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# THE VINERY, POLING, WEST SUSSEX

## NOISE IMPACT ASSESSMENT

Report **7739-NIA-01**

Prepared on 7 December 2012

Issued For:

**Fargro Ltd**

**Toddington Lane**

**Littlehampton**

**West Sussex**

**BN17 7PP**

committed to CSCS Platinum award

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## 1.0 INTRODUCTION

Clement Acoustics Ltd has been commissioned by Fargro Ltd to measure existing background noise levels at The Vinery, Poling, West Sussex. Measured noise levels will be used to determine noise emission criteria for a proposed site relocation in agreement with the planning requirements of the Local Authority.

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

## 2.0 ENVIRONMENTAL NOISE SURVEY

### 2.1 Procedure

Measurements were undertaken at the position shown in Site Plan 7739-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receivers.

Continuous automated monitoring was undertaken for the duration of the survey between 14:45 on 15 November 2012 and 12:00 on 19 November 2012.

Background noise levels at the monitoring position were dominated by traffic from Arundel Road and noise from processes on the existing industrial estate.

Weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

The measurement procedure generally complied with BS7445:1991. *Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*.

### 2.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator


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## 3.0 MANUAL MEASUREMENTS

In order to assess background noise levels further away from Arundel Road, a manned survey was also undertaken at the location shown in indicative site plan 7739-SP1 on 19 November 2012.

Manual measurements lasted approximately 30 minutes and were undertaken during the course of the longer survey in order to compare measurements at each location during the period.

This has allowed an investigation into how noise from Arundel Road and as such, background noise levels, propagate at greater distances.

## 4.0 RESULTS

### 4.1 Environmental Noise Survey

The $L_{Aeq:\ 5min}$, $L_{Amax:\ 5min}$, $L_{A10:\ 5min}$ and $L_{A90:\ 5min}$ acoustic parameters were measured at the location shown in Site Plan 7739-SP1. The measured levels are shown as a time history in Figure 7739-TH1.

Minimum background levels are shown in Table 4.1.

| | Minimum background noise level $L_{A90:\ 5min}$ dB(A) |
|---|---|
| Daytime [*07:00 - 23:00*] | 48 |
| Night-time [*23:00 - 07:00*] | 40 |
| Proposed Daytime Operational Hours [*07:00 - 19:00*] | 48 |
| Proposed Night-time Operational Hours [*06:00 - 07:00*] | 40 |

**Table 4.1: Minimum background noise levels**

### 4.2 Manual measurements

Manual measurements were undertaken the location shown in site plan 7739-SP1 such that measured background noise levels could be corrected for residential properties further from Arundel Road.



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Measured background noise levels and the corresponding background noise levels at the environmental noise survey location during the same period are shown in Table 4.2.

| | Background noise level at Survey Position | Background noise level at Manual Position | Difference |
|---|---|---|---|
| Manual Measurement Period [*17:40 - 18:10, 19 November 2012*] | 61 | 49 | -12 |

**Table 4.2: Minimum background noise levels at Manual Measurement Location**

## 5.0 NOISE CRITERIA

In a BS4142 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.

BS4142:1997:*'Method for rating industrial noise affecting mixed residential and industrial areas'* states that a noise rating 5dB above the background noise level is of 'marginal significance'. If the difference is of 10dB or more, then there is an indication that 'complaints are likely'. A noise rating level of 10dB below the existing background noise is defined as 'a positive indication that complaints are unlikely'.

The minimum measured background noise levels as shown in Table 4.1 will be compared with predicted noise emissions levels for proposed daytime and night-time use.

## 6.0 DISCUSSION

The proposed site relocation will cause two main activities that could potentially have an impact on noise sensitive receivers.

The first is an increase in traffic using the junction between Arundel Road and The Vinery in order to access the new industrial premises.

Second is the proposed siting of a storage area where forklift trucks will operate, as shown in the site plan.

Each of the two activities could affect different residential premises. Noise impact assessments have therefore been undertaken for two receivers; Receiver 1 which is close to the junction with



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the main road and could therefore be affected by noise from increased traffic and Receiver 2 which is closer to where the proposed forklift activity will occur. The two receiver locations are shown in indicative site plan 7739-SP1.

## 7.0 RECEIVER 1 NOISE IMPACT ASSESSMENT

In order to provide a worst case scenario of the impact of noise from traffic using the junction with Arundel Road, calculations have been undertaken considering HGV movements.

It is understood that proposals are for 5 HGV delivery vehicles to depart the site each morning between 06:00 and 07:00. As this hour period is treated as 'night-time' by BS1412:1997, the predicted noise impact will be more onerous.

Measurements were undertaken of a HGV departing The Vinery site onto Arundel Road at source, in order to ascertain an impression of the noise levels generated. Measured noise levels of a HGV pulling away are shown in Table 7.1. Measured levels have been verified with measurements of HGVs pulling away at other sites.

| | *Measured Sound Pressure Level (dB) in each Frequency Band, at 1m* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity** | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| HGV Pulling Away | 75 | 65 | 62 | 65 | 65 | 64 | 59 | 52 |

**Table 7.1 Measured sound pressure level of HGV pulling away**

Corrections are then applied as specified in British Standard 4142:1997 to account for the duration and nature of source noise as well as for distance from the source to the closest receiver.

With 5 HGVs departing site between 06:00 and 07:00, it is anticipated that only one lorry would pass Receiver 1 in each 5 minute night-time reference period. With HGVs departing the existing site observed to take a maximum of 1 minute to exit the junction, a minimum time correction of -7dB is applied to measured noise levels.

BS4142:1997 also recommends a +5 dB penalty is applied when noise emissions are considered tonal or 'distinct'. As by 06:00, noise levels from the dual carriageway are observed to be at a loud level, noise from a passing HGV would not be considered 'distinct' against this backdrop. A +5 dB correction has therefore not been applied for HGVs passing Receiver 1.



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With Receiver 1 located approximately 20m from the closest point of the junction, a correction is also applied to reflect this.

With all corrections as specified in British Standard 4142:1997 applied, the noise rating level would be as shown in Table 7.2, with detailed calculations shown in Appendix B1.

| Calculated Noise Rating Level at Receiver $L_{Aeq,5mins}$ | Measured Minimum Background Noise [*06:00 - 07:00*] $L_{A90,5mins}$ | Difference | Indication |
|---|---|---|---|
| 37 dB(A) | 40 dB(A) | -3 dB | Complaints are unlikely / Marginal Significance |

**Table 7.2 Calculated noise rating level and assessment for Receiver 1**

As shown in Table 7.2, noise emissions from HGV movements at the identified noise sensitive receiver are expected to be between the indication of 'marginal significance' and 'Complaints unlikely'.

It should be noted that by basing the noise impact assessment on measured background noise levels during the 1 hour night-time period when HGVs will be used has provided a particularly robust assessment. During daytime operational hours, the noise rating would be significantly more favourable due to higher background noise levels as well as a longer reference period of 1 hour.

## 7.1 Proposed HGV Noise Management

In order to ensure noise emissions and subsequent noise rating levels due to HGVs are minimised, we would recommend implementing the following measures:

- All Fargro owned trucks should be treated such that noise due to moving parts or unstable loads is minimised. This can be done by treating metallic moveable parts such as chains with a resilient material and ensuring parts such as tailgates and doors are properly secured.

- It should be ensured that all drivers are aware of the noise sensitive nature of the location and act accordingly. Unnecessary noise due to loud radio use, windows being wound down or over revving of engines should be avoided.

- Signage could be installed to ensure that drivers not directly employed by Fargro are also aware of the noise sensitivity and implications.



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## 8.0 RECEIVER 2 NOISE IMPACT ASSESSMENT

Receiver 2 is located away from the junction with the main road, but closer to a proposed storage area where forklift trucks will be in operation.

As a worst-case scenario, it is understood that forklift trucks could be operational during the hours 06:00 to 19:00. The assessment will therefore again consider the hour between 06:00 and 07:00 as a more onerous night-time assessment.

In order to predict noise breakout levels from forklift activity, measurements have been taken from a previous site where one forklift truck in a warehouse was measured, revving forwards and backwards with a reversing beeper also operational. These previously measured levels are shown in Table 8.1.

| | *Measured Sound Pressure Level (dB) in each Frequency Band, at 1m* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Activity** | **63Hz** | **125Hz** | **250Hz** | **500Hz** | **1kHz** | **2kHz** | **4kHz** | **8kHz** |
| Forklift Truck in Warehouse | 59 | 56 | 55 | 60 | 62 | 58 | 53 | 45 |

**Table 8.1 Measured sound pressure level of forklift truck**

As the proposed Fargro site could have up to three forklift trucks operational at any one time, a correction is applied to account for this.

It has been assumed in this assessment that forklift truck activity will be constant throughout the reference period, meaning no time correction is applied.

The +5 dB correction has been applied in this case as Receiver 2 is located away from the main road and forklift trucks have beepers encapsulated in their noise emissions, which are tonal noise sources.

Corrections are then applied to account for the distance between the storage area and Receiver 2 and a further correction to account for the fact that Receiver 2 is in a non-reverberant field, unlike the warehouse where source noise levels where measured.

A final correction is then applied to reflect the screening that will be provided by an existing intermediate building, which will screen the closer parts of the storage area.



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With all corrections as specified in British Standard 4142:1997 applied, the noise rating level would be as shown in Table 8.2, with detailed calculations shown in Appendix B2.

It should be noted that the minimum calculated background noise has been corrected to account for the difference between receiver locations, as detailed in Section 4.2.

| Calculated Noise Rating Level at Receiver $L_{Aeq,5mins}$ | Measured Minimum Background Noise [*Daytime*] $L_{A90,5mins}$ | Difference | Indication |
|---|---|---|---|
| 22 dB(A) | 28 dB(A) | -6 dB | Complaints are unlikely |

**Table 8.2 Calculated noise rating level and assessment for Receiver 2**

As shown in Table 8.2, noise emissions arising from forklift truck movements to the identified nearby noise sensitive receiver are expected to be closest to the 'Complaints Unlikely' region.

## 9.0 CONCLUSION

An environmental noise survey has been undertaken at The Vinery, Poling, West Sussex. The results of the survey have enabled criteria to be set for noise emissions arising from HGV and Forklift Truck movements in accordance with the set requirements of British Standard 4142:1997.

A noise impact assessment has then been undertaken using measured onsite noise data and data measured on previous projects to predict the noise levels due to the proposed activities at the nearby noise sensitive receivers.

Calculations show that guidance from the relevant British Standards indicates that external noise levels are between the regions of 'marginal significance' and 'unlikely to generate complaints' at Receiver 1.

Noise ratings levels at Receiver 2 would be classed as 'unlikely to generate complaints' in the relevant British Standard.

Report by

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Checked by

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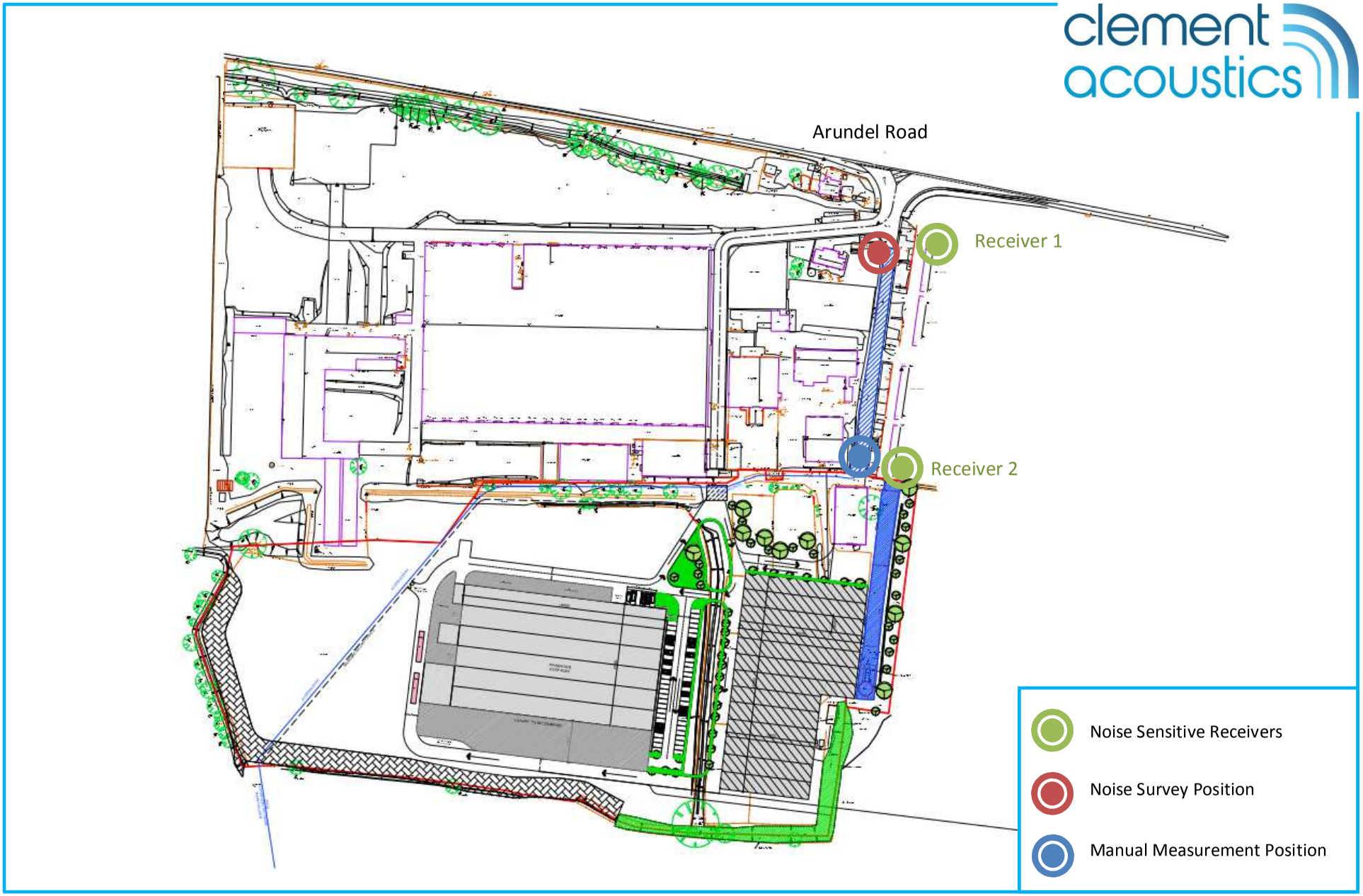


**7739-SP1** Indicative site plan showing noise monitoring positions and nearest noise sensitive receiver **Date:** 10 December 2012

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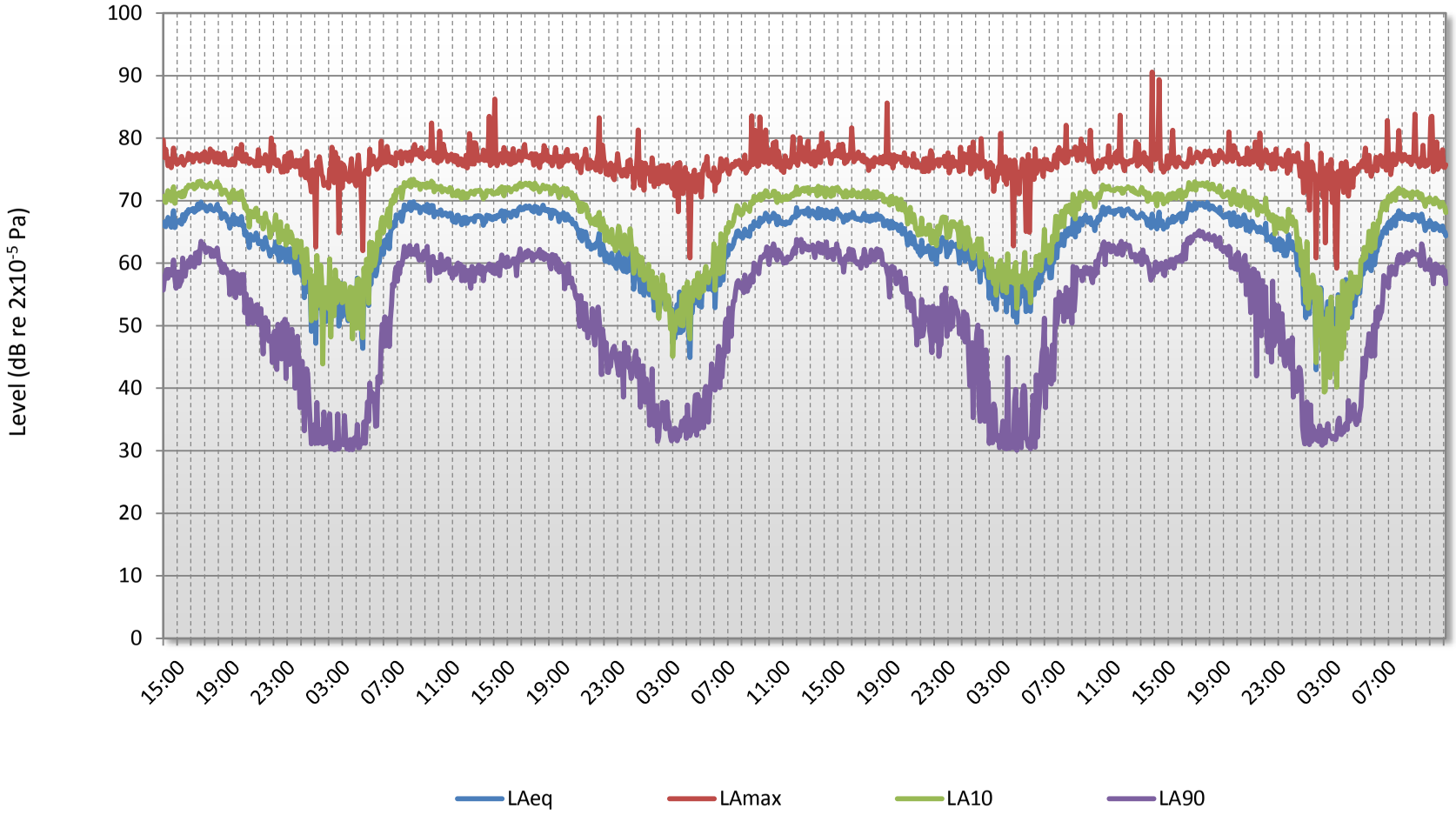
## THE VINERY, POLING, WEST SUSSEX

Environmental Noise Time History
15 November to 19 November 2012




7739-TH1

# APPENDIX A

## 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 10dB higher sound level.



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## 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.



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# APPENDIX B1 - HGV Noise Emissions

## 7739
## The Vinery, Poling, West Sussex

### EXTERNAL NOISE EMISSIONS CALCULATION

**Receiver: Receiver 1**
Source: Proposed Night-time HGV Activity

| | Frequency, Hz | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *63* | *125* | *250* | *500* | *1k* | *2k* | *4k* | *8k* | *dB(A)* |
| **Measured Onsite Sound Pressure Levels, at 1m** | | | | | | | | | |
| HGV pulling away at junction | 75 | 65 | 62 | 65 | 65 | 64 | 59 | 52 | |
| Correction for 1min activity in 5min reference period | -7 | -7 | -7 | -7 | -7 | -7 | -7 | -7 | |
| Penalty for potential nature of noise emissions, dB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Distance correction to receiver, dB (20m) | -26 | -26 | -26 | -26 | -26 | -26 | -26 | -26 | |
| **Cumulative Night-time Sound Pressure Level at Receiver 1** | **42** | **32** | **29** | **32** | **32** | **31** | **26** | **19** | **37** |

| | |
|---|---|
| **Minimum Measured Background Noise** | **40** |

# APPENDIX B2 - Forklift Noise Emissions

## 7739
## The Vinery, Poling, West Sussex

### EXTERNAL NOISE EMISSIONS CALCULATION

**Receiver: Receiver 2**
Source: Proposed Night-time Forklift Truck Activity

| | Frequency, Hz | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *63* | *125* | *250* | *500* | *1k* | *2k* | *4k* | *8k* | *dB(A)* |
| **Measured Onsite Sound Pressure Levels, at 1m** | | | | | | | | | |
| Forklift truck in warehouse | 59 | 56 | 55 | 60 | 62 | 58 | 53 | 45 | |
| Correction for number of forklift trucks in operation (3) | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| Correction for constant use througout reference period | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Penalty for potential nature of noise emissions, dB | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | |
| Distance correction to receiver, dB (70m) | -37 | -37 | -37 | -37 | -37 | -37 | -37 | -37 | |
| Screening from existing intermediate building | -2 | -3 | -5 | -7 | -10 | -12 | -15 | -15 | |
| Non-reverberant correction | -6 | -6 | -6 | -6 | -6 | -6 | -6 | -6 | |
| **Cumulative Night-time Sound Pressure Level at Receiver 2** | **24** | **20** | **17** | **20** | **19** | **13** | **5** | **0** | **22** |

| | |
|---|---|
| **Minimum Measured Background Noise** | **28** |