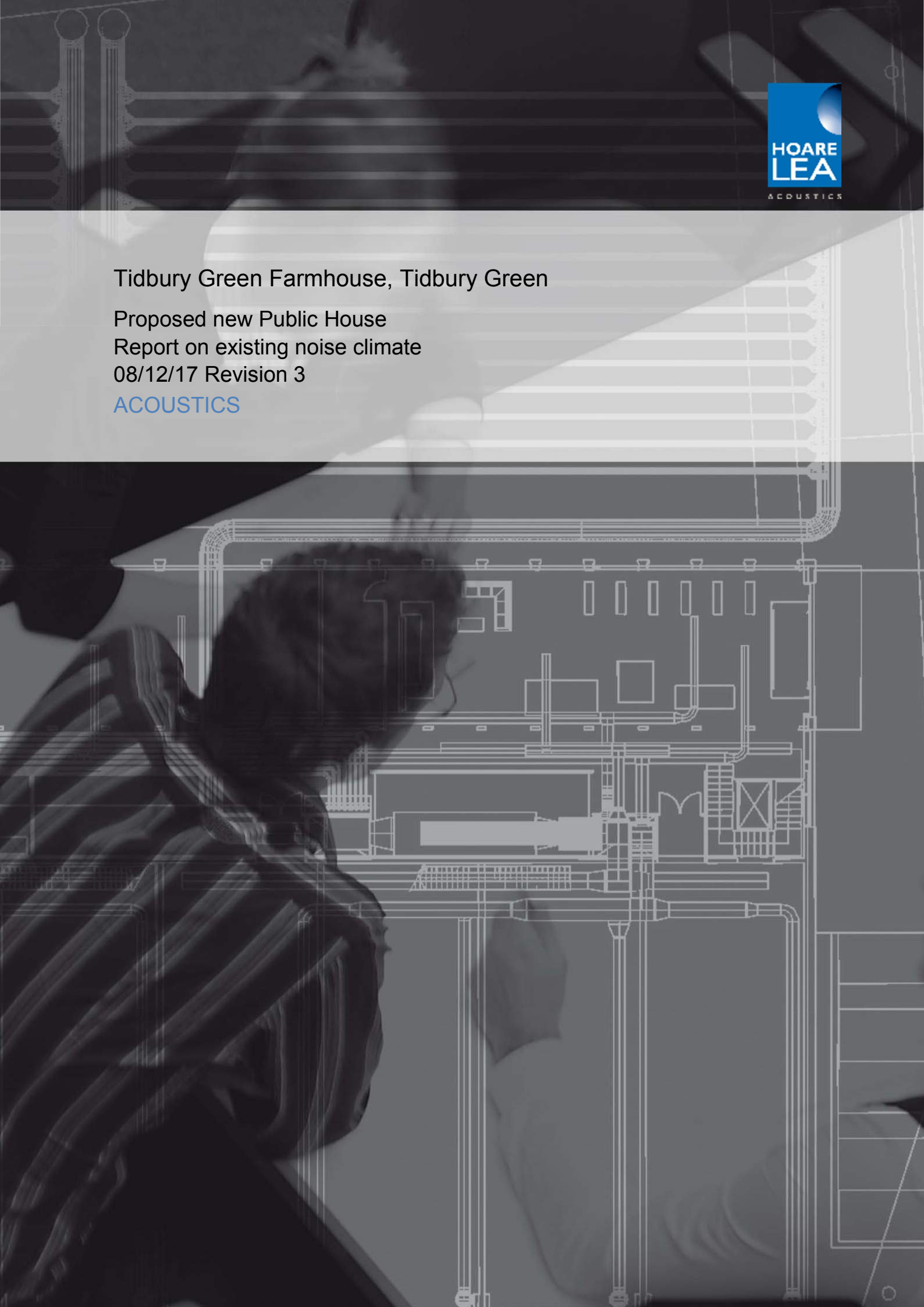


Tidbury Green Farmhouse, Tidbury Green

Proposed new Public House
Report on existing noise climate
08/12/17 Revision 3

ACOUSTICS

Tel: +44 (0) 121 450 4800

Hoare Lea Acoustics
6th Floor West
54 Hagley Road
Edgbaston
Birmingham
B16 8PE

Audit sheet

REVISION	DESCRIPTION	DATE	ISSUED BY	REVIEWED BY
0-DFC	Survey Report	15/11/2017	AMcC	
1	Client issue	21/11/2017	AMcC	DM
2	Updated site plan and client comments	27/11/2017	AM	DM
3	Updated site plan	08/12/2017	AM	DM

Contents

1. Introduction

Hoare Lea Acoustics (HLA) has been appointed by Brunning & Price to conduct a noise assessment for the proposed conversion of the Grade II listed Tidbury Green farmhouse and associated barns to a public house. This assessment has been prepared to support the planning application for the proposed use.

This report presents the results of a survey of the existing noise environment at the site and surrounding properties and reviews this data with respect to applicable guidance and standards. Where required, recommendations are provided for achieving the necessary noise standards.

2. Site description

The development site lies adjacent to the road junction of Tilehouse Lane, Dickens Heath Road, Fulford Hall Road and Lowbrook Lane at Tidbury Green approximately 2 miles south west of Solihull town centre. The development site is currently accessed from Fulford Hall Road.

Dickens Heath Road forms the northern site boundary and provides a link route between Dickens Heath and Shirley to the east and the A435 at Wythall to the west.

Fulford Hall Road forms the western site boundary and provides a link route between residential areas to the south and Hall Green to the north.

In each instance, traffic movements on all adjacent roads are relatively low and intermittent throughout the day and early evening.

Beyond Dickens Heath Road to the north are farm buildings associated with 'Yew Tree Farm' with open farm land beyond.

Across Fulford Hall Road to the west is Steve Lane Cars Ltd, a used car dealer with a forecourt area fronting onto the road junction. Immediately to the south of these premises are existing residential dwellings on Fulford Hall Road. Beyond the crossroads to the west are further existing residential dwellings on Tilehouse Lane and Lowbrook Lane.

To the east of the site is the Tidbury Green School and Nursery. The immediate land-use adjacent to the eastern site boundary is outdoor play areas with the school and nursery buildings located further to the north east.

Immediately to the south of the site is a large residential development which is currently under construction. The foundations of the nearest plots to the development site have been constructed and it is these future plots which are considered to be the closest sensitive residential dwellings to the development site. There is an existing fence along this boundary from the south west corner of site to in line with the eastern façade of the existing farmhouse buildings. The fence is of solid timber approximately 2 metres in height and in very good condition with no obvious gaps. The nearest dwellings will be approximately 10m from this boundary fence and to the east of the existing farm buildings.

There is an existing electricity sub-station just to the south of the western site entrance from Fulford Hall Road.

An aerial view of the site and surroundings is shown below.


Yew Tree Farm
Dickens Heath Rd
Dickens Heath Rd
Dickens Heath Rd
Tidbury Green Farm
Tidbury Green
Tidbury Green
Lowbrook Ln
Fulford Hall Rd
Fulford Hall Rd
Fulford Hall Rd

3. Development proposals

It is proposed that the Grade II Listed farmhouse and stables buildings be retained with a new extension constructed to the east. The site will then be utilised as a public house and restaurant with manager's accommodation on the upper floors.

The existing site entrance via Fulford Hall Road will be retained to provide access to the public house, staff parking, delivery area and main car park area. The main car park and staff parking areas will be gravelled whilst the main access road leading to the delivery area will be tarmacked. There will be provision for 54 spaces on the main car park plus 3 disabled bays. To the east of the buildings are a further 8 bays designated for staff parking. It is noted that the main parking area will be located adjacent to the road junction and away from nearby dwellings.

A courtyard open space will be created in the space between the existing farmhouse and stables with a further open terraced area located to the north of the farmhouse. Further to the north, the open grass area will be retained as use as a play area.

A dedicated delivery area will be located to the east of the buildings which will lead directly to an enclosed yard area.

To the east, beyond the staff car parking area will be a plant area including a pumping station and treatment plant.

A pond located towards the west of site will be retained with a wild-flower meadow around the perimeter separating the western site entrance from the main car park.

The current site layout is shown in Appendix 1 of this report.

4. Basis of assessment

4.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2012 sets out the Government planning policies for England and how these are expected to be applied.

Section 11, Conserving and enhancing the natural environment, para 123 of NPPF states:

'Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development*
- *Mitigate and reduce to a minimum other adverse impacts 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 upon them because of changes in nearby land uses since they were established*
- *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'*

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

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

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

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

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

4.2 BS8233: 2014

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

BS8233 provides guidance regarding acceptable internal and external noise level criteria for dwellings but does not form any statutory requirement to achieve the guidance values provided therein.

The BS8233 target internal design criteria for dwellings are as follows:

Activity	**Location**	**07:00 to 23:00**	**23:00 to 07:00**
Resting	Living rooms	35 dB $L_{Aeq,16hour}$	-
Dining	Dining Room / Area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Section G1 of BS 8233 advises that sound reduction across an open window is limited to 15dB but acknowledges that there will be additional sound reduction for the room and furnishings. Available test data indicates that, for mid frequencies, the overall sound reduction is of the order of 20dB.

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

4.3 BS4142: 2014

BS4142:2014 'Methods for rating and assessing industrial and commercial sound' is the current British Standard providing guidance for assessment of noise impact from industrial and commercial sites. In general, the likelihood of adverse impact for a particular noise is dependent upon factors including the margin by which it exceeds the background noise level, the character of the noise and its occurrence. The Standard recommends the determination of the Rating Level of the specific source and advises a correction factor of between +3dB and +9dB if the sound has a tonal quality, is intermittent or impulsive or has any other distinct characteristics which would make it more noticeable.

The degree of impact is assessed by comparing the measured background level with the Rating Level. Where the Rating Level exceeds the background, the level of impact increases as shown below:

Comparison with background	Assessment
+0 dB or below measured background	Low impact
+ 5 dB	Adverse impact
+ 10 dB or more above background	Significant adverse impact

It should be noted that the assessment method applies to free field external sound levels.

5. Measurements

Measurements have been made to determine the existing noise climate at the nearest proposed dwellings to the site, considered to be those currently under construction immediately south of the site.

Continuous sound level measurements were made over a weekend period from Friday 3rd to Wednesday 8th November 2017. It is considered that lowest background sound levels will occur over the weekend. It is noted that daytime sound levels during the week will be artificially high as a result of construction works taking place on the development site located immediately to the south. However, this noise is not expected to have occurred in the late evening, which would be considered to be the most sensitive period of the day.

The measurement system was located towards the south eastern site boundary at a similar distance from Fulford Hall Road as that of the nearest residential property currently under construction. The microphone system was located approximately 1.5m above local ground level.

Sound levels were recorded continuously in 15 minute samples to determine the equivalent continuous sound level, L_{Aeq} and the percentile L_{A90}.

The measurement position is indicated on the plan at Appendix 1.

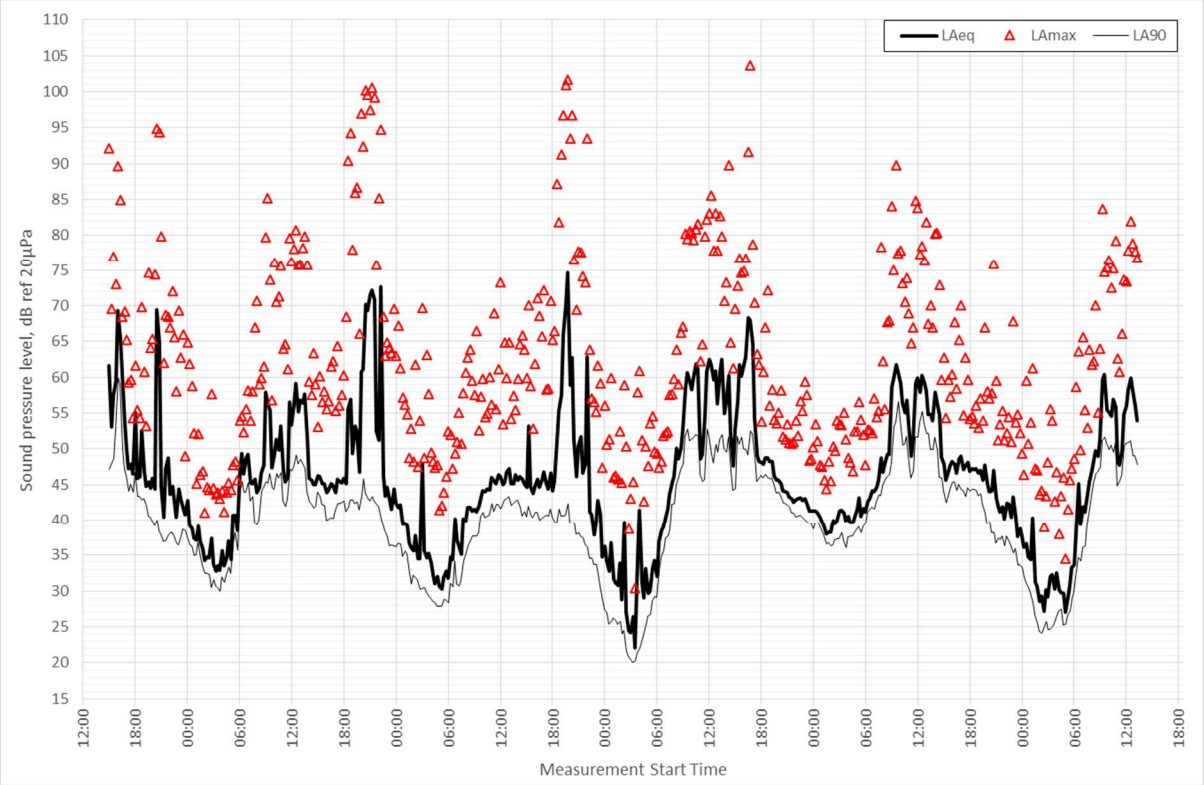
Weather conditions over the survey period were dry, with temperatures ranging between 0° and 13° Celsius with low wind speed. There were no reported periods of rain during this time. It is considered that the measurement data obtained is representative of the overall noise climate at site.

All measurements were made with a calibrated precision grade sound level meter, in accordance with BS EN 60651 and BS 7445:1993. The equipment was acoustically calibrated before and after the survey with no drift being observed. A list of the equipment used can be found in Appendix 3.

6. Results

The results of all diurnal site measurements are tabulated in Appendix 4. Levels are shown as hourly values derived from the measured 15 minute sample results.

The variation in sound levels over the survey period at Position 1 is shown graphically below.



The mean sound levels over the survey period are summarised below:

Period	Mean L_{Aeq}	Mean L_{A90}
Friday (15:00 – 23:00)	59.6	43.5
Friday night	41.6	35.5
Saturday	61.6	43.3
Saturday night	39.6	32.0
Sunday	59.1	39.4
Sunday night	35.9	26.4
Monday	58.4	46.7

Monday night	41.1	38.5
Tuesday	54.0	45.4
Tuesday night	36.6	28.8
Wednesday (07:00 – 13:00)	55.0	46.9

The mean daytime ambient sound level was $L_{Aeq,16hr}$ 58.9dB. However, this was influenced during the day by works occurring on the adjacent building site located to the south. Furthermore, it is understood that there was periods of lawn mowing at the site taking place on site over the weekend. The typical average ambient noise level over the weekend with these events excluded was 51.4dB.

The mean night time ambient noise level was $L_{Aeq,8hr}$ 39.5dB.

The lowest typical background noise level measured during the monitoring survey was $L_{Aeq(1\text{-}hr)}$ 37.7dB during the day and $L_{Aeq(15\text{-}min)}$ 24.6dB during the night.

Lowest ambient and background sound levels during the survey for times when the pub will be open occurred on Sunday evening. Typical sound levels during the late Sunday evening period 20.00hrs to midnight were in the range L_{Aeq} 40 - 57dB and L_{A90} 31 - 39dB.

7. Noise impact

Potential noise impact from the proposed new public house and restaurant use will be limited to plant noise, noise from guests in the outdoor courtyard and terrace, and noise from vehicles entering and leaving the site. There is no proposed amplified music associated with the venue and, therefore, entertainment noise will not impact on the nearest dwellings.

7.1 Plant noise

Plant types to be used on the development have not yet been determined and, consequently, a specific plant noise assessment cannot be undertaken. Given these circumstances, it will be necessary to determine noise limit criteria which can be used to assist the selection and location of new plant.

British Standard BS 4142 details a method for assessing noise from commercial and industrial sites to determine the potential noise impact upon noise sensitive premises based upon the typical existing background sound levels at these premises.

From the survey data, the lowest background sound level was $L_{A90(1\text{-}hr)}$ 37.7dB during the day and $L_{A90(15\text{-}min)}$ 24.6dB during the night.

It is anticipated that from typical operating hours, last orders will be called at 11pm with all patrons having left the site by midnight. The lowest measured noise level between 11pm and midnight was $L_{Aeq(15\text{-}min)}$ 31dB.

The following plant noise limit criteria are derived on the basis of achieving a BS 4142 condition of 'low impact' at the nearest dwellings during late evening:

Parameter	**Daytime**	**Night time**	**Late evening (11pm – 12am)**
Typical lowest background	L_{A90} 38dB	L_{A90} 25dB	L_{A90} 31dB
Character correction(BS 4142 Annex 1)	-3dB	-3dB	-3dB
Plant noise limit level	L_{Aeq} 35dB	L_{Aeq} 22dB	L_{Aeq} 28dB

The derived limit levels are the cumulative level of plant noise that should not be exceeded at the nearest residential properties when the plant is operating at rated output.

7.2 Outdoor areas

Noise impact from guests inside the public house is expected to be low at the nearest dwellings once attenuation provided by the building itself is taken into consideration. Highest levels of noise are

expected to result from patrons entering and leaving the establishment along with people congregating in the courtyard area to the front of the building, or in the terraced area to the north.

Assessment of smoking shelters for a public house has recently been made for another site in Birmingham. Measurement data for a smoking shelter in use with people talking with elevated voices has indicated a typical noise level of 75dB(A) at a distance of 1m. For intermittent sources such as conversation, it would be reasonable to allow for a 3dB on time correction factor together with a further 3dB reduction for periods of time where the outdoor areas are not in use.

The courtyard will be approximately 35m from the nearest bedroom window and the calculated noise level at the window for noise from patrons congregating in the courtyard area at the front of the property is expected to be of the order of 38dB(A).

It is noted that this calculated level is significantly below the existing weekend evening ambient and background sound levels. Section G1 of BS 8233 advises that sound reduction across an open window is limited to 15dB but acknowledges that there will be additional sound reduction for the room and furnishings. On this basis, noise break-in into the nearest first floor dwellings will be below 20dB which is significantly below the internal requirement for night time sleeping in bedrooms. It is also below the BS 8233 upper level for gardens.

These findings would indicate that congregation of patrons in the courtyard area to the front of the establishment is unlikely to have a significant noise impact upon the proposed dwellings.

It is expected that noise from activities occurring from the terraced area located to the north of the public house within the pavilion will be significantly lower than the levels presented above as a result of increased distance attenuation from the nearest sensitive dwellings, along with significant screening provided by the public house. On the basis of the above, noise from activity from the terraced area is not expected to impact on the nearest dwellings.

7.3 Traffic noise

The transport statement for the site provides information for the development and indicates that during the week, 25% of all vehicles movements on site will occur between midday and 15:00 hours, with 50% of all vehicle movements occurring between 16:00 and 19:00. Only 7% of traffic movements on site will occur after 22:00 hours.

During the weekend, 80% of all traffic movements on site will occur between midday and 20:00 hours with only 9% of traffic movements occurring after 20:00 hours.

Car parking will, predominantly, be located towards the west of the site. The main parking area will be more than 50m from the nearest new dwellings to the south beyond the pond and wild flower meadow.

If it is assumed that typical use of the main car park comprises vehicle arrival and departure for 80% of the spaces in any one hour, this equates to approximately 90 vehicle movements per hour. It would be reasonable to assume a vehicle pass-by duration of 10 seconds for arrival and departure which would give a total on-time of 900 seconds per access road.

Current proposals are for the western access drive to be tarmacked.

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

Archive measurement data obtained for vehicle drive-by on a gravel access road indicated a mean pass-by sound level of 57.7dB(A) at 6m.

The resultant noise levels at each of the nearest dwellings to site are calculated below:

Parameter	West access
Source level	62.7dB(A)
Source ref distance	2m
Receiver distance	30m
Distance attenuation	-23.5
On-time correction	-6.0
Screening	-7
spl at receiver	26.2dB(A)

The lowest measured background level during the late evening hours (23.00 – 00:00) as detailed in section 6 is L_{A90} 31dB. The calculated sound levels at the nearest dwellings for 90no vehicle movements along the access road during this hour is, therefore, below existing site background sound levels and it would be expected that noise generated by vehicle movements associated with the car park would be masked by general ambient noise.

It is noted that it would be unlikely that such a high number of vehicles would access/exit the site during this late evening period and most would occur during earlier periods of the day when background levels are higher. On this basis, the true noise impact from vehicles movements along the access drives would be significantly lower than calculated above.

7.4 Delivery vehicles

The delivery bay for the pub will be located on the eastern side of the building and comprises a tarmacked area to accommodate a single vehicle.

It is expected that beer and drinks deliveries would occur 1-2 times per week whilst fresh food and consumables would be delivered on a daily basis.

The assessment is based on the following assumptions:

- The delivery access is approximately 15m from the nearest habitable window
- One delivery occurs within any one hour period
- The duration of each delivery vehicle movement including arrival and departure is approximately 30 seconds (approx 35m traverse at 5mph would take 15 sec)
- Ground floor areas of the nearest dwelling are screened by the proposed barrier fence

Archive measurements have been made of HGV delivery noise for retail premises and these have been used as a reference source level for this assessment.

The predicted noise impact at the dwelling based on a BS4142 assessment is set out in the following table:

Calculation step	**$L_{Aeq,T}$ (dB)**
Delivery vehicle noise $L_{Aeq,T}$ at 2m(archive measurements)	75.1
On time correction (30 sec)	-20.8
Specific Noise level of HGV (1hr)	**54.3**
Distance attenuation over 15m	-17.5
Screening effect of barrier fence	-9
BS 4142 character correction	+3
Rating Level at residential facade	30.8
Lowest daytime background level L_{A90} (07.00-23.00hrs)	38
Difference	**-7.2**
BS4142 Assessment	**Low impact**

The results above indicate that noise experienced at the nearest residential facade from the arrival and departure of a delivery vehicle during the quietest one hour period of the day would fall into the BS 4142 category of ‘low impact’. It is probable, however, that deliveries would occur during the middle part of the day when background sound levels are significantly higher and, consequently, noise impact would be lower than calculated above.

There would be no vehicle noise impact outside of the delivery period or when the vehicle is parked. This represents the majority of the time and noise from vehicle movement would occur for less than 1% of any daytime assessment period.

8. Discussion

8.1 Existing noise climate

The noise climate across the site is relatively low and is primarily determined by traffic noise from the adjacent roads and the road junction at the north west corner of the site. Traffic movement on adjacent roads tends to be fairly low and intermittent but with increased flows and during morning and evening periods and start/finish times at the school to the east of the site.

8.2 Plant noise impact

Section 7.1 of this report has established plant noise limit levels to be achieved at any dwelling adjacent to the site. The limit levels are based upon achieving a BS 4142 condition of 'low impact'. The limit levels would readily achieve the internal guidance values of BS8233 for daytime resting and night time sleeping when windows are open.

On the basis that the limit levels given in this report are used to select and locate plant items, plant noise will not have any noticeable impact upon the nearest dwellings.

8.3 Outdoor areas

For noise from patrons congregating in the courtyard and terrace areas, Section 7.2 of this report indicates that, based upon data for a similar facility, sound levels at the nearest dwellings to the south would be approximately 38dB(A).

The derived sound level from the courtyard area would be below existing ambient and background sound levels on both Saturday and Sunday evenings.

Noise levels from the terraced area to the north will be significantly below the level noted above due to increased distance and screening.

The calculated noise levels would readily achieve the internal requirements of BS8233 with open windows.

8.4 Noise impact from car park traffic

Vehicle movements during arrival can be expected to be spread over several hours as patrons will not all arrive and leave at the same time. The assessment made for this report, however, assumes a worst case condition of 80% of the vehicles arriving and departing within the same hour. The transport statement for the site indicates that the majority of vehicles accessing and leaving the site will occur in the afternoon when ambient and background noise levels are naturally higher.

The calculated noise levels from vehicles arriving and departing from site is calculated in Section 7.3 and gives a level significantly below the quietest late evening background sound level. The calculated sound level would result in levels below L_{Aeq} 20dB within the nearest bedroom with windows open.

On the basis of these findings, noise from customer vehicles arriving and departing the site is unlikely to have any significant impact upon existing or proposed dwellings in the vicinity of the site.

8.5 Noise impact from deliveries

Section 7.4 above assesses the noise impact for the arrival and departure of delivery vehicles.

The calculated Rating Level for delivery vehicle arrival and departure achieves a BS 4142 condition of 'low impact' for the nearest future residential façades to the south.

Notwithstanding this finding, it is noted that calculated from vehicle movement is below existing ambient and background sound levels during daytime. Delivery movements also account for just a few minutes each day and, consequently, there is no delivery vehicle noise impact for the majority of the daytime period.

9. Recommendations

It is recommended that all new external plant and plant outlets associated with the proposed development be specified and selected to achieve the noise limit criteria derived in section 7.1 of this report. The noise limit criteria are cumulative sound levels that are to be achieved at the nearest residential properties including those currently under construction and located approximately 10m beyond the southern site boundary.

10. Conclusions

The survey work carried out at this site indicates that the general noise climate is fairly low and determined by roads near to the site.

Plant noise limit levels for the redevelopment have been determined in accordance with BS4142. Compliance with the limit criteria given in this report will enable the impact of any plant installed as part of the development 'low' when assessed in accordance with the standard.

Noise from external seating areas at the premises incident at surrounding dwellings is calculated to be below existing daytime evening and ambient sound levels and would not be expected to have any significant impact upon the nearest dwellings.

Noise levels generated by delivery vehicle and general customer vehicle movements will be relatively low and are unlikely to result in any significant noise impact on existing or proposed dwellings. BS 4142 assessment of delivery vehicle movements indicates a condition of 'low impact' at the nearest future dwellings to the south.

Appendix 1 – Proposed site layout

Appendix 2 – List of measurement equipment

Measurements

Rion Type NL-52 Sound Level Meter	S/N 00710261
Rion Type NA-31 Sound Level Meter	S/N 2497394

The above equipment fulfils IEC 61672 Class 1 and is traceable to calibration under BS7580: Part 1:1997.

The equipment was calibration-checked before and after measurement – no adverse deviation was observed.

Appendix 3 – Environmental noise survey results

Position 1 – South Eastern Boundary

Day	From:	To:	Leq,1hr	Lmax,1hr	L10,1hr	L90,1hr
Friday	15:00	15:59	58.9	77.0	59.9	49.1
	16:00	16:59	65.2	89.6	65.0	54.1
	17:00	17:59	48.1	65.2	50.2	44.9
	18:00	18:59	51.6	69.8	50.9	44.0
	19:00	19:59	45.4	74.7	47.3	41.6
	20:00	20:59	64.7	94.9	50.0	39.3
	21:00	21:59	46.3	79.9	47.4	37.3
	22:00	22:59	43.1	72.1	44.5	37.7
	23:00	23:59	42.7	69.3	43.4	37.8
Saturday	00:00	00:59	40.0	64.8	41.5	36.3
	01:00	01:59	37.4	52.1	39.2	35.0
	02:00	02:59	35.4	57.7	36.4	32.0
	03:00	03:59	33.2	44.5	35.3	30.7
	04:00	04:59	35.4	45.3	37.7	32.2
	05:00	05:59	39.2	48.2	41.1	35.8
	06:00	06:59	48.1	55.5	50.0	44.3
	07:00	07:59	46.7	66.9	48.5	42.7
	08:00	08:59	46.0	70.7	47.9	42.1
	09:00	09:59	55.6	85.2	56.6	45.5
	10:00	10:59	51.2	76.1	52.2	45.9
	11:00	11:59	51.6	79.6	50.4	43.7
	12:00	12:59	56.5	80.7	57.0	47.9
	13:00	13:59	56.2	79.8	57.4	47.0
	14:00	14:59	45.4	63.4	47.4	42.2
	15:00	15:59	45.7	60.1	47.7	42.9
	16:00	16:59	44.6	62.3	46.7	40.2
	17:00	17:59	45.2	64.4	47.1	42.2
	18:00	18:59	53.6	94.2	47.6	42.2
	19:00	19:59	51.1	86.7	49.3	42.3
	20:00	20:59	67.3	100.2	58.0	44.0
	21:00	21:59	70.3	100.6	55.9	42.7
	22:00	22:59	66.7	94.7	53.1	40.0
	23:00	23:59	43.6	69.5	45.1	36.6
Sunday	00:00	00:59	41.6	67.2	42.9	36.1
	01:00	01:59	38.1	56.2	40.3	33.8
	02:00	02:59	35.8	61.8	37.8	31.4
	03:00	03:59	42.6	69.7	38.0	30.0
	04:00	04:59	32.4	49.5	34.6	28.4
	05:00	05:59	31.5	46.2	33.9	28.3

	06:00	06:59	36.5	52.4	37.9	31.1
	07:00	07:59	37.6	57.8	39.4	31.8
	08:00	08:59	41.3	63.9	43.5	36.4
	09:00	09:59	42.1	66.5	44.6	38.5
	10:00	10:59	44.2	60.0	46.7	40.7
	11:00	11:59	45.8	68.9	47.7	42.0
	12:00	12:59	45.9	73.3	47.9	42.4
	13:00	13:59	46.1	64.8	47.8	42.6
	14:00	14:59	45.7	65.8	47.2	41.7
	15:00	15:59	48.6	70.1	49.3	40.9
	16:00	16:59	45.3	71.0	46.6	40.6
	17:00	17:59	45.8	72.2	47.1	40.9
	18:00	18:59	51.2	87.2	48.9	40.3
	19:00	19:59	70.5	101.6	60.5	41.1
	20:00	20:59	58.5	96.7	52.6	39.1
	21:00	21:59	49.6	77.7	49.1	37.4
	22:00	22:59	56.9	93.5	43.1	34.7
	23:00	23:59	40.3	61.6	41.4	31.4
Monday	00:00	00:59	35.3	59.9	38.0	26.4
	01:00	01:59	32.1	52.5	33.3	25.9
	02:00	02:59	34.3	58.9	30.7	22.8
	03:00	03:59	29.6	57.9	28.3	20.5
	04:00	04:59	36.5	60.9	34.0	23.6
	05:00	05:59	32.3	54.6	33.7	27.8
	06:00	06:59	37.2	51.9	38.8	33.1
	07:00	07:59	43.2	57.7	45.3	39.0
	08:00	08:59	49.0	66.2	50.7	45.1
	09:00	09:59	58.6	80.6	60.2	50.9
	10:00	10:59	60.5	81.6	62.4	51.7
	11:00	11:59	56.1	82.2	55.5	47.6
	12:00	12:59	61.3	85.5	62.4	50.0
	13:00	13:59	59.7	82.7	60.4	50.8
	14:00	14:59	56.3	89.8	56.8	48.0
	15:00	15:59	59.0	76.8	61.5	49.7
	16:00	16:59	66.2	103.6	69.5	50.4
	17:00	17:59	59.3	78.7	56.9	48.1
	18:00	18:59	48.4	72.2	49.9	46.2
	19:00	19:59	47.2	58.3	48.9	45.1
	20:00	20:59	44.8	58.2	46.4	43.1
	21:00	21:59	43.2	53.4	44.9	41.6
	22:00	22:59	43.0	56.7	45.1	40.6
	23:00	23:59	42.1	59.4	43.7	39.7
Tuesday	00:00	00:59	41.0	53.4	42.5	39.2
	01:00	01:59	38.7	48.2	39.8	37.3

	02:00	02:59	39.4	53.9	41.4	36.8
	03:00	03:59	40.9	55.1	43.7	37.1
	04:00	04:59	40.1	52.5	42.2	37.8
	05:00	05:59	41.9	56.5	44.2	38.7
	06:00	06:59	42.9	52.7	44.3	41.0
	07:00	07:59	46.2	78.3	47.0	42.8
	08:00	08:59	48.4	67.9	49.9	45.8
	09:00	09:59	60.4	89.8	62.8	52.9
	10:00	10:59	57.1	77.9	58.9	51.8
	11:00	11:59	55.0	84.8	55.7	48.1
	12:00	12:59	59.4	83.8	61.0	53.6
	13:00	13:59	55.7	81.8	57.7	51.0
	14:00	14:59	55.6	80.4	56.8	48.4
	15:00	15:59	47.1	62.7	49.3	43.7
	16:00	16:59	47.9	67.7	49.6	45.0
	17:00	17:59	48.0	70.0	49.8	44.2
	18:00	18:59	47.1	56.1	49.1	44.3
	19:00	19:59	46.8	66.9	48.7	42.6
	20:00	20:59	45.3	75.9	47.0	38.9
	21:00	21:59	42.1	59.5	45.1	37.3
	22:00	22:59	41.4	54.5	44.4	36.8
	23:00	23:59	40.6	67.8	42.5	34.6
Wednesday	00:00	00:59	36.4	59.5	38.9	31.7
	01:00	01:59	36.0	61.2	34.1	27.6
	02:00	02:59	28.9	44.1	30.8	24.8
	03:00	03:59	31.1	55.6	31.7	25.0
	04:00	04:59	30.7	46.7	32.3	26.6
	05:00	05:59	30.6	47.3	32.0	27.0
	06:00	06:59	40.9	63.6	40.6	32.9
	07:00	07:59	43.4	65.6	45.7	38.4
	08:00	08:59	48.6	70.1	50.3	45.5
	09:00	09:59	57.9	83.7	59.5	50.3
	10:00	10:59	55.7	79.2	57.1	50.3
	11:00	11:59	51.2	73.7	51.8	46.8
	12:00	12:59	58.3	81.9	60.2	50.5

Note that maximum noise levels presented above are the highest level measured in each one-hour period.

Appendix 4 – Glossary of terms

Decibel (dB)

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

A-Weighting

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

$L_{Aeq,T}$

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

$L_{A90,T}$

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

$L_{A10,T}$

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

L_{Amax}

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