Ceres Power Ltd

VIKING HOUSE, FOUNDRY LANE

New Boiler Flue Noise Impact Assessment



R01A
OCTOBER 2025

CONFIDENTIAL

Ceres Power Ltd

VIKING HOUSE, FOUNDRY LANE

New Boiler Flue Noise Impact Assessment

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. UK0042768.6874

OUR REF. NO. R01A

DATE: OCTOBER 2025

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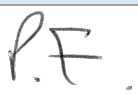
QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks		Updated to include noise impact assessment for 1 Grove House		
Date	09/09/2025	20/10/2025		
Prepared by	Chris Clayden	Chris Clayden		
Signature				
Checked by	Paul Edwards	Paul Edwards		
Signature				
Authorised by	Hannah Jones	Hannah Jones		
Signature				
Project number	UK0042768.6874	UK0042768.6874		
Report number	R01	R01a		
File reference	UK0042768.6874-R01-Viking House-New Boiler Flue-Noise Impact Assessment	UK0042768.6874-R01a-Viking House-New Boiler Flue-Noise Impact Assessment		

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1 INTRODUCTION

WSP have been appointed by Ceres Power Ltd to undertake a noise impact assessment of proposed changes to the boiler and boiler ventilation system at Viking House, Foundry Lane, Horsham. The proposed changes include the replacement of an existing boiler at basement level and addition of a new external stainless steel boiler flue to 1m above roof height on the southeastern corner of the building. The current boiler is ventilated via a louvre at lower ground level opening out onto an alleyway on the east side of the building.

This report sets out the results of a background noise survey carried out by WSP, a prediction of the environmental noise propagation due to the proposed changes and a noise impact assessment for the nearest noise sensitive receptors.

This report is necessarily technical in nature and therefore a glossary of terms in provided in Appendix A.

A summary of the limitations of this report is presented in Appendix C.

2 SITE DESCRIPTION

Viking House, located on Foundry Lane, Horsham is home to Ceres Power's Technical Innovation Centre. The area is best characterised as mixed-use, with industrial units, commercial offices and residential premises all in the near vicinity.

The nearest noise-sensitive receptors to Viking House are a two-storey house immediately east over the road from the site, and blocks of three storey flats on Westlands and King's Place to the east. To the south there are more three storey flats on Horsham Gates.

To the west of the site runs the West Sussex train line along with a large rail sidings and depot. To the south, Foundry Lane meets King's Road and North Street. Immediately adjacent to Viking House, over the road, there is a Lidl supermarket with car park and external building services.

Figure 1 below shows the site location within the surrounding area and highlights the nearest noise-sensitive receptors: residential flats to the east and south.

Figure 1 - Viking House Site Location



3 LEGISLATION, POLICY AND GUIDANCE

3.1 NATIONAL PLANNING POLICY FRAMEWORK 2021

The 'National Planning Policy Framework', published 2021 provides the overarching principles for sustainable development, including the management of noise within the planning process. In the context of a noise impact assessment, the NPPF emphasises the need to prevent existing developments from being adversely affected by unacceptable levels of noise pollution. It requires planning authorities to ensure that noise-sensitive locations, such as residential flats, are adequately protected, and that mitigation measures are embedded into development proposals where necessary.

3.2 NOISE PLANNING POLICY STATEMENT FOR ENGLAND

The 'Noise Planning Policy Statement for England', published in March 2010, sets out the government policy for managing sound within the built environment, guiding local authorities and developers in balancing the need for economic activity with the protection of residential amenity. Its core objective is to avoid, mitigate, and minimise adverse impacts of noise on health and quality of life, particularly for noise-sensitive receptors such as nearby residential flats.

3.3 LOCAL AUTHORITY GUIDANCE

Horsham Council refer to guidance set out in 'Planning Noise Advice Document: Sussex', published in September 2021 which aims to compliment the National Planning Policy Framework and Noise Planning Policy Statement for England. It states that the assessment of industrial noise sources should be undertaken in accordance with BS 4142:2014+A1:2019.

Section 2.6 details the minimum considerations for the assessment of new industrial noise sources:

> "*For a new noise source being introduced near existing noise sensitive premises then an ambient and background noise survey (L_{A90}) should cover the times when the proposed development will be in operation. The expected levels and duration of all the potential noise sources likely to be in operation from the proposed development, whether measured or predicted, should be provided with details of tonality, character, impulsivity and/or intermittency of each noise (e.g. BS 4142). Reference shall also be made if a noise source is anticipated to be readily distinctive against the residual acoustic environment. This could also apply to extensions/ alterations to existing development.*"

3.3.1 CORRESPONDENCE WITH ENVIRONMENTAL HEALTH OFFICER

Correspondence with Horsham District Council environmental health officer Kevin Beer via e-mail dated 12 & 18 August confirmed that a noise survey for a duration of one week was deemed adequate in establishing the typical existing background sound levels at the nearest noise-sensitive receptors, with the biggest concern highlighted as the impact on residential amenity during the nighttime hours.

Kevin Beer confirmed that the selected measurement location was an acceptable representative location to monitor the background sound levels of the nearest noise-sensitive residential dwellings.

It was subsequently confirmed via e-mail dated 16 October that 1 Grove House should be considered a residential receptor.

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

BS 4142 sets out an assessment procedure for noise emissions from new or replacement external fixed plant items at their nearest and most exposed noise sensitive receptors' locations.

The standard describes the sound level generated by the plant item (dB $L_{Aeq,T}$) as the plant's 'specific sound' (dB L_S) at the receptor's location.

Where the source under assessment does not include any acoustic features such as tonality, impulsivity or intermittency, the 'rating level' of the unit (dB $L_{Ar,Tr}$) equals its specific sound level. Where the source includes acoustic characteristics, a series of corrections are arithmetically added to its specific sound level as follows, in order to determine the rating level:

- Sound tonality: +2 dB for a tone which is just perceptible, +4 dB for a tone which is clearly perceptible and +6 dB for a tone which is highly perceptible at the receptor.
- Impulsivity: +3 dB for impulsivity which is just perceptible, +6 dB for impulsivity which is clearly perceptible and +9 dB for impulsivity which is highly perceptible at the receptor.
- Intermittency or any other acoustic features: +3 dB each, where these are readily distinctive against the residual acoustic environment at the receptor.

The background noise level at the receptor (dB $L_{A90,T}$) is measured and subtracted from the plant's rating level.

The result provides an indication of the expected magnitude of impact using the following scale:

- A difference of around 10 dB or more is a likely indication of a significant adverse impact.
- A difference of around 5 dB is a likely indication of an adverse impact.
- 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 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.

The magnitude of impact is also dependent on the context in which the sound arises. Factors, which are considered with respect to context include:

- the absolute level of sound, and
- the character and level of the residual sound (in absence of the source under assessment) compared to the character and level of the specific sound.

4 BACKGROUND SOUND LEVEL SURVEY

4.1 SURVEY METHODOLOGY

The nearest noise sensitive receptor is 1 Grove House, immediately east of the Ceres site. There is also a block of three-storey flats on Westlands (16-24 Westlands), located further to the east of the site. For this assessment, the noise impact will be evaluated for both receptors: 1 Grove House, identified as the nearest noise-sensitive residential receptor, and 16-24 Westlands, recognised as the closest known occupied residential receptor.

An environmental noise survey was conducted by WSP between Tuesday 26 August to Tuesday 2 September 2025 to establish the existing background sound level at the nearest noise sensitive receptors. Measurements were taken in accordance with BS 7445:2003.

A sound level meter was installed at the premises of nearby commercial offices Grove House, approximately 15m east from 1 Grove House and 13m north-west from 16-24 Westlands. This was considered a location representative of the noise levels incident upon both receptors based on the proximity. It is anticipated that background sound levels may be higher above ground floor due to the reduced screening from a wall, but this selected measurement position offers a conservative representation of the overall prevailing background sound level.

The sound level meter was installed 1m from the brick boundary wall between Grove House and the Lidl car park, to safely secure the equipment. The microphone was at fixed height of 1.3m above the ground and housed within an environmental windshield.

Continuous unattended noise level measurements were taken over the entire duration of the survey, in 1 second intervals. This data was post-processed into 1hr periods during the day (07:00 – 23:00) and 15 minute periods during the night (23:00 – 07:00) for analysis.

Figure 4-1 shows the installation location of the sound level meter.

Figure 4-1 – Measurement installation location

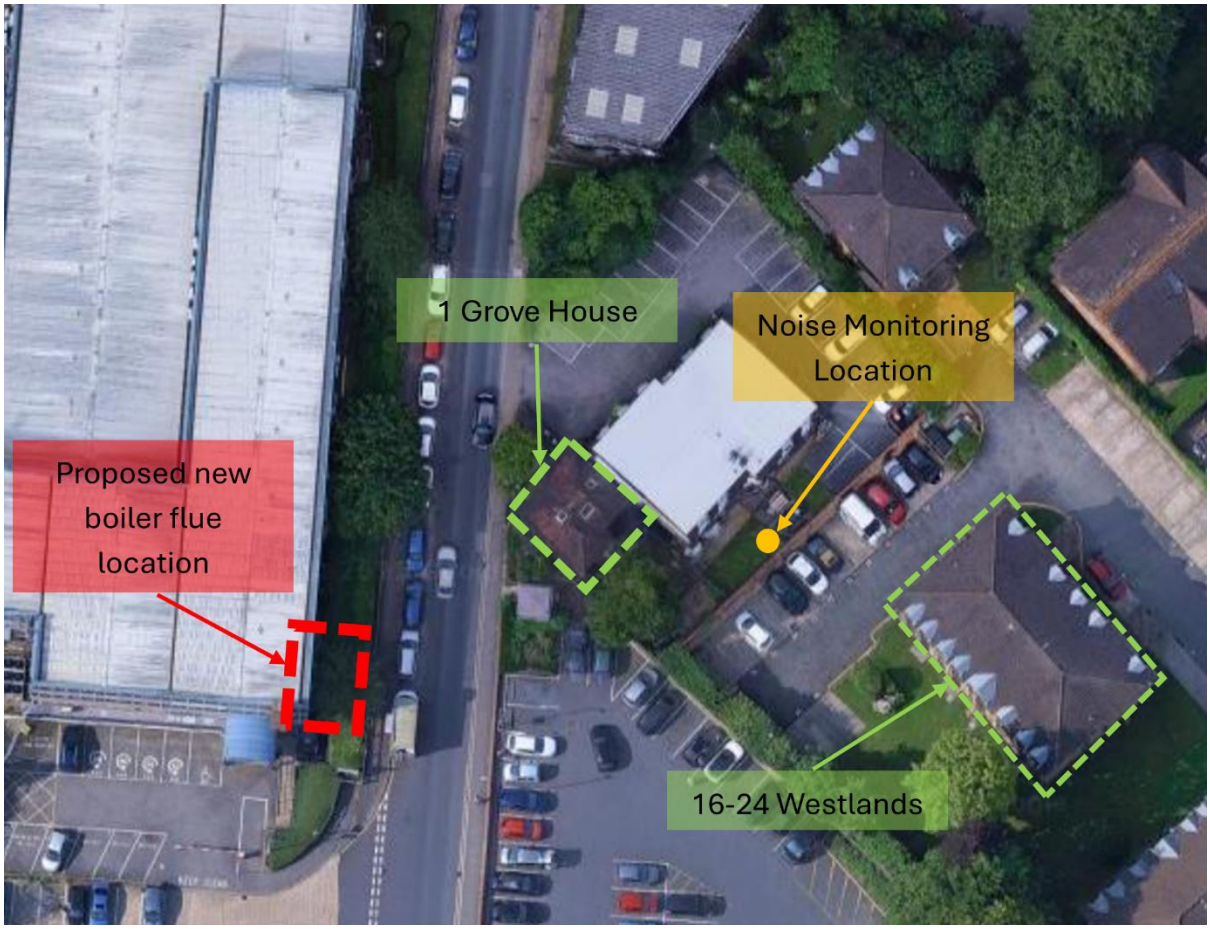


Figure 4-2 shows a photo of the installed sound level meter.

Figure 4-2 – Photo of sound level meter installation



The sound level meter was field calibrated before and after the measurement, with no significant calibration drift (<+/-0.5dB). The sound level meter was laboratory calibrated to traceable standards within the previous 24 months, and the sound calibrator within the previous 12 months of the survey date.

The details of the equipment used are presented in Table 1.

Table 1 – Sound level monitoring equipment details

Equipment Item	Make/Model	Serial Number	Calibration due date
Sound Level Meter	01 dB CUBE 'Integrating-Averaging Sound Level Meter'	10629	29 July 2027
Pre-amplifier	Acoem PRE 22 Preamplifier	1936216	
Microphone	GRAS Type 40CD Condenser Microphone	288092	
Calibrator	01dB-Stell Cal 21	35293350	29 July 2026

Copies of the calibration documentation of the above equipment are available upon request.

4.2 METEOROLOGICAL DATA

Meteorological data was obtained from Wunderground.com using a nearby weather station located approximately 750 meters to the northeast. The data was used to filter out measurement periods potentially influenced by adverse weather conditions. 15-minute intervals with peak wind speeds exceeding 5 m/s and periods with rainfall were excluded from further analysis. As a result, around 25% of the total measured data was omitted based on these criteria.

4.3 SURVEY RESULTS

4.3.1 SITE OBSERVATIONS

Observations of contributors to the overall noise climate were taken on site during installation and collection and review of the automatic periodic audio recordings taken by the sound level meter. Road noise from Foundry Lane and King's Road were significant contributors to the overall noise level, along with rail noise from both passenger and freight train movements. Building services noise from the Lidl supermarket to the south were audible throughout the measurement period as well as vehicle movements in the customer car park. It was noted that there were external fan coil units on the wall overlooking the measurement location at Grove House adjacent to the measurement position however no noise was observed from these units during the survey. The green plastic oil tank next to the meter was also observed to be silent.

4.3.2 UNATTENDED MEASUREMENT RESULTS

A detailed summary of the measured noise levels is presented in Appendix B. A -3dB correction has been applied to all measured levels to account for the reflection of sound from the brick wall 1m from the microphone.

Table 4-2 overleaf presents a summary of the measurement results obtained from the survey.

Table 4-2 – Summary of measured levels

Period, T	Measured sound level*, dB		
	$L_{Aeq,T}$	Range, $L_{Afmax,T}$	Range, $L_{A90,T}$
Weekday daytime (0700 – 1900 hrs)	50 dB $L_{Aeq, 12hrs}$	55 – 76 dB $L_{AfMax, 1hr}$	42 – 46 dB $L_{A90, 1hr}$
Weekend daytime (0700 – 1900 hrs)	48 dB $L_{Aeq, 12hrs}$	50 – 74 dB $L_{AfMax, 1hr}$	42 – 44 dB $L_{A90, 1hr}$
Evening (all days) (1900 – 2300 hrs)	48 dB $L_{Aeq, 4hrs}$	48 – 68 dB $L_{AfMax, 1hr}$	41 – 44 dB $L_{A90, 1hr}$
Night-time (all days) (2300 – 0700 hrs)	43 dB $L_{Aeq, 8hrs}$	44 – 75 dB $L_{AfMax, 15 mins}$	39 – 43 dB $L_{A90, 15 mins}$

** - Excluding periods with unfavourable weather conditions and with a -3dB correction applied to convert from a façade level to a free-field level*

It can be seen from the summary of results that, as is to be expected, the daytime levels are greater than the evening and night-time, following a typical diurnal pattern, although there is only a very small variation between measured levels overall. Based on on-site observations and review of the audio recordings, this is due to the consistent noise emissions from the building services of the nearby Lidl supermarket.

For the purpose of assessing the worst-case scenario, the predicted noise emissions will be evaluated against the night-time noise levels (23:00-07:00).

4.4 TYPICAL BACKGROUND SOUND LEVEL

As set out in BS4142, the background sound level is taken as the L_{A90} value i.e. the noise level exceeded for 90% of each 15-minute measurement interval. This metric provides an indication of the baseline ambient noise, discounting transient events e.g. emergency services sirens or loud train movements.

To determine the typical night-time background sound level at the nearest noise-sensitive receptor to be used in this assessment, the distribution of measured $L_{A90, 15\ min}$ sound pressure levels has been analysed.

Based on the distribution it is considered that the 25th percentile of the measured $L_{A90, 15\ min}$ levels provides a conservative estimate of the background sound level, capturing periods where environmental noise is at its lower background state. During the night-time period, the 25th percentile $L_{A90, 15\ min}$ level is **40dB.**

Appendix B presents the histogram distribution of the measured levels.

5 PREDICTED NOISE LEVELS

5.1 NOISE LEVEL OF PROPOSED NEW BOILER

Manufacturer's data of the proposed new boiler (Wessex ModuMax) has been provided as the following:

	Noise emissions (dBA at 1m)
Min	47
Max	65

For the purpose of assessing the worst-case scenario, the maximum noise emissions will be used in the calculation of predicted noise emissions.

Although some losses in noise are expected to occur as the sound propagates up through the boiler flue, it is considered minimal and therefore the level at the termination of the flue is taken to be **65dB at 1 metre.**

The noise emissions from the boiler are not expected to have any characteristics of impulsivity or intermittency, but may have some faint perceptible tonality. In the absence of spectral data, a +2dB penalty is deemed to be reasonable to account for the potential of faint perceptible tonality at the noise-sensitive receptor.

5.2 SOURCE TO RECEIVER PATH DISTANCE

Figure 5-2 presents the distance between the proposed boiler flue position and the windows of the closest noise-sensitive receptors, 1 Grove House and 16-24 Westlands. The distances have been measured using satellite imagery, courtesy of Google Maps ©.

Figure 5-1 – Source to receptor path distance – 1 Grove House

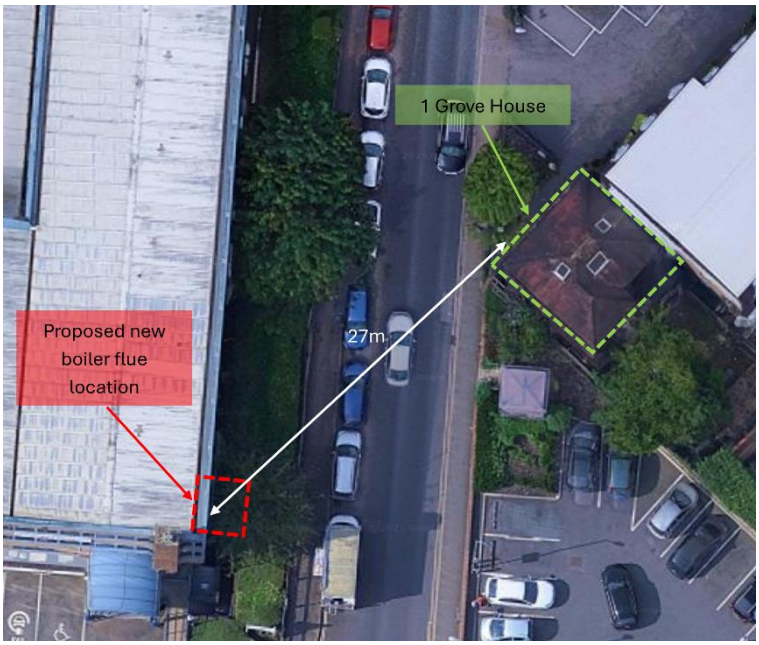


Figure 5-2 – Source to receptor path distance – 16-24 Westlands



The height of the boiler flue termination relative to the ground level is approximately 12.5m as measured from the proposed elevations ref DLS-156-PL-02. The height of the first storey window at 1 Grove House has been measured to be approximately 4.5m. The height of the second storey window of the nearest noise-sensitive receptor 16 -24 Westlands has been measured to be approximately 7.25m

Taking into account the difference in height between the termination of the boiler flue and height of the receptor windows, the source/receiver path distance is calculated to be **28.2 metres** for 1 Grove House and **52.3 metres** for 16-24 Westlands.

5.3 CALCULATION OF NOISE EMISSIONS

Table 5-1 & Table 5-2 present a breakdown of the calculation of noise emissions from the proposed new boiler flue to 1 Grove House and 16-24 Westlands.

Table 5-1 – Boiler flue noise emission calculation – 1 Grove House

Element	Sound pressure level	Source/Explanation
Source noise level	65 dBA at 1m	Manufacturer's data
Distance attenuation over 28m	-29.0 dB	Assuming point source radiation due to distance from source to receiver relative to dimensions of the flue. Point source taken as termination of flue at roof height.
No directivity correction	0dB	Assumed spherical radiation
No screening correction	0dB	Direct line of sight from proposed boiler flue location to closest window of noise-sensitive receptor, no screening from fence or building fabric
No ground absorption	0dB	Source and receiver are significantly above ground level that no ground absorption is included in calculation
Predicted noise level at 16 – 24 Westlands from boiler flue noise emissions	**36 dB**	

Table 5-2 – Boiler flue noise emission calculation - 16-24 Westlands

Element	Sound pressure level	Source/Explanation
Source noise level	65 dBA at 1m	Manufacturer's data
Distance attenuation over 52m	-34 dB	Assuming point source radiation due to distance from source to receiver relative to dimensions of the flue. Point source taken as termination of flue at roof height.
No directivity correction	0dB	Assumed spherical radiation
No screening correction	0dB	Direct line of sight from proposed boiler flue location to closest window of noise-

Element	Sound pressure level	Source/Explanation
		sensitive receptor, no screening from fence or building fabric
No ground absorption	0dB	Source and receiver are significantly above ground level that no ground absorption is included in calculation
Predicted noise level at 16 – 24 Westlands from boiler flue noise emissions	**31 dB**	

6 ASSESSMENT

6.1 BS4142 ASSESSMENT

The boiler can operate for 24 hours a day, turning off when a nominal ambient temperature is reached. For the purpose of capturing the worst-case scenario in terms of lowest background sound level, the night-time period (23:00 – 07:00) has been assessed.

Table 6-1 & Table 6-2 set out the BS 4142 assessment based on the predicted sound emissions calculated in section 5.3 for both receptor locations.

An acoustic feature correction has been applied to the sound emissions prediction for tonality that may be faintly perceptible at the receptor locations. This is based on the rational that the overall predicted sound level is below the background sound level and therefore any tonal characteristic is only likely to be just perceptible. Further study of the influence of the flue on the tonal characteristics determined that tonality is unlikely to be introduced. This is because the fundamental frequency i.e. the resonance of a pipe, is a function the length. At a proposed length of 13m, the fundamental frequency of the boiler flue is below the range of human hearing.

Table 6-1 – BS4142 Assessment – 1 Grove House

Parameter	Sound Pressure level
Predicted noise level at 1 Grove House from boiler flue noise emissions (Specific level)	36 dB
BS 4142 Acoustic feature correction	+2 dB (for just perceptible tonality)
Rating Level	38 dB
Typical night-time background sound level $L_{A90,\ 15mins}$	40 dB
Difference between predicted level and typical background sound level.	-2 dB
The result of the assessment indicates this is a low impact	

Table 6-2 – BS4142 Assessment – 16-24 Westlands

Parameter	Sound Pressure level
Predicted noise level at 16 – 24 Westlands from boiler flue noise emissions (Specific level)	31 dB
BS 4142 Acoustic feature correction	+2 dB (for just perceptible tonality)
Rating Level	33 dB
Typical night-time background sound level $L_{A90,\ 15mins}$	40 dB

Parameter	Sound Pressure level
Difference between predicted level and typical background sound level.	-7 dB
The result of the assessment indicates this is a low impact	

6.2 QUALITATIVE ASSESSMENT

The quantitative assessment in section 6.1 provides a worst-case assessment of the potential noise impact. It is likely that predicted noise levels will be lower due to losses via the transmission of sound up through the flue. The prevailing noise climate of the area has existing industrial noise sources and as such, noise from the proposed boiler is not considered characteristically distinct such that nearby residents could differentiate between noise from the boiler flue and other building services noise.

The proposed boiler will be replacing an existing boiler of the same specifications, which is currently ventilated via a louvre to an alleyway approximately 2.7m below the height of the road on Foundry Lane. It is possible that the proposed change may result in lower noise emissions overall.

Although the boiler can operate continuously for 24 hours per day, it will automatically shut down when the ambient temperature exceeds approximately 23°C. Consequently, during the colder winter months, continuous operation throughout the day is expected. In contrast, during the warmer summer months, the boiler is likely to switch off more frequently, coinciding with periods when residents of nearby receptors are more inclined to keep their windows open.

6.3 UNCERTAINTY

BS4142 Methodology requires commentary on the level of uncertainty within the assessment and the steps taken to reduce the impact of uncertainty on the outcome of the assessment. The two main areas where uncertainty within the assessment arise are:

- Measurement uncertainty – equipment accuracy and variability in residual acoustic environment
- Calculation of source noise level – assumptions on source noise level, simplification of the directivity and propagation of the noise emissions to the receiver, rounding error.

Class 1 acoustic equipment has been used to measure the noise levels to reduce the uncertainty around the accuracy of the measured levels. To account for uncertainty within the measured data due to variability in the residual acoustic environment, conversative values for the background sound level have been selected.

To minimise the risk of uncertainty in determining the predicted noise level at the closest noise-sensitive receptor, a conservative methodology has been applied throughout the noise impact assessment. Assumptions exclude factors such as directivity of the noise source, screening, air absorption, and transmission losses through the boiler flue, thereby ensuring that the predicted noise emissions represent a worst-case scenario. The calculated specific source level has been rounded up to minimise the risk of uncertainty introduced when rounding.

7 CONCLUSION

WSP have been appointed by Ceres Ltd to undertake a noise impact assessment of a proposed boiler replacement and new external boiler flue to roof height. WSP have carried out a background noise survey and predicted the noise emissions from the proposed developments. The findings of the assessment were that the predicted noise levels are below the existing background sound level at the nearest noise-sensitive receptors, and the noise impact is expected to be low when assessed in accordance with the relevant British Standard.

Appendix A

GLOSSARY OF TERMS

A-Weighting: The human ear is not equally sensitive to all frequencies of sound. It is relatively much less sensitive to very low frequencies such as 'mains hum', and to very high frequencies such as the call of a bat, than to the 'mid-frequencies' important for human voice communication. In order to make sound level meters, which would otherwise be indiscriminate in registering sound pressures, respond in a way which reflects human perception of sound, they usually are fitted with a set of filters to progressively filter out the high and low frequency energy. The filters are made to an internationally standardised specification and the filtered noise level is said to be 'A-weighted'. Sometimes A-weighted decibel levels are denoted 'dB(A)', but the correct, internationally standardised format for reporting requires the 'A' to be appended to the noise descriptor e.g. $L_{Aeq,T}$, L_{Amax}, etc.

Ambient Noise: This is the totally encompassing sound at the measurement position over a specified time interval and usually comprises sound from many different sources both near and far. Usually this is measured as an $L_{Aeq,T}$ where T is the time interval.

Attenuation: A general term used to indicate the reduction of noise or vibration, or the amount (in decibels) by which it is reduced.

Averaging: In the absence of a dominant steady source, the sound level at a point, indoors or outdoors, varies continuously. For example, the variation may be over a few dB about an average value in a quiet room, or over 10 dB or more in a noisy outdoor environment. In order to define a level to represent the noisiness of the space it is necessary to define that average value. The most common averaging methods are energy averaging (L_{Aeq}) and statistical averaging (L_{AN} where N is a percentage between 1 and 100).

Background Noise Level, $L_{A90,T}$: Background noise level is a term used to describe that level to which the noise falls during quiet spells, when there is a lull in passing traffic for example. It is quantified by the $L_{A90,T}$ which is the noise level that is exceeded for 90% of the measurement time interval, T. It is typically measured using the fast time weighting (see below), whereby the levels is denoted $L_{AF90,T}$ or $L_{A90,T}$,fast.

Decibels: Noise conventionally is measured in decibels (dB). The decibel is a logarithmic unit and decibel levels do not add and subtract arithmetically. An increase or decrease of 3 dB in the level of a steady noise is about the smallest that is noticeable. It represents a doubling or halving of noise energy. An increase or decrease of 10 dB represents a ten-fold change in noise energy, and is perceived as a doubling or halving of loudness.

The threshold of hearing for a typical young, healthy adult is 0 dB A-weighted sound pressure level. A noise level of 140 dB(A) can cause physical pain. Most people listen to their televisions at about 60 dB(A) to 65 dB(A). Alongside a busy main road the ambient noise level may be in the 70 dB(A) to 80 dB(A) range; on a quiet day in the countryside, it might be as low as 30 dB(A), in town 40 dB(A) to 50 dB(A).

Decibel Addition: If two similar noise sources operate together their combined noise level at an observer's position some distance away is 3 dB higher than the noise level generated by just one of them. If two further machines are switched on the noise level generated by all four at the observer's position is 3 dB higher than the level generated by the two. If the number of machines is again doubled, to eight, the noise level increases by another 3 dB, and so on.

Equivalent Continuous A-Weighted Sound Pressure Level, $L_{Aeq,T}$: The 'equivalent continuous A-weighted sound pressure level' is an average of the fluctuating sound energy in a space. It is the value of the A-weighted sound pressure level of a continuous, steady sound that, over the specified time period, T seconds, has the same root mean square sound pressure as the varying sound. It can be likened to the mean petrol consumption of a car over a specific journey during which the instantaneous consumption peaked during periods of acceleration and fell during periods of coasting or braking.

Façade Sound Level: Road and railway traffic noise levels often are specified in terms of the sound level at a position 1m in front of the most exposed façade of potentially noise sensitive premises. Such levels are assumed to be 3 dB(A) higher than sound levels measured at an equivalent position away from the reflections from the building and any other surfaces (excluding the ground).

Fast Time Weighting: An averaging time used in sound level meters, corresponding to a 125 ms time constant.

Free-field Sound Level: The free-field refers to sound level measurement positions in an open area well away from any buildings or other sound reflecting surfaces other than the ground. Generally, the minimum distance from building façades for free-field measurements is taken to be 3.5 m.

Rating Level, $L_{Ar,Tr}$: This is the equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.

Appendix B

SURVEY RESULTS

This appendix presents a detailed summary of the measured levels during the noise survey undertaken by WSP between 14:15 on the 26 August to 13:45 on the 02 September 2025.

The noise levels presented in this appendix are the raw noise levels measured on site and a -3dB correction has not been applied to convert from a façade level to a free field level.

Figure B-1 – Time history of measured sound levels

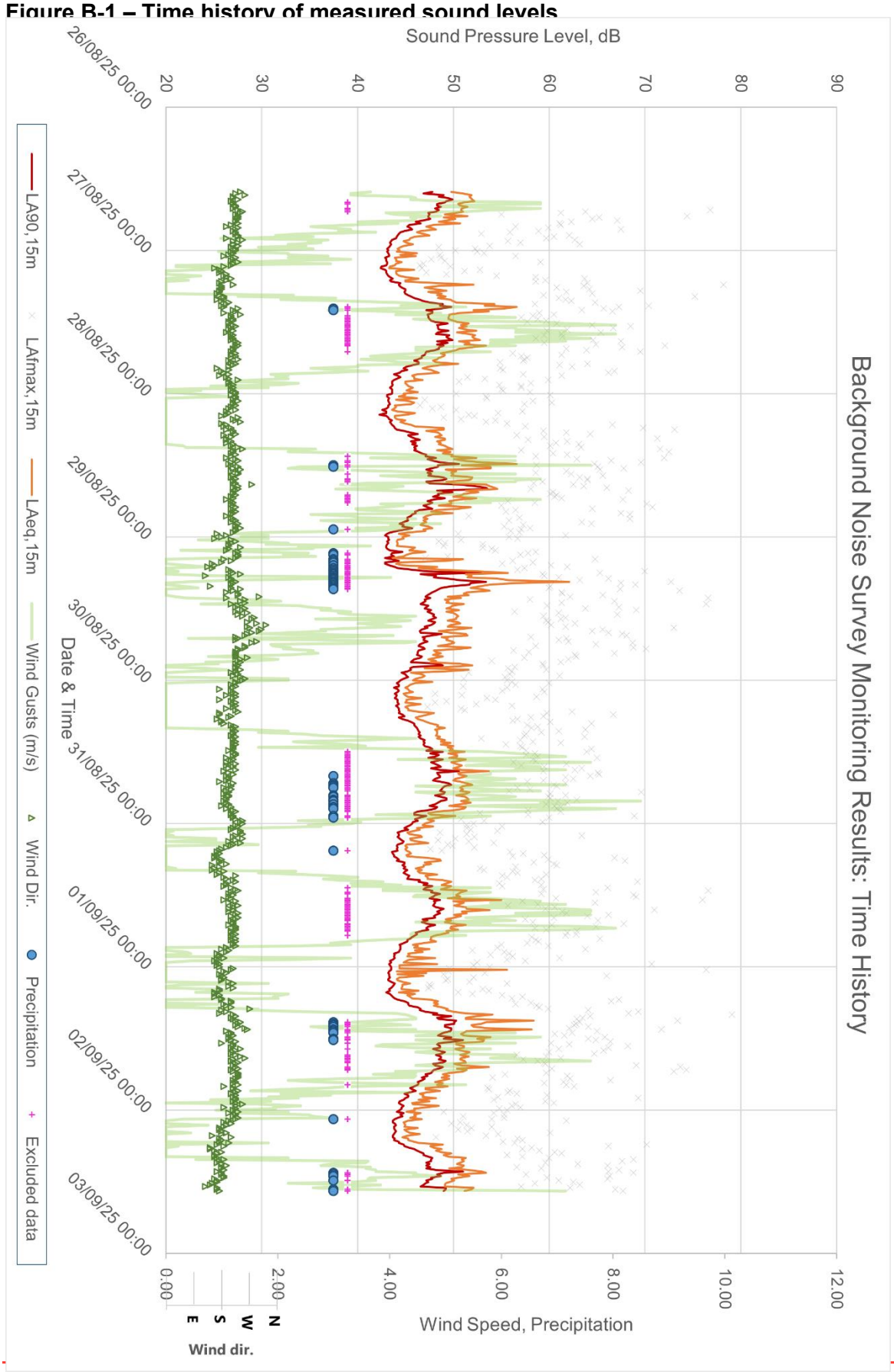


Table B-1 – Summary of measured sound levels: All days, weekdays and weekends

	Background Sound Level, dB $L_{A90,T}$			Residual Sound Level, dB $L_{Aeq,T}$			Maximum Sound Level, dB $L_{Afmax,T}$		
	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)
Range	45 - 49	44 - 47	42 - 46	47 - 53	45 - 50	43 - 56	58 - 79	58 - 71	47 - 78
25th %ile	46	44	43	49	47	45	64	61	51
Median	47	45	44	50	48	45	68	63	55
75th %ile	48	46	44	50	48	47	72	67	58
Arithmetic Avg	47	45	44	50	48	46	68	64	55
Log Avg	-	-	-	50	48	46	-	-	-

Table B-2 – Summary of measured sound levels: Weekdays only

	Background Sound Level, dB $L_{A90,T}$			Residual Sound Level, dB $L_{Aeq,T}$			Maximum Sound Level, dB $L_{Afmax,T}$		
	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)
Range	45 - 49	44 - 47	42 - 46	48 - 53	45 - 50	43 - 56	58 - 79	58 - 71	47 - 78
25th %ile	47	44	43	49	47	44	66	62	51
Median	47	45	44	50	48	45	69	63	54
75th %ile	48	46	44	51	49	46	73	67	58
Arithmetic Avg	47	45	44	50	48	46	69	64	55
Log Avg	-	-	-	50	48	46	-	-	-

Table B-3 – Summary of measured sound levels: Weekends only

	Background Sound Level, dB $L_{A90,T}$			Residual Sound Level, dB $L_{Aeq,T}$			Maximum Sound Level, dB $L_{Afmax,T}$		
	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)	Day (07:00 – 19:00)	Eve (19:00 – 23:00)	Night (23:00 – 07:00)
Range	45 - 47	44 - 46	43 - 46	47 - 50	46 - 48	44 - 49	60 - 69	60 - 65	47 - 71
25th %ile	45	44	44	48	46	45	61	61	51
Median	46	45	44	48	46	46	64	62	55
75th %ile	47	45	45	49	47	47	64	64	59
Arithmetic Avg	46	45	44	48	47	46	63	63	55
Log Avg	-	-	-	48	47	46	-	-	-

Figure B-2 – Histogram of measured $L_{Aeq,\ 15\ min}$ sound levels

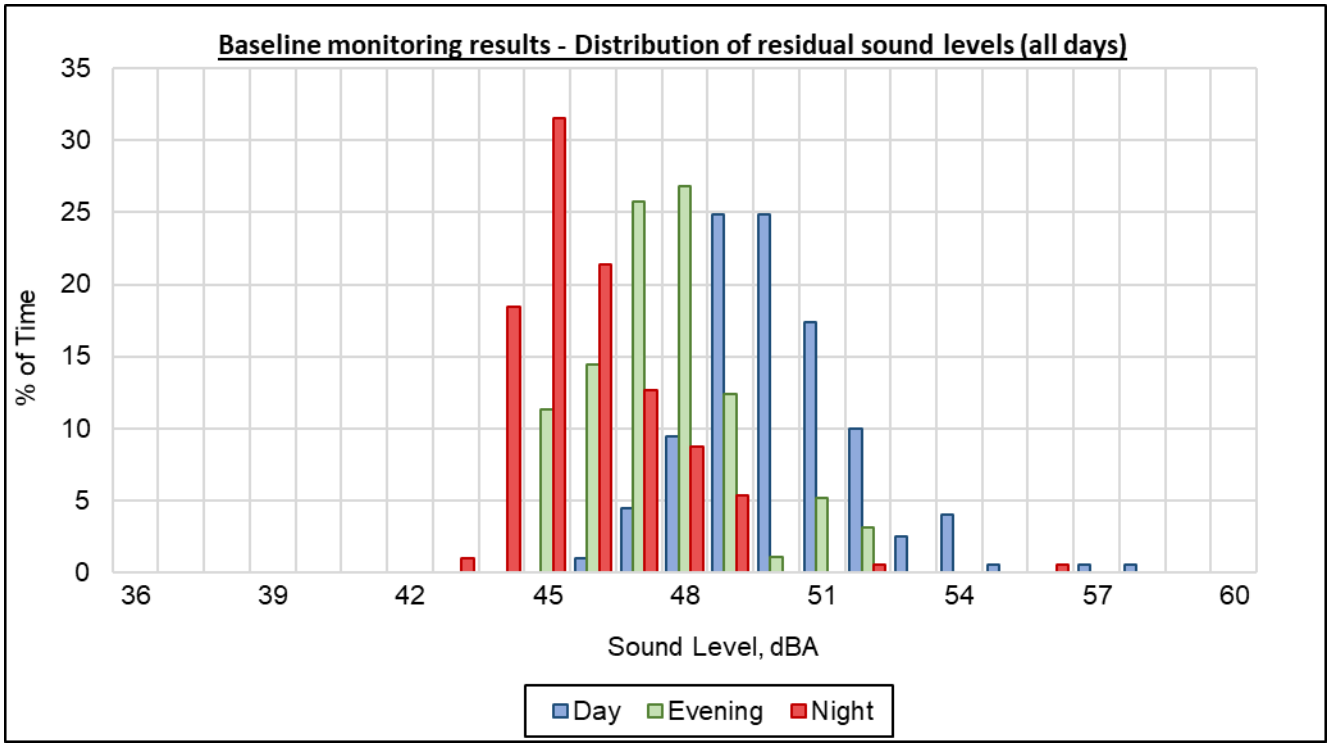
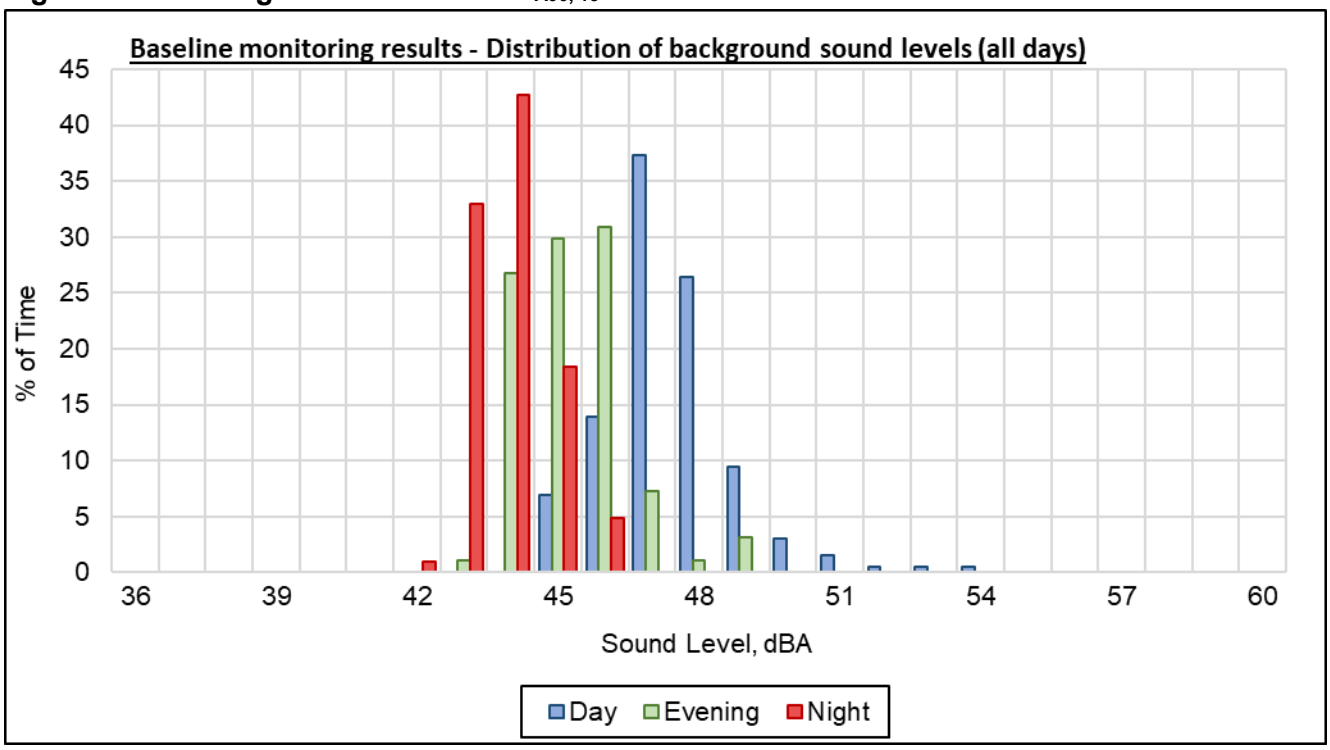


Figure B-3 – Histogram of Measured $L_{A90,\,15\,min}$ sound levels



Appendix C

LIMITATIONS TO REPORT

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