EML Facility Expansion

Noise Impact Assessment

EISAI

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Quality information

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1. Introduction

AECOM have been commissioned by EISAI to conduct a noise impact assessment to accompany the outline planning application for the proposed EML Warehouse Facility expansion (the 'Proposed Development') at the existing EISAI site on Mosquito Way in Hatfield (the ‘Site’). This report provides information of the noise impact assessment of the Proposed Development.

The following are described within this report:

- Site location and description along with nearby noise-sensitive receptors;
- Results of a baseline sound survey and subsequent results;
- Assessment of site suitability for office use;
- Review of current planning requirements (Policy R19) relating to noise emission from new plant items associated with the Proposed Development;
- Quantitative noise impact assessment of changes in operational traffic.

An acoustic glossary can be found in Appendix A.

2. Site Description

The Site is located in an urban industrial built-up area in Hatfield Business Park with multiple commercial buildings in the vicinity. Several residential dwellings are also located on the surrounding roads as well as several leisure (David Lloyd Hatfield, Hertfordshire Sports Village) and educational (Howe Dell School, University of Hertfordshire) facilities. The Site is approximately 500 meters (m) south-west of the Hatfield Business Park junction of the A1001 and approximately 350m west of Hatfield Tunnel of the A1. The Site is located approximately 1.3 kilometres (km) north-west of Hatfield town centre.

The Proposed Development consists of three phases. Phase one and two is a warehouse expansion with phase one corresponding to goods in / out development, and phase two consisting of ambient / refrigerated development. Phase three comprises of the packaging expansion and facility / equipment development.

The proposed expansion of the development site includes the following:

- Proposed extension/relocation to existing canopy
- Additional goods in area with plant above (390 sqm)
- Warehouse supporting area with plant above (296 sqm)
- High bay warehouse (1,130 sqm)
- Warehouse extension (447 sqm)
- Changing & packaging lines with offices & plant floor above (1,737 sqm)

All vehicles use the northern entrance of the Site and enter via Mosquito Way. The southern entrance to the site is for the use of emergency vehicles only.

The closest noise-sensitive receptors are located within the Clarkson Court residential development and Hatfield Residential and Nursing Care Home both on Tamblin Way approximately 60m south of the site.

The location of the site and proposed expansion are shown in Figure 4.1.

3. Relevant Guidance and Local Authority Requirements

National Planning Policy

National Planning Policy Framework (2021)

The National Planning Policy Framework (NPPF) (Ref 1) provides a framework on which local plans can be prepared. In terms of noise, the NPPF advises that:

- Paragraph 174: *"Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability."*
- Paragraph 185*: "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:*

  i. *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;*

  ii. *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

These policies must be applied in the context of Government policy on sustainable development.

Noise Policy Statement for England (2010)

The Noise Policy Statement for England (NPSE) (Ref 2) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise, and neighbourhood noise.

The NPSE sets out the long-term vision of the government's noise policy, which is to "promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development".

This long-term vision is supported by three aims:

- "*Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvements of health and quality of life."*

The 'Explanatory Note' within the NPSE provides further guidance on defining 'significant adverse effects' and 'adverse effects' using the following concepts:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

With reference to the SOAEL, the NPSE states:

"It is recognised 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."

For situations where noise levels are between the LOAEL and SOAEL, all reasonable steps should be taken to mitigate and minimise the adverse effects. However, this does not mean that such adverse effects cannot occur.

Planning Practice Guidance Noise (2019)

The Planning Practice Guidance: Noise (PPGN) (Ref 3) was last updated in July 2019. It is a web-based resource that references both the NPPF and NPSE. It defines when noise is relevant to planning stating: "*Noise needs to be considered when new developments may create additional noise or would be sensitive to the prevailing acoustic environment"*.

The PPG states that local planning authorities 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."*

Factors to be considered in determining whether noise is a concern are identified including the absolute noise level of the source, the existing ambient noise climate, time of day, frequency of occurrence, duration, character of the noise and cumulative effects.

Further details on the hierarchy of noise effects are presented in Table 3.1, which has been reproduced from the PPGN.

Table 3.1 PPGN hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present 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			
Present 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

Local Policy

Welwyn Hatfield District Plan 2005

Welwyn Hatfield's District Plan (Ref 8) was adopted in 2005 and covers the period up to 2011 and contains the local planning framework, policies and proposals which have been used to guide the development and use of land in the district. The 2005 District Plan features two policies relating to noise, which are described as follows.

Policy SD1 Sustainable Development

Policy SD1 states "*Development proposals will be permitted where it can be demonstrated that the principles of sustainable development are satisfied and that they accord with the objectives and policies of this plan… applicants will be expected to submit a statement with their planning application demonstrating how their proposals address the sustainability criteria in the checklist contained in the Supplementary Design Guidance."*

There are two paragraphs and one policy within the District Plan that all relate to noise arising from this type of development:

Paragraph 5.47 states "*The Council will seek to ensure that new development with a potential for causing noise nuisance is sited away from noise-sensitive land uses, both existing and known proposed developments*."

Paragraph 5.48 states "*In considering proposals for development, the Council will take into account:*

- *Possible future increases in noise levels;*
- *That the introduction of noisy activities into some residential and rural areas can be especially disruptive because of their existing very low background noise levels*
- *That intermittent sources of noise can be more disruptive than constant sources.*

Policy R19 Noise and Vibration Pollution

Policy R19 states "*Proposals will be refused if the development is likely:*

i. To generate unacceptable noise or vibration for other land uses; or

ii. To be affected by unacceptable noise or vibration from other land uses.

Planning permission will be granted where appropriate conditions may be imposed to ensure either:

iii. An adequate level of protection against noise or vibration; or

iv. That the level of noise emitted can be controlled.

Proposals should be in accordance with the Supplementary Design Guidance."

Welwyn Hatfield District Plan 2005 Supplementary Design Guidance

The Welwyn Hatfield District Plan Supplementary Design Guidance (Ref 9) provides guidance on the design and layout of all new development in the district to supplement the policies contained in the District Plan.

The guidance repeats statements in Policy R19 from the district plan and any other advice relating to noise and vibration relates to residential development.

Welwyn Hatfield Borough Council Local Plan, Draft Proposed Submission

A new version of the Welwyn Hatfield Borough Council Local Plan is still in the examination process as of the 8 June 2022 and so has not yet been adopted. Its contents and guidance may still be subject to change so it is solely presented in this section for reference.

Other Relevant Standards and Guidance

British Standard 4142:2014+A1:2019

BS 4142:2014+A1:2019 (‘Methods for rating and assessing industrial and commercial sound’ describes methods for rating and assessing sound of an industrial and/or commercial nature affecting residential dwellings.

British Standard 7445-1:2003

BS: 7445 ‘Description and Measurement of Environmental Noise. Part 1 – Guide to Quantities and Procedures’ (Ref 5) defines the parameters, procedures and instrumentation requirements for noise measurement and analysis.

British Standard EN 61672-3:2013 Electroacoustics. Sound level meters Periodic tests

BS EN 61672-3:2013 (describes procedures for periodic testing of time-weighting, integrating-averaging, and integrating sound level meters that were designed to conform to the class 1 or class 2 specifications of the second edition of IEC 61672-1.

British Standard 8233:2014

BS: 8233 ‘Sound Insulation and Noise Reduction for Buildings’ (Ref 7) – Code of Practice provides criteria for the assessment of internal noise levels for various uses including dwellings and commercial properties. It also provides guidelines for external noise in amenity areas.

Calculation of Road Traffic Noise (CRTN)

The Department of Transport/Welsh Office Memorandum ‘Calculation of Road Traffic Noise’ (CRTN) (Ref 11) describes procedures for traffic noise calculation and is suitable for environmental assessments of schemes where road traffic may have an effect.

British Standard 5228:2009+A1:2014

BS 5228-1 ‘Code of practice for noise and vibration control on construction and open sites’ (Ref 12) provides sound power level (L_w) data for individual plant as well as a calculation method for noise from construction activities.

Design Manual for Roads and Bridges (2019)

The Highways Agency’s Design Manual for Roads and Bridges Sustainability & Environment Appraisal LA 111 Noise and Vibration (DMRB) (Ref 13) This document sets out the requirements for assessing and reporting the effects of highways noise and vibration from construction, operation and maintenance projects.

4. Sensitive Receptor Locations

Table 4.1 identifies the closest sensitive receptors that may be subject to significant effects as a result of the Proposed Development. The table also shows the approximate distance from the Proposed Development. Figure 4.1 shows the locations of the sensitive receptors highlighted in purple in relation to the Proposed Development.

Table 4.1 Sensitive Receptor Locations and Description

Receptor ID	Address	Receptor type	Approximate Distance (meters)
R1	Clarkson Court	Residential	60m southwest
R2	Hatfield Residential and Nursing Care Home	Residential	60m southwest
R3	Halford Court	Residential	260m west
R4	Howe Dell School	Education	360m west

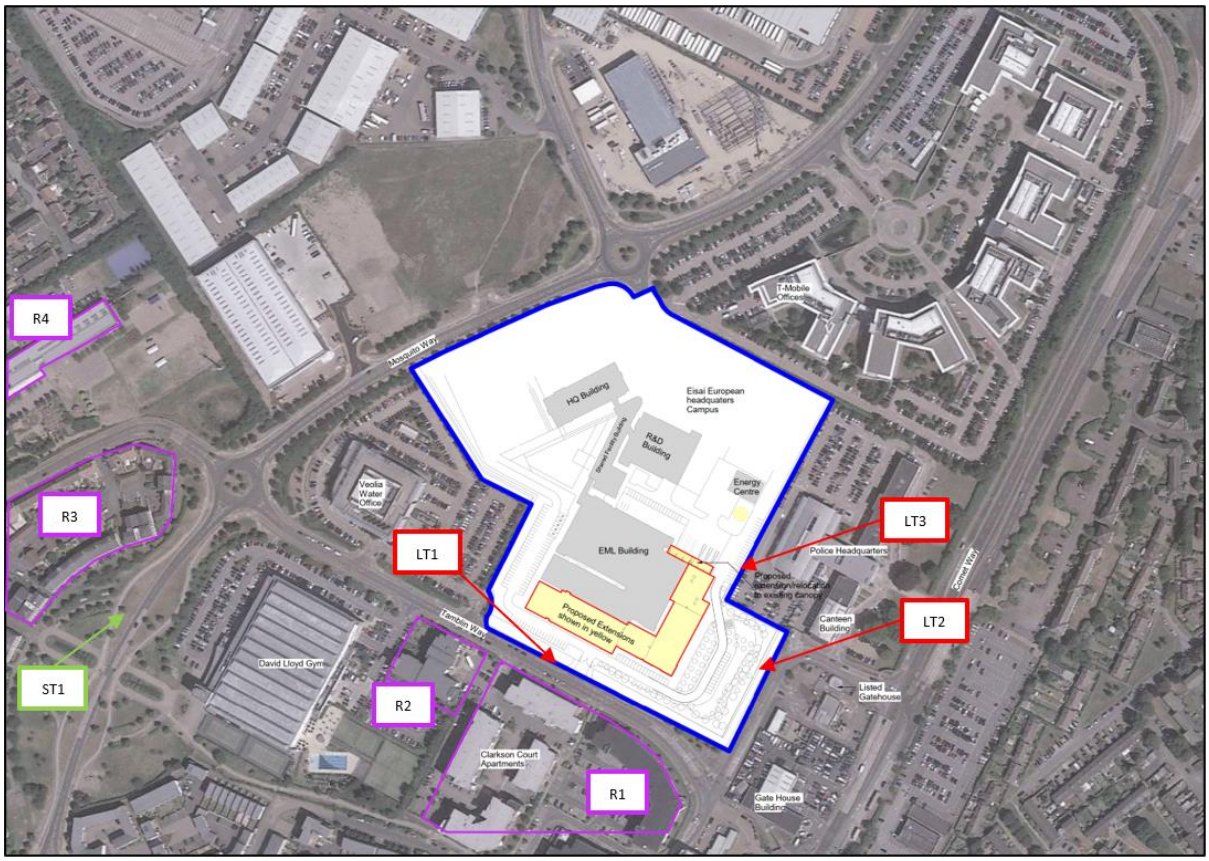

Figure 4.1 Site Map, Proposed Expansion, Sensitive Receptor and Sound Level Monitor Locations

5. Sound Monitoring Survey

Monitoring Methodology

A sound monitoring survey was carried out to determine the existing ambient sound levels at the Site between Wednesday 08 June and Wednesday 15 June 2022. Unattended monitoring equipment was set up at three locations for a period of seven days. Continuous measurements were taken to establish ambient sound levels during typical office work hours (08:00 – 18:00), daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods.

The equipment was housed within a weatherproof case with sufficient battery to power the instrument for the full measurement duration. Appropriate outdoor all-weather kits were used on the microphones. Sound level monitoring locations (LT1 – LT3) are illustrated in Figure 4.1.

All meters were set to measure the L_{Aeq}, L_{A90}, L_{Amax} and one-third octave values, logging at contiguous periods of 1 minute throughout the monitoring period. The equipment calibration level was checked prior to, and after the monitoring periods. No significant drift (±0.1 dB) in calibration was noted.

An attended measurement following the shortened CRTN procedure was carried out along Mosquito Way to determine the ambient sound levels generated by road traffic.

Weather conditions were reviewed daily and were suitable in line with conditions outlined in BS 7445 (no rainfall and windspeeds less than 5 meters per second).

Measurements were carried out using Class 1 sound level meters (as defined in BS EN 61672-1:2013' Electroacoustics. Sound level meters Specifications') and acoustic field calibrators. The sound level meter is calibrated every two years by a UKAS accredited calibration laboratory and field calibrators are calibrated every year by a UKAS accredited calibration laboratory. The equipment used in the survey is presented in Table 5.1.

Table 5.1 Acoustic Monitoring Equipment

Equipment Item	Brand	Model	Serial	Location Used
Sound level meter	Rion	NL-52	420764	LT1
Sound level meter	ACOEM	01dB Duo	12049	LT2
Sound level meter	ACOEM	01dB Duo	12029	LT3
Sound level meter	Rion	NL-52	420765	ST1
Calibrator	Brüel & Kjær	BK4231	2642980	All sound level measurements

A description of the sound level monitoring locations and their respective GPS coordinates are detailed in Table 5.2 and their locations on a map are highlighted in red in Figure 4.1.

Table 5.2 Unattended Sound Level Monitoring Locations

Monitoring location	Description	GPS coordinates (Decimal Degree)
LT1	Located on the south boundary of the Site adjacent to Tamblin Way	51.76533, -0.24119
LT2	Located on the southeast boundary of the Site adjacent to Goldsmith Way	51.765131, -0.23894
LT3	Located to the east of the Site of Site on the Boundary adjacent to Hatfield Police Station	51.76578, -0.23911
ST1	Located on a grass verge 7m north from the roadside on Mosquito Way	51.76553, -0.24556

Unattended Sound Level Monitoring Results

Table 5.3 shows a summary of the arithmetic average of the daily sound monitoring results across the monitoring period. Detailed results are presented in Appendix B and sound level time history plots for each monitoring location are presented in Appendix C.

Table 5.3 Unattended Sound Level Monitoring Summary

Date	Office Hours	Daytime		Night-time		
	$L_{Aeq,10h}$ dB	$L_{A10,18h}$ dB	$L_{A90,1hr}$ dB	$L_{Aeq,8h}$ dB	L_{Amax} dB	$L_{A90,1hr}$ dB
LT1	55	56	51	51	70	49
LT2	58	59	50	53	72	45
LT3	56	55	51	50	63	48

The dominant sound source at LT1 was from an extract fan on the southern façade of the current warehouse.

The dominant sound source at LT2 was traffic along Goldsmith Way.

The dominant sound source at LT3 was plant items on the roof of the warehouse.

The general acoustic environment in the surrounding area is dominated by road traffic noise from the A1001 (Comet Way), Mosquito Way, Tamblin Way, and other internal roads within the Hatfield Business Park development. Other sound sources include items of plant associated with development.

The variability in background sound levels can lead to a rise in the degree of uncertainty about the level of impact at different times of day and on different days. The proposed development is surrounded by other commercial buildings and distribution centres and these may generate more sound during peak hours or during different times of year and these may have not been measured during the monitoring period.

Generally, the greater the period of monitoring, the greater variation in sound levels is recorded and over a greater range of conditions. The sound levels were undertaken over a period of 7 days, which is considered a suitably representative period.

Attended Sound Level Monitoring Results

Table 5.4 shows a summary of the measured sound monitoring results across the attended monitoring period. The dominant sound source at ST1 was from traffic along Mosquito Way 7m to the south from the monitoring position, other sound sources included pedestrians walking and talking past the monitor.

Table 5.4 Attended Sound Level Monitoring Summary

Location	Time Period	Measured Ambient $L_{Aeq,T}$ dB	$L_{A10,\ 1hr}$
ST1	11:30 – 12:30	63	68
	12:30 – 13:30	64	68
	13:30 – 14:30	64	68

15-minute traffic counts were conducted every hour during the monitoring period to understand the levels of traffic associated with the sound generated from Mosquito Way. The traffic counts have been divided into cars, heavy goods vehicles (HGV) with one axel and HGV's with two axels as specified in the CRTN measurement procedure.

Table 5.5 Traffic Count Summary

Location	Time Period	Cars	HGV (1 axel)	HGV (2 axel)
ST1	11:30 – 11:45	115	20	10
	12:30 – 12:45	102	21	3
	13:30 – 12:45	117	19	2

6. Suitability of Site for Office Development

Summary of Noise Criteria

Space will be allocated for an open plan office on the first floor of the south-west side of the Proposed Development. Cafeteria space will be allocated in the same area on the ground floor. External facades of the Proposed Development at this location will be designed to ensure provision of suitable internal noise conditions in accordance with BS 8233. BS 8233 provides recommended criteria for internal ambient noise levels when rooms are unoccupied dependant on their intended use.

Table 6.1 presents the desirable internal sound levels that should not be exceeded in new developments.

Table 6.1 Indoor Ambient Noise Levels (BS 8233)

Space	Design Range (dB $L_{Aeq,T}$)
Staff / meeting room, training room.	35 - 40
Open-plan Office	45 - 50
Cafeteria	50 - 55

The BCO Guide to Specification (Ref 10) states that "*external noise intrusion levels should not be more than the following Noise Rating levels (BS8233:2014) when measured under Cat A standards, in accordance with ANC9801:1998 – Part 2: Noise from External Sources 2013 and the time period T is 8 hours between 09:00 and 17:00:*

Open plan offices NR40($L_{Aeq,T}$);

Speculative offices NR38($L_{Aeq,T}$); and

Cellular offices / meeting rooms NR35($L_{Aeq,T}$)."

Additionally, for naturally ventilated buildings, it may be appropriate to accept higher external noise intrusion levels than those above in maximum ventilation mode, provided occupants have the choice to open or close windows / ventilation openings.

Furthermore, to avoid speech interference, external noise intrusion levels should not normally be more than 55 dB $L_{A01,1h}$ in open plan / speculative offices or 50 dB in cellular offices / meeting rooms.

Assessment

To achieve the internal noise levels details in Table 6.1, external noise ingress must be controlled by the building facade. Glazing recommendations are given below using the (Rw+Ctr) index, a commonly used single figure term used to specify the sound insulation requirements of facades affected by traffic noise (i.e. urban road traffic). Glazing specifications are provided as three numerical values, for example 4-16-6. These values relate to the glazing thickness - air gap - glazing thickness, each in millimetres (mm).

Table 6.2 details the measured sound levels at LT1 on the southwest section of the Proposed Development where office / cafeteria space is planned and the mitigation performance that is predicted to be required to meet internal noise level criteria. In addition, example glazing specifications are provided that may achieve the required internal noise levels.

Table 6.2 Example Glazing Configuration

Building Usage	Typical Daytime $L_{Aeq,\ 16hr}$ dB	Recommendation Rw+Ctr Glazing Specification	Example of Most Onerous Required Glazing Specification
Open-plan Office	55	10	Standard thermal insulation 6mm-12mm-4mm
Cafeteria	55	5	Standard thermal insulation 6mm-12mm-4mm

Sound level measurements of typical daytime L_{Amax} values indicate that suitable internal sound levels can be achieved within the Proposed Development through the implementation of appropriate glazing. Table 6.3 details the highest measured daytime sound levels, and the recommended glazing specification.

It is noted that the L_{Amax} was used for this assessment and is worst-case in comparison with L_{A01}. To meet BCO internal speech criteria for all façades, 6/12/4 mm thermal double glazing or equivalent is adequate for façades on the south of the Proposed Development.

Table 6.3 BCO Internal Speech Criteria Assessment and Glazing Recommendation

Typical daytime L_{Amax} dB	Internal Criteria $L_{A01,1hr}$ dB	Recommendation Rw+Ctr Glazing Specification	Example of Most Onerous Required Glazing Specification
75	55	20	Standard thermal insulation 6mm-12mm-4mm

7. Fixed Plant and Building Services Noise

Planning Requirement and Other Guidance

Planning Requirement

The following is understood to be standard planning condition attached any proposed development by the local authority.

'*A scheme to mitigate the noise from new plant and equipment. The impact of new plant and equipment should be assessed in accordance with BS4142:2014. Noise from plant and equipment shall be 10dB (L_{Aeq}) below background noise level (L_{A90}) at the nearest residential properties (5dB below the background noise level is the applicant is able to prove that the plant / equipment does not produce tonal noise or has other character)*'.

BS4142:2014+A1:2019

The assessment methodologies presented in BS 4142:2014+A1:2019 have been used to provide recommendations for operational noise limits applicable to fixed plant and building services of the Proposed Development.

A key aspect of the BS 4142 assessment method is a comparison between the background noise level in the vicinity of receptor locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background sound level – $L_{A90,T}$ – defined in the standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels;
- Specific sound level – $L_{Aeq,Tr}$ – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr; and
- Rating level – $L_{Ar,Tr}$ – the specific sound level plus any adjustment made for the characteristic features of the noise.

BS 4142 recommends that the specified interval over which the specific sound level is determined as 1 hour during the day from 07:00 to 23:00 hours and a shorter period of 15 minutes at night from 23:00 to 07:00 hours.

The standard recognises that certain acoustic features of a sound source can increase the impact over that expected based purely on the sound level. The standard identifies the following features to be considered:

- Tonality - a penalty of 2 dB is applied for a tone which is just perceptible at the receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible;
- Impulsivity - a penalty of 3 dB is applied for impulsivity which is just perceptible at the receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible. An impulse is defined as the sudden onset of a sound;
- Intermittency - a penalty of 3 dB can be applied if the intermittency of the specific sound is readily identifiable against the residual acoustic environment at the receptor i.e. it has identifiable on/off conditions;
- Other sound characteristics - a penalty of 3 dB can be applied where the specific sound features characteristics that are neither tonal nor impulsive but are readily distinctive against the residual acoustic environment.

Once any adjustments have been made, the background level and the rating levels are compared. BS4142 advises the following:

iii. Typically, the greater the difference, the greater the magnitude of impact.

iv. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.

v. A difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context.

vi. The lower the rating level is to the measured background sound level, the less likely it is that the specific sound 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 upon the context.

With reference to the NPSE, the LOAEL is defined in this assessment as where there rating level is equal to the background level, and the SOAEL as a rating level of 10 dB greater than the background level.

Operational Noise Limits

Table 7.1 presents proposed operational noise limits for any, fixed plant, and building services associated with the Proposed Development, as experienced at nearby sensitive receptors.

These limits are based on attaining a rating level equal to the measured background noise levels (Table 5.3) with all current plant operating at normal load simultaneously, such that operational noise does not exceed a '*low impact'* per BS4142 guidance which is equivalent to the LOAEL.

All sources should be controlled such that they do not produce any distinguishable, discrete or continuous notes (e.g. whine, hiss, screech, hum, etc.) or distinct impulses (e.g. bangs, clicks, clatters, or thumps) where this is not the case a rating correction will need to be applied to these particular items when assessed during detailed design.

Table 7.1 Proposed Fixed Plant and Building Services Design Criteria

Location	Rating level of operational noise $L_{Ar,Tr}$, dB	
	Day 07:00-23:00	Night 23:00-07:00
Receptors to south of site along Tamblin Way	41	39

The above rating levels can be relaxed by 5dB if the design and final selection of plant / equipment does not produce tonal noise or has other character.

8. Operational Changes in Road Traffic

Relevant Criteria

The Proposed Development may have an impact on traffic flows on existing roads in the area surrounding the Site once it is operational. The magnitude of a noise impact due to changes in road traffic noise levels has been assessed with reference to criteria outlined in the DMRB. The criteria used for the assessment of changes in road traffic noise levels arising from the Proposed Development have been taken from Table 3.54a of DMRB and are provided in Table 8.1.

Table 8.1 Magnitude of Change Short-term

Short-term Magnitude	Short-term Noise Change (dB)
Major	Greater than or equal to 5.0
Moderate	3.0
Minor	1.0 to 2.9
Negligible	Less than 1.0

Traffic Noise Assessment

A quantitative approach has been used to assess the impact on traffic flows on existing roads in the area surrounding the Site after the construction of the Proposed Development. All vehicles entering the site use the north entrance off a roundabout on Mosquito Way. There is also an entrance to the south of the site via Tamblin Way however this is strictly reserved for emergency vehicles only.

The Proposed Development would likely increase the number of staff approximately by 40-60. A survey has been undertaken by EISAI of current staffing numbers per day over a long period which identifies that there are around 40 car parking spaces on site that are not utilised on a daily basis. It is not envisaged that any further parking provision would be required as part of the proposed extensions.

There are typically 12 HGV'S per day using the site for deliveries during the Sites current operation. It is forecast that the Proposed Development will increase HGV movements by up to 25 per day with a maximum capacity of 64 per day.

Following BS 5228's 'Method for mobile plant using a regular well-defined route (e.g haul roads)', an assessment has been carried out to determine the impact of increased number of operational HGV's on sensitive receptors to the west of the Proposed Development (R3, R4). Using the maximum capacity of HGV's that could potentially use the route, the ambient sound level $L_{Aeq,\ 1hr}$ at the nearest façade of R3 (approximately 15m) has been predicted as 52 dB $L_{Aeq,\ 1hr}$. Measured levels at ST1 (7m away from Mosquito Way) ranged between 63-64 dB $L_{Aeq,1hr}$.

The predicted increase in the number of HGV's is 10 dB below a worst-case scenario using the maximum capacity, and as such the noise change will not cause changes to behaviour or response to noise and will not give a rise to a significant effect.

9. Conclusions

An assessment of the suitability of the Proposed Development has been undertaken based on the proposed usage of internal space and corresponding facades worst affected by noise. The assessment indicates that mitigation in the form of thermal glazing will be incorporated into the building envelope to provide suitable internal noise conditions.

Recommendations for operational noise limits applicable to the installation of any building services, and fixed plant have been provided.

There will be an increase in the number of traffic due to the Proposed Development, but the increase in road traffic noise is not likely to give a rise to a significant effect.

10. References

Ref 1. Department for Communities and Local Government (2012) National Planning Policy Framework.

Ref 2. Department for Environment Food and Rural Affairs, (2010); Noise Policy Statement for England.

Ref 3. Department for Communities and Local Government (DCLG), (last updated July 2017) Planning Practice Guidance.

Ref 4. British Standards Institute, (2014+A1:2019) - 'Methods for rating and assessing industrial and commercial sound', BSi, London.

Ref 5. British Standards Institute, (2003); BS 7445 – 'Description and Measurement of Environmental Noise. Part 1 – Guide to Quantities and Procedures', BSi, London

Ref 6. British Standards Institute, (2013); BS EN 61672-3 - 'Electroacoustics. Sound level meters Periodic tests', BSi London

Ref 7. British Standards Institute, (2014); BS 8233 - Sound Insulation and Noise Reduction for Buildings – Code of Practice, BSi, London

Ref 8. Welwyn Hatfield District Plan 2005, Welwyn Hatfield Council.

Ref 9. Welwyn Hatfield District Plan 2005 Supplementary Design Guidance, Welwyn Hatfield Council.

Ref 10. Business Conduct Office (BCO) Guide to Specification: Acoustics (2019)

Ref 11. Department of Transport/Welsh Office (1998); Calculation of Road Traffic Noise.

Ref 12. British Standards Institute, (2009); BS 5228+A1:2014 - Code of practice for noise and vibration control on construction and open sites, BSi, London

Ref 13. Highways Agency (2011); Design Manual for Road and Bridges Sustainability and Environment Appraisal LA 111 Noise & Vibration.

Appendix A Acoustic Glossary

Term	Definition
Noise	Unexpected or unwanted sound.
Decibel (dB)	The range of audible sound pressures is approximately 2 x 10^{-5} Pa to 200 Pa. Using decibel notation presents this range in a more manageable form, 0dB to 140dB. Mathematically Sound Pressure level = 20 log {p(t)/p_0} Where P_0 = 2 x 10^{-5} Pa.
A" Weighting (dB(A))	The human ear does not respond uniformly to different frequencies. "A" weighting is commonly used to simulate the frequency response of the ear. It is used in the assessment of risk of damage of hearing due to noise.
Frequency (Hz)	The number of cycles per second, for sound this is subjectively perceived as pitch.
Frequency Spectrum	Analysis of the relative contributions of different frequencies that make up a noise.
Ambient Sound	Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far (*The ambient sound comprises the residual sound and the specific sound when present)*.
Ambient Sound Level $L_a = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
Background Sound Level $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Equivalent Continuous A-weighted Sound Pressure Level $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = $t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation: $$L_{Aeq,T} = 10lg_{10}\left\{\left(\frac{1}{T}\right)\int_{t1}^{t2}\left[p_A\frac{(t)^2}{{p_0}^2}\right]dt\right\}$$ Where p_0 is the reference sound pressure (20μPA); and $P_A(t)$ is the instantaneous A-weighted sound pressure level at time t
Measurement Time Interval T_m	Total time over which measurements are taken (*This may consist of the sum of a number of non-contiguous, short-term measurement time intervals)*
Rating level $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound
Reference Time Interval, T_r	Specified interval over which the specific sound level is determined (*This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h*)
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound
Residual sound level $L_r = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound in a given situation at the assessment location over a given time interval, T.
Specific sound level $L_s = L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T.
Specific Sound Source	Sound source being assessed
L_{Amax}	The maximum RMS A-weighted sound pressure level occurring within a specified time period. Fast time weighting indicates sound pressure level measurements undertaken using a 125-millisecond moving average time weighting period.
L_{A01}	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 1% of a given time interval.

Appendix B Baseline Sound Survey

The office hour period is defined between the hours of 08:00 – 18:00, the daytime period is defined between the hours of 07:00 – 23:00 and the night-time period is defined as 23:00 – 07:00. The ambient sound level (L_{Aeq}) has been calculated as the logarithmic average of the 15-minute samples for the given time period. The L_{A10} has been calculated as the arithmetic average of the 15-minute samples for the daytime period. The background sound level (L_{A90}) has been calculated as the modal value of the 15-minute period samples for the given time period. The peak sound level (L_{Amax}) has been calculated as the 90th percentile of the 15-minute samples for the night-time period.

B.1 Monitoring Location LT1

Unattended sound level measurements were taken on the southern boundary of the Site to the south of the Proposed Development and 60m to the north of receptors R1 and R2 along Tamblin Way. The measurements started at 11:00 on 08 June and finished at 09:45 on 15 June 2022.

The microphone was placed approximately 1.5m above ground level, chained to the boundary fencing adjacent Tamblin Way. An image of the sound level meter circled in red can be seen in Figure B.1.

Figure B.1 LT1 Monitoring Location

During the installation and collection of the sound monitoring equipment, the ambient sound environment at LT1 was characterised by (from most dominant to least dominant noise):

- Extract fan on the southern façade of the current warehouse (approximately 40m);
- Road traffic along Tamblin Way (approximately 10m).

Table B.1 presents the daily day and night-time period sound level monitoring results and the arithmetic average for each sound level indicator.

Table B.1 LT1 Daily Sound Level Monitoring Results

Date	Office Hours	Daytime		Night-time		
	$L_{Aeq,10h}$ dB	$L_{A10,18h}$ dB	$L_{A90,15min}$ dB	$L_{Aeq,8h}$ dB	L_{Amax} dB	$L_{A90,15min}$ dB
Wed 08/06/2022	57	58	51	52	74	49
Thu 09/06/2022	55	57	51	52	71	49
Fri 10/06/2022	55	57	51	51	70	49
Sat 11/06/2022	55	56	51	51	70	49
Sun 12/06/2022	54	56	51	51	71	49
Mon 13/06/2022	54	56	50	51	69	49
Tue 14/06/2022	54	56	50	51	68	49
Wed 15/06/2022	56	56	50	-	-	-
Arithmetic Average	55	56	51	51	70	49

B.2 Monitoring Location LT2

Unattended sound level measurements were taken on the south-eastern boundary of the Site adjacent to Goldsmith Way, located to the east of the Proposed Development and 80m to the north of receptor R1 along Tamblin Way. The measurements started at 10:45 on 08 June and finished at 09:15 on 15 June 2022.

The microphone was placed approximately 1.5m above ground level, attached to a tripod next to the boundary fencing adjacent Goldsmith. An image of the sound level meter circled in red can be seen in Figure B.2

Figure B.2 LT2 Monitoring Location

During the installation and collection of the sound monitoring equipment, the ambient sound environment at LT2 was characterised by (from most dominant to least dominant noise):

- Road traffic along Goldsmith Way (approximately 5m);
- Road traffic along the A1001 (approximately 100m);
- Foliage blowing in the wind;
- Plant items at the Site.

Table B.2 presents the daily day and night-time period sound level monitoring results and the arithmetic average for each sound level indicator.

Table B.2 LT2 Daily Sound Level Monitoring Results

Date	Office Hours	Daytime		Night-time		
	$L_{Aeq,10h}$ dB	$L_{A10,18h}$ dB	$L_{A90,15min}$ dB	$L_{Aeq,8h}$ dB	L_{Amax} dB	$L_{A90,15min}$ dB
Wed 08/06/2022	58	61	51	53	70	43
Thu 09/06/2022	59	60	50	53	72	44
Fri 10/06/2022	58	59	52	54	75	44
Sat 11/06/2022	56	58	50	53	71	43
Sun 12/06/2022	55	57	50	52	73	47
Mon 13/06/2022	56	58	48	53	71	45
Tue 14/06/2022	62	59	50	53	71	49
Wed 15/06/2022	56	56	48	-	-	-
Arithmetic Average	58	59	50	53	72	45

B.3 Monitoring Location LT3

Unattended sound level measurements were taken on the eastern boundary of the Site on the boundary between the Site and Hatfield Police Station. The measurements started at 10:15 on 08 June and finished at 09:00 on 15 June 2022.

The microphone was placed approximately 2m above ground level, attached to fencing between the Site and Hatfield Police Station. An image of the sound level meter circled in red can be seen in Figure B.3.

Figure B.3 LT3 Monitoring Location

During the installation and collection of the sound monitoring equipment, the ambient sound environment at LT3 was characterised by (from most dominant to least dominant noise):

- Plant on the rooftop of the current warehouse (approximately 40m);

- Faint road traffic along the A1001 (approximately 140m);
- Birds singing

Table B.3 presents the daily day and night-time period sound level monitoring results and the arithmetic average for each sound level indicator.

Table B.3 LT3 Daily Sound Level Monitoring Results

Date	Office Hours	Daytime		Night-time		
	$L_{Aeq,10h}$ dB	$L_{A10,18h}$ dB	$L_{A90,15min}$ dB	$L_{Aeq,8h}$ dB	L_{Amax} dB	$L_{A90,15min}$ dB
Wed 08/06/2022	59	58	51	50	66	47
Thu 09/06/2022	57	56	50	51	65	48
Fri 10/06/2022	57	57	54	50	63	48
Sat 11/06/2022	55	55	53	49	63	47
Sun 12/06/2022	55	55	52	50	60	47
Mon 13/06/2022	56	54	51	50	63	48
Tue 14/06/2022	54	54	51	51	62	48
Wed 15/06/2022	53	54	49	-	-	-
Arithmetic Average	56	55	51	50	63	48

Appendix C Sound Monitoring Time-Histories

A time history plot for sound level monitoring for locations LT1, LT2, and LT3 can be seen overleaf.

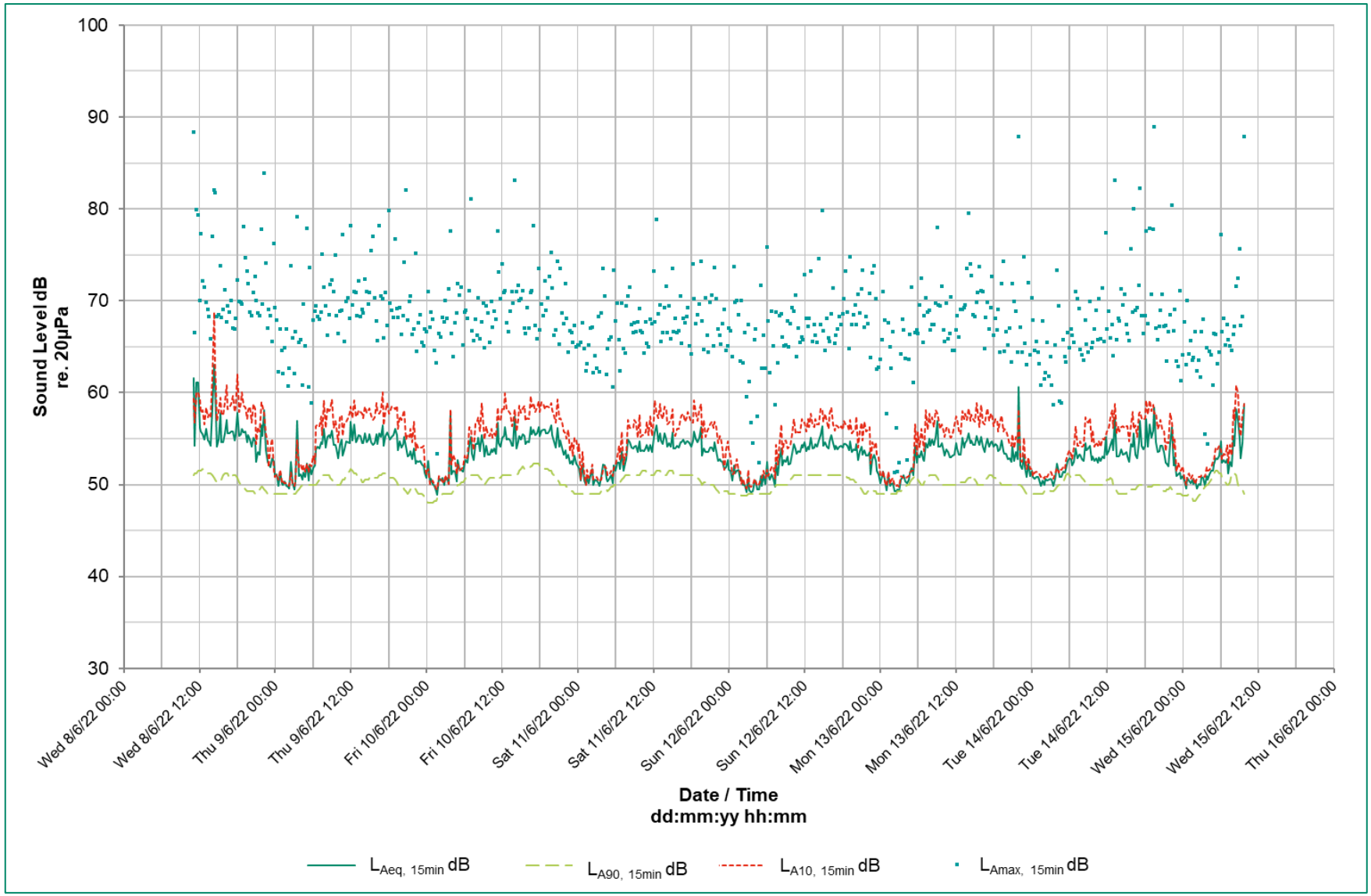

Figure C.4 LT1 – Sound Level Time-History Plot

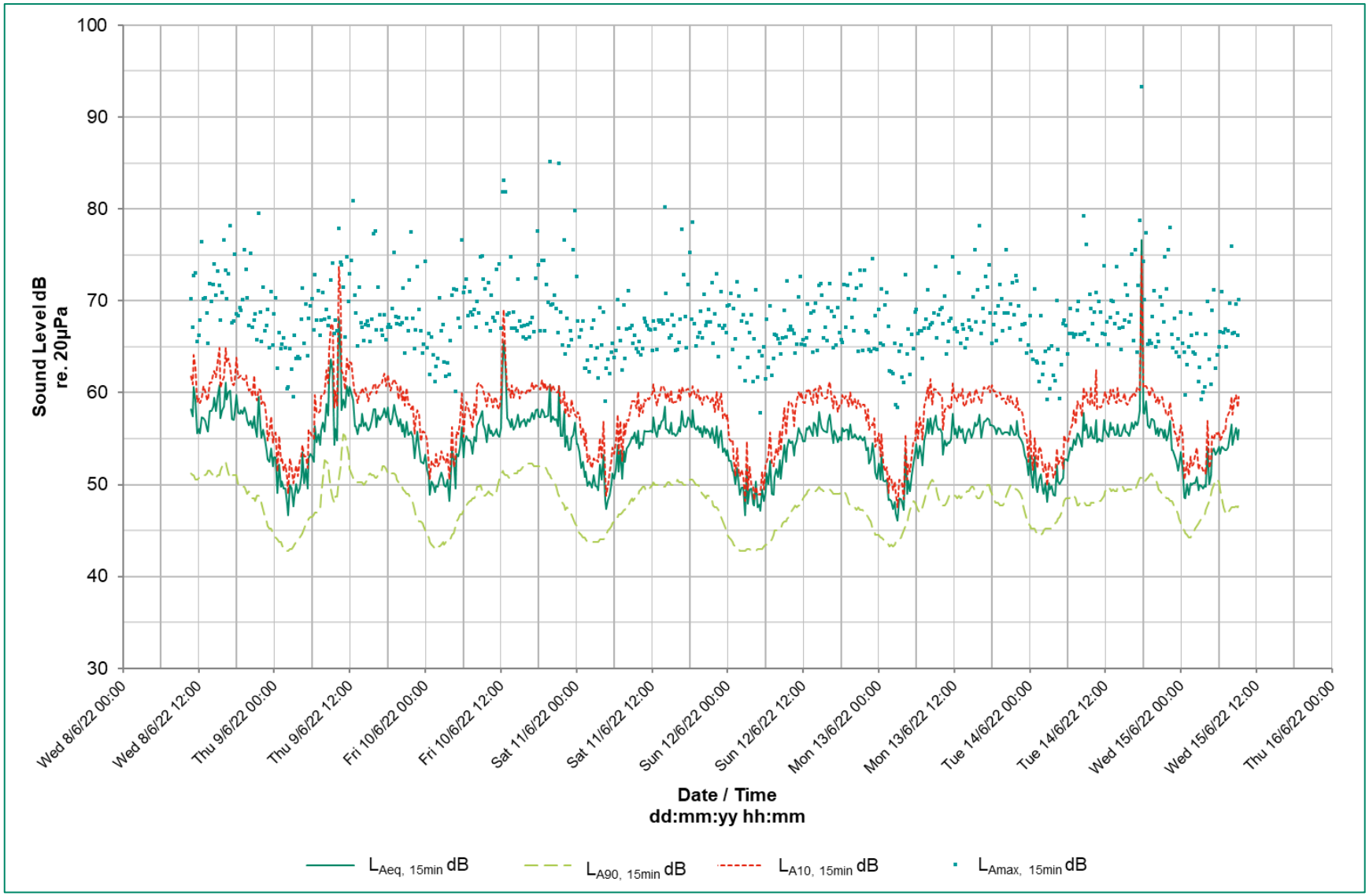

Figure C.5 LT2 – Sound Level Time-History Plot

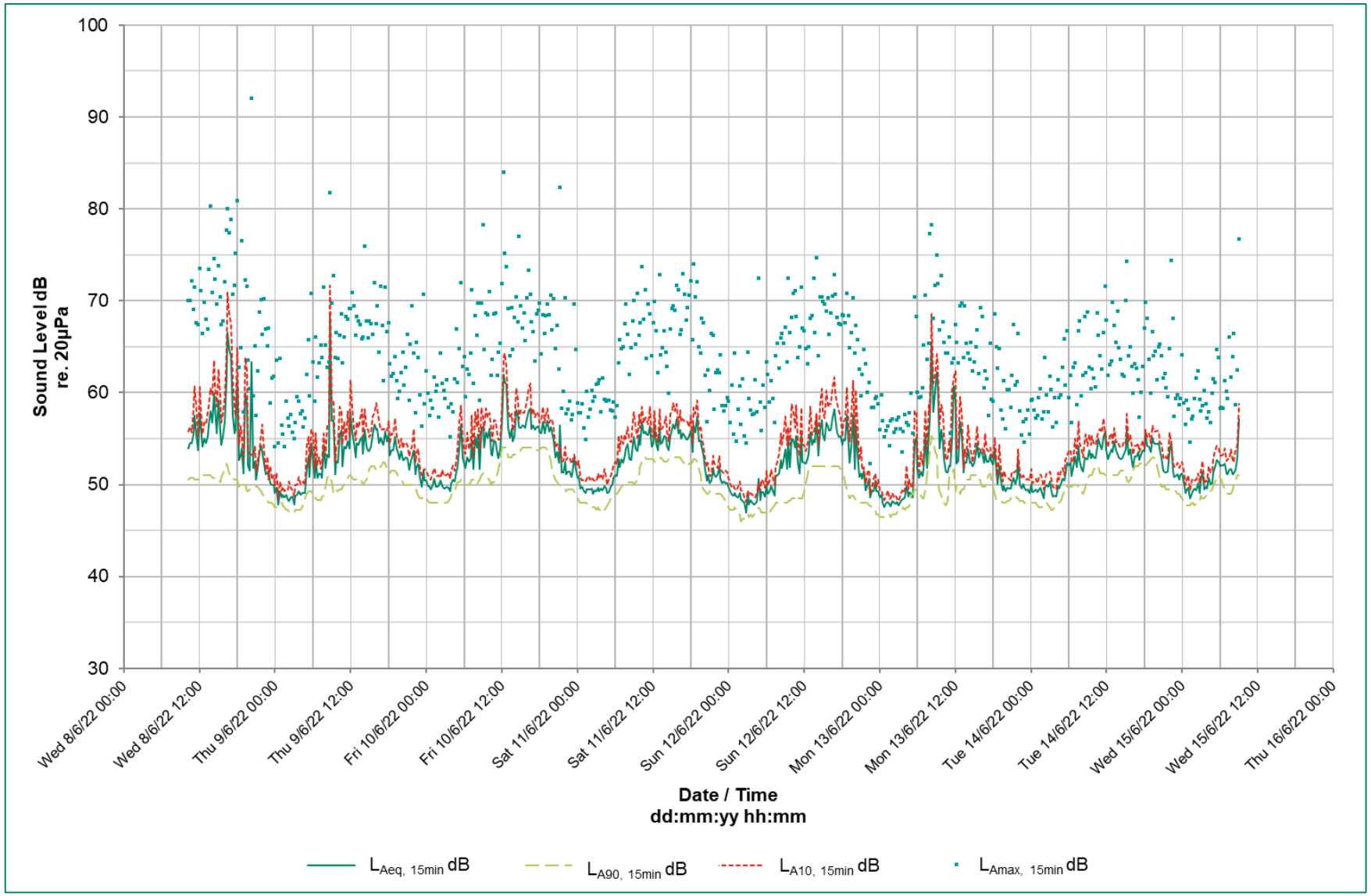

Figure C.6 LT3 – Sound Level Time-History Plot

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