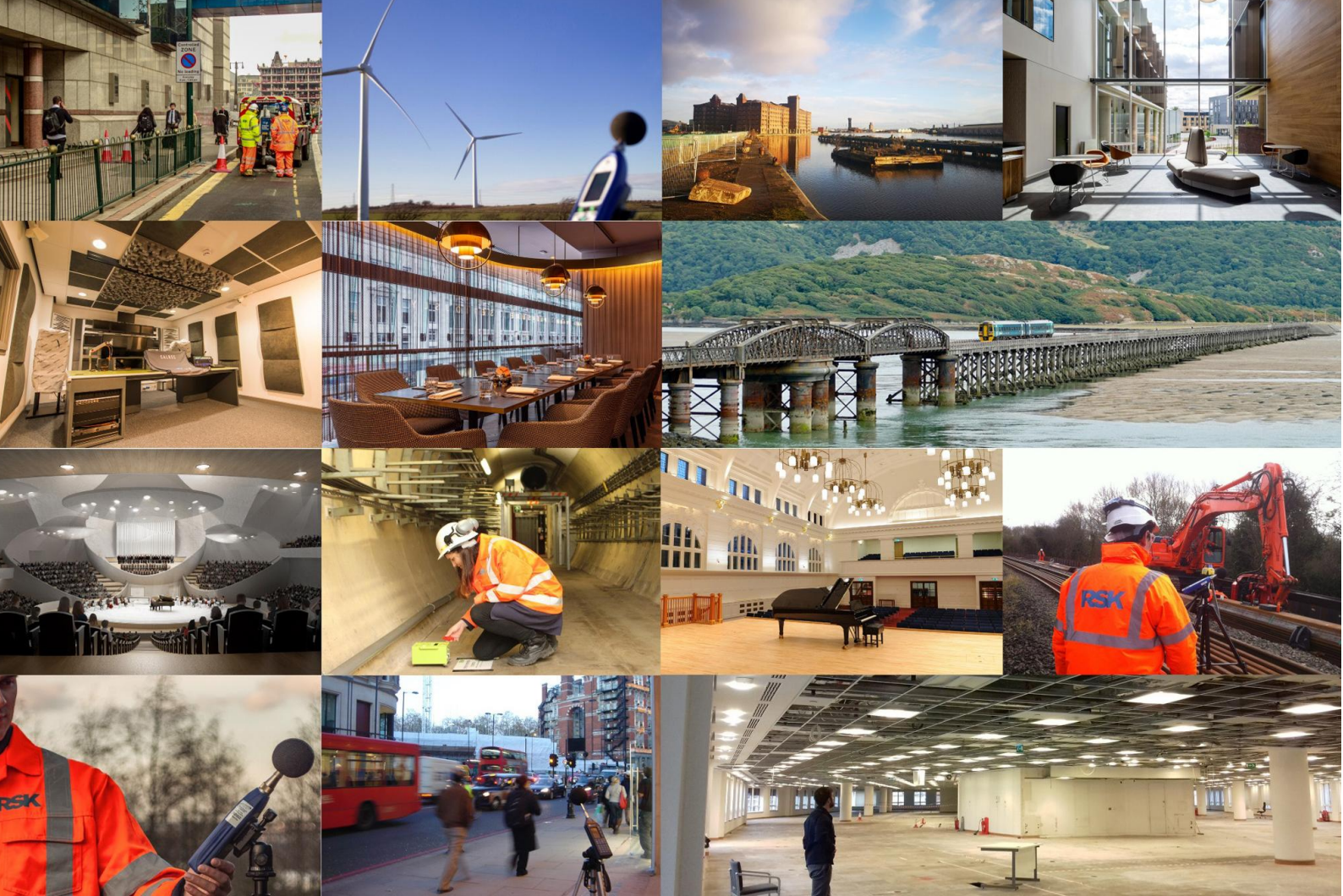


Appendix F – Noise Impact Assessment



ENVIRONMENTAL PERMITTING - NOISE IMPACT ASSESSMENT NORTHFLEET BOILER HOUSE

Kimberly-Clark Limited
2062350-RSKA-RP-002-(02)



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General notes

Project Name:	Northfleet Boiler House
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Signature:

Date: 10 April 2026

Technical reviewer:

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Managing Director – RSK Acoustics

Signature:

Date:

10 April 2026

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSKA for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Acoustics Ltd.



Contents

1	Introduction	4
1.1	Instruction	4
1.2	Site Location and Context.....	4
2	Policy, Standards and Guidance	6
3	Noise Survey	8
3.1	Survey Methodology	8
3.2	Survey Equipment	9
3.3	Weather Conditions	9
3.4	Survey Observations	10
3.5	Results.....	10
4	Noise Impact Assessment Methodology	14
4.1	Source Data.....	14
4.2	Modelling Methodology.....	14
4.3	Acoustic Corrections.....	16
4.4	Predicted Noise Levels.....	16
5	BS 4142 Assessment	18
5.1	Acoustic Corrections Applied.....	18
5.2	Assessment Context.....	21
5.3	Assessment Summary.....	21
6	Best Available Techniques (BAT).....	22
7	Uncertainty	24
8	Summary	25
	Appendix A – Glossary.....	26
	Appendix B – Noise Survey Photographs.....	27
	Appendix C – Survey Weather.....	31
	Appendix D – Noise Survey Results	32
	Appendix E – Boiler House - Building Envelope Specifications.....	34



1 Introduction

1.1 Instruction

RSK Acoustics (RSKA) has been instructed by Kimberly-Clark Limited (KC) to undertake a noise impact assessment to inform a permit variation application for a new duel fuel (hydrogen and natural gas) boiler plant room at the existing Kimberly Clark Northfleet Mill in Gravesend (DA11 9AD).

The staff preparing this document are members of the Institute of Acoustics (IOA) who have undertaken Diploma in Acoustics and Noise Control, and therefore are competent to undertake this study.

A glossary of acoustic terminology relevant to the acoustic investigation is appended to this document.

1.2 Site Location and Context

1.2.1 Site location

The Northfleet Mill site is centred on approximate National Grid reference 562710E, 174375N. An aerial view of the site is shown below:

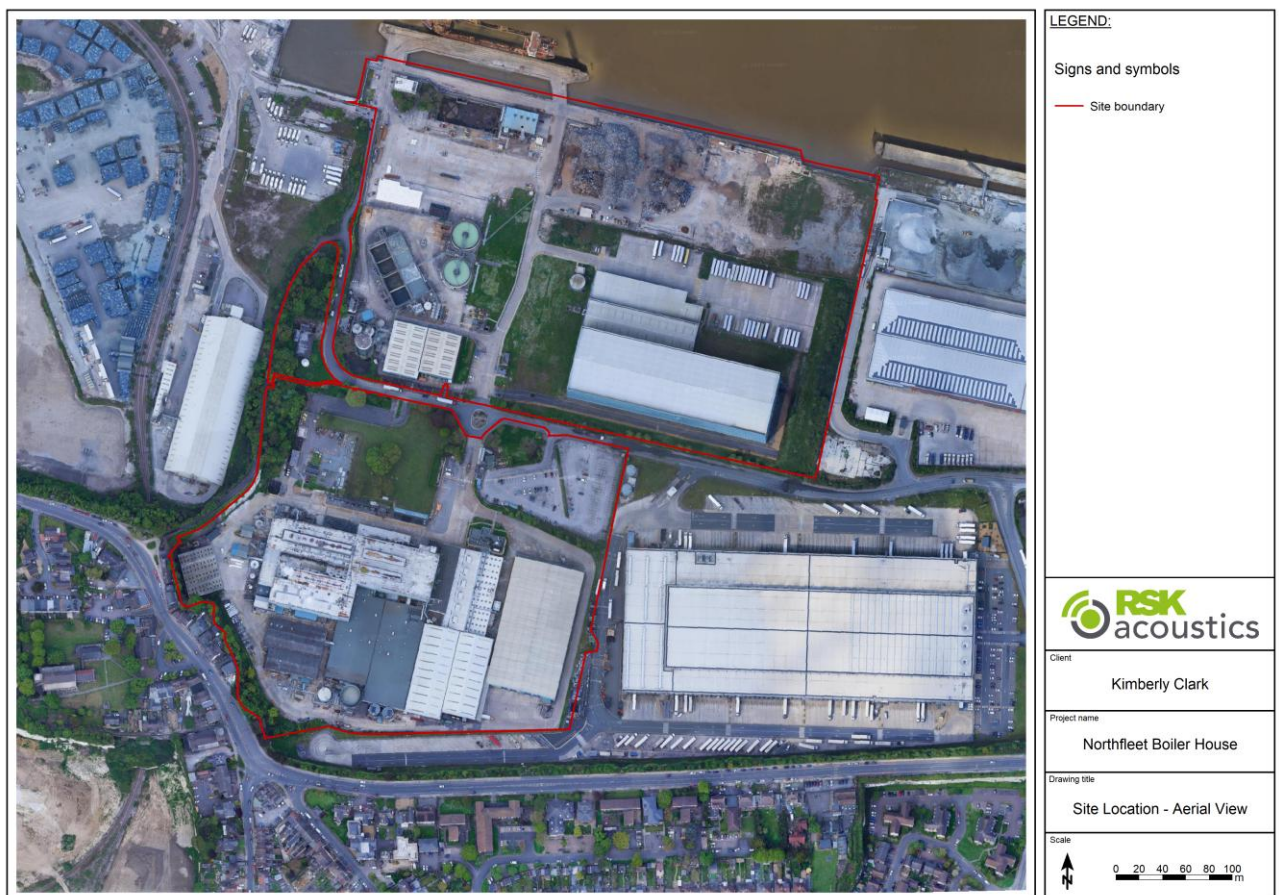


Figure 1 Aerial view of the existing site

The area immediately bounding the site presently comprising the following uses and noise sensitive receptors:

- **Northern boundary** – Warehouses and London Scrap Terminal, with the River Thames beyond;
- **Eastern boundary** – Commercial units and residential dwellings along The Hill Northfleet road (B2175);
- **Southern boundary** – Residential dwellings along London Road (B2175); and,



- **Western boundary** – Commercial/industrial units with residential dwellings beyond.

Figure 2 shows the location of the site in relation to the nearest noise sensitive receptors to the site.

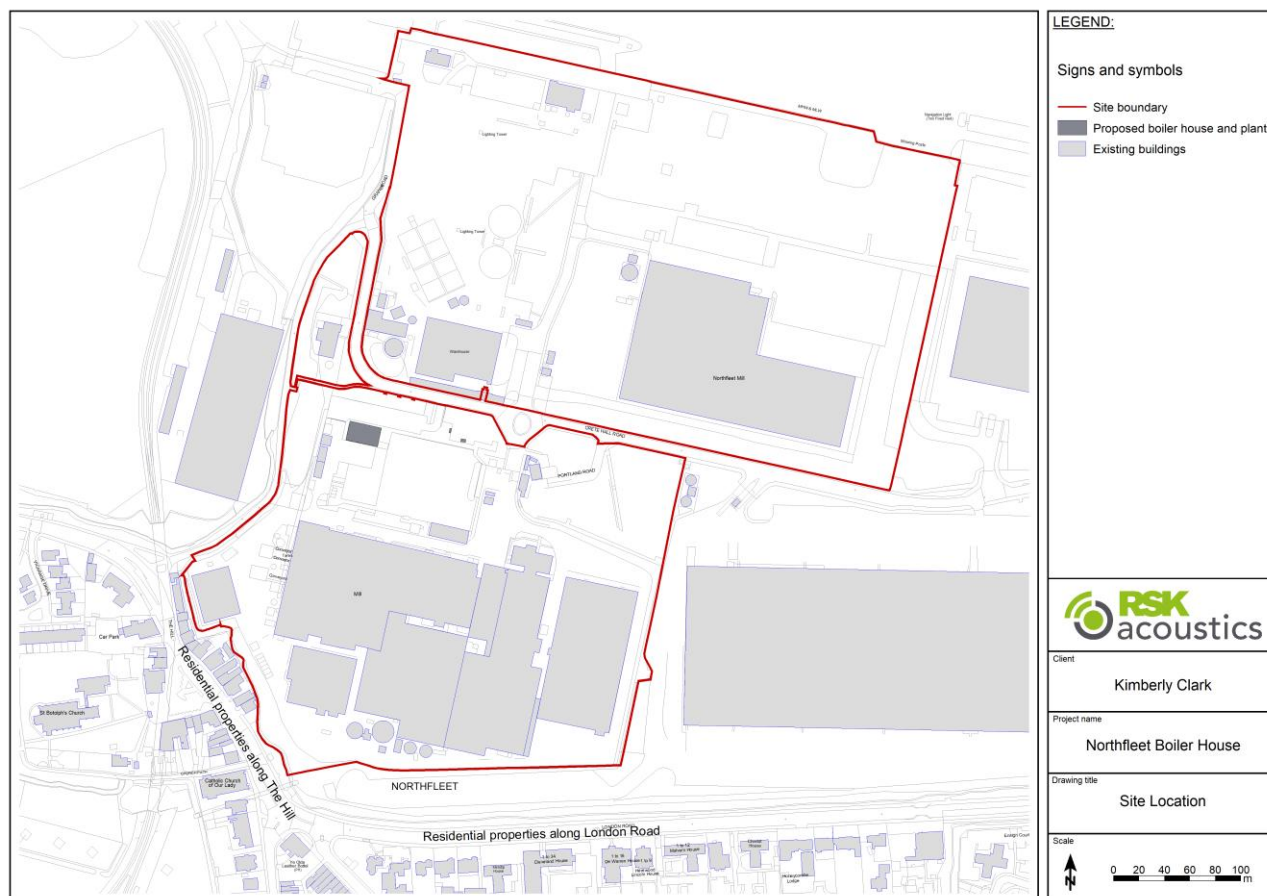


Figure 2 Site location

The nearest noise sensitive receptors to the site are residential properties located along London Road and The Hill Northfleet road. A cliff edge separates residential properties to the east and south, with the Northfleet site located at the bottom of the cliff.

1.2.2 Proposed development

A new dual fuel (hydrogen and natural gas) boiler house is proposed to be located within the existing KC site boundary, however on land not currently included within the permitted site installation boundary.

As part of Kimberly Clark's sustainability strategy, the proposed development includes the provision of two new boilers with full 100% hydrogen firing capability. The boilers will have dual fuel capability to allow use of either hydrogen or natural gas as a fuel. One boiler is required for routine operation with the second used as a standby. As part of the proposals, the boilers and a new transformer will be housed in a clad building with two associated 20m (above ground level) high chimney stacks.

The proposals also include a hydrogen pressure regulating and metering station (PRMS) and a natural gas booster located in the vicinity of the new boiler house.

A new green hydrogen production plant is also proposed to be constructed within the KC site boundary, however this forms part of separate planning application (ref. 20250251 submitted in March 2025).



2 Policy, Standards and Guidance

Document	Summary
Planning policy	
National Planning Policy Framework (NPPF) 2025	The NPPF sets out the Government's planning policies for England and how these are expected to be applied. The NPPF includes statements relating to noise and the requirement to take it into account during the planning process.
Noise Policy Statement for England (NPSE) 2010	The NPSE sets out the long-term vision of Government noise policy: 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.
Standards and guidance	
Commission Implementing Decision - establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for the production of pulp, paper and board (2014/687/EU), September 2014	BAT 17 provides guidance on BAT for reducing the emissions of noise from pulp and paper manufacturing.
BS 4142:2014+A1:2019 <i>'Methods for rating and assessing industrial and commercial sound'</i>	BS 4142 provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities. The rating method takes into account specific source characteristics, such as tonality, impulsivity and intermittency. The impact assessment procedure described in BS 4142 is based on the comparison of the rating sound level with the background sound level prevailing at the assessment locations. The methodology set out within the standard is not intended to be used to assess the extent of an impact at indoor locations. However, internal sound levels may be taken into account by considering any acoustic attenuation measures such as façade treatment or screening when discussing the context of the assessment result. The determination of noise amounting to a nuisance is beyond the scope of the standard.
BS 7445-1:2003 <i>'Description and measurement of environmental noise'</i>	BS 7445 defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.
BS EN IEC 60942:2018 <i>'Electroacoustics – Sound calibrators'</i>	BS EN IEC 60942 specifies the performance requirements for sound calibrators.
BS EN 61672-1:2013 <i>'Electroacoustics – Sound level meters'</i>	BS EN 61672-1 provides electroacoustic performance specifications for sound measuring instruments.
BS ISO 9613-2:2024 <i>'Acoustics – Attenuation of sound during propagation outdoors'</i>	Part two of ISO 9613 specifies an engineering method for calculating the attenuation of sound during propagation outdoors to enable the prediction of environmental noise at a distance from a variety of sources.
Environment Agency (EA),	This guidance replaces the withdrawn Environment Agency Horizontal Guidance for Noise (H3) parts 1 and 2, and



Document	Summary
Noise and Vibration Management: Environmental Permits, 2022	SEPA's Guidance on the control of noise at PPC installations. The purpose of the Noise and Vibration Management Guidance is to provide supplementary information including guidance on regulation and permitting, a description of the principles of noise measurement and prediction; and the control of noise by design, by operational and management techniques and abatement technologies. The Noise and Vibration Management Guidance specifies to follow the methodology in accordance with BS 4142 with consideration to the off-site noise monitoring survey and source assessment.
Environment Agency (EA), Method implementation document (MID) for BS 4142, 2023	This MID supplements BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound (BS 4142), and should be followed when applying to the EA for new environmental permits or permit variation.
World Health Organisation (WHO) Guidelines for Community Noise, 1999	The Guidelines for Community noise was published as a response to a need for action together with a generic need for improvements in legislation at a national level. Although not legislation, this document provides general guidance and guidelines which have been set for different health effects, using the lowest noise level that produces an adverse health effect in specific human environments.
WHO 'Night Noise Guidelines for Europe' (NNG), 2009	The NNG aims to present the conclusions of the WHO working group responsible for preparing guidelines for exposure to noise during the night. This document forms an extension to the WHO Guidelines for Community Noise.

Table 1 *Planning policies, standards and guidance*



3 Noise Survey

3.1 Survey Methodology

The survey comprised noise measurements at two locations representative of the nearest noise-sensitive receptors to the site between Tuesday 25 November 2025 and Thursday 11 December 2025.

The KC Northfleet site typically operates 24/7, however during the noise survey, the site had a shutdown period between Tuesday 25 and Saturday 29 November 2025. This allowed for background sound levels in the absence of the site to be measured in line with EA guidance.

The measurement locations are summarised in Table 2 and presented graphically in Figure 3. Photographs of the monitoring locations and survey notes are presented in Appendix B.

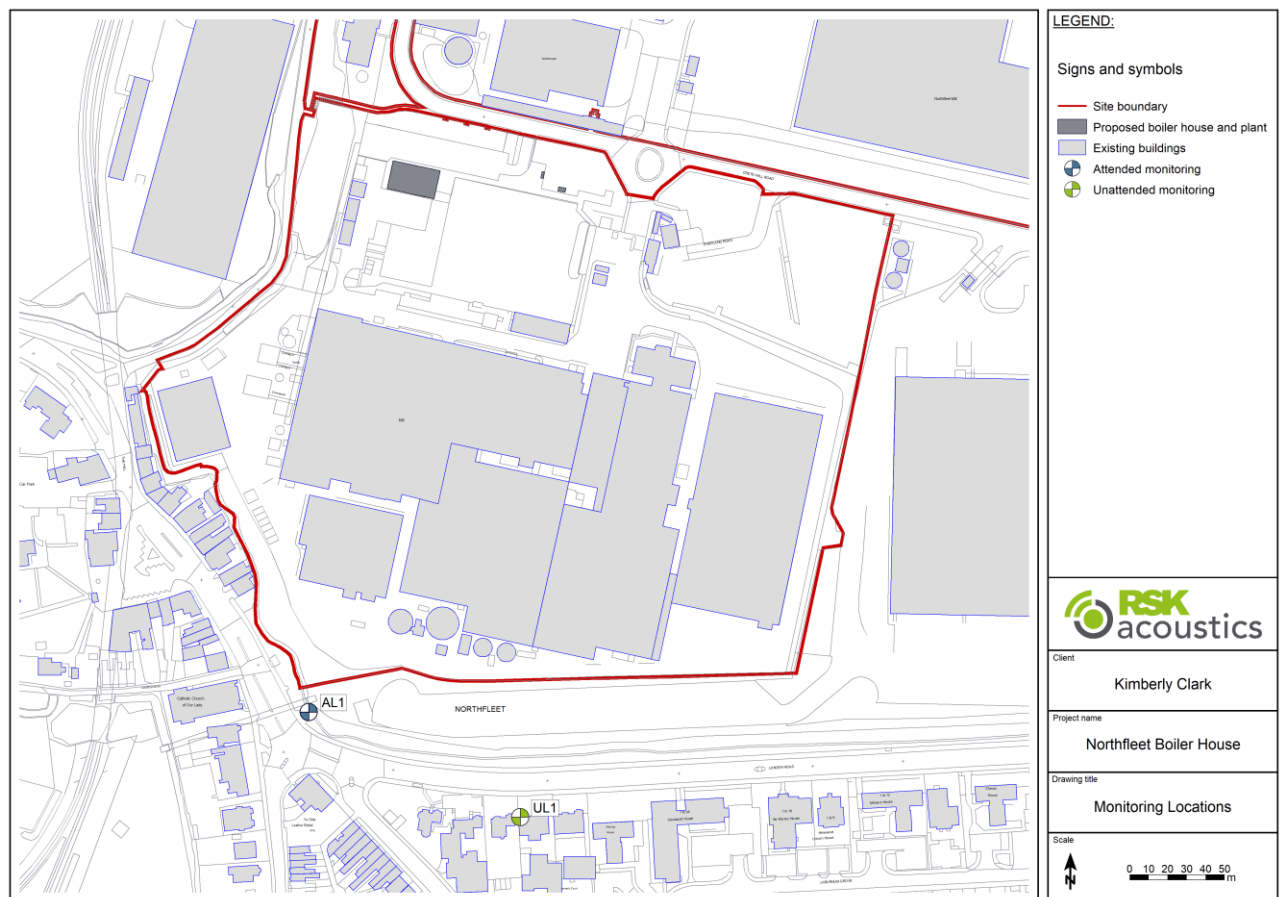


Figure 3 Monitoring locations

Ref.	Measurement Type	Approx. coordinates	Description
UL1	Unattended	562647N, 174029E	Unattended noise logger installed in representative free-field conditions approximately 1.5m above ground level. Installed on a ground floor rooftop/balcony at Jessamine Guest House to quantify noise levels at the residential receptors to the south of the site along London Road.
AL1	Attended	562530N, 174086E	Attended noise measurements during both daytime and night-time due to access restrictions for unattended monitoring. Noise logger installed approximately 1.5m above ground level to quantify noise levels at the residential



Ref.	Measurement Type	Approx. coordinates	Description
			receptors to the west of the site along The Hill Northfleet road.

Table 2 Monitoring locations

3.2 Survey Equipment

The noise measurements were undertaken using the following equipment:

Survey Equipment	Type	Serial number	Calibration date expiry
Sound level meter	Rion NL-52	00620866	22/05/2027
Sound level meter	Rion NL-52	00197783	28/01/2027
Acoustic calibrator	Rion NC-75	34524127	02/02/2026

Table 3 Monitoring equipment

The sound level meters conformed to the Class 1 requirements of BS EN 61672-1:2013. The calibrator used conformed to the Class 1 requirements of BS EN IEC 60942:2018. The equipment used had a calibration history that is traceable to a certified calibration institution. Calibration certificates are available on request. The calibration of the sound level meters were field checked prior to commencing measurements and prior to removing the equipment from site upon completion; no significant calibration drift was observed i.e., within a +/- 0.5 dB tolerance.

3.3 Weather Conditions

Weather information has been obtained via a weather station installed within the Northfleet Mill site boundary (NGR 562734N, 174299E) to determine conditions throughout the unattended survey duration. The weather information has been summarised in Table 4 below and displayed graphically provided in Appendix C. Periods where wind speeds were over 5 m/sec and/or precipitation occurred have been excluded from the assessment; periods of inclement weather are highlighted graphically for UL1 in Section 3.5.1.

Date	Temperature range (°C)	Average wind speed (m/s)	Total rainfall (mm)	Prevailing wind direction
25/11/2025	3.8 - 7.3	1.3	0.0	WNW
26/11/2025	0.2 - 8.5	0.3	0.0	WNW/SW
27/11/2025	8.4 - 13.3	0.9	0.0	SE
28/11/2025	9.1 - 13.3	0.7	0.0	ESE
29/11/2025	5.2 - 12.3	0.7	2.4	SE
30/11/2025	3.6 - 8.2	0.7	0.0	SW
01/12/2025	6.6 - 11.4	0.9	4.4	SE
02/12/2025	6.8 - 11.4	0.3	8.0	SE
03/12/2025	4.6 - 10.3	0.0	0.0	ENE
04/12/2025	2.9 - 8.7	0.4	4.4	ENE
05/12/2025	0.2 - 9.4	0.4	3.0	ENE
06/12/2025	8.5 - 12.7	0.8	1.2	SE
07/12/2025	8.0 - 14.6	0.7	2.4	SW
08/12/2025	10.7 - 14.7	0.7	0.0	SSE



Date	Temperature range (°C)	Average wind speed (m/s)	Total rainfall (mm)	Prevailing wind direction
09/12/2025	12.0 - 14.4	0.7	1.6	ENE

Table 4 Weather conditions

Weather conditions during the attended measurements were also monitored and considered suitable for noise monitoring.

3.4 Survey Observations

Observations of the noise environment at UL1 were noted during the installation and collection of the noise equipment and through interrogation of audio recordings. The dominant noise source at this location was road traffic noise along London Road (B2175), the existing KC Northfleet site and wider industrial estate.

Observations of the noise environment at AL1 were noted during the attended measurements. The dominant noise source at this location during the daytime was road traffic noise along the B2175, with noise from the existing KC Northfleet site and wider industrial estate more prominent during the night-time when road traffic noise was reduced.

3.5 Results

3.5.1 Attended – AL1

The noise monitoring data measured at AL1 is presented below for daytime and night-time respectively. The KC Northfleet site was operational during these measurements.

Date	Start Time	L _{Aeq,15min} (dB)	L _{AFmax,15min} (dB)	L _{A90,15min} (dB)
Tuesday 09/12/2025	10:45	68	78	61
	11:00	64	77	59
	11:15	64	77	58
	11:30	65	76	59
	11:45	65	77	59
	12:00	66	85	58
	12:15	64	74	58
	12:30	64	76	58
	12:45	64	78	58

Table 5 AL1 noise survey results - daytime

Date	Start Time	L _{Aeq,5min} (dB)	L _{AFmax,5min} (dB)	L _{A90,5min} (dB)
Thursday 11/12/2025	00:41	58	83	55
	00:56	57	68	55
	01:11	57	74	56
	01:26	58	74	56
	01:41	57	69	55
	01:56	58	77	56
	02:11	58	74	57
	02:26	57	73	56



Date	Start Time	L _{Aeq,5min} (dB)	L _{AFmax,5min} (dB)	L _{A90,5min} (dB)
	02:41	58	75	56

Table 6 AL1 noise survey result - night-time

3.5.2 Unattended – UL1

The noise monitoring data measured at UL1 is presented below. A tabulated summary is presented in Appendix D.



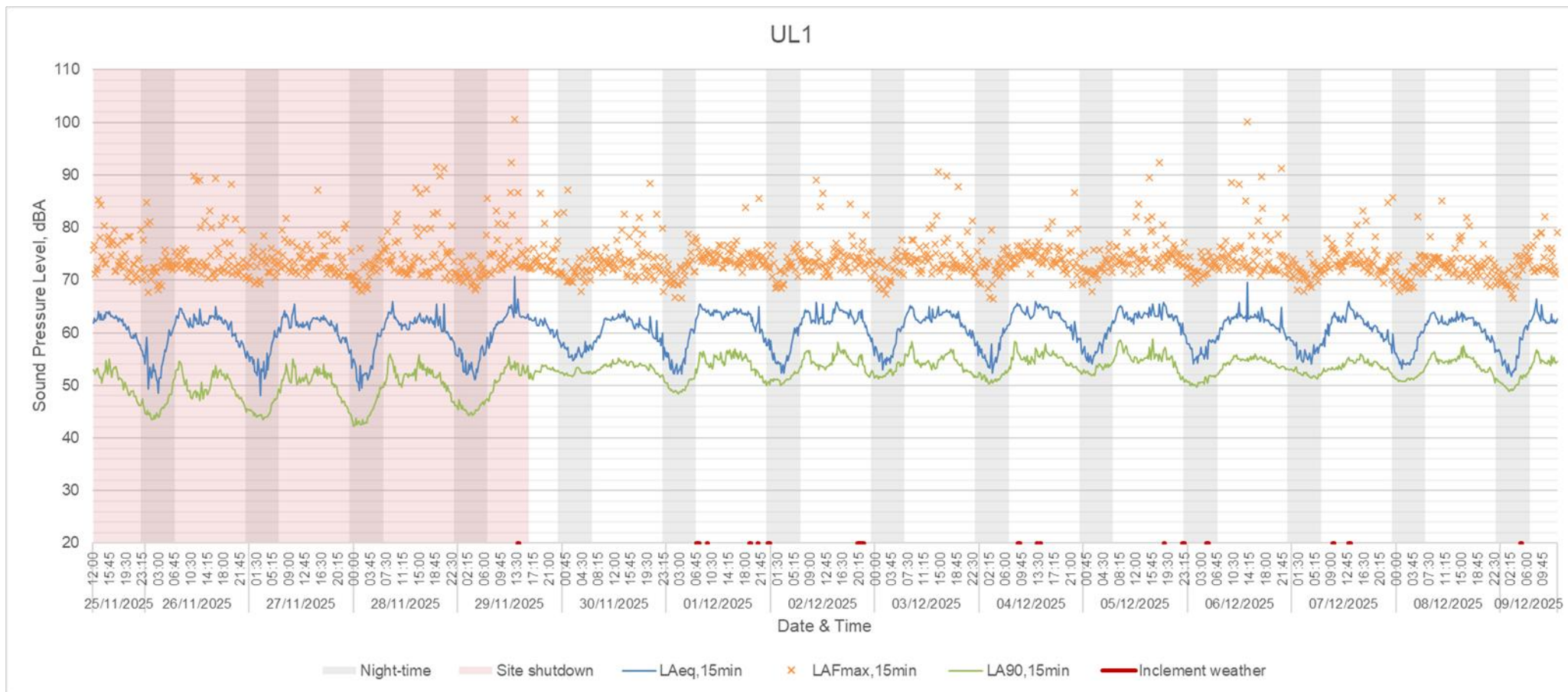


Figure 4 UL1 noise survey results



The methodology detailed in BS 4142: 2014+A1: 2019 provides an example of statistical analysis to determine the typical background sound level ($L_{A90,15min}$) in absence of the existing site in line with EA guidance. The following analysis adopts the methodologies applied within the aforementioned standard for UL1. UL1 is considered applicable to receptors along London Road and The Hill Northfleet road.

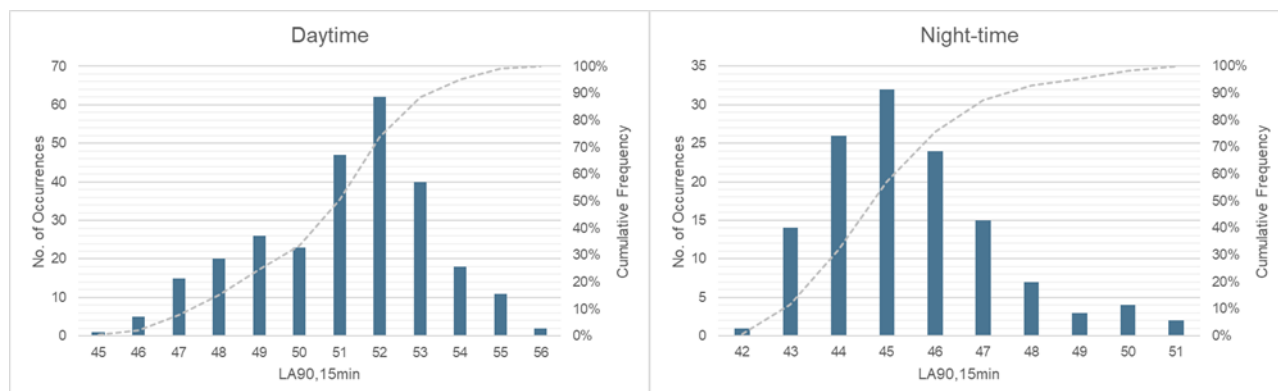


Figure 5 Statistical analysis of background sound levels – UL1

Based on Figure 5, 'BS 4142:2014+A1:2019 Technical Note (March 2020 Version 1.0) and professional judgment, an existing background sound level of 49 dB $L_{A90,1hr}$ during the daytime and 44 dB $L_{A90,15min}$ during the night-time has been derived.



4 Noise Impact Assessment Methodology

4.1 Source Data

The noise emission data for the new boiler plant is presented below. The assessment has been undertaken on the basis that one of the boilers (and associated stack) will be in use under normal operating conditions, with the second used as a standby. It is assumed all other plant items associated with the proposed boiler house have the potential operate simultaneously under normal conditions.

Quantity	Octave band centre frequency (Hz) - L _p dB								L _{WA} dB
	63	125	250	500	1k	2k	4k	8k	
1	86	89	88	78	66	61	63	58	82

Table 7 Noise emission data – boilers (100% load)

Quantity	Octave band centre frequency (Hz) - L _p dB									L _{WA} dB
	31.5	63	125	250	500	1k	2k	4k	8k	
1	72	108	107	105	103	100	100	96	93	106

Table 8 Noise emission data – stacks

Quantity	Octave band centre frequency (Hz) - L _p dB								L _{WA} dB
	63	125	250	500	1k	2k	4k	8k	
1	72	77	72	72	63	55	50	43	71

Table 9 Noise emission data – transformer

Quantity	Octave band centre frequency (Hz) - L _p dB								L _{WA} dB
	63	125	250	500	1k	2k	4k	8k	
1	-	-	-	54	63	73	82	74	80

Table 10 Noise emission data – hydrogen PRMS

Quantity	Octave band centre frequency (Hz) - L _p dB										L _{WA} dB
	31.5	63	125	250	500	1k	2k	4k	8k	16k	
1	57	68	76	79	85	80	83	79	71	89	93

Table 11 Noise emission data – natural gas booster

4.2 Modelling Methodology

A number of proprietary and well proven software packages are available that can be programmed to conform to recognised source noise calculations and propagation calculations. Unless otherwise indicated all noise predictions presented in this report have been carried out using SoundPLAN v 9.1.

International Standard: ISO 9613-2: 2024: 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: Engineering method for the prediction of sound pressure levels outdoors' enables the prediction of noise levels in the community from sources of known sound emission.

The noise prediction method described in this part of the standard is general and is suitable for a wide range of engineering applications where the noise level outdoors is of interest. The noise source(s) may be moving or stationary and the method considers the following major mechanisms of noise attenuation:

- Geometrical divergence (also known as distance loss or geometric damping);



- Atmospheric absorption;
- Ground effect;
- Reflection from surfaces; and
- Screening by obstructions, barriers and buildings.

The method predicts noise levels under metrological conditions favourable to noise propagation from the sound source to the receiver, such as downwind propagation, or equivalently, propagation under a moderate ground-based temperature inversion as commonly occurs at night.

An overview of the modelling parameters is given in Table 12.

Item	Setting
Algorithm	BS ISO 9613-2: 2024
Ground absorption	Ground absorption has been set based on local conditions as derived from aerial imagery and noise survey. Acoustically hard (assumed 0 coefficient) – roads, water, pavements and hard standing areas; Acoustically soft (assumed 1 coefficient) – grassed areas, vegetation
Meteorological conditions	10 degrees Celsius; 70% humidity; and Wind from source to receiver.
Receptor height	Ground Floor level set at 1.5m above external ground level. First Floor level set at 4m above external ground level.
Site layout	Site layout as per drawing refs: ▪ 3001954-AME-NF-ZZ-DR-PL-6051_Site Location Plan Revision P1 ▪ 3001954-AME-NF-ZZ-DR-PL-6054_P1 Prop Boiler Replacement Plans ▪ 3001954-AME-NF-ZZ-DR-PL-6055_P1 Prop Boiler Replacement Elevations ▪ 3001954-AME-NF-XX-DR-ME-2001 - Sketch Plan Showing H2 Prs And NG Gas Booster Positions P1
Source modelling	See Section 4.1. The stacks were modelled as an omni-directional point source at 20m above ground level. The boiler house was modelled as a 3D object with an internal reverberant sound pressure level calculated based on the noise data provided by Cannon Bono, the number of each of the sources, the geometry and finishes of each room. For the main boiler house area this was calculated to be 69 dBA, and for the transformer room this was calculated to be 65 dBA. The internal finishes are acoustically reflective: concrete floor with an average absorption coefficient of 0.02, and steel cladding with an average absorption coefficient of 0.10. Spectral data for the building envelope is presented in Appendix E. The boiler house comprises a cladding and roof system meeting 26 R _w dB and 25 R _w dB respectively with louvred openings as per site layout plans (modelled as fully transmissive areas), and roller shutter doors and double doors meeting 18 R _w dB. The hydrogen PRMS is modelled as a 3D object (3.5m L x 1.25m W x 2.4m H) - 80 dBA at 1m based on data received by Ameresco.



Item	Setting
	The natural gas booster is modelled as a 3D object (3.7m L x 2.3m W x 1.7m H) - 85 dBA at 1m based on data received by Ameresco.
Terrain	LiDAR DTM from Defra with a 1-metre resolution has been imported into the model.

Table 12 Modelling parameters

4.3 Acoustic Corrections

According to BS 4142:2014+A1:2019: 'Methods for rating and assessing industrial and commercial sound', where certain features of the specific sound level can increase the significance of impact of a sound level, a character correction through objective and/or subjective methods is applied to provide a rating level. The characteristics of a sound that are likely to cause an increase in the significance of impact are tonality, impulsivity, intermittency or where the specific sound is readily distinctive (such as a whine, hiss, screech, non-tonal hum, rattle or rasp) against the residual acoustic environment.

4.4 Predicted Noise Levels

4.4.1 Specific sound level - boiler house

The specific sound level for the boiler plant (in isolation) at both of the most affected noise sensitive receptors has been calculated as per Section 4.2 (inclusive of embedded mitigation measures) and are presented below in Figure 6.

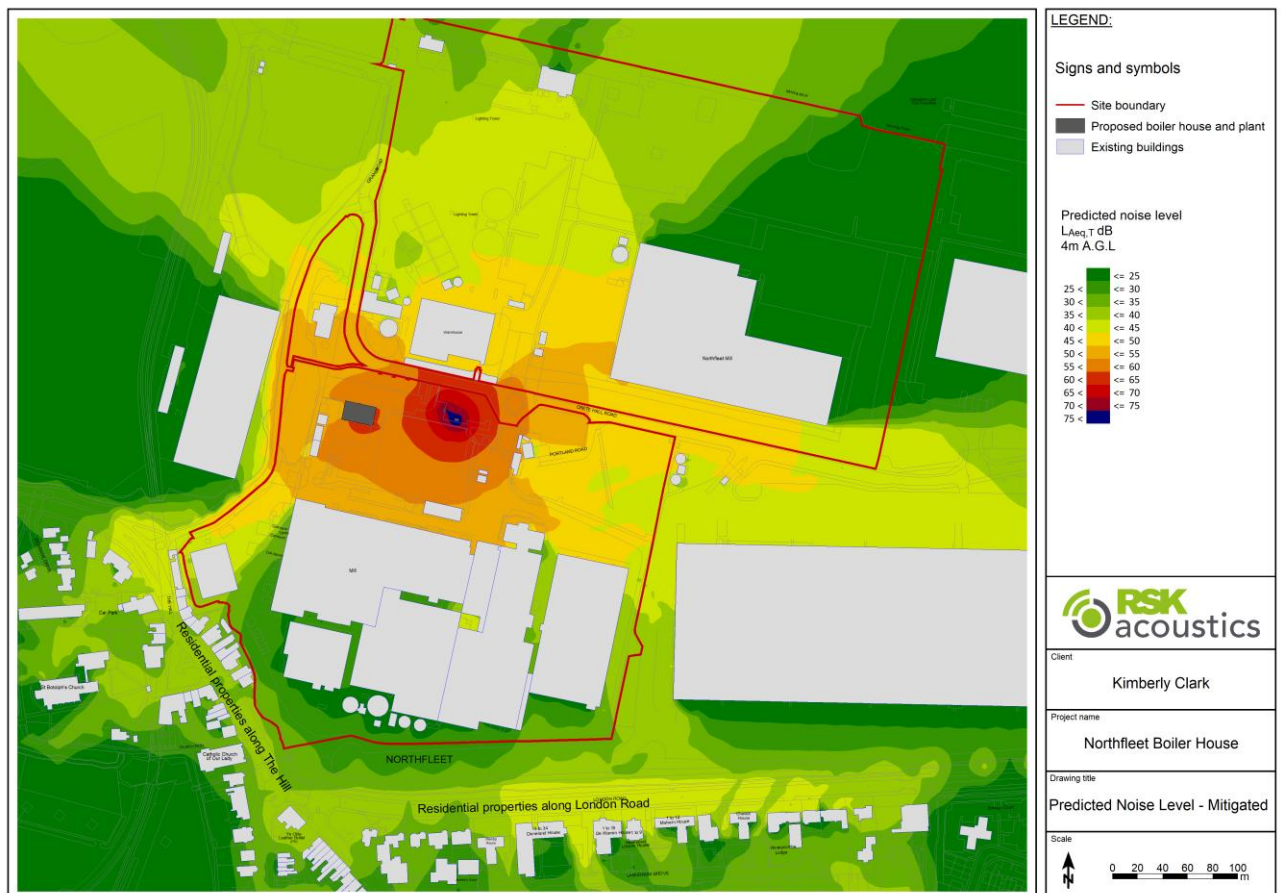


Figure 6 Predicted specific sound levels



On this basis, the specific sound levels used for the assessment 41 $L_{Aeq,15min}$ and 39 dB $L_{Aeq,15min}$ for properties location on London Road and properties on The Hill Northfleet respectively.

4.4.2 Specific sound level - whole site (existing site and boiler house)

In line with BS 4142, the specific sound level of the existing site at the nearest noise sensitive receptors has been calculated by subtracting the residual sound level from the ambient sound level measured during the night-time (when road traffic noise had subsided to typically low levels) combined with the contribution of the boiler house plant (as presented in Section 4.4.1 above).

The residual sound level was determined from the site shutdown period (52 dB $L_{Aeq,15min}$) as measured at UL1 for both receptors, and the ambient sound level was determined based on measured data at UL1 (56 dB $L_{Aeq,15min}$) for properties location on London Road, and AL1 (58 dB $L_{Aeq,15min}$) properties on The Hill Northfleet. On this basis, specific level for the existing site was calculated to be 54 $L_{Aeq,15min}$ for London Road and 57 dB $L_{Aeq,15min}$ for the The Hill Northfleet.

Combined with the boiler house plant contribution, the specific sound level used for the assessment of the whole site (inclusive of the boiler house) is 54 $L_{Aeq,15min}$ and 57 dB $L_{Aeq,15min}$ for properties location on London Road and properties on The Hill Northfleet respectively.



5 BS 4142 Assessment

5.1 Acoustic Corrections Applied

Taking the acoustic features referenced above in Section 4.3 and predicted noise levels (Section 4.4) into consideration, the application of rating penalties is as follows:

- **Tonality** – From analysis of the frequency data predicted at the nearest noise sensitive receptors, it is considered unnecessary to apply a tonal correction at any of the receptors;
- **Impulsivity** - The character of the sound from the site (including the boiler plant) is generally constant, with no rapid change in the level or character of noise. It is therefore considered unnecessary to apply an impulsivity correction at any of the receptors; and,
- **Intermittency** – The site (including the boiler plant) typically operates 24/7 therefore does not have identifiable on/off conditions. It is therefore considered unnecessary to apply an intermittency correction at any of the receptors.
- **Other sound characteristics** - The proposed boiler house plant is unlikely to be readily distinguishable from the existing residual acoustic environment in terms of overall level and character. For the assessment of the whole site, a 3 dB penalty has been applied to correct the specific noise level to account for industrial noise impacts where the sound is neither impulsive or tonal but where it is audible against the residual sound level in accordance with EA guidance.

5.1.1 Boiler house assessment

Prior to context, Table 13 and Table 14 presents the measured specific and rating sound levels, alongside background sound levels and difference between background and rating levels for the proposed boiler house during the daytime and night-time respectively.

As per BS 4142, the significance of sound of an industrial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of impact.

Results	Noise sensitive receptor location		Comments
	Residential properties on London Road	Residential properties on The Hill Northfleet	
Specific sound level, $L_{Aeq,15min}$ (dB)	41	40	Section 4.4.1 as determined through calculation (Section 4.2)
Character corrections	0	0	Section 5.1
Rating level, $L_{Ar,15min}$ (dB)	41	39	
Ambient sound level, $L_{Aeq,15min}$ (dB)	64	65	Sections 3.5.1 (AL1 - The Hill) and 3.5.2 (UL1 - London Road) – inclusive of the existing KC Northfleet site
Residual sound level, $L_{Aeq,15min}$ (dB)	60	60	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site



Results	Noise sensitive receptor location		Comments
	Residential properties on London Road	Residential properties on The Hill Northfleet	
Background sound level, $L_{A90,15min}$ (dB)	49	49	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site
Excess of rating over background level (dB)	-8	-9	

Table 13 BS 4142 assessment – daytime (07:00-23:00)

The initial assessment of impacts from the proposed boiler plant shows that the rating level at both locations does not exceed the existing background sound level (in absence of the existing site) during the daytime. This is an indication of low impact, depending on the context.

Results	Noise sensitive receptor location		Comments
	Residential properties on London Road	Residential properties on The Hill Northfleet	
Specific sound level, $L_{Aeq,15min}$ (dB)	41	40	Section 4.4.1 as determined through calculation (Section 4.2)
Character corrections	0	0	Section 5.1
Rating level, $L_{Ar,15min}$ (dB)	41	39	
Ambient sound level, $L_{Aeq,15min}$ (dB)	56	58	Sections 3.5.1 (AL1 - The Hill) and 3.5.2 (UL1 - London Road) – inclusive of the existing KC Northfleet site
Residual sound level, $L_{Aeq,15min}$ (dB)	52	52	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site
Background sound level, $L_{A90,15min}$ (dB)	44	44	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site
Excess of rating over background level (dB)	-3	-4	

Table 14 BS 4142 assessment – night-time (23:00-07:00)

The initial assessment of impacts from the proposed boiler plant shows that the rating level at both locations does not exceed the existing background sound level (in absence of the existing site) during the night-time. This is an indication of low impact, depending on the context.



5.1.2 Whole site (existing site and boiler house) assessment

To provide further context, Table 15 and Table 16 presents the measured specific and rating sound levels, alongside background sound levels and difference between background and rating levels during the daytime and night-time respectively for the existing site and the proposed boiler house plant.

As per BS 4142, the significance of sound of an industrial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. Typically, the greater this difference, the greater the magnitude of impact.

Results	Noise sensitive receptor location		Comments
	Residential properties on London Road	Residential properties on The Hill Northfleet	
Specific sound level, $L_{Aeq,15min}$ (dB)	54	57	Section 4.4.2 as determined through calculation of the boiler house (Section 4.2) and measurement data at UL1 (Section 3.5.2)
Character corrections	0	0	Section 5.1
Rating level, $L_{Ar,15min}$ (dB)	54	57	
Ambient sound level, $L_{Aeq,15min}$ (dB)	64	65	Sections 3.5.1 (AL1 - The Hill) and 3.5.2 (UL1 - London Road) – inclusive of the existing KC Northfleet site
Residual sound level, $L_{Aeq,15min}$ (dB)	60	60	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site
Background sound level, $L_{A90,15min}$ (dB)	49	49	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site
Excess of rating over background level (dB)	+5	+8	

Table 15 BS 4142 assessment – daytime (07:00-23:00)

A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

Results	Noise sensitive receptor location		Comments
	Residential properties on London Road	Residential properties on The Hill Northfleet	
Specific sound level, $L_{Aeq,15min}$ (dB)	54	57	Section 4.4.2 as determined through calculation of the boiler house (Section 4.2) and measurement data at UL1 (Section 3.5.2)



Results	Noise sensitive receptor location		Comments
	Residential properties on London Road	Residential properties on The Hill Northfleet	
Character corrections	3	3	Section 5.1 - +3 dB applied to account for industrial noise likely to be audible against the residual sound level
Rating level, $L_{Ar,15min}$ (dB)	57	60	
Ambient sound level, $L_{Aeq,15min}$ (dB)	56	58	Sections 3.5.1 (AL1 - The Hill) and 3.5.2 (UL1 - London Road) – inclusive of the existing KC Northfleet site
Residual sound level, $L_{Aeq,15min}$ (dB)	52	52	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site
Background sound level, $L_{A90,15min}$ (dB)	44	44	Section 3.5.2 for both receptors – excludes the existing KC Northfleet site
Excess of rating over background level (dB)	+13	+16	

Table 16 BS 4142 assessment – night-time (07:00-23:00)

A difference of 10 dB or more can be an indication of significant adverse impact, depending on the context.

5.2 Assessment Context

The existing Northfleet site has been operational under Kimberly Clark since the mid 1990s. Additionally, other industrial and commercial units are located in the vicinity of both the existing site, and the receptors. In line with EA guidance, long-standing industry and other industries in the area makes the area inherently less sensitive to sources of industrial noise.

It is acknowledged that the proposed boiler plant will have the potential to be operational 24 hours a day, including during the night-time which is considered to be a more sensitive time period. On this basis the assessment has been undertaken for night-time hours when measured background sound levels are reduced to account for this. Additionally, the existing site is already operational 24 hours a day.

The predicted noise levels indicate that the proposed boiler house plant is unlikely to be distinguishable from the existing residual acoustic environment in terms of overall level and character, particularly given the existing industrial, commercial and transportation noise sources audible at the receptor locations. This is theoretically shown when you compare the noise levels predicted from the proposed boiler plant in isolation (see Section 4.4.1), and the existing site operations (see Section 4.4.2), where boiler house plant noise is greater than 10 dB lower than existing site noise.

5.3 Assessment Summary

At the most affected noise sensitive receptors to the site, noise from the proposed boiler plant is unlikely to be distinguishable or detectable within the context of the acoustic environment. This is an indication of a low impact in line with BS 4142 and EA guidance for noise and vibration management: environment permits. Notwithstanding this, appropriate BAT measures should still be maintained (see Section 6).



6 Best Available Techniques (BAT)

The following embedded mitigation measures are proposed to ensure noise levels from the proposed boiler house plant are minimised as far as practicable, and in line with EA guidance for noise and vibration management: environment permits, and the BAT-C (BAT 17) guidance document:

Noise source	Mitigation implemented	Contribution to off-site receptors ^[1]	Relevant BAT technique (BAT 17)	BAT Implemented – Yes/No?	Additional actions to be taken to meet BAT and timescales
Boilers	Enclosed in the boiler house building comprising brick, cladding, roller shutter doors and double glazing. The minimum specification required by the building envelope is presented in Appendix E.	Low	C. Operational and management techniques in buildings containing noisy equipment	Yes	No further action
Transformer	- An inspection and maintenance of equipment to prevent failures. - All doors to be closed when access is not required by operations.	Low	D. Enclosing noisy equipment and units G. Soundproofing of buildings	Yes	No further action
Boiler stacks	Silencers meeting a minimum broadband reduction of 12 dBA to be fitted to the boiler stacks.	Low	H. Noise abatement E. Use of low-noise equipment and noise-reducers on equipment and ducts.	Yes	No further action
Natural gas booster	- Located towards the centre of the KC Northfleet site behind the main production buildings, increasing the separation distance between the gas booster and receptors. - An inspection and maintenance of equipment to prevent failures.	Low	B. Strategic planning of the location of equipment, units and buildings	Yes	No further action



Noise source	Mitigation implemented	Contribution to off-site receptors ^[1]	Relevant BAT technique (BAT 17)	BAT Implemented – Yes/No?	Additional actions to be taken to meet BAT and timescales
Hydrogen PRMS	- Located towards the centre of the KC Northfleet site behind the main production buildings, increasing the separation distance between the PMRS unit and receptors. - An inspection and maintenance of equipment to prevent failures.	Low	B. Strategic planning of the location of equipment, units and buildings	Yes	No further action
Notes: ^[1] Contribution to off-site receptors based on predicted noise levels (see Section 4.4.1). The contributions are categorised as follows: 'low' – indistinguishable off-site, 'medium' – just perceptible off-site and 'high' – clearly perceptible off-site					

Table 17 *BAT summary*

The above measures are considered to be the best available techniques (BAT) for the site to prevent, or where that is not practicable to minimise noise from the proposed boiler house.



7 Uncertainty

BS 4142:2014+A1: 2019 requires that the assessment considers the level of uncertainty in the data and associated calculations. Consideration of the uncertainty can enable a more informed decision regarding the likely significance of impact, within the context of assessment. It is accepted that uncertainty may arise from all levels of measurement and assessment and reasonably practicable steps have been made at all stages with the aim of reducing uncertainty.

Specific sound level propagation for the proposed boiler house and associated plant has been calculated in accordance with the requirements of BS ISO 9613-2: 2024 which is the widely accepted procedure for the calculation of sound propagation, including favorable wind conditions from source to receiver.

Source data for the boiler plant, PMRS and gas boosters (including frequency data) was provided by the project team. The transformer broadband level was provided by the project team, with frequency data assumed based on a transformer of a similar size.

The noise survey at AL1 was short-term which may introduce some uncertainty, however survey observations confirmed that the dominant noise sources at AL1 was steady-state noise from the existing KC Northfleet site, other local industry in the area, and road traffic noise. This is reflected in the measured data which is relatively consistent between measurements.

The following measures were also taken during the noise survey to limit uncertainty:

- The survey and assessment have been undertaken by suitability qualified acousticians who are members of the Institute of Acoustics (IOA);
- Background sound level measurements undertaken during a site shutdown period at the receptor locations as opposed to using proxy measurement locations;
- Use of monitoring equipment in accordance with Section 5 of BS 4142: 2014+A1: 2019, using Class 1 instrumentation; and,
- Measurement procedures followed in general accordance with Section 6 of BS 4142: 2014+A1: 2019 with all precautions taken to minimise interference whilst maintaining the security of both personnel and monitoring equipment. Weather conditions were monitored throughout the duration of the survey and the exclusion of weather affected data from the assessment.

Overall, based on the above, uncertainty related to the survey data is not expected to have any significance to the outcome of the assessment.



8 Summary

RSK Acoustics has been instructed by Kimberly-Clark Limited (KC) to undertake a noise impact assessment to inform the planning application for a new dual fuel (hydrogen and natural gas) boiler plant room at the existing Kimberly Clark Northfleet Mill in Gravesend.

The noise assessment includes consideration of existing background and residual sound levels, and specific sound levels from the proposed plant including relevant corrections, based on the methodology as described within BS 4142:2014+A1:2019. The proposals incorporate the relevant BAT techniques, and as a result, accounting for the context of the acoustic environment in line with B4142 and EA guidance, the proposed boiler house is unlikely to result in adverse effects at the nearest noise sensitive receptors, with no changes to the existing noise environment anticipated.



Appendix A – Glossary

Term	Definition
Ambient sound	The total sound at a given place, usually a composite of sounds from many sources near and far.
Background sound, $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval.
dB	Decibel. Scale for expressing sound pressure level. It is defined as 20 times the logarithm of the ratio between the root mean square pressure of the sound field and a reference pressure i.e. 2×10^{-5} Pascal.
dB(A)	A-weighted decibel. This provides a measure of the overall level of sound across the audible spectrum with a frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies. Example sound levels include: 140 dB(A) Threshold of pain 120 dB(A) Threshold of feeling 100 dB(A) Loud nightclub 80 dB(A) Traffic at busy roadside 60 dB(A) Normal speech level at 1m 40 dB(A) Quiet office 20 dB(A) Broadcasting studio 0 dB(A) Median hearing threshold (1000 Hz)
Frequency	The repetition rate of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted as kHz, e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20kHz.
$L_{Aeq,T}$	This is defined as the notional steady sound level over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
NR	Noise rating. A set of curves based on the sensitivity of the human ear. They are used to give a single-figure rating for a range of frequencies.
Rating level	Specific sound level of a source plus any adjustment for the characteristic features of the sound.
Residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Sound absorption	Process whereby sound energy is converted in to heat. Sound absorption properties is expressed as the sound absorption coefficient α or the sound absorption class (A-E).
Sound insulation	The reduction or attenuation of airborne sound by a solid element between source and receiver.
Specific sound	Sound pressure level produced by the source being assessed at the assessment location.

Table A 1 Glossary



Appendix B – Noise Survey Photographs



Figure B.1 UL1





Figure B.2 AL1 - daytime



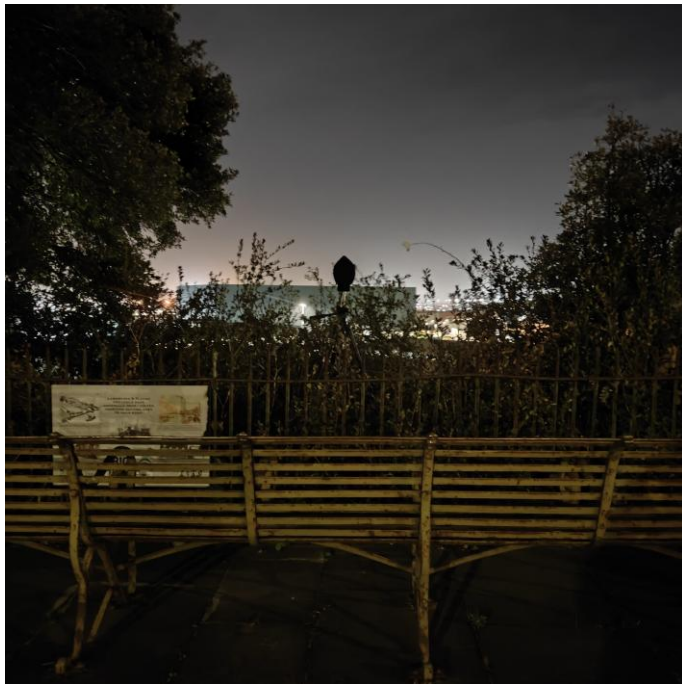


Figure B.3 AL1 – night-time



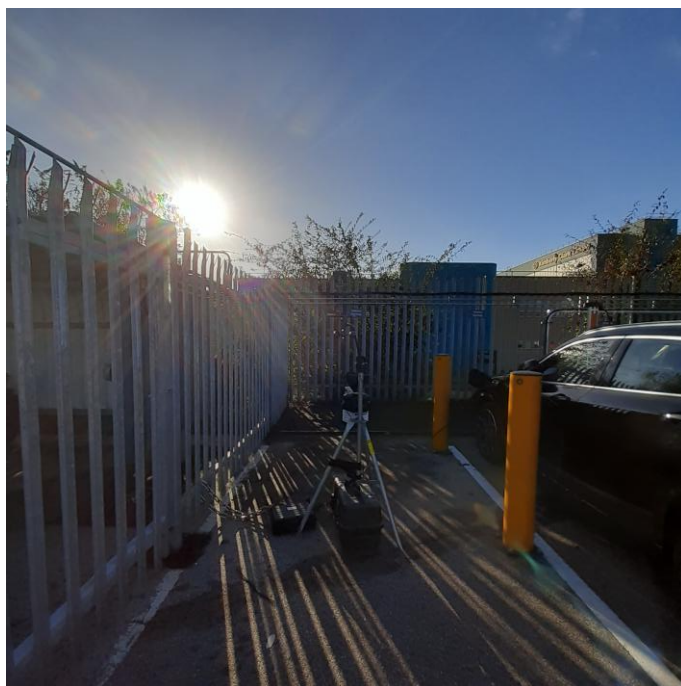
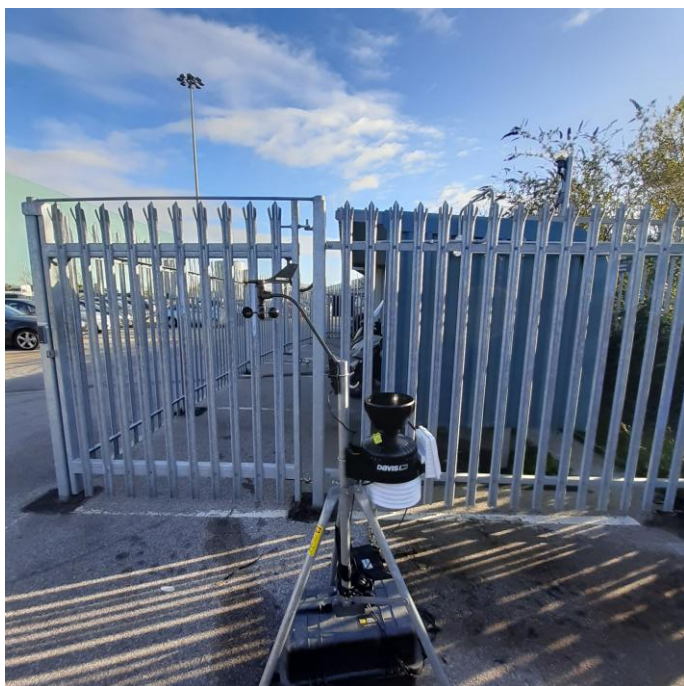


Figure B.4 Weather station



Appendix C – Survey Weather

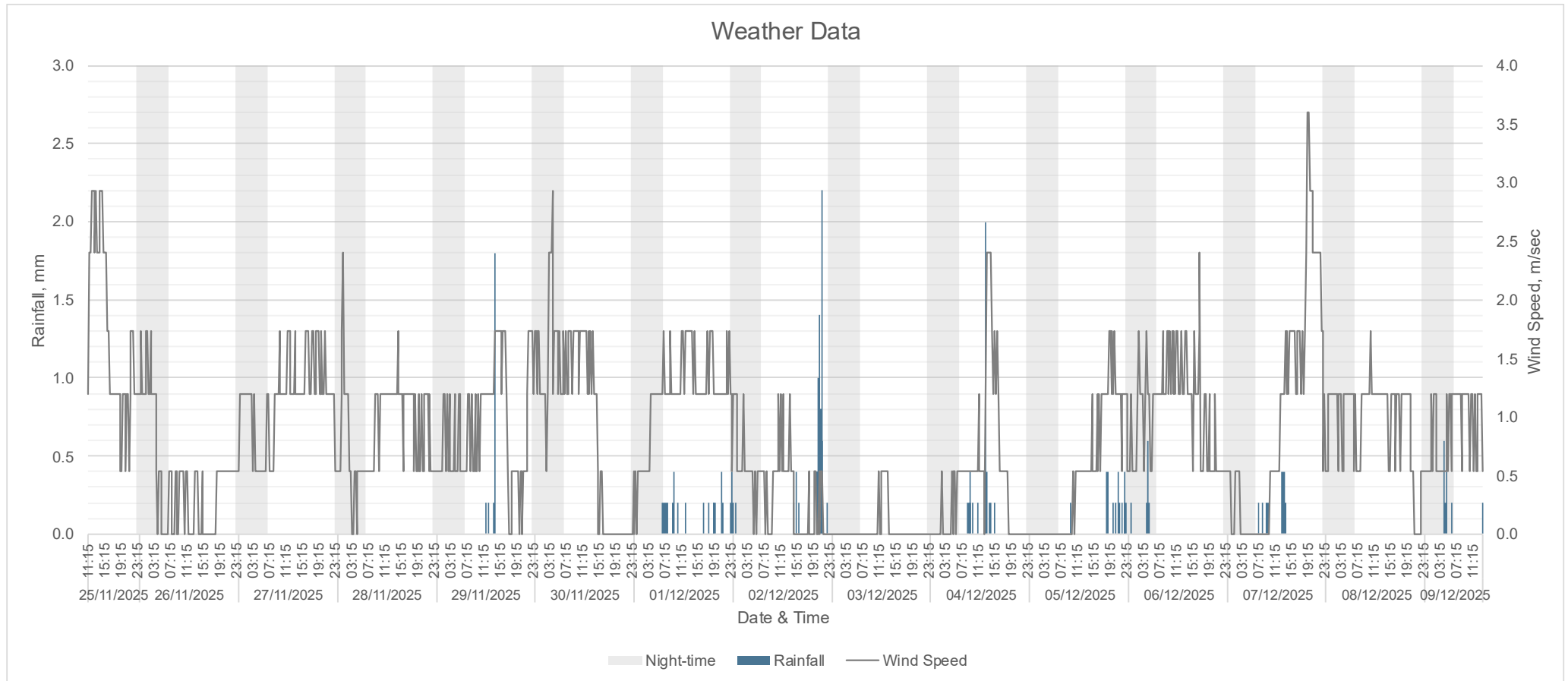


Figure C 1 Weather data



Appendix D – Noise Survey Results

Date	Time	Measured noise levels (dB)		
		L _{Aeq,T}	L _{AFmax,T}	L _{A90,T}
Tuesday 25/11/2025	12:00-23:00	62	85	51
	23:00-07:00	57	85	46
Wednesday 26/11/2025	07:00-23:00	62	90	50
	23:00-07:00	56	79	45
Thursday 27/11/2025	07:00-23:00	62	87	51
	23:00-07:00	56	78	45
Friday 28/11/2025	07:00-23:00	62	92	52
	23:00-07:00	55	86	46
Saturday 29/11/2025	07:00-23:00	63	101	52
	23:00-07:00	57	87	52
Sunday 30/11/2025	07:00-23:00	62	88	54
	23:00-07:00	57	80	50
Monday 01/12/2025	07:00-23:00	64	86	54
	23:00-07:00	57	77	51
Tuesday 02/12/2025	07:00-23:00	63	89	55
	23:00-07:00	58	78	53



Date	Time	Measured noise levels (dB)		
		L _{Aeq,T}	L _{AFmax,T}	L _{A90,T}
Wednesday 03/12/2025	07:00-23:00	63	91	55
	23:00-07:00	58	80	52
Thursday 04/12/2025	07:00-23:00	64	87	55
	23:00-07:00	58	77	53
Friday 05/12/2025	07:00-23:00	64	92	55
	23:00-07:00	57	77	51
Saturday 06/12/2025	07:00-23:00	63	100	54
	23:00-07:00	57	75	52
Sunday 07/12/2025	07:00-23:00	62	85	54
	23:00-07:00	57	86	52
Tuesday 08/12/2025	07:00-23:00	62	85	54
	23:00-07:00	58	76	51
Wednesday 09/12/2025	07:00-13:00	63	82	55

Table D.1 Noise monitoring data – UL1



Appendix E – Boiler House - Building Envelope Specifications

The building envelope of the boiler house comprises the following minimum specification:

Item	Octave band centre frequency (Hz) - R_w dB								R_w dB
	63	125	250	500	1k	2k	4k	8k	
Kingspan QuadCore AWP-S panel	14	19	21	25	21	34	47	53	26
Kingspan QuadCore Lo-Pitch Roof panels	20	18	20	24	20	29	39	47	25
Louvres	-	-	-	-	-	-	-	-	-
Roller shutter doors	2	7	10	15	17	20	20	22	18
Double glazing 4 / 8 / 4mm	14	18	17	24	35	41	35	35	29
Steel door single leaf with seal, T30	22	22	28	28	24	23	23	23	25
Double swing door system	9	9	15	17	17	19	19	19	18

Table E.1 Sound reduction index - octave band data



