Air & Acoustic Consultants

Lewdon Holdings Ltd

Heathrow Garden Centre, Sipson Road

Noise Assessment

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CONTENTS

FIGURES:

TABLES:

1 Introduction

1.1 Brief

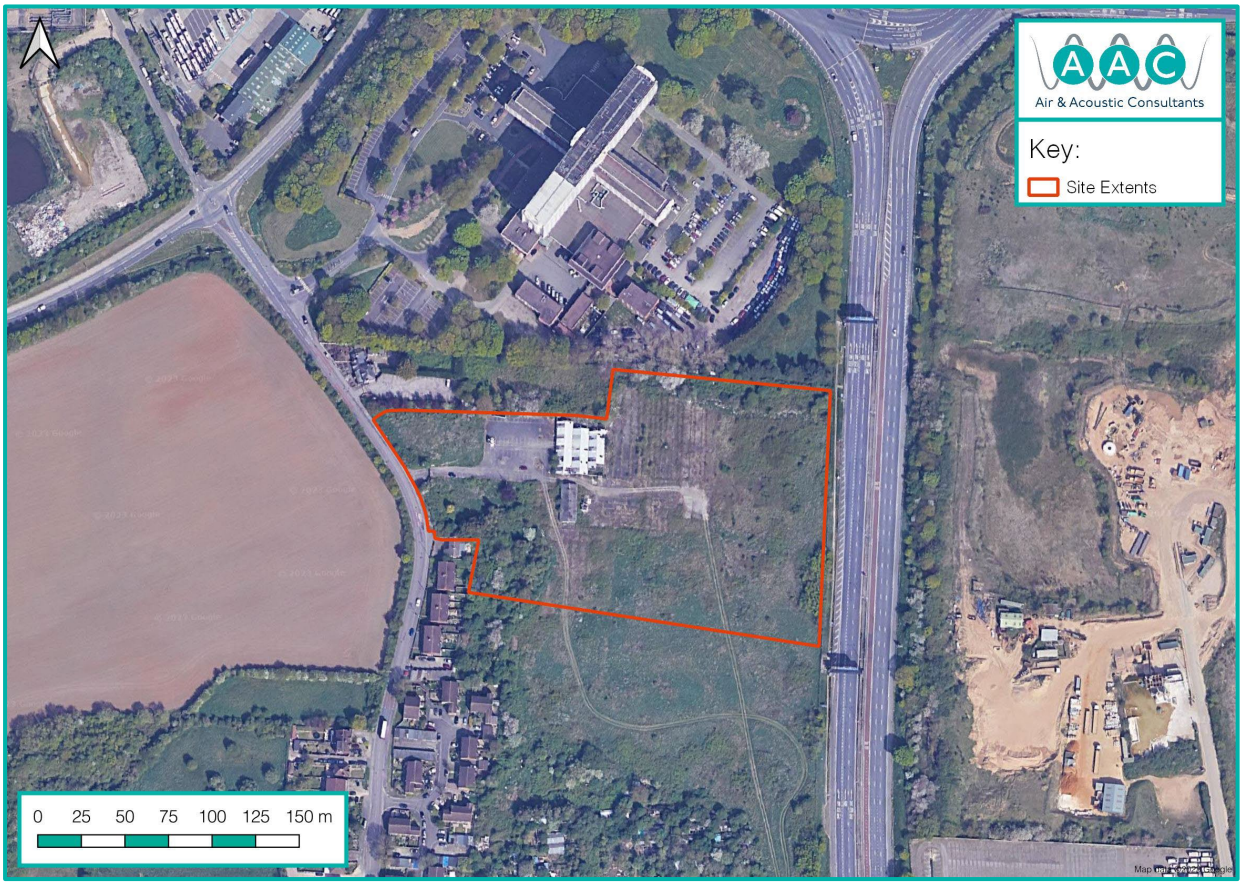
1.1.1 Air & Acoustic Consultants Limited have been commissioned by Lewdon Holdings Ltd to undertake a noise impact assessment in support of a planning application for a proposed commercial development at the Former Sipson Garden Centre, Sipson Road, Sipson.

1.2 Application Site

1.2.1 The application site is a former garden centre, which previously fell under use class E. Planning permission was granted in 2020 under application reference 67666/APP/2019/1245 for the reinstatement of the garden centre with use class A1, however this permission was not acted on. Currently the site is used for the storage of vehicles by AGS Automania Garage Services.

1.2.2 The National Grid Reference for the centre of the site is, TQ 07317 78217 (British National Grid Coordinates E: 507312, N: 178220). The site location and surrounding area are shown in Figure 1.1.

Figure 1.1: Site Location



1.3 Development Proposals

1.3.1 The current application seeks to reestablish the site into a use class B2, two storey office building and use of site for maintenance of airside support vehicles, and additional use for storage of vehicles.

1.3.2 The proposed site layout in within the context of the surrounding area is illustrated in Figure 1.2.

Figure 1.2: Proposed Site Layout

1.4 Assessment Scope

1.4.1 Due to the timing of the planning application, it has not been possible to undertake a full impact assessment; however, a background noise survey has been undertaken. Therefore, this document sets out the proposed methodology for the undertaking of a future Noise Impact Assessment and the existing baseline noise monitoring results. An updated noise assessment will supersede this document during the planning process.

1.4.2 It is noted the proposed development has the potential to cause adverse noise effects from the following sources:

- Vehicle movements in the application site;
- Servicing / general engineering;
- Noise impacts of any increase in traffic on the local road network; and
- Any associated construction works (temporary).

1.4.3 The report is structured as follows:

- Section 2 considers the proposed scheme in relation to the relevant national, regional and local planning policies;
- Section 3 sets out the proposed impact assessment methodology;
- Section 4 details the baseline noise environment at the proposed development site;

- Section 5 considers mitigation measures;
- Section 6 summaries and concludes the assessment.

1.4.4 To assist with the understanding of this report a glossary of acoustic terms is provided in Appendix A.

2 Legislation and Policy Context

2.1 Introduction

2.1.1 The prediction and assessments of the likely noise impacts of the proposed development are to be completed using the relevant legislation policy and guidance concerning noise, which are discussed in turn below.

2.2 National Planning Policy Framework (NPPF)[1]

2.2.1 The NPPF sets out the Government's planning policy for England, to help achieve sustainable development within the planning sector, and that the planning system has three overarching objectives, one of which (Paragraph 8c) is an environmental objective:

> *"To protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy"*

2.2.2 The NPPF addresses noise as a planning issue primarily through the statements in paragraphs 174 and 185. It is also noted that paragraph 187 is also linked to noise through the agent of change principle.

2.2.3 Paragraph 174 states:

> *'Planning policies and decisions should contribute to and enhance the natural and local environment by:'*
>
> *'e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.'*

2.2.4 Paragraph 185 states:

> *'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:*
>
> a) *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;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational amenity value for this reason;'.*

2.2.5 Paragraph 187 states:

> *'"Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or*

[1] Department for Levelling Up, Housing & Communities. 2023. *National Planning Policy Framework.*

'agent of change') should be required to provide suitable mitigation before the development has been completed."

2.2.6 The NPPF refers to the Noise Policy Statement for England (NPSE) for advice on the achievement of these policy aims, and particularly in connection with the explanation of 'adverse impacts'.

2.3 Noise Policy Statement for England (NPSE)[2]

2.3.1 The NPSE is the overarching government policy on noise. It seeks to clarify the underlying principles and aims in past and existing policy documents, legislation, and guidance in relation to all forms of noise including environmental noise, neighbour noise, and neighbourhood noise (but not noise in the workplace).

2.3.2 It uses the established concepts of No Observed Effect Level, (NOEL) and Lowest Observed Adverse Effect Level, (LOAEL). The NPSE extends these by introducing Significant Observed Adverse Effect Level, (SOAEL). This is the level above which significant adverse effects on health and quality of life occur. However, the explanatory note to the NPSE states that it is not possible to identify a single objective value to define SOAEL for noise that is applicable to all sources of noise in all situations. It is likely to be different for different noise sources, for different receptors and at different times.

2.3.3 The NPSE's vision is to:

'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

This long-term vision is supported by the following aims:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life, through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.'*

2.3.4 The second aim of the NPSE refers to noise impacts that lie somewhere between LOAEL and SOAEL. The NPSE asserts that, while this means that all reasonable steps should be taken to mitigate and minimise adverse effects, this does not mean that such adverse effects cannot occur.

2.4 Planning Practice Guidance (Noise)[3]

2.4.1 The Government has published Planning Practice Guidance on a range of subjects including noise. The guidance forms part of the NPPF and provides advice on how to deliver its policies. The Planning Practise Guidance (PPG) (Noise) reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards and contains examples of acoustic environments commensurate with various effect levels.

2.4.2 Paragraph 006 of (Reference ID: 30-006-20190722) of the PPG (Noise) explains that:

[2] Department for Environment, Food and Rural Affairs. 2010. *Noise Policy Statement for England.*

[3] Department for Levelling Up, Housing and Communities and Ministry of Housing Communities and Local Government. 2019. *Planning Practice Guidance Noise.*

'The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.'

2.4.3 The guidance contained within the PPG (Noise) provides advice on how to deliver the policies of the NPPF. The PPG (Noise) reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards and contains examples of acoustic environments commensurate with various effect levels. Paragraph: 004 Reference ID: 30-004-20190722 of the PPG (Noise) describes the different effect levels which are defined and briefly outlined below:

- No Observable Effect Level (NOEL);
- Lowest Observable Adverse Effect Level (LOAEL); and
- Significant Observed Adverse Effect Level (SOAEL).

2.4.4 The PPG (Noise) describes noise that is not noticeable to be at levels below the NOEL. Noise exposures in this range are below the LOAEL and no mitigation is required. The PPG (Noise) suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPG (Noise) are having to turn up the volume on the television; needing to speak more loudly to be heard; or, where there is no alternative ventilation, closing windows for some of the time because of the noise. In line with the NPPF and NPSE, the PPG (Noise) states that consideration needs to be given to mitigating and minimising effects above the LOAEL, but also to take account of the economic and social benefits being derived from the activity causing the noise. The PPG (Noise) suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPG (Noise) are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. In line with the NPPF and NPSE, the PPG (Noise) states that effects above the SOAEL should be avoided and that whilst the economic and social benefits derived from the activity causing the noise must be taken into account, such exposures are undesirable.

2.4.5 The non-numeric guidance contained within the PPG (Noise), based upon the starting point in the NPSE, is summarised in Table 2.1 below.

Table 2.1: Summary of Guidance from NPSE and PPG (Noise)

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Adverse Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			

Perception	Examples of Outcomes	Increasing Effect Level	Action
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and / or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and / or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
`Noticeable and very disruptive	Extensive and regular changes in behaviour and / or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation / awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.4.6 In line with the NPPF and the NPSE, the guidance confirms that significant adverse effects should be avoided. At the next level down in the hierarchy, where there is an observed adverse effect, the PPG (Noise) confirms that effects should be mitigated and reduced to a minimum (as far as reasonably practicable). No mitigation measures are required for effects that are considered to be below the lowest observed adverse effect level (LOAEL).

2.4.7 However, along with the NPSE it does not provide any numerical definition of the NOEL, LOAEL and SOAEL.

2.4.8 The NPSE refers to the World Health Organisation (WHO) when discussing noise impacts. The WHO Guidelines for Community Noise, (1999) suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set based on the lowest effect levels for the general population. Guideline values for amenity which relate to external noise exposure are set at 50 or 55 dB(A), representing daytime levels below which most of the adult population will be protected from becoming moderately or seriously annoyed respectively.

2.5 The Control of Pollution Act[4]

2.5.1 The Control of Pollution Act (1974) gives local authorities powers in relation to noise from construction sites including to serve a notice, (under Section 60) specifying exactly how works should be carried out.

2.5.2 An application for prior consent for the work can be completed under Section 61 of the Act providing a collaborative approach to the development.

2.5.3 A Section 61 application demonstrates to the local authority a pro-active approach to reducing environmental impacts, outlining what methods are in place to minimise disruption to the neighbourhood,

[4] UK Public General Acts. 1974. *Control of Pollution Act*

thus reducing the number of potentials complaints. By having Section 61 consent, a local authority may not issue a Section 60 notice if the terms of the Section 61 agreement are not breached. Having a Section 61 consent in place minimises the likelihood of the contractor's work being stopped, as a mitigation plan is already in place.

2.6 Regional Planning Policy

The London Plan[5]

2.6.1 The spatial development strategy for the Greater London Authority is known as the London Plan, it sets out an integrated economic, environmental, transport and social framework for the development of London.

2.6.2 It contains the following policies specifically relating to noise.

2.6.3 Policy D13 *Agent of Change* states:

> *"A The Agent of Change principle places the responsibility for mitigating impacts from existing noise and other nuisance-generating activities or uses on the proposed new noise-sensitive development. Boroughs should ensure that Development Plans and planning decisions reflect the Agent of Change principle and take account of existing noise and other nuisance-generating uses in a sensitive manner when new development is proposed nearby.*
>
> *B Development should be designed to ensure that established noise and other nuisance-generating uses remain viable and can continue or grow without unreasonable restrictions being placed on them.*
>
> *C New noise and other nuisance-generating development proposed close to residential and other noise-sensitive uses should put in place measures to mitigate and manage any noise impacts for neighbouring residents and businesses.*
>
> *D Development proposals should manage noise and other potential nuisances by:*
>
> > *1) ensuring good design mitigates and minimises existing and potential nuisances generated by existing uses and activities located in the area*
> >
> > *2) exploring mitigation measures early in the design stage, with necessary and appropriate provisions including ongoing and future management of mitigation measures secured through planning obligations*
> >
> > *3) separating new noise-sensitive development where possible from existing noise-generating businesses and uses through distance, screening, internal layout, sound-proofing, insulation and other acoustic design measures.*
>
> *E Boroughs should not normally permit development proposals that have not clearly demonstrated how noise and other nuisances will be mitigated and managed."*

2.6.4 Policy D14 *Noise* states:

> *"A In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:*
>
> > *1) avoiding significant adverse noise impacts on health and quality of life*

[5] Greater London Authority .*The London Plan. The Spatial Development Strategy for Greater London.* 2021.

2) reflecting the Agent of Change principle as set out in Policy D13 Agent of Change

3) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses

4) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)

5) separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation

6) where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles

7) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.

B Boroughs, and others with relevant responsibilities, should identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations."

2.7 Local Planning Policy

Hillingdon Local Plan[6]

2.7.1 The London Borough of Hillingdon Local Plan was adopted in November 2012. The following policy has been considered as part of this noise assessment.

2.7.2 Policy *EM8: Land, Water, Air and Noise* states:

"[…]

The Council will investigate Hillingdon's target areas identified in the Defra Noise Action Plans, promote the maximum possible reduction in noise levels and will minimise the number of people potentially affected. The Council will seek to identify and protect Quiet Areas in accordance with Government Policy on sustainable development and other Local Plan policies. The Council will seek to ensure that noise sensitive development and noise generating development are only permitted if noise impacts can be adequately controlled and mitigated.

[…]"

[6] The London Borough of Hillingdon. 2012. *Local Plan: Part 1 - Strategic Policies*.

3 Assessment Approach

3.1 Construction Impacts

BS5228-1:2014 Code of Practise for Noise and Vibration Control on Construction and Open Sites. Part 1:Noise[7]

3.1.1 The activities associated with the construction phase of the proposed development has the potential to generate noise which may have an adverse impact on the surrounding area.

3.1.2 Guidance on the prediction and assessment of noise from development sites is given in British Standard BS 5228 -1:2009 + A1:2014 (BS 5228-1).

3.1.3 Construction noise can have disturbing effects on the surrounding neighbourhood. The effects are varied and are complicated further by the nature of the site works, which will be characterised by varied noise sources which will change location throughout the construction works. The duration of site operations is also an important consideration. Higher noise levels may be acceptable if it is known that the levels will only occur for a limited period.

3.1.4 BS:5228-1 provides guidance on significance criteria for assessing the potential noise impacts associated with the construction phase of projects. There are two methods specified; the ABC method and the 5 dB(A) change method.

3.1.5 The ABC method involves categorising receptors using the ambient sound level they experience, using the method and categories outlined in Table 3.1.

Table 3.1: BS 5228-1 ABC Method

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23:00-07:00)	45	50	55
Evenings and weekends	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75
Notes: 1) A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level 2) If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise. 3) Applied to residential receptors only			
[A] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. [B] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. [C] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. [D] 19:00-23:00 weekdays, 12:00-23:00 Saturdays and 07:00-23:00 Sundays			

[7] BSI. *BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites. Part 1: Noise.*

3.1.6 The 5 dB(A) change method assesses the change in noise levels as a result of the construction works. It states;

> *"Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,T}$ from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.*
>
> *These evaluative criteria are generally applicable to the following resources:*
>
> *residential buildings;*
>
> *hotels and hostels;*
>
> *buildings in religious use;*
>
> *buildings in educational use;*
>
> *buildings in health and/or community use.*
>
> *For public open space, the impact might be deemed to cause significant effects if the total noise exceeds the ambient noise ($L_{Aeq,T}$) by 5 dB or more for a period of one month or more. However, the extent of the area impacted relative to the total available area also needs to be taken into account in determining whether the impact causes a significant effect."*

3.2 Operational Impacts

BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound[8]

3.2.1 BS 4142:2014+A1:2019 is used to rate and assess sound of an industrial and/or commercial nature including:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and;
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

3.2.2 The purpose of the BS 4142:2014+A1:2019 assessment procedure is to assess the significance of sound of an industrial and/or commercial nature.

3.2.3 BS 4142:2014+A1:2019 refers to noise from the industrial source as the 'specific noise' and this is the term used in this report to refer to noise which is predicted to occur due to activities associated with the proposed commercial/industrial uses.

3.2.4 BS 4142:2014+A1:2019 assesses the significance of impacts by comparing the specific noise level to the background noise level (L_{A90}).

[8]BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

3.2.5 Certain acoustic features can increase the significance of impacts over that expected from a simple comparison between the specific noise level and the background noise level. BS 4142:2014+A1:2019 identifies that the absolute level of sound, the character, and the residual sound and the sensitivity of receptor should all be taken into consideration. BS 4142:2014+A1:2019 includes allowances for a rating penalty to be added if it is found that the specific noise source contains a tone, impulse and/or other characteristics. The specific noise level along with any applicable correction is referred to as the 'rating level'.

3.2.6 The greater the increase between the rating level over the background noise level, the greater the magnitude of the impact. The assessment criteria given by BS 4142:2014+A1:2019 are as follows:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
- The lower the rating level is, relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.2.7 During the daytime, BS 4142:2014+A1:2019 requires that noise levels be assessed over 1-hour periods. However, during the night-time, noise levels are required to be assessed over 15-minute periods.

3.2.8 Where the initial estimate of the impact needs to be modified due to context, BS 4142:2014+A1:2019 states that all pertinent factors should be taken into consideration, including:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or external acoustic conditions.

3.2.1 BS4142:2014+A1:2019 acknowledges context when considering the impacts of new noise sources. In this situation the proposed development will be situated close to the active rail lines, where hundreds of trains pass each day. The noise from the railway is impulsive and affects the surrounding residential dwellings, which are likely to have existing measures to reduce external noise break-in, thereby reducing their sensitivity to noise from new sources.

World Health Organisation Guidelines for Community Noise[9]

3.2.2 The World Health Organisation's Guidelines for Community Noise has been considered regarding the potential impact from any maximum short-term noise levels.

3.2.3 The WHO Guidelines indicate that sound pressure levels at the outside façades of living spaces should not exceed 60 dB L_{AFmax} so that people may sleep within bedrooms with windows open. These values assume the noise reduction with a window partially open is 15 dB, resulting in an internal noise level of 45 dB L_{AFmax}. The guidelines state that for good sleep, indoor sound pressure levels should not exceed

[9] World Health Organisation. 1999. *Guidelines for Community Noise*

approximately 45 dB L_{AFmax} more than 10 – 15 times per night. It is generally accepted that 60 dB L_{AFmax} at the façade represents a LOAEL.

3.3 Uncertainty and Limitations

3.3.1 Regarding the noise survey measurements, the baseline survey was conducted over an eight-day period to obtain a representative sample of the baseline noise environment. Baseline surveys conducted over a number of days reduce the uncertainty of the resulting measured noise levels.

3.3.2 The calibration drift on the meters was very small; less than 0.1 dB for all measurements. All equipment was within laboratory calibration in accordance with the relevant standards (calibrators every year and sound level meters every 2 years).

4 Baseline Conditions

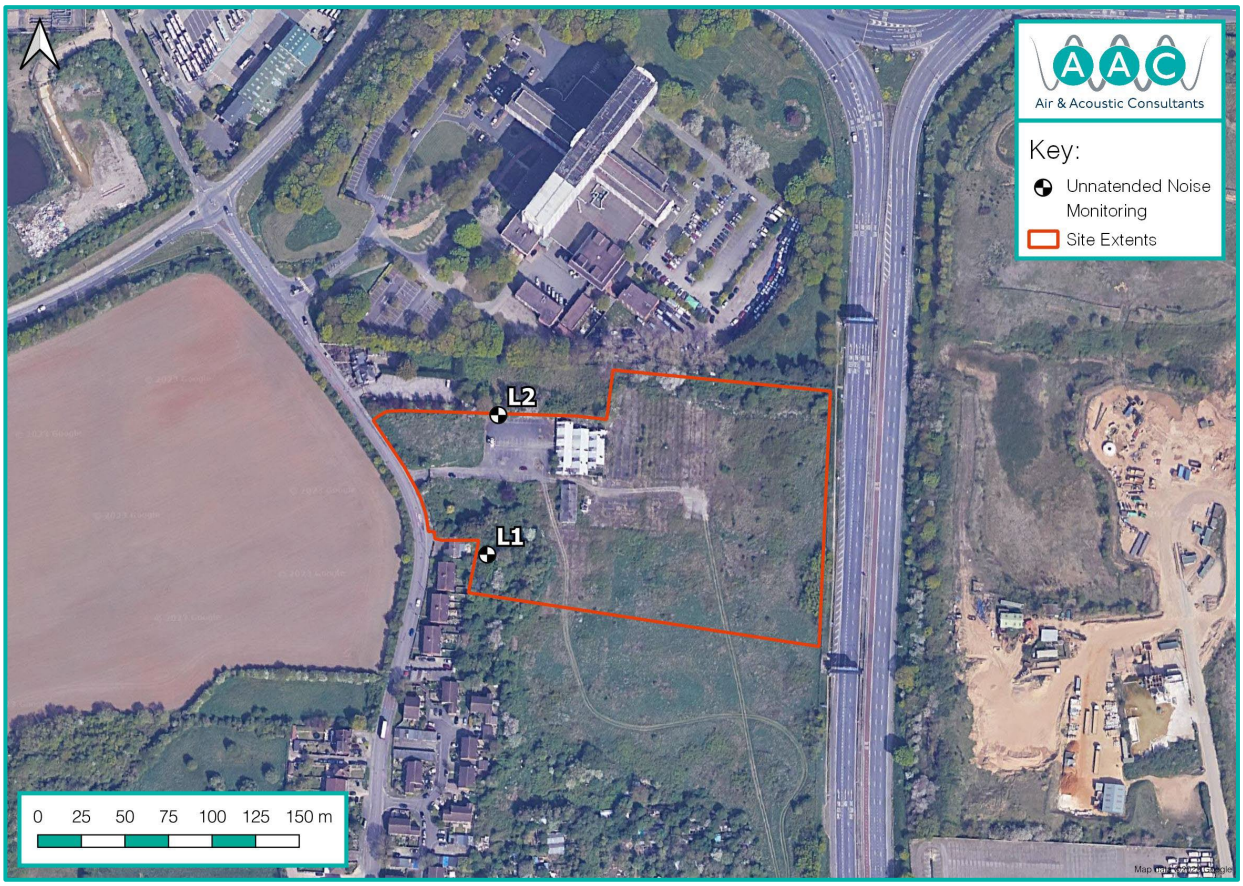
4.1 Noise Monitoring

4.1.1 A long-term unattended baseline noise survey was undertaken between Thursday 23rd November and Thursday 30th November 2023. The survey consisted of two long-term monitoring positions at the locations illustrated in Figure 4.1 and detailed below:

- L1 – southern part of the site – unattended long-term; and
- L2 – north-western part of the site – unattended long-term.

4.1.2 L1 was placed close to the gardens of the residential dwellings on Sipson Road because they are the closest noise sensitive receptors to the south of the site. L2 was placed to the north of the site, close to the public house; The Plough. Additionally, L2 was in proximity to the Holiday Inn Heathrow.

Figure 4.1: Noise Monitoring Locations



4.1.3 All measurements were taken using a class 1 sound level meters. The microphones' measurement positions were in the acoustic free field and were mounted on a pole at 1.5 metres above the ground. Calibration checks were performed at the start and end of the survey; no significant drift in calibration was observed. The details of the monitoring equipment used is set out in Table 4.1.

Table 4.1: Noise Monitoring Equipment

Equipment Type	Manufacturer	Model	Serial Number	Calibration Due
Sound Level Meter	Larson Davis	Model LxT1	4473	01/2025
Pre-Amplifier		PRMLxT1	36007	
Microphone		377BO2	153565	
Sound Level Meter	Larson Davis	Model LxT1	5817	01/2025
Pre-Amplifier		PRMLxT1	55725	
Microphone		377BO2	310663	
Calibrator	Larson Davis	Cal 200	19869	02/2024

4.1.4 The weather conditions during the survey were influenced by generally southerly winds and the average temperatures were between 12 °C and 18 °C. There was precipitation recorded on four days during the monitoring period and average wind speeds were less than 5 m/s for the entire survey.

4.1.5 The information provided in Table 4.2, uses data from Weather Underground. The weather station is located on St Mary's Avenue (Station ID: ICOALV22).

Table 4.2: Summary of Weather Conditions

Date	Temp (°C)	Wind Speed (m/s)		Wind Direction	Total Precipitation (mm)
		Average	Peak		
23/11/2023	11.6	0.8	2.7	NW	0.40
24/11/2023	7.2	1.5	4.5	NW	0.00
25/11/2023	1.8	0.3	2.7	NW	0.00
26/11/2023	3.2	0.1	0.9	NNW	5.00
27/11/2023	7.6	1.1	3.1	NW	5.40
28/11/2023	4.8	0.4	2.2	NW	0.00
29/11/2023	2.8	0.2	1.8	NNW	0.00

4.1.6 Windy or rainy conditions may affect the measured sound levels, increasing them above what is normally created by the existing noise sources. Periods with wind speeds greater than 5 m/s or rainfall rates greater than 0.5 mm/h have been excluded from the final results. Table 4.3 shows the periods of time excluded from the noise monitoring.

Table 4.3: Periods of Unsuitable Noise Monitoring Data

Date and Time Start	Date and Time End	Reason for Removal
23/11/2023 12:40	23/11/2023 12:50	Heavy Rainfall
26/11/2023 18:35	26/08/2023 20:15	Heavy Rainfall
26/11/2023 21:20	26/11/2023 22:20	Heavy Rainfall
27/11/2023 03:30	27/11/2023 05:25	Heavy Rainfall
27/11/2023 12:35	27/11/2023 13:20	Heavy Rainfall

4.2 Unattended Noise Survey Results

4.2.1 A summary of the long-term monitored noise levels is presented in Table 4.4, for L1 in the south of the site, as illustrated in Figure 4.1. The data is presented as average levels for the daytime and night-time periods calculated from 15-minute sound indices.

Table 4.4: Noise Monitoring Results – L1, South, Unattended Long-Term

Date	Period	Average Monitored Sound Level (dBA)		
		LAeq	L_{AFmax}**	L_{A90}**
23/11/2023	Day 07:00 - 23:00	56.0	69.2	54.1
	Night 23:00 - 07:00	53.8	61.7	51.8
24/11/2023	Day 07:00 - 23:00	57.7	69.8	56.0
	Night 23:00 - 07:00	51.8	63.8	49.7
25/11/2023	Day 07:00 - 23:00	55.1	70.7	53.5
	Night 23:00 - 07:00	53.2	64.8	50.5
26/11/2023	Day 07:00 - 23:00	59.9	75.2	56.2
	Night 23:00 - 07:00	52.4	64.4	50.7
27/11/2023	Day 07:00 - 23:00	58.9	70.0	57.3
	Night 23:00 - 07:00	54.7	62.5	52.9
28/11/2023	Day 07:00 - 23:00	55.8	67.1	54.3
	Night 23:00 - 07:00	52.2	62.9	50.2
29/11/2023	Day 07:00 - 23:00	56.3	66.8	54.6
	Night 23:00 - 07:00	56.4	63.3	55.0
30/11/2023	Day 07:00 - 23:00	58.4	66.5	57.0
	Night 23:00 - 07:00	-	-	-
Overall	Day 07:00 - 23:00	57.5	70.7	55.5
	Night 23:00 - 07:00	53.8	63.5	51.9

*Based on partial data.
**Logarithmic averages not used in any assessment that requires maximum sound levels or background sound levels.

4.2.2 A summary of the long-term monitored noise levels is presented in Table 4.5, for L2 in the north of the site, as illustrated in Figure 4.1. The data is presented as average levels for the daytime and night-time periods calculated from 15-minute sound indices.

Table 4.5: Noise Monitoring Results – L2, North, Unattended Long-Term

Date	Period	Average Monitored Sound Level (dBA)		
		LAeq	L_{AFmax}**	L_{A90}**
23/11/2023	Day 07:00 - 23:00	60.2	71.1	58.4
	Night 23:00 - 07:00	56.9	67.2	54.7
24/11/2023	Day 07:00 - 23:00	60.4	75.6	58.4

Date	Period	Average Monitored Sound Level (dBA)		
		LAeq	L_{AFmax}**	L_{A90}**
	Night 23:00 - 07:00	54.5	65.2	52.2
25/11/2023	Day 07:00 - 23:00	58.3	73.5	56.4
	Night 23:00 - 07:00	54.8	67.0	52.4
26/11/2023	Day 07:00 - 23:00	60.8	75.1	57.3
	Night 23:00 - 07:00	56.4	67.9	54.6
27/11/2023	Day 07:00 - 23:00	61.5	71.4	59.8
	Night 23:00 - 07:00	55.6	65.1	53.5
28/11/2023	Day 07:00 - 23:00	58.8	71.8	57.0
	Night 23:00 - 07:00	54.0	66.6	52.1
29/11/2023	Day 07:00 - 23:00	56.7	72.4	54.4
	Night 23:00 - 07:00	54.5	63.6	52.9
30/11/2023	Day 07:00 - 23:00	57.9	71.2	55.9
	Night 23:00 - 07:00	-	-	-
Overall	**Day 07:00 - 23:00**	**59.7**	**73.3**	**57.5**
	Night 23:00 - 07:00	**55.4**	**66.3**	**53.3**

*Based on partial data.
**Logarithmic averages not used in any assessment that requires maximum sound levels or background sound levels.

4.2.3 During the site visits to install the monitoring equipment it was noted that the dominant noise source was traffic on the M4 motorway. There was additional on-site noise from the construction of a new building.

4.3 Background Sound Levels

4.3.1 As part of an assessment of industrial or commercial sound, following the guidance of BS 4142:2014+A1:2019, a representative background sound level must be determined. Typically, the modal $L_{A90,15min}$ value from the relevant time period is used.

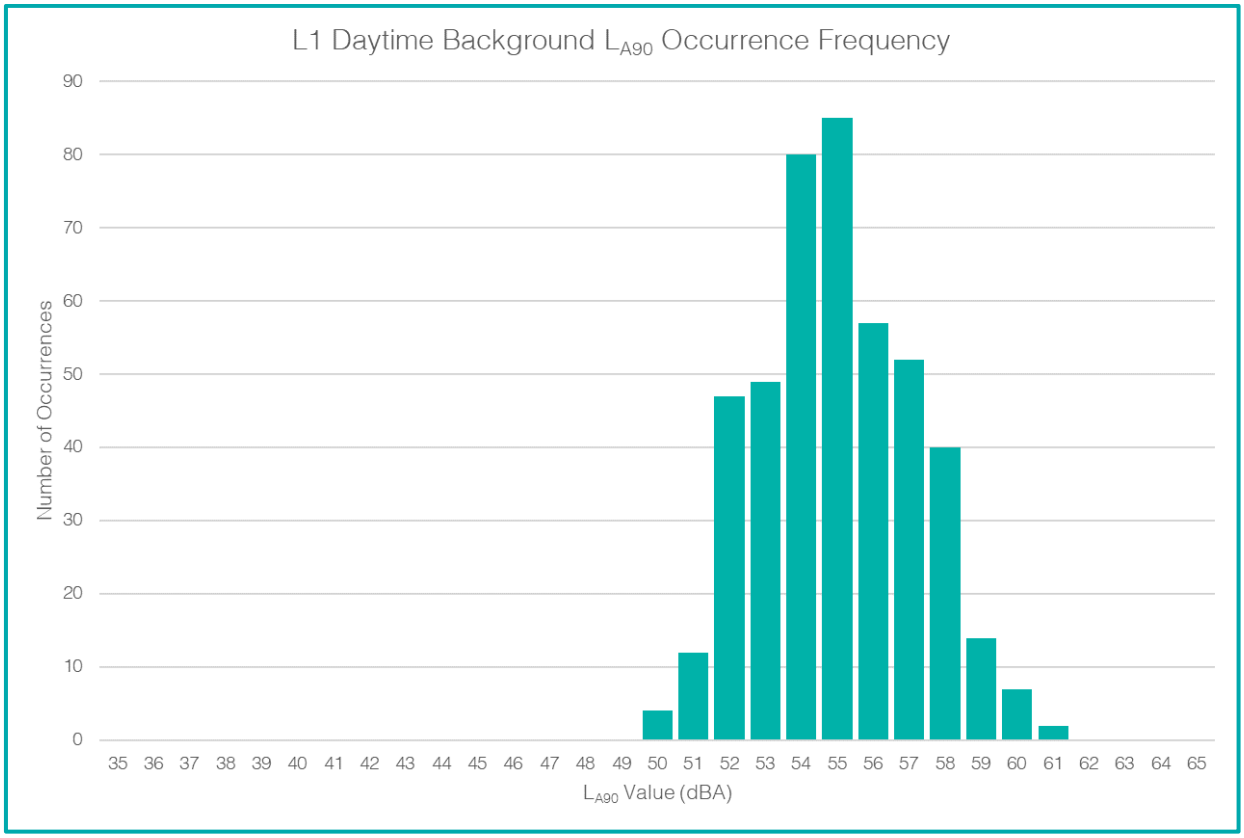
4.3.2 The modal $L_{A90,15min}$ has been identified for both monitoring locations during the proposed operational hours, which are:

- Daytime 07:00-23:00;
- Weekday daytime 23:00-07:00.

4.3.3 The levels identified are considered to be the representative background sound levels for each relevant period.

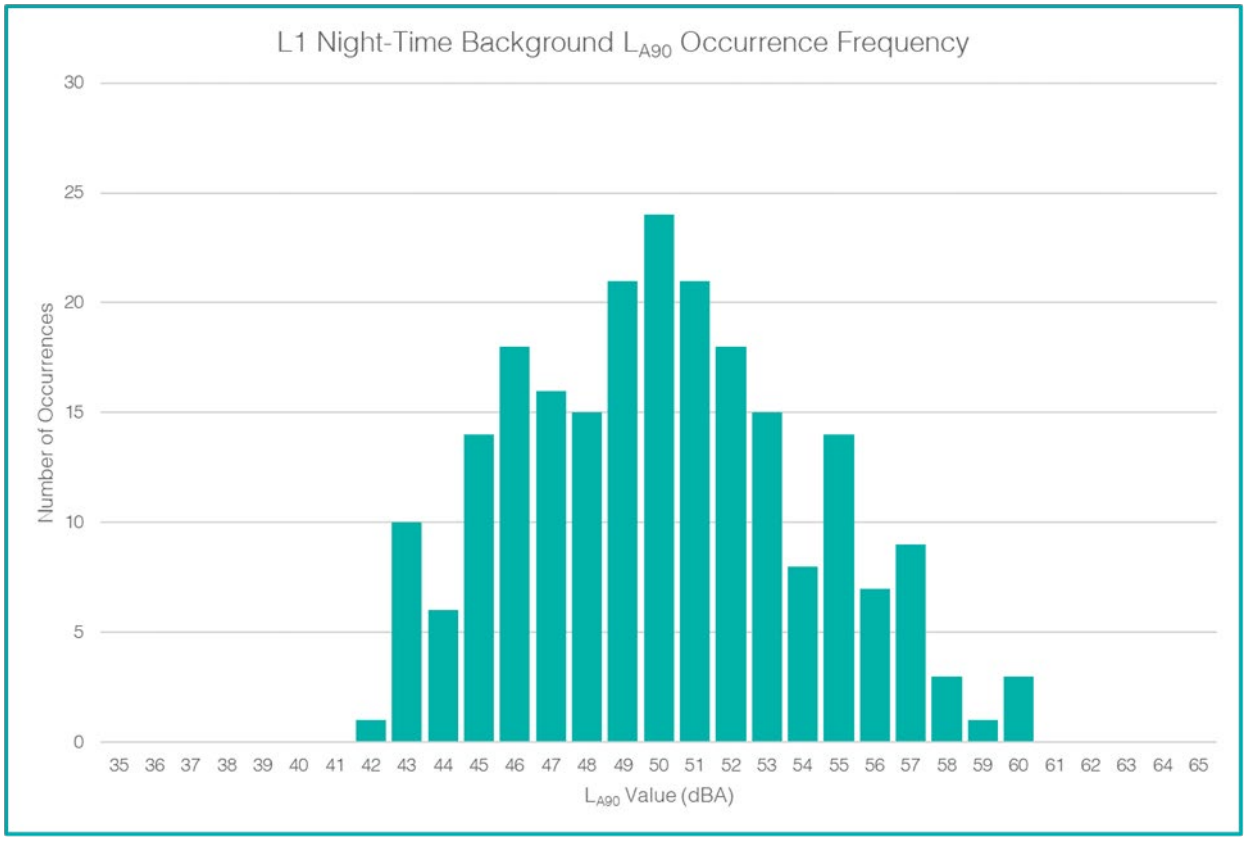
4.3.4 The distribution of measured $L_{A90,15min}$ sound levels are set out below.

Figure 4.2: Occurrence Frequency of $L_{A90,15min}$ during Daytime 23rd to 30th November 2023.



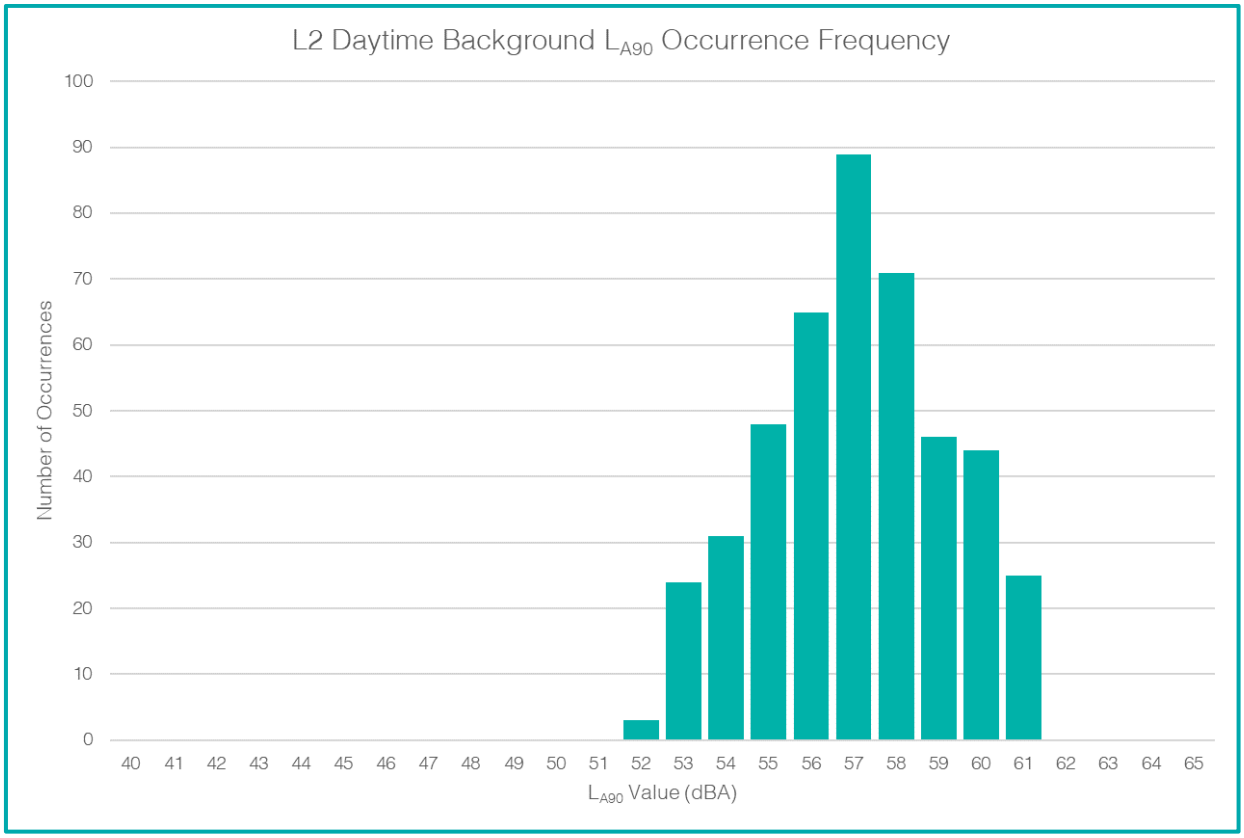
4.3.5 Figure 4.2 shows that the most commonly occurring $L_{A90,15min}$ is 55 dB(A) which is at the centre of the peak of data and is more common than all other sound levels recorded.

Figure 4.3: Occurrence Frequency of $L_{A90,15min}$ during Night-time 23rd to 30th November 2023



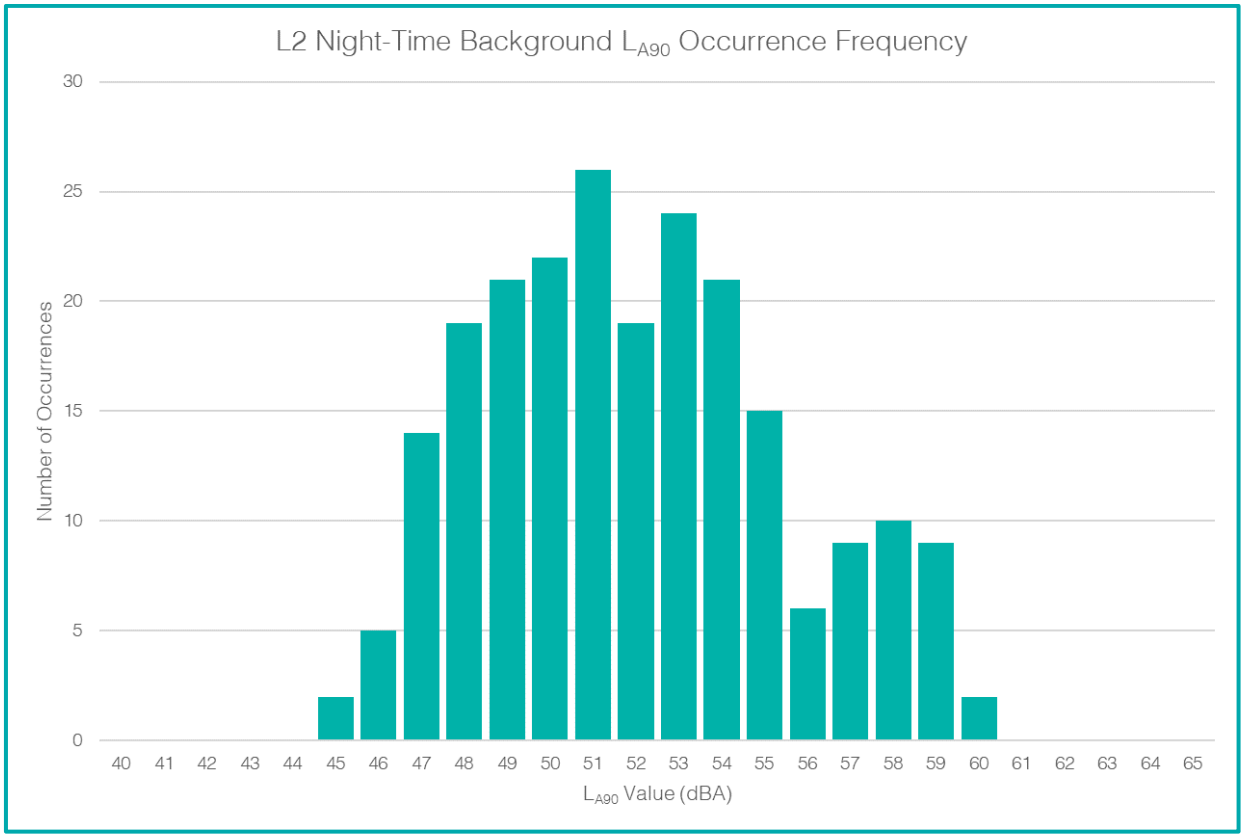
4.3.6 Figure 4.3 shows that the most commonly occurring $L_{A90,15min}$ is 50 dB(A) which is at the centre of the peak of data and is more common than all other sound levels recorded.

Figure 4.4: Occurrence Frequency of $L_{A90,15min}$ during Daytime 23rd to 30th November 2023



4.3.7 Figure 4.4 shows that the most commonly occurring $L_{A90,15min}$ is 57 dB(A) which is at the centre of the peak of data and is more common than all other sound levels recorded.

Figure 4.5: Occurrence Frequency of $L_{A90,15min}$ during Night-time 23rd to 30th November 2023



4.3.8 Figure 4.5 shows that the most commonly occurring $L_{A90,15min}$ is 51 dB(A). This data set is not as distinctive as the previous results. You can identify an unexpected drop in 52 dBA category, and there seems to be a separate cluster of L_{A90} data centring on 58dBA.

5 Mitigation Measures

5.1.1 Should the assessment determine that that there is a potential for adverse impacts then there are several mitigation options available to reduce the noise at source and or to mitigate the source receptor pathway to ensure that the noise levels at the noise sensitive receptor locations does not exceed that British Standard criteria levels.

6 Summary & Conclusions

6.1.1 This Noise Assessment sets out the noise framework and approach that is being undertaken to assess the impacts of the proposed development.

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Appendices

APPENDIX A – DEFINITION OF TERMS

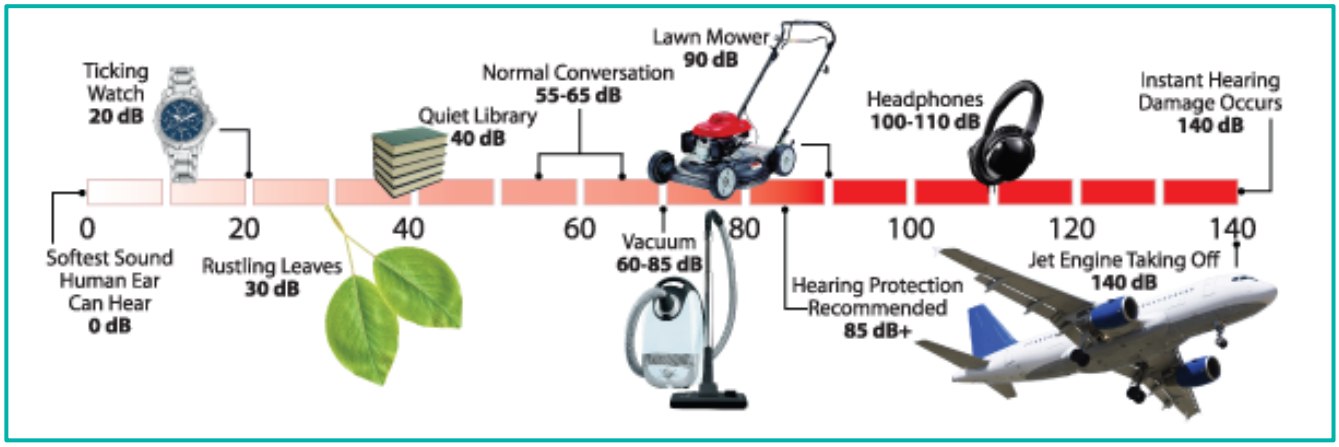
Sound Pressure - Sound, or sound pressure, is a fluctuation in air pressure over static ambient pressure.

Sound Pressure Level - The sound level is the sound pressure relative to a standard reference pressure of 20 µPa ($2x10^{-5}$ Pascals) on a decibel scale.

Decibels dB - Noise is commonly defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

The decibel scale is logarithmic and therefore when two noise sources are present together, they must be combined logarithmically, therefore, when two sound sources of the same sound pressure level are combined the resultant level is 3 dB(A) higher than the single source. However, in subjective terms, the ear can distinguish a difference in 'loudness' between two simple noise sources when there is a 3 dB(A) difference between them. For simple sources, when two sounds differ by 10 dB(A) one is said to be twice as loud as the other.

Figure A.1: Examples of Typical Noise Levels



Noise Level Indices - Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so several different noise indices have been defined, according to how the averaging or statistics are carried out.

'A-Weighted Decibels dB(A) - The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high-frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise-measuring instrument. The weighting which is most used, and which correlates best with the subjective response to noise, including that of music, is the dB(A) weighting. This electronic filter matches the variation in the frequency sensitivity of the meter to that of the human ear. This is an internationally accepted standard for noise measurements.

Table A.1: Other Standard Noise Units:

Symbol	Name	Definition
$L_{Aeq,T}$	Equivalent Continuous Sound Level	The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. The LAeq provides a single value to express the average sound energy over the measurement period and is the most widely used indicator for environmental noise.
$L_{Amax,T}$	maximum 'A' weighted noise level	This is the maximum 'A' weighted noise level recorded during the measurement period, (T).
$L_{A90,T}$	the 'A' weighted noise level	This is the 'A' weighted noise level exceeded for 90% of the measurement period (T). This is normally used to describe the background noise.

Symbol	Name	Definition
$L_{A10,T}$	the A-weighted noise level exceeded for 10% of time	This is the 'A' weighted noise level exceeded for just 10 % of the measurement period, (T). This is normally used to describe traffic noise.
$L_{A90,T}$	the A-weighted noise level exceeded for 90% of the time	A noise level index. The noise level exceeded for 90% of the time over the period T. L90, can be considered to be the "average minimum" noise level and is often used to describe the background noise.
L_S	Specific noise level.	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.
$L_{Ar,Tr}$	Rating noise level	The specific noise level plus any adjustments for characteristic features of the noise.
$D_{n,c,w}$	Laboratory Insulation Rating	A single-number rating of the laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it.
$D_{nf,w}$	Weighted normalised flanking level difference	A single-number that quantifies the in-situ airborne sound insulation between rooms, when the transmission only occurs through a specified flanking path.
$D_{nT,w}$	Weighted standardized level difference	Single-number quantity that characterizes the in-situ airborne sound insulation between rooms.
R_w	Weighted sound reduction index.	Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies in a laboratory.
C_{tr}	Low-Frequency Correction	Correction term applied against the sound insulation single-number values (R_w, D_w and $D_{nT,w}$) to provide a weighting against low-frequency performance.
NOEL	No Observed Effect Level	Noise Policy Statement for England (2010) - The noise level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
LOAEL	Lowest Observed Adverse Effect Level	Noise Policy Statement for England (2010) - The noise level above which adverse effects on health and quality of life can be detected.
SOAEL	Significant Observed Adverse Effect	Noise Policy Statement for England (2010) - The noise level above which significant adverse effects on health and quality of life occur.

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