Appendix 3 – Waste Management Details

SITA One-UK

1 Bishops Court
Lincoln's Office Village
Lincoln Road
Cressex Business Park.
High Wycombe.
Bucks HP12 3 RE

11June 2002

Waste Management

Project: **166 High Holborn London**

Methodology

Introduction

Sita One-UK manage and disposal the waste products from Compass Roadside Central London Hotels.

Sita Wastecare is a Registered Waste Carrier and our Waste Carrier Licence Number is BKM 091252/CB issued by Thames Region Environment Agency.

External Secure Refuse Storage Area

The Hotels refuse storage area has been design to allow for a vented external secure refuse store which is located in the service area as indicated on EPR's drawing TP-110.

This area can accommodate upto six number wheel type 660 litre Euro containers (container dimensions 1.220mm high x 0.810mm wide x 1.370m long).

Refuse Collection

Refuse collection will be made by using a Sita REL (rear end loading) vehicle and will collect the refuse from the Hotels external secure refuse storage area via the service access road in Museum Street.

The Hotel Management staff will be aware of the day and approximate time of the refuse collection.

Upto six Euro containers will be emptied at any one time and the waste disposed into the REL.

Daily collections will be between the hours of 6,30am and 09,30am.

Further Information

Collection days and times may vary and are subject to review.

Sita can make upto three collections in this area per day if required.

Control and management of the external secure refuse storage area will be the responsibility of Compass Roadside Hotel Staff

Sarah Hester
Account Manager for Sita One UK

Date: 14th April 2005

Ref: 04238/002/sw

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acoustic
design

166 HIGH HOLBORN,

LONDON WC1

PLANT NOISE ANALYSIS

Client: Travelodge Hotels Limited

Presented by: .....
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FOREWORD

London Borough of Camden (LBC) require that an acoustic report is prepared to accompany any planning application that includes, amongst other things, machinery / equipment in terms of air conditioning, refrigeration and ventilation. This Acoustic Consultant's report details works to be carried out in order that the Council's requirements are met. This report is based on the equipment selection and location as of April 2005, and supersedes the report submitted in June 2002.

LBC's normal requirement for new developments is, when all the proposed plant is operating simultaneously, that noise arising at a point 1m external to sensitive facades is at least 5 dBA less than the existing background noise level. If any item of plant is likely to exhibit any distinguishable characteristic such as a distinct note or impulses, noise assessed at the same location shall be at least 10 dBA less than the existing background noise level. LBC require that all noise arising shall add not more than 1 dB to the existing background noise level when assessed in each octave, ranging from 63 Hz to 8k Hz inclusive.

LBC's noise emission standards applicable to this proposal are established from background noise levels existing prior to the development. In order to determine background noise levels existing prior to implementing the development proposal, a noise level survey has been undertaken.

The survey results have been used to establish noise emission design criteria that accord with the stated requirements of LBC. Mechanical services plant and equipment has been carefully sited within the proposal such that noise arising from the simultaneous operation of all such plant will be mitigated to meet these requirements.

For an explanation of acoustic terms used in this report, please refer to the glossary of terms, set out in Figure 3.

SUMMARY

Background noise levels were monitored over a 46-hour continuous duration from 15:00 on Wednesday 5th June until 13:00 on Friday 7th June 2002. As the proposed building will be available for use during any time, minimum values of background noise levels have been used to establish the Council's required design and performance standards.

Noise measurements made in 2005 indicate that the noise climate may be some 3-4 dB higher than in 2002; however, measurements were not made at the same location. It is therefore considered prudent to use the data from 2002 (which leads to more stringent criteria)

The minimum noise level results arising from the survey are as follows:

Daytime	07:00 to 23:00 hrs	54 dB $L_{A90,\ 15min}$
Night-time	23:00 to 07:00 hrs	50 dB $L_{A90,\ 15min}$

It is understood that under Planning Condition 11 for this project, LBC require the total noise arising from the operation of plant, when calculated at a position one metre from the nearest noise sensitive façade, to not exceed the following:

Daytime (07:00 -23:00)	(54-5) =	49 dB $L_{Aeq,\ 15min}$
Night-time (23:00 - 07:00)	(50-5) =	45 dB $L_{Aeq,\ 15min}$

Under the same condition, any plant exhibiting tonal or impulsive characteristics shall be limited to 10 dB below the background noise level:

Daytime (07:00 -23:00)	(54-10) =	44 dB $L_{Aeq,\ 15min}$
Night-time (23:00 - 07:00)	(50-10) =	40 dB $L_{Aeq,\ 15min}$

Using plant manufacturer's noise level data where possible, a series of noise prediction calculations have been made and these are identified within this report; the noise level arising at 1m from the nearest noise sensitive façade due to the operation of the proposed plant is predicted as follows:

At the rear of 17 Grape Street	41 dBA (07:00 to 23:00) 32 dBA (23:00 to 07:00)

CONTENTS

1.0 Introduction

1.1 In September 2002 London Borough of Camden (LBC) published their Noise Strategy. This report details works to be carried out in order that the Council's requirements are met, and references documents in which LBCs noise standards are set out in detail.

1.2 The proposal to develop 166 High Holborn as a hotel comprises the addition of four condenser units, two extraction units and one air handling unit to be located at fourth floor level near to the façade overlooking High Holborn. Additionally, an extract fan is proposed at roof level (17th floor). This is to replace existing plant, which has been decommissioned since the building became vacant. Drawings depicting the development proposal are provided within the main body of the planning application.

1.3 As LBC's noise emission standards for each development proposal are established from background noise levels existing prior to the development, a background noise level survey was undertaken prior to commencement of work at 166 High Holborn (i.e. with the existing plant in operation). The survey was completed using automated instrumentation installed at the nearest sensitive façade at the same elevation as the proposed plant. Figure 1 depicts a photograph showing the relationship between the development proposal and the nearest noise sensitive façade.

1.4 The externally located plant will consist of eight units in total. Appendix 2 lists the current equipment selection for information.

2.0 Noise principles and standards

2.1 The noise principles and standards adopted within this report are those invoked by LBC's planning conditions for this project. This report is written with the intent to discharge conditions 4, 11 and 12.

2.2 For reference, these conditions are reproduced in full here:

Condition 4: Before the use commences all plant and machinery shall be sound attenuated and isolated from the structure in accordance with a scheme to be submitted to and approved by the Council such that the use can be carried out without detriment to the amenity of adjoining or surrounding premises.

Condition 11:Noise levels at a point 1 metre external to sensitive facades shall be at least 5 dB(A) less than the existing background measurement (LA90), expressed in dB(A) when ALL plant/equipment are in operation. Where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10 dB(A) below the LA90, expressed in dB(A). The applicant is therefore required to undertake a full acoustic background noise assessment, the full details of which shall e submitted to the Council, in order that the design criteria for the acoustic enclosure of plant/equipment can be properly assessed.

Condition 12: For each of the octave band of centre frequencies 63Hz-8kHz inclusive, noise levels from AL plant/equipment (measured in LAeq) when in operation shall at all times add not more than 1 decibel to the existing background

noise level LA90, expressed in dB(A), in the same octave band as measured 1 metre external to sensitive facades.

A glossary of acoustic terms is included as Figure 3.

3.0 Site and surroundings

3.1 The application site comprises a multi-storey (unoccupied) commercial use building, with a large area of flat roof at fourth floor level beside the main tower. The noise monitor position selected was at the nearest sensitive façade at the same elevation as the proposed plant. The monitor location and closest noise sensitive façade are shown in the photograph at Figure 1.

3.2 The nearest noise sensitive façade is considered to be the adjoining building at 17 Grape Street. This façade does have windows, which are approximately at the same elevation as the plant, although they do not appear to serve internal accommodation.

3.3 There are existing residential units on the upper two floors of the development site. No other residential facades have been identified in the vicinity of the application site by AAD.

4.0 Measurement methodology

4.1 Background noise levels were monitored over a 46-hour continuous duration from 15:00 on Wednesday 5th June until 13:00 on Friday 7th June 2002. Supplementary measurements were made in the vicinity during January 2005.

4.2 The equipment used to measure prevailing background noise levels comprised a Larson Davis type 820 environmental noise level analyser, equipped with a Larson Davis type 2541 microphone and Larson Davis type 828 pre-amplifier. The instrument was powered by an external battery and stored in a weatherproof case.

4.3 The instrument was calibrated prior and subsequent to use with a Larson Davis type CA 250 calibrator whereupon no calibration drift was recorded.

4.4 The environmental noise analyser was located at the nearest sensitive façade at the same elevation as the proposed plant at fourth floor level at 166 High Holborn near the façade overlooking High Holborn, as shown in the photograph at figure 1.

4.5 Monitoring was continuous from 15:00 on Wednesday 5th June until 13:00 on Friday 7th June 2002. The instrument was set up to monitor noise levels continuously in fifteen-minute multiple interval periods.

4.6 Based upon the prevailing weather conditions in the general area of London during the survey period, the weather was mostly dry except for showers during Wednesday and the wind-speed, although not recorded, was considered to be less than 5 m/s throughout the survey period.

4.7 The ambient noise level at this location at the time of the noise survey was characterised particularly by road traffic noise arising from High Holborn and the surrounding road network as well from the existing plant at 166 High Holborn. Measurements during 2005 were made in the absence of noise from existing plant, but indicated that noise due to road traffic in the area has increased since the original survey. A comparison of the 2002 and 2005 data indicated that the 2002 data are still appropriate for use in setting plant noise emission limits.

4.8 From observation of the data we consider there were no unusual noise events arising during the survey period and that the data are a true representation of ambient noise levels prevailing in the area.

4.9 LBC considers limiting noise level criteria for new plant and equipment in two periods, namely daytime (07:00 to 23:00) and night-time (23:00 to 07:00). The minimum integer values of background noise level ($L_{A90,\ 15min}$) measured in the two periods of interest are:

Daytime (07:00 -23:00)	54 dB $L_{A90,15min}$
Night-time (23:00 - 07:00)	50 dB $L_{A90,15min}$

4.10 The above daytime data arise from Thursday 6th June 2002, and night-time data from Friday 7th June 2002. In order to ensure that the operation of proposed new plant complies with the relevant planning criterion, LBC will require the noise level of this plant, *in total*, at one metre from the nearest noise sensitive facade shall not exceed the following:

Daytime (07:00 -23:00)	(54-5) =	49 dB $L_{Aeq,15min}$
Night-time (23:00 - 07:00)	(50-5) =	45 dB $L_{Aeq,15min}$

4.11 Where any item of plant and equipment is expected to exhibit tonal, impulsive or irregular characteristics, LBC requires the noise level arising at one metre from the nearest noise sensitive facade shall not exceed the following:

Daytime (07:00 -23:00)	(54-10)=	44 dB $L_{Aeq,15min}$
Night-time (23:00 - 07:00)	(50-10)=	40 dB $L_{Aeq,15min}$

5.0 Evaluation and analysis of the resultant noise levels - Specific

5.1 The relationship between the proposed plant and the nearest noise sensitive property, shown in Figures 1 and 2, is as follows:

Plant and location	Nearest façade	Distance and disposition
Condensers; 4th floor	Commercial, 4th Floor	~22m, with a line of sight
Extract fans units; 4th floor	Commercial, 4th Floor	~15m, with a line of sight
Air handling unit; 4th floor	Commercial, 4th Floor	~14m, with a line of sight
Extract fan; tower roof	Residential flats, 166 High Holborn	~5m to roof edge, no line of sight

5.2 <u>Noise Levels – Manufacturers' information</u>

5.2.1 In order to deliver the cooling and ventilation duties necessary, plant selections from manufacturers ranges have been made by the building services consulting engineers. The noise levels published by the manufacturers for these selections have been used in acoustic calculations to reveal noise levels arising at the nearest noise sensitive façade. Noise level information supplied by equipment manufacturers for use in calculations are sound power level data (depicted as L_w data). The preliminary plant selections (by product) and related manufacturer's noise level data are as follows:

Toshiba RAV-SM1400AT-E:	2. no
Toshiba RAV-SM560AT-E:	2. no
Nuaire AHU	1. no
Nuaire EST-24R Extract Fan (EF 16/1)	1. no
Nuaire EST-18R Extract Fan (EF 3/1)	1. no
Nuaire AX71P-423A (EF 3/2)	1. no

Equipment	Sound power level (dB – re 10^{-12} W) at octave band centre frequency (Hz)								
	63	125	250	500	1K	2K	4K	8K	dBA
Toshiba RAV 1400	62	61	54	50	51	48	44	39	56
Toshiba RAV 560	54	59	52	48	45	43	36	26	51
Nuaire AHU	88	87	84	82	79	75	72	64	84
Nuaire EST-24R (tower roof)	--	93	89	97	85	82	74	75	95
Nuaire EST-18R	--	84	81	88	86	83	82	78	91
Nuaire AX71P	--	96	93	97	92	87	80	74	97

5.3 Noise Level Calculations

5.3.1 Noise level calculations have been performed using recognised standard procedures and formulae for noise propagation outdoors. The calculation summary is as follows:

Condensers

RAV-SM1400AT-E	dB(A)
Lw	56
Distance loss (22m)	-35
Directivity	-3
3 no.	+5
Reflections	+3
Lp at façade	**26**

RAV-SM560AT-E	dB(A)
Lw	51
Distance loss (22m)	-35
Directivity	-3
1 no.	0
Reflections	+3
Lp at façade	**16**

Extract Fan Units

3/EF2	dB(A)
Lw	97
Distance loss (16m)	-33
Directivity	-3
1 no.	0
Reflections	+3
Lp at façade	**64**

3/EF1	dB(A)
Lw	91
Distance loss (18m)	-34
Directivity	-3
1 no.	0
Reflections	+3
Lp at façade	**57**

16/EF1 (tower roof)	dB(A)
Lw	95
Distance loss (5m)*	-24
Directivity	-3
Screening from roof edge	-10
Reflections	+3
Lp at façade	**61**

*nearest receiver is residential properties at top of 166 High Holborn

Air Handling Unit

AHU1	dB(A)
Lw	84
Unit/coil/filter losses	-12
Distance loss (14m)	-32
Directivity	-3
1 no.	0
Reflections	+3
Lp at façade	**40**

5.4 Summary of Total Predicted Noise Levels

5.4.1 Based upon the predictions for each individual plant item, it is possible to determine the total combined noise level at the nearest sensitive receiver, dependant upon which items of plant are operating during the particular time of day. To this end, it is understood that during the daytime period, all plant items will be operating, however during the night-time period only the bathroom extract fans will run. In this case, the total predicted noise levels affecting can be summarised as follows;

DAYTIME – Flat Roof	Lp at façade dBA
Toshiba RAV 1400	26
Toshiba RAV 560	16
Nuaire AHU	40
Nuaire EST-18R	64
Nuaire AX71P	57
Total Lp at façade	**65**

NIGHT-TIME – Flat Roof	Lp at façade dBA
Toshiba RAV 1400	0
Toshiba RAV 560	0
Nuaire AHU	0
Nuaire EST-18R	0
Nuaire AX71P	57
Total Lp at façade	**57**

Tower – DAY and NIGHT	Lp at façade dBA
Nuaire EST-24R	61
Total Lp at façade	**61**

5.4.2 The predicted residual noise levels are in excess of the maximum permitted daytime noise level of 49 dB $L_{Aeq,15min}$ and the maximum night-time noise level of 45 dB $L_{Aeq,15min}$. It is necessary, therefore, to mitigate noise from some of the items of plant – analysis of the summary indicates that if extract fan and AHU noise is attenuated, then the permitted levels are likely to be achieved.

5.5 Emissions and Mitigation Summary

5.5.1 In order to achieve the noise level criteria, it will be necessary to add attenuators to the intake of the air handling unit, and on the discharge of the extract fans. An attenuator schedule is attached as Appendix 2, indicating the minimum insertion losses required.

5.5.2 With the attenuators provide as per the attached schedule, the revised summary of overall noise levels becomes;

DAYTIME	Lp at façade dBA
Toshiba RAV 1400	26
Toshiba RAV 560	16
Nuaire AHU	29
Nuaire EST-18R	40
Nuaire AX71P	32
Total Lp at façade	**41**

NIGHT-TIME	Lp at façade dBA
Toshiba RAV 1400	0
Toshiba RAV 560	0
Nuaire AHU	0
Nuaire EST-18R	0
Nuaire AX71P	32
Total Lp at façade	**32**

Tower – DAY and NIGHT	Lp at façade dBA
Nuaire EST-24R	34
Total Lp at façade	**34**

6.0 Summary

6.1 The above assessment uses measured noise levels, manufacturers' noise source and attenuation data (where available), architect's drawings and prudent calculation techniques. It demonstrates that, with all plant operating simultaneously and attenuation as detailed in Appendix 2, the resulting noise levels at the nearest noise sensitive façade (Grape Street) amounts to 41 dBA for daytime and 32 dBA for night-time. This residual noise level meets LBC's requirement set in planning condition 11 for noise to be at least 5 dBA below the existing background noise level. Noise from the rooftop plant affecting upper floor residential units is also predicted to meet the requirements of Planning Condition 11.

6.2 Planning Condition 12 further requires that all noise arising shall add not more than 1 dB to the existing background noise level when assessed in each octave ranging from 63 Hz to 8k Hz inclusive. The typical daytime spectral content of the background noise level has been assessed from measurement results, and a comparison of this to the total predicted plant noise levels is as follows:

	octave band centre frequency (Hz								dBA
	63	125	250	500	1k	2k	4k	8k	
	sound pressure level, dB re $2x10^{-5}$ Pa								
Typical background	67	62	56	51	47	44	39	37	54
Plant noise	53	50	43	39	33	28	31	35	42
Difference	-14	-12	-13	-12	-14	-16	-8	-2	-12

6.3 In Planning Condition 11, LBC also require that if any item of plant is likely to exhibit any distinguishable characteristic such as a distinct note or impulses, noise assessed at the same location shall be at least 10 dBA less than the existing background noise level. The shape of the resultant noise spectrum above suggests no tonality in the noise. However, attenuation has been selected such that, in fact, the predicted noise is 10 dBA less than the existing background noise level.

7.0 Conclusion

7.1 Noise arising from all items of plant will be mitigated both by distance and attenuators as shown in the attached schedule.

7.2 The plant noise assessment reveals a predicted noise level at the nearest noise sensitive window within the published requirements of the London Borough of Camden, based upon typical pre-development background noise levels measured.

7.3 The installation of the recommended plant attenuation will discharge Planning Conditions 4, 11 and 12.

Figure 1: Photograph showing relationship between site and closest noise sensitive façade

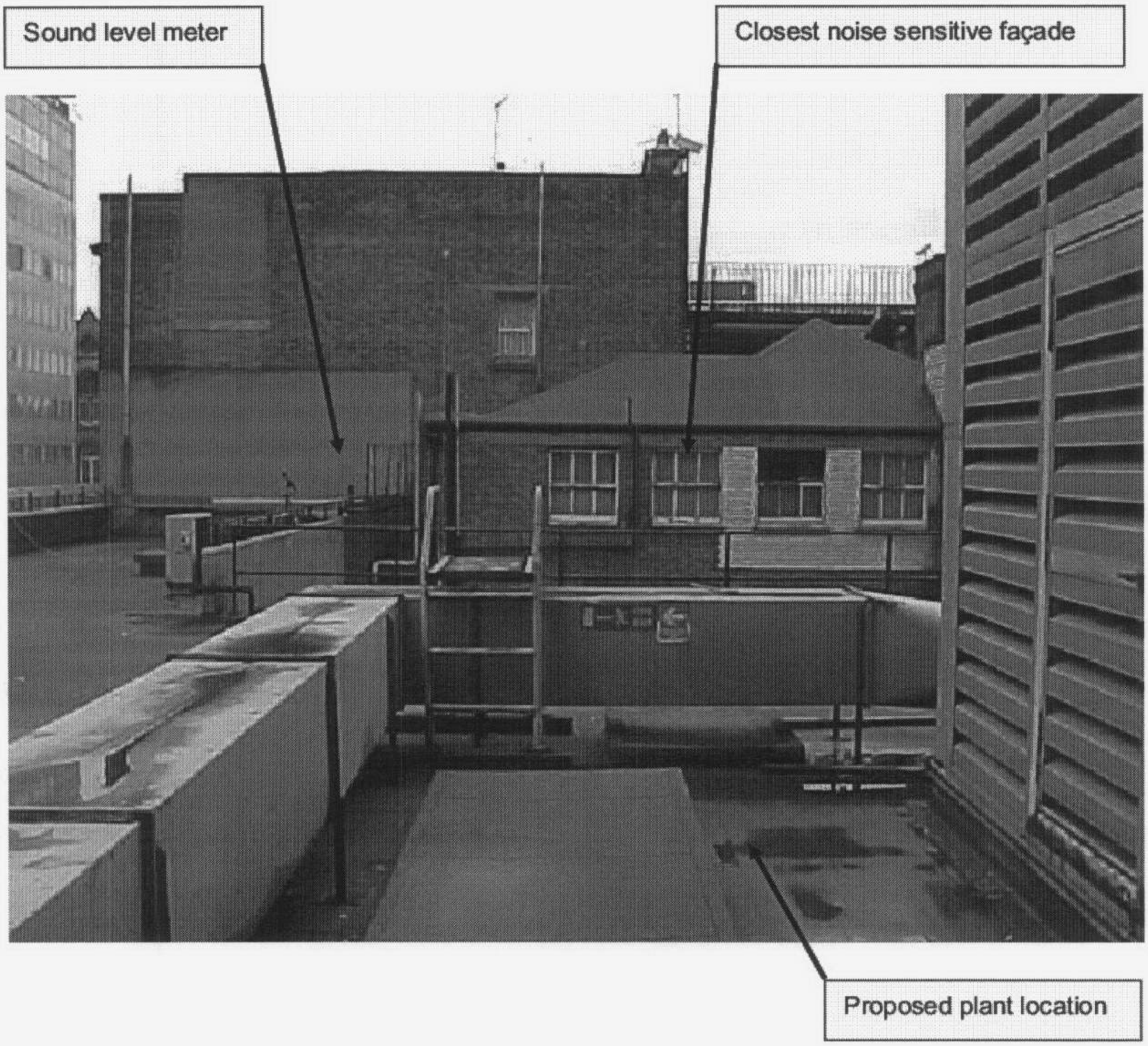
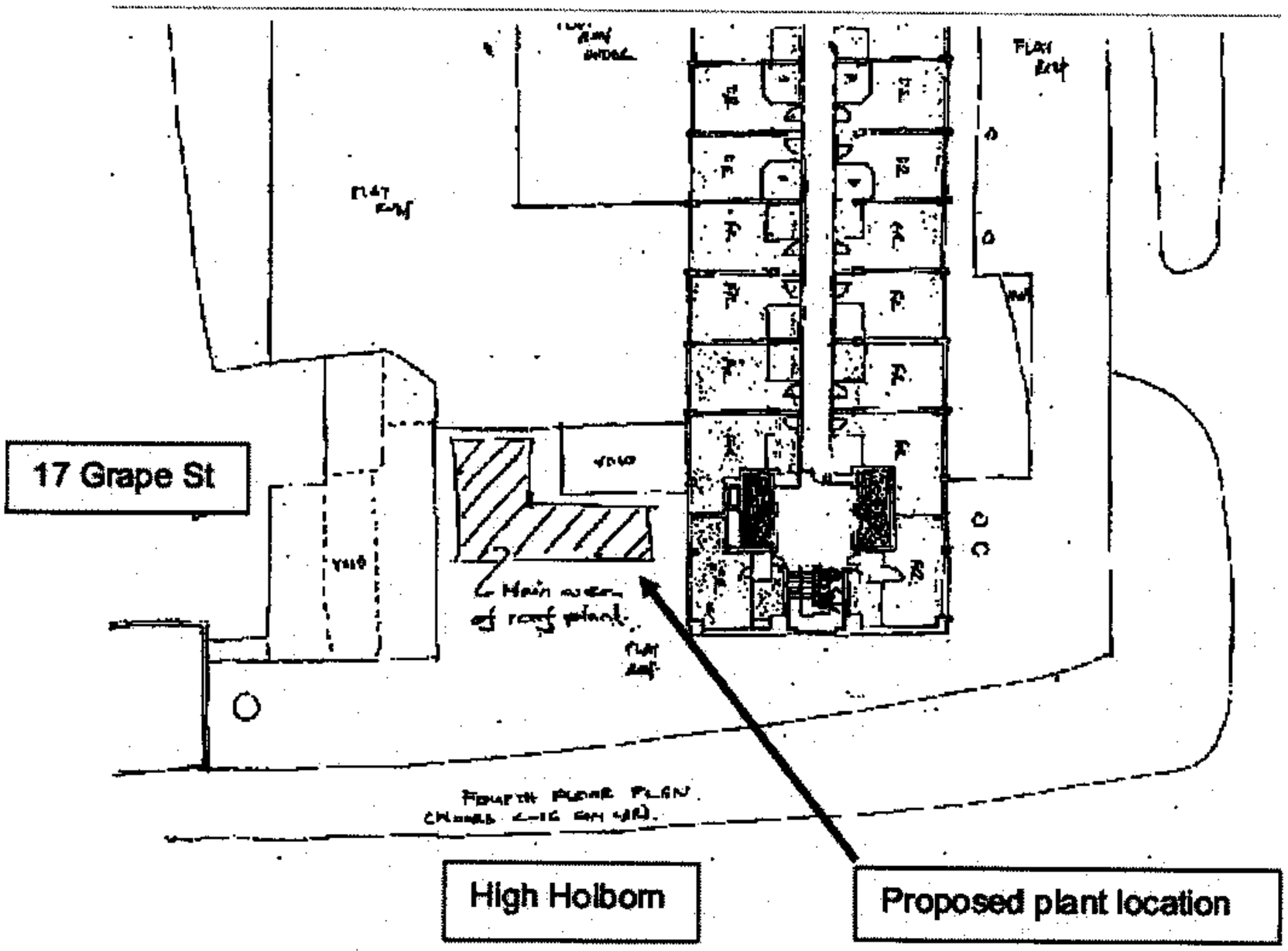


Figure 2: Drawings (not to scale) of site location and plant location

Site location



Proposed plant location

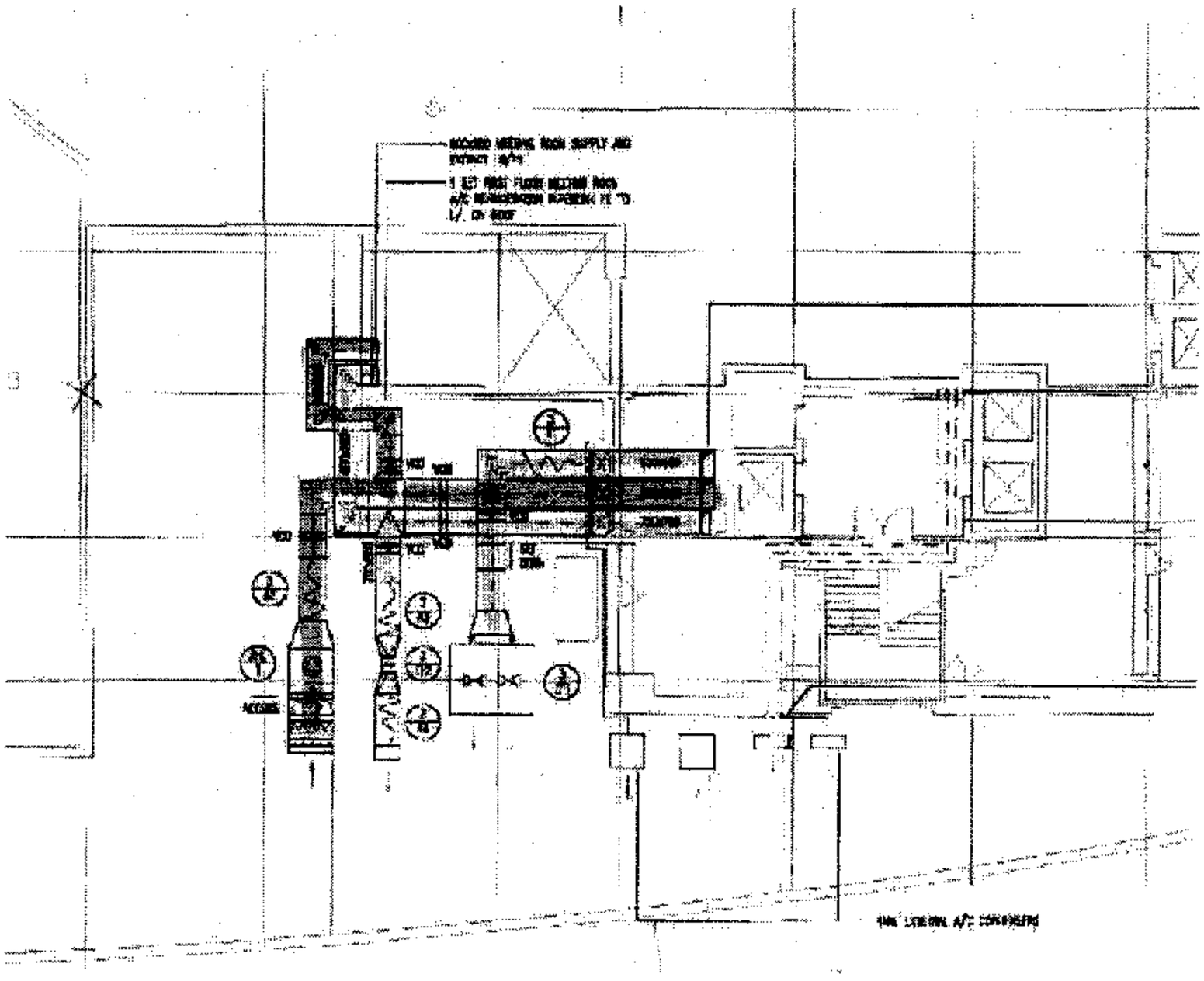


Figure 3 - Glossary of Terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (Lp) the reference quantity is $2x10^{-5}$ N/m^2. The sound pressure level existing when microphone measured pressure is $2x10^{-5}$ N/m^2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (Lp).
Frequency	Is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
A weighting	Arithmetic corrections applied to values of Lp according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of Lp actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of Lp actually measured.
$L_{n,T}$	Lp which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.
Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:1997.
Traffic Noise Level	The value of $L_{A10,T}$.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:1997.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dBA penalty for any tonal, impulsive or irregular qualities, ref. BS4142:1997.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1m from the façade of the nearest affected sensitive property.

APPENDIX 1

SURVEY RESULTS AND DATA

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STAINES
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TELEPHONE: 01784 464404
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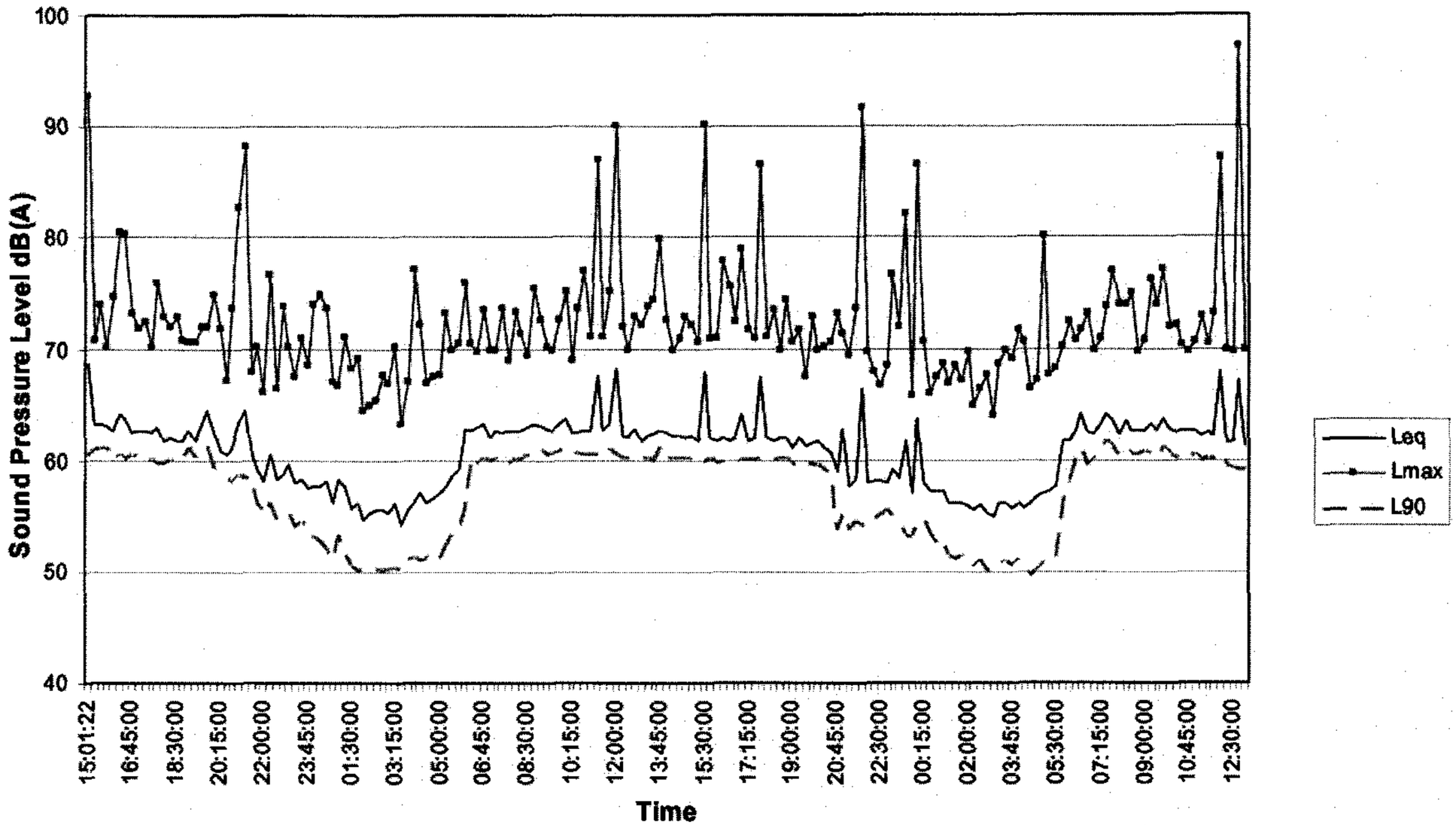
166 High Holborn, WC1
Environmental Noise Survey 5th-7th June 2002
15 minute intervals



APPENDIX 2

ATTENUATOR SCHEDULE

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ATTENUATOR SCHEDULE - ATMOSPHERIC

Ref.	System	Airflow (m3/s)	Length (mm)	Width (mm / Ø)	Height (mm)	Dynamic Insertion Loss (dB) 63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Pressure Drop (Pa)	Notes
3/A4	EF3/2 extract	1.4	1,500	to suit		7	14	24	39	45	46	42	31	<50	
??	EF3/1 extract	1.3	1,500	to suit		7	14	24	39	45	46	42	31	<50	
??	AHU	2.3	1,200	to suit		4	8	15	22	28	27	18	12	<50	
??	EF16/1 extract	3.3	1,500	to suit		7	14	24	39	45	46	42	31	<50	
														<50	
														<50	

Notes:

Attenuator sizes shown are indicative, and the Contractor shall verify these and advise any differences in order to achieve the insertion losses stated or other requireme