

THE PARROT INN,  
SHALFORD

Noise Impact  
Assessment Report

Reference: 13397.RP01.PNA.0

Prepared: 10 April 2024

Revision Number: 0

Pearmain Pubs Ltd

Unit 2b Henley Business Park

Pirbright Road

Normandy

Guildford

Surrey

GU3 2DX

# Noise Impact Assessment Report



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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	10 April 2024	David Johnston	Struan Carmichael

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The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and again will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.

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## 1.0 INTRODUCTION

RBA Acoustics have been appointed by Pearmain Pubs Ltd. to undertake a noise impact assessment in relation to new proposed items of plant at The Parrot Inn, Shalford.

As part of the planning application, Guildford Borough Council requires consideration be given to atmospheric noise emissions from the proposed plant at the nearest noise-sensitive properties.

RBA Acoustics have been commissioned to determine the atmospheric noise emission limits in accordance with Guildford Borough Council's requirements and to assess the plant proposals against those limits.

RBA Acoustics conducted an environmental noise survey at the site as part of a previous application. The noise data collected as part of that survey is considered suitable for reuse as part of this application and is presented herein.

This report presents the results of the original noise measurements, the associated criteria and provides the required assessment.

The report occasionally employs technical terminology. In order to assist the reader, a glossary of terms is presented in Appendix A.

## 2.0 SITE DESCRIPTION

The Parrot pub is a two-storey structure located within a mixed-use area. The building itself is mostly demised to the pub, with two residential apartments in the northwest corner of the building. The beer garden is located to the south of the building. The site is bordered by Broadford Road and Broadford Park to the north and east, respectively. To the south of the site is located a commercial marketing complex belonging to the Pull Agency, while the west of the site is bordered by a commercial building, 98 Broad Road.

The nearest residential properties to the site are those that are located within the same building as the Parrot, and on the boundary with the pub. There are also residential properties on the other side of Broadford Road from the pub.

The pub is currently closed whilst a change of management takes place but for the purpose of this assessment we have assumed daytime trading hours of between 11:00 and 23:00 with the potential for the kitchen plant to run from as early as 09:00.

The new items of plant proposed will serve the pub kitchen and be ducted to outside the building on the flat roof at first floor level. Condenser units serving the air-conditioning system, cellar and cold room condensers are also proposed.

A plan of the site showing the location of the site, items of plant, and the nearby noise sensitive properties is illustrated in Figures 1, 3 and 4 in Appendix B.

## 3.0 ENVIRONMENTAL NOISE SURVEY

### 3.1 General and Suitability of Data

Baseline environmental sound monitoring was undertaken at the site from Thursday 13 May to Monday 17 May 2021. This survey was conducted within 3 years of the time of this report and assessment, and we understand that the surrounding area has not been subject to any significant changes in the interim period. We would therefore consider the noise data representative and suitable for use as part of this assessment. The survey was undertaken during the period where the effects of the COVID-19 pandemic meant that road traffic was likely less heavy than under normal circumstances, and therefore the background noise levels measured can be said to represent a worst-case scenario. The survey commenced at approximately 14:00 on the Thursday and concluded at approximately 12:00 on the Monday. The full details of the monitoring survey are presented in the following sections.

### 3.2 Measurement Location

In order to determine the background noise climate at the nearest affected residential receptors to the site the equipment was installed at the first-floor level terrace, on the eastern façade of the property. The sound level meter was positioned on a pole, which was attached to the terrace railing, such that it was approximately 5m above the ground, and in free field conditions. The prevailing noise climate at this location was considered representative of the background noise climate at the nearest noise sensitive receptors to the pub.

The measurement location is also illustrated on the site plan in Figure 1 and photos in Figure 2 in Appendix B.

### 3.3 Instrumentation

The details of the equipment used for the measurements are presented in Appendix C.

The sound level meter was calibrated both prior to and on completion of the survey with no calibration drift observed. The sound level meter and calibrator have been laboratory calibrated within the last 2 years and 1 year respectively.

### 3.4 Noise Climate

During the site visits to install and collect the equipment, the prevailing noise climate was noted to consist mainly of road traffic and pedestrian activity along Broadford Road, as well as occasional aircraft noise. Birds and other rural sounds were also noted to contribute to the noise climate, however not considered a dominant noise source.

### 3.5 Weather Conditions

Weather conditions throughout the survey were considered to be conducive to the measurement of environmental sound. Wind speeds measured during the beginning of the survey were measured to be an average of 3m/s with a temperature of 11 degrees. At the end of the survey, the wind speed was measured to be an average of 3m/s with a temperature of 13 degrees.

As the survey was unattended, detailed records of weather conditions throughout the survey were not able to be recorded, however, it is understood from weather reports from nearby stations that weather conditions remained dry and still throughout the survey, with wind speeds peaking on Sunday 16<sup>th</sup> May 2021 in the afternoon at 5m/s.

### 3.6 Measured Sound Levels

The full results of the noise monitoring survey are shown in Table 1 below, and also in the time history graphs in Appendix D.

Table 1 – Summary of Measurement Results

Measurement Period	Kitchen Operating Hours (09:00 – 23:00)		Kitchen Closed Hours (23:00 – 09:00)	
	Average $L_{Aeq,T}$	Typical-Lowest $L_{A90,1hour}$	Average $L_{Aeq,T}$	Typical-Lowest $L_{A90,15min}$
Thursday 13 <sup>th</sup> May to Monday 17 <sup>th</sup> May	59	42	54	27

#### *“Typical-Lowest” Background Levels*

When considering the existing background levels of a site, BS 4142:2014, Methods for Rating and Assessing Industrial and Commercial Sound” recommends assessing to the “typical” measured  $L_{A90, 15mins}$  background levels, BS 4142:2014 goes on to state:

*“In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.”*

BS 4142:2014 suggests that statistical analysis is a suitable method to determine the “typical” background level. This can be carried out by calculating the level of the most-commonly occurring  $L_{A90, T}$  period during the proposed operating hours of equipment.

Due to the generally low background noise levels, the modal  $L_{A90,15mins}$  value has been chosen as representative of the periods from 23:00 – 09:00 and the “typical-lowest” level has been chosen as representative of the periods from 09:00 – 23:00 when the kitchen plant will be operating. The ‘typical lowest’ level can be determined statistically as the lowest rounded  $L_{A90,15mins}$  level which occurs for at least 10% of the assessment period. Histograms for 15 minute and 1 hour analysis periods are enclosed in Appendix D.

## 4.0 CRITERIA

General planning guidance for England is included in Appendix E. The project-specific requirements are outlined below.

### 4.1 Local Authority Criteria for Plant Noise

The requirements of the Borough of Guildford's Environmental Health Department regarding new building services plant are understood to be as follows.

*"Any plant or equipment etc, installed and operated at any time in connection with the carrying out of this permission shall not produce mechanical broadband or tonal noise that is clearly audible at the boundary of any noise sensitive premises. Noise from mechanical plant shall not impact more than -5dBA below the existing residual background noise level (LA90) or generate any transient, cyclical tonal or impact noise or vibration that would significantly increase the residual continuous equivalent noise level (> +1dBA LAeq) and be clearly heard at the nearest noise sensitive boundary. Correction factors must be included to account for any tonal characteristic and impulsivity of the noise (Ref BS4142:2014) (Note: Tonal noise shall be considered in one-third octave spectra). A regular and routine maintenance programme will be employed to ensure operational plant does not increase noise output due to mechanical wear or defect that will result in any unit failing to meet the above noise criteria."*

1/3 octave band noise data is not typically available for this type of plant and 1/1 octave band data has been used instead.

### 4.2 Summary of BS 4142:2014 Guidance

BS 4142:2014 *Methods for rating and assessing industrial and commercial sound* describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- sound from industrial and manufacturing processes
- sound from fixed installations which comprise mechanical and electrical plant and equipment
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The methods described within BS 4142:2014 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.

The assessment method described in BS 4142:2014 is based on the continuous sound pressure level produced by a specific source ( $L_{Aeq,Tr}$ ) at the assessment location. Appropriate corrections allowing for any tonality, impulsivity, other characteristics or intermittency of the specific sound source are then applied to derive the rating level ( $L_{Ar,Tr}$ ). The rating level is then compared to the background sound level ( $L_{A90,T}$ ) to produce the relative difference, or excess of rating level over background sound level.

BS 4142:2014 quantifies the estimated impact from the excess as:

- a) Typically the greater this difference, the greater the magnitude of 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 sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

## 5.0 PLANT NOISE IMPACT ASSESSMENT

### 5.1 Plant Noise Emission Limits

The environmental noise survey results presented in Table 1 demonstrate that the background noise is very low at the site. BS 4142 acknowledges that background noise levels below 30dBA can be regarded as “very low”. Resultantly, we believe it is appropriate to design to a level not higher than background during the night-time period, provided doing so would not result in a loss of amenity or adverse effects as a result of unacceptable internal noise levels. BS 4142 states that “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.”

An external limit of 27 dBA, as proposed, should also result in internal noise levels of no more than 12-17 dBA, accounting for a reduction of 10 – 15 dBA through a partially open window. A level of 12 – 17 dBA is well below the guideline level for bedrooms of 30 dBA, provided in BS 8233:2014.

For daytime hours, a limit 5 dB below the background noise level is considered appropriate.

Based on the results of the noise monitoring survey in Table 1, the requirements of the Local Authority in Section 4.1, and the above commentary, it is recommended that noise from mechanical services be mitigated such that the following levels are achieved when assessed at the nearest noise-sensitive location:

- Daytime (07:00 to 23:00) 37 dB L<sub>Ar,1h</sub>
- Night-time (23:00 to 07:00) 27 dB L<sub>Ar,15min</sub>



## 5.2 Proposed Plant Items

The following plant is proposed:

Table 2 – Plant Information

Ref.	Manufacturer/Model	Plant Type
KEF.01	MUB 062 630 D4	Kitchen Extract Fan
KSF.01	Systemair AW 500D EC	Kitchen Supply Fan
CU.01-05	Fujitsu AOYG36KMTA	Condenser Unit
CU.06	To be specified (Cold Room Condenser)	Condenser Unit
CU.07	To be specified (Cellar Room Condenser)	Condenser Unit

3No. of the condenser units will serve guestrooms, and therefore have the capacity to run 24/7. 2No. of the condenser units will serve the pub, and so will not run overnight or whilst the pub is closed.

## 5.3 Mitigation

Attenuation is proposed to the atmosphere-side and roomside of the extract fan. For the purposes of this assessment we have assumed the following minimum insertion losses will be achieved by any future attenuators.

Table 3 – Required Attenuator Insertion Losses

Minimum Insertion Loss (dB) at Octave-Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
5	11	19	25	25	20	15	15

The extract fan is also proposed to be wrapped or boxed in to reduce breakout noise with a bespoke enclosure.

## 5.4 Position of Units

The new kitchen canopy is ducted to roof level over the kitchen (at first floor level) along the western edge of the pub. The extract ductwork runs north and terminates at 1 meter above eaves level. The supply fan is mounted on the roof of the kitchen. The 5No. condenser units are located on the first-floor level roof, toward the north of the site. The cellar room condenser and cold room condenser are also proposed to be located on the edge of the first floor-level roof, overlooking the garden. The equipment positions are indicated on the drawing in Figure 3 in Appendix B.

## 5.5 Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the project M&E Consultant, Elemental Consultants. The associated plant noise levels are detailed as follows:

Table 4 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
KEF.01	L <sub>w</sub> Exhaust	85	95	91	89	87	83	80	74
KEF.01	L <sub>w</sub> Breakout	64	78	62	55	56	53	46	37
KSF.01	L <sub>w</sub> Intake and Breakout	55	63	70	71	73	72	67	60
CU.01-05 (Heating)	L <sub>p</sub> at 1m	64	56	53	52	49	45	38	27
CU.01-05 (Cooling)	L <sub>p</sub> at 1m	61	52	50	49	46	42	35	26
CU.06	L <sub>p</sub> at 1m	Limiting level discussed below							
CU.07	L <sub>p</sub> at 1m								

Review of the octave band data provides no indication of any tonal characteristics associated with the proposed plant.

For the purposes of this assessment, we assumed all the condenser units running in heating mode as the worst-case assessment. These units are also understood to be serving the hotel rooms and therefore, still active during the night-time. Plant serving the kitchen is assumed to run in the daytime only.

## 5.6 Limiting Levels

At this stage in the design, detailed plant selections for the cellar cooling condenser and cold room condenser have not been made. We propose a limiting level of no more than 60 dBA at 1m from the units based on the current proposed location. The massing of the building should be utilised to provide screening to the nearest receptors.

## 5.7 Location of Nearest Residential Windows

The following receptors are considered worst-affected by the proposals:

### Receptor 1 – Broadford Barn

Worst-affected residential receptor is considered to be Broadford Barn, which is located just to the west of the pub and with line-of-sight to the first floor plant deck from an upper window. We understand that the property is a holiday rental.

### Receptor 2 – Flat

The closest residential windows to the plant are on the western façade of the pub building at first floor level and belong to the flat at the northwest corner of the building. This window is closer than receptor 1 but benefits from significant acoustic screening from the massing of the building.

### Receptor 3 – Hotel Windows

The windows belonging to the pub are to be fixed closed and provided with secondary glazing in order to resolve the clash inherent in the plant deck being outside some of the guestrooms. As a result a calculation of levels outside the windows to inside the rooms has been undertaken in order to ensure suitable internal noise levels can be achieved.

## 5.8 Calculation of Noise Levels at Nearest Residential Window

Our calculation method for predicting noise levels from the proposed plant at the nearest residential windows, based on the information stated above, is summarised below.

- Source Term SPL / SWL
- Duct losses (including attenuation)
- Reflections (if applicable)
- Distance Attenuation
- Directivity
- Screening (if applicable)

The results of the calculations indicate the following noise levels at the nearest affected residential windows:

Table 5 – Predicted Noise Levels

Operating Period	Predicted Noise Level (dB) at Receptor 1		Predicted Noise Level (dB) at Receptor 2	
	Prediction	Criterion	Prediction	Criterion
09:00 – 23:00	37	37	36	37
23:00 – 09:00	27	27	25	27

Noise from the proposed units is within the target criteria, and no further mitigation is required.

## 5.9 Calculation of Noise Levels at Nearest Hotel Window

The level outside the nearest hotel windows over night are predicted to be 50 – 55 dBA. The proposal is for windows to be fixed shut and fitted with secondary glazing. The predicted sound reduction for secondary glazing applied to existing windows is a minimum  $R_w$  40. The resultant predicted internal noise level is 10-15 dBA, which is 15-20 dB below the recommended internal noise level for a bedroom as provided in BS 8233:2014, and would be considered acoustically acceptable.

## 6.0 VIBRATION CONTROL

In addition to the control of airborne noise transfer, it is also important to consider the transfer of noise as vibration to adjacent properties (as well as to any sensitive areas of the same building).

We would typically advise that condensing units and fans be isolated from the supporting structure by means of either steel spring isolators or rubber footings. For particularly sensitive locations, or when on lightweight structures the mounts should ideally be caged and be of the restrained type.

It is important the isolation is not “short-circuited” by associated pipework or conduits. To this end, any conduits should be looped, and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

## 7.0 CONCLUSION

RBA Acoustics have been appointed to undertake a noise impact assessment in relation to new proposed items of plant at the Parrot Inn, Shalford GU4.

The results of the plant noise assessment indicate atmospheric noise emissions from the plant are within the criteria required by Guildford Borough Council provided the following mitigation measures are implemented:

- Attenuators capable of achieving the minimum insertion losses in Table 3 should be fitted to the kitchen extract fan
- The kitchen extract fan should be boxed in with a bespoke acoustic enclosure with a minimum superficial density of 10kg/m<sup>2</sup>

As such, the proposed plant installations can be considered acceptable in terms of noise.

# Appendix A – Acoustic Terminology

**dB** Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.

**dB(A)** The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.

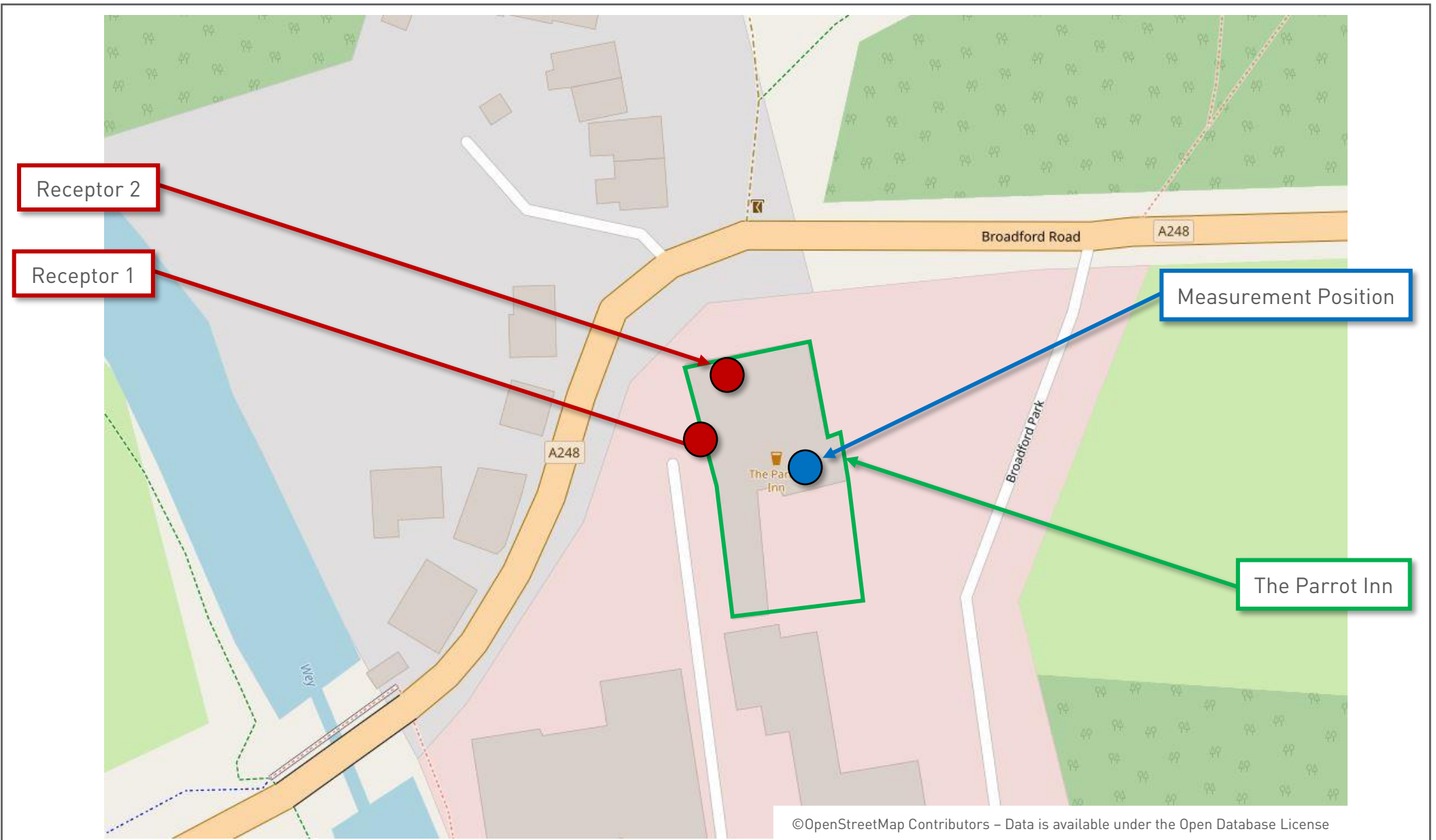
**$L_{eq}$**   $L_{eq}$  is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (1 hour).

**$L_{Aeq}$**  The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.

**$L_{An}$  (e.g.  $L_{A10}$ ,  $L_{A90}$ )** If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The  $L_n$  indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence  $L_{10}$  is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly,  $L_{90}$  is the average minimum level and is often used to describe the background noise.

**$L_{max,T}$**  The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the  $L_{eq}$  value.

## Appendix B – Site Plans



The Parrot Inn, Shalford  
 Site plan showing the measurement position and nearest residential receptor  
 Project 13397

Figure 1  
 10 April 2024  
 Not to Scale

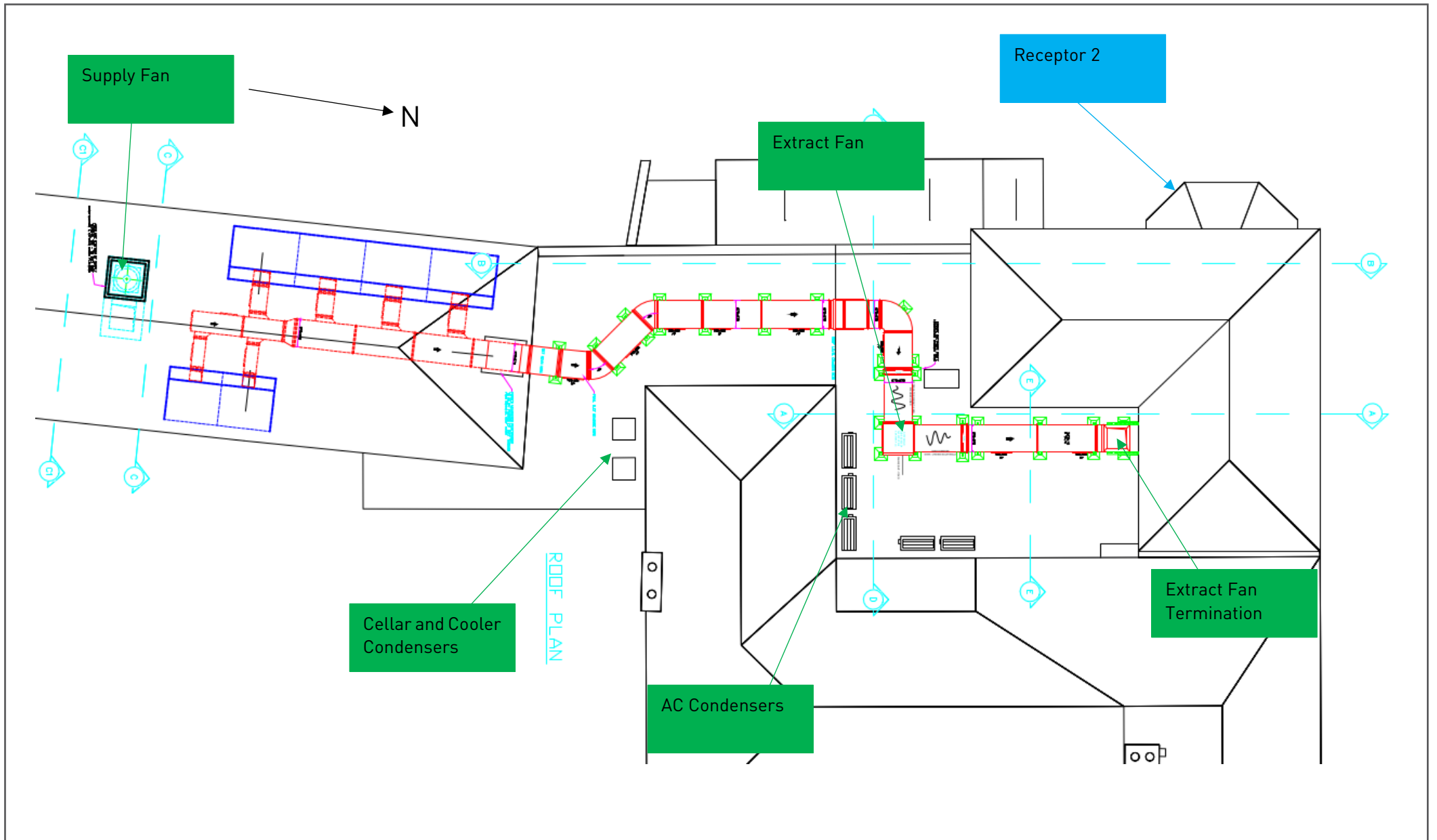




The Parrot Inn, Shalford  
Photos showing the microphone position, looking north-east  
Project 13397

Figure 2  
10 April 2024  
Not to Scale





The Parrot Inn, Shalford  
 Layout of the plant  
 Project 13397

Figure 3  
 10 April 2024  
 Not to Scale



## Appendix C – Instrumentation

The following equipment was used for the measurements

Table C1 – Measurement Equipment

Use	Manufacturer	Model Type	Serial No.	Calibration	
				Certificate No.	Expiry Date
Background Noise Monitoring Survey	Norsonic Type 1 Sound Level Meter	Nor140	1407476	473910533	10 October 2021
	Norsonic Pre Amplifier	1209	22340		
	Norsonic ½" Microphone	1225	358242	Cal 022-2019-11502	27 September 2021
	Norsonic Sound Calibrator	1255	125525265		

Note that equipment was in calibration a the time of the survey

## Appendix D – Graphs

The Parrott, Shalford

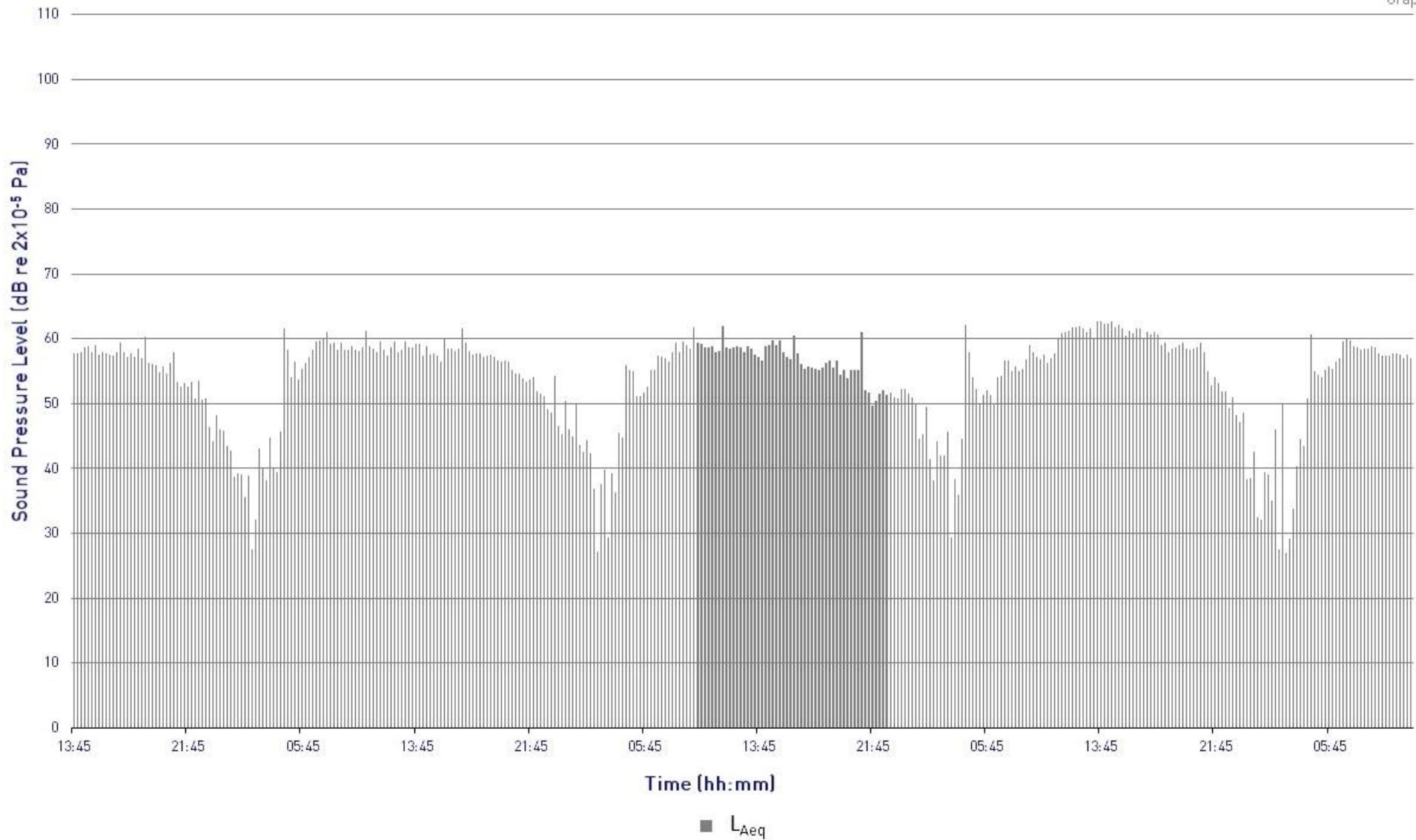
$L_{Aeq}$  Time History

Measurement Position 1, Thursday 13th May to Monday 17th May 2021



Project: 11017

Graph 1



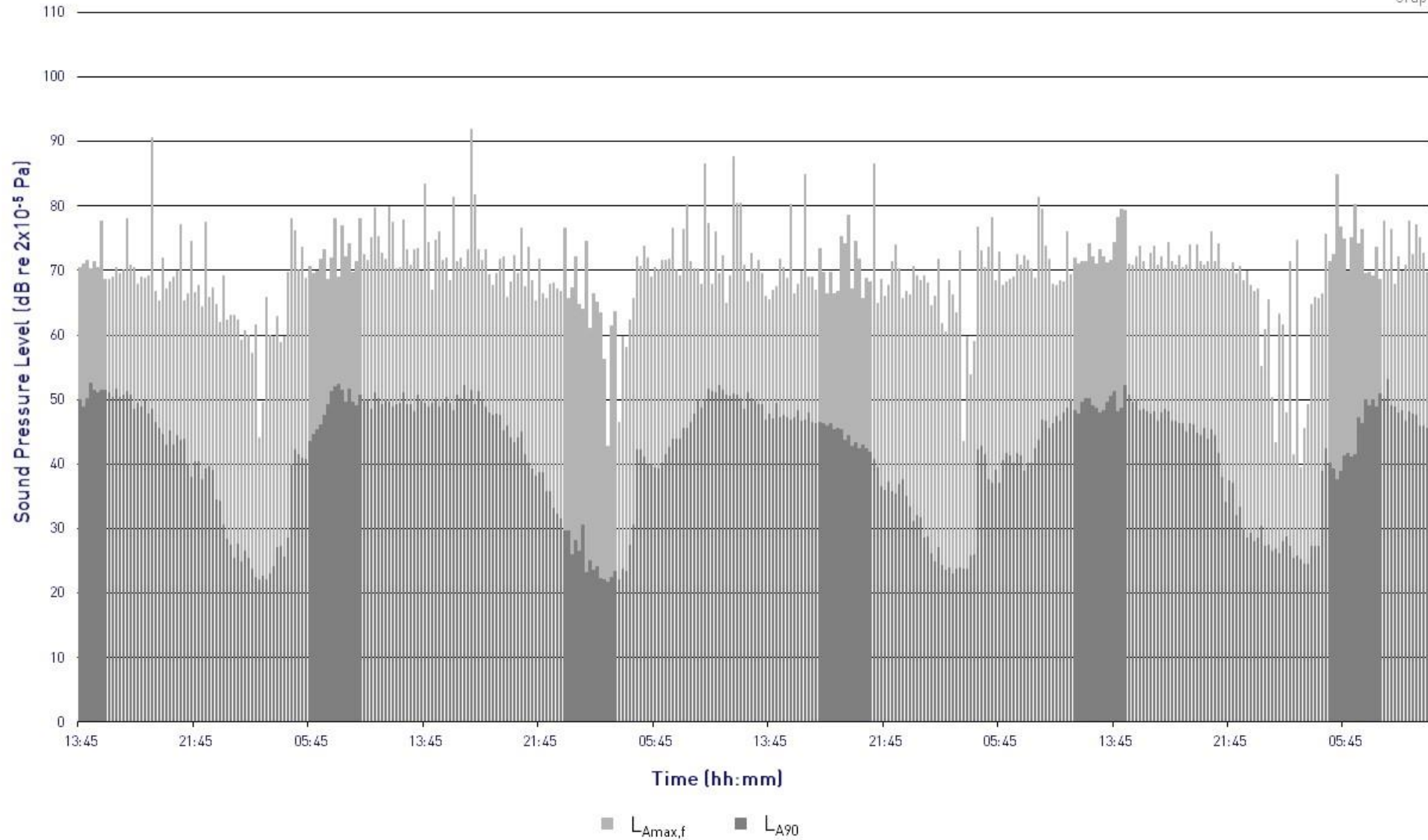
The Parrott, Shalford  
 $L_{Amax,f}$  and  $L_{A90}$  Time History



Project: 11017

Measurement Position 1, Thursday 13th May to Monday 17th May 2021

Graph 2



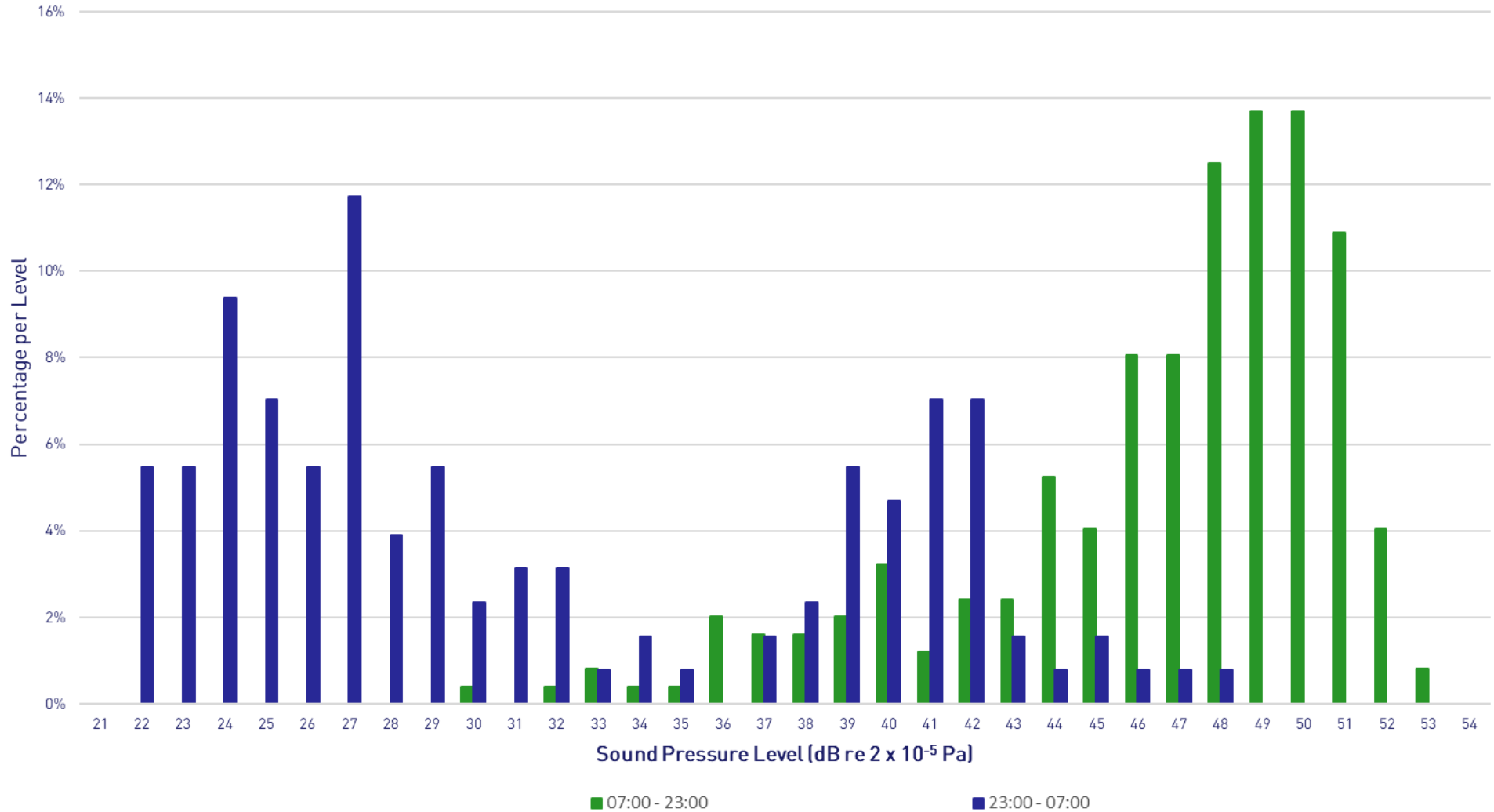
The Parrott, Shalford  
 L<sub>A90,15 minutes</sub> Histogram

Measurement Position 1, Thursday 13th May to Monday 17th May 2021



Project: 11017

Graph 3



The Parrott, Shalford

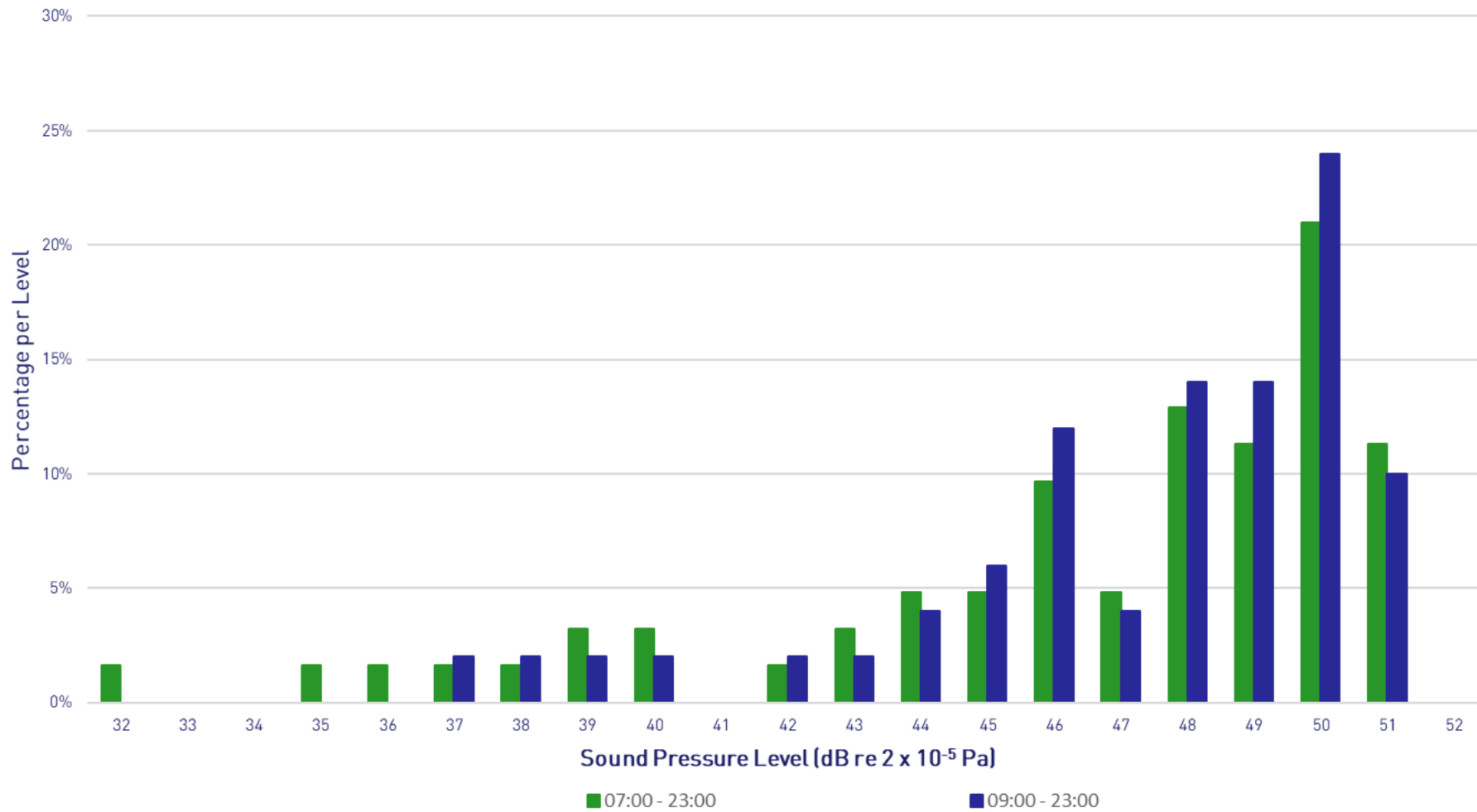
$L_{A90,1\text{ Hour}}$  Histogram

Measurement Position 1, Thursday 13th May to Monday 17th May 2021



Project: 11017

Graph 4



# Appendix E – Planning Criteria

## National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) states that, with respect to noise, planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from a new development, including through the use of conditions;
- Recognise that development will often create some noise and existing business wanting to develop in continuance of their business should not have unreasonable restrictions put upon them because of changes in nearby land uses since they were established; and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The guidance contained within the NPPF further determines that consideration should be given to the Noise Policy Statement for England (DEFRA, March 2010).

## Noise Policy Statement for England (NPSE, March 2010)

The NPSE attends to three types of noise;

- “Environmental noise” which includes noise from transportation sources;
- “Neighbour noise” which includes noise from inside and outside people’s homes; and
- “Neighbourhood noise”, which includes noise arising from within the community such as industrial and entertainment premises, trade and business premises, construction sites and noise in the street.

In line with the aims determined in the NPPF, the NPSE determines three aims;

1. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development;
2. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development; and,
3. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The guidance detailed within the NPSE relates a number of key phrases with regards to adverse effects which can be applied to noise impacts as used by the World Health Organisation.

- **NOEL – No Observed Effect Level** - The level below which no health effect or detrimental impact on the quality of life is observed.
- **LOAEL – Lowest Observed Adverse Effect Level** - The level at which adverse effects on health and quality of life can be detected
- **SOAEL – Significant Observed Adverse Effect Level** - The level above which significant adverse effects on health and quality of life occur.

The guidance indicates that it is not possible to have a single objective noise-based measure that defines SOAEL, and as such the SOAEL is likely to be different for different noise sources and receptors. The document indicates that further research is required to establish what may constitute a significant adverse impact on health and quality of life from noise.



While the NPSE determines the NOEL, LOAEL and SOAEL descriptions, the document indicates that, unlike other environmental disciplines, there are currently no European or national noise limits which have to be met, although the NPSE states that “there can be specific local limits for specific developments” allowing for negotiation.

## Planning Practice Guidance - Noise

The Planning Practice Guidance for noise 2014 (updated July 2019) broadly considers the same issues as demonstrated within both the NPPF and the NPSE with regards to noise within the planning realm. The information detailed within the PPG indicates that noise should be considered when:

- New developments may create additional noise; and/ or,
- New developments would be sensitive to the prevailing acoustic environment.

The guidance indicates that Local Planning Authorities should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and,
- Whether or not a good standard of amenity can be achieved.

The impact of noise is rated within the policy document in terms of the relative ‘Observed Effect Level’, defined in line with the guidance within the NPSE. Based upon this, the Planning Practice Guidance provides the following matrix of likely average response:

Table E1 - PPG Observed Effect Levels

Perception	Example of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
<b>Lowest Observed Adverse Effect Level</b>			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

Table E1 (cont...) - PPG Observed Effect Levels

Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/ or attitude, e.g. avoiding certain activities during periods of intrusion: where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/ or an ability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/ awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

## BS 4142:2014 'Method for Rating and Assessing Industrial & Commercial Sound'

BS 4142 is the generally adopted method for assessing plant noise emissions affecting residential areas, and is also specified by the majority of local authorities for such instances commercial & industrial sound affecting residential properties.

- sound from industrial and manufacturing processes
- sound from fixed installations which comprise mechanical and electrical plant and equipment
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The methods described within BS4142:2014 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.

The standard is also applicable to determine rating levels for sound of an industrial or commercial nature at proposed new dwellings or premises used for residential premises. The standard is only appropriate for the assessment of external sound levels.

The assessment method described in BS4142:2014 is based on the continuous sound pressure level produced by a specific source ( $L_{Aeq,Tr}$ ) at the assessment location. Appropriate corrections allowing for any tonality, impulsivity, other characteristics or intermittency of the specific sound source are then applied to derive the rating level ( $L_{Ar,Tr}$ ). The rating level is then compared to the background sound level ( $L_{A90,T}$ ) to produce the relative difference, or excess of rating level over background sound level. BS4142:2014 quantifies the estimated impact from the excess as:

- e) Typically the greater this difference, the greater the magnitude of impact.
- f) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- g) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- h) 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.

## Appendix F – CDM Considerations

The likelihood the harm will occur can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Remote (almost never)
- 2 – Unlikely (occurs rarely)
- 3 – Possible (could occur, but uncommon)
- 4 – Likely (recurrent but not frequent)
- 5 – Very likely (occurs frequently)

The severity of harm can be assessed by applying an indicative score (from 1 to 5) as follows:

- 1 – Trivial (e.g. discomfort, slight bruising, self-help recovery)
- 2 – Minor (e.g. small cut, abrasion, basic first aid need)
- 3 – Moderate (e.g. strain, sprain, incapacitation > 3 days)
- 4 – Serious (e.g. fracture, hospitalisation > 24 hrs, incapacitation > 4 weeks)
- 5 – Fatal (single or multiple)

The rating value is obtained by multiply the two scores and is then used to determine the course of action.

Rating Bands (Severity x Likelihood)		
Low Risk (1 – 8)	Medium Risk (9 -12)	High Risk (15 – 25)
May be ignored but ensure controls remain effective	Continue, but implement additional reasonable practicable controls where possible	Avoidance action is required; therefore alternative design solutions must be examined. Activity must not proceed until risks are reduced to a low or medium level

The following hazards pertinent to our design input have been identified and control measures suggested:

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Attenuators/ Acoustic Lagging	Strain of neck, limbs or back.	Contractors	3	4	12	Provide sufficient manpower/ lifting gear	1	4	4
Attenuators/ Acoustic Lagging	Skin & respiratory irritation	Contractors	4	3	12	Wear gloves and mask	1	3	3

L: Likelihood    S: Severity    R: Rating

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