



Acoustic Impact Assessment:

Land at Dutton Lane, Eastleigh

Determinari-001 Ltd

4th September 2026



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This report has been prepared by Hawkins Environmental Limited for the sole purpose of assisting in gaining planning consent for the proposed development described in the introduction of this report.

This report has been prepared by Hawkins Environmental Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This assessment takes into account the prevailing conditions at the time of the report and assesses the impact of the development (if applicable) using data provided to Hawkins Environmental Limited by third parties. The report is designed to assist the developer in refining the designs for the proposed development and to demonstrate to agents of the Local Planning Authority that the proposed development is suited to its location. This should be viewed as a risk assessment and does not infer any guarantee that the site will remain suitable in future, nor that there will not be any complaints either from users of the development or from impacts emanating from the development site itself.

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1. INTRODUCTION

1.1. Overview

Hawkins Environmental Limited has been instructed by Determinari-001 Ltd, to undertake an acoustic impact assessment for retrospective development at Dutton Lane, Eastleigh.

1.1.1. Criteria

During the planning process, it has been identified that the site may require a noise assessment to determine whether noise emissions from the proposed open storage facility would be in line with permitted levels. Consequently, a noise survey was conducted to characterise the noise climate of the site and the impact of the proposed new plant has been assessed.

The assessment adheres to the principles of Government planning policy in relation to noise, specifically enacted by the *National Planning Policy Framework (NPPF)*, the *National Planning Practice Guidance (NPPG) on Noise* and the *Noise Policy Statement for England (NPSE)*.

All sound measurements were conducted in accordance with BS 7445-2: 1991 '*Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use*'. The assessment of plant sound has been assessed in accordance with British Standard BS 4142: 2014 +A1:2019 '*Methods for rating and assessing industrial and commercial sound*'.

This version of the report (Version 4) has been prepared as a response to a number of comments and queries made by Eastleigh Borough Council in connection with the application. This version supersedes all previous versions submitted to Eastleigh Borough Council.

1.2. The Nature, Measurement and Effect of Noise

Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to measure the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB(A), has been shown to correlate closely to the subjective human response.

When related to changes in noise, a change of ten decibels from say 60 dB(A) to 70 dB(A) would represent a doubling in 'loudness'. Similarly, a decrease in noise from 70 dB(A) to 60 dB(A) would represent a halving in 'loudness'. A change of 3 dB(A) is generally considered to be just perceptible. **Table 1.1** details typical noise levels. A glossary of acoustic terms can be found in **Appendix 1**.

Table 1.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In car noise without radio
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain

1.3. Site Description

The proposed development site is situated on Dutton Lane in Eastleigh, bound to the south by Bishopstoke Road, to the west by a railway line, to the north by other commercial and light industrial uses and to the east by a terrace of residential properties.

The site currently comprises an open storage and operational facility of seven individual working yards.

The proposed development entails a retrospective planning application for change of use to storage and distribution (B8) in the southern and central portions of the site and general industry/storage and distribution (B2/B8) in the northern part of the site with all associated infrastructure.

The local planning authority is Eastleigh Borough Council.

A location plan of the proposed development site is provided in **Figure 1.1** below.

Figure 1.1: Site Location Plan



2. NATIONAL & LOCAL PLANNING POLICY

2.1. National Planning Policy Framework (2026)

The National Planning Policy Framework (NPPF) was first published on the 27th March 2012 and revised in 2018, 2019, 2021, 2023 (twice) and 2024. The latest version of the NPPF, published in August 2026, sees a major update when compared to earlier revisions.

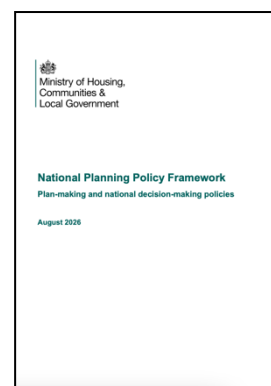
The NPPF outlines the Government's planning policies for England and determines how they should be applied. It provides a framework within which Local Planning Authorities are required to prepare their own locally-prepared plans, where both the policies within the NPPF and the local plan are "a material consideration of critical importance" (Paragraph 1) when making decisions on development proposals.

The NPPF notes "The purpose of the planning system is to contribute to the achievement of sustainable development, by managing the use and development of land in the long-term public interest" (Paragraph 15). The NPPF notes sustainable development should be delivered with three main dimensions: economic; social and environmental (Paragraph 17).

The NPPF notes in policy **P1: Planning for clean and safe places**:

1. "To support efforts to avoid and mitigate risks from natural and man-made hazards, minimise levels of pollution and create clean, liveable and safe places for people to live, work and visit, development plans should:
 - a. Allocate land for development where, taking into account the potential for mitigation:
 - i. Opportunities can be taken to improve local environmental conditions, such as by remediating despoiled, degraded, derelict, contaminated and unstable land;
 - ii. Ground conditions will not inhibit or pose a risk to the nature of the development proposed (such as due to land instability), and occupiers and users will not be put at risk from, or be adversely affected by, unacceptable levels of pollution;
 - iii. Development proposals will not cause unacceptable levels of pollution, either alone or in combination with other pollution sources, taking into account communities which may be particularly vulnerable to its effects, such as children and older people, as well as habitats and species which may be vulnerable to pollution; and
 - iv. The intended uses will not place unreasonable restrictions on the operation of existing businesses, community facilities, public services, defence and security activities.
 - b. Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area (such as by identifying opportunities for strategic nature-based solutions)"...

It goes on to note in policy **P3: Living conditions and pollution**:



1. *“Development proposals should be appropriate for their location, taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, whether these effects are on or off-site; and whether this is as a result of the development itself or the product of preexisting conditions in its vicinity. In assessing the potential effects of pollution, consideration should be given to the potential sensitivity of the site, and its intended occupiers and users, as well as that of the environment and population in the surrounding area (including where certain groups could be particularly vulnerable to its effects, such as children and older people).”*
2. *Within this context development proposals should:*
 - a. *Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions;*
 - b. *Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting);*
 - c. *Sustain and contribute to compliance with relevant limit values or national objectives and targets for air pollutants including PM2.5. Development proposals should take account of Air Quality Management Areas and be consistent with the objectives of relevant Air Quality Action Plans, Clean Air Plans and Local Air Quality Strategies;*
 - d. *Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas (those areas that have remained relatively undisturbed by noise from human sources and are prized for their recreational and amenity value for this reason);*
 - e. *Limit any adverse impact from artificial light on local amenity, intrinsically dark landscapes (those areas entirely, or largely, uninterrupted by artificial light) and nature...”*

Policy P4: Impact of development on existing activities notes:

1. *Existing businesses, community facilities, public services and defence and security activities should not have unreasonable restrictions placed on their current or permitted operation as a result of development being approved after they were established. This means that development proposals should be capable of being integrated effectively with existing business, community and public service activities and infrastructure in their vicinity (including, but not limited to, uses such as pubs, music venues, places of worship, sports clubs, blue light services, defence, electricity network infrastructure and industrial and waste sites).*
2. *Where the operation of an existing activity could have a significant adverse effect on a proposed new development in its vicinity, development proposals should:*

- a. *Identify the nature of the potential impacts, informed where necessary by early discussions between the applicant (i.e. the ‘agent of change’) and those existing uses which could be affected by the proposal to inform the scope for mitigation; and*
- b. *Be able to demonstrate that suitable mitigation can be provided before first occupation of the development, if it is to be acceptable. Planning conditions or obligations should be used to secure agreed mitigation measures”.*

2.2. Noise Policy Statement for England (2010)

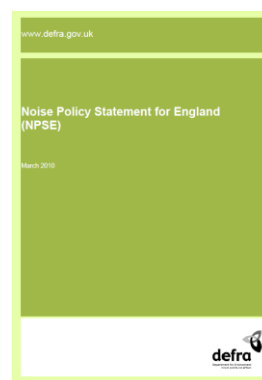
The Noise Policy Statement for England (NPSE) provides further guidance on the interpretation of Section 123 of the NPPF and states that: “*Within the context of sustainable development:*

- 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.”

NPSE introduces established concepts originally from the field of toxicology that are now being applied to noise impacts. They are:

- **NOEL – No Observed Effect Level** - This is the level of noise 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** - This is the level of noise above which adverse effects on health and quality of life can be detected.
- **SOAEL – Significant Observed Adverse Effect Level** - This is the level above which significant adverse effects on health and quality of life occur.

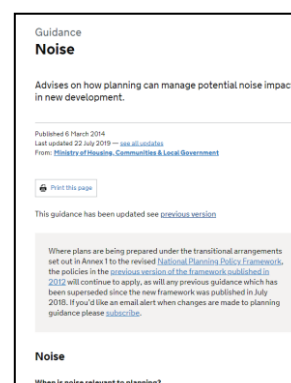
NPSE goes on to state that “*it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.*”



2.3. Planning Practice Guidance

The Planning Practice Guidance was launched on 6th March 2014 and provides additional guidance and interpretation to the Government’s strategic policies, outlined within the NPPF, in a web-based resource. This is updated regularly.

The NPPG provides more guidance on the assessment of noise for planning purposes and builds on the concepts of NOEL, LOAEL and SOAEL introduced in NPSE to establish whether noise is a factor that needs to be taken into account. It



states: *“Local planning authorities’ plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

- whether or not a significant adverse effect is occurring or likely to occur;*
- whether or not an adverse effect is occurring or likely to occur; and*
- whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.”

However, it goes into more detail about the subjective nature of noise and how the results of any assessment must be treated flexibly and pragmatically. The guidance states: *“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. These factors include:*

- the source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day – this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;*
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;*
- the spectral content of the noise (ie whether or not the noise contains particular high or low-frequency content) and the general character of the noise (ie whether or not the noise contains particular tonal characteristics or other particular features). The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.*

More specific factors to consider when relevant include:

- the cumulative impacts of more than one source of noise;*
- whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations.*
- In cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.*
- Noise Action Plans (where these exist), and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations should be taken into account. Defra’s website has information on Noise Action Plans and Important Areas. Local*

authority environmental health departments will also be able to provide information about Important Areas.

- *the effect of noise on wildlife. Noise can adversely affect wildlife and ecosystems. Particular consideration needs to be given to the potential effects of noisy development on international, national and locally designated sites of importance for biodiversity;*
- *where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.*
- *some commercial developments including restaurants, hot food takeaways, night clubs and public houses can have particular impacts, not least because activities are often at their peak in the evening and late at night. Local planning authorities will wish to bear in mind not only the noise that is generated within the premises but also the noise that may be made by customers in the vicinity”.*

Table 2.1 shows examples of the noise hierarchy (adapted from the PPG) and shows that the aim is to identify where the overall effect of the noise exposure falls in relation to SOAEL, LOAEL and NOEL. The implication of the advice is that only noise that is ‘noticeable and very disruptive’ would be considered unacceptable and therefore, should be prevented. The inference, therefore, is that all other outcomes can be acceptable, depending upon the specific circumstances and level of mitigation.

Table 2.1: Noise Exposure Hierarchy

Perception	Examples of outcomes	Increasing effect level	Action	
Not noticeable	No Effect	No Observed Effect	No specific measures required	Low Noise Level
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				
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, eg turning up the 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. The 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, eg 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. The potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep.	Significant Observed Adverse Effect	Avoid	
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate the effect of noise leading to psychological stress or physiological effects, eg regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, eg auditory and non-auditory	Unacceptable Adverse Effect	Prevent	High Noise Level

Increasing Noise Levels
↓

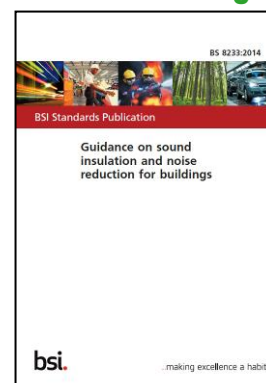
3. ASSESSMENT METHODOLOGY & GUIDANCE

3.1. BS 8233: 2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’

Originally published in 1999, the 2014 edition of BS 8233, significantly updates the guidance in light of the policy changes as a result of the advent of the NPPF and the withdrawal of PPG 24. The 2014 edition of BS 8233 sees a change in the title of the Standard, moving from a ‘Code of Practice’ to ‘Guidance’, as the text ‘largely comprises guidance that does not support claims of compliance’.

BS 8233:2014 indicates that to control external noise ingress into a proposed development, a number of planning stages should occur as follows:

- “Assess the site, identify significant existing and potential noise sources, measure or estimate noise levels, and evaluate layout options.
- Determine design noise levels for spaces in and around the building(s).
- Determine sound insulation of the building envelope, including the ventilation strategy”.



BS 8233:2014 suggests design noise levels for various types of building. The recommended noise levels for dwelling houses, flats and rooms in residential use (when unoccupied) can be seen in **Table 3.1** below. This is replicated from Table 4 of Section 7.7.2 of BS 8233:2014. The guidance suggests that “In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values”. The noise levels in **Table 3.1** are marginally different to those published in BS 8233:1999 ‘Sound insulation and noise reduction for buildings – Code of practice’, but are based on the existing guidance from the current World Health Organisation (WHO) “Guidelines on Community Noise”.

Table 3.1: Summary of Noise Criteria: BS 8233: 2014

Activity	Location	07:00 To 23:00	23:00 To 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

When considering the noise level criteria considered in **Table 3.1**, the following points should be noted:

- BS 8233: 2014 suggests that the above criteria should be adopted flexibly and that “where development is considered necessary or desirable... the internal target level may be relaxed by up to 5 dB and reasonable internal conditions still achieved”.
- The noise levels quoted above are annual averages and “do not need to be achieved in all circumstances” e.g. New Year’s Eve or fireworks night.

- The noise levels in **Table 3.1** are “for steady external noise sources” such as traffic noise or plant noise. This is a departure from the 1999 version of BS 8233, where the recommended internal noise levels were irrespective of the external noise source and therefore included the suggestion that in order to achieve “reasonable” noise levels within bedrooms at night, L_{AFmax} noise levels should not exceed 45 dB. Whilst this has been omitted from the 2014 version of BS 8233, it does state that “Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values.” Therefore, at sites which may be affected by individual noise events, it is more appropriate to use the guidance contained within the WHO “Guidelines on Community Noise” which suggest that good sleep will not generally be affected if internal levels of L_{AFmax} 45 dB are not exceeded more than 10-15 times per night.
- BS 8233:2014 notes that if the design of the building is “relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the facade insulation or resulting noise level”.
- BS 8233 provides guidance for noise in gardens and outdoor amenity space. It suggests that “it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.” The guidance does go on to say that these guideline values are not achievable in all circumstances and in some areas, “such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

3.2. World Health Organisation Guidelines for Community Noise (1999)

The 1999 World Health Organisation (WHO) guidance “Guidelines for Community Noise”, provides recommendations on maximum internal and external noise levels in a range of situations. The WHO guidelines are a consequence of a comprehensive review of the scientific evidence in relation to community noise exposure and the health and social aspects of such exposure. Whilst not adopted policy, the recommendations within the WHO Guidelines are often quoted and form the basis of the recommendations within BS 8233 and other similar guidance. A summary of the noise criteria can be seen in **Table 3.2**.

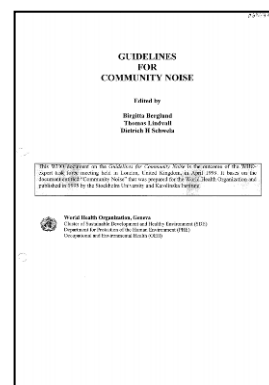
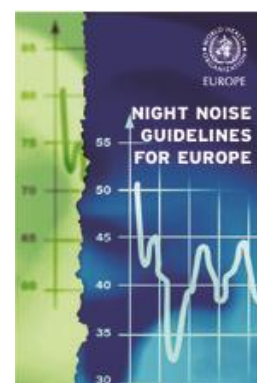


Table 3.2: Summary of Noise Criteria: WHO

Residential Environment	Critical Health Effect	L _{Aeq}	L _{AFmax}	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

3.3. WHO Night Noise Guidelines for Europe (2009)

In 2009, the World Health Organisation published the “*Night Noise Guidelines for Europe*” as a partial update and extension to the “*Guidelines for Community Noise*”, specifically in relation to development on the scientific evidence of night noise exposure. The 2009 guidance suggests that a “*L_{night,outside} of 40 dB should be the target of the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly*”. However, since that target would be impossible to achieve in many situations, a “*L_{night,outside} value of 55 dB is recommended as an interim target for the countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach*”.

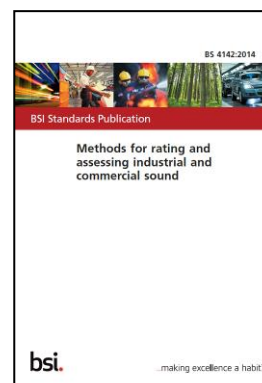


3.4. BS 4142:2014+A1:2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound’

British Standard BS 4142: 2014 +A1:2019 “*Methods for rating and assessing industrial and commercial sound*” provides a method for the measurement and rating of industrial noise or noise of an industrial nature and background noise levels outside dwellings in mixed residential and industrial areas. The rating level (defined in the BS) is used to rate the industrial noise source outside residential dwellings (this is defined as the “specific noise source”).

The procedure defined in BS 4142 for predicting the likelihood of complaints is based on establishing the difference between the rating level and the background level outside the residential property of interest. The greater the difference the greater the likelihood of complaints and more specifically:

- “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;
- 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.
- Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.”

The guidance goes on to state that “where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.” Consequently, when considering the impact of a BS 4142 assessment, it is often also necessary to consider the absolute noise levels experienced at the receptor location in relation to BS 8233 and World Health Organisation guidelines.

3.5. BS 4142:2014+A1:2019 Technical Note (2020)

In March 2020, Acoustic and Noise Consultants (the ANC) published a guidance note to accompany BS 4142.

The Technical Note states “remain concerns for some users of BS 4142 and this guidance is designed to assist readers with a reasonable interpretation and application of BS 4142 as a whole”. It notes “In the production of this guidance, the ANC Working Group (WG) has reviewed BS 4142 and attempted to address any content regarded as ambiguous”. Consequently, whilst not an official guidance document, the Technical Note provides advice of the interpretation of BS 4142 and provides examples of best practice with regards to the application of the BS.

The following sub-sections contain clarifications from the Technical Note that are particularly pertinent to this assessment.



3.5.1. Internal Noise Levels

The Technical Note notes “BS 4142 ‘is not intended to be applied to the assessment of indoor sound levels’ (Subclause 1.3) and cannot, therefore, be used for façade design. Whilst BS 4142 can be used to assist in the determination of the likelihood of an adverse or significant adverse impact, guidance on internal design criteria and mitigation is provided elsewhere”. The Technical Note goes on to state that in conjunction with BS 4142, the use of BS 8233 may be appropriate to determine internal noise levels “although recognition should be given to the associated scope and/or limitations”.

3.5.2. Introduction of a New Noise-Sensitive Receptors

One of the major short-comings of BS 4142 is the lack of differentiation between the assessment of new noise sources verses the assessment of new noise-sensitive receptors. Subclause 8.5 of BS 4142 states “Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In

such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation”.

The Technical Note clarifies this position by noting “where BS 4142 is used in this situation, its fundamental principles, in terms of what constitutes the residual, background and specific sources, should not be compromised. Where other standards or guidance document are used, care should be taken with regard to their own stated scope or limitations. Examples of such guidance might include:

- *BS8233: 2014 where an industrial/commercial sound source is constant and new residential development is proposed nearby;*
- *Elements of ProPG where the impact of regular night time maximum sound events is the critical consideration;*
- *DMRB where impacts relate solely to changes to vehicular movements within or around a site; or*
- *BS 5228 where activities are temporary and of a similar nature to the construction activities considered by that Standard.*

These documents, or others, may help to inform the contextual elements of a BS 4142 assessment or help where a numerical assessment fully in accordance with BS 4142 may not be possible”.

In this regard the Technical Note that when assessing new noise-sensitive receptors close to commercial noise sources, it may not be possible to use BS 4142 as difficulties in disaggregating “legitimate commercial residual sources to the background sound level could potentially lead to unrepresentatively adverse outcomes”. Consequently, “alternative guidance and standards should be referenced, although care should be taken not to apply them beyond their own stated scope or limitations”. It goes on to note that “different approaches might be adopted depending on whether the industrial/commercial source is continuous or intermittent, whether there are ancillary sources present, or where one particular industrial/commercial premises dominates”.

3.5.3. Background Sound Levels

BS 4142 does not provide a definitive method for calculating or determining a background sound level. The Technical Note does not provide a definitive method either, but does provide more clarification. It notes “it was the view of the WG that it is not always appropriate to define a singular background sound level for use in an assessment. In such cases, a range of values over one or more time periods may be more appropriate. An assessment should generally focus on the sound levels measured during the period of greatest interest, which may be the quietest part of the night, or the time period relating to a complaint. Determining the period of greatest interest should be judged on a case-by-case basis”.

The Note points out that “it is important that the established background sound level is representative of typical conditions”. It goes on to provide a number of examples whereby time history, histogram and cumulative distribution data is presented, along with the range of values selected by the WG as being representative. “These examples are included to illustrate the range of views in the WG as to how best to identify representative background sound levels for particular datasets and serve to highlight the sensitivity of the outcome to individual interpretations of measurement data. It must be remembered that there are no ‘correct’ answers, only judgement and justification. In many instances, additional information beyond that presented in these examples would be required to inform the judgement of representative levels”.

3.5.4. Context

The criteria used to determine the acceptability of an impact with BS 4142 talks about the requirement to consider “context”. However, BS 4142 does not provide much detail as to what one might consider in relation to context.

BS 4142 notes that absolute levels of sound can be of significance, where residual values are both high and low. In particular, BS 4142 notes that absolute levels may be as, or more, important than relative outcomes where background and rating levels are low, but does not provide further commentary.

The Technical Note points out that “BS 4142 does not indicate how the initial estimate of impact should be adjusted when background and rating levels are low, only that the absolute levels may be more important than the difference between the two values. It is likely that where the background and rating levels are low, the absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values. For example a situation might be considered acceptable where a rating level of 30dB is 10dB above a background sound level of 20dB, i.e. an initial estimate of a significant adverse impact is modified by the low rating and background sound levels.

There may be situations where the opposite is true, and it is for the assessor to justify any modifications to the initial estimate of impact.

BS 4142 does not define ‘low’ in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB L_{A90} , and low rating levels as being less than about 35 dB $L_{A,T,r}$.

The WG suggest that similar values would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate”.

The Technical Note suggests other areas one might consider when looking at context:

- “character of a particular neighbourhood;
- former uses at or close to a site;
- legitimacy of the industrial use, e.g. planning permissions or environmental permits;
- implementation of best practicable means for a given process or activity; or
- local convention or perceptions”.

It goes on to provide two examples:

“For example; a former industrial use may be less relevant if it ceased 10 years previously, than a use that ceased within the previous six months. Setting out the context in this way is important so that the reader is fully aware of the point being made”.

“For example; a coffee shop with drive thru facility located adjacent to a fairly busy road with traffic lights and constant stop/start traffic, with residential properties nearby. In these circumstances the noise climate is unlikely to change in any perceptible way due to the addition of vehicles moving and idling in the drive thru area. However, during the evening, the gaps in the general traffic could reduce the background sound level sufficiently that an adverse or significant adverse impact is suggested. An intermittency correction could also be

considered appropriate. In this example, the assessor might legitimately take the view that the context is at odds with the initial (numerical) assessment, and substantially adjust the conclusions of the assessment on the basis of the context”.

3.6. IEMA Guidelines for Environmental Noise Assessment (2014)

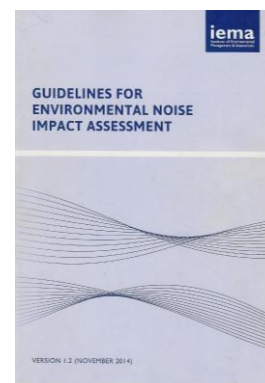
The 2014 IEMA “Guidelines for Environmental Noise Assessment” address the key principles of noise impact assessment and are applicable to all development proposals where noise effects may occur. The guidance provides advice with regards to the collection of baseline noise data, prediction of noise levels and how noise should be assessed.

Whilst the guidance contains a great deal of technical guidance for the noise practitioner, it also provides guidance on the assessment of significance, which is replicated later in this chapter.

The IEMA Guidelines provides guidance on how to assess the effects and significance of developments, but it stops short of providing specific assessment criteria which developments should achieve. The guidance instead suggests that the methodology adopted should be selected on a site by site basis with reference to relevant national and local standards, since the guidance recognises that the effect associated with a particular noise impact will be dependent on a number of factors including but not limited to the sensitivity of the receptor, frequency and duration of the noise source and time of day.

When describing the magnitude of the noise effect, the IEMA guide does not suggest a definitive method but does give a number of examples of ways of describing and determining the magnitude. One such example, which has been used in this assessment, is set out in **Table 3.6** below. **Table 3.6: Magnitude of Change in Noise Levels**

Long Term Impact Magnitude	Sound Level Change dB $L_{Aeq,T}$ (positive or negative) T= 16 hour day or 8 hour night
Negligible	≥ 0 dB and < 3 dB
Minor	≥ 3 dB and < 5 dB
Moderate	≥ 5 dB and < 10 dB
Major	≥ 10 dB



3.7. The Little Red Book of Acoustics (4th ed.) (2024)

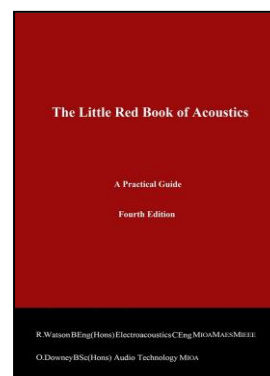
First published in 2007, *'The Little Red Book of Acoustics: A Practical Guide'* remains an industry-standard textbook. Appreciated by professionals and beginners alike for being clear and straightforward, the book has also been included in recommended reading lists for Institute of Acoustics accredited courses.

The 4th edition of the book was published in September 2004 and includes recent updates to standards such as BS 8233 and BS 4142, in addition to presenting a new method to assess and determine the representative background sound levels as part of a BS 4142 assessment.

The book recognises that BS 4142 does not give a single fixed method for assessing the representative background sound level and proposes the '*LRB Method*' which considers a modal approach with a distribution threshold criterion.

The LRB Method requires each of the background sound level integer values to be counted. The analysis of the candidate values for the background sound level first starts with the candidate with the highest number of occurrences. If there are multiple values with the same number of occurrences, then the analysis will first consider the lowest of these candidate values.

Each candidate value is tested based on whether or not there is less than or equal to 45% of the data below the candidate value. If the candidate value features more than 45% of the data below the candidate value, then it should be rejected. Once the candidate value features less than or equal to 45% of the data below the candidate value, then it should be accepted as the representative background sound level.



4. SOUND MEASUREMENT STUDY

4.1. Overview

In order to determine the extent to which the site is affected by sound, a detailed sound measurement study has been carried out on the proposed development site. Sound measurements have been carried out in order to determine the background sound levels for the day and night time periods.

All noise monitoring was conducted using a Norsonic 140 sound level meter, which conforms to BS EN IEC 61672-1: 2003 as a Class 1 precision measurement system. A Norsonic 1251 field calibrator was used before and after the measurement periods in order to ensure that the equipment had remained within reasonable calibration limits (± 0.5 dB).

All of the equipment used has been calibrated in accordance with the procedures set out in BS EN IEC 61672-2: 2003 and for the electrical testing of frequency filters as set out in BS EN IEC 61260. The equipment was calibrated at Campbell Associates Limited, in Great Dunmow, Essex. Campbell Associates Limited meets the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS Lab No. 0789). Sound level meters are laboratory calibrated every two years, with field calibrators laboratory calibrated every twelve months. **Appendix 2** summarises the equipment used including serial numbers and calibration certificates.

All noise monitoring has been conducted in accordance with the guidance set out in BS 7445-2: 1991 '*Description and measurement of environmental noise Part 2: Guide to the acquisition of data pertinent to land use*'. This standard details information that should be recorded in addition to the actual measured levels such as meteorological data, and a description of the noise source itself.

The original surveys were conducted on the 17th, 18th and 25th November 2025. The sound monitoring was conducted by William Bettridge of Hawkins Environmental Limited.

Measurements were undertaken at several locations on and around the development site. Since the site is already operational, but it was necessary to conduct short duration noise measurements and use proxy measurement locations to determine background noise levels without interference from activities occurring on site. The original daytime noise measurements were conducted at Monitoring Location 1 on Tuesday 25th November 2025. The original night-time noise measurements were conducted at Measurement Location 2, which was situated away from the existing commercial noise source and was considered representative of the closest affected properties.

Feedback from Eastleigh Borough Council suggested that the noise monitoring was too limited and extended noise surveys were requested. Andre Pires of Eastleigh Borough Council Environmental Health suggested a survey of at least 4-5 days, preferably incorporating a weekend. As a consequence, additional monitoring was conducted between Tuesday 28th and Thursday 30th July 2026 and again from Friday 22nd May until Tuesday 26th May 2026. The additional sound monitoring was also conducted by William Bettridge of Hawkins Environmental Limited.

The additional monitoring was conducted at Measurement Location 3. This measurement location was within an empty yard on the development site. It is considered that background noise measurements conducted at the third location will be representative of the surrounding dwellings, without the contribution of the existing

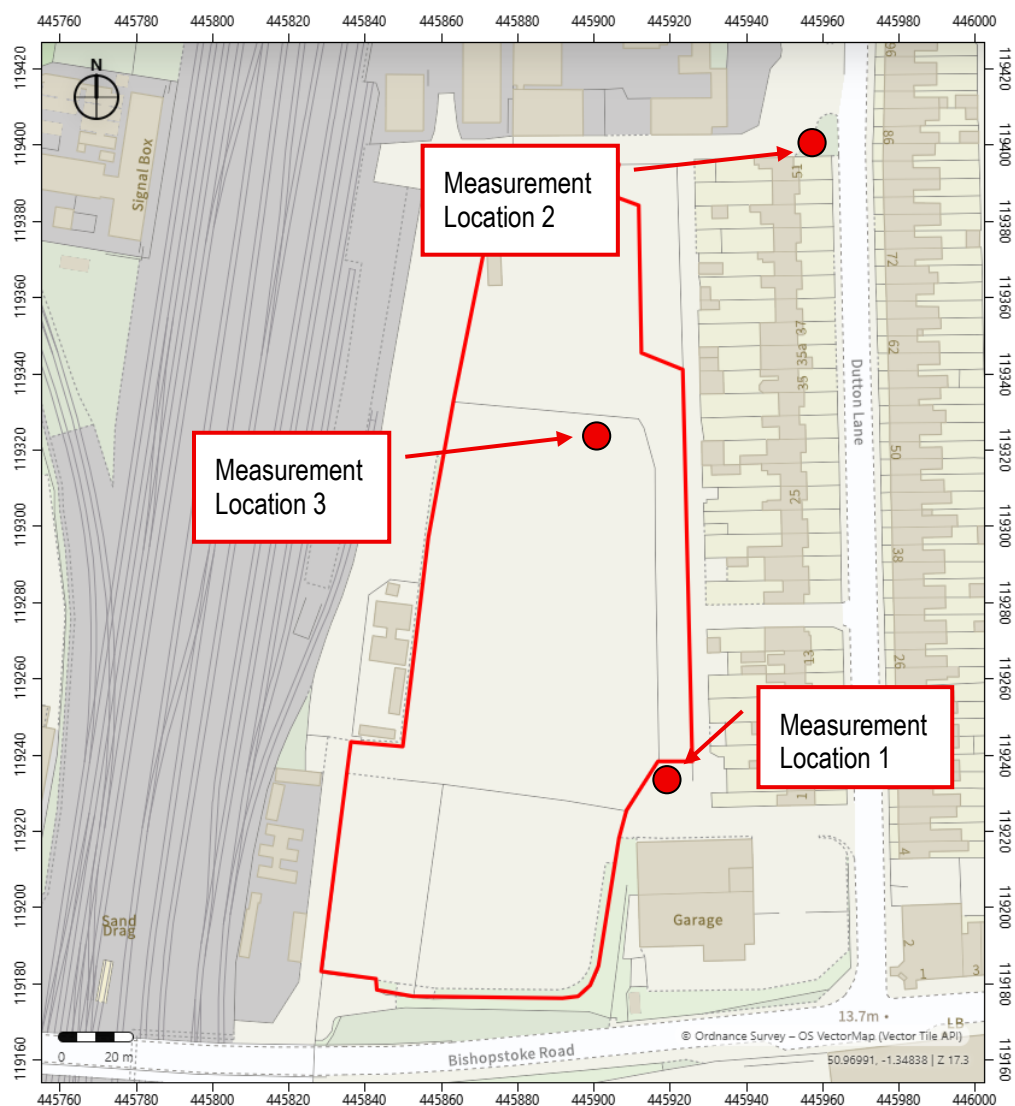
commercial noise from the site. Monitoring Location 3 was within an empty yard with no immediate commercial noise sources in the vicinity during the measurement period, located away from onsite activities. The sound monitoring location was in a freefield position, at a location shown in **Figure 4.1**.

Weather conditions were conducive to successful monitoring. **Table 4.1** summarises the weather conditions during the measurement period.

Table 4.1: Summary of Weather Conditions during the Extended Sound Measurements

Date	Friday 22nd to Tuesday 26th May 2026
General Description	The measurement periods were hot.
Windspeed	Over the measurement period, the average windspeed was around 1 m/s
Temperature	Highs of 31°C, lows of 11°C.
Precipitation	The measurement periods remained dry.
Date	Tuesday 28th to Thursday 30th July 2026
General Description	The measurement periods were hot.
Windspeed	Over the measurement period, the average windspeed was around 1.5 m/s
Temperature	Highs of 31°C, lows of 12°C.
Precipitation	The measurement periods remained dry.

Figure 4.1: Noise Measurement Locations



The noise measurement data for the extended noise survey is detailed in **Appendix 3** and summarised in **Figure 4.2 - Figure 4.3** and **Table 4.2**.

It should be noted that noise events recorded over the measurement period were cross-referenced against the site access logs to confirm that the data is representative of the surrounding area without site operation.

Table 4.2: Summary of the Sound Level Measurements

	L_{Aeq,T} (L_{Aeq,1hr} Range)	L_{Amax,1hr} Range	L_{A90,T} (L_{A90,1hr} Range)
Tuesday Daytime (1pm to 11pm)	54.2 (43.9 - 58.8)	59.7 - 84.3	45.2 (39.4 - 48.9)
Tuesday Night/Wednesday Morning (11pm to 7am)	48.9 (41.5 - 56.4)	52.8 - 81.6	40.6 (36.3 - 50.4)
Wednesday Daytime (7am to 11pm)	54.8 (43.4 - 58.7)	56.8 - 84.1	48.2 (40.7 - 51.2)
Wednesday Night/Thursday Morning (11pm to 7am)	47.7 (40.4 - 54.4)	59.1 - 79.5	40.5 (36.1 - 47)
Thursday Daytime (7am to 1pm)	56.5 (54.2 - 59.1)	74.1 - 82.8	49.9 (46.2 - 52)
Friday Daytime (11am to 11pm)	55.2 (46 - 57.7)	60.8 - 85.2	45.9 (40.8 - 50.6)
Friday Night/Saturday Morning (11pm to 7am)	48.3 (43.2 - 53.7)	58.3 - 78.3	42.2 (40.5 - 44.7)
Saturday Daytime (7am to 11pm)	55.1 (46.2 - 58.8)	60.4 - 84.2	43.7 (42.8 - 45.2)
Saturday Night/Sunday Morning (11pm to 7am)	41.9 (36.6 - 44.8)	47.4 - 71.8	37.8 (34.1 - 40.7)
Sunday Daytime (7am to 11pm)	53.6 (42.2 - 59.8)	58.6 - 85.4	39.7 (37.3 - 43.1)
Sunday Night/Saturday Morning (11pm to 7am)	43.6 (37.6 - 48.7)	46.2 - 63.1	39.3 (36.2 - 43.4)
Monday Daytime (7am to 11pm)	53.8 (46.2 - 58.9)	64.4 - 87.9	41.9 (39.9 - 44.5)
Monday Night/Saturday Tuesday (11pm to 7am)	49.4 (41.2 - 56.4)	52.2 - 72.1	42.3 (38.8 - 50.6)
Tuesday Daytime (7am to 11am)	53.5 (49.9 - 56.3)	75.7 - 82.8	47.3 (45.9 - 49)

The results shown in **Table 4.2** that the daytime L_{Aeq,16hr} was consistently around 54 to 56 dB(A), across both the weekend and weekdays, with Sundays towards the lower end of this range, but Saturdays consistent with

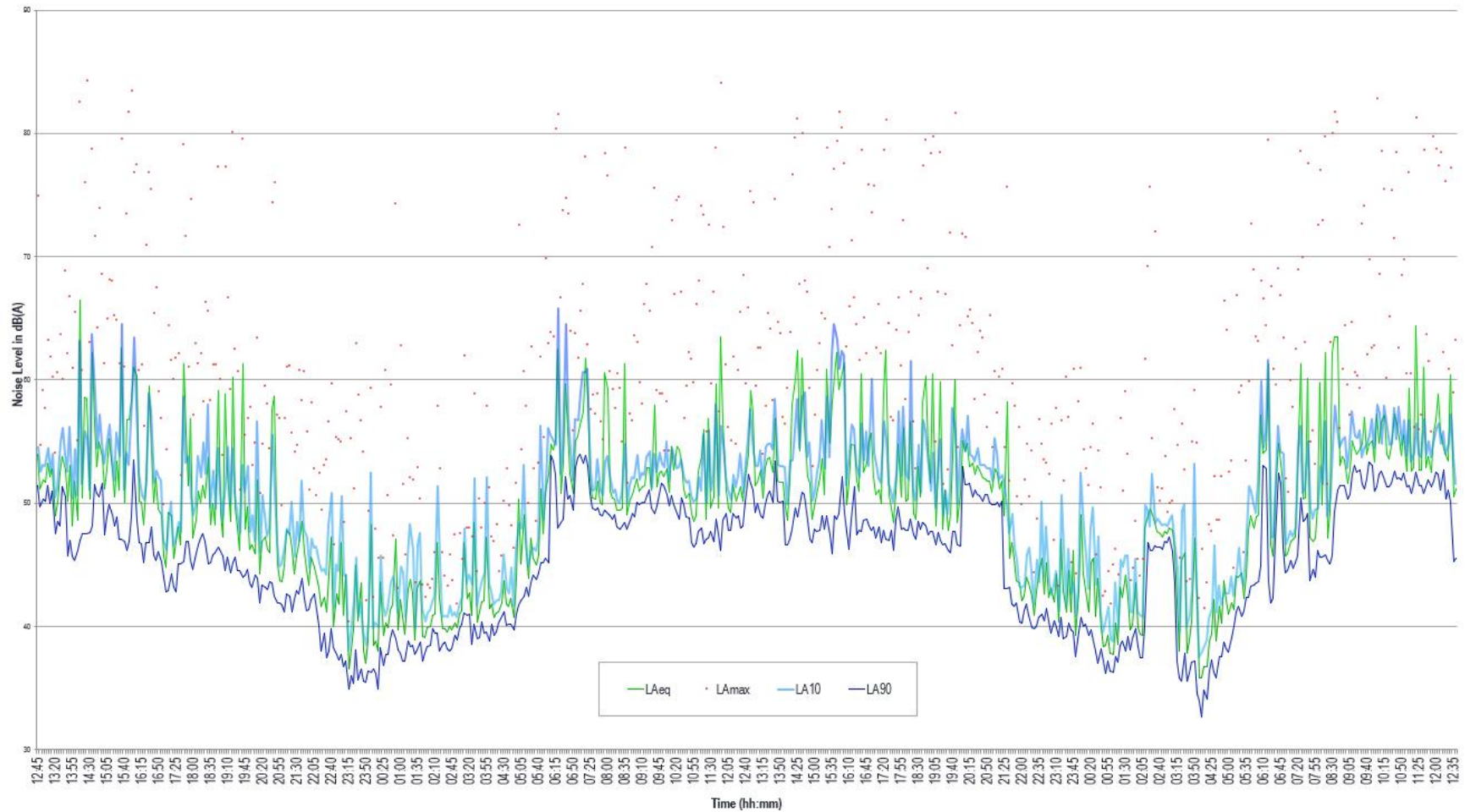
weekday noise levels. At night, $L_{Aeq,8hr}$ noise levels are consistently around 48-49 dB(A) during the week, but on Saturday/Sunday nights experienced significantly lower noise levels in the region of 42-44 dB(A) $L_{Aeq,8hr}$. However, it was noted that L_{A90} (background) noise levels were reduced during both the daytime and nighttime at the weekends when compared to typical weekdays.

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Figure 4.2: Noise Measurements Data – Tuesday to Thursday

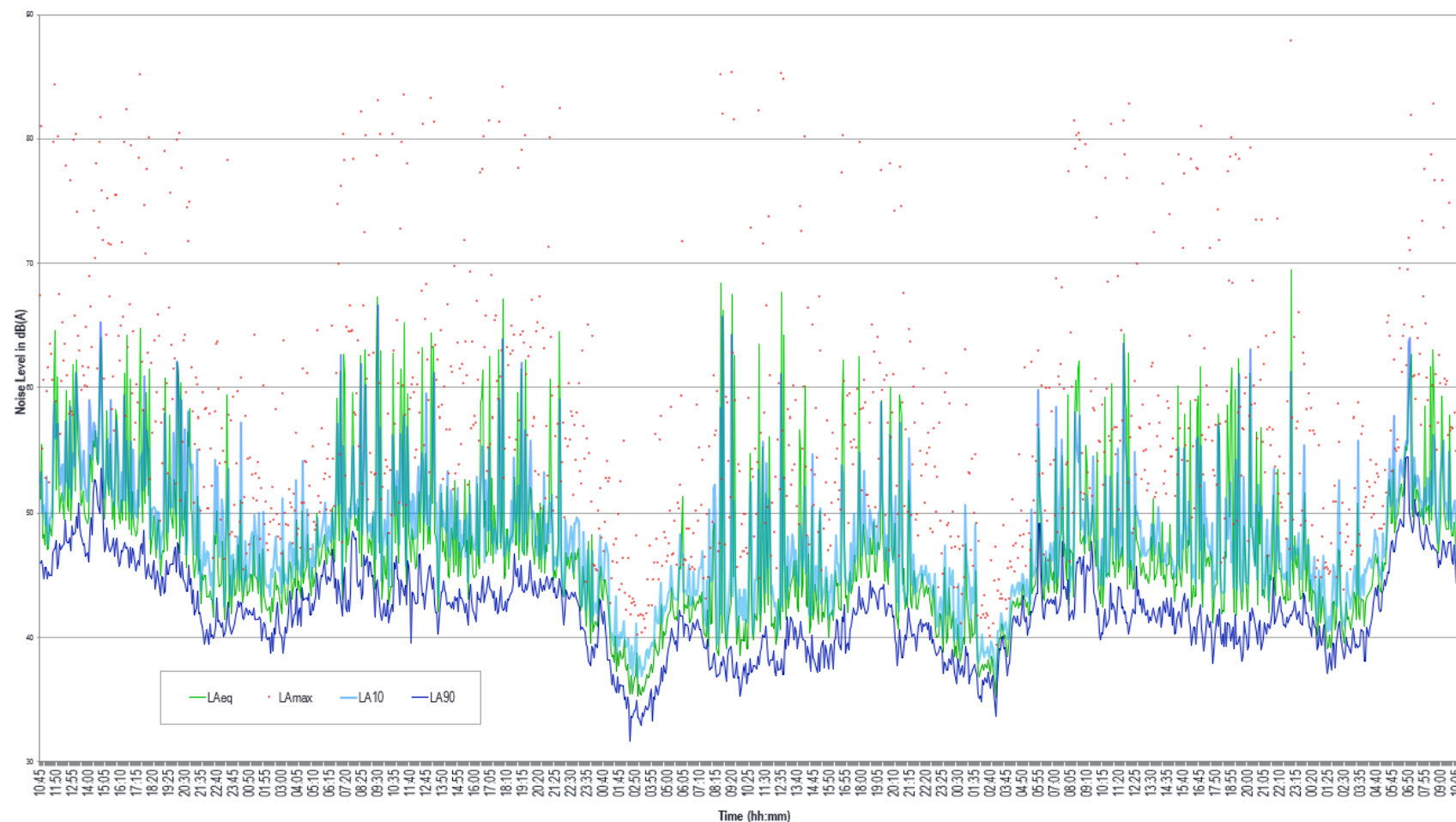


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Figure 4.3: Noise Measurements Data – Friday to Tuesday



4.2. Background Sound Levels

BS 4142: 2014 +A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ requires the determination of background sound levels at a location representative of the potentially affected receptors.

The background sound levels have been calculated in accordance with BS 4142:2014, which represents the most up-to-date guidance on the subject. Prior to the publication of the 2014 version of BS 4142, acousticians would use the lowest measured background sound levels; however, BS 4142: 2014 provides substantially more guidance on the determination of background sound levels. Section 8.1 of BS 4142: 2014 states that “*for this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods. Among other considerations, diurnal patterns can have a major influence on background sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes*”. The guidance goes on to say that “*a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value*”.

In order to determine the background sound levels for the day and night-time periods, the background sound levels have been analysed over the appropriate time periods, i.e. 15 minutes for night-time (11 pm to 7 am) and 1 hour for the daytime periods.

Figure 4.4 and **Figure 4.5** details the distribution of the background sound levels for the weekdays as described in BS 4142: 2014 for the day and night-time periods respectively. Additionally, **Figure 4.6** and **Figure 4.7** detail the distribution of the background sound levels for a Saturday during the survey for the day and night-time periods respectively. **Figure 4.8** and **Figure 4.9** detail the distribution of the background sound levels for a Sunday for the day and night-time periods respectively.

It can be seen from **Figure 4.4** that during a typical weekday daytime, the $L_{A90,1\text{hour}}$ ranged from 39 dB to 52 dB. The value with the highest number of occurrences is 48 dB $L_{A90,1\text{hour}}$. Given that less than 45% of the data is below this value, 48 dB(A) would be accepted as the representative background sound level during the daytime.

At night during a typical weekday, it can be seen from **Figure 4.5** that the $L_{A90,15\text{mins}}$ ranged from 34 dB to 51 dB. The value with the highest number of occurrences is 39 dB $L_{A90,15\text{mins}}$. Given that less than 45% of the data is below this value, 39 dB(A) would be accepted as the representative background sound level during the nighttime.

It can be seen from **Figure 4.6** that during the daytime on a Saturday, the $L_{A90,1\text{hour}}$ ranged from 43 dB to 45 dB. The value with the highest number of occurrences is 43 dB $L_{A90,1\text{hour}}$. Given that less than 45% of the data is below this value, 43 dB(A) would be accepted as the representative background sound level during the daytime on a Saturday.

At night on a Saturday, it can be seen from **Figure 4.7** that the $L_{A90,15\text{mins}}$ ranged from 38 dB to 46 dB. The value with the highest number of occurrences is 42 dB $L_{A90,15\text{mins}}$. Given that less than 45% of the data is below this value, 42 dB(A) would be accepted as the representative background sound level during the nighttime on a Saturday.

It can be seen from **Figure 4.8** that during the daytime on a Sunday, the $L_{A90,1\text{hour}}$ ranged from 37 dB to 43 dB. The value with the highest number of occurrences is 40 dB $L_{A90,1\text{hour}}$. Given that less than 45% of the data is below this value, 40 dB(A) would be accepted as the representative background sound level during the daytime on a Sunday.

At nighttime on a Sunday, it can be seen from **Figure 4.9** that the $L_{A90,15\text{mins}}$ ranged from 33 dB to 42 dB. The value with the highest number of occurrences is 39 dB $L_{A90,15\text{mins}}$. However, given that less than 45% of the data is below 35 dB(A); it would be accepted as the representative background sound level during the nighttime on a Sunday.

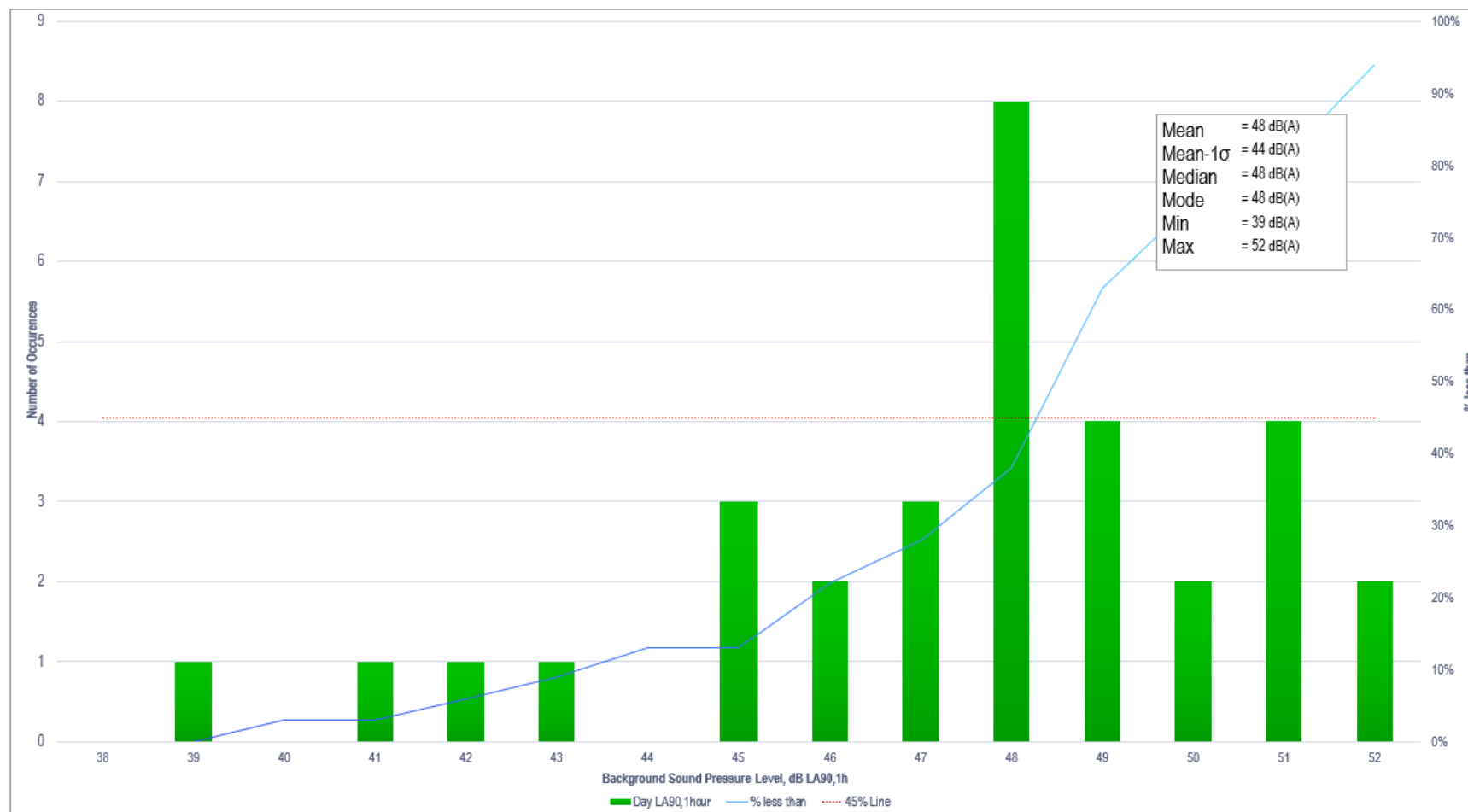
A summary of the background sound levels are presented below in **Table 4.3**.

Table 4.3: Summary of the Background Sound Level Analysis

Date	Period (Hours)	Representative Background Sound Level, dB(A)
Weekday	Daytime (07:00 – 23:00)	48
	Nighttime (23:00 – 07:00)	39
Saturday	Daytime (07:00 – 23:00)	43
	Nighttime (23:00 – 07:00)	42
Sunday	Daytime (07:00 – 23:00)	40
	Nighttime (23:00 – 07:00)	35

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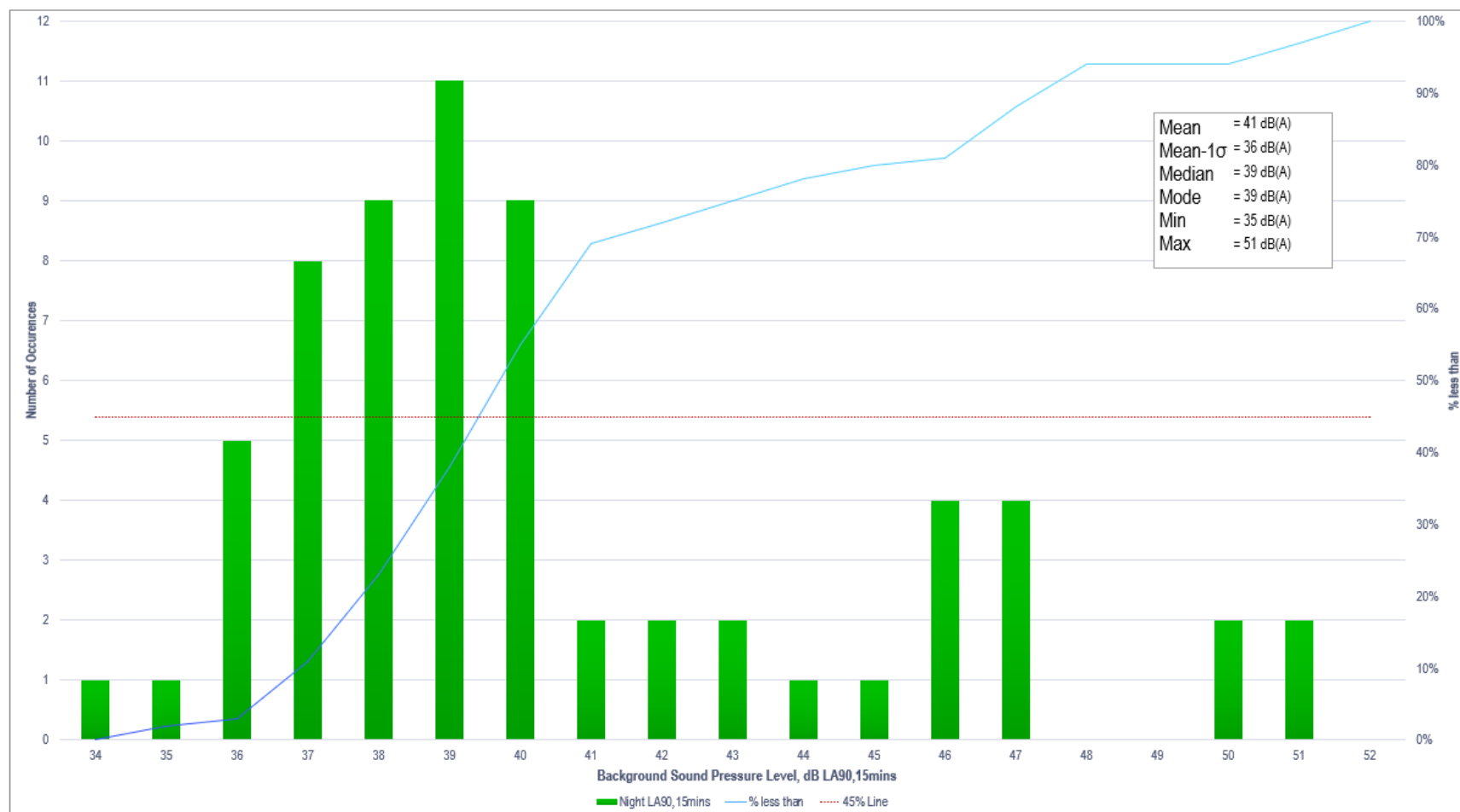
Determinari-001 Ltd • 3rd September 2026 • H4662 – NV – v4Figure 4.5: Distribution of Nighttime $L_{A90,15\text{minute}}$ Sound Levels – Typical Weekday

Figure 4.6: Distribution of Day Time L_{A90,1hour} Sound Levels – Saturday

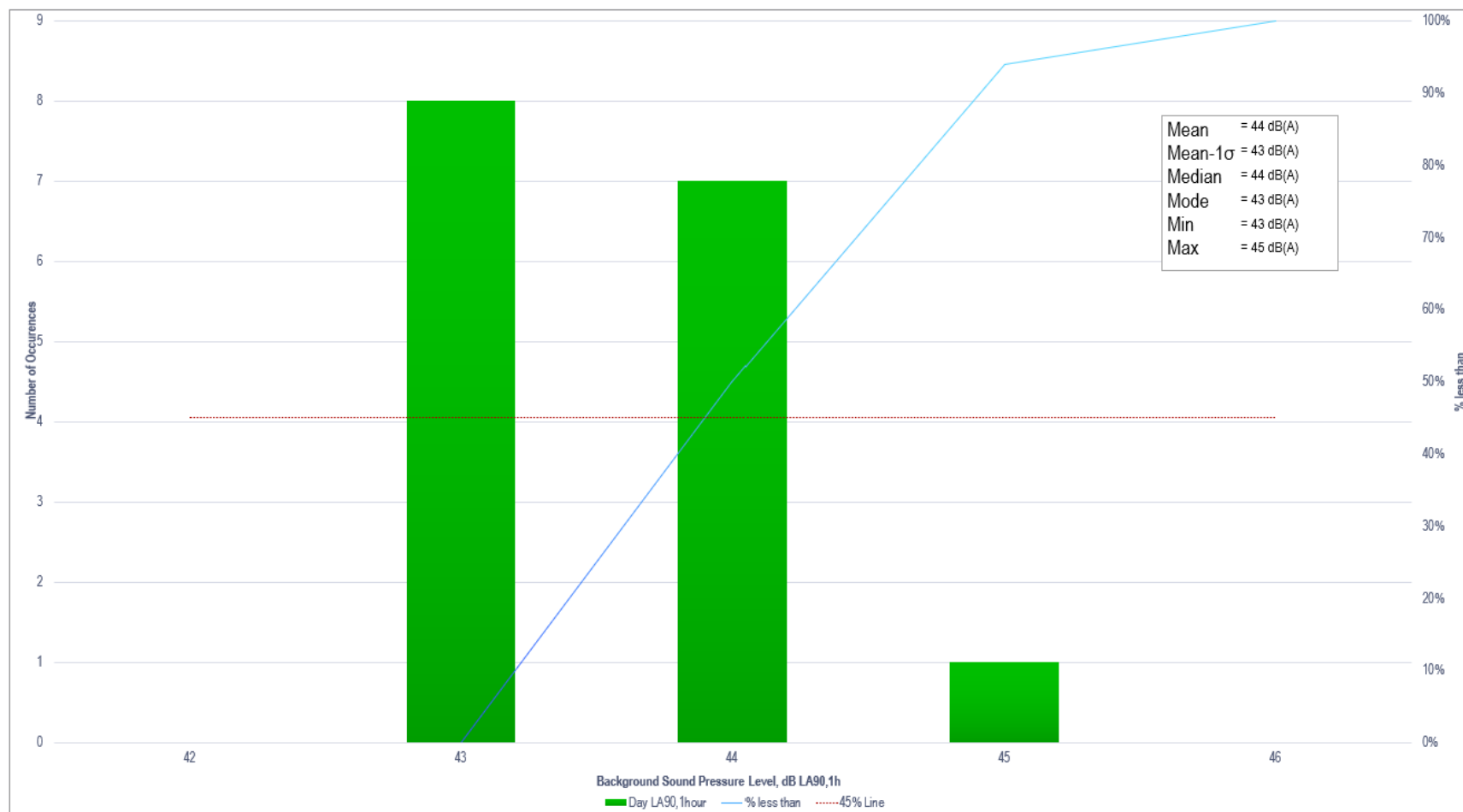
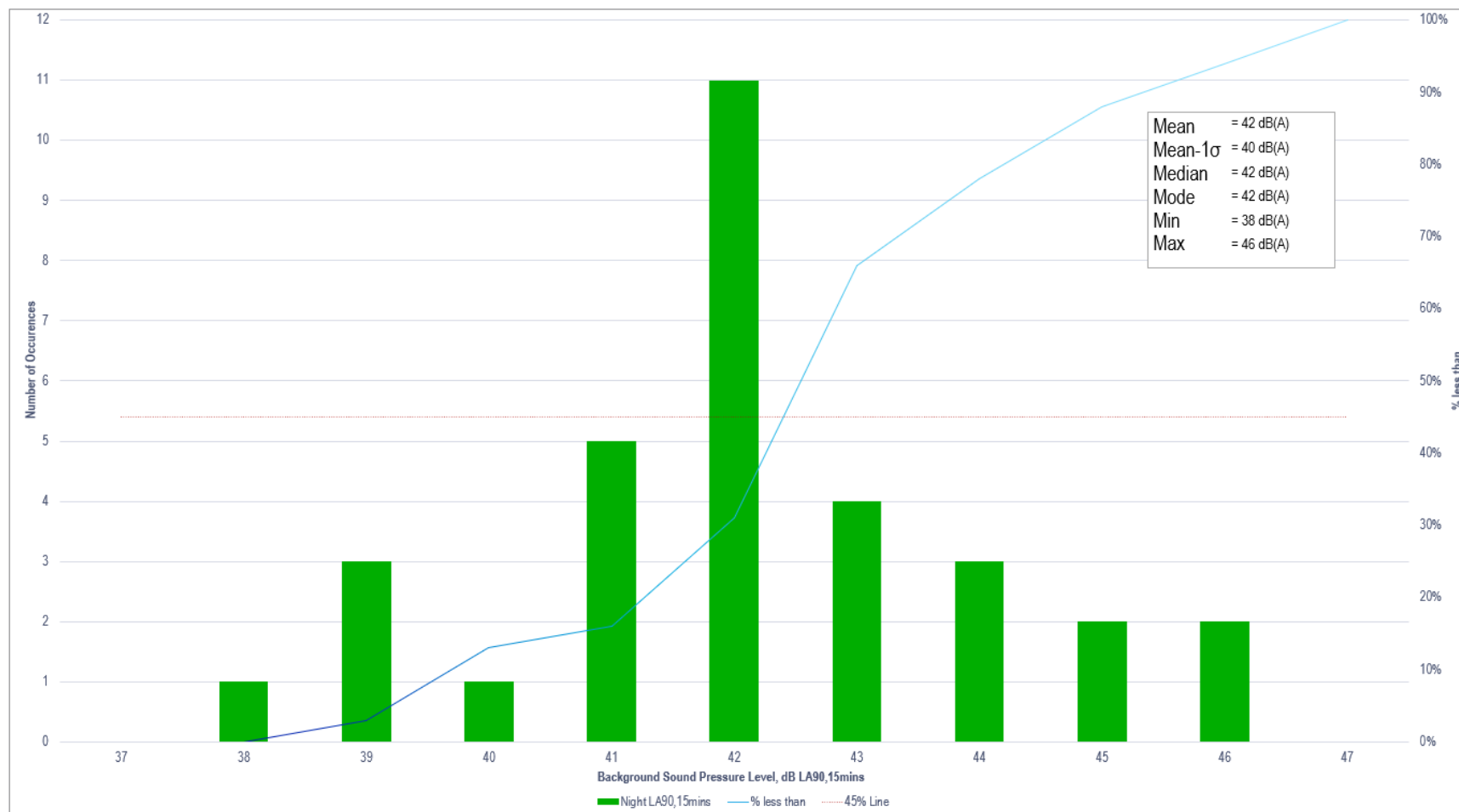


Figure 4.7: Distribution of Nighttime $LA_{90,15\text{minute}}$ Sound Levels – Saturday



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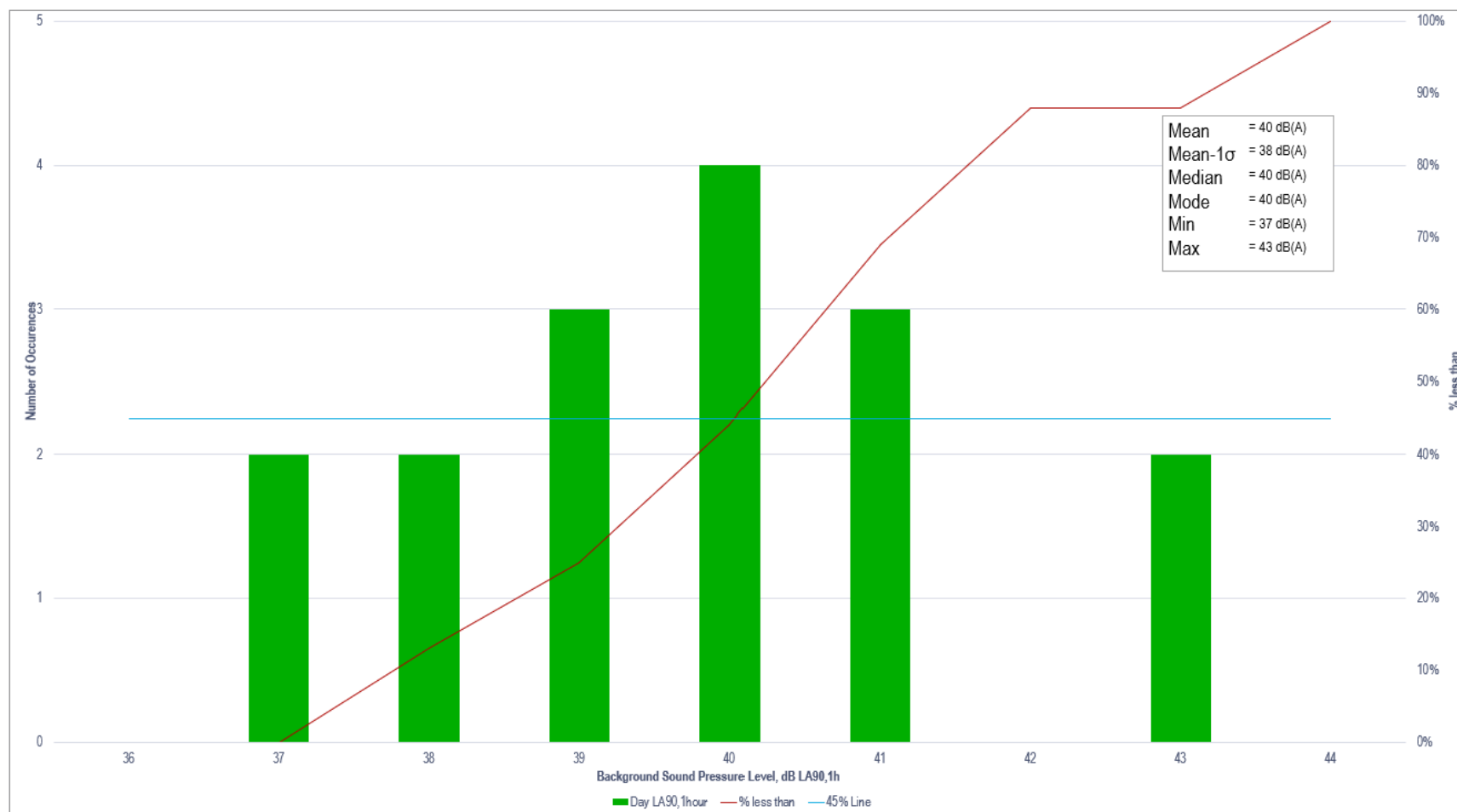
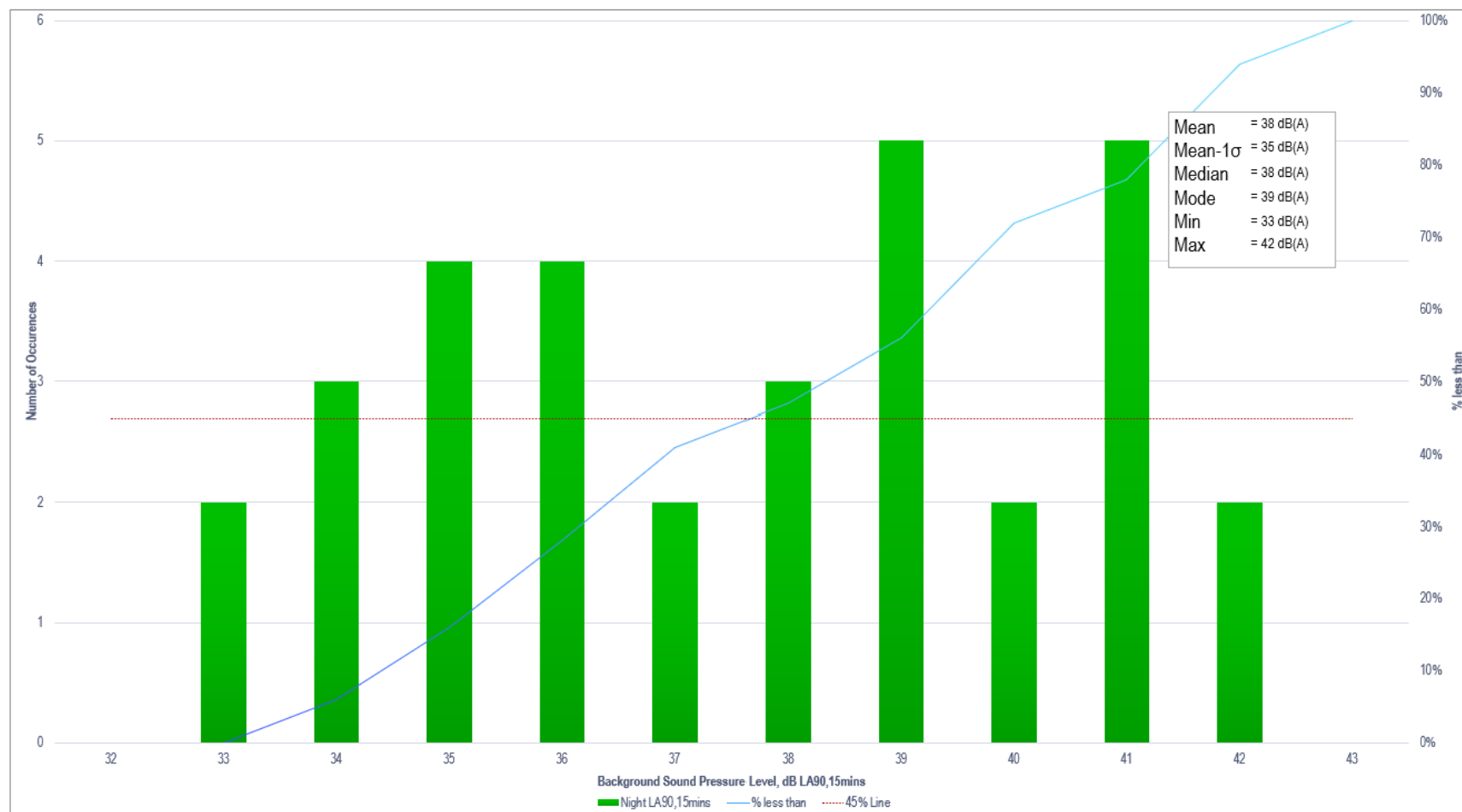
Determinari-001 Ltd • 3rd September 2026 • H4662 – NV – v4**Figure 4.8: Distribution of Day Time LA90,1hour Sound Levels – Sunday**

Figure 4.9: Distribution of Nighttime LA90,15minute Sound Levels – Sunday



5. IMPACT OF THE DEVELOPMENT – PLANT NOISE

5.1. Assessment Overview

The proposed development comprises of open storage yards. The noise-generating activities onsite are anticipated to be a combination of vehicular activity and plant operations. Commercial and industrial schemes such as this fall within the scope of BS 4142:2014+A1:2019 “*Methods for rating and assessing industrial and commercial sound*”. Accordingly, noise from mobile plant has been assessed using BS 4142.

The other source of noise within open storage facilities attribute to vehicular movements, specifically lorry movements, which are explicitly excluded from the scope of BS 4142 and is assessed separately as part of **Section 6** of this report. This separated methodology ensures that the assessment framework remains technically appropriate and wholly aligned with the applicable British Standards and relevant guidance documentation.

The development is a retrospective planning application; however, the site is not running at full capacity. Therefore, two sets of receptor noise levels have been calculated – 1) industrial and commercial noise from the site as it is at present; and 2) industrial and commercial noise from the site as if it were operating at full capacity.

5.2. Scheme Details

The proposed scheme will see 7 plots within the application boundary that are designated for open storage use. It is anticipated that these plots will accommodate intermittent and occasional machinery operations, which may result in occasional plant noise emissions from the development site. The scheme is understood to be capable of operating on 24/7 basis, supporting vehicle movements, loading and unloading operations, and general external operational activities, with plant restrictions during night-time periods.

At present, the yard uses and plant on-site are as follows;

- Yard 1 – Building material logistics, with occasional forklift use within yard.
- Yard 2&3 – Car dealer, use of open storage is to store cars.
- Yard 4 – Railway engineering firm, with this open storage yard predominately used for vehicle storage.
- Yard 5 – Scaffolding firm, used as overflow storage.
- Yard 6 – Haulage firm, no works onsite.
- Yard 7 – Car logistic company, car traffic movements off-site.

5.3. Establishing the Receptor Specific Sound Levels

Based on the onsite activities, a noise model has been constructed to determine how noise levels vary across the proposed development site. The noise model was constructed using the SoundPLAN essential 6.0 noise modelling software by SoundPLAN GmbH.

SoundPLAN utilises methodologies from various established standards for the prediction of noise from a variety of noise sources. This is outlined further below in **Table 5.1**. This assessment is principally concerned with the industry (plant) noise type, which utilises the calculation methodology within BS ISO 9613-2:2024.

Table 5.1: SoundPLAN Prediction Standards

Noise Type	Standards	ISBN	Published by	Published
Road	Calculation of Road Traffic Noise	0 11 550847 3	DfT	1988
Rail	Calculation of Rail Noise	0 11 551754 5	DfT	1995
Industry (Plant)	BS ISO 9613-2:2024	978 0 539 20903 7	BSI	2024
Industry (Construction)	BS 5228-1:2009+A1:2014	978 0 580 77749 3	BSI	2014
Parking Lot	BS ISO 9613-2:2024-01 (Parkplatzlärmstudie 2007)	978 0 539 20903 7 (978 3 940009 17 3)	BSI	2024

ISO 9613-2:2024 contains a procedure for predicting the propagation of sound from a given source of noise. The calculations consider different parameters to account for the total attenuation during the propagation of sound. This includes the consideration of any attenuation afforded by geometrical divergence, atmospheric absorption, ground effect, barriers and other miscellaneous properties as set within the acoustic model.

As noted above, two separate scenarios have been considered:

1. Current Arrangement
2. Full Capacity

When considering current plant noise, calculations have been made based on a single gas-powered forklift – this reflects both our onsite observations, as well as our understanding of current operations as directed by the site operators. Forklift noise has been modelled using 10 forklift movements in a single worst-case hour, reflecting onsite observations. They have been modelled in the location of Yard 1, where forklifts are currently exclusively used.

For the calculations at full capacity, for extensive noise sources have been modelled to represent a worst-case scenario with two gas-powered forklifts operating. For the purposes of the assessment, the following conservative operational assumptions have been adopted:

- Each forklift is assumed to operate for approximately 35% of each hour, equating to ~21 minutes per hour.
- During this operational period, each forklift is assumed to undertake approximately 20–25 lift and set-down events per hour:
 - These lift and set-down activities have been spatially distributed across four representative operational locations along the indicative forklift travel routes, modelled as discrete point sources.

- On this basis, the operational activity equates to approximately 4–6 lift events per operational location per hour.

These assumptions are considered reasonable, realistic, and conservative for the purposes of the noise impact assessment and represent a robust worst-case operational scenario.

The source noise levels were obtained from the global SoundPLAN database and are detailed further below in **Table 5.2**.

Table 5.2: Modelled Noise Sources (per Forklift)

Noise Source	Description	Source Document
3-6t Gas Forklift (Lifting)	Point source, 1 m emission height. Sound Power Level = 75 dB L_{WA}	Forum SCHALL, emission data catalogue 2023
3-6t Gas Forklift (Driving)	Line source, 1 m emission height. Sound Power Level = 62 dB $L_{WA}/m, m^2$	

The two scenarios have been modelled. Subsequently, **Figure 5.1** illustrates the location of the 14 representative receptors at which noise levels have been predicted for a single worst-case operational hour. The corresponding predicted levels are summarised in **Appendix 4**. All predicted values represent free-field sound levels. **Figure 5.2** presents the predicted noise contour mapping for the proposed development site based on current onsite activities, with **Figure 5.3** representing worst-case assumptions.

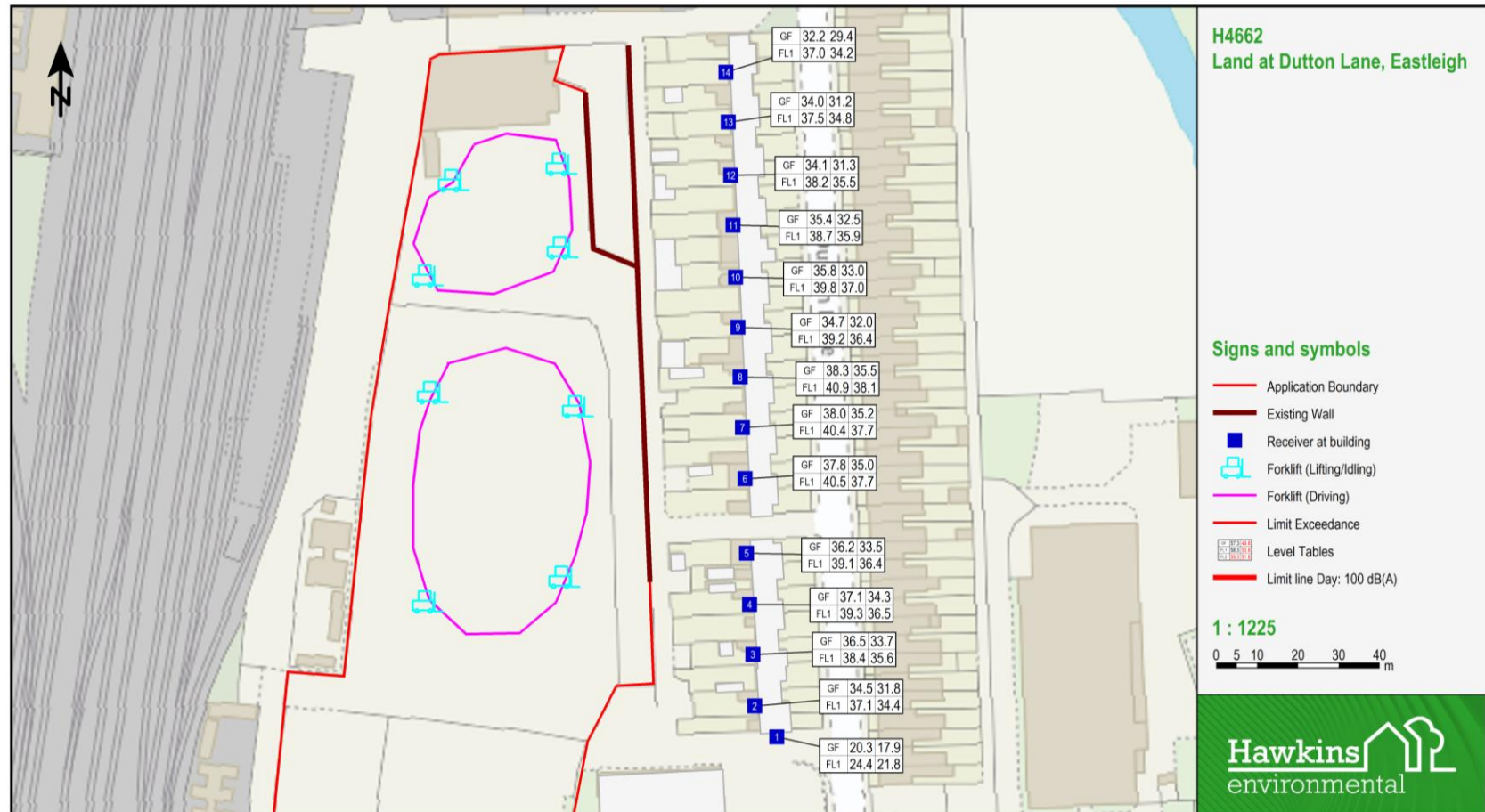
Table 5.3 shows the results at the receptors based on current onsite activities, with **Table 5.4** showing the results based on worst-case assumptions.

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Figure 5.1: Location of Noise Receptors

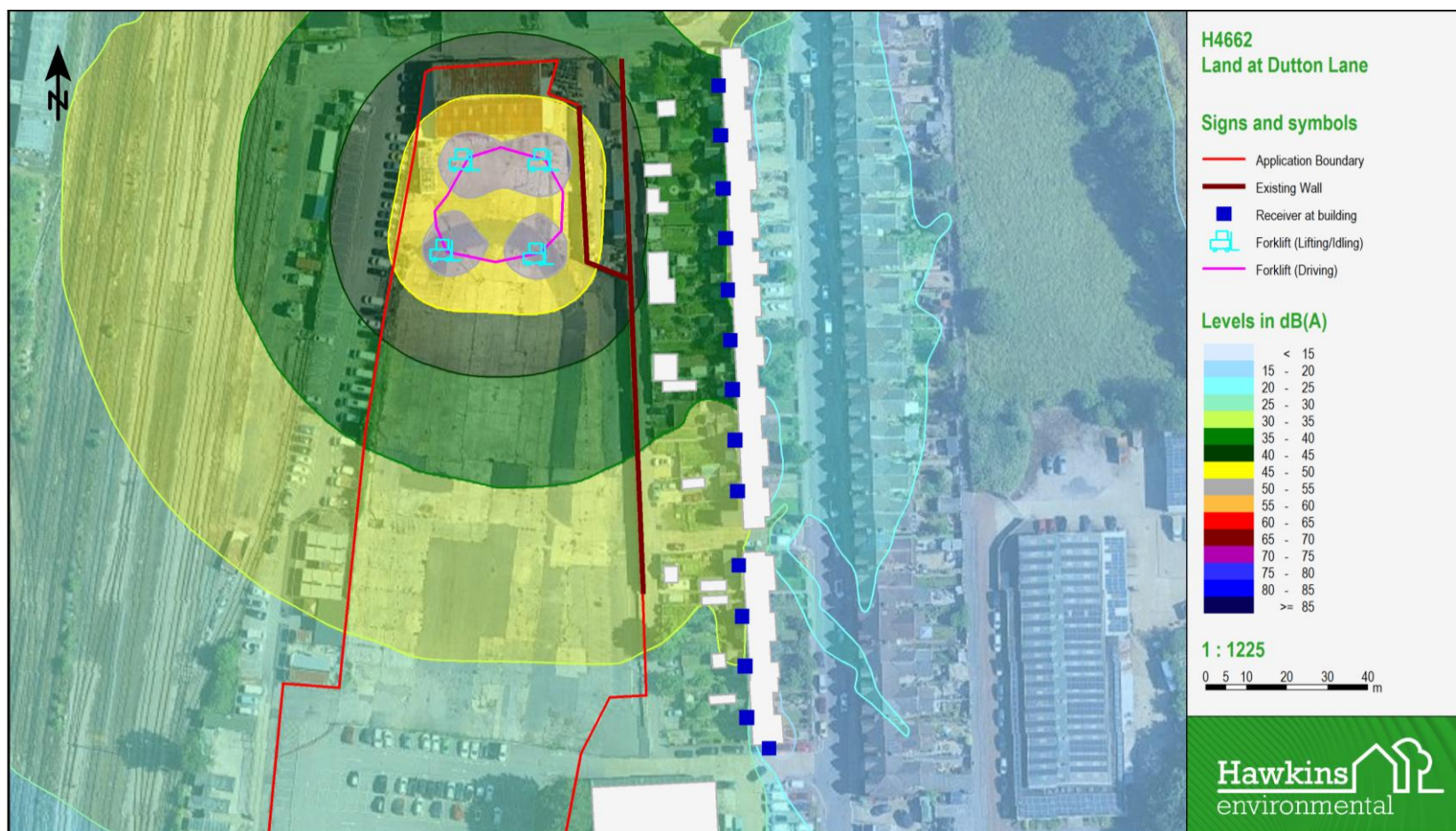


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Figure 5.2: SoundPLAN Current Onsite Plant Noise Contours



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Figure 5.3: SoundPLAN Worst-Case Onsite Plant Noise Contours

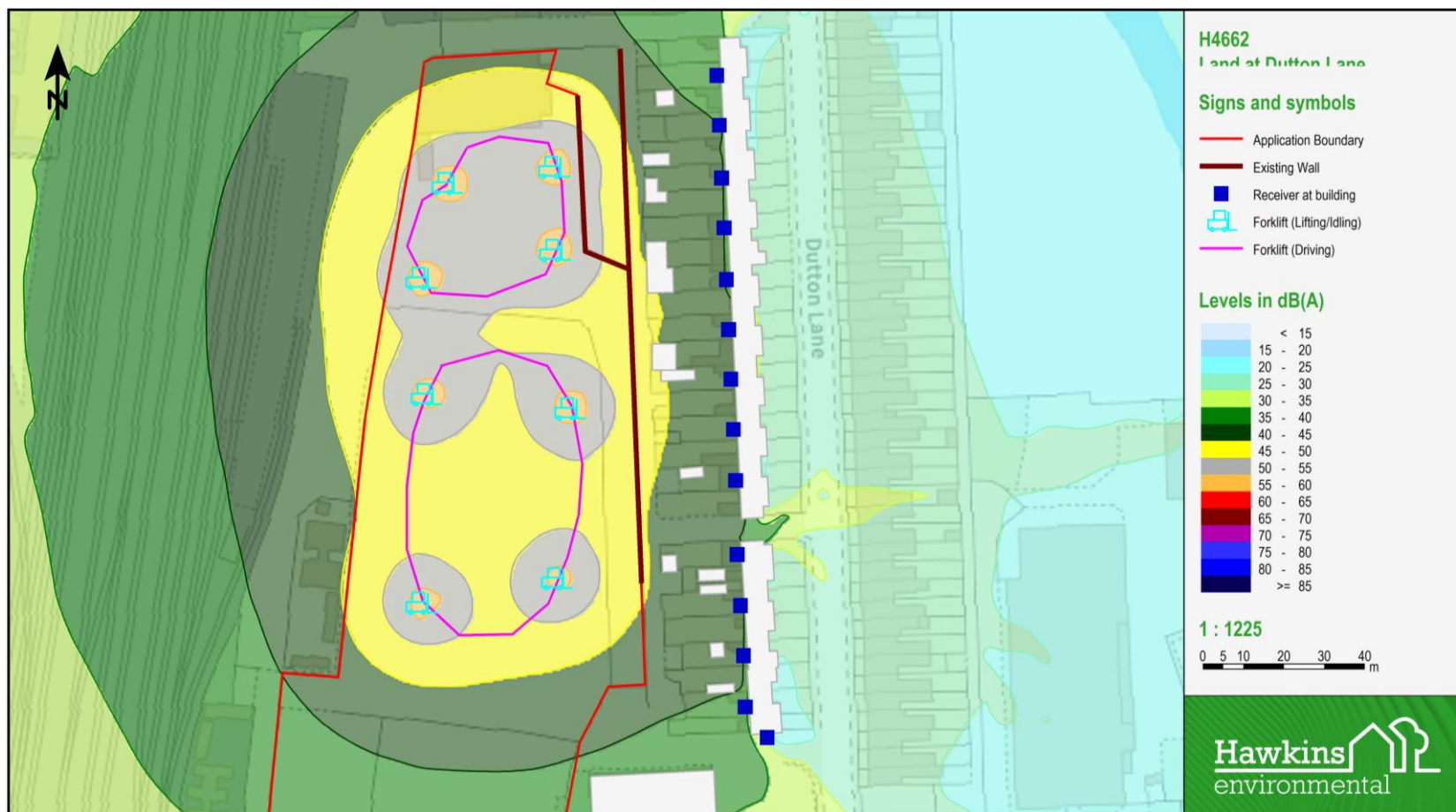


Table 5.3: Current Onsite Plant Specific Sound Levels at Sensitive Receptors

Receptor ID	House Number	Specific Sound Level, dB(A)	
		Ground Floor	1 st Floor
1	1-3	10.7	14.9
2	5-7	20.6	26.8
3	9-11	23.6	27.6
4	13-15	23.4	28.6
5	17-19	26.6	29.4
6	21-23	29.4	31.0
7	25-27	26.9	31.5
8	29-31	30.6	33.1
9	33-35	29.3	33.8
10	35A	29.7	33.9
11	37-39	30.8	34.1
12	41-43	29.8	34.0
13	45-47	30.7	34.1
14	49-51	28.6	33.7

Table 5.4: Worst-Case Onsite Plant Specific Sound Levels at Sensitive Receptors

Receptor ID	House Number	Specific Sound Level, dB(A)	
		Ground Floor	1 st Floor
1	1-3	20.3	24.4
2	5-7	34.5	37.1
3	9-11	36.5	38.4
4	13-15	37.1	39.3
5	17-19	36.2	39.1
6	21-23	37.8	40.5
7	25-27	38.0	40.4
8	29-31	38.3	40.9
9	33-35	34.7	39.2
10	35A	35.8	39.8
11	37-39	35.4	38.7
12	41-43	34.1	38.2
13	45-47	34.0	37.5
14	49-51	32.2	37.0

In accordance with Section 9 of BS 4142, the rating sound level is calculated by applying a character correction to the calculated receiver sound level. For this assessment, the character correction was specified using the “Subjective Method”, where it is necessary to “*consider the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention.*” BS 4142 goes on to highlight the subjective correction that one could apply; these corrections are summarised in **Table 5.5** below.

Table 5.5: Subjective Character Corrections

Category	Comments
Tonality	<i>"2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible".</i>
Impulsivity	<i>"a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible"</i>
Other sound characteristics	<i>"Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."</i>
Intermittency	<i>"If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."</i>

It would be anticipated that the noise generated by the development would result in a just perceptible tonal component and a readily distinctive intermittency element. Consequently, a 2 dB tonal penalty correction and 3 dB intermittency penalty correction should be applied to all specific sound levels to determine the rating sound levels. **Table 5.6** determines the rating sound levels at the receptor locations.

Table 5.6: Receptor Rating Sound Levels

Receptor ID	House Number	Rating Sound Level dB(A)			
		Current		Worst-Case	
		Ground Floor	1 st Floor	Ground Floor	1 st Floor
1	1-3	16	20	25	29
2	5-7	26	32	40	42
3	9-11	29	33	42	43
4	13-15	28	34	42	44
5	17-19	32	34	41	44
6	21-23	34	36	43	46
7	25-27	32	37	43	45
8	29-31	36	38	43	46
9	33-35	34	39	40	44
10	35A	35	39	41	45
11	37-39	36	39	40	44
12	41-43	35	39	39	43
13	45-47	36	39	39	43
14	49-51	34	39	37	42

5.4. Adherence to Sound Criteria

To assess the impact of the proposed plant, the predicted sound levels have been compared to the criteria in BS 4142.

Table 5.7 below considers the sound levels in a BS 4142 assessment during the period when the plant will be operational, during a typical weekday and weeknight. **Table 5.8** considers the sound levels in a BS 4142 assessment during the period when the plant will be operational, during a typical Saturday. **Table 5.9** below considers the sound levels in a BS 4142 assessment during the period when the plant will be operational, during a typical Sunday. In a BS 4142 assessment, the 'industrial' sound is rated by comparison against the background sound level. The difference between the rating sound level and lowest background sound level gives an indication of the likelihood of complaint.

Table 5.7: BS 4142 Assessment – Typical Weekday

Receptor ID	Difference Between Background & Rating Daytime				Difference Between Background & Rating Nighttime			
	Current		Worst-Case		Current		Worst-Case	
	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor
1	-32	-28	-23	-19	-23	-19	-14	-10
2	-22	-16	-9	-6	-13	-7	+1	+3
3	-19	-15	-7	-5	-10	-6	+3	+4
4	-20	-14	-6	-4	-11	-5	+3	+5
5	-16	-14	-7	-4	-7	-5	+2	+5
6	-14	-12	-5	-3	-5	-3	+4	+7
7	-16	-12	-5	-3	-7	-3	+4	+6
8	-12	-10	-5	-2	-3	-1	+4	+7
9	-14	-9	-8	-4	-5	0	+1	+5
10	-13	-9	-7	-3	-4	0	+2	+6
11	-12	-9	-8	-4	-3	0	+1	+5
12	-13	-9	-9	-5	-4	0	0	+4
13	-12	-9	-9	-6	-3	0	0	+4
14	-14	-9	-11	-6	-5	0	-2	+3

Table 5.8: BS 4142 Assessment – Saturday

Receptor ID	Difference Between Background & Rating Daytime				Difference Between Background & Rating Nighttime			
	Current		Worst-Case		Current		Worst-Case	
	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor
1	-27	-23	-18	-14	-26	-22	-17	-13
2	-17	-11	-4	-1	-16	-10	-3	0
3	-14	-10	-2	0	-13	-9	-1	+1
4	-15	-9	-1	+1	-14	-8	0	+2
5	-11	-9	-2	+1	-10	-8	-1	+2
6	-9	-7	0	+3	-8	-6	+1	+4
7	-11	-7	0	+2	-10	-6	+1	+3
8	-7	-5	0	+3	-6	-4	+1	+4
9	-9	-4	-3	+1	-8	-3	-2	+2
10	-8	-4	-2	+2	-7	-3	-1	+3
11	-7	-4	-3	+1	-6	-3	-2	+2
12	-8	-4	-4	0	-7	-3	-3	+1
13	-7	-4	-4	-1	-6	-3	-3	+1
14	-9	-4	-6	-1	-8	-3	-5	0

Table 5.9: BS 4142 Assessment – Sunday

Receptor ID	Difference Between Background & Rating Daytime				Difference Between Background & Rating Nighttime			
	Current		Worst-Case		Current		Worst-Case	
	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor
1	-24	-20	-15	-11	-19	-15	-10	-6
2	-14	-8	-1	+2	-9	-3	+5	+7
3	-11	-7	+2	+3	-6	-2	+7	+8
4	-12	-6	+2	+4	-7	-1	+7	+9
5	-8	-6	+1	+4	-3	-1	+6	+9
6	-6	-4	+3	+6	-1	+1	+8	+11
7	-8	-4	+3	+5	-3	+2	+8	+10
8	-4	-2	+3	+6	+1	+3	+8	+11
9	-6	-1	0	+4	-1	+4	+5	+9
10	-5	-1	+1	+5	0	+4	+6	+10
11	-4	-1	0	+4	+1	+4	+5	+9
12	-5	-1	-1	+3	0	+4	+4	+8
13	-4	-1	-1	+3	+1	+4	+4	+8
14	-6	-1	-3	+2	-1	+4	+2	+7

BS 4142: 2014 suggests that “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”.

Table 5.7, **Table 5.8** and **Table 5.9** show that on a typical weekday, both in the current site usage and when considering the worst-case site usage, the Rating noise level from the plant would be below the background noise level. This is a positive indication that complaints would be unlikely. At the weekend, on both Saturday and Sundays, the Rating noise level from the current site usage is below the background noise level at all receptors. However, when considering a worst-case situation, the Rating noise level could exceed the background noise level by up to 3 dB(A) on a Saturday and 6 dB(A) on a Sunday.

At night, the Rating noise level will exceed the background noise level in all scenarios, during the weekdays and weekends, with the exception of current site usage during a typical weekday, where the Rating noise level is marginally lower than the background noise levels.

It is possible to conclude from **Table 5.7**, **Table 5.8** and **Table 5.9** that unmitigated and unrestricted, impacts could occur from the use of plant and machinery on the site at all times at the weekend and at night. As a consequence it is strongly recommended that the use of plant and machinery on the site is restricted to 7am to 11pm Monday to Friday only.

6. IMPACT OF THE DEVELOPMENT – ROAD TRAFFIC NOISE

6.1. Model and Results

To assess the impact of road traffic noise, specifically HGV movements from the proposed development, a model has been developed to determine the change in noise levels for the closest residential receptors. As the proposed open storage area will operate during the daytime and nighttime, the 2014 IEMA Guidelines for Environmental Noise Assessment state that the predicted road traffic noise emissions should be compared to both the $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$.

The model assumes a worst-case scenario of 5 HGV movements per hour during the daytime and 1 HGV movement per hour at night. The residential receptor locations are presented in **Figure 6.1**. The daytime and nighttime road traffic noise contours are shown in **Figure 6.2** and **Figure 6.3**, respectively.

The model uses source data from the forum SCHALL emission data catalogue (2023). The data is based on a lorry that is greater than 6.5 tonnes, driving on asphalt at less than 30 km/h, with a calculated per meter sound power level of 26.0 dB(A) during the daytime and 19.0 dB(A) at night over a single-hour period.

Figure 6.1: Road Traffic Model Receptor Locations

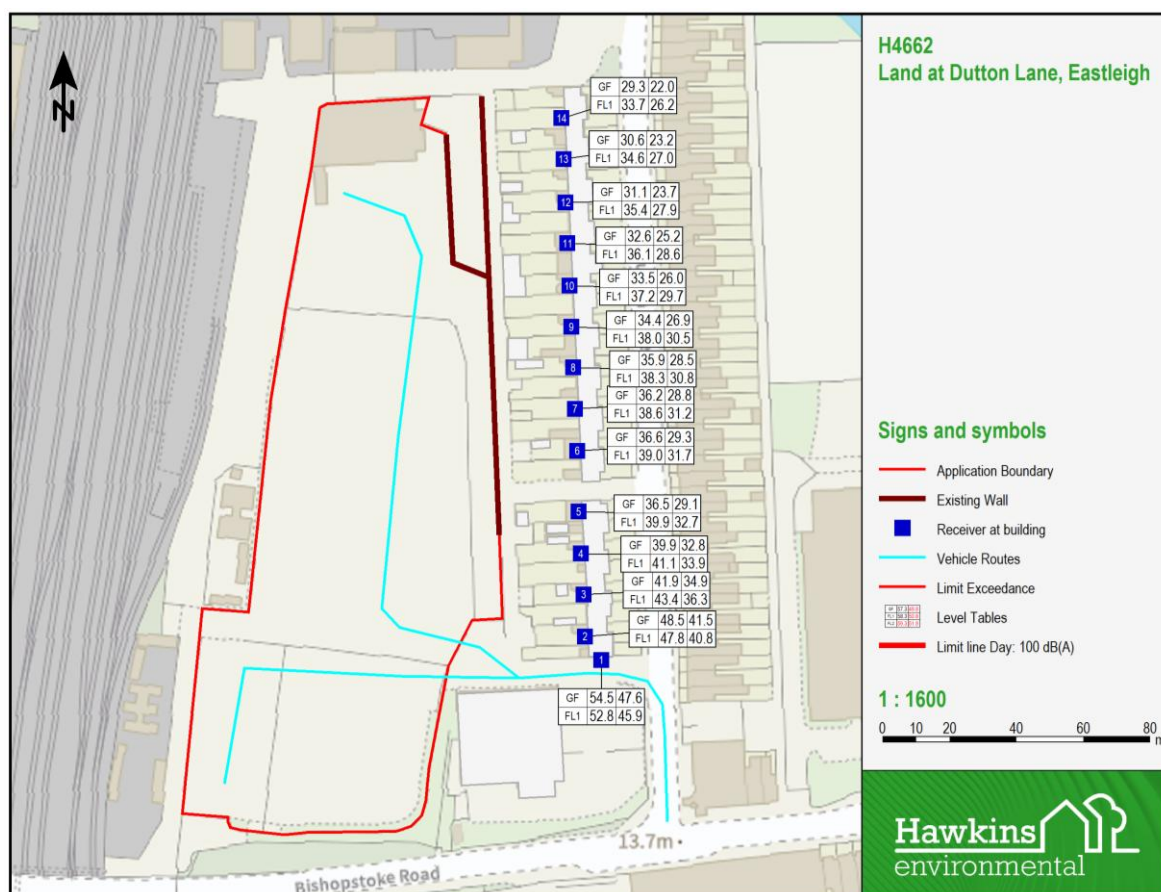


Figure 6.2: Proposed Site Road Traffic Noise Contours Daytime

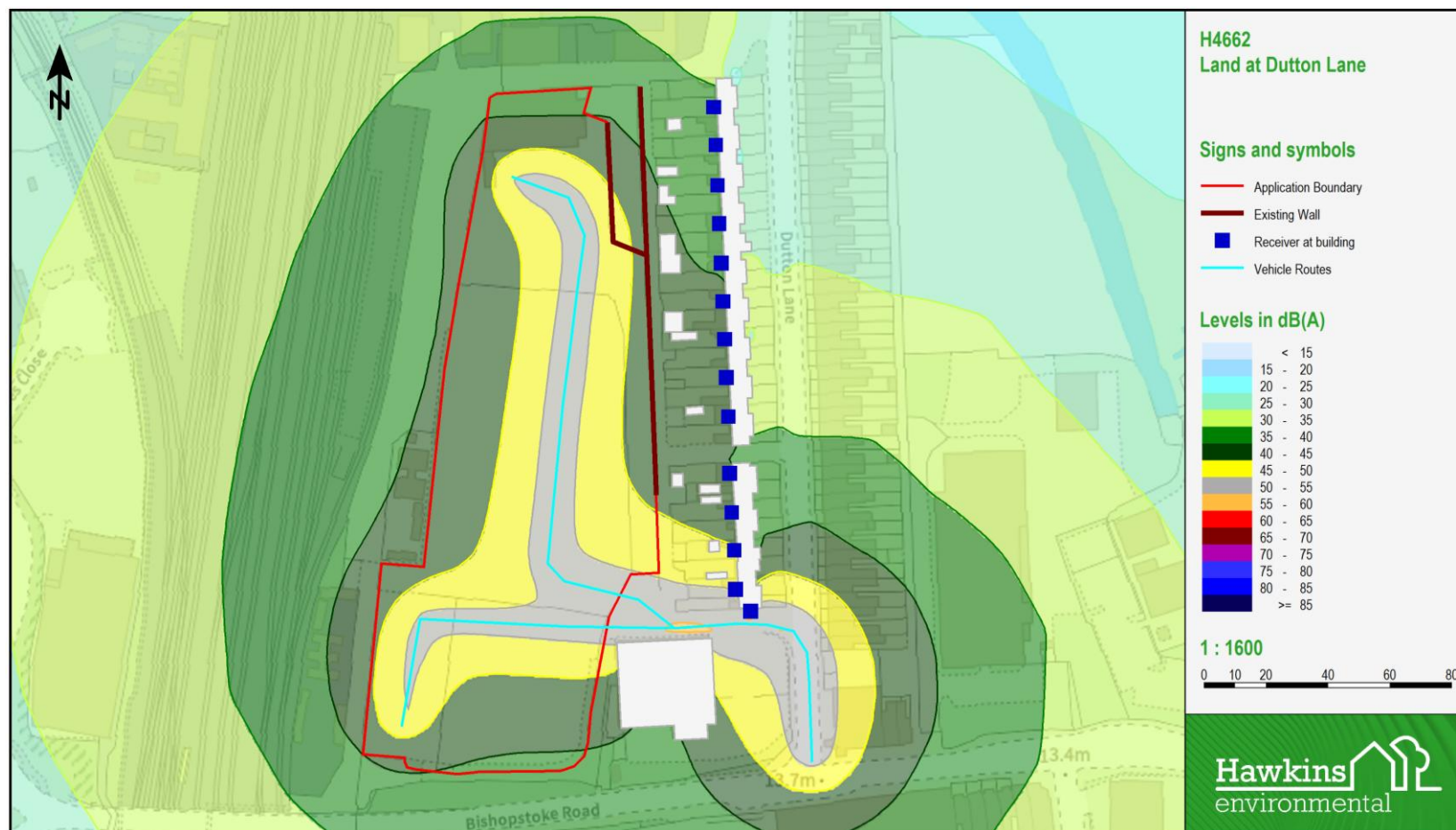


Figure 6.3: Proposed Site Road Traffic Noise Contours Night time

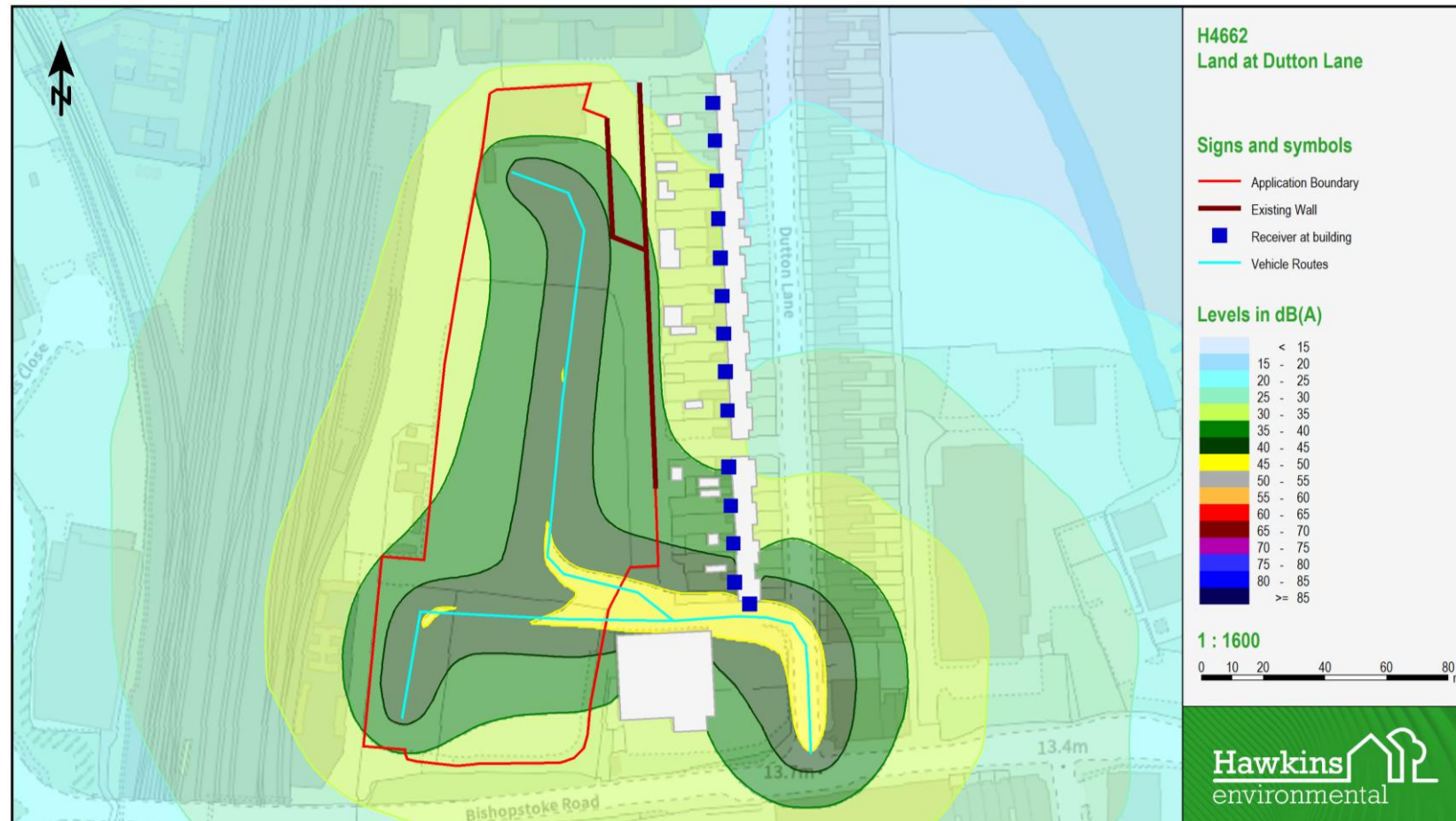


Table 6.1 shows the results of the modelling during the daytime and nighttime at the 14 receptors for both the ground and first floors.

Table 6.1: Modelled Receptor Noise Levels

Receptor ID	Modelled Road Traffic Noise			
	Daytime $L_{Aeq,16hours}$		Nighttime $L_{Aeq,8hours}$	
	Ground Floor	1 st Floor	Ground Floor	1 st Floor
1	54.5	52.8	47.6	45.9
2	48.5	47.8	41.5	40.8
3	41.9	43.4	34.9	36.3
4	39.9	41.1	32.8	33.9
5	36.5	39.9	29.1	32.7
6	36.6	39.0	29.3	31.7
7	36.2	38.6	28.8	31.2
8	35.9	38.3	28.5	30.8
9	34.4	38.0	26.9	30.5
10	33.5	37.2	26.0	29.7
11	32.6	36.1	25.2	28.6
12	31.1	35.4	23.7	27.9
13	30.6	34.6	23.2	27.0
14	29.3	33.7	22.0	26.2

Table 6.1 shows the noise from vehicle movements into and out of the site in isolation. However, **Table 6.2**, **Table 6.3** and **Table 6.4** shows the cumulative noise level at each receptor, including the typical ambient $L_{Aeq,T}$ noise for a weekday, a Saturday and Sunday respectively. These tables also show the relative increase in noise levels as a consequence of the proposed development with reference to the existing ambient noise levels. The extended noise survey indicated that the typical $L_{Aeq,16hr}$ was 54.8 dB(A), 55.1 dB(A) and 53.6 dB(A) for a weekday, a Saturday and a Sunday respectively. The typical $L_{Aeq,8hr}$ was 48.6 dB(A), 41.9 dB(A) and 43.6 dB(A) for a weekday, a Saturday and a Sunday respectively

Table 6.2: Cumulative Modelled Receptor Noise Levels - Weekday

Receptor ID	Cumulative Noise Level with Development (Traffic + Ambient)				Change in Noise Level as a Consequence of the Development			
	Daytime L _{Aeq,16hr}		Nighttime L _{Aeq,8hr}		Daytime L _{Aeq,16hr}		Nighttime L _{Aeq,8hr}	
	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor
1	57.7	56.9	51.2	50.5	+2.9	+2.1	+2.5	+1.9
2	55.7	55.6	49.4	49.3	+0.9	+0.8	+0.8	+0.7
3	55.0	55.1	48.8	48.9	+0.2	+0.3	+0.2	+0.2
4	54.9	55.0	48.7	48.8	+0.1	+0.2	+0.1	+0.1
5	54.9	54.9	48.7	48.7	+0.1	+0.1	0.0	+0.1
6	54.9	54.9	48.7	48.7	+0.1	+0.1	+0.1	+0.1
7	54.8	54.9	48.7	48.7	+0.1	+0.1	0.0	+0.1
8	54.8	54.9	48.7	48.7	+0.1	+0.1	0.0	+0.1
9	54.8	54.9	48.7	48.7	0.0	+0.1	0.0	+0.1
10	54.8	54.9	48.6	48.7	0.0	+0.1	0.0	+0.1
11	54.8	54.8	48.6	48.7	0.0	+0.1	0.0	0.0
12	54.8	54.8	48.6	48.7	0.0	0.0	0.0	0.0
13	54.8	54.8	48.6	48.7	0.0	0.0	0.0	0.0
14	54.8	54.8	48.6	48.6	0.0	0.0	0.0	0.0

Table 6.3: Cumulative Modelled Receptor Noise Levels - Saturday

Receptor ID	Cumulative Noise Level with Development (Traffic + Ambient)				Change in Noise Level as a Consequence of the Development			
	Daytime L _{Aeq,16hr}		Nighttime L _{Aeq,8hr}		Daytime L _{Aeq,16hr}		Nighttime L _{Aeq,8hr}	
	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor
1	57.8	57.1	48.6	47.4	+2.7	+2.0	+6.7	+5.5
2	56.0	55.8	44.7	44.4	+0.9	+0.7	+2.8	+2.5
3	55.3	55.4	42.7	43.0	+0.2	+0.3	+0.8	+1.1
4	55.2	55.3	42.4	42.5	+0.1	+0.2	+0.5	+0.6
5	55.2	55.2	42.1	42.4	+0.1	+0.1	+0.2	+0.5
6	55.2	55.2	42.1	42.3	+0.1	+0.1	+0.2	+0.4
7	55.2	55.2	42.1	42.3	+0.1	+0.1	+0.2	+0.4
8	55.2	55.2	42.1	42.2	+0.1	+0.1	+0.2	+0.3
9	55.1	55.2	42.0	42.2	0.0	+0.1	+0.1	+0.3
10	55.1	55.2	42.0	42.2	0.0	+0.1	+0.1	+0.3
11	55.1	55.2	42.0	42.1	0.0	+0.1	+0.1	+0.2
12	55.1	55.1	42.0	42.1	0.0	0.0	+0.1	+0.2
13	55.1	55.1	42.0	42.0	0.0	0.0	+0.1	+0.1
14	55.1	55.1	41.9	42.0	0.0	0.0	0.0	+0.1

Table 6.4: Cumulative Modelled Receptor Noise Levels - Sunday

Receptor ID	Cumulative Noise Level with Development (Traffic + Ambient)				Change in Noise Level as a Consequence of the Development			
	Daytime L _{Aeq,16hr}		Nighttime L _{Aeq,8hr}		Daytime L _{Aeq,16hr}		Nighttime L _{Aeq,8hr}	
	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor	Ground Fl.	1 st Floor
1	57.1	56.2	49.1	47.9	+3.5	+2.6	+5.5	+4.3
2	54.8	54.6	45.7	45.4	+1.2	+1.0	+2.1	+1.8
3	53.9	54.0	44.1	44.3	+0.3	+0.4	+0.5	+0.7
4	53.8	53.8	43.9	44.0	+0.2	+0.2	+0.3	+0.4
5	53.7	53.8	43.8	43.9	+0.1	+0.2	+0.2	+0.3
6	53.7	53.7	43.8	43.9	+0.1	+0.1	+0.2	+0.3
7	53.7	53.7	43.7	43.8	+0.1	+0.1	+0.1	+0.2
8	53.7	53.7	43.7	43.8	+0.1	+0.1	+0.1	+0.2
9	53.7	53.7	43.7	43.8	+0.1	+0.1	+0.1	+0.2
10	53.6	53.7	43.7	43.8	0.0	+0.1	+0.1	+0.2
11	53.6	53.7	43.7	43.7	0.0	+0.1	+0.1	+0.1
12	53.6	53.7	43.6	43.7	0.0	+0.1	0.0	+0.1
13	53.6	53.7	43.6	43.7	0.0	+0.1	0.0	+0.1
14	53.6	53.6	43.6	43.7	0.0	0.0	0.0	+0.1

Table 6.2, Table 6.3 and Table 6.4 shows that at all receptors, with the exception of Receptor No 1 (1 Dutton Lane), the increase in noise as a consequence of road traffic/lorry movements around the development would be less than 3 dB(A), both during the daytimes and nighttime on all days. An increase in noise levels of less than 3 dB(A) would be considered a “negligible” impact when considering the IEMA Guidelines.

At Receptor No 1, the increase in noise levels would be less than 3 dB(A), both during the weekday daytimes and nighttime, as well as during Saturday daytimes. Therefore, it can be concluded that during the week (both day and night), as well as Saturday daytimes, increases in traffic noise would be acceptable and no impact would occur.

At Receptor 1, the increase in noise during the daytime on a Sunday would be in the region of 3.5 dB(A), which under the IEMA Guidelines would be considered a “minor adverse” impact. Increase during the nighttime periods on Saturday and Sunday would be in excess of 5 dB(A) and therefore would be considered a “moderate adverse” impact.

As of a consequence of the above, that whilst traffic can use the site unrestricted during a typical weekday, even during the nighttime period, over the weekends, specifically at night and on Sundays during the daytime, it is strongly recommended that restrictions are put in place to limit lorry movements during these sensitive times.

7. OVERALL CONCLUSIONS AND RECOMMENDATIONS

A detailed sound measurement study has been carried out to determine whether a proposed 24/7 open storage site is likely to be acceptable in terms of noise and whether complaints are considered likely. This version of the report incorporates an extended period of noise monitoring following feedback from Eastleigh Borough Council.

The extended noise survey lasted for nearly a week and incorporated both weekdays and weekends to extensively characterise noise within the area.

The assessment considered the impact of both fixed plant and machinery (primarily forklift movements) which are assessed using BS 4142: 2014 +A1:2019 *'Methods for rating and assessing industrial and commercial sound'*, as well as the impact of lorry movements into and out of the site, which was assessed using the 2014 IEMA *"Guidelines for Environmental Noise Assessment"*.

This assessment is for a retrospective planning application, so it was possible to observe the current onsite activities. However, in terms of plant noise, there are currently very few forklift movements occurring on site, but it is acknowledged that there could be significantly more if different tenants were occupying the yards. Therefore, current and worst-case scenarios were assessed using BS 4142.

The assessment showed that on a typical weekday, both in the current site usage and when considering the worst-case site usage, the Rating noise level from the plant would be below the background noise level. This is a positive indication that complaints would be unlikely.

However, during the night during the working week and throughout the weekend, when considering a worst-case situation, the Rating noise level could exceed the background noise level. Therefore, it is possible to conclude that unmitigated and unrestricted, impacts could occur from the use of plant and machinery on the site at all times at the weekend and at night. As a consequence, it is strongly recommended that the use of plant and machinery on the site is restricted to 7am to 11pm Monday to Friday only.

Regarding the impact of lorry movements, the assessment shows that at all receptors, with the exception of No 1 Dutton Lane, the increase in noise as a consequence of road traffic/lorry movements around the development would be less than 3 dB(A), both during the daytimes and nighttime on all days. An increase in noise levels of less than 3 dB(A) would be considered a *"negligible"* impact when considering the IEMA Guidelines.

At No 1 Dutton Lane, the increase in noise levels would be less than 3 dB(A), both during the weekday daytimes and nighttime, as well as during Saturday daytimes. Therefore, it can be concluded that during the week (both day and night), as well as Saturday daytimes, increases in traffic noise would be acceptable and no impact would occur. However, at No 1 Dutton Lane, the increase in noise during the daytime on a Sunday would be in the region of 3.5 dB(A), which under the IEMA Guidelines would be considered a *"minor adverse"* impact. Increase during the nighttime periods on Saturday and Sunday would be in excess of 5 dB(A) and therefore would be considered a *"moderate adverse"* impact.

As a consequence of the above, that whilst traffic can use the site unrestricted during a typical weekday, even during the nighttime period, over the weekends, specifically at night and on Sundays during the daytime, it is strongly recommended that restrictions are put in place to limit lorry movements during these sensitive times.

To summarise, it is recommended that the following restrictions

1. The use of plant and machinery, including both fixed plant and mobile machinery such as forklifts, should be restricted to 7am to 11pm Monday to Friday only – plant and machinery should not be used at night or at the weekends.
2. Lorry movements should be restricted at the weekend, with no lorry movements on site from 11pm on Saturday, until 7am on Monday morning.

This effectively means that on a Sunday, the site needs to remain closed, although private cars or small vans would be acceptable.

Providing that the restrictions as noted above are enforced, it is considered that the proposed development complies with Policy P3 of the National Planning Policy Framework since the new development will “*mitigate and reduce to a minimum potential adverse impacts resulting from noise (and) not result in levels of noise exposure which would have a significant observed adverse effect*”. Since it has been shown that in terms of noise, the proposals adhere to local and national planning policy, it is considered that the noise environment of the site should not be a constraint on the proposed development.

Appendix 1

Glossary of Acoustic Terms

Appendix 1: Glossary of Acoustic Terms

Decibel (dB)	This is a tenth (deci) of a bel. Decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of the ratio between two quantities expressed in logarithmic form.
dB(A)	A-weighted decibels, i.e. decibel level incorporating a frequency weighting (A-weighting), which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness.
Freefield	A situation in which the radiation from a sound source is completely unaffected by the presence of any reflecting boundaries.
Hertz (Hz)	Unit of frequency, equal to one cycle per second. The frequency of sound waves refers to the number of pressure fluctuations per second. Frequency is related to the pitch of a sound.
$L_{Aeq,T}$	The equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period, T. For example, daytime noise is generally measured over a 16 hour period, so T is 16 hours. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.
L_{A10}	The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 percent of a given time and is the $L_{A10,T}$. The L_{A10} is used to describe the levels of road traffic noise at a particular location.
L_{A50}	The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 percent of a given time and is the $L_{A50,T}$.
L_{A90}	The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 percent of a given time and is the $L_{A90,T}$. The L_{A90} is used to describe the background noise levels at a particular location.
L_{Amax}	The 'A'-weighted maximum sound pressure level measured over a measurement period.
R_w (or SRI)	The weighted sound reduction index as a single number laboratory measured rating used to describe the sound insulation of building elements.

Appendix 2

Schedule of Equipment

Appendix 2: Schedule of Equipment

Hawkins Noise Kit 3 - Equipment Set 2918:

Equipment Type	Manufacturer	Serial Number	Calibration Certification Number	Calibration Type	Date of Last Calibration Check	Date of Next Calibration Check
Nor-140 Type 1 Sound Level Meter	Norsonic	1402918	U47824	UKAS Calibration: 0789	16 th May 2024	May 2026
Nor-1211-C Weather protected measurement microphone	Norsonic	8706	48196	Traceable Calibration – Campbell Associates	26 th June 2024	June 2026
Nor-1251 Sound Calibrator	Norsonic	31233	U54937	UKAS Calibration: 0789	28 th May 2026	May 2027
Nor1408A/10 Extension Cable	Norsonic/Lemo	Not Applicable				

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Laboratory Location

Campbell Associates Ltd5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030**Certificate of Calibration**Certificate number: **U47824**Test Object: **Sound Level Meter, BS EN IEC 61672-1:2003 Class 1**

Producer: **Norsonic AS.**
 Type: **140**
 Serial number: **1402918**
 Customer: **Hawkins Environmental Ltd**
 Address: **The Square, Basing View,
Basingstoke, Hampshire. RG21 4EB.**
 Contact Person: **Nick Hawkins**
 Order No: **PO-0376**

Introduction:

Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the Test Object listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	Producer	Type	Serial No	Certificate No
Microphone	CEL	192/2F	28241	U47823
Calibrator*	Norsonic	1251	31233	U47822
Preamplifier	Norsonic	1209	12207	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	Norsonic	Nor1451 (ø 60mm)
Attenuator	N/A	
Extension cable	N/A	

These items have been taken into account wherever appropriate.

Instruction Manual: Im140_1Ed8R0En Firmware Version: v2.1.670 The test object is a single channel instrument.

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	99.89 ±0.01	23.05 ±0.85	55.25 ±2.55

Calibration Dates:

Received date:	10/05/2024	Reviewed date:	16/05/2024
Calibration date:	16/05/2024	Issued date:	16/05/2024

Technicians: (Electronic certificate)Calibrated by: *Martyna Silva*Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Slim-Cert-Master-V3-07

Certificate of Calibration

Continuation of Certificate number: U47824

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	BS EN IEC 61672-1:2003
Periodic Tests:	BS EN IEC 61672-3:2006
Pattern Evaluation:	Not Applicable

Conformance:

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC 61672-3 Ed.1 #9	Passed
Self-generated noise - IEC 61672-3 Ed.1 #10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 #11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 #12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 #13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 #14	Passed
Toneburst response - IEC 61672-3 Ed.1 #16	Passed
Peak C sound level - IEC 61672-3 Ed.1 #17	Passed
Overload indication - IEC 61672-3 Ed.1 #18	Passed

Comments

Correct level with associated calibrator is 113.9dB(A).

Statement of Conformance

The sound level meter submitted for testing has successfully completed the periodic tests for the environmental conditions under which the tests were performed. However, no general statement of conclusion can be made about conformance of the sound level meter to the full requirements of the manufactured standard because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in the manufacturer's standard and because the periodic tests completed cover only a limited subset of the specifications in the relevant standard

Observations

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

Decision Rule

Basic Meter Function - The decision rules will be applied in accordance with the procedure as described in BS EN 61672-3:2006.

This certificate relates only to the items tested above.

** End of Certificate **

Certificate of Conformance

Certificate Number 48196
Date of verification June 26, 2024

Laboratory Location

Campbell Associates Ltd

5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

**Weather protected measurement microphone**

Manufacturer Norsonic
Type 1211
Variant C
Serial number 8706

Issued to

Hawkins Environmental Ltd
70 Wentworth Crescent
Basingstoke

Hampshire RG22 4WX

These weather protected measurement microphones comprise a microphone capsule and an associated preamplifier, the types and serial numbers fitted to this unit are noted below. Each of these elements have been tested separately and then the overall acoustic performance of the system verified.

Calibration Report & Certificate Number 48195 for the microphone are attached and form part of this certificate.

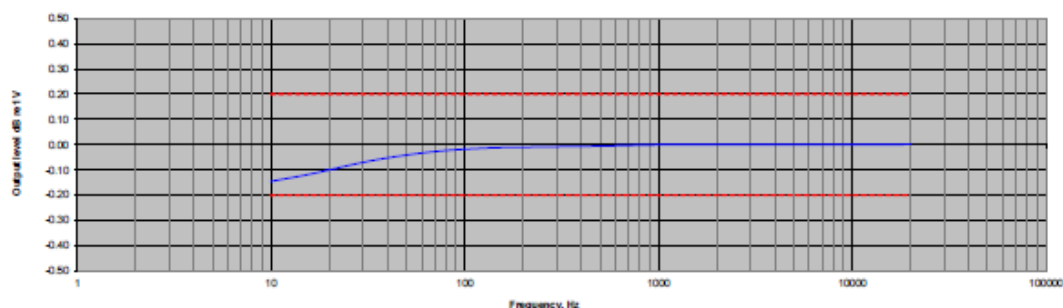
Microphone type	GRAS-40AS	Serial number	9466	Sensitivity	-27.63 dB
Preamplifier type	NOR-1201	Serial number	23667		

Comments: Electrical self noise and acoustic tests carried out using Nor-140.1406335.

Preamplifier conformance

Relative gain test. An input signal was connected via a 18pF line input adaptor. The signal source was a Stanford Research DS360 Signal Synthesizer serial number 88732 and the output levels were read on an Agilent (HP) 34401. Precision Digital Voltmeter serial number MY41015704. Power supplies for the preamplifier were supplied by a Norsoni Nor-483B SMS unit serial number 31072. Valid traceable calibration certificates are held for all this equipment. Verification was performed to the procedure TP 08. The relative gain with frequency of the preamplifier is given in the graph below with the absolute gain at 1kHz given in the table.

Relative gain at 1V input



Continued overleaf

DOCR: CERT-M001

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Absolute gain at 1k Hz

Absolute gain test		
Frequency	Gain	Result
Hz	dB	
1k	-0.24	Pass

Electrical self noise tests

Self noise in dB, at -26dB re 1V/Pa with 18pF load		Result
dB(A)		
	9.5	Pass
dB(C)	13.4	Pass

Acoustic tests

The weather protected measurement microphone was coupled to the Reference Calibrator Nor-1253 serial number 27765 using the supplied coupler Gras-RA0010 s/n 599 and the correct SPL was set on the laboratory analyser. The acoustic cover was then placed over the microphone and the acoustic noise floor checked and the level expressed in dB(A).

The system was then calibrated with Nor-1251 serial number 30873 and the insertion loss of the coupler determined.

Acoustic coupler Gras-RA0010 serial number 599

Acoustic tests	Reference	Measured	Result
	dB	dB	
Acoustic calibration @ 250 Hz	124	124.0	Pass

Acoustic noise floor	Lab ambient	Measured	Result
	dB	dB	
A weighting	35.9	17.2	Pass

Acoustic coupler verification with 1kHz test calibrator	Nominal Level	Measured	k factor
	dB	dB	
	124	114.7	0.71

When using the specified acoustic coupler with the test calibrator given above the correct calibration level for this weather protected measurement microphone is given below.

$$\begin{aligned}
 \text{Calibration level} &= \text{Calibrator nominal level} + \text{Coupler k factor} \\
 &= 113.99 + 0.71 \\
 &= 114.7 \text{ dB}
 \end{aligned}$$

The correct reference angle for this measurement microphone is 90 degrees, when mounted vertically it is correct for measurement of sources co-planar to the horizon.

Environmental conditions at time of tests

Temperature 23.9 °C Humidity 50.3 % RH Pressure 1004.91 mBar

These test indicate that the subject device complies with the requirements of the manufacturer's specification at the time of its manufacture. Repeat verification is recommended within 24 months

Technician: (Electronic certificate)

Verification performed by: *Martyna Silva*

Date of verification: 26 June 2024

Certificate Number: 48196

Laboratory Location

Campbell Associates Ltd

5b Chelmsford Road Industrial Estate

GREAT DUNMOW, Essex, GB-CM6 1HD

Phone 01371 871030

**Certificate of Calibration****Certificate number:** U54937**Test Object:** Sound Calibrator**Producer:** Norsonic AS.**Type:** 1251**Serial number:** 31233**Customer:** Hawkins Environmental**Address:** 70 Wentworth Crescent,
Basingstoke Hants, RG22 4WX**Contact Person:** Nick Hawkins**Order No:**

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.07	0.05	1000.55	0.35
Measurement 2	114.06	0.05	1000.55	0.36
Measurement 3	114.07	0.05	1000.55	0.37
Result (Average):	114.07	0.05	1000.55	0.36
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20 μ Pa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement

Pres:0.0005 dB/kPa Temp:0.003 dB/°C Humi:0 dB/%rh Load volume: 0.0003 dB/mm³

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	101.8 $\pm$ 0.070	20.8 $\pm$ 0.2	55.6 $\pm$ 2.6

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of $k=2$, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\NOR1251_31233_M1.nmf

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	21-May-2026	Reviewed date:	29-May-2026
Calibration date:	28-May-2026	Issued date:	29-May-2026

Technicians: (Electronic certificate)

Calibrated by: *Robyn Pezaro*

Reviewed by: *David Egan*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Calb-V6-Cert-Master-V4-02

Certificate of Calibration

Continuation of Certificate number: U54937

Reference Microphone: WSM8 (A) - GRAS-40AG.147852

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Instruments and Program

A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Comments

Statement of Calibration

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in annex B of BS EN IEC 60942:2003 for the sound pressure levels and frequencies stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organisation responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, no general statement of conclusion can be made about conformance of the sound calibrator to the requirements of BS EN IEC 60942:2003.

Notes:

The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in BOLD are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Observations:

Decision Rule:

The decision rules have been applied in accordance with the procedure as described in BS EN 60942:2003

This certificate relates only to the items tested above.

**** End of Certificate ****

Appendix 3

Summary of Sound Measurements

Appendix 3: Summary of Sound Measurements

Weekend Measurements

Day	Time	L _{Aeq}	L _{Amax}	L _{A10}	L _{A50}	L _{A90}
Friday	11:00	57.1	84.4	52.3	47.8	45.9
	12:00	55.6	77.9	53.7	49.7	47.7
	13:00	54.8	80.4	54.9	50.4	48.3
	14:00	57.7	81.8	57.3	53.0	50.6
	15:00	54.3	75.5	53.5	49.6	47.6
	16:00	57.0	82.4	52.9	48.8	46.7
	17:00	57.0	85.2	53.2	48.8	46.5
	18:00	52.4	80.1	50.0	46.7	44.9
	19:00	55.5	79.0	51.5	47.7	45.5
	20:00	55.6	80.5	53.9	47.6	45.2
	21:00	46.1	60.8	48.2	44.1	41.7
	22:00	46.0	63.7	47.5	42.6	40.8
	23:00	50.0	78.3	47.2	42.8	41.0
Saturday	00:00	45.7	60.8	46.7	43.5	42.2
	01:00	44.9	64.3	46.9	43.2	41.3
	02:00	43.2	58.3	45.1	42.5	40.5
	03:00	45.3	63.8	46.1	43.3	41.1
	04:00	45.7	61.5	47.6	44.7	42.7
	05:00	46.8	64.6	47.7	45.6	43.9
	06:00	53.7	74.8	49.7	46.4	44.7
	07:00	55.9	80.4	51.9	46.3	44.4
	08:00	56.0	82.2	52.1	46.7	45.2
	09:00	58.8	83.1	50.5	45.4	43.4
	10:00	53.8	80.4	49.7	45.2	43.5
	11:00	57.1	83.6	51.7	45.6	43.7
	12:00	54.3	81.2	51.6	46.1	44.1
	13:00	56.7	83.3	50.6	45.6	43.4
	14:00	48.6	69.8	49.3	45.1	42.9
	15:00	48.3	71.9	48.1	44.6	42.8
	16:00	56.5	80.2	49.8	45.2	43.3
	17:00	58.2	84.2	51.6	45.0	43.1
	18:00	51.4	77.7	49.0	45.5	43.9
	19:00	55.1	80.3	51.6	46.4	44.5
	20:00	48.8	67.3	48.3	45.4	44.0
	21:00	55.7	82.5	48.3	45.0	43.8
	22:00	46.2	60.4	47.4	44.3	43.1

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Day	Time	L _{Aeq}	L _{Amax}	L _{A10}	L _{A50}	L _{A90}
Sunday	23:00	44.3	65.1	45.0	41.5	40.0
	00:00	43.5	54.2	44.9	42.4	40.7
	01:00	38.8	52.8	40.9	38.4	36.6
	02:00	37.2	55.8	39.3	36.5	34.4
	03:00	36.6	47.4	38.2	36.0	34.1
	04:00	40.1	57.7	41.7	38.7	36.1
	05:00	44.8	59.4	44.5	42.2	40.1
	06:00	42.4	71.8	44.0	42.1	40.7
	07:00	42.2	58.6	44.2	40.8	39.6
	08:00	59.8	85.2	47.8	40.9	37.7
	09:00	58.0	85.4	45.4	39.3	37.4
	10:00	45.9	72.9	43.8	39.2	37.3
	11:00	54.4	82.3	48.0	41.3	39.0
	12:00	58.6	85.3	45.2	39.8	38.0
	13:00	49.3	74.6	46.5	42.6	40.5
	14:00	50.5	80.2	46.3	41.3	38.9
	15:00	44.3	67.3	44.8	40.7	38.6
	16:00	53.4	80.3	46.7	42.6	40.1
	17:00	52.5	79.8	46.9	43.6	41.4
	18:00	46.9	65.1	48.6	45.1	43.0
	19:00	52.8	78.0	49.8	44.9	43.1
	20:00	51.7	77.8	47.3	42.3	39.9
	21:00	46.4	64.7	46.0	42.5	40.5
	22:00	43.4	61.5	44.8	42.4	40.5
Monday	23:00	41.8	61.2	42.7	39.9	38.3
	00:00	41.3	50.1	42.1	38.8	37.5
	01:00	41.1	63.1	43.8	39.6	37.2
	02:00	37.6	46.2	38.9	37.4	36.2
	03:00	39.6	49.0	40.1	38.9	37.8
	04:00	42.9	54.7	43.9	42.4	41.2
	05:00	48.7	63.0	46.5	44.0	42.5
	06:00	45.3	60.2	46.8	44.8	43.4
	07:00	51.9	77.4	49.4	45.3	43.6
	08:00	56.8	81.5	50.1	46.6	44.2
	09:00	50.7	79.6	49.2	46.6	44.5
	10:00	52.8	81.2	47.5	43.5	41.5
	11:00	57.4	81.5	50.8	44.3	42.3
	12:00	46.7	82.8	48.7	44.8	42.4
	13:00	46.6	72.5	47.6	44.2	41.8
	14:00	46.2	76.4	47.0	44.3	42.1
	15:00	52.3	78.8	48.1	44.3	41.9

Acoustic Impact Assessment:

Land at Dutton Lane, Eastleigh

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Day	Time	L _{Aeq}	L _{Amax}	L _{A10}	L _{A50}	L _{A90}
	16:00	55.2	81.0	49.2	43.9	41.1
	17:00	49.4	71.2	47.0	43.0	40.3
	18:00	54.9	80.1	48.9	43.0	40.4
	19:00	54.0	78.8	48.6	42.3	39.9
	20:00	53.5	79.3	49.7	43.5	40.6
	21:00	47.4	64.4	46.6	42.9	41.2
	22:00	58.9	87.9	47.3	43.3	41.8
	23:00	46.7	66.1	47.5	44.3	42.1
Tuesday	00:00	43.5	59.5	44.5	42.0	40.6
	01:00	41.2	52.2	43.0	40.4	38.8
	02:00	42.9	58.7	44.1	40.9	39.5
	03:00	44.2	58.8	45.2	41.6	39.5
	04:00	44.7	54.3	46.5	43.9	42.0
	05:00	49.8	65.8	50.0	46.9	45.4
	06:00	56.4	72.1	55.1	51.8	50.6
	07:00	52.3	81.9	52.0	49.9	49.0
	08:00	56.3	82.8	51.4	48.6	47.3
	09:00	53.0	76.7	51.5	48.7	47.0
	10:00	49.9	75.7	50.6	47.6	45.9

Weekday Measurements

Day	Time	L _{Aeq}	L _{Amax}	L _{A10}	L _{A50}	L _{A90}
Tuesday	13:00	51.9	68.9	53.3	50.5	48.9
	14:00	58.8	84.3	55.9	50.6	48.4
	15:00	57.0	83.5	55.1	50.1	48.0
	16:00	54.1	77.5	54.3	49.5	47.1
	17:00	53.7	79.1	49.8	46.5	44.6
	18:00	52.2	77.3	52.3	48.2	46.1
	19:00	55.1	80.1	50.9	46.8	44.7
	20:00	51.8	76.0	49.3	45.1	43.0
	21:00	46.2	61.2	47.5	44.2	42.2
	22:00	43.9	59.7	45.7	41.8	39.4
	23:00	42.4	63.0	42.1	38.6	36.3
Wednesday	00:00	41.7	74.3	42.9	39.6	37.5
	01:00	41.5	62.8	44.0	39.8	38.0
	02:00	41.5	57.9	42.5	40.0	38.8
	03:00	44.0	62.0	45.0	41.6	40.0
	04:00	43.7	52.8	43.3	41.4	40.1
	05:00	48.3	72.6	48.6	45.1	43.7

Acoustic Impact Assessment:

Land at Dutton Lane, Eastleigh

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	06:00	56.4	81.6	56.5	51.8	50.4
	07:00	56.9	78.4	55.1	52.6	51.2
	08:00	53.3	78.9	51.6	49.8	48.6
	09:00	53.0	75.6	53.1	51.3	50.4
	10:00	52.1	74.9	52.6	50.4	49.2
	11:00	56.6	84.1	53.2	49.1	47.4
	12:00	53.5	75.3	52.9	50.8	49.4
	13:00	52.8	74.7	54.0	51.9	50.2
	14:00	57.2	81.2	54.6	50.4	48.4
	15:00	58.7	81.8	57.7	51.3	48.5
	16:00	54.6	78.7	55.4	50.9	48.3
	17:00	55.3	81.1	53.1	49.7	47.7
	18:00	55.6	79.5	54.0	49.7	47.9
	19:00	54.4	81.7	52.4	48.6	46.9
	20:00	52.8	71.9	54.0	52.1	51.0
	21:00	51.2	75.7	49.9	47.2	45.4
	22:00	43.4	56.8	45.0	42.0	40.7
	23:00	44.4	60.9	44.0	41.2	39.6
Thursday	00:00	42.3	61.0	45.0	40.8	38.5
	01:00	41.4	59.1	42.7	39.9	38.1
	02:00	47.9	75.7	47.7	46.1	44.5
	03:00	43.9	59.2	45.8	41.2	38.7
	04:00	40.4	66.4	41.1	38.0	36.1
	05:00	46.3	72.7	46.2	42.8	41.4
	06:00	54.4	79.5	53.4	50.4	47.0
	07:00	54.2	78.6	50.5	47.9	46.2
	08:00	59.1	81.8	53.7	49.9	47.8
	09:00	54.9	74.1	55.1	53.2	52.0
	10:00	55.4	82.8	56.4	53.3	51.9
	11:00	57.7	81.3	54.7	52.7	51.5
	12:00	55.6	78.8	55.0	51.7	50.1

Appendix 4 SoundPLAN Results

Appendix 4: Commercial Noise Modelling Results

Worst-Case 1hour Plant Operation

No.	Receiver name	Building side	Floor	Limit		Level
				Day	Night	Day
				dB(A)		dB(A)
1	1	South	EG	43	39	20.3
			1.OG	43	39	24.4
2	2	West	EG	43	39	34.5
			1.OG	43	39	37.1
3	3	West	EG	43	39	36.5
			1.OG	43	39	38.4
4	4	West	EG	43	39	37.1
			1.OG	43	39	39.3
5	5	West	EG	43	39	36.2
			1.OG	43	39	39.1
6	6	West	EG	43	39	37.8
			1.OG	43	39	40.5
7	7	West	EG	43	39	38.0
			1.OG	43	39	40.4
8	8	West	EG	43	39	38.3
			1.OG	43	39	40.9
9	9	West	EG	43	39	34.7
			1.OG	43	39	39.2
10	10	West	EG	43	39	35.8
			1.OG	43	39	39.8
11	11	West	EG	43	39	35.4
			1.OG	43	39	38.7
12	12	West	EG	43	39	34.1
			1.OG	43	39	38.2
13	13	West	EG	43	39	34.0
			1.OG	43	39	37.5
14	14	West	EG	43	39	32.2
			1.OG	43	39	37.0

Road Traffic Noise Modelling Results

No.	Receiver name	Building side	Floor	Limit		Level	
				Day	Night	Day	Night
				dB(A)		dB(A)	
1	1	South	EG	57.6	48.4	54.5	47.6
			1.OG	57.6	48.4	52.8	45.9
2	2	West	EG	57.6	48.4	48.5	41.5
			1.OG	57.6	48.4	47.8	40.8
3	3	West	EG	57.6	48.4	41.9	34.9
			1.OG	57.6	48.4	43.4	36.3
4	4	West	EG	57.6	48.4	39.9	32.8
			1.OG	57.6	48.4	41.1	33.9
5	5	West	EG	57.6	48.4	36.5	29.1
			1.OG	57.6	48.4	39.9	32.7
6	6	West	EG	57.6	48.4	36.6	29.3
			1.OG	57.6	48.4	39.0	31.7
7	7	West	EG	57.6	48.4	36.2	28.8
			1.OG	57.6	48.4	38.6	31.2
8	8	West	EG	57.6	48.4	35.9	28.5
			1.OG	57.6	48.4	38.3	30.8
9	9	West	EG	57.6	48.4	34.4	26.9
			1.OG	57.6	48.4	38.0	30.5
10	10	West	EG	57.6	48.4	33.5	26.0
			1.OG	57.6	48.4	37.2	29.7
11	11	West	EG	57.6	48.4	32.6	25.2
			1.OG	57.6	48.4	36.1	28.6
12	12	West	EG	57.6	48.4	31.1	23.7
			1.OG	57.6	48.4	35.4	27.9
13	13	West	EG	57.6	48.4	30.6	23.2
			1.OG	57.6	48.4	34.6	27.0
14	14	West	EG	57.6	48.4	29.3	22.0
			1.OG	57.6	48.4	33.7	26.2