Report No: **AAW/MAT15041**

Noise Assessment, Mill Cottage, Bartestree, HR1 4BA

Acoustic Associates
WORCESTERSHIRE

Client: **Mr R Whittle**

M.A.Thorne BSc Hons, CIPS, MIDiageE, MIOA

Date: **26th November 2014**

Summary

Acoustic Associates have been commissioned to measure background noise levels in connection with the proposed development that includes a fish & chip shop and residential (flats). An extract system specification has been proposed to comply with the local authority requirement of levels at the nearest residential window being at or below background.

Note:
This report was completed on the basis of a defined programme of work and terms and conditions agreed with the Client. Recommendations in this report are for acoustics purposes only, and it is the responsibility of the Client to ensure that all other requirements are met.

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1 Objective

1.1 Carry out a noise survey of background and ambient noise levels in connection with proposed development of a fish & chip shop on site with flats above.

2 Introduction

2.1 Acoustic Associates have been commissioned to consider the noise impact from the proposed fish & chip shop extract system on near neighbours. The planning application is P142191/F. The results of the noise survey will be used to set the noise levels from the system.

2.2 Plans of the site are shown in Appendix 1. The predominant source of noise is from the A449 from Hereford to Ledbury that then goes on to the M50 motorway. It is a busy main road into the town.

3 Noise measurements

3.1 Noise levels were measured by a competent person for environmental and occupational noise monitoring, in accordance with BS 7445 (Description and measurement of environmental noise) and BS 4142:1997 (Method for rating industrial noise affecting mixed residential & industrial areas). Free field noise levels (unless otherwise specified) were measured at a height of 1.4m above the ground using the following sound level meters with wind shields fitted:

Equipment	**Serial number**	**Calibration date:**	**Type:**
01dB SIP 95 sound level meter	10510	21/03/13	Class 1
01dB Black Solo sound level meter	60673	11/04/13	Class 1
01dB calibrator CAL21	502141778	09.10.2014	

3.2 The equipment was operated according to the manufacturers instructions and calibrated before and after, and the calibration had not changed appreciably (<1dB).

Table showing weather conditions for the days of monitoring:

Date	Ave Temp °C	Rainfall mm	Ave Wind Speed m/s	Prevailing Wind Direction	Comment
08/11/14	9	0	2	S-SW	Cloudy, wind gusts of 4m/s
09/11/14	8	0	1	SSE	Calm & cloudy
10/11/14	9	0	2	S	Cloudy, wind gusts Ocasional to 7m/s
11/11/14	11	5mm	3	S	Occasional showers especially Evening, wind gusts to 7m/s

3.3 Weather conditions were satisfactory for monitoring noise, and noise level measurements were not affected by wind generated noise.

3.4 Average wind speeds were less than 5 m/s generally from the south, and it was overcast with some rain showers on the Tuesday. Temperatures were above 4°C. Although there were occasional wind gusts the site was sheltered and so less affected. Also the road noise was to the north of the measurement site so the noise was being taken away, as a result this should represent a quiet time of operation.

3.5 The measurement position was approximately 27m from the kerbside of the road, 14m from Mill Cottage and 9.5m from the local shop and 3m high to measure near the height of the first floor windows.

3.6 Background noise levels were 32$L_{A90,1hr.}$ or more and ambient noise levels were 51 LAeq,1hr or more.

4 Planning context

4.1 The current Government planning policies are set out in the National Planning Policy Framework 2012 (NPPF). It sets out the Government's requirements for the planning system only to the extent that it is relevant,

proportionate and necessary to do so. It revokes amongst other documents PPG24 (Planning Policy Guidance - Planning and Noise). The document does not contain specific noise related guidelines and places the onus on Local Authorities to implement their own criteria.

The NPPF refers to noise as follows:
Section 11. Conserving and enhancing the natural environment:

109. The planning system should contribute to and enhance the natural and local environment by:.... preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability;

123. '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 upon them because of changes in nearby land uses since they were established.*

- *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'*

14. At the heart of the National Planning Policy Framework is a presumption in favour

of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking.

In March 2010 DEFRA issued a Noise Policy Statement for England 2010 (NPSfE). The stated aim of this document is to:
'provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion'. And that it: '*should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise. The NPSE does not apply to noise in the workplace (occupational noise).*

1.6 This Noise Policy Statement for England (NPSE) sets out the long term vision of Government noise policy: "Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development"

1.7 This long term vision is supported by the following aims:

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.*

To achieve these objectives the NPSE categorises noise exposure into 3 noise levels, "no observed effect level', 'significant adverse' and ' adverse". These concepts have been developed by the World Health Organisation and they follow established concepts from toxicology and apply them to noise impacts:

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.

The *NPSE expands these terms leading 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.

The NPSE goes on to state that:

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.

The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the Policy Statement 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."

No objective values are offered within the NPSE, as the document does indicate that each site should be considered on its own merits.

4.2 Local Authorities to implement their own criteria. n the absence of specific guidance for assessment of environmental noise within NPPF and NPSfE and where local authorities do not provide guidance it would seem reasonable to continue to survey such proposed developments using existing standards, including:

- WHO (1999)
  World Health Organisation - Guidelines for Community Noise.

- BS4142 (2014)
  Method for Rating and Assessing Industrial and Commercial sound.

- BS8233 (2014)
  Guidance on sound insulation and noise reduction for buildings

- ISO9613 (1996)
  Attenuation of sound during propagation outdoors

In any sustainable development noise will need to be taken into account.

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A new version of BS4142 (2014) has just been released. It will take time for it to be fully understood by the industry but introduces the concept of a variable scale of assessment for noise with certain acoustic features depending upon the character of the noise, for example tonality or impulsive noise. It also emphasises the importance of considering the context of the noise concerned. It does not state a fixed rating level

in the same way as the original standard, instead suggesting levels at which adverse impact and significant adverse impact occur.

BS4142-2014 states:

11 Assessment of the impacts
COMMENTARY ON CLAUSE11
The significance of sound of an industrial and/or commercial 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. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

*Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause**8**) from the rating level (see Clause**9**), and consider the following.*

NOTE 1 More than one assessment might be appropriate.

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.

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level Exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.

NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

3) 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:
i) façade insulation treatment;
ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
iii) acoustic screening.

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The likelihood of complaints about noise from industrial development can be assessed, where the standard is appropriate, using guidance in BS 4142. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.
At background noise levels BS4142 indicates low impact so this is the No Observed Effect Level. The Lowest Observed Adverse Effect Level (LOAEL) is where BS4142 indicates adverse impact, and at 10 dBA above background there is likely to be a significant adverse impact, which would equate to the Significant Observed Adverse Effect Level (SOAEL).

5 Noise assessment

5.1 A noise survey was conducted in accordance with BS 4142 as recommended in BS8233. The noise was monitored in 1 hourly intervals - the results are given in Appendix 2. The plans of the site are shown in Appendix 1. The proposed hours of operation are 12.00hrs – 21.00hrs. Monday to Saturday. Although the facility will not operate on Sundays the results are included to illustrate that the quieter time recorded on the Saturday is typical of the levels at a weekend.

Table illustrating background noise levels from Appendix 2:

Date	Typical LA90,1hr.	Lowest LA90,1hr.
Saturday 8th Nov. 2014	39	33
Sunday 9th Nov. 2014	38	32
Monday 10th Nov. 2014	41	40
Tuesday 11th Nov. 2014	43	39

5.2 Within the commentary above BS4142-2014 Note 2 is applicable in this case as levels of residual noise from the road are high (>50dB A, 1hr.) and so consideration of the absolute levels is relevant. It additionally introduces the concept of considering typical background levels rather than lowest levels.

5.3 The manufacturer of the extract system has to be finalised and therefore the information below is designed to ensure that the system is specified to ensure the local authority requirement of below background noise level at the nearest residential window is complied with.

5.4 The extract system will be approximately 4m from the nearest dwelling window. These are flats in the same block, therefore in order to ensure noise levels at the window are below background (using BS4142-1997), noise from the extract system should be no more than 44dBA at 1m from

the system (sound power level at the exit = 55dBA). There is no allowance made for the attenuation due to an open window (around -10dBA) or for directivity (-5 - -10dBA) as the above distance calculation is based upon a point source (12dBA due to distance attenuation) and the ductwork may act more like a line source (-6dBA).

5.5 It would be prudent to angle the exit of the extract system away from the residential windows, for example, angled to exit across the roof which would further attenuate the sound.

5.6 Vibration isolation.

5.6.1 As the system will be installed within the same building as the dwellings, it is important that the system is professionally installed to provide vibration isolation and to prevent vibration transmission through the building. This is normally achieved by fitting suitable vibration isolation mounts to the motors, also to the duct system and its fixing points. The system should be installed by a competent engineer using the Chartered Institute of Building Engineers guidance (CIBSE Guide B) or its equivalent.

6 Conclusion

- The extract system for the fish and chip shop should be specified to provide a maximum sound level of 44dBA @ 1m from the extract or less to comply with the local authority requirement.
- Vibration isolation of the equipment is necessary to ensure structure borne vibration is not an issue to residents of the flats.

Appendix 1. Plans

Plan of the proposed site showing the approximate monitoring position (X).

DRG NO: MC5.B

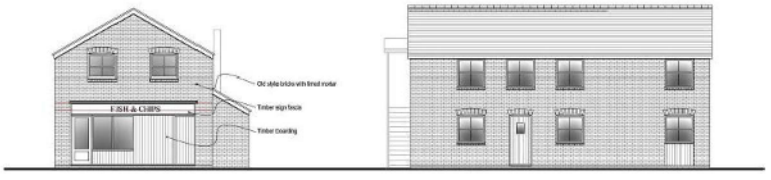
PROPOSED BLOCK PLAN

PROPOSED
DEVELOPMENT ADJACENT
TO MILL COTTAGE
BARTESTREE
HEREFORD

FOR MR R WHITTALL

D A FORREST
ARCHITECTURAL SERVICES
Court Cottage, Bartestree, Hereford, HR1 4DA
01432 851543

Scale 1:200 @ a3 | Date November 2013



FRONT ELEVATION

SIDE ELEVATION

REAR ELEVATION

SIDE ELEVATION

DRG NO: MC3.B

PROPOSED ELEVATIONS

PROPOSED
DEVELOPMENT ADJACENT
TO MILL COTTAGE
BARTESTREE
HEREFORD

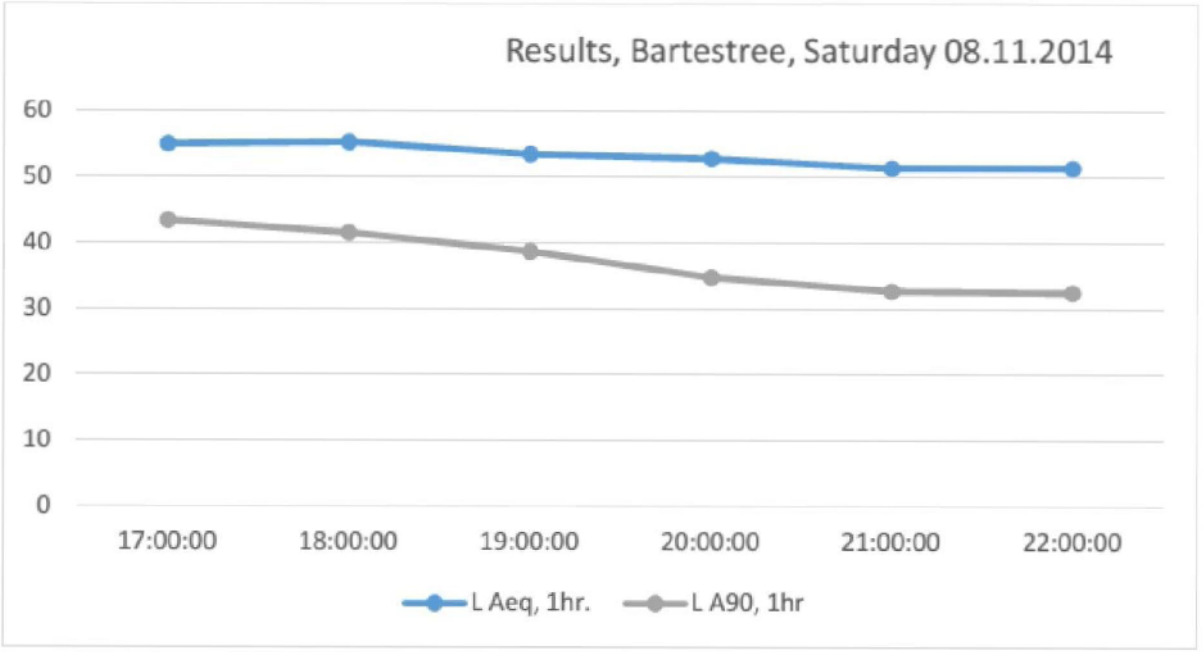
FOR MR R WHITTALL

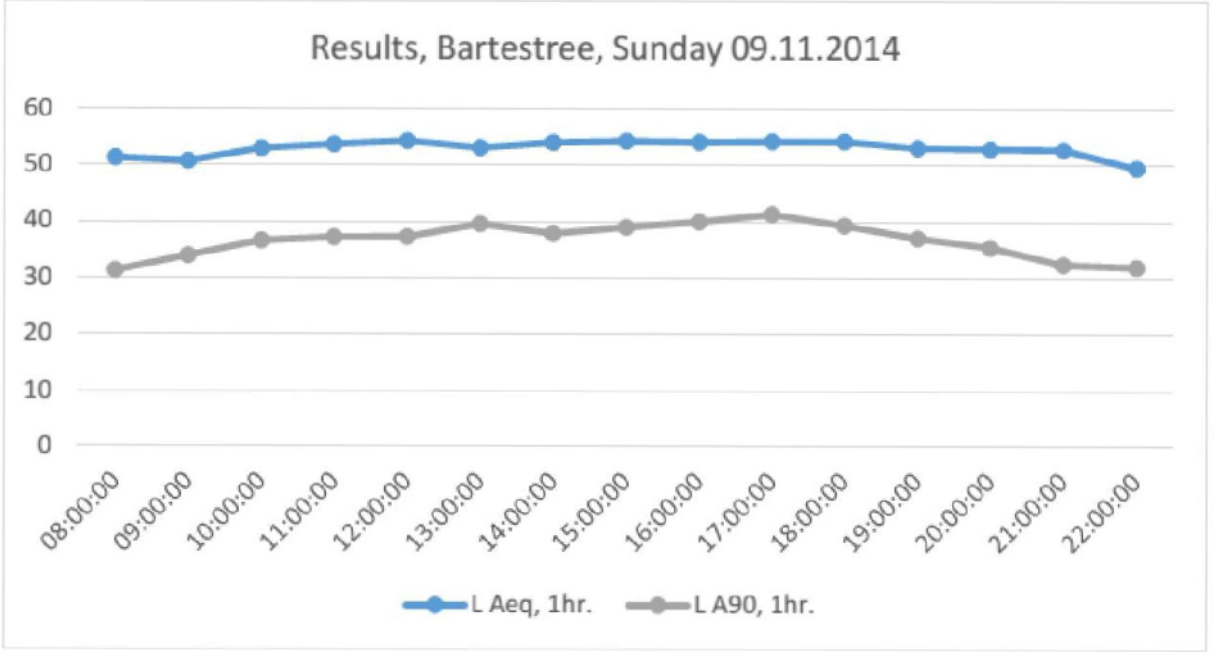
D A FORREST
ARCHITECTURAL SERVICES
Court Cottage, Bartestree, Hereford, HR1 4DA
01432 851543

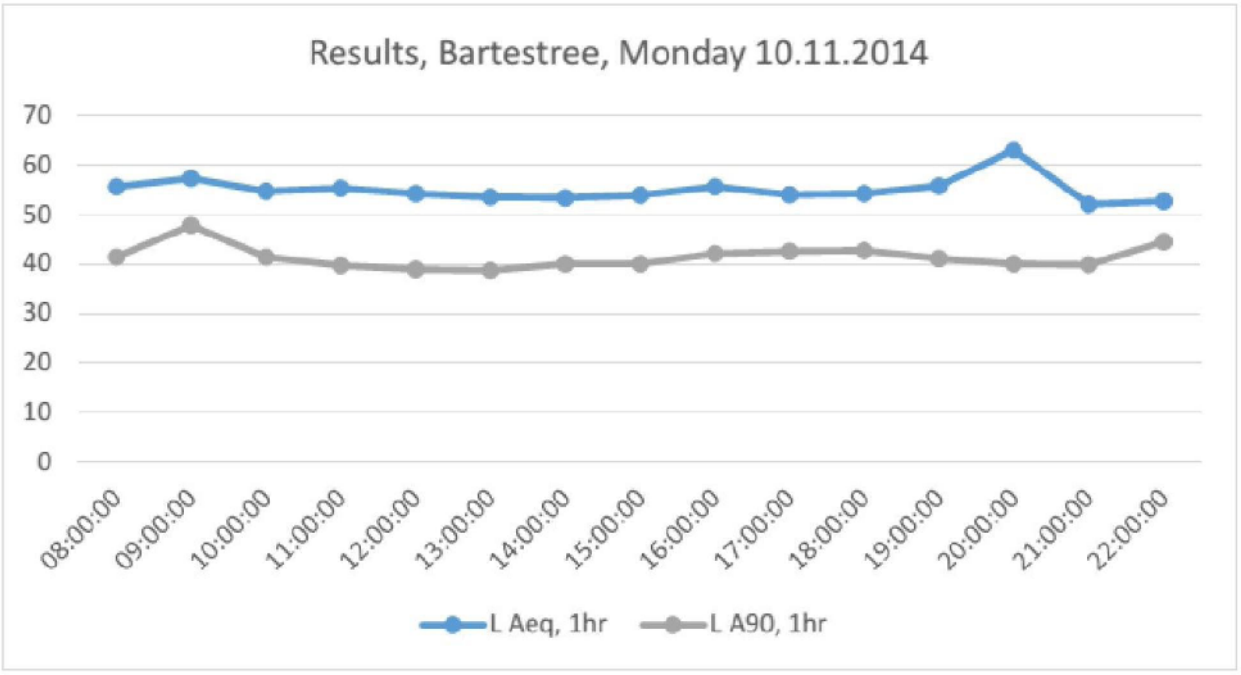
Scale 1:100 @ a3 | Date February 2014

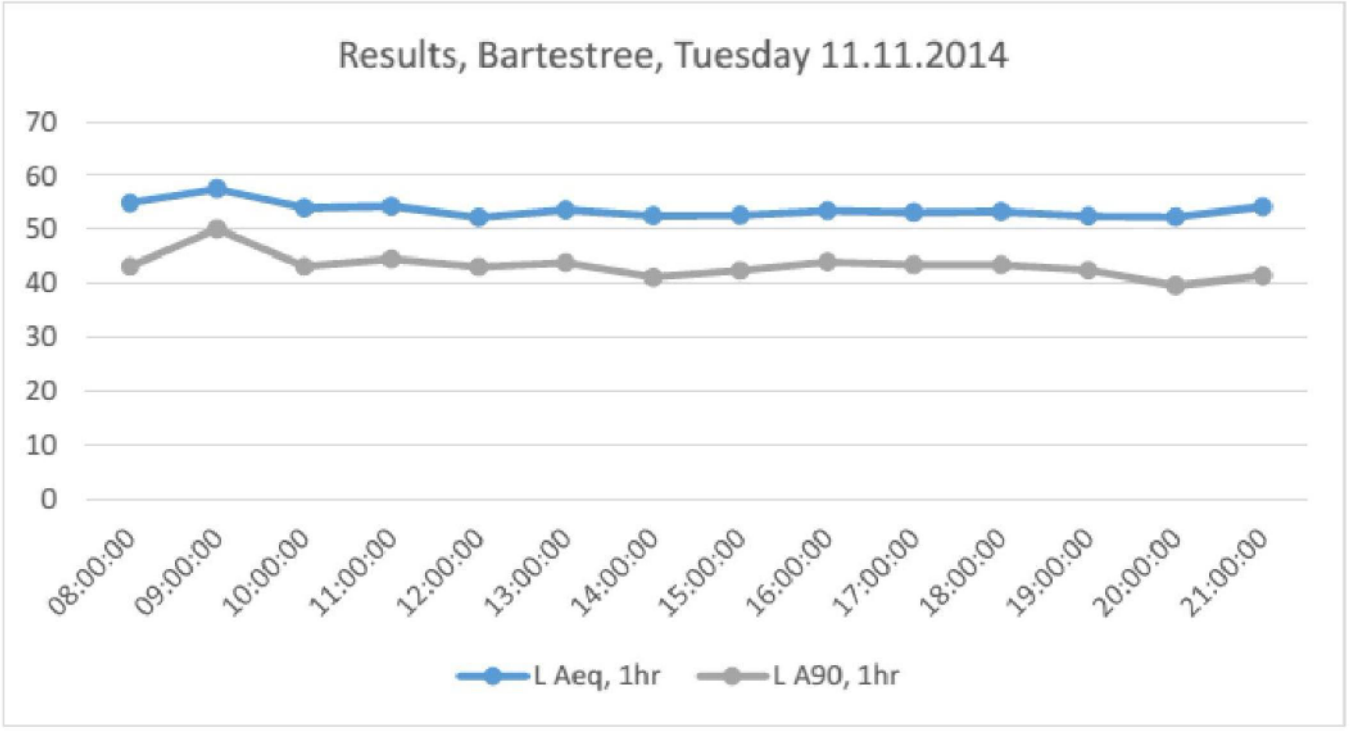
Appendix 2. Measured noise levels

Sound levels were continuously monitored from Saturday, 8th November until Tuesday, 11th November 2014, the graphs below illustrate the levels. Although it is not proposed to operate on a Sunday this monitoring period has been included to illustrate that the background noise levels used for the report represent a quieter time of operation.



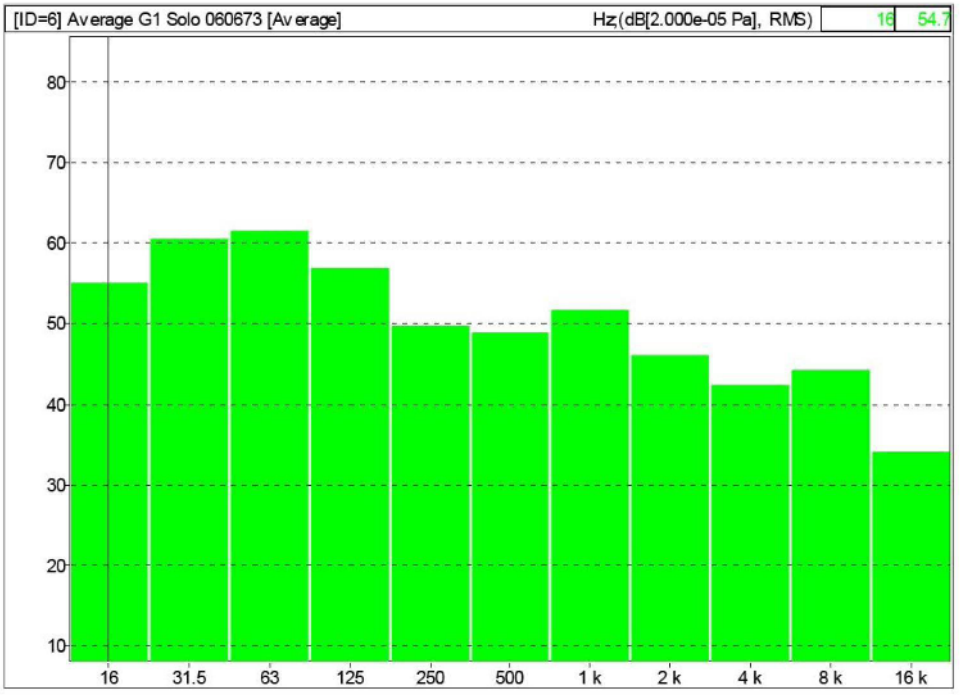



Results, Bartestree, Monday 10.11.2014
70
60
50
40
30
20
10
0
08:00:00
09:00:00
10:00:00
11:00:00
12:00:00
13:00:00
14:00:00
15:00:00
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
22:00:00
L Aeq, 1hr
L A90, 1hr

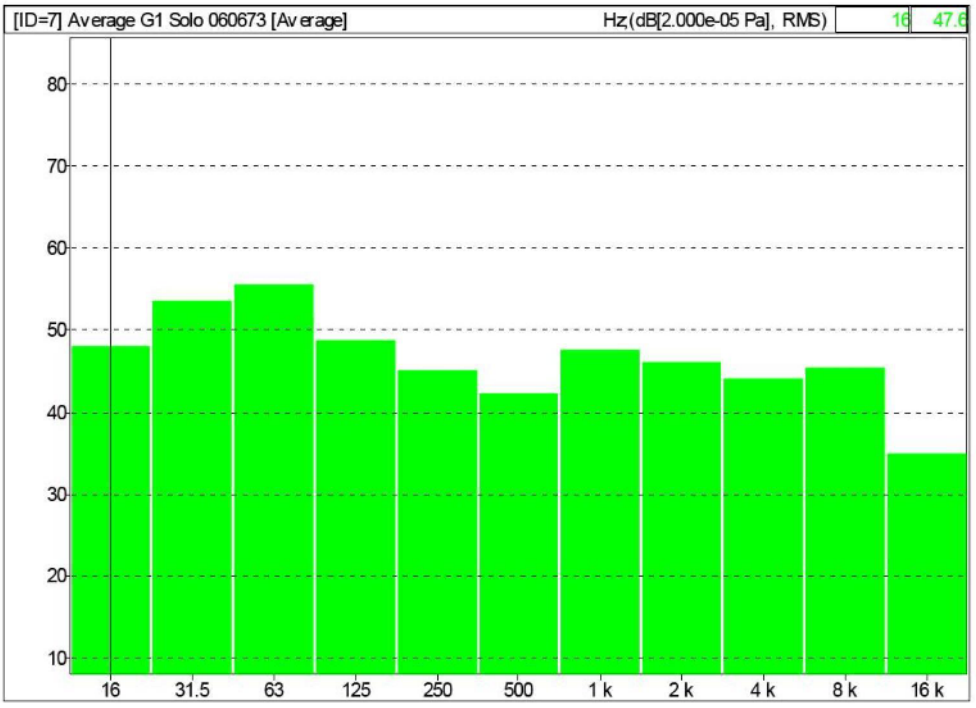

Results, Bartestree, Tuesday 11.11.2014
70
60
50
40
30
20
10
0
08:00:00
09:00:00
10:00:00
11:00:00
12:00:00
13:00:00
14:00:00
15:00:00
16:00:00
17:00:00
18:00:00
19:00:00
20:00:00
21:00:00
L Aeq, 1hr
L A90, 1hr

Plots of the average traffic noise spectrum taken at the beginning and end of the monitoring period (Sat. 8th & Tuesday evening 11th November 2014):

Saturday 8th November 2014 (for approx. 35min., start 16.50hrs.)**:**



Tuesday 11th November 2014 (for approx. 15min., start 20.53hrs.)**:**



Appendix 3. Calculations and formulae used in the report

To calculate the level at the nearest neighbours as defined in BS4142 the following formulae apply:

1) Intermittent noise calculation as BS4142:

(Where the noise is made up of individual noise contributions and is not continuous through the period).

LAeq Tr = LAeq,Tm + 10Lg To/Tr

To = Time on

Tr = Reference period (1hr for daytime, (07.00-23.00Hrs) levels)

LAeq Tr = Specific noise level.

LAeq,Tm = representative A weighted SPL while the noise is on.

2) Calculation of the attenuation due to distance:

L2 = L1 - 20lg(D2/D1) (point sources)

L2 = SPL position 2

L1 = SPL position 1

D1 & D2 are the distances from source to positions 1 & 2.

Distance attenuation for a line source is L2 = L1 - 10lg(D2/D1)

4) Addition of the various contributions (Log sum):

Total sound pressure level = L_{Σ}= 10.lg($10^{(L1/10)}$+$10^{(L2/10)}$+.....$10^{(Ln/10)}$)

Where L1, L2 etc. are the individual SPL.

Appendix 4. Calibration Certificate/s

Certificate of Calibration

Issued by University of Salford (Acoustics Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

Page 1 of 2

APPROVED SIGNATORIES
Claire Lomax [✓] Andy Moorhouse [ ]
Gary Phillips [ ] Danny McCaul [ ]

[redacted]

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UKAS CALIBRATION
0801

University of Salford MANCHESTER

Certificate Number: 01225/5 Date of Issue: 21 March 2013

VERIFICATION OF A TYPE 1 SOUND LEVEL METER to BS7580 Part 1

FOR:	Sefton Metropolitan Borough Council Environmental Protection Department Magdalen House 30 Trinity Road Bootle Merseyside L20 3NJ
FOR THE ATTENTION OF:	Jodie Richardson
CALIBRATION DATE:	21/03/2013
TEST PROCEDURE:	CTP08 (Laboratory Manual)

Sound Level Meter						
Manu:	01dB	Model:	SIP95	Serial No:	10510	
Microphone						
Manu:	Microtech Gefell	Model:	MK250	Serial No:	3449	
Preamp						
Manu:	01dB	Model:	PRE 12 N	Serial No:	002339	
Associated Calibrator						
Manu:	01 dB	Model:	CAL 01	Serial No:	11087	Adaptor: BAC012

Test Engineer (initial): [redacted] Name: Gary Phillips

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to the units of measurement realised at 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.

References

- National Planning Policy Framework
  Issued by Department for Communities and Local Government.
  Published March 2012 ISBN: 978-1-4098-3413-7
- Noise Policy Statement for England (NPSE)
  Issued by Department for Communities and Local Government.
  Published March 2010 by The Department for Environment, Food & Rural Affairs (DEFRA)
- World Health Organisation (WHO) – Guidelines for Community Noise.
  Published March 2000.
- British Standard BS 4142: 1997
  Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Sites. ISBN 0 580 28300 3
- British Standard BS 4142: 2014
  Method for Rating and Assessing Industrial and Commercial sound.
  ISBN 978 0 580 80051 1.
- CRTN – Calculation of Road Traffic Noise.
  Department of Transport Welsh Office. HMSO Publication
  ISBN 0-11-550847-3
- CRN - Calculation of Railway Noise 1995
  HMSO Publication ISBN 0-11-551754-5
- ISO 9613 – 2:
  Acoustics – Attenuation of sound during propagation outdoors.
- British Standard BS8233: 2014,
  Guidance on Sound Insulation and Noise Reduction of Buildings.

Glossary

Ambient noise	The whole noise climate that exists at present, excluding the Specific Noise (the noise under consideration). The all pervasive noise associated with a given environment. It would normally be measured as an LAeq.
A-weighting	The human ear responds to sound in a frequency dependent manner. Low

	frequencies (bass tones) and very high frequencies (e.g. a dog whistle) are not heard as well as intermediate frequencies. The sound level is A-weighted (electronically) to get the sound level meter to respond in a similar way as a human ear.
Background	The "typical lowest" noise level when the specific noise being considered is not contributing to the noise. It is measured in terms of the LA90.
Barrier	A wall or fence which blocks the path of noise. For it to be effective it must be air tight and of sufficient mass, and must be sufficiently wide and tall.
Competent person	A person with sufficient experience and qualification to assess noise, for example a Member of the Institute of Acoustics (an MIOA or FIOA) or someone with a degree in acoustics.
dB	The decibel, the unit of measurement of sound pressure level. It is a logarithmic scale so doubling it's value does NOT mean twice as much sound. It is calculated from the reference level, p0, = 2 x 10-5N/m2, so that 0dB is the threshold of hearing. A 3dB increase indicates a doubling of the energy of the sound. A 10 dB increase in noise level will produce a perception of about a doubling of the **loudness**. Note that it is a ratio and so both sound pressure and sound power are measured in dB, although they are not the same physical quantity.
dB(A)	The sound pressure level after it has been A-weighted.
Free field	An environment where there are no reflective surfaces other than the ground or floor, in the middle of a field for instance. Noise decays at 6 dB per doubling of distance.
Façade noise level	Noise level 1 m in front of a reflective surface (usually a building). It is usually about 3 dB higher than the equivalent free field noise level.
Intermittent	An intermittent noise is one that because of its nature fluctuates in noise level (not one that is switched on and off), for example a dust filter with a self

	cleaning pneumatic mechanism (with a periodic blow back.)
LAeq	Equivalent continuous A-weighted sound pressure level. It indicates the average noise level over the measurement period.
LA N, LA90	N is an integer. The noise level that is exceeded for N% of the time, e.g. LA90 (the background) is the noise level that is exceeded for 90% of the time.
La	Machine declared Noise Level at the operators ear
Noise level	The same as sound pressure level.
Noise sensitive location	Any location where there may be people (animals may also be included in some circumstances) who could be adversely affected by noise, such as dwellings, schools, hospitals, auditoria, law courts and chambers, laboratories, libraries, museums, art galleries, inhabited buildings, open areas used by the public or recreational areas. Usually factories and industrial sites would not be noise sensitive.
Octave bands	Specific frequency ranges (each octave is adjacent to, but does not overlap, its neighbouring bands). The nominal centre frequencies have been internationally agreed and increase by a factor of 2. They include 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1kHz, 2kHz, 4kHz etc.
Representative	A property considered to be an example of the surrounding properties. For property each group it should be the property of the group exposed to the most noise from the site.
Rw	Weighted sound reduction index defined in ISO 140-3:1995. it is the noise reduction provided by a building element.
Sound power	see SWL

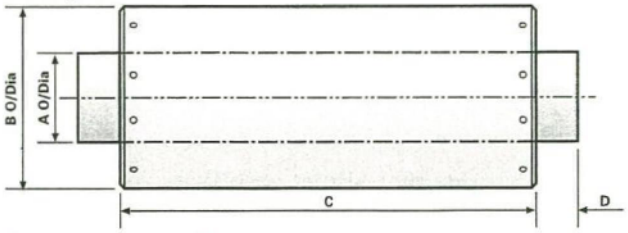
Sound pressure	see SPL
Specific Noise	The noise under consideration, such as from a factory or new development.
SEL	Single event level, the noise level over a one second period that has the same energy as the noise event (usually lasting much longer than 1 second) being measured.
SPL	Sound Pressure Level, not to be confused with sound power level. The noise level indicated by a sound level meter in dB. It will vary from place to place (cf the temperature produced by an electric heater).
SWL	Sound Power Level, should not be confused with sound pressure level although both are measured in dB. Also called the noise level. The sound emission from a machine (cf the power rating of an electric fire). It is not dependent on the measurement position.
Statutory nuisance	A noise which is considered in law to amount to a nuisance, it depends upon the interpretation of a judge. There is no defined noise level at which this occurs, but British Standards (e.g. BS 4142 or BS 5228) and governmental advice (e.g. Noise Insulation Regs, PPG 24) would probably be quoted to indicate whether a nuisance had been caused.
Tonal	Noise which is predominantly at one (or a few) particular frequencies, noise that has a noticeable pitch. For instance it may be described as a hum, whistle, high (or low) pitched noise. Examples of tonal noise would be noise from some fans or reversing alarms.
Working pattern	How a job is performed, for how long each machine operates in a given time period, and where on the site the job is done (or the path taken by mobile plant).

Tecsound Circular Attenuators

Description

The Tecsound range of circular spigoted attenuators offer excellent sound absorbing properties and are available in 10 diameters and four lengths as standard with popular models available on an ex stock basis throughout the U.K.

Tecsound attenuators are suitable for temperatures up to 200°C & a maximum pressure of 1500 pascals. They are supplied, as standard in individual cartons for ease of transport and storage.



Construction

Casing:
Galvanised mild steel (BS2989) with flow formed one piece, zintec spun end fittings.

Inner Lining:
Perforated galvanised mild steel (BS2989).

Sound Absorbing Material:
Mineral fibre slabs faced with glass tissue.

Options

Where moist or greasy ambient conditions exist e.g. kitchen systems or in critically clean applications, silencers maybe specified complete with a melinex interliner to prevent any fibre migration. However please note that this option affects the acoustic performance of the silencer.

Dimensional Data

	DIMENSIONS				
MODEL CODE	A	B	C	D	WT (Kg)
BDER-30-010-030	100	200	300	40	2.4
BDER-30-010-060	100	200	600	40	4.1
BDER-30-010-090	100	200	900	40	6.6
BDER-30-010-120	100	200	1200	40	9.5
BDER-30-012-030	125	225	300	40	2.6
BDER-30-012-060	125	225	600	40	4.5
BDER-30-012-090	125	225	900	40	7.6
BDER-30-012-120	125	225	1200	40	11
BDER-30-015-030	150	260	300	40	2.9
BDER-30-015-060	150	260	600	40	5.8
BDER-30-015-090	150	260	900	40	9
BDER-30-015-120	150	260	1200	40	13
BDER-30-016-030	160	260	300	40	2.9
BDER-30-016-060	160	260	600	40	5.8
BDER-30-016-090	160	260	900	40	9
BDER-30-016-120	160	260	1200	40	13
BDER-30-020-030	200	300	300	40	3.9
BDER-30-020-060	200	300	600	40	7
BDER-30-020-090	200	300	900	40	10
BDER-30-020-120	200	300	1200	40	14
BDER-30-025-030	250	355	300	40	4.7
BDER-30-025-060	250	355	600	40	8.6
BDER-30-025-090	250	355	900	40	12.2
BDER-30-025-120	250	355	1200	40	16
BDER-30-030-030	300	400	300	40	5.4
BDER-30-030-060	300	400	600	40	9.2
BDER-30-030-090	300	400	900	40	13
BDER-30-030-120	300	400	1200	40	17
BDER-30-031-030	315	415	300	40	5.6
BDER-30-031-060	315	415	600	40	9.8
BDER-30-031-090	315	415	900	40	14
BDER-30-031-120	315	415	1200	40	18
XDER-30-035-030	355	450	300	65	6.2
XDER-30-035-060	355	450	600	65	11
XDER-30-035-090	355	450	900	65	15
XDER-30-035-120	355	450	1200	65	20
XDER-30-040-030	400	500	300	65	7
XDER-30-040-060	400	500	600	65	12
XDER-30-040-090	400	500	900	65	17
XDER-30-040-120	400	500	1200	65	22

Acoustic Performance

(Standard Attenuators)

Typical noise reduction (dB)

	CENTRE BAND FREQUENCY (Hz)							
MODEL CODE	63	125	250	500	1000	2000	4000	8000
BDER-30-010-030	2	6	9	14	18	24	30	19
BDER-30-010-060	4	8	14	26	34	41	45	25
BDER-30-010-090	8	11	21	33	48	50	50	28
BDER-30-010-120	13	14	29	39	50	50	50	31
BDER-30-012-030	1	5	7	11	14	21	25	16
BDER-30-012-060	3	6	12	22	28	37	38	22
BDER-30-012-090	5	9	18	30	40	48	43	24
BDER-30-012-120	8	12	24	39	50	50	49	28
BDER-30-015-030	0	4	6	9	11	18	18	13
BDER-30-015-060	2	5	10	18	23	33	30	19
BDER-30-015-090	3	8	16	27	36	47	37	21
BDER-30-015-120	4	12	24	36	45	50	45	24
BDER-30-016-030	0	4	6	9	11	18	18	13
BDER-30-016-060	2	5	10	18	23	33	30	19
BDER-30-016-090	3	8	16	27	36	47	37	21
BDER-30-016-120	4	12	24	36	45	50	45	24
BDER-30-020-030	0	2	5	10	14	17	18	14
BDER-30-020-060	1	4	9	17	22	29	25	18
BDER-30-020-090	2	7	13	24	31	44	31	20
BDER-30-020-120	3	7	14	30	37	46	31	21
BDER-30-025-030	0	2	5	11	16	18	16	14
BDER-30-025-060	0	4	8	15	21	24	20	17
BDER-30-025-090	1	6	11	21	27	39	25	19
BDER-30-025-120	2	6	12	27	32	40	26	20
BDER-30-030-030	0	1	4	11	18	18	14	13
BDER-30-030-060	0	3	7	14	20	20	17	16
BDER-30-030-090	0	5	9	18	23	32	20	18
BDER-30-030-120	1	5	10	24	28	34	20	19
BDER-30-031-030	0	1	4	11	18	18	14	13
BDER-30-031-060	0	3	7	14	20	20	17	16
BDER-30-031-090	0	5	9	18	23	32	20	18
BDER-30-031-120	1	5	10	24	28	34	20	19
XDER-30-035-030	0	0	2	11	14	16	15	8
XDER-30-035-060	0	2	5	12	18	17	15	14
XDER-30-035-090	0	4	9	17	22	30	18	17
XDER-30-035-120	1	4	9	22	26	31	18	18
XDER-30-040-030	0	0	1	10	13	14	12	7
XDER-30-040-060	0	1	3	10	17	15	13	12
XDER-30-040-090	0	4	8	16	20	28	17	17
XDER-30-040-120	1	4	8	21	25	29	17	17

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