AB acoustics

4 Cumbrian Close
High Crompton
Shaw
Oldham
OL2 7RH

T : 07771 567 624
e-mail : leachabacoustics@aol.com

MCD Construction Consultancy Ltd
10 Churchbank
Stalybridge
Cheshire
SK15 2QJ

Acoustic assessment on land adjacent to
The Kings
Darton Lane
Mapplewell
Barnsley
S75 6AP

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4 Cumbrian Close
Shaw
Oldham

June 2017

Introduction

AB acoustics were commissioned by MCD Construction Consultancy Ltd on behalf of Punch Taverns to undertake an environmental noise assessment on land adjacent to The Kings Darton Lane Mapplewell Barnsley.

It is proposed tio build 4 residential properties on the land – these will be adjacent to The Kings Public House .

The purpose of the survey is to determine the existing external noise levels in the neighbourhood of the proposed development and compare these to the requirements of both BS 8233 : 2014 (Guidance on Sound insulation and noise reduction for buildings) and The World Health Organisation Guidelines for external 'private amenity areas'.

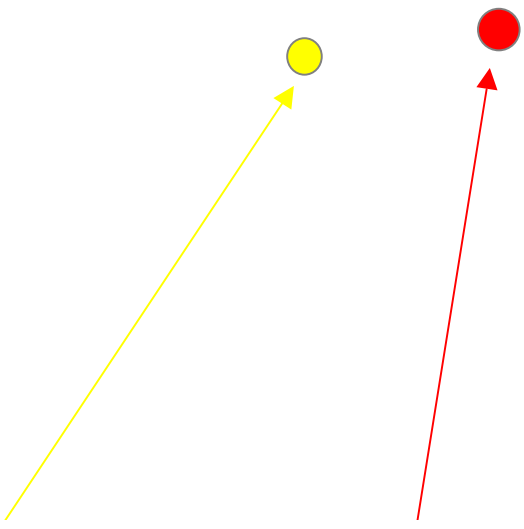
The report details the acoustic measurements undertaken at various times in order to determine the existing noise environment at the proposed development site .

Below is a photograph of the immediate area adjacent to The Kings with the measurement location marked – together with a proposed site plan.

As can be seen the area is mainly residential.

Approximate Measurement Location

Smoking Area



Noise Assessment Criteria

In BS 8233: 2014 (Sound Insulation and Noise Reduction in Building,Ref.4) design criteria is provided for noise levels inside buildings : summarised these are :

Bedrooms : L_{Aeq} = 30 dBA
Lounge : L_{Aeq} = 35 dBA

The above 30 dBA level is acceptable as avoiding sleep disturbance.

The measured external levels are compared to the required internal levels in the Standard to determine the attenuation that must be offered by the structure of the building in order to achieve the required internal levels.

Also it is generally accepted that an open window will achieve an attenuation of 15 dBA to the external noise – however it has been suggested that this figure is too high and is more likely to be in the region of 10 dBA – as a compromise a figure of 12 dBA has been used for the attenuation of an open window.

The requirements specified in the following report should be regarded as the minimum.

Also relevant are the World Health Organisation (WHO) Guidelines for Community Noise – these identify that sleep may be disturbed by short term noise events and the level associated with this is 45 dB LAmax inside the bedroom – this relates to 60 dB LAmax external to the bedroom.

In brief an 'Outdoor Living Area' should be subject to a noise level less than 55 dBA in order to prevent serious annoyance during the daytime and evening - a level less than 50 dBA is desirable to prevent moderate annoyance : reference World Health Organisation.

Equipment Used

The noise level was measured using a Bruel & Kjaer Type 2260 Precision Sound Level Meter (Type 1 instrument).

Calibration was carried out prior to the measurements and checked afterwards using a Bruel & Kjaer Acoustic Calibrator – no drift was recorded.

The measures were undertaken at the location shown and at a height of 1.5m and away from reflecting surfaces.

Discussion of Results.

These are tabulated below for the times stated.

Saturday 13 May 2017

Measurement time	LA eq	LA90	LA 10	LA max
17.45 – 18.45	50.1	44	-	72.1
20.00 – 21.00	47.7	41.5	-	66.1
21.00 – 22.00	49.8	42.5	-	63.8
22.00 – 23.00	50.3	44.6	-	66

Weather – Dry – Temperature = 14 degrees C – Wind 0.0 to 1.2 m/sec - Cloud cover 65% 0 No Temperature Inversion.

The above noise levels were due to people in the smoking areas at the side of The Kings – there was no entertainment on at The Kings during this visit therefore additional measurements were undertaken on Friday 26 May 2017 -as this was considered to be a 'worst case situation'

During this visit there were people outside in the smoking area and a few in the childerens play area – the entertainment started at 21.00 hrs until 23.00 hrs.

This consisted of a solo singer – Mick 2 Tone – with electronic backing.

Measurement Time	LA eq	LA90	LA10	LA max
18.30 – 19.30	53.9	47.5	56	74.5

No entertainent – approximately 20 peolple outside in smoking area

Measurement Time	Comments	LA eq	LA90	LA10	LA max
21.00 - 21.45	Singer + Smokers	62.7	57	-	76.9
21.45 – 22.00	Smokers	59.1	55	-	69.7
22.00 – 22.10	Singer (Door closed) + Smokers	60	55	-	73.9
22.15 – 23.00	Singer + Smokers	62.2	56.5	-	77.3

The number of people in the smoking area remained fairly constant at about 20

Weather – Dry – 0% cloud – 23 – 18 degrees C – wind from East 1.5 / 2.4 m /sec – No Temperature Inversion.
When the side access door was open the Entertainment was clearly audible at the measurement location – however when closed the main source of the noise were the people outside talking / laugthing.

The noise as measured of people talking (short Term) was around 83 / 85 dBA – the entertainment at the open side assess door was recorded at around 91 dBA.

Discussion

If it is assumed that the structure of the proposed properties is based on the requirement to attenuate the highest level recorded and this could occur after 23.00 hrs (though it is understood that the finishing time is strictly enforced) then the noise level at the facades of the proposed properties could be **LA eq = 62 dBA** with an LA max = **77 dBA –** catering for the 'worst case situation'.

With respect to the night time level (23.00 to 07.00 hrs – worst case situation) the required attenuation is 62 – 30 = **32 dBA**

During the night time the LA max needs to be attenuated by 77 – 45 = **32 dBA.**

The above required attenuations can be achieved by using – for example – IGU's of 10mm / 6 to 20mm / 6 mm which have – with reference to the data sheet at the end of the report – a quoted Rw + Ctr = 32 dB and an Rw = 35 dB.

The Rw + Ctr indicator has been used as the 'music' contains most of its energy in the lower frequency octave bands

With respect to the ventilation of the habitable rooms these are usually regarded as the bedrooms, lounges, dining kitchens and kitchens but only if they are dining kitchens.

The type of ventilation fitted will depend also upon the number of air changes per hour that are required by Building Regulations – this is beyond the scope of this report – however suppliers of suitable acoustically treated ventilation systems can be found on the following web sites;

www.passivent.com

These supply vents that fit into the window header and can be acoustically treated or:

www.vents.com

supply core vents that are wall mounted.

Both these types of vent will be suitable acoustically provided that they meet the minimum attenuation requirements

Or any ventilation unit having a quoted $\mathbf{D_{n,ew}}$ **in excess of 32 dB.**

The above applies to the rear facade of the proposed development as the front facade windows are screened from the noise by the development itself – this is discussed below.

With respect to the front facade the noise from The Kings could be attenuated by at least 10 dBA therefore the noise level could be of the order of **52 dBA with an LA max of 67 dBA.**

If this is the case then the required attenuation will be 52 – 30 = **22 dBA** and for the LA max 67 – 45 = **22 dBA.**

The above required attenuations can be achieved by using – for example – IGU's of 4mm / 6 to 20mm / 4 mm which have – with reference to the data sheet at the end of the report – a quoted Rw + Ctr = 25 dB and an Rw = 29 dB.

With respect to the ventilation of the habitable rooms these are usually regarded as the bedrooms, lounges, dining kitchens and kitchens but only if they are dining kitchens.

The type of ventilation fitted will depend also upon the number of air changes per hour that are required by Building Regulations – this is beyond the scope of this report – however suppliers of suitable acoustically treated ventilation systems can be found on the following web sites;

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Both these types of vent will be suitable acoustically provided that they meet the minimum attenuation requirements

Or any ventilation unit having a quoted **$D_{n,ew}$ in excess of 22 dB.**

The above specification caters for the 'worst case situation' for the highest noise level measutred occuring at a time of the most critical internal noise levdels with respect to BS 8233 : 2014.

As two different glazing units have been specified it is important that they are fitted into the correct windows.

It is important that the windows are correctly fitted into the wall – gaps and holes around the frames must be kept to a minimum and those that occur must be fully sealed with a high density sealer – *on no account must light weight expanding foams be used.*

In general the construction of the building must be undertaken with great care as even small gaps will reduce the attenuation provided by the structure and even if a complete wall, which may have an attenuation of 50 dBA has a hole in it equivalent to 1/1000 of the wall area the effective attenuation of the wall is limited to a maximum of 30 dBA.

When the windows are open the only important consideration is the area of the opening: if it is 10% of the total area the noise attenuation will be of the order of 12 dBA regardless of the construction of the remaining 90% of the wall.

With regard to the roof, if it is pitched slated or tiled roof with an under ceiling and mineral fibre insulation then an attenuation of the order of 45 dBA should be achieved.

The attenuations required will be easily met with the proposed construction of the external walls .

The external noise due to the entertainment – who are located next to the fire door - could be reduced by fitting a correctly sealed fire door and frame.

This could be achieved by means of a 54mm thick timber fire door (1 hour fire rated) which has a quoted attenuation of Rw = 35 dB.

If required this door can have a 900mm x 175mm vision panel of 7mm fire resistant glass.

It is very important that both these doors are fully sealed onto there respective frames around the whole perimeter of the door.

If this is undertaken then the noise level at the proposed fresidential property can be calculated from :

$$L_2 = L_1 - 6 - R + 10 \log S - 11 - 20 \log r + DI$$

Where

L_2 = Calculated level at distance r metres

L_1 = Measured Level – **91dBA**

R = the sound reduction index of the building element – door - which in this case is **R_w = 35dBA**

S = surface Area of door – 2.0 x 1.0 = **2sq m**

.r= distance to houses = **23 m** (scaled off Google Earth)

DI= Directivity Index = **3**

Therefore L_2 = 91 – 6 – 35 + 10log 2 – 11 – 20log23 + 3

L_2 = 18 dBA.

It is therefore recommended that the condition of this fire door and particularly the seals around it are examined and if there is any doubt about its effectivenees then it should be replaced as detailed.

It is also important that the door is closed during any performances – if necessary it could be fitted with electronic cut outs which would cut the power to the music if it is opened.

External Areas

These are governed by the requirements of The World Health Organisation which briefly states that the noise level in private amenity areas should not exceed 55 dBA for serious annoyance or 50 dBA for moderatre annoyance.

As can be seen from the above the external levels were recorded at 60 / 62 dBA which is in excess of the levels required by the WHO.

Therefore to the boundary of the proposed residential development there needs to a an acoustic screen constructed - according to ***BS 5228 : Part1 : 2009 Section F.2.2.2.1 Section C*** an attenuation to the noise from this source of the order of 5 to 10 dBA expected – as the smoking area will not actually be visible from the amenity areas then an attenuation of 10 dBA is assumed – if this is the case then the noise level at the residential properties could be of the order of **50 / 52 dBA.**

The screen must be of solid construction and be at least 2.0m high and have a mass of 15 kg / sq m – if it takes the form of a timber fence then there must be no gaps between the fence and the support posts or the ground.

A screen of this type could also be constructed between the Smoking Area and the existing car park which will increase the attenuation to the residential properties – if a screen was constructed here it would have the additional advantage that the noise from the entertainment that ecapes via the side access door will also be attenuated.

It is worth noting that BS 8233 : 2014 states that the main criteria to be considered are the internal levels in the various rooms – and as can be seen from the above if the glazing / ventilation specified is installed then these will be met

Therefore the external levels in 'private amenity areas' whilst obviously desirable are possible not the main criteria and as additional acoustic screening has been recommended to be included then it is likely that the above is the best that can be practically achieved.

Conclusions

The glazing / ventilation recommended above will result in internal levels within the proposed residential properties that comply with the requirements of BS 8233 : 2014.

It is recommended that an acoustic barrier is constructed on the boundary of the proposed properties to a height of 2.0m – ideally one should also be constructed adjacent to the smoking area.

The condition of the fire door adjacent to the stage should be determined – if found to be unsatisfactory then it shoiuld be replaced as detailed.

Roger Leach AMIOA

Dated : June 2017.

Pilkington **Optiphon**™

	dB sound reduction index by octave band – Hz						$R_w(C;C_{tr})$	R_w	R_w+C	R_w+C_{tr}
	125	250	500	1000	2000	4000				
Configuration single glazing										
6.8 mm Pilkington **Optiphon**™	21	26	31	35	37	38	35(-1;-3)	35	34	32
8.8 mm Pilkington **Optiphon**™	24	28	34	38	37	43	37(-1;-4)	37	36	33
10.8 mm Pilkington **Optiphon**™	28	31	36	38	39	47	38(-1;-2)	38	37	36
12.8 mm Pilkington **Optiphon**™	30	32	37	39	41	51	39(-0;-2)	39	39	37
16.8 mm Pilkington **Optiphon**™	29	34	37	39	46	55	40(-0;-2)	40	40	38
Configuration Insulating Glass Unit (IGU), thickness in mm										
6 / 6 to 20 mm / 6.8 Pilkington **Optiphon**™	23	24	34	42	43	52	38(-2;-5)	38	36	33
6 / 6 to 20 mm / 8.8 Pilkington **Optiphon**™	24	26	40	48	46	54	41(-3;-7)	41	38	34
6 / 6 to 20 mm / 10.8 Pilkington **Optiphon**™	23	28	41	47	45	55	42(-3;-7)	42	39	35
6 / 6 to 20 mm / 12.8 Pilkington **Optiphon**™	20	29	43	47	46	49	42(-3;-8)	42	39	34
8.8 Pilkington **Optiphon**™ / 6 to 20 mm / 12.8 Pilkington **Optiphon**™	26	36	46	50	52	63	47(-2;-7)	47	45	40
16.8 Pilkington **Optiphon**™ / 6 to 20 mm / 16.8 Pilkington **Optiphon**™	29	40	45	47	54	68	48(-2;-6)	48	46	42

The above IGUs with Pilkington **K Glass**™ on one pane and a 16 mm 90 % Argon-filled cavity achieve a U value of 1.5 W/m² K
Further information on solar and thermal performance is available on the Pilkington website using the Spectrum program: www.pilkington.com/spectrum
Impact classification EN12600 Class 1(B)1 for all above Pilkington **Optiphon**™ products
$R_w(C;C_{tr})$ are in accordance with EN717-1

Non Pilkington Optiphon™ glass products. Figures from BS EN 12354

	dB sound reduction index by octave band – Hz						$R_w(C;C_{tr})$	R_w	R_w+C	R_w+C_{tr}
	125	250	500	1000	2000	4000				
Configuration single glazing										
4 mm Float Glass	17	20	26	32	33	26	29(-2;-3)	29	27	26
6 mm Float Glass	18	23	30	35	27	32	31(-2;-3)	31	29	28
8 mm Float Glass	20	24	29	34	29	37	32(-2;-3)	32	30	29
10 mm Float Glass	23	26	32	31	32	39	33(-2;-3)	33	31	30
12 mm Float Glass	27	29	31	32	38	47	34(-0;-2)	34	34	32
Configuration Insulating Glass Unit (IGU), Float glass, thickness in mm										
4 / 6 to 20 mm / 4	21	17	25	35	37	31	29(-1;-4)	29	28	25
6 / 6 to 20 mm / 6	20	18	28	38	34	38	31(-1;-4)	31	30	27
6 / 6 to 20 mm / 4	21	20	26	38	37	39	32(-2;-4)	32	30	28
10 / 6 to 20 mm / 4	24	21	32	37	42	43	35(-2;-5)	35	33	30
10 / 6 to 20 mm / 6	24	24	32	37	37	44	35(-1;-3)	35	34	32

Note that these are conservative figures and cover all products by European glass manufacturers.
R_w = Weighted sound reduction. This scale allows for the response of the human ear and could be used for determining a suitable product to reduce noise such as voices.
C = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from music, radio, tv, high speed traffic and other medium to high frequencies.
C_{tr} = An adjustment to the R_w scale that could be used for selecting a product to reduce noise from urban road traffic, disco music and other noises with a large component of low frequencies.
Note that a 3 dB difference is barely discernable, 5 dB is clearly discernable and 10 dB is a doubling or halving of the noise.

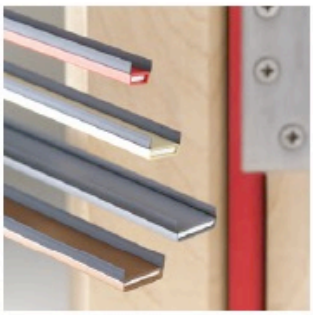
LORIENT

Acoustic, Smoke and Fire Seals

Our DS and Finesse™ seals offer the ultimate in acoustic, smoke and fire protection with the added benefit of thermal containment too. Their unique design means that whichever way around the product is installed, the seal can always be fitted in the correct place, maintaining the integrity of the acoustic and smoke seal at the ironmongery points.

DS and Finesse™ Seals

- Superior acoustic performance to meet the requirements of Approved Document E.
- Successfully tested for fire and smoke performance in accordance with BS 476: Pt.22: 1987, BS 476: Pt.31.1: 1983 and BS EN 1634-1:2008 (Approved Document B).
- Exceptionally low frictional resistance for ease of door operation (Approved Document M).
- Successfully tested for air tightness under BS 476: Pt.31.1: 1983 – this makes a positive contribution to thermal containment between spaces within a building, as well as for external doors.
- Highly durable – has achieved over 1,000,000 opening and closing cycles on a full size door assembly.
- A choice of sizes to cover both 30 and 60 minute applications.



DS Seal

- Available in a range of standard colours, with black fins – to blend or contrast with the doorset as required. White fins are also available (please ask for details).
- Its unique shape allows the product to be stacked, ensuring minimal storage space and protection of the fins.

Finesse™ Seal

- Available in a range of standard colours, plus woodgrain and metallic finishes for superior aesthetics.
- Its transparent fin construction provides a virtually invisible fitted product – ideal for upgrading doorsets in heritage projects.

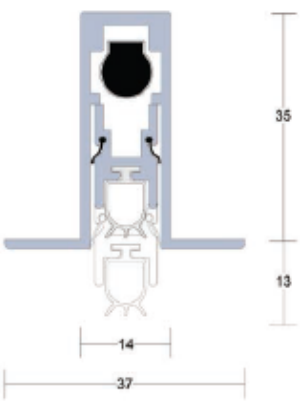
LORIENT

Architectural Seals

LAS8005 si Drop Seal

Medium Duty

CF5179



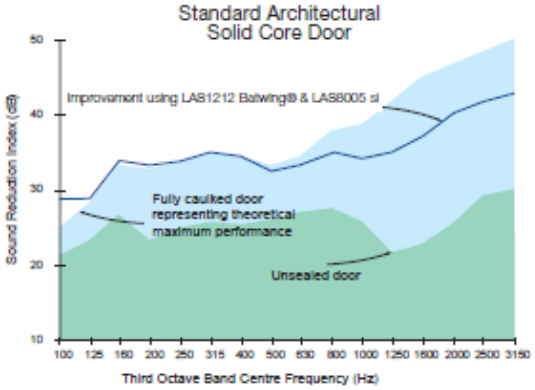
LAS8005 sl

A slim-line, concealed drop seal featuring a high efficiency mechanism. The seal is lifted clear of the floor as soon as the door is opened by a few millimetres – resulting in exceptionally low door operating forces. It requires no power connection.

LAS8005 sl

(Shown with LAS4001)

- **Key benefits**
  Tested for acoustic performance with BS EN ISO 10140-2: 2010.
  Meets the smoke leakage performance requirements of BS 9999 when tested in accordance with BS 476: Pt.31.1: 1983.
  Tested for reliability, the seal completed 1,000,000 cycles without failure.
  Can be fitted to aluminium doors by door fabricators.
- **Location**
  Single swing doors.
  For use on both right and left handed doors.
- **Use with**
  Any perimeter seal.
- **Min/max gap size**
  1mm/13mm.
- **Seal material**
  Grey silicone rubber.
- **Lengths**
  335mm, 435mm, 535mm, 635mm, 735mm, 835mm, 935mm, 1035mm, 1135mm and 1235mm.
  Note: Each length can be cut to the next size down. 335mm can be cut back to 255mm.
- **Fixing**
  This seal is mortised, and screw fixed via the flanges. Fixing screws are supplied; fixing holes are pre-drilled and countersunk.
- **Adjustment**
  Self-levelling on uneven surfaces. Seal height can be adjusted independently of the fixing screws.
- **Finishes**
  Silver anodised aluminium, with grey or black plastic end caps. Grey or black silicone rubber.
- **Acoustic Performance**
  Weighted Sound Reduction Index (Rw): 31dB.



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