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Austin Wilkinson & Sons Ltd
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Environmental Noise Survey
At above

AB Acoustics
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May 2012

Introduction

AB Acoustics were commissioned by Austin Wilkinson & Sons Ltd to undertake an environmental noise assessment at their site on Coal Pit Lane Atherton.

The survey was requested by Wigan Council as it is proposed to vary Planning Condition No. 8 of A/99/50416 – to permit forklift truck movements Monday to Friday 24 hour use – Saturday 00.00 to 17.00 hrs

The survey was requested by the Environmental Protection Department of Wigan Council - *so that the nature and extent of all the noise associated with the proposed development together with the existing noise climate. The assessment should detail if the use of forklifts 24 hours a day is acceptable at this location and if acceptable detail any mitigation measures required to suitably control noise to agreed levels.*

The prediction methodology outlined in BS 5228 : 2009 should be used to predict the noise level to the perimeter of the site.

The method of rating industrial noise as defined in BS 4142 : 1997 should then be used to calculate the rating level for the use of forklift trucks at the perimeter of the site.

Condition 6 of the existing consent specifies the required rating level at the site perimeter.

In Planning Application No A/42452/94. – dated 03 August 2012 Condition 6 states :

The Corrected Noise Level (as defined in BS 4142 : 1990 – Method of Rating Industrial Noise Affecting Mixed Residential & Industrial Areas) should not exceed the following levels at –

1	*Northern Boundary*	*Week Days*	*48 dBA*
		Night Time	*45 dBA*
		At other times	*50 dBA*
2	*East - South & West Boundaries*		
		Week Days	*55 dBA*
		Night Time	*45 dBA*
		All other times	*50 dBA*

Condition 9 of A/40432/93 imposes the same Rating Levels as above but Condition 9 limits the fork lift truck movements to the following:

Monday to Friday	*06.00 to 20.00 hrs*
Saturday	*07.00 to 18.00 hrs*
Sunday	*09.00 to 17.00 hrs.*

Austin Wilkinson & Sons Ltd are a large transport company employing numerous people at the site as drivers – warehouse operatives – office staff etc.

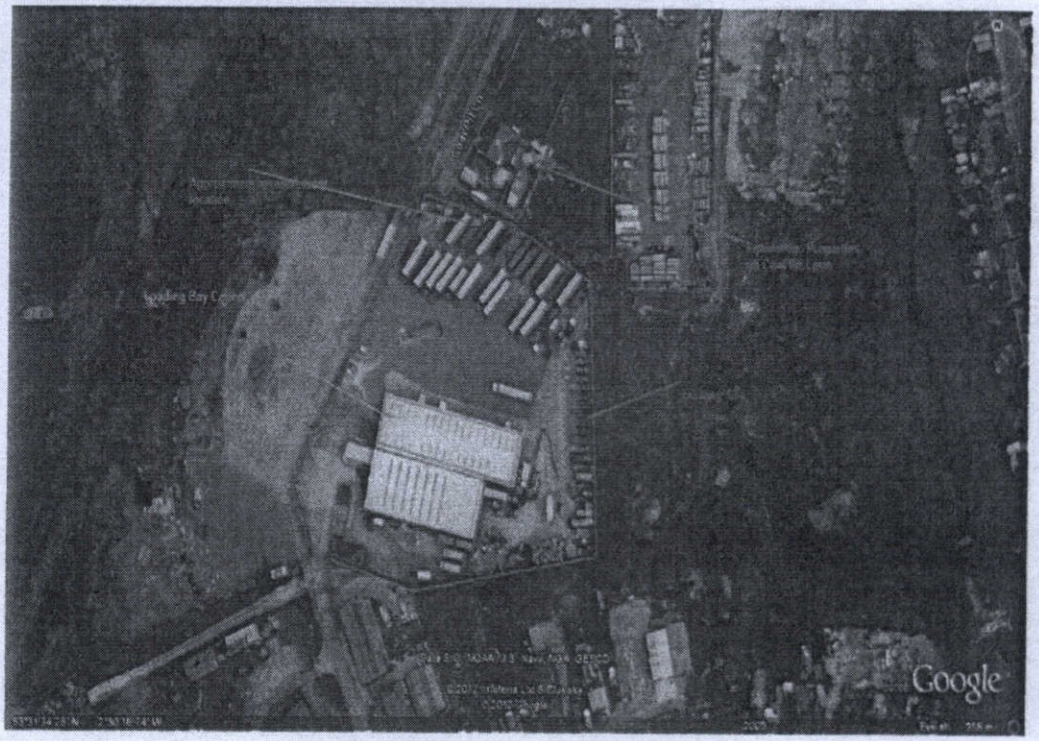
Essentially they collect and deliver palleted goods to the warehouse on Coal Pit Lane – the goods are usually delivered by large curtain sided lorries are loaded onto smaller lorries by fork lift trucks.

This operation can take place between 23.00 and 07.00 hrs – though it is understood that the whole operation does not last eight hours but usually 2 / 3 hrs.

The unloading of the large delivery lorries and the loading of the smaller 'local' delivery lorries takes place under the loading bay canopy – this canopy faces north towards the nearest residential property on Coal Pit Lane.

For the purposes of the following survey two different scenarios were surveyed – the first using two fork lift trucks to unload / load under the canopy – the second to use one fork lift truck under the canopy and the other to unload a lorry parked externally in the yard – both fork lift trucks loaded lorries parked under the canopy.

A photograph of the site is shown below on which is marked the nearest residential property together with the measurement location – both the measurement location and procedure were agreed beforehand with Paul Bentley of the Environmental Protection unit at Wigan Council.



All calculated levels are FREE FIELD.

Noise Assessment Criteria

In addition to the noise levels stated in the various planning conditions note is made of the following :

The likelihood of complaints about noise from industrial plant can be assessed where the standard is appropriate using BS 4142 – 1997. Within the standard, another standard, BS 8233- 1987 is introduced for general guidance on acceptable noise levels within buildings.

Guidance in BS 8233 –1987 (Sound Insulation and Noise Reduction in Buildings) provides design criteria for noise inside dwellings. These are:

Bedrooms	Laeq,T = 30 dB
Living Areas	Laeq,T = 35 to 40 dB

The 30 dB to 40dB Laeq,t level in BS 8233 – 1987 is in line with the night time internal noise criteria in PPG 24 of 30 dBA. This level is acceptable as avoiding disturbance to sleep.

An internal criteria of 35 - 40 dB Laeq,T 5 mins. Would translate to an outdoor limit of 50 - 55 dB Laeq,T 5 mins. where, by convention, an open window would provide an attenuation of 15 dBA, however an attenuation of 12 dBA is a more realistic figure.

The BS 4142 assessment method considers the likelihood of noise from specific noise sources provoking complaints from residents of nearby sensitive properties.

The Specific Noise Level is the noise level of the source or collection of sources under investigation and should exclude any other noise sources which may otherwise contribute.

The likelihood of complaints is assessed by comparing the noise level from the specific noise source(s) under investigation, against the typical prevailing background noise levels. The audible characteristics of the specific noise source(s) are also taken into account ie. If the noise contains any distinct hums, whines or bangs etc. then a correction of +5 dBA should be added to the measured level. This then becomes the Rating Level.

The margin by which the noise level due to the specific noise source under investigation exceeds the background noise level enables the likelihood of complaints to be assessed.

The greater this difference the greater the likelihood of complaints.

A difference of around +10 dB or more indicates that complaints are likely.

A difference of around +5 dB is of marginal significance.

If the rating level is more than 10 dB below the background level this is a positive indication that complaints are unlikely.

Equipment Used and Measurement Method

The noise levels were measured using a :

Bruel & Kjaer Type 2238 Sound Level Meter (Type 1 instrument)

Norsonic Type 114 real Time Octave Band Analyser (type 1 instrument)

Calibration was carried out prior to the measurements – and checked afterwards using a ;

Norsonic Acoustic Calibrator.

The measurements were carried out at the locations described at a height of 1500mm above the ground and away from reflecting surfaces.

The measurements were undertaken at the times stated in the results.

During these measurements the temperature varied slightly but was approximately 8^0 C with no or very little wind; throughout the measurement period the weather was dry.

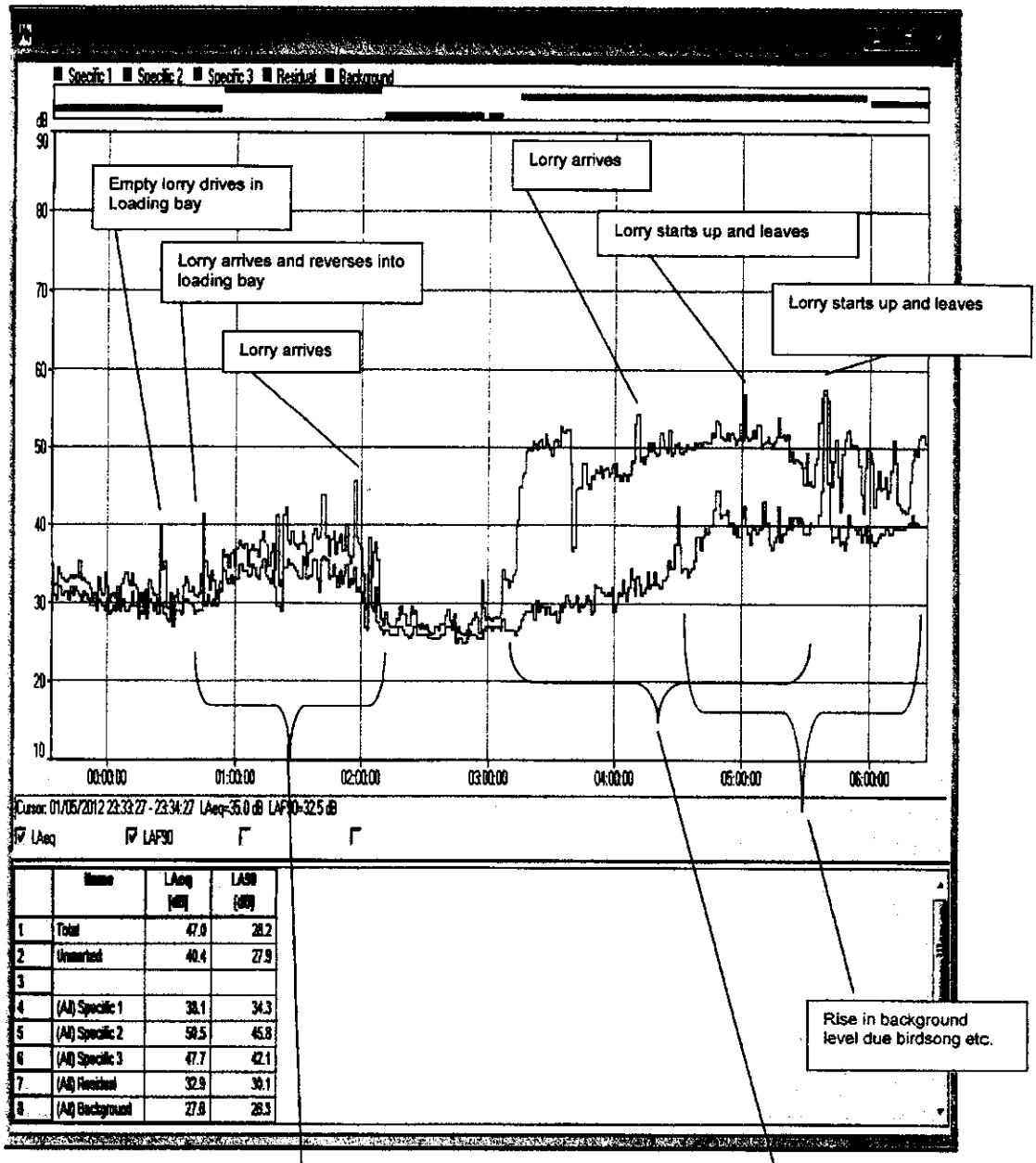
Results

During the early part of the survey when the two fork lift trucks were operating under the loading bay canopy measurements were made of this operation – the average distance between the source (one of the fork lift trucks) and the microphone was 5.0m - the recorded L_{Aeq} = **69.9 dBA** over a measurement period of T = 20 minutes – the second truck was operating within the bay.

Additional measurements were made between 04.10 – 04.40hrs on the single fork lift truck operating in the yard - the second truck was operating under the canopy.

Again the average distance between source and the microphone was 5.0m the recorded L_{Aeq} = **73.4 dBA**

Below are detailed the results of the measurements taken at the boundary of the site adjacent to the nearest residential property.



	Name	LAeq [dB]	LAF90 [dB]
1	Total	47.0	28.2
2	Unmarked	40.4	27.9
3			
4	(All) Specific 1	38.1	34.3
5	(All) Specific 2	50.5	45.8
6	(All) Specific 3	47.7	42.1
7	(All) Residual	32.9	30.1
8	(All) Background	27.8	28.3

As can be seen from the above graph the L_{Aeq} as measured at the boundary for the activity within the loading bay canopy resulted in a level of **38.1 dBA.**

When one FLT was operating mainly externally and the other internally the recorded L_{Aeq} = **50.5 dBA.**

Both of these figures can be regarded as the Specific Noise Level – as the noise sources consists of bumps tonal character then according to BS 4142 a +5 dBA correction should be added to the Specific Noise Leve resulting in a Rating Level of **43 and 56 dBA** respectively.

The above are the measured levels at the site boundary – assessing the noise using BS 5228 : 2009 the following results:

The noise level due to the activity (in the loading bay under the canopy) can be calculated from :

$L_{Aeq} = L_{WA} - 33 + 10 \log Q - 10 \log V - 10 \log d$

Where :

L_{Aeq} = The calculated noise level at the required distance d m

L_{WA} = The Sound Power Level of the plant item = 102 dB in this case – Reference Hyster Technical Date – www Hyster.co.uk

Q = estimated number of trips / hr = 30 / FLT = 60 in total for 2 FLT's

V = vehicle speed = estimated to be 10 km / hr

d = distance between source and receiver = 77m (from the middle of the canopy to the residential property (Reference : Google Earth).

Therefore :

$L_{Aeq} = 102 - 33 + 10 \log 60 - 10 \log 10 - 10 \log 77$

L_{Aeq} = 58 (57.9) dBA

However the above assumes that the angle of view is 180^0 – this is not the case here and it is estimated that the angle of view from the residential property to the loading bay is of the order of 20^0 – if this is the case then the above calculated level is attenuated by 10 log 180 / 20 = 9.5 dB.

The resultant therefore could be of the order of **48.5 dBA.**

As can be seen from the above the actual measured level is some 10 dBA lower than the calculated level – the reason for this may be that the trailer units that are parked between the loading bay and residential property act as an acoustic screen – if fact in BS 5228 : 2009 it states that if the receiver cannot see the source an attenuation of the order of 10 dBA can be expected (Reference : F.2.2.2.1 c).

If this is correct then the calculated level at the boundary will be of the order of **38.5 dBA**

In the above the use of diesel FLT's has been discussed – from the information available on Hyster's web site the sound power level of both diesel and gas FLT's are the same at 102 dB.

However the electric FLT's (of a similar capacity) have a quoted L_{WA} = **90 dB** – if the above calculation is repeated for electric FLT's the L_{Aeq} is calculated to be **46 dBA** – again assuming an attenuation of 9.5 dB due to the angle of view then the resultant boundary level could be of the order of **37 (36.5) dBA.**

Resulting in a boundary Rating Level of **42 dBA** which is in excess of the Planning Condition

If the additional measured attenuation – due to screening - is taken into account then the potential Specific Nois Level on the boundary could be **27 dBA** – resulting in a Rating Level of **32 dBA** – which complies with th Planning Condition.

The potential noise from the operation of the FLT's in the loading bay can be attenuated possibly in three ways :

Screen the source from the receiver – this is not practical in this case as the loading bay needs completely ope access to allow efficient loading of the delivery lorries – and practically it is likely that any doors that were fitte would be left / fixed open.

To reduce the source level – during the measurement period the main noise source was the FLT's and i particular the noise of the diesel engine – the noise from the actual movement of the FLT's in the loading ba (bangs rattles etc.) was not particularly evident as the floor is in good condition being even with no pot holes in nor was noise from the banging of the pallets when they were being loaded etc.

As is shown above the boundary level due to activity in the loading bay can be reduced by using electric FLT's.

In addition the loading / unloading of lorries must only take place in the loading bay and not out in the yard itself.

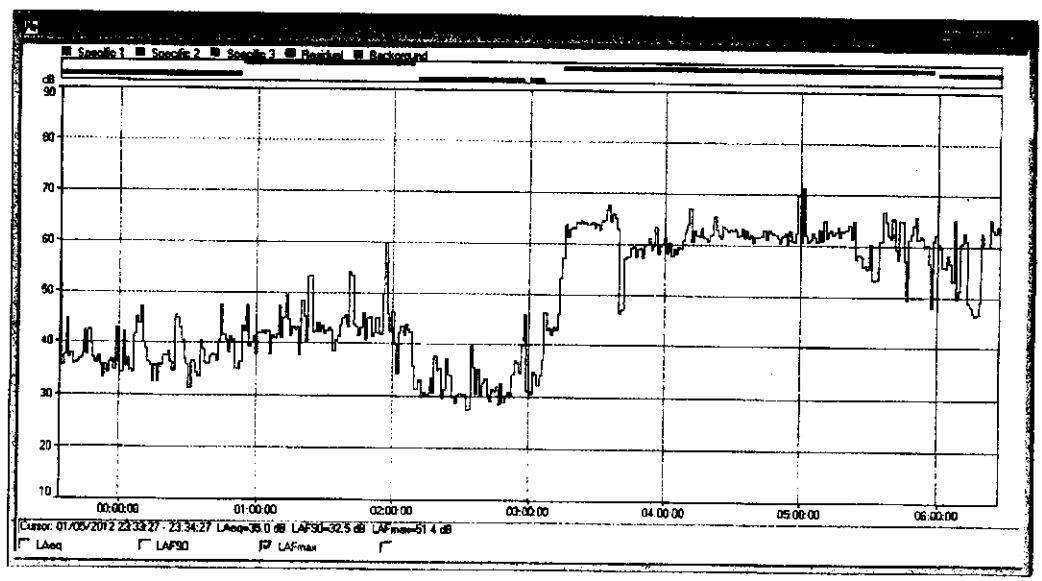
An additional element of the application that is not directly connected with this report is the allowing of parking c HGV's (or the storage of goods) to a height of 4.2m adjacent to the boundary.

The above shows that the attenuation offered by the parking of the lorries at the present time does in fact offer a attenuation of the order off 10 dBA – this is in agreement with the statement in BS 5228 : 2009 (see above).

Therefore acoustically the granting of the variation to this condition will assist in the attenuation of the noise to th residential property.

It is understood that should be storage of goods be allowed at this location they will only be moved during 'normal working hours

In addition to the above requirements for a Rating Level on the boundary it is very likely that the new applicatior will have a L_{Amax} noise level quoted that must not be exceeded – below is the graph for the L_{Amax} measurements undertaken at the site.



The same conditions apply as detailed on the previous graph.

It is very likely that the condition will require that the L_{Amax} on the boundary does not exceed 60 dBA – as can be seen from the above this is the case when the FLT's were operating in the loading bay area under the canopy.

When there were operations in the yard – as can be seen – the level exceeded 60 dBA for a considerable period of time.

The recommendations made above should – as well as reducing the overall noise level – reduce the L_{Amax} levels to below 60 dBA.

Therefore we would recommend that the planning application be granted with possibly the following conditions :

The parking of HGV's and storage of goods on the boundary (particularly the Northern Boundary) be allowed but no movement of these goods to be undertaken between 23.00 and 07.00 hrs.

This will increase the attenuation offered to the noise from the operation of the FLT's under the loading bay canopy – from measurements this attenuation could be of the order of 10 dBA.

All loading / unloading operations should only take place in the loading bay area under the canopy.

The use of electrically powered FLT's should be investigated as calculation in the report have shown that if the above three elements are implemented then the Rating Level on the Northern boundary should be within the requirements of the Planning Condition.

Roger Leach AMIOA

Date : May 2012