Environmental Equipment Corporation Ltd
Richmond House, Churchfield Road
Walton on Thames
Surrey. KT12 2TP
t: 01932 230940
f: 01932 230941
e: info@eec.co.uk

Project:

69 Fitzjohn's Avenue

Title:

Noise Impact Assessment Report

quietly moving forward

Environmental Equipment Corporation Ltd
Richmond House, Churchfield Road
Walton on Thames
Surrey. KT12 2TP
t: 01932 230940
f: 01932 230941
e: info@eec.co.uk

Report Title	69 Fitzjohn's Avenue Noise Impact Assessment Report
Reference	WW/EC13915-002
Version	
Issue Date	9 March 2015
Client	Crawford & Gray Architects
Author	Will Wright BSc(Hons) Acoustic Engineer
Checked	Jon Mudd BEng(Hons) MIOA Director

CONTENTS:

1 INTRODUCTION

1.01 Environmental Equipment Corporation Limited has been commissioned by Crawford & Gray Architects to undertake a noise assessment of 2 No. Vaillant ecoTEC 80 boiler units to serve the school building at 69 Fitzjohn's Avenue, London.

1.02 This noise assessment has been conducted in accordance with the policies and requirements of Camden Council and is based on a noise survey carried out at the site over a typical weekday period.

1.03 This assessment includes:

- the setting of plant noise limits in accordance with the requirements of Camden Council and national planning policy, standards and guidance; and
- the prediction of noise impacts at the worst affected noise sensitive receptors based on the proposed items of plant and their location.

1.04 This report is prepared solely for Crawford & Gray Architects. Environmental Equipment Corporation Limited accepts no responsibility for its use by any third party.

1.05 Whilst every effort has been made to ensure that this report is easy to understand, it is necessarily technical in nature. To assist the reader, an explanation of the terminology used in this report is contained in Appendix A.

2 SITE

2.01 69 Fitzjohn's Avenue is a four storey school building located in a predominantly residential area of Hampstead, London.

2.02 The property is bound by the following:

- North – Adjacent 4 No. storey residential property with windows facing the school on the south east and southwest elevations;
- East – Fitzjohn's Avenue roadway, with residential properties beyond that on the opposite side ;
- South – Adjacent 4 No. storey residential property with windows overlooking the school on the northeast and northwest elevations; and
- West – Rears of the residential properties along Arkwright Road beyond the school playground.

2.03 This application is for 2 No. Vaillant ecoTEC 80 boiler units which are proposed to be located in a boiler room in the north corner of the property with exhaust flues terminating within a proposed lightwell, as presented in Appendix B.

2.04 The closest noise sensitive receptors to the proposed plant items are the following;

- The south most window of the southeast and southwest elevations of the adjacent residential property north of the school, approximately 6m from the proposed boiler flue termination. The flues will be screened within the lightwell such as there is no line of sight between the flue discharges and the residential windows.

2.05 All other noise sensitive receptors are at a greater distance from the proposed location of the units, or are protected by more screening by the intervening structures, and as such will be subject to lower levels of noise.

3 GUIDANCE

3.01 Local and National Planning Policy for the Camden Council is presented in Appendix C of this document.

3.02 A summary of the pertinent points relating to this application are presented below;

Camden Council's Development Policy 28 (DP28) sets noise level limits for noise from plant and machinery in Table E and states that noise at 1m from the sensitive facade noise from plant must be 5dB(A) less than the lowest measured background noise level. It goes on to state that tonal noise sources or those with distinct bangs, clicks, clatters and thumps must be 10dB(A) less than the lowest measured background noise level.

4 MEASUREMENTS

4.01 Environmental noise measurements were carried out over a weekday period, between 1620 hours on 26th February 2015 and concluded 0755 hours the following day, to establish the existing noise levels at the site. The survey methodology and results are set out below.

4.02 Noise measurements have been carried out at the following location, as shown in Appendix B and described as:

- Position 1: located at the rear of the school between the main building and the school playground at a height of approximately 1.5 metres off the ground. The measurement was not located within 3.5 metres of any reflecting surfaces, other than the mounting surface.

4.03 This location is considered to be representative of the south most windows of the adjacent residential property to the north.

5 EQUIPMENT

5.01 Equipment for the survey was as follows:-

- Brüel & Kjær type 2238 Integrating Sound Level Meter conforming to Class 1 BS EN 61672, Type 1 BS EN 60804 & BS EN 60651: 1994.
- Brüel & Kjær Condenser Microphone and Connecting Leads.
- Brüel & Kjær Outdoor Microphone Kit, type UA1404.
- Tripod.

5.02 The equipment holds current UKAS or equivalent accreditation and serial numbers as follows:

Sound Level Meter B&K2238	Serial No.	2736836
	Calibration Date	20th June 2013
	Cal Certificate No.	01356/2
½" Condenser Mic. B&K4188	Serial No.	2760436
	Calibration Date	20th June 2013
	Cal Certificate No.	01356/2
Calibrator B&K4231	Serial No.	2389051
	Calibration Date	27th August 2014
	Cal. Certificate No.	01968/1

N.B. Copies of calibration certificates are available upon request.

5.03 The equipment was calibrated both before and after the survey with no difference noted in the levels.

6 RESULTS

6.01 The weather during the survey was suitable for noise measurement, it being dry with little wind for the duration of the survey.

6.02 Noise sources at the site include local and distant road traffic and the occasional aircraft fly over. There were no other significant sources of noise during the survey.

6.03 A list of the levels measured is included in Appendix D and represented graphically in Appendix E.

6.04 A summary of the time averaged ambient levels and lowest measured background levels over the measurement periods are shown in Table 6.1. The minimum L_{A90} is the lowest five minute measurement in the specified period.

Location	Period	Average $L_{Aeq,T}$ – dB	Minimum L_{A90} – dB
Position 1	Day time (0700-1900 hrs)	52	44
	Evening (1900-2300 hrs)	49	42
	Night-time (2300-0700 hrs)	47	37

Table 6.1: Free-Field Measured Ambient and Lowest Background Noise Levels

7 PLANT ASSESSMENT

7.01 This application is for the installation 2 No. proposed Vaillant ecoTEC 80 boiler units to be located in the boiler room in the north corner of the property with exhaust flues terminating within the proposed light well

7.02 Based on the standard requirements of Camden Council and the lowest measured background noise level in each time period, Table 7.1 sets out the recommended noise limits that the proposed items of plant should meet.

7.03 Please note that in accordance with the requirements of Camden Council, the proposed noise limits are based on being 5 dB below the measured background noise level.

Position	Period	Measured Existing $L_{A90,T}$	Proposed Noise Limit L_{Ar}
1	Day	44 dB	39 dB
	Evening	42 dB	37 dB
	Night	37 dB	32 dB

Table 7.1: Suggested Plant Noise Emission Limits Based on Lowest Measured L_{A90}, Free-field dB

7.04 Note that the limits suggested above are rating levels and as such any design should take into account the acoustic characteristics of the plant. In this instance the proposed units display none of the characteristics whereby the acoustic correction should be applied.

7.05 Assuming the proposed items meet the noise limits set out in Table 7.1 noise will be between the NOEL and the LOAEL with respect to the NPPF.

7.06 The proposed units have a stated manufacturers sound pressure level of 51 dB(A) measured at a distance of 1m.

7.07 Predicted noise levels have been calculated at the closest noise sensitive windows, the south most windows of the adjacent residential property north of the school. In order to achieve noise limits at the receptor, a noise control scheme providing 9 dB noise reduction is required. This will consist of a duct attenuator on each of the exhaust flues of the two boilers.

7.08 Other residential receptors located further from the site will be subject to lower noise levels than those predicted at the above locations.

7.09 Tables 7.2 and 7.3 present the results of worst-case plant noise predictions at the worst-case locations.

Item	Noise Level	Notes
2 Boiler Units	54 dB(A)	Cumulative sound pressure level at 1m
Barrier Effect	- 5 dB	No line of sight to proposed plant location due to light well
Conformal area Losses over 6 metres	- 14 dB	Distance to closest window
Noise Control Scheme	-9 dB	Attenuator on exhaust flue
Reflections	+ 6 dB	Additional reflections - walls within lightwell
Total Noise Level	32 dB(A)	Adjacent residential property windows to the north

Table 7.2: North Adjacent Residential Windows Plant Noise Calculation

Property	Period	Proposed Noise Limit L_{Ar}	Predicted $L_{Aeq,T}$	Exceedance of noise limit
North Adjacent Residential Windows	Daytime	39 dB	32 dB	-7 dB
	Evening	37 dB	32 dB	-5 dB
	Night-time	32 dB	32 dB	0 dB

Table 7.3: Assessment of Predicted Noise Levels Based on Proposed Noise Limit, Free-field dB(A)

7.10 It can be seen from the above tables that the noise limits are met during all periods of the boiler units potential 24 hour operating period assuming the installation of the noise control specified in section 7.07

7.11 Assuming the above is included in the installation, predicted noise levels will meet the requirements of the Local Authority during all periods of operation and at the closest noise sensitive receptors.

7.12 With respect to the NPPF, achieving the noise limits would be classified as being between the NOEL and the LOAEL.

8 CONCLUSIONS

8.01 Crawford & Gray Architects has appointed Environmental Equipment Corporation Limited to undertake a noise assessment for 2 No. proposed boiler units to serve the school building at 69 Fitzjohn's Avenue, London.

8.02 The assessment has been carried out in accordance with national planning guidance and the requirements of the Camden Council, and is based on an environmental noise survey conducted at the site over a mid-week period.

8.03 A noise assessment has been undertaken to evaluate the potential noise impact of the proposed condensers at the south facing windows of the north adjacent residential property.

8.04 Plant noise limits have been set based on the results of a background noise survey and the requirements of Camden Council, to control the noise from the proposed boilers. In accordance with the Camden Council, the noise limit has been set 5 dB below the lowest measured background noise level.

8.05 Predictions have shown that the noise criterion is met at all assessment locations during all periods of the condenser's potential operation periods assuming the noise control scheme specified in section 7.07 is included in the installation of the boilers.

8.06 Assessing the site in accordance with the principles of the National Planning Policy Framework has shown that predicted noise levels would be between the level at which no effects are observed to occur, the NOEL, and the lowest observed adverse effect level, the LOAEL.

8.07 On the basis of this assessment it is considered that noise does not pose a material constraint to the operation of the boiler units.

APPENDIX A

GLOSSARY OF TECHNICAL TERMS

TECHNICAL TERMS AND UNITS

Decibel (dB) - This is the unit used to measure sound. The human ear has an approximately logarithmic response to sound over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). We therefore use a logarithmic scale to describe sound pressure levels, intensities and power levels. The logarithms used are to base 10; hence, an increase of 10 dB in sound pressure level corresponds to a doubling in perceived loudness of the sound.

Sound Power Level (SWL) - This is a function of the noise source alone and is independent of its surroundings. It is a measure of the amount of sound power output measured in decibels.

Sound Pressure Level (SPL) - This is a function of the source and its surroundings and is a measure of the sound pressure at a point in space. For example, a sound pressure level measured at 1 metre from a sound source of certain sound power in reverberant room will not be the same as the sound pressure level a 1 metre from the sound source measured in open space.

Octave and One-Third Octave Bands - The human ear is sensitive to sound over a range of approximately 20 Hz to 20 KHz and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For finer analysis, each octave band may be split into one-third octave bands.

"A" Weighting - A number of frequency weightings have been developed to imitate the ear's varying sensitivity to sound of different frequencies. The most commonly used weighting is the "A" weighting. The "A" weighted SPL can be measured directly or derived from octave or one-third octave band SPLs. The result is a single figure index which gives some idea of the subjective loudness of the sound, but which contains no information as to its frequency content.

Noise Rating (NR) Curves - The "A" weighted sound pressure level cannot be used to define a spectrum or to compare sounds of different frequencies. NR curves convey frequency information in a single-figure index. This is done by defining the maximum permissible sound pressure level at each frequency for each curve. To measure the noise rating of a given environment, the SPL is measured in octave or one-third octave bands and the noise rating is then the highest NR curve touched by the measured levels.

Intermittency and Time-Weighting - The degree of annoyance caused by a noise also depends on its duration and intermittency of a noise. Intermittent, impulsive or repetitive noises tend to be more annoying than continuous noises. Various time-weightings have been derived to measure sounds of differing intermittences and these can be measured directly on modern equipment. The most common time-weightings in use are as follows:-

L_{90} This is the sound pressure level exceeded for 90% of the measurement period. It is widely used to measure background noise levels.

L_{10} This is the sound pressure level exceeded for 10% of the measurement period. It is widely used to measure traffic noise. For a given measurement period, the L_{10} level is by definition greater than or equal to the L_{90} level.

L_{eq} The equivalent continuous noise level is often used to measure intermittent noise. It is defined as the notional steady noise level that would contain the same acoustic energy as the varying noise. Because the averaging process used is logarithmic, the L_{eq} level tends to be dominated by the higher noise levels measured.

APPENDIX B

SITE PLAN
&
MEASUREMENT LOCATION

APPENDIX C

PLANNING POLICY AND GUIDANCE

PLANNING POLICY AND GUIDANCE

Camden Development Policies

Policy DP28 - Noise and vibration

The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:

a) development likely to generate noise pollution; or
b) development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.

Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted.

The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds.

The Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. Where these phases are likely to cause harm, conditions and planning obligations may be used to minimise the impact.

Below is the table from which this report has set noise limits for the boiler exhausts;

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 façade	Day, evening and night	0000-2400	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dB$_{LAeq}$

Key references / evidence

- Camden's Noise Strategy, 2002
- The London Plan (Consolidated with Alterations since 2004), 2008
- Planning Policy Guidance 24: Planning and noise

National Planning Policy Framework and the Noise Policy Statement for England

The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) on 27th March 2012 and upon its publication, the majority of planning policy statements and guidance notes were withdrawn, including Planning Policy Guidance 24 Planning and Noise, which previously presented the government's overarching planning policy on noise.

The NPPF contains four aims, which are set out at paragraph 123 in Section 11 of the document, titled *Conserving and enhancing the natural environment*:

"Planning policies and decisions should aim to:

avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and

identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."

The Department for Environment Food and Rural Affairs published the Noise Policy Statement for England (NPSE) in March 2010. The explanatory note of NPSE defines the following terms used in the NPPF:

"NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

2.21 Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur."

The NPSE does not define any of the above effect levels numerically.

The NPSE presents the Noise Policy Aims as:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy and sustainable development:

avoid significant adverse impacts on health and quality of life;

mitigate and minimise adverse impacts on health and quality of life; and

where possible, contribute to the improvement of health and quality of life."

It can be seen that the first two bullet points are similar to Section 11 of the NPPF, with a third aim that seeks to improve health and quality of life. The NPSE later expands on the Noise Policy Aims, stating:

2.23 The first aim of the NPSE states that significant adverse effects on health and quality of life should be avoided while also taking into account the guiding principles of sustainable development (paragraph 1.8).

2.24 The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the

guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

2.25 This aim (the third aim)*, seeks where possible, positively to improve health and quality of life through the pro-active management of noise while also taking into account the guiding principles of sustainable development (paragraph 1.8), recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."*

It is clear that noise described in the NPSE as SOAEL that would lead to significant adverse effects should be avoided, although there is no definition as to what constitutes a significant adverse effect. Similarly, noise should be mitigated where it is high enough to lead to adverse effects, termed the LOAEL, but not so high that it leads to significant adverse effects.

APPENDIX D

SURVEY RESULTS
(TABULAR)

EC 13954 - 6-10 Mount Row

Edward Pearce

Tabulated Noise data

Time	L_{Aeq}	L_{AMax}	L_{A90}
11:35	56	78	45
11:40	47	54	45
11:45	48	58	45
11:50	46	61	45
11:55	47	60	45
12:00	46	58	44
12:05	46	54	44
12:10	47	53	45
12:15	47	60	45
12:20	46	54	45
12:25	46	52	45
12:30	46	52	44
12:35	47	55	44
12:40	47	61	45
12:45	47	61	46
12:50	47	55	45
12:55	48	57	46
13:00	48	54	46
13:05	50	64	46
13:10	48	58	46
13:15	46	58	44
13:20	47	57	45
13:25	47	62	45
13:30	46	57	45
13:35	46	54	45
13:40	48	61	46
13:45	50	61	47
13:50	50	65	47
13:55	49	67	46
14:00	47	53	46
14:05	48	56	47
14:10	48	56	46
14:15	47	54	46
14:20	48	55	47
14:25	48	56	47
14:30	48	55	46
14:35	49	54	47
14:40	50	57	47
14:45	49	60	47
14:50	50	64	47
14:55	51	61	47
15:00	49	62	47
15:05	49	65	47
15:10	50	69	47
15:15	55	73	47
15:20	60	67	48
15:25	59	65	48
15:30	60	67	47

Time	L_{Aeq}	L_{AMax}	L_{A90}
15:35	61	68	57
15:40	59	66	48
15:45	57	71	47
15:50	57	61	47
15:55	56	63	46
16:00	48	67	46
16:05	47	55	45
16:10	47	65	46
16:15	47	59	46
16:20	47	61	46
16:25	48	64	46
16:30	49	66	46
16:35	46	51	46
16:40	48	53	46
16:45	47	51	46
16:50	47	55	46
16:55	49	60	47
17:00	49	66	46
17:05	48	61	46
17:10	49	60	46
17:15	47	57	46
17:20	48	53	47
17:25	47	53	46
17:30	51	67	47
17:35	47	53	46
17:40	48	55	46
17:45	49	61	46
17:50	48	58	46
17:55	46	52	45
18:00	48	56	46
18:05	49	62	45
18:10	47	54	45
18:15	47	62	45
18:20	48	62	46
18:25	48	57	47
18:30	47	52	45
18:35	47	56	45
18:40	46	54	45
18:45	47	63	44
18:50	46	52	45
18:55	47	54	45
19:00	46	52	45
19:05	48	64	46
19:10	47	56	45
19:15	47	52	45
19:20	47	60	45
19:25	46	55	45
19:30	47	54	46

EC 13954 - 6-10 Mount Row

Edward Pearce

Tabulated Noise data

Time	L_{Aeq}	L_{AMax}	L_{A90}
19:35	47	54	45
19:40	47	57	46
19:45	48	60	46
19:50	47	54	46
19:55	48	53	46
20:00	47	53	45
20:05	47	54	46
20:10	47	58	45
20:15	47	57	45
20:20	47	53	45
20:25	47	53	46
20:30	47	58	46
20:35	47	54	46
20:40	47	53	46
20:45	47	58	45
20:50	46	54	45
20:55	47	55	45
21:00	47	54	45
21:05	46	54	45
21:10	47	53	45
21:15	47	52	45
21:20	47	52	45
21:25	46	55	45
21:30	47	55	45
21:35	45	51	44
21:40	47	54	45
21:45	47	56	45
21:50	46	56	45
21:55	46	52	45
22:00	45	52	44
22:05	46	53	45
22:10	46	54	45
22:15	46	53	45
22:20	45	52	44
22:25	46	53	45
22:30	45	52	44
22:35	45	52	44
22:40	46	58	44
22:45	45	53	44
22:50	47	56	45
22:55	46	55	45
23:00	45	55	44
23:05	46	54	44
23:10	45	56	44
23:15	45	52	44
23:20	44	50	43
23:25	44	51	43
23:30	44	53	43

Time	L_{Aeq}	L_{AMax}	L_{A90}
23:35	44	51	43
23:40	45	52	44
23:45	45	57	44
23:50	45	53	44
23:55	45	53	43
00:00	45	53	43
00:05	45	53	43
00:10	44	51	43
00:15	44	55	43
00:20	43	51	42
00:25	43	51	43
00:30	44	50	42
00:35	45	52	43
00:40	43	52	42
00:45	43	51	42
00:50	43	50	42
00:55	43	51	41
01:00	43	50	42
01:05	44	54	43
01:10	44	52	42
01:15	43	49	42
01:20	43	51	42
01:25	43	51	42
01:30	42	49	41
01:35	42	51	41
01:40	43	51	41
01:45	42	50	41
01:50	42	50	41
01:55	42	54	41
02:00	42	50	41
02:05	42	51	41
02:10	42	53	40
02:15	42	48	41
02:20	42	53	40
02:25	42	51	40
02:30	42	50	40
02:35	42	53	41
02:40	42	54	40
02:45	42	50	41
02:50	42	49	41
02:55	42	49	41
03:00	42	51	41
03:05	42	52	41
03:10	42	56	41
03:15	42	51	41
03:20	42	51	41
03:25	42	50	41
03:30	42	50	41

EC 13954 - 6-10 Mount Row

Edward Pearce

Tabulated Noise data

Time	L_{Aeq}	L_{AMax}	L_{A90}
03:35	42	50	41
03:40	42	52	41
03:45	42	51	41
03:50	42	50	41
03:55	42	51	41
04:00	44	63	41
04:05	42	50	41
04:10	42	52	41
04:15	42	52	41
04:20	43	51	41
04:25	42	50	41
04:30	43	51	41
04:35	42	52	41
04:40	42	50	41
04:45	43	53	41
04:50	42	53	41
04:55	44	51	42
05:00	43	51	42
05:05	43	55	42
05:10	43	52	41
05:15	43	53	41
05:20	43	50	42
05:25	43	53	42
05:30	47	58	43
05:35	44	52	42
05:40	43	51	42
05:45	44	60	42
05:50	43	51	42
05:55	44	53	43
06:00	46	64	44
06:05	45	51	44
06:10	46	57	44
06:15	46	58	44
06:20	46	62	44
06:25	46	56	44
06:30	45	56	44
06:35	47	53	45
06:40	45	52	44
06:45	45	56	44
06:50	45	63	44
06:55	45	52	44
07:00	46	52	45
07:05	47	56	45
07:10	46	62	45
07:15	46	56	45
07:20	47	63	45
07:25	47	62	45
07:30	47	59	45

Time	L_{Aeq}	L_{AMax}	L_{A90}
07:35	46	53	45
07:40	46	51	45
07:45	47	57	46
07:50	47	54	46
07:55	49	59	47
08:00	47	53	46
08:05	49	56	47
08:10	48	54	46
08:15	47	51	46
08:20	48	53	47
08:25	48	54	47
08:30	48	55	47
08:35	48	56	47
08:40	49	56	48
08:45	48	59	47
08:50	48	52	47
08:55	49	59	47
09:00	49	60	47
09:05	49	60	48
09:10	50	59	48
09:15	48	55	47
09:20	48	64	47
09:25	48	55	47
09:30	48	55	47
09:35	48	55	47
09:40	49	63	47
09:45	48	55	47
09:50	48	57	47
09:55	48	65	47
10:00	48	55	46
10:05	48	60	46
10:10	48	60	47
10:15	47	59	45
10:20	48	56	46
10:25	47	55	46
10:30	47	57	46
10:35	48	54	46
10:40	50	67	46
10:45	47	61	45
10:50	47	53	46
10:55	47	58	46
11:00	47	60	45
11:05	47	55	46
11:10	47	56	46
11:15	47	55	46
11:20	47	53	45
11:25	48	57	47
11:30	49	59	46

EC 13954 - 6-10 Mount Row

Edward Pearce

Tabulated Noise data

Time	L_{Aeq}	L_{AMax}	L_{A90}
11:35	*49*	*56*	*47*
11:40	*48*	*62*	*47*
11:45	*50*	*66*	*47*
11:50	*49*	*53*	*47*
11:55	*49*	*58*	*46*
12:00	*49*	*56*	*47*
12:05	*55*	*78*	*47*

Time	L_{Aeq}	L_{AMax}	L_{A90}

APPENDIX E

SURVEY RESULTS
(GRAPHICAL)

Noise Level Time History at 6-10 Mount Row