

Acoustic Assessment at



Court Lodge Farm

Hook Green Road, Southfleet

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Executive Summary

Ned Johnson Acoustic Consultants Limited has been appointed to undertake an acoustic assessment of the proposed change of use at Court Lodge Farm, Hook Green Road, Southfleet.

The assessment takes account of the existing noise environment, which has been quantified using direct measurement to allow comparison of any sound emissions from the proposed change of use at the boundary of the nearest residential property.

No noise control works are required as the operation is predicted to have a low impact using the BS4142 rating system.



Contents

Executive Summary	2
1. Introduction	4
2. Site Description	5
3. Planning Reference Documents	8
4. Methodology	14
5. Noise Survey Results	15
6. Discussion	18
Appendix 1: Glossary	20
Appendix 2: Calibration Certificates	22
Appendix 3: Uncertainty	25
Appendix 4: Data	28



1. Introduction

- 1.1 Ned Johnson Acoustic Consultants Limited has been appointed to undertake an acoustic assessment of the proposed change of use from agricultural to a commercial/industrial enterprise at Court Lodge Farm.
- 1.2 The proposal for the site is to use the existing buildings on the site for the importation, packing, cold-storage, packing and dispatch of produce.
- 1.3 The site has previously been used for the 12 years as processing, packing, storage and distribution facility for agricultural produce such as strawberries and raspberries. The use by former occupant, Prep World, was more intense than the current proposed use and operated 24-hours per day with a higher level of staff, fork-lift trucks and heavy goods vehicles. The current proposed use will involve less staff and vehicles and operate over a shorter period of time. The current buildings also have various banks of condenser and chiller units. These condenser and chiller units have continued to be in use following the departure of Prep World.
- 1.4 The noise levels from the system at the nearest noise-affected property has been predicted and compared to the likely requirements of Dartford Borough Council using the methodology set-out in BS4142:2014+A1 2019. The likely requirement is that noise from the external equipment shall be at least 5dB below the background noise level at the nearest or most noise affected residential window.



2. Site Description

- 2.1 The site is located on Court Lodge Farm, Hook Green Road, Southfleet. The site currently buildings which are used for commercial operations, most recently they were occupied by Prep World, which packed, stored and distributed agricultural products, such as strawberries and raspberries. The operation was 24-hours per day.
- 2.2 The site had a regular movement of HGVs for deliveries and distribution to the buildings on site, up to 60 per day, as well as 40 light vans undertaking deliveries. There were 8 forklift trucks which all worked externally at the site. The previous occupant also had 450 members of staff which led to up to 240 cars per day arriving/leaving the site.
- 2.3 Figure 1 below shows the location of the units and their proximity nearest residential property. MP1 refers to the measurement point for background noise which was located in the garden of the nearest residential property to the site. The sound level meter was placed adjacent to the façade of the property nearest to the site.

Figure 1



- 2.4 The new occupant of the site, Prep Kitchen, will have 80 members of staff and it is predicted there will 40-80 cars per day as opposed to 120-240 under the previous tenant. There will be up to 10 HGVs per day and approximately 5 small deliveries as opposed to the previous 40. The operating hours of the site are proposed to be 6am – 6pm.
- 2.5 In addition to the reduced HGV movements and staff there will be one forklift truck as opposed to the eight previously in use.
- 2.6 The activities themselves all take place within the existing buildings, with all vehicles entering the site via the gated entrance, the buildings screen the nearest noise sensitive receptor from all activities.



- 2.7 The receptor also has a 3-metre high close-boarded heavy wooden fence along the boundary with the farm complex. This screens the receptor from the nearest mechanical plant.
- 2.8 During the site visits the mechanical plant at Court Lodge Farm was all in operation. In the garden of the receptor there was a very faint hum of the nearest condenser units at Court Lodge Farm, nothing else was audible.



3. Reference Documents

National Planning Policy Framework

3.1 The Department of Housing, Communities and Local Government published the National Planning Policy Framework (NPPF) in July 2021.

3.2 Paragraphs 174 (e) 185(a), (b) and 187 refer to noise in terms of policy approach:

174. 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 or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

185. 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

187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

Noise Policy Statement for England

3.3 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.”

3.4 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.”

3.5 There is no local or national guidance on how the three terms should be defined numerically.

3.6 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):

3.7 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.

3.8 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.

- 3.9 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 4142:2014+A1 2019

- 3.10 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.
- 3.11 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’).

- 3.12 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.

- 3.13 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.”

- 3.14 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.'

- 3.15 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.



4. Survey Methodology

- 4.1 The survey was conducted over a 24-hour period on October 24th – October 25th 2023. This period was used to ensure a whole operating day would be covered. The measurement point is shown in Figure 1.
- 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 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 The measurements at MP1 were taken with the microphone on a tripod with no reflecting surfaces, other than the ground, within 3.5 metres. The measurement point was representative of the façade of the receptor.
- 4.5 During the background survey the temperature was 10°C – 16°C with a wind speed of 0.3 metres per second. Cloud cover was a maximum of 60%. There was a small amount of precipitation during the early morning of October 25th.



5. Noise Survey Results

- 5.1 The results of the survey show that the typical measured background for the measurement period was 39dB L_{A90} , the typical ambient sound pressure level was 48dB L_{Aeq} . The measurement data can be found in Appendix 4.
- 5.2 Although the operations at the site will be intermittent this will not be readily distinctive against the residual acoustic environment and no penalty has been added, as per paragraph 9.2 of BS4142:2014+A1 2019. No penalty has been added for other acoustic features, such as bangs and clangs, as this will not be audible against the residual acoustic environment at the nearest residential receptor.
- 5.3 The loading of goods in the area outside the units has been calculated. The single exposure level (SEL) measurement has been used and then converted to compare to daily noise levels.



Table 1. External site activities

Event	Duration	Sound Pressure Levels	Distance to Receptor	Distance Correction	Correction to 12-Hours	Screening	L _{Aeq}
10 HGVs arriving/departing at 1m	10 minutes	73dB _A	80m	-38	-19	-18	0
10 HGVs loading/unloading at 2m	200 minutes	70dB _A	80m	-32	-6	-18	14
Arrival/departure 80 cars at 1m (all arriving and leaving together)	80 minutes	77dB _A	80m	-38	-10	-18	10
Forklift truck at 1m	200 minutes	70dB _A	80m	-38	-6	-18	8
Total							16

5.4 The following table represents the predicted outbreak from the farm units, this is based on warehouse noise, measured at a different site.

Table 2. Farm unit breakout impact

Procedure	Overall dB _A
1. Sound pressure inside the nearest unit	70
2. Attenuation due to building fabric	-25
3. Attenuation due to sound outbreak (loss of reverberant sound)	-6
4. Attenuation to nearest residential property (25m)	-28
5. Overall sound pressure level at nearest window	11



5.5 The following table presents the BS4142 assessment for the noise from the operation at the nearest noise sensitive façade at Receptor 1.

Table 3. BS4142 assessment for the impact of the noise from the combined activity at the nearest residential property

Results	Measurement	Clause	Commentary
Typical ambient sound level	$L_{Aeq} = 48\text{dB}$	7.3.1	
Typical background sound level	$L_{A90} = 39\text{dB}$	8.3	
Specific sound level of the warehouse activities at Orchard House	17dB _A		
Acoustic feature	0dB	9.2	Loading/unloading will not be audible against the residual acoustic environment
Rating level	17dB _A	11	Sound source
Typical background sound level	$L_{A90} = 39\text{dB}$	8.3	
Rating level at receptor point	-22dB	11	
The assessment shows that there is likely to be no adverse impact at receptor point			
Uncertainty of the assessment			The rating level is -22dB and in this instance the uncertainty of the measurement does not have any significance to the outcome of the assessment.



6 Discussion

- 6.1 The suitability of the site 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 site at the receptor during daytime operational hours is -22dB. This result shows that the operational noise will comply with the likely requirements of Dartford Borough Council.
- 6.3 No penalties have been added to the rating for intermittency as the intermittent operation will not be audible at the nearest residential property as it will be 31dB lower than the ambient sound pressure level. BS4142:2014+A1 2019 states that a penalty for intermittency can be added if it is readily distinct against the residual acoustic environment. In this case the intermittent action will not be distinctive against the residual acoustic environment.
- 6.4 No penalty for any other acoustic features has been added as none of the activities on site would be audible against the residual acoustic environment.
- 6.5 In terms of rating for BS4142 the results show that there will be a low impact and no noise control system is required to protect the nearest receptor.
- 6.6 The nearest receptor is at least 80 metres from the external activities and is screened from all of them by the existing commercial units at the site. The combination of distance and screening ensures that the nearest receptor is unaffected by any vehicle movements or activities. While at the receptor during the survey there were some HGV movements, which were inaudible while in the garden.



- 6.7 The fabric of the units themselves also provide a reasonable level of sound attenuation to prevent internal activities impacting upon the receptor. The assumption made is that the sound generated inside the units by Prep Kitchen will be similar to that of a fruit and vegetable warehouse. The calculations at the Receptor due to the sound breakout from the commercial unit have not taken into account the metre high solid boarded fence that screens the house from Court Lodge Farm. If this were to be taken into account the impact would be even lower at the receptor.
- 6.8 As mentioned earlier in the report the site has been used more intensively for the last 12 years. The current proposed use amounts to a reduction in noise compared to the previous 12 years and the application represents a betterment in terms of noise impacts.
- 6.9 As can be seen from Section 5, the assessment is based upon the measured background and ambient sound pressure levels in the absence of site activity and is therefore a conservative approach.



Appendix 1: Glossary of Terms

Daytime Defined in BS8233 and BS4142 as the period 07:00-23:00 hours.

Night-time Defined in BS8233 and BS4142 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 : 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 is the minimum perceptible under normal conditions, and a change of 10 dB 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 .

$L_{A10,T}$: 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.

$L_{A90,T}$: The A weighted noise level exceeded for 90% of the measurement period, T. This is defined in BS 4142 as the background noise level.

L_{AE} : 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.



$L_{Aeq,T}$: 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).

$L_{A Max}$: The highest A weighted noise level recorded during a noise event. The time weighting (slow or fast) should be stated.



Appendix 2: Calibration Certificates

Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030



Certificate of Calibration

Certificate number: 41049

Test Object: Sound Level Meter, BS EN 60651 and or BS EN 60804 Class 1

Producer: Brüel & Kjær
Type: 2260
Serial number: 2034414
Customer: Ned Johnson Acoustic Consultants Ltd
Address: 378 Church Street,
London. N9 9HS.
Contact Person: Ned Johnson
Order No:

Introduction:

Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	Producer	Type	Serial No	Certificate No
Microphone	Brüel & Kjær	4189	2169417	41048
Calibrator*	Brüel and Kjær	4231	2039392	41047
Preamplifier	Brüel & Kjær	ZC0026	NoCode	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	Brüel & Kjær	UA0237 (Large round)
Attenuator	N/A	
Extension cable	N/A	

These items have been taken into account wherever appropriate.

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	101.07 ±0.03	22.35 ±0.15	42.43 ±1

Calibration Dates:

Received date:	06/05/2022	Reviewed date:	17/05/2022
Calibration date:	17/05/2022	Issued date:	17/05/2022

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Darren Batten*

This certificate is issued in accordance with the CA Quality Management system. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



Laboratory Location

Campbell Associates Ltd
 5b Chelmsford Road Industrial Estate
 GREAT DUNMOW, Essex, GB-CM6 1HD
 Phone 01371 871030



Certificate of Calibration

Certificate number: 41048

Test Object: Measurement Microphone

Producer: Brüel & Kjær
Type: 4189
Serial number: 2169417
Customer: Ned Johnson Acoustic Consultants Ltd
Address: 378 Church Street, London. N9 9HS.
Contact Person: Ned Johnson
Order No:

Measurement Results	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)	Capacitance (pF)
Measurement 1	-24.87	57.07	14.09
Measurement 2	-24.87	57.10	14.09
Measurement 3	-24.86	57.14	14.10
Result (Average):	-24.87	57.11	14.09
Expanded Uncertainty:	0.10		1.00
Degree of Freedom:	>100		>100
Coverage Factor:	2		2

The stated sensitivity is the pressure sensitivity at 250Hz, S₂₅₀, and is valid at reference conditions. The following correction factors have been applied during the measurement:

Pressure:-0.01 dB/kPa Temperature:-0.006 dB/°C Humidity:0 dB/%RH

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	101.108 ± 0.043	22.4 ± 0.1	41.9 ± 0.9

The calibration test report shown on the next page gives details of the response at other frequencies relative to this 250 Hz reference sensitivity. Results ≥100 Hz are obtained using an electrostatic actuator as described in BS EN 61094-6 and those below 100 Hz are obtained in a reference pressure chamber. Detailed results are available from the calibration laboratory upon request.

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a coverage probability 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.

Calibration Dates:

Received date: 06/05/2022 Reviewed date: 17/05/2022
 Calibration date: 17/05/2022 Issued date: 17/05/2022

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan BEng(Hons), MSc*
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Doc ref: Mic-Cert-Master-V3-03



Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030



Certificate of Calibration

Certificate number: 41047

Test Object: Sound Calibrator

Producer: Brüel & Kjær
Type: 4231
Serial number: 2039392
Customer: Ned Johnson Acoustic Consultants Ltd
Address: 378 Church Street, London. N9 9HS.
Contact Person: Ned Johnson
Order No:

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	94.05	0.02	999.86	0.46
Measurement 2	94.05	0.02	999.86	0.45
Measurement 3	94.05	0.02	999.86	0.46
Result (Average):	94.05	0.02	999.86	0.46
Expanded Uncertainty:	0.1	0.02	1	0.25
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

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:0.0008 dB/kPa Temperature:0.0015 dB/°C Humidity:0.001 dB/%RH Load volume: 0.0003

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	101.107 ±0.043	22.3 ±0.1	41.6 ±0.8

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=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.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\2022\BNK4231_2039392_M1.nmf

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date: 06/05/2022 Reviewed date: 17/05/2022
Calibration date: 17/05/2022 Issued date: 17/05/2022

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng(Hons), M.Sc*
Reviewed by: *Darren Batten*

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Appendix 3: Uncertainty

The measurement method used was to measure the existing background noise levels. 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 new commercial use is not currently taking place.

The complexity and level of variability of the residual acoustic environment

In relation to the existing ambient noise level the noise over each 15-minute period varied very little.

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+A1 2019 and was representative of the noise sources in the area. The results were reproducible.

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

The sources of sound are all screened from the receptor. The receptor has a 3-metre-high heavy boarded fence along his boundary and the existing buildings screen all external activity at the site from the receptor. The distance from the receptor to external activities is a minimum of 80 metres and from the façade of the commercial buildings the separation is a minimum of 25 metres.

The number of measurements taken

24-hours of data was collected in 15-minute periods providing a data set which is representative of the quietest conditions during operational hours. Overall there is a 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.



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

During the survey the wind conditions were suitable as they did not exceed 5m/s at any time; there was also no precipitation and temperature was 10°C – 16°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 instruments used are class 1 sound level meters and calibrators and have all been calibrated to a traceable standard at a UKAS accredited laboratory in the last 24 months. Uncertainty due to instrumentation is low.

Appendix 4: Data

Table 4.

Start Time	L _{Aeq}	L _{A90}
13:24:19	50.59	43.16
13:30:00	44.2	41.61
13:45:00	46.64	41.98
14:00:00	43.43	39.83
14:15:00	44.64	41.29
14:30:00	42.06	39.55
14:45:00	41.83	38.84
15:00:00	48.5	39.28
15:15:00	41.67	39.89
15:30:00	41.49	39.54
15:45:00	67.79	39.79
16:00:00	41.17	39.26
16:15:00	43.04	38.48
16:30:00	43.97	38.55
16:45:00	42.38	37.90
17:00:00	45.44	37.59
17:15:00	49.15	38.61
17:30:00	42.7	40.23
17:45:00	45.03	38.83
06:00:00	45.19	44.04
06:15:00	45.71	44.11
06:30:00	46.56	44.49
06:45:00	46.97	45.25
07:00:00	48.46	45.60
07:15:00	48.74	44.93
07:30:00	51.34	47.62
07:45:00	50.69	47.52
08:00:00	49.81	46.21
08:15:00	49.82	47.88
08:30:00	48.53	47.29
08:45:00	48.86	45.52
09:00:00	47.4	44.79
09:15:00	47.1	45.02
09:30:00	49.89	44.82
09:45:00	46.67	43.40
10:00:00	46.79	43.64
10:15:00	46.77	43.71



10:30:00	48.48	42.31
10:45:00	51.97	42.73
11:00:00	44.88	42.18
11:15:00	49.13	42.01
11:30:00	44.54	41.31
11:45:00	48.9	40.24
12:00:00	49.14	42.04
12:15:00	46.65	41.57
12:30:00	55.79	40.28
12:45:00	47.15	40.46
13:00:00	48.46	40.40
13:15:00	47.85	40.45
13:30:00	45.13	41.13