

Acoustic Assessment of Noise at



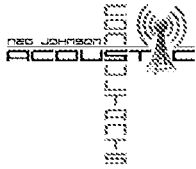
22 Beach Road

Littlehampton

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Author: N Johnson MSc. MIOA



Executive Summary

Ned Johnson Acoustic Consultants Limited has been appointed by Southern Creations LTD to undertake an acoustic assessment for the development at 22 Beach Road, Littlehampton.

The assessment takes account of the existing noise environment, which has been quantified using direct measurement to take account of the effects of the proposed kitchen extraction system on neighbouring properties.

Noise from extraction systems has been assessed using the methodology and assessment system set-out in BS4142:2014.



Ned Johnson Acoustic Consultants Ltd





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1. Introduction

- 1.1 Ned Johnson Acoustic Consultants Limited has been appointed by Southern Creations LTD to undertake an acoustic assessment for the development at 22 Beach Road, Littlehampton.
- 1.2 The proposed development is for the installation of a kitchen extraction system to serve the kitchen and two chiller units for the refrigeration for the proposed Pizza Hut. A plan of the proposed layout can be found in Appendix 3.
- 1.3 The opening hours of Pizza Hut will be 11am – 11pm and the extraction system will only operate during these hours. The Chiller units will operate intermittently through a 24-hour period.
- 1.4 The background noise levels have been used to compare with the manufacturers data and using the methodology in BS4142:2014. The noise levels from the system on the nearest noise-affected properties has been calculated as the system has not yet been installed. The results have been compared to the rating system in BS4142:2014.
- 1.5 This report does not undertake any internal sound insulation tests in relation to Approved Document E of the Building Regulations.



2. Site Description

- 2.1 The development is currently an empty commercial unit; planning permission has been granted for a Pizza Hut take away. The main sources of noise are customers and the extraction system at Panama Joes.
- 2.2 Figure 1 below shows the location of the development, which is shaded in blue. The measurement location is shown below.

Figure 1.





3. Reference Documents

National Planning Policy Framework

- 3.1 The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) on 27th March 2012 and upon its publication, the majority of planning policy statements and guidance notes were withdrawn, including PPG24, which until the emergence of the NPPF, set out the Government's position on how noise should be dealt with in the planning system.
- 3.2 The guidance set out in PPG24 has been replaced in the NPPF by four aims, which are set out at paragraph 123 in Section 11 of the document, titled *Conserving and enhancing the natural environment*:

"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 new development, including through the use of conditions;*
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on 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.*

3.3 There are two footnotes to the above guidance. The first footnote refers to the Explanatory Note of the *Noise Policy Statement for England*, which defines both “*significant adverse impacts on health and quality of life*” and “*adverse impacts on health and quality of life*” as described in the first two bullet points.

3.4 The second footnote indicates that the third bullet point is “*subject to the provisions of the Environmental Protection Act 1990 and other relevant law*”.

3.5 Annex 1 of the NPPF, titled *Implementation* notes that:

“210 Planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise.

211 For the purposes of decision-taking, the policies in the Local Plan (and the London Plan) should not be considered out-of-date simply because they were adopted prior to the publication of this Framework.

212 However, the policies contained in this Framework are material considerations which local planning authorities should take into account from the day of its publication. The Framework must also be taken into account in the preparation of plans.

213 Plans may, therefore, need to be revised to take into account the policies in this Framework. This should be progressed as quickly as possible, either through a partial review or by preparing a new plan.



214 For 12 months from the day of publication, decision-takers may continue to give full weight to relevant policies adopted since 2004 even if there is a limited degree of conflict with this Framework.

215 In other cases and following this 12-month period, due weight should be given to relevant policies in existing plans according to their degree of consistency with this framework (the closer the policies in the plan to the policies in the Framework, the greater the weight that may be given)."

Noise Policy Statement for England

- 3.6 The Department for Environment, Food and Rural Affairs published the *Noise Policy Statement for England* (NPSE) in March 2010. The explanatory note of NPSE defines the terms used in the NPPF:

"2.20 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level. This is the level above which adverse effects on health and quality of life can be detected.

2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur."

- 3.7 The NPSE does not define the SOAEL numerically, stating at paragraph 2.22:



“2.22 It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”

- 3.8 There is no local or national guidance on how the three terms should be defined numerically.
- 3.9 There are three aims in the NPSE, which match, and expand upon, the first two bullet points in paragraph 123 of the NPPF and add a third aim that relates to a wider improvement in health and quality of life (the bold text is in the NPSE):
- 3.10 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development.
- 3.11 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur.
- 3.12 This aim seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking



into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim.

British Standard 8233

- 3.13 The scope of British Standard 8233: 2014 *Sound insulation and noise reduction for buildings – Code of practice* is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use.
- 3.14 The standard suggests suitable internal noise levels for residential dwellings, as shown in Table 1. Below.

Table 1.

Activity	Location	07:00 - 23:00	23:00 - 07:00
		$L_{Aeq, 16 \text{ hour}}$	$L_{Aeq, 8 \text{ hour}}$
Resting	Living Rooms	35 – 40	-
Dining	Dining Area	40	-
Sleeping	Bedrooms	35	30



- 3.15 In terms of this development the internal noise levels have been compared to the internal noise levels in Table 1. It is suggested in this report that by meeting these noise levels the development would be classed as NOAEL.

World Health Organisation Guidelines for Community Noise (1999)

- 3.16 The World Health Organisation (WHO) *Guidelines for Community Noise* (1999) also sets out guidance on suitable internal and external noise levels in and around residential properties which are very similar to those contained in BS8233. The following internal noise levels are recommended by the WHO:

- 35dB LAeq,T in living rooms over a 16 hour day; and
- 30dB LAeq,T in bedrooms during the 8 hour night.

- 3.17 With respect to the night-time maximum noise levels, the WHO guidelines state:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAF max more than 10-15 times per night.”

British Standard 4142:2014

- 3.18 The scope of British Standard 4142: *Method for rating industrial noise affecting mixed residential and industrial areas* describes methods for determining, at the outside of a building:



a) noise levels from factories, or industrial premises, or fixed installations, or sources of an industrial nature in commercial premises; and

b) background noise level.

3.19 In particular BS4142 describes the *“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.”* It sets out a methodology for assessing a noise Rating level which is a combination of absolute or ‘specific’ noise level (in terms of L_{Aeq} average noise level over different durations; 1 hour for daytime and 15 minute at night); and then including penalties to account for character of a noise (i.e. tonality, impulsivity, intermittency and ‘other’).

3.20 BS4142 applies to new noise sensitive developments that are proposed near existing industrial sources, the following paragraph relates to such developments:

“Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.”

Further to this BS4142:2014 also notes that other standards may be relevant; in this development this would include BS8233:2014.

3.21 The rating levels in BS4142 are as follows:

“a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a



significant adverse impact, depending on the context.

c) A difference of around +5 dB 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."

3.22 BS4142:2014 also states 'where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration'. In terms of those factors the document states the following: 'The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as, facade insulation ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and acoustic screening.'

3.23 Where there is an adverse impact in terms of the BS4142 rating mitigation can be proposed to reduce the impact or achieve desirable internal noise levels.

3.24 Arun District Council has placed a planning condition relating to noise on the planning permission:

'Before the development commences, the applicant shall submit a report, prepared in accordance with the provisions of BS4142 to predict noise levels generated by the machinery and plant to be operated on site at the nearest noise sensitive location.'



4. Survey Methodology

- 4.1 The survey was conducted over a 2-hour period during the day on August 21st 2017 between 21:00 – 23:00. A measurement of the night time background noise took place on August 22nd 00:00 – 01:00.
- 4.2 The instrument used for the survey was a Bruel & Kjaer 2260 precision grade sound level meter.
- 4.3 The sound level meter was calibrated immediately before and after use during the survey with a Bruel & Kjaer 4231 Acoustic Calibrator producing 94dB_A at 1KHz and no drift was noted in calibration readings. Both calibration results were 93.8dB_A.
- 4.4 During the survey there were no unusual noise events. The sound level meter was set to log every 15 minutes. The metrics measured were L_{Aeq}, L_{A90} and L_{AF Max}.
- 4.5 The measurement procedure in BS4142:2014 was followed. The sound level meter was set-up on a tripod 1.5 metres above the ground with no reflecting surfaces within 3.5 metres. The microphone was housed in a Bruel & Kjaer UA1404A weather-proof microphone cover and the sound level meter in a weather-proof case.
- 4.6 During the background survey the temperature ranged from 16^oC to 19^oC with a wind speed of 0.6 metres per second and no precipitation.
- 4.7 The predictive method in BS4142:2014 has been used to calculate the noise from the air conditioning units as they are not yet in place.



5. Noise Survey Results

- 5.1 The results of the survey show that the typical daytime L_{A90} was 43dB_A; the night time L_{A90} was 35dB_A. This has been used to calculate the BS4142 rating.
- 5.2 The BS4142 ratings are calculated for the most affected receptors.
- 5.3 The following tables set-out the calculations of sound pressure for the stack outlet and the casing breakout of the fans (outlet).

Table 2. Noise from stack vent point at nearest residential window:

Procedure	Octave band centre frequency, Hz								Overall
	63	125	250	500	1000	2000	4000	8000	
1. Sound power level of the S&P 450 fan (dB _A)	58	70	80	80	83	79	71	64	
2. Sound pressure level at nearest residential noise sensitive window at 2 metres (dB _A)	-17	-17	-17	-17	-17	-17	-17	-17	
3. Minimum attenuation due to end reflection	-11	-7	-3	-1	0	0	0	0	
4. Attenuation due to silencer	-4	-7	-15	-26	-33	-33	-19	-11	
5. Attenuation due to directionality	0	-1	-3	-7.5	-15	-20	-20	-20	
6. Sound pressure level at the residential window (dB _A)	26	38	42	28.5	18	9	15	16	43



Table 3. Noise from casing breakout for extraction fan:

Procedure	Octave band centre frequency, Hz								Overall
	63	125	250	500	1000	2000	4000	8000	
1. Sound power level of the S&P 450 fan dB_A	58	70	80	80	83	79	71	64	
2. Sound pressure level at nearest residential noise sensitive window at 2 metres (dB_A)	-17	-17	-17	-17	-17	-17	-17	-17	
3. Sound pressure level at the residential window (dB_A)	41	53	63	63	67	62	54	47	70

- 5.3 There are also 2 chiller units located 2 metres from the same window that is worst affected by the fan for the kitchen extraction system. One unit has a sound pressure level of 51dB_A at 2 metres and the second has a sound pressure level of 44dB_A at 2 metres. The combined sound pressure level at the nearest window for both units will be 52dB_A .
- 5.4 The BS4142 ratings are calculated for the most affected receptor, which are the residential bedrooms of the flats above Pizza Hut. For the fan and chiller units the worst affected window is at first floor level and for the extraction stack vent point it is the window at second floor level.
- 5.5 The following tables present the assessment calculations and results of the BS4142 ratings.



Table 4. BS4142 assessment for the stack vent point

Results	Measurement	Clause	Commentary
Ambient sound level	$L_{Aeq \text{ 1-hour}} = 55$	7.3.1	
Typical background sound level	$L_{A90} = 43$	8.3	
Specific sound level at nearest residential noise sensitive window at 2m	43dB _A		This includes distance correction,
Acoustic feature	0dB	9.2	No correction required for intermittency or impulsivity, there is no tonal frequency.
Rating level	43dB _A	11	Sound source
Typical background sound level	$L_{A90} = 43\text{dB}$	8.3	
Rating level at receptor point	0dB	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level over the background sound level is 0 dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment. The measurement conditions were repeatable so overall uncertainty is low.



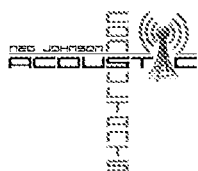
Table 5. BS4142 assessment for casing breakout and chiller units

Results	Measurement	Clause	Commentary
Ambient sound level	$L_{Aeq} 15 \text{ minute} = 55$	7.3.1	
Typical background sound level	$L_{A90} = 43$	8.3	
Specific sound level at nearest residential window at 2m.	70dB_A		
Acoustic feature	3dB	9.2	No correction required for intermittency or impulsivity, there is no tonal frequency for the extraction fan. 3dB added to the chiller units for intermittency.
Rating level	70dB_A	11	Sound source
Typical background sound level	$L_{A90} = 43\text{dB}_A$	8.3	
Rating level at receptor point	$+27\text{dB}_A$	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level over the background sound level is +27 dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment. The measurement conditions were repeatable so overall uncertainty is low.



Table 6. BS4142 assessment for chiller units at night.

Results	Measurement	Clause	Commentary
Ambient sound level	$L_{Aeq} \text{ 15 minute} = 53$	7.3.1	
Typical background sound level	$L_{A90} = 35$	8.3	
Specific sound level at nearest residential window.	52dB _A		
Acoustic feature	3dB	9.2	Correction required for intermittency ; there is no tonal frequency or impulsivity.
Rating level	55dB _A	11	Sound source
Typical background sound level	$L_{A90} = 35\text{dB}_A$	8.3	
Rating level at receptor point	+20dB _A	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level over the background sound level is +20 dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment. The measurement conditions were repeatable so overall uncertainty is low.



6 Evaluation of results

- 6.1 The suitability of the site for residential development has been determined by comparing the measured noise levels with the criteria set out in Section 3 of this report.
- 6.2 The rating level for the stack vent point at the receptor point during daytime is 0dB_A at the nearest receptor point. This result shows that the stack vent noise will be of low impact, when following the guidance in BS4142:2014.
- 6.3 The rating level for the fan and chiller plant at the receptor point during the day is $+27\text{dB}$. According to the rating system in BS4142:2014 this shows that the noise outbreak from the fan is likely to have a significant adverse impact
- 6.4 The noise from the chiller units during the night have a rating of $+27\text{dB}$ and the rating system dictates that this will have a significant adverse impact.
- 6.5 In order to control noise transferring to the structure the fans and ducting must be fixed with anti-vibration mounts and the fans must be connected to the ducting using flexible connectors.
- 6.6 All applicable penalties have been added to the ratings. As the kitchen extraction system will run continuously once in operation and there are no hisses, whines, thumps, bangs or distinct tones no correction penalties have been added to the assessment. A correction has been added for intermittency to the chiller units.



Appendix 1: Glossary of Terms

Daytime Defined in PPG 24 as the period 07:00-23:00 hours.

Night-time Defined in PPG 24 as the period 23:00-07:00 hours.

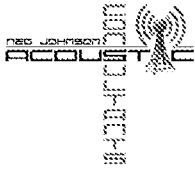
Decibel (dB): A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure levels the reference quantity is 20 uPa. The threshold of normal hearing is in the region of 0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

dB(A), Lax: 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 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).

LA10,T: The A weighted noise level exceeded for 10% of the measurement period, T. It gives an indication of the upper limit of fluctuating noise such as that from road traffic.

LA90,T: The A weighted noise level exceeded for 90% of the measurement period, T. This is defined in BS 4142 as the background noise level.

LAE: The sound exposure level – the level of a sound with a period of 1 second that has the same sound energy as the event considered.



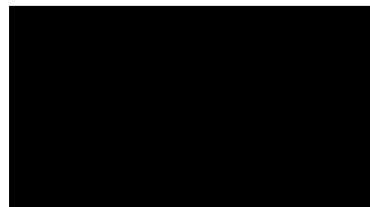
LAeq,T: The equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq, T is used to describe many noises and can be measured directly with an integrating sound level meter.

LAmix: The highest A weighted noise level recorded during a noise event. The time weighting (slow or fast) should be stated.



Appendix 2: Calibration Certificates

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, CM9 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879108



Certificate of Calibration

Certificate number: 21991

CALIBRATION

Test object: Sound Level Meter
Manufacturer: Brüel and Kjær
Type: 2280_G1
Serial no: 2834414

Customer: Ned Johnson Acoustic Consultants Ltd
Address: 378 Church Street,
London, SE8 6HG.
Contact Person: Ned Johnson.

Method :

Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. The following items have been calibrated as set out in BS 7580 Part 1:1997

	Producer:	Type:	Serial No:	Certificate number
Microphone	Brüel & Kjær	4188	2189417	21990
Calibrator*	Brüel and Kjær	4231	2039392	21949
Preamplifier	Brüel & Kjær	ZC0026	Not Marked	Included

Additional items that also have been submitted for verification:

Wind shield	Brüel & Kjær	UA0469
Attenuator	None	
Extension cable	None	

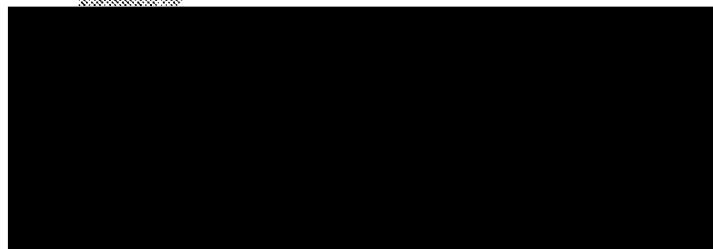
These items have been taken into account wherever appropriate.

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50.0 %RH
Measurement conditions:	100.99 ±0.01kPa	23.3 ±0.2°C	58.7 ±2%RH

Date received : 16/06/2016
Date of calibration: 23/06/2016
Date of issue: 23/06/2016

Engineer

Supervisor



This certificate provides evidence of measurement to recognised national standards, and to the best of our knowledge issued in the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



Campbell Associates Ltd
 5b Chelmsford Road Industrial Estate
 GREAT DUNMOW, CM8 1HD, England
 www.campbell-associates.co.uk
 Tel: 01371 871630 Fax: 01371 871636
 Phone 01371 871630 Facsimile 01371 871636

Certificate number: 21949

Certificate of Calibration and Conformance

Test object: Sound Calibrator
Manufacturer: Brüel and Kjær
Type: 4231
Serial no: 3558982
Customer: Ned Johnson Acoustic Consultants Ltd
Address: 219 Church Street,
 London, SE9 6NS
Contact Person: Ned Johnson

Measurement Results	Level	Level Stability	Frequency	Frequency Stability	Uncertainty
1:	93.90 dB	0.04 dB	999.95 Hz	0.00 %	0.33 %
2:	93.90 dB	0.04 dB	999.95 Hz	0.00 %	0.33 %
3:	93.91 dB	0.04 dB	999.95 Hz	0.00 %	0.33 %
Result (average):	93.90 dB	0.04 dB	999.95 Hz	0.00 %	0.33 %
Expanded Uncertainty:	± 1.10 dB	± 0.02 dB	± 0.01 Hz	± 0.01 %	± 0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	2.00	2.00	2.00

The stated level is relative to 20µPa. The level is traceable to National Standards.

The stated level is valid at reference conditions. The following correction factors have been applied during the measurement: Pressure: 0.0000 dB/Pa; Temperature: 0.0015 dB/°C; Relative humidity: 0.001 dB/Pa; (see clause 5.2.2.2.2 of ISO 9001:2015)

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of 2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\Calibration\2019\2019-10-10\Calibration\4231_3558982_9m.mxl

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	20.0 °C	50 %RH
Measurement conditions:	100.923 ± 0.042 kPa	20.3 ± 0.2 °C	67.7 ± 2.0 %RH

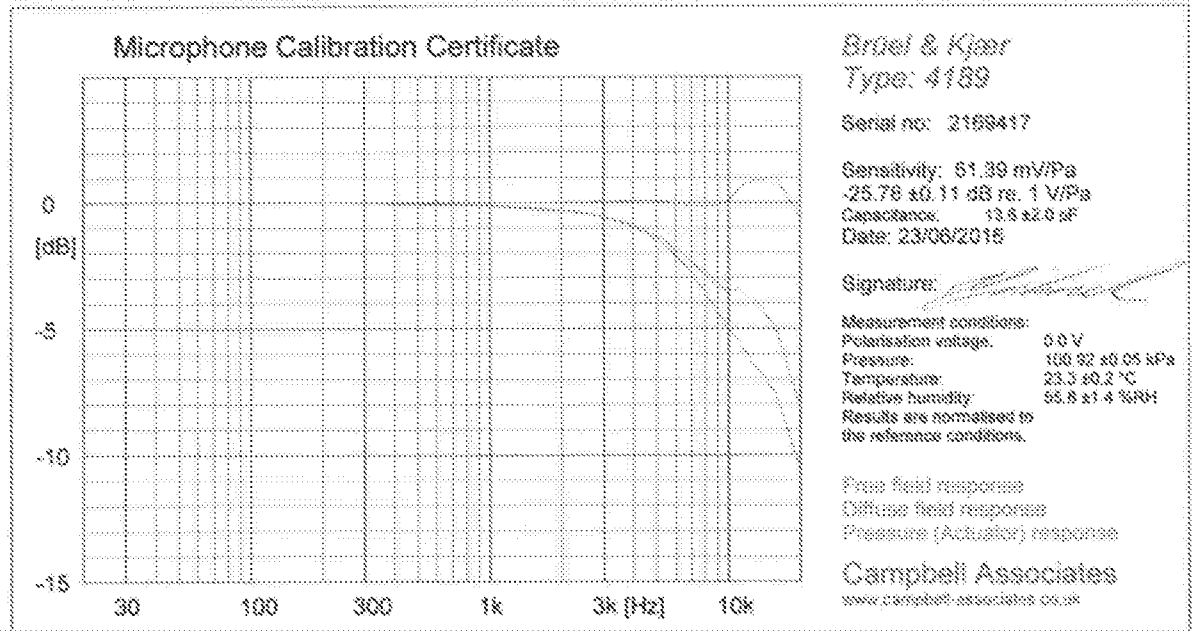
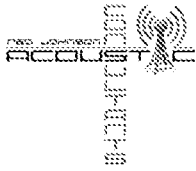
Date received for calibration: 19/09/2019
 Date of calibration: 23/09/2019
 Date of issue: 23/09/2019
 Engineer:

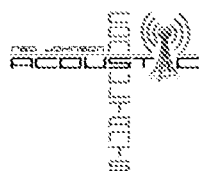
Supervisor:

This certificate is valid in accordance with the requirements of the UKAS Calibration standard, and is subject to the terms and conditions of the UKAS Calibration standard. The certificate may not be reproduced or used in any way without the prior written approval of the issuing laboratory.

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Issued by: Thomas P. Jones

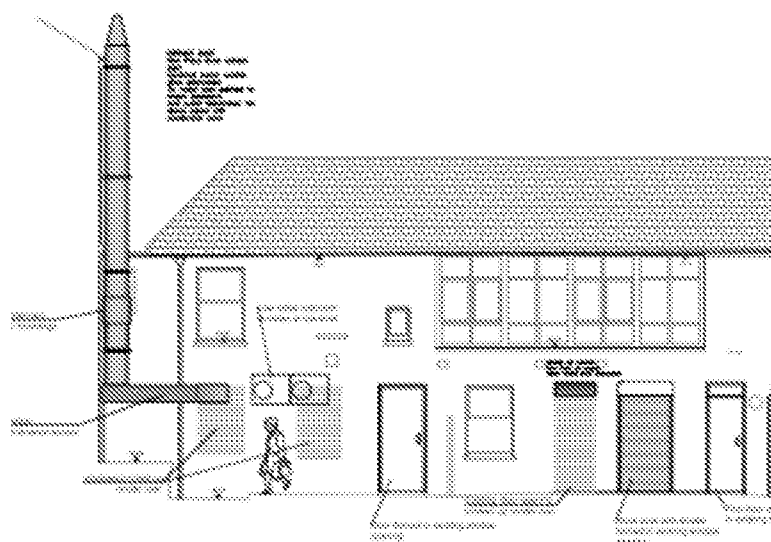




Appendix 3: Plant Location



PROPOSED REAR ELEVATION



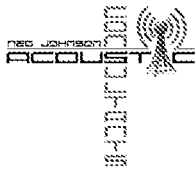
POPOGSED REAR SIDE ELEVATION



Appendix 4: Data

MP1:

Start time	LAF90
21:01:00	43.1322884
21:16:00	43.34976603
21:31:00	43.35541267
21:46:00	43.32963936
22:01:00	42.40958995
22:16:00	43.50717203
22:31:00	43.4893636
22:46:00	43.42148249
00:00:22	35.42531072
00:15:00	34.35223811
00:30:00	35.39220919
00:45:00	35.33544905



Appendix 5: Qualifications, Experience and Professional Memberships

Qualifications, training, accreditation

BSc. Honours Applied Biology, 1995; MSc. Modern Approaches to Plant Health, 1996; BSc. (Honours) Environmental Health, 2006; Institute of Acoustics Diploma in Acoustics & Noise Control, 2004; MIOA, 2012; EHRB Registration, 2009; MCIEH, 2012.

Experience in BS4142:2014

I have undertaken 24 BS4142 assessments following the issue of the revised standard in 2014.



Appendix 6: Uncertainty

The measurement method used was to measure the existing background noise levels for both daytime and night time. No measurement of the sources could be undertaken as they are not in place.

As part of the BS4142 assessment the headings from the 2014 standard have been used to consider where uncertainty in the measurements may have occurred.

The complexity of the sound source and the level of variability in sound emission from the source

It is not possible to comment on the variability, as the extraction system and chiller units have not been installed..

The complexity and level of variability of the residual acoustic environment

No residual measurements could be taken, as the sound sources are not in place. In relation to the existing ambient noise level the noise over each 15-minute period varied very little due to the operation of the various items of plant serving the nearby restaurant.

The ambient environment overall provided consistent, reproducible results and therefore uncertainty for this aspect is low.

The level of residual sound in the presence of the specific sound at the measurement location

This could not be done due to the absence of the specific sound sources.



The location(s) selected for taking the measurements

The location for measurements followed the guidance in BS4142:2014 and was representative of the noise sources in the area. The results were unaffected by reflections or unusual events and reproducible.

The distance between sources of sound and the measurement location and intervening ground conditions

Again as the sound sources are not yet in place this is not a source of uncertainty in this survey.

The number of measurements taken

Data was collected in 15-minute periods providing a full data set. Overall there is a suitable and reliable dataset from which to derive the typical background noise levels and uncertainty is low.

The measurement time intervals

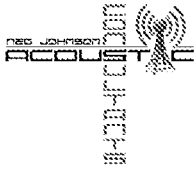
The time intervals for logged data were 15-minute periods, which is an appropriate period for this type of survey and uncertainty is low.

The range of times when the measurements have been taken

The measurement times were representative of the background and ambient sound levels. Uncertainty is low in regard to the range of times.

The range of suitable weather conditions during which measurements have been taken

During the surveys the wind conditions were suitable as they did not exceed 5m/s at any time; there was also no precipitation and temperatures ranged between 16°C – 19°C. All conditions were recorded, including cloud cover and



all were in line with the requirements of BS4142 and therefore uncertainty due to weather is low.

The measurement method and variability between different practitioners in the way the method is applied

The method for taking measurements followed that required in BS4142. The measurement procedure is reproducible and therefore uncertainty is low.

The level of rounding of each measurement recorded

Where necessary results have been rounded to the nearest whole decibel; any results at 0.5 have been rounded up.

The instrumentation used

The instrument used is a class 1 sound level meter and calibrator and have all been calibrated to a traceable standard at a UKAS accredited laboratory in the last 14 months. Uncertainty due to instrumentation is low.