Report

Environmental Noise Impact Assessment

KAO Data – KAO 1 - 3

Generator Noise

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1 Introduction

The Acoustics Division of Sweco UK Limited has been commissioned by BCS Data Centres Limited to assess the noise impact due to the operation of the already installed and proposed generators for KAO 1 – 3 on London Road, Harlow, CM17 9NA.

The proposed data centre development comprises four separate buildings, each arranged over three floors, with external plant equipment located around the perimeter on three sides of each building. This assessment specifically pertains to the data halls designated as K-LON01, K-LON02, and K-LON03. For all three data halls, it is understood that the ground floor will house the main engineering infrastructure dedicated to the data halls, while the top two floors will serve as the data hall spaces. Additionally, the envelope of each building will include an ancillary block that provides office and operational spaces, such as a loading bay and a reception area.

It is understood that the following backup generators are already installed and permitted on site:

- K-LON01: 5 x 1.8MW generators (MTU 16V4000G23E)
- K-LON02: 3 x 1.8MW generators (MTU 16V4000G74F)

The installation of the additional backup generators are understood to be as follows:

- K-LON01: 2 x 1.8MW generators (MTU 16V4000G74F or similar specifications)
- K-LON02: 4 x 1.8MW generators (MTU 16V4000G74F or similar specifications)
- K-LON03: 11 x 3.2MW generators (MTU DS4000)

The existing noise conditions on site have been established by an environmental noise survey carried out by Sweco between Thursday 7th November 2024 and Friday 15th November 2025 and between Tuesday 12th November 2024 and Friday 15th November 2024.

This is in addition to the noise survey undertook on site in 2021 before the data centre halls associated with the K-LON01 and K-LON02 were in operation. These measurement results have also been considered for this assessment.

This report presents details on the acoustic criteria, current plant specifications with the selected noise limits, proposed mitigation measures, proposed modelling methodologies, and any outstanding risk items.

2 Relevant Standards and Guidelines

A summary of the standards and guidance documents used to inform the acoustic design of the scheme is provided below.

- BS 4142:2014+A1 Method for Rating and Assessing Industrial and Commercial Sound

3 Proposed Development and the Surrounding Site

3.1 Site Description and Closest Noise Sensitive Receptors

The proposed KAO Data Centre Campus site is located on the land at London Road, Harlow, CM17 9NA. It is bound by existing office buildings to the west and north-west, with the A414 further west beyond them. There are sports pitches and associated facilities to the north, the Maypole Cottages to the east and the London Road beyond them and to the south.

The KAO Data Campus will consist of four separate buildings arranged over three floors with external plant located on the perimeter on three sides of each building. The construction of the data centre campus will be undertaken in four phases (one per each building). Please note that this assessment only deals with Phases 1 to 3 Data Centre building (K-LON01, K-LON02 and K-LON03).

The worst affected noise sensitive receptors due to the operation of the future K-LON03 data centre are expected to be the residential properties (R1 and R2), the primary school building (R3) located on London Road, a residential area located approximately 230m to the south of the Kao Data (R4) and a residential area located approximately 300m to the north west (R5).

Figure 1 presents the site location, the proposed development, identifies the approximate location of the future data centre buildings and the location of the nearest noise sensitive receptors to the Proposed Development.

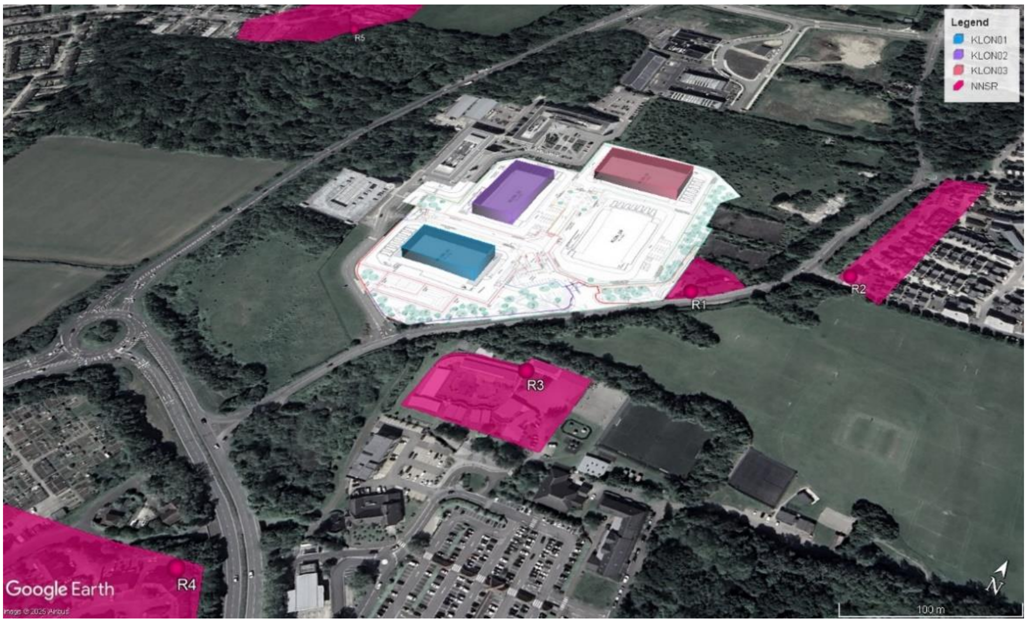

Figure 1: Site Location, K-LON01-03 Locations and Nearest Noise Sensitive Receptors

3.2 Proposed Development

To provide backup power in the event of emergencies, the data halls are served by MV generators which are located at ground level to the rear of each data centre. Generators will be tested regularly under normal operating conditions and all generators will run in the event of a power outage. Additionally, a movable load bank will be utilized to conduct full load testing for the generators.

It is understood that the following backup generators are already installed and permitted on site:

- K-LON01: 5 x 1.8MW generators (MTU 16V4000G23E)
- K-LON02: 3 x 1.8MW generators (MTU 16V4000G74F)

The installation of the additional backup generators are understood to be as follows:

- K-LON01: 2 x 1.8MW generators (MTU 16V4000G74F or similar specifications)
- K-LON02: 4 x 1.8MW generators (MTU 16V4000G74F or similar specifications)
- K-LON03: 11 x 3.2MW generators (MTU DS4000)

Full details for the proposed generators and loadbank locations are presented in Section 5.

The Masterplan figure below illustrates the designated locations for the proposed generators. For the movable loadbank, worst-case locations have been assumed in relation to nearby receptors.

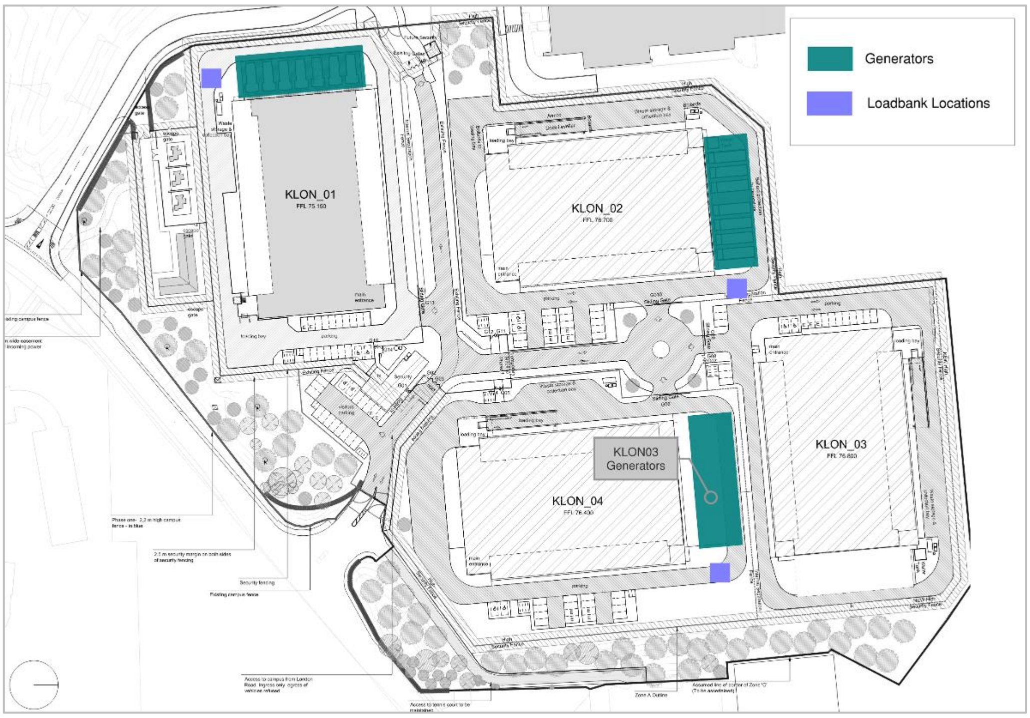

Figure 2: Masterplan – Generators and Loadbank Locations

Please note that the K-LON04 building will not be in place when the proposed and already installed generators become operational. As a result, the block for KLON04, which would provide some screening for certain noise sources associated with this development, has not been included in this assessment.

4 Baseline Sound Conditions

4.1 2024 Survey Summary

The prevailing sound conditions in the area have been determined by an environmental sound survey over a number of suitable measurement locations around the Proposed Development site so as to inform the specification and design. Long-term measurements at two unattended positions were carried out, one between the morning of Thursday 7th November 2024 and Friday 15th November 2024, and the other between Tuesday 12th November 2024 and Friday 15th November 2024.

The table below provides a summary of the measurement results obtained during this survey. The measurement positions are highlighted in Figures 3 and 4 below

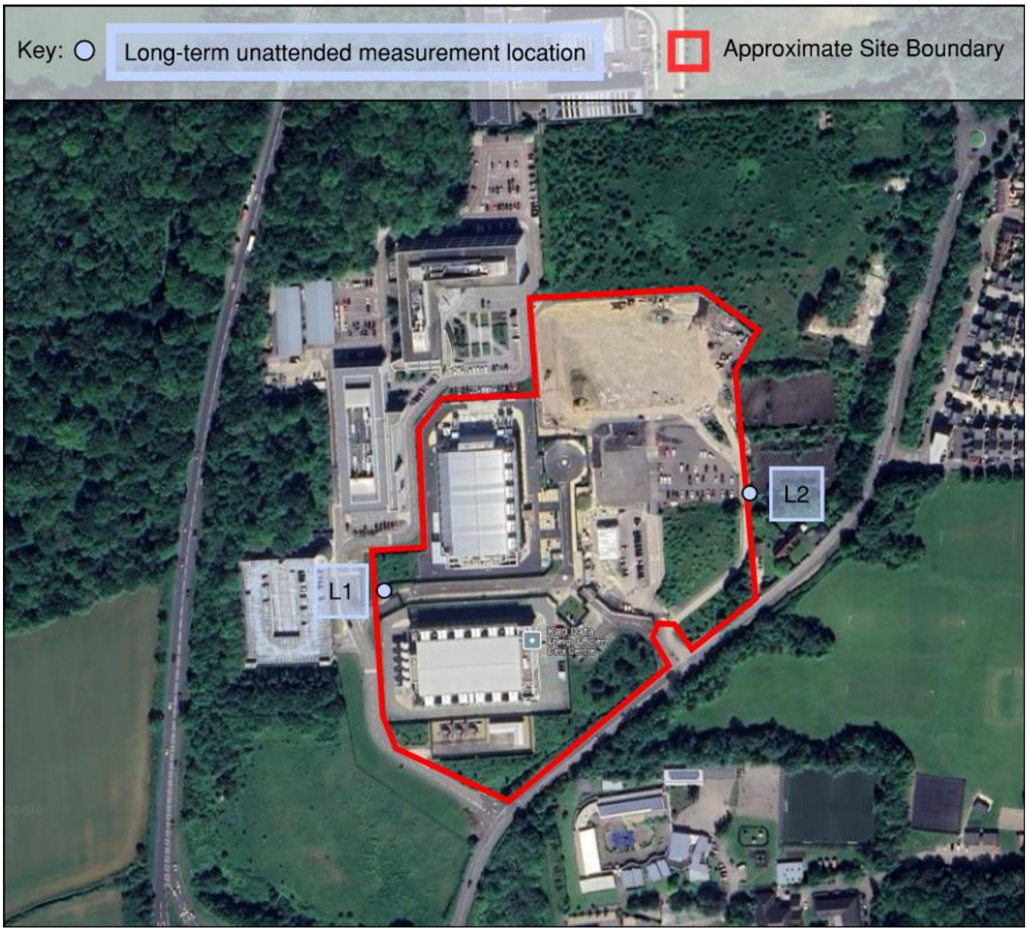

Figure 3: Long-term Noise Measurement Positions

Figure 4: Attended Short-term Noise Measuring Positions

Table 1: Summary of Measured Noise Levels – Representative Values		
Location	Typical background sound level, dB L_{A90}	
	Daytime hours (07:00 to 23:00)	Night-time hours (23:00-07:00)
L1	51	41
L2	47	39
S1*	46	-
S2*	45	-
S3*	50	-

4.2 Survey Results Comparison

This section offers an overview of the variations in environmental noise observed when comparing the noise levels measured during the most recent survey with those recorded in 2021, when the data centres associated with Phases 1 and 2 of the development were not fully operational.

The table below illustrates the differences in background noise levels between the two surveys.

Table 2: Measured Background Sound Levels – 2024 vs. 2021 Surveys, dB L_{A90}

Location	2024		2021	
	Daytime hours (07:00-23:00)	Night-time hours (23:00-07:00)	Daytime hours (07:00-23:00)	Night-time hours (23:00-07:00)
L1	51	41	44	36
L2	47	39	49	38
S1	46	-	48	-
S2	45	-	41	-
S3	50	-	49	-

Measurements undertaken at L1 clearly demonstrates the impact of K-LON01 and K-LON02 data centres, highlighting an increase in background noise levels due to their operation. This impact is pronounced during both daytime and night-time hours. In contrast, at greater distances from the data centres, the influence of their operations on noise levels is less evident, suggesting that while the data centres contribute to local noise conditions, their effect diminishes as distance increases.

Please note that the noise survey results associated with L1 are presented for informational purposes only. The results from L2, S1, S2, and S3 were utilised to establish the representative background noise levels at the receptors. The data from these measurement locations demonstrate a consistent pattern across both surveys. This consistency suggests that the noise limits outlined in the previous assessment remain suitable and applicable.

For complete details on the noise surveys, please refer to Appendix B and C.

5 Generators Noise Impact Assessment

6.1 Assessment Criteria

This assessment has been conducted in accordance with the criteria set forth in BS 4142:2014, which provides a standardized framework for assessing and rating industrial and commercial noise impacts on surrounding residential and sensitive environments.

BS 4142:2014 outlines a procedure for comparing the noise levels from proposed developments with the background noise levels at nearby sensitive receptors. The assessment focuses on the following key components:

1. Rating Level ($L_{Ar,Tr}$): The Rating Level is the specific noise level from the proposed development, adjusted for any identifiable characteristics such as tonality, impulsiveness, or intermittency. This level is measured in decibels (dB) and represents the noise that will be experienced by nearby receptors.

2. Background Noise Level (L_{A90}): The Background Noise Level is defined as the A-weighted noise level that is exceeded for 90% of a given measurement period. This level is crucial for establishing the existing acoustic environment prior to the introduction of the noise source.

3. Difference Calculation: The impact of the noise source is determined by calculating the difference between the Rating Level and the Background Noise Level. This difference is referred to as the "excess level."

4. Impact Evaluation:

    a. A difference of 0 dB or less indicates that the noise source is unlikely to have a significant adverse impact.

    b. A difference of +1 dB to +5 dB suggests a low likelihood of significant adverse impact, but potential for some complaints.

    c. A difference of +6 dB to +10 dB indicates a likelihood of significant adverse impact, with increased chance of complaints.

    d. A difference greater than +10 dB signifies a significant adverse impact, likely resulting in complaints.

The assessment considers various sensitive receptors, including residential properties and schools within the vicinity of the proposed development. Variations in background noise levels and the time of day and night are also taken into account, as they can influence the perception of noise.

By adhering to the criteria established in BS 4142:2014, this assessment aims to provide a comprehensive evaluation of the potential noise impacts associated with the proposed development, ensuring compliance with relevant environmental permit requirements.

5.1 Noise Modelling

Predictions have been undertaken to determine the expected plant noise levels at the receptors. The likely effects of the proposed noise sources have been assessed using the Cadna/A suite of noise modelling software. This advanced software employs standard acoustic principles outlined in ISO 9613:2024, ensuring compliance with internationally recognized guidelines for environmental noise assessment.

The methodology incorporates a range of approved prediction techniques that account for factors such as source characteristics, propagation paths, and environmental influences, including terrain and atmospheric conditions. Cadna/A is a tried and tested tool widely used for accurately predicting and evaluating the impact of noise from various sources, including industrial operations, transportation, and mechanical equipment.

The calculations consider both direct and reflected sound, applying appropriate correction factors for absorption by the atmosphere and ground effects. By modelling these characteristics, the software allows for a comprehensive analysis of noise emissions and their potential impact on surrounding receptors. This approach ensures that the assessment is robust and reliable, providing an accurate prediction of potential noise levels in the vicinity of the proposed development.

The most relevant parameters used in our noise modelling exercise are as follows:

- Standard: ISO 9613 (2024)
- Order of reflection: 2
- Ground absorption: 0.3

5.2 Proposed Plant

To ensure backup power during emergencies, each data hall is equipped with MV generators located at ground level at the rear of the data centre. These generators will be regularly tested under normal conditions and will automatically activate during a power outage. A movable load bank will also be used for full load testing of the generators.

Figure 2 earlier in this report shows the locations of the generators and load bank.

The noise data for the proposed generators and load bank is presented in Appendix D. It is understood that all proposed and already installed generators are designed to comply with the noise levels outlined in this report.

Generator testing will take place exclusively during daytime hours. The information regarding the generator testing regime provided to Sweco is summarized in the table below.

Table 3: Generator Testing Regime

Regime	Frequency	Duration	Scheduling	Approach
Generator PPM Maintenance (Off-load test)	Monthly	Up to 60min per generator	Weekdays, 9-5pm	All gens start and run for 60min
Full Load Test / Loadbank Test*	Once per year	2 hours per generator	Weekdays, 9-5pm	Each generator tested individually against a 75% loadbank

Table 3: Generator Testing Regime				
Regime	Frequency	Duration	Scheduling	Approach
Black building test	Once per year	30min	Weekdays, 9-5pm	Simulated mains failure for each building (one building at the time). All gens start and run for 30min)
***It is assumed that four generators might be tested sequentially within the same day**				

5.3 Operational Noise Scenarios

Various noise scenarios for the different generator operations have been assessed to evaluate their impact on the surrounding environment. These scenarios include various testing conditions, such as maintenance testing, full load testing, and black building tests. Additionally, for informational purposes, the emergency scenario will also be included, representing a situation where all generators are operating in a steady state.

The scenarios assessed include:

- Generators maintenance testing: All generators operating for 60 minutes.
- Generators full load testing: worst case generator operating for 2 hours. Loadbank running in a steady state during the operation of the generators.
- Black building test: simulating mains failure with all generators running for 30 minutes.
- Emergency scenario: all generators running in steady state.

Please note that this assessment focuses solely on the noise impact generated by the operation of the generators and the load bank. The noise contribution from any other equipment included in the development is not accounted for in our calculations.

5.4 BS4142 Corrections

In accordance with the guidelines set out in BS 4142:2014, various corrections may be applied to the measured noise levels to account for specific characteristics of the noise, such as tonality, impulsivity, or intermittency. These corrections are essential for accurately assessing the potential impact of noise on the surrounding environment and for ensuring compliance with relevant noise standards.

For this particular assessment, it has been determined that no corrections for tonality, impulsivity, or intermittency are necessary. This conclusion is based on the nature of the noise produced by the generators and the load bank, which is expected to be consistent and steady during operation. The noise generated is primarily of a continuous nature without significant tonal or impulsive components that would typically warrant a correction.

Additionally, the operational characteristics of the equipment do not indicate any irregular or intermittent noise patterns that could affect the assessment. As a result, the predicted noise levels can be considered representative of the actual noise impact without the need for further adjustments. This approach simplifies the evaluation while still ensuring that the assessment remains robust and aligned with the standards outlined in BS 4142.

5.5 Predicted Noise Impact

This section provides an assessment of the predicted noise impact resulting from the operation of the proposed generators and load bank. The evaluation focuses on the potential effects at the nearest noise-sensitive receptor (NSR) locations, which are shown in Figure 1 in Section 3 of this report.

Tables 4 to 13 in the following subsections summarize the predicted specific noise levels arising from the operation of the generators and load bank across the various scenarios included in this assessment. These tables compare the predicted noise levels with the measured background and ambient noise at each receptor. Additionally, the likelihood of significant impact at each location, based on the BS 4142 criteria, is also presented.

5.5.1 KLON01

Table 4: KLON 01 – Generators Maintenance Testing

Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	41	49	-8	Unlikely
R2	37	47	-10	Unlikely
R3	44	47	-3	Unlikely
R4	40	48	-8	Unlikely
R5	34	41	-7	Unlikely

Table 5: KLON 01 – Generators full load testing

Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	39	49	-10	Unlikely
R2	36	47	-11	Unlikely
R3	56	47	9	Likelihood
R4	49	48	1	Low Likelihood
R5	35	41	-6	Unlikely

Table 6: KLON 01 – Black building test

Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	38	49	-11	Unlikely

SWECO

Table 6: KLON 01 – Black building test				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R2	34	47	-13	Unlikely
R3	41	47	-6	Unlikely
R4	37	48	-11	Unlikely
R5	31	41	-10	Unlikely

5.5.2 KLON02

Table 7: KLON 02 – Generators Maintenance Testing				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	44	49	-5	Unlikely
R2	41	47	-6	Unlikely
R3	38	47	-9	Unlikely
R4	30	48	-18	Unlikely
R5	34	41	-7	Unlikely

Table 8: KLON 02 – Generators full load testing				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	56	49	7	Likelihood
R2	51	47	4	Low Likelihood
R3	50	47	3	Low Likelihood
R4	39	48	-9	Unlikely
R5	36	41	-5	Unlikely

Table 9: KLON 02 – Black building test				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	40	49	-9	Unlikely

Table 9: KLON 02 – Black building test				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R2	38	47	-9	Unlikely
R3	35	47	-12	Unlikely
R4	27	48	-21	Unlikely
R5	31	41	-10	Unlikely

5.5.3 KLON03

Table 10: KLON 03 – Generators Maintenance Testing				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	51	49	2	Low Likelihood
R2	43	47	-4	Unlikely
R3	45	47	-2	Unlikely
R4	39	48	-9	Unlikely
R5	34	41	-7	Unlikely

Table 11: KLON 03 – Generators full load testing				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	59	49	10	Likelihood
R2	54	47	7	Likelihood
R3	50	47	3	Low Likelihood
R4	44	48	-4	Unlikely
R5	32	41	-9	Unlikely

Table 12: KLON 03 – Black building test				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R1	48	49	-1	Unlikely

Table 12: KLON 03 – Black building test				
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)	Typical Background Noise $L_{A90,T}$(dB)	Exceedance over the Background Sound Level (dB)	Likelihood of Significant Adverse Impact (BS4142:2014)
	Day	Day		
R2	40	47	-7	Unlikely
R3	42	47	-5	Unlikely
R4	36	48	-12	Unlikely
R5	31	41	-10	Unlikely

5.5.4 Emergency Scenario (For Guidance Only)

Table 13: Emergency						
Receptor	Predicted Specific Noise Levels $L_{Aeq,T}$(dB)		Typical Background Noise $L_{A90,T}$(dB)		Exceedance over the Background Sound Level (dB)	
	Day	Night	Day	Night	Day	Night
R1	62	62	49	38	13	24
R2	56	56	47	41	9	15
R3	57	57	47	-	10	-
R4	52	52	48	42	4	10
R5	48	48	41	35	7	13

5.6 Results Discussion

The predicted noise levels from the generators during maintenance testing and black building testing at the majority of the receptors are below the measured background noise levels. Consequently, the likelihood of significant adverse impacts, based on the BS 4142 criteria, is considered unlikely across the assessed locations. The predicted noise levels at R1 during the generator maintenance testing for KLON03 are only slightly above the background, indicating a low likelihood of significant impact.

In the full load scenario, the predicted specific noise levels suggest that the operation of the generators and load bank will have varying impacts across the assessed receptors. While some receptors may experience slight increases in noise levels during testing of the generators, the overall likelihood of significant adverse impact remains low for the majority of receptors. However, likelihoods of significant adverse impact are predicted at R3 during KLON01 full load testing, at R1 during KLON02 full load testing and at R1 and R2 during KLON03 full load testing.

It's important to note that the results for the full load testing are dictated by the noise generated from the movable load bank. Since this element does not have a fixed position within the development, worst-case locations have been assumed in our calculations, with the following distances:

- KLON01 Loadbank: 130m from R3
- KLON02 Loadbank: 160m from R1
- KLON03 Loadbank: 80m and 150m from R1 and R2, respectively

In scenarios where the load bank is located at least at the following distances, a low likelihood of significant adverse impact would be expected:

- KLON01 Loadbank: 150m from R3 (Screened by generators. Without direct line of sight between source and receptor)
- KLON02 Loadbank: 180m from R1 (Screened by generators. Without direct line of sight between source and receptor)
- KLON03 Loadbank: 105m and 180m from R1 and R2, respectively (Screened by generators. Without direct line of sight between source and R1)

Please note that the KLON 04 building will not be in place when the assessed generators are operational. Therefore, it has not been included in this assessment. Based on initial calculations, the screening effect provided by the KLON 04 building is not expected to significantly affect the overall impact at the receptors, with the exception of the predicted likelihood of significant adverse impact at R1 during the full load testing of KLON02. In this case, the screening provided by KLON 04 would significantly reduce the impact at R1, making the likelihood of significant adverse impact unlikely.

6 Conclusion

The Acoustics Division of Sweco UK Limited has been commissioned by BCS Data Centres Limited to assess the noise impact due to the operation of the already installed and proposed generators for KAO 1 – 3 on London Road, Harlow, CM17 9NA.

The existing site noise conditions on site have been established by an environmental noise survey carried out by Sweco between Thursday 7th November 2024 and Friday 15th November 2025 and between Tuesday 12th November 2024 and Friday 15th November 2024.

Sweco undertook a noise survey on site during 2021 before the data centre halls associated with the Phases 1 and 2 were in operation. The results of this survey have also been considered for this assessment.

The assessment of predicted noise levels from the generators indicates that during maintenance and black building testing, most receptors experience noise levels below the background levels, resulting in a low likelihood of significant adverse impacts. While some receptors may see slight increases in noise during full load testing, significant impacts are primarily anticipated at R1, R2 and R3 during specific tests. The results are influenced by the movable load bank's positioning, with worst-case scenarios considered in the calculations. Suitable loadbank locations have been identified to reduce the noise impact at these receptors.

Furthermore, as a guideline, the KLON 04 building, which has not been included in our modelling exercise, is expected to offer minimal additional noise screening benefits, except for potentially reducing impacts at R1 during the full load testing of KLON02.

Overall, the likelihood of significant adverse impacts remains low across the assessed locations provided that the recommended loadbank locations are used.

Appendix A – Glossary

Sound is the vibration of particles in a medium, such as air, which may be detected by the human ear. This sound is defined as noise when it is audible and unwanted or undesirable to a listener.

The vibration, or oscillation, of particles about an equilibrium position results in local pressure fluctuations from the normal pressure. These local pressure fluctuations are described as sound pressure, and the number of oscillations per second is described as the frequency.

The human ear responds to an incredibly large range of sound pressure, from 0.00002 Pa to 200 Pa, and the perceived loudness is proportional to the logarithm of the sound pressure squared. For this reason, sound is measured in terms of a logarithmic parameter, the sound pressure level, to approximate the response of the ear. Sound pressure levels are quantified in decibels (dB) relative to the threshold of hearing.

The human ear responds to a wide range of sound frequencies, from the lowest perceptible bass note, around 20 Hz, to the highest perceptible treble note, around 20,000 Hz. The ear does not respond equally to each frequency - the ear is most sensitive to sound within the mid-frequency range of around 600 to 8000 Hz.

The response of the ear to each frequency also varies with the sound pressure level. For very loud sounds the difference in perceived loudness between each frequency is less pronounced than for low level sound.

Acousticians measure sound pressure levels using sound level meters, which incorporate a microphone.

A sound level meter approximates the response of the human ear to sound by using frequency filters. For typical environment sounds, the A-weighting filter is used to approximate the response of the ear at typical sound pressure levels. The sound pressure level, adjusted to approximate the response of the ear, is then quantified in A-weighted decibels, dB(A).

In a typical environment, the A-weighted sound pressure level will vary with time. For this reason, acousticians use statistical measurement parameters to describe the sound environment. The most common measurement parameters are as follows:

- dB $L_{Aeq,T}$: Equivalent continuous A-weighted sound pressure level - This is the energy-average sound pressure level during a measurement period, T.
- dB $L_{AFmax,T}$: Maximum A-weighted sound pressure level - This is the maximum sound pressure level during a measurement period, T, and measured in a way that approximates the time-response of the ear.
- dB $L_{A90,T}$: 90th percentile A-weighted sound pressure level - This is the sound pressure level exceeded for 90% of the measurement period, T, commonly used to quantify the background sound level.

The sound pressure levels in typical environments are presented in Table A1.

Further definitions of acoustic parameters are presented in Table A2.

Table A1 – Typical Sound Levels Found in The Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Table A2 – Glossary of Acoustic terms

Terminology/Parameter	Definition
Ambient sound level	The total sound pressure level in a given position from all surrounding sources of noise, both near and far. Normally expressed as an equivalent continuous A-weighted sound pressure level, dB $L_{Aeq,T}$.
A-weighting	The process of weighting the observed sound pressure level at each frequency band, to approximate the sensitivity of the human ear to sounds of different frequencies. A-weighted sound pressure levels are expressed as dB(A) or dB L_{Ap}.
C_{tr}	Spectrum adaptation term No. 2 as defined in BS EN ISO 717-1. This term is a correction that applies to the weighted standardised level difference to account for how well a partition insulates against sound which has mainly low and medium frequency content (e.g., road traffic noise, amplified disco music).
Decibel	A logarithmic value quantifying the sound pressure at a specified position or sound power relative to a reference sound pressure or sound power (20 µPa for sound pressure, 10-12 W for sound power).
D	Sound level difference. The difference in energy-average sound pressure levels between a “source” room containing a loudspeaker and an adjacent “receiving” room. D = L(source) – L(receiving).
$D_{ne,w}$	Weighted element normalised sound level difference. The single-figure rating of the difference in sound level between rooms when sound is transmitted only through a small technical element only, such as a vent or grille, and normalised to a reference absorption area A0 of 10 m^2. Measured in a laboratory in accordance with BS EN ISO 10140, with single figure rating determined in accordance with BS EN ISO 717-1.
$D_{nF,w}$	Weighted normalised flanking sound level difference. A single-figure rating of the difference in sound level between rooms when sound is transmitted only via a specified flanking path, such a via a flanking curtain wall system. Measured in a laboratory in accordance with BS EN ISO 10848, with single figure rating determined in accordance with BS EN ISO 717-1.

Terminology/Parameter	Definition
$D_{nT,w}$	Weighted standardised sound level difference. A single-figure rating of the sound insulation between adjacent rooms or spaces in real-world conditions in completed buildings. The rating is determined over a range of frequencies and normalised to a reference reverberation time of 0.5 seconds for dwellings. Measured in-situ in accordance with BS EN ISO 140-4, with single figure rating determined in accordance with BS EN ISO 717-1. The measurement includes the effects of sound transmission via flanking routes and weak points at junctions, interfaces, and penetrations.
Façade	A sound monitoring position is a "façade" position when it includes a strong reflection from an adjacent building or structure. This corresponds with a position that is between 1 and 2 metres away from a reflecting building or structure.
Flanking sound transmission	The transmission of sound between two spaces via an indirect path rather than via the separating element. Example would be sound transmission via a flanking corridor, or sound transmission via a flanking curtain wall.
Free-field	A sound monitoring position is a "free-field" position when it is not affected by sound reflections from surrounding buildings and structures. This corresponds with a position at least 3.5 metres away from reflecting buildings or structures.
Frequency	The number of oscillations per second of a vibrating particle in a medium, measured in Hertz (Hz) or cycles per second.
Impact sound	Sound due to impacts on a floor, such as due to footfall, as observed in the room below the floor.
$L_{n,w}$	Weighted normalised impact sound pressure level. A single-figure rating of the impact sound level in a lower room due to a standard impact sound source in laboratory conditions. The rating is determined over a range of frequencies and normalised to a reference absorption area of 10 m^2. A single-figure rating of the impact sound insulation provided by the floor construction in idealised conditions over a range of frequencies. Measured in a laboratory in accordance with BS EN ISO 140-6 (or BS EN ISO 10140-3), with single figure rating determined in accordance with BS EN ISO 717-2.
$L'_{nT,w}$	Weighted standardised impact sound pressure level. A single-figure rating of the impact sound level in a lower room due to a standard impact sound source in real-world conditions in completed buildings. The rating is determined over a range of frequencies and normalised to a reference reverberation time of 0.5 seconds for dwellings. Measured in-situ in accordance with BS EN ISO 140-7, with single figure rating determined in accordance with BS EN ISO 717-2. The measurement includes the effects of impact sound transmission via flanking routes and weak points at junctions, interfaces, and penetrations.
$L_{A90,T}$	The A-weighted sound pressure level exceeded during 90% of the time interval, T. Typically used to quantify the background sound level at a specified position.

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Terminology/Parameter	Definition
$L_{Aeq,T}$	The equivalent continuous A-weighted sound pressure level over a time interval, T. This is an energy-average sound pressure level over the specified time period.
$L_{AFmax,T}$	The maximum A-weight sound pressure level during a specified time interval, T. Measured with "fast" time-weighting (which approximates the time-response of the human ear).
Noise	Unwanted or undesirable sounds observed by a listener.
Octave band	A frequency band used in acoustical measurements. An octave is a frequency interval between two sounds where the frequency of the lower sound is half the frequency of the upper sound. The human hearing range is divided into ten logarithmically equal frequency divisions called octave bands, with centre-band frequencies as follows: (16 Hz, 32 Hz,) 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, 16000 Hz.
Rating level, $L_{Ar,Tr}$	The specific sound level plus a correction accounting for acoustic features such as impulses, tones, intermittent features, or any other characteristics that draw more attention to the sound source.
Residual sound level	The equivalent continuous A-weighted sound pressure level of the ambient sound remaining at a specified position when the specific sound source (the sound source being assessed) does not contribute to the ambient sound.
Reverberation	The reflection of sound from room surfaces, resulting in the prolongation or persistence of a sound in a room.
Reverberation time	Time, in seconds, required for the sound pressure level in a room to decrease by 60 dB after a sound source has stopped. Long reverberation times are present in large empty rooms with hard surfaces (e.g., a cathedral); short reverberation times are present in smaller rooms with soft furnishing (e.g., typical living room, a recording studio).
R_w	The weighted sound reduction index of an architectural element. A single-figure rating of the sound insulation provided by the architectural element in idealised conditions over a range of frequencies. Measured in a laboratory in accordance with BS EN ISO 140-3 (or BS EN ISO 10140-2), with single figure rating determined in accordance with BS EN ISO 717-1.
Sound	The vibration, or oscillation, of particles in a medium, such as air, which may be detected by the human ear.
Sound absorption	The reduction of sound energy by transmission through an absorbing medium such an "acoustically soft" material or surface which results in a reduced reflection of incident sound.
Sound absorption class.	A classification system describing the ability of a specified material or surface to absorb sound. Typically measured in a laboratory in accordance with BS EN ISO 354, with class determined in accordance with BS EN ISO 11654.

Terminology/Parameter	Definition
Sound absorption coefficient, α	A fractional measure of the ability of a material or surface to absorb incident sound. Expressed as a value between 1.0 (total absorption of incident sound, no reflection) and 0.0 (no absorption, 100% reflection).
Sound insulation	The ability of architectural elements or structures to reduce the transmission of sound, predominantly due to the reflection of sound incident on the element or structure. Typically measured as the difference in sound pressure levels between a "source" room containing a loudspeaker and an adjacent "receiving" room.
Sound power level	A logarithmic measurement that quantifies the total sound power of a source emitted in all directions relative to a reference sound power (Wref = 1 pW or 10-12 W). Equal to 10 log10 (W / Wref) and expressed in decibels.
Sound pressure level	A logarithmic measurement that quantifies the sound pressure at a specified position relative to a reference sound pressure (pref = 20 µPa). Equal to 20 log10 (p / pref) and expressed in decibels.
Specific sound level	The equivalent continuous A-weighted sound pressure level at a specified position due to the specific sound source (the sound source being assessed).
Speech transmission index (STI)	The STI is a measurement of the intelligibility of speech content from a sound system or within a speech environment at a defined position and with defined background noise conditions and is a value ranging from 0 to 1. In practice this value varies from around 0.3 (poor intelligibility) to around 0.8 (excellent intelligibility).
STIPA	The STIPA (speech transmission index for public address systems) test method within BS EN 60268-16 is used to assess the speech transmission index within a speech environment. These involves broadcasting a modulated test sound within a space under defined background sound conditions to determine the STI value at defined positions within the space
Third Octave Band	A higher resolution frequency band used in sound measurements. One of three logarithmically equal parts of the corresponding octave frequency band. The upper band edge frequency is equal to the lower band edge frequency multiplied by 1/3

Appendix B – Environmental Noise Survey (2024)

Introduction

An environmental noise survey was undertaken by Sweco UK in November 2024 in order to quantify the prevailing environmental noise levels on and around the Site. This survey consisted of long-term unattended monitoring at two positions and short-term attended monitoring at additional positions.

Long-term measurements at two unattended positions were carried out, one between the morning of Thursday 7th November 2024 and Friday 15th November 2024, and the other between Tuesday 12th November 2024 and Friday 15th November.

This section presents details of the survey procedure along with the summary noise measurements results at each position.

Noise Survey Methodology

The environmental noise survey was undertaken using suitable measurement instrumentation configured to log sound pressure levels in each octave frequency band every 125 ms. The noise data was then analysed to determine the following parameters for each 5-minute interval (T):

- $L_{Aeq,T}$ - The A-weighted equivalent continuous sound pressure level over a period of time, T;
- $L_{A90,T}$ - The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Environmental noise measurements were taken at the positions shown in B1 and are shown in Figure 1 and Figure 2. Long-term unattended measurement positions are referenced as L1, L2, etc, and short-term attended measurement positions are referenced as S1, S2, etc.

Table B1: Noise Measurement Positions		
Position ref.	Position description	Conditions and height
L1	A microphone was located on a pole positioned on the western boundary of the site between KAO1 and KAO2. The noise climate in this position comprised of road noise from passing cars, some plant noise from the data centres and construction noise from KAO3.	Free-field, circa 3 m above street level
L2	A microphone was located on a pole near to the cottages on London Road	Free-field, circa 3 m above street level

Table B1: Noise Measurement Positions		
Position ref.	Position description	Conditions and height
	to the east of the site. The noise climate at this position was made up of Road noise, construction noise and vegetation noise.	
S1	Attended measurements were undertaken next to 15 Maypole Street. Measurements were dominated by road noise. There were a fair number of pedestrians and vegetation noise.	Free-field conditions. Circa 1.5 m above street level.
S2	Attended measurements were undertaken next to 261 Ladyshot. The noise climate was quiet with the occasional car. There is faint road noise from the local area but this was often dominated by vegetation noise,	Free-field conditions. Circa 1.5 m above street level.
S3	Attended measurements were undertaken the fork on Old London Road. Noise was dominated by road noise. There was some vegetation noise when the wind picked up.	Free-field conditions. Circa 1.5 m above street level.

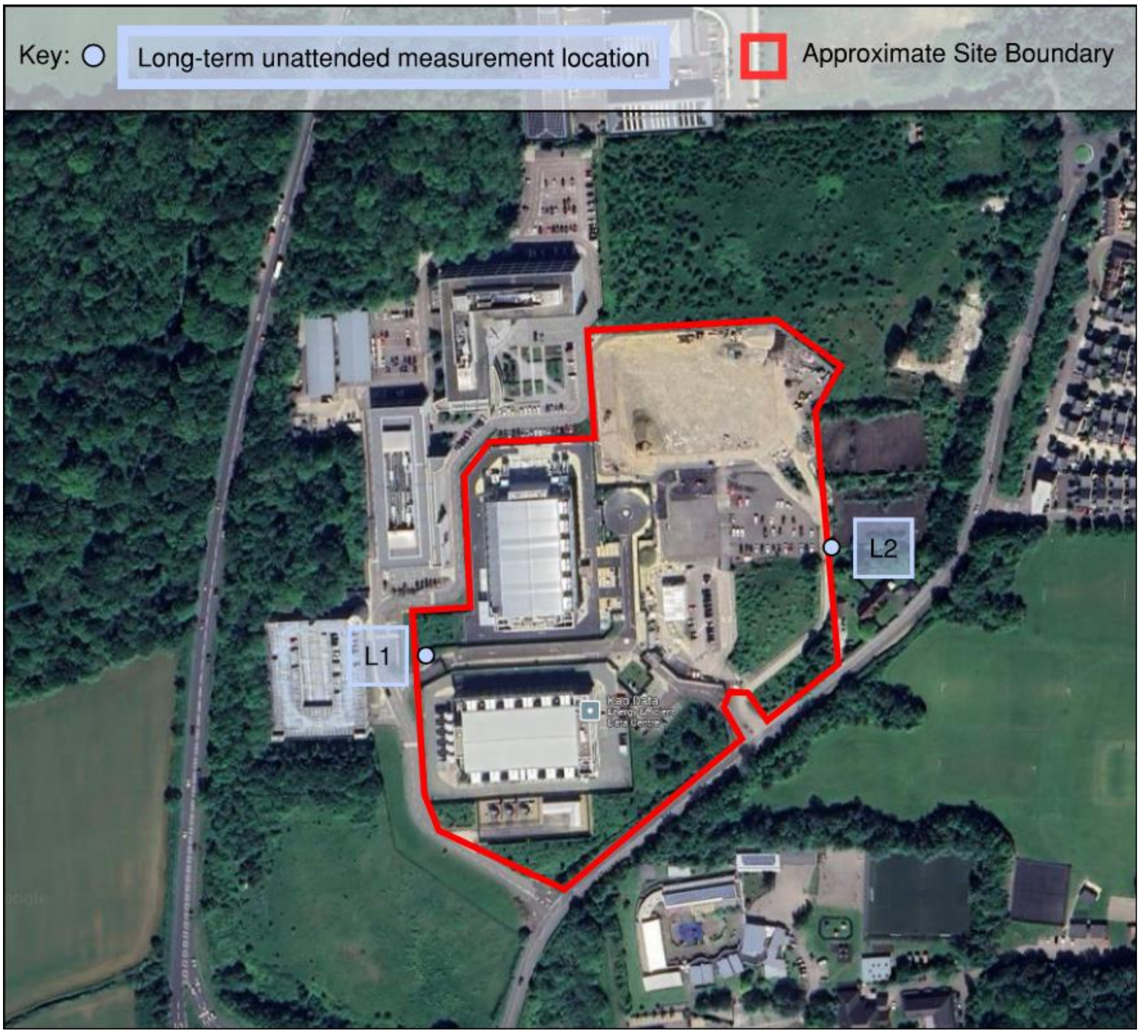

Figure 1: Long-term Noise Measurement Positions

Figure 2: Attended Short-term Noise Measuring Positions

Measurement Equipment

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 6167. Details of the noise measurement instrumentation used are shown in Table B2.

Each meter had been calibrated by a UKAS accredited laboratory within the previous 24 months. The calibration level was also checked at the start and end of the survey using field calibrators (which had been suitably calibrated by an accredited laboratory).

No significant drift in the calibration over the course of the survey (≤0.3 dB). The calibrator used had itself been calibrated by a UKAS accredited calibration laboratory within the twelve months preceding the measurements.

The microphones were fitted with protective windshields for the measurements.

Table B2: Inventory of Acoustic Measurement Equipment						
Position	Equipment details				Calibration details	
	Description	Manufacturer	Type Number	Serial Number	Certificate reference*	Date of calibration
L1	Sound level meter	Rion	RION - NL52	620901	TCRT23/1397	23 May 2025
	Pre-amplifier	Rion	RION - NH25	76417		
	Microphone	Rion	RION - UC59	11342		
L2	Sound level meter	Rion	RION - NL52	620957	TCRT23/1134	6 February 2025
	Pre-amplifier	Rion	RION - NH25	20998		
	Microphone	Rion	RION - UC59	3875		
S1 – S3	Sound level meter	01 dB	01dB - Fusion	12825	TR-REP-10813	31 May 2026
	Pre-amplifier	01 dB	01dB PRE-22N°	2004246		
	Microphone	GRAS	GRAS 40CD	292431		
All Positions Set-up	Field calibrator	B&K	4231	2615249	TCRT24/1407	31 May 2025
All Positions Collection	Field calibrator	Rion	Rion NC74	34662223	TCRT24/1470	27 June 2025
*Calibration records are available upon request.						

Observations and Weather Conditions

The sources of noise that contributed to environmental noise climate were noted during attended periods. The site is exposed to moderate levels of environmental noise, not untypical for this type of setting. Environmental noise conditions at the site were mainly affected by road traffic noise from local and distant roads as well as constant low-level noise from building services systems on the nearby commercial buildings.

Measurement periods in which construction noise was the dominant source of noise at the microphone position were excluded from the analysis.

Weather conditions were dry with negligible wind during the survey period and were therefore suitable for environmental noise monitoring.

Measurement Results

Tables B3 to B5 present the measurement results obtained during the survey at the unattended and attended receiver positions.

Table B3: Summary of Measured Noise Levels at L1

Date	Equivalent continuous SPL [dB LAeq,8 hour]			Typical background sound level [dB LA90,10 min]			
	Daytime hours 07:00-23:00	Office hours 09:00-17:00	Night-time 23:00-07:00	Daytime hours 07:00 to 23:00	Office hours 09:00-17:00	Evening 17:00-23:00	Night-time 23:00-07:00
Thursday 7 November 2024	55	57	48	52	52	50	43
Friday 8 November 2024	55	56	46	51	51	49	40
Saturday 9 November 2024	52	52	45	49	49	45	39
Sunday 10 November 2024	53	54	47	52	52	50	41
Monday 11 November 2024	56	58	48	52	51	47	41
Tuesday 12 November 2024	55	56	49	51	51	47	43
Wednesday 13 November 2024	57	59	48	51	50	52	41
Thursday 14 November 2024	57	58	48	50	50	45	41
Representative Value	55	56	48	51	51	50	41

Table B4: Summary of Measured Noise Levels at L2

Date	Equivalent continuous SPL [dB LAeq,8 hour]			Typical background sound level [dB LA90,10 min]			
	Daytime hours 07:00-23:00	Office hours 09:00-17:00	Night-time 23:00-07:00	Daytime hours 07:00-23:00	Office hours 09:00-17:00	Evening 17:00-23:00	Night-time 23:00-07:00
Tuesday 12 November 2024	52	53	48	49	49	46	42
Wednesday 13 November 2024	52	52	46	47	46	50	41
Thursday 14 November 2024	51	52	43	46	46	43	34
Representative Value	52	52	46	47	46	46	39

Table B5: Summary of Attended Noise Measurements S1 to S3

Position	Date and Start Time	Duration, T	Equivalent continuous sound pressure level	Background sound level
		[hh:mm]	[dB LAeq,T]	[dB LA90,T]
S1	7 November 2024 13:30	00:20	58	46
S2	7 November 2024 14:00	00:20	48	45
S3	7 November 2024 11:55	00:20	54	50

Time history graphs for the long-term measurements are presented in Figures 3 to 4.

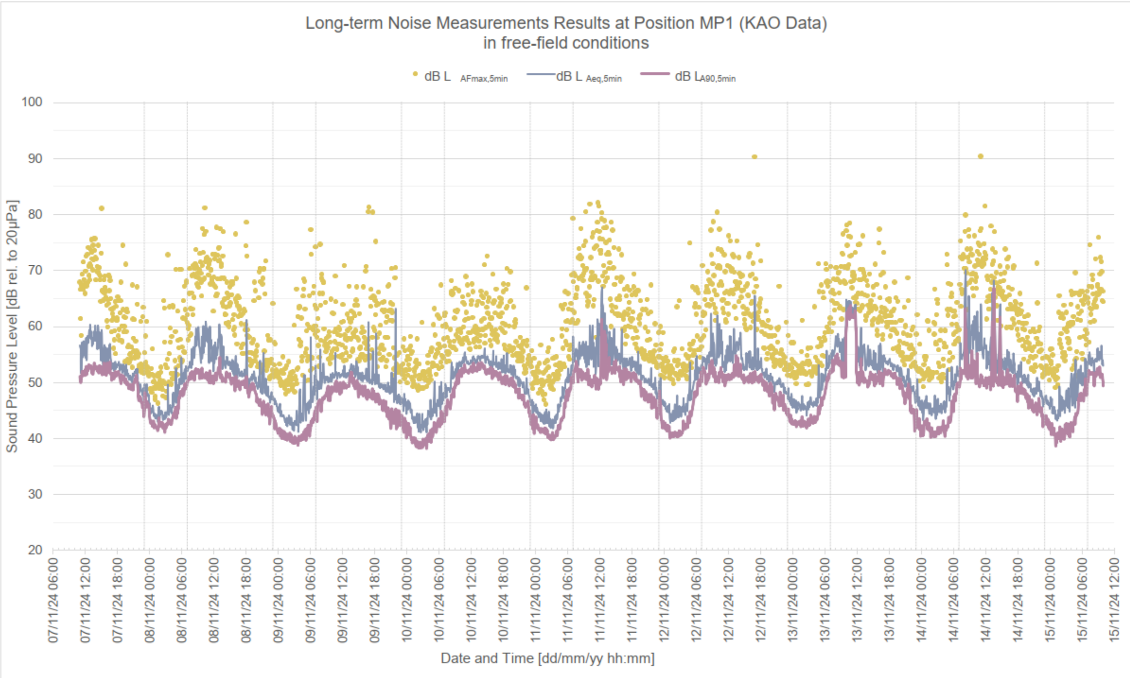

Figure 3: Long-term noise measurement results at position L1 (in façade conditions)

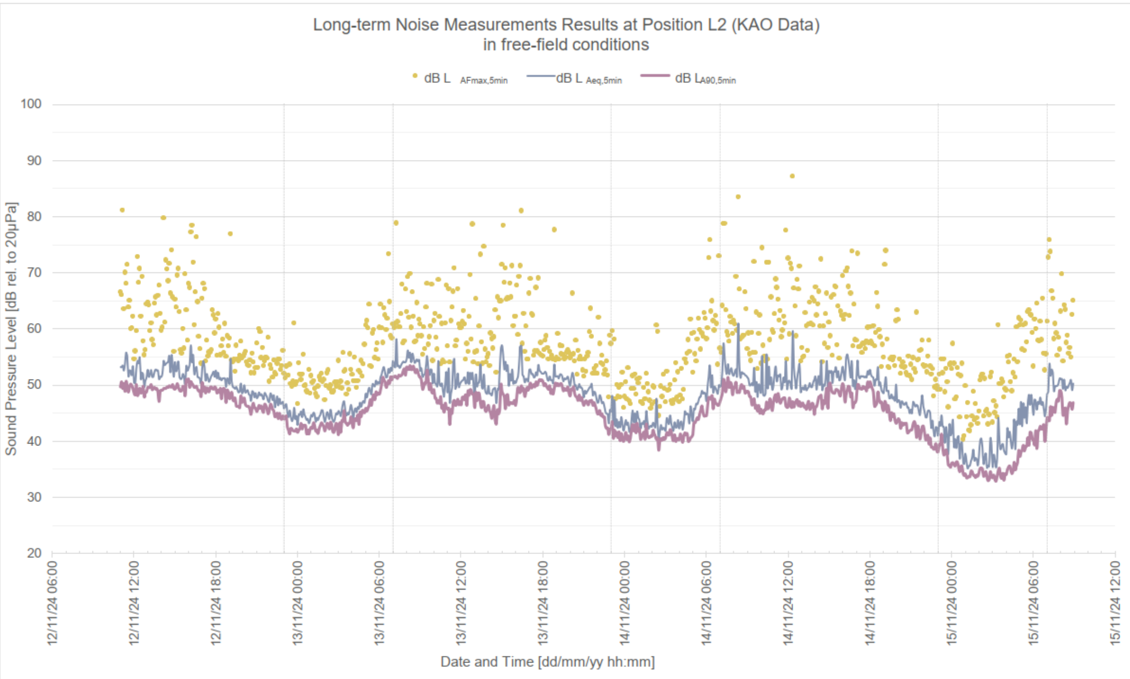

Figure 4: Long-term noise measurement results at position L2 (in façade conditions)

Appendix C – Environmental Noise Survey (2021)

Introduction

An unattended environmental noise survey has been undertaken by Sweco over a period of five consecutive days, between Thursday 7th October 2021 and Tuesday 12th October 2021 in order to establish by means of detailed daytime and night-time noise measurements, the existing environmental levels at suitable locations around the development site, so as to inform the specification and design.

Attended spot measurements of environmental noise were also undertaken at several off-site noise sensitive locations and well as on site plant noise measurements at the Data Centre.

The results of the noise survey are used to:

- Determine the sound insulation performance of the building envelope based on the acoustic criteria, Local Authority, and any Client specific requirements.
- Establish acceptable building services plant noise emission limits in accordance with the proposed acoustic criteria, Local Authority, and any Client specific requirements.

Noise Survey Methodology

The noise survey comprised both attended and automated unattended measurements, undertaken at five fixed measurement positions, as shown in Figure C1 and Figure C. 2 below. Noise monitoring was undertaken over 5-minute periods at each measurement position for the duration of the survey.

The sound indices measured during the sound survey are shown below:

- $L_{Aeq,T}$ - The A-weighted equivalent continuous sound pressure level over a period of time, T;
- $L_{A1,T}$ - The A-weighted sound pressure level exceeded for 1% of the measurement period. Indicative of the maximum sound level.
- $L_{A90,T}$ - The A-weighted sound pressure level exceeded for 90% of the measurement period (indicative of the background sound level)

All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and, in accordance with the principles of BS 7445.

Measurement Equipment

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672. A full inventory of this equipment is shown in Table C1 below:

Table C1: Equipment						
Position	Equipment details				Calibration details	
	Description	Manufacturer	Type Number	Serial Number	Date of calibration	Certificate reference
L1	Sound level meter	Rion	NL-52	620957	01/02/2021	TCRT21/1082
	Pre-amplifier	Rion	NH-25	20998		
	Microphone	Rion	UC-59	03875		
L2	Sound level meter	01dB	Fusion	12089	16/04/2021	37682
	Pre-amplifier	01dB	PRE22 N°	1805176		
	Microphone	01dB	GRAS 40CD	331995		
L3	Sound level meter	Rion	NL-52	620901	03/07/2020	TCRT20/1423
	Pre-amplifier	Rion	NH-25	76417		
	Microphone	Rion	UC-59	13342		
L1 to L3	Field Calibrator	01dB	CAL31	87808	16/04/2021	37680
S1 to S3	Sound Level Meter	Norsonic	140	7400	16/04/2021	37678
	Pre-amplifier	Norsonic	1209	22149		
	Microphone	Norsonic	1225	355544		
	Field calibrator	Norsonic	1255	25161	16/04/2021	37677
	Calibration records are available upon request.					

The microphones were fitted with protective windshields for the measurements.

The noise measurement equipment used during the survey was calibrated at the start and end of each measurement. The calibrator used had itself been calibrated by a UKAS accredited calibration laboratory within the twelve months preceding the measurements. No significant drift in calibration was found to have occurred.

Observations and Weather Conditions

Weather conditions were dry with negligible wind during the vast majority of the monitoring period.

The environmental sound conditions at the site are mainly affected by road traffic, construction noise (from KLON 01 construction works), air traffic, plant noise and distant traffic noise. The site is exposed to moderate levels of noise.

Since the survey was unattended, it is not possible to comment on the precise nature of the noise climate throughout the full duration of the survey period. However, the survey period was chosen following close monitoring of weather conditions. Any period of time where weather conditions have been considered as not suitable for this noise measurement exercise, being dry with only light winds, have been excluded from our assessment . Measurement periods affected by the construction noise have also been excluded from our assessment.

Noise Measurement Positions

The noise measurement positions were selected to monitor worst-case noise levels incident on the various façades of the development, as well as to consider variations in the surrounding noise climate; this, together with the extended duration of the environmental survey, would ensure a suitably robust and accurate Assessment of the external building fabric elements around the proposed development.

The long-term measurements were carried at three fixed locations around the proposed development site. The selected locations are described in detail below and shown in Figure C1 below:

Long-term measurement 1 (L1) – A microphone was located to the south-west on the site boundary, near Maple Cottage and Maypole Cottage, London Rd, approximately 2.5 meters above the local ground level. Measurements undertaken at this position were free-field. It was noted that the noise climate was dominated by road traffic, air traffic and bird song noise during the quietest periods. This position is representative on the nearest noise sensitive receptor and background noise level.

Long-term measurement 2 (L2) – A microphone was located at approximately the south-west corner of the proposed building (KLON-02), approximately 3 meters above the local ground level. Measurements undertaken at this position were free-field. It was noted that the noise climate was dominated by nearby construction noise, remote road traffic and air traffic. This position represents the façade of the proposed building (KLON-02).

Long-term measurement 3 (L3) – A microphone was located to the east of the site on the site boundary between KAO data and KAO park, approximately 2.5 meters above the local ground level. Measurements undertaken at this position were free-field. It was noted that the noise climate was dominated by road traffic (A414) and air traffic as well as distant construction noise. The measurement position is beside an access road for KAO park and Raytheon UK and therefore individual vehicles will also contribute to the noise climate. This measurement position is representative of the noise produced from the A414 on site.

Attended Measurements (S1, S2 and S3) – The microphone was tripod mounted (1.5m over the local ground level). The noise climate was dominated by the road traffic from London Rd for S1 and Church Langley Way for S3. S2 was the quietest with distant noise from the A414 and the occasional person on Momples Rd

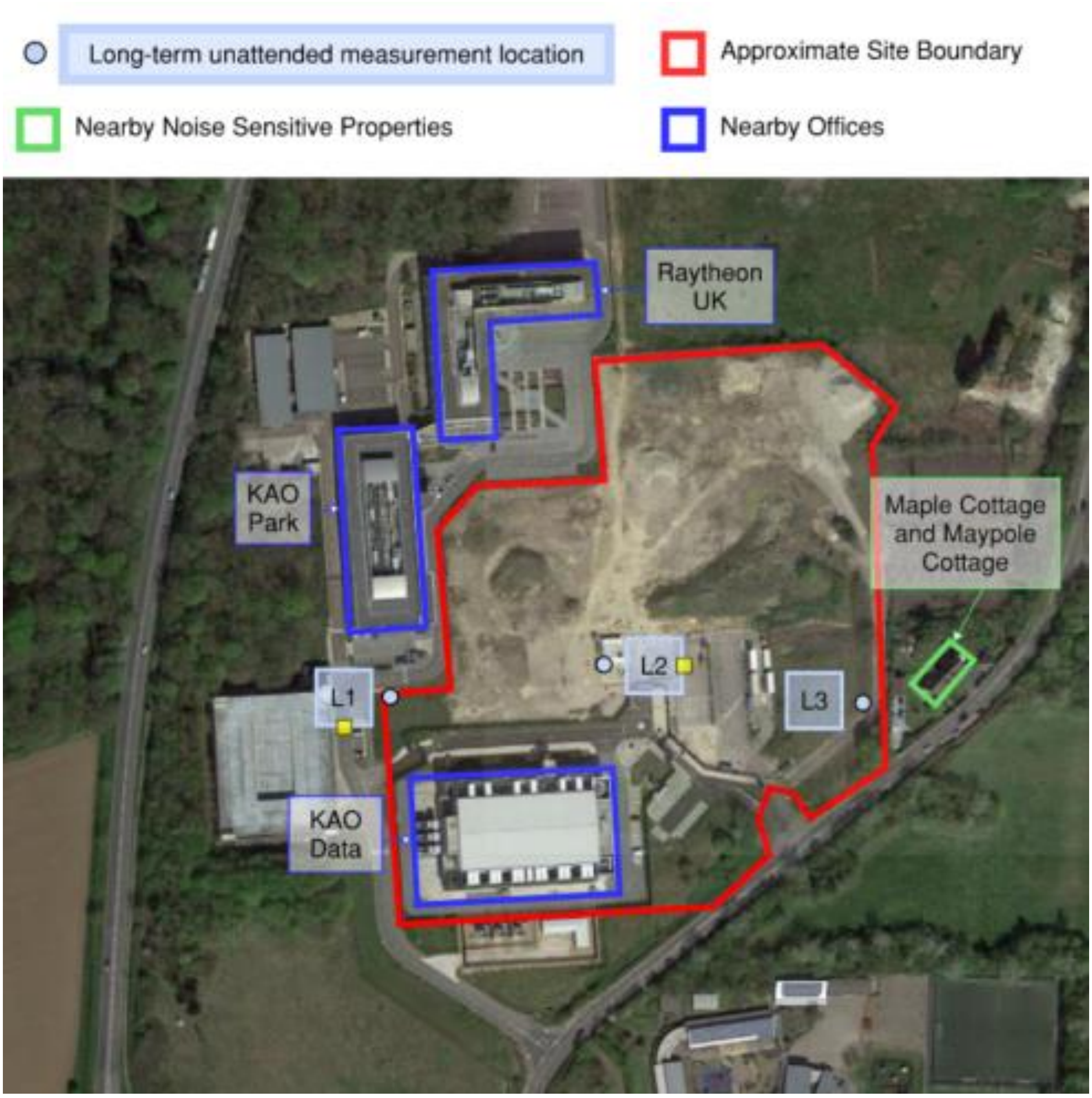

Figure C.1: Approximate site boundary, nearby offices and residential dwellings and long-term measurement positions

Figure C. 2: Approximate Site Boundary, off-site noise sensitive receptors and short-term measurement position

Measurement Results

The results of Environmental Noise Survey are summarised in Tables C2 to C5 below. Time history and typical spectral graphs for each measurement position are shown at the end of the appendix.

Table C2: Summary of Measured Noise Levels at L1			
Survey Date	Period (T) LAeq	LAeq,T (dB)	Typical LA90,T(dB)*
07/10/2021	Daytime (11:00 – 23:00)	52	47
	Night time (23:00 – 07:00)	44	34
	Office Hours (11:00 – 17:00)	53	48
08/10/2021	Daytime (07:00 – 23:00)	51	44
	Night time (23:00 – 07:00)	44	36
	Office Hours (09:00 – 17:00)	52	40
09/10/2021	Daytime (07:00 – 23:00)	51	40
	Night time (23:00 – 07:00)	46	36
	Office Hours (09:00 – 17:00)	51	40
10/10/2021	Daytime (07:00 – 23:00)	49	40
	Night time (23:00 – 07:00)	47	37
	Office Hours (09:00 – 17:00)	50	43
11/10/2021	Daytime (07:00 – 23:00)	52	42
	Night time (23:00 – 07:00)	46	39
	Office Hours (09:00 – 17:00)	52	43
12/10/2021	Daytime (07:00 – 10:45)	54	48
	Night time (23:00 – 07:00)	-	-
	Office Hours (09:00 – 10:45)	55	46

Table C3: Summary of Measured Noise Levels at L2			
Survey Date	Period (T) LAeq	LAeq,T (dB)	Typical LA90,T(dB) *
07/10/2021	Daytime (11:35 – 23:00)	52	44
	Night time (23:00 – 07:00)	43	38

Table C3: Summary of Measured Noise Levels at L2			
Survey Date	Period (T) LAeq	LAeq,T (dB)	Typical LA90,T(dB) *
	Office Hours (11:35 – 17:00)	54	
08/10/2021	Daytime (07:00 – 23:00)	52	46
	Night time (23:00 – 07:00)	45	40
	Office Hours (09:00 – 17:00)	51	-
09/10/2021	Daytime (07:00 – 23:00)	53	46
	Night time (23:00 – 07:00)	45	40
	Office Hours (09:00 – 17:00)	54	-
10/10/2021	Daytime (07:00 – 23:00)	51	48
	Night time (23:00 – 07:00)	47	40
	Office Hours (09:00 – 17:00)	51	-
11/10/2021	Daytime (07:00 – 23:00)	49	46
	Night time (23:00 – 07:00)	45	41
	Office Hours (09:00 – 17:00)	-	-
12/10/2021	Daytime (07:00 – 11:15)	-	-
	Night time (23:00 – 07:00)	-	-
	Office Hours (09:00 – 11:15)	-	-

Table C4: Summary of Measured Noise Levels at L3			
Survey Date	Period (T) LAeq	LAeq,T (dB)	Typical LA90,T(dB) *
07/10/2021	Daytime (12:00 – 23:00)	55	52
	Night time (23:00 – 07:00)	49	40
	Office Hours (12:00 – 17:00)	56	53
08/10/2021	Daytime (07:00 – 23:00)	54	50

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Table C4: Summary of Measured Noise Levels at L3			
Survey Date	Period (T) LAeq	LAeq,T (dB)	Typical LA90,T(dB) *
	Night time (23:00 – 07:00)	49	42
	Office Hours (09:00 – 17:00)	55	51
09/10/2021	Daytime (07:00 – 23:00)	54	50
	Night time (23:00 – 07:00)	50	41
	Office Hours (09:00 – 17:00)	54	50
10/10/2021	Daytime (07:00 – 23:00)	52	49
	Night time (23:00 – 07:00)	49	38
	Office Hours (09:00 – 17:00)	54	49
11/10/2021	Daytime (07:00 – 23:00)	55	50
	Night time (23:00 – 07:00)	51	39
	Office Hours (09:00 – 17:00)	56	50
12/10/2021	Daytime (07:00 – 11:25)	56	52
	Night time (23:00 – 07:00)	55	-
	Office Hours (09:00 – 11:25)	49	51

Table C5: Summary of Attended Measurements – S1, S2 and S3					
Location	Description	Date & Time	Period T mins	LAeq,T (dB)	Typical LA90,T (dB)
S1	Outside 15 Maypole St. 1.5m above ground in façade conditions. London Rd is approx. 30 metres away	07/10/2021 14:30	5	59	48
		07/10/2021 14:35	5	60	47
		07/10/2021 14:45	5	59	48
		07/10/2021 14:50	5	56	48
S2	Outside 261 Ladyshot. 1.5m above ground in free-field conditions. Main	07/10/2021 15:15	5	46	41
		07/10/2021 15:20	5	46	41
		07/10/2021 15:45	5	44	41

Table C5: Summary of Attended Measurements – S1, S2 and S3					
Location	Description	Date & Time	Period T mins	LAeq,T (dB)	Typical LA90,T (dB)
	source of noise is Momples Rd.	07/10/2021 15:50	5	47	41
S3	Old London Rd turning point. 1,5m above ground in free-field conditions. Main source of noise Church Langley Way	07/10/2021 16:10	5	67	50
		07/10/2021 16:15	5	52	49
		07/10/2021 16:25	5	53	49
		07/10/2021 16:30	5	52	48

Table C6: Summary of Attended Measurements – S1, S2 and S3					
Location	Description	Date & Time	Period T mins	LAeq,T (dB)	Typical LA90,T (dB)
South of KAO Data	East end of south façade. 8m from facade	07/10/2021 12:45	15min	58	56
	Central position of south façade. 8m from façade	07/10/2021 13:03	5min	58	57
	West end of south façade. 10m from façade	12/10/2021 10:20	5min	58	57
North of KAO data	1m from façade of pump	12/10/2021 10:13	1min	60	59
	10cm from vent on the west side of the north façade	12/10/2021 10:27	30s	77	73

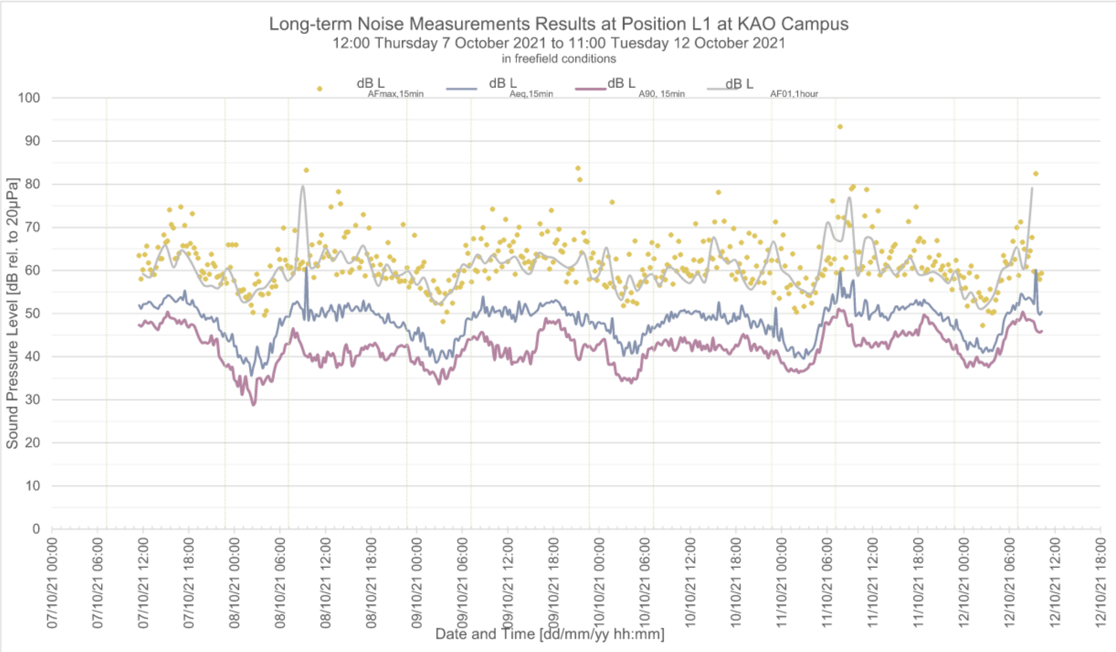

Figure C.3: Time History Graph at Position L1

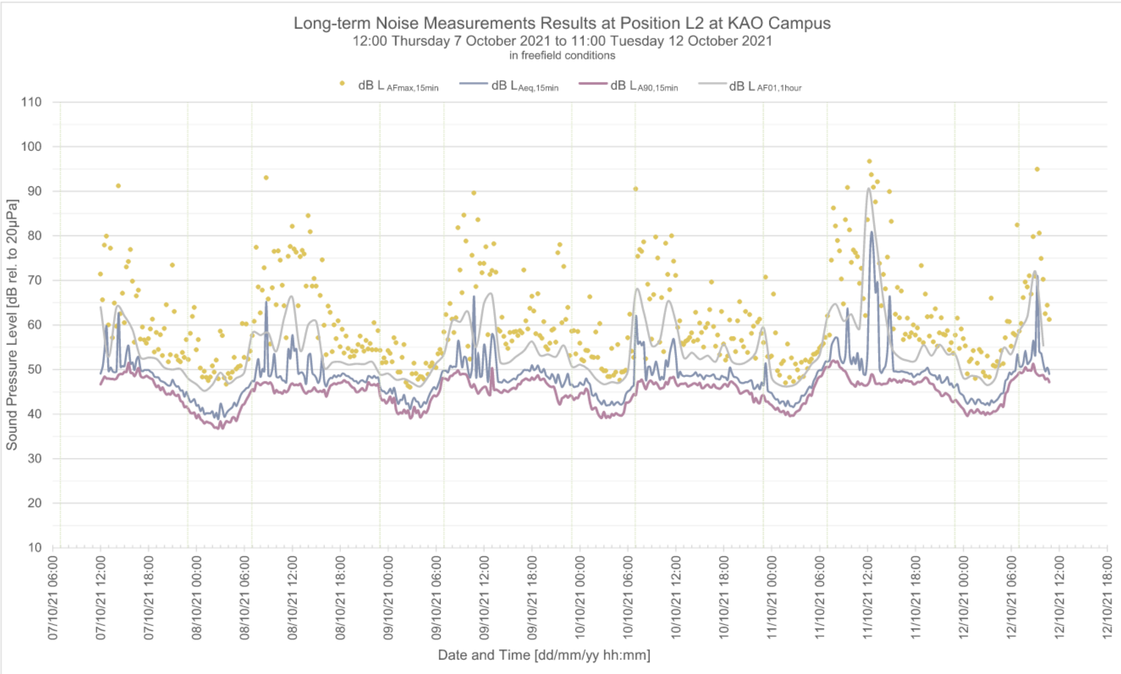

Figure C.4: Time History Graph at Position L2. The greyed areas are affected by construction noise.

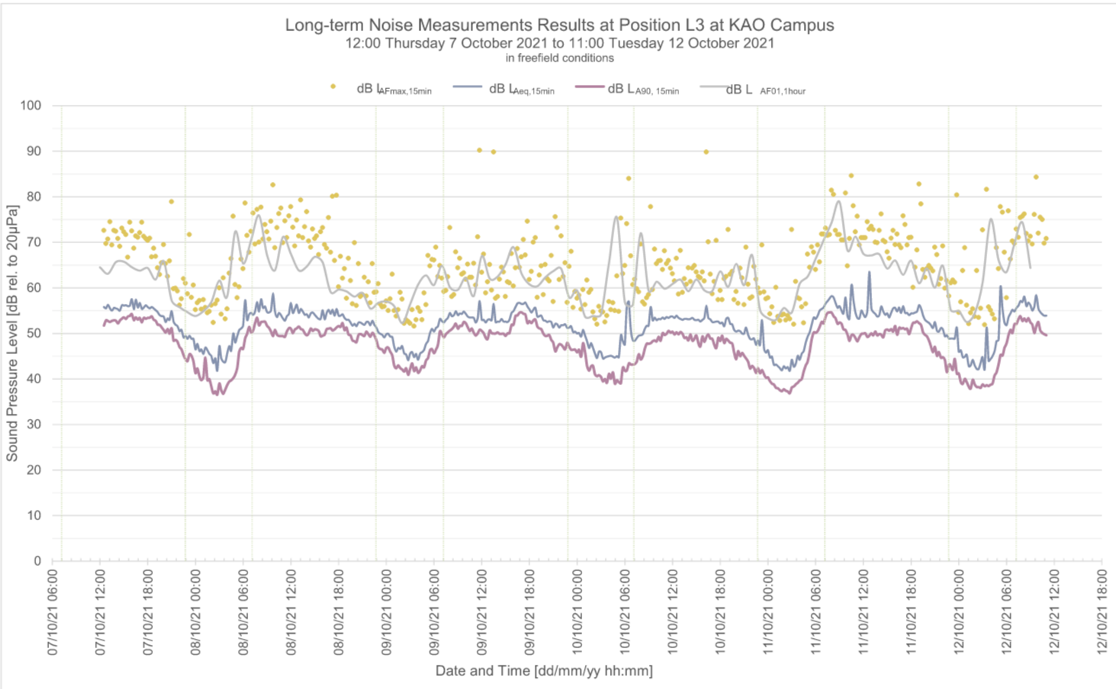

Figure C.5: A time-history graph on position L3


Figure C. 6: Measurement position L1


Figure C. 7: Measurement position L2

Appendix D – Plant Noise Data

Table D1: Plant Noise Data											
Plant Reference	**N**	**Quantity**	**Unit SWL/SPL(dB) at Octave Band Centre Frequencies (Hz)**								**dBA**
			63	125	250	500	1k	2k	4k	8k	
KLON 03 Generators [Proposed]*	11	Canopy Lp@1m	84	89	81	69	63	64	62	74	78
		Inlet Louvre Lp@1m	85	78	59	51	52	52	53	76	76
		Outlet Louvre Lp@1m	92	85	66	59	60	61	61	73	75
		Flue Exhaust Lp@1m	100	88	76	70	69	65	57	58	78
KLON 02 Generators [Proposed]**	4	Canopy Lp@1m	86	91	83	71	65	66	64	76	80
		Inlet Louvre Lp@1m	89	82	63	55	56	56	57	80	80
		Outlet Louvre Lp@1m	96	89	70	63	64	65	65	77	79
		Flue Exhaust Lp@1m	102	90	78	72	71	67	59	60	80
KLON 01 Generators [Proposed]**	2	Canopy Lp@1m	86	91	83	71	65	66	64	76	80
		Inlet Louvre Lp@1m	89	82	63	55	56	56	57	80	80
		Outlet Louvre Lp@1m	96	89	70	63	64	65	65	77	79
		Flue Exhaust Lp@1m	102	90	78	72	71	67	59	60	80
KLON 02 Generators [Existing]**	3	Canopy Lp@1m	86	91	83	71	65	66	64	76	80
		Inlet Louvre Lp@1m	89	82	63	55	56	56	57	80	80
		Outlet Louvre Lp@1m	96	89	70	63	64	65	65	77	79
		Flue Exhaust Lp@1m	102	90	78	72	71	67	59	60	80
KLON 01 Generators [Existing_1]**	3	Canopy Lp@1m	86	91	83	71	65	66	64	76	80
		Inlet Louvre Lp@1m	89	82	63	55	56	56	57	80	80
		Outlet Louvre Lp@1m	97	90	71	64	65	66	66	78	80
		Flue Exhaust Lp@1m	102	90	78	72	71	67	59	60	80
KLON 01 Generators [Existing_2]**	2	Canopy Lp@1m	86	91	83	71	65	66	64	76	80
		Inlet Louvre Lp@1m	89	82	63	55	56	56	57	80	80
		Outlet Louvre Lp@1m	96	89	70	63	64	65	65	77	79
		Flue Exhaust Lp@1m	102	90	78	72	71	67	59	60	80

Table D1: Plant Noise Data											
Plant Reference	**N**	**Quantity**	**Unit SWL/SPL(dB) at Octave Band Centre Frequencies (Hz)**								**dBA**
			63	125	250	500	1k	2k	4k	8k	
Loadbank* **	1	Lp@3m at 50Hz	85dB								
		Lp@3m (Representative spectrum shape adjusted to meet approximately 85dB at low frequencies)	85	89	86	85	85	79	72	66	88

***It has been confirmed that the container is designed to achieve a sound level of 78 dBA at 1 meter under free field conditions. It is assumed that these sound levels include the contribution from noise breakout through the flue and its silencer. Additionally, the spectral noise levels outside the flue exhaust are currently unknown. However, it has been confirmed that the design will aim to achieve a target noise level of 78 dBA at a distance of 1 meter from the flue outlet. A typical generator flue exhaust spectrum has been assumed and adjusted to meet this target of 78 dBA at 1 meter.**
****The acoustic specifications confirmed for the generators in KLON01 and KLON02 indicate the overall sound pressure level at 1 meter for each noise-emitting element individually. The noise spectrum shape used for the generators in KLON03 are considered representative of the spectral noise generated by these units and have therefore been adopted for this assessment. These noise spectrums have been adjusted to align with the overall sound pressure levels provided.**
***** The noise data provided pertains solely to the noise levels at 50 Hz. A representative spectrum has been assumed in our calculations. This has been adjusted to align with the known noise levels at low frequencies.**