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Noise & Vibration Engineers

Noise Assessment

Land south of Chiswell Green Lane, Chiswell Green

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Noise Assessment

Project:

LAND SOUTH OF CHISWELL GREEN LANE,

CHISWELL GREEN

Report reference:

RP01-21618-R2

Clients:

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REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
0	02 February 2022	Henry Cox, BEng AMIOA, Acoustics Consultant	Sam Bryant, MPhys CEng MIOA, Director	Initial issue
1	07 February 2022	Henry Cox, BEng AMIOA, Acoustics Consultant	-	Minor amendments
2	30 March 2022	Henry Cox, BEng AMIOA, Acoustics Consultant	-	Site layout update and minor amendments

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1. INTRODUCTION

1.1 Cass Allen has been instructed by Alban Developments Limited and Alban Peter Pearson, CALA Homes (Chiltern) Ltd and Redington Capital Ltd to carry out a noise assessment of a proposed new development to the west of Chiswell Green, St. Albans.

1.2 The assessment has been carried out in accordance with relevant national planning guidance.

1.3 The aims of the assessment were:

- To quantify the existing noise levels at the site for the proposed development;
- Where required, provide outline guidance on suitable mitigation measures to achieve acceptable noise levels in habitable areas.

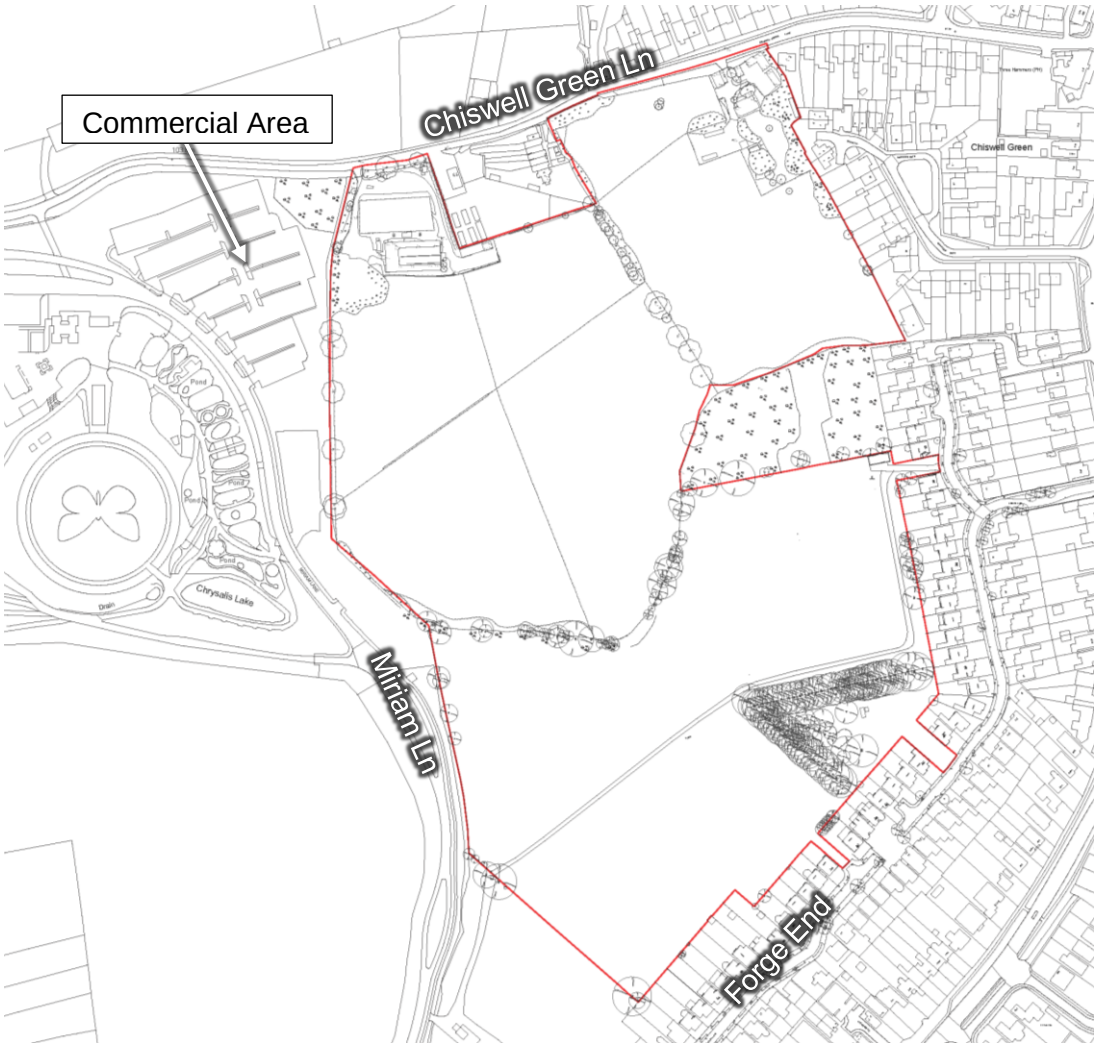
1.4 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

2. PROJECT DESCRIPTION

2.1 The northern half of the site is currently used to keep horses, and the southern half is unused. It is located in a mixed-use area, bounded to the north by Chiswell Green Lane, to the west by Miriam Lane (no public access), and the east and south by Forge End. Residential areas exist to the east and south of the site, and a commercial area exist to the north-west. Several motorways and A roads are within a 1 mile radius of the site including the M1, M25, A414, and North Orbital Road.

2.2 The site location is shown in Figure 1 below.

Figure 1 Site Location and Surrounding Area



2.3 The proposal is to develop the site to include up to 391 dwellings, with an area at the north west of the site allocated for a new school. A current drawing of the proposed development layout is shown in Appendix 1.

3. PLANNING POLICY

National Policy

3.1 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.*
>
> 186. 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.

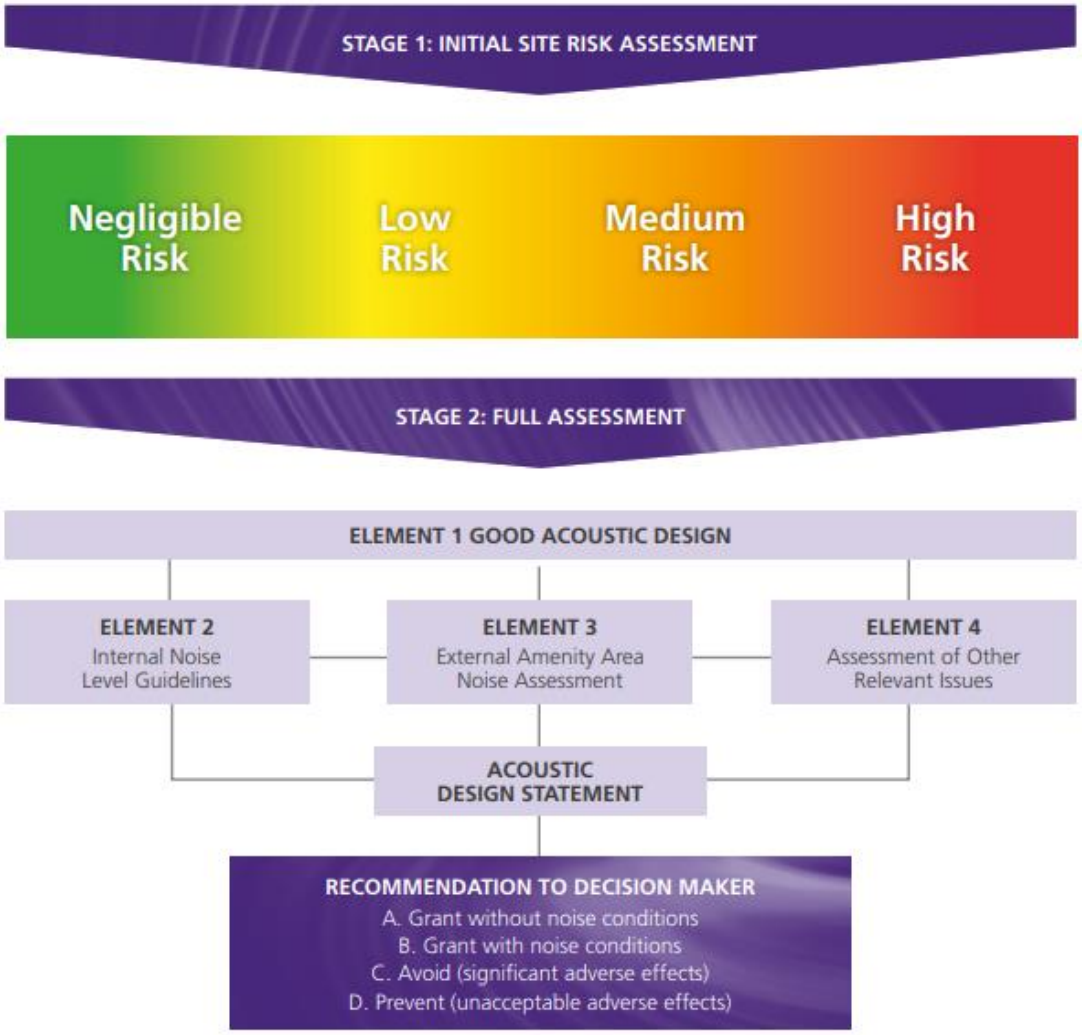
4. NOISE AFFECTING THE DEVELOPMENT

4.1 Specific guidance on the assessment of noise affecting new residential development is given in ProPG: Planning and Noise for New Residential Development, May 2017 (ProPG). The process within the ProPG guidance for the appraisal of noise levels affecting new residential development is considered to be current 'best practice' and therefore has been followed for the assessment. The assessment process can be summarised as follows:

- Stage 1 – measure noise levels at the site and carry out an initial noise risk assessment of the proposed development site based on the measured levels.
- Stage 2 – where a higher noise risk is identified, carry out a detailed assessment including the following four considerations:
    - Element 1 – the overall acoustic design and layout of the site
    - Element 2 – internal noise levels in habitable areas
    - Element 3 – noise levels in external amenity areas
    - Element 4 – consideration of other relevant issues
- Based on the results of the Stage assessment, provide a recommendation to the decision maker on whether planning permission can and should be granted.

4.2 The process is shown visually in Figure 2 below:

Figure 2 ProPG Assessment Process



4.3 It should be noted that the guidance in ProPG relates primarily to noise from transportation sources, i.e. road traffic, aircraft, rail etc. Any significant noise from other sources (e.g. industrial, commercial or entertainment sources) is outside the scope of the ProPG guidance and therefore requires separate consideration.

Stage 1 – Noise survey and initial assessment

4.4 A noise survey was carried out at the site between 18 and 22 January 2022 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.

4.5 During the survey, access to the northern half of the site was not possible. However, sufficient attended measurements were taken on Chiswell Green Lane to characterise noise sources in the northern half.

4.6 Average (LAeq) and background (LA90) noise levels across the site were generally dictated by constant distant road traffic from the M25, M1, A414, and North Orbital Road. Average noise levels at the north-east and western edges of the site were also affected by large vehicle movements (such as HGVs and tractors) on Chiswell Green Lane and Miriam Lane (a private road connected to the commercial premises to the north-west of the site), respectively.

4.7 It was noted that the dominant direction of distant road traffic across the site changed over the attended survey periods. On 18 January 2022, traffic noise primarily came from the south-west (M1, M25), whereas on 21 January 2022 it came from the north-west (A141, A1). Weather records showed that windspeeds were low-medium and southerly on both days.

4.8 Maximum (LAmax) noise levels at the north-east and west of the site were dictated by individual large vehicle passes on Chiswell Green Lane and Miriam Lane, respectively.

4.9 Noise was also identified from aircraft movements. The contribution of aircraft to average noise levels was insignificant in comparison to road traffic noise, however aircraft noise dictated the maximum levels in areas further from Miriam Lane and Chiswell Green Lane.

4.10 During the site survey, noise from a commercial premises to the north-west was identified, which appeared to be in used for service vehicle repairs/maintenance including 'clanging' of metal being moved, hammering, reverse beepers, and large vehicles maneuvering.

4.11 Industrial/commercial sources are normally outside the scope of the ProPG guidance. However, ProPG makes an exception where the noise is not dominant, stating:

> *"In the special case where industrial or commercial noise is present on the site but is "not dominant" (i.e. where the impact would be rated as lower than adverse (subject to context) if a BS4142:2014 assessment was to be carried out), its contribution may be included in the noise level used to establish the degree of risk (and if included, this should be clearly stated)… The judgement on whether or not to undertake a BS4142 assessment to determine dominance should be proportionate to the level of risk. In low risk cases a subjective judgement of dominance, based on audibility, would normally be sufficient."*

4.12 The noises described in Paragraph 4.10 were occasionally audible during attended measurements on Chiswell Green Lane (N7), and to a lesser extent at the logging position (L1/N5). In each case, average noise levels due to commercial activity were equal to or lower than background, and are therefore considered to be rated lower than adverse. On this basis, the commercial noise has been included in the ProPG risk assessment and a full BS4142 assessment is not considered to be necessary. No commercial noise was audible at the other measurement positions.

4.13 Maximum noise levels from the commercial premises were characterised by occasional hammering, which was measured to be 61 dB LAF at position N7.

4.14 The proposed development is sufficiently far from the commercial area such that the maximum levels heard at position N7 are representative of only the worst-affected proposed dwellings. These levels have been considered in the recommendation of mitigation, and are discussed further below.

4.15 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.

4.16 The 3D noise model was developed using Cadna/A v2022 environmental noise modelling software. Cadna/A incorporates the calculation methodology given 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 sources.

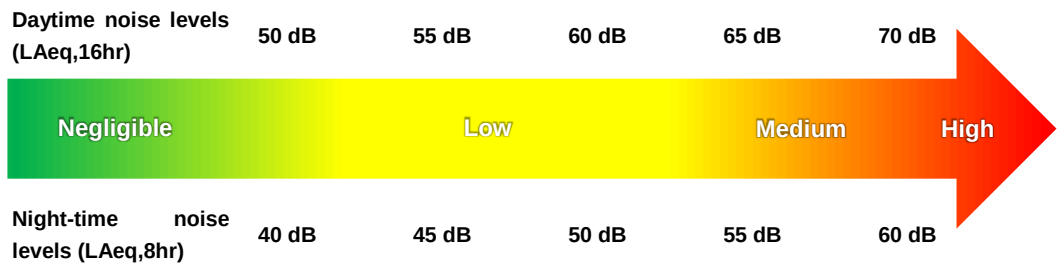
4.17 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, average and maximum noise levels were input for the surrounding roads and calibrated to the results of the on-site noise measurements.

4.18 The methodology and results of the noise modelling are provided in Appendix 3. It can be seen from the results that average and background noise levels do not significantly vary across the site. However, areas of the development at the northern and western edges of the site will be subject to the highest maximum noise levels. The modelling results show that noise levels at these positions are as follows:

- North-eastern edge of the site facing Chiswell Green Lane:
    - Average noise levels during the daytime - 54 dB LAeq,0700-2300hrs;
    - Average noise levels during the night-time - 50 dB LAeq,2300-0700hrs;
    - Typical maximum noise levels during the night-time - 76 dB LAmax.
- Western edge of the site facing Miriam Lane:
    - Average noise levels during the daytime - 55 dB LAeq,0700-2300hrs;
    - Average noise levels during the night-time – 50 dB LAeq,2300-0700hrs;
    - Typical maximum noise levels during the night-time - 72 dB LAmax.

4.19 The measured noise levels can be compared with Figure 3 below to assess the 'noise risk' of the site. Where the noise risk is high, significant acoustic design measures may be required to achieve acceptable noise levels in the development. Where the noise risk is low, acceptable noise levels may be achievable with no specific acoustic design measures.

Figure 3 Noise Risk Assessment (Adaption of Figure 1 from ProPG)



4.20 It can be seen from a comparison of the measured noise levels in paragraph 4.18 above with Figure 3 that the site is 'Low' risk in relation to daytime and night-time noise levels. ProPG therefore requires that a more detailed 'Stage 2' assessment is carried out.

Stage 2 – Element 1 – Overall acoustic design of the site

4.21 The acoustic design of the development has been reviewed in relation to the measured noise levels at the site. In this case the following measures would offer potential improvements to the acoustic design of the development:

1. Configure the internal layouts of the units to minimise habitable rooms overlooking Miriam Lane.
2. Acoustically attenuate the facades overlooking the road to reduce noise levels in habitable rooms.
3. Minimise maximum noise levels in gardens on the western edge by acoustically screening them from the road with suitable acoustic fencing.

4.22 The layout of the development is good in our view, as the even spread of average noise levels eleminates the requirement for screening within the development, and the levels in private amenity areas are measured to be compliant with the BS8233 guideline levels. Furthermore, the public open space is at the centre of the development and therefore all residents also have access to a quiet central amenity area. The internal layout of units can be discussed further at the detailed design stage.

4.23 The outline design of the facades is discussed below.

Stage 2 – Element 2 - Internal noise levels

4.24 Appropriate design criteria for acceptable noise levels in acoustically sensitive areas of new developments are given in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'.

4.25 Relevant BS8233 design criteria are summarised in Table 1 below.

Table 1 BS8233:2014 Internal Noise Criteria

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

4.26 It is also considered appropriate in this case to assess the potential impact of noise emissions from individual vehicle passes on Miriam Lane and Chiswell Green Lane at the bedrooms of the development during the night-time. This is in line with guidance given in BS8233:2014 and ProPG, which both point out that regular individual noise events during the night have the potential to cause sleep disturbance.

4.27 Appropriate design criteria for acceptable maximum noise levels in habitable rooms of new residential developments are given in the ProPG guidance, which states that "*In most*

circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB LAmax,F more than 10 times a night."

4.28 The following acoustic design criteria have therefore been adopted for the development:

- Average noise levels in living rooms and dining rooms during the day should not exceed 35 dB LAeq,0700-2300hrs and 40 dB LAeq,0700-2300hrs respectively;
- Average noise levels in bedrooms should not exceed 35 dB LAeq,0700-2300hrs during the day and 30 dB LAeq,2300-0700hrs during the night;
- Maximum noise levels should not regularly exceed 45 dB LAmax in bedrooms during the night.

4.29 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). Consequently, internal noise levels would be dictated by external noise ingress via glazing and ventilators.

4.30 The ventilation scheme for the project has not yet been decided and therefore, for the purpose of the assessment, it has been assumed that units will be ventilated via trickle ventilators in the external facades with openable windows for the provision of purge ventilation (as per System 1 or System 3 from Building Regulations Part F) as this represents a 'worst case' scenario in terms of noise ingress.

4.31 Calculations were carried out using facade modelling software in accordance with the methodology given in BS8233:2014 to calculate the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in habitable rooms of the development. The calculations included a suitable design margin where appropriate.

4.32 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.

4.33 The results of the calculations are shown in Appendix 4.

4.34 The average noise levels due to constant road traffic and the maximum noise levels due to aircraft and commercial noise are sufficiently low to achieve compliancy with the BS8233 internal levels without acoustically upgraded façade elements (i.e. standard thermal double glazing and hit-and-miss trickle ventilators are sufficient). However, the maximum noise levels due to large vehicle passes require mitigation to achieve compliancy with the proposed design criteria. A preliminary acoustic façade specification, shown in Appendix 5, has been developed and is summarised in Table 2 below.

Table 2 Preliminary Acoustic Requirements for Habitable Rooms

Façade Spec Reference (see Appendix 5)	Glazing Performance Requirements (inc. Frames)	Ventilator Performance Requirements (in Open Position)
FC01	27 dB Rw+Ctr	31 dB Dne,w + Ctr
FC02	32 dB Rw+Ctr	40 dB Dne,w + Ctr
FC03	34 dB Rw+Ctr	45 dB Dne,w + Ctr

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

4.35 The required sound insulation performance values in Table 2 could typically be achieved by the glazing and ventilator types shown in Table 3.

Table 3 Example Glazing / Ventilator Acoustic Performances

Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
4/16/4mm standard thermal double glazing	27
10/16/6mm standard thermal double glazing	32
6/16/8.8mm acoustically upgraded thermal double glazing	34
Example Ventilators	**Typical Acoustic Performance (Dnew + Ctr)**
Standard 'hit & miss' in-frame trickle ventilator	31
Passivent AL-dB 450 in-frame trickle ventilator	40
Brookvent TunalSus 290-10	45

4.36 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 (which could be secured with a suitable planning condition). 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.

4.37 It should be noted that the above assessment is based on windows being closed whereas the ProPG guidance suggests that internal noise levels should also be assessed with windows in the open position, which will likely be required at times to control overheating. This can be assessed further at the detailed design stage when full details of the construction of the development will be available and a full overheating assessment can be carried out. If the units closest to Miriam Lane and Chiswell Green Lane are predicted to overheat for long periods with windows closed then an enhanced mechanical ventilation system may be required. This could be controlled by the Council through the imposition of a planning condition and would not normally be a barrier for granting planning permission.

Stage 2 – Element 3 – Noise levels in external amenity areas

4.38 BS8233 states that it is desirable that noise levels in external amenity areas of residential developments do not exceed 50 dB LAeq and that 55 dB LAeq,T should be regarded as a upper guideline value. BS8233 recognises however that these guideline values will not always be achievable in urban areas adjoining main roads or other transport sources. In these cases, BS8233 states that the development should be designed to achieve the lowest practical noise levels in the amenity spaces.

4.39 The noise survey results indicate that noise levels in external amenity areas are predicted to generally achieve the BS8233 recommended levels.

4.40 Noise levels in some gardens directly adjacent to Miriam Lane and Chiswell Geen Lane are predicted to exceed the 55 dB LAeq,T limit by 1 dB. However, whilst this is not ideal, it is a very small exceedance which is unlikely to be perceptible to residents.

4.41 To reduce noise levels in these gardens as far as practicable, it is recommended that 1.8m high close-boarded timber fencing is used around the gardens where levels are predicted to be higher than the BS8233 recommended levels.

Stage 2 – Element 4 – Other relevant issues

4.42 In our view the design and acoustic approach outlined above is in line with national noise policy.

4.43 As discussed in Paragraph 4.12, average noise levels resulting from nearby commercial uses are equal to or lower than background and are therefore considered insignificant. On this basis, a full BS4142 assessment is not considered necessary. Maximum noise levels from the commercial uses have been assessed at the worst affected dwellings. It was found that BS8233 recommended internal levels would be achieved without the need for acoustically upgraded facades. This can be investigated further at the detailed design stage.

Recommendation to decision maker

4.44 It is our view that planning permission should be granted in relation to noise affecting habitable areas of the development.

5. CONCLUSIONS

5.1 Cass Allen was instructed by Alban Developments Limited and Alban Peter Pearson, CALA Homes (Chiltern) Ltd and Redington Capital Ltd to assess the noise levels across the proposed development and, where required, provide outline guidance on mitigation to achieve acceptable noise levels in habitable areas.

5.2 The assessment was carried out in accordance with relevant national planning guidance.

5.3 A noise survey was carried out at the site and found the following:

- Background and average levels at the site are dictated by distant road traffic noise emissions from the M1, M25, A414, and North Orbital Road.
- Maximum noise levels are dictated by aircraft, and individual large vehicle passes on Miriam Land and Chiswell Green Lane.
- Noise was identified from a commercial premises to the north-west of the site.

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

5.5 Noise affecting the development has been assessed in accordance with the ProPG guidance. The design of the development is considered to be acceptable subject to the adoption of acoustically upgraded glazing and ventilation, as shown in the outline acoustic facade specifcation. This can be investigated further at the detailed design stage.

5.6 In summary of the above it is our view that the site is suitable for the development in terms of noise and that planning permission should be granted.

Appendix 1 Illustrative Masterplan

Key:

1. Drainage strategy: SUDS/Swale
2. Children Play Areas
3. General Amenity Areas

Illustrative Masterplan
Land South of Chiswell Green Lane
St Albans

A1

JOB Nº:	LHG61860
DATE:	30.03.2022
SCALE:	1:1000
DRAWING Nº:	REDC01-MCB-ZZ-ZZ-DR-A-0210-D5-P1 Illustrative masterplan
DRAWN BY:	CA/ES
REVIEWED BY:	POR
APPROVED BY:	POR
REVISION:	29.03.2022|P1 Issued for comments

0 10 20 40 100m

Note: This drawing and schedule is based on the information supplied by others, the accuracy of which we cannot guarantee. No consultation has taken place with the planning authority and as such the above proposal should not be used as a basis for financial or commercial transactions.

CLIENT:

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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. Noise levels at the site were generally dictated by distant road traffic from the M25, M1, A414, and North Orbital Road.

Survey Period:

18/01/2022 to 21/01/2022

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
Sound level meter[1] (noise logger)	Rion	NL-32	00272007
Calibrator	Rion	NC-74	34551703
Sound level meter[1]	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.

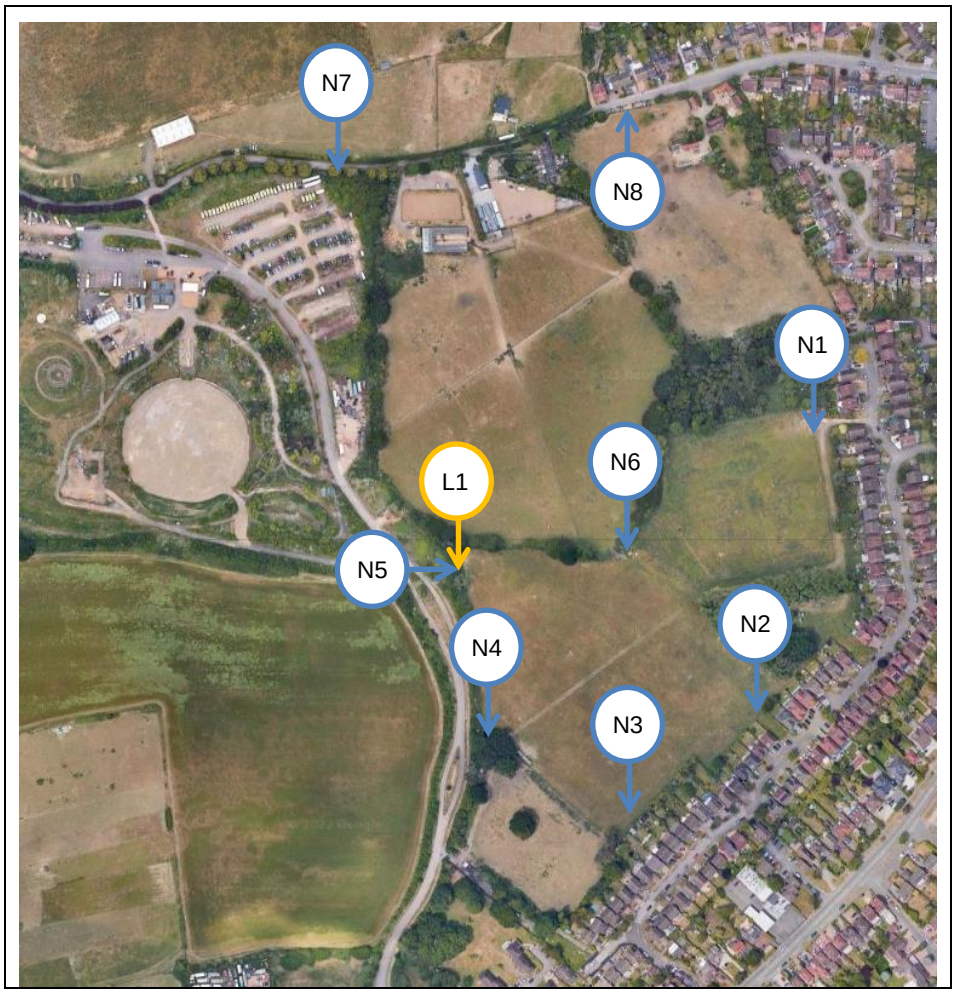
Measurement Positions:

Position (refer plan below)	Description
L1	Unattended noise monitoring position. 3m above ground. Free-field. Direct line of sight to Miriam Lane.
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Forge End.
N2	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Forge End.
N3	Attended noise monitoring position. 1.5m above ground. Free-field.
N4	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Miriam Lane.
N5	Attended noise monitoring position. 1.5m above ground. Free-field. 2m from L1. Direct line of sight to Miriam Lane.
N6	Attended noise monitoring position. 1.5m above ground. Free-field.
N7	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Chiswell Green Lane and commercial premises.

Measurement Positions:

Position (refer plan below)	Description
N8	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Chiswell Green Lane.

Site Plan showing Measurement Positions:



Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
18/01/2022	N1	12:30	10 mins	54	60	53	Constant distant road traffic dictates – some from south-west, some noise from other directions. Birdsong audible. No activity on Forge End. Measurement captured some DIY/construction noise from a nearby garden (LAmax is dictated by hammering).
	N2	12:45	10 mins	52	64	50	Traffic dictated LAeq/LA90. Traffic nosie is quieter than L1 but noticeably more directional, from south-west.

Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
							LAmax dictated by plane taking off. Another quieter plane was 57 dB LAF at its loudest, and generally 53-54 dB LAF while passing over.
	N3	13:00	5 mins	54	58	53	Noise dictated by road traffic from south-west. Garden DIY noise inaudible at this distance.
	N4	13:10	8 mins 40 secs	55	73	52	Noise dictated by road traffic from south-west. LAmax dictated by tractor with trailer passing on Miriam Lane.
	N5	13:20	5 mins	54	64	52	Noise dictated by road traffic from south-west. Some noise from breakdown recovery vehicles at N4 are heard. Crane and car-carrying truck pulling up. LA90 dictated by distant road noise. LAmax dictated by tractor trailer hitting pot hole.
	N6	13:30	5 mins	53	57	51	Noise dictated by road traffic from south-west.
	N7	14:00	10 mins	56	74	49	LAeq dictated by vehicle passes and some clanging of metal/chains/parts from nearby facility. Vehicles maneuvering. LA90 dictated by distant traffic from south-west. Only seven vehicles passed on Chiswell Green Lane during 10 min measurement (narrow single track lane).
21/01/22	N8	15:55	10 mins	56	75	48	LA90 dictated by distant road traffic. LAeq dictated by aircraft, animal calls, and individual vehicle passes on Chiswell Green Lane (5m from measurement position). LAmax dictated by HGV passing. No commercial activity audible.
	N7	16:15	10 mins	60	76	53	LA90 dictated by road noise clearly coming from North-West. LAeq dictated by vehicles passing on Chiswell Green Lane and aircraft. Hammering heard from industry at 61dB LAF. Reverse beepers audible. Creaking vehicle movements and metal being moved. Very difficult to quantify commercial noise as it is usually below or near the background level.
	N1	16:45	10 mins	54	63	53	LAeq and L90 dictated by traffic from north-west. LAmax dictated by plane passing overhead. One metallic and impulsive occurrence of commercial noise was audible.
	N6	17:00	10 mins	53	57	52	LAeq and L90 dictated by traffic from north-west, but audible contribution from south-west. No commercial noise audible.

Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
	N5	17:15	5 mins	53	62	52	LAeq and L90 dictated by traffic from north-west, but audible contribution from south-west. No commercial noise audible.
	N4	17:20	10 mins	55	70	53	LAeq and L90 dictated by traffic from north-west, but audible contribution from south-west. No commercial noise audible. LAmax dictated by large vehicle passing on Miriam Lane.
	N2	17:35	10 mins	53	63	53	LAeq and L90 dictated by traffic from north-west, but audible contribution from south-west. No commercial noise audible.

Unattended Noise Monitoring Results:

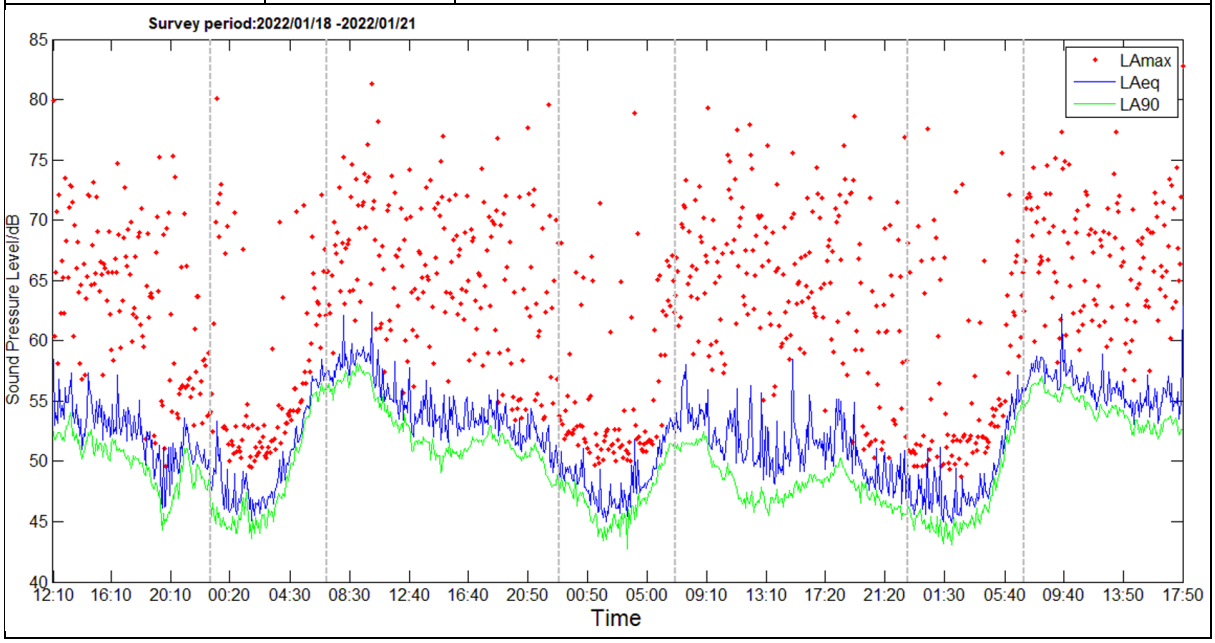
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
18/01/2022 to 21/01/2022	L1	54	46	50	44	72

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	
18/01/2022 to 21/01/2022	L1	

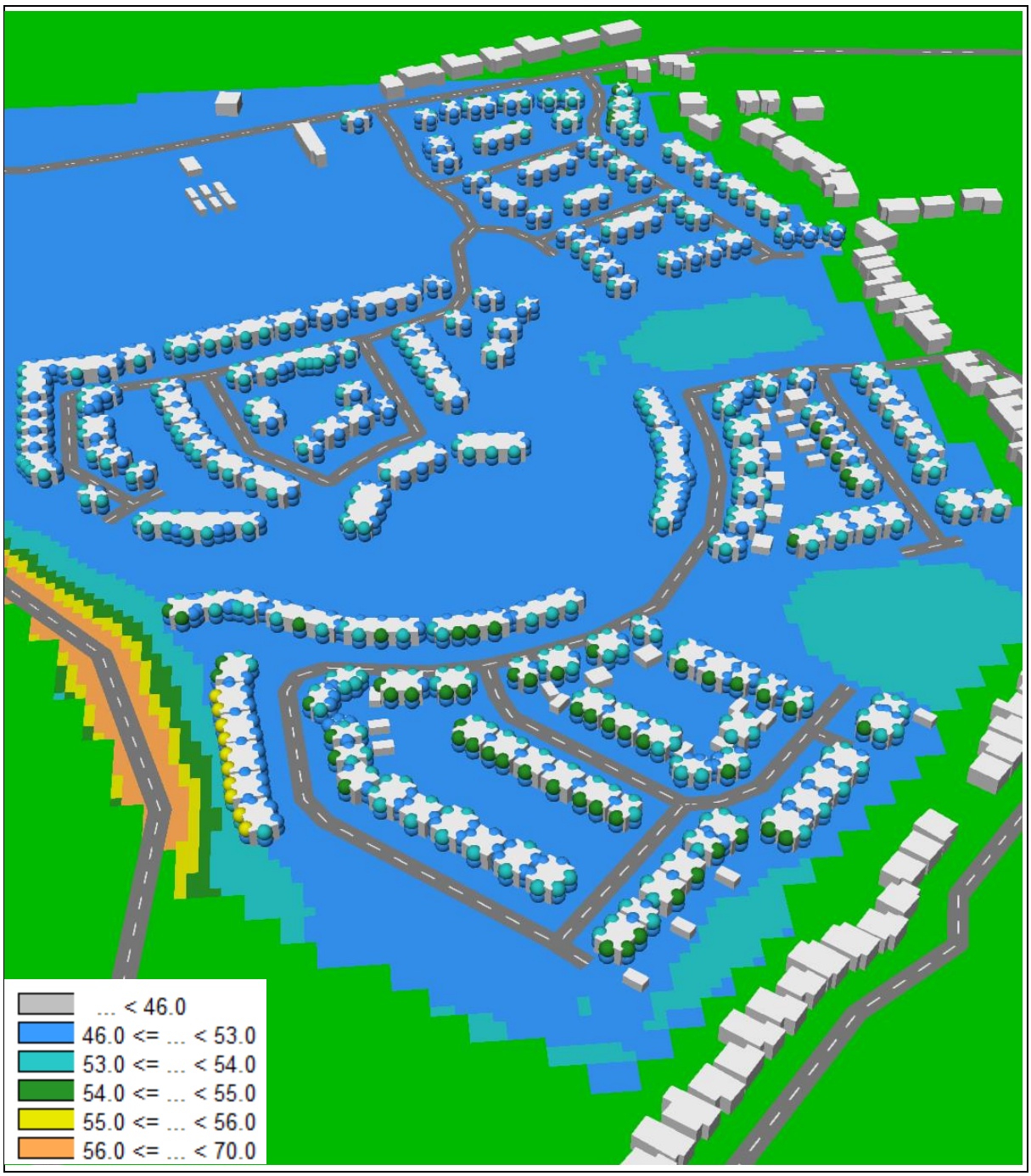


Appendix 3 Modelling Results

Modelling Software:	CADNA/A Version 2022
Modelled Scenarios:	Day and night-time average noise levels across the site. Night-time maximum noise levels across the site.
Data inputs:	• Noise survey results • Topographical data for the site • 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

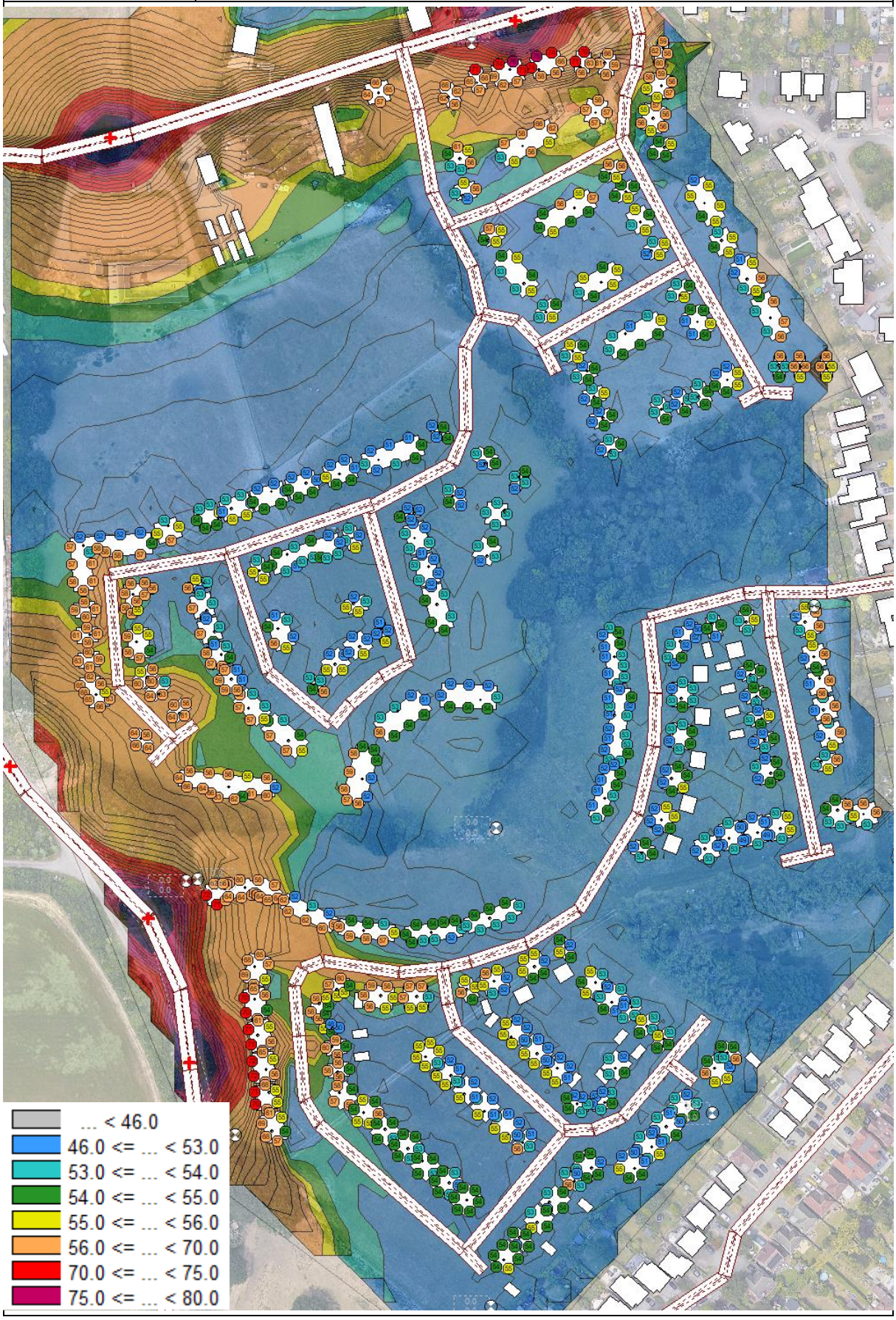
Modelling Printout:

Scenario	Daytime noise levels (LAeq,16hr)


... < 46.0
46.0 <= ... < 53.0
53.0 <= ... < 54.0
54.0 <= ... < 55.0
55.0 <= ... < 56.0
56.0 <= ... < 70.0

Scenario	Night-time noise levels (LAeq,8hr)

Scenario	Night-time maximum noise levels (LAmax)



Scenario	Maximum commercial noise levels (LAmax)

Appendix 4 Outline Facade Calculations

FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

		W		L		H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	4.0	X	4.0	X	2.5
ROOM:	Typical worst-case living room					
VARIANT:	Day-time LAeq	Room Volume =	40.0	m3		
NOTES:	Levels similar across whole site. Spectrum shape measured at position L1/N5.	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		

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	56.0	35.2	37.7	41.2	50.6	53.9	40.7	28.3	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		35.2	37.7	41.2	50.6	53.9	40.7	28.3	**Direct input**

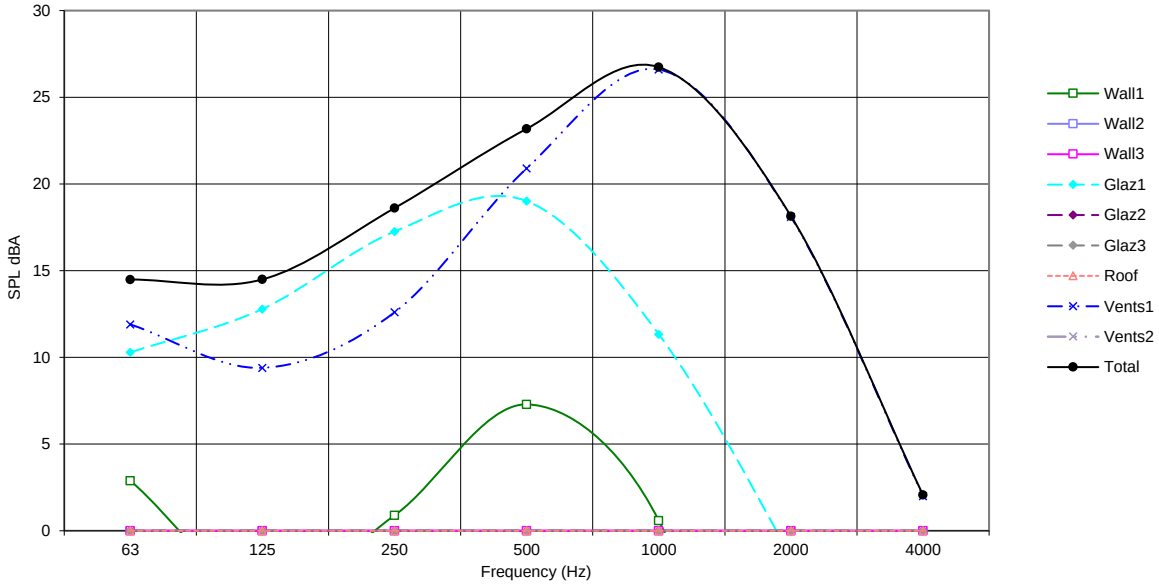
REVERBERATION TIME

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	15.0	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	27 dB Rw + Ctr - Standard Thermal Double Glazing	2.0	20	20	19	27	38	37	40	20%	27 (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		28	29	28	36	46	46	49				
	Resultant SPL inside room excluding ventilators dB	22.7	11	13	17	19	12	-1	-16	21%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	3	30	35	35	36	34	29	33	78%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	28.4	12	9	13	21	27	18	2	79%			
	Total SPL inside room	**29.4**	14	14	19	23	27	18	2				

Element contribution to total internal noise level



FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	3.0	X	3.0	X	2.5
ROOM:	Typical worst-case bedroom						
VARIANT:	Day-time LAeq						
NOTES:	Levels similar across whole site. Spectrum shape measured at position L1/N5.						

Room Volume =	22.5	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

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

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	56.0	35.2	37.7	41.2	50.6	53.9	40.7	28.3	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		35.2	37.7	41.2	50.6	53.9	40.7	28.3	**Direct input**

REVERBERATION TIME

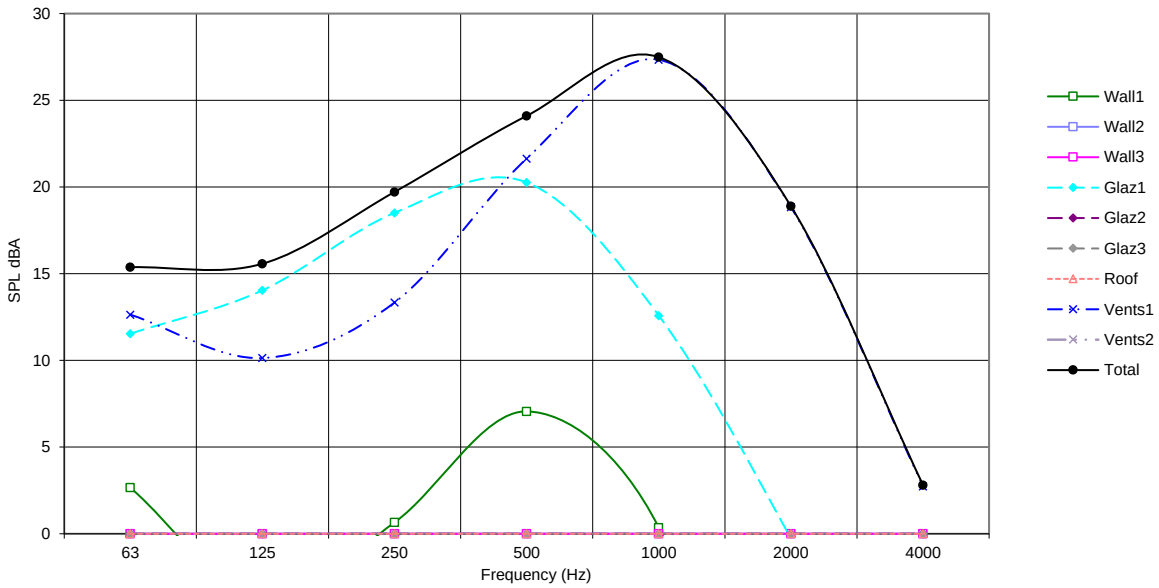
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	27 dB Rw + Ctr - Standard Thermal Double Glazing	1.5	20	20	19	27	38	37	40	22%	27 (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		27	28	27	34	45	45	48				
	Resultant SPL inside room excluding ventilators dB	23.9	12	14	19	20	13	0	-15	23%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	2	30	35	35	36	34	29	33	77%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	29.1	13	10	13	22	27	19	3	77%			

Total SPL inside room	**30.3**	15	16	20	24	27	19	3

Element contribution to total internal noise level



FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

		W		L		H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	3.0	X	3.0	X	2.5
ROOM:	Typical worst-case bedroom						
VARIANT:	Night-time LAeq						
NOTES:	Levels similar across whole site. Spectrum shape measured at position L1/N5.						

Room Volume =	22.5	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

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

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	50.0	29.2	31.7	35.2	44.6	47.9	34.7	20.3	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		29.2	31.7	35.2	44.6	47.9	34.7	20.3	**Direct input**

REVERBERATION TIME

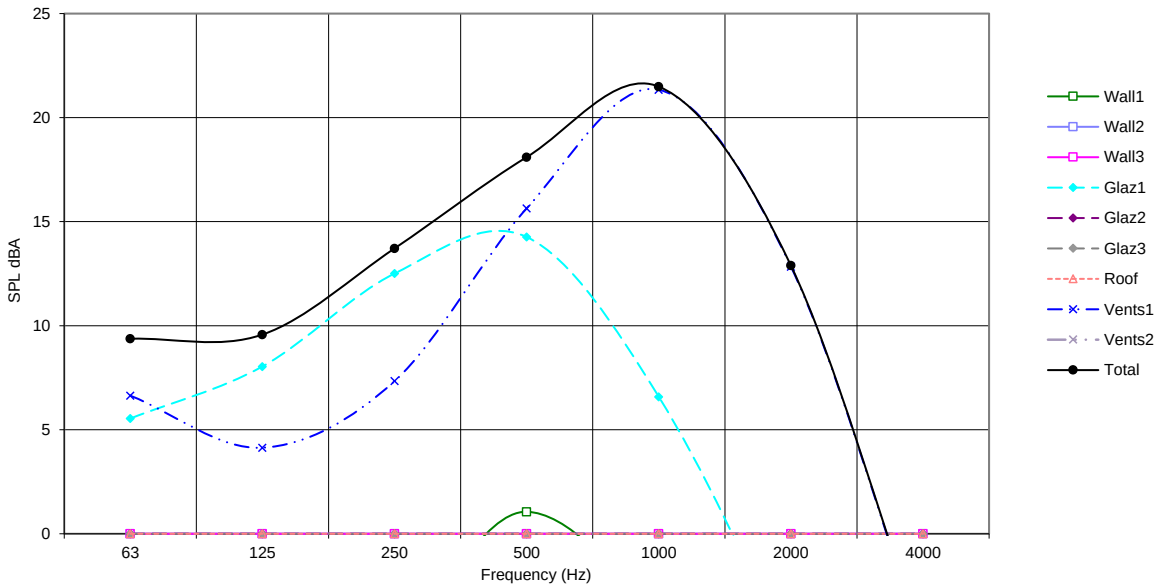
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	0%	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	27 dB Rw + Ctr - Standard Thermal Double Glazing	1.5	20	20	19	27	38	37	40	22%	27 (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		27	28	27	34	45	45	48				
	Resultant SPL inside room excluding ventilators dB	17.9	6	8	13	14	7	-6	-23	23%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	2	30	35	35	36	34	29	33	76%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	23.1	7	4	7	16	21	13	-5	77%			

Total SPL inside room	**24.3**	9	10	14	18	21	13	-5	

Element contribution to total internal noise level



FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

		W		L		H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	3.0	X	3.0	X	2.5
ROOM:	Typical worst-case bedroom						
VARIANT:	Night-time LAmax - Road, 73-76						
NOTES:	Spectrum shape measured at position N8.						

Room Volume =	22.5	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

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

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	76.0	51.8	64.8	67.4	68.3	72.1	68.6	60.5	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		51.8	64.8	67.4	68.3	72.1	68.6	60.5	**Direct input**

REVERBERATION TIME

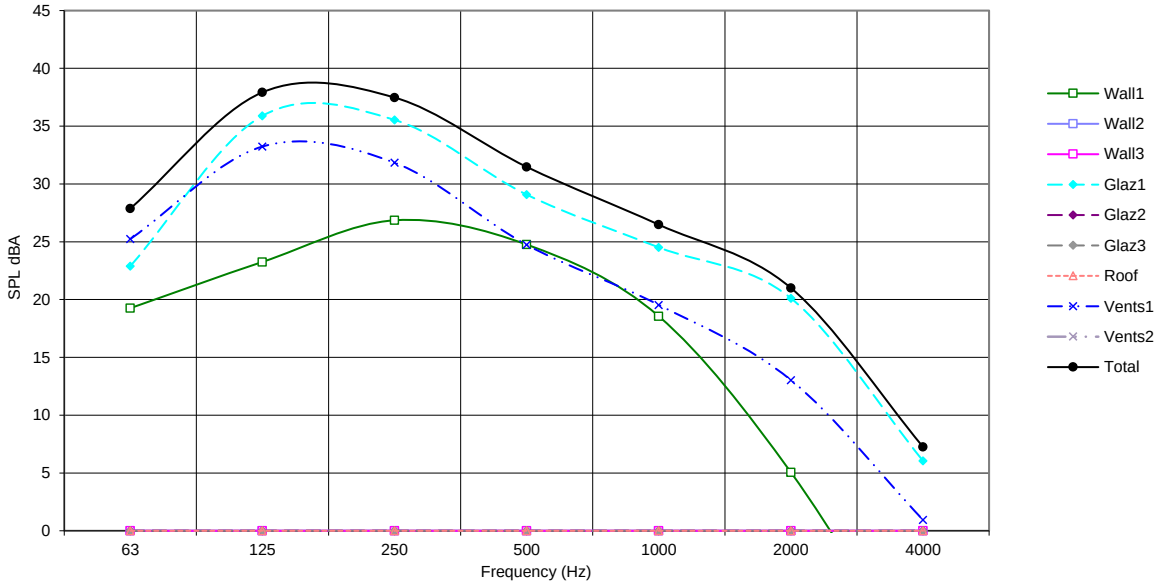
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	8%	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	34 dB Rw + Ctr - High Acoustic Performance Double Glazing	1.5	25	25	28	35	44	45	51	62%	34 (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	33	36	42	51	53	59				
	Resultant SPL inside room excluding ventilators dB	40.0	24	36	36	30	25	20	6	70%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Brookvent TunalSus 290-10	2	34	39	43	51	60	63	67	30%	50	-1	-5
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	36.4	25	33	32	25	20	13	1	30%			

Total SPL inside room	**41.6**	28	38	37	31	26	21	7

Element contribution to total internal noise level



FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

		W		L		H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	3.0	X	3.0	X	2.5
ROOM:	Typical worst-case bedroom						
VARIANT:	Night-time LAmax - Road, 67-72						
NOTES:	Spectrum shape measured at position N8.						

Room Volume =	22.5	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

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

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	72.0	47.8	60.8	63.4	64.3	68.1	64.6	56.5	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		47.8	60.8	63.4	64.3	68.1	64.6	56.5	**Direct input**

REVERBERATION TIME

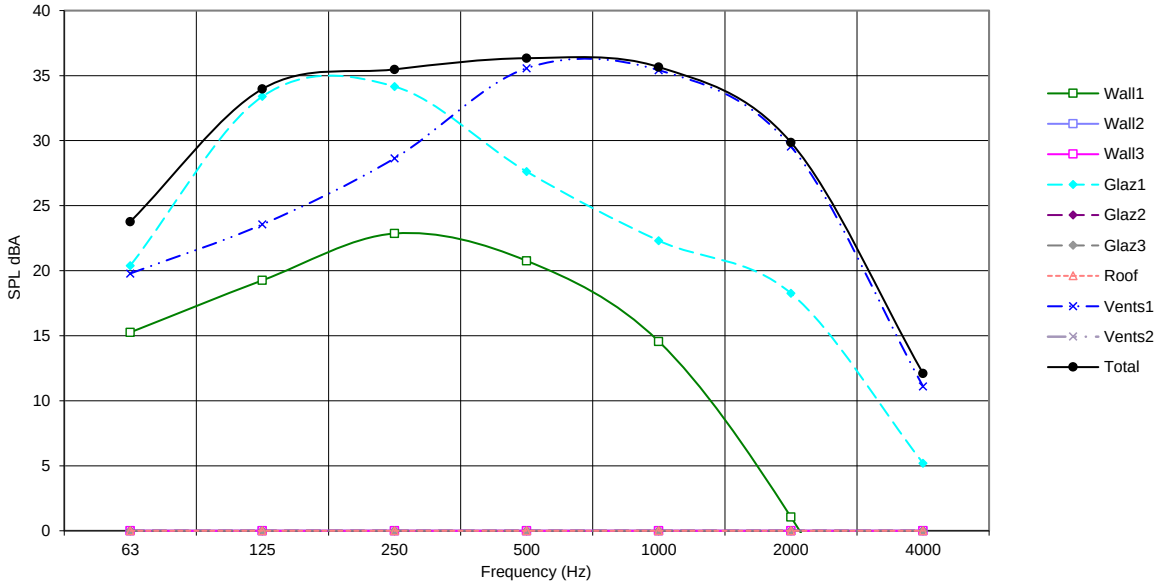
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	3%	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	32 dB Rw + Ctr - Acoustically Upgraded Double Glazing	1.5	24	24	25	33	42	43	47	38%	32 (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		30	31	33	40	49	50	55				
	Resultant SPL inside room excluding ventilators dB	37.9	22	34	34	28	23	18	5	41%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Passivent AL-dB 450 Air supply window vent	2	35	45	42	36	40	42	53	59%	40	0	0
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	39.6	20	24	29	36	35	30	11	59%			

Total SPL inside room	**41.8**	24	34	35	36	36	30	12

Element contribution to total internal noise level



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FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

		W	L	H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	3.0 X	3.0 X	2.5
ROOM:	Typical worst-case bedroom				
VARIANT:	Night-time LAmax - Road, up to 66 dBA				
NOTES:	Spectrum shape measured at position N8.				

Room Volume =	22.5	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

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

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	66.0	41.8	54.8	57.4	58.3	62.1	58.6	50.5	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		41.8	54.8	57.4	58.3	62.1	58.6	50.5	**Direct input**

REVERBERATION TIME

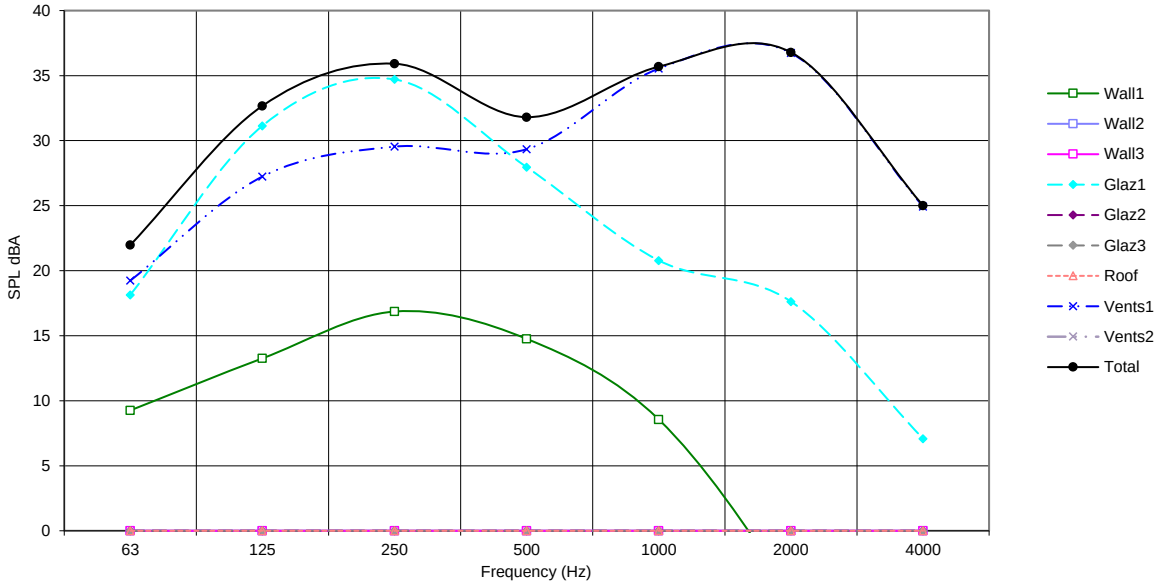
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	27 dB Rw + Ctr - Standard Thermal Double Glazing	1.5	20	20	19	27	38	37	40	32%	27 (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		27	28	27	34	45	45	48				
	Resultant SPL inside room excluding ventilators dB	37.2	19	31	35	28	21	18	7	32%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	2	30	35	35	36	34	29	33	68%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	40.4	19	27	30	29	36	37	25	68%			

Total SPL inside room	**42.1**	22	33	36	32	36	37	25

Element contribution to total internal noise level



FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	3.0	X	3.0	X	2.5
ROOM:	Typical worst-case bedroom						
VARIANT:	Construction LAmax						
NOTES:	Spectrum shape 'metal clang' from Cass Allen archive data.						

Room Volume =	22.5	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

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

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	66.0	19.5	36.0	44.5	53.5	60.4	60.3	61.8	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		19.5	36.0	44.5	53.5	60.4	60.3	61.8	**Direct input**

REVERBERATION TIME

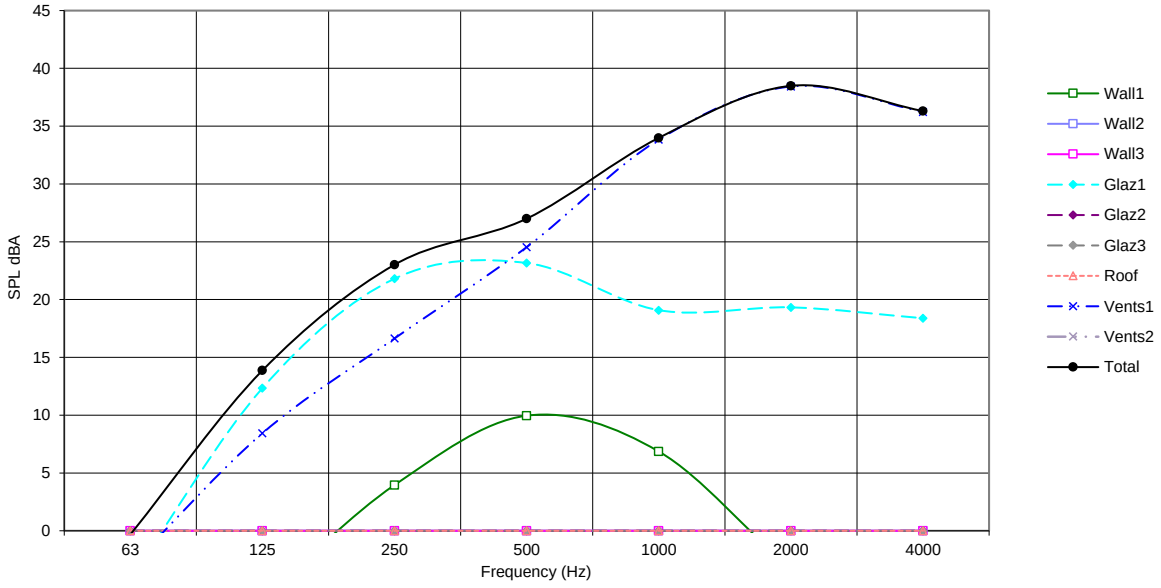
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	0%	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	27 dB Rw + Ctr - Standard Thermal Double Glazing	1.5	20	20	19	27	38	37	40	4%	27 (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		27	28	27	34	45	45	48				
	Resultant SPL inside room excluding ventilators dB	28.0	-4	12	22	23	19	19	18	4%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	2	30	35	35	36	34	29	33	96%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	41.4	-3	8	17	25	34	38	36	96%			

Total SPL inside room	**41.6**	0	14	23	27	34	38	36

Element contribution to total internal noise level



FACSIM V2.7.5 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
PROJECT:	CALA - Land west of Chiswell Green	Room Dimensions [m]	3.0	X	3.0	X	2.5
ROOM:	Typical worst-case bedroom						
VARIANT:	Aircraft LAmax						
NOTES:	Spectrum measured at position N2						

Room Volume =	22.5	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

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

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	65.4	39.7	55.3	58.9	61.6	58.7	50.9	46.8	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		39.7	55.3	58.9	61.6	58.7	50.9	46.8	**Direct input**

REVERBERATION TIME

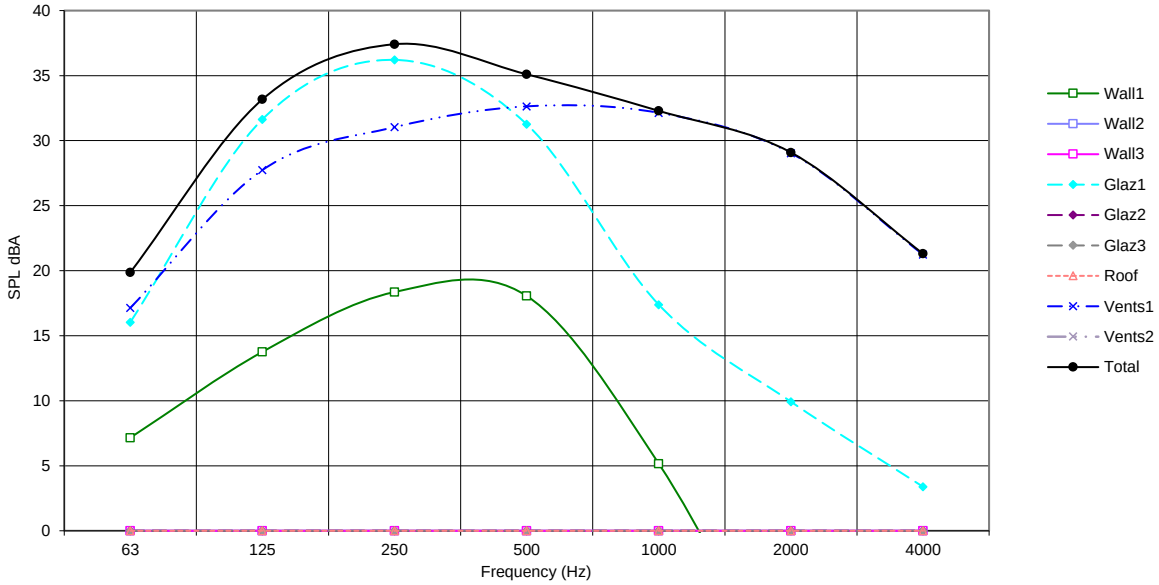
DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	27 dB Rw + Ctr - Standard Thermal Double Glazing	1.5	20	20	19	27	38	37	40	52%	27 (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		27	28	27	34	45	45	48				
	Resultant SPL inside room excluding ventilators dB	38.6	17	32	36	31	18	10	3	53%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	2	30	35	35	36	34	29	33	47%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	38.0	17	28	31	33	32	29	21	47%			

Total SPL inside room	**41.3**	20	33	37	35	32	29	21

Element contribution to total internal noise level



Appendix 5 Outline Acoustic Facade Specification

Reference	Colour	Glazing Specification	Ventilator Specification	
FC03		34 dB Rw+Ctr	45 dB Dnew+Ctr	
FC02		32 dB Rw+Ctr	40 dB Dnew+Ctr	
FC01	No mark up	27 dB Rw+Ctr	31 dB Dnew+Ctr	(No upgrade needed)

NOTES: Values must include the Ctr correction. Manufacturers or suppliers should provide laboratory test data demonstrating that the proposed systems are capable of achieving the values given. Windows should be tested as complete systems (rather than just the glazing in isolation) and trickle ventilators should be in the open position.

All floors:

cass allen

Architectural & Environmental Acousticians

Noise & Vibration Engineers

This report has been prepared by Cass Allen Associates Ltd in accordance with the CDM regulations with all reasonable skill, care and diligence, and taking account of the resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid at the time of collection. This report is for the exclusive use of the client named above; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Cass Allen Associates Ltd. Cass Allen Associates Ltd disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of work.

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