Martec Environmental Consultants Ltd.
Waterbrow Wood, Gressingham, LANCASTER LA2 8LX
Tel: 01524 222000
Fax: 01695 768188
Email: info@MartecEnviro.co.uk Website: www.noise.sh

- 3 JUN 2009

NOISE ASSESSMENT
LONGSIGHT GARAGE, GREVILLE STREET
MANCHESTER M13 0YG

Report by
M. A. Kenyon, M.Sc., BSc., M.I.O.A.

Report Date: 27th May 2009
Ref: 5233.Manchester MOT
Site Visited by: M A Kenyon
Site Visit: 13th and 19th May 2009

Ormskirk Office:
131 New Court Way, Ormskirk, LancsL39 2YT

Nottingham Office:
23 Bunny Lane, Keyworth, Nottingham, NG12 5JU

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1.0 INTRODUCTION

On the instructions of Nagib Gedal, Martec Environmental Consultants Ltd carried out a noise assessment at Longsight Garage, Greville St, Manchester, in connection with a planning application to replace the existing garage buildings with a new facility designed as a purpose built motor vehicle repair garage. It is understood that Manchester City Council required details of "Acoustic insulation measures including background noise assessment and acoustic specification of any noise producing machinery".

Acoustic terminology is explained at Appendix 1 of this report and the author's qualifications and experience are described in Appendix 2.

2.0 SITE DESCRIPTION

It is understood that within the new building the main tools would be a nut runner to remove and replace wheels, a compressor, possibly occasional use of an electric grinder and occasional hammering, together with exhaust gas analysis, a horn test and a brake test, all the works would take place within the building. These activities all take place currently.

The new building (described in greater detail elsewhere) consists of brick

walls, roller shutter doors and composite metal roof panels.

At the time of the site visits, the main source of background noise was road traffic on the nearby busy roads.

3.0 NOISE CRITERIA

BS.4142 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas" is often used as a basis for assessing similar developments. This British Standard describes a method for assessing whether a noise is likely to give rise to complaints. The standard requires the user to "*Choose measurement positions that are outside buildings and that will give results that are representative of the specific noise level and background noise level at the buildings where people are likely to be affected.*"

The Standard requires that the ambient noise (total noise including the "problem" noise) is measured in terms of the equivalent continuous sound level LAeq [see Appendix 1 for acoustic terms], which is then corrected for the residual noise (total LAeq excluding the "problem" noise) to give the specific noise (from the "problem" noise alone).

A correction for character is made if the noise contains a distinguishable discrete, continuous note [whine, hiss, screech, hum etc.], or if there are

distinct impulses in the noise [bangs, clicks, clatters, or thumps], or if the noise is irregular enough to attract attention. If appropriate an addition of 5 dB is made to the specific noise. The final figure, including any character correction is known as the Rating level.

This Rating Level is then compared with the measured background [LA90] level. "*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...*". At a difference of -10 dBA or more this is "*...a positive indication that complaints are unlikely*".

4.0 MEASUREMENT PROCEDURE

The sound level meters were a Svan type 957 [s/n 12308] and SVAN type 948 [s/n 6593]; the meters calibrated correctly before and after the measurements using a RION calibrator type NC-74 [s/n 34362041] and had been laboratory calibrated within the preceding two years. The 957 meter (used for the background measurements) was mounted on a 1.4m high pole and fitted with a windmuff at the position described below. The 948 was used for the source noise measurements and was hand held with a windmuff.

During the measurements on Wednesday 13th May, the weather conditions were 100% cloud cover and a temperature of around 10 to 15 degrees Centigrade, and with a wind of Beaufort 3-4 with the direction difficult to discern.

Background noise measurements were made on Tuesday 19th May, when the weather conditions were 80% cloud cover, and temperature around 10 degrees Centigrade and a wind of Beaufort 2-3 with the direction difficult to discern. The meter was located approximately 4m above local ground height in the rear yard of the nearest property in Birch Lane, and approximated to free field conditions. Although the garage was in operation, noise from the site was intermittent and unlikely to have influenced the measurements of LA90.

5.0 MEASUREMENT RESULTS

5.1 Source Noise Levels

The results were obtained on 13th May 2009 using the above SVAN 948, and are shown in Table 1 below.

Condition	Duratior	Octave Band Centre Frequency						dBA
	[mins]	125	250	500	1000	2000	4000	
Compressor	10	69.7	66.0	68.5	67.9	62.7	60.8	71.4
Ingersol Rand Nut Run	5	59.3	58.2	62.2	67.8	72.8	73.2	78
Makita Angle Grinder	5	51.6	56.6	68.4	71.4	77.4	81.5	85.1
Gas Welder	5	59.7	54.6	56.7	53.4	55.3	50.0	62
Hand Hammer	5	59.0	61.4	66.6	74.5	82.2	80.2	85.8
Exhaust Gas Analyzer	1	79.3	72.1	70.9	72.6	72.0	67.2	77.4
Horn Test	1	62.5	63.7	87.1	93.8	92.9	84.4	97.3
Brake Test	1	67.7	63.7	65.0	60.2	59.0	54.8	66.7
Combined		65.2	60.9	68.4	74.0	75.6	73.9	80.5

Table 1: Reverberant Sound Levels inside MOT Garage

5.2 Background Levels

Date & time	Max [dB]	Min [dB]	Leq [dB]	L01	L10	L50	L90
19/05/2009 16:54:08	80	47.9	62	69.8	65.7	59.4	53.6
19/05/2009 17:24:08	77.9	48.6	61.1	71.4	63.9	57.6	52.7

Table 2: Background noise levels: Rear of Birch Lane (free field)

6.0 ASSESSMENT OF RESULTS

6.1 Prediction of Noise Levels

Predictions have been undertaken for a number of nearby properties, based on the assumed durations of tool and machine use shown in Table 2 above.

Detailed calculations have been carried out and presented in Appendix 3. The predictions are based on assumptions. For the avoidance of any doubt this is an illustrative scheme, there are alternatives which may provide a similar or better result at lower cost. The assumptions are:-

1. The walls and roof are constructed from Kingspan KS1000 RW steel panels (or similar and approved) with the same or better Sound Reduction Index as listed on their website.
2. The Roller Shutter main door is supplied by Insulated Roller Shutter Products (or similar and approved) and has a Sound Reduction Index as tested by AIRO on 31st August 1994.
3. Any windows in the workshop roof have the same or better sound insulation qualities as the rest of the roof.
4. The roller shutter and access door are kept closed most of the time.
5. No significant noise generation occurs outside the building.
6. That the reverberant sound pressure levels inside the existing facility are reasonable estimates for the reverberant sound pressure levels in the proposed facility.
7. The prediction methodology assumes plane wave radiation close to a building element, thereafter a line source, and thereafter point source radiation.

BS4142 Assessment – Birch Lane

Predicted Noise Level LAeq	36 dB
Tonal/Impulsive/Intermittent Character Correction	5 dB
Rating Level [Specific + Character Correction]	41 dB
Background Noise Level L90	53 dB
Excess over Background	-12 dB
Conclusion – "Positive Indication Complaints Unlikely"	

BS4142 Assessment – Allingham Street

Predicted Noise Level LAeq	40 dB
Tonal/Impulsive/Intermittent Character Correction	5 dB
Rating Level [Specific + Character Correction]	45 dB
Background Noise Level L90	53 dB
Excess over Background	-8 dB
Conclusion – Approaching "Positive Indication that Complaints are unlikely"	

In reaching the above conclusion it should be borne in mind that for most of the time maintenance operations would produce little noise, and that the above is probably a worst case scenario.

7.0 CONCLUSIONS

The above predictions based on work being undertaken inside with the roller shutter doors closed are approaching a "positive indication that complaints are unlikely" as defined in BS.4142.

In addition the application is for a replacement of an existing facility involving no real enlargement or intensification, and the new building appears to have better sound insulation capabilities than the old.

Overall it is considered that the noise impact of the development should be acceptable in planning terms.

APPENDIX 1
EXPLANATION OF ACOUSTIC TERMS

The dB or the decibel, is the unit of noise. The number of decibels or the level, is measured using a sound level meter. It is common for the sound level meter to filter or 'weight' the incoming sound so as to mimic the frequency response of the human ear. Such measurements are designated **dB(A)**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dB(A). The least discernible **difference** is 2 dB(A). Thus most people cannot distinguish between, say 30 and 31 dB(A).

The Background level of noise is most commonly represented by the level which is exceeded for 90% of the time i.e. the LA90.

If a noise varies over time then the **equivalent continuous level, or LAeq**, is the notional constant level of noise which would contain the same amount of acoustic energy as the time varying noise.

The following table gives an indication of the comparative loudness of various noises expressed in terms of the A weighted scale:

Source of noise	dB(A)	Nature of Noise
Inside Quiet bedroom at night	30	Very Quiet
Quiet office	40	
Rural background noise	45	
Normal conversational level	60	
Busy restaurant	65	
Typewriter @ 1m	73	
Inside suburban electric train	76	
Alarm clock ringing @ .5m	80	
Hand clap @ 1m	80	
HGV accelerating @ 6m	92	Very Loud

APPENDIX 2
QUALIFICATIONS AND EXPERIENCE OF M. A. KENYON

My full name is Melville Alexander Kenyon. I am the principal of the firm of Martec Environmental Engineering, a consultancy company that specialises in environmental noise assessment and control. I hold a Bachelor's degree in Engineering and a Master's degree in Environmental Acoustics. I am a member of the professional body for noise and vibration specialists, the Institute of Acoustics and have sat on the British Standards Committee dealing with noise in buildings [BS.8233].

My company is on the panel of noise advisers to both the Noise Abatement Society and the Clay Pigeon Shooting Association and I have lectured at Liverpool John Moores University on the Diploma of Acoustics course and at Manchester Metropolitan University on their Environmental Health degree course.

I have some 27 years experience of dealing with problems caused by noise and vibration, both regarding noise and vibration in the environment, the workplace and the home. The firm of Martec Environmental Consultants was formed some 36 years ago. During that time we have advised many groups of both residents and developers about the problems of noise and vibration in the environment.

APPENDIX 3

Predicted Noise Levels

Allingham Street			125	250	500	1k	2k	A
Source Spectrum			65.2	60.9	68.4	74.0	75.6	78.9
Roof of Low Garage								
KS 1000RW Roof Panel			14.0	19.0	24.0	27.0	34.0	
Dimensions	11.5	6.2						
Building orientation (deg)		90.0						
Effective area		71.3						
Dist to Window		15.0						
SPL			30.3	21.0	23.4	26.1	20.7	28.5
Closed Roller Shutter Doors Left Hand								
SRI			6.6	14.8	18.9	24.8	17.8	
Dimensions	4.5	3.0						
Building orientation (deg)		90.0						
Effective area		13.5						
Dist to Window		10.0						
SPL			34.0	21.5	24.8	24.6	33.2	35.2
Closed Roller Shutter Doors Right Hand								
SRI			6.6	14.8	18.9	24.8	17.8	
Dimensions	4.2	4.0						
Building orientation (deg)		90.0						
Effective area		16.8						
Dist to Window		10.0						
SPL			34.9	22.4	25.8	25.6	34.2	36.1
Roof of High Garage								
KS 1000RW Roof Panel			14.0	19.0	24.0	27.0	34.0	
Dimensions	18.6	11.4						
Building orientation (deg)		90.0						
Effective area		212.0						
Dist to Window		15.0						
SPL			35.0	25.7	28.2	30.8	25.4	33.3
Total Level			39.9	29.1	31.9	33.6	37.1	40.1

Birch Lane			125	250	500	1k	2k	A
Source Spectrum			65.2	60.9	68.4	74.0	75.6	78.9
Roof of Low Garage								
KS 1000RW Roof Panel			14.0	19.0	24.0	27.0	34.0	
Dimensions	11.5	6.2						
Building orientation (deg)		10.0						
Effective area		12.4						
Dist to Window		8.0						
SPL			35.7	26.4	28.9	31.6	26.2	34.0
Side Wall Low Garage								
190mm blockwork SRI			39.0	41.0	45.0	49.0	56.0	
Dimensions	11.4	3.9						
Building orientation (deg)		90.0						
Effective area		44.5						
Dist to Window		4.0						
SPL			14.7	8.4	11.8	13.5	8.1	16.0
Side Wall High Garage								
190mm blockwork SRI			39.0	41.0	45.0	49.0	56.0	
Dimensions	11.4	2.4						
Building orientation (deg)		90.0						
Effective area		27.4						
Dist to Window		10.6						
SPL			4.1	-2.2	1.3	3.0	-2.4	5.5
Roof of High Garage								
KS 1000RW Roof Panel			14.0	19.0	24.0	27.0	34.0	
Dimensions	18.6	11.4						
Building orientation (deg)		10.0						
Effective area		36.8						
Dist to Window		17.0						
SPL			33.9	24.6	27.1	29.8	24.4	32.2
Total Level			37.9	28.7	31.1	33.8	28.4	36.2