

Former Novartis Site Parsonage Road, Horsham

Western parcel Noise Impact Assessment

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Lovell Partnerships Ltd

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1. INTRODUCTION

This Noise Impact Assessment has been prepared for Lovell Partnerships Ltd to support a planning application for residential development at the Former Novartis Site, Parsonage Road, Horsham.

The site is approximately 1.5 kilometres northeast of Horsham Town Centre, triangular, and bounded by Wimblehurst Road and Parsonage Road to the west and north. There are railway lines to the southwest and east. The surrounding area is mainly residential, with housing to the north and west, and commercial/industrial areas to the southeast. There is a general industrial area located east of the adjoining railway line. To the south of the railway line, there is a mixture of housing, retail and light industrial uses, as well as the College of Richard Collyer.

Following an Outline Application, outline planning permission (ref: DC/18/2687) was approved on 11 February 2020 (and was amended by a s96a application DC/22/1724 on 04 October 2022) for development of the full site, with residential use on the site's western portion.

This report accompanies a new full application for this western part of the site only. It extends from the central buildings towards Wimblehurst Road and was identified in the previous outline application as being for residential use. The current proposals are for residential use on this parcel, and will include new build housing, and conversion of an existing building to flats.

The proposed site location and proposed layout is attached at Appendix A.



2. POLICY

2.1 PLANNING GUIDELINES

2.1.1 National Planning Policy Framework, MHCLG, December 2024

The National Planning Policy Framework (NPPF)¹ sets out the Government's planning policies for England and how these should be applied by establishing a framework within which locally prepared plans for development can be produced.

The NPPF requires (187) prevention of new or existing development from contributing to, or being adversely affected by, unacceptable levels of noise pollution.

New development (198) should be appropriate to its location taking into account the likely effects of pollution on health, living conditions and the natural environment. In doing so it is required to:

'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 life²;

'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'

Planning policies and decisions should also (200) *'ensure that new development can be integrated effectively with existing businesses and community facilities [...]. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.'*

2.1.2 Noise Policy Statement for England (NPSE), DEFRA, March 2010

The Noise Policy Statement for England (NPSE)³ sets out the long term vision of government noise policy which is to *'Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.'*

The aims of the NPSE are to (2.23-2.25):

- 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

These aims are developed by reference (2.20-2.21) to the concepts of:

- NOEL (No Observed Effect Level). This is the level below which no effect can be detected.
- LOAEL (Lowest Observed Adverse Effect Level). This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL (Significant Observed Adverse Effect Level)..This is the level above which significant adverse effects on health and quality of life occur.

¹ National Planning Policy Framework, MHCLG, December 2024

² See Explanatory Note to the Noise Policy Statement for England, paragraphs 2.23 and 2.24 , Department for Environment, Food & Rural Affairs, 15 March 2010.

³ Noise Policy Statement for England (NPSE), DEFRA, 15 March 2010



It recognises that there is no universally applicable objective threshold for these concepts. Consequently, the NOEL, LOAEL and SOAEL are likely to be different for different noise sources and receptors and at different times (2.22).

Situations of significant adverse effect (SOAEL) should be avoided (2.23). Where the impact is between LOAEL and SOAEL reasonable steps should be taken to minimise and mitigate adverse effects on health and quality of life, but does not mean that such adverse effects cannot occur (2.24). It is also implied that situations of NOEL would be acceptable in noise terms.

2.1.3 Planning Practice Guidance: Noise, Paragraphs 1-17, DLUHC, 22 July 2019

Planning Practice Guidance on Noise⁴ (PPG-N) sets out government guidance on '*how planning can manage potential noise impacts in new development*'.

Whilst it does advise that noise can override other planning concerns, '*where justified*', it states that '*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.*' (002)

It also details the hierarchy of noise exposure, including the thresholds LOAEL and SOAEL, based on the likely average response, referred to within NPSE⁵. The noise exposure categories are summarised below.

- No Observed Adverse Effect: Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response.
- Observed Adverse Effect: Noise can be heard and causes small changes in behaviour, attitude or other physiological response.
- Significant Observed Adverse Effect: The noise causes a material change in behaviour, attitude or other physiological response.
- Unacceptable Adverse Effect: Extensive and regular changes in behaviour, attitude or other physiological response, and/or an inability to mitigate effect of noise leading to psychological stress.

The guidance advises, in accordance with the first and second aims of the NPSE, that where there is no observed effect or no observed adverse effect, no specific measures are required to manage the acoustic environment; where there is an observed adverse effect, consideration needs to be given to mitigating and minimising those effects; where there is significant adverse effects, the planning process should be used to avoid these effects occurring; where there are unacceptable adverse effects, the situation should be prevented.

In establishing values for LOAELs and SOAELs, which represent the onset levels of adverse effects and significant adverse effects, respectively, the guidance advises because of the subjective nature of noise, there is no simple relationship between noise level and its impact. It will instead depend on a number of factors in a particular situation. These will include:

- The source, its absolute level and the time of day.
- For intermittent sources, the number and duration of events;
- The spectral frequency content of the noise

⁴ PPG - Noise, MHCLG, 22 July 2019

⁵ Explanatory Note to the Noise Policy Statement for England, paragraphs 2.19 and 2.20, DEFRA, 15 March 2010



And also other factors will need to be considered in many cases, which are more fully described and detailed within the full PPG guidance, but include matters such as:

- The cumulative impacts with other sources
- Whether internal effects can be completely removed for example by closing windows (relevant with new residential development subject to ventilation being developed)
- Whether existing noise sensitive locations already experience high noise levels,
- Where Noise Action Plans, and, in particular Important Areas are identified nearby.
- The effect on wildlife especially on nationally designated sites.
- The use of external amenity spaces intrinsic to an overall design and including private gardens.
- The potential effect of a new residential or other sensitive development being located close to an existing noisy business or site, and for noise mitigation to be considered.
- Whether there are nearby areas of tranquility relatively undisturbed by noise from human caused sources that undermine the intrinsic character of the area and likely already valued for their tranquillity.

It should be observed that the PPG guidance does not provide any detail on the how such assessment including these factors, should be carried out. However, reference is made to documents published by other organisations, such as:

- BS 8233:2014— Guidance on sound insulation and noise reduction for buildings (British Standards Institute 2014);
- BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting

This should not be considered an exhaustive list, however, as reference may also be made to other existing British Standards, where relevant, and to scientific exposure-response studies or reviews relating to noise and its effects on human and, where appropriate, animal populations.

2.2 QUANTITATIVE STANDARDS

When considering the implications of noise on the site, the following documents provide additional useful guidance, consistent with the policies detailed above.

2.2.1 BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

BS 8233:2014⁶ 'provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use'. 'The Standard is not⁷ intended to be used routinely where noise sources are brought to existing noise sensitive buildings'.

For residential use dwellings (7.7.1), 'the main considerations, for bedrooms, are the acoustic effect on sleep; and for other rooms, the acoustic effect on resting, listening and communicating' (7.7.1).

Internal noise criteria are advised relating to sources of external noise "without a specific character", previously termed "anonymous noise".(...). For simplicity, only noise without character is considered. Noise has a specific character if it contains features such as a distinguishable, discrete and continuous

⁶ BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

⁷ The word 'not' is omitted from the text in the Standard. The Institute of Acoustics advised 'not' to be added following a meeting of their London Branch in March 2015.



'tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate'.(7.7.1)

'For steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 1'.

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

Table 1: 'Indoor ambient noise levels for dwellings' for 'noise without character'

There are a number of notes to the table. These include:

'Note 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values'.

BS 8233 does not give guidance on what might constitute a guideline value. However, as the standard does cross reference WHO, we suggest that the guideline value of L_{AFmax} 45dB, inside bedrooms, should not be exceeded during the night more than 10-15 times, which reflects the WHO position.

'Note 5: If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the facade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment'.

'Note 6: Attention is drawn to the Building Regulations'

'Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved'.

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited'.(7.7.3.2)

Although small balconies in flats or apartments used only for drying washing or growing pot plants should not have noise limits, 'the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve



the lowest practicable levels. Achieving levels of 55 dB L_{Aeq,T} or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space' (7.7.3.2).

2.2.2 Guidelines for Community Noise -World Health Organization, 1999

Guidelines for Community Noise (GCN) was published in 1999 with the aim of informing legislation and guidance produced at the national and regional levels for the purposes of minimising any potential adverse health effects resulting from noise in the community. It presents guideline noise level criteria for the avoidance of adverse effects such as sleep disturbance and annoyance in a range of specific environments. The preface to WHO states that community noise includes road, rail and air traffic, industries, construction and public work, and the neighbourhood.

New guidance from WHO titled Environmental Noise Guidelines for the European Region (ENG) was published in 2018. The document takes a very different approach to guidance set out in the previous Guidelines for Community Noise (GCN) document by identifying separate thresholds for specific sources rather than for community noise as a whole. Consequently, much of the earlier guidance set out in GCN is now absent from ENG. While ENG was intended to supersede GCN, it recognises this absence and states that '*indoor guideline values and any values not covered by the current guidelines (such as industrial noise and shopping areas) should remain valid.*'

It is recommended that all WHO guidance should be noted but it is recommended that it should also not be relied upon in assessments without reference to other relevant detailed guidance, especially that in British Standards. These may align better with Planning Practice Guidance⁸ in England.

2.2.3 BS 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting

BS 6472-1⁹ provides guidance on predicting human response to vibration in buildings.

The assessment is carried out by determining a vibration dose value (VDV) by measurement, for a relevant time period and comparing these levels to a range of values for which the probability of adverse comment is defined for residential buildings, offices and workshops. VDV takes into account both vibration level and the duration of vibration, thereby giving additional weight to vibration levels that are frequent or continuous or of high level.

⁸ PPG - Noise, MHCLG, 6 March 2014

⁹ BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings – Part 1: Vibration sources other than blasting



3. AMBIENT NOISE AND VIBRATION CRITERIA AND BASELINE CONDITIONS

3.1 CRITERIA

3.1.1 Noise

Appropriate noise limits, developed from the standards set out in BS 8233 (See Section 2.2.1) are summarised in Table 2 below:

Activity	Location	Time	
		Day (0700-2300)	Night (2300-0700)
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,T}$
Sleep disturbance	Bedroom	-	45 dB $L_{AF,max}$ (regularly, defined as not more than 10-15 times)

Table 2: Indoor ambient noise levels for dwellings.^{10,11}

These noise limits align with those detailed and approved in the previous outline application (Reserved Matter 21).

- If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation¹² that does not compromise the façade insulation or the resulting noise level given in Table 1. (This is confirmed by ProPG¹³, para 2.34.)
- ProPG (para 2.35) advises that internal noise level guidelines are generally not applicable under purge¹⁴ ventilation conditions as defined by Building Regulations Approved Document F, as this should only occur occasionally (e.g. to remove odour from painting and decorating or from burnt food).
- Reliance on open windows for the mitigation of overheating is addressed in Approved Document O, and so is a matter for Building Regulations rather than planning. ADO requires noise levels in bedrooms at night to be considered, as limits are given that if exceeded, indicates windows are likely to be kept closed¹⁵. If windows need to be kept closed, overheating mitigation may be needed utilising some other method, which may have a planning implication.

For external amenity areas, BS 8233 advises ...*it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

¹⁰ BS 8233:2014 Guidance on sound insulation and noise reduction for buildings

¹¹ Guidelines for community Noise, WHO, 1999

¹² Whole Dwelling Ventilation, as defined by Approved Document F, December 2021

¹³ ProPG: Planning and Noise – Professional Practice Guidance on Planning & Noise, May 2017, IOA, ANC, CIEH

¹⁴ Manually controlled ventilation of rooms or spaces at a relatively high rate to rapidly dilute pollutants and/or disperse water vapour.

¹⁵ $L_{Aeq,2300-0700}$ 40 dB, L_{AFmax} 55 dB more than 10 times a night between 11 pm and 7 am



Noise in external amenity areas was not a requirement of the Reserved Matters for the previous outline application. The noise report that accompanied the previous outline application suggested a higher noise limit was acceptable. This appears to have been accepted by the LPA on that scheme.

3.1.2 Vibration

In terms of vibration BS 6472-1¹⁶ (see section 2.2.3) provides guidance on predicting human response to vibration in buildings. The assessment is carried out by determining a vibration dose value (VDV) by measurement, for a relevant time period and comparing these levels to a range of values for which the probability of adverse comment is defined for residential buildings, offices and workshops. VDV takes into account both vibration level and the duration of vibration, thereby giving additional weight to vibration levels that are frequent or continuous or of high level.

Place and time	Low probability of adverse comment, m/s ^{1.75}	Adverse comment possible, m/s ^{1.75}	Adverse comment probable, m/s ^{1.75}
Residential Buildings, 16h day	0.2-0.4	0.4-0.8	0.8-1.6
Residential Buildings 8h night	0.1-0.2	0.2-0.4	0.4-0.8

Table 3: Vibration dose value ranges which might result in various probabilities of adverse comment within residential buildings¹⁶

3.2 SURVEY

3.2.1 Survey Procedure

Unattended noise monitoring was carried out between 7th and 12th September 2022 at three measurement positions (Positions 1-3, see below) and between 12th and 15th September 2022 at one further measurement position (Position 4, see below). Weather conditions were kept under review during this period to ensure that valid measurement data was obtained. Unattended vibration monitoring was also completed over these dates. (A noise and vibration survey was also completed by others¹⁷ in 2018 to support the previous outline application.)

Unattended noise level monitoring was carried out to obtain continuous ambient noise data throughout the survey at the locations described below and shown in Figure 1 and as described in Appendix B. The results of these measurement allowed the daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ metrics to be measured directly. $L_{Aeq,T}$ is the average noise level, measured over the time period T. BS8233 and WHO advise that the time period for the daytime should be a 16 hour average (0700-2300). The night period is defined as 2300-0700.

The sound level meters recorded data in contiguous 5-minute periods over the whole monitoring period. This provides information on the distribution of night-time maximum noise events (LAF,max). Charts showing the results of the survey at each location are included in Appendix B.

Vibration monitoring measured VDV directly. Survey results are also provided in Appendix B.

3.2.2 Survey Positions

The measurement positions used were:

¹⁶ BS 6472-1:2008 *Guide to Evaluation of Human Exposure to Vibration in Buildings – Part 1: Vibration sources other than blasting*

¹⁷ Novartis Site, Horsham – Noise Assessment R7397-1 Rev 0 2nd July 2018, by 24Acoustics



Noise

- Position 1 – Adjacent to the railway line that runs to the south west of the site, in line with the existing Novartis building. The microphone was extended to a height of 4 m, so as to be above the substantial site hoarding. Noise levels here were affected by occasional trains, distant road traffic, distant industrial noise and activity at the College of Richard Collyer, which includes some construction activity. This is similar to locations 4 and e in the noise assessment completed at outline application stage, though the height of measurement is not described, nor the existence or otherwise of any site hoarding. The outline report advised that the dominant noise source at this location was the railway.
- Position 2 – Adjacent to Parsonage Rd, to the north of the site, in line with the existing Novartis building. The microphone was extended to a height of 4 m, so as to be above the substantial site hoarding. Noise levels here were dominated by road traffic. This is similar to location 2, a little further east than location b, and west of location c in the noise assessment completed at outline application stage, though the height of measurement is not described, nor the existence or otherwise of any site hoarding. The outline report advised that the dominant noise source at this location was road traffic.
- Position 3 - Adjacent to Wimblehurst Rd, to the north-west of the site. The microphone was extended to a height of 4 m, so as to be above the substantial site hoarding. Noise levels here were dominated by road traffic on Parsonage Rd as well as on Wimblehurst Rd. This is similar to location 1, and a little further east than location a, in the noise assessment completed at outline application stage, though the height of measurement is not described, nor the existence or otherwise of any site hoarding. The outline report advised that the dominant noise source at location e, closer to the railway, was dominated by the rail traffic, though location 1 was dominated by road traffic at the Wimblehurst Rd/Parsonage Rd roundabout.
- Position 4 - Adjacent to the rail line to the east. This is outside the area of site due to be developed for housing, with a separation distance of just under 200 m. The microphone was extended to a height of 4 m, so as to be above the substantial site hoarding. Noise levels here were affected by the railway, as well as the industrial estate to the east of the railway. This is similar to location 3, north of location d, and south of location c in the noise assessment completed at outline application stage, though the height of measurement is not described, nor the existence or otherwise of any site hoarding. The outline report advised that the dominant noise sources at location 3 was the railway and industrial activity, and at location e, the railway.

Vibration

- Position 1 – Adjacent to the railway line that runs to the south west of the site, in line with the existing Novartis building. The accelerometer was located on a substantial concrete base, that appeared to be the foundation of a former building. This is similar to location 4 in the outline report, which also measured at further positions, but did not provide any commentary on the impact of these other locations, as they are less significant relative to the proposed development.



Figure 1: Summary of Measurement Positions (Larger Map given in Appendix B)

3.2.3 Survey equipment

The following equipment was used:

- Brüel & Kjaer Type 2250 Sound Level Meter s/n 2726905
- Brüel & Kjaer Type 4189 Microphone s/n 2710995
- Brüel & Kjaer Type 4231 Acoustic Calibrator s/n 2730220
- Brüel & Kjaer Type 2250 Sound Level Meter s/n 3000713
- Brüel & Kjaer Type 4189 Microphone s/n 2780512
- Brüel & Kjaer Type 4231 Acoustic Calibrator s/n 3001598
- Brüel & Kjaer Type 2250 Sound Level Meter s/n 3024398
- Brüel & Kjaer Type 4189 Microphone s/n 3147720
- Brüel & Kjaer Type 4231 Acoustic Calibrator s/n 3021283
- Svantek Type SVAN 958 Sound & Vibration Meter s/n 15173
- Dytran Tri-axial Accelerometer Type 3233A s/n 646



Before and after the survey, the sound level meter was field-calibrated in accordance with the manufacturer's guidelines, and no significant drift was observed. The meters, microphones, accelerometer and field calibrator are laboratory calibrated biennially in accordance with UKAS procedures or to traceable National Standards.

3.2.4 Results

Noise

A summary of the measured noise levels are shown in Table 4.

Position ¹	Daytime $L_{Aeq,16hr}$ dB		Night-time $L_{Aeq,8hr}$ dB		Night-time L_{AFmax} dB ⁴	
	2022 ²	2018 ³	2022 ²	2018 ³	2022 ²	2018 ³
1	57	55	58	55	78	76
2	67	61	58	52	78	71
3	60	63	52	54	69	73
4	57	58	51	52	72	74

Table 4: Summary results of ambient noise level measurements for design purposes

¹ Measurement positions as referenced in this report

² Data measured in 2022 survey described in this report

³ Data measured in 2018 survey

⁴ Described as the typical L_{AFmax} value, which is the 10th highest that occurs, representing regular events

At Position 1, the daytime $L_{Aeq,16hr}$ was 57-59 on each day, with Sunday being notably quieter, at $L_{Aeq,16hr}$ 49 dB. Night-time noise levels followed a similar pattern $L_{Aeq,8hr}$ 58-59 dB each night, with Saturday night into Sunday morning being a little quieter, at 55 dB. It is notable that the daytime and night-time noise levels do not differ significantly. Noise levels at this location are controlled by trains. Throughout the daytime period trains are regular, with an increase in the number of trains in the early part of the night until around 0100, then starting again from 0445. On Saturday night/Sunday morning, the trains did not start again until 0635, and there were then none after 0950 on Sunday¹⁸. On Sunday night there were a few train events from about 2315 until 0145, with a busy period recommencing on Monday morning at 0445. Noise from individual events at night do not regularly (as defined in BS8233 and by WHO) exceed¹⁹ $L_{AF,max}$ 78 dB. This is also dominated by trains. The 2018 and 2022 data correlates well, showing little change.

At Position 2, the daytime $L_{Aeq,16hr}$ was 65-68 dB on each day, with Saturday and Sunday being marginally quieter than during the week. At night, noise levels are lower, $L_{Aeq,8hr}$ 56-60 dB, with Friday, Saturday and Sunday night being a little quieter than a weekday. Noise levels follow an expected pattern of quieter at night, rising early morning, staying steady through the day and then dropping early evening into the night. Maximum noise levels were dominated by road traffic, with $L_{AF,max}$ 78 dB not regularly exceeded¹⁹. Noise levels are completely dominated by road traffic. This is noisier than measured in 2018, and the reason for this is not clear. The precise measurement position and configuration used in 2018 is not clearly marked or explained.

¹⁸ This aligns with the timetable and wider train schedules (which include non-passenger trains) for this line

¹⁹ When assessing noise from individual events at night, WHO Guidelines for Community Noise references 10-15 events per night exceeding a set level to prevent awakenings. Therefore, the analysis is focussed on the tenth noisiest event.



At Position 3, noise levels were again dominated by road traffic, though the measurements were slightly quieter than Position 2, as Wimblehurst Rd is less busy than Parsonage Rd, and the measurement is set back slightly further from the road itself. The daytime $L_{Aeq,16hr}$ was 58-62 dB on each day, with the weekend being marginally quieter than during the week. At night, noise levels are lower, $L_{Aeq,8hr}$ 50-54 dB, with Friday, Saturday and Sunday night being a little quieter than a weekday. Maximum noise levels were dominated by road traffic, with LAF,max 69 dB not regularly exceeded¹⁹. This aligns well with the 2018 data.

Position 4 is adjacent to the railway to the east. This does not represent a position for future housing, but gives an indication of the noise levels to the far east of the site adjacent to the railway line that runs north-south, and the industrial estate beyond. There is existing housing very close to these industrial units already, particularly at the western end of Horsham Gates (west of foundry Lane) and along the north side of Parsonage Rd, running east to a level crossing and then the industrial estate. Daytime noise levels are $L_{Aeq,16hr}$ 57 dB each day, and drop to $L_{Aeq,8hr}$ 50-51 dB at night. This is controlled by train events, shown by a further drop in noise levels between approximately 0045 and 0500 each night when there are no trains (again, which correlates well with the real time train data). However, variable industrial noise is part of the soundscape at this location, and there are periods where the industrial noise is a dominant source (between train events). The maximum noise level is again controlled by train events, with LAF,max 72 dB not regularly exceeded at night. The 2022 data and 2018 data shows very similar noise levels, indicating little change in the noise environment between the two surveys. The 2018 report identified a distinctive tone at 315 Hz and 600 Hz, emanating from a roof mounted extract fan on an industrial unit to the east. It was measured in 2018 as $L_{eq,1min}$ 55 dB at 315 Hz, 95 m away. In 2022, this tone was again audible, though not at the housing position. Measurements at Position 4 do show a very clear tone at 315 Hz, with a low frequency element at 31.5 Hz. There is also a periodic material 630 Hz tonal element, and other higher frequency elements, likely related harmonics. There is variability to this – it is not always present. The 2018 survey identified it as operating for a few hours at a time.

The 2018 report also identified a Hanson concrete depot at the north-east corner of the site, though describes noise from it as not significant. However, it is not clear what this is referring to, as there is no Hanson plant in this location, but there is a Hanson Concrete Plant²⁰ at the southern corner of the site across the railway. This is described in the 2018 report as an “Aggregate Yard”, and is indicated on the plan as a “Hanson Aggregate Yard” in the 2018 report (Figure 1). During the 2022 survey it also did not appear to be a significant noise source. This far corner of the site is well separated by at least 300 m, from the proposed housing location. The 2018 report indicated noise level 45 m from the yard of $L_{Aeq,10min}$ 58 dB, with low frequency noise levels of $L_{eq,1min}$ 72 dB at 50 Hz occurring briefly when HGV boxes were shaken to loosen stuck material. An activity cycle in the yard would be 10-15 minutes, and there may be 3 each hour. During the 2022 survey, noise from the yard was not distinct above other sources (road and rail) at any of the proposed housing locations on the site.

²⁰ Opening hours advertised as 07:30-17:00 Monday to Friday, 07:30-12:00 Saturday



Vibration

A summary of the measured vibration results is given below in Table 5.

Period	Measured VDV per axis ($\text{m/s}^{1.75}$)		
	x VDV_d	y VDV_d	z VDV_b
Daytime (16 hour)	0.011	0.007	0.071
Night-time (8 hour)	0.006	0.004	0.065

Table 5: Summary of measured vibration levels

Note 1: Axis with highest VDV highlighted with bold text

Note 2: Adverse comment is not expected

At this position the vertical vibration axis dominates measurable vibration, as is commonly the case. The 2018 survey data exhibited the same pattern of a similar order of magnitude at the comparable measurement position.



4. ASSESSMENT

4.1 NOISE

4.1.1 Internal Noise Levels and Façade Requirements

The north side of the site is adjacent to Parsonage Road. Noise levels along this road were dominated by road traffic and measured as $L_{Aeq,16hr}$ 67 dB during the day, $L_{Aeq,8hr}$ 58 dB during the night, with a typical LAFmax 78 dB at night.

The west end of the site is adjacent to Wimblehurst Road. Noise levels along this road were dominated by road traffic and measured as $L_{Aeq,16hr}$ 60 dB during the day, $L_{Aeq,8hr}$ 52 dB during the night, with a typical LAFmax 69 dB at night.

The southern side of the site, adjacent to the west-east rail line recorded noise levels of $L_{Aeq,16hr}$ 57 dB during the day, $L_{Aeq,8hr}$ 58 dB during the night, with a typical LAFmax 78 dB at night.

The eastern side of the site is located centrally, and so is affected by noise from the eastern railway line and more distant industrial activity, as well as by Parsonage Rd and the west-east rail line.

To enable appropriate assessment, a noise model has been developed where the noise levels incident on each block can be derived, and the internal noise level calculated (assuming a brick block façade) utilising the rigorous calculation procedure set out in BS 8233. To minimise window types, in each block the highest noise level incident on that block has been used. The design has been rationalised to two mitigation schemes to avoid excessive combinations of acoustic specifications.

Plots	Acoustic Performance requirements for each building element			
	Window/Door		Ventilator	
	R_w dB	R_w+C_{tr} dB	$D_{n,e,w}$ dB	$D_{n,e,w}+C_{tr}$ dB
1-7, 9-11, 15-16, 19, 21, 23-26	35	32	42	38
8, 12-14, 17-18, 20, 22	29	25	33	32

Table 6: Sound insulation specification for the proposed development site

¹ This can typically be achieved if the window is a double-glazed unit comprising 10 mm float glass, 6-16 mm cavity, 6 mm float glass. Greenwood 5000EAW.AC2 ventilators are an example of a unit that meets the ventilator acoustic specification.

² This can typically be achieved if the window is a double-glazed unit comprising 4 mm float glass, 6-16 mm cavity, 4 mm float glass. Greenwood 4000SBW ventilators are an example of a unit that meets the ventilator acoustic specification, which is a standard hit and miss trickle ventilator.

The acoustic specification applies to the building element (the window, the doorset, the ventilator), as a whole, not just to the glazing. For many windows and doorsets, the influence of the frame materials on the composite sound reduction of the window set is largely negligible. However, for high performance acoustic windows that must achieve R_w 40 dB and R_w+C_{tr} 34 dB, or more, the influence of the frame becomes increasingly significant and must be taken into account, and for doorsets that must achieve R_w 30 dB and R_w+C_{tr} 25 dB, or more the influence of the frame and the seals becomes increasingly significant



and must be taken into account. In these cases, it is recommended that compliance is demonstrated by comparing the results of supplier laboratory test data with the required specifications with and without the C_{tr} term.

In this analysis calculations have assumed 2 vents in each bedroom, and 4 in each living room. However, the precise number is to be determined by the mechanical consultant for the project as they must be sized to ensure adequate ventilation as required by Approved Document F, and ventilation design is beyond our expertise. The noise levels experienced in the rooms is affected by the number of vents so if the number of vents that is installed is higher than we have assumed then the vent acoustic specification will need to be increased to ensure that the indoor noise target is still achieved.

4.1.2 Noise Constraints on Overheating Mitigation (Building Regulations Approved Document O)

Although the mitigation of overheating is a Building Control issue, rather than a planning issue, site noise constraints can lead to design changes that may become planning issues, so these interrelationships require early consideration.

The primary requirements for noise as they relate to overheating are set out in the Building Regulations Approved Document O (ADO).

To mitigate overheating, ADO sets out several strategies for limiting solar gains (e.g. shading devices and glazing design) and for removing excess heat (e.g. passive/mechanical ventilation and mechanical cooling). The strategy chosen to remove excess heat will typically be constrained by the external noise environment and in many cases, it will not be possible to rely on open windows.

ADO advises that:

'Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a. 40dB LAeq,T , averaged over 8 hours (between 11pm and 7am).*
- b. 55dB LAFmax , more than 10 times a night (between 11pm and 7am).'*

The reduction to noise ingress provided by an open window will depend on various factors, such as:

- the Acoustic Open Area of the window;
- the geometric volume of the bedroom;
- the reverberation time in the bedroom.

Therefore, whether or not the ADO noise thresholds are exceeded will depend on the external noise level and how far the window is open. A limit on how far a window can be open while ensuring ADO noise thresholds are met is first determined by the acoustician and this limit can then be shared with the overheating assessor and used as an input in their assessment.

ADO provides a simplified method for demonstrating compliance with requirement O1. A number of criteria must be met for compliance, one of which relates to the minimum required free area of openings in bedrooms for ventilative cooling. For bedrooms in locations with a high risk of overheating, the minimum free area must be 13% of the bedroom floor area. In moderate risk locations, it must be 4% of the bedroom floor area. If external noise levels result in a free area limit that is lower than the minimum free area required for ventilation, the simplified method fails, and dynamic thermal modelling is required.



This leads to the external compliance limits set out in Table 7.

AcOA as a percentage of floor area (%)	Noise level difference (dB)	Incident noise level limit outside bedroom windows at night for ADO compliance (dB)		Comment	Plots
		$L_{Aeq,8hr}$	L_{AFmax}		
0%	n/a	> 50	> 65	Assume windows will need to be closed.	1-11, 15-16, 19, 21-26
4%	10	50	65	If levels exceeded in moderate risk area, simplified method cannot be used.	12-14, 17-18, 20
13%	5	45	60	If levels exceeded in high risk area, simplified method cannot be used.	None

Table 7: Maximum allowable acoustic open area of window for compliance with ADO noise thresholds

It should be noted that the ventilative performance of an open window is described by a term called the Equivalent Area (EA), as defined in ADO. By contrast, the Acoustic Open Area (AcOA) of an open window is not well defined and depends on several complex interactions between the external sound field and the geometry and type of window. However, empirical evidence suggests that the sound reduction of an open window calculated on the basis of AcOA and EA results in a similar degree of uncertainty. Therefore, limiting values of AcOA can be interpreted by the overheating assessor as limiting values of EA.

It must be noted that the ADO related advice set out in this report relates only to the acoustic constraints on the use of open windows during overheating. Any comments made on the wider (non-acoustic) issues of ADO are intended as guidance only and are based on our understanding. However, we are not specialists in the mitigation of overheating and cannot take responsibility for, or give advice on, the wider compliance of the scheme with ADO.

4.1.3 Amenity Areas

Noise levels in external amenity areas at ground floor level (ie gardens) have been modelled for comparison with the Table 1 guidelines. In general, the central area of the site will be below $L_{Aeq,16hr}$ 55 dB during the daytime, and so complies with the guideline values. The western central half of the site will exceed $L_{Aeq,16hr}$ 55 dB, but will be below 60 dB. In summary the private gardens are exposed to noise during the day as follows:

- C01, C02, C03 – Noise levels are between $L_{Aeq,16hr}$ 65-70 dB
- C04, C05, C06 – Noise levels are between $L_{Aeq,16hr}$ 60-65 dB
- C07 and C10 – Noise levels on the terraces are between $L_{Aeq,16hr}$ 65-70 dB, though this does not account for the screening benefit from the terrace edge treatment
- C08 – Noise levels are between $L_{Aeq,16hr}$ 55 and 60 dB
- C09 – Noise levels are between $L_{Aeq,16hr}$ 60 and 65 dB
- C16-C23 – Noise levels are between $L_{Aeq,16hr}$ 50 and 55 dB
- C11 – Noise levels on balconies overlooking Parsonage Road are between $L_{Aeq,16hr}$ 65 and 70, with balconies on end facades $L_{Aeq,16hr}$ 60 and 65 dB



- C15 – Noise levels on balconies overlooking the rail line are between $L_{Aeq,16hr}$ 55 and 60, with balconies on end facades $L_{Aeq,16hr}$ 50-55 dB
- C12, C13 and 14 – Noise levels on balconies and in ground floor areas around the building are generally below $L_{Aeq,16hr}$ 55 dB

The site benefits from a large central area where noise levels satisfy BS 8233 requirements.

The original outline application stage gave a clear understanding that noise levels in some gardens would exceed guidelines. This was justified by referenced to BS 8233 as described in Section 2.2.1 above. Furthermore, the reserved matters noise condition did not require specific consideration of noise in amenity areas.

4.2 VIBRATION

The measured vibration levels are significantly below the level that correlates to a low probability of adverse comment" as defined in BS6472. Whilst the levels of vibration in a finished home can differ from those measured in the form set out here, it is reasonable to assume in this case that there is unlikely to any material increase in vibration experienced by future residents, because the measurements were taken on a concrete base similar to raft foundations, and the heavier loading of the new buildings will reduce the coupling loss of the foundations to the surrounding ground. As properties are low rise, there is no material floor to floor attenuation, nor upper floor amplification.

Therefore, no vibration mitigation is considered necessary.



5. ENVIRONMENTAL NOISE FROM MECHANICAL SERVICES

Each site will have Air Source Heat Pumps, and so noise from these units will be assessed. Appropriate positioning of these units away from sensitive receptors will minimise noise impact. Noise emissions from these units can vary significantly by manufacturer and model. Quieter units should be sought, as it is likely they will be relatively close to sensitive receptors.

Atmosphere side attenuation should be expected on any MVHR systems.

There are two new substations proposed.

Emergency plant would not expect to have a high degree of noise control, though would be controlled sufficiently that when tested (assuming tests are done at times of day which are not noise sensitive), does not cause disproportionate loss of amenity for residents.

Noise limits for all plant will be developed following an approach in accordance with BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound would be taken*, aiming to achieve a rating level no greater than the existing background level at the nearest sensitive location.

6. CONCLUSIONS

The site is affected by distant road traffic, and rail noise.

To attenuate noise, a scheme of sound insulation and ventilation for the buildings has been set out Acoustic standards as detailed in BS8233 and related documents are met, including consideration (as required by BS8233) of the ventilation strategy for the buildings, which, where appropriate additionally references the requirements of Approved Document O.

The report additionally sets out a proposal for post-construction validation by design review.

The report also demonstrates there to be no requirement for vibration attenuation measures.

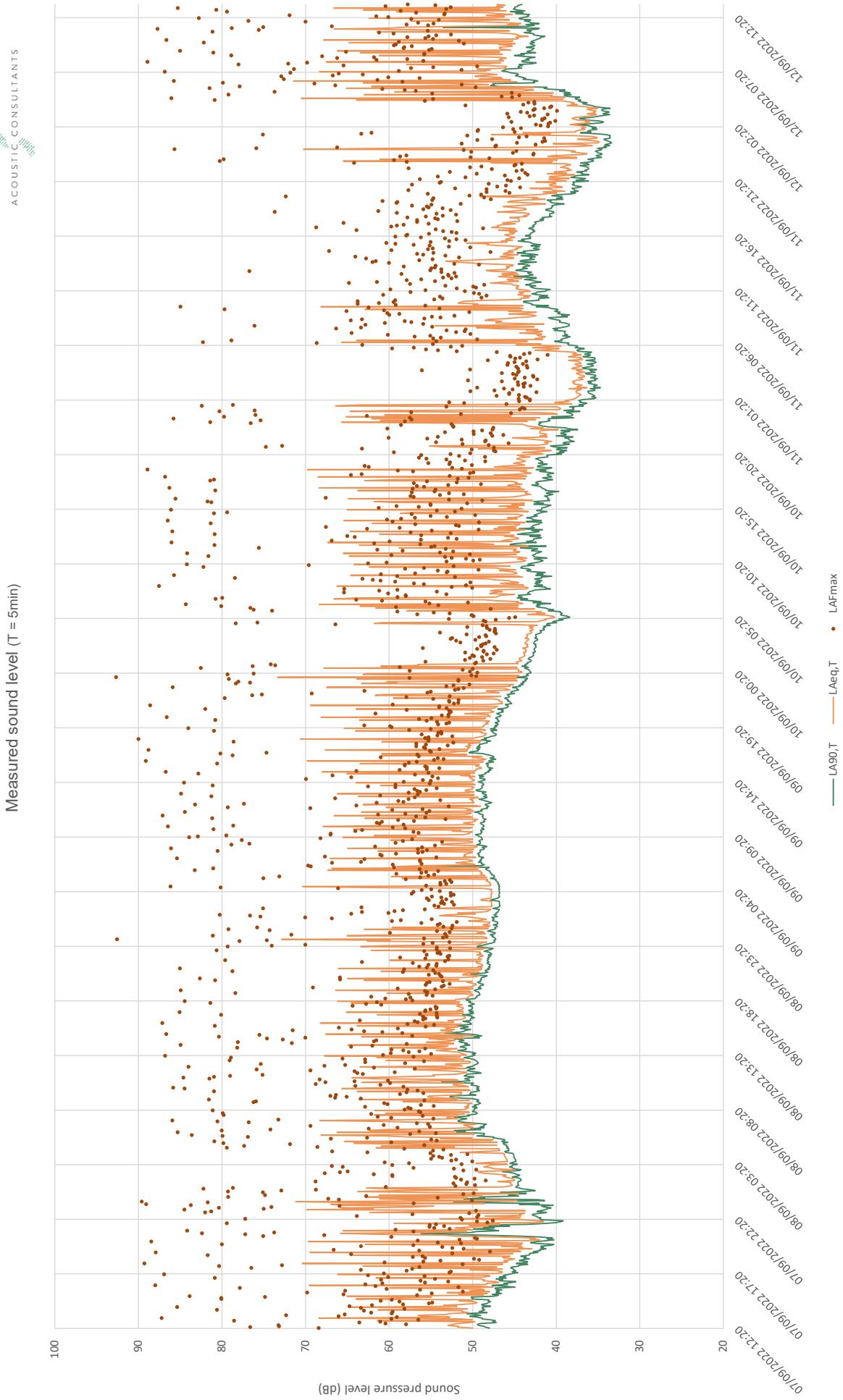
A P P E N D I X A

Site Location and Proposed Layout

A P P E N D I X B

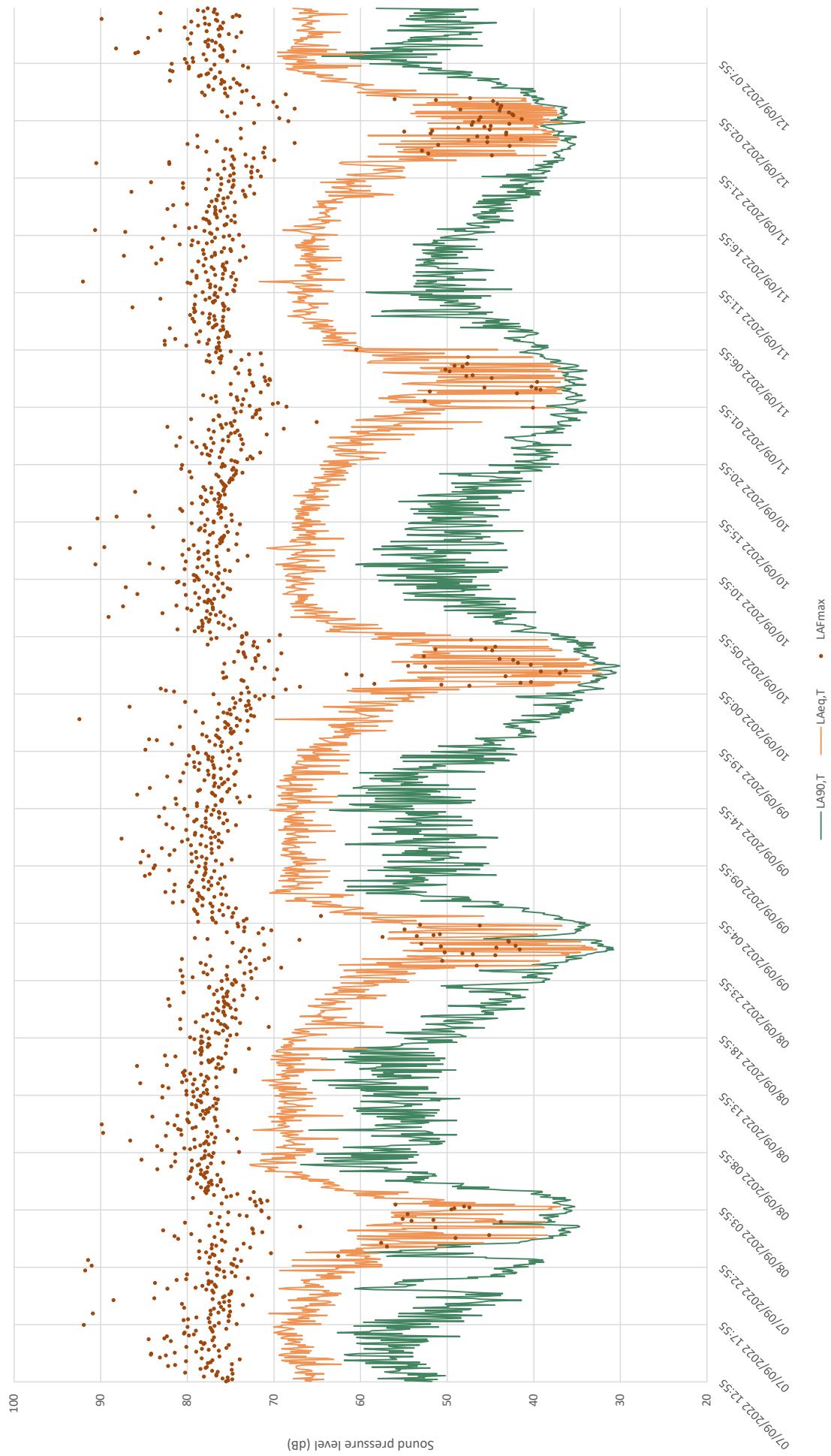
Noise and Vibration Survey Results





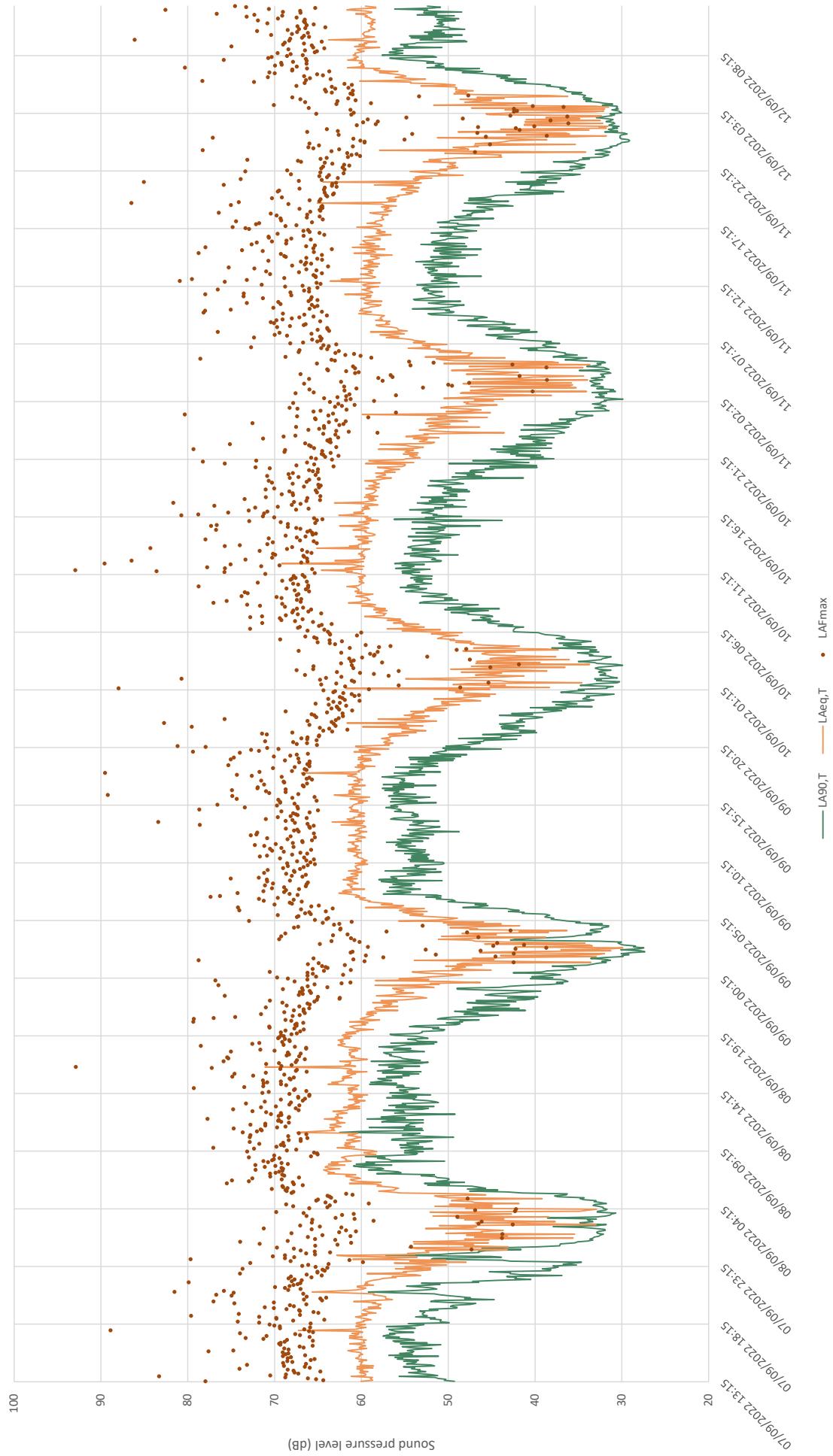
Position 2

Measured sound level ($T = 5\text{min}$)



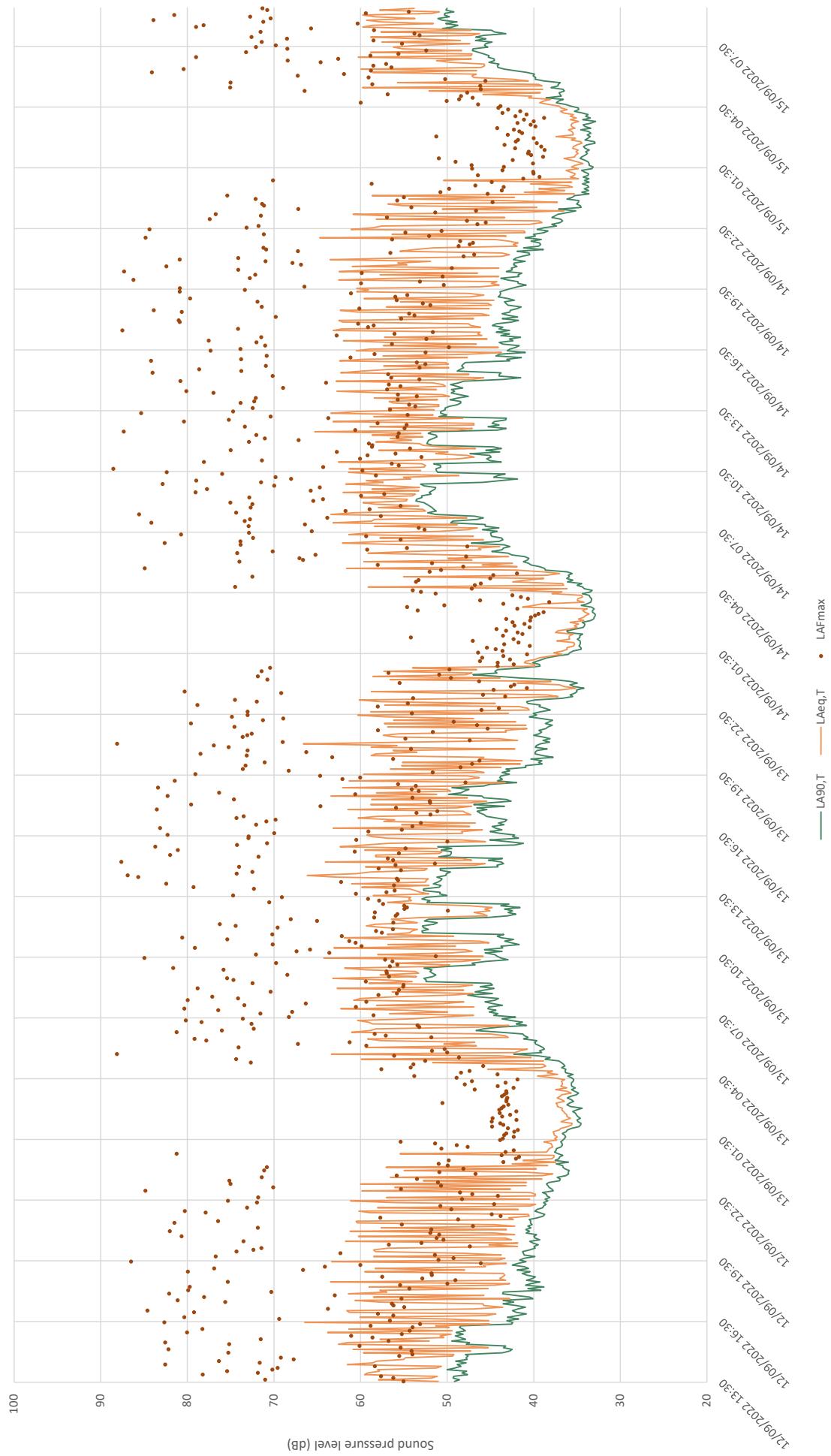
Position 3

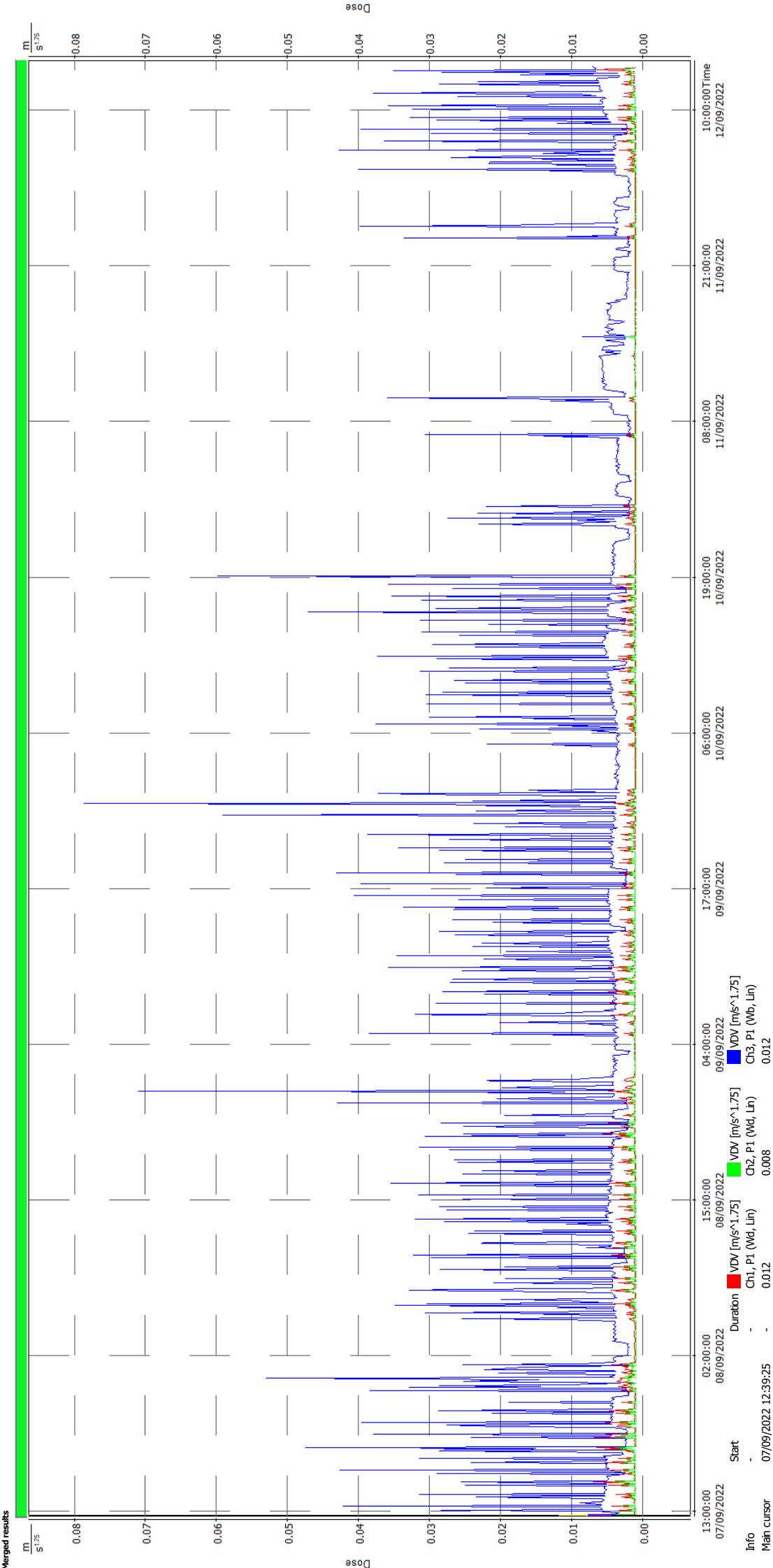
Measured sound level ($T = 5\text{min}$)



Position 4

Measured sound level ($T = 5\text{min}$)





SPECTRUM
ACOUSTIC CONSULTANTS

Measured Vibration - VDV in 5 minute intervals, at Position 1.

Red is X axis - 90° to the track
Green in Y axis - Parallel to the track
Blue is Z axis - Vertical

A P P E N D I X C

Noise Model (Indicative Contour plots)





A P P E N D I X D

Noise Ingress Calculations



Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park
Project number:	21324
Date:	28/02/2025
Plot:	7 and 10
	LKD at first floor

Daytime ($L_{Aeq, 16h}$)		Unit		Value		Description		Octave band centre frequency						Broadband term									
EXTERNAL NOISE LEVEL								Term	63	125	250	500	1k	2k	4k	8k							
External noise level		Facade 1						$L_{eq,1}$	70	62	61	60	67	61	50	44	$L_{Aeq,1}$						
Facade correction factor								C	0	0	0	0	0	0	0	0	69 dB						
INCIDENT FAÇADE NOISE LEVEL		Facade 1						$L_{eq,ff}$	70	62	61	60	67	61	50	44	$L_{Aeq,ff}$	69 dB					
ROOM DATA		Room description and reverberation time		Volume		71		RT60						s		s							
Incident noise level																							
FAÇADE ELEMENTS (Façade 1)		Area		3.64		Generic 10/6-16/6		Rw		23		24		32		37		47					
Glazing		Area		8.6		Brick and block external wall		Rw		34		40		44		51		60					
Walls		Area		4		Greenwood 5000EAW/AC2 (Acoustic trickle)		Dn,e		32		40		37		47		53					
Vent		No. off.		--												45		Dn,e,w / Dn,e,w+Ctr					
None																42 / 38 dB		Rw / Rv+Ctr					
																50 / 47 dB		Rw / Rv+Ctr					
																42 / 38 dB		Dn,e,w+Ctr					

RESULTS

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park		
Project number:	21324		
Date:	28/02/2025		
Plot:	7 and 10		
Room:	Bedroom (Ground Floor)		
Daytime ($L_{Aeq,16hr}$)			
EXTERNAL NOISE LEVEL		Unit	Value
External noise level			
Façade correction factor			
INCIDENT FAÇADE NOISE LEVEL			
Incident noise level	Façade 1	$L_{eq,ff}$	70
ROOM DATA			
Room description and reverberation time	Volume	RT ₆₀	0.4
No. off.	Bedroom	$L_{eq,ff}$	30
FAÇADE ELEMENTS (Façade 1)			
Glazing	Area	R_w	23
Wall	Area	R_w	34
Vent	No. off.	Dn,e	32
None		--	
RESULTS			
Total calculated indoor noise level	$L_{eq,2}$	48	38
		37	34
		29	22
		8	2
		$L_{Aeq,2}$	35 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park		
Project number:	21324		
Date:	28/02/2025		
Plot:	7 and 10		
Room:	Bedroom (Ground Floor)		
Night time ($L_{Aeq,8hr}$)	Unit	Value	Description
EXTERNAL NOISE LEVEL			
External noise level			
Façade correction factor			
INCIDENT FAÇADE NOISE LEVEL			
Incident noise level	Façade 1	$L_{eq,ff}$	62
ROOM DATA	Room description and reverberation time	Volume	30
		Bedroom	
		RT ₆₀	0.4
FAÇADE ELEMENTS (Façade 1)			
Glazing	Area	4.68	Generic 10G-16/6
Wall	Area	2.04	Brick and block external wall
Vent	No. off.	2	Greenwood 5000EAV.AC2 (Acoustic trickle)
None		--	
RESULTS			
Total calculated indoor noise level	$L_{eq,2}$	40	29
		27	25
		19	13
		1	-
			$L_{Aeq,2}$ 26 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park
Project number:	21324
Date:	28/02/2025
Plot:	7 and 10

Room: Bedroom (Ground Floor)

Night time ($L_{A\text{Max}}$)	Unit	Value	Description	Term	Octave band centre frequency						$L_{A\text{Max},1}$	Broadband term	
					63	125	250	500	1k	2k	4k		
EXTERNAL NOISE LEVEL													
External noise level			Façade 1	$L_{\text{Max},1}$	86	73	69	71	74	72	67	56	
Façade correction factor				C	0	0	0	0	0	0	0	0	
INCIDENT FAÇADE NOISE LEVEL													
Incident noise level			Façade 1	$L_{\text{Max},\text{ff}}$	86	73	69	71	74	72	67	56	
ROOM DATA	Room description and reverberation time	Volume	30	RT ₆₀	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.2	
			Bedroom										s
FAÇADE ELEMENTS (Façade 1)													
Glazing	Area	4.68	Generic 10G-16/6	R_w	23	24	32	37	44	47	$R_w / R_w + Ctr$	35 / 32 dB	
Wall	Area	2.04	Brick and block external wall	R_w	34	40	44	51	56	60	$R_w / R_w + Ctr$	50 / 47 dB	
Vent	No. off.	2	Greenwood 5000EAV.AC2 (Acoustic trickle)	Dn,e	32	40	37	32	47	53	$Dn,e,w / Dn,e,w + Ctr$	42 / 38 dB	
None					--								

RESULTS

Total calculated indoor noise level | $L_{A\text{Max},2}$ | 64 | 49 | 45 | 45 | 36 | 33 | 25 | 14 | $L_{A\text{Max},2}$ | 45 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park
Project number:	21324
Date:	28/02/2025

Plot:	17, 18 and 20
Room:	LKD

Daytime ($L_{Aeq,16hr}$)				Unit	Value	Description	Term	Octave band centre frequency					Broadband term	
EXTERNAL NOISE LEVEL								63	125	250	500	1k		
External noise level		$L_{eq,1}$	63	52	47	45	51	47	37	25			$L_{Aeq,1}$	54 dB
Façade correction factor		C	0	0	0	0	0	0	0	0			$L_{Aeq,1}$	54 dB
External noise level		$L_{eq,1}$	63	52	47	45	51	47	37	25			$L_{Aeq,1}$	54 dB
Façade correction factor		C	0	0	0	0	0	0	0	0			$L_{Aeq,1}$	54 dB
INCIDENT FAÇADE NOISE LEVEL				Unit	Value	Description	Term	Octave band centre frequency					Broadband term	
Incident noise level		$L_{eq,ff}$	63	52	47	45	51	47	37	25			$L_{Aeq,ff}$	54 dB
Incident noise level		$L_{eq,ff}$	63	52	47	45	51	47	37	25			$L_{Aeq,ff}$	54 dB
ROOM DATA				Room description and reverberation time	Volume	Living Room	RT60	Octave band centre frequency					Broadband term	
FACADE ELEMENTS (Façade 1 (Long Wall))								63	125	250	500	1k		
Glazing	Area	8.64	Generic 4/6-16/4	Area	Volume	Living Room	RT60	6	0.6	0.5	0.5	0.4	Broadband term	
Wall	Area	8.4	Brick and block external wall					Rw	20	21	17	25		
Vent	No. off.	4	Greenwood 4000 SBW (Hit and miss)					Rw	34	40	44	45		
None	--	--	--					Dn,e	32	38	37	34		
FACADE ELEMENTS (Façade 2 (Short Wall))				Area	Volume	Living Room	RT60	Octave band centre frequency					Broadband term	
Glazing	Area	2.07	Generic 4/6-16/4					Rw	20	21	17	25		
Wall	Area	7.77	Brick and block external wall					Rw	34	40	44	45		
Glazing	Area	2.16	Generic 4/6-16/4					Rw	20	21	17	25		
None	--	--	--					Dn,e	37	35	37	31		
RESULTS				Area	Volume	Living Room	RT60	Octave band centre frequency					Broadband term	
Contribution from Façade 1 (Long Wall)								$L_{eq,2}$	44	31	29	21		
Contribution from Façade 2 (Short Wall)								$L_{eq,2}$	39	27	25	15		
Total calculated indoor noise level								$L_{eq,2}$	45	32	30	22	26	18

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park		
Project number:	21324		
Date:	28/02/2025		
Plot:	17, 18 and 20		
Room:	Bedroom		
Daytime ($L_{Aeq,16hr}$)	Unit	Value	Description
EXTERNAL NOISE LEVEL			
External noise level			$L_{eq,1}$
Façade correction factor			C
External noise level			$L_{eq,1}$
Façade correction factor			C
INCIDENT FAÇADE NOISE LEVEL			
Incident noise level			$L_{eq,ff}$
Incident noise level			$L_{eq,ff}$
Façade 1			$L_{eq,ff}$
Façade 2			$L_{eq,ff}$
ROOM DATA			
Room description and reverberation time	Volume	36	Bedroom
FAÇADE ELEMENTS (Façade 1)			
Glazing	Area	4.32	Generic 4/6-16/4
Wall	Area	4.32	Brick and block external wall
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)
None		--	--
FAÇADE ELEMENTS (Façade 2)			
Glazing	Area	5.52	Generic 4/6-16/4
Wall	Area	6.48	Brick and block external wall
None		--	--
RESULTS			
Contribution from Façade 1			$L_{Aeq,2}$
Contribution from Façade 2			$L_{eq,2}$
Total calculated indoor noise level			$L_{Aeq,2}$
			29 dB

Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park		
Project number:	21324		
Date:	28/02/2025		
Plot:	17, 18 and 20		
Room:	Bedroom		
Night time ($L_{Aeq,8hr}$)	Unit	Value	Description
EXTERNAL NOISE LEVEL			
External noise level			$L_{eq,1}$
Façade correction factor			C
External noise level			$L_{eq,1}$
Façade correction factor			C
INCIDENT FAÇADE NOISE LEVEL			
Incident noise level			$L_{eq,ff}$
Incident noise level			$L_{eq,ff}$
Façade 1			$L_{eq,ff}$
Façade 2			$L_{eq,ff}$
ROOM DATA			
Room description and reverberation time	Volume	36	Bedroom
FAÇADE ELEMENTS (Façade 1)			
Glazing	Area	4.32	Generic 4/6-16/4
Wall	Area	4.32	Brick and block external wall
Vent	No. off.	2	Greenwood 4000 SBW (Hit and miss)
None		--	--
FAÇADE ELEMENTS (Façade 2)			
Glazing	Area	5.52	Generic 4/6-16/4
Wall	Area	6.48	Brick and block external wall
None		--	--
RESULTS			
Contribution from Façade 1			$L_{eq,2}$
Contribution from Façade 2			$L_{eq,2}$
Total calculated indoor noise level			$L_{eq,2}$
			39
			24
			23
			14
			16
			8
			1
			-
			$L_{eq,2}$
			39
			24
			23
			14
			16
			8
			1
			-
			$L_{eq,2}$
			39
			24
			23
			14
			16
			8
			1
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			$L_{eq,2}$
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			1
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			14
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			8
			1
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			39
			24
			23
			14
			16
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Calculated Indoor Ambient Noise Levels (as per BS 8233:2014 Annex G)

Project:	Horsham Enterprise Park
Project number:	21324
Date:	28/02/2025
Plot:	17, 18 and 20
Room:	Bedroom

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