

Report

Land off Henthorn Road, Clitheroe

Noise Assessment: LFE Plant

For Gladman Developments Ltd

3 July 2026

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1 Introduction

1.1 Scope and Background

- 1.1.1 This report describes the potential impact of operational noise from an existing landfill gas to energy (LFE) plant site on a proposed residential development (the 'Development') on land off Henthorn Road, Clitheroe (the 'Site') which falls into the administrative boundary of Ribble Valley Borough Council (RVBC).
- 1.1.2 The assessment has been carried out by Noise Consultants (NCL), part of Logika Group, and has been prepared in accordance with National and local policy and guidance, and by reference to relevant acoustics standards and guidance. A glossary of acoustic terminology is provided in **Appendix A1**.

1.2 Existing Site

- 1.2.1 The existing Site comprises two parcels of land; the northern parcel used for grazing, and the southern parcel comprising open fields used for grazing, public footpaths, and a watercourse towards its northern edge.

1.3 Surrounding Land Uses

- 1.3.1 Henthorn Road (20 mph) runs between the northern and southern parcels and provides access to a small number of dwellings to the south of the Site. Residential dwellings are located to the immediate north of the Site. The Site is bounded by open fields to the west, with the Ribble Valley (railway) Line (RVL) located on an embankment at least 180 m from the Site's eastern edge.
- 1.3.2 The Site is bounded to the south by Pendleton Brook. A further 120 m south is a solar array (SA) and Clitheroe wastewater treatment works (WwTW).
- 1.3.3 At the western edge of the WwTW lies a landfill gas to energy (LFE) plant site, benefiting from planning consent¹ since approximately 2008. The plant operates continuously throughout the day and night. Planning documents for the LFE site are limited to a delegated report to Lancashire County Council stating RVBC had no objection to the LFE development as the plant will be in an acoustic enclosure and that based on the supporting planning documents, noise from the LFE plant "*will have dissipated by the time it reaches the nearby properties over 200 m away.*"
- 1.3.4 Clitheroe Household Waste Recycling Centre (CHWRC) is located approximately 300 m to the south-west of the Site, and operates between 09:00 and 17:00 from Friday to Tuesday.
- 1.3.5 The WwTW and LFE are accessed by Henthorn Road, which passes between the two parcels of the proposed Development Site and terminates at a farm further south of CHWRC. Consequently, the majority of daytime road traffic on Henthorn Road is associated with the CHWRC, when operating.
- 1.3.6 For reference, **Figure 1-1** shows both the 200 m separation distance cited in the LFE planning documentation and the 250 m standoff between the LFE and the nearest existing residential receptors.

¹ Ribble Valley Borough Council application re. 3/2008/0942/P,



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Figure 1-1: Site Location Plan and Wider Site Context

1.4 Proposed Development

- 1.4.1 The proposed development comprises up to 115 dwellings with associated infrastructure, with all matters reserved except for access. The proposed Development Framework Plan (DFP) and wider site context are presented in **Figure 1-1**. Residential developable areas are positioned marginally closer to the LFE plant than existing dwellings, but are outside the 200 m separation distance previously deemed an acceptable distance at which operational noise from the LFE would not result in adverse noise impacts on existing dwellings.

1.5 Site Planning History

- 1.5.1 The outline planning application² to which this and previous reports relating to this Site prepared by NCL, were received by RVBC on 19 December 2025, and registered on 08 January 2026. During consultation, RVBC requested that a noise assessment be prepared and submitted in support of the application.
- 1.5.2 NCL prepared the noise assessment³ (the 'site suitability assessment') requested by RVBC, which included a comprehensive baseline noise survey carried out under favourable (i.e. downwind, dry, and calm) weather conditions, a visual and auditory inspection of nearby land uses undertaken during both the daytime and night-time periods, road traffic noise modelling, and an assessment in accordance with ProPG⁴. Whilst inspections of nearby land confirmed that the WwTW, SA and LFE

² RVBC planning application ref. 3/2025/0997

³ NCL report ref. 17676A-20-R01-02, dated 08 May 2026

⁴ Professional Practice Guidance on Planning and Noise: New Residential Development (2017). Institute of Acoustics, Association of Noise Consultants, and Chartered Institute of Environmental Health.

sites were operating at the time of the survey, no operational noise from any of these land uses was audible on any part of the Site above the underlying noise climate, at any time. The report concluded that the Site was at negligible to low risk of the adverse effects of noise, and subject to the implementation of good acoustic design as set out in the site suitability assessment, noise was not considered a material constraint to the proposed Development.

1.5.3 The site suitability assessment was reviewed by RVBC, and the principal planning officer (PPO) provided a response, on 11 June 2026, which is summarised as follows:

- RVBC acknowledge that the Site is considered low risk with respect to ProPG.
- Despite this, and the fact that operational noise from the LFE plant was not audible on the Site, RVBC environmental health requested a noise assessment of the LFE plant on the Development be carried out in accordance with BS 4142:2014⁵ (BS 4142, **Appendix A3.1**).
- The response suggests that a BS 4142 assessment is warranted due to receipt of complaints concerning noise from the LFE plant, to RVBC, from a resident located approximately 300 m to the north of the LFE plant.
- RVBC set out the methodology of the BS 4142 assessment requested, including narrowband noise measurements, during the daytime and night-time, and both with the LFE plant operating and turned off.

1.5.4 With respect to the response by the PPO, it is important to note that:

- NCL consulted with RVBC's Environmental Health (EH) on 17 March 2026, setting out the proposed assessment methodology used in the site suitability assessment for agreement prior to the assessment taking place. A formal response was received on 30 March 2026, agreeing in principle to the proposed assessment methodology. RVBC's EH did not request an assessment of LFE noise, nor did they indicate they had received complaints regarding the LFE plant or any other nearby sources of environmental noise.
- The findings of the site suitability assessment in respect of road traffic noise, and operational noise from the SA, WwTW and HWRC were not questioned and are therefore not considered further in this report.
- No detailed supporting evidence regarding the precise location of the complainant(s), the validity of the complaint(s), or assurance that the noise complaints relate to the LFE plant has been received by the applicant (Gladman Developments Ltd) or NCL. Therefore, NCL are not able to validate these complaints.
- NCL are not able to directly influence the operating conditions of third-party assets, and the request for noise levels to be measured with the LFE plant under on/off conditions cannot be readily achieved without significant delays to the determination of the planning application. However, BS 4142 states that alternative (i.e. proxy/surrogate) locations can be used to gain an understanding of the underlying noise climate, both in terms of its character and noise levels where the source(s) being assessed affect noise levels at the assessment locations, provided that a detailed justification is provided⁶. Therefore, the request to undertake measurements without the LFE plant operating is not necessarily warranted.

⁵ British Standards Institute, BS 4142:2014 +A1:2019, 'Methods for rating and assessing industrial and commercial sound'

⁶ BS 4142:2014, clause 8.1.1

1.5.5 NCL prepared a technical note⁷ (the 'technical note') in response to the PPO's request for the BS 4142 assessment, which is summarised as follows:

- The need for a BS 4142 assessment is only triggered where industrial noise (or commercial noise of an industrial nature) is a dominant feature of the acoustic environment on the Site.
- Narrowband (FFT) analysis of LFE plant noise on the Site was not considered to be technically feasible, as LFE plant noise was inaudible and subjectively masked by the natural residual environment, and therefore, mathematically and practically impossible to isolate and determine the plant's Specific Sound Level based on on-site baseline noise data.
- The proposed Development Framework Plan fully respects the 200 m separation distance established under the LFE plant's original planning consent⁸ as the distance at which RVBC agreed with the noise assessment submitted in support of the LFE plant, that operational noise dissipates to acceptable levels.
- Any historical complaints received by RVBC EH from residents 300 m from the LFE plant may represent transient and atypical events (such as equipment malfunction, temporary maintenance, or bypass operations), and under established planning principles, matters of statutory nuisance enforcement are dealt with under the Environmental Protection Act 1990 or Environmental Permitting regulations, and do not constitute a sound planning basis to restrict or refuse sustainable residential development.

1.6 Local Policy and Guidance

Ribble Valley Local Development Framework (LDF) and Core Strategy 2008 to 2028.

1.6.1 RVBC's Local Development Framework (LDF) provides the basis for planning decisions in the Ribble Valley and sets the pattern for development and investment over the coming years, and includes the Core Strategy that forms the central document of the LDF, and collectively establishes the vision and strategic planning policy framework to guide development. Policy DMG1 (General Considerations, Pg 86) sets out *amenity* requirements for new developments.

1.7 Baseline Noise Survey, April 2026

1.7.1 The baseline noise survey and inspection of surrounding land uses found that;

- The WwTW was operational, and its noise profile was characterised as running water, with some mechanical plant audible in the vicinity of the WwTW site. However, on the Site, operational noise from the WwTW is indiscernible above the sound of running water in Pendleton Brook.
- The SA was inaudible on the Site at all times.
- The LFE was observed as operating continuously throughout the day and night-time periods, with the predominant source of noise at the boundary of the LFE Site characterised as engine noise, typical of that associated with a gas-powered generator. As noted previously, LFE plant noise was observed as not discernible against the underlying residual noise climate at any location on the Site at all times during the daytime and night-time periods, and can be concluded as being very low.

⁷ NCL report ref. 17676A-20-M01-01, dated 12 June 2026

⁸ RVBC planning application ref. 3/2008/0942/P

2 Assessment Approach

2.1 Baseline Noise Survey: June 2026

- 2.1.1 A noise survey was conducted between 23:18 on Saturday 14th June and 00:30 on Sunday 16 June 2026. The purpose of the survey was to confirm that the LFE plant was operating, characterise noise emission from the LFE plant, and to determine the specific noise level attributable to the plant on the Site.
- 2.1.2 Prior to commencing any noise measurements, the LFE was first confirmed to be operational by way of a boundary inspection at the LFE site.
- 2.1.3 The findings of the April 2026 baseline noise survey found that noise levels on the Site were higher during the daytime, which can be expected in the vast majority of the country, except for very remote areas well away from sources of environmental noise.
- 2.1.4 Noise measurements were therefore undertaken during a quiet part of the night-time when the influence of other environmental noise was minimal to ensure that the measured noise levels were representative, and so that a reasonably robust assessment could be undertaken.
- 2.1.5 The surveys and boundary inspections found that the LFE plant noise is steady and continuous. Consequently, representative LFE plant noise emission levels have been determined from short-term sample noise measurements undertaken on an attended basis, as longer-term noise measurements would not yield materially different results. Noise levels were measured in terms of the broadband level, in one-third octave band levels, and narrowband (FFT) levels.
- 2.1.6 The measured noise conditions are described in **Section 3.1** with full details of the baseline noise measurement survey provided in **Appendix A2**.

2.2 Assessment Procedure

- 2.2.1 Operational noise associated with the LFE plant is assessed on the Site using the methodology set out in British Standard BS 4142, and any other relevant standards and guidance.
- 2.2.2 The basic procedure of a BS 4142 assessment is to compare the operational sound level from the source(s) (the specific sound level, L_s) with the existing acoustic environment (background sound level, $L_{A90,T}$) at the assessment location(s).
- 2.2.3 Guidance is provided in the standard on how to monitor and determine the background sound level, specific sound level and rating level.
- 2.2.4 The background sound level, $L_{A90,T}$ should be measured at the assessment locations during a period in the absence of the influence of sound from the proposed/introduced industrial sources. The background sound level can be measured at alternative locations at which the background sound levels are representative of the assessment location, provided the choice of location is justified.
- 2.2.5 Where there are certain acoustic features of the specific sound level, L_s that would likely increase the significance of impact, then an appropriate character correction is added to the specific sound level, to determine the sound rating level $L_{A,r,T,r}$.
- 2.2.6 An initial assessment is performed by comparing the rating level of the sound source(s), $L_{A,r,T,r}$ at the assessment locations(s) against the background sound level to obtain an indication of impact.
- 2.2.7 The lower the rating level compared with the background sound level, the less likely the source will result in an adverse impact. BS 4142 suggests that a result of +10 dB above background sound level is

an initial indication of a significant adverse impact, +5 dB above background sound level is an initial indication of an adverse impact, and a rating level equal to background is an initial indication of a low impact.

- 2.2.8 The first note in the scope of the previous version of BS 4142 (BS 4142:1997 *Method for rating industrial noise affecting mixed residential and industrial areas*) stated that:

“The method is not suitable for assessing the noise measured inside buildings or when the background and rating noise levels are both very low’ and ‘for the purposes of this standard, background noise levels below about 30 dB and rating levels below about 35 dB are considered to be very low”.

- 2.2.9 Adopting the above indicative assessment in isolation excludes other quantitative and qualitative considerations needed to provide a reasoned and balanced assessment, which are particularly important where existing noise levels are very high or low (see **Appendix A3.1**).

- 2.2.10 The scope of BS 4142 specifically excludes the assessment of indoor noise levels attributable to the source(s) being assessed. Therefore, for context, the guideline internal noise criteria of BS 8233 have been used to further inform this assessment, and are reproduced in **Table 2-1**.

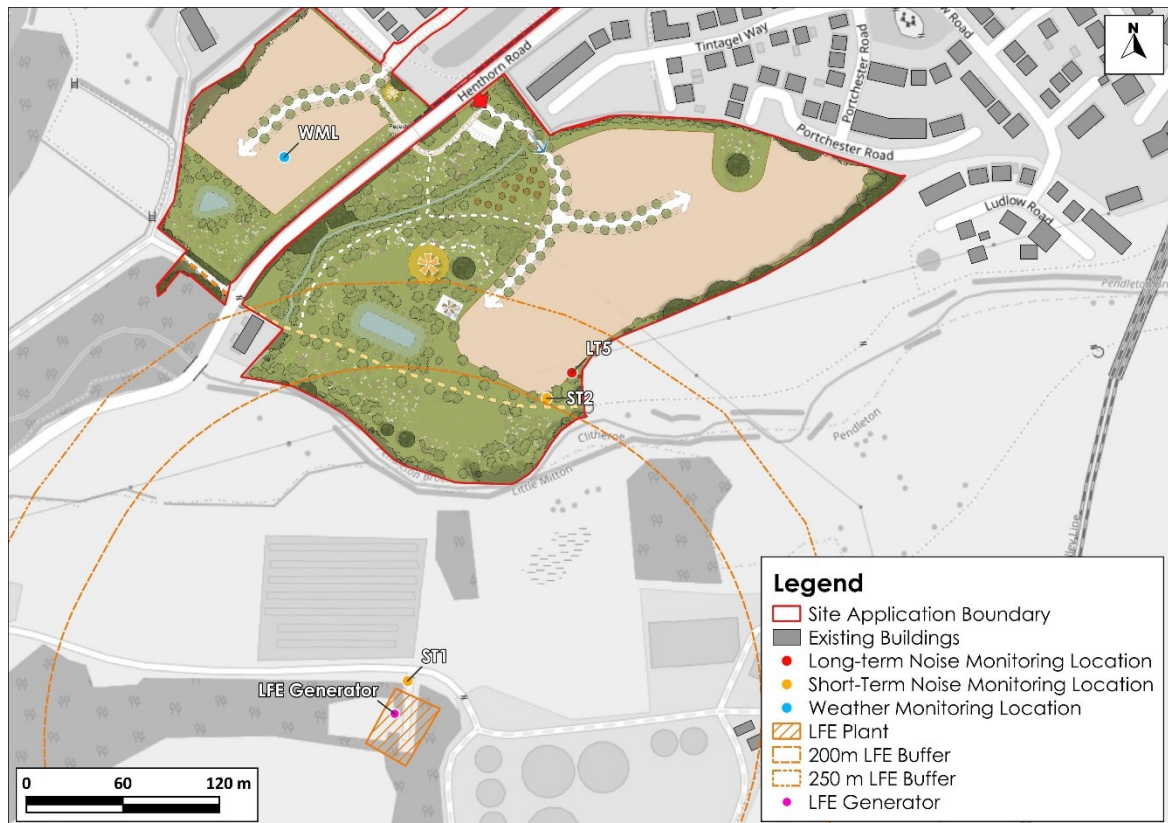
Table 2-1: BS 8233 Guideline Internal Noise Levels

Location	Activity	Daytime Noise Level (07:00 – 23:00)	Night-time Noise Level (23:00 – 07:00)
Living Room	Resting	≤ 35 dB LAeq,16hr	-
Dining Room	Dining	≤ 40 dB LAeq,16hr	-
Bedroom	Sleeping (daytime resting)	≤ 35 dB LAeq,16hr	≤ 30 dB LAeq,8hr

3 Baseline Noise Survey

3.1 Noise Measurement Survey

3.1.1 **Figure 3-1** presents noise survey monitoring locations from the April 2026 survey that are relevant to this assessment, and the most recent survey undertaken in June 2026, which are described in **Table 3-1** below. Full details of the April 2026 survey are presented in the site suitability assessment report and are not repeated in this report.



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Figure 3-1: Noise Survey Monitoring Locations

Table 3-1: Summary of Baseline Noise Survey Monitoring Locations

Location	Description	Observations
ST1	Attended free-field monitoring location, 1.4 m above ground, 22 m from the acoustic enclosure around the LFE generator. Location chosen to measure noise emission from the LFE plant.	Engine noise attributable to the LFE plant was dominant at ST1
ST2	Attended free-field monitoring location, 1.4 m above ground on the southernmost edge of the proposed residential development area closest and most exposed to operational noise from the LFE plan. Location chosen to measure any noise from the LFE plant.	Distant road traffic just audible. Sound of running water in Pendleton Brook. No discernible noise from WwTW, SA, LFE or CHWRC.

Location	Description	Observations
LT5	Unattended free-field monitoring location, 1.4 m above ground towards the southern boundary. Location chosen to measure road traffic noise on Henthorn Road, noise from passing trains on the RVL, and noise from other nearby non-residential land uses, at a location representative of proposed residential developable areas closest to the WwTW, SA and LFE.	Birdsong was dominant throughout the survey. Distant road traffic just audible. Distant trains on the RVL faintly audible in the evening/night. Sound of running water in Pendleton Brook. No noise from WwTW, SA, LFE or CHWRC.

- 3.1.2 The weather conditions were dry with clear skies. Using a handheld anemometer, the prevailing temperature was 15°C with a very light breeze (below 2m/s) from the south-west.
- 3.1.3 The sound level meter was field-calibrated at the start and end of the survey with no significant drift (i.e. >0.5 dB) in calibration recorded. A windshield was fitted to the microphone for the duration of the survey to minimise the effects of wind-induced noise.
- 3.1.4 Details of the monitoring instrumentation (model/serial numbers and calibration details) are presented in **Appendix A4.2**.
- 3.1.5 The sound level meter was configured to report the environmental parameters L_{eq} , L_{10} , L_{90} and L_{Fmax} in unweighted one-third octave bands or narrowband (2.5Hz bandwidth) and A-weighted broadband levels at a 100 ms sample rate.

3.2 Survey Results

- 3.2.1 The results of the unattended noise measurement survey at location LT5 are summarised in **Table 3-3**, rounded to the nearest decibel. The full noise measurement survey results are presented in the Site suitability assessment report submitted in support of the application and are not repeated here

Table 3-2: Summary of Unattended Measured Free-Field Noise Levels at LT5 – April 2026

Location	Period	$L_{Aeq,T}$ (dB)	L_{AFmax} (10 th Highest) (dB) ⁹	$L_{A90,5min}$ (mean) (dB)	$L_{A90,5min}$ (mode) (dB)
LT5	Daytime (07:00 – 23:00)	46	-	40	42
	Night-time (23:00 – 07:00)	39	< 49	40	42

- 3.2.2 The results of the attended broadband noise measurements measured in June 2026 are presented in **Table 3-3**.

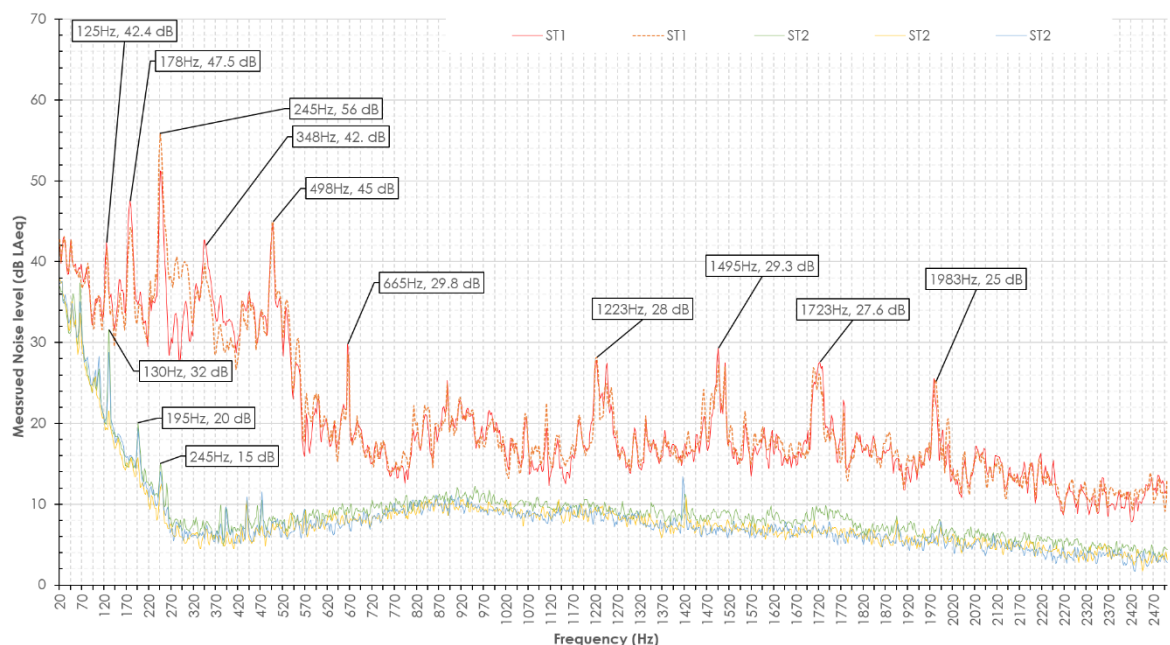
⁹ Survey Data processed to excludes majority of birdsong and extraneous noise to obtain appropriate data for the assessment.

Table 3-3: Summary of Attended Broadband Measured Free-Field Noise Levels – June 2026

Location	Period	Duration (hh:mm)	L _A F _{max}	L _A eq,T (dB)	L _A 90,T (dB)
ST1	23:18 – 23:33	00:15	59.9	53.2	52.5
	23:35 – 23:50	00:15	57.6	53.2	52.5
ST2	00:12 – 00:14	00:02	38.2	36.7	36.3
	00:14 – 00:29	00:15	49.4	36.5	35.8

3.2.3 The results in **Table 3-3** demonstrate that LFE plant noise emission levels are steady and 53 dB at a distance of 22 m. Environmental noise levels at ST2, are considered to be low, were marginally lower than measured in April 2026. At ST2, LFE plant was not discernible, and therefore, the measured noise levels at ST2 were not affected by noise from the LFE plant.

3.2.4 The results of the narrowband noise measurements are shown in **Figure 3-2**.

**Figure 3-2: Narrowband (FFT) Noise Measurements**

3.2.5 At ST1, in close proximity to the LFE plant, the results of the narrowband analysis in **Figure 3-2** indicate that LFE plant noise contains tonal components at 125 Hz, 178 Hz, 24 Hz, 248 Hz, and 498 Hz, and are likely attributable to the gas engine and exhaust. Tonal components are also noted around 1223Hz, 1495 Hz, 1723 Hz and 1938 Hz, which are likely attributable to ancillary pumps, fans and other mechanical equipment used to support the operation of the LFE plant. None of these tonal components are audible on the Site at location ST2.

3.2.6 Furthermore, the tonal adjustment for potential tonal noise identified at 130 Hz, 195 Hz, and 245 Hz, based on the measured narrowband levels at ST2 and objective method for assessing the audibility of tones (reference method) in Annex D of BS 4142, indicates that no correction (K_t) is necessary.,

3.2.7 The measurements confirm the statement in the technical note that LFE plant noise is entirely masked by the natural residual environment, and therefore, it is mathematically impossible to isolate and determine the plant's specific sound level based on on-site noise measurements.

3.3 Summary

3.3.1 Based on the results of the survey,

- The measured noise levels on the Site were marginally lower than those previously measured at LT5 in April 2026 and are therefore considered both useful and representative;
- LFE plant noise, including any tonal components, is not discernible on the Site; and,
- LFE plant noise must therefore be well below the measured underlying noise levels,

4 Operational Noise Assessment

4.1 Assessment Location

- 4.1.1 For the purpose of this assessment, LFE plant noise has been assessed at the southern edge of the proposed developable area closest and most exposed to LFE plant noise to undertake a reasonably worst-case assessment. Therefore, noise levels measured at location LT5 in April 2026, and location ST2 in June 2026 have been used in this assessment.

4.2 Adopted Background Sound Levels

- 4.2.1 LFE plant noise did not affect noise levels measured at any measurement location on the Site. Therefore, daytime background levels measured in April 2026 have been used in this assessment.
- 4.2.2 Section 8.1 of BS 4142 advises that the background sound level should be typical of the period of interest, rather than the absolute lowest value. Given that the night-time background sound levels monitored in June 2026 are marginally lower than the historical baseline data from April 2026, the use of levels measured during the night-time in June 2026 also introduces an inherent degree of conservatism, further facilitating a robust and reasonably worst-case assessment.

4.3 Specific Sound Levels

- 4.3.1 LFE plant noise did not affect noise levels measured at location ST2 or LT5. Therefore, LFE plant noise is considered to be at least 10 dB below the residual noise level (L_{Aeq}) measured during the night-time in June 2026, and is therefore 27 dB $L_{Aeq,T}$. With reference to Table 1 of the now superseded version of BS 4142, LFE plant noise is considered to be very low. Notably, LFE plant noise will be lower in all other areas of the Site.

4.4 Assessment

Initial BS 4142 Assessment

- 4.4.1 As LFE plant noise was not discernible on the Site, and the analysis of the measured narrowband measurements indicates no correction is necessary for discrete tones, correction for acoustic features of the LFE plant is not considered necessary. **Table 4-1** presents the initial assessment of LFE plant noise.

Table 4-1: Initial BS 4142 Assessment of LFE Plant Noise

Parameter	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Background sound level $L_{A90,15min}$ (dB, $L_{A90,T}$)	40	36
Specific Sound Level $L_{Aeq,1h}$ (dB)	27	27
Acoustic Feature Correction	+0	+0
Rating Level $L_{Ar,Tr}$ (dB)	27	27
Excess of Rating Level over Background Sound Level	-13	-9
Initial Assessment Outcome	Low Impact	Low Impact

- 4.4.2 Based on the assumptions set out above, **Table 4-1** indicates LFE plant noise levels result in a low impact, before consideration of context.

Contextual Considerations

4.4.3 The following additional points are considered in determining the final significance of noise impact of from the LFE plant on the proposed development:

- As the specific sound is inaudible externally within the proposed development site, it will not alter the existing acoustic character on the Site.
- Assuming a sound level difference from outside to inside of 13 dB(A)¹⁰ the resulting internal noise level attributable to LFE plant will be well below the guideline internal noise criteria of BS 8233.

Assessment Outcome

4.4.4 The assessment clearly demonstrates that rated operational noise levels attributable to the LFE plant in the most exposed areas of the Site are low, are at least 9 dB below the underlying background sound level, and would be well below the guideline internal noise levels of BS 8233 with open windows. It is therefore concluded that operational noise from the LFE plant will not give rise to an adverse, nor significant adverse noise impact on the proposed Development, and that no noise mitigation measures are warranted in respect of the LFE plant.

¹⁰ Waters-Fuller, T., Lurcock, D., Mackenzie, R. & MacKenzie, R. (2007). NANR 116: 'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows.

5 Conclusions

- 5.1.1 This report describes the potential impact of operational noise from an existing landfill gas to energy (LFE) plant site on a proposed residential development (the 'Development') on land off Henthorn Road, Clitheroe (the 'Site'), which falls into the administrative boundary of Ribble Valley Borough Council (RVBC). The assessment has been carried out by Noise Consultants (NCL), part of Logika Group.

Existing Site

- 5.1.2 The existing Site comprises two parcels of land; the northern parcel used for grazing, and the southern parcel comprising open fields used for grazing, public footpaths, and a watercourse towards its northern edge.

Proposed Development

- 5.1.3 The proposed development comprises up to 115 dwellings with associated infrastructure, with all matters reserved except for access. The proposed DFP fully respects the 200 m separation distance established under the LFE plant's original planning consent at which RVBC agreed that LFE plant noise would be at an acceptable level.

Baseline Surveys

- 5.1.4 To quantify current levels of ambient and background noise on the Site, an unattended noise survey was conducted over a period of four days in April 2026. Attended noise measurements were undertaken in June 2026 during the night-time to establish the noise emission profile of the LFE plant, located some 200 m south of proposed residential developable areas, when the other sources of environmental noise were at their lowest to ensure a reliable set of noise data was obtained for use in the assessment. LFE plant noise was not audible on the site during the April 2026 survey or the June 2026 survey.

Operational Noise

- 5.1.5 Operational noise on areas of the Site most exposed to LFE plant noise has been assessed using the methodology set out in British Standard BS 4142:2014, as requested by RVBC and any other relevant standards and guidance. The assessment was conducted for both the daytime and night-time periods.
- 5.1.6 To further support the assessment, and as required by RVBC, narrowband analysis of the noise emission from the LFE plant and noise levels on the Site were carried out.
- 5.1.7 The assessment shows that whilst the LFE clearly generates modest levels of noise containing some tonal components, the resulting LFE plant noise levels on the Site are very low, do not contain any of the tonal components generated by the LFE plant, are at least 9 dB below the lowest measured background sound level, and readily achieve the guideline internal noise criteria of BS 8233.

Conclusions

- 5.1.8 Residential developable areas are positioned marginally closer to the LFE plant than existing dwellings, but are outside the 200 m separation distance previously deemed an acceptable distance at which operational noise from the LFE would not result in adverse noise impacts on existing dwellings.
- 5.1.9 On the basis of this assessment, the Development is not considered likely to give rise to an adverse or significant adverse impact on health and quality of life in relation to noise, in accordance with paragraphs 187 and 198 of the National Planning Policy Framework (NPPF) or Policy DMG1 the Ribble Valley Local Development Framework and Core Strategy.

- 5.1.10 Given that LFE plant noise on the Site was very low and inaudible (and would therefore allow a reasonable increase of operational noise in future without resulting in unacceptable noise impact on existing or proposed dwellings), and that existing dwellings are only marginally further away from the LFE plant than proposed residential developable areas, the noise constraints upon the LFE Site will not materially change. Consequently, the Proposed Development would not impose unreasonable restrictions on the LFE plant operator, and do not therefore conflict with the agent of change principle of paragraph 200 of the NPPF.
- 5.1.11 Therefore, it is concluded that LFE plant noise is not a material constraint to the proposed Development, the Site remains capable of accommodating noise-sensitive development in accordance with national and local planning policy, that no specific noise mitigation measures are warranted with respect to LFE plant noise, and therefore the proposed development should not be refused on grounds of noise.

6 Appendices

A1 Glossary

Term	Definition
dB	Decibel. The logarithmically scaled measurement unit of sound.
A-weighting	Frequency weighting applied to measured sound in order to account for the relative loudness perceived by the human ear.
Ambient Sound Level, $L_{Aeq,T}$	A-weighted equivalent continuous sound level over a given time period. It is the sound level of a steady sound that has the same energy as a fluctuating sound over the same time period. Daytime is typically 07:00 – 23:00 and night-time is typically 23:00 – 07:00.
Background Sound Level $L_{A90,T}$	The A-weighted sound level exceeded for 90% of the measurement period. Often referred to as the background sound level.
Free-field Sound Level	A sound level which is measured or calculated in the open without any reflections from nearby surfaces except the ground. Measurements are typically carried out at 1.2 m to 1.5 m above ground level and at least 3.5 m from other reflective surfaces such as buildings which is in accordance with British Standard 7445-2: 1991 <i>Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use</i> .
L_{Amax}	The A-weighted maximum recorded noise level during a measurement period. L_{AFmax} noise levels are measured using a fast (F) measurement weighting (125 ms) and L_{ASmax} noise levels are measured using a slow (S) measurement weighting (1 s).
Noise Sensitive Receptor, NSR	Receptors which are particularly sensitive to noise. Examples include residential dwellings, hospitals, healthcare facilities, education facilities.
Residual sound level	The A-weighted equivalent continuous ambient sound level remaining when the specific sound level has decreased to a degree in which it does not contribute to the ambient sound level.
Specific sound level, $L_s = L_{Aeq,T}$	The A-weighted equivalent continuous sound pressure level produced by the specific sound source at the reference location over a reference time interval, T
Rating level, $L_{Ar,T}$	The specific sound level plus any adjustment for the characteristic features of the sound.

A2 National Policy and Guidance

A2.1 Noise Policy Statement for England (NPSE, 2010)

A2.1.1 The Noise Policy Statement for England (NPSE, 2010) sets out the Government's Noise Policy Vision 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".

A2.1.2 The aims of the policy 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 impacts on health and quality of life
- Mitigate and minimise adverse impacts on health and quality of life
- Where possible, contribute to the improvement of health and quality of life."

A2.1.3 With respect to 'significant adverse' and 'adverse' impacts in line with the three aims of NPSE, the policy statement notes that "there are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organization. They are:

- NOEL – No Observed Effect Level: This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL – Lowest Observed Adverse Effect Level: This is the level above which adverse effects on health and quality of life can be detected.
- Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed negative effect level.
- SOAEL – Significant Observed Adverse Effect Level. This is the level above which significant adverse effects on health and quality of life occur."

A2.1.4 In respect of observed effect levels, the policy recognises that:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available".

A2.1.5 The document advises that "the first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development". Whilst not explicitly stated in NPSE this is taken to align with noise exposure above SOAEL.

A2.1.6 The policy also states:

"The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise negative effects on health and quality of life while also taking into account the guiding principles

of sustainable development (paragraph 1.8). This does not mean that such negative effects cannot occur."

- A2.1.7 And finally, the third aim "seeks, where possible, to positively improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim".

A2.2 National Planning Policy Framework (NPPF, 2024)

- A2.2.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. The Planning Practice Guidance (PPG) provides further context to the NPPF, and it is intended that the two documents should be read in conjunction. Planning Practice Guidance – Noise (PPG-N, 2019) is discussed in detail in **Section A2.3**.

- A2.2.2 NPPF provides policies to promote sustainable development and sets out that the purpose of the planning system is to contribute to the achievement of sustainable development. Sustainable development includes three dimensions: economic, social, and environmental, and thus, when planning decisions are made to increase capacity, the process requires weighing the relative balance of these three factors.

- A2.2.3 The NPPF provides a framework within which locally prepared plans for housing and other development can be produced. Planning law requires that applications for planning permission must be determined in accordance with the development plan, unless material considerations indicate otherwise. Planning policies and decisions must reflect and where appropriate promote relevant obligations and statutory requirements.

- A2.2.4 In relation to noise, it states:

"187. Planning policies and decisions should contribute to and enhance the natural 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and..."

- A2.2.5 The NPPF includes policy which makes reference to "significant adverse impacts on health and quality of life", as per the NPSE. NPPF policy states:

"198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- 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; and..."

- A2.2.6 NPPF has also recently introduced the agent of change principle as follows:

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

A2.3 Planning Practice Guidance – Noise (PPG-N, 2019)

- A2.3.1 The National Planning Practice Guidance (PPG), which supplements the NPPF, incorporates Planning Practice Guidance – Noise (PPG-N). PPG-N, most recently updated in 2019, advises how the planning system can manage potential noise impacts in new development and draws upon the principles advocated in the NPSE.
- A2.3.2 The document advises how the effects of noise can be described in terms of perception and outcomes aligned to increasing effect levels. In addition, the PPG-N introduces a fourth unacceptable adverse effect levels (UAEL), which is described as a level at which:
- "noise exposure would cause extensive and sustained adverse changes in behaviour and / or health without an ability to mitigate the effect of the noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be avoided."*
- A2.3.3 **Table A2-1** presents the noise exposure hierarchy described in PPG-N.
- A2.3.4 The Guidance advises that due to the subjective nature of noise, "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 situation".

Table A2-1: Planning Practice Guidance - Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

A2.3.5 PPG-N also provides guidance in terms of what factors may influence whether noise could become a concern. To mitigate conflicts between new developments and existing businesses or facilities, the

agent of change (typically the developer) is responsible for assessing and addressing potential nuisances that could affect future residents or users. These nuisances may include noise, dust, odours, vibration, and other environmental pollutants generated by existing businesses, community facilities, or industrial operations. The assessment should consider not only current activities but also those permitted under existing planning consents, even if they are not actively taking place at the time of the application.

- A2.3.6 The agent of change must propose and implement appropriate mitigation measures, which could include enhanced acoustic insulation, mechanical ventilation systems to allow windows to remain closed, reconfiguration of site layouts to create buffer zones, or other design interventions aimed at minimizing exposure to potential nuisances.
- A2.3.7 While such measures cannot entirely prevent complaints from new occupants, they can help ensure that the development achieves an acceptable standard of amenity in line with planning policy and reduces the risk of statutory nuisance claims.
- A2.3.8 Taking a proactive approach in identifying, mitigating, and communicating these risks will not only help secure planning approval but also foster long-term compatibility between new developments and established businesses or facilities.
- A2.3.9 PPG-N also provides guidance on how adverse effects of noise can be mitigated. Examples of mitigation provided include:
- "engineering: reducing the noise generated at source and/or containing the noise generated;
 - layout: where possible, optimising the distance between the source and noise-sensitive receptors and/or incorporating good design to minimise noise transmission through the use of screening by natural or purpose built barriers, or other buildings;
 - using planning conditions/obligations to restrict activities allowed on the site at certain times and/or specifying permissible noise levels differentiating as appropriate between different times of day, such as evenings and late at night, and;
 - mitigating the impact on areas likely to be affected by noise including through noise insulation when the impact is on a building".
- A2.3.10 In the case of new residential development, PPG-N also states that the impact of noise can be "partially off-set" if occupants have access to:
- "a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling, and/or;
 - a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;
 - a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;
 - a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within 5 minutes walking distance)".

A3 Assessment Guidance

A3.1 British Standard 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

- A3.1.1 BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature at outdoor locations to assess the likely effects of sound on people who might be inside or outside of a dwellings or premises used for residential purposes. BS 4142 can be used for the purposes of assessing sound from existing, proposed, new, modified or additional source(s) of sound, and assessing sound at proposed new dwellings or premises used for residential purposes.
- A3.1.2 The methodology relies on comparing the operational rating level, $L_{Ar,Tr}$, (a combination of the specific sound level, $L_{Aeq,Tr}$, of the source with an acoustic feature correction) with the background sound level, $L_{A90,T}$, in the absence of the source over a representative time period. BS 4142 provides guidance on the measurement of background sound, the determination of the specific sound level and calculation of the rating level.
- A3.1.3 Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. A character correction should be added to the specific sound level to obtain the rating level, where such features are present at the assessment location. The guidance provides three methods for determining acoustic feature corrections: subjective method, objective method for tonality, and the reference method.

Acoustic Feature Correction: Subjective Method

- A3.1.4 The subjective method states that the specific sound level should be corrected if a tone, impulse or other characteristic occurs, or is expected to be present for the relevant sound sources.
- A3.1.5 A tonal correction between 0 and +6 dB can be applied for sounds that range from not tonal to prominently tonal. An impulsivity correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level.
- A3.1.6 **Table A3-1** presents the subjective assessment method corrections for tonal and impulsive sounds.

Table A3-1: Subjective Method – Rating Level Corrections for Tonal Sounds

Subjective Assessment of Sound at the Receptor	Tonality Correction	Impulsivity Correction
The tone/impulse is just perceptible at the receptor	+2 dB	+3 dB
The tone/impulse is clearly perceptible at the receptor	+4 dB	+6 dB
The tone/impulse is highly perceptible at the receptor	+6 dB	+9 dB

- A3.1.7 A 3 dB penalty can be applied where the specific sound has identifiable on/off conditions (intermittent operation) which are readily distinctive against the residual acoustic environment.
- A3.1.8 Notably, where two characteristics are present in the specific sound within the same reference period, then both corrections can be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections can be added arithmetically.

- A3.1.9 Alternatively, where the specific sound has characteristics that do not fall into the tonal, impulsive or intermittent categories but are otherwise readily distinctive against the residual acoustic environment, a penalty of 3 +dB can be applied.

Acoustic Feature Correction: Objective Method for Tonality

- A3.1.10 The objective method for tonality compares the time-average linear sound pressure levels in adjacent one-third octave bands to determine whether a tone is prominent. For a tone to be prominent and discrete, the time-averaged linear sound pressure level in the one-third octave band of interest is required to exceed the time-averaged sound pressure level in both of the adjacent one-third octave bands by some constant level difference:

- 15 dB in the low-frequency one-third octave bands (25 Hz to 125 Hz)
- 8 dB in the middle-frequency one-third octave bands (160 Hz to 400 Hz)
- 5 dB in the high-frequency one-third octave bands (500 Hz to 10 kHz).

Acoustic Feature Correction: Reference Methods

- A3.1.11 For assessing tonality, the Joint Nordic Method 2 (found in ISO 1996-2) can be used. This method is based on the psychoacoustic concept of critical bands, which are defined so that sound outside of a critical band does not contribute significantly to the audibility of tones inside that critical band. The method produces a correction on a sliding scale from 0.0 dB to +6.0 dB.
- A3.1.12 For assessing the prominence of impulsive sounds, BS 4142 Annex D presents a methodology derived from Nordtest Method NT ACOU 112 and is not intended for use with gunfire sound or high-energy impulsive sound. The method is intended to determine the prominence of impulsive sounds in correspondence with average subjective judgements made by listeners. It produces a correction in the range 0.0 dB to +9.0 dB.

Reference Time Periods

- A3.1.13 The appropriate reference time interval for assessing a sound source is dependent upon when it operates i.e. during the daytime or night-time. BS 4142 determines the reference time interval as 1 hour during the daytime (07:00 – 23:00) and 15 minutes at night (23:00 – 07:00).

Assessment Methodology

- A3.1.14 BS 4142 assessment methodology also states that:
- *“Typically, the higher the rating level is above the background sound level the greater the magnitude of 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; and*
 - *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.”*
- A3.1.15 Contextual factors which could alter the outcome of the indicative impact include the absolute level of sound, the character and level of residual sound, sensitivity of the receptor and inherent design

measures that secure good internal/external acoustic conditions including building envelope design, ventilation/cooling that reduces the need to have open windows, and acoustic screening.

A3.2 British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

A3.2.1 BS 8233:2014 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.

A3.2.2 BS 8233:2014 provides noise guidance for buildings of different uses, however in respect to dwellings and habitable residential spaces, Table 4 of BS 8233:2014 provides guideline values that it is desirable not to exceed during daytime and night-time periods. These guideline values are reproduced in **Table A3-2** and:

- Apply to noise "without character" that excludes features such as "a distinguishable, discrete and continuous tone...irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate";
- Apply to overall noise levels (i.e. the sum of all noise);
- Include normal diurnal fluctuations in external noise (shorter time periods may otherwise be used);
- Do not have to be achieved in all circumstances (such as seasonal / occasional events); and,
- Excludes noise from new mechanical ventilation equipment.

Table A3-2: Indoor Ambient Noise Levels for Residential Dwellings

Activity	Location	Daytime Guideline (07:00 – 23:00)	Night-time Guideline (23:00 – 07:00)
Resting	Living Room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining Room / Area	40 dB $L_{Aeq,16hr}$	-
Sleeping (Daytime Resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Internal Noise

A3.2.3 The internal noise requirements are not intended to be met with open windows, although BS 8223:2014 states that the internal noise levels should take account of the proposed ventilation strategy.

A3.2.4 BS 8233:2014 also notes 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". This sentence refers to the World Health Organization 'Guidelines for Community Noise' (WHO GCN, 1999). This statement is also reiterated in ProPG.

A3.2.5 BS 8233:2014 does not provide specific guidance on noise levels for regular individual noise events, such as passing trains, which can cause sleep disturbance. Guidance on suitable noise levels for individual events is provided in ProPG, which states:

"In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the

judgement of acceptability will depend not only on the maximum noise levels but also on factors such as source, number, distribution, predictability and regularity of noise events."

- A3.2.6 On this basis, it is considered appropriate to adopt the 10th highest $L_{Amax,F}$ noise event occurring in the night time period for the purposes of the assessment.

External Amenity

- A3.2.7 With respect to external amenity spaces, BS 8233:2014 states that *"it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments"*.
- A3.2.8 BS 8233:2014 also states that it will not always be possible to achieve these guideline values for all circumstances where development may be desirable, and that development in higher noise areas, such as urban areas adjoining the strategic transport network or city centres, may warrant a compromise between elevated noise levels and other factors (for example the convenience of living in these locations). In these situations, BS 8233:2014 states that *"development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited"*. This approach is also advocated in PPG-N.

A4 Baseline Survey Details

A4.1 Overview

A4.1.1 All noise measurements were conducted, where possible, in accordance with BS 7445-1:2003 'Description and measurement of environmental noise. Guide to quantities and procedures' (BS 7445, 2003).

A4.2 Noise Survey Monitoring Equipment

A4.2.1 Details of the equipment used during the June 2026 survey can be found in **Table A4-1**.

Table A4-1: Measurement Equipment

Equipment	Make and Model	Serial Number	Date of Last Laboratory Calibration
Sound Level Meter	Rion NL-52	01176433	16/07/2025
Acoustic Calibrator	Rion NC-74	34212937	11/12/2025