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Architectural & Environmental Consultants

Noise | Vibration | Air Quality

Noise Assessment

Thaxted Road, Saffron Walden

Noise Assessment

Project: THAXTED ROAD, SAFFRON WALDEN

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1. EXECUTIVE SUMMARY

1.1 Cass Allen was instructed by Kier Ventures Ltd to assess the noise impact of a proposed new development at Thaxted Road, Saffron Walden.

1.2 The aims of the assessment were to establish the suitability of existing noise levels at the site for the proposed development and, where necessary, to establish the feasibility of acoustic mitigation to reduce noise to appropriate levels.

1.3 Noise criteria were proposed in accordance with relevant local and national planning guidance.

1.4 A site noise survey was carried out to investigate the existing noise environment. Daytime noise levels are generally dictated by the Saffron Walden Recycling Centre and the retail service yard for B&M and PureGym at Knight Park. Night-time noise levels are dictated by fixed mechanical plant associated with the PureGym.

1.5 A 3D noise model of the development was constructed based on the results of the site noise survey. The noise model was used to calculate the spread of noise levels across the development.

1.6 Noise affecting the development was assessed in accordance with relevant local and national planning guidance. It was demonstrated that the proposed criteria can be complied with subject to good acoustic design and the adoption of acoustically upgraded glazing and ventilation to habitable areas. This can be investigated further at the detailed design stage and may be secured by the imposition of a noise related planning condition by the Local Planning Authority.

1.7 In summary of the above it is our view that there is no noise-related reason why planning permission should not be granted.

2. INTRODUCTION

2.1 The assessment has been carried out in accordance with relevant local and national planning guidance.

2.2 The aims of the assessment were:

- To investigate the existing noise environment at the site;
- Where required, identify appropriate measures to optimise the acoustic design of the development and achieve acceptable noise levels in habitable areas.

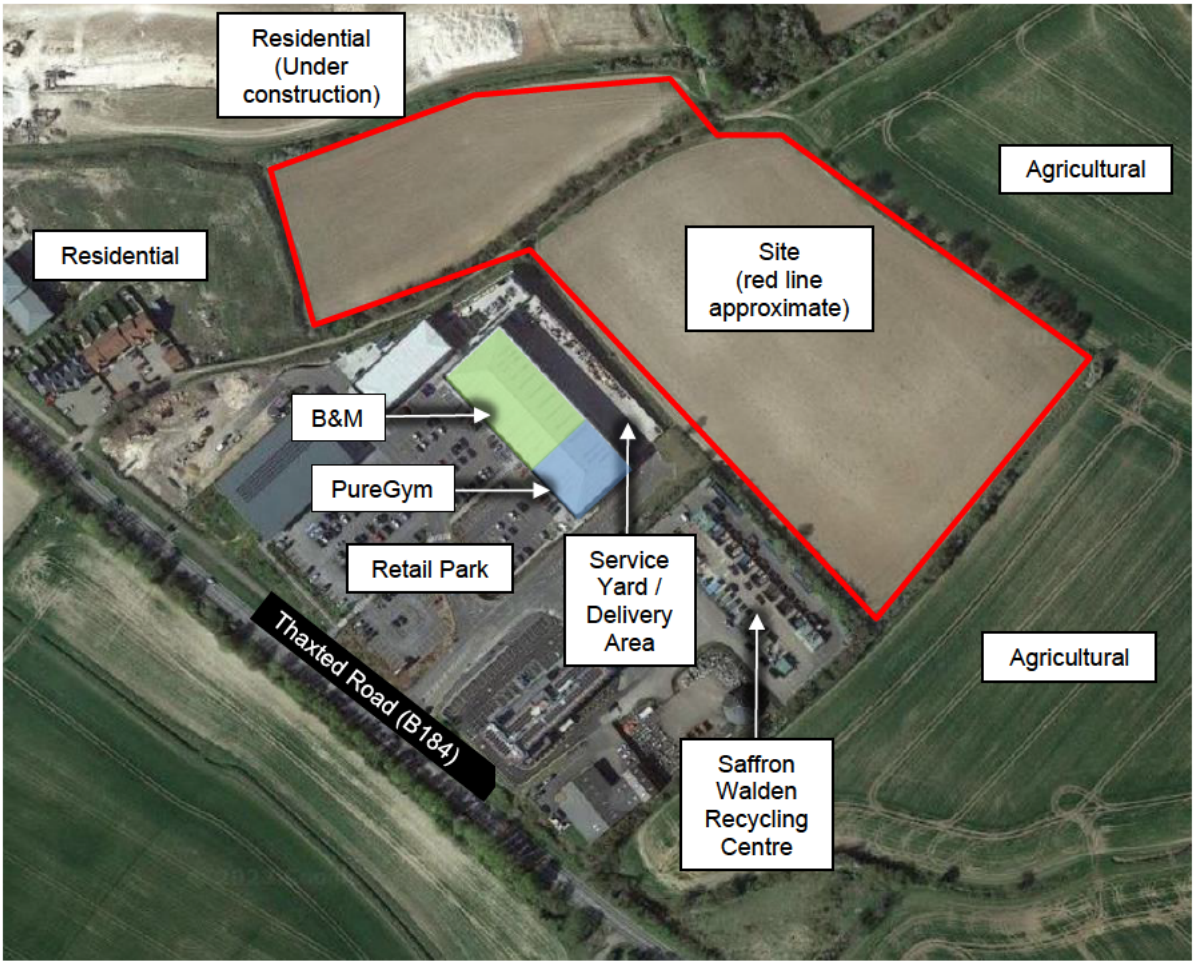
2.3 This report contains technical terminology; a glossary of terms can be found at [redacted].

3. PROJECT DESCRIPTION

3.1 The site is currently vacant and is located in a mixed-use area. To the east are fields in agricultural use. To the north-west are residential properties (under construction). To the south-east is the Saffron Walden Recycling Centre and a retail park service yard/delivery area serving a B&M and a PureGym. The closest major road is Thaxted Road (B184), which is approximately 200m to the south-east.

3.2 The site location is shown in Figure 1 below.

Figure 1 Site Location and Surrounding Area



3.3 This noise assessment accompanies an outline planning application for development of the site for up to 55 dwellings, associated landscaping and open space, with access from Knight Park. An indicative site layout is shown in Appendix 1.

4. PLANNING POLICY

National Policy

4.1 Outline guidance for the assessment of noise affecting new developments is given in the National Planning Policy Framework (NPPF). Relevant sections in this case are highlighted below:

> *174. Planning policies and decisions should contribute to and enhance the natural and local environment by … preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of …noise pollution.*
>
> *185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *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.*
>
> *187. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. 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.*

Noise Policy Statement for England

4.2 The Noise Policy Statement for England (NPSE) was published in March 2010 and seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. It also sets out the long-term vision of Government noise policy:

> *"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."*

4.3 The NPSE clarifies that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and noise effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

4.4 The explanatory note of 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."

4.5 The NPSE does not define the SOAEL numerically, stating in Paragraph 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."

Noise Planning Practice Guidance

4.6 The Noise Planning Practise Guidance (NPPG), as amended on 22 July 2019, provides further guidance on noise and reiterates the guidance within the NPPF and NPSE. It states that:

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

4.7 The NPPG provides advice regarding how to determine the impact of noise, including whether or not a significant adverse effect or adverse effect is occurring or likely to occur and whether or not a good standard of amenity can be achieved.

4.8 It provides more descriptive detail for the definitions of NOEL, LOAEL and SOAEL than the NPSE, but does not specify numerical values. A summary of the advice given is reproduced in Table 1 below.

Table 1 Observed Effect Levels due to Noise (NPPG)

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No effect	No Observed Effect	No specific measures required
Present 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		
Present 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		
Present 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 windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour 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

Local Policy

4.9 Uttlesford District Council's (UDC) Local Plan (January 2005) provides outline guidance on the assessment of noise affecting new development in the borough. *Policy ENV10 – Noise Sensitive Development and Disturbance from Aircraft* states the following:

> *"Housing and other noise sensitive development will not be permitted if the occupants would experience significant noise disturbance. This will be assessed by using the appropriate noise contour for the type of development and will take into account mitigation by design and sound proofing features."*

4.10 UDC's Draft Local Plan 2021-2041 (Consultation November 2023) contains Core Policy 44: Noise, which states the following:

> *"Proposals will be supported that will not result in an unacceptable risk to public health or safety, the environment, general amenity or existing users due to the potential of noise.*
>
> *To reduce, manage and mitigate noise to improve health and quality of life, residential and other development proposals should manage noise in accordance with the following:*
>
> ***A. Noise Sensitive Development***
>
> *Residential and other noise sensitive development will be permitted where it can be demonstrated that users of the development will not be exposed to unacceptable noise impact from existing, temporary or future uses.*
>
> *Noise sensitive uses proposed in areas that are exposed to noise at the Lowest Observed Adverse Effect Level (LOAEL) or the Significant Observed Adverse Effect Level (SOAEL) from existing or future industrial, commercial or transport (air, road, rail and mixed) sources will be permitted where it can be demonstrated good acoustic design has been considered early in the planning process, and that all appropriate mitigation, through careful planning, layout and design, will be undertaken to ensure that noise impact for future users will be made acceptable.*
>
> *Noise sensitive uses proposed in areas that are exposed to noise at the Unacceptable Adverse Effect level will not be permitted. For surface transport noise sources, the Unacceptable Adverse Effect Level is considered to occur where noise exposure is above 66 dBLAeq,16hr (57dB LAeq,8hr at night).*
>
> *For aviation transport sources the Unacceptable Adverse Effect is considered to occur where noise exposure is above 60dB LAeq,16hr.*
>
> ***C. Noise Impact Assessment***
>
> *A Noise Impact Assessment will be required to support applications where noise sensitive uses are likely to be exposed to significant or unacceptable noise exposure. The Noise Impact Assessment will:*

i. assess the impact of the proposal as a noise receptor or generator as appropriate, and

ii. demonstrate in full how the development will be designed, located, and controlled to mitigate the impact of noise on health and quality of life, neighbouring properties, and the surrounding area.

D. Mitigating Noise Impact

Where proposals are identified as being in the Lowest Observed Adverse Effect Level (LOAEL) or the Significant Observed Adverse Effect Level (SOAEL) categories, either through noise exposure or generation, all reasonable mitigation measures must be employed to mitigate noise impacts to an acceptable level.

4.11 This report has also been prepared with regard to UDC's *Noise Assessment Technical Guidance* (June 2017) which aims to provide help and advice in relation to noise in a planning context to encourage good acoustic design. It states the following regarding sound insulation schemes:

"The required sound insulation should be determined on the basis of the assessment of:

1) the level and characteristics of the noise outside the building

2) the design criteria noise levels in the rooms and other spaces of the building

A suitable sound insulation scheme should be suggested which meets the required Council internal noise criteria. In its simplest terms, when the attenuation factor for the building element is subtracted from the measured noise level, the resulting figure should be at or less than the appropriate noise criterion target level."

4.12 To address the requirements of the national and local policies, noise affecting the habitable areas of the proposed development has been assessed.

5. EXISTING NOISE ENVIRONMENT

5.1 A site noise survey was carried out from 01 to 08 June 2023 to investigate the existing noise environment, comprising both short-term attended and longer-term unattended noise monitoring. The full survey results and methodology are provided in Appendix 2.

5.2 Construction noise from the residential scheme to the north-west was observed during the attended noise survey. This dictated the background noise level (LA90) across the site during working hours.

5.3 Average (LAeq,0900-1700hrs) and maximum noise levels (LAmax) across the site are dictated by the Saffron Walden Recycling Centre during its opening hours (0900-1700hrs).

5.4 Fixed mechanical plant serving the PureGym (open 24 hours, 7 days per week) dictated the night-time average noise level (LAeq,8hr) and the background noise level (LA90) at a low level when there was no site activity at the nearby construction site. This was dictated by 4No. condensers at ground level, against the north-east facade of the PureGym and was logged at Position L1. This was the only significant noise source observed from the PureGym. The condensers and the wider retail service yard are shown below in Figures 2a-c.

5.5 Activity associated with B&M (open 0800-2100hrs) in the retail service yard was also observed during the attended noise survey. Cages being rolled during a delivery were audible close to the site boundary and found to be roughly equal to the background level, therefore insignificant in comparison to potential noise from the recycling centre. It is our understanding that forklifts also operate during the daytime in this area. This noise was captured on the unattended noise monitoring at Position L1. We understand that no night-time deliveries occur.

5.6 Average and maximum noise levels at other times, including the night-time, are typically very low and dictated by distant road traffic and natural sources (e.g. rustling leaves and birdsong).

Figures 2a-c Retail Service Yard

2a – PureGym plant.

2b – B&M delivery area.

2c – Service yard perimeter, adjacent to proposed development boundary.

6. ASSESSMENT CRITERIA

6.1 It is noted that road noise is at a relatively low level at the site and as such the nominated criteria focus on commercial noise sources.

6.2 BS4142:2014 – *Methods for rating and assessing industrial and commercial sound* (BS4142) can be used to assess the impact of noise from external industrial and/or commercial noise sources on residential receptors.

6.3 The BS4142 assessment methodology can be summarised as follows:

1. Measure the existing background noise levels (LA90,T dB) at the locations of nearby noise sensitive receptors during the quietest periods when the noise source(s) under investigation will operate;
2. Predict or measure the noise emissions (LAeq,T dB) from the noise source(s) under investigation at the location(s) of the nearby sensitive receptors, including corrections for any distinguishable acoustic features (e.g. tones, whines, screeches, hisses etc);
3. Subtract the measured background noise levels (item 1 above) with the measured or predicted rating noise levels (item 2 above) at each sensitive receptor. BS4142 states that:

a) Typically, the greater this difference, the greater the magnitude of the impact.

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

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

d) 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.

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

6.4 Where an assessment of the rating noise level indicates an adverse or significant adverse impact depending on context, it will be important to mitigate this noise either at the source or as part of the development. In this case, the applicant has control over the mitigation at the development and, in line with Section 187 of NPPF (see Paragraph 4.1) and as the "agent of change", should seek to avoid any restrictions being placed on the existing businesses as a result of noise impact.

6.5 It is noted above that any assessment of adverse impact is dependent on the context surrounding the site and its design. On context, BS4142 provides further guidance on the types of suitable mitigation:

> *"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.*
>
> *3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*
>
> *i) facade insulation treatment;*
>
> *ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
>
> *iii) acoustic screening."*

6.6 In line with the methodology and guidance in BS4142, 'all pertinent factors' relating to the context should be taken into consideration. In this case, the context of the development is that the applicant has control over the acoustic mitigation incorporated into the design of the dwellings (such as façade insulation treatment, ventilation strategy etc.) and overall layout of the development. Therefore, when assessing the impact of industrial and commercial noise on the proposed development, it is appropriate to include the effect of acoustic facade treatments.

6.7 BS4142 also contains the following note for the situation where new receptors are introduced and there is extant industrial or commercial noise:

> *"Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation."*

6.8 Therefore, in line with the guidance in BS4142, where the comparison between background noise levels and rating noise level implies a potential adverse impact is possible, alternative or additional guidance and criteria are considered appropriate when assessing the impact of plant noise on the development itself.

6.9 BS4142 provides examples of suitable additional guidance in Appendix A.6.1-3. These examples indicate appropriate design targets for industrial and commercial noise levels in acoustically sensitive areas of new developments derived from BS8233:2014 – *Guidance on sound insulation and noise reduction for buildings* (BS8233), with the addition of rating corrections to account for the potential additional annoyance caused by the noise character.

6.10 The proposed commercial noise criteria for the development are therefore to comply with the BS8233 internal noise targets including BS4142 character corrections to account for the nature of the noise, where the comparative method indicates a potential adverse impact.

6.11 In summary of the above, the acoustic design criteria are summarised in Table 2 below.

Table 2 Proposed Acoustic Design Criteria

Location	Time	Upper Design Target
Living Rooms	Daytime (0700-2300)	35 dB LAr,Tr
Dining Rooms	Daytime (0700-2300)	40 dB LAr,Tr
Bedrooms	Daytime (0700-2300)	35 dB LAr,Tr
	Night-time (2300-0700)	30 dB LAr,Tr
Gardens	Daytime (0700-2300)	55 dB LAeq,T

6.12 In addition to the above it is understood that UDC are requesting that commercial and industrial noise levels do not exceed a level greater than 5 dB below the background noise levels. It should be noted however that this figure does not appear in any of the relevant British Standards or guidance and also does not take into account the context of the development as discussed in detail above. Furthermore, UDC's *Noise Assessment Technical Guidance* (June 2017) from which this may have been derived refers specifically to the situation where new commercial noise sources are introduced to existing residential areas which is not the case in this instance. It is therefore our view that this request is not applicable to this development and the design criteria in Table 2 are appropriate and applicable.

6.13 This assessment approach has been independently peer reviewed by Wardell Armstrong. The full results of this review are presented in Appendix 3 and can be summarised as agreeing with this approach as a reasonable application of the relevant standards and capable of providing suitable living environments for future occupants.

6.14 It is worth noting that this assessment methodology has been used successfully on similar developments to assess potential noise impact and demonstrate that a suitable noise environment can be secured. Examples of developments following this assessment methodology that have been granted approval or recommended for approval by Environmental Health are included in Table 3.

Table 3 Applications demonstrating the adopted assessment methodology

Site Address	Authority and LPA Ref	Scheme Description	Noise Summary
Staple Tye Depot, CM18 7NR	Harlow Council HW/FUL/23/00108	10 no. residential apartments	Plant noise and delivery noise from nearby retail, food, and industrial uses. Mitigated via orientation of built form, buffer area, facade treatment.

Site Address	Authority and LPA Ref	Scheme Description	Noise Summary
Land South of Leighton Road, Stanbridge	Central Bedfordshire Council CB/22/03521/OUT	99 extra care housing units; 43 affordable dwellings; and a 66-bed care home.	Site bounded by various industrial uses (including car repair and scaffolding companies). Mitigated via orientation of built form, buffer area, facade treatment.
Site Of Former Wildlife Public House, Birchwood Avenue	City of Lincoln Council 2023/0351/RD (Discharge of Condition - Noise Impact Assessment) of planning permission 2022/0632/FUL	Two buildings for residential and C2 use.	Site adjacent to petrol station with plant. Mitigated via facade treatment.
22-24 Grove Road, AL5 1PX	St Albans City & District Council 5/2022/2735	75-bed care home	Site bounded by household waste recycling centre and a builder's merchant. Mitigated via screening to amenity areas and facade treatment.
Marlborough Park, AL5 1NI	St Albans City & District Council 5/2023/1119	Mixed use three storey building including 14 apartments	Site bounded by removal company and auto repair garages. Mitigated via screening to amenity areas and facade treatment.

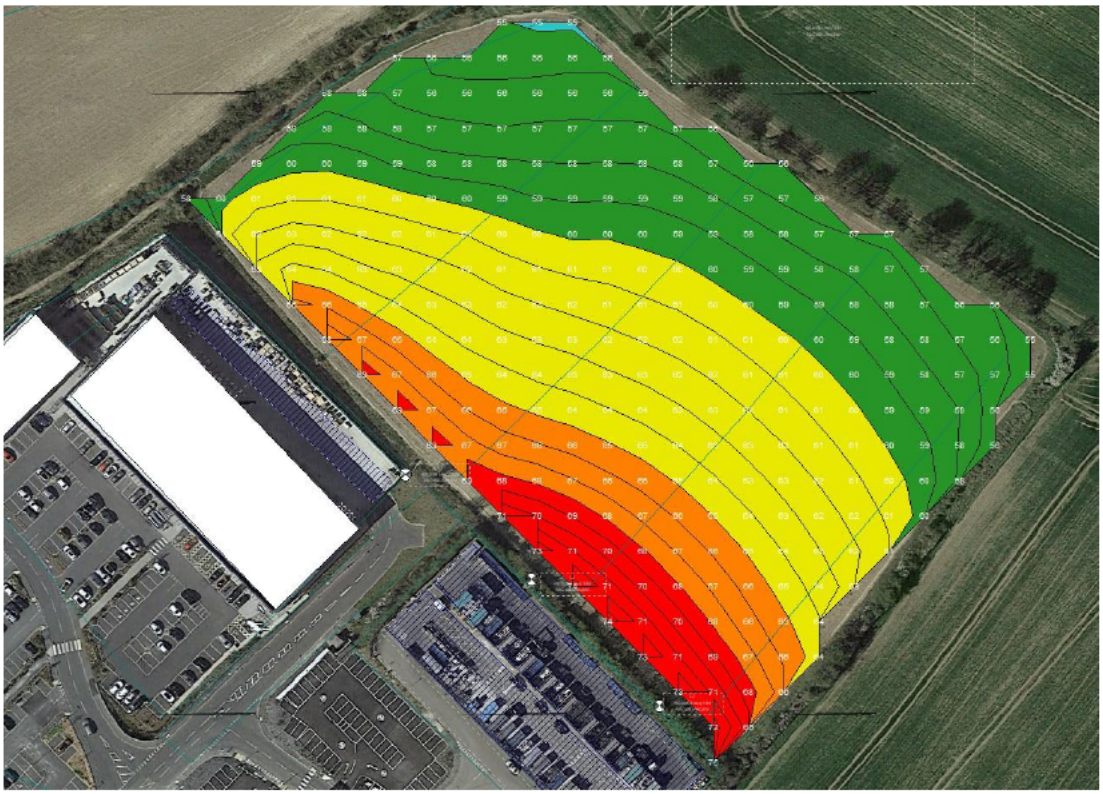
7. COMMERCIAL NOISE IMPACT ASSESSMENT

Initial Assessment of Potential Noise Impact

7.1 Based on the results of the site noise survey, a 3D noise model was developed using CadnaA v2023 noise modelling software. The model incorporates the calculation methodology outlined in the Department of Transport Welsh Office - Calculation of Road Traffic Noise (CRTN) for the assessment of road traffic noise propagation, and ISO 9613 for other noise sources (plant, commercial activity).

7.2 The model was used to calculate the spread of noise levels from the recycling centre and retail service yard, averaged over a 'worst-case' (i.e. loudest measured) hour during the daytime, as this is the BS4142 assessment period which will dictate the design response. This is shown below in Figure 3.

Figure 3 Worst-case daytime recycling centre & retail service yard noise level (dB LAeq,1hour)



7.3 The 3D modelling results indicate that the specific average commercial noise level during a worst-case hour ranges from 55 dB LAeq,1hr at the north of the site to 74 dB LAeq,1hr at the south of the site, at the boundary of the recycling centre.

7.4 It should be noted that a BS4142 assessment requires a correction to the noise level to account for the character of the noise, resulting in a 'rating level' (LAr,Tr). The appropriate correction would

be +6 dB for clearly perceptible impulsivity. Although there are periods where noise from the recycling centre is relatively quiet, we do not consider it appropriate to apply a cumulative correction for intermittency because the impulsivity is the primary acoustically distinguishing feature which will attract attention. On this basis, the rating level during a worst-case hour ranges from 61 dB LAr,1hr at the north of the site to 80 dB LAr,1hr immediately adjacent to the recycling centre.

7.5 Background noise levels (LA90) at the site were measured as part of the site noise survey (see Appendix 2). The typical lowest measured background noise levels at the site are:

- 36 dB LA90,1hr during the daytime (0700-2300hrs).
- 28 dB LA90,15mins during the night-time (2300-0700hrs).

7.6 It can be seen from a comparison of the rating level to the existing background level, in accordance with BS4142, that the background level will be exceeded by more than 10 dB across the site increasing closer to the noise source. This is an indication of "significant adverse impact, depending on the context". In accordance with local and national policy, the proposed development would therefore be expected to mitigate the commercial noise levels, as discussed in Section 6.

Initial Design Response

7.7 The commercial noise levels discussed above were considered throughout the development of the illustrative site layout, provided in Appendix 1. The following examples of good acoustic design have been incorporated in response to the noise levels affecting the site:

- A significant buffer area has been included to the south, reducing the noise levels that are incident on the facades and in the gardens of proposed dwellings.
- All gardens associated with dwellings that comprise the southern-most frontage have been positioned to the north of the dwellings, using the building itself to provide screening to the external amenity areas.
- Where possible, internal layouts will be set out to increase the number of habitable rooms facing away from the noise sources to the south. As noted above, the gardens for dwellings forming the southern-most frontage have been positioned to the north of the dwellings. It is therefore envisioned that the living rooms of these dwellings will face on to the gardens, where the facade will be screened from the commercial noise sources to the south. Commercial noise levels during the night-time are significantly lower, and therefore bedrooms facing the commercial sources are at a much lower risk of adverse impact.
- Allowance has been made for a 3m noise barrier at the application boundary, which will provide additional screening from the recycling centre and the retail service yard.
- 1.8m fences have been included around all gardens to further reduce noise levels in external amenity areas.

7.8 The 3D noise model was updated to include the proposed development layout and 3m noise barriers. The methodology and results from the 3D noise model are provided in Appendix 4.

7.9 The modelling indicates that the garden noise levels will not exceed 48 dB LAeq,16hr. This is significantly lower than the design criteria (≤55 dB LAeq,16hr). Additional mitigation to the facades of the dwellings is discussed further below.

Internal Noise Levels

7.10 Further to the good acoustic design response discussed in Paragraph 7.7, the building facades can be designed to mitigate the noise levels at the site to comply with the internal criteria provided in Table 2.

7.11 Full construction details for the development have not been finalised as the project is at an early design stage. It has therefore been assumed that the external walls of the development will be constructed using a standard masonry construction (e.g. 102mm brick, 100mm insulated cavity, 100mm concrete block) or a light-weight construction designed to achieve a similar level of sound insulation (this is technically achievable subject to detailed design).

7.12 The ventilation strategy for the development has not yet been confirmed and therefore it is assumed that background ventilation will be provided via trickle ventilators in the building facade. This is a 'worst case' assumption from an acoustic perspective as trickle ventilators are often an acoustic weak point in the facade.

7.13 Calculations were carried out using facade modelling software in accordance with the methodology given in BS8233 to calculate the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in the 'worst-case' habitable rooms of the development (i.e. the habitable rooms that will be subject to the highest external noise levels).

7.14 The calculations were based on the rating level (including BS4142 character corrections) measured during the worst-case hour (LAr,1hr) and included a 3 dB design margin.

7.15 The calculations were carried out based on the following typical dimensions/details for facade elements:

- Glazing – 1.5m^2 for bedrooms and 2m^2 for living rooms;
- External walls – 8m^2 for bedrooms and 15m^2 for living rooms; and
- 2 in-frame trickle ventilators in bedrooms and 3 in-frame trickle ventilators in living rooms.

7.16 If compliant rated internal noise levels can be achieved in 'worst case' habitable rooms during a worst-case hour, then it follows that compliant internal noise levels can be achieved in all other habitable rooms of the development using similar glazing and ventilator types.

7.17 The results of the calculations are shown in Appendix 5 and are summarised in Table 4 below.

Table 4 Acoustic Requirements for 'Worst Case' Habitable Rooms

'Worst Case' Rooms	Glazing Performance Requirements (inc. Frames)	Ventilator Performance Requirements (in Open Position)
Bedrooms and living rooms	35 dB Rw+Ctr	50 dB Dne,w + Ctr

Note The requirements given are preliminary only and should be confirmed at the detailed design stage when full design details are available.

7.18 It can be seen from the above that acceptable internal noise levels will be achievable in the development subject to the specification of suitable glazing and ventilation systems at the detailed design stage. It is our view therefore that the proposed development is, in principle, acceptable with regards to the noise levels that will exist within the habitable rooms.

7.19 It should be noted that it will be possible to use lower acoustic performance glazing and ventilators for habitable rooms on facades that are further from or acoustically screened from the surrounding noise sources. This can also be investigated further at the detailed design stage.

7.20 It should also be noted that the 16-hour daytime average noise levels will be significantly lower than the criteria in Table 2. Noise ingress calculations estimating the 16-hour daytime average internal noise levels are also provided in Appendix 5.

Ventilation and Overheating

7.21 The above assessment for planning purposes is based on internal noise levels with windows closed (assumed to be "normal" circumstances). However, it is anticipated that residents will open their windows at times for thermal comfort (e.g. to prevent overheating in warmer months). Noise levels in the rooms will increase under these circumstances.

7.22 The development will be subject to Part O of the Building Regulations (Approved Document O), which came into effect on 15 June 2022. Section 3.2 of Approved Document O (ADO) states:

> *In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).*
>
> *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).*

7.23 The results of the noise survey and 3D modelling indicate that the noise levels at the development will comply with the above ADO limits when the windows are opened. The overheating assessment is, therefore, likely to be able to rely on open windows. This will need to be confirmed as part of the overheating assessment during the detailed design stage.

7.24 However, in order to reduce the potential noise impact as far as practicable, it may be appropriate for dwellings to be provided with mechanical ventilation to offset the requirement for residents to open windows during the daytime. If required, this could be secured by an appropriate planning condition.

8. CONCLUSIONS

8.1 Cass Allen was instructed by Kier Ventures Ltd to assess the noise impact of a proposed new development at Thaxted Road, Saffron Walden.

8.2 Noise criteria were proposed in accordance with relevant local and national planning guidance.

8.3 A site noise survey was carried out to investigate the existing noise environment. Daytime noise levels are generally dictated by the Saffron Walden Recycling Centre and the retail service yard for B&M and PureGym at Knight Park. Night-time noise levels are dictated by fixed mechanical plant associated with the PureGym.

8.4 A 3D noise model of the development was constructed based on the results of the site noise survey. The noise model was used to calculate the spread of noise levels across the development.

8.5 Noise affecting the development was assessed in accordance with relevant local and national planning guidance. It was demonstrated that the proposed criteria can be complied with subject to good acoustic design and the adoption of acoustically upgraded glazing and ventilation to habitable areas. This can be investigated further at the detailed design stage and may be secured by the imposition of a noise related planning condition by the Local Planning Authority.

8.6 In summary of the above it is our view that there is no noise-related reason why planning permission should not be granted.

Appendix 1 Indicative Site Layout

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Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise measurements and longer-term unattended noise monitoring at the site (with continuous audio recording). Noise levels during the attended survey were generally dictated by construction noise from an adjacent construction site. In the absence of construction noise, noise levels were very low, except for activity at the Saffron Walden Recycling Centre (household waste).

Deliveries to the B&M occur at the north of the service yard. Cages were observed being rolled into the delivery door. However, this was barely audible from the proposed site at Measurement Position N2 (see site plan on following page). Fixed mechanical plant at the south of the service yard (serving the PureGym) dictated the background level when there was no site activity at the construction site. This was logged at Measurement Position L1. No other noise was identified from the PureGym during the day or night-time.

There was no significant noise from the adjacent fields.

Survey Period:

01/06/2023 to 08/06/2023

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Calibrator	Larson Davis	Type CAL200	15011
Sound level meter[1] (noise logger)	Rion	NL-32	01182950
Sound level meter[1] (noise logger)	Rion	NL-32	00623765
Sound level meter[1] (noise logger and attended meter)	Rion	NL-52	00965090

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

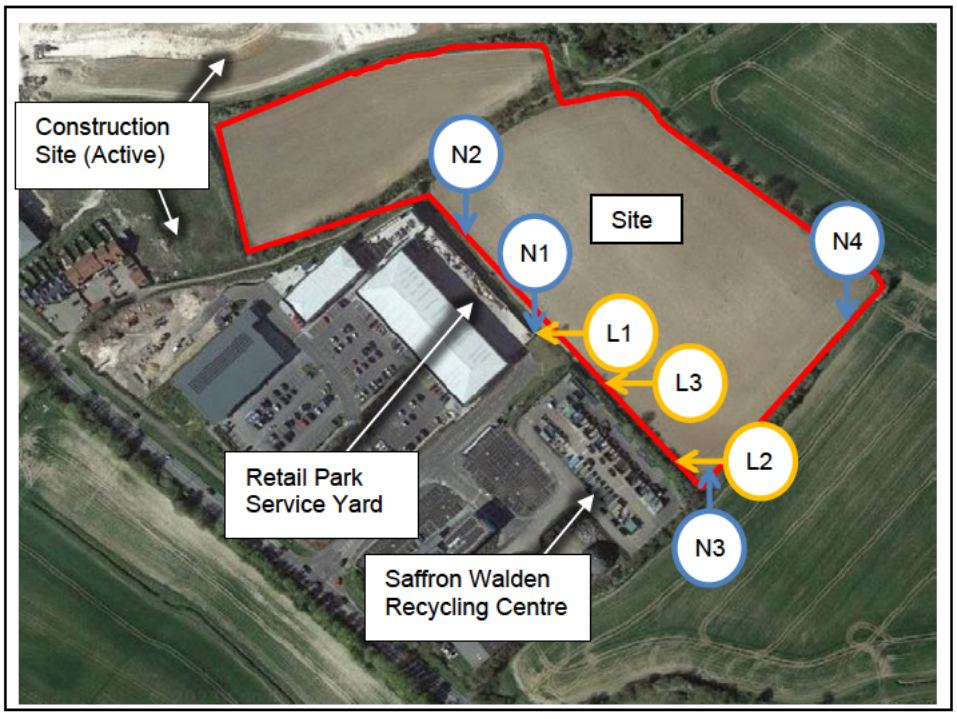
Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions:

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight through slotted wooden perimeter fence to retail service yard.
N2	Attended noise monitoring position. 1.5m above ground. Free-field.
N3	Attended noise monitoring position. 1.5m above ground. Free-field.
N4	Attended noise monitoring position. 1.5m above ground. Free-field.
L1	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to retail service yard, over the top of the slotted wooden perimeter fence to retail service yard.
L2	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to recycling centre.
L3	Unattended noise logging position. 2m above ground level. Free-field. Direct line of sight to recycling centre.

Site Plan Showing Measurement Positions:



Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
01/06/2023	N1	16:05	10 mins	52	66	49	Noise dictated by nearby construction site. Cages observed being rolled in the north area of the retail service yard were inaudible at this position.
	N2	16:20	5 mins	53	74	48	LAeq dictated by nearby construction site. LAmax dictated by birdsong and items being dropped into bins at the recycling centre. Cages being rolled in the north area of the retail service yard were audible at ~49 dB LAF,instantaneous.
	N3	16:30	10 mins	48	67	43	LAeq dictated by the construction site and noise from the recycling centre (items being disposed). LA90 dictated by construction noise.
	N4	16:45	10 mins	41	57	37	Noise dictated by natural sources (e.g. birdsong and rustling of foliage), due to recycling centre and construction site finishing for the day. Very quiet. L90 dictated by distant road traffic.

Unattended Noise Monitoring Results:

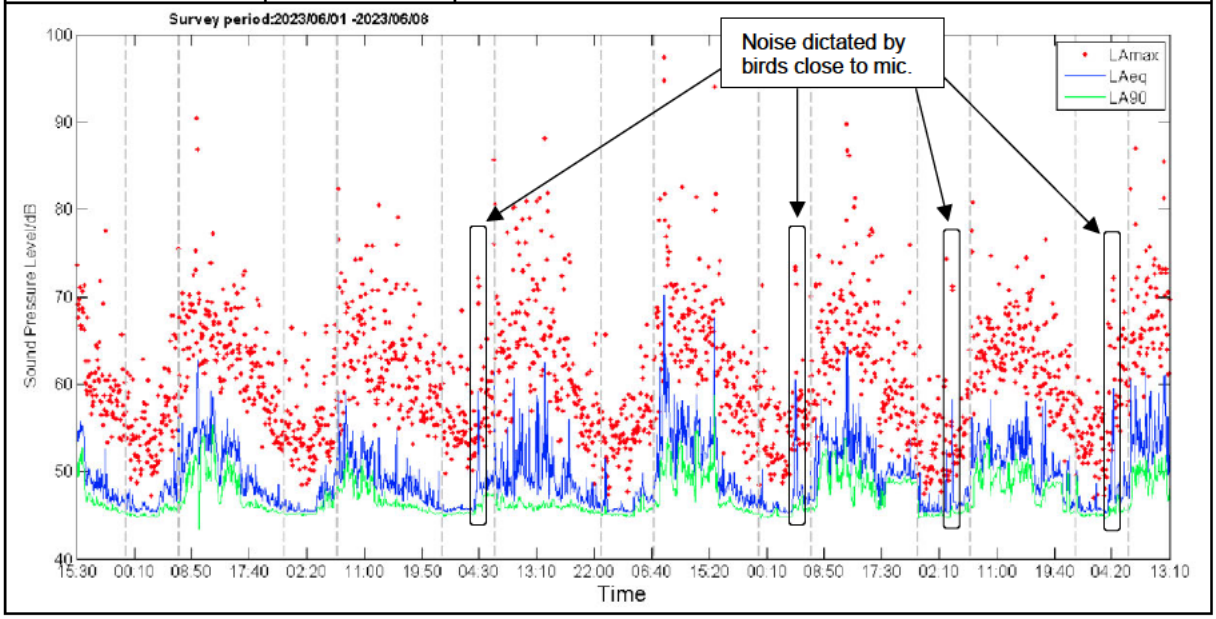
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
01/06/2023 to 08/06/2023	L1	52	45	48	45	60
01/06/2023 to 08/06/2023	L2	62	40	45	28	55
01/06/2023 to 04/06/2023	L3	61	36	45	30	55

Note 1: Typical lowest measured during the period shown.

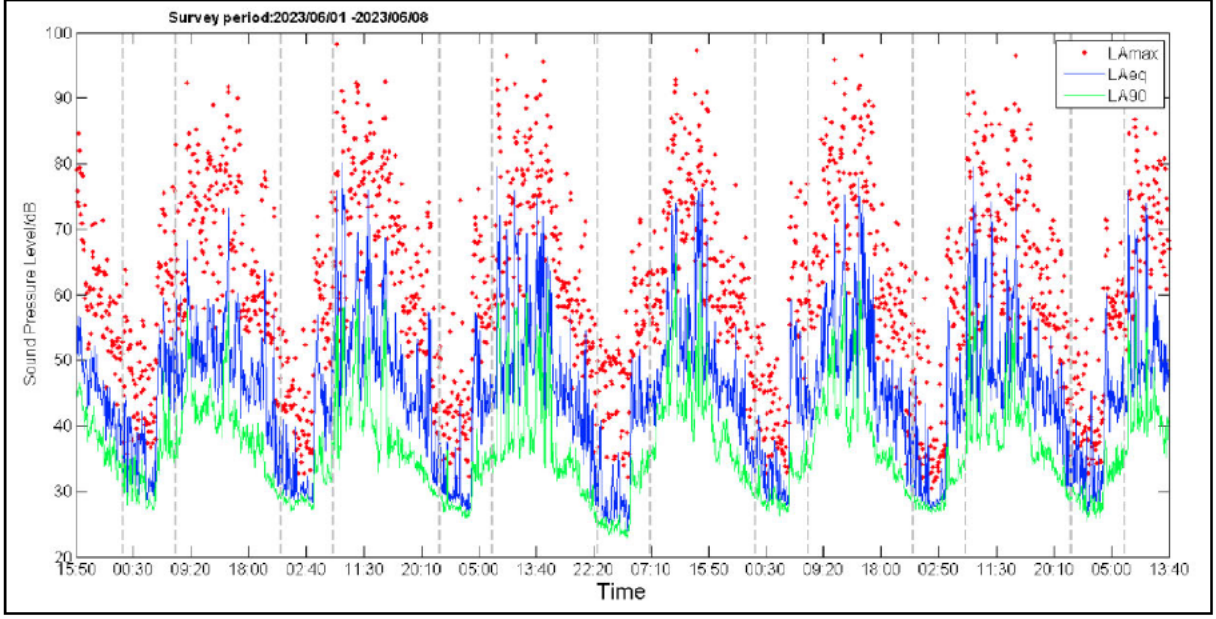
Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results:

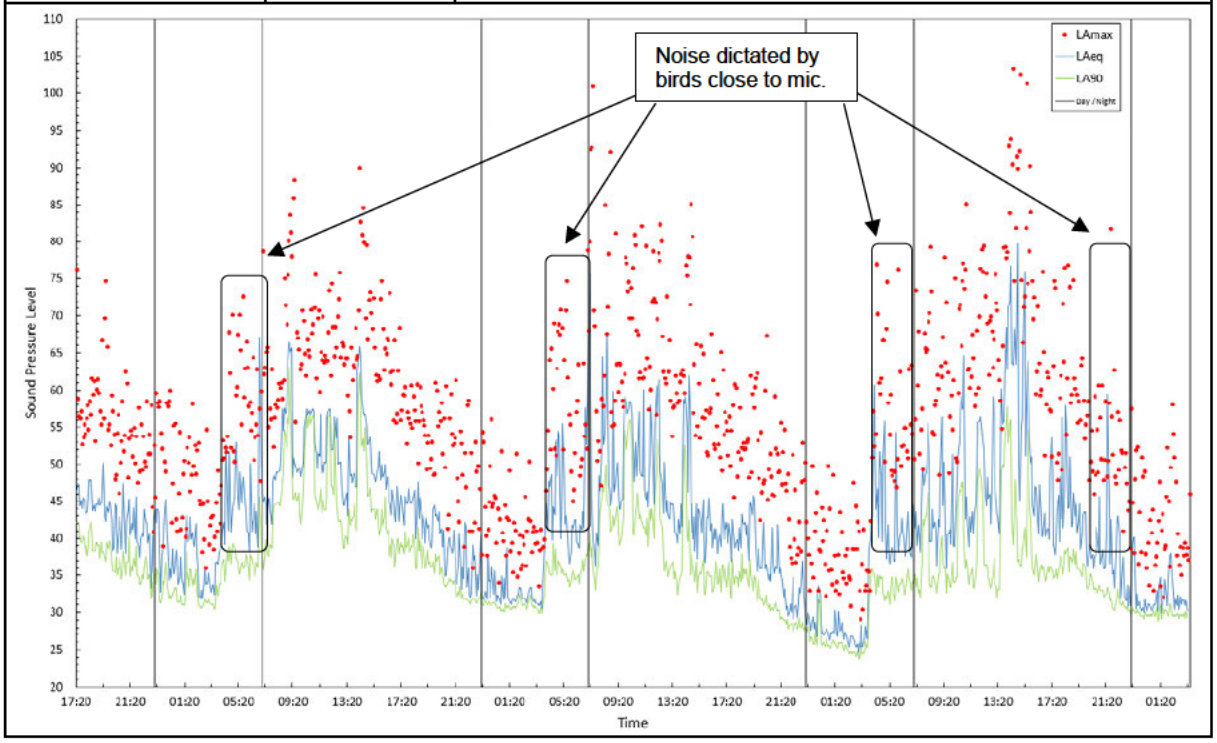
Meas. Period	Position	
01/06/2023 to 08/06/2023	L1	Lowest L90 dictated by mechanical plant from retail service yard (condensers to the rear of existing gym).



Meas. Period	Position	
01/06/2023 to 08/06/2023	L2	No noise from the recycling centre occurs at night. The elevated noise levels recorded before 0700hrs are due to birdsong close to the mic.



Meas. Period	Position	No noise from the recycling centre occurs at night. The elevated noise levels recorded before 0700hrs are due to birdsong close to the mic.
01/06/2023 to 05/06/2023	L3	



Appendix 3 Wardell Armstrong Peer Review

Technical Note

CLIENT:	Kier Property
PROJECT:	Thaxted Road, Saffron Walden
SUBJECT:	Review of Noise Assessment Methodology
JOB NO:	GM13168
DATE:	28th November 2023
PREPARED BY:	R Calvert, MIOA

This note has been prepared further to our instruction from Kier Property to undertake a review of the noise assessment methodology, to be used for the assessment report, which will be prepared to accompany the planning application for the proposed residential development at Thaxted Road, Saffron Walden.

The proposed development comprises 55 dwellings on land at Saffron Walden. This site lies adjacent to an industrial / commercial area which includes a gym, retail uses, and a household waste recycling centre (HWRC).

The development is being promoted by Kier Property, with the noise impact assessment works being undertaken by Cass Allen. As part of the planning application process there has been correspondence between Cass Allen and Uttlesford District Council (UDC) regarding the proposed noise assessment methodology.

Cass Allen have prepared an indicative noise impact assessment dated 4th October 2023 which includes noise monitoring and some indicative assessment works. The assessment shows that with an appropriate stand-off, and façade mitigation for some plots, that appropriate amenity can be provided.

The Cass Allen noise assessment report, dated 4th October 2023, has been submitted to UBC as part of the pre-application consultation for the development. In response, UBC have requested a more detailed assessment in terms of *BS4142:2014+A1:2019:Methods for rating and assessing industrial and commercial sound* (BS4142) of the noise from the adjacent industrial / commercial uses.

Additionally, UBC have requested that;

> *"...new residential developments with respect to Industrial/commercial noise impacts is a noise rating level of -5dBA assessed in accordance with the methodology in BS4142."*

Furthermore, UDC state;

> *"If there are music noise impacts from the Gym a low frequency band analysis (particularly 63 Hz and 125 Hz may be required to determine music noise impacts at the proposed development). Low frequency noise sources may additionally need to be assessed in accordance with NANR 45 Procedure for the assessment of low frequency noise disturbance."*

Through the pre-application response, UDC have identified that they have significant concerns over the potential for an adverse noise impact from industrial noise at the proposed dwellings. With a view to avoiding the likelihood of a noise impact, UDC and have requested that any industrial & commercial noise should be 5dB below the background sound level at the proposed dwellings. However, this requirement does not consider the context of the sound or the mitigation which can be implemented into the proposed dwellings. This is a requirement of the BS4142 assessment process.

Therefore, UDCs request is not considered to be in accordance with BS4142 and Cass Allen have also raised significant concerns on UDCs to this end. The methodology used by Cass Allen takes a more holistic, hybrid approach between BS4142 for industrial noise, and *British Standard 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings* (BS8233). This approach is in accordance with BS4142 and good practice methods.

In summary , we would agree with the methodology and approach which has been taken by Cass Allen. Cass Allen have shown that appropriate amenity could be provided in proposed dwellings with correctly specified façade mitigation, which would likely comprise acoustic double glazing and acoustic ventilation. It is possible that some noise from the adjacent HWRC could be audible, whilst still achieving the upper guideline noise level of 55dB(A) in gardens. This audibility in gardens has the potential to cause an adverse noise impact, and this is likely what UDC are seeking to avoid.

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It is therefore suggested, and as requested by UDC, that detailed noise measurements and correspondence is undertaken between Cass Allen and the operator of the adjacent commercial / industry premises. This information could be fed into the computer noise model, so that the exact contribution of each noise source can be accurately determined at each proposed dwelling.

Following this modelling process, a design process could be undertaken to accurately show the predicted sound level in each dwelling, and in garden areas. This more detailed assessment, along with justification of the assessment methodology used by Cass Allen, should be sufficient for UDC to make a more informed decision on the application.

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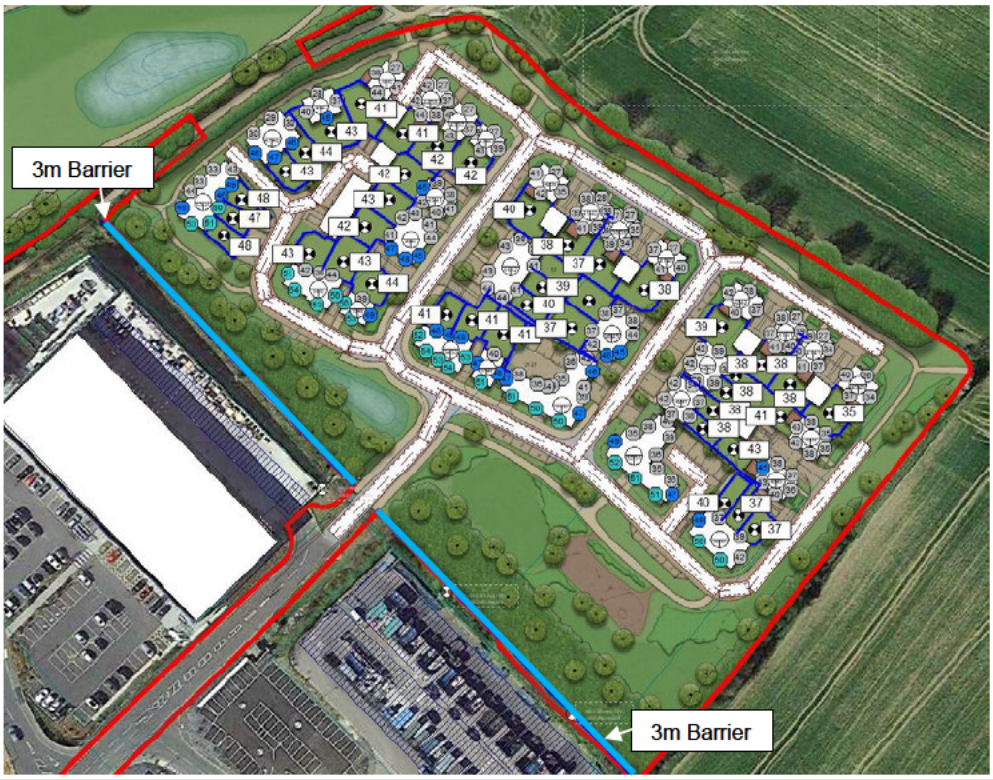
Appendix 4 Modelling Results

Modelling Software:	CADNA/A Version 2023
Modelled Scenarios	Daytime and night-time commercial noise levels across the site.
Data inputs:	• Noise survey results • Topographical data for the site • Proposed development layout
Calculation Algorithms Used:	• Calculation of Road Traffic Noise 1988 – Department of Transport • ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere • ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation
Notes:	Night-time commercial noise levels were dictated by condensers running continuously. On this basis, the night-time 8-hour average (LAeq,8hr) and night-time worst-case hour (LAeq,1hr,night) would result in the same value.

Modelling Printout:

Scenario	Daytime average free-field noise levels (LAeq,16hr). Garden levels are shown at 1.2m above ground level.



Scenario	Daytime average free-field noise levels during worst-case hour (LAeq,1hr).

Scenario	Night-time average free-field noise levels (LAeq,8hr).

Appendix 5 Facade Noise Ingress Calculations

FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Thaxted Road, Saffron Walden
ROOM:	Worst-case bedroom
VARIANT:	Rated worst-case daytime hour 71 dB LAr,1hr
NOTES:	13:50-14:50 04/06/2023

Room Dimensions [m] W 3.0 X L 4.0 X H 2.4

Room Volume = 28.8 m3
Partition Area = 9.5 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>> Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	71.0	46.6	53.3	57.9	61.6	62.4	68.8	60.3	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		46.6	53.3	57.9	61.6	62.4	68.8	60.3	Direct input

REVERBERATION TIME

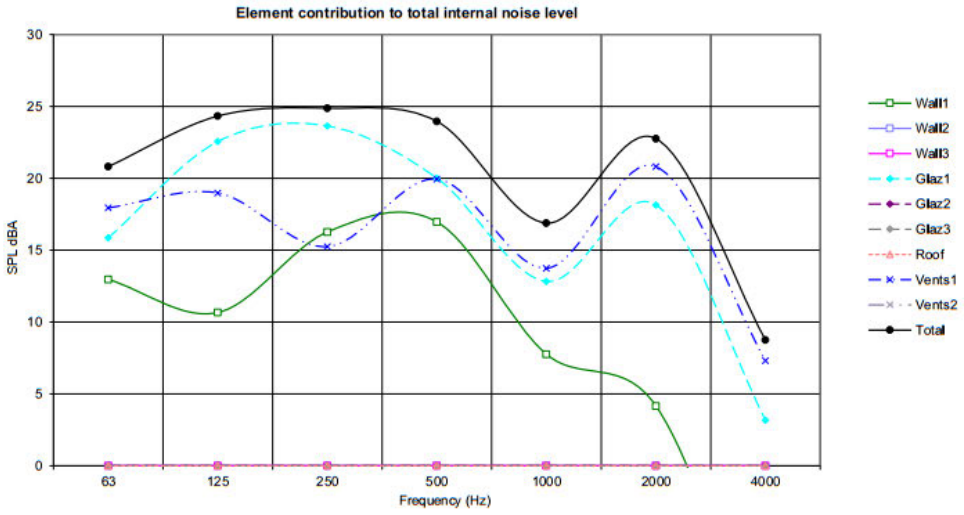
DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	8.0	36	45	44	47	57	67	77	11%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	35 dB Rw + Ctr - High Acoustic Performance Double Glazing	1.5	26	26	29	37	45	46	52	53%	35 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		32	34	37	43	52	54	60				
	Resultant SPL inside room excluding ventilators dB	28.9	18	23	24	22	14	18	3	64%			

Ventilator Type		Num	D_{nw} dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Passivent Airbrick + STM	2	35	41	49	48	55	54	59	35%	53	-1	-3
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	26.3	18	19	15	20	14	21	7	36%			

NOTE 2 - The selected vents are THROUGH WALL and therefore the aesthetic implications should be considered as an alternative ventilation strategy may be preferable

Total SPL inside room	30.8	21	24	25	24	17	23	9



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Thaxted Road, Saffron Walden
ROOM:	Worst-case bedroom
VARIANT:	Daytime 16-hour average - 54 dB LAr,1hr
NOTES:	13:50-14:50 04/06/2023

Room Dimensions [m] W 3.0 X L 4.0 X H 2.4

Room Volume = 28.8 m3
Partition Area = 9.5 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>> Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	54.0	29.6	36.3	40.9	44.6	45.4	51.8	43.3	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		29.6	36.3	40.9	44.6	45.4	51.8	43.3	Direct input

REVERBERATION TIME

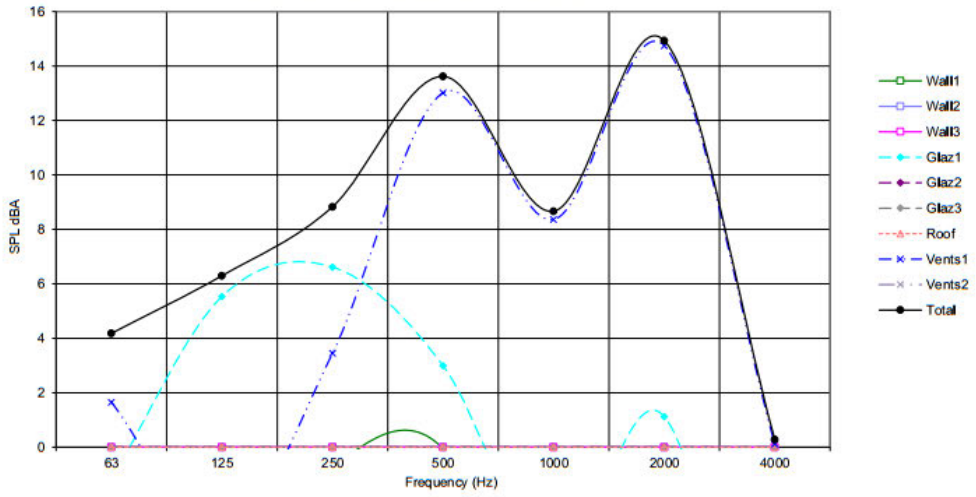
DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	8.0	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	35 dB Rw + Ctr - High Acoustic Performance Double Glazing	1.5	26	26	29	37	45	46	52	16%	35 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		32	34	37	43	52	54	60				
	Resultant SPL inside room excluding ventilators dB	11.8	1	6	7	5	-3	1	-14	20%			

Ventilator Type		Num	D_{nw} dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Passivent AL-dB 800 Air supply window vent	2	34	46	44	38	43	43	50	77%	42	0	0
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	17.9	2	-3	3	13	8	15	0	80%			

Total SPL inside room	18.9	4	6	9	14	9	15	0

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Thaxted Road, Saffron Walden
ROOM:	Worst-case living room
VARIANT:	Rated worst-case daytime hour 71 dB LAr,1hr
NOTES:	13:50-14:50 04/06/2023

Room Dimensions [m] W 4.0 X L 4.0 X H 2.4

Room Volume = 38.4 m3
Partition Area = 17.0 m2
Ventilation ref area = 10.0 m2
Free Field SPL K= 3 dB

SELECT Free Field or Façade SPL for model input >>>

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	71.0	46.6	53.3	57.9	61.6	62.4	68.8	60.3	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		46.6	53.3	57.9	61.6	62.4	68.8	60.3	Direct input

REVERBERATION TIME

DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

NOTES:

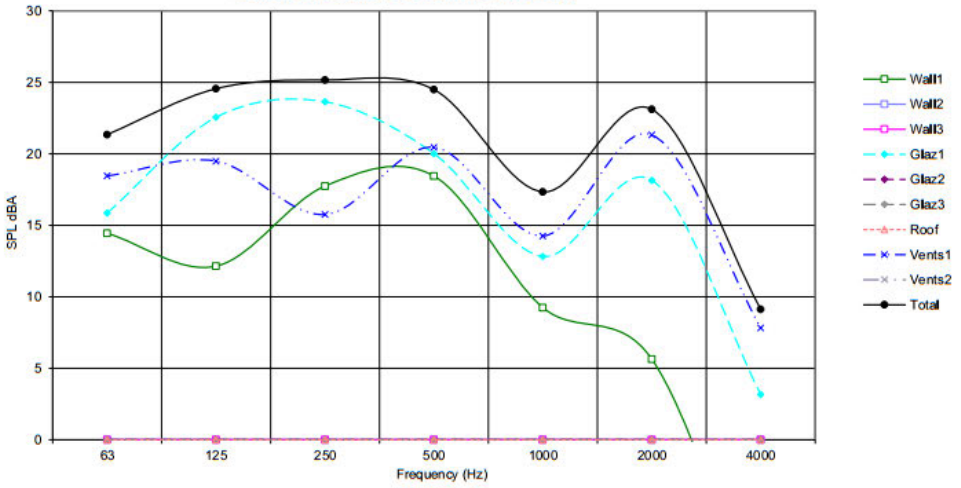
Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	15.0	36	45	44	47	57	67	77	14%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	35 dB Rw + Ctr - High Acoustic Performance Double Glazing	2.0	26	26	29	37	45	46	52	49%	35 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		33	35	38	44	52	55	61				
	Resultant SPL inside room excluding ventilators dB	29.2	18	23	25	22	14	18	3	63%			

Ventilator Type		Num	D_{nw} dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Passivent Airbrick + STM	3	35	41	49	48	55	54	59	37%	53	-1	-3
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	26.8	18	19	16	20	14	21	8	37%			

NOTE 2 - The selected vents are THROUGH WALL and therefore the aesthetic implications should be considered as an alternative ventilation strategy may be preferable

Total SPL inside room	31.1	21	25	25	24	17	23	9

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Thaxted Road, Saffron Walden
ROOM:	Worst-case living room
VARIANT:	Daytime 16-hour average - 54 dB LAr,1hr
NOTES:	13:50-14:50 04/06/2023

Room Dimensions [m] W 4.0 X L 4.0 X H 2.4

Room Volume = 38.4 m3
Partition Area = 17.0 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K= 3 dB

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	54.0	29.6	36.3	40.9	44.6	45.4	51.8	43.3	
Road traffic spectrum (according to BS 8233:1999 section 6)		29.6	36.3	40.9	44.6	45.4	51.8	43.3	Direct input

REVERBERATION TIME

DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

NOTES:

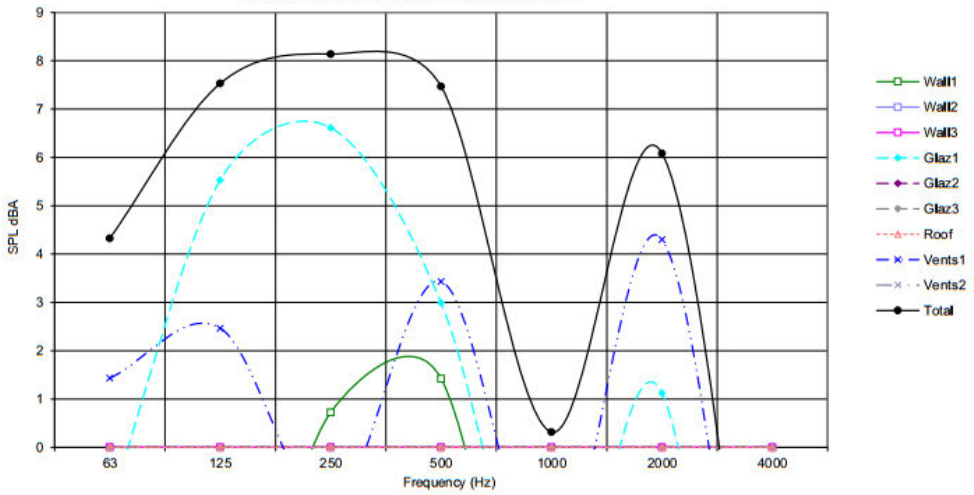
Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	15.0	36	45	44	47	57	67	77	4%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	35 dB Rw + Ctr - High Acoustic Performance Double Glazing	2.0	26	26	29	37	45	46	52	45%	35 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		33	35	38	44	52	55	61				
	Resultant SPL inside room excluding ventilators dB	12.1	1	6	8	5	-3	1	-14	63%			

Ventilator Type		Num	D_{nw} dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Passivent Airbrick + STM	3	35	41	49	48	55	54	59	34%	53	-1	-3
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	9.8	1	2	-1	3	-3	4	-9	37%			

NOTE 2 - The selected vents are THROUGH WALL and therefore the aesthetic implications should be considered as an alternative ventilation strategy may be preferable

Total SPL inside room	14.1	4	8	8	7	0	6	-8

Element contribution to total internal noise level



FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Thaxted Road, Saffron Walden
ROOM:	Worst-case bedroom
VARIANT:	Rated worst-case night-time average - 37 dB LAr,8hr
NOTES:	Commercial noise at night is dictated by the PureGym condensers.

Room Dimensions [m] W 3.0 X L 4.0 X H 2.4

Room Volume = 28.8 m3
Partition Area = 9.5 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>> Free Field SPL K= 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	37.0	23.3	29.4	33.7	27.7	22.6	28.5	20.6	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		23.3	29.4	33.7	27.7	22.6	28.5	20.6	Direct input

REVERBERATION TIME

DIRECT INPUT ----->								No data
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

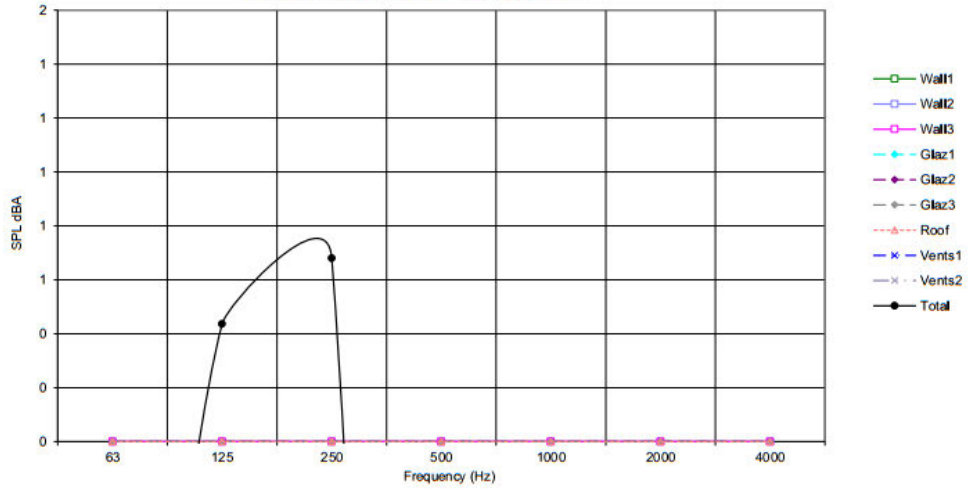
Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	8.0	36	45	44	47	57	67	77	13%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	35 dB Rw + Ctr - High Acoustic Performance Double Glazing	1.5	26	26	29	37	45	46	52	13%	35 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		32	34	37	43	52	54	60				
	Resultant SPL inside room excluding ventilators dB	3.4	-6	-1	0	-12	-26	-22	-36	73%			

Ventilator Type		Num	D_{ne} dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Passivent Airbrick + STM	2	35	41	49	48	55	54	59	12%	53	-1	-3
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-5	-5	-9	-14	-26	-19	-32	0%			

Total SPL inside room	4.7	-2	0	1	-10	-23	-18	-31

NOTE 2 - The selected vents are THROUGH WALL and therefore the aesthetic implications should be considered as an alternative ventilation strategy may be preferable

Element contribution to total internal noise level



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Noise | Vibration | Air Quality

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