

Report No. NVE2506-1
Issued on 6th August 2007

A Survey of Background Noise
at 146-162 Kilburn High Road and 4-10 Kingsgate Road,
Kilburn, London NW6

* * *

For specification of plant

Prepared for:
Kingsgate Land Limited
Philpot House
Station Road
Rayleigh
Essex SS6 7HH

Prepared by:
Tom Brodowski MIOA
Noise & Vibration Engineering Limited
1 Rothesay Avenue
London SW20 8JU

Tel: 020 8542 9226
Email: tbrodowski@noise-vibration.co.uk

CONTENT

Clause		Page
1	Introduction	3
2	The site and the proposed plant	3
3	The Camden Council's noise requirements	4
4	The method of assessing the impact of noise	4
5	The noise survey and results	5
6	Discussion	6
Figure		
1	Location plan	7
2	Existing first floor roof plan showing the noise monitoring and the proposed plant	8
3	Proposed first floor roof plan showing the noise monitoring and the proposed plant	8
4	Proposed elevation in Kingsgate Place the noise monitoring location	9
Photos		
1	Noise monitoring location (2)	10
2	Noise monitoring location (3)	10
Chart 1	Time history of the noise at Location 2	11
Table 1	Results of the noise survey at Location 2	11-12
Chart 2	Time history of the noise at Location 3	13
Table 2	Results of the noise survey at Location 3	13-14
Table 3	Summary of Noise Results & Allowable Levels	15
Appendix		
A	Glossary of Terms and Noise Principles	16-17

1. Introduction

Kingsgate Land Limited are applying for a planning application for a planned development scheme at 146-162 Kilburn High Road, London NW6 4JD.

As part of a planning application it is required to satisfy Camden Council that the noise produced by the outdoor plant, ventilation and air conditioning equipment will not cause a nuisance to the local residents.

Kingsgate Land Limited have commissioned Noise & Vibration Engineering Limited (NVE) to carry out a noise survey to determine allowable levels of the noise from the proposed plant at the nearest noise-sensitive windows in residential properties.

This report describes the survey, presents and discusses results.

2. The Site and the Proposed Plant

The scheme is located in part on Kilburn High Road and involves changing the use of offices above the ground floor retail. This refurbishment will create 38 apartments, 15 of which will have habitable rooms facing out over the main road. The remaining 23 will face onto a quiet Kingsgate Place at the rear and an internal courtyard.

In addition to the above an Affordable Block of 14 flats will be created above the supermarket building at 4-10 Kingsgate Road.

It is proposed to install a VRV condenser, which will handle the air movement, at high level on the ground floor above storage areas at the rear elevation in Kingsgate Place, see Elevation in Figure 4 and Photo 1.

It is also proposed to install a community heating system, retail refrigeration plant and vents to retail plant on the roof of the supermarket building at 4-10 Kingsgate Road, see Figures 2 and 3 and photo 2.

However, at this stage there is no specific information available about the proposed plant, i.e. its type, noise output and hours of operation.

For this reason this report only provides levels of noise that should not be exceeded by the proposed plant at the nearest noise-sensitive windows in order to comply with the Camden Council's Noise Requirements.

3. The Camden Council's Noise Requirements

The Camden Council requires that all development proposals that include the installation of plant, ventilation or air conditioning equipment will need to provide detailed acoustic/noise and vibration information in the form of a report at the planning application stage.

The Council will only grant planning permission for plant or machinery, including ventilation or air handling equipment, if it can be operated without causing loss to local amenity and does not exceed the thresholds set out in Table E below:

Camden Council's Unitary Development Plan
Appendix 1 - Noise and Vibration Thresholds

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	55dB(A) - LA90
Noise that has a distinguishable discrete continuous noise (whine, hiss, screech, hum) at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	10dB(A) - LA90
Noise that has distinct impulsive (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	10dB(A) - LA90
Noise at 1 metre external to sensitive facade where LA90 > 60dB	Day, evening and night	0000-2400	55dB LAeq

4. The Method of Assessing the Impact of Noise

The Camden Council's criteria are based on the assessment method in accordance with BS 4142: 1997 "Rating industrial noise affecting mixed residential and industrial areas". This standard describes a method of determining, at the outside of buildings, whether a noise of an industrial nature is likely to give rise to complaints from persons living in the vicinity.

Response to noise is subjective and affected by many factors (acoustic and non-acoustic). In general the likelihood of complaint in response to a noise depends on factors including the margin by which it exceeds the background noise level, its absolute level, time of day, changes in noise environment etc., as well as local attitudes to the premises and the nature of the neighbourhood.

The BS 4142 is only concerned with the rating of a noise of an industrial nature, based on the margin by which it exceeds a background noise level with an appropriate allowance for the acoustic features present in the noise. As this margin increases, so does the likelihood of complaint.

5. The Noise Survey & Results

The noise survey was carried out over a 24 hour period, i.e. between 12 noon on Tuesday, 31st July and 12 noon on Wednesday, 1st August 2007. It consisted of measuring the level of the existing background noise at two locations, i.e. Locations 2 and 3.

N.B. Locations 1 and 4 are allocated for the assessment of a road traffic noise only and are dealt with in a separate report.

At Location 2 a microphone was positioned 1m in front of the rear façade, at the first floor level, facing Kingsgate Road where the nearest windows of habitable rooms from the proposed VRV condensers will be located, see Figure 2 and Photos.

At Location 3 a microphone was positioned 1m in front of the façade, at the second floor level, facing the roof of the supermarket building at 4-10 Kingsgate Road where the plant enclosure will be located, see Figure 2 and Photos. There will be a number of habitable rooms of the new Affordable Block of flats (to be constructed) overlooking the plant enclosure. The measurement location was chosen to represent the quietest location within the proposed internal courtyard.

Throughout the survey it was warm, dry and there were occasional light breezes.

The following instrumentation was used for the noise survey at Locations 2 and 3 respectively:

- The SIP95 Sound Level Meter (Serial No. 010468) together with a type MK250 Microphone (Serial No. 2943) and type PRE12N Preamplifier was laboratory calibrated by the manufacturers (01dB MVI technologies group) in July 2003.
- SIP95 Sound Level Meter (Serial No. 010663) together with a type MK250 Microphone (Serial No. 4023) and type PRE12N Preamplifier was laboratory calibrated by the manufacturers (01dB MVI technologies group) in December 04.

The sound level meters was checked for calibration just before and after the measurements with a B&K 4231 Sound Level Calibrator (Serial No. 2084931), which was laboratory calibrated by (AVI Ltd) in January 2005. No drift in the measurement level has been observed in either SLM.

The measurements of the existing background noise levels at Locations 2 and 3 are tabulated and presented Tables 1 and 2 respectively. A time history of the noise at Locations 2 and 3 is presented in Charts 1 and 2 respectively.

The summary of results is presented in Table 3.

For the Glossary of Terms and Noise Principles see Appendix A.

6. Discussion

In the summary of results the maximum allowable levels of noise from the proposed plant at 1m external to a sensitive façade are presented.

Since the maximum allowable levels are based on the lowest background noise over 24-h period, they can be used to design and specify the plant, which would operate during any period of the day or night.

In order to ensure that the retailer's plant does not contribute to the background noise level the plant should be installed in an acoustic enclosure.



Figure 1. Location Plan (N.T.S.)

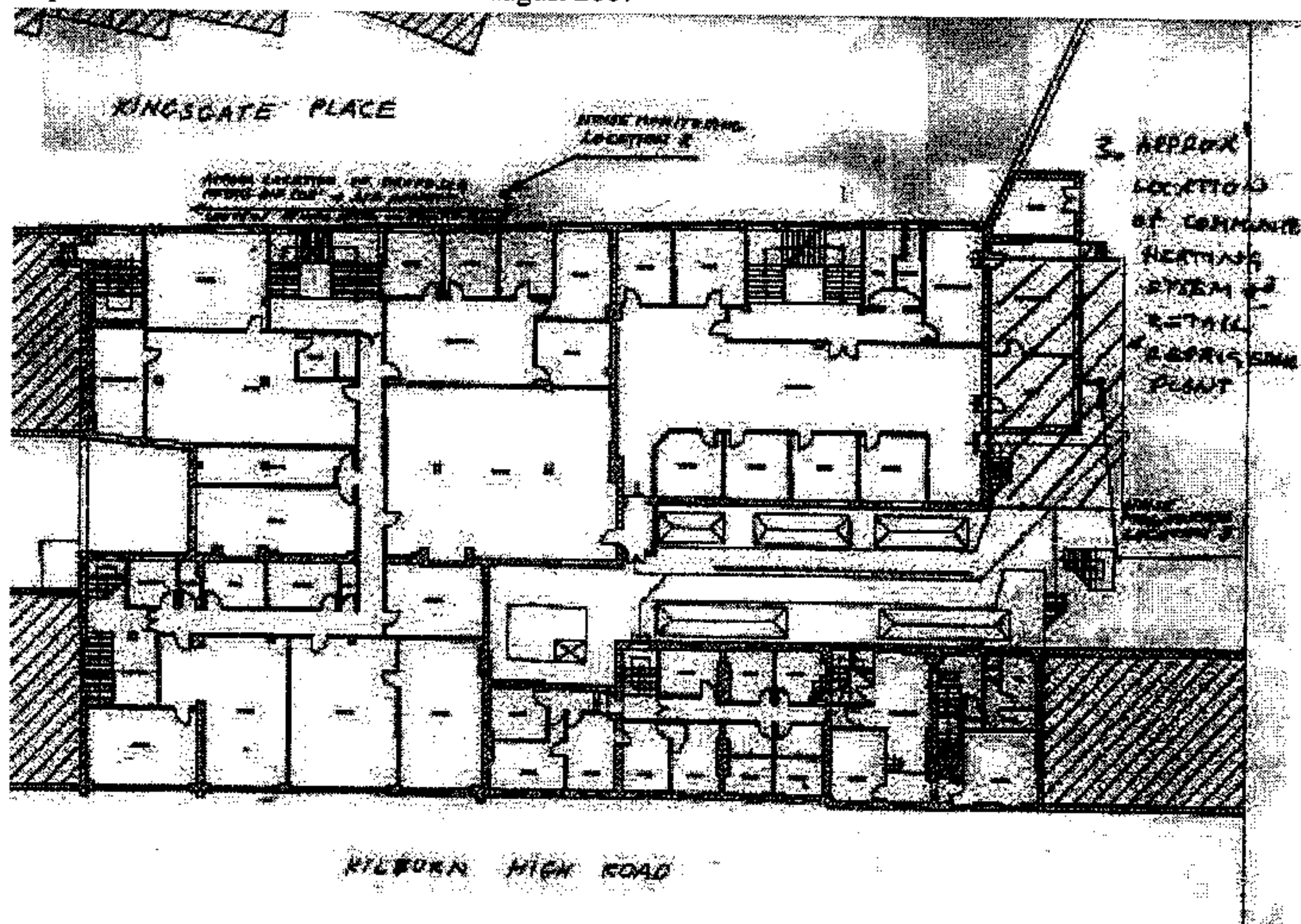


Figure 2 - Existing first floor plan showing the locations of the noise monitoring and the proposed plant (N.T.S)

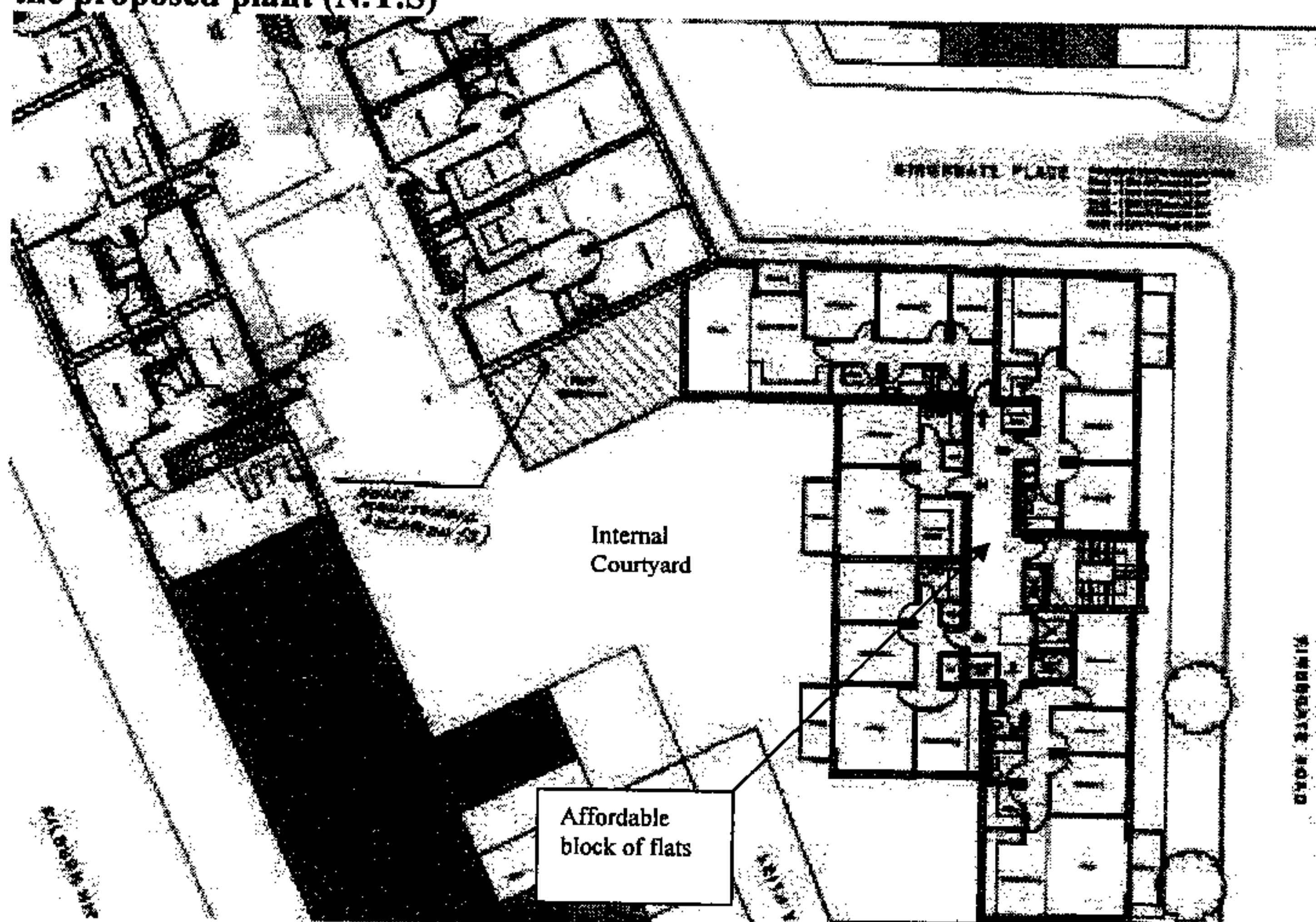


Figure 3 – Proposed first floor plan showing the location of noise monitoring (N.T.S.)

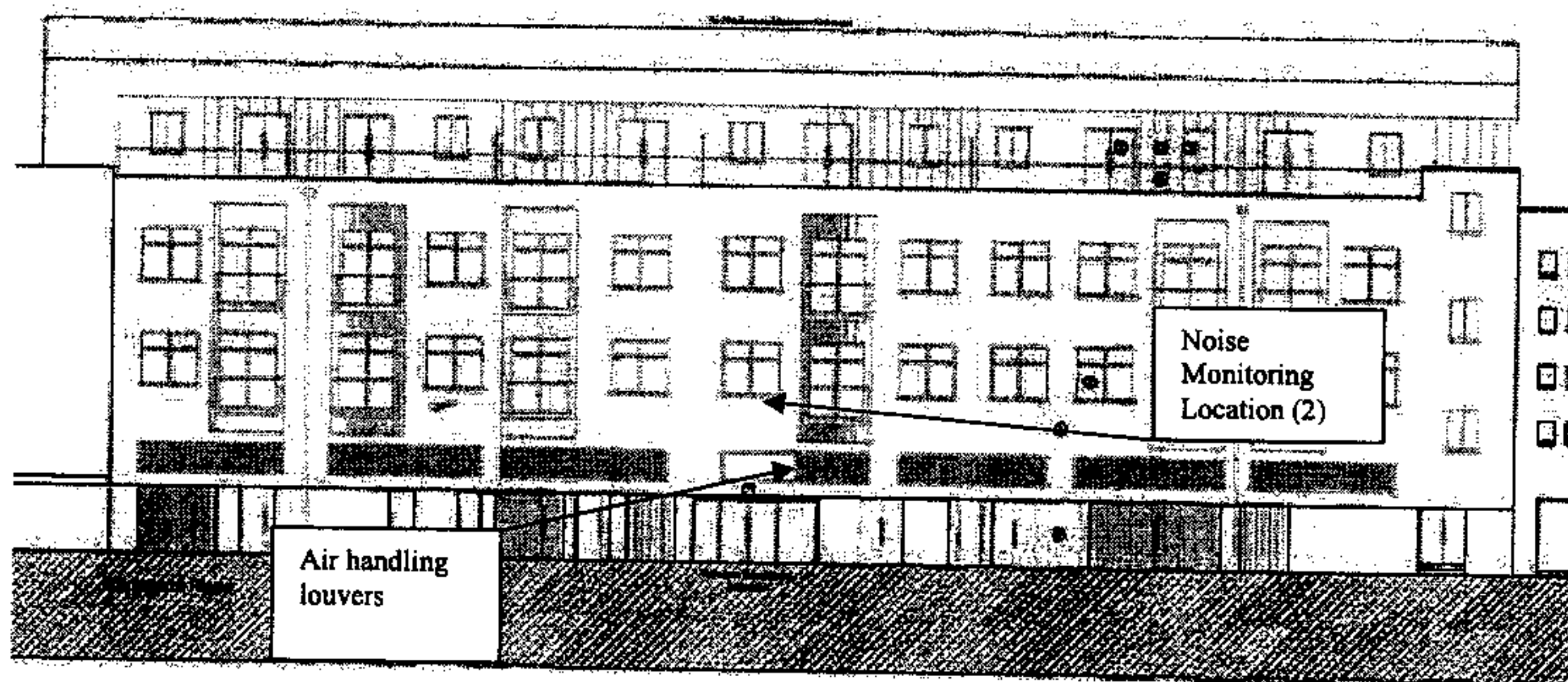


Figure 4 – Proposed elevation in Kingsgate Place showing the noise monitoring location (2), (N.T.S.)

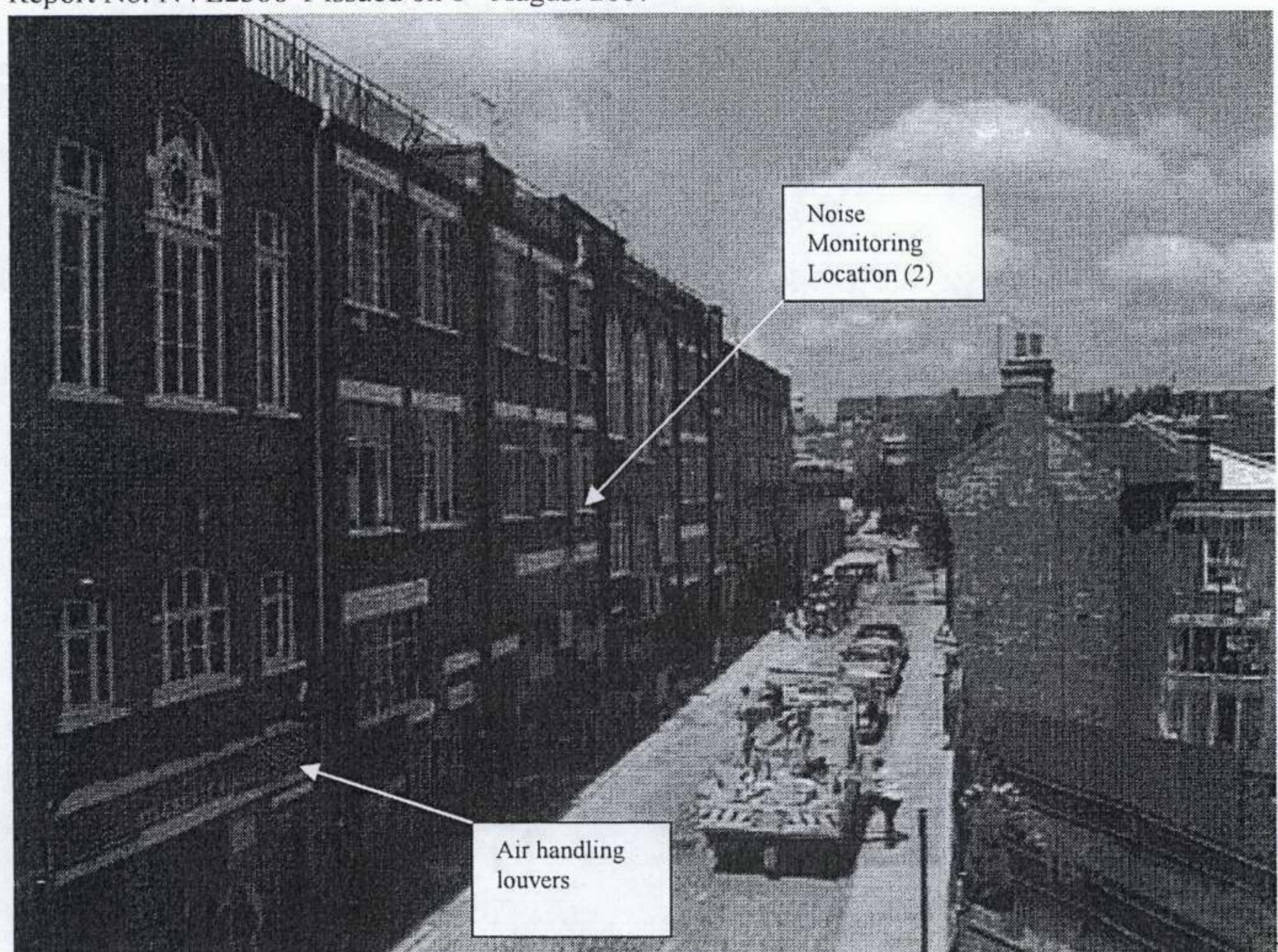


Photo 1 – Noise Monitoring Location (2) in Kingsgate Place

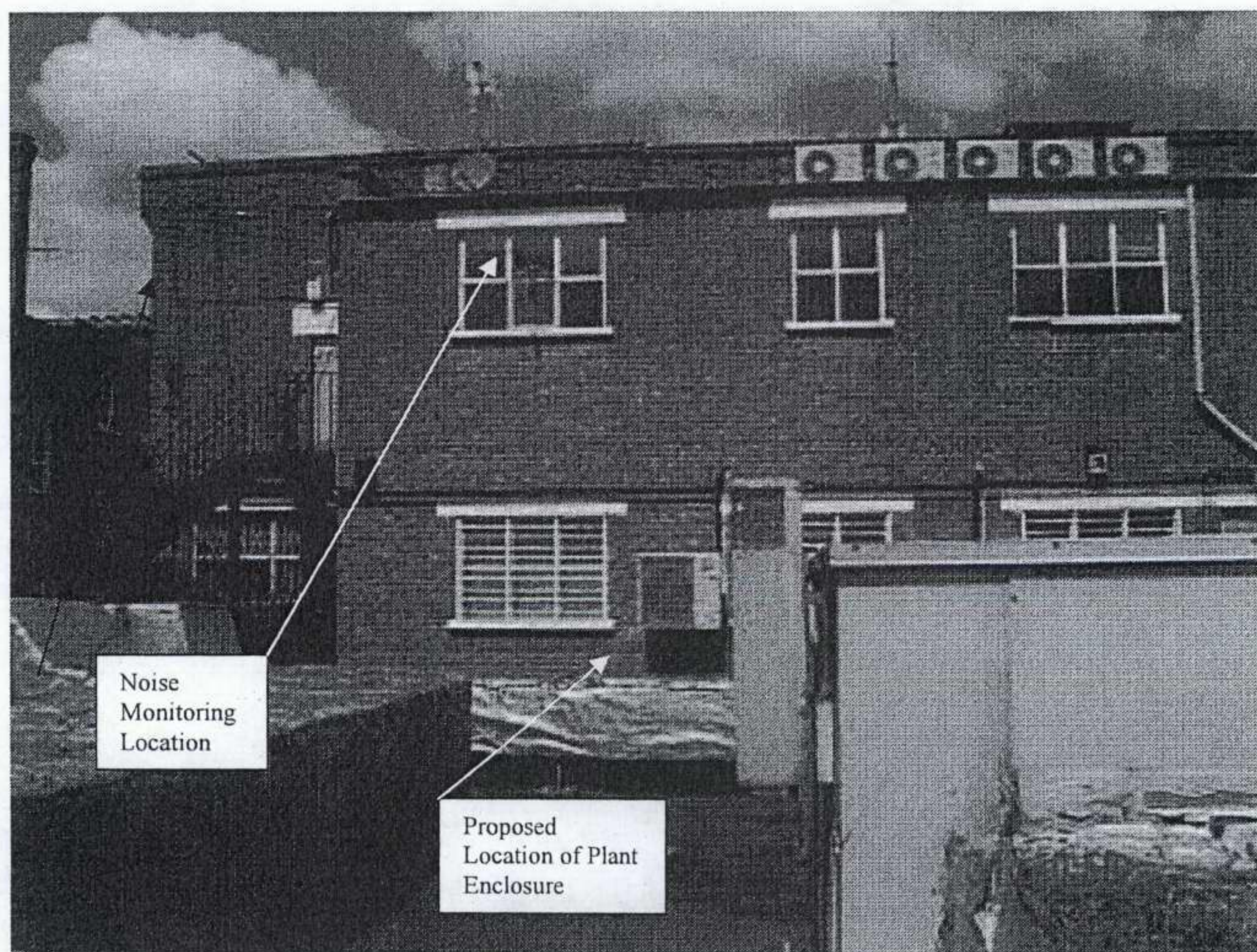


Photo 2 – Noise Monitoring Location (3) overlooking the roof of the supermarket

RESULTS OF THE NOISE SURVEY

Chart 1 - Time History of the Noise at Location 2 in Kingsgate Place

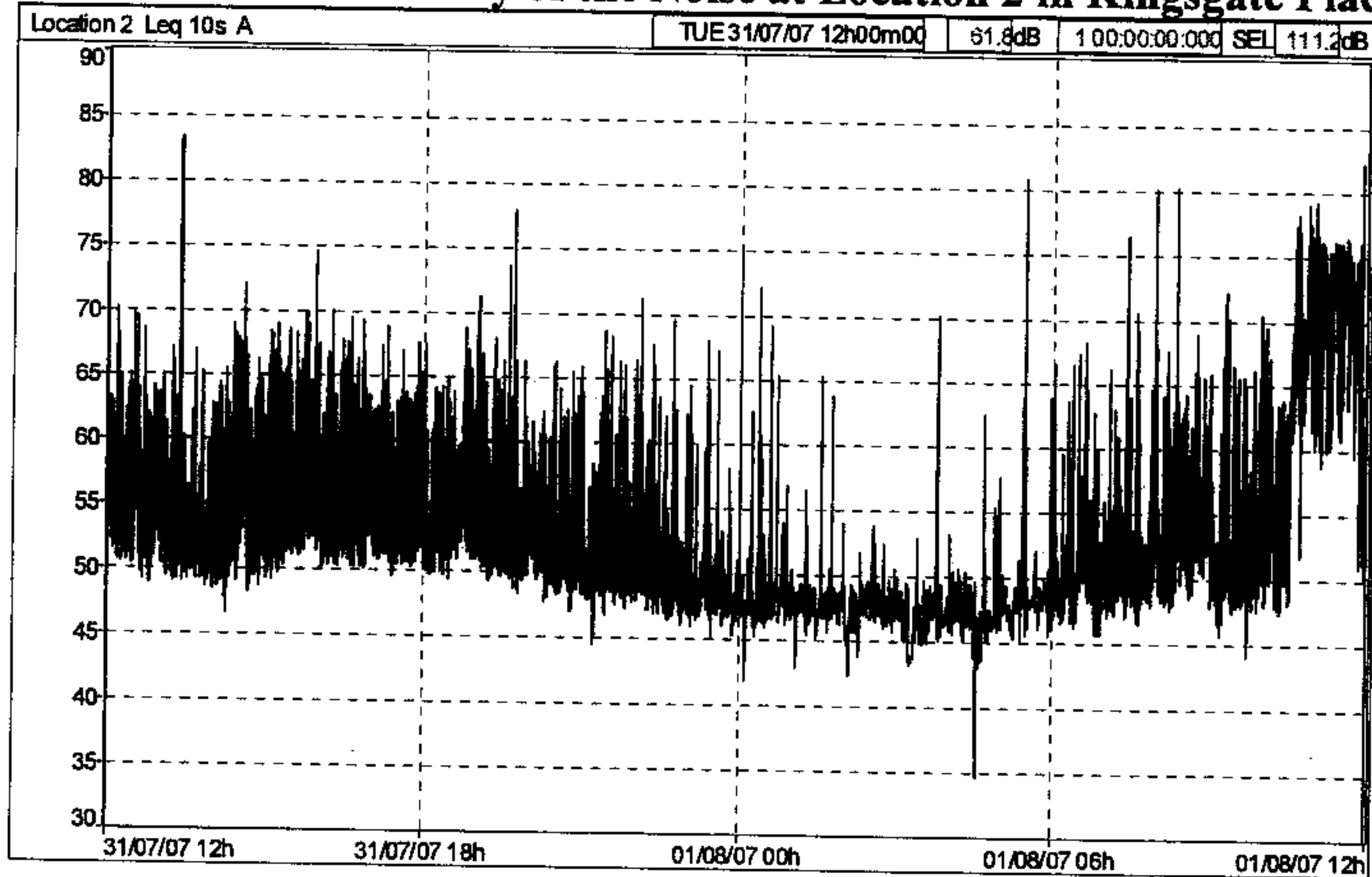


Table 1 - Results of the Noise Survey at Location 2 in Kingsgate Place

Daytime (0700-2300)			Night-time (2300-0700)		
Periods	15m		Periods	15m	
Location	2		Location	2	
Weighting	A		Weighting	A	
Elementary			Elementary		
Duration	1s		Elementary Duration	1s	
Unit	dB		Unit	dB	
Period start	Leq	L90	Period start	Leq	L90
01/08/2007 07:00	52.8	47.4	31/07/2007 23:00	52	46.6
01/08/2007 07:15	58.5	48.2	31/07/2007 23:15	53	46.6
01/08/2007 07:30	57.4	47.6	31/07/2007 23:30	51.4	46.5
01/08/2007 07:45	64	48.2	31/07/2007 23:45	48.4	46.4
01/08/2007 08:00	55.5	48.5	01/08/2007 00:00	56.5	44.1
01/08/2007 08:15	62.1	48.5	01/08/2007 00:15	54.6	46
01/08/2007 08:30	56.9	49.3	01/08/2007 00:30	52.1	46.4
01/08/2007 08:45	57.4	50.9	01/08/2007 00:45	50.9	46.8
01/08/2007 09:00	52.9	46.4	01/08/2007 01:00	47.6	44.2
01/08/2007 09:15	59.6	47.8	01/08/2007 01:15	48.5	46.4
01/08/2007 09:30	55.5	45.8	01/08/2007 01:30	49.9	46.3
01/08/2007 09:45	57.3	47.7	01/08/2007 01:45	50	46.5
01/08/2007 10:00	59.4	49.1	01/08/2007 02:00	47.4	42.5
01/08/2007 10:15	56.4	47.8	01/08/2007 02:15	47.6	45.5
01/08/2007 10:30	71.4	49.1	01/08/2007 02:30	48.4	46.8
01/08/2007 10:45	71.4	62	01/08/2007 02:45	47.6	46.2
01/08/2007 11:00	72.9	59.5	01/08/2007 03:00	47.6	45.8

01/08/2007 11:15	71.8	59.8
01/08/2007 11:30	72.3	62.3
01/08/2007 11:45	69.3	50.5
31/07/2007 12:00	63.1	50.2
31/07/2007 12:15	56.4	50.3
31/07/2007 12:30	59.2	49.9
31/07/2007 12:45	56	50
31/07/2007 13:00	58.5	49.6
31/07/2007 13:15	72.8	49
31/07/2007 13:30	54.4	49.4
31/07/2007 13:45	54.1	48.9
31/07/2007 14:00	54	48.2
31/07/2007 14:15	59.2	48.6
31/07/2007 14:30	60.8	49
31/07/2007 14:45	57	49.4
31/07/2007 15:00	58.2	49.1
31/07/2007 15:15	59.4	50.5
31/07/2007 15:30	58.5	50.9
31/07/2007 15:45	60.2	51.7
31/07/2007 16:00	57	50.3
31/07/2007 16:15	58.1	50.4
31/07/2007 16:30	57.6	50.3
31/07/2007 16:45	57.9	50.3
31/07/2007 17:00	57.5	50.9
31/07/2007 17:15	57	49.9
31/07/2007 17:30	57.1	50.2
31/07/2007 17:45	57.6	50.4
31/07/2007 18:00	55.2	49.7
31/07/2007 18:15	56.3	49.8
31/07/2007 18:30	55.5	50.6
31/07/2007 18:45	58.6	51.1
31/07/2007 19:00	58.4	50.1
31/07/2007 19:15	56.1	49.5
31/07/2007 19:30	62.2	49.4
31/07/2007 19:45	55.8	48.7
31/07/2007 20:00	54.2	49.6
31/07/2007 20:15	54.4	48.4
31/07/2007 20:30	54.3	48.5
31/07/2007 20:45	54.6	48
31/07/2007 21:00	51.7	47.8
31/07/2007 21:15	55.2	46.7
31/07/2007 21:30	54.3	48.2
31/07/2007 21:45	53.3	47.6
31/07/2007 22:00	57.2	47.7
31/07/2007 22:15	54.9	47.2
31/07/2007 22:30	53.3	46.8
31/07/2007 22:45	50.4	47
Quietest Period	50	46
	Leq	L90
	dBA	dBA

façade

01/08/2007 03:15	46.3	43.3
01/08/2007 03:30	46.8	44.9
01/08/2007 03:45	52.4	45.9
01/08/2007 04:00	48	46.3
01/08/2007 04:15	48.3	46.1
01/08/2007 04:30	46.1	43
01/08/2007 04:45	49.5	45.5
01/08/2007 05:00	48.5	46.5
01/08/2007 05:15	62	45.9
01/08/2007 05:30	54.4	47.2
01/08/2007 05:45	49.6	46.4
01/08/2007 06:00	52.9	47.1
01/08/2007 06:15	52.7	46.6
01/08/2007 06:30	58	49
01/08/2007 06:45	51.7	45.9
Quietest Period	46	43
Facade	Leq	L90
	dBA	dBA

Chart 2 - Time History of the Noise at Location 3 overlooking the roof of the supermarket

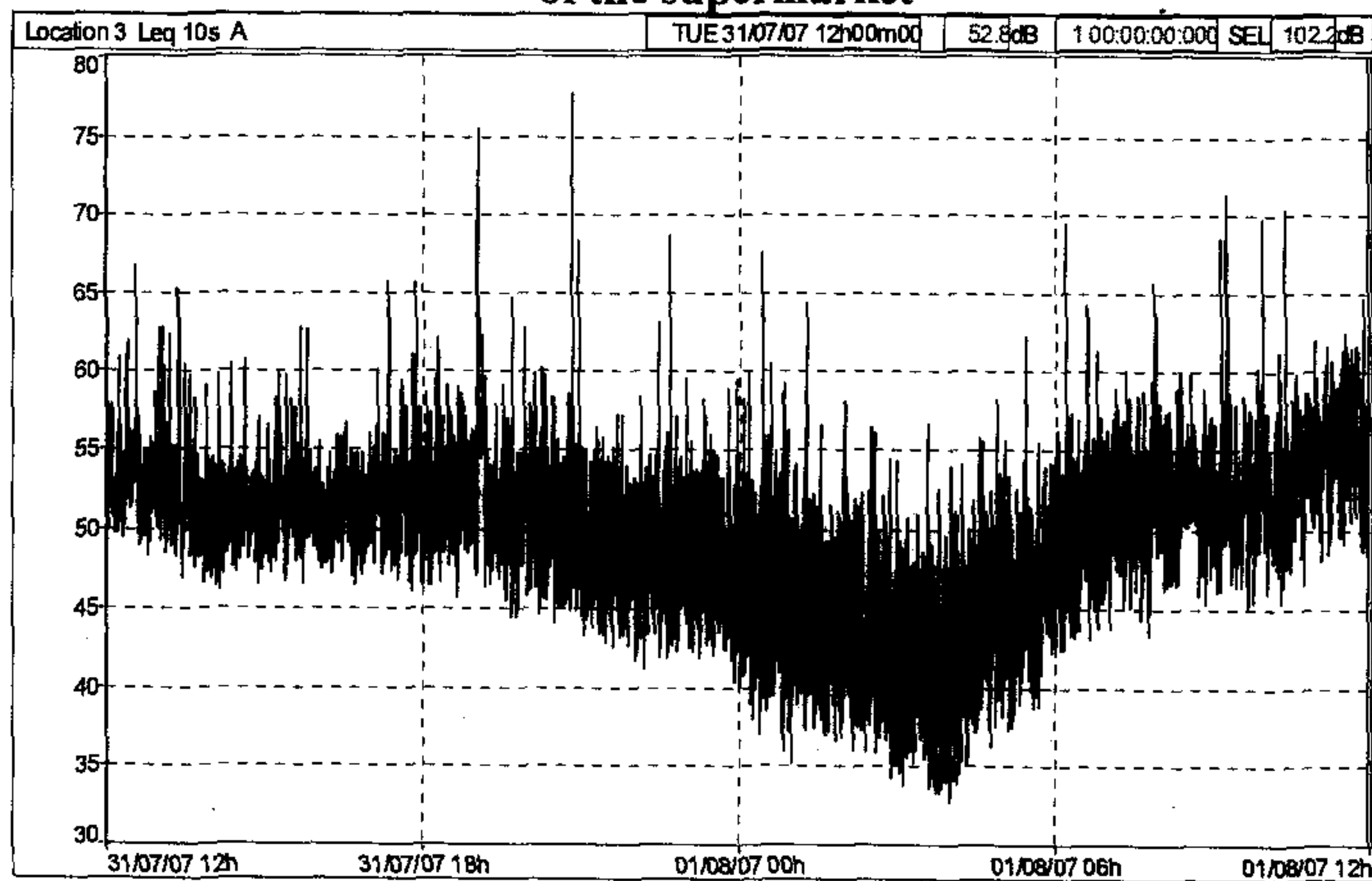


Table 2 - Results of the Noise Survey at Location 3 overlooking the roof of the supermarket

Daytime (0700-2300)			Night-time (2300-0700)		
Periods	15m		Periods	15m	
Location	3		Location	3	
Weighting	A		Weighting	A	
Elementary			Elementary		
Duration	1s		Duration	1s	
Unit	dB		Unit	dB	
Period start	Leq	L90	Period start	Leq	L90
01/08/2007 07:00	52.4	47	31/07/2007 23:00	49.9	43.4
01/08/2007 07:15	52.8	46.7	31/07/2007 23:15	50.4	43.4
01/08/2007 07:30	52.2	46.4	31/07/2007 23:30	49.6	43.4
01/08/2007 07:45	54.7	46.9	31/07/2007 23:45	49.3	41.6
01/08/2007 08:00	52.7	47.4	01/08/2007 00:00	49.9	40.7
01/08/2007 08:15	53.2	48.3	01/08/2007 00:15	51.1	40.3
01/08/2007 08:30	53.4	49.8	01/08/2007 00:30	50	40
01/08/2007 08:45	52.2	47.3	01/08/2007 00:45	49	39.1
01/08/2007 09:00	54.6	47.2	01/08/2007 01:00	46.9	39
01/08/2007 09:15	57.6	48	01/08/2007 01:15	49.9	38.1
01/08/2007 09:30	52.1	46.8	01/08/2007 01:30	45.1	37.7
01/08/2007 09:45	56.4	47.8	01/08/2007 01:45	45.2	38
01/08/2007 10:00	51.8	47.9	01/08/2007 02:00	47.5	37.9
01/08/2007 10:15	55.8	46.8	01/08/2007 02:15	43.6	37.4
01/08/2007 10:30	54.8	48.4	01/08/2007 02:30	46.6	37.4
01/08/2007 10:45	55.9	49.8	01/08/2007 02:45	44.3	36.3
01/08/2007 11:00	56.2	49.4	01/08/2007 03:00	44.1	34.7
01/08/2007 11:15	56.7	49.7	01/08/2007 03:15	42.5	35.9

01/08/2007 11:30	58.7	50.3	01/08/2007 03:30	44.3	35.2
01/08/2007 11:45	55.7	48.8	01/08/2007 03:45	43	33.8
31/07/2007 12:00	53.4	49.7	01/08/2007 04:00	44.4	34.6
31/07/2007 12:15	54.3	50.3	01/08/2007 04:15	44.4	37.3
31/07/2007 12:30	54.1	49.5	01/08/2007 04:30	46.2	38.1
31/07/2007 12:45	53.1	49.7	01/08/2007 04:45	46.6	38
31/07/2007 13:00	54.1	49.2	01/08/2007 05:00	46.9	38.1
31/07/2007 13:15	56.7	48.1	01/08/2007 05:15	49.2	39.7
31/07/2007 13:30	53.2	48.9	01/08/2007 05:30	46.2	39.6
31/07/2007 13:45	50.6	47.3	01/08/2007 05:45	48.4	42.2
31/07/2007 14:00	52.1	47	01/08/2007 06:00	54.3	43.5
31/07/2007 14:15	51.5	48	01/08/2007 06:15	51.1	43.9
31/07/2007 14:30	51.9	48.3	01/08/2007 06:30	54.6	46.7
31/07/2007 14:45	51	47.5	01/08/2007 06:45	51.9	45.2
31/07/2007 15:00	51.7	47.8	Quietest Period	43	34
31/07/2007 15:15	52.7	48.1		Leq	L90
31/07/2007 15:30	53.3	47.7		dBA	dBA
31/07/2007 15:45	52.5	48.9			
31/07/2007 16:00	50.4	47.6			
31/07/2007 16:15	51.9	47.9			
31/07/2007 16:30	51.9	48.1			
31/07/2007 16:45	50.8	47.6			
31/07/2007 17:00	52.7	49			
31/07/2007 17:15	55.3	48.4			
31/07/2007 17:30	54	48			
31/07/2007 17:45	55	48.2			
31/07/2007 18:00	52.4	47.6			
31/07/2007 18:15	53.6	48.4			
31/07/2007 18:30	52.6	48.2			
31/07/2007 18:45	53.4	49			
31/07/2007 19:00	60.1	48.4			
31/07/2007 19:15	51	47			
31/07/2007 19:30	53	46.4			
31/07/2007 19:45	52.2	46.5			
31/07/2007 20:00	51.9	46.1			
31/07/2007 20:15	52.2	46.8			
31/07/2007 20:30	51.3	45.7			
31/07/2007 20:45	59.6	45.9			
31/07/2007 21:00	50.3	44.3			
31/07/2007 21:15	50.3	44.4			
31/07/2007 21:30	50.3	44.9			
31/07/2007 21:45	49.6	43.9			
31/07/2007 22:00	49.2	42.9			
31/07/2007 22:15	51.4	44.6			
31/07/2007 22:30	52.6	43.7			
31/07/2007 22:45	49.6	43.7			
Quietest Period	49	43	Façade (rounded to whole number)		
	Leq	L90			
	dBA	dBA			

SUMMARY OF NOISE RESULTS

Table 3 - The lowest background noise levels (L_{A90} in dBA) and the maximum allowable levels (L_{Aeq} in dBA) of noise from the proposed plant at 1m external to a sensitive façade

Location		2		3		Comments
Description	Index	Day	Night	Day	Night	
Lowest Background	L_{A90}	46	43	43	34	
No Acoustic Features	L_{Aeq}	41	38	38	29	$L_{A90} - 5\text{dB}$
Acoustic Features Present	L_{Aeq}	36	33	33	24	$L_{A90} - 10\text{dB}$

APPENDIX A

Glossary of Terms

A-weighted sound pressure level

The unit generally used for measuring and assessing environmental noise is A-weighted sound pressure level in decibels, denoted dB(A). The weighting is based on the frequency response of the human ear and has been found to correlate well with human subjective reactions to various sounds. It is worth noting that an increase or decrease of approximately 10 dB(A) corresponds to a subjective doubling or halving of the loudness of a noise, and a change of 2 to 3 dB(A) is subjectively barely perceptible.

$L_{Aeq,T}$

The equivalent continuous sound level is a notional steady sound level which would, over a given period of time, deliver the same sound energy as the actual fluctuating sound over the same period and is denoted $L_{Aeq,T}$. It is the unit which has been adopted to cover many forms of environmental noise from construction and open sites, mineral working, industrial noise and noise from railway trains. It is also by definition the only unit which can measure ambient noise, which itself is defined as the totally encompassing sound in a given situation at a given time usually being composed of sound from many sources near and far.

Background noise level, $L_{A90,T}$

The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the given time interval, T,

Residual noise

The ambient noise remaining at a given position in a given situation when the specific noise source is suppressed to a degree such that it does not contribute to the ambient noise.

Specific noise source

The noise source under investigation for assessing the likelihood of complaints

Reference time interval, T_r

The specified interval over which an equivalent continuous A-weighted sound pressure level is determined

Rating level, $L_{Ar, Tr}$

The specific noise level plus any adjustment for the characteristic features of the noise.

Distance attenuation

The noise from a person talking will reduce by 6 dB for each doubling of the distance between source and listener, i.e. raised male speaking voice which is typically 65 dBA at one 1 metre will be 59 dBA at 2 metres, 53 dBA at 4 meters, and so on. The noise propagation from a point source in a free space is in accordance with the inverse square law by which sound pressure level decreases by 6 dB per doubling of the distance from the source.

The noise from the road traffic will reduce by 3 dB for each doubling the distance between the road and receiver, provided there are no reflective surfaces, such as the concrete or asphalt. The noise propagation from a line source situated near the ground is in accordance with unidirectional hemispherical propagation, i.e. sound pressure level decreases by 3 dB per doubling the distance between the source and receiver.