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[Redacted]



### Technical Report:

*Noise Impact Assessment  
Lovecotes Farm, Chickney Road,  
Debden, Essex  
CM22 6BH*

*dBc 10714*

## Noise Impact Assessment

<b>Date of Assessment:</b>	24/11/2023
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Rev 1	Draft for approval	24 <sup>th</sup> November 2023



## 1. Executive Summary

- 1.1. Tony Gallagher has been required to provide a noise impact assessment for the demolition of an industrial unit and erection of 6 no. new industrial units at Lovecotes Farm, Chickney Road, Debden, Essex CM22 6BH.
- 1.2. A noise impact assessment was commissioned to determine the impact of the 6 industrial units at the nearest noise sensitive receptors (NSRs) to satisfy the requirements of Uttlesford District Council.
- 1.3. The acoustic environment at the site, during the monitoring period was dominated by vehicle movements, vehicle repairs, airplane noise, power tools and bird song.
- 1.4. The existing ambient and background sound levels affecting Lovecote Lodge, NSR1, adjacent to the access road to the yard and Lovecotes Farm House, NSR2, on the northeast boundary of the site, the nearest noise sensitive receptors (NSRs), was measured at monitoring location P1 over a six-day period between the 16<sup>th</sup> and 23<sup>rd</sup> November 2023.
- 1.5. The hours of use are unknown; however, the client has indicated a start time after 07.00 and a finish time in the evening, therefore a daytime assessment will be conducted.
- 1.6. The representative day background sound level measured at P1 was determined to be daytime  $L_{A90,1hr}$  29dB, the ambient day time sound level ranged from  $L_{Aeq,1hr}$  31dB and 73dB.
- 1.7. Using 'BS 4142:2014 Methods for rating and assessing industrial and commercial sound' dBC has specified the sound power level of external plant, such as bathroom extraction and air conditioning units and any other mechanical plant, in the new buildings so there will be a low impact during the day at the NSRs. Section 8 of this report has outlined mitigation measures required to ensure low impact at the NSR and provide acceptable noise levels for the Local Authority.



## **2. Introduction**

- 2.1. Uttlesford District Council have requested a noise impact assessment for the proposed development at Lovecotes Farm, Chickney Road, Debden, Essex CM22 6BH.
- 2.2. dB Consultation Limited were commissioned to undertake the Noise Impact Assessment of the six new industrial units using methodology and guidance specified in BS 4142:2014.
- 2.3. The assessment is based upon the noise measured at P1 on the northeast boundary with Lovecotes Farm House at a representative location of the NSRs between the 16<sup>th</sup> and 23<sup>rd</sup> November 2023.
- 2.4. The report was written by Samantha Riley of dB Consultation Limited (dBc), a practicing acoustician for over 24 years, Full Member of the Institute of Acoustics (MIOA) and experienced in noise assessment in many industrial and commercial sectors.
- 2.5. The report has been reviewed by Mick Lane, Acoustic Director at dB Consultation Limited, a practicing acoustician for over 17 years, Full Member of the Institute of Acoustics (MIOA) and experienced in noise assessment in many industrial and commercial sectors.



### 3. Relevant Standards & References

#### BS 4142:2014 Method for rating and assessing industrial and commercial sound

- 3.1. BS 4142 provides a robust method for 'rating' external noise levels from factories, industrial premises, or fixed installations of an industrial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.
- 3.2. The method is based on the difference between the background noise level without the industrial noise and the specific noise level of the industrial noise source at the receiver location.
- 3.3. The noise level from the industrial source (referred to as the specific noise level) can be weighted to determine a rating level by adding acoustic penalties for tonality, intermittency, impulsivity or acoustic features that make the sound distinctive, penalties are applied for their impact at the receptor location. These methods refer to a sliding scale between +0dB up to +9dB, depending on the severity and can be combined for different acoustical features.
- 3.4. The background noise level is then subtracted from the rating level (the specific noise level plus any acoustic penalties) and the difference used to assess the impact, as shown in the Table 1 below.

Difference	Assessment
Around +10dB or more	Indication of Significant Adverse Impact
Around +5dB	Indication of an Adverse Impact
0dB or below	Indication of Low Impact

Table 1: Explanation of BS 4142:2014 assessment terms

- 3.5. BS 4142 Section 11 Note 2 states that 'Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night'.



#### 4. Site Description

- 4.1. The proposed development is located on a quiet road surrounded by fields with a small number of residential and commercial properties, the closest noise sensitive receptors (NSRs) are Lovecote Lodge NSR1, adjacent to the access road to the yard separated by a brick wall, and to the northeast, Lovecotes Farm House, NSR2, as shown in Fig.3.
- 4.2. The warehouse to be demolished is located on a commercial site in a rural setting and has been used for storage, as has the yard in front, where there are multiple containers, vans, lorries and cars. There are two remaining large warehouses, behind the warehouse to be demolished, fronting Chickney Road, and Gidney garage is situated to the rear of the site. The garage has customer vehicles and delivery vans regularly entering and leaving the site. To the west of the site is a Motor Cross track and further north there is a Banger racing track. Stanstead airport is located 5300m to the south and depending on wind direction, planes take off to the east of the site and circle past to the north. To the west of Lovecote Lodge is a campsite.
- 4.3. The existing site and warehouse to be demolished is shown in fig. 1 below.

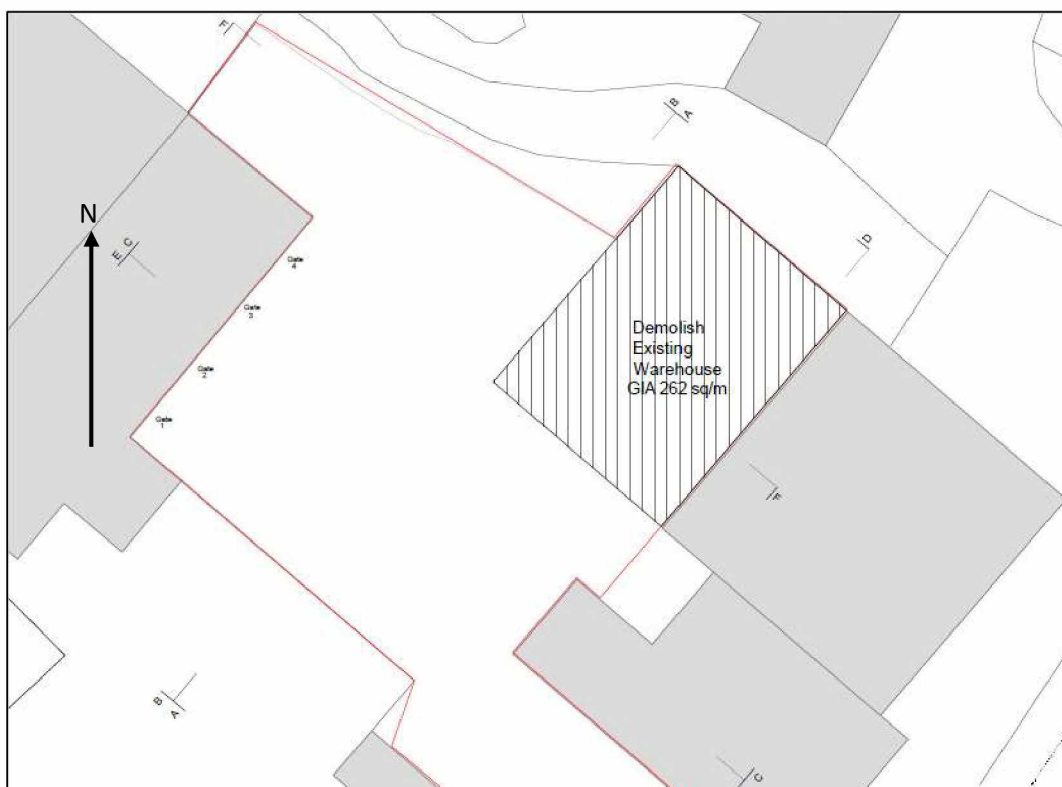


Fig.1: Existing site is outlined in red and the warehouse to be demolished.

4.4. The site location marked in red, and surrounding buildings are marked on fig. 2 below.

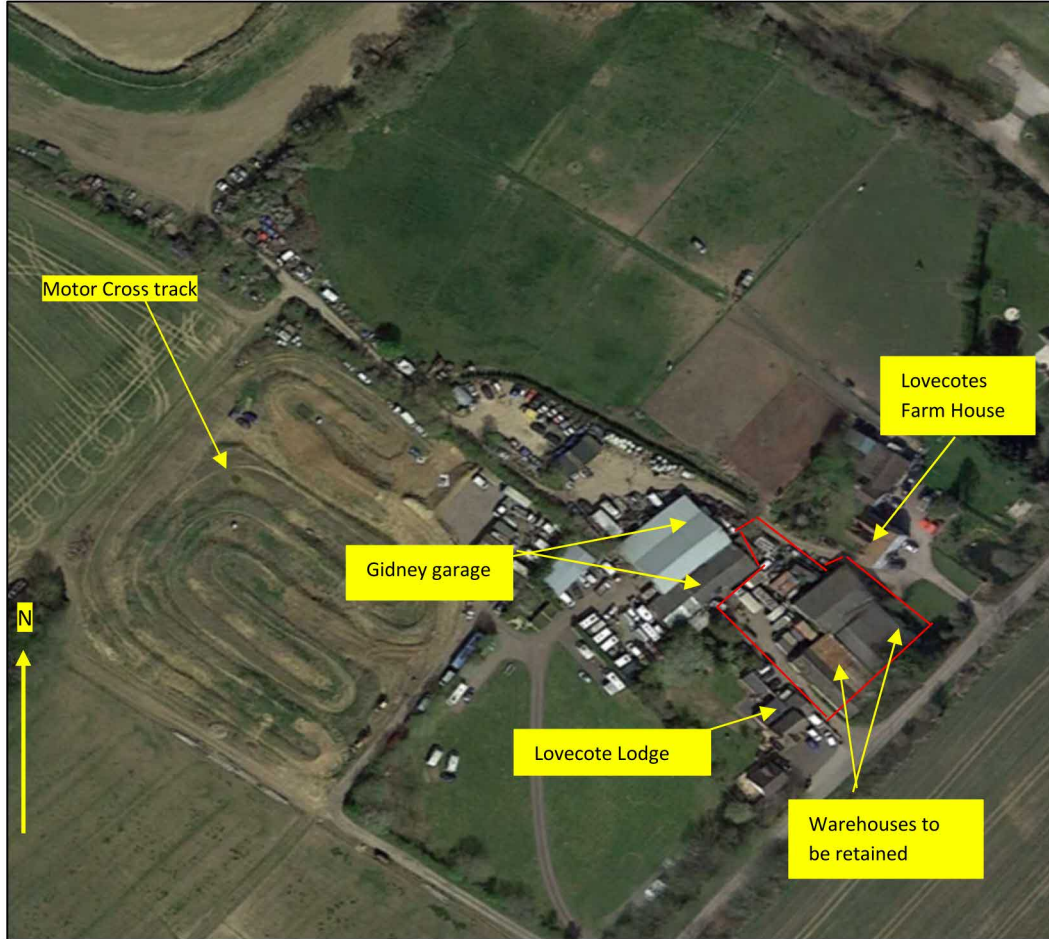
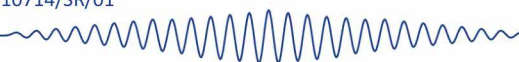


Fig.2: Site location outlined in red and surrounding buildings and uses.

4.5. The monitoring position P1 and the location of the NSRs are shown in fig. 3 below.





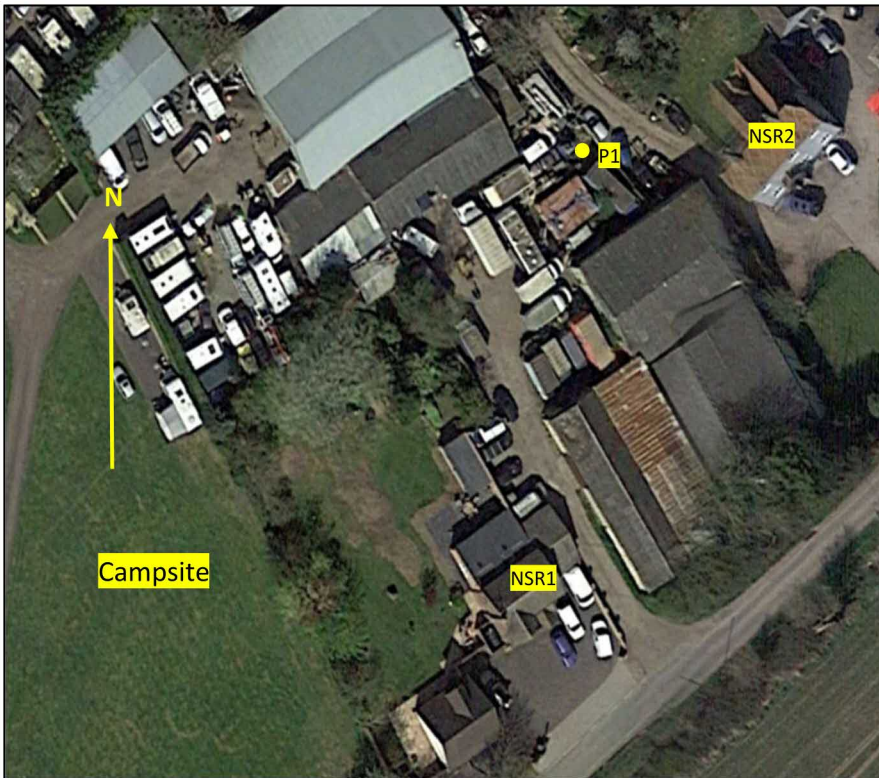


Fig 3: Monitoring location P1 and NSRs.

4.6. The proposed site layout including parking spaces is shown in fig. 4.

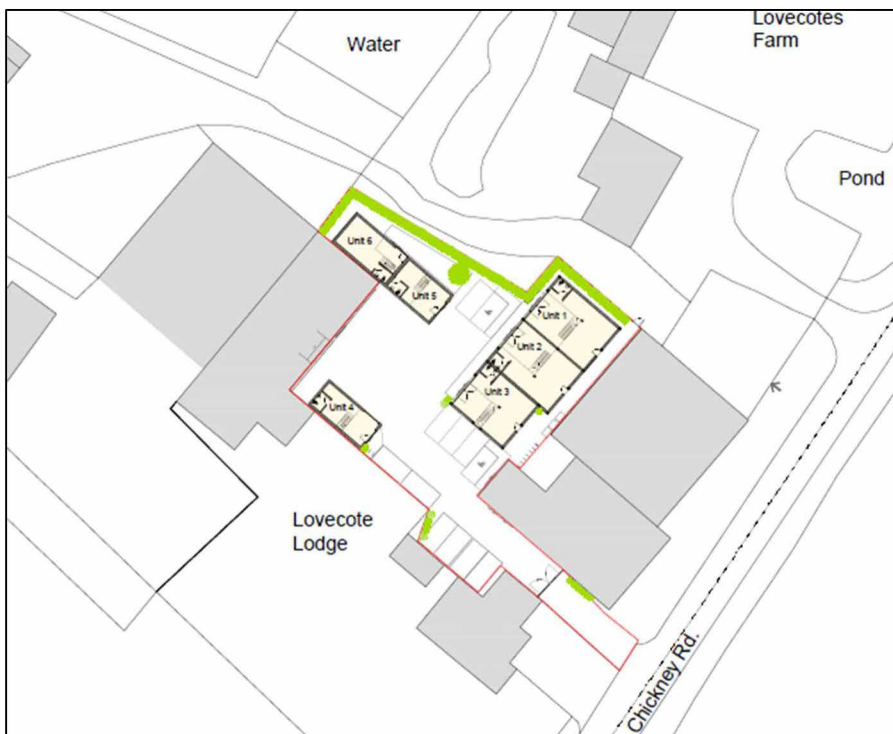


Fig.4: Proposed site layout including parking.

## **5. Specific Sound Level**

- 5.1. The intended use for the six units is for start-up businesses/cottage industries and the specific sound is likely to be from mechanical plant for toilet extraction, air conditioning units and vehicle movements. The use of forklift trucks is not anticipated.
- 5.2. The mechanical plant will operate during opening hours, although unknown at this time, are assumed to be between 07.00 and 20.00, the assessment period is 1 hour during the day.
- 5.3. There is no mechanical plant proposed at this time, therefore it is not possible to conduct a BS4142 assessment. Using the measured background noise level, distances and screening of the units to the NSRs, dBc has calculated the maximum sound power levels (SWL) for any external plant to be installed.
- 5.4. The previous use of storage warehouses and existing use of the garage means the yard has been and is quite active with customer vehicles and delivery vehicles. The proposed units have been allocated two parking spaces, it is likely one if not both will be used by the owners/employees that will arrive at the start of the day and leave at close of business. The deliveries and collections are likely to be from Sprinter type vans which already deliver to the garage and are similar or smaller than the lorries previously used as part of the applicant's storage business.
- 5.5. The speed of vehicles using the access road and manoeuvring in the yard will be low, and the noise levels at NSR1 are likely to be lower than from the previous lorries and HGVs and indistinguishable from the vehicles associated with the garage.



## 6. Background Sound Level

6.1. The ambient and background sound levels were measured on the northeast boundary of Lovecotes Farm, P1, from the 16<sup>th</sup> to the 23<sup>rd</sup> November 2023. The monitoring position was deemed to be a representative background sound level at the NSRs. The measurement location is marked with a yellow arrow in Table 2 below.

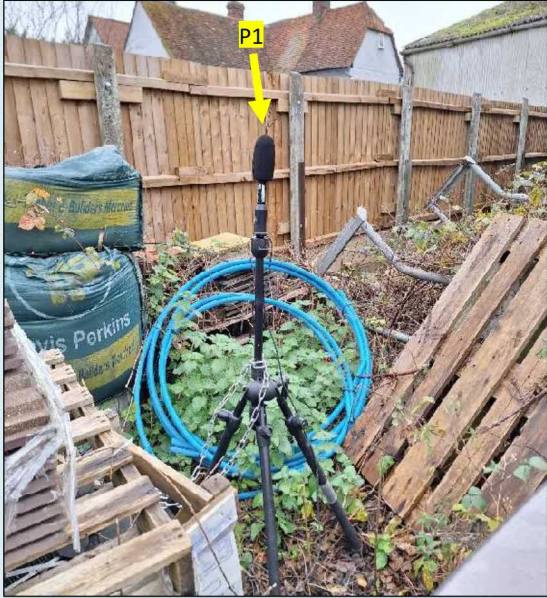
Location	Photograph	Sound Sources
<p>P1                      Situated on the northeast boundary of Lovecotes Farm 1.35m off the ground</p>		<p>Customer &amp; delivery vehicles, airplanes, power tools and bird song.</p>

Table 2: Noise Monitoring Location P1

6.2. The monitoring was undertaken at P1, using a Norsonic 140 sound level meter serial number 1403084 and using a Campbell Associates outdoor microphone system serial number GRAS-41AL#01, which were field calibrated to 114dB at 1kHz using a Nor-1251 calibrator serial number 34682. Both meter and calibrator have been calibrated at a UKAS accredited laboratory within the last two years. Calibration certificates are available upon request.

6.3. The field calibration readings were within standard guidance allowance.

6.4. The weather during the monitoring period 16<sup>th</sup> and 23<sup>rd</sup> 2023 is summarised in Table 3 below.

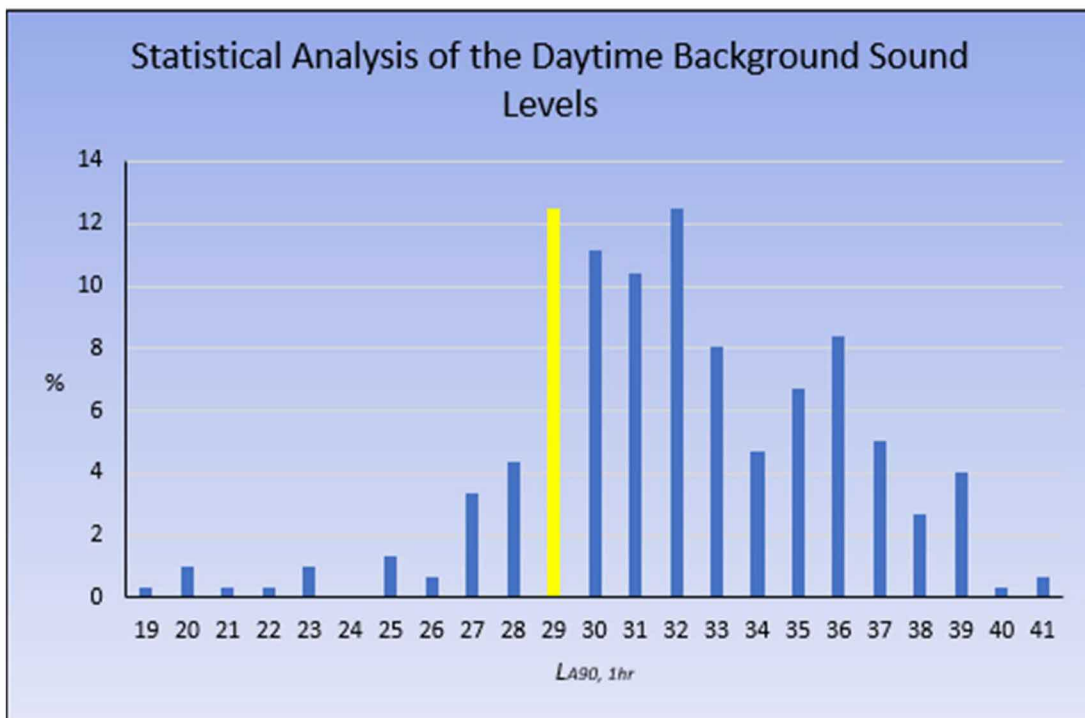


Date	Time	Details	Temperature (°C)	Wind Speed (m/s)	Wind Direction
16 <sup>th</sup> November	07:00 – 23:00	Sunny intervals and light rain	4 – 7	1.8 – 3.6	NW/W
16 <sup>th</sup> /17 <sup>th</sup> November	23:00 – 07:00	Cloudy, light showers	4 – 5	2.2 – 2.7	W
17 <sup>th</sup> November	07:00 – 23:00	Sunny and dry	4 – 9	2.2 – 3.1	W/S
17 <sup>th</sup> /18 <sup>th</sup> November	23:00 – 07:00	Cloudy, light rain	6 – 8	1.3 – 5.8	S/E
18 <sup>th</sup> November	07:00 – 23:00	Overcast, heavy rain	9 – 13	4.9 – 6.3	S/SW
18 <sup>th</sup> /19 <sup>th</sup> November	23:00 – 07:00	Overcast, patchy cloud	10 – 11	6.3 – 6.7	SW
19 <sup>th</sup> November	07:00 – 23:00	Light rain with gusty winds	10 – 13	7.2 – 8.5	SW/W
19 <sup>th</sup> /20 <sup>th</sup> November	23:00 – 07:00	Overcast, light showers	9 – 10	5.4 – 7.2	W
20 <sup>th</sup> November	07:00 – 23:00	Light rain, sunny intervals	9 – 11	3.1 – 5.4	W
20 <sup>th</sup> /21 <sup>st</sup> November	23:00 – 07:00	Patchy cloud, light rain	7 – 8	3.6 – 4.0	NW/W
21 <sup>st</sup> November	07:00 – 23:00	Overcast, light rain shower	7 – 9	3.6 – 5.4	N
21 <sup>st</sup> /22 <sup>nd</sup> November	23:00 – 07:00	Patchy cloud, dry	4 – 6	2.7 – 3.6	N
22 <sup>nd</sup> November	07:00 – 23:00	Sunny, dry	4 – 8	1.8 – 2.7	NW/W
22 <sup>nd</sup> /23 <sup>rd</sup> November	23:00 – 07:00	Clear, patchy cloud	5	2.2 – 3.1	W

Table 3: Weather

6.5. It should be noted that there were periods during the monitoring when wind speeds exceeded the British Standard guidance speed of 5m/s<sup>-1</sup>, notably throughout the 18th and 19th. These winds would lead to elevated noise levels measured at P1 and so these measurements have not been used in the assessment.

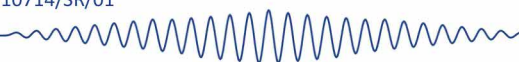
6.7. dBc have been informed that the site will operate after 07.00 and close before 23.00. Graphs 1 shows the statistical analysis of the daytime background sound levels measured at P1 between 07.00 and 23.00 from 16<sup>th</sup> November to 22 November 2023, excluding the 18<sup>th</sup> and 19<sup>th</sup> of November.



Graph 1: Shows the daytime background sound levels at P1.



- 6.8. From the results shown in graph 1, a representative daytime background sound level of  $L_{A90,1hr}$  29dB(A) was used in the assessment. A background level measured over 15min was deemed equivalent to a 1hr level for this assessment.
- 6.9. The ambient day time sound level ranged from  $L_{Aeq,1hr}$  31dB to 73dB at P1, which was influenced by idling vehicles, vehicle movement, airplanes, power tools and bird song.



## 7. BS 4142:2014 Assessment

### Noise Sensitive Receptors

- 7.1. A representative background level for the NSRs was 29dB(A). To ensure any future plant such as mechanical ventilation has a low impact on NSR1 and NSR2 the maximum sound power level (SWL) has been calculated using the background sound level and distance to the receptor.
- 7.2. Table 5 below shows the distance of units to the nearest NSR, the reduction in sound levels with distance and the recommended SWL.

Unit	Closest receptor	Distance to receptor (m)	Reduction due to distance (dB)	Recommended SWL (dB)
1	Lovecotes Farm House	9	19	56
2	Lovecotes Farm House	17	25	62
3	Lovecotes Lodge garden	12	22	59
4	Lovecotes Lodge garden	0	0	37
5	Lovecotes Farm House garden	20	26	63
6	Lovecotes Farm House garden	20	26	63

Table 4: Shows Distance of closest units to NSRs, reduction in sound levels with distance and recommended SWL.

- 7.3. There is potential for mechanical plant to be screened from the NSRs. External mechanical plant screened by the existing buildings, the units themselves or the brick wall adjacent to Lovecotes Lodge or the wooden fence on the boundary with Lovecotes Farm House can increase the recommended SWL by a maximum of 10dB.
- 7.4. Where more than one mechanical plant is to be installed the cumulative impact needs to be considered.
- 7.5. To ensure during the day the impact from mechanical plant is low mitigation measures are recommended in section 8.



## 8. Discussion – Mitigation Measures

- 8.1. The plans do not include external plant however this may be required once the units are occupied, to ensure low impact at the NSRs, dB would recommend the following mitigation measures.
- 8.2. Silent type mechanical plant should be selected for extraction, ventilation or any other use.
- 8.3. Mechanical plant should be positioned behind units, for example units 1, 2, & 3 on the east side facing the remaining warehouses, unit 4 on the north side facing towards the garage and units 5 & 6 (labelled 6 & 7 in the drawing) on the west side and north side respectively as shown by blue lines in figs. 5 and 6 below.

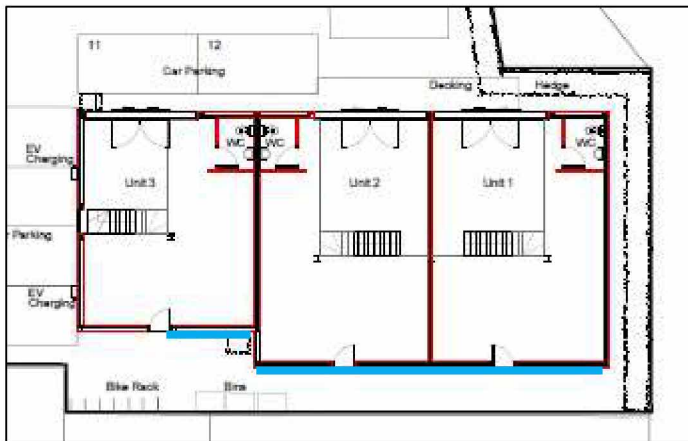


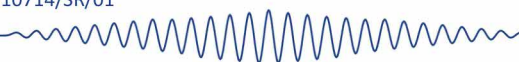
Fig.5: Recommended location for external mechanical plant for units 1-3 indicated by a blue line.



Fig.6: Recommended location for external mechanical plant for units 4, 5 & 6 (labelled 6 & 7) indicated by a blue line.

- 8.4. Install any external mechanical plant 1m below the top of the boundary brick wall or fence to maximise the screening affect.

- [REDACTED]
- 8.5. Should external mechanical plant be installed, dB Consultation Ltd would recommend further advice is sought from a qualified acoustician to confirm the noise emission ensures a low impact at the NSRs. This is particularly important if more than one mechanical plant is installed as the cumulative affect needs to be considered.
  - 8.6. To control noise from vehicles, signage restricting speed on the access road and an even road surface are recommended.
  - 8.7. The above measures regarding external mechanical plant and control of vehicle noise should ensure a low impact on the NSRs.





## 9. 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 can be used to duplicate the ear's variable sensitivity to sound across a spectrum of frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the average 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).

### **$L_{eq,T}$**

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 (T).

### **$L_{10,T}$**

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

### **$L_{90,T}$**

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

### **$L_{fmax}$**

This is the maximum sound pressure level that has been measured over a period using a fast time constant.

### **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 combine, on a logarithmic scale, 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 3 identical sources produce a 5dB 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 3dB 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.

