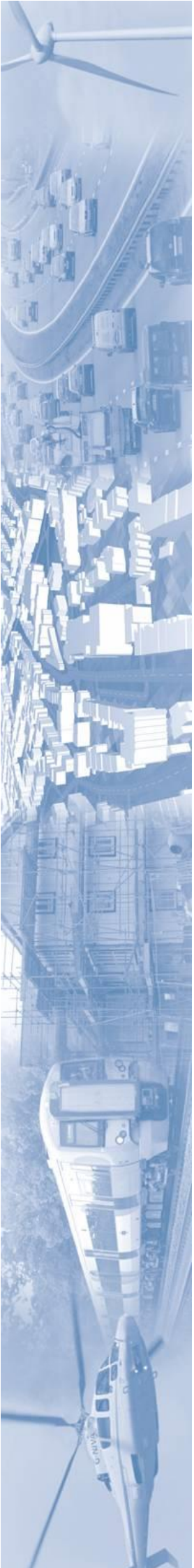


Report for

Greene King PLC

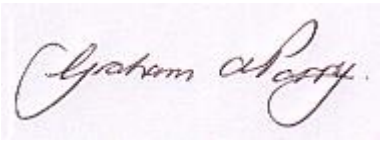
Greene King Pubs – The Assembly House, Kentish Town

Noise Assessment

Status: Final **Date: 13.12.2017**

Greene King PLC

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

Author:	**Mike Ledbetter**
Contributors	**Angela Lamacraft**
Approved By:	 **Graham Parry** **Managing Director**
Report For:	**Shane McNulty** **Greene King PLC** **Abbot House** **Westgate Street** **Bury St Edmunds**
Date:	**13.12.2017**
Version Number:	**A2142/N/004 – Version 5**
Status:	**Final**

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Table of Contents

List of Appendices

List of Figures

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

List of Tables

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

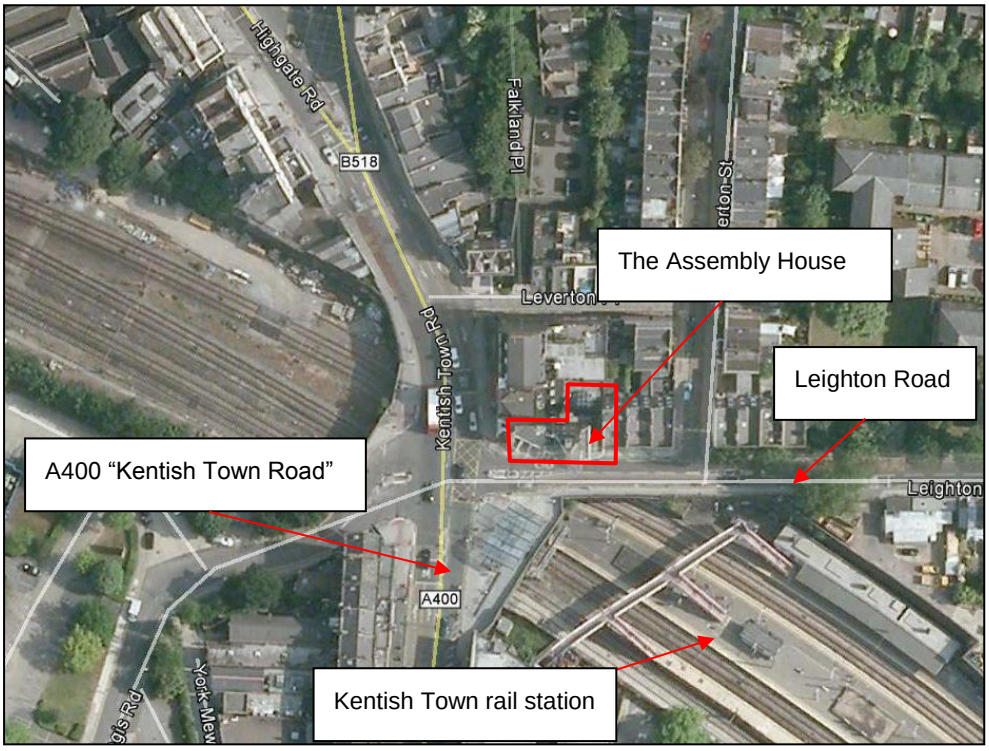
1 INTRODUCTION

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 seven guest rooms and ancillary floor space within The 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 floor space. 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[1] 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

[1] Retrieved on 7th December 2017 from: https://historicengland.org.uk/listing/the-list/list-entry/1379240

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

from any proposed air handling plant that will be installed. Recommendations for mitigation are made where appropriate. A Glossary of Acoustic Terms is provided in **Appendix 1**.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

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 characterise 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, for example, from 60 dB (A) to 70 dB (A) would represent a doubling in 'loudness'. Similarly, a decrease in noise, for example 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[2]. **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

[2] Institute of Environmental Management and Assessment (2014). Guidelines for environmental noise impact assessment.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

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.

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.*

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

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 Planning Practice Guidance

The Planning Practice Guidance for Noise (PPG-N), 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 PPG-N does not provide any advice with respect to specific noise levels/ limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new development would be sensitive to the prevailing acoustic environment.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

3.4 London Borough of Camden

3.4.1 Camden Local Plan 2017

The London Borough of Camden (LBC) has provided advice on hotel/visitor accommodation in the Camden Local Plan 2017. Paragraph 5.56 of the Local Plan 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 rooms by 2036 across London. The Working Paper also states that 37% of the expected increase in the number of rooms across Greater London will be met in Westminster, City of London and Camden. This policy aims to maintain and encourage a range of attractions and accommodation in the borough for Camden's visitors.*"

With reference to noise and vibration, *Policy A4* of the Local Plan states the following:

"*The Council will seek to ensure that noise and vibration is controlled and managed.*

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3 [of the Local Plan]*). We will not grant planning permission for:*

- *Development likely to generate unacceptable noise and vibration impacts; or*
- *Development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.*

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development."

Appendix 3 of the Local Plan provides detailed advice on noise levels and criteria for development. There are not any specific criteria regarding hotels and guest houses, however, the criteria reproduced in **Table 3.1** are applicable to residential development proposed in areas of existing anonymous noise. LBC define anonymous noise as "*general environmental noise, road traffic and rail traffic*". The noise levels in **Table 3.1** are typically considered for dwellings, however, they may be considered for other residential uses, such as hotel accommodation.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Table 3.1: Noise Levels Applicable to Noise Sensitive Residential Development Proposed in Areas of Existing Noise

Assessment Location	Design Period	Lowest Observed Adverse Effect Level (LOAEL)	LOAEL to SOAEL	Significant Observed Adverse Effect Level (SOAEL)
Noise at 1 metre from noise sensitive façade / free field	Day	<50 dB $L_{Aeq,16hr}$	50 dB to 72 dB $L_{Aeq,16\ hr}$	>72 dB $L_{Aeq,16hr}$
	Night	<45 dB $L_{Aeq,8hr}$ <40 dB L_{night}	45 dB to 62 dB $L_{Aeq,8hr}$ >40 dB L_{night}	>62 dB $L_{Aeq,8hr}$
Inside a bedroom	Day	<35 dB $L_{Aeq,16hr}$	35 dB to 45 dB $L_{Aeq,16hr}$	>45 dB $L_{Aeq,16hr}$
	Night	<30 dB $L_{Aeq,8hr}$ 42 dB L_{AFmax}	30 dB to 40 dB LAeq,8hr 40 dB to 73 dB L_{AFmax}	>40 dB $L_{Aeq,8hr}$ >73 dB L_{AFmax}
Outdoor living space (free field)	Day	<50 dB $L_{Aeq,16hr}$	50 dB to 55 dB $L_{Aeq,16hr}$	>55 dB $L_{Aeq,16hr}$
Notes: $L_{Aeq,T}$ values specified for outside a bedroom window are façade levels. L_{night} values specified outside a bedroom are free-field levels.				

For industrial and commercial noise sources, LBC anticipate the use of British Standard 4142: 2014 *Methods for rating and assessing industrial and commercial sound*. The lowest observed adverse effect level (LOAEL) for dwellings is a rating level that is 10 dB below background with no events exceeding 57 dB L_{Amax} during the night-time. The 10 dB criterion may need to be increased to 15 dB if there are audible tonal features unless it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed sound source. The significant observed adverse effect level (SOAEL) for dwellings is a rating level greater than 5 dB above background and/or night-time events exceeding 88 dB L_{Amax}.

3.4.2 Camden Planning Guidance – Amenity, Draft: November 2017

The draft Camden Planning Guidance document titled "*Amenity*" provides further advice on the noise and vibration requirements to support planning applications. With reference to sound insulation between dwellings paragraphs 6.22 states:

"*The requirements of the Building Regulations are usually adequate for the sound insulation between floors and walls of adjoining dwellings, making planning conditions unnecessary.*"

Where the Building Regulations requirements are considered inadequate, LBC are likely to consider guidance available within British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings* and the World Health Organization publications *Guidelines for Community Noise* and *Night Noise Guidelines for Europe*.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

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 2010 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 3.2 – 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

3.6 British Standard BS 8233:2014

BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* 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. The most appropriate internal sound insulation criteria to the proposed development are reproduced in **Table 3.3**.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Table 3.3: Example noise criteria for hotels

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

The most appropriate indoor ambient noise level ranges to the proposed development are reproduced in **Table 3.4**.

Table 3.4: 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_{AFmax}

3.7 British Standard 4142:2014

British Standard 4142:2014 "*Methods for rating and assessing industrial and commercial sound*" 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 sound level").

The rating level is determined by assessing the character of the noise and applying an acoustic feature correction if appropriate. Corrections are applied for the tonality and intermittency of the noise source which can both make noise more noticeable.

The initial assessment described in BS 4142 to determine whether an adverse impact is likely is based on establishing the difference between the rating level and the background noise level outside the residential property of interest. The British Standard states that the following points should be considered:

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level,*

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

this is an indication of the specific sound source having a low impact, depending on the context.

Where it is considered that the initial assessment of the impact needs to be modified due to the context in which the noise is occurring, BS 4142 suggests that all pertinent factors are taken into consideration, including:

1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*

   Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

   Where residual sound [3] levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*

   i) facade insulation treatment;

   ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and

   iii) acoustic screening.

[3] The residual sound is defined as the ambient sound level at the assessment location in the absence of the specific sound source.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

3.8 Assessment Criteria

3.8.1 Ambient Noise Assessment

The indoor ambient noise level ranges in **Table 3.4** for hotel rooms are broadly in line with the LBC *LOAEL* and *LOAEL to SOAEL* criteria in **Table 3.1** which are typically utilised for residential dwellings. The assessment of indoor ambient noise levels will aim to achieve internal noise levels within the ranges identified in **Table 3.4** as far as reasonably practicable and with consideration of the age and the Grade II listed status of the existing building.

3.8.2 Sound Insulation Between Rooms

An assessment of the internal sound insulation between the proposed guest rooms and the existing bar aim to achieve the criteria in **Table 3.3** as far as reasonably practicable and with consideration of the age and listed status of the existing building. The guidance in **Table 3.3** is in line with the Building Regulations requirements for residential dwellings, but requires a greater sound reduction between the bar area and any bedrooms. As such, these performance standards are considered to be appropriate for this assessment.

3.8.3 Plant Noise Assessment

At this stage, details of any new plant systems which may be installed as part of this development are unknown. Therefore, an assessment of the maximum sound power levels which are likely to be permissible has been carried out. The assessment aims to ensure that any proposed plant rating levels are at least 10 dB below the background noise level, in accordance with the LBC criteria.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

4 AMBIENT NOISE ASSESSMENT

4.1 Baseline Noise Measurements

In order to characterise the existing noise climate, a noise measurement study has been carried out at the site. Noise measurements were carried out utilising one semi-permanent noise monitor in a free-field position. The noise monitoring position was located on a first floor balcony with the microphone positioned at an overall height of 4.5 m above local ground level. The first floor balcony overlooks the A400 "Kentish Town Road" 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 Svantek 971 Class 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 Tuesday 14th November 2017 and Wednesday 15th November 2017.

The weather at the start of the measurement period was dry and cloudy with wind speeds of 2 m/s and a temperature of up to 10°C during the daytime, dropping to 6°C overnight.

There was a period of rain between 0350 hrs and 0420 hrs on Wednesday 15th November 2017. An analysis of the noise measurements during the night-time period has shown that this period of rain did not significantly affect the overall results of the noise measurement survey.

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 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 childrens' voices from a nearby school were also audible at the measurement position.

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

Period	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
07:00 – 23:00	72	98	70	59
23:00 – 07:00	69	90	67	53

Note: The average levels stated are logarithmic for the $L_{Aeq,T}$ and arithmetic for the L_{A10} and L_{A90}. The L_{Amax} noise levels stated are the average of the highest hourly maximum noise levels.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

4.2 Internal Noise Levels

The existing windows at The Assembly House are single glazed windows, which will achieve a maximum sound reduction of 28 dB(A), assuming that the frames are in good condition and that the sealing is of a good standard. The windows (and any ventilation openings) are typically the weakest sound insulation elements of a building façade and therefore it can be assumed that the approximate façade sound insulation is 28 dB(A). **Table 4.2** identifies the likely internal noise levels using these assumptions and compares these levels against the informative criteria set out in BS 8233 (30-40 $L_{Aeq,\,T}$ daytime and 25-35 $L_{Aeq,\,T}$ night-time).

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

External Noise Levels (dB)		Approximate Façade Sound Insulation (dBA)	Internal Noise Levels (dB)		Compliance with Criteria
$L_{Aeq,16hr}$	$L_{Aeq,8hr}$		$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	BS 8233
72	69	28	44	41	X

It can be seen, by reference to **Table 4.2**, that the predicted internal noise levels fail to achieve the informative criteria set out in Annex H of BS 8233 during the day and night time periods.

Table 4.3 below identifies the likely internal maximum noise levels (L_{AFmax}) using the façade sound reduction assumptions and compares these levels against the criteria set out in BS 8233 (45-55 L_{AFmax} night-time).

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

External Noise Levels (dB)	Approximate Façade Sound Insulation (dBA)	Internal Noise Levels (dB)	Compliance with Criteria
L_{AFmax}		L_{AFmax}	BS 8233
88	28	60	X

Note: The external maximum noise level is the 10th highest L_{Amax} measured during the night-time period. It is indicated in the World Health Organisations Guidelines for Community Noise (1999) that the L_{AFmax} criteria should not be exceeded more than 10 – 15 times per night.

It can be identified by reference to **Table 4.3** that the predicted internal noise levels fail to achieve the informative criteria set in BS 8233 for maximum noise levels.

It is ACCON's opinion that the performance of the windows should be upgraded such that they provide an A-weighted sound reduction of 34 dB. This would result in internal noise levels of 38 dB $L_{Aeq,16hr}$ during the daytime, 35 dB $L_{Aeq,8hr}$ during the night-time and 54 dB L_{AFmax} during the night-time. This would meet the informative criteria in Annex H of BS 8233 and therefore no further mitigation would be necessary. However, as The Assembly House is a listed building, the desired method for upgrading the sound insulation properties of the windows is with the use of secondary glazing. A 4 mm Selectaglaze Series 10 secondary glazing system is reported by Selectaglaze to provide an R_W (laboratory measured sound reduction index) of 39 dB when fitted to a 6 mm primary window using a 50 mm cavity. This

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

is therefore sufficient to achieve the required internal noise levels for daytime and night-time $L_{Aeq,T}$ and night-time L_{AFmax}. It should be noted that this assessment has not accounted for a decrease in the sound reduction offered by the secondary glazing if trickle ventilation is required. Acoustic trickle vents (with 4000 mm^2 equivalent free area) are reported by Selectaglaze to reduce the overall sound reduction index by 2 dB.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

5 INTERNAL SOUND INSULATION

5.1 Internal Sound Insulation

In order to determine the current level of sound insulation, a noise measurement survey was undertaken in 2014 in order to quantify the sound reduction properties of the current structure. The internal construction of the Public House has not changed since this survey therefore the results are still considered to be valid.

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).

5.2 Floors

5.2.1 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 one-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)	BS 8233 Minimum Performance (60 dB Bar to Bedroom and 45 dB Bedroom to Bedroom)
Ground Floor Public House	>100	First Floor Ancillary Room	53	53	✓	X
Second Floor Ancillary Room	74	First Floor Ancillary Room	53	41	X	X

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

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.

5.2.2 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 one-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)	BS 8233 Maximum Performance (62 dB 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. Therefore, any improvements to the sound insulation of the separating floors in order to improve the airborne sound insulation, as discussed in **Section 5.2.3**, are also likely to further improve the impact sound insulation performance to some extent.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

5.2.3 Improvements to the Construction of the Floor

The list entry summary for The Assembly House (obtained from Historic England[4]) states that the building has an "*elaborately moulded plaster ceiling in Jacobean style*". It is assumed from the wording of the list entry summary that this is only refers to the bar area at ground floor level. However, to be certain that no features of historic or architectural importance would be adversely affected by the proposed development, all reasonably practicable mitigation measures will be considered which do not require the removal or replacement of the ceilings within the listed building.

It is also understood by ACCON that alterations which significantly increase the thickness of the floors are also unlikely to be acceptable.

A minimum improvement of 7 dB to the airborne sound insulation from the Public House bar on the ground floor to the proposed first floor guest rooms will be required in order to achieve the standards provided within BS 8233. The informative criteria provided within BS 8233 of 60 dB $D_{nT,w}$ + C_{tr} is typically considered in respect of new build hotels and may not be achievable in a conversion of this type.

A minimum improvement of 4 dB to the airborne sound insulation of the floor between the first and second floor guest rooms is required to achieve the standards set out in ADE and BS 8233.

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. It is likely that the construction of this floor is similar to the floor between the first and second floors. Therefore, 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 when this floor is restored.

The exact construction of the separating floors is not known, however, it is likely that the floors are of a timber joist construction (ACCON have assumed a 200mm floor joist), with softwood floorboards above and a lath and plaster ceiling below.

Detail 73 of Section 5 (Separating Floors) of the British Gypsum HomeSpec[5] provides some recommendations which may be appropriate for consideration at The Assembly House. The aim of this detail is to avoid altering an existing ceiling and to minimise any increase to the thickness of the floor whilst improving the sound insulation of the separating element.

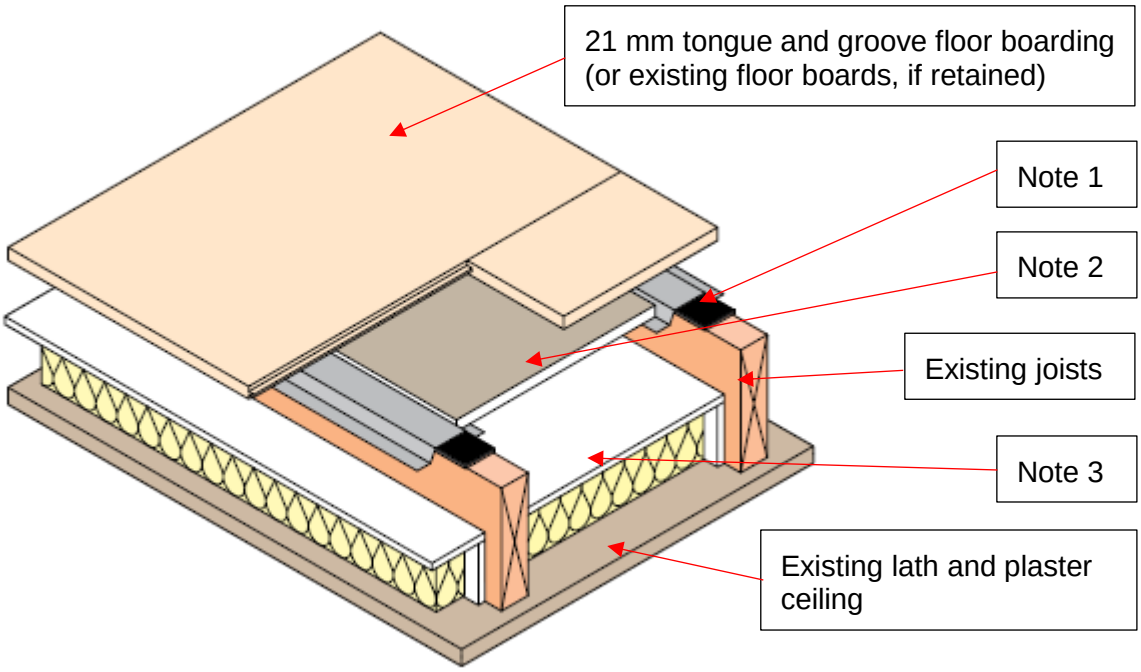
The detail utilises Gypframe SIF Floor Channels on the top of joists, supporting a layer of Gyproc Plank which would provide further sound reduction to the separating floors without significantly increasing the thickness of the floor. The detail also provides a comprehensive approach to installing insulation between the joists. **Figure 5.1** identifies a cut-away of the floor construction which has been obtained from Detail 73.

[4] Retrieved on 7th December 2017 from: https://historicengland.org.uk/listing/the-list/list-entry/1379240

[5] Retrieved on 7th December 2017 from: http://www.british-gypsum.com/literature/sector-guides/homespec

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Figure 5.1: Extract of Detail 73, Section 5, British Gypsum HomeSpec



Note 1: Gypframe SIF Floor Channels
Note 2: 19mm Gyproc Plank
Note 3: Cavity bridged between joists (minimum width of 50 mm) by 12.5 mm Glasroc F multiboard resting on 100 mm wide, 12.5 mm thick Glasroc F multiboard strips, screw-fixed to each joist flush with the bottom edge. 100 mm Isover Acoustic Partition Roll (APR 1200) in the cavity.

If the complete detail identified in **Figure 5.1** cannot be installed then, as a minimum, the cavity between floor joists should be filled, or any existing insulation between the floor joists should be replaced, with a dense acoustic insulation material. An insulation product with a minimum density of 22 kg/m^3 and a minimum thickness of 50 mm should be installed. Depending on the quality of any existing insulation, installing dense acoustic insulation could provide up to an additional 6 dB sound reduction to the separating floors.

Additionally, it is recommended that a layer of mass loaded vinyl is installed between the floor joists and the floorboards. A continuous sheet product which is 4 mm thick and has a surface mass of 10 kg/m^2 could provide up to 3 dB further sound reduction to the separating floors. If only strips are utilised along the top of joists and the existing floorboards are to be reused, any gaps should be completely sealed by any available reasonably practicable means (such as re-laying the boards, using timber fillets and/or acoustic sealant) as this will further inhibit the passage of sound.

It is recommended that these improvements are installed to all floors in order to provide the greatest level of sound reduction between all floors in the building.

It should be noted that any alterations to the building may need prior consent from LBC. If no appropriate sound insulation solutions can be identified which are acceptable with regards to

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

the listed status of the building, LBC may, at their discretion, relax the requirements for sound insulation.

The standard as set out in Annex H of BS 8233 is typically considered for a new build hotel. With converted premises, and especially those above Public Houses, people tend to be more tolerant of higher sound levels.

The improvements gained by the mitigation measures specified in this section would reduce the effects of noise from the ground floor bar area and between guest rooms to a minimum, in line with the aims of the NPPF and the PPG-N.

5.3 Walls

The existing walls are likely to be a single skin of 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 BS 8233.

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 metal or timber frame filled with dense acoustic insulation. The frame can be fitted directly to the existing wall. The single skin 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 BS 8233.

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 BS 8233 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 at the present time.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

6 PLANT NOISE ASSESSMENT

It has been proposed that the new plant equipment will be positioned on an area of the first floor flat roof of The Assembly House alongside existing items of plant. Some ductwork connected from the kitchen extract fans will also be relocated to this area. The worst affected noise sensitive dwelling is 1 Leighton Road (1 m from plant). If plant is positioned such that there is no line of sight with any windows at the identified noise sensitive receptor, then noise from the plant equipment or ducting 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 ensure an indication of a low impact, if there is a line of sight between the proposed plant equipment or ducting and any windows at the identified noise sensitive receptor, is shown in **Table 6.1** below.

Table 6.1: Maximum BS 4142 Sound Power Level

Results	Nearest Noise Sensitive Receptor		Relevant Clauses of BS 4142:2014	Commentary
	Daytime	Night-time		
Typical Background Sound Level $L_{A90,T}$ (dB)	60	55	8.1, 8.2	The most frequently occurring background sound level over consecutive 5 minute measurements during the specific periods.
Maximum Rating Level $L_{Aeq,1hr}$ (dB)	50	45	9.1	The maximum allowed rating noise level in order to achieve specified criteria (10 dB below the $L_{A90,T}$)
Acoustic Feature Correction	Unknown	Unknown	9.2	No acoustic feature correction has been applied as the specific plant items have not been specified
Maximum Specific Sound Level $L_{Aeq,1hr}$ (dB)	50	45	9.1, 9.2	(Rating Level - Acoustic Feature Correction)
Maximum Sound Power Level L_{WA} (dB)	58	53	-	Maximum sound power level to achieve specified criteria. (Receptor 7 m from source)

If there is a line of sight between the proposed plant equipment or ducting 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 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. Alternatively, noise attenuation measures such as acoustic attenuators, acoustic louvres or acoustic enclosures may be required.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

7 CONCLUSIONS

In order to support a planning application for the proposed conversion of the upper floors of The Assembly House Public House into seven guest rooms and ancillary floor space 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, at their discretion, relax any requirements for sound insulation.

It has been shown that the existing approximate façade sound insulation would not achieve internal noise levels within the guideline ranges provided in BS 8233. It has been recommended that the windows are upgraded such that they provide an A-weighted sound reduction of 34 dB. Due to restrictions on the development of the listed building, secondary glazing has been recommended.

In order to mitigate sound transmission between floors, ACCON have made recommendations to improve the airborne sound insulation of the floor structure between the bar and the guest rooms immediately above. The improvements would ensure that the sound insulation properties would be closer to the informative criteria provided within BS 8233 for new build hotels, although they may not fully 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 recently constructed purpose-built hotels. The proposed mitigation measures should also ensure that the airborne sound insulation between guest rooms on different floors achieves compliance with the guidelines of the Building Regulations Approved Document E “Resistance to the passage of sound”.

A plant noise assessment in line with BS 4142 has identified the maximum acceptable noise levels which may be emitted by the proposed plant equipment or ducting at The Assembly House during both the daytime and night-time periods. The noise levels identified should ensure that the likelihood of an adverse impact is low. Should the plant emit a higher sound pressure than that which is specified in **Table 6.1** then noise attenuation measures such as acoustic attenuators, acoustic louvres or acoustic enclosures may be required.

Achievement of the target noise criteria ensures compliance with the overall aims of the NPPF and the PPG-N 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 of properties neighbouring the Public House.

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Appendix 1
Glossary of Acoustic Terms

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

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.*

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Appendix 2
Noise Monitoring Positions

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Appendix 2: Noise Monitoring Positions

LEGEND

- Semi Permanent Noise Monitoring Position
- Site Boundary

N
W E
S

Client: Greene King PLC		Description: Site Location with Noise Monitoring Positions		Design	ML	21.11.2017
				Drawn	ML	21.11.2017
Rev: A	Description: FINAL	Project: Greene King Pubs – The Assembly House		Checked	AL	22.11.2017

ACCON UK ENVIRONMENTAL CONSULTANTS

Appendix Two

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Appendix 3
Summary of Noise Measurements

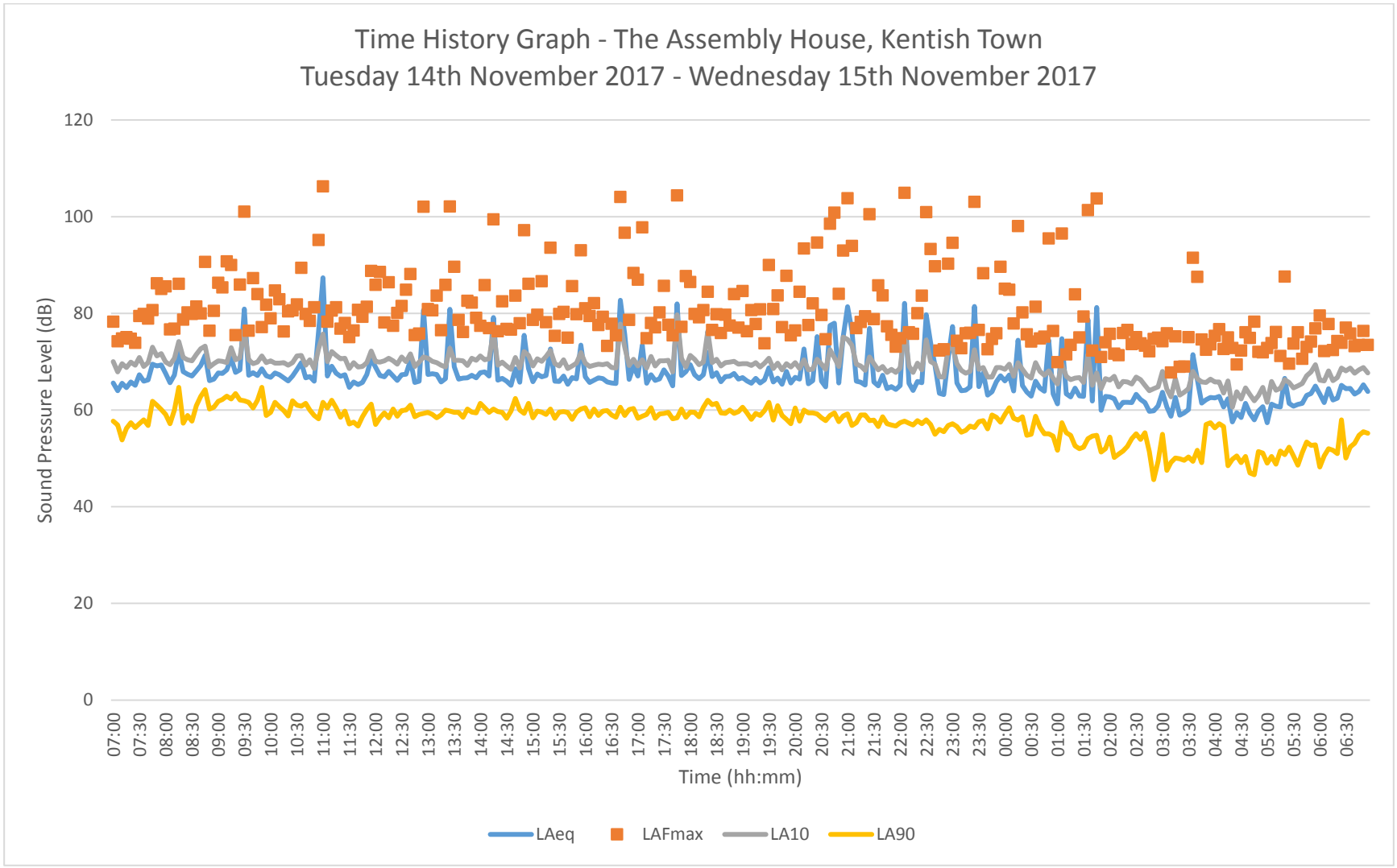
Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Appendix 3: Summary of Noise Measurements

Time	$L_{Aeq, 1hr}$	$L_{AF(max)*}$	L_{A10}	L_{A90}
07:00-08:00	66.9	86.2	70.1	57.8
08:00-09:00	68.5	90.7	71.0	60.3
09:00-10:00	72.1	101.0	71.0	62.0
10:00-11:00	69.3	95.2	70.2	60.2
11:00-12:00	77.0	106.3	70.7	59.5
12:00-13:00	71.8	102.0	70.3	59.2
13:00-14:00	71.7	102.1	70.2	59.4
14:00-15:00	71.5	99.5	70.7	60.2
15:00-16:00	68.5	93.6	70.1	59.3
16:00-17:00	73.5	104.1	70.4	59.6
17:00-18:00	72.8	104.4	70.5	59.0
18:00-19:00	67.9	86.5	70.5	60.0
19:00-20:00	66.5	90.0	69.4	59.2
20:00-21:00	72.8	100.9	70.1	58.9
21:00-22:00	73.4	103.8	69.7	57.8
22:00-23:00	74.3	104.9	70.0	56.9
23:00-00:00	72.8	103.1	68.9	57.1
00:00-01:00	68.6	98.0	68.1	57.0
01:00-02:00	73.2	103.8	66.9	53.6
02:00-03:00	61.6	76.6	65.5	52.0
03:00-04:00	64.2	91.5	65.4	51.4
04:00-05:00	60.6	78.3	63.8	51.2
05:00-06:00	62.5	87.6	65.6	51.0
06:00-07:00	63.8	79.6	67.6	52.7
07:00-23:00	**72.1**	**98.2**	**70.3**	**59.3**
23:00-07:00	**68.5**	**89.8**	**66.5**	**53.2**

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

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814



Email: enquiry@accon-uk.com • www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Appendix 4
Receptor Location

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Appendix 4: Receptor Location

LEGEND

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

N
W E
S

Client: Greene King PLC		Description: Site Location with Receptor Location		Design	ML	21.11.2017
				Drawn	ML	21.11.2017
Rev: A	Description: FINAL	Project: Greene King Pubs – The Assembly House		Checked	AL	22.11.2017

ACCON UK ENVIRONMENTAL CONSULTANTS

Appendix Four

Email: enquiry@accon-uk.com ● www.accon-uk.com
Unit B, Fronds Park, Frouds Lane, Aldermaston, Reading, RG7 4LH
Reading Office Tel: 0118 971 0000 Fax: 0118 971 2272
Brighton Office Tel: 01273 573 814

Email: enquiry@accon-uk.com

Reading Office:

Tel: 0118 971 0000
Fax: 0118 971 2272
Unit B, Fronds Park,
Frouds Lane, Aldermaston,
Reading, RG7 4LH

Brighton Office:

Tel: 01273 573 814
Citibase, 95 Ditchling Road,
Brighton, East Sussex, BN1 4ST

www.accon-uk.com