MILLER GOODALL
ACOUSTICS AND AIR QUALITY

NOISE ASSESSMENT

on behalf of

FRANK WHITTAKER TOWN PLANNING CONSULTANTS

for the site at

REMEMBRANCE PARK, ENTWISTLE HALL LANE, EDGWORTH, BL7 0LR

REPORT DATE: 14TH NOVEMBER 2017

REPORT NUMBER: 101666

Miller Goodall Ltd
Ground Floor
Ashworth House
Deakins Business Park
Blackburn Road
Egerton
Bolton
Lancashire
BL7 9RP

Tel: 01204 596166

www.millergoodall.co.uk

Company registration number 5201673

ANC | ACOUSTICS & NOISE CONSULTANTS

Summary

A noise assessment was undertaken to predict the potential impact of a dog breeding facility at Remembrance Park, Entwistle Hall Lane, Edgworth, BL7 0LR. This was requested by the Local Authority to support a retrospective planning application for dog breeding at the development.

Measurements were taken over two days to obtain noise data for a full day's operating period.

Specific noise levels due to dogs barking at the site were calculated using site measured data and assessed against representative background sound levels for the nearest noise sensitive receptor.

The assessment approach has been agreed with BDBC and involves assessing the noise to number of different guidance documents; however it was agreed in consultation and noted in our report that there is no clear guidance on how to assess dog noise, and therefore the conclusions drawn from assessing them using the guidance available cannot be considered definitive.

The BS 4142 assessment predicted that noise at the nearest noise sensitive receptor (NSR) has a likelihood of 'significant adverse' impact during worst case daytime periods when some of the dogs are outside. However assessing to BS 8233 and WHO guidance levels provides a more favourable assessment whereby noise levels are within the stated limits.

The BS 4142 assessment predicted that noise at the NSR has a likelihood of 'low' impact during worst case night time periods when the dogs are all inside the kennels. Assessing to BS 8233 and WHO guidance is also favourable whereby noise levels are well within the stated limits.

Physical mitigation of noise while the dogs are outside would be difficult to achieve due to the site's topography, however mitigation options for further reducing noise from the kennels have been provided that are predicted to reduce the noise levels from the kennels by at least 9 dB, which would mean a BS 4142 rating level of -8 dB compared to the background (i.e. 'low' adverse impact).

Certain practical means of mitigating noise from the dogs are already in place, such as limiting the number of dogs that are let outside at any one time, using ultrasonic dog silencers in the kennels to deter dogs from barking when inside, and putting up a visual barrier along the boundary between the dogs' exercise area and the railway platform so that the dogs do not see pedestrians waiting for trains (a previous cause of barking at the site).

Record of changes

Prepared By	Michael Rickard AMIOA	Reviewed By	Jo Miller MIOA
Signed		Signed	
Date	14th November 2017	Date	14th November 2017

Version	Date	Change	Initials
1	14th November 2017	Final issue	MR

Contents

1 Introduction

1.1 Miller Goodall Ltd has, on behalf of Frank Whittaker Town Planning Consultants, undertaken a noise assessment in respect of the potential impact of noise from the site which is currently operating as a police dog breeding and training facility. The assessment has been carried out to supplement a retrospective planning application for both the change of use of the open land area (former rail goods yard) for the supervised exercise of the dogs, and the retention of 3 no existing kennel units. An application for the erection of 2 no additional kennel buildings to be sited centrally between the existing units will also be made.

2 Site Description

2.1 The site is located at Remembrance Park, Entwistle Hall Lane, Edgworth, BL7 0LR. The site location is shown in Appendix 1.

2.2 The Remembrance Park woodland cemetery lies approximately 30 meters to the east of the site, while Entwistle train station is immediately to the west of the site with the railway line running along the western boundary of the dogs' exercise area. The nearest residential noise sensitive receptors are approximately 60 meters to the west of the site on Edge Lane. The Strawbury Duck pub is approximately 130 meters to the south of the site.

2.3 The existing and proposed dog kennels are to be located along the eastern border of the site. They are approximately 4.2m(W) x 3.7m(L) x 2m(H) in dimension. The walls are made of prefabricated concrete sections and the roofs are corrugated fibre cement sheets with a 200mm void and 10mm pvc coated polystyrene ceiling underneath. Each kennel is subdivided into two units with separate 12mm thick timber doors and single glazed window assemblies.

2.4 Our assessment has considered the noise impact to the nearest noise sensitive receptor (NSR) as shown in Appendix 1.

3 Proposed Development

3.1 The proposed site will include 3no adult kennels and 2no puppy kennels with outdoor runs and will use the outdoor area (previously a rail goods yard) for the supervised exercise of the dogs. We understand that the site is currently occupied by 19no various dogs, though this would be subject to fluctuation as puppies are born, sold or re-homed.

3.2 The dogs are kept in the kennels and allowed out at certain times of day in small groups and under direct supervision.

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]) was published in March 2012. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise"[3].

4.2.2 Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) "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, water or noise pollution or land stability".

4.2.3 The NPPF goes on to state in Paragraph 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 thorough use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use since they were established, and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value".

4.2.4 The NPPF document does not refer to any other documents regarding noise other than NPSE.

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".

[2] National Planning Policy Framework, DCLG, March 2012

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

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

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.

5 Local Authority Consultation

5.1 MGL consulted over telephone with Simon Kirby from Blackburn with Darwen Borough Council (BDBC) Environmental Services to identify what type of an assessment was required. BDBC do not have a set approach for assessing dog barking noise from kennels. It was agreed that there is a lack of clear guidance for assessing noise from dogs and dog kennels, and it was therefore felt appropriate by both parties to assess noise with reference to both BS 4142:2014 and BS 8233:2014/WHO:1999 guidance, with the understanding that neither approach can provide a definitive assessment of the potential impact, and there will unavoidably be some degree of uncertainty regarding the outcomes derived using these guidance documents.

5.2 There has been a complaint regarding noise from the dogs and we discussed the nature of the complaint, which apparently is particularly focused on noise from the dogs in the early weekday mornings when they are in their kennels waiting to be let out, as well as during the day on the weekends.

5.3 MGL described our findings that noise from the dogs when they are outside of the kennels present the greater potential for noise impact, which was accepted by BDBC, however they upheld an interest in further efforts to mitigate noise from the dogs when they are in the kennels due to the nature of the existing noise complaint. We have therefore included some potential mitigation options relating to kennel noise in the mitigation section (section 9) of this report. However it was agreed that physical screening of dog noise would be difficult when they are exercising outside due to the topographical nature of the site, with the NSRs overlooking the area from above, meaning the use of noise barriers at the boundary are not feasible.

6 Acoustic Standards and Guidance

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

6.1.1 BS 4142: 2014[5] 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.

6.1.2 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).

6.1.3 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.

6.1.4 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.*

6.1.5 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.*

6.1.6 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.

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

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

6.2.1 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 $L_{Aeq,8hr}$

6.2.2 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".*

6.2.3 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.

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

6.3.1 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] World Health Organisation Guidelines for Community Noise, 1999

[7] Sound exposure level or L_{AE}

[8] WHO Night Noise Guidelines for Europe 2009

6.3.2 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}.

7 Noise Survey

7.1 Measurements of Existing Noise Sources

7.1.1 Noise measurements were undertaken at two locations; one at the front façade of the noisiest kennel (being occupied by adolescent german shepherd dogs), P1, and another at the nearest NSR, P2. Measurements were made in accordance with BS 7445-1: 2003[9] by Michael Rickard of Miller Goodall Ltd. The calibration of the sound level meters was checked before and after measurements with negligible deviation (<0.1 dB). Details of the equipment used are shown in Table 2, below.

Table 2: Noise monitoring equipment

Equipment Description	Type Number	Manufacturer	Serial No.	Date Calibrated	Calibration Certification Number
Class 1[10],[11] Integrating Real Time 1/3 Octave Sound Analyser	NOR 140	Norsonic	1406815	12/01/17	474629844
Microphone	NOR 1225	Norsonic	264687	15/12/16	474629844
Class 1 Calibrator[12]	NOR 1251	Norsonic	34123	05/07/17	02777/1
Outdoor microphone housing	NOR 1217	Norsonic	12175738	N/a	N/a
Class 1[13],[14] Integrating Real Time 1/3 Octave Sound Analyser	NOR 140	Norsonic	1406017	23/05/17	03238/2
Microphone	NOR 1225	Norsonic	151206	23/05/17	03238/2
Class 1 Calibrator[15]	Type 4231	Brüel & Kjær	2478249	18/05/17	03238/1
Outdoor microphone housing	NOR 1217	Norsonic	12175146	N/a	N/a

[9] BS 7445-1: 2003 Description and measurement of environmental noise - Part 1: Guide to quantities and procedures

[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

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

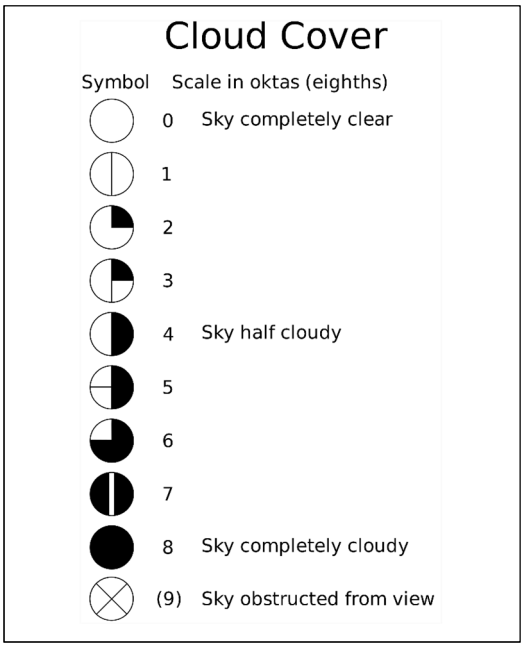
[14] IEC 61260 (1995) Electroacoustics – Octave-band and fractional-octave-band filters

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

7.1.2 Weather conditions were determined both at the start and on completion of the survey. There were some periods of light precipitation during the night time period of the survey, however these were intermittent and there are no significant roads in the vicinity of the site. It was not felt that this had a significant impact on the measured background levels.

7.1.3 It is considered that meteorological conditions were appropriate for environmental noise measurements.

Table 3: Dates, times and weather conditions during noise measurements

Measurement Locations	Date/Time	Weather conditions		
		Description	At Start of Survey	On Completion
P1 & P2	01/11/17, 14:00 to 02/11/17, 14:00	Temperature:	9 ºC	11 ºC
		Precipitation:	Dry	Dry
		Cloud cover (oktas – see opposite):	3	5
		Any fog/snow/ice?	No	No
		Any damp roads/wet ground?	No	No
		Wind speed:	2 m/s	3 m/s
		Wind direction:	SW	W
		Any conditions that may cause temp. inversion (e.g. calm nights with no cloud):	No	No

7.1.4 The total survey duration covered a typical 24hr operational period monitored over two consecutive days. Measurements were made under free-field conditions. Position P1 was logging at a microphone height of 2 m above the ground and extended 1 m from the façade of the northernmost kennel (attached to a pole going horizontally from the roof). Position P2 was logging at a microphone height of approximately 1.5 m in the garden of the NSR.

7.1.5 The measurement locations are indicated in Appendix 1.

7.1.6 The noise sources within the vicinity of the measurement locations are summarised in Table 4, below:

Table 4: Description of noise sources affecting the site

Measurement Locations	Noise Sources
P1	Radio noise from inside the kennels, train noise, vehicle noise, occasional dog barks, distant traffic noise
P2	Train noise, vehicle noise, occasional dog barks, distant traffic noise

7.2 Monitoring Results

7.2.1 A summary of the broadband measurement data for the period the centre is in use is provided in Table 5 below. All data are sound pressure levels in dB re 20 µPa.

Table 5: Summary of noise measurements

Measurement Location	Date	Start Time	End Time	$L_{Aeq,1hr}$ (dB)	$L_{AFmax,1hr}$ (dB)	$L_{AF90,1hr}$ (dB)
P1	01/11/17	14:00	23:00	46 - 58	78 - 91	32 - 42
	-	23:00	07:00	31 – 54*	44 – 83*	30 – 44*
	02/11/17	07:00	13:30	52 - 68	81 - 96	36 - 39
P2	01/11/17	15:00	23:00	37 - 52	65 - 86	25 - 32
	-	23:00	07:00	27 – 48*	40 – 69*	24 – 40*
	02/11/17	07:00	14:00	44 - 53	69 - 82	29 - 35

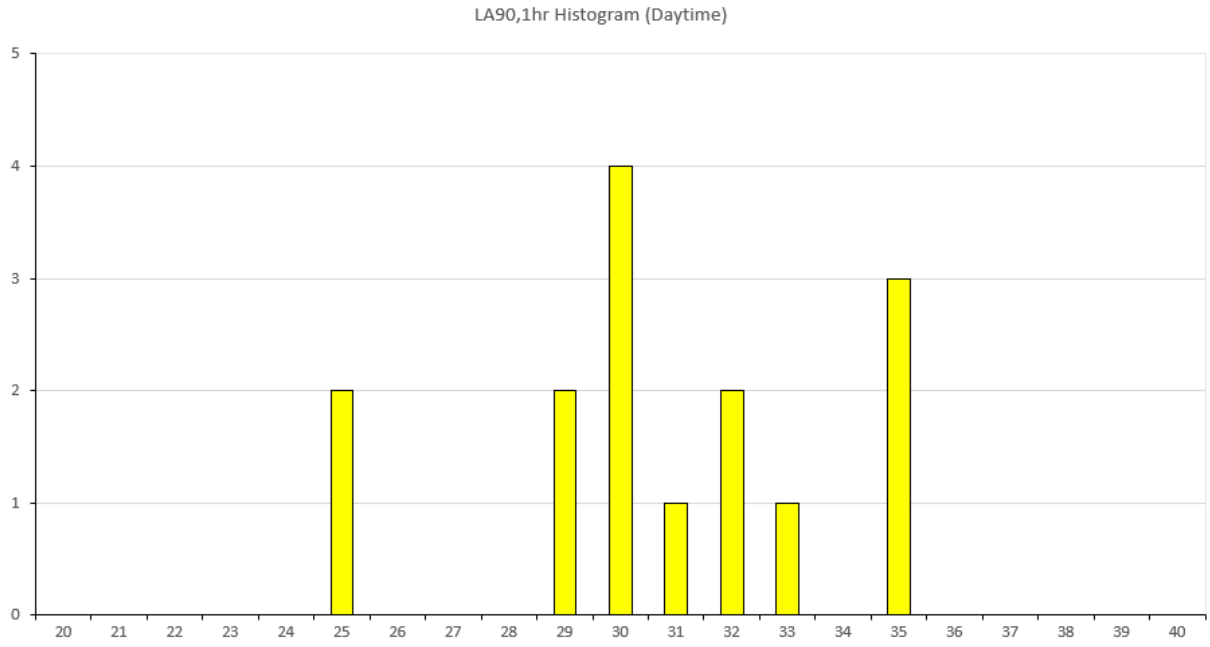
* Based on 15-minute sample measurements

7.2.2 The 1 second noise levels have not been presented in this report but are kept on file for future reference.

7.3 BS 4142:2014 Assessment Background Levels

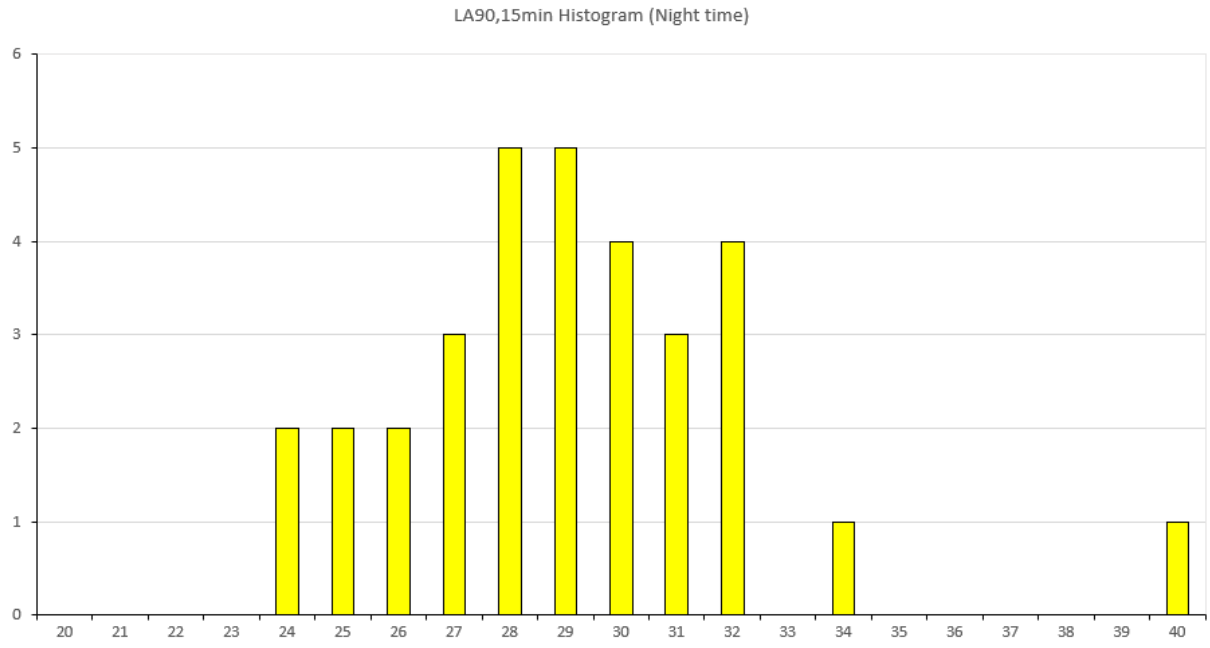
7.3.1 The typical background sound levels for daytime and night time at the NSR have been determined using statistical analysis. Lowest modal average background noise levels measured during the daytime and night time at the survey position P2 are presented in tables 6 and 7 below.

Table 6: Statistical Analysis of Daytime $L_{A90,1hr}$ levels



7.3.2 Based on the data above, a daytime background sound level of 30 dB $L_{AF90,1hr}$ will be used for the assessment.

Table 7: Statistical Analysis of Night time $L_{A90,15min}$ levels



7.3.3 Based on the data above, a night time background sound level of 28 dB $L_{AF90,15min}$ will be used for the assessment.

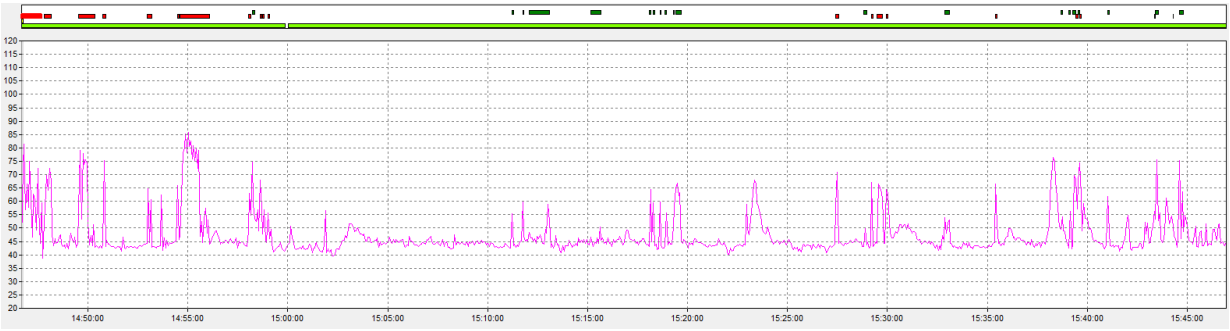
8 Impact of Noise from the Proposed Development

8.1 Determination of Specific Sound Levels

8.1.1 The levels recorded at position P1 were analysed to determine the noisiest periods for dogs barking in terms of $L_{Aeq,1hr}$ daytime levels and $L_{Aeq,15min}$ night time levels.

8.1.2 The noisiest daytime hour for dog barking was recorded between 13:46 to 14:46 on 01/11/2017. Figure 1a shows the $L_{Aeq,1s}$ time history recorded over that hour. Each instance of dog barking has been extrapolated from the data in order to determine the specific $L_{Aeq,1hr}$ sound levels for dog barking noise. Noise from inside the kennel and noise from the external exercise/ training area has been analysed separately.

Figure 1a: $L_{Aeq,1s}$ Time History (13:46:36 –14:46:36)



(times shown are 1hr ahead from actual time of recording due to BST time setting on meter)

8.1.3 The specific sound level consisted of a cumulation of dog barks occurring both within the kennel and externally recorded over the hour. The distance between the kennels and the microphone was 1 meter, however as the distance from the microphone to the external dogs is unknown due to the survey being unattended (and the position of dogs relative to the microphone will have varied over the hour) an average distance of the dogs to the microphone of 20 meters has been adopted as a reasonable assumption.

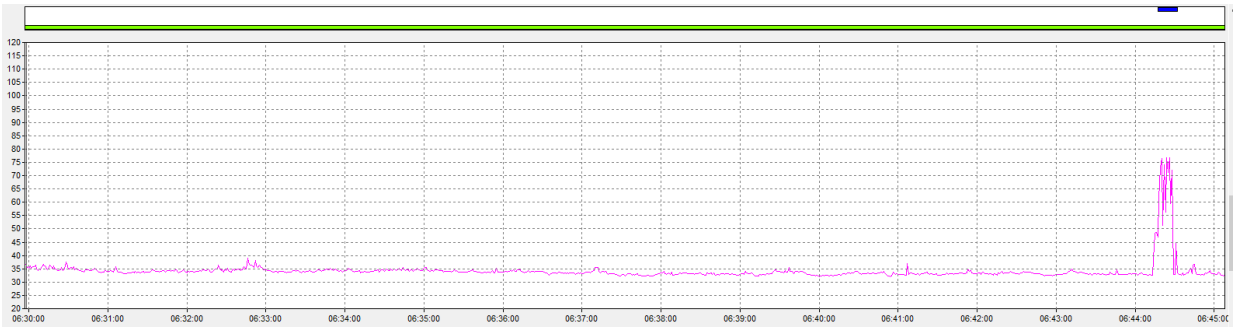
8.1.4 The specific sound level of the dogs has been determined as shown below:

Daytime kennel specific sound level = 64 dB $L_{Aeq,1hr}$ (at 1m distance from microphone)

Daytime external area specific sound level = 53 dB $L_{Aeq,1hr}$ (at 20m distance from microphone)

8.1.5 The noisiest night time 15 minutes for dog barking was recorded between 05:30 to 05:45 on 02/11/2017. Figure 1b shows the $L_{Aeq,1s}$ time history recorded over that 15 minute period. The period of dog barking lasted for approximately 11 seconds and was initiated in response to a fairly loud and unusual bird noise.

Figure 1b: $L_{Aeq,1s}$ Time History (05:30:00 – 05:45:00)



(times shown are 1hr ahead from actual time of recording due to BST time setting on meter)

8.1.6 The specific sound level consisted of a cumulation of dog barks occurring within the kennel over an 11 second period within the 15 minute assessment period. The distance between the kennels and the microphone was 1 meter.

8.1.7 The specific sound level of the dogs has been determined as shown below:

Night time kennel specific sound level = 54 dB $L_{Aeq,15min}$ (at 1m distance from microphone)

8.1.8 The specific sound levels identified above for daytime and night time dog barking noise have been used as source noise data within a 3D computer model of the site. The source noise levels were then adjusted to match the specific noise levels from dog barking noise as measured at P2. By this method the model has been exactly calibrated so that the predicted noise levels at the NSR in our model are the same as those actually measured at P2.

8.1.9 The noise levels measured at P2 were analysed to include only dog barking noise (therefore excluding all other noise including railway and, traffic and other general ambient noise). The worst case 1 hour daytime and 15 minute night time specific noise levels measured at P2 are shown below:

Daytime specific sound level = 33 dB $L_{Aeq,1hr}$ (14:19:00 – 15:19:00)

Night time specific sound level = 23 dB $L_{Aeq,15min}$ (05:30:00 – 05:45:00)

8.1.10 Tabular data for the specific noise levels measured at P2 are shown in Appendix 2.

8.2 Computer Modelling

8.2.1 Predictions of existing noise levels on the site have also been undertaken using the CadnaA noise modelling package. Specific model parameters were applied as follows:

- Propagation of noise using algorithms within ISO 9613: 1993 *Acoustics - Attenuation of sound during propagation outdoors*.
- Default ground absorption G = 1 (equivalent to grassed areas and consistent with the dominant ground cover at the site).
- Ground attenuation: spectral all sources
- No adverse meteorological effects
- Two orders of reflection

- Topographical data was obtained using NextMap Britain 2 m contours for the site and surrounding assessment area.

8.3 BS 4142:2014 Assessment

8.3.1 A BS 4142 assessment for both the daytime and the night time period has been undertaken in order to assess the potential noise impact at the nearest NSR. The assessment location is shown in Appendix 1. Both daytime and night time assessments have been carried out to ground floor window height as the nearest receptor is a single storey building within the residence, and due to the topography of the site (which slopes upwards) there is no significant change in predicted noise levels with regard to the height of the assessment receptor. 1.5 m was also the height at which measurements of specific noise levels were made on site.

8.3.2 The BS 4142 assessments for daytime and night time are shown in Table 8.

Table 8: BS 4142:2014 Noise Impact Assessment

Period	Background sound level $L_{A90,T}$	Specific sound level $L_{eq,T}$	Acoustic Feature Correction	Rating Level (including corrections) dB	Difference between BS4142 rating level and background sound level	Comment (based on BS 4142 guidance)
Daytime	30	33	6*	39	+ 9	'significant adverse' impact (depending on context)
Night time	28	23	6*	29	+ 1	'low adverse' impact (depending on context)

* Impulsivity correction – 'clearly perceptible'

8.4 Discussion

Daytime Noise Levels

8.4.1 A difference of +9 dB is predicted at the NSR, which indicates a potentially 'significant adverse' impact according to BS 4142 assessment methodology. The assessment is based on the worst case one hour period in the daytime measured during the survey, and therefore the potential impact for the remaining 15 hours of the daytime is likely to be reduced somewhat from that predicted here.

8.4.2 It should be remembered that there is no clear guidance on how to assess noise sources of this type and therefore the conclusions drawn from assessing them in this way cannot be considered definitive.

Night Time Noise Levels

8.4.3 A difference of + 1 dB is predicted at the NSR, which indicates a likelihood for 'low adverse' impact according to BS 4142 assessment methodology. The assessment is based on the worst case 15 minute period in the

night time measured during the survey, and therefore the potential impact for the remaining 7 hours and 45 minutes of the night time is likely to be even lower than that predicted here.

8.4.4 It should be remembered that there is no clear guidance on how to assess noise sources of this type and therefore the conclusions drawn from assessing them in this way cannot be considered definitive.

Uncertainty

8.4.5 Due to the nature of the noise source, it is expected that there will be a certain degree of variability in terms of noise levels from the dogs on a day-to-day, and perhaps even season-to-season basis. It is not possible to put a figure on the likely variability but as an indication, a doubling of noise from the site (twice as much barking, or a doubling of the number of barking dogs) on any particular day over another would result in a 3 dB increase in measured noise levels. Likewise a reduction of the noise levels by half would result in a 3 dB decrease in noise levels.

8.5 BS 8233:2014/WHO:1999 Assessment

8.5.1 In order to gain a wider context of the potential impact of activity noise associated with the proposed site comparison has also been made to guidance levels found in BS 8233 and WHO.

Daytime Noise Levels

8.5.2 The predicted specific noise level of $L_{Aeq,1hr}$ 33 dB would be expected to reduce by at least 10 dB (assuming open window attenuation) and therefore levels of approximately 23 dBA would be likely during the worst case hour of dog barking during the day. This would be 12 dB below the guidance noise limit for internal spaces. The external noise level would also be 17 dB below the lower limit of 50 dBA for external noise levels.

8.5.3 As with the BS 4142 assessment carried out earlier in this report, it should be noted that there is no clear guidance on how to assess noise of this nature and therefore the conclusions drawn from assessing them using the guidance available cannot be considered definitive.

Night Time Noise Levels

8.5.4 The predicted specific noise level of $L_{Aeq,1hr}$ 23 dB would be expected to reduce by at least 10 dB (assuming open window attenuation) and therefore levels of approximately 13 dBA would be likely during the worst case 15 minutes of dog barking during the night time. This would be 17 dB below the guidance noise limit for internal spaces.

8.5.5 The loudest night time maximum level due to dog barking occurred at 06:44:25 in the morning and was measured at L_{Amax} 52 dB at the NSR. This would reduce to at least 42 dB after passing through an open window and would therefore be below the 45 dB noise limit for L_{Amax} noise levels during the night time.

8.5.6 As with the BS 4142 assessment carried out earlier in this report, it should be noted that there is no clear guidance on how to assess noise of this nature and therefore the conclusions drawn from assessing them using the guidance available cannot be considered definitive.

9 Mitigation

9.1.1 We understand that certain practical mitigation measures have already been adopted at the site in order to minimise the noise impact from the dogs, including, limiting the number of dogs that are let outside at any one time, using ultrasonic dog silencers in the kennels to deter dogs from barking when inside, and putting up a visual barrier along the boundary between the dogs exercise area and the railway platform so that the dogs do not see pedestrians waiting for trains (a previous cause of barking at the site).

9.1.2 Our assessment has found that noise from the dogs when they are outside is more significant in terms of potential noise impact compared to when they are in the kennels. However as has been discussed with BDBC there are limited options for mitigating noise from the dogs when they are outside due to the inability to effectively screen the external area from the NSRs which overlook the site. Mitigating noise from the dogs when they are outside is likely to be in the form of limiting the number of dogs let out at a time and supervising them at all times – both of which methods are currently being employed at the site.

9.1.3 As discussed in section 5 above, after discussing the site with BDBC, the council have expressed an interest in further mitigating noise from the dogs when they are in the kennels, due to the nature of the existing noise complaint. Some options for reducing noise from the kennels are provided below:

1) Install a 2 m high noise barrier within 2m of the front of the kennels. The barrier should be constructed from continuous, imperforate material with a minimum mass of 12 kg/m2 and extend fully to the ground with no gaps along the bottom edge, as well as extending along the full length of the kennels. 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 R_w 25 dB would be appropriate. A suitable location for the barrier is shown in Appendix 3c.

2) Increase the mass and insulation of the kennel roofs. Replace the polystyrene ceiling with two layers of 12.5mm high density plasterboard (min. mass 10 kg/m^2) and put a mineral wool lining in the ceiling void. Ceiling cut-outs for lighting or any other holes should be avoided and therefore having a separate service void beneath the plasterboard layers with final polystyrene ceiling if significant cut outs are required would be preferable.

3) Include a 4mm glass panel of secondary glazing to the existing window assembly. New and existing frames should be installed to a good level of workmanship and sealed appropriately so that there are no gaps or other acoustic weaknesses around the perimeter of the assemblies.

4) Upgrade the kennel doors by double boarding the existing doors to increase their mass (or replace existing doors with approx. 25mm thick solid timber doors). Ensure that there is full perimeter sealing (e.g. rubber edging/draft strips) including at the threshold. Seals should be fitted carefully to be 'airtight'.

9.1.4 With the above mitigation in place, our conservative predictions indicate at least a 9 dBA reduction in noise levels at the NSR, which would mean a BS 4142 rating level of -8 dB compared to the background.

9.1.5 The predicted noise grids showing noise levels with and without mitigation are shown in Appendix 3.

10 Conclusions

10.1 A noise assessment was undertaken to predict the potential impact of a dog breeding facility at Remembrance Park, Entwistle Hall Lane, Edgworth, BL7 0LR. This was requested by the Local Authority to support a retrospective planning application for dog breeding at the development.

10.2 Measurements were taken over two days to obtain noise data for a full day's operating period.

10.3 Specific noise levels due to dogs barking at the site were calculated using site measured data and assessed against representative background sound levels for the nearest noise sensitive receptor.

10.4 The assessment approach has been agreed with BDBC; however it was agreed in consultation and noted in our report that there is no clear guidance on how to assess dog noise, and therefore the conclusions drawn from assessing them using the guidance available cannot be considered definitive.

10.5 The BS 4142 assessment predicted that noise at the NSR has a likelihood of 'significant adverse' impact during worst case daytime periods when some of the dogs are outside. However assessing to BS 8233 and WHO guidance levels provides a more favourable assessment whereby noise levels are within the stated limits.

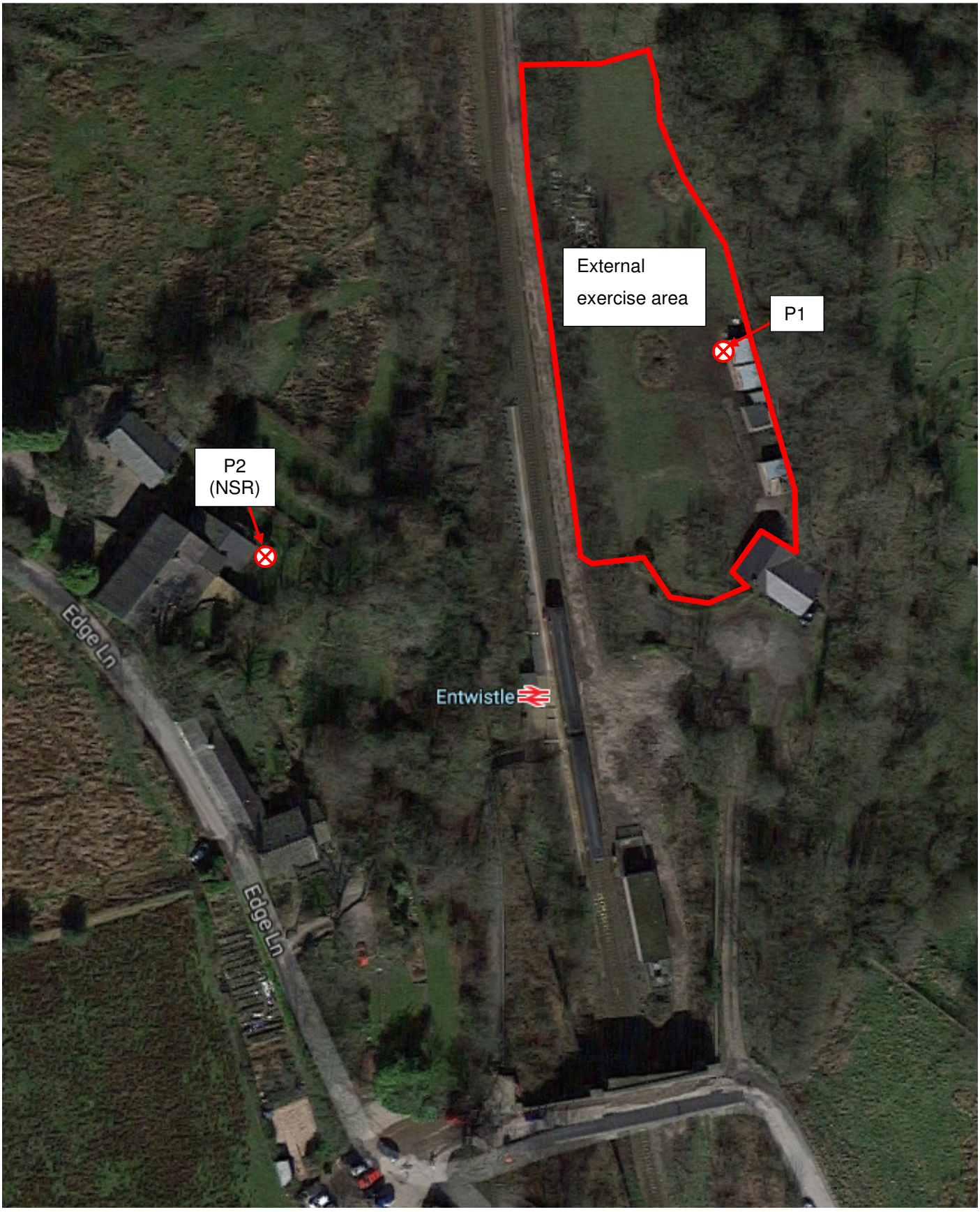
10.6 The BS 4142 assessment predicted that noise at the NSR has a likelihood of 'low' impact during worst case night time periods when the dogs are all inside the kennels. Assessing to BS 8233 and WHO guidance is also favourable whereby noise levels are well within the stated limits.

10.7 Physical mitigation of noise while the dogs are outside would be difficult to achieve due to the site's topography, however mitigation options for further reducing noise from the kennels have been provided that are predicted to reduce the noise levels from the kennels by at least 9 dB, which would mean a BS 4142 rating level of -8 dB compared to the background (i.e. 'low' adverse impact).

10.8 Certain practical means of mitigating noise from the dogs are already in place, such as limiting the number of dogs that are let outside at any one time, using ultrasonic dog silencers in the kennels to deter dogs from barking when inside, and putting up a visual barrier along the boundary between the dogs' exercise area and the railway platform so that the dogs do not see pedestrians waiting for trains (a previous cause of barking at the site).

APPENDICES

Appendix 1: Site Location (Exercise Area and Kennels)



Appendix 2a: Daytime Specific Noise Levels at NSR

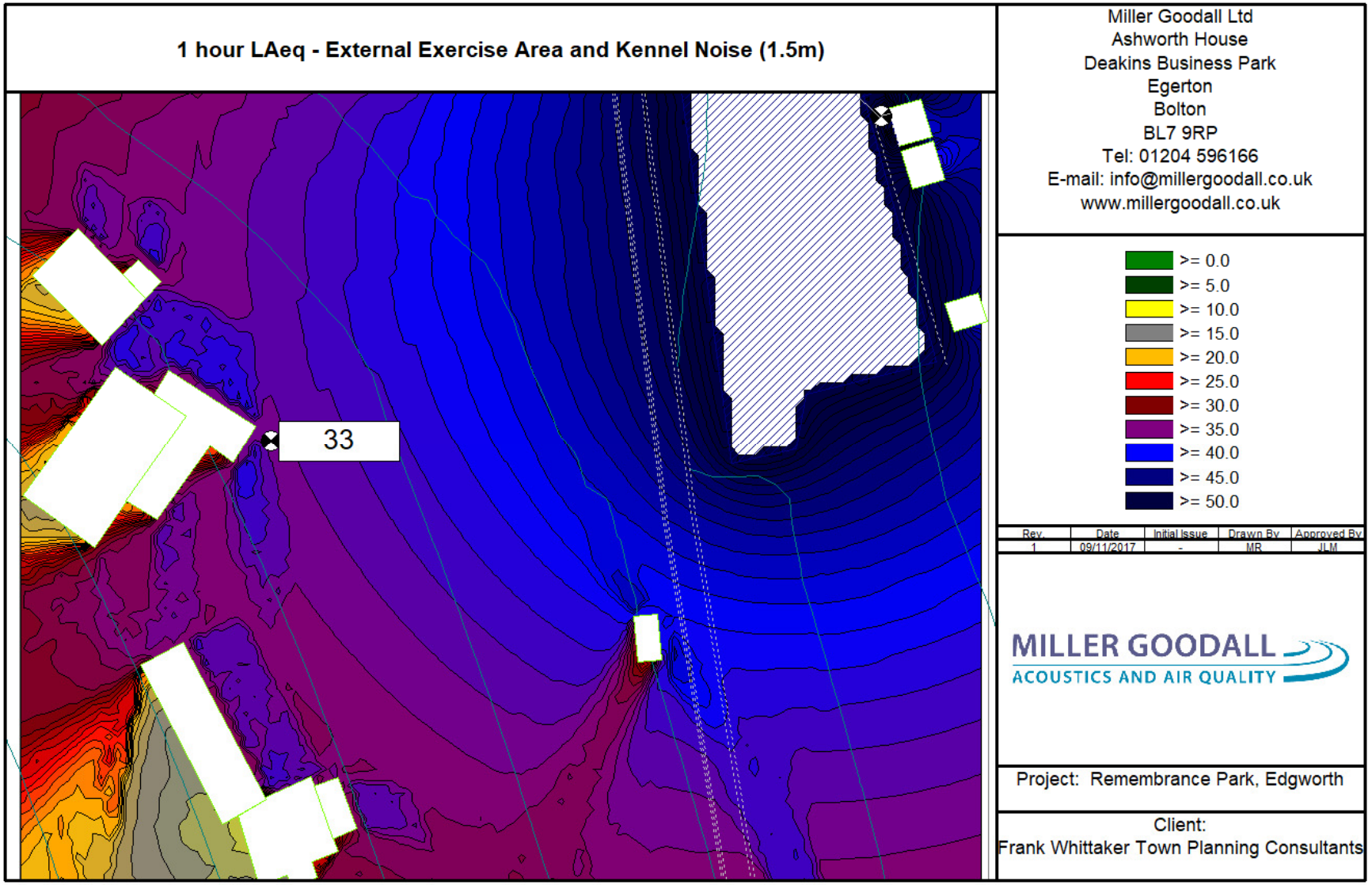
Effective duration	L_{Aeq}	L_{AFmax}	Time of Max
00:01.0	33.7	36.1	15:19:01
00:01.0	49.6	57.4	15:19:02
00:01.0	46.4	57.6	15:19:03
00:01.0	30.8	31.7	15:19:04
00:01.0	38.2	44	15:19:25
00:01.0	51.7	58	15:19:26
00:01.0	37.6	54.1	15:19:27
00:01.0	31.8	33.6	15:19:32
00:01.0	53	60.2	15:19:33
00:01.0	40.8	58.7	15:19:34
00:01.0	51.2	57.5	15:19:35
00:01.0	46.5	54.6	15:19:36
00:01.0	58.4	64.2	15:19:37
00:01.0	55	61.5	15:19:38
00:01.0	32.7	50.7	15:19:39
00:01.0	29.8	31.1	15:19:41
00:01.0	49.2	57.3	15:19:42
00:01.0	54.3	59.6	15:19:43
00:01.0	40.2	45.3	15:19:44
00:01.0	29.7	38.3	15:19:45
00:01.0	36.9	38.2	15:20:32
00:01.0	40.6	43.1	15:20:33
00:01.0	37.3	39.5	15:20:34
00:01.0	28.5	31.4	15:44:43
00:01.0	28	29	15:44:44
00:01.0	56.9	61.1	15:44:45
00:01.0	34.5	46.7	15:44:46
00:01.0	28.6	29.2	15:44:47
00:01.0	27.4	28.1	15:44:51
00:01.0	44.3	50.8	15:44:52
00:01.0	28	38	15:44:53
00:01.0	29.9	31.7	15:47:50
00:01.0	38.7	43.2	15:47:51
00:01.0	44.8	48.1	15:47:52
00:01.0	38.8	46.7	15:47:53
00:01.0	29.2	34	15:47:54
00:01.0	38.5	46.2	15:51:57
00:01.0	45.6	51.6	15:51:58
00:01.0	29.7	33.2	15:51:59
00:01.0	43.6	45.5	16:00:46
00:02.0	48.5	55.4	16:00:47
00:02.0	53.3	61.1	16:00:48
00:02.0	52.1	61.1	16:00:48
00:01.0	41.8	45.7	16:00:49

Effective duration	L_{Aeq}	L_{AFmax}	Time of Max
00:01.0	46.2	47.2	16:07:40
00:02.0	56.7	65.2	16:07:41
00:02.0	61.4	66.7	16:07:42
00:02.0	60.8	66.7	16:07:42
00:02.0	54.9	64.1	16:07:43
00:02.0	46.5	47.4	16:07:44
00:01.0	46	47.4	16:07:45
00:01.0	30.2	30.8	16:10:02
00:02.0	50.8	58.2	16:10:03
00:02.0	50.9	58.2	16:10:03
00:01.0	37.4	54.4	16:10:04
00:01.0	28.9	29.6	16:16:07
00:02.0	42.4	53.3	16:16:08
00:02.0	45	54.5	16:16:09
00:02.0	41.8	54.5	16:16:09
00:01.0	30	31.7	16:16:10

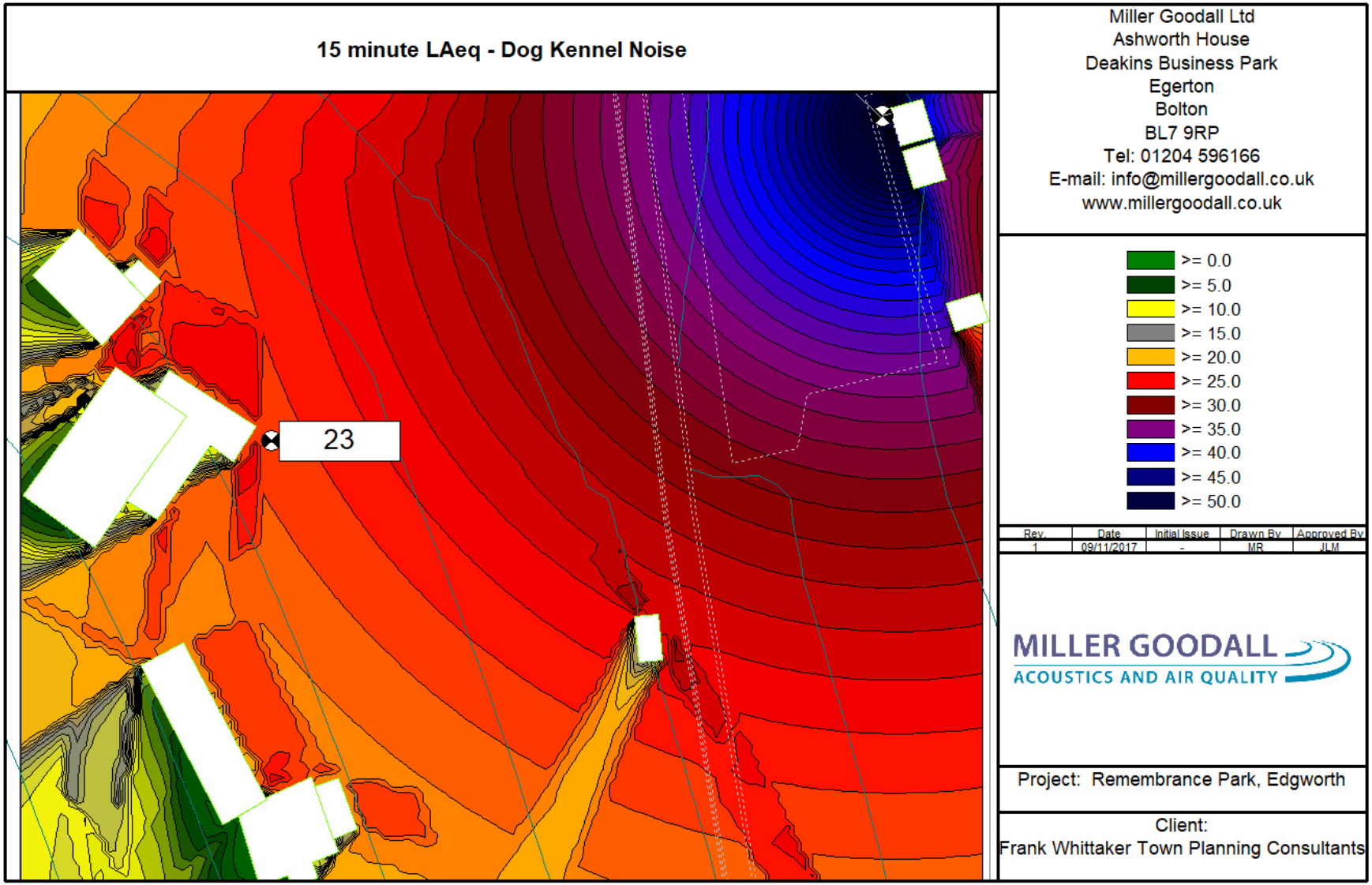
Appendix 2b: Night time Specific Noise Levels at NSR

Effective duration	L_{Aeq}	L_{AFmax}	Time of Max
00:01.0	39.7	44.7	06:44:24
00:01.0	46.5	51.9	06:44:25
00:01.0	41.5	47.7	06:44:26
00:01.0	42.6	49.5	06:44:27
00:01.0	34.6	42.9	06:44:28
00:01.0	44.1	51.4	06:44:29
00:01.0	39.6	48.2	06:44:30
00:01.0	38.9	45.2	06:44:31
00:01.0	42.9	47.4	06:44:32
00:01.0	39.4	45.6	06:44:33
00:01.0	29.3	36.5	06:44:34

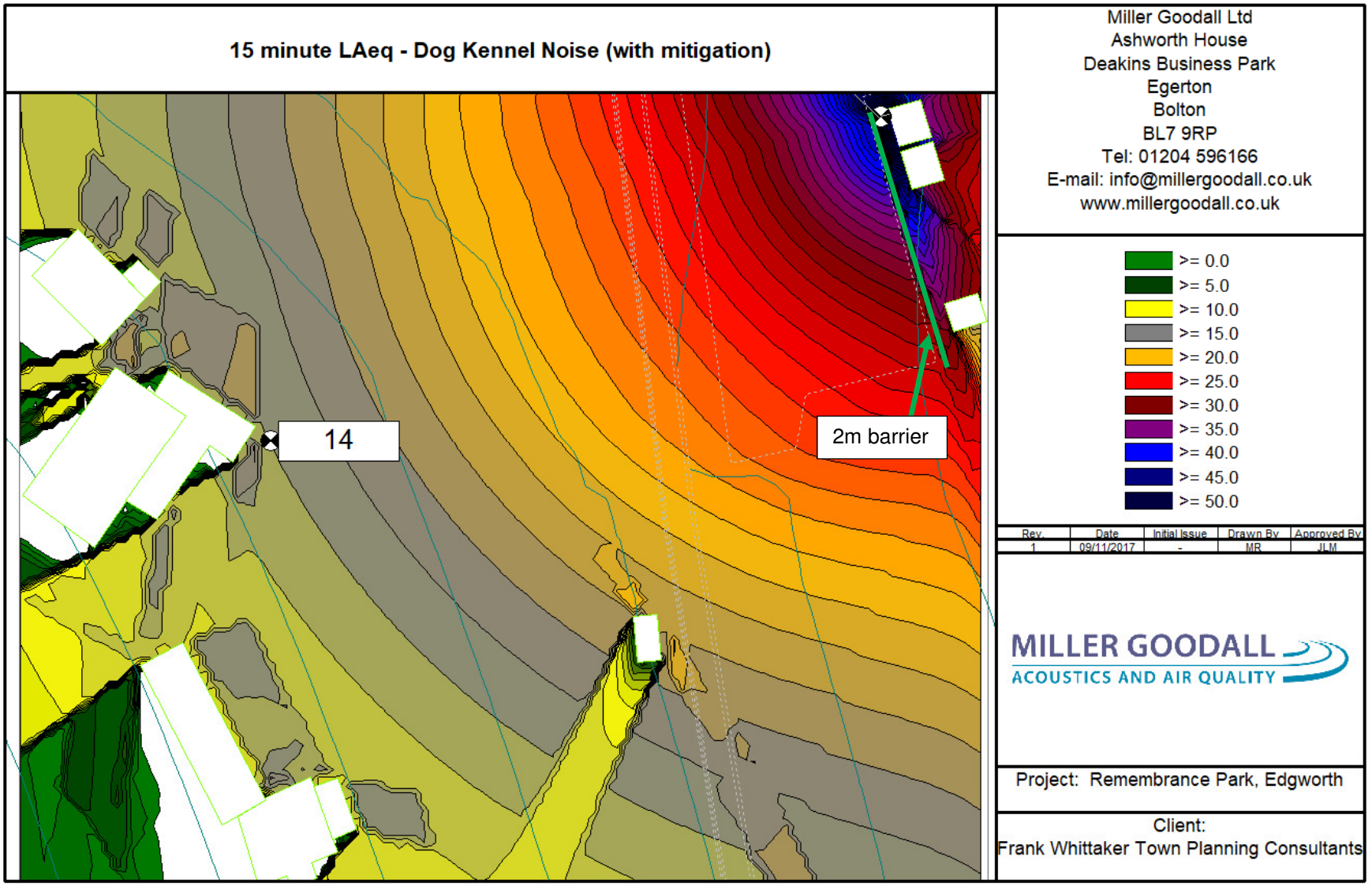
Appendix 3a: Noise Grid – Daytime noise (1.5m)



Appendix 3b: Noise Grid – Night time kennel noise (1.5m)



Appendix 3c: Noise Grid – Night time kennel noise (1.5m) (with mitigation)



Miller Goodall Ltd
Ashworth House
Deakins Business Park
Egerton
Bolton
BL7 9RP
Tel: 01204 596166
E-mail: info@millergoodall.co.uk
www.millergoodall.co.uk

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.

MILLER GOODALL

ACOUSTICS AND AIR QUALITY