Report for

Greene King PLC

Greene King Pubs – The Assembly House, Kentish Town

Noise Assessment

Status: Final **Date: 17.04.2014**

Greene King PLC

Noise Assessment – Greene King Pubs – The Assembly House, Kentish Town

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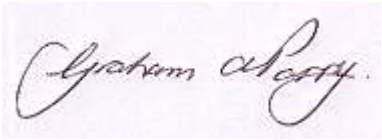
Approved By:	 **Graham Parry** **Managing Director**
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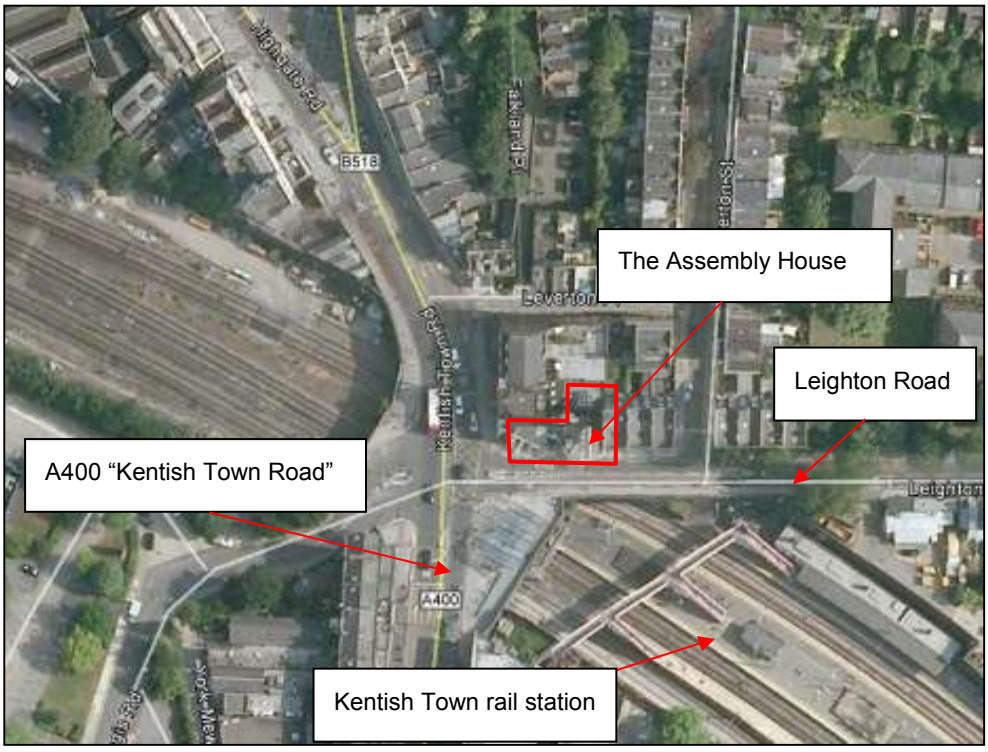
1. INTRODUCTION

ACCON UK Limited (ACCON) have been commissioned by Greene King PLC to carry out a noise assessment, which is required to be submitted in support of the planning application for the proposed conversion of the upper floors of The Assembly House Public House, Kentish Town, into 8 guest rooms and ancillary floorspace within Assembly House Public House. The Assembly House Public House is four storeys high, with a bar area on the ground floor. The first and second floors are currently utilised as ancillary floorspace. The third floor is currently an unused loft space.

The site is located on the corner of A400 "Kentish Town Road" and Leighton Road, as shown in **Figure 1.1** below. The site is within the administrative boundary of the London Borough of Camden.

The Assembly House is a Grade II listed building and therefore any alternations made may need the approval of the local planning authority.

Figure 1.1: Site Location



The purpose of this noise assessment will be to first assess, through on-site noise measurements, the extent to which the existing ambient noise levels will affect the proposed guest rooms. Additionally, the sound insulation of the existing floor structure will be assessed to ensure that an adequate level of sound insulation is provided for the guest rooms, particularly those on the first floor due to noise from the bar area below, as well as the noise from any proposed air handling plant that will be installed. Recommendations for mitigation are made where appropriate. An acoustic glossary is provided in **Appendix 1**.

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2. THE NATURE, MEASUREMENT AND EFFECT OF NOISE

Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to measure the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB (A), has been shown to correlate closely to the subjective human response.

When related to changes in noise, a change of ten decibels from say 60 dB (A) to 70 dB (A) would represent a doubling in 'loudness'. Similarly, a decrease in noise from 70 dB (A) to 60 dB (A) would represent a halving in 'loudness'. A change of 3 dB (A) is generally considered to be just perceptible[1]. **Table 2.1** details typical noise levels.

Table 2.1: Typical Noise Levels

Approximate Noise Level (dB(A))	Example
0	Limit of hearing
30	Rural area at night
40	Library
50	Quiet office
60	Normal conversation at 1 m
70	In car noise without radio
80	Household vacuum cleaner at 1 m
100	Pneumatic drill at 1 m
120	Threshold of pain

[1] Communities & Local Government (1994). Planning Policy Guidance 24: Planning & Noise (now revoked)

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3. NOISE ASSESSMENT CRITERIA

This section of the report will outline those noise assessment criteria which are considered to be applicable for guest rooms.

3.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was released in March 2012 and has replaced the Planning Policy Guidance which previously covered planning and pollution control and new development in England. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. The environmental role is to contribute to protecting and enhancing our natural, built and historic environment; and as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate to adapt to climate change including moving to a low carbon economy.

One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser value, where consistent with other policies in the Framework. The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 123 of the NPPF states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) on health and quality of life arising from noise from new development, including through the use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use since they were established (Subject to the provisions of the Environmental Protection Act 1990 and other relevant law); and
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

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3.2 Noise Policy Statement England

The Noise Policy Statement for England (NPSE) was developed by DEFRA and published in March 2010. The vision of the NPSE is to '*Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.*

The NPSE aims to *'through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life'*

3.3 National Planning Practice Guidance

The National Planning Practice Guidance (NPPG), published March 2014, provides advice on how to determine the noise impact on development:

"*Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy."

The document goes on to provide a definition for the levels of noise exposure at which an effect may occur:

"***Significant observed adverse effect level:*** *this is the level of noise exposure above which significant adverse effects on health and quality of life occur.*

Lowest observed adverse effect level: *this is the level of noise exposure above which adverse effects on health and quality of life can be detected.*

No observed effect level: *this the level of noise exposure below which no effect at all on health and quality of life can be detected.*"

It is important to understand that as the NPPG does not provide any advice with respect to specific noise levels/ limits for different sources of noise, it is appropriate to consider other

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sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment.

3.4 London Borough of Camden

London Borough of Camden (LBC) has provided advice on hotel/visitor accommodation in "*Camden Development Policies 2010 – 2025: Local Development Framework*". Section 14.2 of the policy states "*Visitor numbers to London are expected to continue to increase, creating demand for more hotels and other overnight accommodation, particularly in Central London. The London Plan sets a target of achieving 40,000 net additional hotel bedrooms by 2026 across London. This policy aims to maintain and encourage a range of attractions and accommodation in the borough for Camden's visitors*".

LBC do not have any published noise criteria specifically regarding hotels and guest houses.

3.5 The Building Regulations Approved Document E "Resistance to the passage of sound"

The requirements under Part E of Schedule 1 to the Building Regulations 2000 are from 1st July 2003 as follows:

"E1. Dwelling houses, flats and rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same building and from adjoining buildings."

Although not strictly applicable to hotels/guestrooms, the standards for "rooms for residential purposes" are commonly applied to developments of this type in order to provide a reasonable degree of sound insulation between hotel bedrooms. The minimum values for airborne and impact insulation for "rooms for residential purposes" are outlined in **Table 3.2** below.

Table 3.1 – Rooms for Residential Purposes – Performance Standards for Separating Walls, Separating Floors and Stairs that have a Separating Function.

		Airborne Sound Insulation $D_{nT,w} + C_{tr}$ dB (Minimum Values)	Impact Sound Insulation $L'_{nT,w}$ dB (Maximum Values)
Purpose built rooms for residential purposes	Walls	43	-
	Floors and stairs	45	62
Rooms for residential purposes formed by material change of use	Walls	43	-
	Floors and stairs	43	64

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3.6 British Standard BS 8233:2014

BS 8233:2014 "*Sound Insulation and Noise Reduction for Buildings – Code of Practice"* Annex H has a number of example design criteria for hotels in terms of the level of sound reduction to be provided by internal partitions and to prevent external noise from becoming intrusive. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and the most appropriate to the proposed development are reproduced in **Tables 3.3** and **3.4** below.

Table 3.2: Example noise criteria for hotels

Room Areas	Airborne Performance	Impact Performance
Bedroom/Bathroom – Bedroom/Bathroom	Walls: 43dB $D_{nT,w} + C_{tr}$ Floors: 45dB $D_{nT,w} + C_{tr}$	62dB $L'_{nT,w}$
Bedroom – Restaurant/Bar/Kitchen	60dB $D_{nT,w} + C_{tr}$	-

Table 3.3: Indoor ambient noise level ranges for hotel bedrooms

Period	Noise Level
Daytime (0700 – 2300 hrs)	30 – 40 dB $L_{Aeq, 1hour}$
Night-time (2300 – 0700 hrs)	25 – 35 dB $L_{Aeq, 1hour}$
Night-time (2300 – 0700 hrs)	45 – 55 dB L_{Amax}

3.7 British Standard BS 4142

British Standard BS 4142:1997 "*Method of rating industrial noise affecting mixed residential and industrial areas*".

The standard provides a method for the measurement and rating of industrial type noise sources and background noise levels outside dwellings. The rating level (defined in the BS) is used to rate the noise source outside residential dwellings (this is defined as the "specific noise source").

The procedure defined in BS 4142 for predicting the likelihood of complaints is based on establishing the difference between the rating level and the background level outside the residential property of interest. The greater the difference the greater the likelihood of complaints and more specifically:

- A difference of around +10 dB or more indicates that complaints are likely
- A difference of around +5 dB is of marginal significance
- If the rating is more than 10 dB below the measured background noise level then this is a positive indication that complaints are unlikely.

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4. AMBIENT NOISE ASSESSMENT

4.1 Baseline Noise Measurements

In order to characterise the existing noise climate, a detailed noise measurement study has been carried out at the site. Noise measurements were carried out utilising one semi-permanent noise monitor in a façade position. The noise monitoring position was located at first floor height (approximately three metres) and was positioned on a balcony overlooking the A400 and Leighton Road junction as well as the railway line in the vicinity of Kentish Town rail station. The noise monitoring position is shown on a site layout plan in **Appendix 2**.

The noise measurements utilised a Norsonic 116 Type 1 Precision Sound Level Meter, which has a current certificate of calibration. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB). Measurements were carried out between Wednesday 19th March 2014 and Friday 21st March 2014. The weather was dry and cloudy with some moderate wind (2 - 3 m/s) with occasional gusts of up to approximately 5 m/s and a temperature of up to 10ºC during the daytime, dropping to 5ºC overnight.

At the noise monitoring position the ambient noise climate was dominated by local road traffic noise from A400 "Kentish Town Road". Some distant road traffic and occasional rail traffic in the vicinity of Kentish Town rail station was audible at the measurement location. Voices from members of the public passing the public house on the footpath and children's voices from a nearby school were also audible at the measurement position.

Close scrutiny of the measurement data revealed a number of anomalously high peaks in the noise levels, which may have been due to high gusts of wind. This anomalous data was removed from the measurement results as it would not be representative of the typical noise climate at The Assembly House.

The measured noise levels from the noise monitoring position are summarised in **Table 4.1** below. Detailed noise measurements are displayed in **Appendix 3**.

Table 4.1: Summary of Measured Noise Levels

Location	Measured Ambient Noise Level, L_{Aeq}	Measured Maximum Noise Level, L_{Amax}	Measured Background Noise Level, L_{A90}
07:00 – 23:00	66.2	78.3	59.1
23:00 – 07:00	61.2	72.8	51.6

Note: The quoted noise levels are a logarithmic average for the L_{Aeq}, and an arithmetic average for the L_{Amax} and L_{A90}.

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4.2 Internal Noise Levels

The existing windows at The Assembly House are single glazed windows, which will achieve a maximum SRI of 28 dB, assuming that the frames are in good condition and that the sealing is of a good standard. **Table 4.2** identifies the likely internal noise levels using these single glazed windows and compares these levels against the informative criteria set out in BS8233 (30-40 L_{Aeq} Daytime and 25-35 L_{Aeq} Night-time).

Table 4.2: Predicted Existing Internal Noise Levels - L_{Aeq}

Location	External Noise Levels		Existing Glazing R_w	Internal Noise Levels		Compliance with Criteria
	$L_{Aeq\ 16\ hours}$	$L_{Aeq\ 8\ hours}$		$L_{Aeq\ 16\ hours}$	$L_{Aeq\ 8\ hours}$	BS 8233
The Assembly House, Camden	66	61	28	38	33	✓

It can be seen, by reference to **Table 4.2**, that the predicted internal noise levels achieve the informative criteria set out in Annex H of BS 8233 during the day and night time periods, assuming that the window frames are in good condition and that the sealing is of a good standard.

Table 4.3 below identifies the likely internal maximum noise levels (L_{Amax}) using the existing single glazed windows and compares these levels against the criteria set out in BS8233 (45-55 L_{Amax} Night-time).

Table 4.3: Predicted Internal Noise Level - L_{Amax}

Location	External Noise Levels	Existing façade R_w	Internal Noise Levels	Compliance with Criteria
	Average L_{Amax}		Average L_{Amax}	BS 8233
The Assembly House, Camden	73	28	45	✓

It can be seen, by reference to **Table 4.3**, that the predicted internal noise levels achieve the informative criteria set out in Annex H of BS 8233 for maximum noise levels, assuming that the window frames are in good condition and that the sealing is of a good standard.

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5. INTERNAL SOUND INSULATION

In order to determine the current level of sound insulation, a noise measurement survey has been undertaken in order to quantify the sound reduction properties of the current structure.

A Norsonic 118 Sound Level Meter Type 1 Precision Sound Level Meter, with a current certificate of calibration, was utilised to carry out the noise measurements. Before and after the measurement periods the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

5.1 Floors

5.1.1. Existing Airborne Sound Insulation

Noise measurements were undertaken in line with the procedures detailed in ISO 140-4 *"Field measurements of airborne sound insulation between rooms"*.

Noise was generated utilising a minirator pink noise generator and amplifier through a dodecahedron speaker. Measurements were obtained in third octave frequency bands between 100 Hz and 3150 Hz. The dodecahedron speaker was initially located in two positions around the ground floor of the public house and spatially averaged internal noise measurements were made on both the ground floor of the public house and a first floor ancillary room. The test procedure was then repeated with a second floor ancillary room being utilised as the source room and a first floor ancillary room directly below being the receiving room.

Table 5.1 provides a summary of the noise reduction offered by each floor.

Table 5.1: Airborne Sound Insulation Summary

Source Room	Volume (m^3)	Receiver Room	Volume (m^3)	Calculated $D_{nT,w} + C_{tr}$ (dB)	Approved Document E Minimum Performance (43 dB)	BS8233 Minimum Performance (60dB Bar to Bedroom and 45 dB Bedroom to Bedroom)
Ground Floor Public House	-	First Floor Ancillary Room	53	53	✓	X
Second Floor Ancillary Room	74	First Floor Ancillary Room	53	41	X	X

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Table 5.1 identifies that the floor between the first floor ancillary room and second floor ancillary room fails to meet the ADE and BS 8233 performance requirements. Although the floor between the ground floor public house and first floor ancillary room meets the ADE performance requirements, the floor fails to meet the BS 8233 requirements between a Public House and ancillary room above.

5.1.2. Existing Impact Sound Insulation

The impact sound insulation performance of a 'floor' is assessed by placing a tapping machine on the floor in the source room whilst the noise levels are measured in the receiving room. The tapping machine comprises of five hammers arranged along a common driven rail. The hammers are raised and allowed to fall freely from a height of 40mm. The time between impacts is 100ms and the mass of each hammer is 500g. Standardising the measured data to a reference reverberation time, the floor standardised impact sound pressure level (L'_{nT}) can then be calculated. This is then compared with a reference curve such that the weighted standardised impact sound pressure level can be obtained ($L'_{nT,,w}$). It should be noted that the tapping machine was placed at 45° to the joists.

Measurements were obtained in third octave frequency bands between 100 Hz and 3150 Hz. The tapping machine was located in four positions around the second floor ancillary room (source room) and spatially averaged internal noise measurements were made in a first floor ancillary room (receiver room) directly below. **Table 5.2** provides a summary of the noise reduction offered by the floor.

Table 5.2: Impact Sound Insulation Summary

Source Room	Volume (m^3)	Receiver Room	Volume (m^3)	Calculated $L'_{nT,w}$ (dB)	Approved Document E Maximum Performance (64 dB)	BS8233 Maximum Performance (62dB Bedroom to Bedroom)
Second Floor Ancillary Room	74	First Floor Ancillary Room	53	58	✓	✓

Table 5.2 shows that the floor between the first floor ancillary room and the second floor ancillary room meets ADE and BS 8233 performance requirements for impact noise.

5.1.3. Improvements to the Construction of the Floor

Although the exact construction of the floors are not known, it is likely that the floors are of a timber joist construction (ACCON have assumed a 100mm floor joist), with hardboard

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floorboards above and a lath and plaster ceiling below (which ACCON have assumed is equivalent to two layers of standard plasterboard).

In order to maximise the sound insulation that would be provided by this structure, it is important that the space between the floor joists is filled with dense acoustic insulation material (such as 60kg/m^3 rockwool).

As The Assembly House is a listed building, any alterations made may need the prior consent of LBC. If there are no alternative sound insulation solutions which can be identified that are acceptable, LBC may, in their discretion, relax any requirements for sound insulation.

The Floor between the First and Second Floors

It has been shown in **Table 5.1** above that the floor between the first and second floors will fail to achieve the requirements of ADE and BS8233 for airborne noise. The floor between the first floor residential and second floor residential will achieve the requirements of ADE and BS8233 for impact noise, as shown in **Table 5.2** above.

A 4 dB improvement to the airborne sound insulation of the floor between the first and second floors is required to achieve the standards set out in ADE and BS8233. Replacing any acoustic insulation between the floor joists with the recommended dense acoustic insulation material should afford some improvement. It would also be recommended that the ceiling is lined with one layer of 15mm soundblocking plasterboard and a floating floor system is installed on the second floor to ensure that the required improvements are achieved.

The Floor between the Second and Third Floors

The floor between the second and third floors has not been measured for airborne or impact sound insulation as it is currently in a dilapidated state and the results would not give an accurate reflection of the acoustic performance of the floor. Improvements to this floor, in line with the advice provided for the floor between the first and second floor should ensure that a reasonable level of sound insulation is achieved.

The Floor between the Ground and First Floors

An improvement of 7 dB to the airborne sound insulation from the pub on the ground floor to the proposed first floor guest rooms will be required in order to achieve the standards provided within BS8233. The informative criteria provided within BS8233 of 60 dB $D_{nT,w}$ + C_{tr} is set in respect of new build hotels and may not be achievable in a conversion of this type, without installing an independent ceiling below the existing ceiling in the bar area.

Some improvement to the airborne sound insulation can be achieved by installing a layer of mass loaded vinyl (with density 10kg/m^2) on top of the existing floor boards and then installing a floating floor on top of this. The floating floor could be either a proprietary or bespoke system, providing at least 30mm separation between the new and existing floorboards is achieved. Care would need to be taken when installing a floating floor in order to ensure that it is installed to the manufacturer's instructions and that the resilient

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layer below is not breached. The treatment would need to be implemented across the entire first floor in order to prevent noise flanking due to an acoustically weaker floor in the corridors. This approach would also overcome the issue of having a 'step up' in floor level between treated and untreated areas. The improvements to the floor should achieve an increase in airborne sound insulation of approximately 6 dB, to 59 dB $D_{nT,w} + C_{tr}$.

A further 2-3 dB improvement in the sound insulation could be achieved by installing one layer of 15mm soundblock plasterboard below the existing ceiling in the bar area. The airborne sound insulation should then be improved to approximately 61 dB $D_{nT,w} + C_{tr}$, which would achieve the standard set out in BS8233.

The standard as set out in Annex H of BS8233 is for a new build hotel. With converted premises, and especially those above Public Houses, people tend to be more tolerant of higher sound levels.

If it is not possible to install another plasterboard layer onto the ceiling, the improvements gained by the other mitigation measures specified in this section would reduce the impact of noise from the ground floor bar area to a minimum, in line with the aims of the NPPF and the NPPG.

5.2 Walls

The existing walls are likely to be a single skin of 120mm brickwork, plastered both sides. Within the proposed layout, this will achieve a $D_{nT,w} + C_{tr}$ between guest rooms of approximately 40 dB, which would not meet the requirements of ADE and BS8233.

Where any existing walls will be utilised to separate two guest rooms, a plasterboard lining system will need to be installed on one side of the wall. ACCON recommend that this lining system would be one layer of standard 12.5mm plasterboard placed on a 50mm wide frame filled with dense acoustic insulation. The frame can be fitted directly to the existing wall. The 120mm brickwork with a plasterboard lining system would achieve a $D_{nT,w} + C_{tr}$ between guest rooms of approximately 47 dB which would meet the requirements of ADE and BS8233.

Where new walls are to be built they should be designed to achieve an $R_w + C_{tr}$ (laboratory rated sound insulation index, with low frequency C_{tr} correction) of at least 48 dB, which can be achieved with a specially designed plasterboard based partition. Assuming a high standard of workmanship, and no acoustic weaknesses due to flanking, this should achieve the requirements of ADE and BS8233 of 43 dB $D_{nT,w} + C_{tr}$. ACCON have not been provided with any proposed construction details, and therefore a more detailed assessment cannot be completed.

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6. PLANT NOISE ASSESSMENT

The typical measured background noise levels, for a noise impact assessment in line with BS4142 are:

- $L_{A90,\ 1\ hour}$, during the daytime hours of operation (0700 - 2300 hrs) was 59 dB L_{A90}.
- $L_{A90,\ 5\ mins}$, during the night time hours of operation (2300 - 0700 hrs) was 52 dB L_{A90}.

To achieve a noise rating level that would be described as a "*positive indication that complaints are unlikely*", plant equipment associated with the Public House should not emit noise levels which are greater than 10 dB below the background noise level (L_{A90}).

For noise from the plant equipment to achieve the criteria of 10 dB below the background noise level a rating level of 49 dBA or less, during the daytime period, is required. To achieve a rating level of 49 dBA the specific noise level (the noise level from the plant equipment at the nearest noise sensitive receptor) must not exceed 49 dBA or 44 dBA if the plant equipment is tonal, intermittent, or contains any other acoustic features.

For the night-time period (2300 – 0700 hrs), a rating level of 42 dBA is required. To achieve a rating level of 42 dBA the specific noise level must not exceed 42 dBA or 37 dBA if the plant equipment is tonal, intermittent, or contains any other acoustic features.

It has been proposed that the new plant equipment will be positioned on an area of flat roof of The Assembly House alongside existing items of plant. The nearest noise sensitive dwelling could potentially be 1 Leighton Road (1 metre from plant). If there is no line of sight with any windows at the identified noise sensitive receptor, then noise from the plant equipment is unlikely to be a concern. The location of the nearest noise sensitive receptor is identified in **Appendix 4**.

The total sound power level (L_{WA}) to meet the sound pressure level criteria discussed above, if there is a line of sight between the proposed plant equipment and any windows at the identified noise sensitive receptor, is shown in **Table 6.1** below.

Table 6.1: Total Sound Power Level of Plant Equipment

Nearest Noise Sensitive Dwelling	Total Sound Power Level (L_{WA}) of Plant Equipment			
	5 dB character correction		No character correction	
	Day	Night	Day	Night
1 Leighton Road	52	45	57	50

If there is a line of sight between the proposed plant equipment and any windows at the identified noise sensitive receptor, it will be important to ensure that plant associated with The Assembly House Public House does not exceed the specific noise levels identified in this section of the report. Careful consideration is required as to the specification and siting

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of any plant/equipment. If the plant/equipment was positioned further away from the identified noise sensitive receptor, the total sound power levels identified in **Table 6.1** may be increased accordingly.

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7. CONCLUSIONS

In order to support a planning application for the proposed conversion of the upper floors of The Assembly House Public House into 8 guest rooms and ancillary floorspace within The Assembly House, a detailed noise assessment has been carried out. The Assembly House is a Grade II listed building and therefore any alternations made may need the approval of the local planning authority. If there are no alternative sound insulation solutions which can be identified that are acceptable, LBC may, in their discretion, relax any requirements for sound insulation.

It has been shown that the existing glazing, assuming that the frames and sealing are in good condition and that it offers an SRI of 28 dB, would achieve a good internal noise environment within the proposed guest rooms of The Assembly House. This would achieve compliance with the guidelines of BS8233 for the daytime and night-time periods.

In order to mitigate sound transmission between floors, ACCON have made recommendations to improve the sound insulation of the floor structure, which would achieve compliance with the guidelines of the Building Regulations Approved Document E "Resistance to the passage of sound". The recommendations would also achieve an improvement in the airborne sound insulation between the bar and the guest rooms immediately above, such that they would be closer to the informative criteria provided within BS8233 for new build hotels, although they may not quite comply with those standards. It should be noted that guests staying in guest rooms above Public Houses are likely to be more tolerant of higher sound levels than those guests staying in hotels.

A plant noise assessment in line with BS4142 has identified the maximum acceptable noise levels which may be emitted by the proposed plant equipment at The Assembly House during both the daytime and night-time periods. The noise levels identified should ensure that "*complaints are unlikely*".

Achievement of the target noise criteria ensures compliance with the overall aims of the NPPF and the NPPG in that noise will not result in any adverse effects on health or quality of life for future occupants of the guest rooms at The Assembly House and existing occupants neighbouring the public house.

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Appendix 1
Glossary of Acoustic Terms

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Appendix 1: Glossary of Terms

Term	Description
'A'-Weighting	*This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.*
Decibel (dB)	*This is a tenth (deci) of a bel. The decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.*
$L_{Aeq,T}$	*The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.*
L_{A90}	*The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the L_{A90T}. The L_{A90} is used to describe the background noise levels at a particular location.*
L_{Amax}	*The 'A'-weighted maximum sound pressure level measured over a measurement period.*
$D_{nT,w}$	*Weighted value of D, standardised to a constant reverberation time.*
C_{tr}	*The correction to a sound insulation quantity (such as DnT,w) to take account of a specific sound spectra.*
$D_{nT,w + Ctr}$	*A single number quantity which characterises the airborne sound insulation between rooms using noise spectra no.2 as defined in BS EN ISO 717-1:1997*
$L'_{nT,W}$	*Weighted value of L, standardised to a constant reverberation time.*
R_w	*Weighted sound reduction index, a single number quantity for the airborne sound insulation in buildings and of building elements such as wall, doors and windows. The quantity is intended for rating the airborne sound insulation and for simplifying the formulation of acoustical requirements in building codes, when measured in the presence of flanking sound transmission, denoted R'w.*

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Appendix 2
Noise Monitoring Positions

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Appendix 2: Noise Monitoring Positions

LEGEND

- Semi Permanent Noise Monitoring Position
- Site Boundary

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Client: Greene King PLC		Description: Site Location with Noise Monitoring Positions		Design	VB	21.03.2014
				Drawn	VB	24.03.2014
Rev: A	Description: FINAL	Project: Greene King Pubs – The Assembly House		Checked	DY	25.03.2014

Appendix Two

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Appendix 3
Summary of Noise Measurements

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Appendix 3: Summary of Noise Measurements

Time	$L_{Aeq, 1hr}$	$L_{AF(max)*}$	L_{A10}	L_{A50}	L_{A90}
07:00-08:00	67.6	89.4	70.2	64.9	59.8
08:00-09:00	67.8	88.6	70.3	66.0	62.5
09:00-10:00	65.6	87.0	68.7	63.8	59.2
10:00-11:00	66.0	86.3	68.6	64.2	59.6
11:00-12:00	67.3	90.6	69.3	64.1	59.2
12:00-13:00	65.3	89.2	68.1	63.7	59.1
13:00-14:00	65.4	79.9	68.3	63.9	59.6
14:00-15:00	65.4	80.2	67.9	63.6	59.3
15:00-16:00	66.7	91.7	69.5	64.5	59.5
16:00-17:00	66.1	87.0	69.0	64.2	58.9
17:00-18:00	67.3	91.0	69.0	64.3	59.9
18:00-19:00	66.8	93.7*	68.8	63.7	59.0
19:00-20:00	65.4	81.3	68.1	63.4	58.1
20:00-21:00	63.9	78.8	67.1	61.7	56.4
21:00-22:00	63.9	88.3	66.9	61.4	56.7
22:00-23:00	63.4	80.6	66.4	61.6	57.2
23:00-00:00	62.5	75.6	65.9	59.9	54.9
00:00-01:00	61.6	80.6	65.1	58.3	52.1
01:00-02:00	59.9	77.3	63.4	56.0	49.7
02:00-03:00	58.8	83.6*	61.8	54.3	48.6
03:00-04:00	60.0	78.8	63.0	55.7	49.5
04:00-05:00	59.4	75.8	63.0	55.6	50.2
05:00-06:00	61.2	79.5	64.7	58.1	52.0
06:00-07:00	64.2	81.8	67.3	62.1	56.4
07:00-23:00	**66.2**	**93.7**	**68.5**	**63.7**	**59.0**
23:00-07:00	**61.2**	**83.6**	**64.3**	**57.5**	**51.7**

***Highest L_{Amax} in period**

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Appendix 4
Receptor Location

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Appendix 4: Receptor Location

LEGEND

- Approximate plant position
- Potential nearest noise sensitive receptor
- Site Boundary

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Client: Greene King PLC		Description: Site Location with Receptor Location		Design	VB	17.04.2014
				Drawn	VB	17.04.2014
Rev: A	Description: FINAL	Project: Greene King Pubs – The Assembly House		Checked	DY	17.04.2014

Appendix Four

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