

Radwell Grange, Baldock

Noise assessment in relation to Permitted Development Regulations (Class Q) for conversion of agricultural barns to residential use

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Northerns of Radwell

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SECTION	TITLE	PAGE
1.	INTRODUCTION.....	1
2.	SITE DESCRIPTION	1
3.	THE TOWN AND COUNTRY PLANNING (GENERAL PERMITTED DEVELOPMENT) (ENGLAND) ORDER 2015 (CLASS Q).....	1
4.	RELEVANT POLICY AND GUIDANCE.....	2
4.1	NATIONAL PLANNING POLICY FRAMEWORK (NPPF).....	2
4.2	NOISE POLICY STATEMENT FOR ENGLAND (NPSE).....	3
4.3	PLANNING PRACTICE GUIDANCE (PPG).....	4
4.4	BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND.....	5
5.	AMBIENT NOISE SURVEY	6
5.1	METHODOLOGY	6
5.2	SITE OBSERVATIONS	7
5.3	MEASUREMENT RESULTS.....	8
6.	ASSESSMENT	9
7.	CONCLUSIONS.....	10

APPENDIX A: Site drawings

APPENDIX B: Noise measurement results



1. INTRODUCTION

Northerns of Radwell intend to convert two existing agricultural barns at the above site to residential dwellings under Permitted Development legislation (Class Q).

Spectrum has been instructed by Northerns of Radwell to carry out the required noise impact assessment for the development.

The assessment detailed within this report focuses on the noise impact from commercial and agricultural activities.

2. SITE DESCRIPTION

The proposed development site is located around 330m east of the A1(M), due east of Stotfold and north of Baldock. The site forms part of a small group of buildings surrounded by agricultural land, with mixed use, comprising agricultural, commercial, and residential.

The two barns to be converted to residential use under this proposal are Barns A and B. These are currently used for agricultural storage. Bounding these barns to the northwest, northeast and east are residential uses with open agricultural land beyond. Opposite the barns to the southeast is Barn C, which is occupied by Herts & Beds Transmissions Ltd, a company specialising in the repair and servicing of motor vehicle gearboxes. Beyond this to the southeast is Barn D, which is used for agricultural storage.

It is understood that Herts & Beds Transmissions Ltd operate during the following hours:

- Monday to Friday 7am – 6pm
- Saturday 7am – 11am
- Sunday Closed

A site layout plan is presented in Appendix A.

3. THE TOWN AND COUNTRY PLANNING (GENERAL PERMITTED DEVELOPMENT) (ENGLAND) ORDER 2015 (CLASS Q)

The relevant parts of the Permitted Development legislation under Class Q are copied below.

Permitted development

Q. Development consisting of—

(a) a change of use of—

- (i) a building that is part of an established agricultural unit and any land within that building's curtilage, or***
- (ii) a former agricultural building that was (but is no longer) part of an established agricultural unit and any land within that building's curtilage,***

to a use falling within Class C3 (dwellinghouses) of Schedule 1 to the Use Classes Order,

(b) development referred to in sub-paragraph (a) together with the extension of the building referred to in sub-paragraph (a), or



(c) development referred to in sub-paragraph (a) together with building operations reasonably necessary to convert the building referred to in sub-paragraph (a) to a use falling within Class C3 (dwellinghouses) of that Schedule or to extend that building.

Conditions

Q2.—(1) *Where the development proposed is development under Class Q(a) together with development under Class Q(c), development is permitted subject to the condition that before beginning the development, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—*

- (a) transport and highways impacts of the development,*
 - (b) noise impacts of the development,*
 - (c) contamination risks on the site,*
 - (d) flooding risks on the site,*
 - (e) whether the location or siting of the building makes it otherwise impractical or undesirable for the building to change from agricultural use to a use falling within Class C3 (dwellinghouses) of Schedule 1 to the Use Classes Order,*
 - (f) the design or external appearance of the building, and*
 - (g) the provision of adequate natural light in all habitable rooms of the dwellinghouses,*
- and the provisions of paragraph W (prior approval) of this Part apply in relation to that application.*

The condition in subparagraph (1)(b) requires an assessment of ‘noise impacts of the development’. The use of a converted barn as a residential dwelling would not be expected to generate any noise impacts so it is not clear why this is included. However, the Permitted Development legislation for conversions of other types of buildings to residential dwellings (e.g. Class O or Class MA) require an assessment of commercial noise impact on the proposed dwelling, while other sources of noise need not be assessed. It is therefore assumed that the wording within subparagraph (1)(b) is the result of a typo and the assessment within this report follows the spirit of the wider legislation as more clearly stated under other relevant classes.

4. RELEVANT POLICY AND GUIDANCE

4.1 NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The National Planning Policy Framework (NPPF)¹ sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

The NPPF requires (187) prevention of new or existing development from contributing to, or being adversely affected by, unacceptable levels of noise pollution.

New development (198) should be appropriate to its location taking into account the likely effects of pollution on health, living conditions and the natural environment. In doing so it is required to:

¹ National Planning Policy Framework, MHCLG, December 2024



'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 life²;

'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'

Planning policies and decisions should also (200) *'ensure that new development can be integrated effectively with existing businesses and community facilities [...]. 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.'*

4.2 NOISE POLICY STATEMENT FOR ENGLAND (NPSE)

The Noise Policy Statement for England (NPSE)³ sets out the long term vision of government noise policy which is to *'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'*

The aims of the NPSE are to (2.23-2.25):

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life

These aims are developed by reference (2.20-2.21) to the concepts of:

- NOEL (No Observed Effect Level). This is the level below which no effect can be detected.
- LOAEL (Lowest Observed Adverse Effect Level). This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL (Significant Observed Adverse Effect Level)..This is the level above which significant adverse effects on health and quality of life occur.

It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times (2.22).

Situations of significant adverse effect (SOAEL) should be avoided (2.23). Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but does not mean that such adverse effects cannot occur (2.24). It is also implied that situations of NOEL would be acceptable in noise terms.

² See Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24 , Department for Environment, Food & Rural Affairs, 15 March 2010).

³ Noise Policy Statement for England (NPSE), DEFRA, 15 March 2010



4.3 PLANNING PRACTICE GUIDANCE (PPG)

Planning Practice Guidance on Noise⁴ (PPG-N) sets out government guidance on *'how planning can manage potential noise impacts in new development'*.

Whilst it does advise that noise can override other planning concerns, *'where justified'*, it states that *'it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern.'* (002)

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE⁵. The noise exposure categories are summarised below.

- No Observed Adverse Effect: Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response.
- Observed Adverse Effect: Noise can be heard and causes small changes in behaviour, attitude or other physiological response.
- Significant Observed Adverse Effect: The noise causes a material change in behaviour, attitude or other physiological response.
- Unacceptable Adverse Effect: Extensive and regular changes in behaviour, attitude or other physiological response, and/or an inability to mitigate effect of noise leading to psychological stress.

The guidance advises, in accordance with the first and second aims of the NPSE, that where there is no observed effect or no observed adverse effect, no specific measures are required to manage the acoustic environment; where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects; where there is significant adverse effects, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.

In establishing values for LOAELs and SOAELs, which represent the onset levels of adverse effects and significant adverse effects, respectively, the guidance advises because of the subjective nature of noise, there is no simple relationship between noise level and its impact. It will instead depend on a number of factors in a particular situation. These will include:

- The source, its absolute level and the time of day.
- For intermittent sources, the number and duration of events;
- The spectral frequency content of the noise

And also other factors will need to be considered in many cases, which are more fully described and detailed within the full PPG guidance, but include matters such as:

- The cumulative impacts with other sources
- Whether internal effects can be completely removed for example by closing windows (relevant with new residential development subject to ventilation being developed)

⁴ PPG - Noise, MHCLG, 22 July 2019

⁵ Explanatory Note to the Noise Policy Statement for England, paragraphs 2.19 and 2.20, DEFRA, 15 March 2010)



- Whether existing noise sensitive locations already experience high noise levels,
- Where Noise Action Plans, and, in particular Important Areas are identified nearby.
- The effect on wildlife especially on nationally designated sites.
- The use of external amenity spaces intrinsic to an overall design and including private gardens.
- The potential effect of a new residential or other sensitive development being located close to an existing noisy business or site, and for noise mitigation to be considered.
- Whether there are nearby areas of tranquility relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area and likely already valued for their tranquillity.

It should be observed that the PPG guidance does not provide any detail on the how such assessment including these factors, should be carried out. However, reference is made to documents published by other organisations, such as:

- *BS 8233:2014– Guidance on sound insulation and noise reduction for buildings (British Standards Institute 2014);*
- *Guidelines for Environmental Noise Impact Assessment (Institute of Environmental Management and Assessment, 2014);*
- *ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise- New Residential Development (Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health, May 2017).*

This should not be considered an exhaustive list, however, as reference may also be made to other existing British Standards, where relevant, and to scientific exposure-response studies or reviews relating to noise and its effects on human and, where appropriate, animal populations.

4.4 **BS 4142:2014+A1:2019 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND**

The principle of BS 4142⁶ is to determine an initial estimate of impact of industrial/commercial sound on nearby residents by comparing the Rating Level (sound level from the industrial/commercial source, with a correction applied for any acoustic features that characterise the sound) with the Background Sound Level (L_{A90} as measured in absence of the industrial/commercial source).

Generally, the greater the difference by which the Rating Level exceeds the Background Sound Level, the greater the magnitude of impact. BS 4142 states that ‘a difference of around +10 dB or more is likely to be an indication of a significant adverse impact [...]. A difference of around +5 dB is likely to be an indication of an 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.’

However, BS 4142 also advises that ‘when making assessments and arriving at decisions [...] it is essential to place the sound in context’ so in each case, the context in which the sound is placed must be considered and the initial estimate of impact should be modified accordingly. For example it advises ‘Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.’ It also

⁶ BS 4142:2014 Methods for rating and assessing industrial and commercial sound



indicates that impacts estimated during *'the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes.'*

5. AMBIENT NOISE SURVEY

5.1 METHODOLOGY

The ambient noise survey consisted of both attended and unattended measurements at a location representative of the proposed dwellings to determine the existing ambient noise environment. Measurements were conducted between Tuesday 14th and Friday 17th January 2025.

Attended measurements were carried out during a sample period of the day on Tuesday 14th January between 15:30 and 17:00. This period was chosen as it is within the operational hours of Herts & Beds Transmissions Ltd.

Continuous unattended measurements were also carried out from 15:25 on Tuesday 14th January to 12:40 on Friday 17th of January 2025, with the noise logger set to measure in contiguous 1-minute periods. Sample audio recordings were also made at regular intervals for later analysis and source identification.

Noise measurement parameters consisted of equivalent continuous (L_{Aeq}) noise levels and maximum (L_{Amax}) noise levels as well as statistical noise levels (termed L_n , where n is the percentage of time the level is exceeded during the measurement period). Both overall and 1/1 octave band measurements were stored for later analysis.

The following equipment was used:

- Bruel & Kjaer Type 2250 Sound Level Meter s/n 3010945
- Bruel & Kjaer Type 4189 Microphone s/n 3060807
- Bruel & Kjaer Type 4231 Acoustic Calibrator s/n 3010648

Before and after the survey, the sound level meters were field-calibrated in accordance with the manufacturer's guidelines, and no significant drift was observed. The field calibrator is laboratory calibrated annually and the meter and microphone are laboratory calibrated at 2 yearly intervals, all in accordance with UKAS procedures by a UKAS-accredited laboratory.

The weather was generally overcast with wind speeds below 5m/s during the attended period of the survey.

The noise monitoring location (NML) is presented in Figure 1, below.

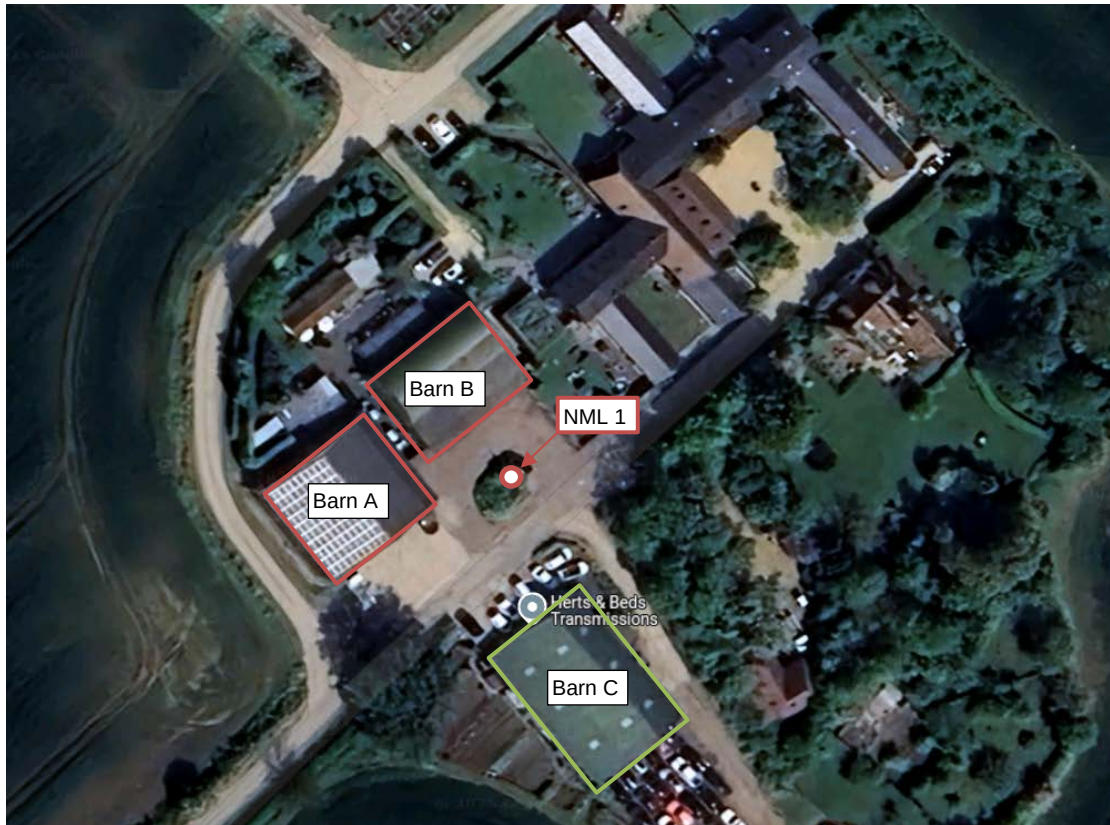


Figure 1: Noise monitoring location (NML 1)

5.2 SITE OBSERVATIONS

The noise environment at the site is dominated by continuous road traffic movements on the A1(M) to the west. Occasional vehicle movements at low speeds associated with residential, agricultural and commercial uses were noted on the driveway between the proposed dwellings and Barn C. Noise events associated with the commercial and agricultural uses included occasional light clunks and thuds resulting from loading/unloading activities and doors closing, and occasional and brief ratchet noise breakout from within Barn C. For most of the time, however, there was no audible commercial noise.

On-site observations were made on Tuesday 14th January between 15:30 and 17:00 during which time notes on audible activities were made for each 1-minute measurement period. During this time, there were a total of 17 minute periods during which agricultural or commercial activity was briefly audible and a total of 1 hour 13 minutes when no agricultural or commercial activity was audible.

There was also some bird tweeting activity observed in the bush near the microphone, which affected the noise measurements when present. This was occasional during the attended part of the survey but analysis of the unattended survey results and sample audio recordings indicated a significant amount of bird activity during the daytime periods, typically between 7am and 3-4pm.



5.3 MEASUREMENT RESULTS

Noise from birds tweeting occupies frequencies at and above the 4kHz octave band, with little sound energy produced below these frequencies. In contrast, noise from road traffic and agricultural and commercial activities occupies the lower frequency spectrum (63Hz-2kHz) with little significant energy at 4kHz and above.

The chart in Figure 2, below, presents the results of measurements at NML 1 during the attended part of the survey. The orange line represents the broadband $L_{Aeq,1min}$ levels, which includes sound at all frequencies. The blue line represents the $L_{Aeq,1min}(63Hz-2kHz)$ levels, which excludes frequencies at 4kHz and above. Where there is a marked difference between these two lines it may be concluded that sound from tweeting birds is dominating the measured $L_{Aeq,1min}$ level. These periods have been excluded from further analysis.

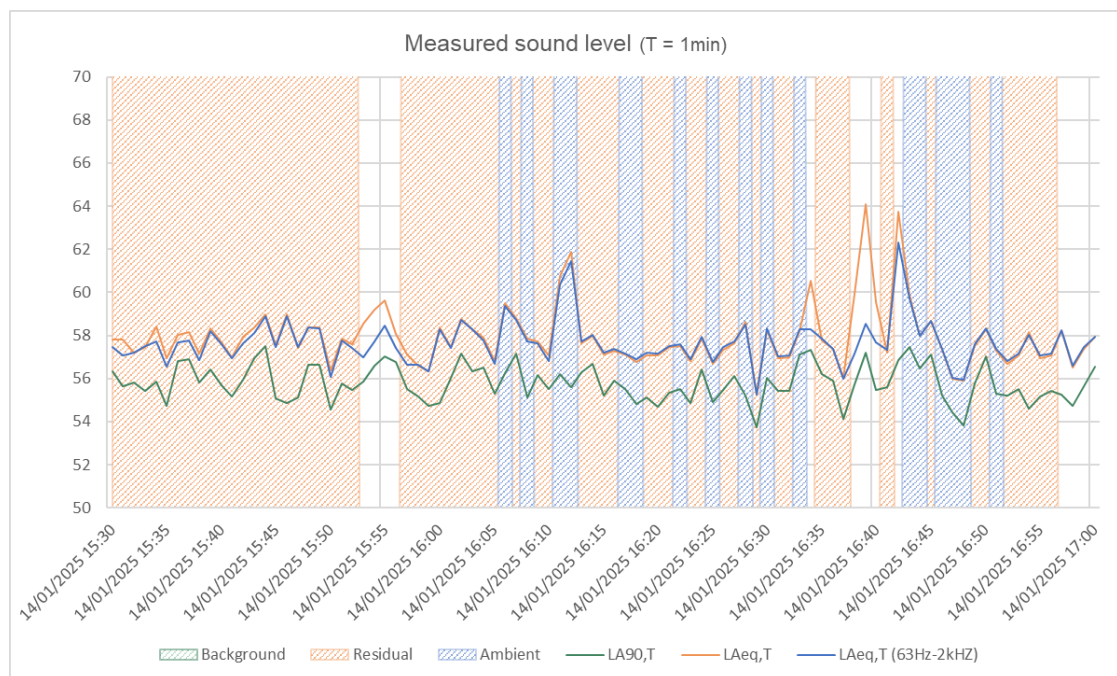


Figure 2: Attended measurement results

The chart in Figure 2 is marked up to highlight periods where agricultural and commercial activities were audible (ambient region - blue) and where these activities were not audible (residual region - orange). In total there are 17 minutes of ambient measurements and 1 hour 1 minute of residual measurements represented. The highlighted 1-minute measurements have been log averaged to determine the ambient and residual sound levels measured over the attended part of the survey.

Ambient sound levels were $L_{Aeq,17min}$ 58.4dB. Residual sound levels were $L_{Aeq,1hr1min}$ 57.6dB.

The specific sound level from agricultural and commercial activities can be determined by logarithmically subtracting the residual sound level from the ambient sound level, giving $L_{Aeq,17min}$ 50.6dB.



Background sound levels can be determined by statistical analysis of the L_{A90} values measured during periods without agricultural and commercial activity. The typical background sound level has been determined to be L_{A90} 55dB by taking the lowest of the mean, mode, and median values recorded over the period.

The results of the measurements over the full unattended survey period are presented in Appendix B and shows consistent levels for each day of the survey. The chart presents both the $L_{Aeq,1min}$ levels and the $L_{Aeq,1min}(63Hz-2kHz)$ levels to highlight periods where tweeting birds dominated the $L_{Aeq,1min}$ levels.

6. ASSESSMENT

The results of the noise measurement survey indicate that the specific sound level from agricultural and commercial activities incident on the proposed residential units is $L_{Aeq,17min}$ 50.6dB.

The daytime reference period for assessment under BS 4142 is 1-hour. Based on on-site observations made over a 1-hour reference period, there were 17 minutes during which the specific sound was audible. Therefore, an on-time correction of -5.5dB is made to give a specific sound level over the 1-hour assessment period of $L_{Aeq,1hr}$ 45dB.

Although there were very occasional light clunks and thuds, other acoustic characteristics that were neither tonal nor impulsive were the main features that stood out against the residual acoustic environment, such as vehicles arriving and departing and occasional noise from a racket. Accordingly, a +3dB character correction is considered appropriate, giving a rating level of $L_{Ar,Tr}$ 48dB.

The background sound level is L_{A90} 55dB. Therefore, the rating level is 7dB below the background sound level.

As summarised in Section 4.4, above, the BS 4142 methodology determines an initial estimate of the impact by comparing the rating level to the background sound level: *a difference of around +10 dB or more is likely to be an indication of a significant adverse impact [...]. A difference of around +5 dB is likely to be an indication of an 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.'*

In this case, the initial estimate of the impact is low.

It is noted that on-site observations were only made on one day during a period of 1.5 hours and that there is likely to be some variation in agricultural and commercial activities from one day to another. The results of the unattended measurements indicate consistent noise levels measured on each day of the survey and a review of the sample audio recordings made for 15 seconds every 20 minutes showed up audible activities in only a few samples. In the vast majority of the audio recordings no agricultural or commercial activities were audible.

Nevertheless, a more intensive operational scenario may be considered by assuming that the activities observed for 17 minutes of the 1.5 hour attended survey may occur continuously over the full 1-hour reference period. Accordingly, the on-time correction of -5.5dB would not apply, the specific sound level would be $L_{Aeq,1hr}$ 51dB, and the rating level would be $L_{Ar,Tr}$ 54dB. This is still 1dB below the background sound level, indicating a low impact.



The above analysis demonstrates, with a high degree of certainty, that there would be low noise impact from commercial activities on the proposed residential dwellings at this site.

7. CONCLUSIONS

Northerns of Radwell intend to convert two existing agricultural barns at the above site to residential dwellings under Permitted Development legislation (Class Q).

A noise measurement survey has been undertaken to determine the existing acoustic environment affecting the site. The noise environment at the site is dominated by continuous road traffic movements on the A1(M). Noise from commercial and agricultural activities are also occasionally audible.

An assessment of commercial noise impact has been carried out in accordance with the methodology set out in BS 4142. The results of the assessment indicate that the impact is acceptably low.

A P P E N D I X A

Site Drawings



The Chaff Barn

The Mill Place

The Shay House

The Old Dairy

Radwell Grange

BARN B
321.7m²
GEA

BARN A
434.6m²
GEA

BARN C
397.2m²
GEA

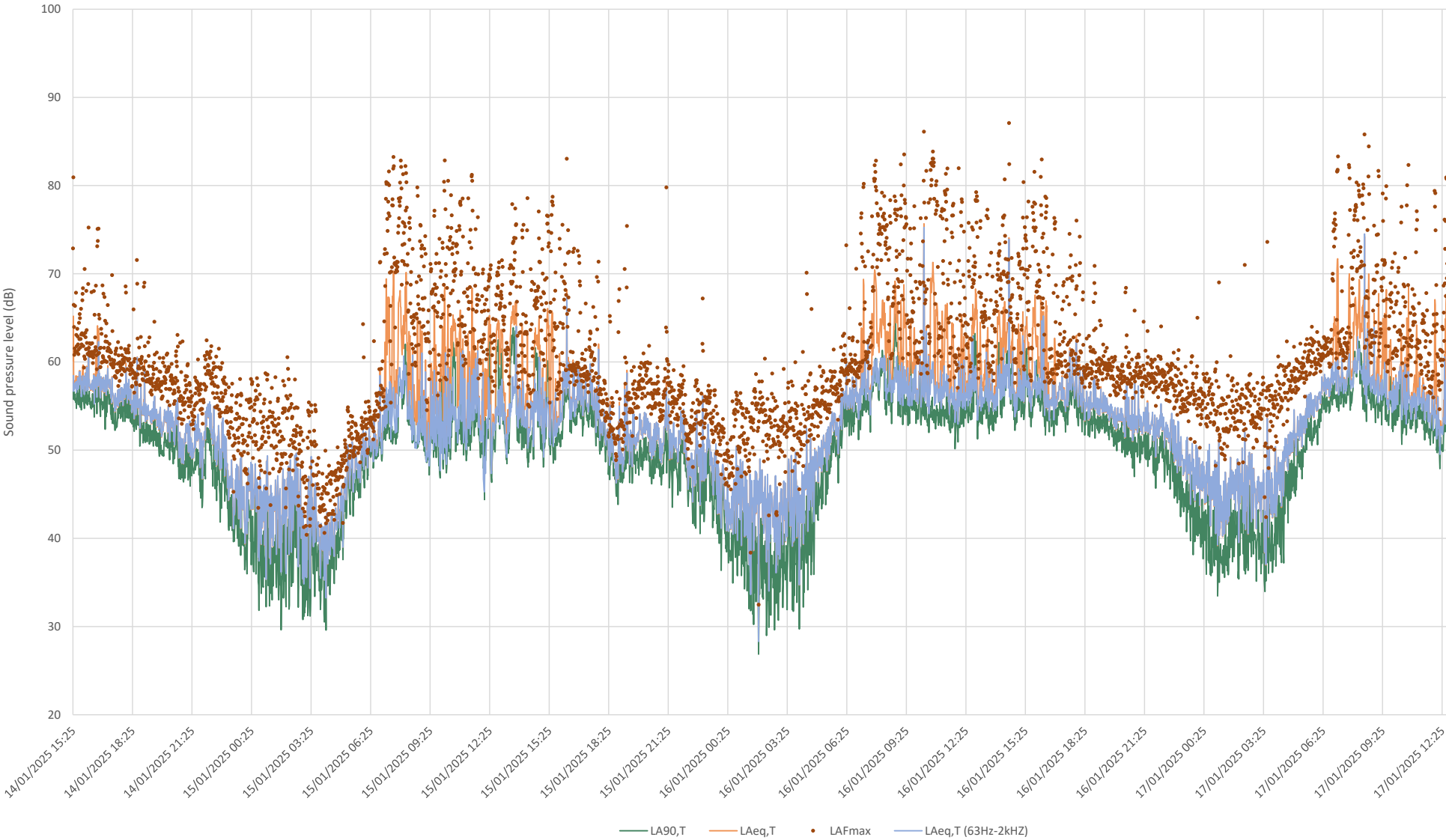
BARN D
227.7m²
GEA

A P P E N D I X B

Noise Measurement Results

NML 1

Measured sound level (T = 1min)



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