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Twine Valley Farm, Bury

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20194-NIA-01-AA-R0

Noise Impact Assessment

Project Number
20194

Issued For
SR & RJ Brown Ltd

EXECUTIVE SUMMARY

This noise impact assessment has been undertaken in order to assess an agricultural building for the housing of cattle at Twine Valley Farm, Bury.

A background noise survey has been undertaken as detailed in the report, in order to determine an appropriate noise emission criterion, in accordance with the requirements of British Standard 4142: 2014 +A1 2019 '*Methods for rating and assessing industrial and commercial sound*'.

Calculations were undertaken for the nearest receiver, identified as residential dwellings on Church Road. It should be noted that if there are closer receivers that Clement Acoustics is not aware of, a reassessment will be necessary, and this should therefore be confirmed by the Client.

It has been demonstrated that compliance with the established criterion is feasible, dependent on the following material considerations:

- The feeding of cattle can occur between 07:00 and 23:00 only
- The noise emissions are in line with the source noise levels used in this report
- Barn and receiver locations are as established in this report and marked on the attached site plan

If there is any deviation from the above, Clement Acoustics must be informed, in order to establish whether a reassessment is necessary.

Clement Acoustics has used all reasonable skill and professional judgement when preparing this report. The report relies on the information as provided to us at the time of writing and the assumptions as made in our assessment.

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LIST OF ATTACHMENTS

20194-SP1	Indicative Site Plan
20194-TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	Acoustic Calculations

REVISION HISTORY

Issue	Date of Issue	Author	Reviewed	Authorised
0	04/07/2025			
		Jamie Newton Senior Consultant BEng (Hons) MIOA	John Smethurst Director BSc (Hons) MIOA	Andrew Thomas Director BSc (Hons) MIOA

Issue	Comment
R0	First Issue

1.0 INTRODUCTION

Clement Acoustics has been commissioned by SR & RJ Brown Ltd to measure existing background noise levels at Twine Valley Farm, Bury. Measured noise levels have been used to determine noise emissions criteria for the proposed use of an existing agricultural building for the housing of livestock in agreement with the planning requirements of the British Standard 4142: 2014 +A1 2019 '*Methods for rating and assessing industrial and commercial sound*' (BS 4142).

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

An acoustic terminology glossary is provided in Appendix A.

2.0 SITE DESCRIPTION

The site is an existing agricultural building on Twine Valley Farm, Bury. The surrounding area is rural in nature, with residential and commercial buildings located nearby.

Current proposals are to use the existing building for the housing of cattle, specifically cows.

Houses on Church Street have been identified as the nearest affected receivers. These nearest noise sensitive receivers were identified through observations on-site. If there are any receivers closer than those identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receiver should be confirmed by the client.

Locations are shown in attached site plan 20194-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Unattended Noise Survey Procedure

Measurements were undertaken at one position as shown on indicative site drawing 20194-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest affected receiver.

The microphone was mounted on a tripod at 1.5 m above ground level at the western site boundary, 20 m east from the junction of Church Road and Edith Street. at the front of the building. The position was considered to be free-field according to guidance found in BS 4142, and a correction for reflections has therefore not been applied.

Continuous automated monitoring was undertaken for the duration of the survey between 16:15 on 11 June 2025 and 10:00 on 16 June 2025.

The measurement procedure generally complied with ISO 1996-2: 2017: *'Description, measurement and assessment of environmental noise'*.

3.2 Weather Conditions

Weather conditions were observed and noted during the set-up and collection of the monitoring equipment.

Wind speeds and temperatures were measured using a digital anemometer and thermometer, while other weather elements were determined through subjective observations.

The noted weather conditions are summarised in Table 3.1.

Position No.	Wind Speed	Wind Direction	Temperature	Cloud Cover	Comments
Meter Set-Up [11/06/2025]					
AN1	3.5 m/s	South	25 °C	30 %	No Precipitation
Meter Collection [16/06/2025]					
AN1	2.7 m/s	West	17 °C	100 %	No Precipitation

Table 3.1 Noted weather conditions during surveys

It is understood that the weather conditions during the unattended survey were warm and generally dry with precipitation during the following periods:

- 11:45 on 13/06/2025 – 01:15 on 14/06/2025
- 12:00 – 13:45 on 14/06/2025
- 03:00 – 04:00 on 15/06/2025

Data measured during these periods have been excluded from the assessment. It is considered that the weather conditions for the rest of the survey were suitable for the measurement of environmental noise.

3.3 Equipment

The equipment calibration was verified, by means of a field verification check, before and after use and no abnormalities were observed.

The equipment used was as summarised in Table 3.2.

Position	Instrument	Manufacturer	Type
UN1	Class 1 sound level meter ^[1]	Svantek	977
UN1	Class 1 sound level meter calibrator ^[1]	Norsonic	Type 1251

Table 3.2 Instrumentation used during the survey

4.0 RESULTS

4.1 Unattended Noise Survey Results

The L_{Aeq} : 5min, L_{Amax} : 5min, L_{A10} : 5min and L_{A90} : 5min acoustic parameters were measured at the location shown in site drawing 20194-SP1.

Measured noise levels are shown as a time history in Attachment 20194-TH1, with average ambient and typical background noise levels summarised in Table 4.1.

It should be noted that the guidance of the latest revision of British Standard 4142: 2014 +A1 2019 ‘Methods for rating and assessing industrial and commercial sound’, as detailed in Section 8.1 of the standard is as follows:

‘The objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.’

Therefore, the typical background noise level will be used for the purpose of this assessment.

Position	Time Period	Average ambient noise level L_{Aeq} : T, dB	Typical background noise level L_{A90} : 15min, dB
UN1	Daytime (07:00 - 23:00)	52	48
	Night-time (23:00 - 07:00)	48	42

Table 4.1 Average ambient and typical background noise levels

5.0 NOISE CRITERIA

Due to the commercial nature of the noise source, an assessment according to the guidance of BS 4142 is considered appropriate.

In a BS 4142 assessment, corrections are applied to noise levels in order to calculate a noise rating level for the effects of proposed activities on nearby noise sensitive receivers. This calculated receiver noise level is compared with the typical measured background noise level.

BS 4142 recommends penalties that can be applied to noise emissions to account for tonality and intermittency. Where a sound source is neither tonal nor impulsive, but is still distinctive against the residual acoustic environment, a penalty may still be applied.

The available penalties for different characteristics are summarised in Table 5.1.

Characteristic	Comments	Maximum Penalty
Tonality	Can be converted to 2 dB for a tone which is just perceptible, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible	6 dB
Impulsivity	Can be converted to 3 dB for impulsivity which is just perceptible, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible	9 dB
Distinctiveness	Intended for sources that are neither tonal nor impulsive, but distinctive against background noise sources	3 dB
Intermittency	When the sound has identifiable on/off conditions	3 dB

Table 5.1 Available penalties according to BS 4142

BS 4142 states that a noise rating 5 dB above the background noise level is likely to be an indication of an adverse impact. If the difference is 10 dB or more, then this is stated as likely to be an indication of a significant adverse impact. Where the rating level does not exceed the background sound level, this is stated as an indication of the sound source having a low impact.

Calculated noise emissions will be assessed against the background sound levels shown in Table 4.1. It is understood that the feeding of the cattle is the noisiest regular activity at the barn, which happens during daytime hours only, as such the background noise level of **L_{A90} 48 dB** will be used as the basis of the assessment.

A 1-hour reference period has been used for the assessment of daytime operations that could occur for this use, in line with the requirements of BS 4142.

6.0 NOISE IMPACT ASSESSMENT

6.1 Source Noise Levels

Source noise measurements were taken within the barn where cattle are currently housed throughout the survey described in section 3.0.

Through conversations of the owner of the site it was found that the feeding of the cattle is the activity which generates the highest noise levels at the barn. Source noise levels taken through this feeding period have been used to predict the impact of the feeding of the cattle on nearby noise sensitive receivers.

The noise levels used in this analysis are shown in Table 6.1

Source	Reverberant Sound Pressure Level within the barn in each Frequency Band, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Feeding of Cattle	65	62	60	62	63	57	51	49	69

Table 6.1 Reverberant Sound Pressure Level within the barn during feeding time.

6.2 3-Dimensional Noise Model

In order to provide an accurate and robust assessment of the barns use, noise emissions have been considered by developing a noise map.

The noise emissions of the use of the barn have been modelled using the following source types:

- Building Facades
 - Vertical area sources matching the façade dimensions
 - Northern and 6 m of the eastern and western facades are modelled as open
 - Southern and remainder of the eastern and western facades are modelled as being constructed of combination of a single layer of hard wood and a single layer of breezeblock
- Building Roof
 - Area sources matching the horizontal roof dimensions
 - Roof modelled as being constructed of a single layer of corrugated aluminium

The noise model was constructed using the proprietary noise modelling software package CadnaA, utilising the following assumptions and parameters:

- Noise levels modelled and calibrated using the measured noise levels described in Table 6.1
- Locations of obstacles such as building envelopes
- Presence of reflecting surfaces
- Hardness of the ground between the sources and receivers
 - Surrounding grassed areas are modelled as absorptive
- Attenuation due to atmospheric absorption
- Receiver height for first floor windows 4 m above ground
- Receiver heights for gardens an ground floor windows 1.5 m above ground

It should be noted that all calculations in the CadnaA model, including those for distance and screening of intermediate building envelopes are undertaken according to International Standard ISO 9613-2:1996 '*Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation*'. This standard is the preferred method stated in BS 4142 to minimise uncertainty.

The specific noise level has been derived by the use of the 3D noise map model following the calculation method stated in ISO 9613. Calculations are performed over single octave band from 63 Hz to 8 kHz.

Figure 6.1 shows a plan view of noise propagation from the site, towards the identified receptors, with all measured noise sources operational.

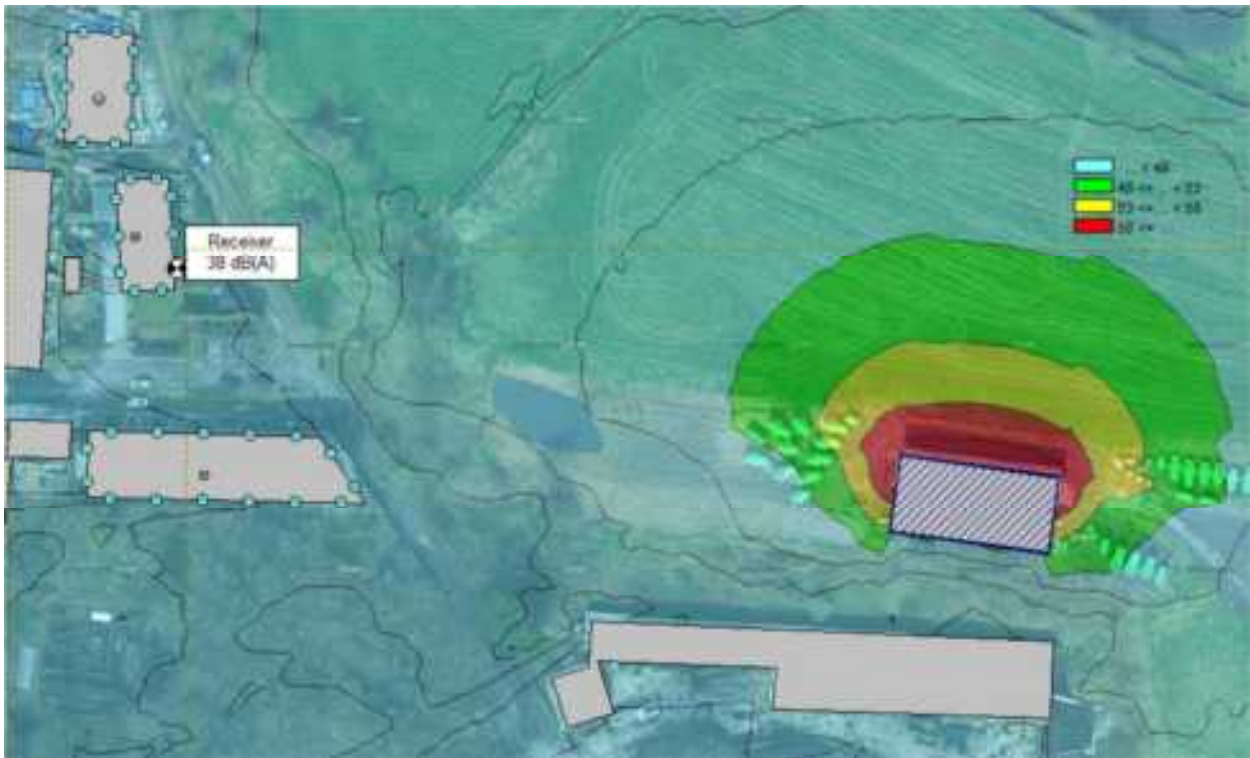


Figure 6.1 Plan view of noise propagation in 3D noise mapping model

6.3 Noise Impact Assessment

The closest receiver has been identified as windows on the eastern facade of residential properties on Church Road and Edith Street, a minimum of 100 m from the barn.

Taking into account all necessary acoustic corrections, the resulting noise level at the identified residential windows would be as shown in Table 6.2. With reference to Table 5.1, a +3 dB correction for intermittency has been applied, as per BS 4142 guidance.

Receiver	Typical Background Noise Level	Specific Noise Level at Receiver (due to operations)	BS4142 Penalties	Noise Rating Level at reciever	Rating Noise level Above Background Noise Level	BS:4142 Classification
Houses on Edith Street	48 dB(A)	38 dB(A)	+ 3 dB for intermittency	43 dB(A)	-5 dB(A)	Low Impact

Table 6.2 Noise levels and project criterion at noise sensitive receivers

As presented in Table 6.2 and Appendix B, noise from the use of the barn for the housing of cattle, specifically during feeding time, is indicated as having a low impact on the worst effected nearby noise sensitive receiver.

6.4 British Standard Requirements

Further calculations have been undertaken to assess whether the noise emissions from barn would be expected to meet recognised British Standard recommendations, in order to further ensure the amenity of nearby noise sensitive receivers.

British Standard 8233: 2014 *'Guidance on sound insulation and noise reduction for buildings'* gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS 8233: 2014 recommends 35 dB(A) as being acceptable internal resting conditions during daytime.

With loudest external levels of 38 dB(A), acceptable internal conditions would be met by taking the attenuation of the window itself into consideration. According to BS 8233: 2014, a typical building facade with a partially open window offers 15 dB attenuation.

It can therefore be predicted that, in addition to meeting the requirements of the set criteria, the emissions from the barn would be expected to meet the most stringent recommendations of the relevant British Standard, with neighbouring windows partially open. Predicted levels are shown in Table 6.3.

Receiver	Recommended Target – For resting conditions in a bedroom, in BS 8233: 2014	Noise Level at Receiver (due to the barn)
Inside Residential Window	35 dB(A)	23 dB(A)

Table 6.3 Noise levels and BS 8233: 2014 criteria inside nearest residential space

7.0 CONCLUSION

An environmental noise survey has been undertaken at Twine Valley Farm, Bury. The results of the survey have enabled criteria to be set for noise emissions from the housing of cattle in an existing barn in accordance with the requirements of the British Standard 4142: 2014 +A1 2019 *'Methods for rating and assessing industrial and commercial sound'*.

A noise impact assessment has then been undertaken using measured source noise levels to predict the noise levels, due to the housing of cattle in the barn, at the nearby noise sensitive receivers.

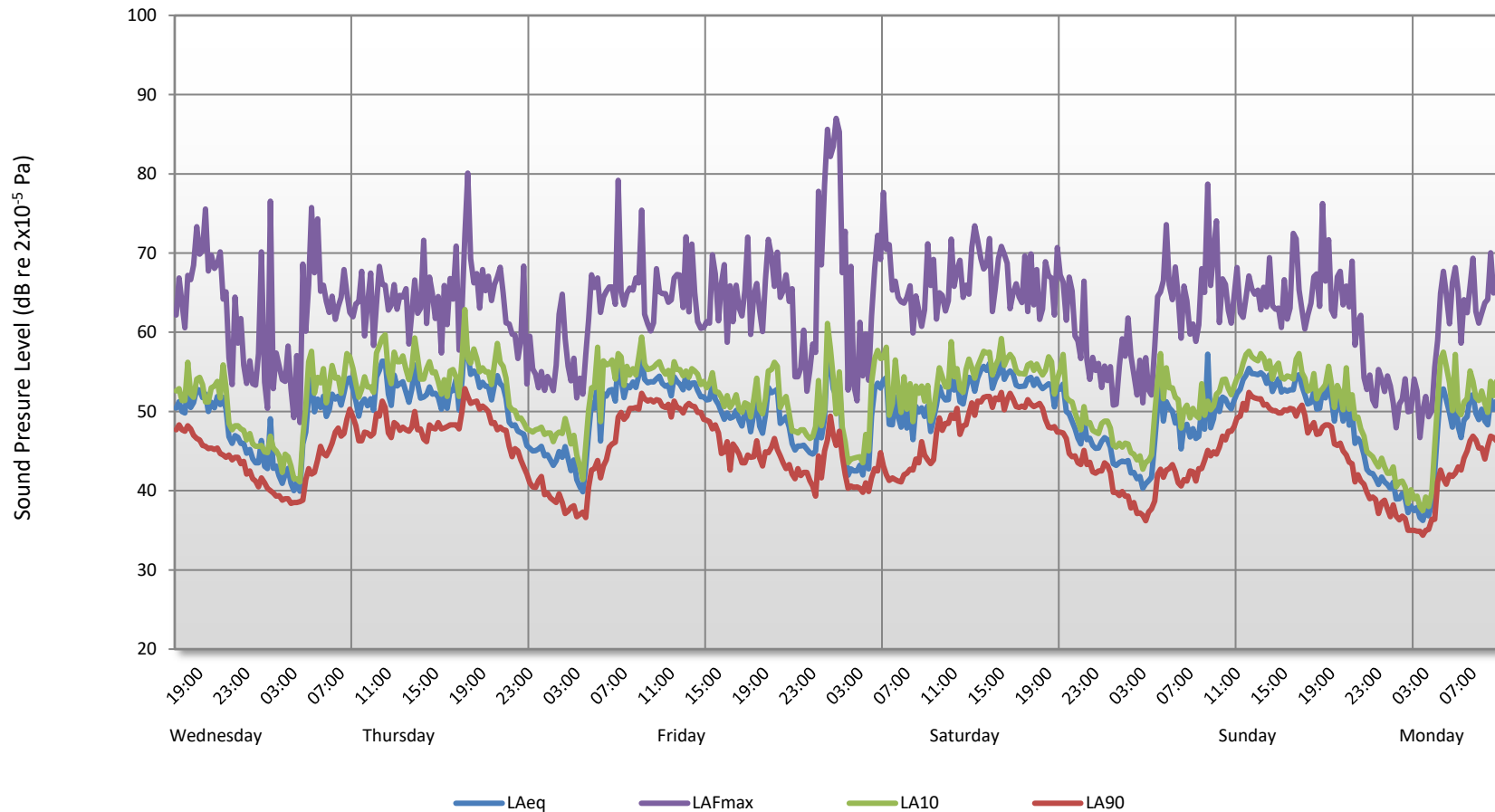
Calculations show that noise emissions from the use of the barn are indicated as having a low impact on nearby noise sensitive receivers.

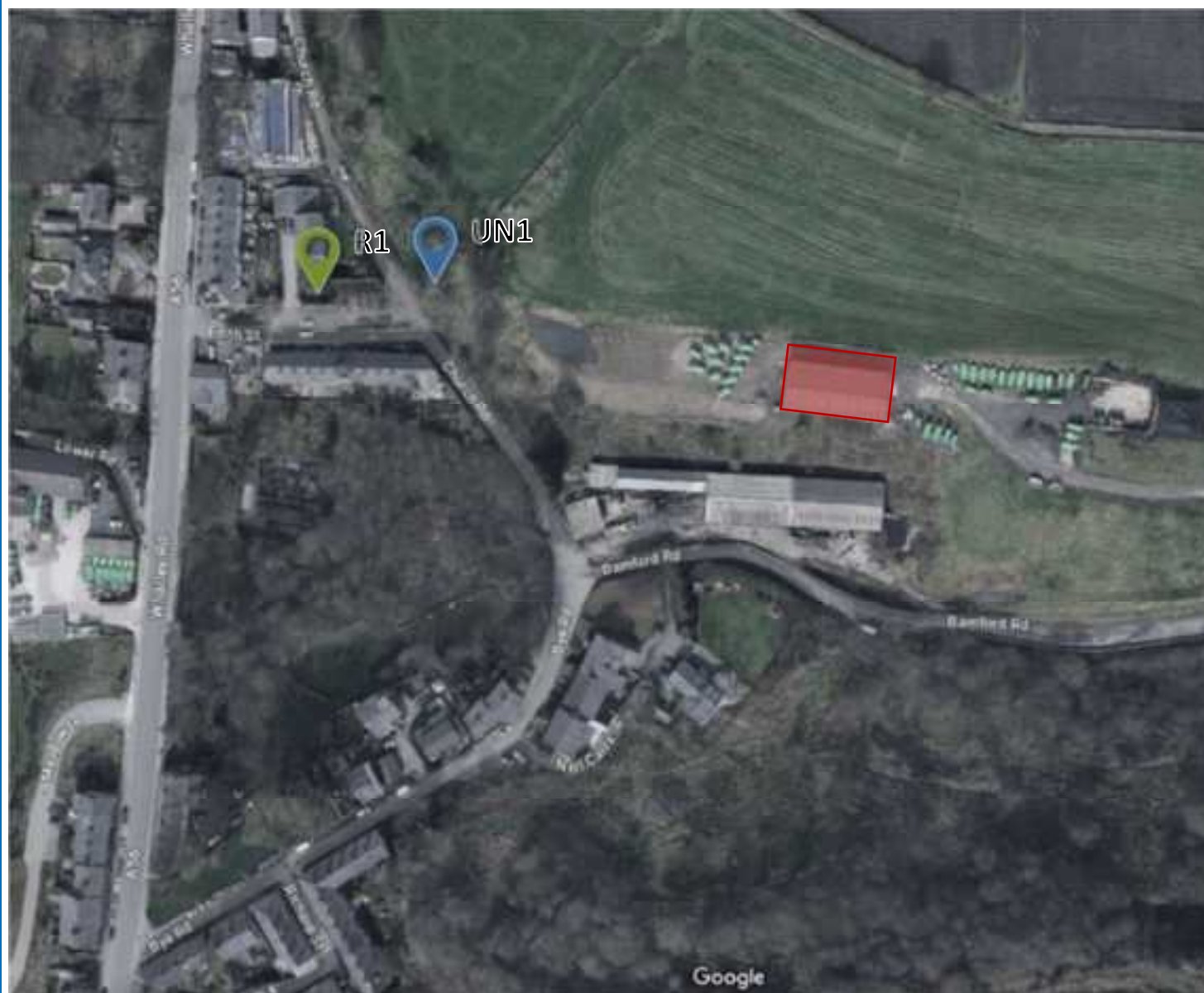
Twine Valley Farm, Bury



Position UN1

Environmental Noise Time History
11 June 2025 to 16 June 2025





Not to scale

Description:

Indicative site plan showing noise monitoring position and nearest sensitive receiver

Date	04 July 2025
Reference	20194-SP1
Project Name	Twine Valley Farm, Bury
Image ©	Google Earth

Key:

	Unattended Noise Survey Position
	Site Location
	Noise Sensitive Receiver

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq} . The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10 dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3 dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

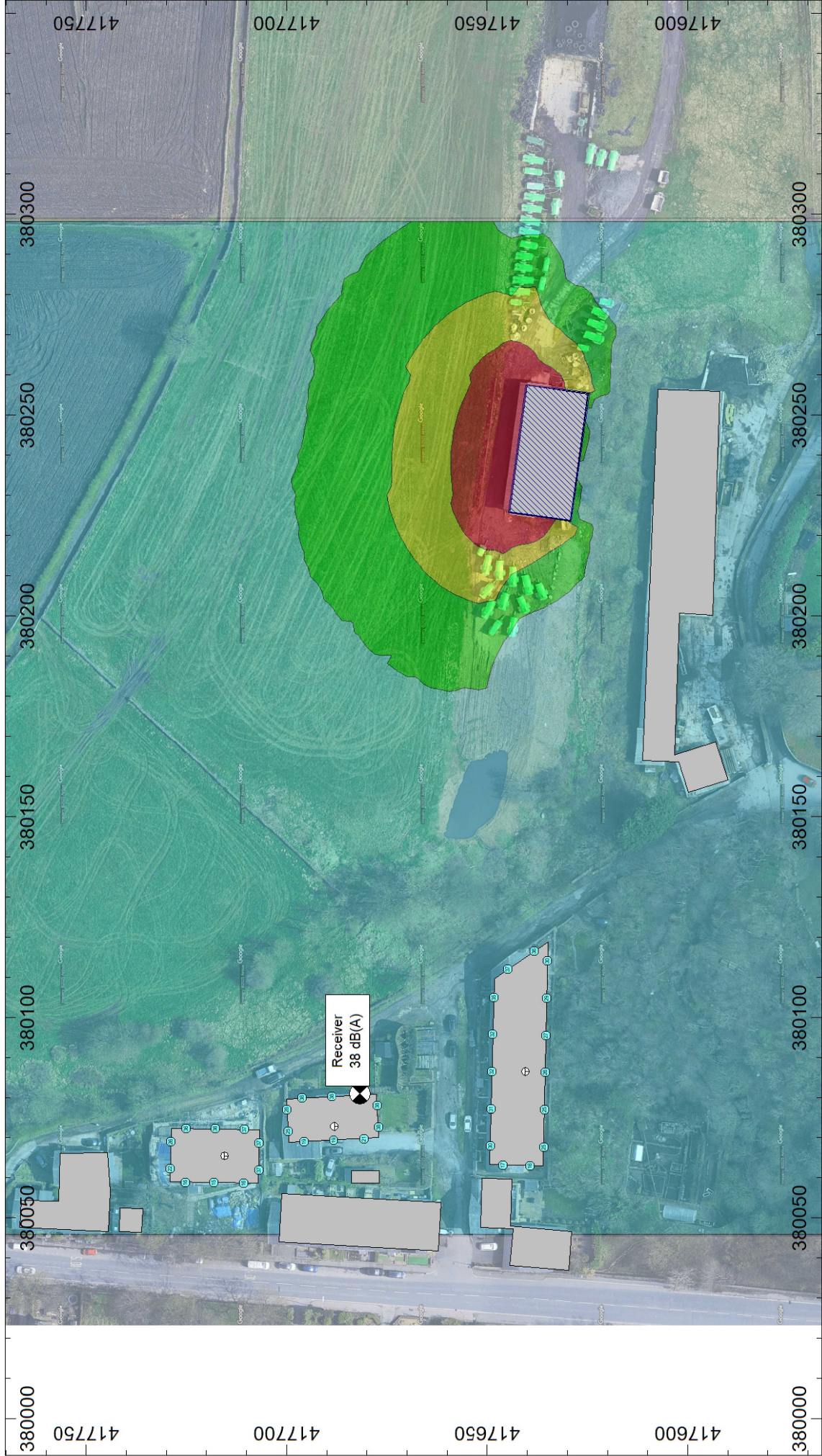
Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

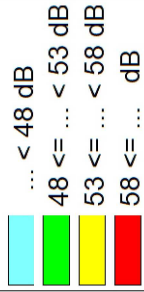


Sound Levels due to feeding of cattle, LAeq



Notes:

- The noise model was constructed using the proprietary noise modelling software package Cadna A.
- The potential noise mitigation of a barrier at the nearby proposed buildings has been predicted using the calculation methodology outlined in ISO 9613-2.
- The noise model was constructed utilising the following assumptions and parameters:
 - Locations of obstacles such as screens or barriers in the propagation path
 - Presence of reflecting surfaces
 - Hardness of the ground between the sources and receivers



- Area Source
- vert. Area Source
- Building
- Receiver
- Building Evaluation
- Calculation Area

20194-Appendix B



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