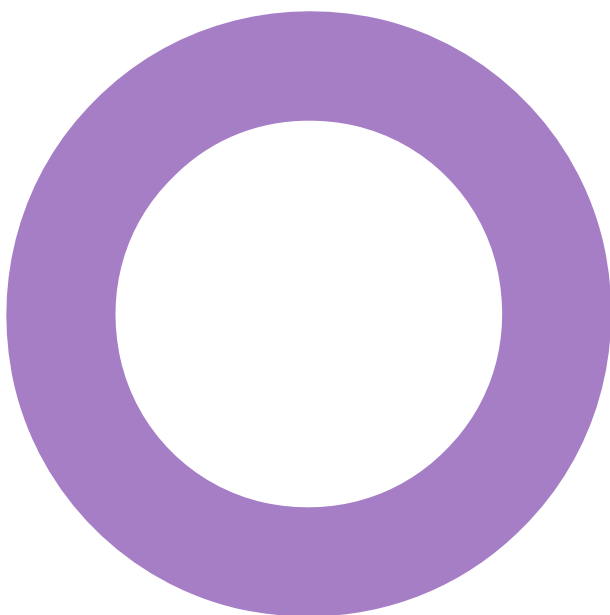


**Plot B, Windrush.
Witney.
Canmoor Properties Ltd.**

ACOUSTICS

NOISE IMPACT ASSESSMENT AND BREEAM ASSESSMENT

REVISION 02 - 04 MARCH 2024



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	02/02/2024	Initial issue DFC	AM	PM	PM
01	21/02/2024	Updated site plan	AM	AM	PM
02	04/03/2024	Updated site plan	AM	AM	PM

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Executive summary

Hoare Lea Acoustics has been appointed by Canmoor Properties Ltd to carry out an environmental noise survey and noise impact assessment in relation to a proposed employment development at Plot B, Windrush Industrial Park, Witney.

This report reviews typical operational noise levels for warehouse/manufacturing facilities and assesses these with respect to the existing noise climate at the nearest residential properties. Recommendations for noise control measures are provided where appropriate.

Assessment of activity noise levels in accordance with BS 4142 indicates that noise from the proposed development would achieve a condition of 'low impact' at the nearest existing residential properties at all times and would be unlikely to give rise to noise disturbance.

This report also determines compliance with the BREEAM 2018 credits available under Hea 05 and Pol 05.

The representative ambient sound levels measured during the survey at the development site were 51-54 dB $L_{Aeq,T}$.

The representative background sound levels measured during the survey were 41 dB $L_{A90,15min}$ during the daytime (07:00 to 23:00 hrs) and 32 dB $L_{A90,15min}$ at night-time (23:00 to 07:00 hrs).

Based on BREEAM 2018 and BS8233:2014 guidance, the following minimum performance requirements are recommended for the building envelope components:

Element	Minimum Performance Requirement
Masonry Walls (where applicable)	R_w 45
Composite metal panel systems wall – offices	R_w 27
Glazing	R_w 30
Roof – warehouse/production areas	R_w 25
Roof – offices (with insulation from rain noise)	R_w 42

Based on BREEAM 2018 and BS4142:2014 guidance, all plant, equipment and machinery associated with the development shall be controlled to ensure that the overall sound pressure levels when measured at 1m from the façade of the nearest noise sensitive premises do not exceed 36 dB $L_{Aeq,T}$ during the daytime (07:00 to 23:00 hrs) and 27 dB $L_{Aeq,T}$ during the night-time (23:00 to 07:00 hrs). If the plant contains any noticeable tonal characteristics at the receptor position, a further correction will be required.

1. Introduction.

Hoare Lea Acoustics have been appointed to carry out an environmental noise survey and report to assist the planning application for the development site located at 'Plot B, Windrush Industrial Park, Witney'. The site falls within the jurisdiction of West Oxfordshire District Council.

An environmental noise survey has been carried out at the site over 5 days commencing on Friday 26 January 2024. The aim of the survey was to determine the prevalent noise levels around the site in order to set maximum noise egress limits for plant and machinery associated with the development and assesses these with respect to the existing noise climate at the nearest residential properties. Recommendations for noise control measures are provided where appropriate.

It is also intended that the new facility be designed to achieve all the relevant available acoustic credits of BREEAM UK – New Construction 2018 Issue 2.0.

This report details the results of site measurements to determine the existing site noise climate in order to determine performance requirements necessary to achieve the available credits in BREEAM Hea05 and Pol05.

Hoare Lea are accredited to carry out BREEAM assessment in accordance with the Association of Noise Consultants accreditation scheme – registration no 126.

2. Assessment criteria.

2.1 National Planning Policy framework.

The National Planning Policy Framework (NPPF): December 2023 sets out the Government's planning policies for England and how these are expected to be applied. The document seeks to encourage sustainable development subject to all relevant factors.

Section 15: 'Conserving and enhancing the natural environment', paragraph 170, states the following:

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

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability'.*

Furthermore, paragraph 180 states that:

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

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'*

Paragraph 183, additionally, states *'The focus of planning policies and decisions should be on whether proposed development is acceptable use of land rather than control of processes or emissions (where these are subject to separate pollution control regimes)'.*

NPPF also makes reference to the DEFRA Noise Policy Statement for England (NPSfE) 2010. This latter document is intended to apply to all forms of noise other than that which occurs in the workplace. It includes environmental noise and neighbourhood noise in all forms.

NPSfE advises that the impact of noise should be assessed on the basis of adverse and significant adverse effect but does not provide any specific guidance on assessment methods or limit sound levels. Moreover, the document advises that it is not possible to have *'a single objective noise-based measure...that is applicable to all sources of*

noise in all situations! It further advises that the sound level at which an adverse effect occurs is *'likely to be different for different noise sources, for different receptors and at different times'*.

In the absence of specific guidance for assessment of environmental noise within NPPF and NPSfE, it will be necessary to base the assessment on current British Standards and relevant local or national guidance.

It is noted that NPSfE also advises that the general principle that increases in ambient noise should be 'minimised', needs to be considered in context for each site and, in this regard, states:

'Of course, taken in isolation and to a literal extreme, noise minimisation would mean no noise at all. In reality, although it has not always been stated, the aim has tended to be to minimise noise as far as is reasonably practical... the application of the NPSfE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular...development or other activity may not have been given adequate weight when assessing the noise implications'

2.2 BS 4142:2014 guidance.

Noise egress from any plant and machinery associated with the development should not cause disturbance at nearby residential areas, therefore noise limits will be set in accordance with the guidance given in line with BS 4142:2014 'Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas'.

The rating level for all new plant and machinery should be no more than equal to the existing minimum background noise levels. Further corrections should be applied if the plant noise contains tonal and/or impulsive characteristics. The magnitude of these corrections is dependent upon the subjective perceptibility of the tones/impulses present. These corrections as stated in BS 4142:2014 are as follows:

Tonality:

- +2dB for a tone which is *just* perceptible
- +4dB for a tone which is *clearly* perceptible
- +6dB for a tone which is *highly* perceptible

Impulsivity:

- +3dB for impulsivity which is *just* perceptible
- +6dB for impulsivity which is *clearly* perceptible
- +9dB for impulsivity which is *highly* perceptible

Intermittency:

- +3 dB for intermittency which is readily distinctive against the residual acoustic environment.

The Standard makes clear that application of any correction factors should be on the basis of the noise as perceived at the receptor and not as perceived in proximity to the noise source.

Where the Rating Level exceeds the background, the level of impact increases as shown below.

Comparison with background	Assessment
+0 dB or below measured background	Low impact
+ 5 dB	Adverse impact
+ 10 dB or more above measured background	Significant adverse impact

2.3 BREEAM Design Requirements.

BREEAM UK New Construction Technical Manual – 2018 Issue 2.0 for Non-domestic Buildings has two sections where acoustic credits can be obtained:

- Health and Wellbeing 05 – Acoustic performance
- Pollution 05 – Reduction of noise pollution

2.3.1 Hea 05.

Section Hea 05 'Shell and Core' advises that a single credit is available as follows:

Credit	Requirement
First	Indoor ambient noise level criteria: All criteria relevant to the building type and function apply.

For this project, it is considered that all office areas will be required to comply with BS 8233 guidance for background sound level requirements as follows:

Area	Noise Level $L_{Aeq,T}$
Single person office	≤ 40
Multiple person offices	40-50
Meeting room	≤ 35
Canteen areas	≤ 50
Warehouse / production areas	70-80
Circulation and toilets	≤ 45

For 'Shell and Core' assessments, additional credits for sound insulation and reverberation criteria are not applicable.

2.3.2 Pol 05.

The Pol 05 credit is intended 'To reduce the likelihood of noise from fixed installations on the new development affecting nearby noise sensitive premises' and 'to design and specify the building and its services in a way that limits its impact'.

The credit can be awarded if

1. If there are no noise sensitive areas within the assessed building or noise sensitive areas within 800m radius of the assessed site. of the new development, the credit is awarded by default. If this is not the case, then a noise impact assessment in accordance with BS7445:1991 must be carried out.

OR

2. Where there are noise sensitive areas within the assessed building or noise sensitive areas within 800m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014 is commissioned to determine existing background sound levels at noise sensitive receptors and the noise Rating Level for the assessed building

The noise Rating Level of the assessed building at the nearest noise sensitive areas 'must be at least 5dB lower than the background noise throughout the day and night'.

The nearest dwellings to the development site are located approximately 470 metres to the west of site on the far side of Deer Park Road.

It is not considered that there are any noise sensitive premises within the vicinity of the site within the Windrush Industrial Park.

3. Site and development details.

The proposed development comprises the demolition of the existing industrial buildings and the development of two new industrial buildings which will be subdivided into seven smaller units (Units 14 to 20), each with dedicated loading bays and car parking.

The site is accessed via Windrush Park Road to the north west and an access road leading to Range Road in the south east.

The immediate adjacencies to the proposed site predominantly comprises of other industrial and commercial units on the Windrush Industrial Park. To the north west of the site on the far side of Windrush Park Road is the Roastery Café with an external seating area.

The nearest identified residential premises to the location of the proposed development site are located approximately 470 metres to the east on the far side of Deer Park Road. Whilst there are dwellings set at a similar distance to the south west on Wheatfield Drive, intervening industrial and commercial units will result in no section of the site being directly visible from these houses.

The above are indicated in Figure 1 below.



Figure 1 Annotated 3D aerial render indicating site location (courtesy of Google Earth)

4. Environmental noise survey.

The environmental noise survey was carried out on site over a period of 5 days between 26 and 30 January 2024. During this time, long-term unattended measurements were carried out at Position L1, deemed representative of noise levels at dwellings to the east on Deer Park Road. In addition to the above, attended spot measurements were undertaken at Positions A and B, deemed representative of external noise levels at the development site.

Full details of the method and equipment used, as well as weather information are provided in Appendix A.

The survey measurement position is presented in Figure 2, indicated as Positions L1, A and B.



Figure 2 Annotated 3D aerial render indicating measurement position (courtesy of Google Earth)

4.1 Observations.

From observations on site during equipment set up and collection, ambient and background noise levels at the nearest dwellings to the development site are dominated by road traffic along Deer Park Road and Burford Road.

Ambient and background noise levels at the development site are dominated by occasional activity from adjacent premises, as well as localised road traffic within the Witney Park Industrial Estate.

4.2 Results.

4.2.1 Ambient noise levels.

The measured ambient noise levels during the survey during each day and night of the survey period at position L1 are presented in Table 1, along with the arithmetic average for each period of the day. A time history graph of the survey results at position L1 is provided in Appendix B.

Table 1 Unattended measurement results at position L1

Date	Ambient sound pressure levels measured (dB)	
	Day (07:00 - 23:00) L _{Aeq, 16hr}	Night (23:00 - 07:00) L _{Aeq, 8hr}
15/12/2023	59	49
16/12/2023	59	49
17/12/2023	57	49
18/12/2023	58	50
19/12/2023	60	#N/A

Date	Ambient sound pressure levels measured (dB)	
	Day (07:00 - 23:00) L _{Aeq, 16hr}	Night (23:00 - 07:00) L _{Aeq, 8hr}
Representative level	59	49

4.2.2 Typical background noise levels.

In line with BS 4142:2014, for the purpose of analysis and establishing representative background noise levels during the periods of interest, the background noise levels have been quantified using statistical analysis from the continuous logging measurements.

From the analysis carried out, the representative background noise levels measured during the survey are presented to follow, based on the 10th percentile of measured noise levels:

- 41 dB L_{A90,15min} during the daytime (07:00 - 23:00), and
- 32 dB L_{A90,15min} during the night (23:00 - 07:00).

4.2.3 Attended monitoring.

Attended monitoring took place adjacent to the development site.

The measured ambient noise levels adjacent to the nearest dwellings to the development site at Positions A and B are presented in Tables 2 and 3.

Table 2 Unattended measurement results at Position A

Measurement Start Time	dB L _{Aeq,T}	dB L _{AFmax}	dB L _{AF10.0}	dB L _{AF90.0}
26/01/2024 10:00	51.3	65.3	54.2	45.3
26/01/2024 10:15	50.6	64.6	52.7	45.1

Table 3 Unattended measurement results at Position B

Measurement Start Time	dB L _{Aeq,T}	dB L _{AFmax}	dB L _{AF10.0}	dB L _{AF90.0}
26/01/2024 10:45	53.6	65.9	58.1	46.3
26/01/2024 11:00	54.1	64.7	57.4	47.1

Ambient noise levels in the vicinity of the development site are all in the order of 51-54dB L_{Aeq, T}.

5. Noise assessment from proposed works.

5.1 Noise Break-out from the Warehouse Buildings.

Sound transfer to outside from activity within each of the buildings will be determined by the sound reduction provided by the building fabric and by the distance between the building and the receptor.

It is understood that the main building fabric will be constructed from steel frame with an outer cladding. As a worst case, it is assumed that the outer cladding will be composite thermal panels with a minimum manufacturer’s rated sound reduction of R_w 27.

Measurement exercises carried out in several large manufacturing workshops indicate reasonably consistent levels in the range L_{Aeq} 75-77dB with an overall mean level of $L_{Aeq,1hr}$ 76dB and highest maximum levels in the range L_{Amax} 90-95dB. These levels are quite loud and would require shouted conversation for communication between two individuals 1m apart. For warehouse operations, a recent measurement exercise within an existing warehouse facility indicated that, over a one-hour period in an active section of the warehouse, typical sound levels were in the range $L_{Aeq,5-min}$ 50-64dB with an overall mean level of $L_{Aeq, 1-hour}$ 59dB. Short duration maximum levels were in the range L_{Amax} 80-82dB.

The assessment below has been based on the higher manufacturing sound levels. On this basis, the break-out sound level just outside the building, from standard theory, would be approximately L_{Aeq} 45dB.

For positions at a significant distance from the proposed building, there will be additional distance attenuation and an accepted method of determining noise breakout is as follows:

$$spl_{ext} = spl_{int} - TL - 20\log r + 10\log s - 14dB \quad \text{where } r \text{ is the distance and } s \text{ is wall area}$$

The predicted break-out sound levels at the nearest dwellings at a distance of 470 metres and a façade area of 1272m² is 15dB. Assessment of the calculated emission levels at the nearest dwellings in accordance with BS 4142 is shown below

Table 4 BS4142 Assessment of break-out noise impact at nearest dwellings.

Parameter	Deer Park Road	
	Day	Night
spl_{ext}	15	15
Character correction (intermittent)	+3	+3
Rating level at nearest dwelling	18	18
Typical lowest background $L_{A90, T}$	41	32
Difference	-23	-14
BS4142 Assessment- impact	'low impact'	'low impact'

At the nearest dwellings to the east, the assessment indicates a BS 4142 condition of 'low impact' during the day and night.

5.2 HGV Impact.

Based upon the current proposed site layout shown in Appendix 1, dwellings to the east of site will only have a limited view to the service yards of Units 14 to 20.

An assessment of the noise from HGV movements at the dwellings has, therefore, been based upon the following assumptions:

- 1 movement per hour per loading bay during the daytime (9 movements per hour)
- 1 movement per hour per loading bay during the night time (~2no movement per 15-minutes)
- The typical vehicle traverse distance is 140 m which would take approximately 30 seconds at 10mph.
- HGV reversing time of 7 seconds based upon a reversing distance of 16m at a speed of 5mph
- Source noise data from Hoare Lea archived measurements
- Point source attenuation based upon a typical distance of 470 metres
- Barrier screening calculated in accordance with the principles of CRTN.

5.2.1 HGV Movements.

Ambient noise levels for the purposes of assessment in accordance with the principles of BS8233 and BS4142 are derived below.

Table 5 Predicted HGV noise levels at nearest dwellings.

Parameter	Daytime	Night time
Archive HGV noise level ($L_{Aeq,T}$ at 2m)	75	75
On time correction (30 + 7 + 30 seconds)	-17	-11
Specific Noise Level ($L_{Aeq,T}$ dB)	58	64
Movements in assessment period (dB)	10	3
Distance Attenuation (470m)	-47	-47
Barrier screening	-10	-10
Level at Dwelling (L_{Aeq})	10	9

5.2.2 HGV Reversing Alarms

Manufacturer's data indicates that, for tonal alarms, the most common rating level is SWL 96-98 dB.

Table 6 Predicted reversing alarm noise levels at nearest dwellings.

Parameter	Daytime	Night time
SWL (dB)	98	98
Alarm noise level (L_{Aeq} at 1m)	87	87
On time correction (7 seconds)	-27	-21
Specific Noise Level - $L_{Aeq,T}$ dB	60	66
movements per assessment period (dB)	10	3
Distance Attenuation (57m)	-53	-53
Barrier Screening	-10	-10
Level at Dwelling - L_{Aeq}	6	5

5.2.3 BS4142 Assessment.

From the above, the BS 4142 assessment for vehicle movements at the nearest dwellings can be calculated as follows:

Table 7 BS4142 Assessment of vehicle activity at nearest dwellings.

Parameter	Day		Night	
	HGV	Alarm	HGV	Alarm
spl L_{Aeq}	10	6	9	5
correction (intermittent +3, tonal +2)	+3	+5	+3	+5
Rating Level at dwelling - L_{Aeq}	13	11	12	10
Total Rating level	15		14	
Typical lowest background	41		32	
Difference	-26		-18	
BS4142 Assessment	'low impact'		'low impact'	

The calculated rating sound levels from vehicle movements at the nearest residential dwellings to the development site achieve a condition of 'low impact' during both the daytime and night time.

6. BREEAM Assessment.

6.1 Hea 05.

The building envelope is required to provide adequate sound reduction of external noise levels to achieve the internal noise criteria. With respect to the roof, this construction is also required to provide adequate attenuation of rainfall impact noise.

With respect to environmental noise, this primarily is attributable to traffic noise on the surrounding roads with localised activity from the adjacent retail, commercial and industrial units.

From the site measurement data, it may be extrapolated that, in order to achieve the BREEAM internal requirements for offices, based on the highest level of 54 dB $L_{Aeq,T}$, the building fabric would need to provide a composite sound reduction of the order of 19dB(A). In the case of the warehouse and production areas, the measured site noise levels are already below the stipulated maximum BREEAM requirement.

It is understood that the main building fabric will be constructed from an insulated metal panel system. As a worst case, composite thermal panels typically achieve a minimum sound reduction of R_w 27 dB.

This level of reduction will be sufficient to achieve target internal noise levels in the offices and meeting rooms in order to satisfy BREEAM requirements.

Data given in BRE IP 12/89 and BS 8233 indicates that, for road traffic and general urban noise, standard thermal double glazing provides a typical sound reduction of 33dB whilst for rail noise, the typical reduction is 32-36dB. These orders of reduction, in conjunction with the structural façade, would enable the BREEAM internal noise criteria to be achieved.

BS 8233:2014 advises that the sound reduction across an open window is limited to 15dB. On this basis, the BREEAM internal criteria would not be achieved with open windows and alternative means of ventilation to these areas will be appropriate. Background ventilation in accordance with Building Regulations requirements can be achieved with proprietary window or wall mounted trickle vents. All such vents should, when open, should have a minimum rating equivalent to the glazing system and, typically, this may mean a D_{new} rating of 6dB higher than the window glazing system R_w rating. Alternatively, an appropriately attenuated mechanically assisted ventilation system may also be considered.

On the basis of the design criteria scheduled above, the following minimum performance requirements are recommended for the building envelope components:

Element	Minimum Performance Requirement
Masonry Walls (where applicable)	R_w 45 dB
Composite metal panel systems wall – offices	R_w 27 dB
Glazing	R_w 30 dB
Roof – warehouse/production areas	R_w 25 dB
Roof – offices (with insulation from rain noise)	R_w 42 dB

6.2 Pol 05.

BS4142 can be used to derive limit noise levels at the nearest dwelling that would achieve an assessment of 'low impact' and also the requirement of Pol 05.

The following table derives the limit sound levels to be achieved at the nearest dwellings in order to achieve a BS4142 condition of 'low impact'.

Table 8 Maximum permissible sound pressure levels at 1m from the nearest noise sensitive premises

Parameter	Day	Night
Background level L_{A90}	41	32
BREEAM Hea 05 requirement	-5	-5
Noise Rating Level at nearest dwelling*	36	27

*A further correction would be applicable if the plant contains distinguishing features, as per BS4142:2014 guidance.

The derived limit levels for fixed plant are cumulative values to be achieved at the nearest residential property with all plant operating normally. Plant noise can be expected to attenuate with distance.

It will also be necessary also to ensure that any fixed plant does not give rise to intrusive noise within any occupied area of the building. Based upon the requirements for offices and allowance for a reduction of 15 dB across an open window, it is considered that plant noise should not exceed a level of 50dB(A) at any window within the development.

It is noted that, after allowance for distance and screening effects that will occur for the nearest dwelling, the requirement for office windows within the development is significantly more onerous than the Pol 05 requirement. On this basis, attainment of the internal BREEAM requirement for offices would, by default, readily enable compliance with the Pol 05 requirement for plant noise at the nearest dwelling.

6.2.1 Mitigation measures.

At this stage, the design is not sufficiently advanced to specify specific attenuation measures and will need to be assessed in detail as the design progresses; however the above limits are deemed achievable by rooftop mounted plant on the basis of typical mitigation measures such as in-duct attenuation, acoustic screening or enclosures, low noise equipment, acoustic lagging, and acoustically rated louvres.

Specific attenuation measures will depend on the type and location of the plant items, and will be developed as the design progresses to ensure compliance with the limits set in Table 4.

7. Conclusion.

Assessment carried out for this report indicates that the noise climate in the vicinity of the proposed development site is mostly attributable to road traffic noise in the local area. It is considered that this noise will determine background sound levels at existing dwellings nearest to the development site. Additional noise is attributable from the surrounding commercial and industrial sites.

Assessment of activity noise levels in accordance with BS 4142 indicates that noise from the proposed development would achieve a condition of 'low impact' at the nearest existing residential properties at all times and would be unlikely to give rise to noise disturbance.

The measurement data has been used to determine sound reduction requirements for the building envelope to enable the internal requirements of BREEAM 2018 Hea 05 to be achieved.

In accordance with the guidance provided in BS 4142:2014, all plant noise associated with the development shall be controlled to ensure that the overall sound pressure level at 1m from the façade of the nearest noise sensitive premises does not exceed L_{Aeq} 36 dB during the daytime (07:00 to 23:00 hrs) and L_{Aeq} 27 dB during the night (23:00 to 07:00 hrs). Plant noise should also not exceed a level of 50dB(A) at any window within the development. These limit criteria satisfy the requirements of BREEAM 2018 Pol 05.

Appendix A: Survey and equipment details.

Unattended noise measurements were carried out on site between 11:15 on 26 January 2024 and 12:00 on 30 January 2024.

Attended noise measurements at the development site were carried out on site on the morning of Friday 26 January 2024.

The microphone was fitted with a windshield. The meter was calibrated before and after the survey and no significant drift was noted.

Equipment details.

Table A1 summarises the details of the equipment used during the environmental noise survey. All equipment used was within dates of calibration and calibration certificates are available on request.

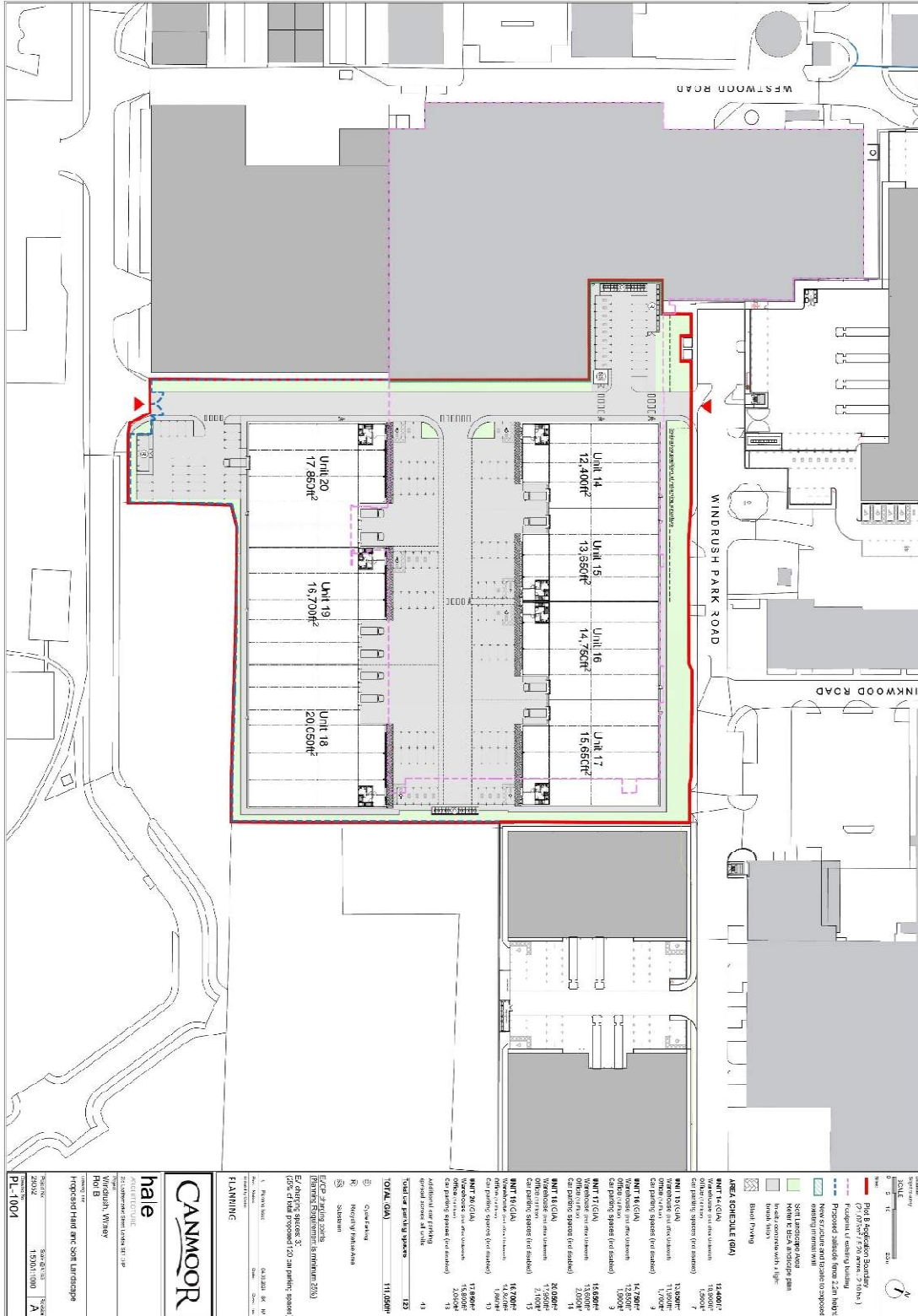
Table A1 Equipment used during environmental noise survey

Description	Serial Number	Calibration Date
Rion - Sound Level Meter: NL-52	632046	18/08/2023
Rion - Microphone: UC-59	18987	
Rion - Pre-amplifier: NH-25	32074	

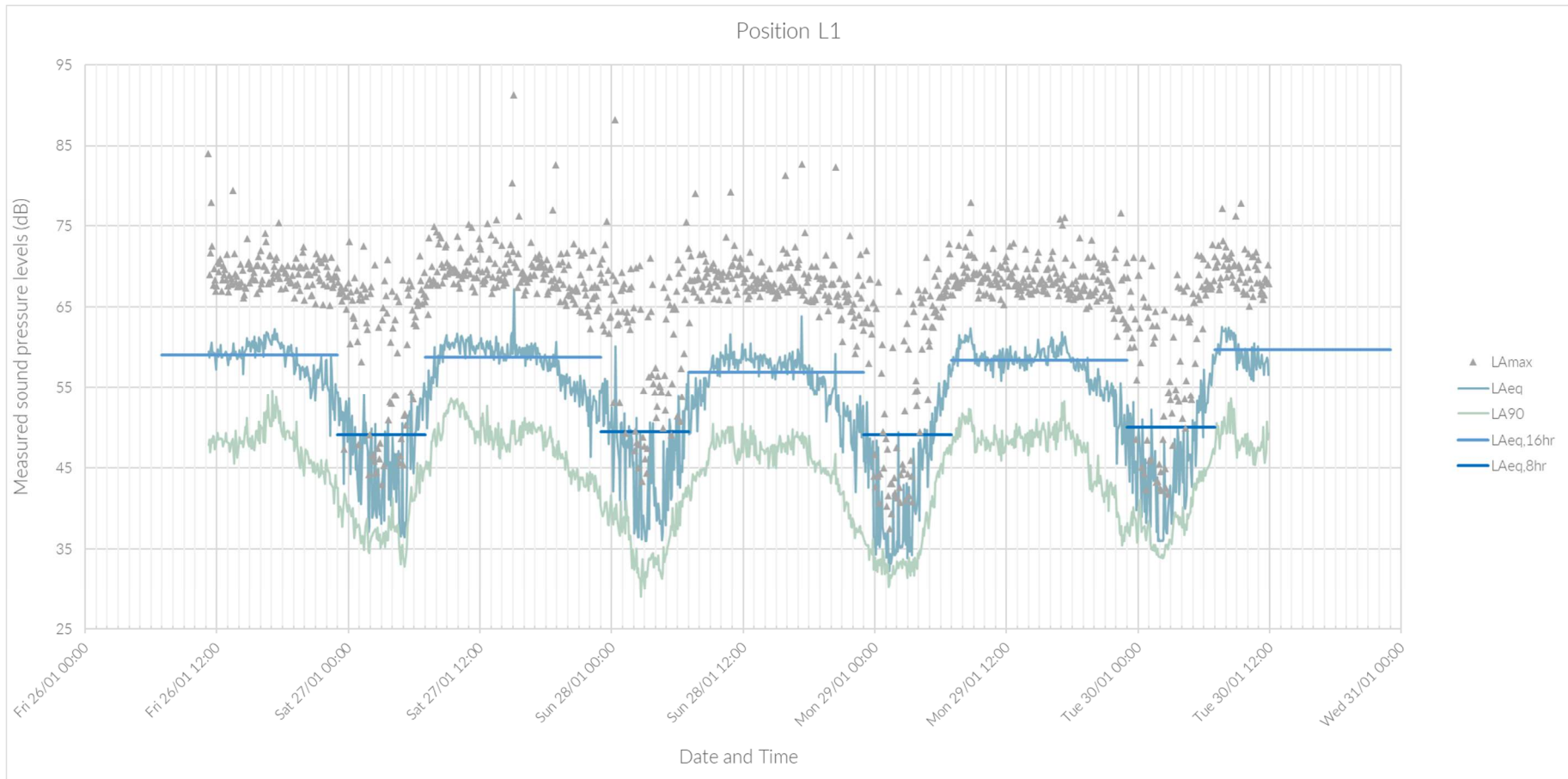
Weather information.

Weather reports for the area indicate that temperatures ranged between -2°C to 12 °C. Weather conditions during the day were noted to be predominantly dry, with wind speeds generally below 5m/s and not expected to have adversely affected measurements during the survey period.

Appendix B: Proposed Site Layout.



Appendix C: Time history of unattended measurements.





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