

Project: 22-24 Cross Street, Reading, RG1 1SN
Client: Bluebird Engineering

Date: 08/10/2019
Reference: 20191008_4523_C6_001.docx



Project:	22-24 Cross Street, Reading, RG1 1SN			
Client:	Bluebird Engineering			
Report Title:	Approval 171742, Condition 6 Assessment			
Author:	P J Shortt MSc MIOA		Date:	08/10/2019
Checked:	J A Gillott MIOA		Date:	08/10/2019
Revision:	A			
Report Status:	First Draft			
Reference:	20191008_4523_C6_001.docx			

Unit 12b, Southview Business Park
Marsack Street, Caversham RG4 5AF
Tel: 0118 9448444
E-mail: enquiries@paragonacoustics.com
Web: www.paragonacoustics.com
Registered No.: 5032116: VAT No.: 844917204



Limitations

This report has been prepared by Paragon Acoustic Consultants Ltd in line with legislation and guidelines in force at the time of writing. All reasonable care and diligence has been exercised within the terms of the contract with the client.

Except as otherwise requested by the Client, Paragon Acoustic Consultants Ltd is not obliged and disclaims any obligation to update the report for events taking place after:

- a) The date on which this assessment was undertaken; and
- b) The date on which the final report is delivered.

Paragon Acoustic Consultants Ltd makes no representation whatsoever concerning the legal significance of its findings or to other legal matters referred to in the following report.

This report has been prepared for the sole use of Bluebird Engineering. No other third parties may rely upon or reproduce the contents of this report without the written permission of Paragon Acoustic Consultants Ltd. If any unauthorised third party comes into possession of this report they rely on it at their own risk and the authors do not owe them any Duty of Care or Skill.

Opinions, if included herein, are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations, Paragon Acoustic Consultants Ltd reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

Contents

1	Introduction	1
2	Site Description	2
3	Guidance on the Assessment of Noise	4
3.1	BS 8233:2014: Guidance on sound insulation and noise reduction for buildings	4
3.1.1	Dwellings	4
3.2	World Health Organisation	5
3.3	Design Criteria	5
4	Environmental Noise Surveys	6
4.1	Method	6
4.2	Results	6
5	External Building Fabric Assessment	9
5.1	Room Surface Finishes	9
5.2	Mansard	9
5.2	Flat Roof	10
5.4	Glazing Specification	10
6	Ventilation	12
6.1	Kitchen/Living/Dining	12
6.2	Bedrooms	12
7	Conclusions	13
Appendix A: Façade Calculation Sheets		
Appendix B: Product Brochure		

List of Tables

Table 1: Indoor ambient noise levels for dwellings (source: BS 8233:2014, Table 4)	4
Table 2: Guideline values for community noise (source: WHO Guidelines for Community Noise Table 1)	5
Table 3: Proposed target indoor ambient noise levels for dwellings	5
Table 4: Summary of measurement results	6
Table 6: Sound insulation performance of mansard	9
Table 6: Sound insulation performance of flat roof	10
Table 7: Glazing sound insulation requirements	10
Table 8: Indicative Glazing Selections	10
Table 9: Predicted indoor ambient noise levels with windows open vs RBC pre-application ventilation guidance	12

List of Figures

Figure 1: Site location2

Figure 2: Existing and proposed fourth floor levels3

Figure 3: MP1 - Daytime environmental noise time series7

Figure 4: MP1 - Night environmental noise time series7

Figure 5: MP2 - Daytime environmental noise time series8

Figure 6: MP2 - Night environmental noise time series8

1 Introduction

The existing premises located at 22-24 Cross Street, Reading, RG1 1SN, is to be extended to provide new residential accommodation at fourth floor level. Paragon Acoustic Consultants LTD (PACL) has been commissioned to provide consultancy advice in respect of discharging Condition 6 of Approval 171742/FUL stipulated by Reading Borough Council (RBC), which requires that:

“No development shall take place until a detailed scheme, informed by an assessment of the current noise environment, for protecting the dwellings from the external noise environment of the area has been submitted to and approved, in writing, by the Local Planning Authority. The scheme itself shall be designed, specified and constructed so that the sound insulation performance of the structure and the layout of the dwellings are such that the indoor ambient noise levels do not exceed the values detailed in Table 4 of BS 8233:2014. Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system with cool air bypass as an alternative means of cooling and ventilation. Noise from the system should not result in BS8233 internal levels being exceeded.”

Under the section entitled “Amenity of future occupiers “, the RBC delegated application report noted that:

“Policy DM4 seeks that new development creates a quality living environment for existing and future residents. Policy CS34 seeks to protect surrounding occupiers from the impacts of pollution associated with proposed development.”

“The unit and room sizes proposed are considered to provide a good standard of accommodation whilst outlook and daylighting are also considered to be good with all units being dual aspect.”

“As an application for new residential in the town centre a noise assessment and noise mitigation scheme shall be sought by way suitably worded condition to be submitted to and agreed by the Local Planning Authority prior to the commencement of works in order to ensure the flats are protected from external noise to a suitable level in accordance with the British Standard in accordance with Policy CS34 of the Core Strategy 2008, 2015.

With this condition secured the proposal is considered to accord with Policies DM4 and CS34.”

2 Site Description

The site is located at 22-24 Cross Street, Reading, RG1 1SN, lying in an area that contains a mix of residential, commercial and retail premises, Figure 1 below illustrates.

The building currently comprises a ground floor commercial tenancy with residential accommodation at first to third floor levels above. Under the proposal, the existing roof space is to be converted to provide a new fourth floor level comprising a two bedroom apartment. The proposed fourth floor layout is shown in Figure 2.

Directly opposite is the Marks and Spencer Department store, with other retail and commercial interests being apparent along Cross Street.

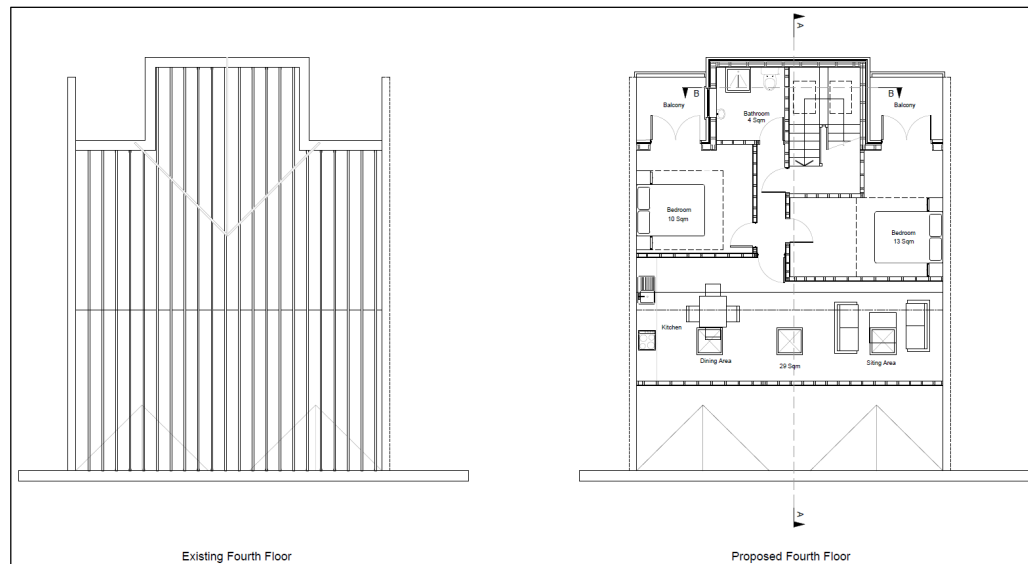
Broad Street lies approximately 35m to the south, with Friar Street being of the order 80m to the west.

The site location is illustrated below.

Figure 1: Site location



Figure 2: Existing and proposed fourth floor levels



3 Guidance on the Assessment of Noise

As noted at Section 1, RBC has provided pre-application guidance stating that indoor ambient noise levels within dwellings formed by the conversion works should comply with BS 8233:2014. The relevant sections of this document are reviewed below.

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

This British Standard came into effect on 28 February 2014 and supersedes BS 8233:1999, which is withdrawn.

The standard draws on the results of research and experience to provide information on the design of buildings that have internal acoustic environments appropriate to their functions. It deals with control of noise from outside the building, noise from plant and services within it, and room acoustics for non-critical situations. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

3.1.1 Dwellings

Indoor ambient noise levels for dwellings are set out at Section 7.7.2, Table 4, reproduced below.

Table 1: Indoor ambient noise levels for dwellings (source: BS 8233:2014, Table 4)

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

A series of notes provide context to the guideline values of Table 4. Note 1 advises that the indoor ambient noise levels are *“the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.”*

Note 3 states *“These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.”*

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

Note 5 states that if relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation arrangement that does not compromise the façade insulation or the resulting noise level.

Note 7 provides a rider to the guideline values of Table 4, *“Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved”*.

3.2 World Health Organisation

The recommended indoor ambient noise levels given at Table 4 of BS 8233:2014 do not included a specified value for noise events. Although not explicitly covered in the pre-application advice, it is considered prudent to make an allowance for night noise events as it is often that case this will dictate facade sound insulation requirements for bedrooms.

Guidance on event noise is given in the World Health Organisation (WHO) Guidelines for Community Noise, as below.

The WHO document provided a review of the effects of noise and a description of the principles of health criteria.

Table 1 of the document presents guideline values arranged according to specific environments and critical health effects. Noise indices to be adopted and the accompanying time base to be used for the assessment are also presented.

The guideline values consider all health effects for a specific environment. An adverse health effect refers to any temporary or long-term impairment of physical, psychological or social functioning associated with noise exposure. The specific noise limits were set for each health “using the lowest noise level that produces an adverse health effect”

Table 2: Guideline values for community noise (source: WHO Guidelines for Community Noise Table 1)

Specific environment	Critical health effect(s)	L_{Aeq} [dB]	Time base [hours]	L_{Amax} fast [dB]
Dwelling, indoors	Speech intelligibility & moderate annoyance daytime & evening	35	16	45
	Sleep disturbance, night time	30	8	

For noise events, the guideline value was set at 45 dB L_{Amax} , with research cited in the text advising that this value should not be exceeded by more than 10 to 15 times per night to ensure “good sleep”.

3.3 Design Criteria

Based on RBC requirements and having regard to WHO guidance, the following indoor ambient noise levels for dwellings are proposed

Table 3: Proposed target indoor ambient noise levels for dwellings

Location	Period	Target Indoor ambient noise level	
Living rooms/dining rooms/kitchens	07:00-23:00 hours	35 dB $L_{Aeq,16h}$	
Bedrooms	23:00-07:00	30 dB $L_{Aeq,8h}$	45 dB L_{AFmax} (10 th highest)

4 Environmental Noise Surveys

4.1 Method

Detailed surveys have previously been carried out at site to determine the extant noise climate at the site, to which PAC report 20180416_4187_FSIR_001 dated 13/06/2018 refers.

Measurements were carried out at the front and rear facades of the building, at first floor level. The noise data obtained were facade values due to the contribution from reflected sound from surfaces other than the ground plane.

The measurements were obtained using instrumentation complying with the Type 1 specification of IEC 60651 and IEC 60804 and the Class 1 specification of IEC 61260 and IEC 61672. Field calibration checks were made using a calibrator meeting Class 1 of IEC 60942 at the beginning and end of each the measurement session. No significant drift was encountered, calibration level $114.0 \text{ dB} \pm 0.2 \text{ dB} @ 1000 \text{ Hz} \pm 0.2\%$.

4.2 Results

Noise survey results are summarised in Table 4 and shown as a time series in Figures 3 to 6 below. Broadband results are given over to Appendix A. For brevity, spectral data is available upon request

Table 4: Summary of measurement results

Elevation	Start Date	Façade Noise Level dB re: 20µPa		
		$L_{Aeq,16h}$	$L_{Aeq,8h}$	L_{AFmax} (10th highest)
Cross Street	04/04/18	58.0	53.4	73.1
	05/04/18	59.9	56.0	76.5
	06/04/18	58.5	59.4	78.6
	07/04/18	57.6	62.0	80.8
	08/04/18	58.0	54.1	76.9
	09/04/18	63.1		
Rear	09/04/18	53.9	45.0	60.9
	10/04/18	51.4	44.8	60.4
	11/04/18	49.5	42.6	59.8
	12/04/18	50.2		

Figure 3: MP1 - Daytime environmental noise time series

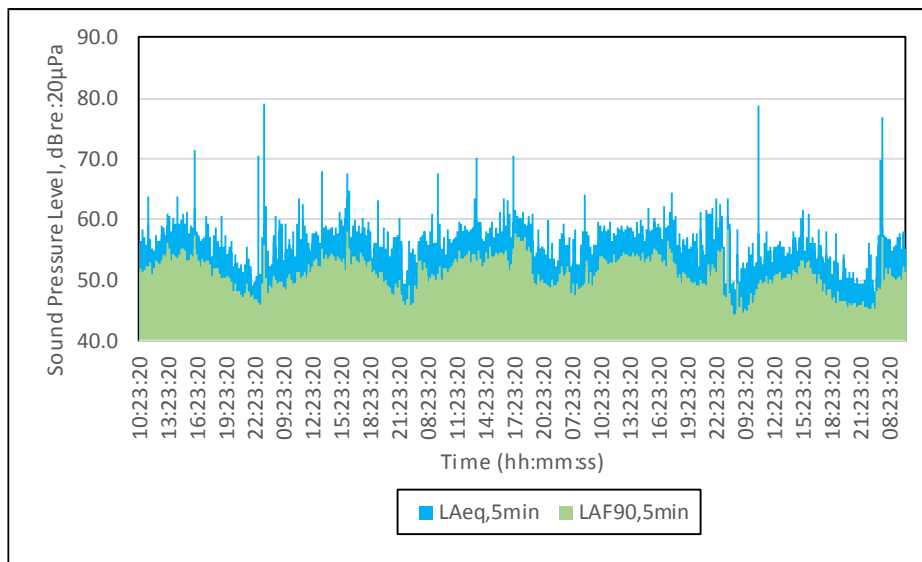


Figure 4: MP1 - Night environmental noise time series

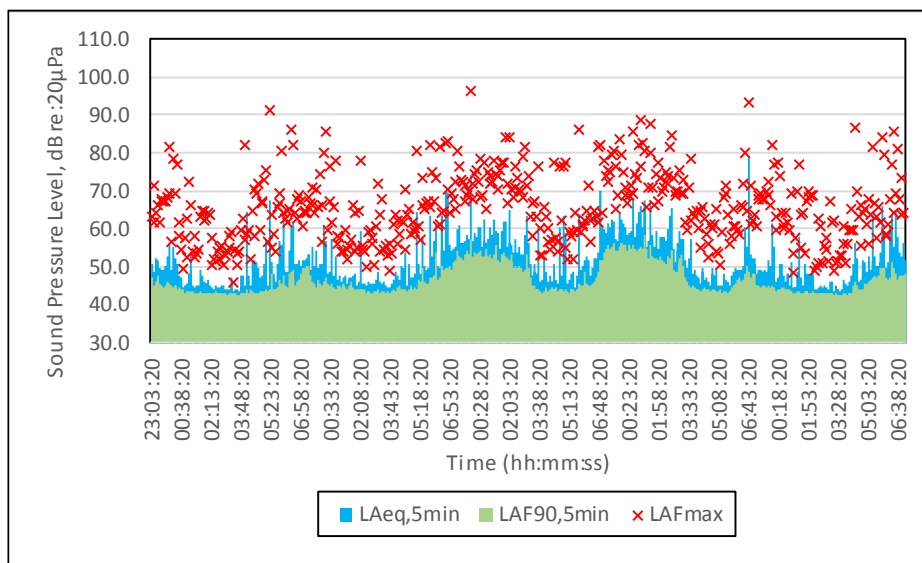


Figure 5: MP2 - Daytime environmental noise time series

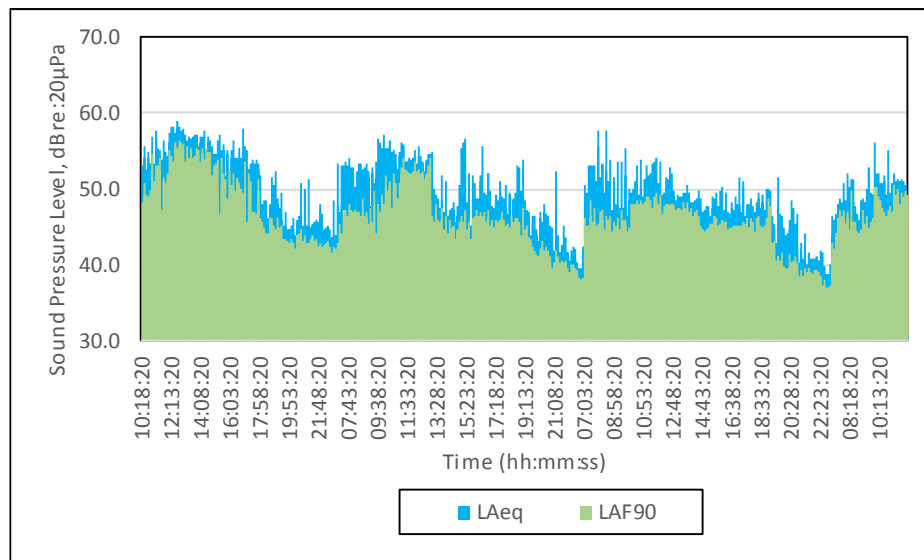
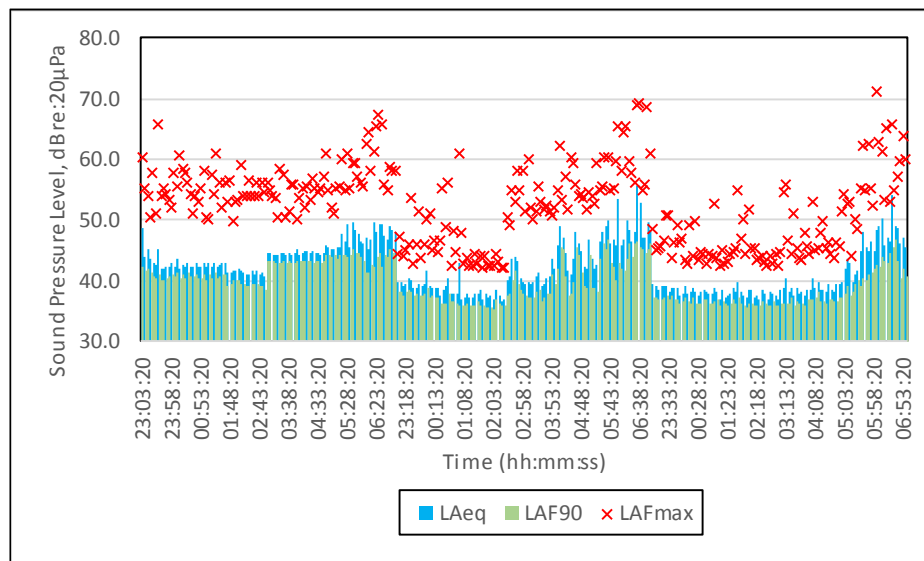


Figure 6: MP2 - Night environmental noise time series



5 External Building Fabric Assessment

The assessment detailed herein has been based on the information and assumptions detailed in the following sections, in conjunction with the noise data illustrated above. The determination of facade sound insulation requirements has been undertaken in accordance with equation G.1 of Section G.2.1 of BS 8233:2014, where:

$$L_{eq,2} = L_{eq,ff} + 10 \lg \left(\frac{A_0}{S} 10^{\frac{-D_{n,e}}{10}} + \frac{S_{wi}}{S} 10^{\frac{-R_{wi}}{10}} + \frac{S_{ew}}{S} 10^{\frac{-R_{ew}}{10}} + \frac{S_{rr}}{S} 10^{\frac{-R_{rr}}{10}} \right) + 10 \lg \left(\frac{S}{A} \right) + 3$$

- $L_{eq,ff}$ is the equivalent continuous sound pressure level outside the room element under consideration. It is the free-field sound level, measured or calculated, at the **intended** position of the element under consideration;
- A_0 is a reference absorption area of 10m² and is independent of frequency;
- S_f is the total facade area of the room in question in square metres (m²);
- S_{wi} is the area in square metres (m²) of the windows of the room;
- S_{ew} is the area in square metres (m²) of the external wall of the room;
- S_{rr} is the area in square metres (m²) of the ceiling of the room;
- S is the total area of elements through which sound enters the room in square metres (m²), i.e. $S_f + S_{rr}$;
- $D_{n,e}$ is the insulation of the ventilator measured according to BS EN 20140-10;
- R_{wi} is the sound reduction index of the window;
- R_{ew} is the sound reduction index of the external wall;
- R_{rr} is the sound reduction index of the roof;
- A is the equivalent absorption area of the receiving room.

The foregoing expression is also considered to be appropriate to the assessment of transient noise in the context of the metric L_{Fmax} .

5.1 Room Surface Finishes

It has been assumed that living rooms will be fitted out with hard floor coverings and other soft furnishings and bedrooms will be fitted out with soft floor coverings and other soft furnishings.

5.2 Mansard

The build-up of the mansard is taken comprise hung clay tiles (nominal laid weight 34 kg/m²) on battens on timber framing (nominal depth 195mm) lined internally with two sheets of Gypsum based board of minimum mass 8 kg/m per sheet, with an absorbent Rockwool quilt in the timber frame zone.

The sound insulation performance has been calculated using Insul v7.0.13 software, thus:

Table 5: Sound insulation performance of mansard

Element	Sound reduction index (R) dB at 1/1 octave band centre frequency (Hz)							ISO 717-1 Rating $R_w (C; C_{tr})$ dB
	63	125	250	500	1k0	2k0	4k0	
Tiled mansard	29	37	43	48	51	48	51	49 (-1;-2)

5.2 Flat Roof

The build-up of the flat roof is taken comprise waterproof membrane of 18mm plywood on timber framing (nominal depth 195mm) lined internally with two sheets of Gypsum based board of minimum mass 8 kg/m² per sheet, with an absorbent Rockwool quilt in the timber frame zone.

The sound insulation performance has been calculated using Insul v7.0.13 software, thus:

Table 6: Sound insulation performance of flat roof

Element	Sound reduction index (<i>R</i>) dB at 1/1 octave band centre frequency (Hz)							ISO 717-1 Rating <i>R_w</i> (<i>C</i> ; <i>C_{tr}</i>) dB
	63	125	250	500	1k0	2k0	4k0	
Tiled mansard	18	29	36	40	42	38	45	40 (-1;-2)

5.4 Glazing Specification

Assuming achievement of the sound insulation values identified above, fenestration shall be required to achieve the random incidence sound reduction indices given in Table 7. The performance specifications apply to the glazing units as a whole inclusive of glazing, sealing, framing, doors, spandrel panels, etc.

Calculation sheets are given over to Appendix A for reference.

Table 7: Glazing sound insulation requirements

Space	Sound reduction index (<i>R</i>) dB at 1/1 octave band centre frequency (Hz)							ISO 717-1 Rating <i>R_w</i> (<i>C</i> ; <i>C_{tr}</i>) dB
	63	125	250	500	1k0	2k0	4k0	
Kit/Liv/Din	13	23	18	26	38	44	38	31 (-1;-4)
Bed 1	13	23	18	26	38	44	38	31 (-1;-4)
Bed 2	13	23	18	26	38	44	38	31 (-1;-4)

Based on published data obtained from proprietary manufacturers such as Pilkington and Saint-Gobain Solaglass, the forms of glazing set out below should be capable in principle of achieving the sound insulation performance values detailed in Table 7, subject to appropriate specification and detailing of frames, supports etc. It should however be noted that Table 7 forms the specification to be achieved and the glazing configurations detailed below are for **guidance** purposes.

Table 8: Indicative Glazing Selections

Space	Potential glazing configuration
Kit/Liv/Din	SGG 4(16)4 double glazed unit
Bed 1	SGG 4(16)4 double glazed unit
Bed 1	SGG 4(16)4 double glazed unit

As the design criteria set out previously are broadband single figure quantities, variation in the spectral sound reduction indices of Table 7 is technically possible, subject to prior approval from the acoustic consultant.

The relevant specialist trade contractors shall provide test data to demonstrate that the performance values of the glazed systems (including opening window lights, framing elements and infill panels as applicable) identified in Table 3 will be achieved.

Tests shall be carried out in accordance with BS EN ISO 10140 Parts 1, 2, 4 and 5:2010 (Acoustics-Laboratory measurement of sound insulation of building elements – Part 1: Application rules for specific products. Part 2: Measurement of airborne sound insulation. Part 4: Measurement procedures and requirements. Part 5: Requirements for test facilities and equipment) or an equivalent series of standards.

Single number quantities for sound insulation shall be derived in accordance with BS EN ISO 717-1: 1997 Acoustics – Rating of sound insulation in buildings and of building elements Part 1: Airborne sound insulation and should include relevant spectrum adaptation terms.

It should be noted that that identical sound insulation is obtained irrespective of which way round insulating units are installed. Thus, for example a 6/12/6.4pVB unit gives the same performance as a 6.4pVB/12/6 unit.

Over the usual cavity width range of 6 to 20mm for insulating units, there is little variation in acoustic performance although there is a more significant change in thermal insulation. This acoustic performance plateau is due to the relatively strong coupling of the component glasses.

It is understood that the glazing units to be installed throughout the residential areas are to be openable, and therefore the window lights must be suitably designed to ensure that the sound insulation potential of the glazing is not undermined.

6 Ventilation

6.1 Kitchen/Living/Dining

Ventilation to the kitchen/living/dining space will need to comprise Approved Document F System 4 – Mechanical Ventilation with Heat Recovery (MVHR) with a cool air bypass or equivalent, based on RBC pre-application guidance.

For illustrative purposes, a typical system could comprise the Ander ComfoCool Q600 with ComfoAir Q600, and a product data sheet is given over to Appendix B. Alternative equivalent systems would also be permissible.

The specialist contractor shall ensure that the self-generated noise from the MVHR system meets the guidance given at paragraph 4.3.6 of Approved Document F 2010.

6.2 Bedrooms

As noted at Section 1, the pre-application guidance requires that:

“...Where opening windows will lead to an internal noise level increase of 5 dBA or greater above BS 8233:2014 recommended internal levels, the scheme shall include provision of alternative mechanical ventilation with minimum performance equivalent to a mechanical heat recovery (MVHR) system...”

WHO guidance notes that a partially open window will provide an outdoor to indoor reduction of 15 dB(A). Based on the worst-case rear elevation measurement results set out in Section 4.2, the following internal noise levels are calculated and compared with the RBC pre-application requirement.

Table 9: Predicted indoor ambient noise levels with windows open
vs RBC pre-application ventilation guidance

Day ($L_{Aeq,16h}$)			Night ($L_{Aeq,8h}$)			Night (L_{AFmax} 10 th highest)		
Target	Predicted	Compliant	Target	Predicted	Compliant	Target	Predicted	Compliant
40 dB	39 dB	Yes	35 dB	30 dB	Yes	50 dB	46 dB	Yes

It can be seen from Table 9 that indoor ambient noise levels with windows partially open for ventilation should meet the applicable pre-application guidance and hence a passive ventilation strategy may be adopted for the rear façade of the scheme.

7 Conclusions

A detailed review of facade sound insulation requirements has been carried in respect of 22-24 Cross Street, Reading, RG1 1SN. It is concluded that subject to adoption of the recommendations set out herein, external noise ingress should be controlled to values as per the guidance set out in BS 8233:2014 and hence adequate residential amenity should in principle prevail. Sufficient information is also considered to be presented herein to satisfy the requirements of Reading Borough Council.

Project: 22-24 Cross Street, Reading, RG1 1SN
Client: Bluebird Engineering

Date: 08/10/2019
Reference: 20191008_4523_C6_001.docx

Appendix A: Façade Calculation Sheets

Project: 22-24 Cross Street, Reading, RG1 1SN
Client: Bluebird Engineering

Date: 08/10/2019
Reference: 20191008_4523_C6_001.docx

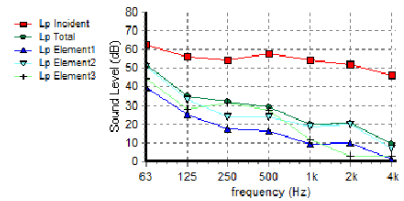
Outdoor To Indoor Sound Transmission Calculation (v7.0.13)

According to EN12354/3

Title :Front Elevation K/L/D

Comments :

Saint Gobain 4 (12) 4 Glazing as per CDI Test 626130
 Rw (C;Ctr) 31 (-1;-4)



Date: 8 Oct 19

Initials:patrick

File Name: 20191008_4523_KLDLeq.inz

Octave Band Centre Frequency (Hz)								Overall dBA
Source	63	125	250	500	1k	2k	4k	
Incident sound level (freefield)	63	56	54	58	54	52	46	59
Path								
Element 1 ,External Wall STL	-29	-37	-43	-48	-51	-48	-51	19
Facade Shape Level diff.	1	1	1	1	1	1	1	
Area (+10Log A) [17 m2]	12	12	12	12	12	12	12	
Element sound level contribution	40	25	17	16	9	10	1	
Element 2 ,Roof STL	-18	-29	-36	-40	-42	-38	-45	28
Facade Shape Level diff.	1	1	1	1	1	1	1	
Area (+10Log A) [17 m2]	12	12	12	12	12	12	12	
Element sound level contribution	51	33	24	24	18	20	7	
Element 3 ,Roof Lights (x3) STL	-13	-23	-18	-26	-38	-44	-38	27
Facade Shape Level diff.	0	0	0	0	0	0	0	
Area (+10Log A) [1.1 m2]	0	0	0	0	0	0	0	
Element sound level contribution	45	28	31	27	11	3	3	
Receiver								
Room volume (-10Log V) [17 m3]	-12	-12	-12	-12	-12	-12	-12	31
Reverberation time (s)	0	0	0	0	0	0	0	
RT (+10Log T)	-4	-4	-4	-4	-4	-4	-4	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	52	35	32	29	20	20	9	

Project: 22-24 Cross Street, Reading, RG1 1SN
Client: Bluebird Engineering

Date: 08/10/2019
Reference: 20191008_4523_C6_001.docx

Outdoor To Indoor Sound Transmission Calculation (v7.0.13)

According to EN12354/3

Title : Rear Elevation Bedroom

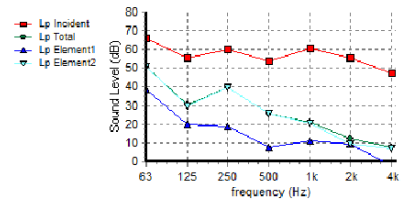
Comments :

Saint Gobain 4 (12) 4 Glazing as per CDI Test 626130
 Rw (C;Ctr) 31 (-1;-4)

Date: 8 Oct 19

Initials: patricks

File Name: 20191008_4523_Rear Elev Bed Lmax.inz



	Octave Band Centre Frequency (Hz)							Overall dBA
Source	63	125	250	500	1k	2k	4k	
Incident sound level (freefield)	66	55	60	54	61	56	47	63
Path								
Element 1 ,External Wall STL	-29	-37	-43	-48	-51	-48	-51	18
Facade Shape Level diff.	1	1	1	1	1	1	1	
Area (+10Log A) [6.1 m2]	8	8	8	8	8	8	8	
Element sound level contribution	39	20	19	7	11	9	-2	
Element 2 ,Glazing STL	-13	-23	-18	-26	-38	-44	-38	33
Facade Shape Level diff.	1	1	1	1	1	1	1	
Area (+10Log A) [2.5 m2]	4	4	4	4	4	4	4	
Element sound level contribution	51	30	40	25	20	9	7	
Receiver								
Room volume (-10Log V) [17 m3]	-12	-12	-12	-12	-12	-12	-12	33
Reveberation time (s)	0	0	0	0	0	0	0	
RT (+10Log T)	-4	-4	-4	-4	-4	-4	-4	
Equation Constant	11	11	11	11	11	11	11	
Room sound level	51	30	40	25	21	12	7	

Project: 22-24 Cross Street, Reading, RG1 1SN
Client: Bluebird Engineering

Date: 08/10/2019
Reference: 20191008_4523_C6_001.docx

Appendix B: Product Brochure



Zehnder ComfoAir Q 600

The Zehnder ComfoAir Q is the next generation of heat recovery ventilation units, with state of the art design and intelligent technology, regardless of whether you are working on a new build or an old building, with Zehnder comfortable ventilation you have an innovative, tried and tested complete system. It contains features such as its automatic modulating true summer by-pass, world class heat recovery efficiency and integrated humidity sensor to provide a comfortable, healthy and energy-efficient indoor climate.



OCRFZ Radio Frequency



ComfoSense C67



ComfoSwitch C67



Zehnder ComfoControl App

Key Features

- World class 96% efficiency.
- 100% full and filtered modulating summer bypass.
- Left or right hand configuration through software alone, no mechanical alteration required.
- Commissioning wizard for a quick and simple set-up process.
- Flow control to maintain commissioned flow rates.
- Adaptive comfort technology.
- Automatic passive temperature boost in summer.
- Humidity boost continuously monitors the humidity level within the home and looks for a man-made spike before boosting the unit, irrespective of distance or dilution.
- Tool free filter access.
- ISO ePM1 >55% (F7) filter option.
- App for installer and end user option.
- Wireless commissioning option.
- Remote access option.
- KNX compatibility option.
- 0-10V input option.
- Internal pre-heater option.
- Post heater control option.
- Enthalpy cube option.
- Passive House certified.

SAP PCDB Test Results

	SFP (W/l/s)		Efficiency (%)	
	2009	2012	2009	2012
K+1		0.63		96%
K+2	0.63	0.60	96%	95%
K+3	0.57	0.63	95%	94%
K+4	0.57	0.71	95%	94%
K+5	0.61	0.79	94%	93%
K+6	0.67	0.91	94%	93%
K+7	0.75	1.06	94%	93%

SEC Class



Based on average climate with local demand control

Passive House Certification

	Standard heat exchanger	Enthalpy heat exchanger
Air flow range	70-460m³/hr	70-460m³/hr
Heat recovery rate	nHR=87%	nHR=80%
Specific electric power	PeI,spec=0.24 Wh/m³	PeI,spec=0.22 Wh/m³
Humidity recovery		nx = 68%





Zehnder ComfoCool Q600 with ComfoAir Q600

The Zehnder ComfoCool Q600 is an air temperation device designed to help reduce the risk of overheating in homes. It combines with the ComfoAir Q600 and compliments its features to ensure it automatically activates and deactivates to provide a comfortable, healthy and energy-efficient indoor climate.



CCRFZ Radio Frequency



ComfoSense C67



ComfoSwitch C67



Zehnder ComfoControl App

Key Features

ComfoCool Q

- 1.5kW cooling capacity.
- Easy and space-saving installation in combination with the Zehnder ComfoAir Q600.
- No external device required, just utilise the ventilation units ductwork.
- Filtered fresh supply air, not recycled stale air.
- Controlled via the CAQ600's variety of controller options including ComfoSense C, KNX or ComfoControl app for IOS or Android

ComfoAir Q

- World class 96% efficiency.
- 100% full and filtered modulating summer bypass.
- Left or right hand configuration through software alone, no mechanical alteration required.
- Commissioning wizard for a quick and simple set-up process.
- Flow control to maintain commissioned flow rates.
- Adaptive comfort technology.
- Automatic passive temperature boost in summer.
- Humidity boost continuously monitors the humidity level within the home and looks for a man-made spike before boosting the unit, irrespective of distance or dilution.
- Tool free filter access.
- ISO ePM1 >55% (F7) filter option.
- App for installer and end user option.
- Wireless commissioning option.
- Remote access option.
- KNX compatibility option.
- 0-10V input option.
- Internal pre-heater option.
- Post heater control option.
- Enthalpy cube option.
- Passive House certified.