Architectural & Environmental Acousticians

Noise & Vibration Engineers

Noise Assessment

Chapel Gate, Basildon

Cass Allen
01234 834 862
www.cassallen.co.uk

Noise Assessment

Project: CHAPEL GATE, BASILDON

Report reference: RP01-20620-R1

Client: SEMPRA HOMES LTD
ST MARTINS SQUARE
BASILDON, ESSEX
SS14 1DL

Our details: CASS ALLEN ASSOCIATES LTD
BEDFORD I-LAB
BEDFORD
MK44 3RZ

Document control:

REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
0	22 October 2020	Matthew Hill, BSc AMIOA, Acoustics Consultant	Adam Bamford, BSc MIOA DipIOA, Principal Acoustics Consultant	Initial issue
1	15 March 2021	Matthew Hill, BSc AMIOA, Acoustics Consultant	Adam Bamford, BSc MIOA DipIOA, Principal Acoustics Consultant	Updated layout + minor text changes

TABLE OF CONTENTS

Cass Allen
01234 834 862
www.cassallen.co.uk

1. INTRODUCTION

1.1 Cass Allen has been instructed by Sempra Homes Ltd to assess the suitability of the site for the proposed development known as Chapel Gate in Basildon with regard to noise and vibration.

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

1.3 The aims of the assessment were:

- To establish the suitability of existing noise and vibration levels at the site for the proposed development;
- Where required, identify appropriate measures to optimise the acoustic design of the development and 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.

Cass Allen
01234 834 862
www.cassallen.co.uk

2. PROJECT DESCRIPTION

2.1 The site is located in between Laindon Link (which bounds it to the north) and a railway line (which bounds it to the south). It is also bounded to the east by the A176 and a roundabout connecting the surrounding roads. Beyond the A176 lies a BP petrol station and other commercial units.

2.2 The site location and surrounding area are shown in Figure 1 below. A current drawing of the proposed site layout is shown in Appendix 1.

Figure 1 Site and surrounding area

2.3 The proposal is to develop the site into residential properties.

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). Section 170 of the NPPF states:

> *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.*

and in Section 180:

> *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.*

Local Policy

3.2 It is understood that Basildon Council's local policy references the use of the guidelines outlined in the NPPF. As such this report will be carried out to the criteria laid out in BS8233 whilst using the 'ProPG: *Planning and Noise for New Residential Development, May 2017 (ProPG)*' methodology as this is current 'best practice'.

3.3 To address the requirements of the national and local policies, the key acoustic matters to consider are noise and ground-borne vibration affecting the habitable areas of the proposed development.

4. NOISE AFFECTING THE DEVELOPMENT

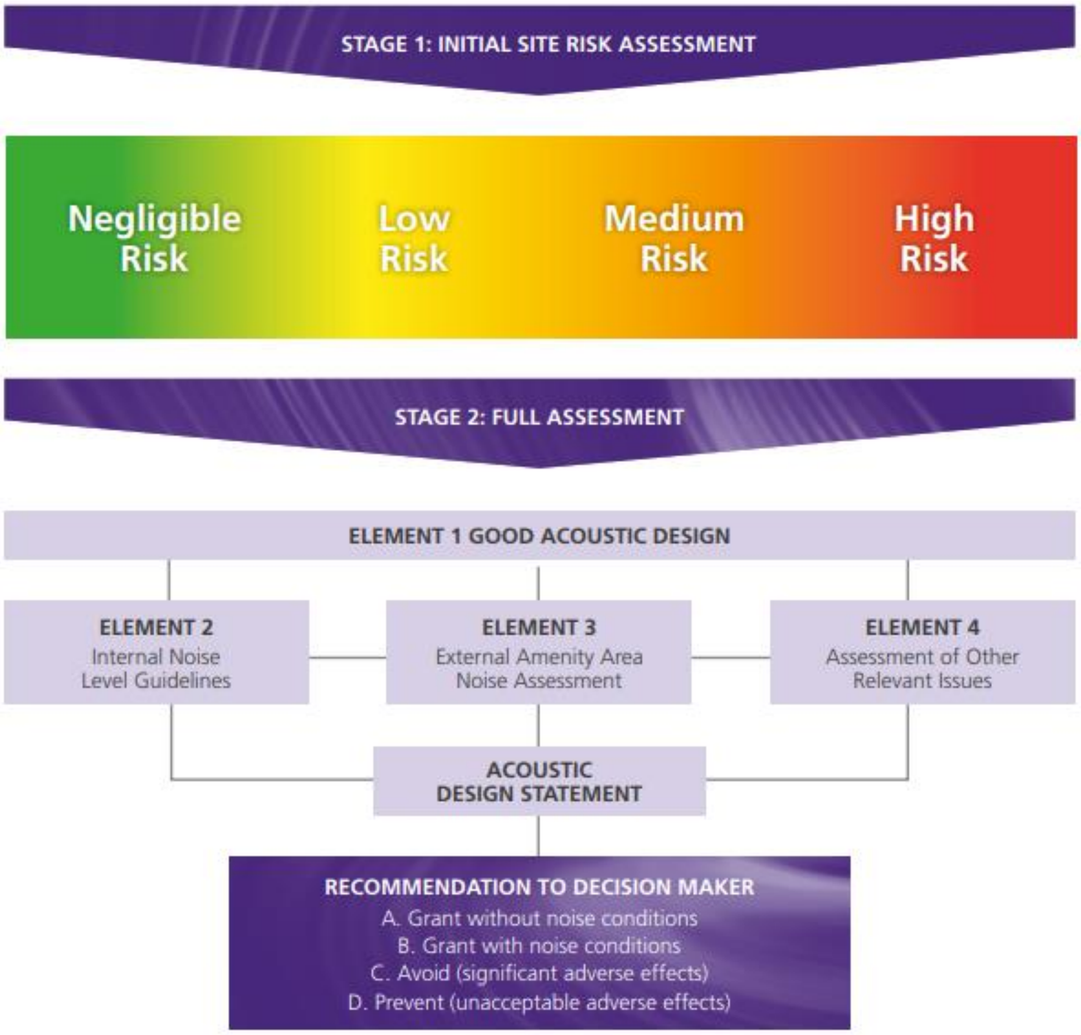
4.1 Specific guidance on the assessment of noise affecting new residential development is given in ProPG: Planning and Noise for New Residential Development, May 2017 (ProPG). The process within the ProPG guidance for the appraisal of noise levels affecting new residential development is considered to 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 1/2 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.

Cass Allen
01234 834 862
www.cassallen.co.uk

Figure 2 ProPG Assessment Process



4.3 It should be noted that the guidance in ProPG only relates 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 requires separate consideration.

Stage 1 – Noise survey and initial assessment

4.4 A noise survey was carried out at the site from 30th September to 2nd October 2020 to determine the existing noise environment at the site. The full methodology and results of the noise survey are provided in Appendix 2.

4.5 Average noise levels across the site were generally dictated by road traffic on Laindon Link and the A176. Average noise levels across the site were also affected by train passes on the adjacent railway.

4.6 Maximum noise levels at the south of the site were largely dictated by fast train passes on the adjacent railway. Maximum noise levels at the south and eastern edges of the site were generally dictated by vehicle movements on Laindon Link and the A176.

4.7 Background noise levels (LA90) across the site were dictated by constant road traffic noise from surrounding roads.

4.8 Due to the elevated railway lines, it was not possible to safely capture data at a representative location for the worst case facade facing the rail. As a result, a transfer function was derived using Cadna/A noise modelling software to model the difference in levels between the measurement position and the worst case noise levels at higher elevations. A correction of +5.5 dB has been applied to the measured levels to give a suitable worst-case facade level at this position.

4.9 The measurement and assessment of the road traffic noise from the A176/ Laindon Link has been carried out in accordance with the "shortened" measurement procedure given in the Department of Transport Welsh Office – "Calculation of Road Traffic Noise" (1998) and converted to LAeq,0700-2300 and LAeq,2300-0700 in accordance with the DEFRA/TRL document "Method for converting the UK road traffic noise index LA10,18h to the EU noise indices for road noise mapping" (2006).

4.10 The current layout shows that the worst case facade is equidistant from the two main noise sources. Noise at this location will be subject to noise from rail and road. To derive a suitable worst case facade level, noise from both sources were added together. The results of this are summarised below.

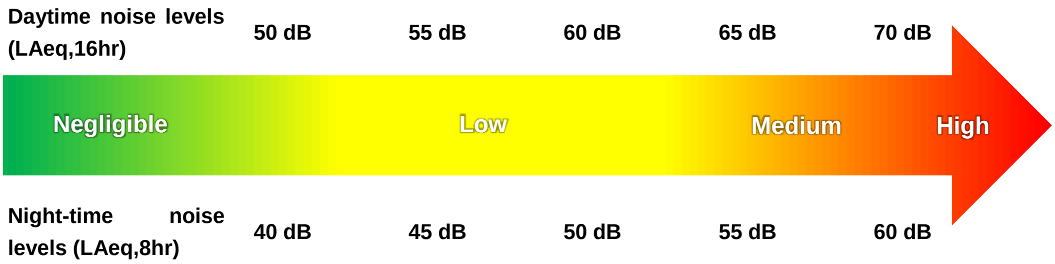
4.11 The noise survey and subsequent correction calculation results show that noise levels at the worst case facade are as follows:

- Average noise levels during the daytime - 64 dB LAeq,0700-2300hrs;
- Average noise levels during the night-time - 57 dB LAeq,2300-0700hrs;
- Typical maximum noise levels during the night-time - 77 dB LAmax.

4.12 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.

Cass Allen
01234 834 862
www.cassallen.co.uk

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



4.13 It can be seen from a comparison of the measured noise levels in Paragraph 4.11 above with Figure 3 that the site is a 'Medium' risk in relation to daytime noise levels and a 'Medium' risk in relation to night-time noise levels. ProPG would therefore require that a more detailed 'Stage 2' assessment is carried out.

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

4.14 The current site layout represents good acoustic design in our view as good distance has been allowed between the major noise sources and the facades of the buildings. Also, private external amenity areas are well screened from the Laindon Link by the proposed buildings.

Stage 2 – Element 2 - Internal noise levels

4.15 ProPG provides criteria for acceptable noise levels in acoustically sensitive areas of new developments, drawn from BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' and World Health Organisation '*Guidelines for Community Noise*' (1999).

4.16 ProPG design criteria are summarised in Table 1 below.

Table 1 ProPG/BS8233 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 45 dB LAmax,F[1]

[1] ProPG provides further clarity: "*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.*"

4.17 ProPG also states that noise levels in external amenity areas of residential developments should be assessed and that noise levels should ideally not be above 50 to 55 dB LAeq,16hr. ProPG recognises however, that these guideline values may not be achievable in all circumstances where development is desirable. In these cases, ProPG states that the development should be designed to achieve the lowest practical noise levels in the amenity space.

4.18 External walls of the development will be constructed using masonry constructions. Traditional brick and block for houses and reinforced concrete structure with brick external leaf for flats. Consequently, internal noise levels would be dictated by external noise ingress via glazing and ventilators.

4.19 It is our understanding that the ventilation scheme for the project is Mechanical Ventilation with Heat Recovery (MVHR) i.e. System 4 from Building Regulations Part F for flats and Mechanical Extract (cMEV) i.e. System 3 from Building Regulations Part F for houses. Dwellings that are shown to overheat as part of the energy assessment will require acoustic louvers in order to minimise the need to open windows. The acoustic louvers will be designed to achieve the performance specification as shown in Table 2 below.

4.20 The MVHR system should be selected to ensure that noise from air supply and extract ductwork does not exceed acceptable levels within habitable rooms. Appropriate specifications for noise levels from the MVHR system (operating at typical maximum duty) would be as follows:

- Bedrooms and living rooms – 30 dB LAeq,T at 1.5m from any ventilation aperture; and,
- Other habitable areas – 35 dB LAeq,T at 1.5m from any ventilation aperture.

4.21 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 the worst case habitable rooms of the development (i.e. the habitable rooms that will be subject to the highest external noise levels). The calculations included a 3 dBA design margin.

4.22 If acceptable internal noise levels can be achieved in worst case habitable rooms then it follows that acceptable internal noise levels can be achieved in all other habitable rooms of the development using similar glazing.

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

- Glazing – 1.5m^2 for bedrooms and 2.5m^2 for living rooms;
- External walls – 8m^2 for bedrooms and 12m^2 for living rooms; and
- Acoustic louvers (large) - 755mm x 1955mm as per data sheet provided in Appendix 4 (or similar approved).

4.24 The results of the calculations are shown in Appendix 3 and are summarised in Table 2 below.

Table 2 Acoustic Requirements for 'Worst Case' Habitable Rooms

'Worst Case' Rooms	Glazing Performance Requirements (inc. Frames)	Acoustic louvers Performance Requirements
Bedrooms	29 dB Rw+Ctr	30 dB Dn,e,w+Ctr
Living rooms	28 dB Rw+Ctr	30 dB Dn,e,w+Ctr

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

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

Table 3 Example Glazing Acoustic Performances

Example Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
6/ 6 to 20/ 4mm thermal double glazing	28
8/ 6 to 16/ 6mm thermal double glazing	29

4.26 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 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 regard to the noise levels that will exist within the habitable rooms.

4.27 It should be noted that it may be possible to use lower acoustic performance facade elements for facades that are further from or acoustically screened from the surrounding noise sources. This could be investigated further at the detailed design stage.

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

4.28 BS8233/ProPG 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 an upper guideline value.

4.29 The noise survey results indicate that noise levels in some gardens are predicted to exceed the 55 dB LAeq,T guideline level, however whilst this is not ideal, it is not uncommon for noise levels in gardens in urban areas to be higher than the BS8233/ProPG recommended levels.

4.30 To reduce noise levels in these gardens as far as practicable, it is recommended that 1.8m high close-boarded timber fencing (or equivalent solid noise barrier) is used around the gardens where levels are predicted to be higher than the BS8233/ProPG recommended levels. This type of fencing should especially be used for gardens in close proximity to Laindon Link, the A176 or the adjacent rail.

4.31 In summary of the above, noise levels in external amenity areas of the development are predicted to be acceptable provided that 1.8m high close-boarded timber fencing (or equivalent solid noise barrier) is used around gardens where noise levels are predicted to be higher than the BS8233/ProPG recommended upper level (55 dB LAeq,T).

Stage 2 – Element 4 – Other relevant issues

4.32 In our view the design and acoustic approach outlined above is in line with both local and national noise policy. It is common for residential properties to be situated near to main roads and railway lines and this is an acceptable scenario provided that the properties are acoustically upgraded where necessary to achieve acceptable noise levels in habitable areas.

Recommendation to decision maker

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

5. GROUND-BORNE VIBRATION AFFECTING THE DEVELOPMENT

5.1 The ground-borne vibration levels that exist at the site have been measured and assessed according to relevant British Standards.

Design criteria – Ground-borne vibration

5.2 Appropriate criteria for ground-borne vibration affecting residential dwellings are given in BS 6472-1:2008 *'Guide to evaluation of human exposure to vibration in buildings - Part 1: Vibration sources other than blasting'*. The criteria in BS6472-1 are provided as Vibration Dose Values, as summarised in Table 4.

Table 4 BS6472-1:2008 Vibration Criteria

Place	Low Probability of Adverse Comment (VDV) $m{\cdot}s^{-1.75}$ 1)	Adverse Comment Possible (VDV) $m{\cdot}s^{-1.75}$	Adverse Comment Probable (VDV) $m{\cdot}s^{-1.75}$ 2)
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

5.3 Measured ground-borne vibration levels at the site have been assessed against the criteria above.

Existing ground-borne vibration levels

5.4 Ground-borne vibration measurements were carried out as part of the site survey on 30th September 2020.

5.5 Tri-axial Vibration Dose Value (VDV) measurements were taken across the low-frequency range (0.5-80Hz) and logged at 10 second intervals for 45 minutes to ensure an adequate quantity of train movements at the site. These short term measurements were then extrapolated to produce 16h day and 8h night-time levels as required by the BS6472 criteria.

5.6 Timetables indicate that there are consistently around approximately 10 train passes per hour at the site during the daytime and 4 train passes per hour during the night. The extrapolated VDV levels are summarised below in Table 5 below.

Table 5 Vibration Data Summary (Vibration Dose Values)

Position	Period	X Axis ($m{\cdot}s^{-1.75}$) Wd	Y Axis ($m{\cdot}s^{-1.75}$) Wd	Z Axis ($m{\cdot}s^{-1.75}$) Wb
V1	Day 16hr	0.002	0.002	0.028
	Night 8hr	0.001	0.002	0.019

5.7 A comparison of the criteria in Table 4 and the results summary Table 5 shows that vibration levels at the site fall below the *"Low probability of adverse comment"* rating for both daytime and night-time periods according to BS6472:2008.

5.8 The results of the BS6472 assessment are in line with subjective opinion formed during the survey that there are insignificant ground-borne vibration levels at the site. It is subsequently reasonable to conclude that levels of vibration at the site are acceptable for the proposed development.

6. CONCLUSIONS

6.1 Cass Allen was instructed by Sempra Homes Ltd to assess the suitability of the site for the proposed development with regard to noise and vibration.

6.2 The assessment was carried out in accordance with relevant local and national planning guidance.

6.3 A noise and vibration survey was carried out at the site. Average noise levels at the site are dictated by road traffic noise emissions from Laindon Link and the A176. Maximum noise levels at the south of the site were dictated by train passes on the adjacent railway. Maximum noise levels at the north and east were dictated by road traffic on the surrounding roads.

6.4 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 suitable double glazing and acoustically enhanced ventilation louvres. This can be investigated further at the detailed design stage and may be controlled by the Local Planning Authority with a suitable planning condition.

6.5 Ground-borne vibration levels at the site have been measured to be compliant with BS6472-1:2008 and are considered acceptable for the development.

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

Appendix 1 Site Layout

Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise and vibration measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads and noise from train passes on the adjacent railway.

Survey Period:

30/09/2020 to 02/10/2020

Survey Objectives:

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

Equipment Used (Appendix 2, Table 1):

Type	Manufacturer	Model	Serial Number
Sound level meter[1]	NTi Audio	XL2	A2A-15506-E0
Calibrator	NTi Audio	600 000 388	15011
Sound level meter[1] (noise logger)	Rion	NL-32	00530374
Sound level meter[1] (noise logger)	Rion	NL-32	00623765
Tri-Axial Vibration Meter	Rion	XV-2P	00380055
Tri-axial accelerometer	Rion	PV-83CW	63643

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.

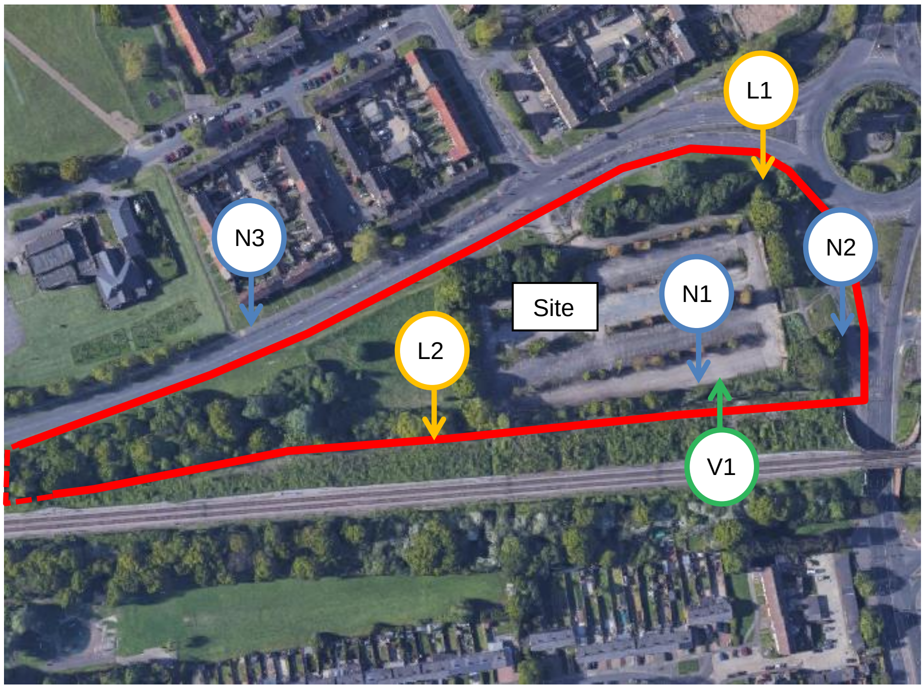
Weather Conditions:

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 (Appendix 2, Table 2):

Position (refer plan below)	Description
L1	Unattended road noise logging position. 1.5m above ground level. Free-field. Direct line of sight to nearby roads.
L2	Unattended rail noise logging position. 5m above ground level. Free-field.
N1	Attended train noise monitoring position. 1.5m above ground. Free-field.
N2	Attended road noise monitoring position. 1.5m above ground, 7m from road. Free-field. Direct line of site to nearby road.
N3	Attended road noise monitoring position. 1.5m above ground, 4m from road. Free-field. Direct line of site to nearby road.
V1	Attended ground-borne vibration monitoring position. The vibration measurements were taken on top of the existing concrete pavement.

Site Plan showing Measurement Positions (Appendix 2, Figure 1):



Attended Noise Monitoring Results (Appendix 2, Table 3):

Date	Position	Meas. Length	Time	LAeq, dB	LAmax, dB	LA90, dB	Observations
30/09/2020	N1	5 mins	10:42	53	65	48	Average levels dictated by road traffic on A176. Max levels dictated by train passes on the adjacent railway.
			10:50	55	71	49	
			11:20	57	69	47	
		15 secs	11:07	-	69	-	Max level measurement of individual train pass.
	N2	3 mins	11:27	71	76	64	Measurement dictated by road traffic on A176. Typical max levels (76 – 78 dB LAFmax) dictated by HGV passes.
		5 mins	11:30	72	93	61	
			11:36	70	76	62	
	N3	5 mins	11:47	72	82	55	Measurement dictated by road traffic on Laindon Link. Max levels dictated by fast car/van passes on Laindon Link.
			11:52	72	84	48	

Shortened CRTN Calculation Summary (Appendix 2, Table 4):

Date	Position	LA10,1hr dB			LA10,18hr dB	Daytime LAeq,16hr dB	Night-time LAeq,8hr dB
		1000 – 1100 hrs	1100 – 1200 hrs	1200 – 1300 hrs			
30/09/2020	L1	66	66	65	65	62	54

Unattended Noise Monitoring Results (Appendix 2, Table 4):

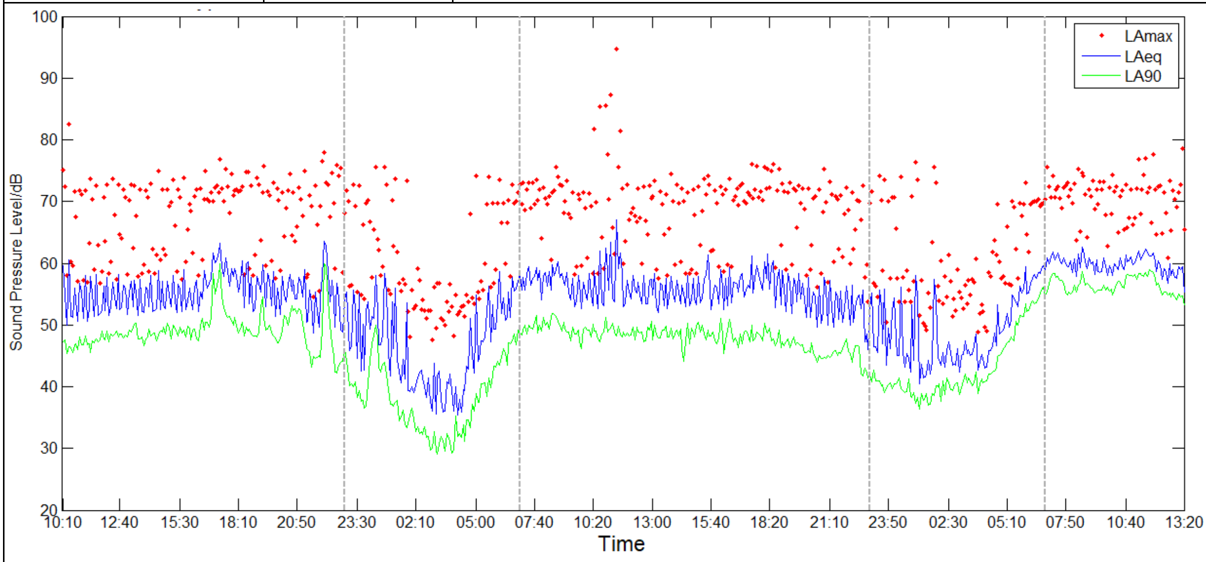
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
30/09/2020 to 02/10/2020	L2	57	43	51	31	73

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 (Appendix 2, Figure 2):

Meas. Period	Position
30/09/2020 to 02/10/2020	L2



Appendix 3 Facade Acoustic Calculations

FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

CLIENT:	Sempra Homes Ltd	Room Dimensions [m]	W 3.0	X	L 4.0	X	H 2.4	
PROJECT:	Chapel Gate, Basildon							
ROOM:	Bedroom Worst case					Room Volume =	28.8	m3
RUN REF:	Daytime					Partition Area =	7.2	m2
VARIANT:	LAeq (0700-2300)					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 ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	64.0								
		45.8	49.9	53.4	56.8	60.0	57.2	52.0	**Reference spectrum**

REVERBERATION TIME

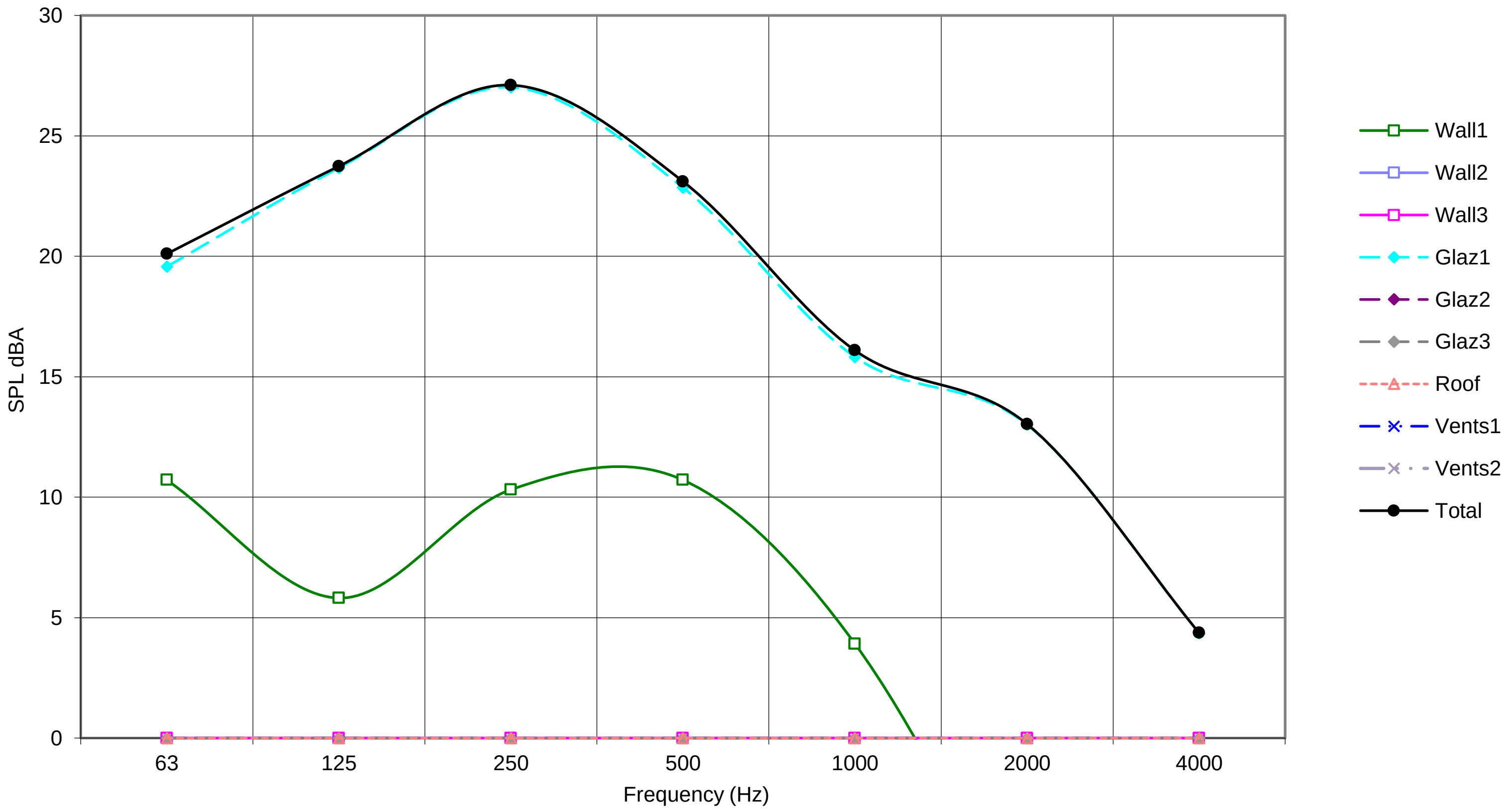
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	5.7	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	29 dB Rw + Ctr - Acoustically Upgraded Double Glazing	1.5	21	21	22	29	39	39	43	96%	29 (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	28	28	36	46	46	50				
	Resultant SPL inside room excluding ventilators dB	30.5	20	24	27	23	16	13	4	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation		0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**30.5**	20	24	27	23	16	13	4

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	Sempra Homes Ltd	Room Dimensions [m]	3.0	X	4.0	X	2.4	
PROJECT:	Chapel Gate, Basildon							
ROOM:	Bedroom Worst-case				Room Volume =		28.8	m3
RUN REF:	Night-time				Partition Area =		7.2	m2
VARIANT:	LAeq (2300-0700)				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 ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	57.0								
		38.8	42.9	46.4	49.8	53.0	50.2	45.0	**Reference spectrum**

REVERBERATION TIME

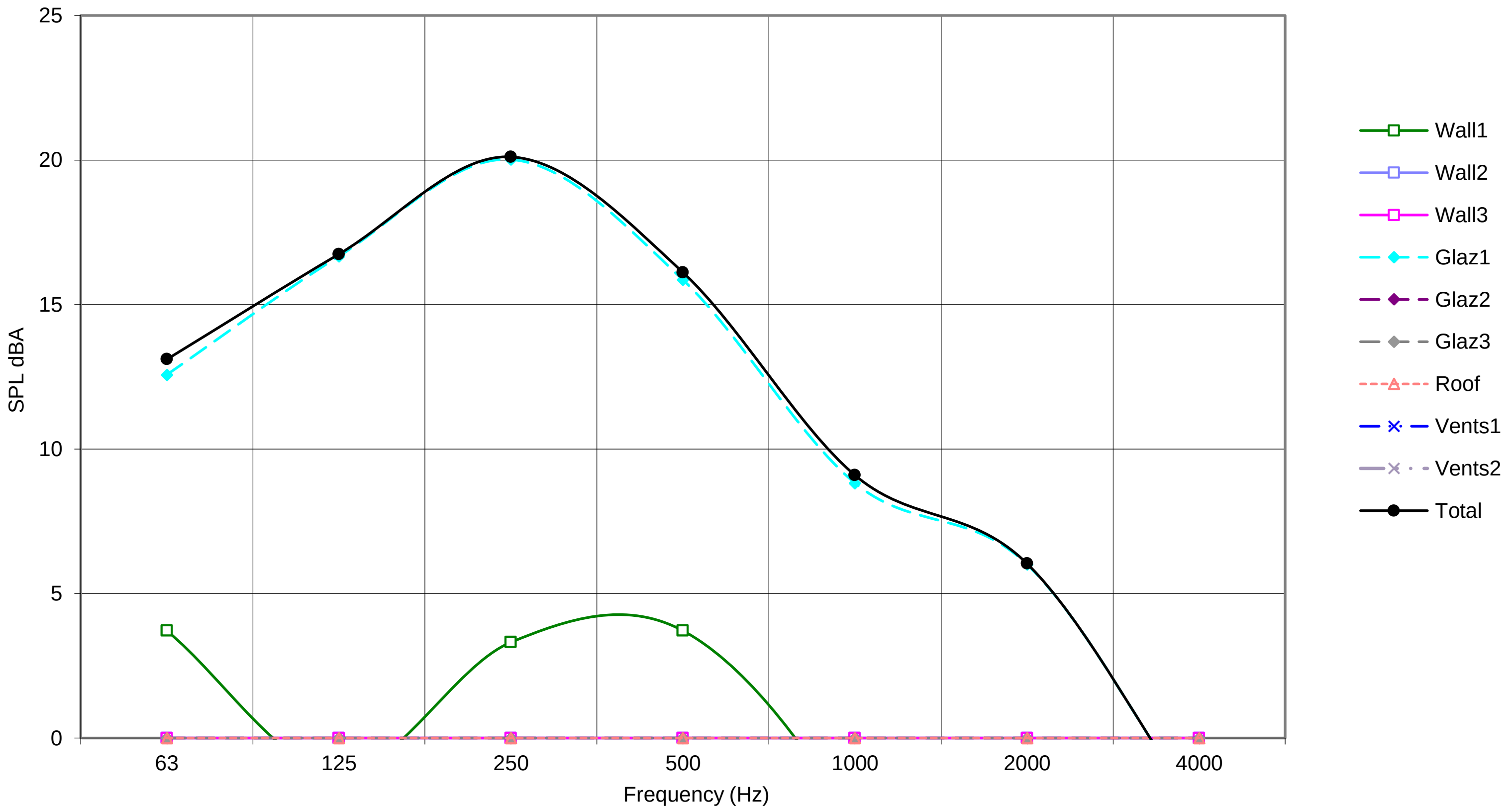
		63	125	250	500	1000	2000	4000	
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	5.7	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	29 dB Rw + Ctr - Acoustically Upgraded Double Glazing	1.5	21	21	22	29	39	39	43	94%	29 (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	28	28	36	46	46	50				
	Resultant SPL inside room excluding ventilators dB	23.5	13	17	20	16	9	6	-3	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation		0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

	dBA	63	125	250	500	1000	2000	4000
Total SPL inside room	**23.5**	13	17	20	16	9	6	-3

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	Sempra Homes Ltd	Room Dimensions [m]	3.0	X	4.0	X	2.4	
PROJECT:	Chapel Gate, Basildon							
ROOM:	Bedroom Worst case					Room Volume =	28.8	m3
RUN REF:	Night-time					Partition Area =	7.2	m2
VARIANT:	LAmax (2300-0700)					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 ----->	77.0	49.2	59.3	62.6	71.4	73.8	68.0	64.5	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		49.2	59.3	62.6	71.4	73.8	68.0	64.5	**Direct input**

REVERBERATION TIME

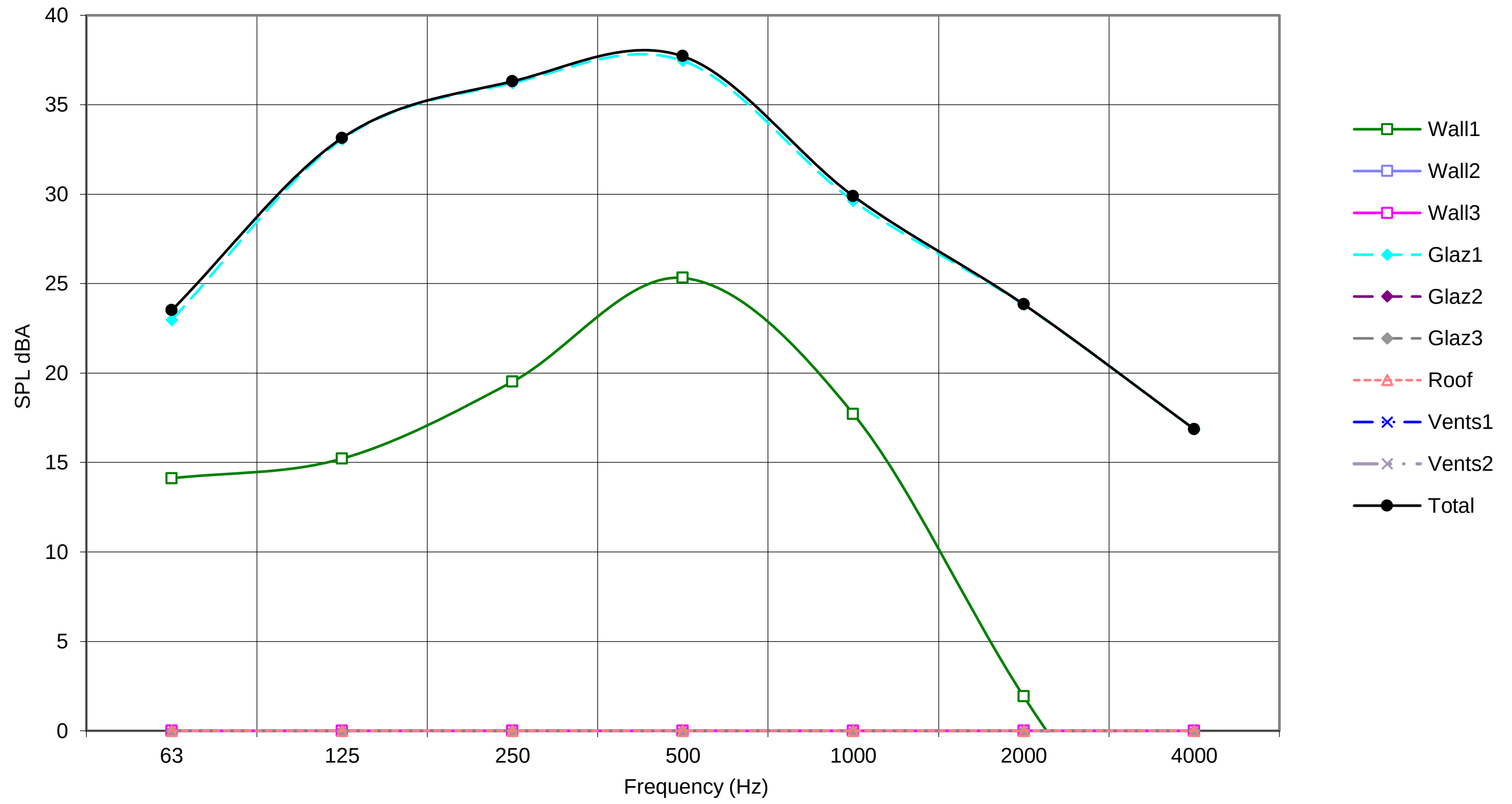
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	5.7	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	29 dB Rw + Ctr - Acoustically Upgraded Double Glazing	1.5	21	21	22	29	39	39	43	96%	29 (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	28	28	36	46	46	50				
	Resultant SPL inside room excluding ventilators dB	41.4	24	33	36	38	30	24	17	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation		0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**41.4**	24	33	36	38	30	24	17

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	Sempra Homes Ltd	Room Dimensions [m]	4.0	X	5.0	X	2.4	
PROJECT:	Chapel Gate, Basildon							
ROOM:	Living room Worst case					Room Volume =	48.0	m3
RUN REF:	Daytime					Partition Area =	9.6	m2
VARIANT:	LAeq (0700-2300)					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 ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	64.0								
		45.8	49.9	53.4	56.8	60.0	57.2	52.0	**Reference spectrum**

REVERBERATION TIME

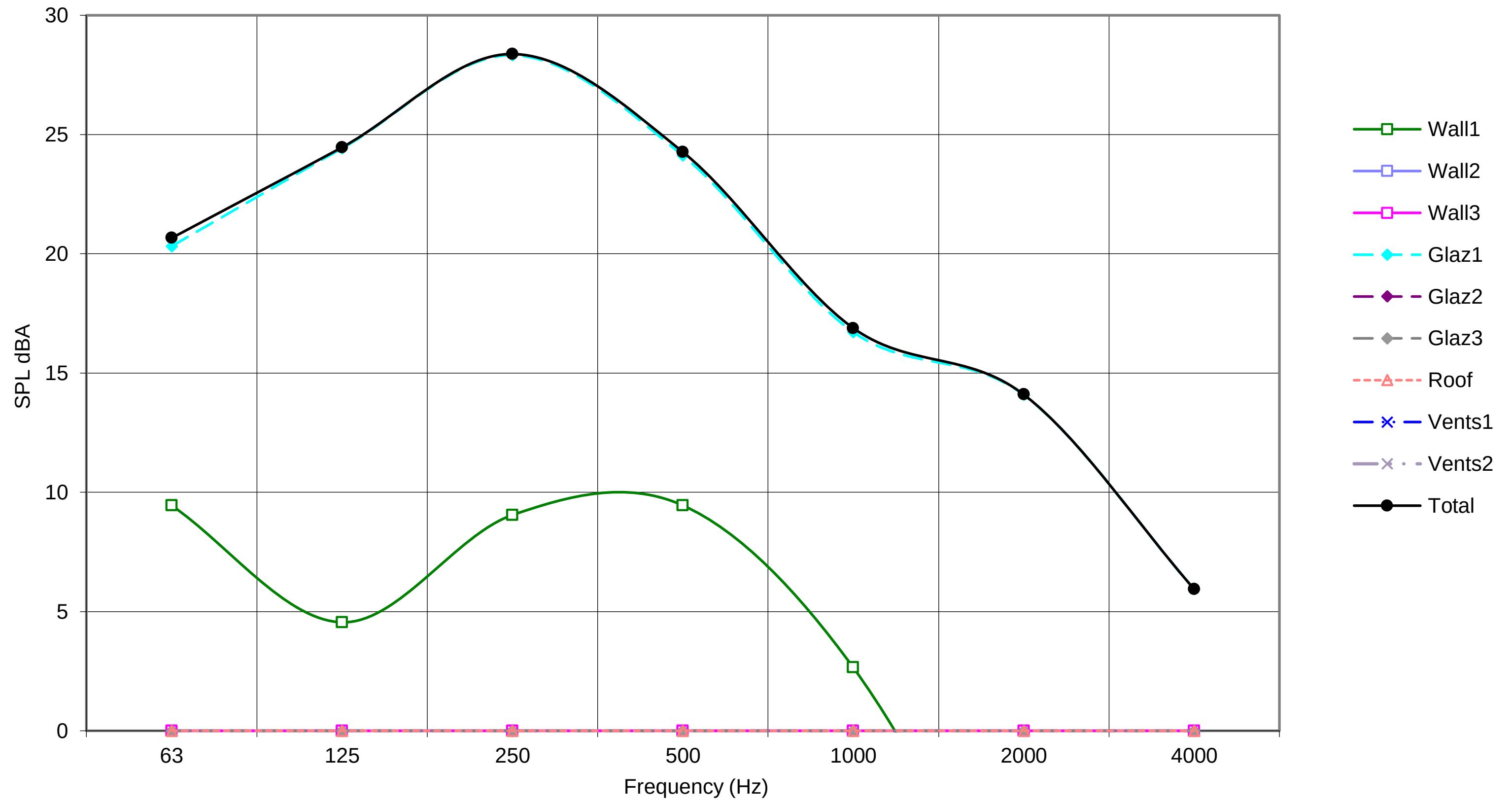
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

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	7.1	36	45	44	47	57	67	77	2%	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	28 dB Rw + Ctr - Acoustically Upgraded Double Glazing	2.5	21	21	20	28	38	38	41	97%	28 (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		26	26	26	33	44	44	47				
	Resultant SPL inside room excluding ventilators dB	31.6	21	24	28	24	17	14	6	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation		0	0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**31.6**	21	24	28	24	17	14	6

Element contribution to total internal noise level



Appendix 4 Acoustic Louvres Data Sheet

Acoustic Performance for Large Attenuated Unit

TEK LTD

Acoustic Performance for Attenuated Unit - Louvre and Attenuator in One Case *(Unit Size: 755mm Wide x 1955mm High)*				
Attenuator Lengths mm	$D_{n,e,w}$ (C;C_{tr})	R_w (C;C_{tr})	Free Area %	Free Area m²
150	17 (-1; -1) dB	9 (0; -1) dB	47	0.70
150	17 (0; -1) dB	10 (-1; -1) dB	44	0.65
150	18 (-1; -2) dB	10 (0; -1) dB	41	0.60
150	18 (0; -1) dB	11 (-1; -1) dB	37	0.55
150	19 (-1; -1) dB	11 (0; -1) dB	34	0.50
150	20 (-1; -2) dB	12 (0; -1) dB	30	0.45
150	20 (0; -1) dB	13 (0; -2) dB	27	0.40
150	21 (0; -1) dB	14 (-1; -2) dB	24	0.35
300	21 (-1; -2) dB	13 (-1; -2) dB	47	0.70
300	22 (-1; -2) dB	15 (-1; -3) dB	41	0.60
300	24 (-1; -3) dB	16 (0; -2) dB	34	0.50
300	28 (-1; -4) dB	20 (-1; -4) dB	24	0.35
450	24 (-1; -3) dB	17 (-1; -4) dB	47	0.70
450	26 (-1; -4) dB	18 (-1; -3) dB	41	0.60
450	28 (-1; -4) dB	21 (-1; -5) dB	31	0.50
450	32 (-2; -6) dB	25 (-2; -6) dB	24	0.35
600	27 (-2; -4) dB	20 (-2; -5) dB	47	0.70
600	29 (-1; -5) dB	22 (-2; -5) dB	41	0.60
600	32 (-2; -6) dB	24 (-2; -5) dB	31	0.50
600	36 (-2; -6) dB	29 (-2; -7) dB	24	0.35

As tested by Sound Research Laboratory in accordance with BS EN ISO 10140-2:2010
NB: Increasing the height will have a minimal effect on the attenuation.

Acoustic Performance for Small Attenuated Unit

TEK LTD

Acoustic Performance for Attenuated Unit - Louvre and Attenuator in One Case *(Unit Size: 400mm Wide x 1800mm High)*					
Test	Attenuator Lengths mm	$D_{n,e,w}$ ($C;C_{tr}$)	R_w ($C;C_{tr}$)	Free Area %	Free Area m²
1	150	20 (-1; -1) dB	10 (-1; -1) dB	50	0.36
2	150	22 (-1; -1) dB	11 (0; 0) dB	38	0.27
3	150	25 (-1; -1) dB	15 (-1; -1) dB	25	0.18
4	150	31 (-1; -2) dB	21 (-1; -2) dB	13	0.09
5	300	23 (0; -1) dB	13 (0; -1) dB	50	0.36
6	300	26 (0; -1) dB	16 (-1; -1) dB	38	0.27
7	300	31 (-1; -3) dB	21 (-1; -3) dB	25	0.18
8	300	38 (-1; -4) dB	28 (-1; -4) dB	13	0.09
9	450	27 (-1; -2) dB	17 (-1; -2) dB	50	0.36
10	450	31 (-1; -3) dB	20 (-1; -2) dB	38	0.27
11	450	37 (-2; -4) dB	27 (-2; -4) dB	25	0.18
12	450	43 (-1; -4) dB	33 (-1; -4) dB	13	0.09
13	600	29 (-1; -2) dB	19 (-1; -2) dB	50	0.36
14	600	34 (-1; -3) dB	24 (-1; -2) dB	38	0.27
15	600	41 (-1; -5) dB	31 (-1; -5) dB	25	0.18
16	600	50 (-3; -8) dB	40 (-3; -8) dB	13	0.09

As tested by Sound Research Laboratory in accordance with BS EN ISO 10140-2:2010
NB: Increasing the height will have a minimal effect on the attenuation.

Architectural & Environmental Acousticians

Noise & Vibration Engineers

If you have any queries with this report, please click here to send us an email and we will call you back to discuss

Cass Allen Associates Ltd
01234 834 862
www.cassallen.co.uk