ACOUSTIC DESIGN TECHNOLOGY
Noise & Vibration Consultants

ADT 1449

23 October 2008

Bramall Construction Ltd
The Lighthouse
14 The Quays
Salford
M50 3BF

VARNA STREET PRIMARY SCHOOL, OPENSHAW

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT 1449/ENIA

1.0 BRIEF

1.1 To undertake an environmental noise survey in order to determine the currently prevailing noise levels around the development site.

1.2 To make a preliminary assessment of compliance with the indoor ambient noise criteria in Building Bulletin 93 (hereafter referred to as BB93).

2.0 SURVEY PROCEDURE AND RESULTS

2.1 Instrumentation

The survey was conducted using the following instrumentation:-

Norsonic NW-110 Class 1 Real Time Analyser
Brüel and Kjær 4176 ½ inch Measurement Microphone
Rion NL-31 Class 1 Integrating Sound Level Meter
Rion UC-53A ½ inch Measurement Microphone
Rion NC-73 Acoustic Calibrator
Microphone Windshields

The analyser and sound level meter were calibrated prior to use, and on completion of the survey. No significant changes occurred.

2.2 Procedure

The manned environmental noise survey was undertaken between 08:00 hours and 16:00 hours on Thursday 25th September 2008.

Four measurement positions were selected as illustrated on the attached site plan 1449/SP1, and as described below:

1) On Chisholm Street, approximately 10 metres from the junction with Ashton Old Road

2) Atop a low bund approximately 10 metres from Ashton Old Road

3) On the southern site boundary, at the end of Columbine Street

4) On the western site boundary, alongside the route of the former Stockport Branch Canal.

At all four measurement positions the L_{90}, L_{eq} and L_{max} dB(A) sound pressure levels were recorded hourly over a 10 minute sample period. The Rion sound level meter was employed for the major part of the survey period, with the Norsonic used at various intervals to record octave band L_{eq} spectra in addition to the dB(A) parameters.

All readings were taken at a height of approximately 1.5 metres above the ground. (Please refer to Appendix A for explanation of the statistical noise units and the "A" weighted dB scale - dB(A) - used in this Report).

2.3 Results

With steady traffic as the dominant noise source it is reasonable to assume that the readings taken over a 10 minute period are representative of the ½ hour in which they were taken.

The results are therefore listed as $L_{Aeq,\ 30\ mins}$ and L_{A90} levels in the attached table 1449/T1. Average octave band L_{eq} spectra for the whole day are plotted on the attached graph 1449/G1.

2.4 Weather Conditions

The weather conditions were dry with a very light breeze for the duration of the survey period .

3.0 DISCUSSION OF SURVEY RESULTS

2.4 Development Location

The site is located on Ashton Old Road, in the Openshaw district of Manchester, and is currently a landscaped area apart from a short terrace of shops at the junction of Ashton Old Road and Lees Street.

The busy Ashton Old Road forms the northern site boundary, with a series of minor roads and pedestrian paths to the south and the route of the former Stockport Branch Canal to the west. The eastern portion of the site is currently separated from the main plot by Chisholm Street.

The surrounding area includes a diverse mixture of land uses, with houses of various types to the north-east and south of the site, mainly shops on Ashton Old Road, and industrial units on Cornwall Street to the west.

Immediately opposite the site on Ashton Old Road is a medium sized retail development currently under construction, the Taxiworld trade outlet, a vacant tyre and exhaust workshop and a convenience store.

Amongst the industrial units to the west are an electrical substation, a builder's storage yard and the Superior Coatings factory.

2.5 Existing Noise Climate

For the duration of the survey the primary noise source controlling the levels at all four positions was traffic on Ashton Old Road. Measurement position 1 had a more restricted angle of view of the traffic as a result of screening from the existing buildings at the corner of Ashton Old Road and Lees Street.

At positions 2, 3 and 4 the noise of construction activity at the retail unit site affected the noise levels to some degree, but not sufficiently to have any significant effect on the $L_{eq,T}$. A loud siren increased the noise levels recorded between 14:00 hours and 15:00 hours at position 2.

At position 4 noise which appeared to emanate from the Superior Coatings factory was audible as a continuous muted 'hum', significantly lower than the traffic noise, and occasional metallic bangs. No correlation was found between the incidence of 'bangs' and any increased $L_{eq,T}$.

The noise of frequent aircraft was audible throughout the survey, though with little effect on the measured noise levels.

2.6 Building Bulletin 93 Requirements

Section 1.1.1 of Building Bulletin 93 sets internal noise design criteria in terms of the $L_{eq, 30\ mins}$ parameter, and notes that

"The specified levels refer to the highest equivalent continuous A-weighted sound pressure level, $L_{Aeq, 30mins}$, likely to occur during normal teaching hours."

but goes on to say that:

"High noise levels due to exceptional events may be disregarded".

One reading was affected by an exceptional events as indicated in the attached table 1449/T1. The highest recorded $L_{Aeq, 30\ mins}$ arising from the normal acoustic environment are as follows:

Measurement position	Worst Case $L_{Aeq, 30\ mins}$ - dB
1	68
2	71
3	57
4	60

The above results have been used to create a simple acoustic model of the site, with free field $L_{Aeq, 30\ mins}$ for a levelled site shown on the attached plot 1449/CP1.

The normal building envelope package for Manchester schools comprising high specification double glazing (10/12/6), traditional cavity masonry walls and mechanical ventilation is capable of providing 30 - 35 dB(A) overall noise reduction, depending on the area of glazing on the exposed elevation.

The actual incident noise levels will vary considerably from the simple model, and should be remodelled once a preliminary building layout has been agreed, although based on the levels shown on the attached noise map, the following general principles are suggested for incorporation into the building design:

1) teaching rooms and offices should generally have no windows on elevations exposed to incident noise levels of 70 dB(A) $L_{eq,30mins}$ or higher (within about 10 metres of the Ashton Old Road boundary). Offices with limited glazing may be feasible in this acoustic environment.

2) classrooms and other sensitive rooms should ideally have no windows on elevations exposed to incident noise levels of 65 dB(A) $L_{eq,30mins}$ or higher (within around 25 metres of Ashton Old Road boundary).Teaching rooms with a higher internal noise criterion (e.g. resource areas) and with limited glazing may be feasible in this acoustic environment.

3) in areas exposed to incident noise levels of less than 65 dB(A) $L_{eq,\ 30\ mins}$ (from 25 metres away from Ashton Old Road) the BB93 internal noise criteria should be comfortably achieved in all rooms.

3.0 CONCLUSION

3.1 An environmental noise survey has been undertaken over a complete school day, and indicative guidance is provided on compliance with the BB93 requirements.

FOR ACOUSTIC DESIGN TECHNOLOGY

APPENDIX A

The annoyance produced by noise is dependant upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

dB(A) — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average person. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level.

When the noise being measured has a variable amplitude, such as traffic noise, it is necessary to qualify the basic dB(A) unit. This may be done using a statistical index L_n dB(A), where n is an integer between 1 and 99, and is the percentage of the sample time for which the stated dB(A) level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

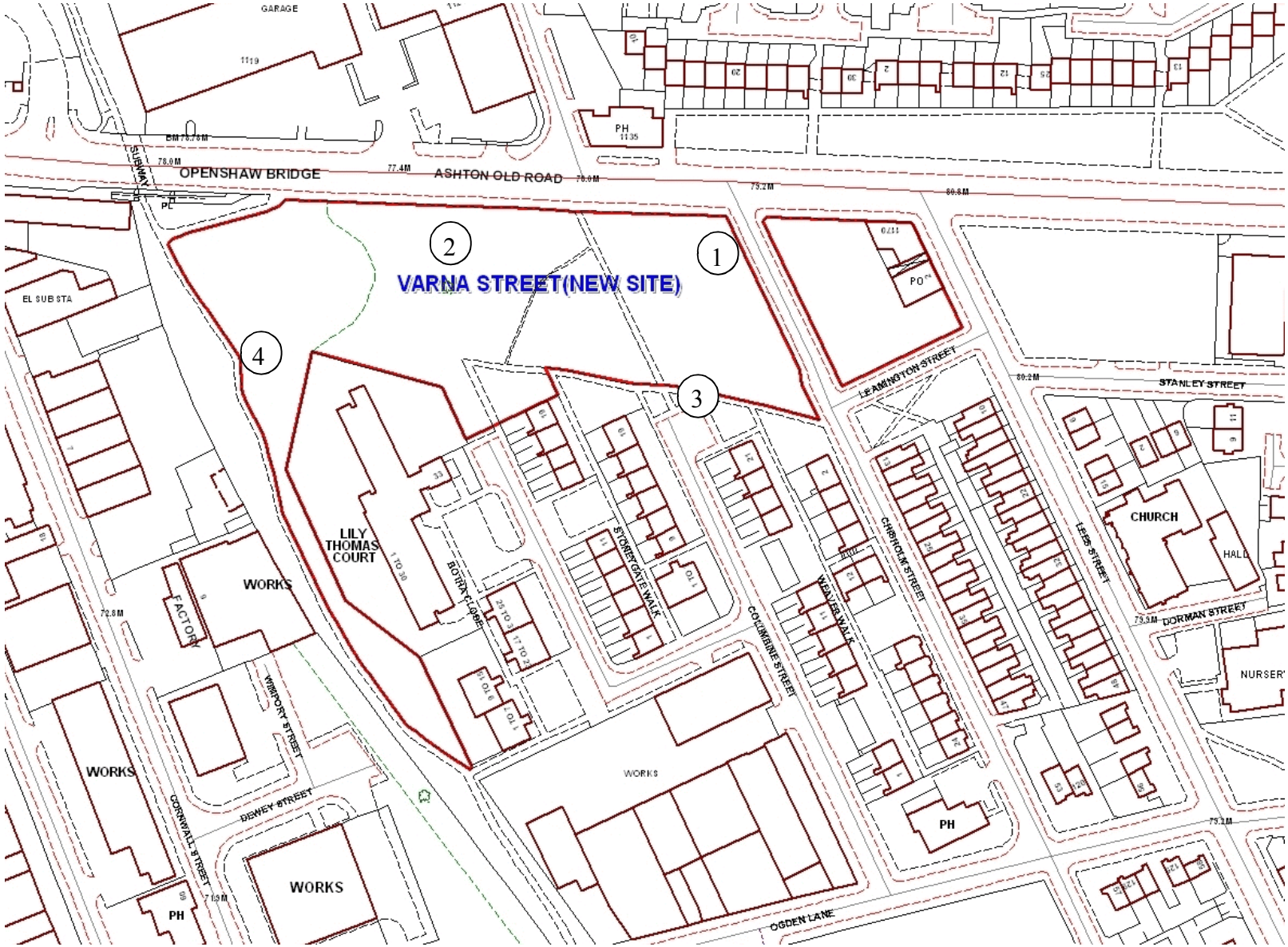
L_{10} — L_{10}, being the dB(A) level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} — L_{90} is the dB(A) level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

L_{eq} — The L_{eq} is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period - ie: it is a measure of the "average" noise level.

L_{max} — The L_{max} is the maximum sound pressure level over the stated period.



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

DESCRIPTION

Site plan

PROJECT

Varna Street

DATE	Oct 2008
DWG NO.	1449/SP1

SURVEY RESULTS

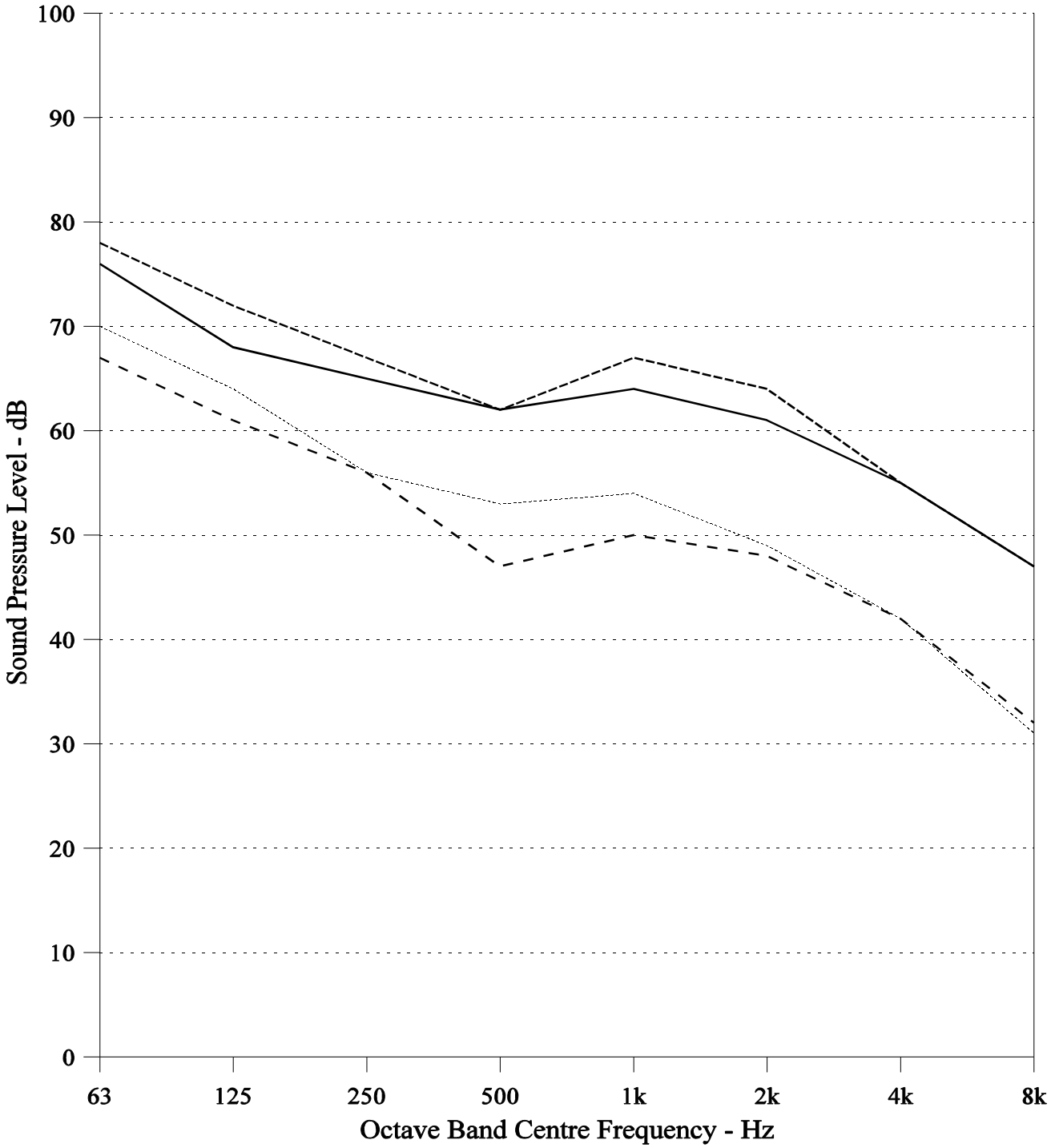
Time Period	dB(A) results							
	Position 1		Position 2		Position 3		Position 4	
	$L_{eq,\ 30\ mins}$	L_{90}	$L_{eq,\ 30\ mins}$	L_{90}	$L_{eq,\ 30\ mins}$	L_{90}	$L_{eq,\ 30\ mins}$	L_{90}
08:00 - 09:00	67	62	71	67	-	-	-	-
09:00 - 10:00	67	58	71	65	57	52	58	55
10:00 - 11:00	67	58	70	61	55	51	60	55
11:00 - 12:00	67	60	70	62	56	52	58	54
12:00 - 13:00	68	59	70	64	55	51	57	55
13:00 - 14:00	68	-	70	63	55	52	59	56
14:00 - 15:00	68	58	72*	64	55	50	58	55
15:00 - 16:00	68	59	70	64	56	52	58	54

* Note:- affected by extraordinary siren

TABLE 1449/T1

Varna Street

Day-time Leq Spectra

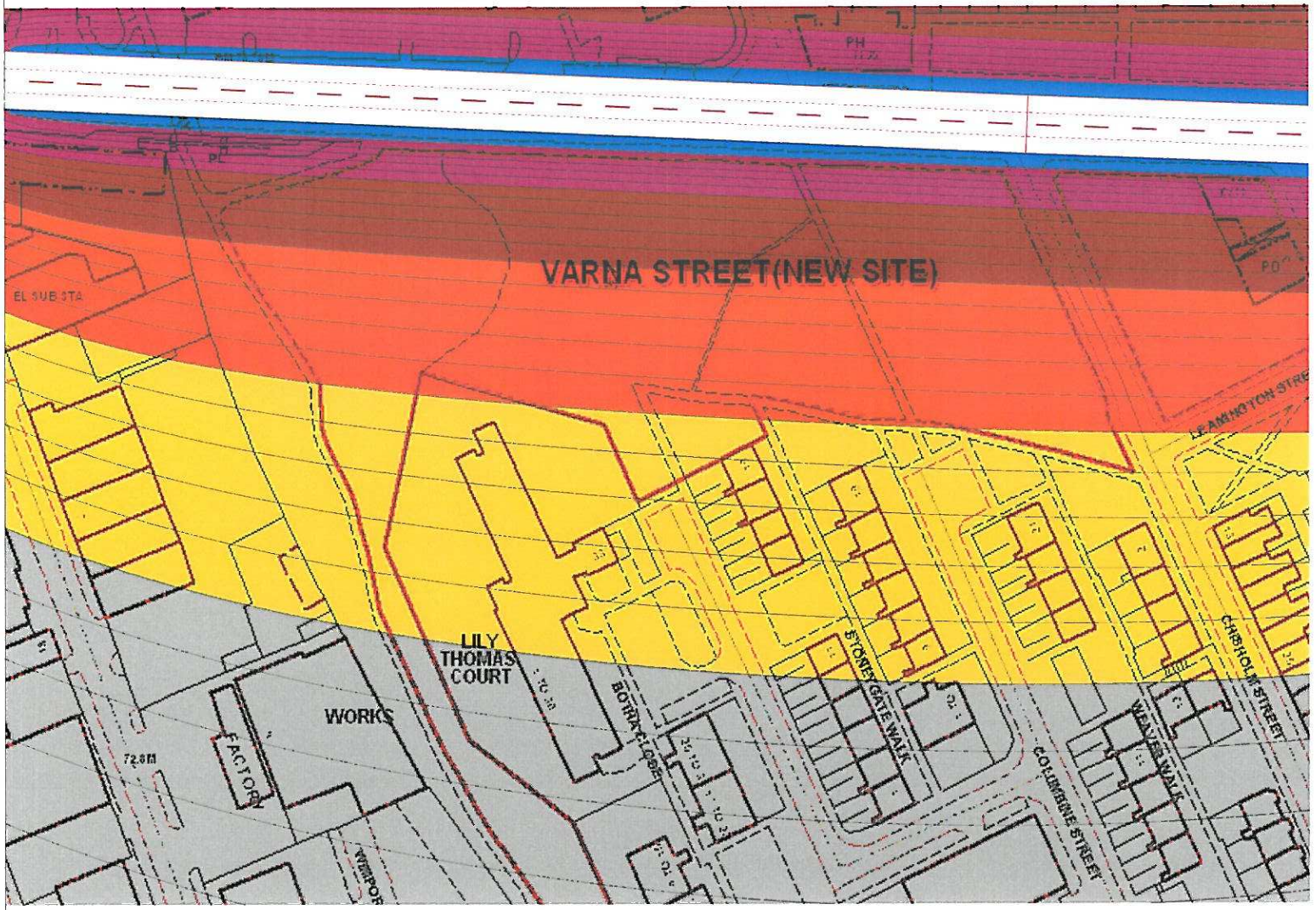


ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

DESCRIPTION

Octave band L_{eq} Spectra

PROJECT	SURVEY DATE	DRAWING NO.
Varna Street	25th Sep 2008	1449/G1



	DESCRIPTION Plot of free field LAeq, 30 mins on levelled site		
	PROJECT Varna Street	**DATE** October 2008	**PLOT NO.** 1449/CP1