

**The Star Inn  
Harbottle  
Morpeth  
Northumberland  
NE65 7DG**

**Proposed conversion of existing garages/stores  
into restaurant with associated kitchen and bar  
servery/reception**

**Noise Assessment**

<b>Report No.</b>	<b>Author</b>	<b>Checked/Approved</b>	<b>Date of issue</b>
LAE1102.1	Louise M Alderson MIOA	[REDACTED]	18 May 2021

Tel: [REDACTED]

Mobile: 07732 660840

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## **APPENDICES**

- Appendix A Glossary of Acoustic Terminology
- Appendix B Noise Monitoring Equipment
- Appendix C Noise Monitoring Results
- Appendix D Technical Data – Fan Model SQU23/4-3HT

## 1 INTRODUCTION

### 1.1 Context

1.1.1 L A Environmental Ltd were instructed to carry out a noise assessment for the conversion of existing garages/stores into a restaurant with associated kitchen and bar servery/reception. Construction of new ancillary pot-wash attached to proposed kitchen at The Star Inn, Harbottle Morpeth Northumberland NE65 7DG.

1.1.2 The Public Health Protection Unit of Northumberland County Council have objected to the application on grounds of noise. Therefore, an assessment according to British Standard 4142:2014 + A1:2019: "*Rating industrial noise affecting mixed residential and industrial areas*" to determine the impact of the kitchen extraction ventilation (KEV) upon sensitive receptors has been undertaken.

1.1.3 The site is shown in Figure 1. The associated activity will be contained within the site boundaries (marked by a red line).

Figure 1: Site Location



1.1.4 A glossary of terminology is included in Appendix A to assist the reader.

## 2 SITE DETAILS

### 2.1 Proposal

- 2.1.1 The Star Inn, Harbottle is a well-established business within the heart of the village of Harbottle and lies within the Northumberland National Park. The site lies within a sensitive area and is bound by existing residential use.
- 2.1.2 The proposal is to extend the existing kitchen by converting the garages/stores and provide eating rooms. The proposals include the external refurbishment of the roof coverings and sandstone walls. Internally, proposals include the retention of the existing timber structures and exposure of stonework where possible. The proposed kitchen extract flue is located on the east roof slope adjacent to the residential garden of Woodbine Cottage.
- 2.1.3 The purpose of this assessment is to investigate the level of noise generated by the proposed kitchen extract flue and whether the proposal will have an impact on the nearest noise sensitive residential dwellings.

Figure 2: Proposed Plan

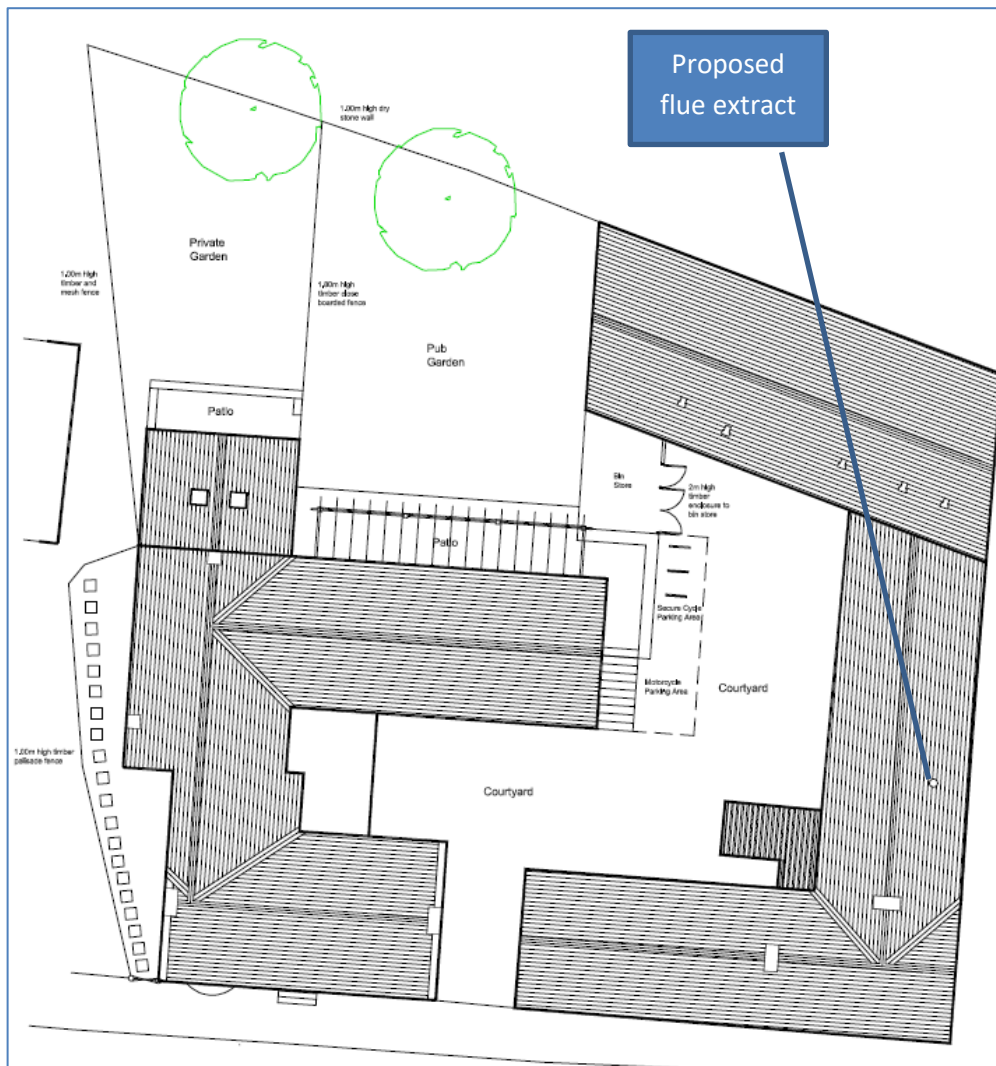
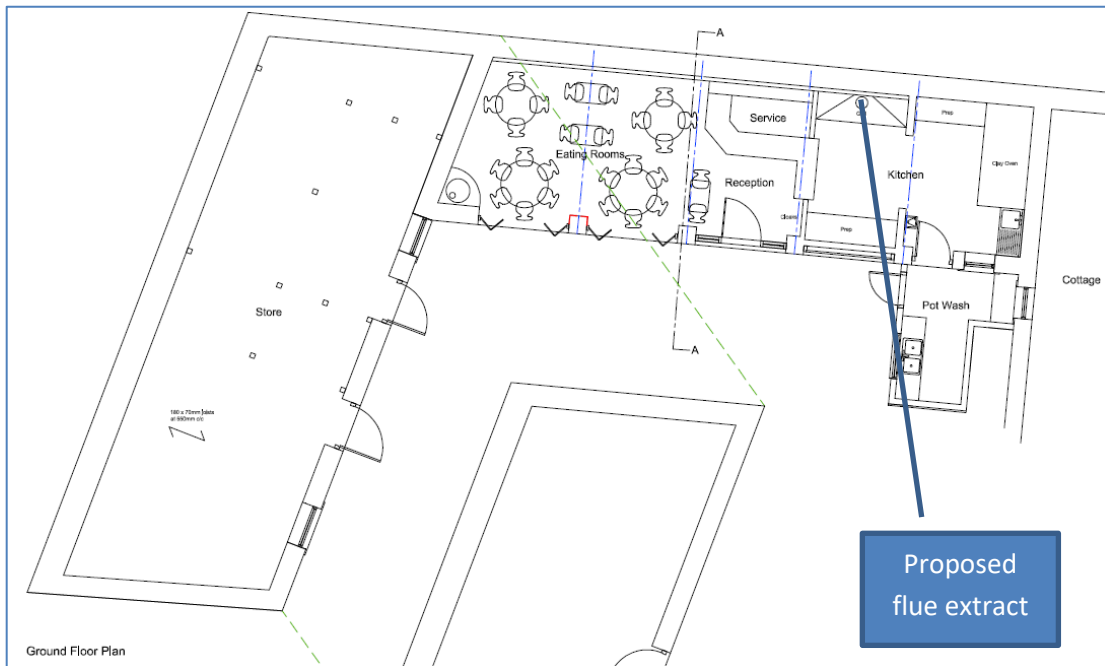


Figure 3: Proposed Internal Layout

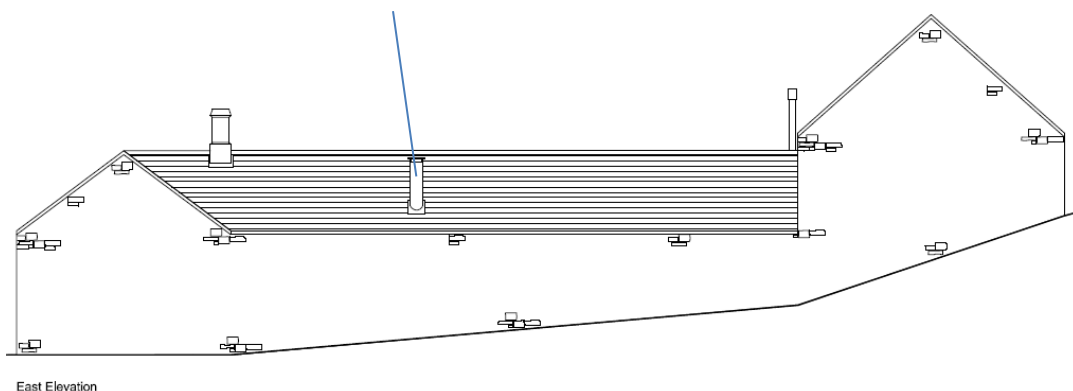


- 2.1.4 This report assesses the results of a noise survey carried out in accordance with current guidance and includes recommendations for noise mitigation, if deemed necessary.
- 2.1.5 The impact of any future noise producing activity has been compared against the criteria outlined in British Standard 4142:2014 + A1:2019: “*Rating industrial noise affecting mixed residential and industrial areas*”. Compliance with a rating level not exceeding the background noise level during the day by 5dB is recommended in accordance with guidance.
- 2.1.6 Guidelines values on the acceptability of community noise are based on the World Health Organisations (WHO) “Guidelines for Community Noise” (1999).

## 2.2 Nearest Noise Sensitive Facades

- 2.2.1 The proposed kitchen extract flue is located on the east roof slope adjacent to the residential garden of Woodbine Cottage, approximately 12m from the nearest façade.

Figure 4: Proposed location of flue (east elevation)



### 3 NOISE PLANNING POLICY AND GUIDANCE

#### 3.1 National Planning Policy Framework (NPPF) 2019

3.1.1 The revised National Planning Policy Framework (NPPF) was updated in February 2019 and sets out the government's planning policies for England and how these are expected to be applied. The NPPF does not provide specific policies or define noise limits, but rather is intended to enable the planning system to support the Government's aims and objectives with respect to sustainable development provides a framework within which locally-prepared plans for housing and other development can be produced.

3.1.2 The NPPF represents the Government's commitment in favour of sustainable development, through its intention to make the planning system more streamlined, localised and less restrictive.

3.1.3 Paragraph 170 of the NPPF states that:

*"Planning policies and decisions should contribute to and enhance the natural and local environment by:*

*e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution."*

3.1.4 Paragraph 180 of the NPPF goes on to states that:

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

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

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

3.1.5 Additional national planning guidance is provided in the Government's Noise Policy Statement for England (NPSE), to which the framework makes specific reference as the main source of national guidance on planning and noise.

### 3.2 Noise Policy Statement for England (NPSE) 2010

3.2.1 The underlying principles and aims of existing policy documents, legislation and guidance are clarified in DEFRA: 2010: The Noise Policy for England (NPSE) which has a long term vision to:

*“Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”.*

3.2.2 The vision is supported by three key aims intended to promote sustainable development with respect to noise so that *“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life”.

3.2.3 The Noise Policy recognises that it is not currently possible to define a single objective noise level having specific effects on people, that defines “Significant Observed Adverse Effect Level” that is applicable to all sources of noise in all situations and hence the emphasis on *“promoting”* improvements to health and quality of life through effective management of noise, considered in the context of the wider environment and factors other than noise. Without having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available in relation to noise.

3.2.4 In the absence of specific criteria within the NPPF or NPSE, the assessment of external noise levels for acceptable amenity criteria has been undertaken in consideration of the guidance provided in British Standard BS 8233: 2014 *Guidance on Sound Insulation and Noise reduction in buildings*.

3.2.5 This Standard provides, not only advice on acceptable external noise levels, reflecting those given in the World Health Organisation’s 1999 *Guidelines for Community Noise*, but also advises on suitable design specifications for building envelopes to achieve suitable internal noise levels.

### 3.3 BS8233:2014 and WHO 1999 Guidance Levels

3.3.1 BS8233:2014 ‘*Guidance on sound insulation and noise reduction for buildings*’ defines a range of ambient noise levels for design criteria, such that suitable conditions are achieved in certain internal and external environments.

3.3.2 BS8233 refers to the World Health Organisation research and recommendations when defining acceptable and upper guidance noise levels within gardens during the day,



and within habitable rooms in dwellings during the day and night time periods. The noise levels that normally satisfy these criteria for most people are defined in Table 1.

Table 1: Summary of BS8233 guidance noise levels			
Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living rooms	35 dB L <sub>Aeq,16hour</sub>	--
Relaxing	Gardens	55 dB L <sub>Aeq,16hour</sub>	--
Dining	Dining room/area	40 dB L <sub>Aeq,16hour</sub>	--
Sleeping (daytime resting)	Bedroom	35 dB L <sub>Aeq,16hour</sub>	30 dB L <sub>Aeq,8hour</sub> 45dB L <sub>Amax</sub>

3.3.3 The advice provided states that where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5dB and reasonable internal conditions still achieved.

### 3.4 Planning Practice Guidance in England: Noise, 2019

3.4.1 Further guidance in relation to the NPPF and the NPSE is published on-line in the Planning Practice Guidance which advises on how planning can manage potential noise impacts in new development. There are three observed effect levels and are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Response	Example of outcomes	Increasing effect level	Action
<b>No Observed Effect Level (NOEL)</b>			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
<b>Lowest Observed Adverse Effect Level (LOAEL)</b>			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum

<b>Significant Observed Adverse Effect Level (SOAEL)</b>			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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 acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

### 3.5 British Standard 4142:2014 + A1:2019: Rating industrial noise affecting mixed residential and industrial areas

- 3.5.1 BS 4142:2014 + A1:2019 describes methods for rating and assessing sound of an industrial and/or commercial nature and is used 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.
- 3.5.2 The procedure is based on comparing the measured or predicted noise level from the source in question immediately outside a dwelling with the "background sound level" ( $L_{A90}$ ) that would otherwise exist in the absence of the specific noise. The "rating level" is derived by adding any feature corrections that are considered necessary, due to certain characteristics of the noise to the "specific sound level".
- 3.5.3 The "specific sound level" is the equivalent continuous A-weighted sound pressure level ( $L_{Aeq}$ ) of the noise associated with the site in question, at the assessment position, over a time period specified in the standard. The assessment position must be outside the dwelling or other noise sensitive building affected by the noise and the measurements must be representative of the specific sound and the background sound level.
- 3.5.4 If the sound contains a tonality, impulsivity or other certain acoustic features, and are present at the assessment location then a character correction is added to the specific sound level to obtain the rating level.
- 3.5.5 The significance of sound of an industrial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. Therefore, it is essential to place the sound in context.

- 3.5.6 Essentially there is a sliding scale of 0 to +6dB for tonality which the standard *"can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible"*.
- 3.5.7 For impulsivity, the standard states that *"A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible"*.
- 3.5.8 Section 11 of BS4142 states to subtract the measured background sound level from the rating level and consider the following:
- Typically, the greater this difference, the greater the magnitude of the impact.
  - A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
  - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
  - 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.

### **3.6 Local Authority Consultee Comments**

- 3.6.1 The Councils Environmental Protection Team were not consulted during the application process and have had no direct involvement with the application.

## **4 ENVIRONMENTAL NOISE SURVEY**

### **4.1 Methodology**

- 4.1.1 A noise survey was carried out between Thursday 6 to Monday 10 May 2021 to establish the existing background and ambient noise levels during both the day and night time periods.
- 4.1.2 Measurements were undertaken within the front garden of Woodbine Cottage adjacent to the proposed kitchen and results are considered representative of the noise climate at the nearest potentially noise sensitive dwellings.

### **4.2 Equipment used in noise surveys**

- 4.2.1 The equipment used in the noise survey was a CK:247 Invictus Portable Noise Monitor with communication for remote download and alerts. Statistical values,  $L_{A10}$ ,  $L_{A90}$  etc

and third octave bands, together with time history logging and audio recordings were gathered throughout the survey period.

4.2.2 Equipment is fully compliant with that specified as Type 1 in British Standard BS EN61672 - 1: 2003: "Electroacoustics. Sound level meters Specifications" and are detailed in Appendix B.

4.2.3 Equipment has also been calibrated to a traceable standard by UKAS-accredited laboratory within the 24 months preceding the survey.

#### 4.3 Noise monitoring location

4.3.1 The monitoring location was selected to be representative of the noise climate at potentially the most noise sensitive receptor and nearest neighbouring residential dwelling.

4.3.2 The location is shown in Photograph 1.

**Photograph 1: Noise Monitoring Position**



#### 4.4 Weather conditions

4.4.1 Weather conditions are shown in Appendix B. A summary is as follows:

- Temperature: High of 17°C on Sunday 9 May
- Mostly light breeze <5m/s from WSW/SW except for Saturday 8 May when rain dominated the weather throughout the day and winds from the south.

## 5 NOISE MONITORING RESULTS

### 5.1 Background sound level

5.1.1 Full details of the monitoring results are shown in Appendix C. A summary is provided in Table 2 below.

Table 2: Average Background noise survey results 6 – 9 May 2021				
Period	Monitoring period	LAFMax	LAF90	LAeq
Thursday	12:00 – 21:00	70 – 75	35	49
Friday	12:00 – 21:00	67 – 80	36	50
Saturday	12:00 – 21:00	66 – 80	38	50
Sunday	12:00 – 21:00	64 - 82	36	51

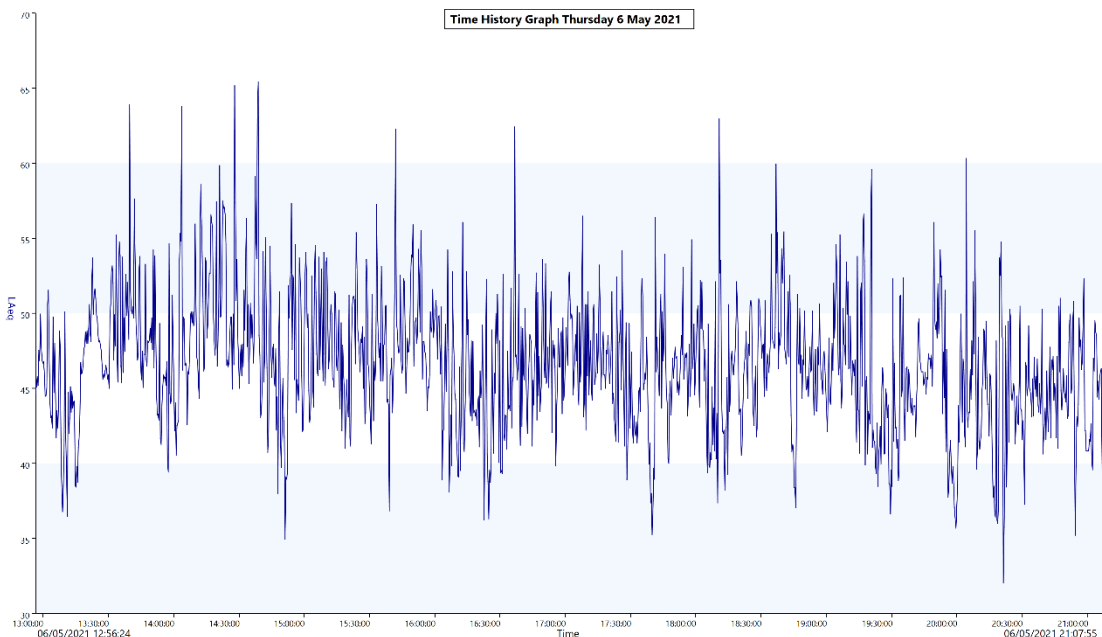
5.1.2 The main contributing noise source was from road traffic on the unnamed road to the south through the village.

5.1.3 Background noise levels were slightly higher on Saturday and are likely due to wet roads following rainfall most of the day. Typical background noise levels at the measurement position are considered to be as follows:

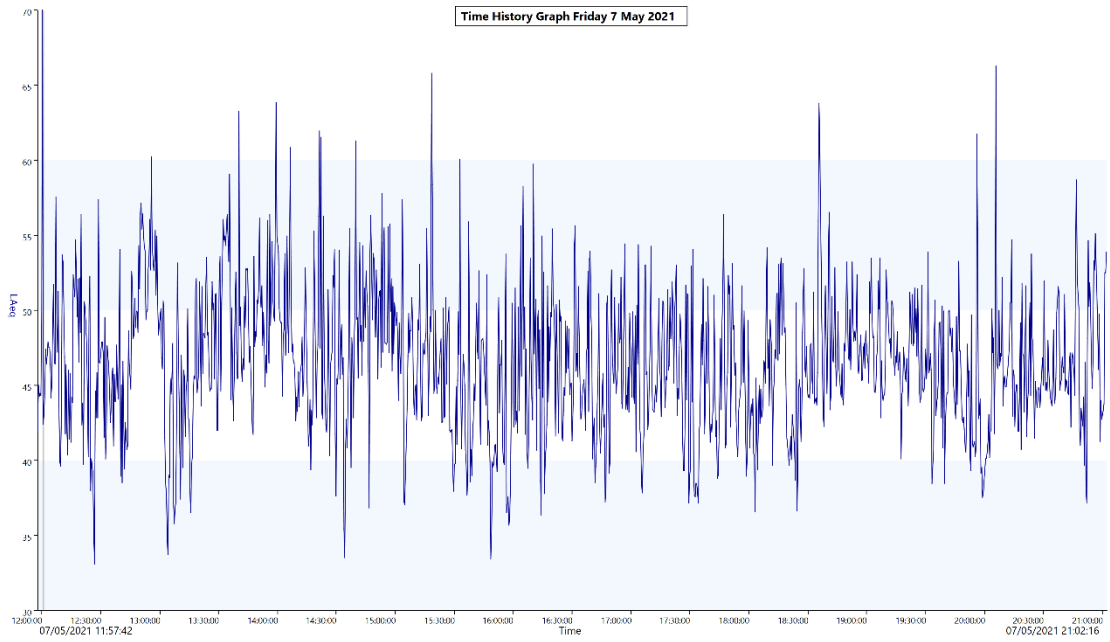
- Daytime (12:00 – 21:00) background level was 36dBLA90

5.1.4 Graphs 1 - 4 show the time history noise levels over the proposed opening times of the kitchen over the 4 full days of monitoring.

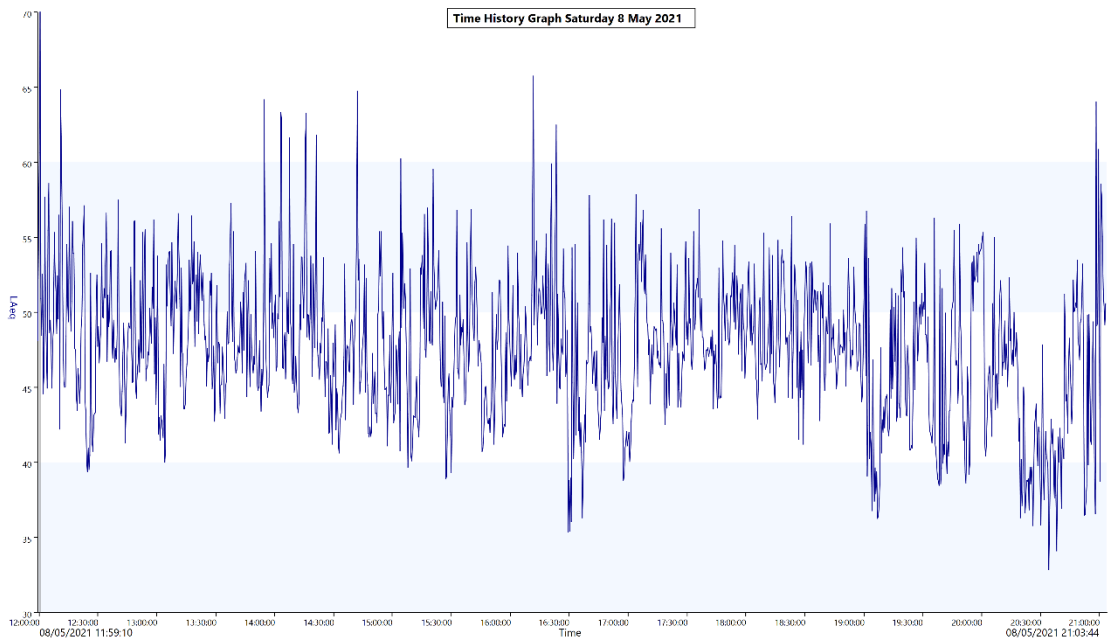
**Graph 1: Measured noise levels dB(A) – Thursday 6 May 2021**



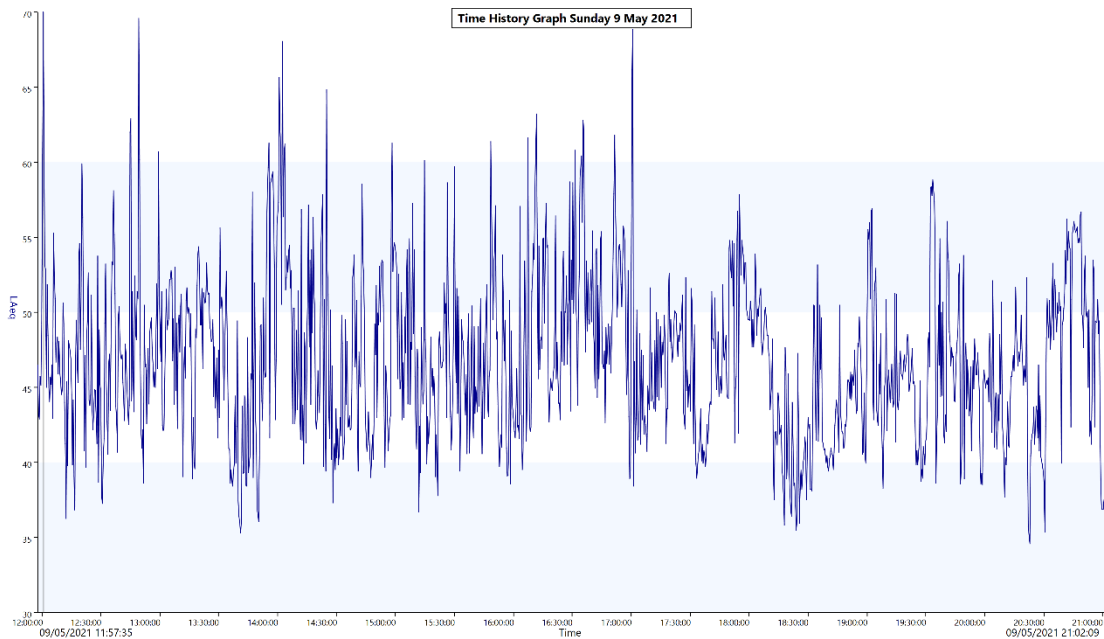
**Graph 2: Measured noise levels dB(A) – Friday 7 May 2021**



**Graph 3: Measured noise levels dB(A) – Saturday 8 May 2021**



**Graph 4: Measured noise levels dB(A) – Sunday 9 May 2021**



## 5.2 Calculation of Specific Sound Level

5.2.1 The methodology in BS4142 suggests that where possible the specific sound level should be determined by measurement of the ambient sound level and the residual sound level at the assessment location. However, as the noise source is not yet in operation at the proposed location, the specific sound level has been determined by calculation based on information provided by the supplier as shown below. (See Append D for full spec).

### Sound Data

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB) with 2DENP:	74	74	74	68	58	60	61	58	79	50
Outlet (dB) with 2DENP:	76	76	76	70	60	62	63	60	81	52
Breakout (dB):	79	81	79	72	62	53	42	36	85	53

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.

- 5.2.2 The above data has been used to calculate the noise levels at the nearest potentially sensitive facades to the proposed KEV.
- 5.2.3 The specific sound should be evaluated over an appropriate reference time interval, T
- a) 1 h during the day
- 5.2.4 For the purposes of this assessment, daytime is typically between 07:00h and 23:00h.
- 5.2.5 As there is no activity proposed during the night time period, only daytime hours (kitchen opening times 12:00 – 21:00) have been considered in the assessment.

## 6 NOISE MODELLING

### 6.1 Predicted Noise Levels

6.1.1 In order to assess propagation of noise from kitchen extract ventilation predictions have been carried out based on the following formula:

$$\text{SPL2} = \text{SPL1} - 20\log(r2/r1)$$

Where r1 and r2 are the distances , r2 being the receive distance, r1 being the measurement distance and SPL1 is the noise levels measured at r1

6.1.2 The specific sound source of the kitchen extraction ventilation at the nearest residential property are detailed in Table 3.

Table 3: Calculated Specific Noise Level at Woodbine Cottage				
Breakout SPL dB(A) @3m	Distance from source (m) r1	Distance of interest r2	Reduction in SPL	SPL at r2
53	3	12	10	<b>41</b>

6.1.3 Based on the output of the proposed Fan Model SQU23/4-3HT, predicted noise levels at the nearest potentially noise sensitive receptor have been determined.

6.1.4 Attenuation resulting from distance has been calculated and it has been determined that the noise from the kitchen extract to be 41dBLAeq at a distance of 12m from the source.

## 7 BS4142 ASSESSMENT

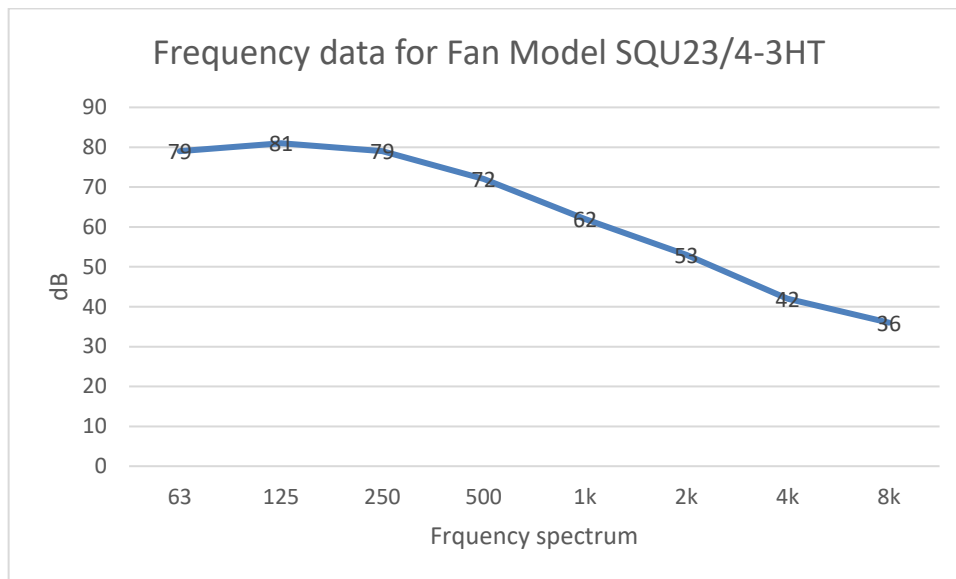
### 7.1 Rating level

7.1.1 If the noise source under consideration contains certain acoustic features then these can increase the likelihood of adverse impact over that expected from a simple comparison between the specific noise level and the background noise level. If this is considered to be the case then a correction should be applied in accordance with BS4142:2014.

7.1.2 Third octave band frequency data has been taken from the data sheet of the fan to determine whether the specific noise source contains any distinctly tonal notes. The results are shown in Graph 5.



**Graph 5:** Third Octave band frequency analysis of mixers operating in existing kitchen



7.1.3 For a prominent discrete tone to be identified as being present, the time-averaged sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged sound pressure level of both adjacent one-third-octave bands by some constant level difference. From the graph above it can be seen that there are no prominent, discrete-frequency spectral components and therefore no tonal corrections have been applied.

## 7.2 Background sound level

7.2.1 Noise levels were measured at a position considered representative of the background noise climate at the nearest potentially noise sensitive property to the proposed kitchen extract.

7.2.2 The most commonly used percentile level is the LA90,T, which is the 90th percentile level and is the level exceeded for 90 per cent of the time, T. It is higher than the Lmin and has been adopted as a good indicator of the “background” noise level. The noise climate was influenced mainly by road traffic noise during the survey period in May 2021. The results of the survey were presented in Table 2 and demonstrated that the average background noise climate in the area (in the absence of the specific noise source) was as follows:

- Daytime = 36 dBL<sub>A90</sub>

7.2.3 It is considered that this level is representative of the average background noise climate in the area and gives a clear indication of the underlying noise level, or the level that is almost always there in between intermittent noisy events. Measured levels are also considered representative of the noise climate at other nearby noise sensitive properties.

### 7.3 Results

- 7.3.1 The significance of sound of an industrial or commercial nature depends upon the margin by which the rating level exceeds the existing background noise climate and the context in which the sound occurs.
- 7.3.2 An assessment of the impact is carried out following the procedure detailed in Table 4 at the nearest noise sensitive receptor.

Table 4: Assessment Results – Daytime		
	Daytime	Commentary
Residual Sound Level $dBL_{Aeq}$	50	<i>This is the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.</i>
Measured background Sound Level $dBL_{A90}$	36	<i>Measured at the assessment location in the absence of the specific sound.</i>
Reference time period	1 hour	<i>Assessment is through the day (12:00 – 21:00)</i>
Calculated Specific Noise Level at façade of nearest dwellings $L_{Aeq, 1hr}$	41	<i>Correction for distance to facades calculated using the formula <math>SPL2 = SPL1 - 20\log(r2/r1)</math></i>
Acoustic feature correction	0	<i>Noise from the specific source does not contain any distinctive characteristics that would be audible at the assessment location</i>
Rating level	41	<i>The rating level is equal to the Specific Noise Level as there is no acoustic feature correction.</i>
<b>Excess of rating level over background level dB(A)</b>	5	

### 7.4 Assessment results

- 7.4.1 An assessment of the impact of the specific sound is gained by subtracting the measured background sound level from the rating level and the assessment method in Section 11 of BS4142 states that, typically, the greater this difference, the greater the magnitude of impact.
- 7.4.2 The predicted rating level from the operation of the kitchen extraction ventilation over a one hour worst-case period has been demonstrated to be 5dB(A) above the existing measured background sound level at the closest façade of the nearest noise sensitive receptor. The significance of the rating level is therefore not considered to have an adverse impact or significant adverse impact on the amenity of residents at the closest residential dwelling.

## 7.5 Uncertainty

- 7.5.1 The level of uncertainty in the measured data and associated calculations have been considered where the level of uncertainty could affect the conclusions. Confidence in the measured background values is high as the measurements were carried out over a 4-day period, at the nearest potentially noise sensitive dwelling. Noise monitoring was undertaken during the current global coronavirus (Covid-19) pandemic but not during a full national lockdown period. Restriction rules changed on 12 April 2021 and non-essential retail reopened including hairdressers nail and salons, libraries and community centres and outdoor hospitality venues reopened. It is considered that traffic flows and subsequent noise measurements are, therefore, likely to be representative of typical conditions and the level of uncertainty low.
- 7.5.2 There is also a low uncertainty in the calculations as the specific sound source used in the calculations has been supplied by the manufacturer.
- 7.5.3 A correction for distance to the façade of the closest dwelling has been carried out using standard acoustic formula which demonstrates that there is a low impact on the amenity of the nearest residential dwelling and that the specific sound source will have no adverse or significant adverse impact.

## 8 DISCUSSION

### 8.1 BS4142

- 8.1.1 It is acknowledged in BS4142 that other guidance, such as BS8233, might also be considered when assessing the potential impact of new noise sources near potentially noise sensitive properties.
- 8.1.2 This assessment has indicated there is a very low indication of adverse or significant adverse impact as a result of operation of the kitchen extraction ventilation. This is based on an external assessment of the noise. Consideration should also be given to noise levels affecting residents inside their properties which is acknowledged in BS4142.
- 8.1.3 Consideration should therefore also be given to the likely internal noise levels to which residents may be exposed to.

### 8.2 BS8233

- 8.2.1 It should be noted that the acoustic performance of a building envelope will be reduced in the event windows are opened for ventilation or cooling purposes, which typically reduces the insulation to no more than 10 – 15dB(A). Most residents value the ability to open windows for a variety of reasons and therefore internal noise levels should be achieved in noise-sensitive rooms with windows open. A level of 35dB LAeq internally would equate to an external value of 45dB LAeq in a worst case scenario.

8.2.2 It has been calculated that the daytime specific noise level at the nearest façades do not exceed 41dB(A)eq, during the operation of the KEV. Therefore, current guidance suggests that it is unlikely to change the behaviour of local residents.

## 9 CONCLUSIONS

9.1.1 A noise assessment has been carried out for a proposed conversion of existing garages/stores into restaurant with associated kitchen and bar servery/reception at The Star Inn, Harbottle Morpeth Northumberland NE65 7DG.

9.1.2 The assessment has included measurement of the background noise climate at the nearest residential dwelling to the site during typical daytime periods. The existing noise climate was found to be influenced mainly by road traffic on the unnamed road to the south.

9.1.3 Calculation of the specific sound source has been undertaken using the manufacturers published data to predict the rating level at the nearest potentially noise sensitive dwelling.

9.1.4 The worst-case rating level during the day time period was determined to be up to 5dB(A) above the measured daytime background sound level at the nearest façade of Woodbine Cottage. Therefore, the operation of the kitchen extraction ventilation, according to the methodology in BS4142:2014 has a low potential for adverse or significant adverse impact.

9.1.5 Internal noise levels have also been considered at the nearest residential dwelling and in the event that windows are opened for ventilation or cooling purposes, internal noise levels would be reduced by a minimum of 10dB(A). Subsequent internal noise levels of <35dB(A)eq during the day have been calculated as a result of the operation of the kitchen extraction ventilation at the proposed restaurant which therefore meets the guidance criteria contained within BS8233 and the WHO Guidelines.

9.1.6 With regards to Planning Policy it is not expected that noise from the proposed development would be noticeable at the nearest noise sensitive receptors and therefore would not be intrusive and would result in '*no observed adverse effect*' and therefore there would be no change *in the quality of life* of nearby residents.

9.1.7 Noise from the proposed kitchen extraction ventilation associated with the proposed conversion of existing garages/stores into restaurant with associated kitchen and bar servery/reception is defined by the 'No Observed Adverse Effect Level' in PPG-Noise. This falls below the 'Lowest Observed Adverse Effect Level' and this therefore complies with the aims of the Noise Policy Statement for England (NPSE) requirements.

## Appendix A: Glossary of Acoustic Terminology

**Decibel (dB):** a unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

**dB(A):** decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).

**L<sub>Aeq,T</sub>:** the equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). L<sub>Aeq,T</sub> is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is written as Leq in connection with aircraft noise.

### **Maximum and Minimum (L<sub>Amax</sub> and L<sub>Amin</sub>)**

The simplest statistical parameters are the maximum level (L<sub>Amax</sub>) and the minimum level (L<sub>Amin</sub>) during the measurement period. The L<sub>Amax</sub> is often used as a measure of the most obtrusive facet of the noise, even though it may only occur for a very short time and is the level of the maximum Root Mean Square reading. L<sub>Amin</sub> is rarely used, but can be a useful way of identifying a constant noise amongst other intermittent noises.

**Fast Time-weighting:** An averaging time used in sound level meters, equivalent to 1/8 second.

**Slow Time-weighting:** An averaging time used in sound level meters, equivalent to 1 second.

### **Percentile Parameters (L<sub>n,T</sub>)**

Percentile parameters, L<sub>n</sub> values, are useful descriptors of noise. The L<sub>n</sub> value is the noise level exceeded for n per cent of the measurement period, which must be stated. The L<sub>n</sub> value can be anywhere between 0 and 100. The two common ones are discussed below, but sometimes other values will be encountered.

### **Background Noise (L<sub>A90,T</sub>)**

The most commonly used percentile level is the L<sub>A90,T</sub>, which is the 90<sup>th</sup> percentile level and is the level exceeded for 90 per cent of the time, T. It will be above the L<sub>min</sub> and has been adopted as a good indicator of the "background" noise level. It is specified in BS 4142:1997 as the parameter to assess background noise levels. Whilst it is not the absolute lowest level measured in any of the short samples, it gives a clear indication of the underlying noise level, or the level that is almost always there in between intermittent noisy events. BS4142:1997 advises that the measurement period should be long enough to obtain a representative sample of the background level.

### **Level exceeded for 10% of the Time (L<sub>A10,T</sub>)**

L<sub>A10,t</sub> is the 10<sup>th</sup> percentile, or the level exceeded for 10 per cent of the time, and was used for road traffic noise assessments since it had been shown to give a good indication of people's subjective response to noise. Although the L<sub>Aeq</sub> has largely superseded its use for traffic, L<sub>A10,T</sub> may still be found in acoustic reports discussing road traffic. It is still used to assess traffic noise to determine eligibility for noise-insulation grants where a road is altered or a new one proposed. The L<sub>A10,T</sub> can be useful in assessing the overall noise climate, for example, if the L<sub>A90,T</sub>, L<sub>A10,T</sub> and L<sub>Aeq,T</sub> are all within a few dB, then this indicates that the noise source is fairly constant.

**Specific noise source:** The noise source under investigation for assessing the likelihood of complaints.

**Specific noise level, L<sub>Aeq,T</sub>:** The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.

**Rating level, L<sub>Ar,T</sub>:** The specific noise level plus any adjustment for the characteristic features of the noise.

**Ambient noise:** Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.

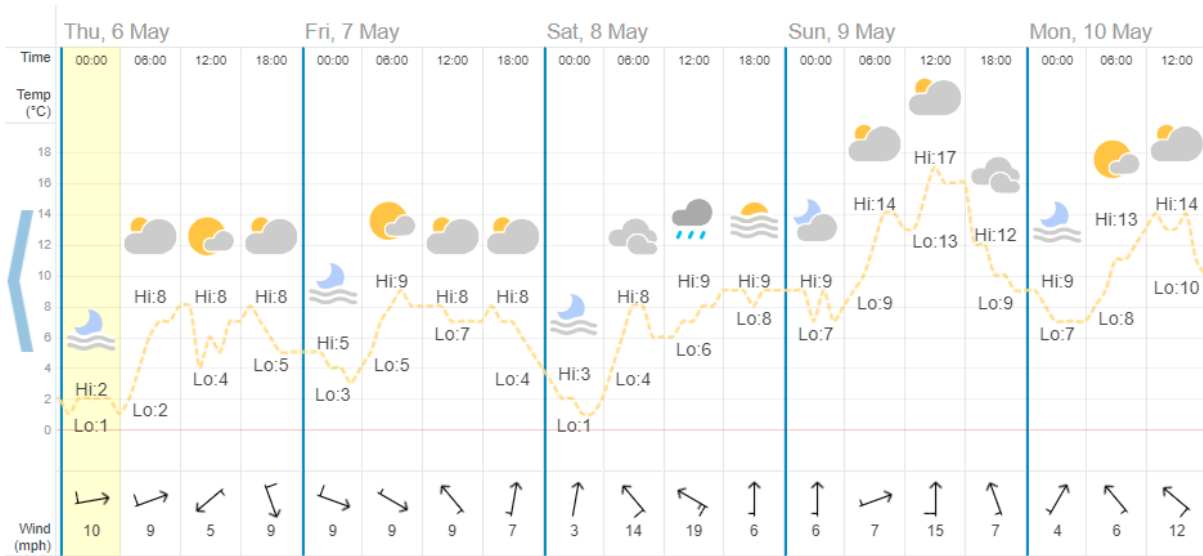
**Residual noise:** The ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

**Residual noise level, L<sub>Aeq,T</sub>:** The equivalent continuous A-weighted sound pressure level of the residual noise.

**Appendix B: Noise Monitoring Equipment & Meteorological Conditions**

Instrumentation	Certificate no.	Calibration due
Cirrus Research plc Instrument type: CR:247 Noise Monitoring terminal Serial number V069903	144970	14/08/2022

**Past Weather in Harbottle — Graph**



### Appendix C: Noise Monitoring Results

Start Time	End Time	Instrument	LAFMax	LAF90	LAeq
06/05/2021 12:50	06/05/2021 13:00	V069903	72.6	37.7	47.7
06/05/2021 13:00	06/05/2021 14:00	V069903	72.8	36.9	49.4
06/05/2021 14:00	06/05/2021 15:00	V069903	75.0	37.6	53.0
06/05/2021 15:00	06/05/2021 16:00	V069903	75.3	35.8	50.0
06/05/2021 16:00	06/05/2021 17:00	V069903	70.1	34.0	48.0
06/05/2021 17:00	06/05/2021 18:00	V069903	70.8	36.1	47.9
06/05/2021 18:00	06/05/2021 19:00	V069903	73.0	35.8	49.1
06/05/2021 19:00	06/05/2021 20:00	V069903	74.5	32.8	48.2
06/05/2021 20:00	06/05/2021 21:00	V069903	71.2	31.3	46.9
		<b>Max/Average</b>	<b>75.3</b>	<b>35.3</b>	<b>48.9</b>
			<b>70.1</b>		

Start Time	End Time	Instrument	LAFMax	LAF90	LAeq
07/05/2021 12:00	07/05/2021 13:00	V069903	74.5	35.6	50.2
07/05/2021 13:00	07/05/2021 14:00	V069903	78.3	36.5	51.1
07/05/2021 14:00	07/05/2021 15:00	V069903	79.0	37.5	51.3
07/05/2021 15:00	07/05/2021 16:00	V069903	74.9	33.7	49.5
07/05/2021 16:00	07/05/2021 17:00	V069903	69.3	35.5	48.7
07/05/2021 17:00	07/05/2021 18:00	V069903	68.5	36.0	47.7
07/05/2021 18:00	07/05/2021 19:00	V069903	74.2	36.1	49.6
07/05/2021 19:00	07/05/2021 20:00	V069903	74.6	37.0	48.1
07/05/2021 20:00	07/05/2021 21:00	V069903	80.0	36.3	49.6
		<b>Max/Average</b>	<b>80.0</b>	<b>36.0</b>	<b>49.5</b>
			<b>68.5</b>		

Start Time	End Time	Instrument	LAFMax	LAF90	LAeq
08/05/2021 12:00	08/05/2021 13:00	V069903	78.8	40.1	51.5
08/05/2021 13:00	08/05/2021 14:00	V069903	71.3	40.6	50.7
08/05/2021 14:00	08/05/2021 15:00	V069903	73.4	39.7	52.3
08/05/2021 15:00	08/05/2021 16:00	V069903	79.8	37.7	49.9
08/05/2021 16:00	08/05/2021 17:00	V069903	77.1	36.4	51.0
08/05/2021 17:00	08/05/2021 18:00	V069903	66.2	38.5	50.1
08/05/2021 18:00	08/05/2021 19:00	V069903	66.1	39.2	49.8
08/05/2021 19:00	08/05/2021 20:00	V069903	69.3	36.1	48.8
08/05/2021 20:00	08/05/2021 21:00	V069903	80.2	31.3	48.1
		<b>Max/Average</b>	<b>80.2</b>	<b>37.7</b>	<b>50.2</b>
			<b>66.1</b>		

Start Time	End Time	Instrument	LAFMax	LAF90	LAeq
09/05/2021 12:00	09/05/2021 13:00	V069903	79.0	37.1	52.7
09/05/2021 13:00	09/05/2021 14:00	V069903	74.7	36.1	50.5
09/05/2021 14:00	09/05/2021 15:00	V069903	81.9	37.4	53.7
09/05/2021 15:00	09/05/2021 16:00	V069903	74.6	37.3	49.9
09/05/2021 16:00	09/05/2021 17:00	V069903	78.0	38.8	53.3
09/05/2021 17:00	09/05/2021 18:00	V069903	81.0	37.3	51.9
09/05/2021 18:00	09/05/2021 19:00	V069903	64.2	35.3	45.8
09/05/2021 19:00	09/05/2021 20:00	V069903	72.8	34.7	49.3
09/05/2021 20:00	09/05/2021 21:00	V069903	69.1	33.2	49.6
		<b>Max/Average</b>	<b>81.9</b>	<b>36.4</b>	<b>50.7</b>
			<b>64.2</b>		



**Appendix D: Technical Data – Fan Model SQU23/4-3HT**



**Technical Data - Fan Model 2DENP+SQU23/4-3HT+2DENP**

**Location:**

**Designation:**

Please Note: Data shown is nominal - enter more criteria for accurate detail.

**Performance - Required**

Air Flow : 0,00 m³/s  
 Static Pressure : 0 Pa  
 Selection Pressure: 0 Pa  
 Installation Type: n/a  
 Air Density: 1,204 kg/m³  
 - Atmos. Temp: 20 °C  
 - Altitude: 0 m  
 - Humidity: 0,0 %

**Actual**

Air Flow: 0,00 m³/s  
 Static Pressure: 0 Pa  
 Total Pressure: 0 Pa

**Fan Data**

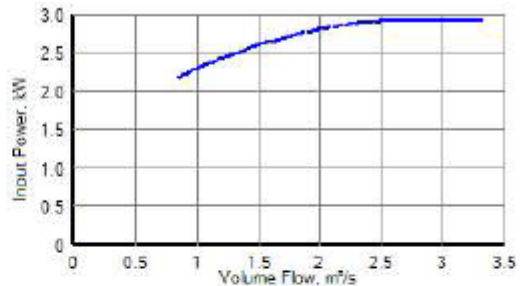
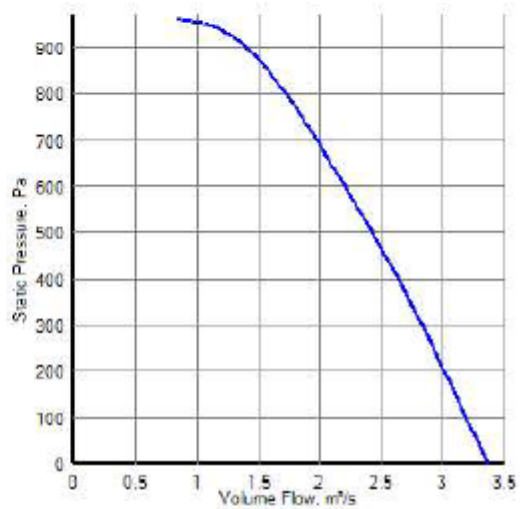
Catalogue Code: 2DENP+SQU23/4-3HT+2DENP  
 Description: Centrifugal Box

Diameter: 500 mm  
 Impeller Type: Centrifugal  
 Blade Material: -  
 Speed: 1445 r/min @50 Hz  
 Power, Abs: - Peak: 2,56 kW  
 Input Power: 0,97 kW  
 Efficiency Total: - Static: -  
 SFP: -

Fan Weight: 144,0 kg

**Motor Data (at STP)**

Motor Type:  
 Electrical Supply: 400V 3ph 50Hz  
 Motor Frame: 100L  
 Motor Power: 3,00kW  
 FLC/Start (DOL): 7,50A / 48,75A  
 Motor Speed: 4 pole  
 Motor Efficiency: 78,6%



**Sound Data**

Spectrum (Hz):	63	125	250	500	1K	2K	4K	8K	dBW	dB(A) @ 3m
Inlet (dB) with 2DENP:	74	74	74	68	58	60	61	58	79	50
Outlet (dB) with 2DENP:	76	76	76	70	60	62	63	60	81	52
Breakout (dB):	79	81	79	72	62	53	42	36	85	53

Sound levels are quoted as in-duct values. dB(A) values are average spherical free-field for comparative use only.