MILLER GOODALL
ACOUSTICS AND AIR QUALITY

NOISE ASSESSMENT

on behalf of

O'CALLAGHAN LIMITED LTD

for the site at

WOODFIELD FARM, LONGSIGHT ROAD, CLAYTON LE DALE, BLACKBURN BB2 7JA

REPORT DATE: 21ST DECEMBER 2018

REPORT NUMBER: 101659-2

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Summary

A noise assessment was undertaken to predict the potential impact of a proposed development consisting of a civil engineering site at Woodfield Farm, Longsight Road, Clayton Le Dale, Blackburn BB2 7JA. This was requested by the Local Authority to support a planning application for the development.

Measurements were made on site at a location closest to the nearest residential dwellings to the proposed site to identify the existing background sound levels. This data along with computer noise modelling of the proposed site, based on layouts, was used to predict the impact of noise from likely activities associated with the proposed development when in use.

When assessed to BS 4142: 2014 the Rating Level, including correction factors for impulsivity and intermittency, was found to be + 3 dB above the measured background level during full daytime activity at the proposed site, indicating likelihood of a low impact at the most affected noise sensitive receptor. The assessment included mitigation recommended in a previous issue of this report, in the form of a 1.8 m high acoustic barrier and 1.8 m high noise attenuation bunds.

The internal noise levels within surrounding dwellings due to the proposed development are predicted to satisfy the guidance set out in BS 8233 during both daytime and early morning periods. Noise levels in gardens are also predicted to satisfy guidance on noise levels within external amenity spaces.

In conclusion, with the implementation of the proposed mitigation measures, we are of the opinion that the development may be permitted without causing adverse loss of acoustic amenity to the surrounding dwellings during the daytime.

Record of changes

Prepared By	Gareth Willox TechIOA	Reviewed By	Jo Miller MIOA
Signed		Signed	
Date	21st December 2018	Date	21st December 2018

Version	Date	Change	Initials
1	20th November 2017	Initial issue	GW
2	28th March 2018	Change of operational hour – Daytime only	GW
3	21st December 2018	Assessment updated to reflect new proposed site layout including noise mitigation measures.	RM

Contents

1 Introduction

1.1 Miller Goodall Ltd has, on behalf of O'Callaghan Limited undertaken a noise assessment in respect of a planning application for a civil engineering workshop and office new build development on land at Woodfield Farm, Longsite Road, Clayton Le Dale, Blackburn, BB2 7JA.

2 Site Description

2.1 The site is located approximately 2 km north east of Mellor Brook and approximately 5 km north of Blackburn. The proposed site location is shown in Appendix 1.

2.2 The north of the site is bounded by the A59 Longsight Road. The east and south of the site is bounded by approximately 1 km of farm land.

2.3 To the west of the site is the location of the nearest noise sensitive receptor (NSR) at approximately 50 m away.

3 Proposed Development

3.1 The proposal is to develop the land at Woodfield Farm for the erection of a civil engineering workshop and office with associated moveable plant.

3.2 Table 1 below shows the proposed plant in both the yard and the workshop on site.

Table 1: Noise monitoring equipment

Plant in Yard	Plant in Workshop
32 tonne 8 wheel tipper wagon	Compaction Plate
6 tonne 6 wheel tipper wagon	13 tonne Excavator
7.5 tonne tipper waggon	Telehandler
Telehandler	32 tonne 8 wheel tipper wagon
Excavator	Vibratory Roller

3.3 Access to the development site is from Longsight Road, A59.

3.4 We understand that hours of operation are proposed to be between 07:00 – 23:00, seven days a week. Baseline assessment will assume the roller shutter doors of the workshop are open during site operation.

3.5 Planned mitigation for the site consists of 1.8 m high acoustic fencing or 1.8 m high noise attenuation bunds around the boundary of the site (see Appendix 1 and Appendix 4).

3.6 The proposed site layout is shown in Appendix 1.

4 Policy Context

4.1 Noise Policy Statement for England

4.1.1 The Noise Policy Statement for England (NPSE[1]), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are:

> "Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
>
> - avoid significant adverse effects on health and quality of life;
> - mitigate and minimise adverse effects on health and quality of life; and
> - where possible, contribute to the improvement of health and quality of life."

4.1.2 The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and the quality of life occur.

4.1.3 The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the Statement). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case:

"…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".

4.1.4 Importantly, the NPSE goes on to state:

"This does not mean that such adverse effects cannot occur".

4.1.5 The Statement does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that:

"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available"

4.1.6 It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

[1] Noise Policy Statement for England, Defra, March 2010

4.2 National Planning Policy Framework

4.2.1 The National Planning Policy Framework (NPPF[2]) initially published in March 2012, was updated in July 2018. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise"[3].

4.2.2 The revised NPPF advises that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives). One of these is an environmental objective which is described in par. 8 (c):

"to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

4.2.3 At par. 170 we are advised that:

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

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

4.2.4 Par. 180 goes on to state:

"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.

[2] National Planning Policy Framework, Ministry of Housing, Communities and Local Government, July 2018

[3] Planning Policy Guidance 24: Planning and Noise, DCLG, September 1994

4.3 Planning Practice Guidance – Noise

4.3.1 As of March 2014, a Planning Practice Guidance[4] for noise was issued which provides additional guidance and elaboration on the NPPF. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:

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

4.3.2 In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

"…the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation".

4.3.3 Examples of these factors include:

- The source and absolute noise level of the source along with the time of day that it occurs;
- Where the noise is non-continuous, the number of noise events and pattern of occurrence;
- The frequency content and acoustic characteristics of the noise;
- The effect of noise on wildlife;
- The acoustic environment of external amenity areas provided as an intrinsic part of the overall design;
- The impact of noise from certain commercial developments such as night clubs and pubs where activities are often at their peak during the evening and night.

4.3.4 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

"Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed".

4.3.5 The PPG was amended in December 2014 to clarify guidance on the potential effect of noise from existing businesses on proposed new residential accommodation. Even if existing noise levels are intermittent (for example, from a live music venue), noise will need to be carefully considered and appropriate mitigation measures employed to control noise at the proposed accommodation.

[4] Planning Practice Guidance – Noise, http://planningguidance.planningportal.gov.uk/blog/guidance/noise/, 06 March 2014

5 Local Authority Consultation

5.1 Ribble Valley was consulted in respect of the methodology used in this assessment[5]. To date we are yet to receive a response.

6 Acoustic Standards and Guidance

6.1 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

This standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation (WHO) document, Guidelines for Community Noise (1999)[6]. These guideline noise levels are shown in Table 1, below.

Table 1: BS 8233: 2014 guideline indoor ambient noise levels for dwellings

Location	Activity	07:00 to 23:00	23:00 to 07:00
Living Room	Resting	35 dB $L_{Aeq,16hr}$	-
Dining room/area	Dining	40 dB $L_{Aeq,16hr}$	-
Bedroom	Sleeping (daytime resting)	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

6.1.1 BS 8233:2014 advises that:

> *"regular individual noise events…can cause sleep disturbance. A guideline value may be set in terms of SEL[7] or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".*

6.1.2 BS 8233:2014 adopts guideline external noise values provided in WHO for external amenity areas such as gardens and patios. The standard states that it is "desirable" that the external noise does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ whilst recognising that development in higher noise areas such as urban areas or those close to the transport network may require a compromise between elevated noise levels and other factors that determine if development in such areas is warranted. In such circumstances, the development should be designed to achieve the lowest practicable noise levels in external amenity areas.

[5] Email to planning@ribblevalley.gov.uk

[6] World Health Organisation Guidelines for Community Noise, 1999

[7] Sound exposure level or L_{AE}

6.2 World Health Organisation (WHO) Guidelines for Community Noise 1999

6.2.1 The WHO Guidelines 1999 recommends that to avoid sleep disturbance, indoor night-time guideline noise values of 30 dB L_{Aeq} for continuous noise and 45 dB L_{AFmax} for individual noise events should be applicable. It is to be noted that the WHO Night Noise Guidelines for Europe 2009[8] makes reference to research that indicates sleep disturbance from noise events at indoor levels as low as 42 dB L_{AFmax}. The number of individual noise events should also be taken into account and the WHO guidelines suggest that indoor noise levels from such events should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night.

6.2.2 The WHO document recommends that steady, continuous noise levels should not exceed 55 dB L_{Aeq} on balconies, terraces and outdoor living areas. It goes on to state that to protect the majority of individuals from moderate annoyance, external noise levels should not exceed 50 dB L_{Aeq}.

6.3 BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound'

6.3.1 BS 4142: 2014[9] provides guidance on the assessment of the likelihood of complaints relating to noise from industrial sources. It replaced the 1997 edition of the Standard in October 2014. The key aspects of the Standard are summarised below.

6.3.2 The standard presents a method of assessing potential noise impact by comparing the noise level due to industrial sources (the Rating Level) with that of the existing background noise level at the nearest noise sensitive receiver in the absence of the source (the Background Sound Level).

6.3.3 The Specific Noise Level - the noise level produced by the source in question at the assessment location - is determined and a correction applied for certain undesirable acoustic features such as tonality, impulsivity or intermittency. The corrected Specific Noise Level is referred to as the Rating Level.

6.3.4 In order to assess the noise impact, the Background Sound Level is arithmetically subtracted from the Rating Level. The standard states the following:

- *Typically, the greater this difference, the greater the magnitude of the impact,*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context,*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context,*
- *The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending on the context.*

[8] WHO Night Noise Guidelines for Europe 2009

[9] BS 4142:2014 Methods for rating and assessing industrial and commercial sound

6.3.5 In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

> *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.*

6.3.6 The 2014 edition of BS 4142 also introduces a requirement to consider and report the uncertainty in the data and associated calculations and to take reasonably practicable steps to reduce the level of uncertainty.

7 Environmental Noise Survey

7.1 Survey Description

7.2.1 Unattended measurements were made to determine existing background sound levels at the proposed site between 00:00 hrs on Saturday 4th November and 10:15 hrs on Monday 6th November 2017. Measurements were undertaken in accordance with BS 7445-1:2003 by Gareth Willox of Miller Goodall Ltd. The calibration of the sound level meter was checked before and after the surveys with negligible deviation (<0.1 dB). Details of the equipment used are shown in Table 4.

Table 4: Noise monitoring equipment

Equipment Description	Type Number	Manufacturer	Serial No.	Date Calibrated	Calibration Certification Number
Outdoor microphone housing	Type NOR 1217	Norsonic	12175146	N/a	N/a
Class 1[10],[11] Integrating Real Time 1/3 Octave Sound Analyser	Type NOR 140	Norsonic	1406815	12/01/17	474629844
Microphone	Type NOR 1225	Norsonic	26487	12/01/17	474629844
Class 1 Calibrator[12]	Type NOR 1251	Norsonic	34123	05/07/16	02777/1

7.1.1 Noise measurements were undertaken at the times specified in Table 5. Weather conditions were determined both at the start and on completion of the surveys.

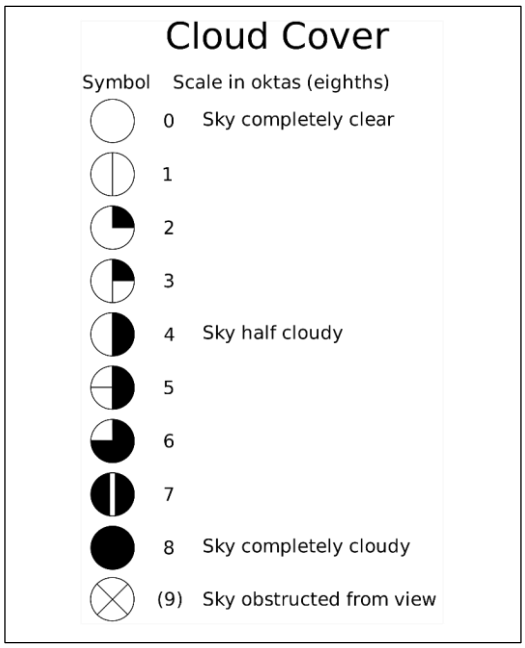
7.1.2 Although we are aware the noise measurements may have been affected by firework noise, our assessment had considered periods where the activities of fireworks is considered unlikely.

[10] IEC 61672-1 (2002) Electroacoustics – Sound level meters Part 1: Specifications

[11] IEC 61260 (1995) Electroacoustics – Octave-band and fractional-octave-band filters

[12] IEC 60942 (2003) Electroacoustics – Sound calibrators

Table 5: Dates, times and weather conditions during noise measurements

Measurement Locations	Date/Time	Weather conditions		
		Description	20/01/2017	
			Start	End
P1	04/11/17 00:00 To 06/11/17 10:15	Temperature:	4ºC	6ºC
		Precipitation:	none	none
		Cloud cover (oktas – see opposite):	0	2
		Any fog/snow/ice?	No	No
		Any damp roads/wet ground?	Damp grass	Damp grass
		Wind speed:	1 m/s	3 m/s
		Wind direction:	SE	
		Any conditions that may cause temp. inversion (e.g. calm nights with no cloud):	No	No

7.1.3 Measurements were taken at times considered to be representative of the quietest background noise levels during which the proposed development is planning to operate. Measurements were made under free-field conditions at a height of approximately 1.5 m above the ground.

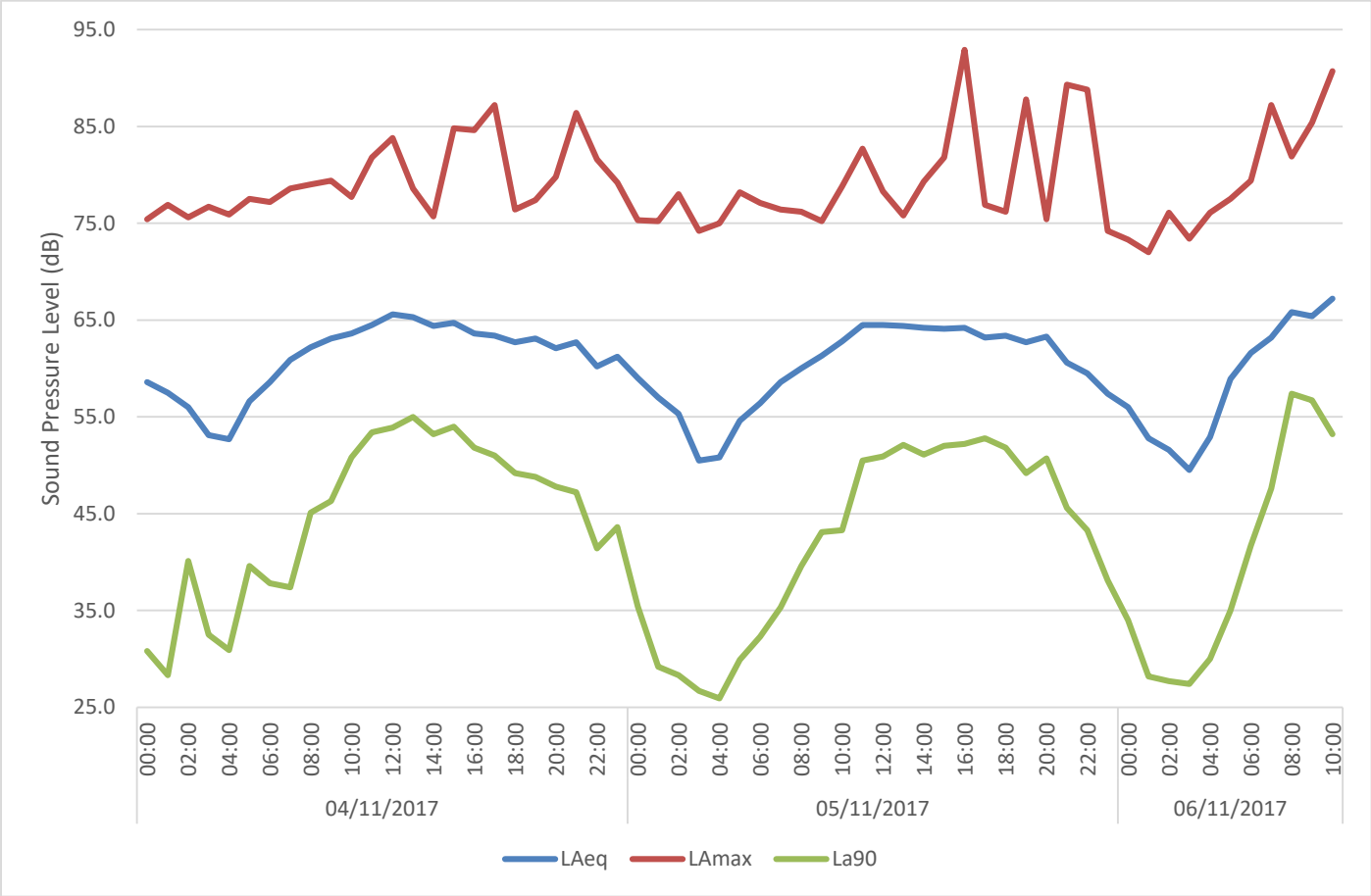
7.1.4 The audio from the survey was analysed and the noise climates at the monitoring position was as follows:

- Road traffic noise
- Bird song;
- Farm activities (tractors, grass cutting etc…)

7.1 Monitoring Results

7.1.1 A summary of the broadband measurement data is provided in Appendix 5. Whilst all the individual noise measurement data are not presented in this report, they are kept on file for future reference. All data are sound pressure levels in dB re 20 μPa.

Figure 1: Time graph entire measurement period

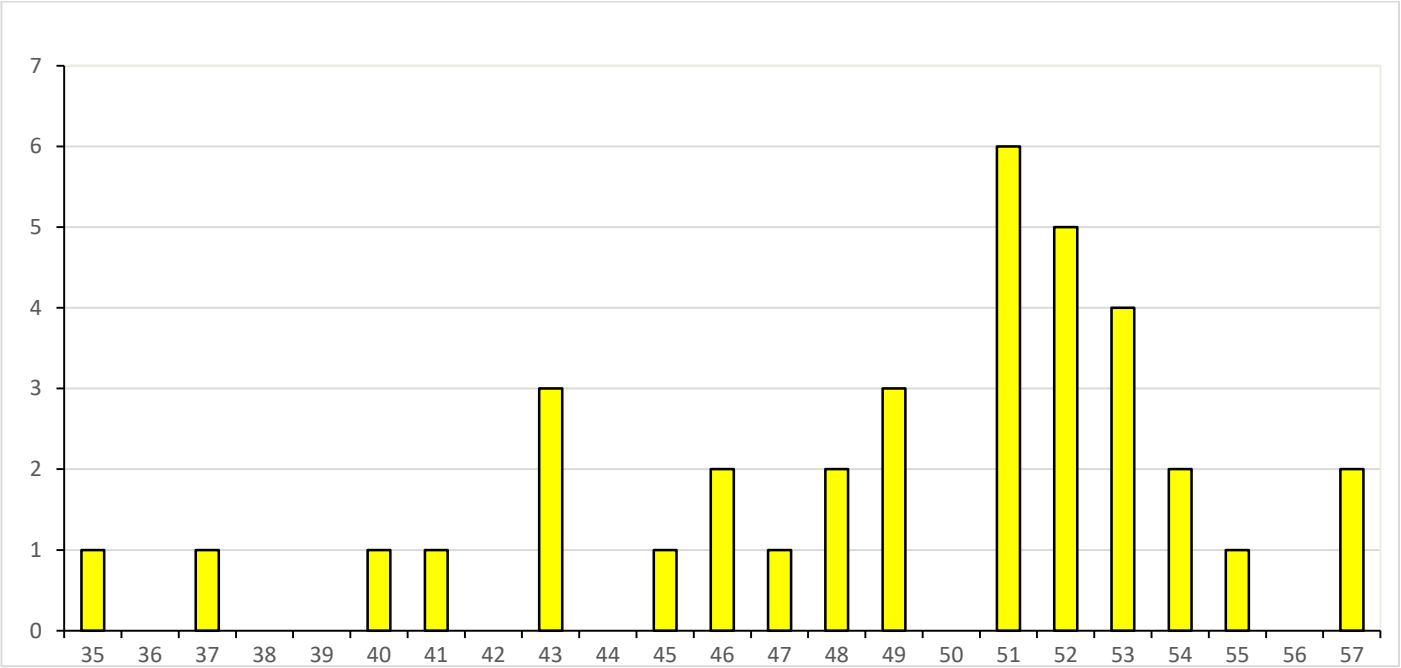


7.2 Determination of the Background Sound Levels

7.2.1 The background sound levels for the assessment periods of interest were derived for the day time, corresponding to likely hours of operation of the moveable plant and noise associated with the proposed redevelopment.

7.2.2 For the assessment of daytime noise, the most frequently occurring value of the measured $L_{A90,1hour}$ level was obtained for the day time period between 07:00hrs and 23:00hrs, as shown in Figure 3 below:

Figure 3: Day Time Background Sound Level Histogram – 07:00hrs – 23:00hrs



7.2.3 Based on the above, the representative day time background sound level is deemed to be 51 dB $L_{A90,1hour}$.

8 Noise Modelling Inputs

8.1 General Inputs

8.1.1 A 3D computer model of the proposed site and wider study area has been developed in CadnaA noise modelling software.

8.1.2 The general horizontal plan information of the area surrounding and including the proposed development site was imported from emapsite. This was used to determine road positions, building footprint areas and relative locations.

8.1.3 The general input parameters used for the model are listed below.

- Propagation model: ISO 9613:1993
- Default ground absorption G = 1 (grass area)
- No adverse meteorological effects
- Two orders of reflection
- Topographical data was obtained using emapsite 2 m contours for the area surrounding the site
- Buildings are reflecting (smooth, non-structured façade)
- The heights of buildings within the noise model have been estimated using Google Earth and site observations. Where height data is not available, it is assumed that single storey high buildings are 4.5 m and that, in general, building height increases by 2.5 m per storey.

- The dimensions of the proposed building including the size of the unit doors have been determined from proposed plans.

8.1.4 Facade noise levels at sensitive receptors have been predicted at 1.5 m high on the most adversely affected façades, except where two storey buildings are located, in which case a height of 4 m has been used.

8.1.5 Octave-band noise data for the various noise sources were imported into the model using data referenced from the guidance noise levels provided in BS5228:2014. A full description of the noise sources assumed in our model is provided in the following section of this report. The octave band L_{eq} data used for the noise sources in our model are presented in Table 8.

Table 8: Noise source data used within CadnaA

Description	Sound Pressure Level, dB in Octave Band Centre Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Tracked Excavator @ 10 m*	64	60	63	64	62	57	51	45	66
Loadall Telehandler @ 10 m*	82	72	63	65	67	64	56	49	66
32 ton 8 Wheel Tipper Wagon @ 10 m*	85	74	78	73	73	74	67	63	79
26 ton 6 Wheel Tipper Wagon @ 10 m*	85	80	77	72	74	70	65	58	78
7.5 ton Tipper Wagon @ 10 m*	84	81	74	73	72	68	61	53	76
Vibrating Roller @ 10 m*	90	82	73	72	70	65	59	54	75
Vibrating Compactor @ 10 m*	76	78	74	77	77	77	73	70	83

*BS 5228:2009 guidance level

8.1.6 For noise sources within the workshop octave-band noise data for the various noise sources was also imported to the model using data referenced from the guidance noise levels provided in BS5228:2014.

9 Impact of Noise from the Proposed Development

9.1.1 The impact of operational noise from the proposed industrial activities on existing residential dwellings has been modelled using CadnaA computer software.

9.1.2 Dwellings to the west and north of the proposed site have the potential to be impacted by noise from activities within the site. It is understood that full operations are likely to take place during the daytime periods only between 07:00 – 23:00. The BS 4142 assessment will assess full site activities during these times.

9.1.3 The lowest measured modal daytime background noise level was 51 dBA. This figure has therefore been used as the typical background level in our assessment for houses to the west of the proposed site.

9.2 BS 4142: 2014 Assessment

9.2.1 The potential noise was assessed in accordance with the methodology set down in BS 4142:2014. Realistic worst case scenarios have been considered. It is assumed that the two roller shutter doors on the south elevation of the workshop will remain open during site operations. All plant is assumed to be operating continuously.

9.2.2 The following scenarios were assessed:

- Between 07:00 – 23:00: Full site activities operational and workshop doors open, with planned mitigation in place

9.2.3 The BS 4142 assessment for daytime assessment is shown in Table 7 below:

Table 7: BS 4142:2014 Noise Impact Assessment: Daytime Full Site Activates, Workshop Door Open

Results		Relevant Clauses of BS 4142:2014	Commentary
Background Sound Level	$L_{AF90,1hour}$ = 51 dB	8.1.2 8.3	Background sound level between 07:00 – 23:00
Assessment made during the day time (after 07:00), so the reference interval is 1 hour		7.2	
Specific Sound Level	$L_{Aeq,1hour}$ = 48 dB	7.3.3 eqn(2)	Determined from CadnaA model
Acoustic feature correction	+6 dB	9.2	Penalty applied to account for impulsivity characteristic of plant noise and intermittency of plant. Subjectively expected to be perceptible at the assessment location
Rating Level	(48 + 6) dB = 54 dB		
Excess of Rating Level over Background Sound Level	(54 – 51) dB = 3 dB		3 dB excess
Assessment indicates likelihood of adverse impact		11	
Context		11 8.5	Plant is moveable and could be located further away from NSR.
Uncertainty of the assessment	Could be up to 3 dB more favourable	10	Assessment includes all plant operating at once with the workshop shutters open

9.2.4 It can be seen from Table 7 that the initial estimate of noise impact based on the BS 4142:2014 methodology, indicates a likelihood of a low impact level at the nearest NSR (see Table 9).

9.2.5 As the standard advises, the estimated impact must be considered within the context of the site and the surrounding acoustic environments. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:

- The potential impact as a result of plant movements on site occur for a short duration. It is unlikely that these activities will take place every morning during the week

9.3 Assessment of Internal and External Noise to BS8233 and WHO Guidelines

9.3.1 The BS 4142:2014 assessment presented in Section 9.2 of this report only considers external noise levels at the location of sensitive receptors and does not consider the attenuation offered by the building envelope of the receptors.

9.3.2 The sound attenuation offered by a building will be governed by its weakest element, acoustically speaking. This is invariably the glazing and any natural ventilation provision. Standard thermal double glazing fitted to most houses will achieve a sound insulation rating of around 27 dB $R_w + C_{tr}$. With windows left open for ventilation, a sound reduction of around 15 dB may be expected (as referenced in WHO).

9.3.3 Calculations indicate that the predicted internal noise levels within rooms of the most affected dwellings, during site operations, will satisfy the BS8233 criteria for the daytime when assessed over the entire 16 hour daytime periods.

9.4 External Noise Levels

9.4.1 It is also necessary to consider the potential noise impact of the proposals upon the amenity of external areas in the vicinity, in particular within the gardens of the surrounding dwellings.

9.4.2 It can be seen from the colour contour plot that the highest noise level in gardens resulting from site activities is predicted to be around 40-50 dB $L_{Aeq,1hour}$.

9.4.3 These noise levels satisfy the WHO guidance for noise in external areas bounding the site.

10 Planned Mitigation

10.1 Acoustic Barrier and Earth Bunds

10.1.1 It is intended that a 1.8 m high acoustic barrier and noise attenuation bunds are placed around the boundary of the site (see Appendix 1 and Appendix 4).

10.1.2 The barrier is to be constructed from continuous, imperforate material with a minimum mass of 12 kg/m^2 and is to extend from the ground to a minimum height of 1.8 m above the level of the site. Close-boarded or overlapped timber panelling would be suitable in this regard; hit-and-miss fencing would not. Alternatively, a proprietary acoustic fence with a minimum weighted sound reduction index of 25 dB R_w would be appropriate.

11 Conclusions

11.1 A noise assessment was undertaken to predict the potential impact of a proposed development consisting of civil engineering site at Woodfield Farm, Longsight Road, Clayton Le Dale, Blackburn BB2 7JA. This was requested by the Local Authority to support a planning application for the development.

11.2 Measurements were made on site at a location closest to the nearest residential dwellings to the proposed site to identify the existing background noise levels. This data was used to inform a computer noise model of the proposed site, based on layouts, which was used to predict the noise from likely activities associated with the proposed development when in use.

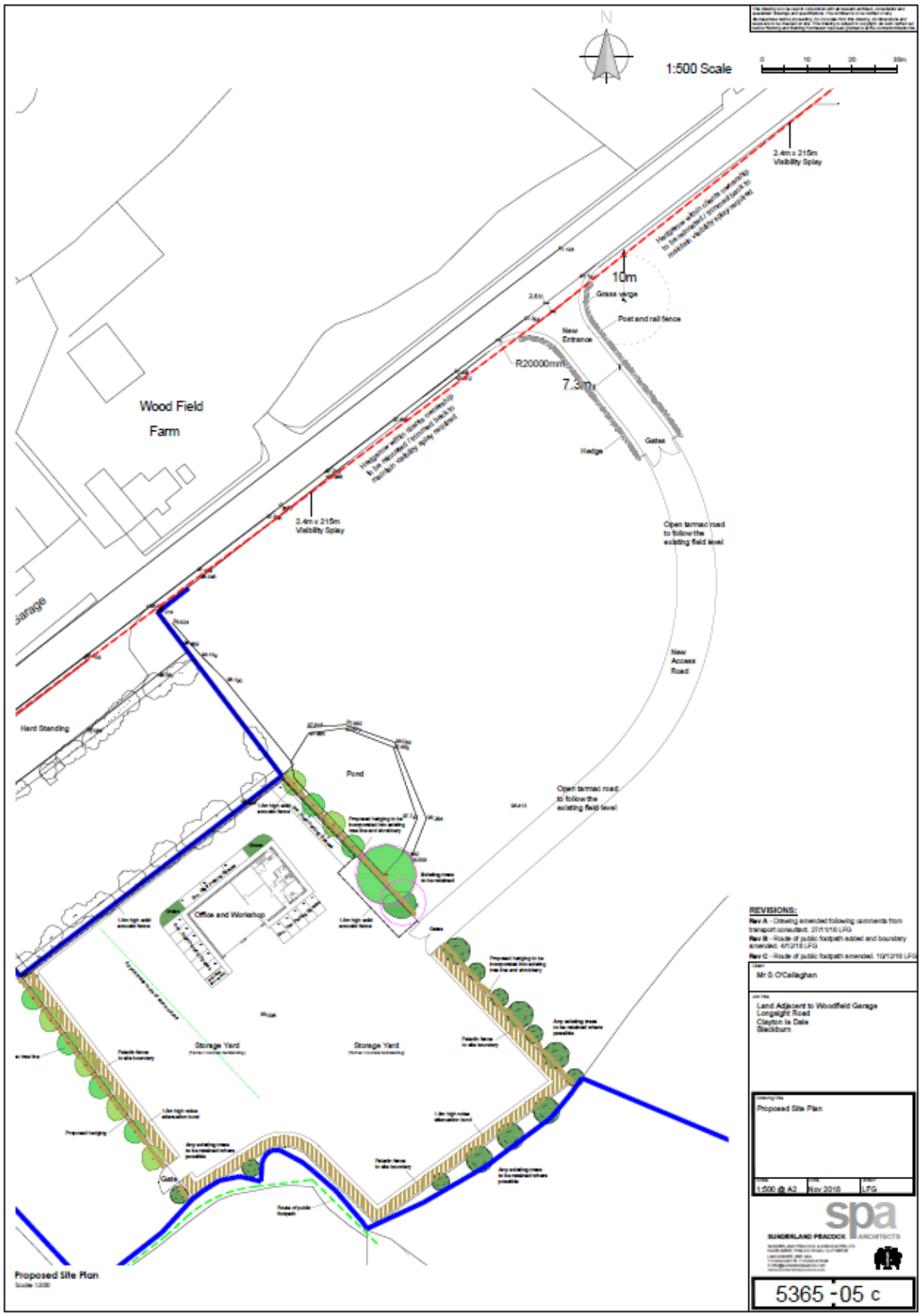
11.3 Noise modelling was used to predict the site activity noise levels at the nearest dwellings and when assessed to BS 4142: 2014 the Rating Level, including correction factors for impulsivity and intermittency, was found to be + 3 dB above the measured background level during full daytime activity at the proposed site, indicating likelihood of a low impact at the most affected noise sensitive receptor.

11.4 The internal noise levels within surrounding dwellings due to the proposed development are predicted to satisfy the guidance set out in BS 8233 during daytime periods. Noise levels in gardens are also predicted to satisfy guidance on noise levels on external amenity spaces.

11.5 In conclusion, with the implementation of the proposed mitigation measures, we are of the opinion that the development may be permitted without causing adverse loss of acoustic amenity to the surrounding dwellings during the daytime.

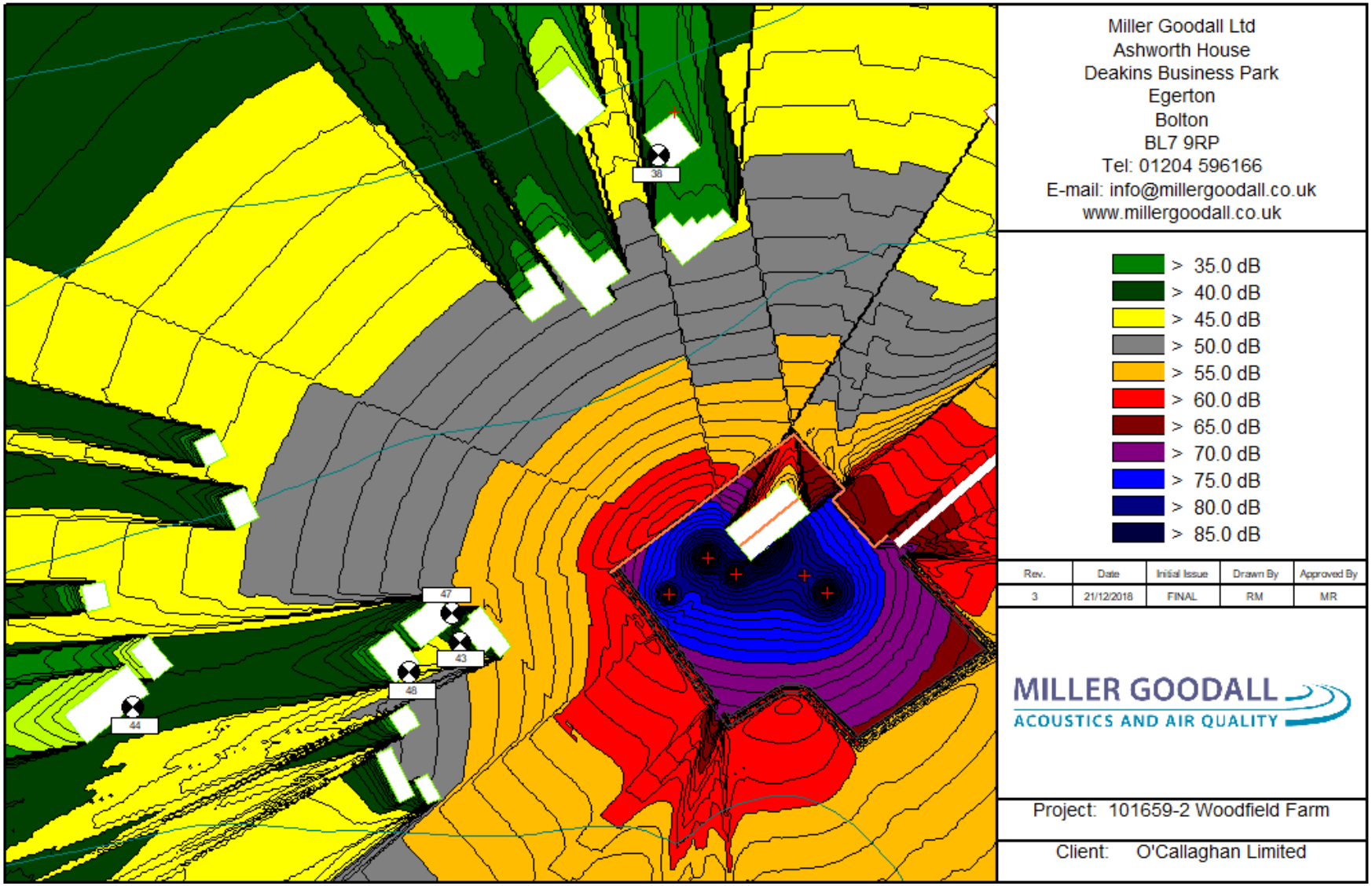
APPENDICES

Appendix 1: Proposed Site Layout



Appendix 2: Survey Measurement Position and NSR Location

Appendix 3: Noise Contours – Daytime $L_{Aeq,1hour}$ 07:00 – 23:00hrs (1.5 m grid height)



Appendix 4: Mitigation – 1.8 m Barrier and Bund

Appendix 5: Measurement Data

Date	Start Time	Elapsed Time (min:sec)	L_{Aeq} (dB)	L_{AFmax} (dB)	L_{AF90} (dB)
04/11/2017	00:00:02	01:00:00	58.6	75.4	30.8
04/11/2017	01:00:02	01:00:00	57.5	76.9	28.3
04/11/2017	02:00:02	01:00:00	56.0	75.6	40.1
04/11/2017	03:00:02	01:00:00	53.1	76.7	32.5
04/11/2017	04:00:02	01:00:00	52.7	75.9	30.9
04/11/2017	05:00:02	01:00:00	56.6	77.5	39.6
04/11/2017	06:00:02	01:00:00	58.6	77.2	37.8
04/11/2017	07:00:02	01:00:00	60.9	78.6	37.4
04/11/2017	08:00:02	01:00:00	62.2	79.0	45.1
04/11/2017	09:00:02	01:00:00	63.1	79.4	46.3
04/11/2017	10:00:02	01:00:00	63.6	77.7	50.8
04/11/2017	11:00:02	01:00:00	64.5	81.8	53.4
04/11/2017	12:00:02	01:00:00	65.6	83.8	53.9
04/11/2017	13:00:02	01:00:00	65.3	78.6	55.0
04/11/2017	14:00:02	01:00:00	64.4	75.7	53.2
04/11/2017	15:00:02	01:00:00	64.7	84.8	54.0
04/11/2017	16:00:02	01:00:00	63.6	84.6	51.8
04/11/2017	17:00:02	01:00:00	63.4	87.2	51.0
04/11/2017	18:00:02	01:00:00	62.7	76.4	49.2
04/11/2017	19:00:02	01:00:00	63.1	77.4	48.8
04/11/2017	20:00:02	01:00:00	62.1	79.8	47.8
04/11/2017	21:00:02	01:00:00	62.7	86.4	47.2
04/11/2017	22:00:02	01:00:00	60.2	81.6	41.4
04/11/2017	23:00:02	01:00:00	61.2	79.2	43.6
05/11/2017	00:00:02	01:00:00	59.0	75.3	35.4
05/11/2017	01:00:02	01:00:00	57.0	75.2	29.2
05/11/2017	02:00:02	01:00:00	55.3	78.0	28.3
05/11/2017	03:00:02	01:00:00	50.5	74.2	26.7
05/11/2017	04:00:02	01:00:00	50.8	75.0	25.9
05/11/2017	05:00:02	01:00:00	54.6	78.2	29.9
05/11/2017	06:00:02	01:00:00	56.4	77.1	32.3
05/11/2017	07:00:02	01:00:00	58.6	76.4	35.3
05/11/2017	08:00:02	01:00:00	60.0	76.2	39.6
05/11/2017	09:00:02	01:00:00	61.3	75.2	43.1
05/11/2017	10:00:02	01:00:00	62.8	78.8	43.3
05/11/2017	11:00:02	01:00:00	64.5	82.7	50.5
05/11/2017	12:00:02	01:00:00	64.5	78.3	50.9
05/11/2017	13:00:02	01:00:00	64.4	75.8	52.1
05/11/2017	14:00:02	01:00:00	64.2	79.3	51.1
05/11/2017	15:00:02	01:00:00	64.1	81.8	52.0
05/11/2017	16:00:02	01:00:00	64.2	92.9	52.2
05/11/2017	17:00:02	01:00:00	63.2	76.9	52.8
05/11/2017	18:00:02	01:00:00	63.4	76.2	51.8
05/11/2017	19:00:02	01:00:00	62.7	87.8	49.2

05/11/2017	20:00:02	01:00:00	63.3	75.4	50.7
05/11/2017	21:00:02	01:00:00	60.6	89.3	45.6
05/11/2017	22:00:02	01:00:00	59.5	88.8	43.3
05/11/2017	23:00:02	01:00:00	57.4	74.2	38.1
06/11/2017	00:00:02	01:00:00	56.0	73.3	34.0
06/11/2017	01:00:02	01:00:00	52.8	72.0	28.2
06/11/2017	02:00:02	01:00:00	51.6	76.1	27.7
06/11/2017	03:00:02	01:00:00	49.5	73.4	27.4
06/11/2017	04:00:02	01:00:00	52.9	76.1	30.0
06/11/2017	05:00:02	01:00:00	58.9	77.5	35.0
06/11/2017	06:00:02	01:00:00	61.6	79.4	41.7
06/11/2017	07:00:02	01:00:00	63.2	87.2	47.6
06/11/2017	08:00:02	01:00:00	65.8	81.9	57.4
06/11/2017	09:00:02	01:00:00	65.4	85.4	56.7
06/11/2017	10:00:02	00:13:30	67.2	90.7	53.2

Glossary of Terms

Decibel (dB) The unit used to quantify sound pressure levels; it is derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 µPa, 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 usually only perceptible under controlled conditions.

dB L_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 L_A broadly agree with an individual's assessment of loudness. A change of 3 dB L_A is the minimum perceptible under normal conditions, and a change of 10 dB L_A corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB L_A; normal conversation about 60 dB L_A at 1 meter; heavy road traffic about 80 dB L_A at 10 meters; the level near a pneumatic drill about 100 dB L_A.

$L_{A90,T}$ The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1997 it is used to define background noise level.

$L_{Aeq,T}$ 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). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

L_{Amax} The highest A weighted noise level recorded during the time period. It is usually used to describe the highest noise level that occurred during the event.

$L_{A10(18\ hour)}$ Often referred to as the UK road traffic noise index, this is the arithmetic average of the values of L_{A10} hourly for each of the 18 one hour periods between 06:00 and 00:00.

NOEL No observed effect level: the level of noise exposure below which no effect at all on health or quality of life can be detected.

LOAEL Lowest observed adverse effect level: the level of noise exposure above which adverse effects on health or quality of life can be detected.

SOAEL Significant observed adverse effect level: the level of noise exposure above which significant adverse effects on health or quality of life can be detected.

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