Q= Number of vehicles =1

110-33+10Log(1)-10*log(8)-10*log(5) =60.9dB.

As a worst case vehicle pass, this is 1dB more than the measured $L_{Aeq,T}$ for the daytime period and is not likely to be a concern. The assessment considers a worst case, as just that, a worst case, not a typical case.

7 Computer Noise Modelling (IMMI)

In order to see how noise varies at different positions around the proposed development it is possible to produce a noise contour map. A computer noise model has been completed using the computer package IMMI. Drawings of the area have been used to complete the noise models and the topography of the location recreated. IMMI faithfully implements the propagation method of ISO-9613:1996; Acoustics – Attenuation of sound during propagation outdoors.

The noise modelling software predicts freefield and A weighted dB values.

7.1 Noise Model Inputs

The following assumptions were made to inform the noise modelling process:

It remains important to understand the site topography. The client provided detailed topographical plans identifying the change in level from the roadside (Handcross Road) to the bottom electric gate to access the site as being a 22m level difference. A noise model was created with a 22m slope.

Hill Crest Farm as the receptor location was entered as a building with an apex roof height of 8.5m above ground level. Whilst the room layouts are not understood, an external receptor position was added at the North facing elevation for both ground floor (1.5m) and first floor (4.5m) above ground level. These consider the received freefield sound pressure levels from the two buildings and vehicle passes.

Whilst the buildings on the site are not currently weatherproof, they are being professionally clad and lined to ensure offices for the smaller AD building and B2/B8 uses for the larger of the two buildings.

Area sound sources were created for the buildings inside the noise modelling software. This allows the selection of an indoor sound pressure level and the walls and roof to be constructed accordingly.

A Kingspan quadcore KS1000Rw wall panel (insulated metal profile sheet) was used which provides 25dB(A) of attenuation. This was added to the walls and roof for both buildings to present a worst case, as in reality, further internal cladding will also occur to ensure that the buildings are suitable for day to day working, weatherproofing etc. The additional improvements will also provide additional sound attenuation, however as a worst case, only the Kingspan wall panel has been used at present.

The benefit of using an area sound source is that an internal sound pressure level can be derived and break-out and further propagation and attenuation calculated.

For the former AD and smaller building – which will be offices – an internal noise level of 65dB $L_{Aeq,T}$ was set. For the larger building with proposed B2/B8 uses, an elevated level of 85dB $L_{Aeq,T}$ was set which represents a worst case internal soundscape where individuals would be using machinery and wearing hearing protection.

The farm buildings/stables which extend to the South were added into the noise model as 2.4m in height.

No solid fencing was added between the access track and the farm and stables/equine area to the East.

There are also noted to be two, 2m bunds close to the lower access electric gate on the site. These were not added into the noise model.

Whilst the above accounts for the noise break out from the buildings, it is also relevant to consider vehicular access for the site and the number and type of vehicles which might access the premises via the track.

The worst-case vehicle movements in an hour are stated within section 3.6 and SELS were used for a 100m pass measured recently at another site.

7.2 Noise Model Outputs

7.2.1 Noise Break Out

The 2D noise contours can be seen in Figure 7 below.

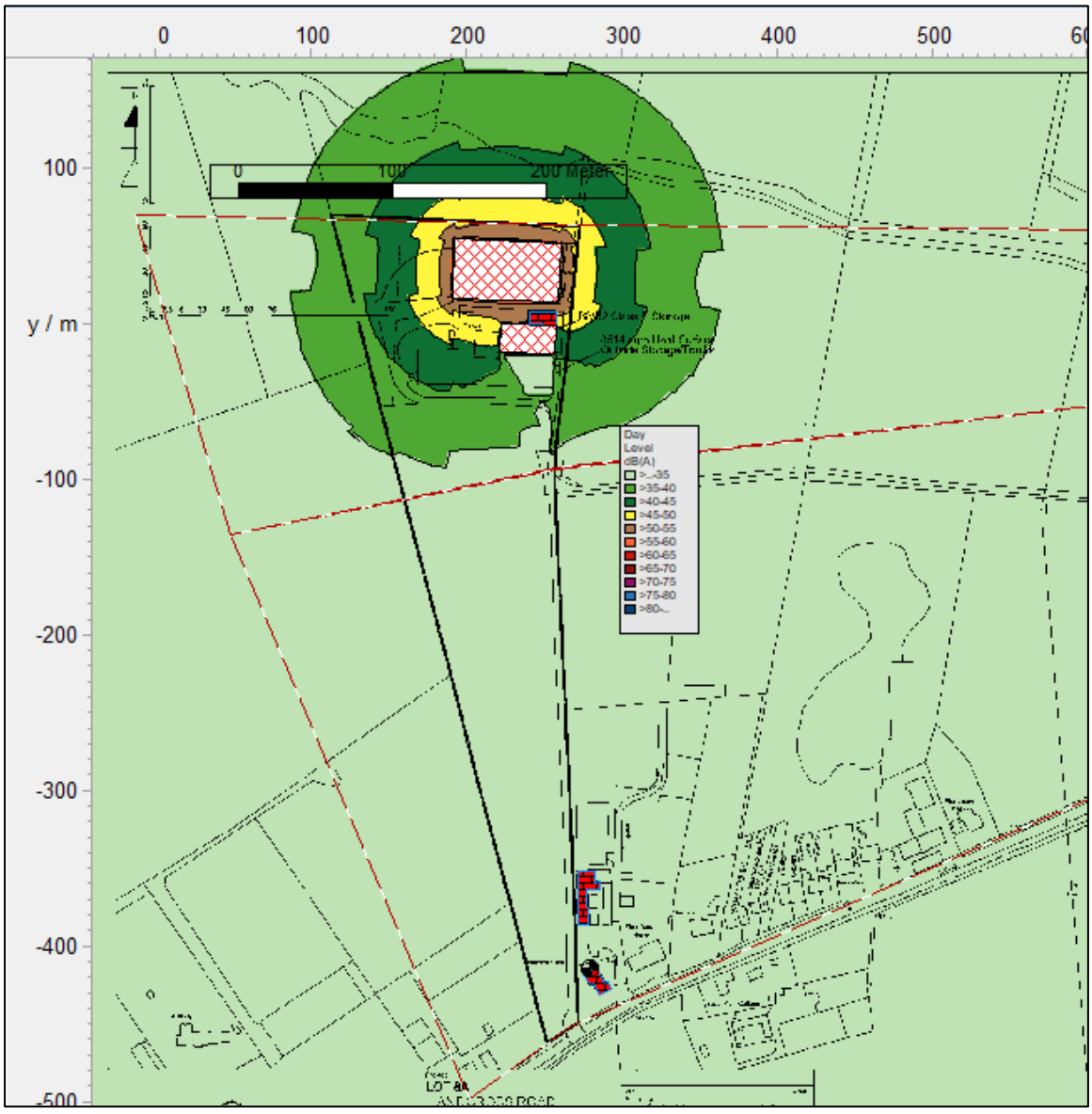

Figure 9. 2D Noise Contours of Noise Break Out from 2 Buildings.

8 BS4142:2014 A1:2019 Assessment

An assessment is possible using BS4142:2014-A1:2019 of both the building noise break out and the track.

The access track may also be assessed, as this is deemed to be private land and attention is drawn to section 1.3 whereby sound of an industrial nature and/or commercial nature does not include sound from the passage of vehicles on public roads and railway systems.

As a private/shared access track, this is capable of being quantified and has included a 3dB character correction for intermittency.

Daytime- Building Noise Breakout			
Results	**Measurement Parameter**		**Relevant Clause**
Specifc sound level	$L_{Aeq(T)}$	24.1	7.3.4
On time corrected value	Worst Case Hour Considered	0	
Acoustic feature correction	0 as not likley to be audible	0	9.2
Rating level	$L_{Ar,Tr}$	24.1	9.2
Background sound level	$L_{A90(T)}$	46	8
Excess of rating level over background sound level		-21.9	11
Assessment indicates a	Considerably Below Measured Background-low/no impac		11
Uncertainty of the assessment	Discussed		10

Daytime - Worst Case Hour Vehicle Movements			
Results	**Measurement Parameter**		**Relevant Clause**
Specifc sound level	$L_{Aeq(T)}$	43.8	7.3.4
On time corrected value	Worst Case Hour Considered	0	
Acoustic feature correction	Intermittancy	3	9.2
Rating level	$L_{Ar,Tr}$	46.8	9.2
Background sound level	$L_{A90(T)}$	46	8
Excess of rating level over background sound level		0.8	11
Assessment indicates a	Marginally above Background, consider with Context		11
Uncertainty of the assessment	Discussed		10

Figure 10. Assessment of Noise Breakout and Vehicle Passes.

If the two sounds were likely to occur simultaneously, then they may be logarithmically summed as follows – $10\log(10^{2.41}+10^{4.68})$ providing a Rating Level or $L_{Ar,Tr}$ of 46.8dB or rounded to 47dB.

This is 1dB above background and is heavily influenced on a worst-case hour vehicle movement. As with any BS4142:2014-A1:2019 assessment, it is relevant to consider context and discuss this and not merely rely on a single figure outcome.

9 Discussion and Context

It is appropriate to consider the relevant context of the site and the access track. The following factors assist in considering the assessment of the noise impact.

The proposed opening hours are based on daytime uses only, ie 07:00-19:00 hours.

There is minimal change in the soundscape due to the busy Handcross Road which dominates the site soundscape at the location of the nearest residential receptor.

For the buildings, these will be newly clad constructions.

For the purpose of the noise modelling, the two buildings have had minimal sound insulation applied (25dB) as well as conservative internal noise levels for the assessment. These included 65dB $L_{Aeq,T}$ internally for a busy office and 85dB $L_{Aeq,T}$ internally for the B2/B8 unit. At the latter internal sound pressure level, the building occupants would be required to wear hearing protection, which is not unreasonable for a B2 use and likely machinery noise being generated.

There is approximately 428 metres between the B2 building and the residential receptor location. This allows for considerable attenuation of noise levels.

Due to the distance and topography between the application site and the nearest residential receptor, there is no line of sight and the received sound pressure levels at the nearest residential property will not likely be audible.

The access track which serves the 2 buildings is not solely for the 2 buildings as part of the application. Contextually, the track is used by a tenant farmer for access and large machinery and vehicles already utilise the access.

For the worst-case hour of vehicle movements, this considered the noise level in relation to both the existing soundscape ($L_{Aeq,}$) as well as the more stringent BS4142:2014 measured background sound pressure levels ($L_{A90,T}$).

For the existing soundscape, the measured survey indicates that this was 59-60dB $L_{Aeq,\ 07:00\text{-}19:00\ hours.}$ Therefore, the predicted vehicle movements of 46.8dB $L_{Aeq,1\ hour}$ remains comfortably below this and not likely to be audible.

For consideration against the measured background, the vehicle movements are predicted to be 0.8dB above the measured background, albeit this did include a 3dB character correction for intermittency.

Given the circumstances, the assessment identified a low/no impact.

It is acknowledged that BS4142:2014-A1:2019 is not simply a numbers exercise but must also consider the relevant context of the site such as the factors above.

It is also relevant to note that the noise modelling, by considering a line source is likely to over predict for the vehicle movements. In reality, the vehicle movements are not acting as a line source, but a moving point source and will have significantly better noise attenuation. The noise model outcomes therefore reflect a worst-case scenario.

As a point source, it would be apparent that the vehicle would pass the receptor location relatively quickly, and this would warrant a sizeable on time correction. For example, if it took 15 seconds to pass Hillcrest Farm at a low speed, this would be a 24dB reduction (10log(15/3600)).

10 Uncertainty

It is relevant to reflect within reporting how uncertainty has been reduced in both the data collection and data processing areas.

The survey period was predominantly dry and weather conditions were checked against a local weather survey to the North. It was not necessary to remove data due to adverse weather conditions.

The measurements made on site included a field calibration at 1000Hz (114dB) without any significant drift having occurred. This occurred at site set up as well as the decommissioning of the site and provides confidence that the measured data may be relied upon.

Whilst a tenant is proposed for the buildings, to accommodate the B2/B8 elements which could well include machinery generated noise, a high soundscape was modelled inside the B2/B8 building without any detrimental impact on the nearest residential receptor.

For the purposes of noise modelling, no bunding or hedgerows were placed into the model, which again presents a worst-case scenario. Similarly, whilst it is recognised that the buildings will be refurbished, a standard insulated metal profile sheet with a 25dB transmission loss was used within the noise modelling.

11 Conclusion

A class 1 sound level meter was used to assess the site soundscape between 29th November to 5th December 2024.

IMMI noise modelling software was used to create the existing two agricultural buildings located to the North of the application site. Area sound sources were used to construct an office with an internal sound pressure level of 65dB $L_{Aeq,T}$ and for the larger B2/B8 building, an internal soundscape of 85dB $L_{Aeq,T}$ which would represent a noisy worst case workshop use with employees wearing hearing protection.

The noise break out from the two change of use buildings would generate a Rating Level or $L_{Ar,Tr}$ of 24dB at the nearest residential property. This is 22dB below the measured background and will not be audible.

A worst case hour of vehicle movements using the shared access track was also considered and this generates a $L_{Ar,Tr}$ of 47dB (which includes a 3dB character correction) at the nearest residential receptor. This is 1dB above the measured background sound pressure level and must be considered in line with the contextual factors discussed in section 9 of the report.

With the vehicle movements considered against the measured ambient soundscape, these are also comfortably below the 59-60dB L_{Aeq},07:00-19:00 hours measured dataset.

Based on the information presented, the change of use for the two agricultural buildings to offices/B2/B8 should not have any adverse impact. Planning permission should not be withheld on noise grounds.