Land at Church Lane, Lydden, CT15 7JP

Residential Noise Assessment

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1 INTRODUCTION

1.1 Entran Ltd has been commissioned to undertake a noise assessment for a proposed residential development at Land at Church Lane (the 'proposed development') in Lydden, Kent.

1.2 The assessment has been undertaken to consider the noise levels at the proposed residential development site. The assessment considers the existing ambient noise and the suitability of the site for residential use.

1.3 The potential noise impacts are assessed in accordance with the most relevant national and local standards and guidelines.

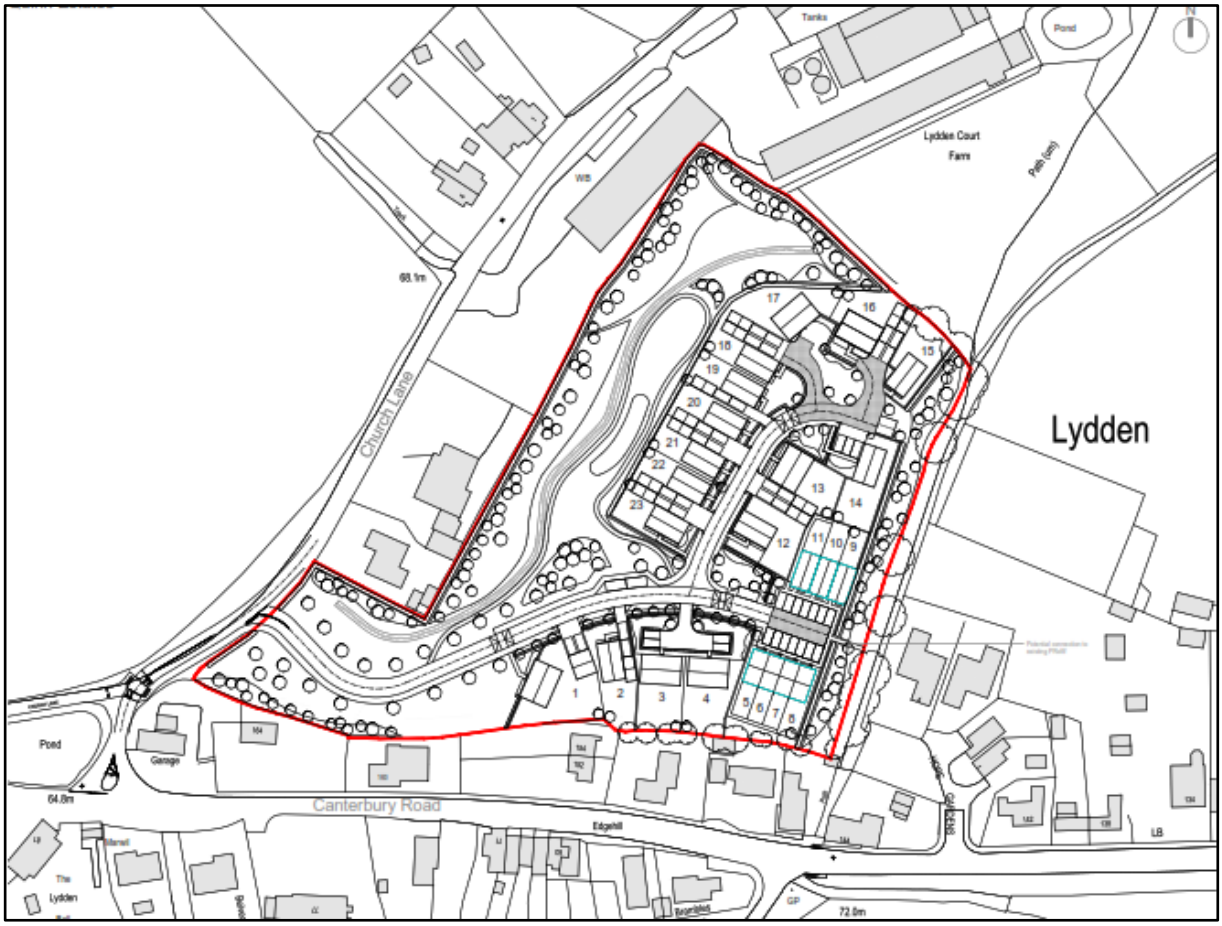
1.4 The noise levels are assessed using criteria provided within BS 8233:2014 and the WHO Guidelines. This report is necessarily technical in nature and contains terminology relating to acoustics and noise. Therefore, a glossary together with a brief introduction to the subject of noise has been provided in Appendix A.

2 SITE DESCRIPTION

2.1 The site is situated approximately 65m to the east of Church Lane and 30m north of Canterbury Road. The existing noise climate within the vicinity of the proposed development site is dominated by distant road traffic on the surrounding road network.

2.2 The proposed development location and boundary are indicated in Figure 1.

Figure 1 – Site Location



3 ASSESSMENT METHODOLOGY

National Policy

National Planning Policy Framework (NPPF) (July 2021)

3.1 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

3.2 Under Section 15; Conserving and enhancing the natural environment, the following is stated in paragraph 174:

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

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…"

3.3 The NPPF goes on to state in paragraph 185 that:

"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 potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

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;

identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"

Noise Policy Statement for England NPSE (March 2010)

3.4 The Government is committed to sustainable development and the Department for Environment Food and Rural Affairs (Defra) plays an important role in this by working to secure a healthy environment in which current and future generations can prosper. One aspect of meeting these objectives is the need to manage noise for which Defra has the overall responsibility in England.

3.5 In March 2010, the Noise Policy Statement for England (NPSE) set out the long-term vision of Government noise policy as 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.'

3.6 The long-term vision is supported by the following aims:

'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life: and,*
- *Where possible, contribute to the improvement of health and quality of life.'*

3.7 The explanatory note to the policy statement emphasises that sustainable development is a core principle underpinning all government policy. In this respect, there is a need to integrate consideration of the economic and social benefit of the activity under examination with proper consideration of the adverse environmental effects.

3.8 To achieve these objectives the NPSE sets out three noise conditions to be determined by the assessor:

NOEL - No Observed Effect Level

3.9 This is the level below which no effect can be detected. In simple terms, below this level there is no detectable effect on health and quality of life due to the noise.

LOAEL - Lowest Observed Adverse Effect Level

3.10 This is the level above which adverse effects on health and quality of life can be detected.

SOAEL - Significant Observed Adverse Effect Level

3.11 This is the level above which significant adverse effects on health and quality of life occur.

3.12 The NPSE considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable.

3.13 Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the NPSE requires that:

'All reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development…. This does not mean that such adverse effects cannot occur.'

3.14 No objective values are offered within the NPSE, as the document does indicate that each site should be considered on its own merits. Consequently, consideration of the observed effects is made through an assessment methodology as detailed below.

British Standard BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (2014)

3.15 The scope of BS 8233 is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

3.16 This Standard suggests suitable internal noise levels within different types of buildings, including residential dwellings. It suggests that an internal noise level of 30 dB $L_{Aeq,\,T}$ within bedrooms is a 'desirable' standard. For living areas during the daytime, the standard recommends 35 dB $L_{Aeq,\,T}$ as a desirable standard for resting.

3.17 Whilst BS 8233 recognises that a guideline value may be set in terms of SEL or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: *Guidelines for Community Noise*.

3.18 The Standard also states that "*where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved*."

The Institute of Environmental Management & Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (2014)

3.19 The Institute of Environmental Management and Assessment (IEMA) published the '*Guidelines for Environmental Noise Impact Assessment*'. The guidelines are applicable to noise impact assessment for any scale of development proposal, including core principles to achieve effectively integration with the EIA, and provide advice on the issues that need to be considered in a noise impact assessment and whether the appropriate conclusions are being reached. The factors include:

- The appropriateness of the noise parameters used for the situation;
- The reference time period used in making the assessment;
- The level, character and frequency content of the noise sources under investigation; and,
- How the predicted noise levels relate to relevant Standards and guidelines.

3.20 The guidelines also recommend that the assessor should determine the degree of impact based on evidence derived from the assessment.

The Professional Practice Guidance on Planning and Noise (2017)

3.21 The '*Professional Practice Guidance on Planning and Noise'* (ProPG) was produced by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH) to provide acoustical practitioners with guidance on the management of noise within the planning system in England.

3.22 The reparation of the ProPG acknowledges and reflects the Government's overarching NPSE, the NPPF and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance. It provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

- advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- encourage the process of good acoustic design in and around new residential developments;
- outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- promote appropriate noise exposure standards; and,
- assist the delivery of sustainable development.

4 ENVIRONMENTAL NOISE MEASUREMENTS

4.1 Noise conditions in the vicinity of the proposed development have been determined by an environmental noise survey conducted between 28th July and 1st August 2023.

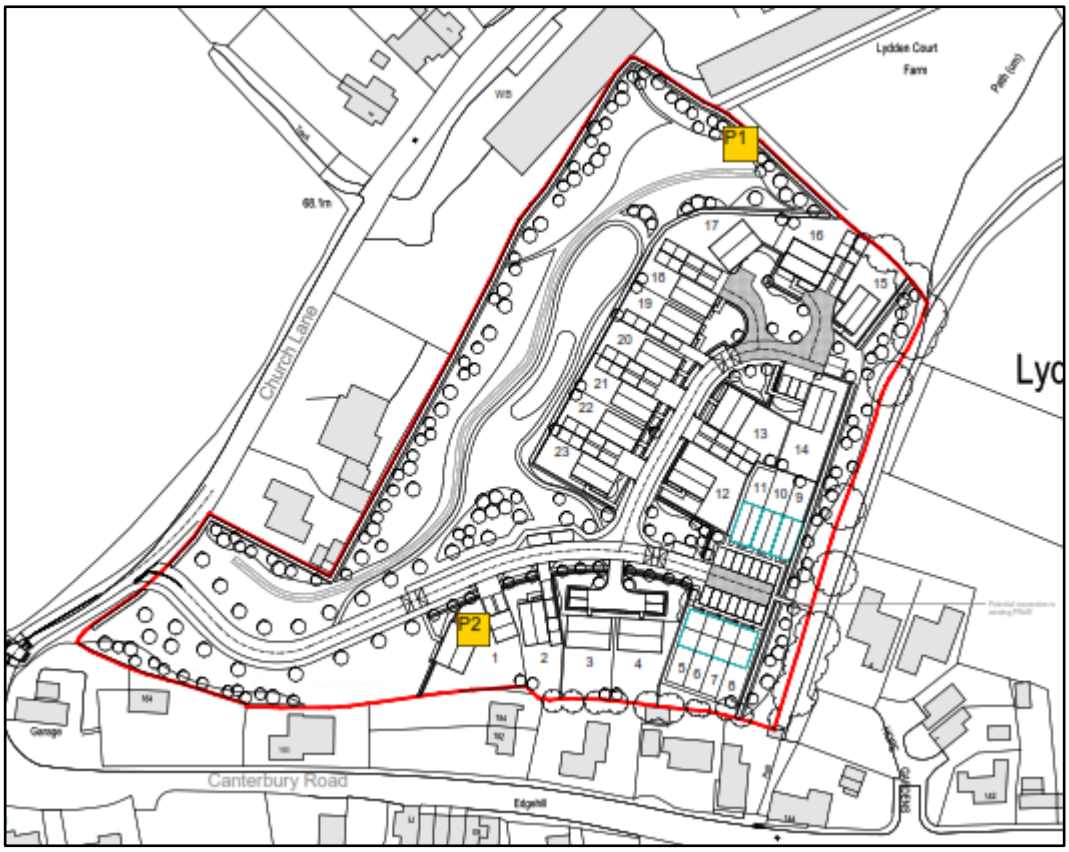
4.2 All noise measurements were undertaken by competent individuals with experience in environmental noise monitoring. Measurements were obtained in accordance with the principles of BS 7445: 2003: '*Description and measurement of environmental noise'*. The microphones were fitted with a protective windshield and the sound level meters were situated in a weatherproof case.

4.3 All acoustic measurement equipment used during the noise surveys conformed to Type 1 specification of British Standard 61672: 2003: *Electroacoustics. Sound level meters. Part 1 Specifications*. The noise measurement equipment used during the surveys was calibrated at the start and end of the measurement period. The calibrator used for field calibration was itself laboratory calibrated to 114 dB at 1 kHz. There was no significant drift in calibration measurements observed during the survey period.

4.4 Unstable weather conditions with periods of rain may have affected the survey results during the measurement period and typical noise levels at the site may therefore be lower than those obtained during the survey period. However, no consideration to periods of unstable weather has been made in order to provide a cautious assessment of noise levels at the proposed development.

4.5 Unattended measurements were obtained to the north and south of the site. The monitors were situated approximately 1.8 m above local ground level. The monitoring positions are indicated in Figure 2.

Figure 2 – Monitoring Locations



4.6 A summary of the unattended survey is provided in Table 1 and graphical representation of the unattended results is presented in Figure B1 and Figure B2 of Appendix B.

Table 1: Summary of Unattended Noise Measurements

Monitoring Position	Date	Measured Free-Field Sound Pressure Level, dB re. $2x10^{-5}$ Pa.					
		Day Time (07:00 - 23:00)			Night-time (23:00 - 07:00)		
		$L_{Amax,F}$	$L_{Aeq,T}$	$L_{A90,T}$	$L_{Amax,F}$	$L_{Aeq,T}$	$L_{A90,T}$
P1	28/07/2023	84.0	46.0	36.6	72.8	43.3	28.5
	29/07/2023	80.5	52.3	39.6	73.1	41.1	27.4
	30/07/2023	83.1	49.1	41.0	72.2	46.7	39.9
	31/07/2023	79.8	52.2	40.0	72.2	42.2	32.5
	01/08/2023	72.4	44.6	39.0	-	-	-
P2	28/07/2023	76.7	44.0	37.1	59.1	37.4	28.9
	29/07/2023	77.0	45.8	39.5	70.7	37.9	31.2
	30/07/2023	79.6	46.5	40.9	65.0	42.9	39.2
	31/07/2023	79.5	46.0	40.4	65.9	40.2	35.2
	01/08/2023	71.6	45.7	42.1	-	-	-

Maximum levels represent the highest $L_{Amax,F}$ sound level during the given period.
The period $L_{Aeq,T}$ is obtained from the logarithmic average of measured sound levels.
The period $L_{A90,T}$ is obtained from the average of the measured sound levels.

5 NOISE ASSESSMENT

Ambient Noise Levels

5.1 The existing noise levels at the site have been assessed by comparing the results of the environmental noise survey with the guidance provided in BS 8233 and the WHO Guidelines.

5.2 The measured ambient noise levels have been averaged to obtain representative day and night-time noise levels. Internal ambient noise levels have been calculated using the typical façade reductions detailed in BS 8233. The typical façade reduction afforded by insulated double glazing and attenuated trickle ventilation is given within BS 8233 as 33 dB. For partially open windows the reduction is given as 15 dB.

5.3 Daytime and night-time noise levels calculated at the site are presented in Table 2.

Table 2 – External and Internal Ambient Noise Levels

Monitoring Position	Period	Maximum Noise Level, $L_{Amax,F}$	Sound Pressure Level, $L_{Aeq,T}$ dB re. $2x10^{-5}$ Pa.		
			External	Internal (Windows Partially Open)	Internal (Windows Closed)
P1	Day	84	50	35	17
	Night	73	44	29	11
P2	Day	80	46	31	13
	Night	71	40	25	7

5.4 The ambient noise levels at P1 indicate that during the day and night-time the average ambient noise levels are 50 dB $L_{Aeq,16\ hr}$ and 44 dB $L_{Aeq,8hr}$ respectively. Noise levels at P2 are 46 dB $L_{Aeq,16\ hr}$ and 40 dB $L_{Aeq,8hr}$ respectively.

5.5 BS 8233:2014 provides guideline values for external amenity areas and internal rooms during the day and night. Assessment of the external and internal noise levels is presented in Table 3.

Table 3 – Assessment of Ambient Noise Levels, Internal and Enclosed Areas

Monitoring Position	BS 8233 Criteria Achieved (Y/N)			
	Outdoor Amenity (daytime)	Internal (Windows Partially Open/Windows Closed)		
		Living Rooms & Bedrooms (daytime)	Dining Areas	Bedrooms (night time)
Criterion Noise Level	*55*	*35*	*40*	*35*
P1	Y	Y/Y	Y/Y	Y/Y
P2	Y	Y/Y	Y/Y	Y/Y

5.6 The reductions provided within BS 8233 indicate that internal noise levels will fall below the internal criteria with windows partially open and therefore no specific mitigation is required. Accordingly, typical insulated double glazing and trickle ventilation are considered to provide adequate attenuation at the proposed development

5.7 The WHO Guidelines states that indoor noise levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times a night to ensure there are no negative health effects related to sleep disturbance.

5.8 Considering the façade sound reduction from typical design as used in the 8233 assessment, measured maximum noise levels will achieve the WHO criteria with typical insulated double glazing and attenuated trickle ventilation.

5.9 Measured noise levels at P1 and P2 achieve the BS 8233 desirable guideline value of 50 dB $L_{Aeq,16hr}$ for external amenity areas and no mitigation is required.

6 MITIGATION

6.1 Measured noise levels fall below internal and external criteria and no specific mitigation requirements are identified. Typical insulated double glazing and attenuated trickle ventilation are considered to be suitable to attain suitable internal noise levels.

7 CONCLUSIONS

7.1 An assessment of the potential noise impacts attributable to the existing ambient environment has been undertaken for the proposed residential development at Land at Church Lane in Lydden.

7.2 Unattended noise measurements were undertaken to obtain sound levels representative of the existing environment for assessment in accordance with BS 8233:2014 and the WHO Guidelines for Community Noise.

7.3 The assessment indicates that the BS 8233 criteria would be achieved with windows partially open across the development and suitable habitable noise levels will be achieved without further consideration of mitigation.

7.4 Ambient noise levels fall below the BS 8233 criterion for external amenity. Accordingly, no specific consideration of mitigation is required.

APPENDIX A – INTRODUCTION TO NOISE

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB.

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs. For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest.

In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}. This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 5 minutes during the night. The noise levels are commonly symbolised as $_{A90(1hour)}$ and $L_{A90(5mins)}$. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

Table A1: Glossary of Terms

Term	Definition
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,F}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the 'average minimum' noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Residual Noise Level	The ambient noise remaining at a given position in a given situation when specified sources are suppressed to a degree such that they do not contribute to the ambient noise level ($L_{Aeq,T}$)
Specific Noise Level	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (the noise source under investigation) over a given time interval ($L_{Aeq,T}$)
Rating Noise Level	The specific noise level plus any adjustment for the characteristic features of the noise ($L_{Ar,Tr}$).

APPENDIX B – GRAPHICAL REPRESENTATION OF NOISE MEASUREMENT RESULTS

Figure B1: Unattended Survey Results at Position 1

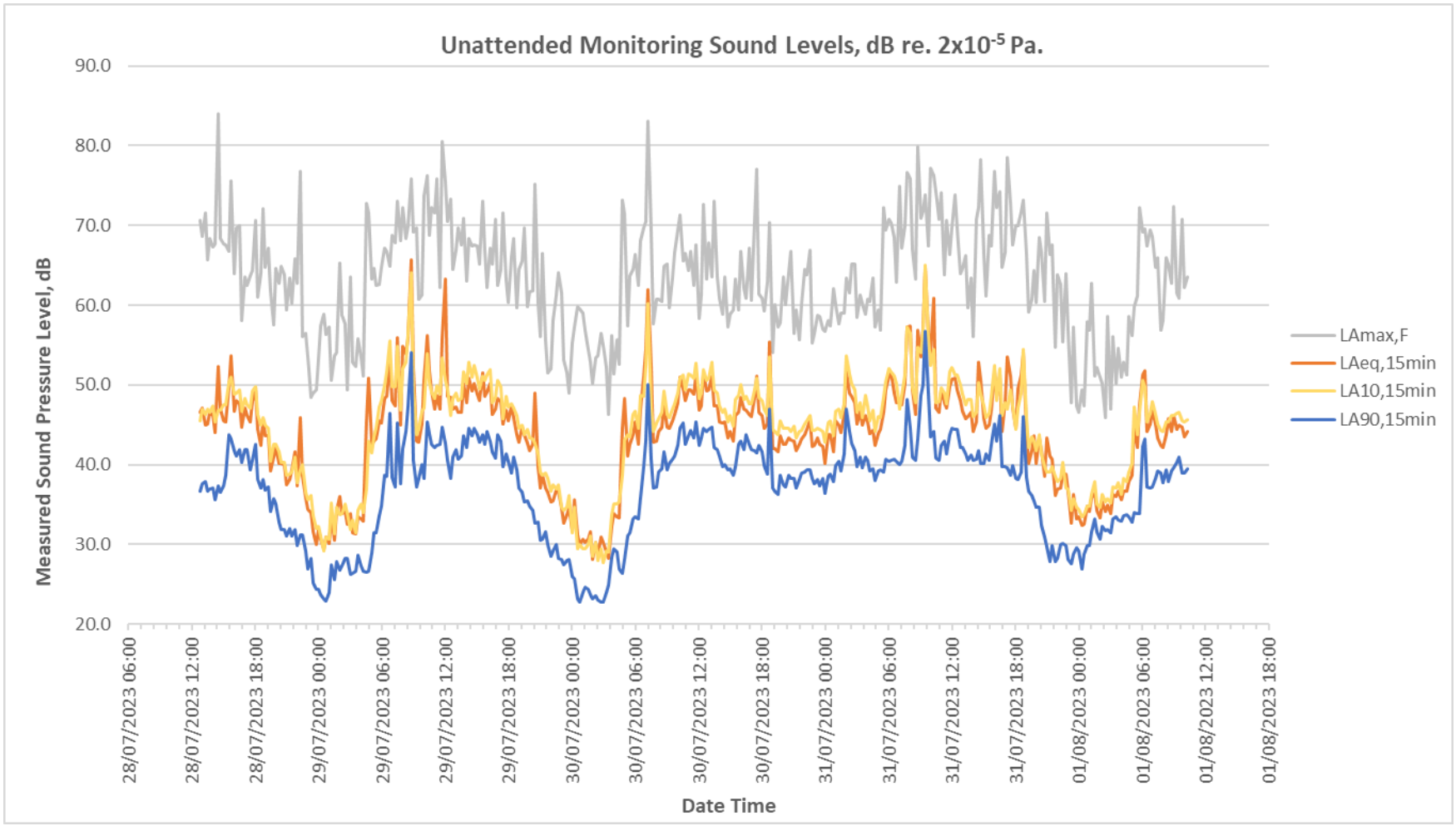


Figure B2: Unattended Survey Results at Position 2