Land South of A507 and West of A10, Buntingford, Hertfordshire

Noise Impact Assessment for Outline Planning Application

17th June 2024

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1. INTRODUCTION

1.1. Overview

inacoustic has been commissioned to prepare a Noise Impact Assessment in support of an Outline Planning Application for development of employment land (flexible use B2, B8, E(c) and E(g)), informal open space, associated works and infrastructure including a new access from A507, with all matters reserved save for access, on Land South of A507 and West of A10, Buntingford.

This report presents an assessment of noise constraints and opportunities of the proposed Land Use Components Plan, along with an outline assessment of an Illustrative Masterplan for the propose uses.

The assessment has been produced to provide supporting information to accompany an Outline Planning Application to East Herts Council and is based upon environmental noise measurements undertaken at the site.

This report is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

Full-time history graphs of the noise survey are presented in Appendix B.

1.2. Scope and Objectives

The scope of the Noise Assessment report can be summarised as follows:

- A baseline noise monitoring survey was undertaken at discrete locations around the Site;
- A 3-dimensional noise modelling exercise, in order to quantify the noise levels across the Site;
- An assessment of predicted changes in traffic noise in the surrounding road network; and
- Recommendations on outline mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England: Noise[1].

[1] Department for Communities and Local Government (DCLG), 2019. National Planning Practice Guidance for England: Noise. DCLG.

2. LEGISLATION AND POLICY FRAMEWORK

The development proposals for the Site are guided by the following policy directives and guidance:

2.1. National Policy

2.1.1. National Planning Policy Framework, 2023

The *National Planning Policy Framework* (NPPF)[2] sets out the UK Government's planning policies for England. Planning policy requires that applications for planning permission must be determined in accordance with the development plan, unless material considerations indicate otherwise.

The NPPF is also a material consideration in planning decisions. It sets out the Government's requirements for the planning system and how these are expected to be addressed.

Under Section 15; *Conserving and Enhancing the Natural Environment*, in Paragraph 180, the following is stated:

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

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

Paragraph 191 of the document goes on to state:

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

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

Paragraph 191 refers to the Noise Policy Statement for England, which is considered overleaf.

[2] Department for Levelling Up, Housing & Communities (DLUHC), December 2023. National Planning Policy Framework. HMSO. London.

2.1.2. Noise Policy Statement for England, 2010

The underlying principles and aims of existing noise policy documents, legislation and guidance are clarified in *DEFRA: 2010: Noise Policy Statement for England* (NPSE)[3]. The NPSE sets out the *"Long Term Vision"* of Government noise policy as follows:

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

The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

- *"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".*

The guidance states that it is not possible to have a single objective noise-based measure that defines *"Significant Observed Adverse Effect Level (SOAEL)"* that is applicable to all sources of noise in all situations and that not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

2.1.3. National Planning Practice Guidance in England: Noise, 2019 (PPGNoise)

Paragraph: 002 of the PPGNoise states the following:

"Can noise override other planning concerns?

It can, where justified, although it is important to look at noise in the context of the wider characteristics of a development proposal, its likely users and its surroundings, as these can have an important effect on whether noise is likely to pose a concern."

As such, Paragraph: 003 of the NPPG states that:

"Plan-making and decision making need to 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 NPSE, this would include identifying whether the overall effect of the noise exposure … is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."

Consequently, the *National Planning Practice Guidance in England: Noise* (NPPG Noise)[4] summarises the noise exposure hierarchy, based on the likely average response. The following three observed effect levels are identified below, as identified in Paragraph 004:

[3] Department for Environment, Food and Rural Affairs (DEFRA), 2010. Noise Policy Statement for England. DEFRA.
[4] Department for Communities and Local Government (DCLG), 2019. National Planning Practice Guidance for England: Noise. DCLG.

- **Significant Observed Adverse Effect Level**: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- **Lowest Observed Adverse Effect Level**: This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- **No Observed Adverse Effect Level**: This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Importantly, Paragraph: 004 of the PPGNoise states that:

"Although the word 'level' is used here, this does not mean that the effects can only be defined in terms of a single value of noise exposure. In some circumstances adverse effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs."

Paragraph: 005 of the PPGNoise expands the significant criteria related to each of these levels, which are reproduced in Table 1, below.

TABLE 1: SIGNIFICANCE CRITERIA FROM NPPG IN ENGLAND: NOISE

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Noticeable and Not Intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a 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, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and Disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and Very Disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.2. British Standards

2.2.1. BS4142:2014+A1:2019

BS4142:2014+A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound* sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014+A1:2019 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ *specific sound level*, immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ *rating sound level*. The effect of uncertainty in sound measurements, data and calculations should also be considered when necessary.

BS4142:2014+A1:2019 states: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs"*. An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- *"Typically, the greater this difference, the greater the magnitude of the impact."*
- *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*
- *"A difference of around +5dB 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."*

During the daytime, the assessment is typically carried out over a reference time period of 1-hour, with a reference period of 15-minutes used for the night-time assessment. The periods associated with day or night, for the purposes of the Standard, are considered to be 07.00 to 23.00 and 23.00 to 07.00, respectively.

2.3. Other Guidance

2.3.1. Relative Change in Ambient Noise Level

The IEMA Guidelines[5] define 'Noise Impact' as the difference in the acoustic environment before and after the implementation of the proposals, also known as the magnitude of change. In circumstances where a noise environment may be altered by addition or removal of a noise source, considered to be largely anonymous or within the prevailing acoustic character of an area, for example, changes to traffic quantum or patterns, it is normal to consider this relative change in ambient noise level. The assessment, therefore, considers this phenomenon to add context.

The impact scale adopted in this assessment is shown in Table 2 below, which relates to established human responses to noise, in line with '*Table 7-12 Effect Descriptors'* of the IEMA Guidelines and set in the context of NPPG.

TABLE 2: IMPACT SCALE FOR COMPARISON OF FUTURE NOISE AGAINST EXISTING NOISE

Noise Level Change dB(A)	Subjective Response	Significance	NPPG Context
Less than 1.0	No perceptible	Negligible	NOEL
1.0 – 2.9	Barely perceptible	Minor impact	NOAEL
3.0 – 4.9	Noticeable	Moderate impact	LOAEL
5.0 – 9.9	Up to a doubling or halving of loudness	Substantial impact	SOAEL
10.0 or more	More than a doubling or halving of loudness	Major impact	UAEL

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the perception of loudness. The difference between the minimum perceptible change and the doubling or halving of the perceived noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the criteria specified in Table 2 provide a good indication as to the likely significance of changes in noise levels in this case and can be used to inform the context in which the sound occurs in order to assess the impact of noise from the proposed development.

[5] Institute of Environmental Management & Assessment (IEMA), Version 1.2 (November 2014). Guidelines for Environmental Noise Impact Assessment

2.3.2. The Design Manual for Roads and Bridges (DMRB) – LA 111 Noise and vibration

DMRB LA 111 Revision 2, dated May 2020, (which supersedes HD 213/11 and the accompanying IAN 185/15) sets out the requirements for noise and vibration assessments from road projects.

It sets out the magnitude of noise change due to changes in road traffic in the short-term, along with the significance of effects, which are presented below.

TABLE 3: MAGNITUDE OF CHANGE AND SIGNIFICANCE OF EFFECTS FROM ROAD TRAFFIC CHANGES - SHORT-TERM

Short-term Noise Change (dB $L_{A10,18hr}$)	Magnitude of Change	Significance of Effect
Greater than or equal to 5.0	Major	Significant
3.0 to 4.9	Moderate	Significant
1.0 to 2.9	Minor	Not significant
Less than 1.0	Negligible	Not significant

The above criteria have been used in the assessment to evaluate the significance of effect due to changes in the road traffic network due to the Proposed Development.

3. Site Description and Development Proposals

3.1. Site and Surrounding Area

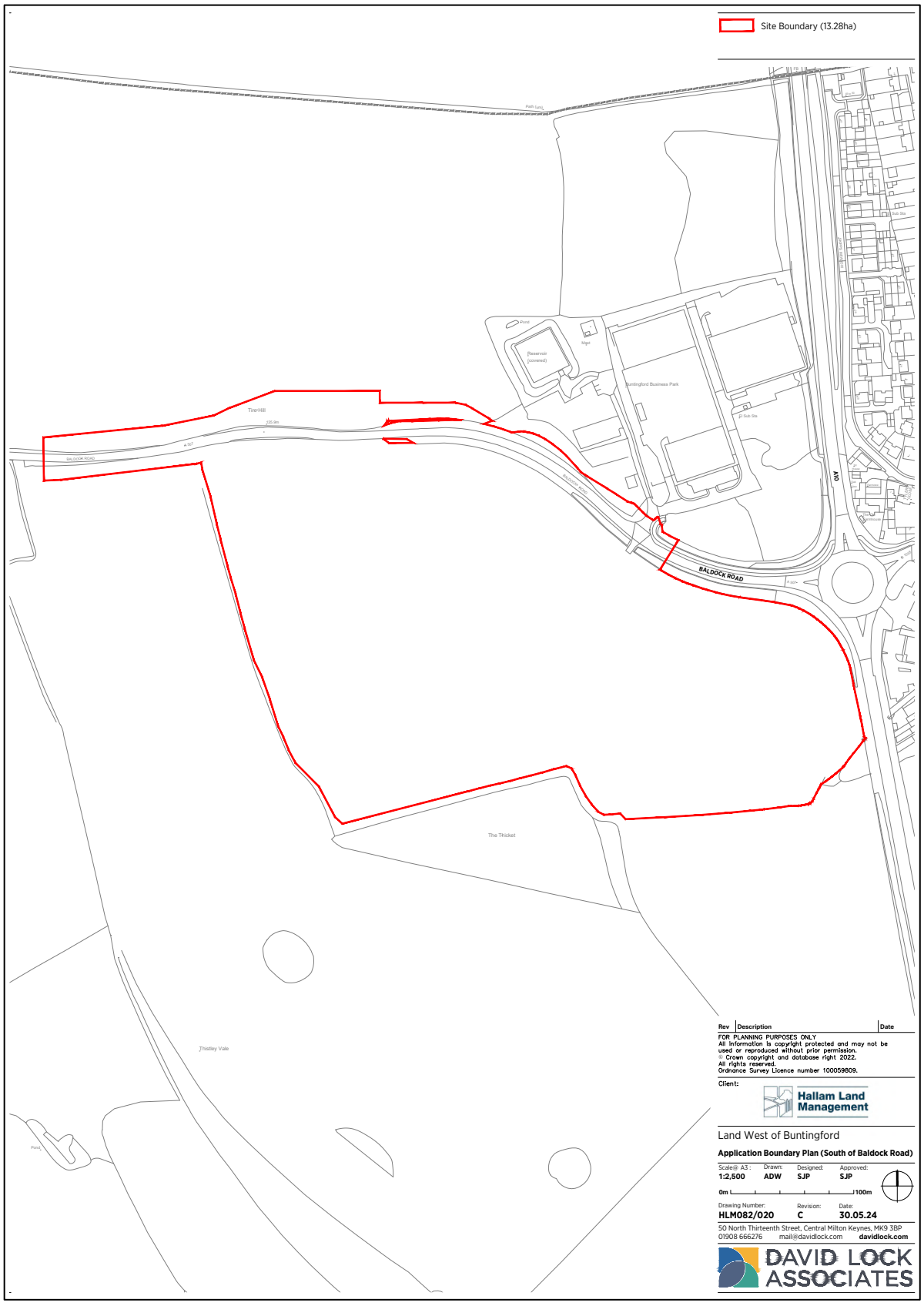
The Site is situated on Land South of A507 and West of A10, Buntingford, Hertfordshire.

The site is bound to Baldock Road (A507) to the north and to the A10 road to the east. The rest of the site is surrounded by agricultural fields.

The ambient sound environment at the area is influenced by road traffic noise from the A10 to the east of the Site. In addition to this, other sounds affecting the general ambient sound climate were road traffic noise from Baldock Road and natural sources such as birdsong and breeze-induced vegetation movement.

The Application Boundary Plan and surrounding area can be seen in Figure 1, overleaf.

FIGURE 1: SITE BOUNDARY AND SURROUNDING AREA

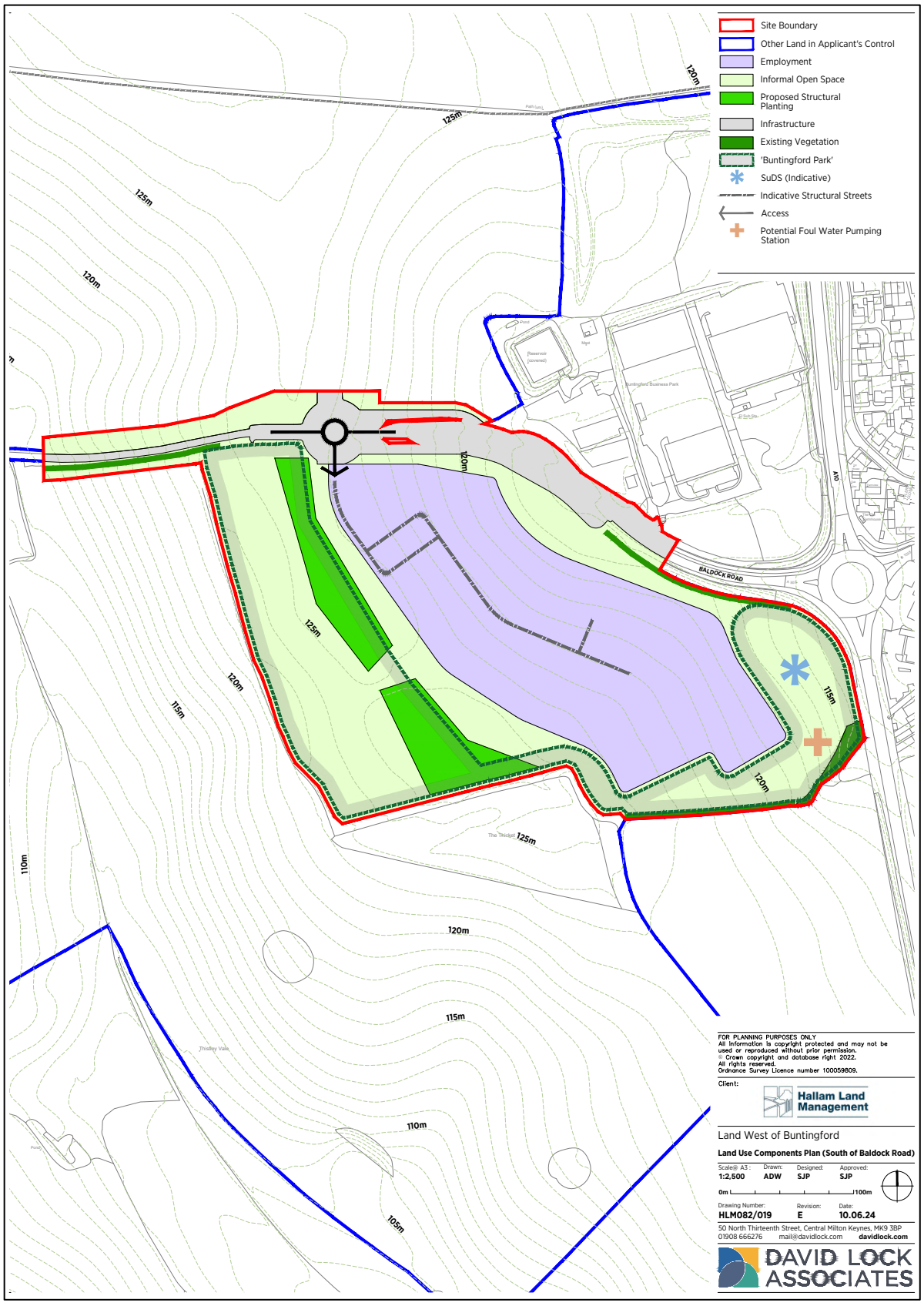


3.2. Proposed Development

The proposals comprise an Outline Planning Application for development of employment land (flexible use B2, B8, E(c) and E(g)), informal open space, associated works and infrastructure including a new access from A507, with all matters reserved save for access, on Land South of A507 and West of A10, Buntingford.

The proposed Land Use Components Plan is presented in Figure 2 overleaf.

FIGURE 2: LAND USE COMPONENTS PLAN



4. Baseline Sound Survey

4.1. General

The prevailing noise conditions in the area have been determined by an environmental noise survey conducted during both daytime and night-time periods between Sunday 23rd and Wednesday 26th July 2023.

4.2. Measurement Details

All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and, in accordance with the principles of BS 7445[6].

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 61672[7]. A full inventory of this equipment is shown in Table 4 below.

Table 4: Inventory of Sound Measurement Equipment

Position	Make, Model & Description	Serial Number	Calibration Certificate Number	Calibration Due Date
MP1	Brüel & Kjær 2238 Sound Level Meter	2163634	1144539	15/05/2025
	Brüel & Kjær 4188 Microphone	2200693		
MP2	Rion NL-52 Sound Level Meter	00810575	CONF032202	11/03/2024
	Rion NH-25 Preamplifier	11118		
	Rion UC-59 Microphone	19968		
All	Rion NC-74 Acoustic Calibrator	34984020	1131148	10/08/2023

The sound measurement equipment used during the survey was field calibrated at the start and end of the measurement period. A calibration laboratory has calibrated the field calibrator used within the twelve months preceding the measurements. A drift of less than 0.2 dB in the field calibration was found to have occurred on the sound level meters.

The weather conditions during the survey were conducive to noise measurement; it being predominantly dry, with wind speeds consistently below 5m/s.

The microphones were fitted with a protective windshield for the measurements, which are described in Table 5, with an aerial photograph indicating its locations shown in Figure 3.

[6] British Standard 7445: 2003: *Description and measurement of environmental noise*. BSI.
[7] British Standard 61672: 2013: *Electroacoustics. Sound level meters*. Part 1 *Specifications*. BSI.

Table 5: Measurement Positions Description

Measurement Position	Description
MP1	Largely unattended daytime and night-time measurement of sound under free-field conditions, at a height of 1.5 metres above local ground level, located at the east boundary of the Site. The microphone was located at approximately 7 metres from the closest A10 carriageway edge. The sound environment at this location was dominated by road traffic noise from the A10 road. This position characterises the noise from the A10.
MP2	Largely unattended daytime and night-time measurement of sound under free-field conditions, at a height of 1.5 metres above local ground level, located at the middle of the Site. The microphone was located at approximately 5 metres from the closest road's carriageway edge. The sound environment at this location was influenced by road traffic noise from the Baldock road (A507). This position is representative of the sound environment of the nearest receptors to the site.

Figure 3: Measurement Positions



4.3. Sound Indices

The parameters reported are the average Equivalent Continuous Sound Level, $L_{Aeq,T}$, the statistical index (typical) Background Sound Level, $L_{A90,T}$, as well as the and the typical Maximum Sound Pressure Level, L_{AFmax}. An explanation of the sound units presented is given in Appendix A.

The measured L_{Aeq}, L_{AFmax}, and L_{AF90} sound levels are presented as time histories in a graph in Appendix B.

4.4. Summary Results

The summarised results of the environmental sound measurements, during the day and night-time periods, can be seen below in Table 6. Values have been rounded to the nearest whole number.

TABLE 6: SUMMARY OF SOUND MEASUREMENT RESULTS

Measurement Position	Period	$L_{Aeq,T}$ (dB)	$L_{AF90,T}$ (dB)	L_{AFmax} (dB)
MP1	Day	71	48	89
	Night	66	25	87
MP2	Day	63	46	81
	Night	57	23	77

5. Assessment of Land Use Components Plan

5.1. Overview

The noise levels across the site have been predicted using the Cadna/A suite of noise modelling software. This software utilises standard acoustic principles in conjunction with approved prediction methodologies and it is a tried and tested method for accurately predicting and assessing the impact of noise from a variety of sources. Road traffic noise predictions have been carried out in accordance with the calculation methodology presented in the Calculation of Road Traffic Noise (CRTN[8]).

The noise model was validated to ensure that the levels predicted were an accurate reflection of real world measured noise levels at the measurement positions, both at daytime and night-time periods, plus any adjustments to reflect future traffic noise changes, should the Proposed Development go ahead.

5.2. Model Assumptions

In addition to the road source noise levels used in the predictions, the model also considers the effects of the topographical conditions throughout the area, based on associated LIDAR Composite DTM topographic contours sourced from the Defra Data Services Platform, ground absorption, acoustic reflections and acoustic screening. The ground factor has been set to 0.5.

5.3. Changes in Future Traffic Noise

For a robust assessment, the model has considered the potential changes of traffic noise levels due to changes in traffic flows in the future.

Traffic data for the surrounding roads have been provided by the Applicant's traffic consultants. The predictions of changes in traffic noise have been undertaken in accordance with the BNL principles detailed within CRTN. These predictions consider the relative change in noise level that is likely as a result of changes in traffic pattern at a notional roadside receptor for each considered road link. The relevant traffic parameters and predicted changes in noise level are presented Table 7.

Table 7: Road traffic Basic Noise Level (BNL) Changes

Road Link	Year 2023 Baseline Traffic			Year 2035 Predicted Traffic*			BNL Change, dB
	AAWT-18H	HGV%	Speed (km/h)	AAWT 18H	HGV%	Speed (km/h)	
Ermine St W	1464	6.6	97	1622	6.6	97	+0.6
Ermine St E	2345	2.1	97	2598	2.1	97	+0.5
The A10 N of Ermine St	9468	7.0	97	10728	6.9	97	+0.5
The A10 S of Ermine St	9590	6.6	97	10863	6.5	97	+0.5
The A10 S of Throcking Ln	9637	6.4	97	10915	6.3	97	+0.5
The A10 N of Baldock Rd	9900	7.2	97	11206	7.1	97	+0.5
Baldock Rd East of A10	9800	4.9	48	11188	4.8	48	+0.5

[8] Department of Environment: 1988: Calculation of Road Traffic Noise, HMSO0.70.5

Side Access	1237	6.7	30	1370	6.7	30	+0.7
The A10 S of Baldock Rd	15399	7.0	97	17571	6.8	97	+0.5
Baldock Rd West of A10	9927	4.9	69	12079	4.6	48	-1.1
Baldock Rd East of Site Access	10415	4.9	97	12620	4.6	48	-6.7
Baldock Rd West of Site Access	10415	4.9	97	12068	4.7	48	-6.8
Baldock Rd West of High Street	6169	4.6	48	7165	4.4	48	+0.6
High Street N	3280	2.5	48	3780	2.5	48	+0.6
High Street S	7974	3.4	48	9019	3.3	48	+0.5
High Street North of Hare St	7950	3.2	48	8992	3.2	48	+0.1
Hare Street	4507	4.0	48	5141	3.9	48	+0.6
High Street South of Hare St	7311	2.5	48	8137	2.5	48	+0.5
Station Road north of the A10	7976	3.8	64	8836	3.8	64	+0.4
Access	233	3.0	30	258	3.0	30	+0.4
The A10 South	20879	5.7	80	23642	5.6	80	+0.5
The A10 West	15586	6.9	97	17779	6.7	97	+0.5
Throcking Ln	271	1.0	50	300	1.0	48	+0.3

** Year 2035 Predicted Traffic includes Growth Background Traffic and Proposed Development Traffic, as provided by the Applicant's Traffic Consultants.*

It can be seen that changes to the Basic Noise Level (BNL) on the surrounding road network as a result of the Proposed Development are predicted to remain largely below 1 dB, which is considered negligible with reference to Table 3. A major decrease in noise levels (in the order of 6-7 dB) is expected on Baldock Road due to the reduction in traffic speed, should the proposed development go ahead.

5.4. Noise Maps

The results of the environmental noise survey and the noise modelling exercise have been used to determine the noise levels and the potential noise constraints across the proposed Land Use Components Plan, which forms the basis of this Outline Application. It must be noted that the results do not include the impact of any new or additional structures or mitigation measures to be included in the development proposals.

Open site noise assessment maps for the daytime and night-time periods, at 1.5 metres high and 4 metres above local ground level are presented below in Figure 4 and Figure 5 respectively.

FIGURE 4: NOISE MAP – LAND USE COMPONENTS PLAN - DAYTIME (GRID AT 1.5M HIGH)

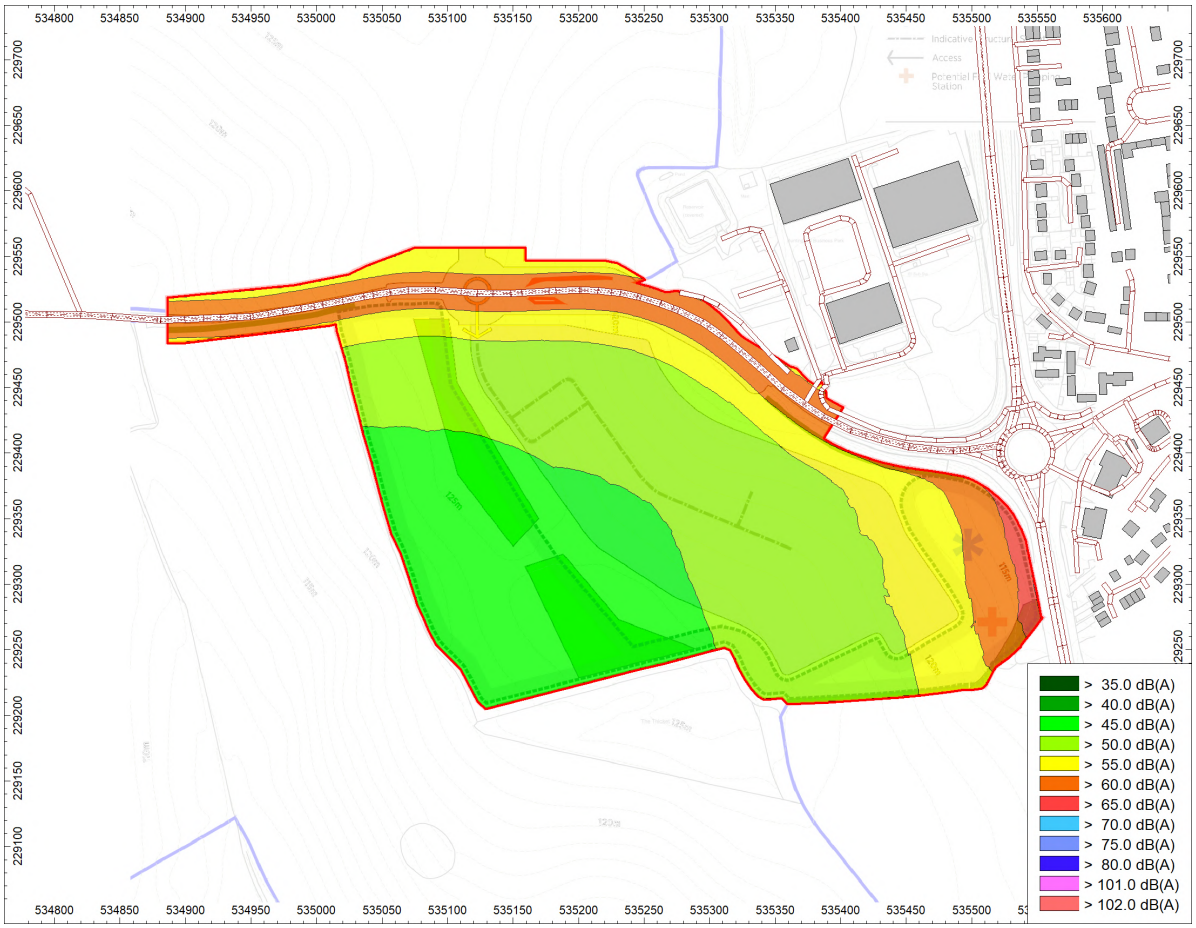
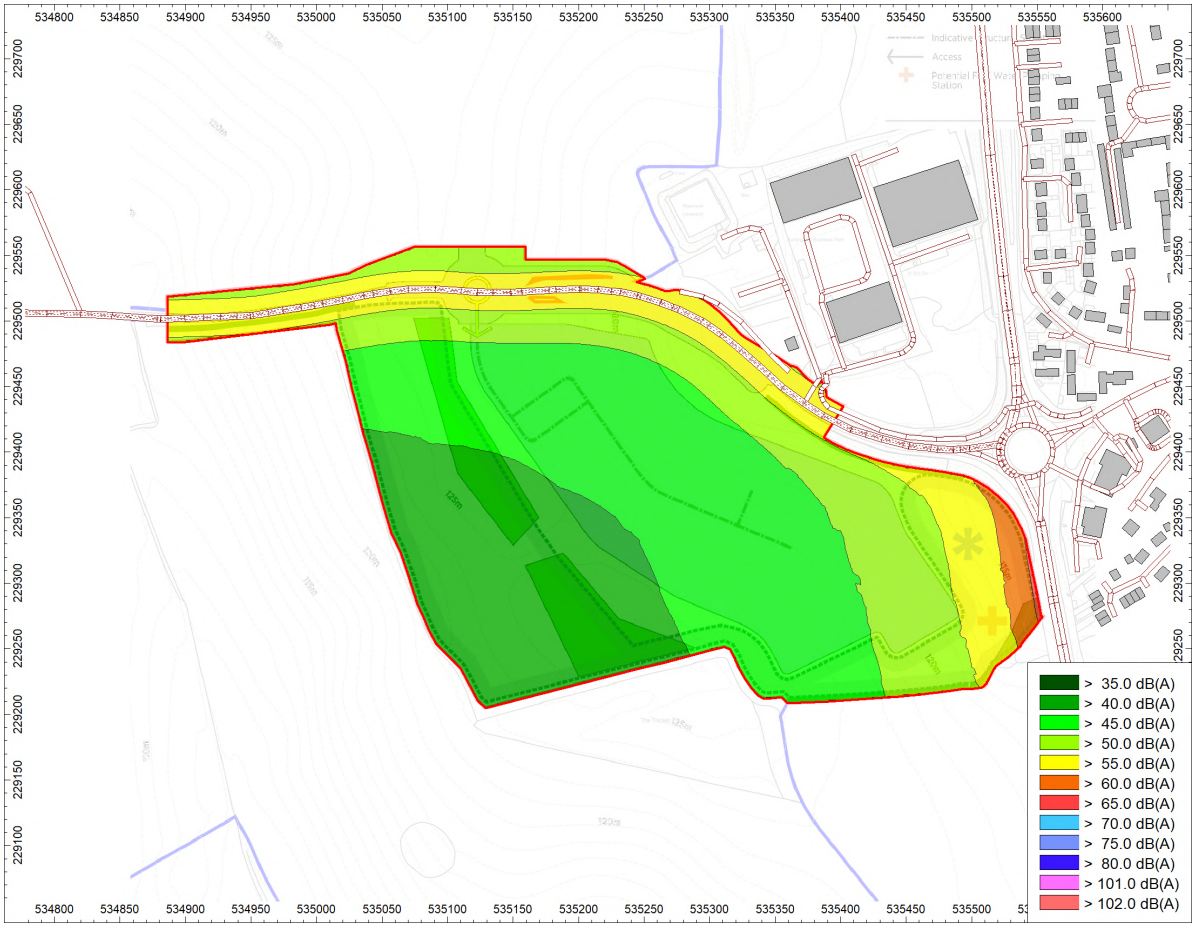


FIGURE 5: NOISE MAP – LAND USE COMPONENTS PLAN – NIGHT-TIME (GRID AT 4M HIGH)



The noise map presented above identify that the large majority of the site is subject to low noise levels, generally below 55 dB(A). Only areas close to the A10 can experience noise levels between 55-65 dB(A).

From the initial assessment of the Land Use Components Plan, it is concluded that the Site is suitable for the proposed uses, subject to the control of noise impacts from the development upon other noise sensitive receptors, which is assessed with the Illustrative Masterplan.

6. Operational Noise Assessment - Illustrative Masterplan

6.1. Overview

A more detailed noise assessment of potential noise impacts upon off-site Noise-Sensitive Receptors (NSRs), considering an Illustrative Masterplan, has been undertaken.

6.2. Illustrative Masterplan

As a reference, an Illustrative Masterplan is presented overleaf. It must be noted that this Illustrative Masterplan is used for reference only and it is subject to changes, since only the Land Use Components Plan shown in Figure 2 forms the basis of this Outline Application, with all matters reserved except access.

The Illustrative Masterplan includes a proposed mixed-use residential-led development north of Baldock Road, which is subject to a separate Outline Planning Application. The illustrative layout of the northern site have been used for the identification of potential sensitive receptors in the vicinity of the proposed employment land.

The closest and most potentially affected NSRs to the site are identified as follows:

- NSR1: Potential residential uses north of Baldock Road, within a proposed mixed-use residential-led development: and
- NSR2: Existing detached dwelling south of Baldock Road, west of the proposed development site.

FIGURE 6: ILLUSTRATIVE MASTERPLAN AND NEAREST NSRS



6.3. Noise Modelling

6.3.1. Overview

As precise details of the Proposed Development, *vis-à-vis* end users and operational details have not yet been finalised, beyond the scope of the B use categories for the site, the following assessment considers a hypothetical, worst-case operational scenario and suggests a suitable noise-limiting planning condition.

6.3.2. Operational Assumptions

The following input data has been considered within the assessment:

- In order to quantify noise emissions of a reasonable B2 industrial nature, it has been assumed a typical Indoor Reverberant Noise Level of 75 dB(A) during the day and 70 dB(A) during the night for each unit, which is considered robust. It has been assumed that all processes may occur simultaneously in the 13 buildings included in the Illustrative Masterplan, representing a worst-case scenario;
- Loading bay activity on the basis of 27 daily 2-way HGV movements within the site, as advised by the Applicant's traffic consultants. It has been assumed that a quarter of these could operate during the night. For the purposes of a reasonable worst-case BS4142 assessment, it has been assumed 4x HGV arriving and unloading and 4x HGV departing during a daytime 1-hour period and 1x HGV arriving and unloading or loading and departing during a night-time 15-minute period; and
- Roller shutter doors to the service areas maintained in a closed position during any noisy operations.

6.3.3. Source Data

The A-weighted sound source levels associated with the Proposed Development, based on archive data, can be seen below in Table 8.

TABLE 8: SOUND SOURCE DATA

Source	Distance / Description	Noise Level – dB	
		$L_{Aeq,T}$	SEL
HGV arriving	10 metres	-	77
HGV reversing (inc reverse alarm)	10 metres	-	82
HGV starting and departing	10 metres	-	76
Internal Level	Internal Reverberant	75 Day / 70 Night	-

6.3.4. Building Envelope

In terms of the acoustic performance of the building envelope, the sound reduction statistics set out in Table 9 have been adopted.

TABLE 9: SOUND REDUCTION INDEX OF BUILDING COMPONENTS

Component	Type / Material Example	SRI – dB(A)
Wall Cladding	Tata Trimapanel or similar	29
Roof Cladding	Tata Trisomet or similar	28

It has been assumed that any proposed ventilation louvres or access doors will be of a design and fit that does not compromise the overall sound insulation performance of the building envelope.

6.3.5. Calculation Process

Calculations were carried out using Cadna/A, which undertakes its calculations in accordance with guidance given in ISO9613-1 and ISO9613-2.

Given that the land between Proposed Development and nearest receptors will be mixed, the ground factor has been set to 0.5 in the calculation software.

6.3.6. Specific Sound Level Map

The sound maps of the specific sound level emissions from the Proposed Development site are presented below. Daytime noise levels in Figure 7 have been calculated at 1.5m above ground and night-time levels in Figure 8 at 4m above ground.

FIGURE 7: SPECIFIC SOUND LEVEL MAP - DAYTIME



FIGURE 8: SPECIFIC SOUND LEVEL MAP – NIGHT-TIME



6.3.7. Specific Sound Level Summary

The predicted specific sound level arising from typical operations at the closest receptors to the site can be seen below in Table 10.

TABLE 10: PREDICTED SPECIFIC SOUND LEVEL SUMMARY

NSR	Period	Specific Sound Level $L_{Aeq,T}$ - dB
NSR1 – Proposed Development North of A507	Day	31
	Night	28
NSR2 – Existing Dwellings West of the Site	Day	15
	Night	11

6.4. Assessment

6.4.1. Rating Penalty Principle

Section 9 of BS4142:2014+A1:2019 describes how the rating sound level should be derived from the specific sound level, by determining a rating penalty.

BS4142:2014+A1:2019 states:

"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level. This can be approached in three ways:

a) subjective method;
b) objective method for tonality;
c) reference method."

Given that the Proposed Development is not operational, the subjective method has been adopted to derive the rating sound level from the specific sound level. This is discussed in Section 9.2 of BS4142:2014+A1:2019, which states:

"Where appropriate, establish a rating penalty for sound based on a subjective assessment of its characteristics. This would also be appropriate where a new source cannot be measured because it is only proposed at that time, but the characteristics of similar sources can subjectively be assessed.

Correct the specific sound level if a tone, impulse or other characteristics occurs, or is expected to be present, for new or modified sound sources."

BS4142:2014+A1:2019 defines four characteristics that should be considered when deriving a rating penalty, namely; tonality; impulsivity; intermittency; and other sound characteristics, which are defined as:

Tonality

A rating penalty of +2 dB is applicable for a tone which is *"just perceptible"*, +4 dB where a tone is *"clearly perceptible"*, and +6 dB where a tone is *"highly perceptible"*.

Impulsivity

A rating penalty of +3 dB is applicable for impulsivity which is *"just perceptible"*, +6 dB where it is *"clearly perceptible"*, and +9 dB where it is *"highly perceptible"*.

Intermittency

BS4142:2014+A1:2019 states that when the *"specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time … if the intermittency is readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied."*

Other Sound Characteristics

BS4142:2014+A1:2019 states that where *"the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distance against the residual acoustic environment, a penalty of +3 dB can be applied."*

6.4.2. Rating Penalty Assessment

Considering the content of Section 6.4.1, an assessment of the various sound sources associated with the Proposed Development, in terms of whether any rating penalties are applicable, and has been detailed in Table 11.

TABLE 11: RATING PENALTY ASSESSMENT

Source	Tonality	Impulsivity	Intermittency	Other Sound Characteristics	Discussion
Typical internal operations	0 dB	0 dB	0 dB	0 dB	The specific details of these are as yet unknown, but given the distances involved, the prevailing sound environment and the attenuation properties of the building envelope, such acoustic features are unlikely to be audibly distinct.
Vehicle movements	0 dB	0 dB	0 dB	0 dB	The residential receptors are influenced by road traffic noise, primarily from the A10 and the A507. Consequently, on-site vehicle movements are likely to be indistinct from the ambient sound environment.

In summary, a no rating penalty has been applied to the typical operation of the Proposed Development.

6.4.3. Uncertainty

BS4142:2014+A1:2019 requires that the level of uncertainty in the measured data and associated calculations is considered in the assessment. The Standard recommends that steps should be taken to reduce the level of uncertainty.

Measurement Uncertainty

BS4142:2014+A1:2019 states that measurement uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

"
...
b) the complexity and level of variability of the residual acoustic environment;
...
d) the location(s) selected for taking the measurements;
...
g) the measurement time intervals;

h) the range of times when the measurements have been taken;
i) the range of suitable weather conditions during which measurements have been taken;
…
k) the level of rounding of each measurement recorded; and
l) the instrumentation used."

Each of the measurement uncertainty factors outlined above have been considered and discussed in Table 12.

TABLE 12: MEASUREMENT UNCERTAINTY FACTORS

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Residual acoustic environment is relatively constant, hence no correction for a complex residual acoustic environment.
d)	0 dB	Measuring at positions representative the closest affected receptor to the site, has enabled the determination of the worst-case background level.
g)	0 dB	Measurement time intervals were set in accordance with BS4142:2014, hence no further correction needs to be made.
h)	0 dB	Measurements were undertaken over a continuous and substantial time period.
i)	0 dB	No periods of significant wind or precipitation were noted during the utilised part of the measurement.
k)	0 dB	Measured values were rounded to the nearest whole number, therefore rounding would not have had a significant impact on the overall typical background sound levels.
l)	0 dB	The acoustic measurement equipment accorded with Type 1 specification of British Standard 61672, and were deployed with appropriate wind shields.

In summary, no uncertainty budget has been considered in the assessment, to account for measurement uncertainty.

Calculation Uncertainty

BS4142:2014+A1:2019 states that calculation uncertainty depends on a number of factors, including the following, which are applicable to the Proposed Development:

"
…
b) uncertainty in the operation or sound emission characteristics of the specific sound source and any assumed sound power levels;
c) uncertainty in the calculation method;
d) simplifying the real situation to "fit" the model (user influence on modelling); and
e) error in the calculation process."

Each of the calculation uncertainty factors outlined above have been considered and discussed in Table 13.

TABLE 13: CALCULATION UNCERTAINTY FACTORS

Calculation Uncertainty Factor Reference	Level of Uncertainty	Discussion
b)	0 dB	Sound source levels are based on robust archive data and worst-case assumptions of likely operations.
c)	0 dB	Calculations were undertaken in accordance with ISO 9613-2, which is considered a *"validated method"* by BS4142:2014+A1:2109.
d)	0 dB	The real situation has not been simplified for the purposes of this assessment; however, an operational scenario has been assumed for the purposes of the assessment.
e)	±1 dB	ISO 9613-2 indicates that there is a ±3 dB accuracy to the prediction method, therefore, an uncertainty factor of ±1 dB is considered appropriate and proportional, given the separation distances involved.

In summary, an uncertainty budget of ±1 dB has been considered in the assessment, to account for calculation uncertainty.

The overall uncertainty is considered to be small enough that it would not affect the conclusions of the assessment.

6.4.4. BS4142:2014+A1:2019 Assessment

The rating sound level, as calculated from the predicted specific sound level, has been assessed in accordance with BS4142:2014+A1:2019, at the closest NSRs, and can be seen in Table 14 and Table 15 for the daytime and night-time respectively.

TABLE 14: BS4142 ASSESSMENT – DAYTIME (07:00-23:00)

NSR	Specific Sound Level (dB)	Rating Penalty (dB)	Rating Sound Level (dB)	Daytime Background Sound Level (dB)	Excess of Rating over Background Sound Level (dB)
1	31	-	31	46	-15
2	15	-	15	46	-31

TABLE 15: BS4142 ASSESSMENT – NIGHT-TIME (23:00-07:00)

NSR	Specific Sound Level (dB)	Rating Penalty (dB)	Rating Sound Level (dB)	Night-time Background Sound Level (dB)	Excess of Rating over Background Sound Level (dB)
1	28	-	28	23	+5
2	11	-	11	23	-12

It can be seen that the Proposed Development is predicted to have rating sound levels that are well below the background sound levels at the nearest receptors during the day, representing a 'Low Impact'. During the night, predicted rating sound levels are also well below the background level at NSR2, representing a 'Low Impact'. At NSR1 during the night, rating sound levels are predicted to be 5 dB above the prevailing background sound levels, which is BS4142 terms could represent an 'Adverse Impact', depending on the context, which is discussed below.

6.4.5. Discussion on Context

The results set out in Table 14 and Table 15 identify that the operation of the scheme, as assessed with an Illustrative Masterplan, can occur without affecting the amenity of the closest residential receptors to the site, except at the nearest residential uses of a proposed development to the north of A507, where a potentially adverse impact could exist. BS4142:2014+A1:2019, however, recognises the importance of the context in which a sound occurs when assessing impacts.

It is noted that the assessment considers a worst-case scenario, with all the 12 units in the Illustrative Masterplan operating during the night. As such, the calculated noise levels from the Proposed Development are likely to be an overprediction based on a worst-case scenario which is unlikely to happen in reality.

The assessment identifies that probable noise emissions from activities associated with the Site would likely give rise to low levels of audibility at the closest residential properties. On this, BS4142:2014+A1:2019 states that '*for a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low'. It follows on to* say 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'*.

In this case, both background sound levels and rating levels are low at the assessment locations. The predicted absolute level of 28 dB(A) at NSR1 demonstrates that indoor ambient noise levels would be in the order of 13-18 dB(A) within a bedroom at night when considering a 10-15 dB sound reduction for a partially open window for ventilation, well below the BS8233:2014[9] criteria of 30 dB(A).

On the above basis, it is considered that a rating sound level in the order of 5 dB above a very low prevailing background sound level at NSR1 at night would still ensure that the amenity of the nearest proposed dwellings would not be compromised by noise, and should be acceptable from a policy perspective.

The effect of the Proposed Development on the relative change in ambient noise levels at the nearest residential receptors should also be considered as part of the context.

[9] BS 8233:2014 Guidance on sound insulation and noise reduction for buildings. BSI 2014

The effect of the Proposed Development on the relative change in ambient noise levels at the nearest proposed residential receptors has also been assessed as part of the context, with reference to the IEMA guidelines outlined in Section 2.3.1

TABLE 16: ASSESSMENT OF RELATIVE CHANGE IN SOUND LEVEL

Receptor	Period	Future L_{Aeq} Ambient Sound Level, dB(A)*	Sound from Proposed Development dB(A)	Cumulative Sound Level dB(A)	Change in Sound Level, dB	Significance
NSR1	Daytime	56	31	56	0	No Change
	Night-time	50	28	50	0	No Change

** A reduction of 7 dB has been applied to the measured ambient sound levels at MP2, to represent the likely reduction in traffic noise levels if the proposed development goes ahead, as presented in Table 7.*

As can be seen, the operation of the Proposed Development is predicted to have no change on the prevailing acoustic environment at the nearest proposed receptors.

6.4.6. Good Acoustic Design Outline Advice

The assessment does consider the effects of the presumed, most potentially acoustically significant operations within the Proposed Development, on a reasonable worst-case basis, given the lack of currently available information relating to the actual end uses of the buildings within the Site. These assumptions are considered robust, insofar as demonstrating the potential levels of noise impact arising from the probable future operations and should offer sufficient evidence to the Local Planning Authority, that noise arising from the Site can be controlled via the design of the Site.

It is also noted that the core of this Planning Application refers to the Land Use Components Plan, while the Illustrative Masterplan has been assessed for reference only, and it is subject to change.

Good Acoustic Design that could be applied to the development of the Masterplan, where feasible, could include increasing the distance of the proposed B2/B8 units with Baldock road, and hence with the potential residential uses at the proposed site to the north.

It is also recommended, where possible, that loading bays are oriented to the east or south, away from the NSRs and screened by the employment building themselves.

7. Assessment of Fixed Plant

Noise from potential plant installations should be controlled so that it does not adversely affect the nearest Noise-Sensitive Receptors (NSRs). Fixed plant installations could include plant servicing the employment buildings. As the proposals are at the outline stage of the design, nature and location of static plant are not developed yet. Therefore, a noise limit determination exercise has been undertaken.

The following environmental noise limits are proposed at the closest NSRs, in line with guidance presented in British Standard 4142:2014+A1:2019 *Method for Rating and Assessing Industrial and Commercial Sound*. These limits are based on achieving a level equal to or below the typical measured background sound level at the nearest noise sensitive receptors.

Table 17: Proposed Plant Noise Rating Limits

NSR	Operating Period	Typical Measured Background Sound Level $L_{AF90,T}$ (dB)	Proposed Rating Sound Level $L_{Ar,T}$ (dB)
NSR1 and NSR2	Day (07:00-23:00)	46	46
	Night (23:00-07:00)	23	23

The above limits apply to the total sound emission level from all static plant within the Proposed Development. Individual plant items may need to be designed to a lower limit such that the overall total achieves the stated criteria above. Should the proposed plant items be found to be tonal, or impulsive in nature (so as to attract attention), a penalty correction would likely be applied to the above limits.

Practical Control Measures

Screening of any external plant as well as provision of sound attenuators to items of plant may be necessary to control the transmission of sound and achieve the above criteria as well as to reduce the sound level produced by the plant to a reasonable extend around the footprint of the development itself.

Environmental attenuators and possibly other means of sound mitigation such as acoustic louvres or acoustic screens may be required to control sound emanating from plantrooms, air intake and discharge points or from externally mounted plant.

Locating the future plant installation as far as possible from the NSRs and using the proposed building to screen any future plant items would to ensure compliant emissions sound levels.

Proposed Planning Condition

The following noise-limiting planning condition is therefore suggested to cover external static plant, to ensure no adverse effect on the amenity of the closest residential receptors to the Proposed Development.

> *'Noise arising from the Development shall not exceed the background sound level during the day or night at the closest residential receptors to the site, when assessed in accordance with the methodology and principles set out in BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.'*

8. Cumulative Assessment

In addition to the proposed employment use (flexible use B2, B8, E(c) and E(g)), which presents the core of this noise assessment, a proposed mixed-use residential-led development to the north of Baldock Road (A507) is proposed at the Land North of A507 and West of A10, Buntingford, as can be seen in Figure 2 of this report.

This proposed development will be subject to a separate Outline Planning Application, with all matters reserved save for access. For robustness, however, this assessment considers the likely changes to traffic noise in the surrounding road network, should both developments go ahead.

The relative Basic Noise Level (BNL) change has been assessed for 2023 Baseline Traffic and Year 2035 Cumulative Traffic, considering both proposed developments north and south of the A507.

The predictions of changes in traffic noise have been undertaken in accordance with the BNL principles detailed within CRTN. These predictions consider the relative change in noise level that is likely as a result of changes in traffic pattern at a notional roadside receptor for each considered road link. The relevant traffic parameters and predicted changes in noise level are presented Table 18.

Table 18: Road traffic Basic Noise Level (BNL) Changes – Cumulative Assessment

Road Link	Year 2023 Baseline Traffic			Year 2035 Predicted Cumulative Traffic*			BNL Change, dB
	AAWT-18H	HGV%	Speed (km/h)	AAWT 18H	HGV%	Speed (km/h)	
Ermine St W	1464	6.6	97	1677	6.4	97	+0.8
Ermine St E	2345	2.1	97	2653	2.1	97	+0.6
The A10 N of Ermine St	9468	7.0	97	10837	6.8	97	+0.6
The A10 S of Ermine St	9590	6.6	97	11027	6.5	97	+0.6
The A10 S of Throcking Ln	9637	6.4	97	10904	6.3	97	+0.5
The A10 N of Baldock Rd	9900	7.2	97	11195	7.1	97	+0.5
Baldock Rd East of A10	9800	4.9	48	11824	4.5	48	+0.7
Side Access	1237	6.7	30	1370	6.7	30	+0.7
The A10 S of Baldock Rd	15399	7.0	97	18685	6.5	97	+0.8
Baldock Rd West of A10	9927	4.9	69	13818	4.1	48	-0.7
Baldock Rd East of Site Access	10415	4.9	97	14358	4.1	48	-6.3
Baldock Rd West of Site Access	10415	4.9	97	12420	4.6	48	-6.7
Baldock Rd West of High Street	6169	4.6	48	7726	4.2	48	+0.8
High Street N	3280	2.5	48	3904	2.4	48	+0.8
High Street S	7974	3.4	48	9456	3.2	48	+0.7
High Street North of Hare St	7950	3.2	48	9429	3.1	48	+0.2
Hare Street	4507	4.0	48	5261	3.8	48	+0.6

High Street South of Hare St	7311	2.5	48	8454	2.5	48	+0.6
Station Road north of the A10	7976	3.8	64	9082	3.7	64	+0.5
Access	233	3.0	30	258	3.0	30	+0.4
The A10 South	20879	5.7	80	24510	5.5	80	+0.7
The A10 West	15586	6.9	97	18893	6.4	97	+0.8
Throcking Ln	271	1.0	50	475	1.3	48	+2.4

** Year 2035 Predicted Cumulative Traffic includes Growth Background Traffic and Proposed Development Traffic from both sites north and south of Baldock Road, as provided by the Applicant's Traffic Consultants.*

It can be seen that changes to the Basic Noise Level (BNL) on the surrounding road network as a result of the combined traffic of both Proposed Developments is predicted to remain largely below 1 dB, which is considered negligible with reference to Table 3. A major decrease in noise levels (in the order of 6-7 dB) is expected on Baldock Road due to the reduction in traffic speed, should both proposed developments go ahead. A Minor increase in noise levels is predicted in Throcking Lane due to an increase in traffic flows due to the proposed residential-led development.

9. Conclusion

inacoustic has been commissioned to prepare a Noise Assessment in support of an Outline Planning Application for employment land (flexible use B2, B8, E(c) and E(g)), associated works and infrastructure, with all matters reserved save for access, on Land South of A507 and West of A10, Buntingford.

The report assesses the noise risks and opportunities for the proposed Land Use Components Plan. It has been produced to assess the initial suitability of the site for employment land and to inform the development of the Masterplan.

As indicative only, the report also assesses noise impact of an Illustrative Masterplan. It follows the guidance within BS4142:2014+A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound.*

It is considered that the proposed site is largely suitable for employment land development, subject to following 'Good Acoustic Design' during the development of the Masterplan.

An assessment of cumulative noise impacts due to changes if traffic noise levels in the surrounding road network, should the Proposed Development go ahead along with the proposed mixed-use residential-led development to the north of A507, has also been undertaken. This assessment identifies that the combined traffic from both developments will produce largely negligible changes in the local road network.

In light of the above, which demonstrates that the site is predicted to meet the requirements of the relevant British Standard and planning guidance, it is considered that noise does not present a constraint to the development of the site, considering the current proposed Land Use Components Plan.

The following Appendices are also included in the report:

- Appendix A - Glossary of terms
- Appendix B - Full-time noise survey history graphs.

10. APPENDICES

Appendix A – Definition of Terms

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20µPa ($20x10^{-6}$ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20µPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.
Sound Exposure Level (SEL)	The SEL is the Single Event Level, commutable with L_{Aeq} using the following formula: 'SEL = L_{Aeq} + 10log(t)'; where 't' is time in seconds

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE 19: TYPICAL SOUND LEVELS FOUND IN THE ENVIRONMENT

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

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source.

A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}.

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,15mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125 ms.

Appendix B – Sound Measurement Results

FIGURE 9: MEASURED TIME HISTORY – MP1

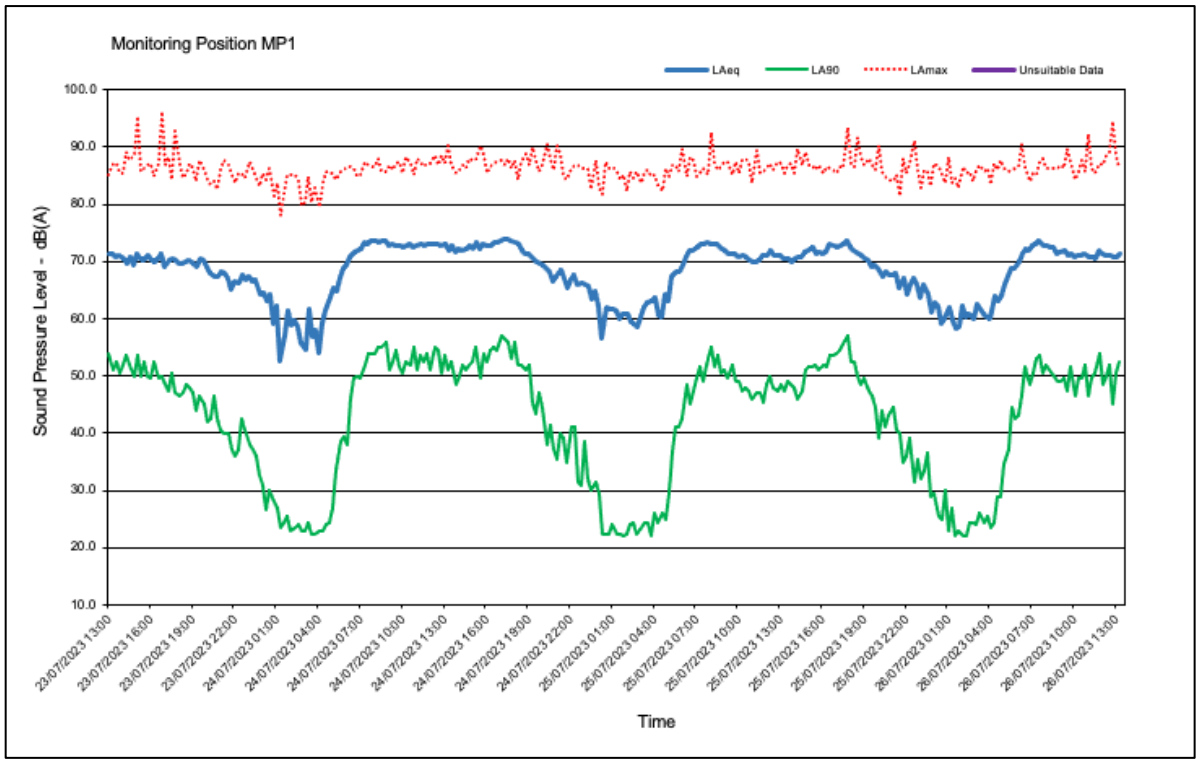
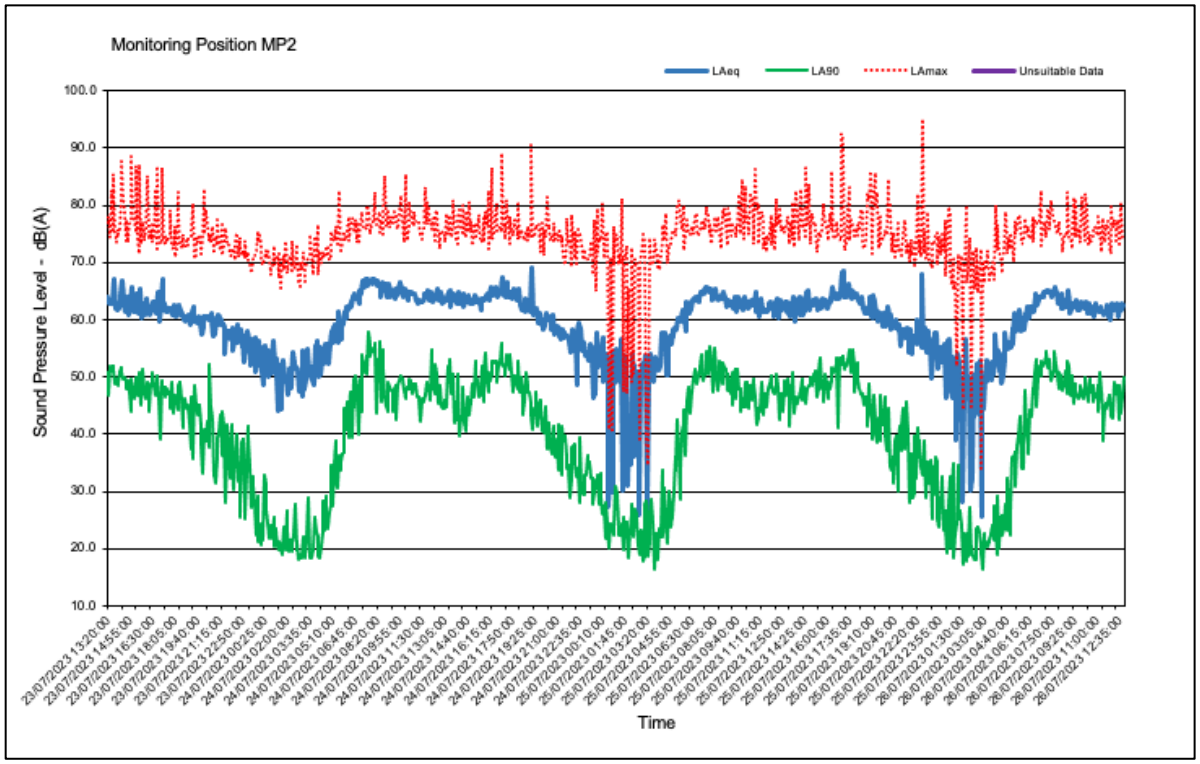


FIGURE 10: MEASURED TIME HISTORY – MP2



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