JC ACOUSTICS LTD

JC2814

BS4142 Noise Assessment of a proposal to move a Wood Waste Extraction System from a factory at Ilkeston to the Horrowbrook Industrial Estate Hinckley

JC Acoustics Ltd, Bretby Business Park, Ashby Road, Burton-on-Trent, Staffordshire, DE15 0YZ
Tel: 01283 211574 * Fax: 01283 212445
Website: www.jcacoustics.co.uk

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Introduction

The survey was carried out by JC Acoustics Ltd at the request of David Wintle of the Design Development Partnership. DDP were acting on behalf of *i* 4 Detail Ltd of Ilkeston who are intending to move part of their operations to Hinckley. The proposed move will involve re-locating a wood waste extraction system to the new premises on the Horrowbrook Industrial Estate at Hinckley. The extraction system would be positioned externally to the industrial units, on a car parking area.

The Senior Environmental Health Officer of Hinckley and Bosworth Borough Council has requested that a noise survey be carried out to assess the impact of the proposed move on nearby residential properties.

It is intended that the extraction system will extract wood waste from the wood working equipment positioned within the factory unit and would only operate during the day.

Instrumentation

Noise measurements were taken using a CEL 490 sound level meter. The meter was calibrated before and after the survey periods and no deviation was noted.

The sound level meter was fitted with a wind shield for all measurements.

Noise measurements were taken over a series of 5 minute measurement periods to determine Leq, L90 and octave band Sound Pressure Levels.

Description of Survey

The survey consisted of two parts:

A noise survey at the Ilkeston factory to determine typical noise levels from the extraction system.

A noise survey at the proposed new location to determine the existing background noise levels.

Both surveys were carried out on the 7th September 2011.

The survey at the Ilkeston factory was carried out between 9:30 and 10:30. The weather was fine, quite blustery with wind speeds between 0.8 m/sec and 1.2 m/sec. The temperature was 16.5 degrees C.

Description of Survey (continued)

The extraction system is positioned outside the factory, close to the external factory wall and the overall sizes of the fan and filter system are approximately 7 metres long x 3 metres wide x 6 metres high. The extraction fan is located next to the filter and is positioned on the ground. The fan is currently un-enclosed.

A noise measurement was taken at 1 metre from the extraction fan. As the noise source was relatively large, measurements were also taken at various distances from the unit to determine the near field and far field effect. It was established that noise levels reduced by 6 dB from 10 metres to 20 metres and therefore the noise level at 10 metres was sufficiently in the far field such that the noise from the unit could be treated as a point source when calculating the noise level at other distances.

The survey at the new units at Hinckley was carried out between 11:30 and 12:30. The weather remained fine and was still quite blustery with wind speeds between 0.6m/sec and 1.0 m/sec.
The temperature was 17.5 degrees C.

The new factory units are on the edge of a large industrial estate. These units and adjacent units are currently unoccupied and consequently the ambient noise levels were quite low and any noise would be from the factory units that were occupied, some distance away.

The closest residential properties are on Coventry Road and these properties have long rear gardens facing on to a 3 metre high embankment that separates the gardens from the industrial estate. The embankment is planted with trees.

It was determined that the distance between the proposed location of the extraction system to the embankment was 17.5 metres and the boundary with the rear gardens of the nearest properties was a further 9 metres away. The houses were a further 30 metres from the boundary fence.

Noise measurements were taken at three locations to determine the existing ambient noise levels. These measurement positions are shown in figure 1.

Position 1 was on the car park area at the proposed location of the extraction system.

Position 2 was on top of the embankment.

Position 3 was close to the boundary of the rear garden of number 391 Coventry Road, the closest property to the units.

Results

At the Ilkeston Factory

The dB(A) Leq and octave band measurements determined at 1 metre from the extraction fan are shown in the table below:

dB(A)	63	125	250	500	1K	2K	4K	8K
81.1	78.9	76.8	76.6	75.7	72.9	76.7	71.6	67.6

The noise close to the unit was occasionally impulsive due to larger pieces of waste passing through the system.

The dB(A) Leq level from the extraction system at 10 metres was **67.5 dB(A)**

The dB(A) Leq level from the extraction system at 20 metres was **61.3 dB(A)**

At the Hinckley location

The dB(A) Leq and L90 noise levels determined at the three measurement positions are shown in the table below:

Position	dB(A) Leq	dB(A) L90
1	54.7	46.5
2	53.6	50.5
3	52.9	48.5

BS4142 Assessment

BS4142 is a method for rating industrial noise affecting mixed residential and industrial areas.

The standard assesses the likelihood of complaints by comparing the Specific Noise Level of the noise source at the assessment location with the background noise level.

The Specific Noise Level is adjusted for any characteristic noise such as tonal noise or impulsive noise to establish a Rating Level of the source. Any noise reducing features of the area are also taken into account in determining the Rating Level.

The assessment of the likelihood of complaints is made by subtracting the measured background noise level from the Rating Level. The greater the difference, the greater the likelihood of complaints.

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

BS4142 Assessment (continued)

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

We have used all the noise data that has been established from these two surveys to carry out a BS4142 assessment at the boundary with the rear garden of number 391 Coventry Road.

We have also carried out an assessment at the rear of the house.

In order to determine the effect of the embankment, we have used conventional barrier calculations that take into account the octave band spectrum of the noise source, the relative heights of the noise source and the embankment and the relative distances. These calculations indicate that the embankment will reduce noise levels by 5 dB(A).

Assessment location: Boundary with the rear garden of number 391 Coventry Road

Specific Noise Level at 26.5 metres	**59 dB**	(67.5 – 20log 26.5/10)
Reduction from embankment	**-5dB**	
Acoustic Feature correction:	**+5**	(as the noise is impulsive, see Appendix 1)
Rating level	**59**	
Background level	**48.5**	
Excess of Rating over background	**+10.5**	

Conclusion: ***The difference is more than +10 dB and therefore complaints are likely***

Assessment location: Rear of number 391 Coventry Road

Specific Noise Level at 56.5 metres	**52.5 dB**	(67.5 – 20log 56.5/10)
Reduction from embankment	**-5dB**	
Acoustic Feature correction:	**+5**	(as the noise is impulsive, see Appendix 1)
Rating level	**52.5**	
Background level	**48.5**	
Excess of Rating over background	**+ 4**	

Conclusion: ***The difference is less than +5 dB and is therefore of marginal significance***

Observations and recommendations

The noise survey and BS4142 assessment has indicated that complaints are likely when assessed at the boundary of the rear gardens of the closest properties.

However, the assessment indicates that the predicted noise from the extraction system will be of marginal significance at the rear of the actual house.

We therefore recommend that consideration should be given to attenuating the extraction system when it is transferred to the new location and reducing the noise levels by 10 dB(A) would be sufficient.

This can readily be achieved by the installation of a suitable discharge attenuator between the fan and the filter system and also by erecting an acoustic enclosure around the fan.

Survey and Report by:

John Clements, MSc MIOA
Director
JC Acoustics Ltd

08 September 2011

Appendix 1: Terminology

dB: The decibel is used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.

dB(A): The human ear is more susceptible to mid-frequency noise than high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds to the overall level of noise that is discerned by the average human.

Leq: Is the equivalent continuous sound level and is defined as a notional steady state sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over that same period.

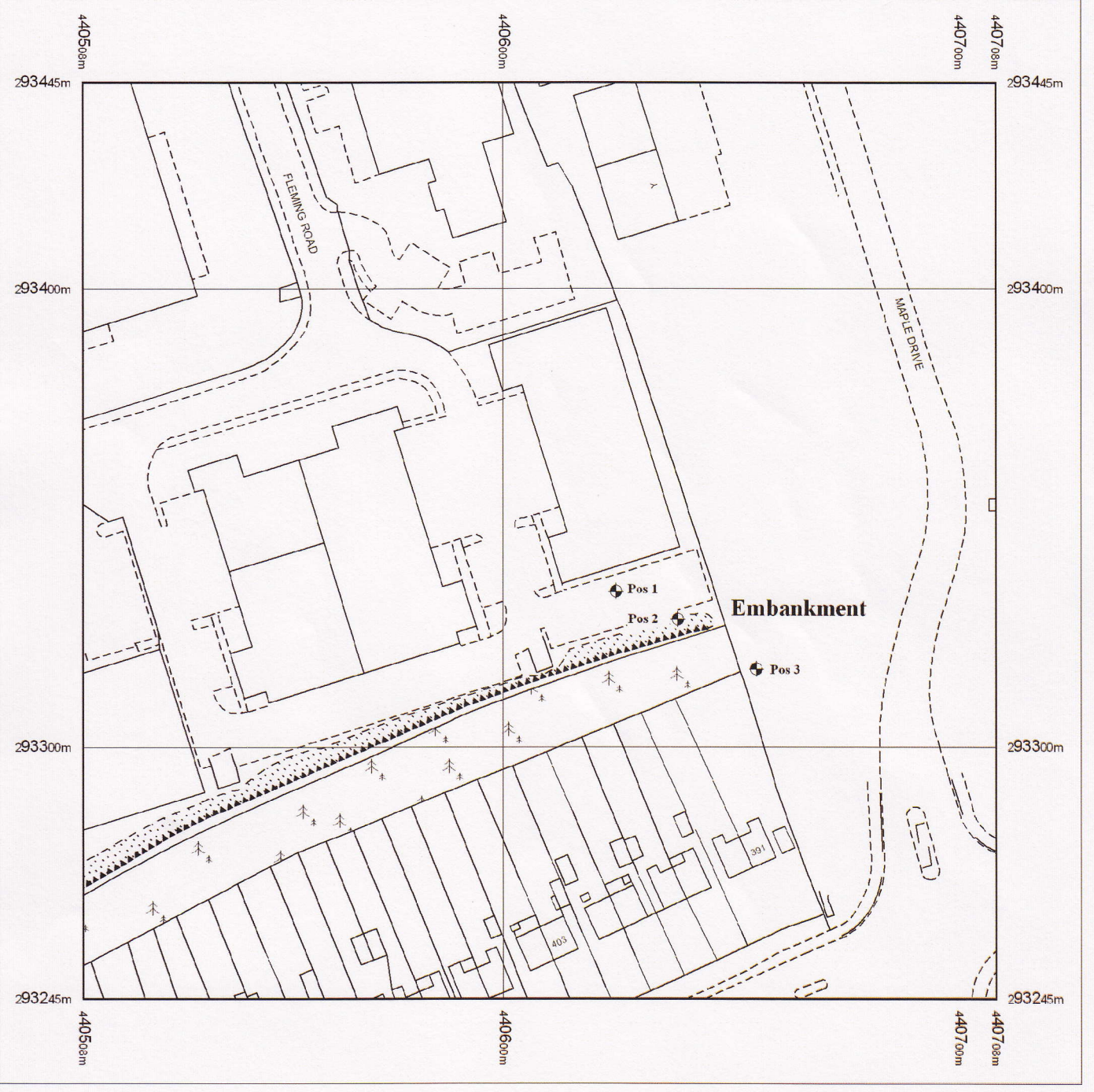
L90: Is the noise level that is exceeded for 90% of the time over a stated period of time and is the recognised measurement of background noise.

Specific Noise level: The equivalent continuous 'A' weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval.

Rating Level: The specific noise level plus any adjustment for the characteristic features of the noise. The correction is +5 dB if one or more of the following features occur or are expected to be present for a new noise source:

- the noise contains a distinguishable, discrete, continuous note (whine, hiss, screech, hum, etc)
- the noise contains distinct impulses (bangs, clicks, clatters or thumps)
- the noise is irregular enough to attract attention.

Background Noise Level
The 'A' weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval.


4405 08m
4406 00m
4407 00m
4407 08m
2934 45m
2934 00m
2933 00m
2932 45m
FLEMING ROAD
MAPLE DRIVE
Pos 1
Pos 2
Pos 3
Embankment
391
403