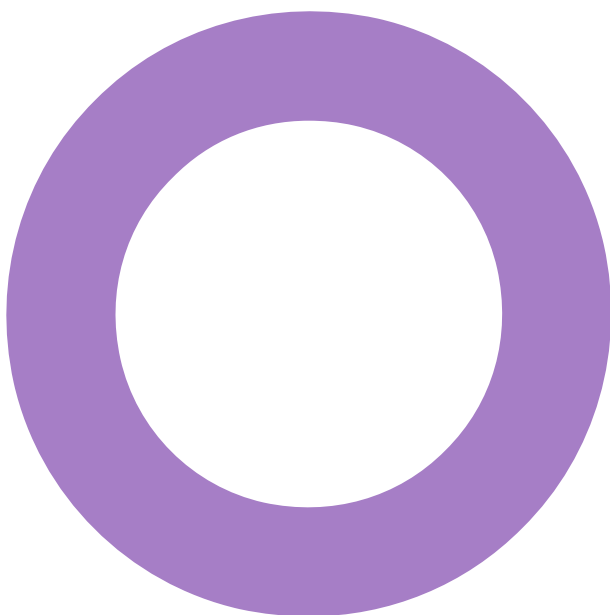


Land off Chapel Lane. Witherley. Pegasus Group.

ACOUSTICS

NEW RESIDENTIAL DEVELOPMENT
BASELINE NOISE ASSESSMENT
REVISION 1 – 05 OCTOBER 2021



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed
0	02/07/2021	Draft Report	AM	
1	05/10/2021	Issued report	AM	AM

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Project number: 10/13333

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1. Introduction.

Hoare Lea Acoustics (HLA) has been appointed by Pegasus Group to conduct a noise assessment for a proposed residential development at land off Chapel Lane, Witherley.

Planning permission has been sought for the development site but has been refused at appeal (Appeal Decision APP/K2420/W/18/3197865), citing the potential for noise from the adjacent Parish Room causing a '*significant adverse effect*' on the living conditions of the five closest proposed dwellings (Plots 1 to 5).

This report presents the results of a survey of the existing noise climate and reviews this data with respect to applicable guidance and standards for residential development. Where required, recommendations are provided for achieving the necessary noise standards.

Due to COVID-19 restrictions in place at the time of monitoring, no live music events were taking place at the Parish Room. The potential impact of noise from the club has therefore been assessed using measured data from other venues of a similar size.

2. Site Description.

The site comprises a large area of open farm land accessed via Chapel Lane, an access road leading to a couple of farms and the Witherley Boarding Kennels and Cattery.

Chapel Lane forms the northern site boundary with a large area of open farm land beyond.

To the north west of the site is the Parish Room, a Village Hall that is available for hire with no restrictions on hours of use. Immediately to the east of the Parish Room is a small area of car parking with provision for approximately 2-3 vehicles. The layout of the building is such that the entrance is to the north which leads into the main hall. To the south of the hall is a kitchen area which has an open hatch servery into the main hall. The windows to the Parish Room are double glazed with the option to open one of the window panels on each window frame.

To the west of the Parish Room are existing residential dwellings accessed via Chapel Lane. The nearest dwelling (38 Chapel Lane) is set back 10 metres from the Parish Room beyond a gated access route into the development site.

To the east of the site is an existing residential dwelling accessed via Chapel Lane.

All remaining site perimeters back on to large areas of open farmland.

The A5 Watling Street lies to the south west at a closest distance of approximately 650 metres.

An aerial view of the site and surroundings is given below. The location of the Parish Room and associated car park is indicated in red.



3. Development Proposals.

The proposed development will comprise of 5 new dwellings in detached format.

Access to the site will be from Chapel Lane in the north with each dwelling having provision for off-street car parking and a private external garden area.

The majority of the gardens are located to the rear of dwellings away from Chapel Lane.

An indicative site layout proposal is shown at Appendix 1.

4. Basis of Assessment.

4.1 Planning History.

The site was subject to a previous planning application in April 2015 (ref 15/00441/FUL) and to a subsequent appeal against refusal (ref APP/K2420/W/18/3197865) dated November 2018.

The planning appeal was dismissed and specific reference was made to noise from the Parish Rooms by the appeal inspector as follows:

'20. The Parish Room is an important well used community asset in the village that is available for hire. In the twelve month period up to August 2018 the Parish Council states that it has been used for over 400 social events. Located beyond the continuous built form of the village and surrounded by open countryside on three sides there is currently little scope for noise associated with its use causing annoyance or nuisance to neighbours. There are no planning conditions that restrict its hours of use.'

'21. The appeal site surrounds the Parish Room. The proposed development would position two houses directly to the rear of the Parish Room separated only by the short back gardens to these dwellings. On the western side of the Parish Room, beyond its small car park and an access drive, three further houses set behind modest front gardens would face the side or rear of the building. Five of the proposed houses would therefore be in close proximity to the Parish Room with a front or rear elevation of each containing windows to at least one main habitable room facing this building.'

'22. The Parish Room has large windows in its sides and windows in its front and rear. As a result, noise generated within the building can easily escape, particularly in warmer weather when windows are opened. In the absence of any planning restrictions on the hours of use of the Parish Room well attended social events at the building with music occurring during the day or late into the evening would annoy and disturb future occupants of the five dwellings described and have a significant adverse effect on their living conditions. This could result in restrictions being placed on the use of the Parish Room which would significantly reduce its value as a facility enjoyed by the community.'

'23. The local planning authority and its environmental health service do not consider that the development would harm the living conditions of future neighbours or restrict the use of the Parish Room. However, for the reasons given above, in the absence of substantive evidence that has been submitted to the contrary, I disagree.'

'24. For the reasons given above, I therefore conclude that the amenity of the occupiers of the proposed development would be significantly adversely affected by the use of the Parish Room. This would be contrary to policy DM10 of the SADMPDPD which, amongst other matters, seeks to prevent such harm. As a result, contrary to paragraph 182 of the Framework, it is likely that restrictions would be placed on the use of the Parish Room that would significantly reduce its value as a community facility.'

The following report provides an assessment of the potential noise impact of the club on the proposed residential development.

4.2 National Planning Policy Framework.

The National Planning Policy Framework (NPPF): updated 20th July 2021 sets out the Government's planning policies for England and how these are expected to be applied.

Section 15: Conserving and enhancing the natural environment, paragraph 174, states the following:

'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 soil, air, water or noise pollution or land instability'.*

Furthermore, paragraph 185 states that:

'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:

- 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;*
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason'*

Paragraph 188, additionally, states *'The focus of planning policies and decisions should be on whether a proposed development is an acceptable use of land, rather than control of processes or emissions (where these are subject to separate pollution control regimes).'*

Reference is made to the DEFRA Noise Policy Statement for England (NPSfE) 2010 within the NPPF. This latter document is intended to apply to all forms of noise other than that which occurs in the workplace. It includes environmental noise and neighbourhood noise in all forms.

NPSfE advises that the impact of noise should be assessed on the basis of adverse and significant adverse effect but does not provide any specific guidance on assessment methods or limit sound levels. Moreover, the document advises that it is not possible to have *'a single objective noise-based measure...that is applicable to all sources of noise in all situations'*. It further advises that the sound level at which an adverse effect occurs is *'likely to be different for different noise sources, for different receptors and at different times'*.

In the absence of specific guidance for assessment of environmental noise within NPPF and NPSfE, it is considered appropriate to base this assessment on current British Standards and appropriate local or national guidance.

It is noted that NPSfE also advises that the general principle that increases in ambient noise should be 'minimised', needs to be considered in context for each site and, in this regard, states:

'Of course, taken in isolation and to a literal extreme, noise minimisation would mean no noise at all. In reality, although it has not always been stated, the aim has tended to be to minimise noise as far as is reasonably practical... the application of the NPSfE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications'.

4.3 BS 8233:2014.

BS8233:2014 'Guidance on sound insulation and noise reduction for buildings' is the current British Standard providing guidance for acoustic requirements within buildings. The Standard advises appropriate criteria and limits for different building types including dwellings. The BS8233 internal design criteria for dwellings are as follows:

Activity	Location	Day (07:00 to 23:00)	Night (23:00 to 07:00)
Resting	Living rooms	35 dB LAeq,16hour	-
Dining	Dining Room / Area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

Section G1 of BS8233 advises that the typical sound reduction that is achievable through open windows is limited to 15 dB. The Standard does, however, acknowledge that additional sound reduction will result from room furnishings. Available test data indicates that, for mid-frequencies typical of road traffic noise, the overall sound

reduction from outside to inside is approximately 20dB for a window open by approximately 100mm onto a furnished room.

With regard to ventilation, BS 8233 section 8.4.5.4 refers to the Building Regulations recommendation that habitable rooms be provided with background ventilation and states '*Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.*'

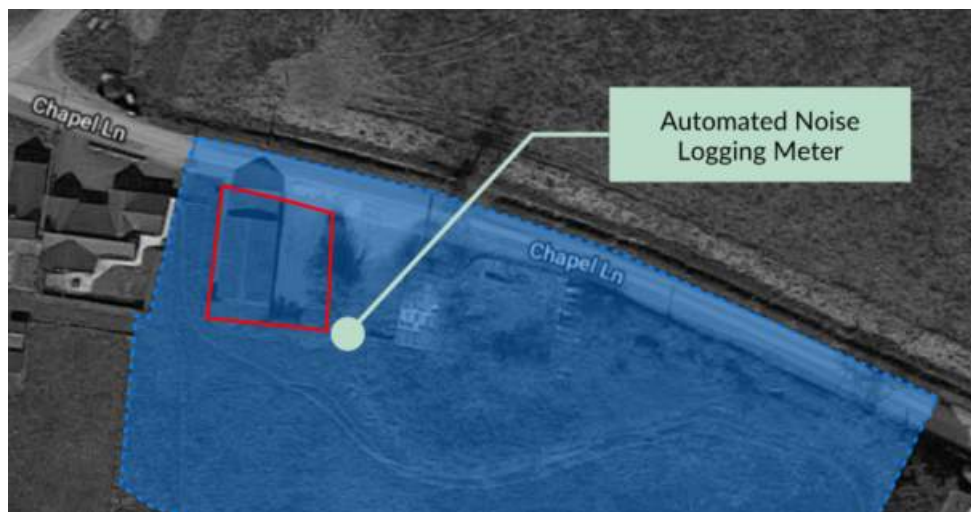
For gardens and terraces, BS8233 states that it is desirable that the steady noise level does not exceed $L_{Aeq,T}$ 50 dB whilst a level of $L_{Aeq,T}$ 55 dB would be acceptable in noisier environments.

5. Measurements.

Continuous sound level measurements were undertaken at the development site between Thursday 24th and Monday 28th June 2021 to determine the typical diurnal noise climate affecting the site. We have not been made aware of any large events taking place at the Parish Room during the monitoring survey and therefore, the measured sound levels will be typical of the ambient and background noise levels at the proposed dwellings in the absence of noise from the Parish Room.

Impact of noise from the Parish Room has been based upon measured sound levels from other similar-sized venues.

An automatic logging measurement system was located on the development site as indicated below.



Sound levels were recorded continuously in 15-minute samples to determine the equivalent continuous sound level, $L_{Aeq,15min}$, the short duration level L_{Amax} and also the percentile $L_{A90,15min}$.

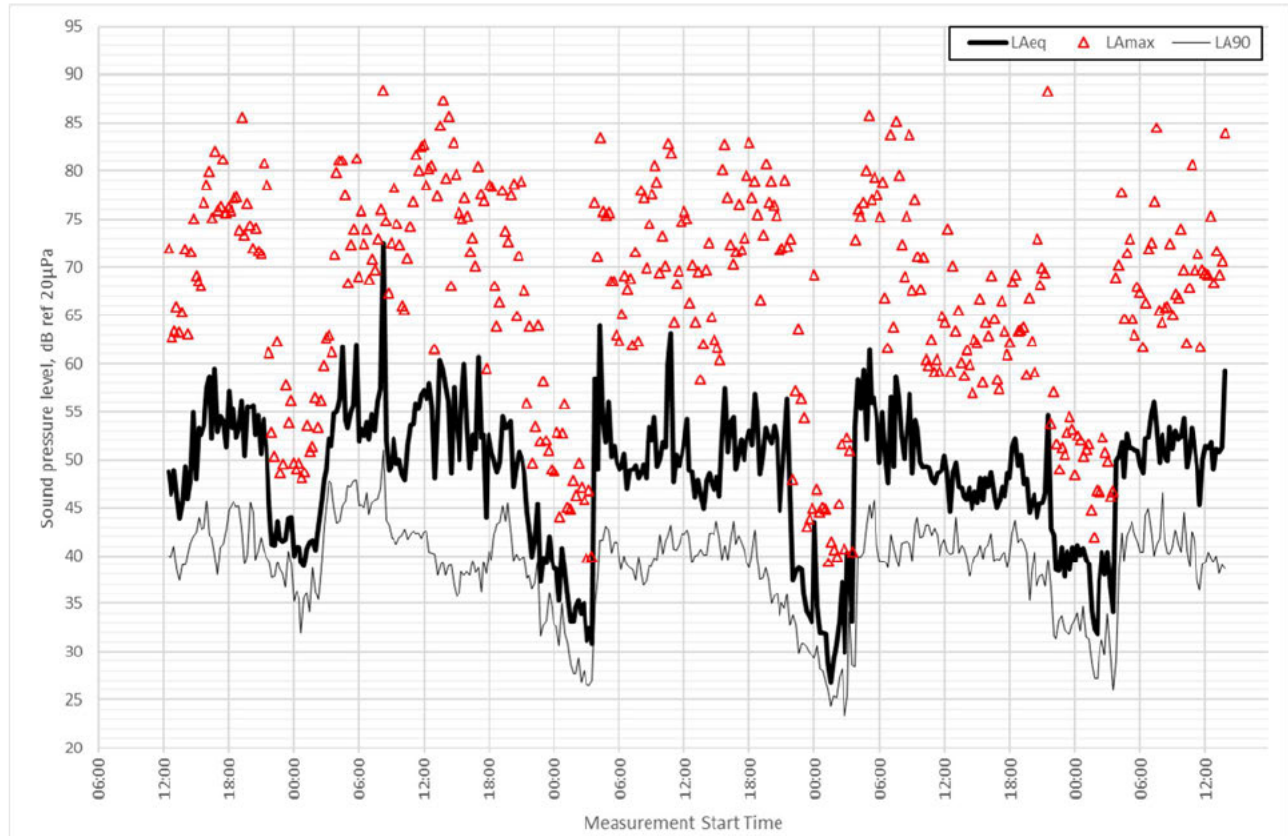
Weather conditions over the survey period were predominantly dry with no recorded periods of rainfall during this time. The meteorological conditions were considered to be satisfactory for measurement purposes at all times during the monitoring period.

The measurements were made with calibrated precision grade sound level meters, in accordance with BS EN 60651 and BS 7445:1993. The equipment was acoustically calibrated before and after the survey with no drift being observed. A list of the equipment used can be found in Appendix B.

6. Results.

The results of all site measurements are tabulated in Appendix 3. Levels are given as hourly values derived from the recorded 15-minute values.

The variation in sound levels over the survey period is shown graphically below.



The following table summarises the overall sound levels during each of the day and night time periods:

Period	LAeq dB	LAmax dB		LA90 dB
Thursday (12:30 – 23:00)	53.4	62 – 86	86	38.4
Thursday night	53.2	50 – 81	81	34.7
Friday	57.2	64 – 88	88	36.2
Friday night	51.8	50 – 83	83	28.0
Saturday	52.4	64 – 83	83	31.9
Saturday night	52.3	45 – 86	86	25.7
Sunday	50.1	57 – 88	88	32.5
Sunday night	47.4	52 – 78	78	29.5
Monday (07:00 – 14:00)	52.6	71 – 85	85	38.6

The mean daytime ambient sound level at position L1 was $L_{Aeq,16hr}$ 53.9dB.

The mean night time ambient sound level was $L_{Aeq,8hr}$ 51.7dB.

Night time maximum noise levels were all in the range L_{Amax} 39 to 78dB with two or less events per night exceeding this value.

It is expected that highest levels of noise will be generated by the Parish Room in the evenings when daytime background noise levels are lower. Hourly background sound levels $L_{A90,1hr}$ on each of the evenings up to midnight are as follows:

From:	Thursday	Friday	Saturday	Sunday	Monday
19:00	41.9	44.5	37.8	39.7	41.9
20:00	42.6	40.5	35.1	38.3	42.6
21:00	40.5	38.8	34.5	37.8	40.5
22:00	38.4	36.2	31.9	32.5	38.4
23:00	38.6	34.2	30.3	32.2	38.6

The lowest typical background noise level was $L_{A90, 1-hr}$ 32dB measured on Saturday evening between 22:00 and 23:00.

Discussions with local residents did not indicate that there were any significant events occurring at the Parish Room during the monitoring period.

7. Discussion.

7.1 Existing noise climate.

The results of the measurement survey, including observations made whilst on site, indicate that the noise climate at the site and surrounding area, predominantly, is determined by traffic on the A5 to the south of the development with intermittent traffic noise from other smaller roads in the local vicinity.

It is expected that during larger events at the Parish Room, there is potential for entertainment noise to impact upon the development and, therefore, discussion regarding this potential impact is presented below.

7.2 BS 8233 Assessment.

From the measured weekday daytime survey data, the building fabric to habitable rooms within the new Block B building would need to provide a minimum sound reduction of 19dB for daytime resting and 22dB for night time sleeping.

In practice, the structural components of the building envelope can be expected to provide a sound reduction in excess of 45 dB and will not provide a significant pathway for noise break-in and greatest sound break-in can be expected to occur via windows.

Data given in BRE IP 12/89 and BS8233 Annex G indicates that, for road traffic and general urban noise, standard thermal double glazing provides a typical sound reduction of the order of 33dB. This order of reduction would enable the BS 8233 internal criteria to be achieved within all habitable rooms.

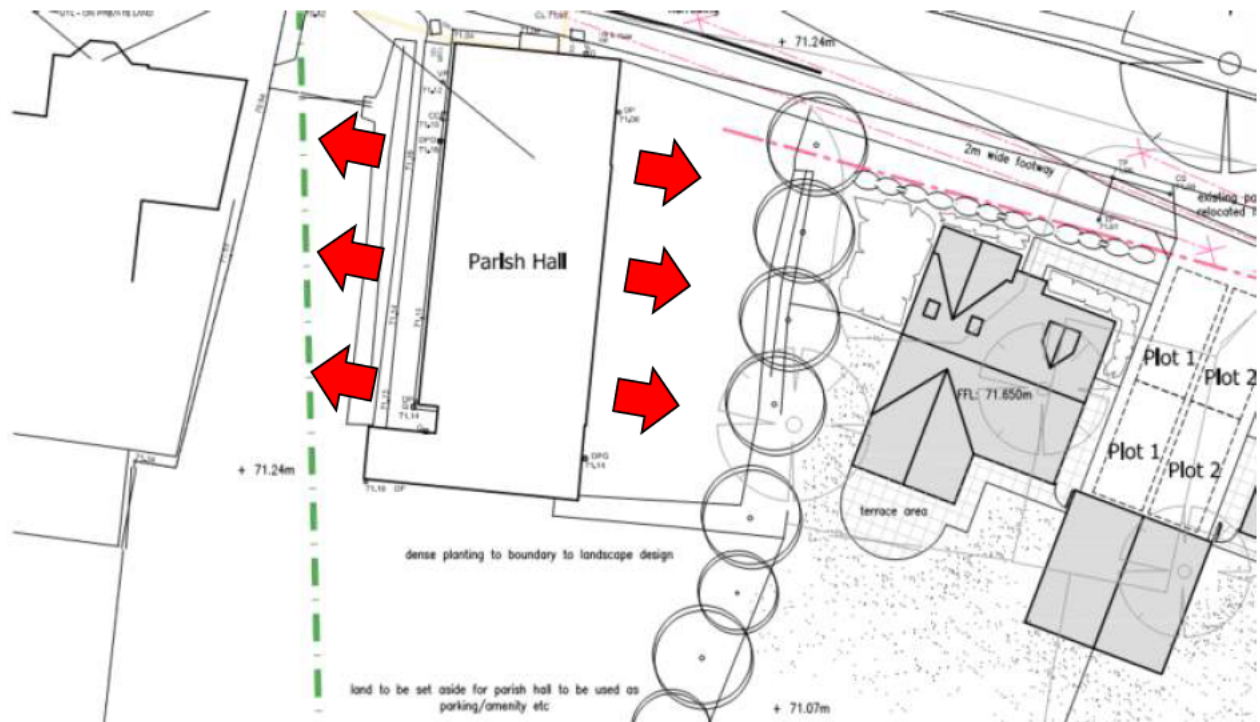
Where windows are open for ventilation, BS8233 advises that sound reduction across a partially open window will be limited to 15dB. However, available site test data indicates that the typical sound reduction across a partially open window of a furnished room is approximately 20dB for mid-frequencies. Under these conditions, the BS 8233 internal criteria within habitable rooms would be marginally exceeded with open windows.

BS 8233 notes that regular individual noise events can cause sleep disturbance. Glazing achieving a typical sound reduction of the order of 33dB would achieve an internal level of L_{Amax} 45dB for all noise events..

Sound levels at the measurement position, representative of outdoor space to the south of plot 1, achieves the BS 8233 desirable level criteria for gardens without further mitigation.

7.3 Entertainment Noise Assessment.

There is expected to be some noise break-out from the Parish Room during live music events, especially when the windows are open on the eastern and southern façades. Music impacting on the development is considered to be highest at plot 1 as indicated below.



Music noise break-out is also expected to impact upon the nearest existing dwelling (38 Chapel Lane), approximately 10 metres to the west.

In order that noise from the Parish Room be unintrusive within the nearest residential dwellings when windows are open, it is considered that noise from the entertainment premises would need to be below the prevailing background sound level (assuming no significant noise within the habitable room). For the operating hours, site survey data for the residential boundary nearest to the clubhouse indicates that the lowest late evening background sound level on any day of the week is L_{A90} 32dB for the period 19.00-23.00hrs. From this, entertainment noise incident upon any residential façade would need to be no greater than L_{Aeq} 32dB.

Archive measurement data.

Archive measurement data obtained at several venues indicates that the typical sound level on the dance floor area immediately in front of the stage during a live pop/rock band performance is in the range $L_{Aeq,5min}$ 96-97dB reducing to approximately L_{Aeq} 85dB at the room periphery and seating areas (where it is necessary to be able to conduct a conversation). Similar levels have been measured at a similar sized sports pavilion during times when a disco is in operation.

For a measured internal level of L_{Aeq} 95dB 1m from the loudspeakers, an external level sound level immediately outside the venue with doors to the function room open was L_{Aeq} 73dB.

The living room windows on the proposed development are at a distance of 12 metres from the proposed dwellings to the east (plot 1).

The estimated sound level incident upon the nearest residential window would be less than 51dB to the east.

On the basis of closed windows providing a sound reduction of 33dB, the break-in sound level to habitable rooms nearest to the Parish Room would be below 20dB after allowance for room effects. This level is more than 15dB below the BS 8233 recommendation for daytime resting.

Site testing of a furnished bedroom indicates that with a partially open window (100mm), mid-frequency sound reduction is, typically, 20dB. This order of reduction would give a break-in sound level of 33dB(A) which just achieves the BS 8233 recommendation for daytime resting. However, music noise might still be audible at

positions near to windows within quiet rooms and it would be advisable for habitable rooms overlooking the Parish Room to be provided with alternative means of ventilation to enable residents to close windows if desired.

Vents with a comparable acoustic rating to the window system will reduce music noise break-in to levels well below the BS 8233 criteria for daytime resting.

Alternative ventilation can be achieved with mechanical systems or else a passive ventilation system which provides an equivalent free area to that of an open window, and hence an equivalent ventilation rate.

Persons congregating by the front door of the Parish Room would be in the order of 30 metres from the nearest dwelling to the east. For loud male voices in the smoking area the typical sound level would be 70dB(A) at 1m which, after correction for distance would be 44dB(A) at the north west corner of plot 1. For the majority of the plot 1 dwelling, this area will be screened from view by the Parish Room building itself which would be expected to reduce conversation immission levels by approximately 10dB. However, even without the benefit of this screening, noise levels within the living room would be below 30dB(A) with an open window.

The assessments above indicate that break-out from the Parish Room during live music events and from external loud voices at the front of the building would achieve levels within BS8233 recommended internal criteria with the Parish Room windows open and windows at the new dwellings also open. When the Parish Room doors and windows are closed, the levels of noise break-out will be significantly lower.

7.4 The Parish Room car park.

The car park is located to the west of the proposed plot 5 with provision for approximately 3 spaces.

If all parked vehicles leave the site in a 15-minute period between 23:00 and midnight, this would give a total on-time of (3 movements x 10 seconds) 30 seconds.

Archive measurement data obtained for vehicle drive-by on a public car park indicated a mean pass-by sound level of 62.7dB(A) at 2m for a range of common passenger cars.

The car parking spaces are typically 8 metres from the nearest dwellings. As a result, the highest individual car movement event noise level after distance attenuation (-12.1dB) is taken into consideration is 50.6dB(A).

Correcting this level for on-time gives a temporal sound level of the car park as a whole at the nearest dwelling at peak times of $L_{Aeq(15-min)}$ 35.8dB.

The calculated noise levels above is 20dB below the BS 8233 recommended preferred limit for gardens.

With regard to the nearest building facades, Section G1 of BS 8233 advises that, where windows are open for ventilation, then sound reduction is limited to 15dB, with a further 5dB attenuation as a result of room absorption. This indicates a break-in noise level to the nearest dwellings of 16dB which is significantly below the BS8233 indoor criterion for night time sleeping.

8. Recommendations.

It is recommended that habitable rooms overlooking either the Parish Room or Chapel Lane be fitted with windows with a minimum manufacturer's rating of R_w 33dB. The sound reductions should be achieved by the window unit as a whole including frames and furniture.

Any external vents to habitable rooms should, when open, have a minimum acoustic rating of D_{new} 38dB.

It is recommended that all habitable rooms to facades overlooking the Parish Room be provided with an alternative means of ventilation to control music noise break-in. For the majority of time, when live music does not occur at the Parish Room, BS 8233 internal criteria can be fully achieved with open windows.

9. Conclusions.

The results of the site survey, including observations made during the site visits, indicate that the general noise climate across the site and surrounding area is determined by traffic on the A5, Chapel Lane and other smaller roads in the local vicinity.

The requirements of BS8233 for internal spaces can be achieved with appropriate acoustic rated glazing and acoustic rated vents.

The requirements of BS8233, and local planning criteria for private gardens is currently achieved with no further mitigation measures required.

In order to guard against occasional music events at the Parish Room, it is recommended that all habitable rooms which directly overlook the venue utilise an appropriate acoustic rated glazing system and alternative means of ventilation to control external noise break-in during these times.

Compliance with BS8233 internal criteria, including an allowance for noise character, can be achieved for all habitable rooms by use of an appropriate acoustic rated glazing system and alternative means of ventilation to control external noise break-in.

Calculated internal noise levels from the Parish Room car park at the nearest dwellings is significantly below the BS8233 night time criteria with open windows and therefore, no specific mitigation is required.

Appendix A – Development Layout Plans.



Appendix B - Survey Measurement Data.

Date	Day	From:	To:	Leq,1hr	Lmax,1hr	L10,1hr	L90,1hr
24/06/2021	Thursday	13:00	13:59	46.6	65.9	49.1	39.0
		14:00	14:59	50.9	75.0	50.2	40.6
		15:00	15:59	52.4	76.7	54.2	43.1
		16:00	16:59	57.7	82.1	59.1	42.5
		17:00	17:59	53.3	81.2	53.5	40.7
		18:00	18:59	55.0	77.3	56.6	45.2
		19:00	19:59	54.4	85.6	54.9	41.9
		20:00	20:59	54.8	74.3	58.5	42.6
		21:00	21:59	51.4	80.8	50.2	40.5
		22:00	22:59	42.1	62.3	44.3	38.4
		23:00	23:59	42.9	57.8	45.3	38.6
25/06/2021	Friday	00:00	00:59	40.3	49.7	43.7	34.7
		01:00	01:59	40.8	53.6	43.4	36.1
		02:00	02:59	45.1	59.8	47.3	38.3
		03:00	03:59	52.3	71.3	54.5	46.4
		04:00	04:59	58.0	81.1	57.9	44.5
		05:00	05:59	57.9	81.3	58.4	47.6
		06:00	06:59	53.0	75.9	56.0	45.5
		07:00	07:59	54.2	73.0	57.6	45.4
		08:00	08:59	66.7	88.4	60.6	46.3
		09:00	09:59	50.5	78.2	50.5	41.7
		10:00	10:59	51.0	74.2	53.0	42.2
		11:00	11:59	55.6	82.5	57.3	42.3
		12:00	12:59	56.9	82.7	57.6	41.5
		13:00	13:59	57.7	87.3	56.2	39.0
		14:00	14:59	56.1	85.7	55.8	38.2
		15:00	15:59	56.2	79.6	56.4	37.0
		16:00	16:59	51.9	75.3	53.9	38.5

Date	Day	From:	To:	Leq,1hr	Lmax,1hr	L10,1hr	L90,1hr
		17:00	17:59	55.9	80.4	52.9	38.1
		18:00	18:59	50.8	78.5	52.7	41.4
		19:00	19:59	53.1	77.9	54.5	44.5
		20:00	20:59	51.0	78.6	52.5	40.5
		21:00	21:59	47.5	78.9	49.1	38.8
		22:00	22:59	42.1	64.0	43.7	36.2
		23:00	23:59	40.3	58.2	43.1	34.2
26/06/2021	Saturday	00:00	00:59	38.7	52.9	41.6	32.8
		01:00	01:59	35.5	55.8	37.8	29.8
		02:00	02:59	34.7	49.7	38.3	28.0
		03:00	03:59	52.4	76.7	41.7	28.7
		04:00	04:59	58.7	83.4	54.9	41.1
		05:00	05:59	52.7	75.7	55.4	41.5
		06:00	06:59	49.1	69.1	52.6	39.3
		07:00	07:59	48.8	71.6	52.6	38.6
		08:00	08:59	50.5	77.9	51.8	37.8
		09:00	09:59	51.9	80.5	51.8	40.1
		10:00	10:59	59.2	82.8	59.8	41.8
		11:00	11:59	49.7	74.7	51.4	41.2
		12:00	12:59	51.6	75.8	52.8	41.6
		13:00	13:59	46.5	69.5	48.9	40.2
		14:00	14:59	47.7	72.6	49.1	41.8
		15:00	15:59	53.2	82.7	51.0	41.6
		16:00	16:59	52.5	77.2	54.1	41.6
		17:00	17:59	51.4	79.5	51.4	40.9
		18:00	18:59	54.5	82.9	55.0	40.5
		19:00	19:59	51.5	80.7	52.3	37.8
		20:00	20:59	51.5	78.9	50.4	35.1
		21:00	21:59	52.3	79.0	49.4	34.5
		22:00	22:59	38.3	63.6	39.1	31.9

Date	Day	From:	To:	Leq,1hr	Lmax,1hr	L10,1hr	L90,1hr
		23:00	23:59	34.4	54.4	36.7	30.3
27/06/2021	Sunday	00:00	00:59	38.6	69.2	36.4	29.0
		01:00	01:59	29.5	44.9	31.3	25.7
		02:00	02:59	33.8	51.6	35.7	26.0
		03:00	03:59	47.8	72.9	44.7	29.2
		04:00	04:59	57.1	80.0	59.6	40.9
		05:00	05:59	57.9	85.8	58.1	44.1
		06:00	06:59	51.6	78.8	53.7	39.3
		07:00	07:59	56.4	85.2	55.9	40.5
		08:00	08:59	53.9	83.7	54.2	41.4
		09:00	09:59	52.0	77.0	54.6	42.2
		10:00	10:59	49.0	71.0	52.1	42.7
		11:00	11:59	48.4	64.9	52.0	41.6
		12:00	12:59	48.5	73.9	51.1	40.7
		13:00	13:59	47.8	65.5	50.9	41.6
		14:00	14:59	46.2	62.5	49.4	39.1
		15:00	15:59	47.0	66.7	50.0	40.4
		16:00	16:59	47.1	69.1	49.9	40.7
		17:00	17:59	47.1	66.5	50.5	39.7
		18:00	18:59	50.6	69.2	54.0	41.9
		19:00	19:59	48.1	66.8	51.3	39.7
		20:00	20:59	45.4	73.0	47.5	38.3
		21:00	21:59	49.9	88.3	48.6	37.8
		22:00	22:59	40.3	57.1	43.1	32.5
		23:00	23:59	39.6	54.5	42.8	32.2
28/06/2021	Monday	00:00	00:59	40.4	52.5	43.8	33.6
		01:00	01:59	37.4	51.6	39.9	29.7
		02:00	02:59	37.8	52.3	40.4	29.5
		03:00	03:59	44.6	68.9	43.3	29.8
		04:00	04:59	51.1	77.7	52.4	40.6

Date	Day	From:	To:	Leq,1hr	Lmax,1hr	L10,1hr	L90,1hr
		05:00	05:59	51.1	73.0	54.5	42.6
		06:00	06:59	50.9	71.9	54.2	42.5
		07:00	07:59	53.9	84.5	56.3	41.5
		08:00	08:59	51.8	72.5	54.7	42.2
		09:00	09:59	52.2	73.9	55.8	41.4
		10:00	10:59	52.4	80.6	55.4	41.6
		11:00	11:59	49.6	71.4	52.1	38.6
		12:00	12:59	51.0	75.3	53.7	39.7
		13:00	13:59	54.9	83.9	54.4	38.9

Appendix C – List of Monitoring Equipment.

Measurements

Rion type NL-28 Sound Level Meter	S/N 01260202
Rion type NH-23 pre-amplifier	S/N 60105
Rion type UC-59 Microphone	S/N 282

Additional Equipment

Rion Type NC-74 Calibrator	S/N 34172706
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The above equipment fulfils IEC 61672 Class 1 and is traceable to calibration under BS7580:Part 1:1997. The equipment was calibration-checked before and after measurement – no adverse deviation was observed.

Appendix D – Glossary of Terms.

Decibel (dB)

The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

A-Weighting

The 'A' weighting is a correction term applied to the frequency range in order to approximate to the sensitivity of the human ear to noise. It is generally used to obtain an overall noise level from octave or third octave band frequencies. An 'A' weighted sound level is written as dB(A).

$L_{Aeq,T}$

The A-weighted equivalent continuous sound level – the sound level of a notionally steady sound having the same energy as the fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter. It is the preferred descriptor for environmental noise in accordance with BS 7445:1993.

$L_{A90,T}$

The A-weighted noise level exceeded for 90% of the specified measurement period (T). This is generally taken to indicate the prevailing background noise level.

$L_{A10,T}$

The A-weighted sound level exceeded for 10% of the specified measurement period (T). This parameter is indicative of the average maximum sound level.

L_{Amax}

The highest short duration A-weighted sound level recorded during a noise event.

R_w

A single figure value of sound reduction index, derived according to procedures given in BS 5821, used for rating and comparing the sound reduction performance of partitions and based on the values of sound reduction index at different frequencies.



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