

Noise Assessment

Chalcroft 3 – Paddock Land

November 2023

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FIP West End Limited

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Contents

1.	Introduction.....	1
2.	Site Description	2
3.	Guidance	3
4.	Noise Survey	14
5.	Noise Assessment	16
6.	Noise Mitigation.....	23
7.	Conclusion.....	26

Figures:

Figure 1: Draft Proposed Site Plan showing Noise Measurement Locations

Figure 2: Site Plan showing Noise Prediction Locations

Figure 3: Draft Proposed Site Plan showing Noise Barriers

Appendices:

Appendix A: Introduction to Noise and Glossary of Terminology

Appendix B: Noise Monitoring Equipment

Appendix C: Noise Measurement Results

Appendix D: Noise Predictions

Appendix C: Uncertainty Assessment for BS4142

1. Introduction

- 1.1 Phlorum Limited has been commissioned by Strutt & Parker on behalf of FIP West End Ltd to undertake a noise assessment for the Paddock Development at the Chalcroft Business Park, Burnetts Lane, Southampton.
- 1.2 The outline application is for up to 4,185m² of E(g)(ii) (research and development of products or processes), E(g)(iii) (Industrial Processes), B8 (Storage and Distribution) and supporting floorspace, including a farm shop.
- 1.3 The noise has been established by measuring and predicting the effects against national guidelines on noise. Where necessary, mitigation measures have been recommended so that a noise climate suitable for the nearest residential properties to the proposed development can be achieved.
- 1.4 Whilst reasonable efforts have been made to produce a report that is easy to understand, it is technical in nature. To assist the reader, an introduction to noise, and an explanation of the terminology used in this report are contained in Appendix A.

2. Site Description

Site Location

- 2.1 The application site cover approx. 1.8ha of undeveloped land situated adjacent to Chalcroft Business Park. To the north of the site lies the access road to Chalcroft Business Park including 1 residential properties and an office and to the east of the site is Chalcroft Way, the new link road that serves both the business park and a future link to the One Horton Heath development. The Eastleigh/Fareham railway lines runs along the south western boundary of the site. Adjacent to the south eastern boundary of the site are 5 detached residential properties fronting Burnetts Lane and a new turning head feature where the latter terminates.
- 2.2 The proposed site plan is shown in Figure 1 along with the noise measurement locations.

3. Guidance

National Planning Policy Framework

- 3.1 The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) on 27th March 2012 and upon its publication, the majority of planning policy statements and guidance notes were withdrawn, including Planning Policy Guidance (PPG) 24 Planning and Noise, which until the emergence of the NPPF, set out the Government's position on how noise should be dealt with in the planning system.
- 3.2 The NPPF was revised on 24th July 2018, with the earlier 2012 version immediately withdrawn. The latest update was published on 5th September 2023.
- 3.3 The general guiding principle in the NPPF is contained in Section 15 under the heading Conserving and enhancing the natural environment. Paragraph 174 states:

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

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;"

- 3.4 The noise planning policy is contained in paragraph 185, which also appears in Section 15 of the NPPF:

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

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

- 3.5 A footnote to paragraph 185(a) refers to the Explanatory Note of the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010), which defines both “significant adverse impacts on health and quality of life” and “adverse impacts on health and quality of life”.

Noise Policy Statement for England

- 3.6 The Department for Environment, Food and Rural Affairs published the Noise Policy Statement for England (NPSE) in March 2010. The explanatory note of the NPSE defines the terms used in the NPPF:

“2.20 There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.”

- 3.7 The NPSE does not define the SOAEL numerically, stating at paragraph 2.22:

“2.22 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.”

- 3.8 There is no local or national guidance on how the three terms should be defined numerically.

- 3.9 There are three aims in the NPSE, two of which expand upon the first bullet point in paragraph 180 of the NPPF:

“The first aim of the Noise Policy Statement for England

Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.23 *The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (paragraph 1.8).*

The second aim of the Noise Policy Statement for England

Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.24 *The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.*

The third aim of the Noise Policy Statement for England

Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.25 *This aim seeks, where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."*

Planning Practice Guidance

3.10 In March 2014, the Government released Planning Practice Guidance (PPG) on noise, entitled 'Noise'. This document sets out a number of principles in the form of questions and answers, and reinforces the guidance set out in the NPPF and the NPSE. The noise PPG was last updated in December 2014.

3.11 The noise PPG notes that:

"Noise needs to be considered when new development may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."

3.12 It goes on to note that:

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

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

3.13 The noise PPG broadly repeats the NPSE definitions of the NOEL, LOAEL and SOAEL and it provides a summary table to explain how the terms relate to each other and to typical human reactions to sound. The table is replicated below in Table 3.1.

Table 3.1: Planning Practice Guidance summary of noise exposure hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
		Lowest observed adverse effect level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
		Significant observed adverse effect level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep the windows closed most of the time because of the noise. Potential for sleep disturbance	Significant observed adverse effect	Avoid

Perception	Examples of Outcomes	Increasing Effect Level	Action
	resulting in difficulty in getting back to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.		
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable adverse effect	Prevent

3.14 It is noted that the text in paragraph 005 of the PPG for noise reiterates the point illustrated in Table 3.1, that there are degrees of adverse effect above the SOAEL. Table 3.1 defines two degrees of significant adverse effect: a significant observed adverse effect, which is deemed noticeable and disruptive, and an unacceptable adverse effect, which is deemed noticeable and very disruptive.

3.15 The distinction between these two degrees of significant adverse effect is expanded upon in the text in paragraph 005 of the PPG for noise:

“005 Increasing noise exposure will at some point cause the significant observed adverse effect level boundary to be crossed. Above this level the noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.

At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.”

3.16 The PPG, which is the most recent manifestation of Government advice on how noise should be treated within the planning system, as opposed to a policy position as stated in the more recent NPPF, is clear that a significant adverse effect, which lies above the SOAEL but below an unacceptable adverse effect, can be addressed (or ‘avoided’ in the terms of the PPG) through the provision of mitigation, including noise insulation; it is not until an unacceptable adverse effect is reached that the cause of the effect should be prevented.

3.17 The noise PPG provides advice on how to mitigate the effects of noise, noting that there are options to reduce noise at source, to optimise site layouts, to use planning conditions, and provide insulation within affected properties.

3.18 The noise PPG also notes that:

The noise impact may be partially offset if the residents of those dwellings have access to:

a relatively quiet façade (containing windows to habitable rooms) as part of their dwelling, and/or

• a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or

• a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or

• a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance)."

BS8233:2014

3.19 As discussed above, condition 14 requires the noise levels that are detailed in Table 4 of British Standard BS8233:2014 to be achieved at the development.

3.20 The scope of British Standard (BS) 8233: 2014 Guidance on sound insulation and noise reduction for buildings is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

3.21 Table 4 of BS8233: 2014 suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 3.2.

Table 3.2: BS8233 recommended internal noise levels, dB

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35dB LAeq,16hour	-
Dining	Dining room/area	40dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16hour	30dB LAeq,8hour

3.22 BS8233 contains the following relevant guidance in footnotes to the above information:

“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 LA_{max,F}, depending on the character and number of events per night. Sporadic noise events could require separate values.

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 façade insulation or the resulting noise level.

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.”

3.23 Although Note 4 above refers to setting a guideline value for maximum noise levels, BS8233: 2014 does not provide any guidance on a suitable criterion.

3.24 Placing the BS8233: 2014 guidance into the context required by the NPPF and the NPSE, it is considered that where the internal noise levels meet the guideline values set out in Table 3.2, there is considered to be no observed effect.

3.25 Since BS8233: 2014 allows for a 5dB relaxation in the guideline values in Table 3.2 (Note 7 above), it is considered that internal noise levels up to 5dB above the guideline values in Table 3.2 may still be acceptable.

3.26 Section 7.7.3.2 of BS8233, titled Design criteria for external noise states:

“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 50dB LA_{eq,T}, with an upper guideline value of 55dB LA_{eq,T} which would be acceptable in noisier environments.”

3.27 BS8233: 2014 goes on to note that the upper guideline value may be exceeded in certain circumstances:

“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.”

3.28 Achieving the lowest practicable noise levels in gardens is deemed acceptable in BS8233: 2014 in circumstances where development is needed in areas where the upper 55dB limit cannot be achieved.

3.29 As BS8233: 2014 states that it is desirable that garden noise levels do not exceed 50dB LA_{eq,T}, this implies some adverse effect above this level. Therefore, an external daytime noise level of 50dB LA_{eq,16hrs} can be defined as the LOAEL.

- 3.30 However, it would not be appropriate to equate the 55dB criterion with the SOAEL, since it is clear from BS8233: 2014 that 55dB is not a threshold that should never be exceeded. Equating the 55dB criterion to the SOAEL would mean that, in national policy terms, exceeding this threshold should be avoided, which is not what the standard requires.

World Health Organisation

- 3.31 The World Health Organisation (WHO) Guidelines for Community Noise (1999) also sets out guidance on suitable internal and external noise levels in and around residential properties. The guidance on internal and external noise levels is the same as set out in BS8233: 2014 in terms of LAeq values, but the WHO guidelines also provide guidance on night-time maximum noise levels, stating:

“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAFmax more than 10-15 times per night.”

- 3.32 The WHO guidelines suggest the possibility of sleep disturbance if continuous noise in bedrooms exceeds 30dB LAeq,8hrs during the night-time, and therefore internal noise levels above this value can be considered to be above the LOAEL. This internal value can be translated to an external value by the addition of 10dB, to account for the typical reduction through an open window. Therefore, external night-time noise levels of 40dB LAeq,8hrs can be defined as the LOAEL.
- 3.33 The WHO published their Night Noise Guidelines for Europe in 2009. This document sets an external ‘night noise guideline’ (NNG) of 40dB. This is consistent with the LOAEL value determined above. The NNG also sets an interim target of 55dB in situation where the 40dB value cannot be met. Above 55dB the NNG notes that the situation is considered increasingly dangerous for public health. On the basis of the above, a free-field external value of 55dB LAeq,8hrs is considered to be the night-time SOAEL.

Industrial & Commercial Noise

- 3.34 BS4142:2014+A1:2019 provides a methodology that determines the significance of adverse impact at dwellings potentially affected by noise of an industrial nature. BS 4142 refers specifically to sound from fixed installations which comprise mechanical and electrical plant and equipment; sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

- 3.35 The basis of the standard requires a comparison to be made between the 'background noise level' of the assessment area and the 'specific noise level' of the noise source under consideration. There are five key definitions relating to this relationship;
- 👁️ Background Noise Level - LA90,T - this is defined in the Standard as 'the 'A' weighted sound pressure level of the residual noise at the assessment position which is exceeded for 90 % of the given time interval, T, measured using time weighting F and quoted to the nearest number of whole decibels.
 - 👁️ Specific Noise Level - LAeq,T - this is the equivalent continuous 'A' weighted sound pressure level over a given time interval.
 - 👁️ Residual Noise - this is defined as the ambient noise remaining in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.
 - 👁️ Ambient Noise - totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far.
 - 👁️ Rating Level - LAeq,T - the specific noise level plus any adjustment made for the characteristic features of the noise.
- 3.36 The background level, wherever possible should be determined at the location where the assessment is to be made. Situations will arise where, due to circumstances which influence this level unduly, for example the specific noise level is operating continuously and thus the residual noise cannot be measured at this point, the background level may be determined in other ways. This may be, for example, by measuring at a different location or a different time which are nevertheless representative of the assessment position.
- 3.37 A further acoustic correction to the specific noise level is made if the sound has tonal or impulsive characteristics.
- 3.38 Once all necessary adjustments have been made, the background and the specific noise levels are compared. The standard states that the greater this difference is, the greater is the magnitude of the impact.
- 👁️ A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - 👁️ A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
 - 👁️ The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

- 3.39 The assessment should consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, reasonable practicable steps should be taken to reduce the level of uncertainty.

Traffic Noise, DMRB

- 3.40 The impact of changes in road traffic noise levels has been considered against the principles and guidance presented within Design Manual for Roads and Bridges (DMRB) LA 111, Noise and Vibration, May 2020 published by Highways England. DMRB presents an impact significance matrix for assessing the magnitude of changes in noise level for the short and long term and can be used as criteria for assessing the impact of any changes in road traffic noise levels.

Table 3.2: Magnitude of Change – Short Term (Table 3.54a in DMRB)

Short Term Magnitude	Short Term Noise Change (dB $L_{A10,18\text{ hr}}$ or L_{night})
Major	Greater than or equal to 5.0
Moderate	3.0 to 4.9
Minor	1.0 to 2.0
Negligible	Less than 1.0

Table 3.3: Magnitude of Change – Long Term (Table 3.54a in DMRB)

Short Term Magnitude	Short Term Noise Change (dB $L_{A10,18\text{ hr}}$ or L_{night})
Major	Greater than or equal to 10.0
Moderate	5.0 to 9.9
Minor	3.0 to 3.9
Negligible	Less than 3.0

4. Noise Survey

Noise

- 4.1 A noise survey was undertaken to establish typical sound levels at the site. The measurements were taken over a 24 hour period starting at 1215 hours on Thursday 20th July 2023 to provide the day and night-time noise levels at the site.
- 4.2 The survey methods and results are set out below.

Sound Survey Method

- 4.3 The equipment used during the survey is summarised in Appendix B. The sound level meters were field-calibrated immediately before and after the measurements using the listed acoustic calibrator. No significant calibration drifts were found to have occurred.
- 4.4 The sound level meters have been laboratory-calibrated to a traceable standard within the two years preceding the survey. The acoustic calibrator had been laboratory-calibrated to a traceable standard within the year preceding the survey.
- 4.5 Noise measurements were carried out at three 24 hour locations. The measurement locations are shown in Figure 1 are described as follows:
 -  Position 1: The microphone was located in a free-field position on the eastern boundary with Burnetts Lane. The mic was 1.5m above the ground.
 -  Position 2: The microphone was located in a free-field position on the western boundary. The mic was at 1.5m above the ground.

Sound Survey Results

- 4.6 The weather during the survey was suitable for noise measurement, it being predominantly dry with wind speeds of less than 5m/s.
- 4.7 The dominant sound source was from road traffic on the surrounding road network. Other noise sources included occasional trains and construction noise at the One Horton Heath development.
- 4.8 The sound survey results are summarised in Table 4.1, aggregated across the daytime and night-time periods. Full survey results are set out graphically in Appendix C.

Table 4.1 Summary of measured façade noise levels, dB

Measurement Location	Date	Period	Duration, T	L _{Aeq,T}	L _{AFmax}	L _{A10,T}	L _{A90,T}
1	20 th and 21 st July 2023	Day	16 hours	50.3	63.5	48.9	40.3
		Night	8 hours	43.0	58.9	39.9	29.9
2		Day	16 hours	49.2	63.9	48.9	41.5
		Night	8 hours	44.4	57.1	41.4	34.0
Note: ⁽¹⁾ – The L _{A90,T} , L _{Amax} and L _{A10,T} and values are the arithmetic means of the L _{A90,T} , L _{Amax} and L _{A10,T} measurements for each period.							

5. Noise Assessment

IMMI Noise Mapping

- 5.1 The noise predictions have been undertaken using IMMI noise modelling software, which take the site topography and any intervening noise barriers into account. The model utilises the methodology outlined in ISO 9613 and takes into account the effects of geometric divergence, ground and atmospheric absorption and acoustic screening.
- 5.2 The following assumptions have been used for the noise predictions:
- 🌿 The following source noise levels have been used to predict the noise impact of the proposed development site:
 - HGV manoeuvres in yard areas, $L_{Aeq,30secs}$ 66 dB at 10m per HGV
 - Loading/unloading activities, $L_{Aeq,30min}$ 61 dB at 10m per HGV
 - Distribution of development traffic has been split across the development site based on size/area of unit.
 - 🌿 Traffic data has been provided by the projects traffic consultants including day and night flows and %HGV's.
 - 🌿 No noise data is available to assess the internal noise from within the units at this stage of the development. When the occupiers are known then this issue will need to be assessed and appropriate mitigation provided, if required.
 - 🌿 Hard ground cover, 10 Degrees C; 70% RH.
 - 🌿 Site topography is a combination of client supplied data and EA lidar data.
 - 🌿 All sources are ISO 9613 with a downwind noise propagation.
 - 🌿 One degree of reflections off hard surfaces has been included in the noise model.
- 5.3 The noise levels have been predicted at the nearest receptor locations for the following scenarios:
- 🌿 Baseline noise with 2023 traffic flows and including 2010 traffic flows for Burnetts Lane (to provide an indication of the noise levels prior to the closure of this road).
 - 🌿 Traffic noise in 2028 without the development but with committed development.
 - 🌿 Traffic noise in 2028 with the development but with committed development.

- Development noise including loading/unloading, lorry manoeuvres in yard areas and development traffic noise on the site.

5.4 The predicted noise levels for the above scenarios in the day and night-time periods are shown in Appendix C, Tables C.1 and C.2 respectively. The noise prediction locations are shown in Figure 2. A summary of the predicted noise at the nearest elevations of the residential properties in the day and night-time periods is shown in Table 5.1.

Table 5.1: Summary of Predicted Noise Levels at Upper Floors, dB

Receptor Location	Floor	Elevation	Predicted Noise Levels, L _{Aeq,T} dB			
			2023 Baseline	2028 Without Development + Committed Development	2028 With Development + Committed Development	2028 Development
Daytime (0700-2300 hrs)						
1 Fallow Hill House	First	N/W	63.0	56.3	57.1	41.4
	First	North	59.9	58.5	59.3	29.1
2 Waypoint House	First	West	62.5	53.2	53.9	44.9
	First	N/E	57.7	56.1	57.0	37.3
3 Bracken	First	N/W	62.8	51.0	51.7	44.8
	First	N/E	58.0	54.4	55.3	42.7
4 Ashmead House	First	N/W	62.9	49.6	50.2	43.8
	First	N/E	58.5	53.2	54.1	43.9
5 The Bungalow	Gnd	N/E	59.9	49.9	50.6	39.4
6 1_2 Estate Rd	First	S/E	52.2	53.8	54.9	46.2
7 Salem Cottages	Gnd	N/E	56.8	49.3	50.0	28.5
Night-time (2300-0700 hrs)						
1 Fallow Hill House	First	N/W	53.3	41.0	42.6	25.0
2 Waypoint House	First	West	52.9	38.2	39.8	28.7
	First	N/E	46.9	40.3	41.9	23.9
3 Bracken	First	N/W	53.3	35.7	37.2	31.2
	First	N/E	47.5	38.4	40.0	29.1
4 Ashmead House	First	N/W	53.4	34.0	35.4	27.8
	First	N/E	48.3	37.0	38.5	28.8
5 The Bungalow	Gnd	N/E	50.2	33.4	34.8	29.3
6 1_2 Estate Rd	First	S/E	40.0	40.1	41.8	34.5
7 Salem Cottages	Gnd	N/E	46.9	32.7	34.0	21.4

- 5.5 The noise predictions indicate that road traffic on Burnetts Lane (south) was the dominant noise source at the properties overlooking the development prior to the closure of this road. A comparison of the measured noise levels at position 1 and the predicted baseline ambient level ($L_{Aeq,T}$) indicates that the noise has reduced by around 13 dB in the daytime and by around 10 dB at night due to the closure of Burnetts Lane.

Traffic Noise

- 5.6 For the year of opening in 2028, the traffic noise levels at the nearest residential properties have been compared both with and without the development. The predicted traffic noise impact of the development at the most affected elevations of the nearest residential properties is shown in Table 5.2.

Table 5.2: Predicted Traffic Noise Levels at upper floors with and without the development, dB

Receptor Location	Elevation	Predicted Noise Levels, $L_{Aeq,T}$ dB		Difference, dB
		2028 Without Development + Committed Development	2028 With Development + Committed Development	
Daytime (0700-2300 hrs)				
1 Fallow Hill House	N/W	56.3	57.1	0.8
	North	58.5	59.3	0.8
2 Waypoint House	West	53.2	53.9	0.7
	N/E	56.1	57.0	0.9
3 Bracken	N/W	51.0	51.7	0.7
	N/E	54.4	55.3	0.9
4 Ashmead House	N/W	49.6	50.2	0.6
	N/E	53.2	54.1	0.9
5 The Bungalow	N/E	49.9	50.6	0.7
6 1_2 Estate Rd	S/E	53.8	54.9	1.1
7 Salem Cottages	N/E	49.3	50.0	0.7
Night-time (2300-0700 hrs)				
1 Fallow Hill House	N/W	41.0	42.6	1.6
2 Waypoint House	West	38.2	39.8	1.6
	N/E	40.3	41.9	1.6
3 Bracken	N/W	35.7	37.2	1.5
	N/E	38.4	40.0	1.6
4 Ashmead House	N/W	34.0	35.4	1.4
	N/E	37.0	38.5	1.5
5 The Bungalow	N/E	33.4	34.8	1.4
6 1_2 Estate Rd	S/E	40.1	41.8	1.7
7 Salem Cottages	N/E	32.7	34.0	1.3

- 5.7 As shown in Table 5.2 when comparing the ‘without dev’ in 2028 against the ‘with dev’ in 2028, the development is predicted to increase the traffic noise levels at the nearest receptors by up to 1 dB in the daytime and up to 2 dB at night. DMRB considers an increase in traffic noise of 2 dB to be a minor magnitude of change in the short term and a negligible increase in the long term.
- 5.8 The IMMI noise predictions provide 16 hour day and 8 hour night $L_{Aeq,T}$ values. DMRB considers the 18 hour day and 6 hour night $L_{A10,T}$ noise levels and these would provide the same change in noise level in the day and night-time periods as the predicted $L_{Aeq,T}$ values.

Industrial/Commercial Noise

- 5.9 The assessment of noise from the proposed commercial/industrial units including HGV movements and manoeuvres in yard areas and access roads and loading/unloading activities has been considered against the measured background noise levels in the day and night-time periods. As discussed, the background noise is significantly lower due to the recent closure of Burnetts Lane.
- 5.10 The measured background noise levels at Positions 1 are considered to be representative of the noise at the nearest residential properties on Burnetts Lane and at Position 2 are representative of the residential property on the Estate Road. The background noise levels in the day and night-time periods have been analysed and the results are shown in Table 5.3, below.

Table 5.3: Summary of Background Noise Levels

Period	Mode $L_{A90,T}$ dB	Average $L_{A90,T}$ dB	Lowest $L_{A90,T}$ dB
Position 1			
Day	44	40	29
Night	27	30	25
Position 2			
Day	43	42	33
Night	32	34	31

- 5.11 In relation to the 'background sound level', BS4142 states that:

'it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest background sound level, but rather to quantify what is typical during particular time periods'.

- 5.12 It is considered that the 'Average' background sound levels provide typical levels for the BS4142 assessment.
- 5.13 BS4142 indicates that an acoustic correction should be applied if the noise is tonal, impulsive or intermittent. It is considered that the loading/unloading activities and HGV movements will provide impulsivity that may be just perceptible at the nearest receptors and a 3 dB correction has been added to both the day and night-time assessment.
- 5.14 The day and night-time BS4142 assessment for the proposed development when considered at the nearest residential properties is shown in Table 5.4 below.

Table 5.4 – BS4142 Noise Assessment, 1st Floor

BS4142 Assessment	Day	Night
Burnetts Lane		
Specific Noise Level	$L_{Aeq,T}$ 45 dB	$L_{Aeq,T}$ 29 dB
Background Sound Level	$L_{A90,T}$ 40 dB	$L_{A90,T}$ 30 dB
Acoustic Correction	+3 dB	+3 dB
Rating Level	$(45+3) = 48$ dB	$(29+3) = 32$ dB
Excess of rating over background level	$(48-40) = +8$ dB	$(32-30) = +2$ dB
Estate Road		
Specific Noise Level	$L_{Aeq,T}$ 46 dB	$L_{Aeq,T}$ 35 dB
Background Sound Level	$L_{A90,T}$ 42 dB	$L_{A90,T}$ 34 dB
Acoustic Correction	+3 dB	+3 dB
Rating Level	$(46+3) = 49$ dB	$(35+3) = 38$ dB
Excess of rating over background level	$(49-42) = +7$ dB	$(38-34) = +4$ dB

- 5.15 The BS4142 noise assessment provides an excess of rating over background level of between +7 to +8 dB in the daytime at the nearest residential properties. At night the BS4142 noise assessment provides an excess of rating over background level of between +2 to +4 dB at the nearest residential properties.
- 5.16 BS4142 states that a difference of around +5 dB is likely to be an indication of an adverse impact and the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- 5.17 The context is provided by the predicted traffic noise levels for the year of opening, 2028 at the existing properties. The predicted traffic noise levels without the development in 2028 are predicted to be up to $L_{Aeq,16\text{ hr}}$ 59 dB in the daytime and $L_{Aeq,16\text{ hr}}$ 40 dB at night. This indicates that noise from activities at the development is predicted to be up to 14 dB lower in the daytime and 11 dB lower at night than the traffic noise even without the development at Burnetts Lane. Furthermore, the noise levels at Burnetts Lane have reduced significantly with the road closure and the residents were previously exposed to noise levels of $L_{Aeq,16\text{ hr}}$ 63 dB in the daytime and $L_{Aeq,16\text{ hr}}$ 53 dB at night, which are higher than those predicted for the year of opening, 2028.
- 5.18 BS4142 requires that the uncertainty of the assessment is considered and this is provided in Appendix E.

Plant & Internal Unit Noise

- 5.19 At this stage of the development the users of the individual units are not known and details of any internal noise from within the units or any external noise from mechanical services plant is not available. It is recommended that when this information is available a further noise assessment is undertaken to ensure that the noise targets provided by BS4142: 2014+A1:2019 are achieved for internal noise from within the units or any external noise from mechanical services plant.

6. Noise Mitigation

- 6.1 To reduce the noise impact of the proposed development activities at the nearest residential properties a scheme of acoustic barriers has been considered. The optimum location of these barriers is shown on Figure 3. Various barrier heights have been considered and due to the distance from the activities to the barriers an increase in barrier height is predicted to provide a minimal noise reduction. The predicted noise levels at the worst case locations on Burnetts Lane and Estate Road are shown in Table 6.1.

Table 6.1: Predicted Noise Levels with Acoustic Barrier

Receptor Location	Receptor Level	Barrier Height m	Predicted Noise Level L _{Aeq,T} dB
Daytime			
Waypoint House, Burnetts Lane	Ground	No barrier	43.8
	1 st		44.9
	Ground	2.5	41.6
	1 st		43.1
	Ground	3	40.7
	1 st		42.6
1-2 Estate Road	Ground	No barrier	45.0
	1 st		46.2
	Ground	2.5	42.7
	1 st		45.2
	Ground	3	41.8
	1 st		44.6
Night-time			
Waypoint House Burnetts Lane	Ground	No barrier	28.0
	1st		28.7
	Ground	2.5	27.3
	1st		28.6
	Ground	3	26.7
	1 st		27.9
1-2 Estate Road	Ground	No barrier	33.4
	1 st		34.5
	Ground	2.5	31.3
	1 st		33.7
	Ground	3	30.4
	1 st		33.0

- 6.2 As shown in Table 6.1 there is predicted to be only a small noise reduction at the nearest receptors when the barrier height is increased. For example at 1st floor level at Waypoint House, Burnetts Lane in the daytime a 2.5m high acoustic barrier provides a reduction of 1.8 dB and this only increases to a reduction of 2.3 dB with a 3m high barrier.
- 6.3 A BS4142 assessment level of an excess of rating over background level of around +5 dB is considered to provide a reasonable noise target for the development activity, especially as the development noise levels are significantly lower than the predicted traffic noise levels in the year of opening. With a 3m high acoustic barrier between the units adjacent to Burnetts Lane the daytime BS4142 assessment level reduces from +8 to +6 dB. A 2.5 m high acoustic barrier adjacent to Estate Road reduces the daytime BS4142 assessment level from +7 to +5 dB.

Plant & Internal Unit Noise

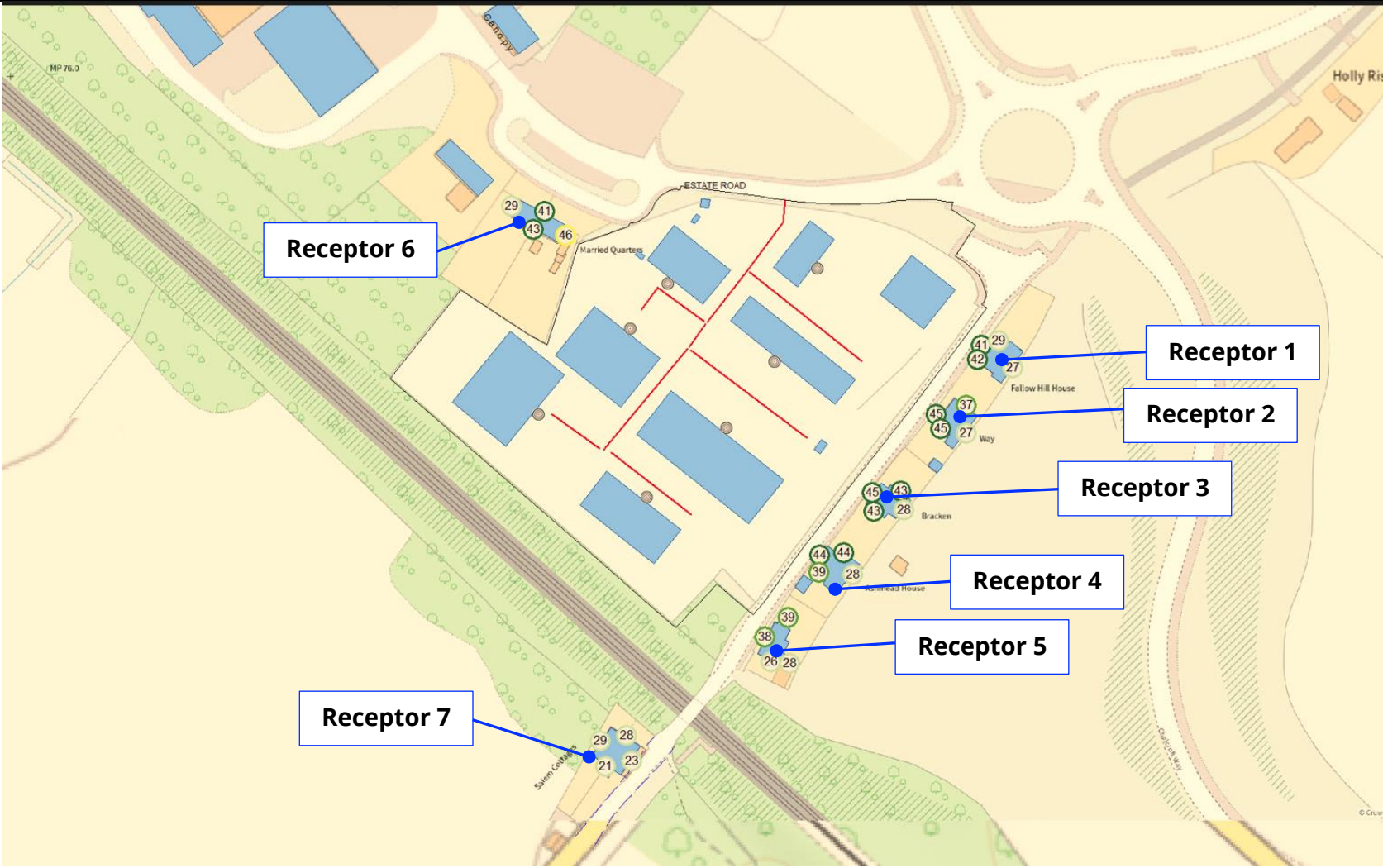
- 6.4 It is recommended that when the users of the individual units are known a further noise assessment is undertaken to ensure that the noise targets provided in BS4142: 2014+A1:2019 are achieved for both internal noise from within the units and any external noise from mechanical services plant.

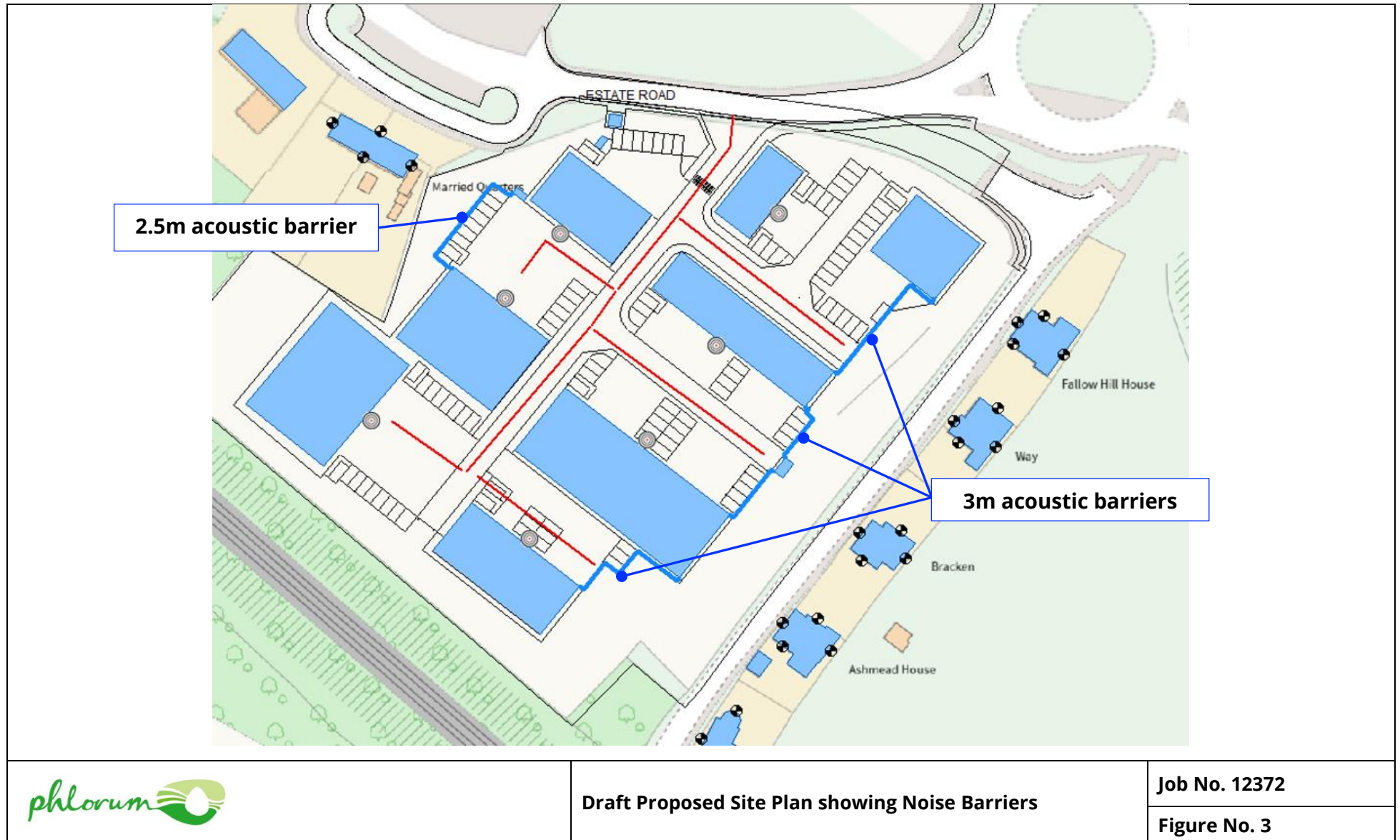
7. Conclusion

- 7.1 Phlorum Limited has been commissioned by Strutt & Parker on behalf of FIP West End Ltd to undertake a noise assessment for the Paddock Development at the Chalcroft Business Park, Burnetts Lane, Southampton.
- 7.2 The development is predicted to increase the traffic noise levels at the nearest receptors by up to 1 dB in the daytime and up to 2 dB at night in the year of opening, 2028. DMRB considers an increase in traffic noise of 2 dB to be a minor magnitude of change in the short term and a negligible increase in the long term.
- 7.3 Noise from development activities is predicted to provide noise levels that BS4142 considers to be above an 'indication of an adverse impact' in the daytime period, depending on the context. The context is provided by the predicted traffic noise levels for the year of opening at the existing properties. The predicted traffic noise levels without the development are up to $L_{Aeq,16\text{ hr}}$ 59 dB in the daytime and $L_{Aeq,16\text{ hr}}$ 40 dB at night. This indicates that noise from activities at the development is predicted to be up to 14 dB lower in the daytime and 11 dB lower at night than the traffic noise even without the development.
- 7.4 A BS4142 assessment level of an 'excess of rating over background level' of around +5 dB is considered to provide a reasonable noise target for the development activity, especially as the development noise levels are significantly lower than the predicted traffic noise levels in the year of opening. To reduce the daytime BS4142 assessment level to around +5 dB a 3m high acoustic barrier is recommended adjacent to Burnetts Lane and 2.5 m high acoustic barrier adjacent to Estate Road. The location of these barriers is shown on Figure 3.
- 7.5 It is recommended that when the users of the individual units are known a further noise assessment is undertaken to ensure that the noise targets provided in BS4142: 2014+A1:2019 are achieved for both internal noise from within the units and any external noise from mechanical services plant.
- 7.6 On the basis of this assessment, it is considered that with suitable noise mitigation measures noise from the proposed development will be within acceptable levels.

Figures & Appendices







Appendix A: Introduction to Noise and Glossary of Terminology

Appendix A: Introduction to Noise and Glossary of Terminology

Noise is defined as unwanted sound. The human ear is able to respond to sound in the frequency range 18Hz (deep bass) to 18,000Hz (high treble) and over the audible range of 0dB (the threshold of perception) to 140dB (the onset of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting (filtering) mechanism is used. This reduces the importance of lower and higher frequencies, approximating the response of the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. Noise can be perceived to be louder or more noticeable if the source of the noise is observed; e.g. roads, trains, factories, building sites etc. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. Various noise indices have been derived to describe the fluctuation of noise levels that vary over time. Usually, these noise indices relate to specific types of noise, and as such different noise indices are used to describe road traffic noise, background noise, construction noise, etc.

The weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement and the levels are denoted as dB(A) or L_{Aeq} , L_{A10} , etc, according to the parameter being measured.

Noise is measured on the decibel scale, which is logarithmic rather than linear. As a result of this, a 3dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3dB(A) is generally regarded as the minimum difference needed to perceive a change. Table A.1 sets out examples of noise levels typically experienced during everyday activities. Table A.2 sets out an explanation of the terminology used in this report.

Table A.1: Typical sound levels found in the environment

Sound Level	Location
0 to 10dB(A)	Threshold of hearing
10 to 20dB(A)	Broadcasting studio
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car

Sound Level	Location
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside a factory or noisy pub
100 to 110dB(A)	Burglar Alarm at 1m
110 to 130dB(A)	Pneumatic drill at 1m away
140dB(A)	Threshold of Pain

Table A.2: Terminology relating to noise

Term	Description
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of $20\mu\text{Pa}$ (20×10^{-6} Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1/s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is $20\mu\text{Pa}$.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$ or Background Noise Level	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 metres

Term	Description
Façade	At a distance of 1 metre in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS EN 61672.

Appendix B: Noise Equipment

Table B1: Noise monitoring equipment

Position	Equipment	Serial Number	Calibration Date
1	LD824 Sound Analyser	A1419	20/10/2022
	Mic	31817	
	Preamp	2732	
2	LD824 Sound Analyser	A1420	
	Mic	37023	
	Preamp	1812	
3	LD820 Sound Meter	1350	
	Mic	37024	
	Preamp	1568	
All positions	LD CAL200 Calibrator	3724	

Appendix C: Noise Measurement Results

Figure C1: Façade Noise Levels at Position 1

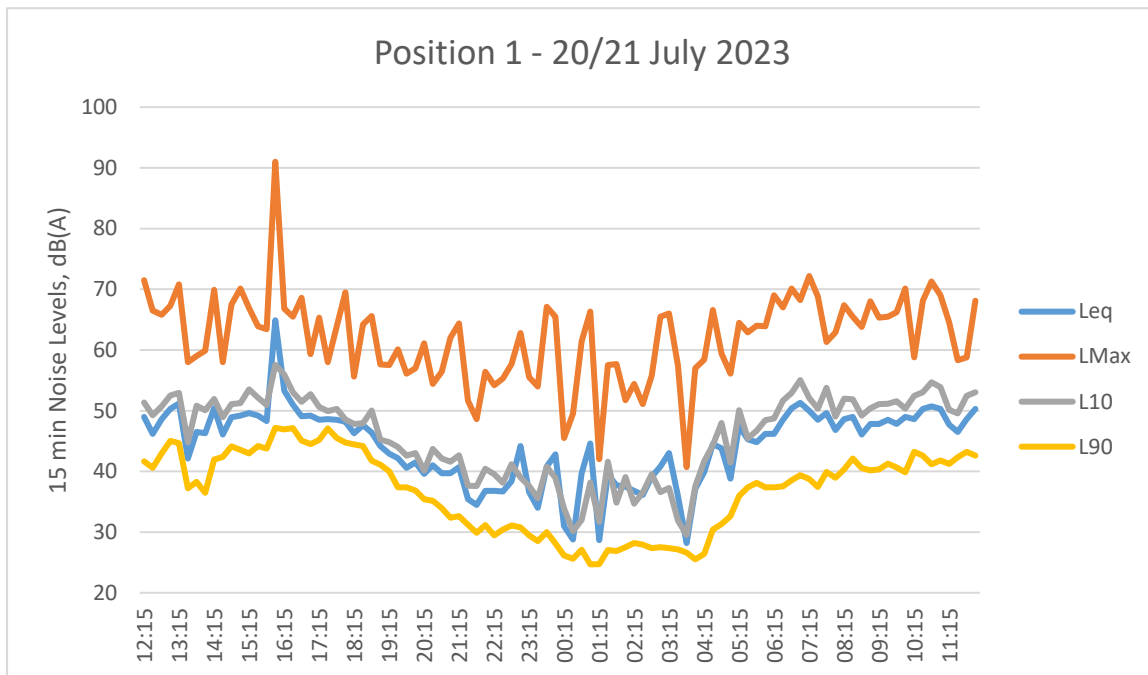
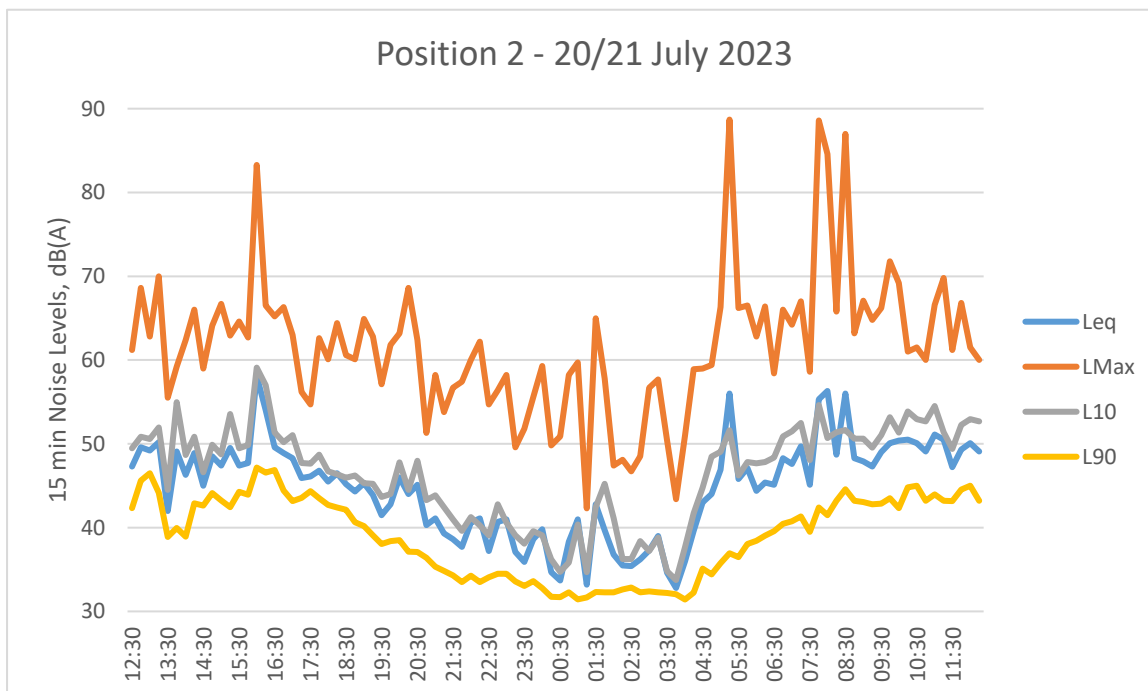


Figure C2: Free-Field Noise Levels at Position 2



Appendix D: Noise Predictions

Table C.1: Predicted Noise Levels, Daytime

Receptor Location	Floor	Elevation	Predicted Noise Levels, $L_{Aeq,16\text{ hour}}$ dB			
			2023 Baseline	2028 Without Development + Committed Development	2028 With Development + Committed Development	2028 Development
1 Fallow Hill House	Ground	N/W	62.9	54.5	55.3	40.4
	First	N/W	63.0	56.3	57.1	41.4
	Ground	North	59.7	56.8	57.6	28.2
	First	North	59.9	58.5	59.3	29.1
	Ground	S/E	53.6	55.6	56.6	26.1
	First	S/E	55.8	57.8	58.8	26.6
	Ground	West	60.7	47.2	48.5	41.2
	First	West	60.7	49.6	50.9	42.2
2 Waypoint House	Ground	West	62.8	51.3	52.0	43.8
	First	West	62.5	53.2	53.9	44.9
	Ground	N/E	57.4	54.3	55.1	36.3
	First	N/E	57.7	56.1	57.0	37.3
	Ground	S/E	51.8	53.8	54.7	26.8
	First	S/E	54.3	56.3	57.2	27.5
	Ground	S/W	58.3	41.2	41.8	43.7
	First	S/W	58.1	43.8	44.4	44.7
3 Bracken	Ground	N/W	62.8	49.2	49.8	43.5
	First	N/W	62.8	51.0	51.7	44.8
	Ground	N/E	57.7	51.8	52.6	42.3
	First	N/E	58.0	54.4	55.3	42.7
	Ground	S/E	49.3	51.2	52.1	27.3
	First	S/E	52.2	54.1	54.9	27.9
	Ground	S/W	58.1	46.4	47.0	41.6
	First	S/W	57.9	48.5	49.2	42.8
4 Ashmead House	Ground	N/W	62.8	47.8	48.3	42.8
	First	N/W	62.9	49.6	50.2	43.8
	Ground	N/E	58.5	51.2	52.0	42.9
	First	N/E	58.5	53.2	54.1	43.9
	Ground	East	48.8	50.7	51.5	27.5
	First	East	51.3	53.0	53.9	28.3
	Ground	West	57.4	39.8	40.1	38.2
	First	West	58.4	42.5	42.8	39.0
5 The Bungalow	Ground	N/W	62.9	45.8	46.3	38.0
	Ground	N/E	59.9	49.9	50.6	39.4
	Ground	S/E	48.1	49.6	50.4	28.3
	Ground	South	57.9	44.6	44.9	25.9

Receptor Location	Floor	Elevation	Predicted Noise Levels, $L_{Aeq,16\text{ hour}}$ dB			
			2023 Baseline	2028 Without Development + Committed Development	2028 With Development + Committed Development	2028 Development
6 1_2 Estate Road	Ground	N/E	49.7	52.0	53.3	40.0
	First	N/E	50.5	53.2	54.3	40.9
	Ground	S/E	51.3	52.8	54.0	45.0
	First	S/E	52.2	53.8	54.9	46.2
	Ground	S/W	45.2	43.0	43.5	42.4
	First	S/W	46.7	44.4	44.9	43.3
	Ground	N/W	32.3	42.2	42.3	28.4
	First	N/W	36.1	44.1	44.3	29.0
7 Salem Cottages	Ground	N/W	43.9	45.3	45.7	28.8
	Ground	N/E	56.8	49.3	50.0	28.5
	Ground	S/E	59.2	48.9	49.4	22.5
	Ground	S/W	57.9	44.3	44.4	21.3

Table C.2: Predicted Noise Levels, Night-time

Receptor Location	Floor	Elevation	Predicted Noise Levels, $L_{Aeq,16\text{ hour}}$ dB			
			2023 Baseline	2028 Without Development + Committed Development	2028 With Development + Committed Development	2028 Development
1 Fallow Hill House	Ground	N/W	53.2	39.3	40.9	24.3
	First	N/W	53.3	41.0	42.6	25.0
	Ground	North	49.3	40.7	42.3	14.3
	First	North	48.9	42.4	44.0	14.5
	Ground	S/E	37.0	38.7	40.3	13.8
	First	S/E	39.2	40.9	42.5	14.0
	Ground	West	51.1	33.7	35.5	25.7
	First	West	51.0	35.6	37.4	26.4
2 Waypoint House	Ground	West	53.2	36.3	37.8	28.0
	First	West	52.9	38.2	39.8	28.7
	Ground	N/E	46.9	38.5	40.1	23.2
	First	N/E	46.9	40.3	41.9	23.9
	Ground	S/E	35.2	36.8	38.4	14.8
	First	S/E	37.8	39.4	40.9	15.1
	Ground	S/W	48.6	25.9	27.3	28.8
	First	S/W	48.3	28.2	29.5	29.5
3 Bracken	Ground	N/W	53.2	33.6	35.1	30.4
	First	N/W	53.3	35.7	37.2	31.2

Receptor Location	Floor	Elevation	Predicted Noise Levels, $L_{Aeq,16\text{ hour}}$ dB			
			2023 Baseline	2028 Without Development + Committed Development	2028 With Development + Committed Development	2028 Development
	Ground	N/E	47.6	35.8	37.3	28.1
	First	N/E	47.5	38.4	40.0	29.1
	Ground	S/E	32.9	34.3	35.7	15.5
	First	S/E	35.8	37.1	38.6	16.0
	Ground	S/W	48.3	29.4	30.5	28.5
	First	S/W	48.0	31.6	32.8	29.5
4 Ashmead House	Ground	N/W	53.2	32.0	33.4	27.1
	First	N/W	53.4	34.0	35.4	27.8
	Ground	N/E	48.5	34.9	36.4	28.2
	First	N/E	48.3	37.0	38.5	28.8
	Ground	East	32.5	33.7	35.1	15.6
	First	East	35.1	36.1	37.5	16.0
	Ground	West	47.8	22.7	23.4	28.9
	First	West	48.7	25.5	26.2	29.5
5 The Bungalow	Ground	N/W	53.4	30.0	31.3	25.7
	Ground	N/E	50.2	33.4	34.8	29.3
	Ground	S/E	32.7	32.7	34.0	13.9
	Ground	South	48.1	27.5	28.1	14.9
6 1_2 Estate Road	Ground	N/E	37.0	38.7	40.5	28.9
	First	N/E	37.7	39.4	41.2	29.7
	Ground	S/E	39.0	39.3	41.1	33.4
	First	S/E	40.0	40.1	41.8	34.5
	Ground	S/W	33.5	26.0	27.0	31.0
	First	S/W	35.1	27.5	28.5	31.9
	Ground	N/W	19.0	24.4	24.9	18.3
	First	N/W	23.0	26.5	27.0	18.9
7 Salem Cottages	Ground	N/W	33.0	29.2	30.4	23.3
	Ground	N/E	46.9	32.7	34.0	21.4
	Ground	S/E	49.6	31.8	32.9	12.1
	Ground	S/W	48.2	27.1	27.5	12.5

Appendix E: Uncertainty Assessment for BS4142

Uncertainty Assessment for BS4142

BS4142 requires that the level of uncertainty in the measured data and associated calculations is considered in the assessment. The Standard recommends that steps should be taken to reduce the level of uncertainty. BS 4142 states that measurement uncertainty depends on a number of factors, including the following, which may be applicable to the Proposed Development and, therefore, need to be considered:

- 1. the complexity and level of variability of the residual acoustic environment;
- 2. the location(s) selected for taking the measurements;
- 3. the measurement time intervals;
- 4. the range of times when the measurements have been taken;
- 5. the range of suitable weather conditions during which measurements have been taken;
- 6. the level of rounding of each measurement recorded; and
- 7. the instrumentation used

Each of the measurement uncertainty factors outlined above have been considered and discussed in Table E.1.

Table E.1: Measurement Uncertainty Factors

Measurement Uncertainty Factor Reference	Level of Uncertainty	Discussion
1	0 dB	Residual acoustic environment is relatively constant and dominated by existing traffic noise, hence no correction for a complex residual acoustic environment.
2	0 dB	Measuring at locations representative of the closest affected receptors to the site has enabled the determination of robust background sound levels.
3	0 dB	Measurement time intervals were set in accordance with BS 4142, hence no further correction needs to be made.
4	0 dB	Measurements were undertaken over a continuous diurnal time period.
5	0 dB	No periods of significant wind or precipitation were noted.
6	0 dB	Measured values were rounded to 0.1 dB, therefore rounding would not have had a significant impact on the overall typical background sound levels.
7	0 dB	The acoustic measurement equipment accorded with Type 1 specification of British Standard 61672 and were deployed with appropriate wind shields.

In summary, a correction of 0 dB has been included in the assessment, to account for measurement uncertainty.



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