TOWN AND COUNTRY PLANNING ACT 1990
(AS AMENDED)

Sweaty Betty
No.35 Heath Street
Hampstead
London
NW3 6TR

NOISE REPORT
(Project Ref: 431/14)

Prepared by Michael Sugiura CEng BSc MScTech MIOA
On behalf of Sweaty Betty UK

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Contents

1. Preamble

My name is Michael Sugiura. I am a Chartered Engineer and hold a Bachelor of Science Degree in Mathematics from the University of Sheffield and the Master of Science Degree in Technology Control Systems Engineering. I have been awarded the Diploma in Acoustics and Noise Control. I am a Member of the Institute of Acoustics and the Institute of Mathematics and its Applications.

I am an Acoustics Consultant and have had over thirty years' experience in acoustics and vibration studies of development related noise and have worked for both consultants and local authorities. I have previously appeared as an expert witness at numerous hearings and public inquiries. From October 1995 I established my own independent consultancy practice Michael Sugiura Associates. With effect from 1 October 2004 my practice incorporated to Michael Sugiura Limited.

2. Introduction

I was instructed by Julian Church Ltd on behalf of Sweaty Betty Ltd to undertake a noise assessment in support of a planning application for the proposed installation of a single condensing unit serving the ground floor shop premises at No. 35 Heath Street, Hampstead, London NW3 6TR. The equipment is to be located on the back wall of the shop spanning the panel above the back door of the store room serving the premises (photograph sw.hamp006.jpg). The nearest residential development are flats above the rear of the shop at No.35 Heath Street.

The noise assessment is in relation to the likely impacts of noise arising from the air conditioning external unit and its proximity to potential noise sensitive residential properties.

In Section 3 I briefly describe the site and noise issue that are of concern to the Local Planning Authority London Borough of Camden Council (LBC). In Section 4 I review the noise standards, which may be appropriate and discuss the requirements of Camden Council Environmental Health Authority.

In Section 5 I describe a noise survey of existing conditions that I carried out in November 2014. This report in Section 6 examines the likely implications for noise levels at the façades of the nearest residential dwelling from the proposed mechanical plant. In Section 7 I present conclusions on effects of noise on residential amenity.

Definitions of the noise units used in this report are in Appendix 1 - Terminology.

3. The Site and the Noise Related Issue

3.1 Noise Climate

The noise climate in the locality surrounding this site is dominated by road traffic noise because of its close proximity to Heath Street and to the local highway network.

The area at the rear of 35 Heath Street has been used to site various items of mechanical plant and there are a number of these fixed sources generating noise serving the shops neighbouring commercial and residential development.

3.2 The Noise Issue

The Applicant proposes to install 1 no. air conditioning (a/c) unit for cooling for the shop. It is understood that the ground floor rear location is acceptable in principle to the Local Planning Authority. The location of the mechanical plant is shown on planning application rear elevation drawing No.J150801-01 issued by Horizon Air Conditioning Limited. The Unit measures height 550 mm width 780 mm depth 290 mm.

The London Borough of Camden (LBC) Planning Authority requires a noise report to demonstrate that the equipment satisfies the relevant criterion of the Council. The London Borough of Camden (LBC) Planning Authority requires information and reassurance on the impact of noise from the new Toshiba air conditioning a/c plant. In addition reference is made to the requirements of the Council's Environmental Health Officer(s).

To a greater extent in comparison to transportation noise sources in the locality the site is presently affected by noise generated from mechanical plant notably a kitchen extract ventilation system serving the existing ground floor adjoining restaurant and air conditioning equipment serving adjoining office and shop premises in the locality. The use of this rear area of the premises for positioning the plant on site is in common with similar commercial development in Heath Street in that outside spaces has been used to site outdoors air conditioning units and other various items of mechanical plant for internal processes including heating, kitchen extract ventilation plant.

4. Noise Criterion and Noise Policy

4.1 Noise Criterion

4.1.1 London Borough of Camden Council (LBC) has adopted in their environmental policies (Refs 1, 2 and 3) the noise criterion shown below.

(1) Where noise emitted from the mechanical plant in the development will not contain tones or will not be intermittent, the 'A' weighted sound pressure level from the equipment use when operating at its noisiest, shall not exceed a value of 10 dB below the lowest external background noise, at a point 1 metre outside any window of any residential and other noise sensitive property during the permitted hours of use.

(2) Where noise emitted from the mechanical plant will contain tones or will be intermittent, the 'A' weighted sound pressure level, when operating at its noisiest, shall not exceed a value of 15 dB below the minimum external background noise $L_{A90,\ 15min}$, at appoint 1 metre outside any window of any residential and other noise sensitive property unless during the permitted hours of use.

In selecting a noise criterion for mechanical plant it is common practice to take into account how frequently the noise will be generated and how disturbing it could be, and balance the commercial use against nuisance to other people having regard to:

- Ambient noise levels in the vicinity of the site
- The times of the day and evening during which operations occur;
- The duration of the noise producing activities;
- The character of the noise;
- The character of the area in the vicinity of the noise;

In general, any noise from modified or new plant shall be designed to a level lower than the existing background noise and therefore will not impact on the amenity of nearby residents.

4.1.2 BS 4142:1997 (Ref.4) and its replacement BS 4142:2014 (Ref.5) generally applies to noise from sources of an industrial nature in commercial premises (e.g. kitchen extract ventilation system, air conditioning equipment) operating in mixed residential and industrial areas. The standard is adopted by many local authorities to assist in the appraisal of development operating close to a noise-sensitive area.

The likelihood of complaints about noise is indicated by the difference between the noise from the development and the existing background noise level. Tonal or impulsive characteristics of the noise are likely to increase the likelihood of complaints and this is taken into account by the "rating level". Since background noise levels vary throughout a 24-hour period it is necessary to assess the acceptability of noise levels for separate periods day and night.

The standard states that if the noise at the point of assessment is 10 dB $L_{Aeq,\ T}$ above the background noise level $L_{A90,\ T}$ then "complaints are likely". An increase of around 5 dB (A) above background level would be considered as of "marginal significance". A noise 10 dB (A) below background would be indicative of complaints from residents being "unlikely".

4.2 National Planning Policy Framework (NPPF)

National Planning Policy Framework (NPPF) (Ref.6) has replaced Planning Policy Guidance Note 24 'Planning and Noise' which was previously the main guidance document with respect to acceptable noise levels for dwellings.

The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. The environmental role is to contribute to protecting and enhancing our natural, built and historic environment; and as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate to adapt to climate change including moving to a low carbon economy.

One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser value, where consistent with other policies in the Framework. The planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of environmental pollution including noise. Paragraph 123 of the NPPF (Ref.6) states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts (see Explanatory Note to the Noise Policy Statement for England) on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts (see Explanatory Note to the Noise Policy Statement for England) 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 use since they were established (Subject to the provisions of the Environmental Protection Act 1990 and other relevant law); 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.

4.3 Noise Policy Statement England (NPSE)

The Noise Policy Statement for England (NPSE) (Ref.7) was developed by DEFRA and published in March 2010. The vision of the NPSE is to '*Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.*

The NPSE aims to *'through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on 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'*

4.4 British Standard BS 8233

BS 8233: Sound Insulation and Noise Reduction for Buildings – Code of Practice (Ref.8) and its replacement BS 8233:2014 (Ref.9) has a number of design criteria and limits for intrusive external noise. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms. Those most appropriate to the residential environment are reproduced in Table 1.1.

Table 1.1: Summary of Internal Noise Criteria: BS 8233

Criterion	Typical situations	Good Level $L_{Aeq,T}$	Reasonable Level $L_{Aeq,T}$	Reasonable Peak L_{Amax}
BS 8233 Reasonable resting/sleeping conditions	Living rooms	30	40	-
	Bedrooms	30	35	45

4.5 World Health Organisation Guidelines for Community Noise

The World Health Organisation (WHO) (Ref.10) has developed guidelines designed to minimise the adverse effects of noise. The guidelines relevant to residential noise exposure are detailed in Table 1.2. For each specific environment the stated noise levels are the maximum noise levels to avoid the health effect noted.

Table 1.2: WHO Community Noise Guideline Values

Specific Environment	Critical health effect(s)	L_{Aeq} dB	Time Base (hours)	L_{Amax} (fast) dB
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
Hospital, ward rooms, indoors	Sleep disturbance, night time	30	8	40
	Sleep disturbance, daytime and evenings	30	16	-

4.6 Noise Impact Matrix

The Noise Impact Matrix defines a set of parameters from which the magnitude of the impact of noise as a result of the development, on surrounding sensitive receptors, can be categorised. The Noise Impact Matrix parameters have been derived from guidance provided in BS 8233 (Ref.8 and Ref.9) and the WHO guidelines (Ref.10).

The criteria used to determine the sensitivity of a receptor is given in Table 1.3 **b**elow. In producing this criteria it is assumed that all buildings are naturally ventilated via partially open windows, giving 13 dB (A) of noise reduction from outside to inside. This is considered to represent a worst-case scenario.

Table 1.3: Sensitivity of receptor to noise

	High	Medium	Low	Negligible
Humans	Receptors of greatest sensitivity to noise such as World Heritage Sites and churches	Noise sensitive receptors such as dwellings, hospitals, schools, places of quiet recreation and places of recognised tranquillity	Receptors with some sensitivity to noise such as offices, other workplaces and play areas	Receptors of very low sensitivity to noise or marginal to the zone of influence of the proposals

The magnitude of the change in noise levels is considered using the criteria outlined in Table 1.4 below. The relative and absolute changes are considered in parallel and the worst case taken. The relative levels are reproduced from the semantic scale found in the Department of Transports 'Design Manual for Roads and Bridges' guidance document (Ref.11) and IEMA and IOA guidance (Ref.12). The absolute noise levels are with reference to the recommendations for dwellings made in BS 8233:1999 'Sound insulation and noise reduction for buildings – Code of Practice' (Ref.8), BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (Ref.9) and in the World Health Organisation's 1999: Guidelines for Community Noise (Ref.10).

Table 1.4: Magnitude of change in noise levels

	Large	Medium	Small	Negligible
Relative change	Greater than 10 dB(A) change in sound level	5 to 9.9 dB(A) change in sound level	3 to 4.9 dB(A) change in sound level	2.9 dB(A) or less change in sound level
Absolute change – Adverse daytime	If b<50 dB $L_{Aeq,16hr}$ and f ≥55 dB $L_{Aeq,16hr}$ If f triggers entitlement to statutory sound insulation	If b < 50 dB $L_{Aeq,16hr}$ and 50≤f<55 dB $L_{Aeq,16hr}$ If 50≤b<55 dB $L_{Aeq,16hr}$ and f≥55 dB $L_{Aeq,16hr}$		

Absolute change – Adverse night-time	If b<45 dB $L_{Aeq,16hr}$ and f ≥45 dB $L_{Aeq,16hr}$ If b<60 dB L_{Amax} and f ≥60 dB L_{Amax} If b≥60 dB L_{Amax} but does not exceed 85 dB L_{Amax} more than twice in a one hour period and f≥85 dB L_{Amax} more than twice in a one hour period	If b> 85 dB L_{Amax} though not regularly and f exceeds 85 dB L_{Amax} more than twice in any one hour period		
Absolute change – Beneficial daytime	If b≥55 dB $L_{Aeq,16hr}$ and f <50 dB $L_{Aeq,16hr}$	If 50≤b<55 dB $L_{Aeq,16hr}$ and f <55 dB $L_{Aeq,16hr}$ If b≥55 dB $L_{Aeq,16hr}$ and 50≤f <55 dB $L_{Aeq,16hr}$		
Absolute change – Beneficial night-time	If b≥45 dB $L_{Aeq,16hr}$ and f <45 dB $L_{Aeq,16hr}$ If b≥60 dB L_{Amax} and f <60 dB L_{Amax}			

Note: “b” denotes for the existing or future **b**aseline noise levels and “f” stands for the predicted **f**uture noise levels.

Table 1.5: Degree of Effect Matrix

		Importance/sensitivity of receptor			
		High	**Medium**	**Low**	**Negligible**
Magnitude/scale of change	**Large**	Very Substantial	Substantial	Moderate	None
	Medium	Substantial	Substantial	Moderate	None
	Small	Moderate	Moderate	Slight	None
	Negligible	None	None	None	None

Table 1.6: Degree of Effect Matrix Descriptors

Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

Table 1.7: Noise Impact Matrix Assessment example

Receptors	Description	Sensitivity	Level Difference (dB A)	Magnitude of Impact	Significance of Impact
35B Heath Street	Dwelling	Medium	+0.0	Negligible	None
35C Heath Street	Dwelling	Medium	+0.0	Negligible	None

5. Noise Survey

A survey was carried out on Tuesday 18th November 2014 from 09:45 hours to 16:55 hours to assess the prevailing noise climate at the rear façade of 35A Heath St.

Unattended automatic environmental noise measurement equipment was installed on the back addition roof approximately 4m above local ground 3.5m from a rear window of the building (mp1) pre-set to record noise levels every 10 minutes continuously.

The microphone was tripod mounted 1.2m above the roof adjoining the fire escape stairs to the residential dwellings above the shop, above the entrance door of 35A Heath Street overlooking the existing rear yard and passageway.

Measurements procedures were in accordance with BS 7445:2003 “Description and Measurement of Environmental Noise” (Ref.13). Noise measurement position is shown on Site Plan.

This baseline noise measurement information forms the basis of the acoustic analysis. Noise survey measurements recorded by the RION NA-27 analyser are detailed in Appendix 3 for the daytime survey on 18th November 2014 and noise level time histories are shown in Appendix 4 recorded at the noise monitoring position.

This baseline noise measurement information forms the basis of the acoustic analysis. The continuous daytime noise monitoring recorded all environmental noise sources including other fixed plant sources (notably a kitchen extract ventilation system and air conditioning and heating equipment) serving neighbouring premises.

Noise survey measurements are detailed in Appendix 3.

6. Discussion

6.1 Noise Survey Results

Background $L_{A90,\ 10mins}$ noise levels recorded daytime (09:45-17:00) by the unattended noise analyser at 3.5m from the north west facing elevation above 35 Heath Street overlooking the rear passageway (mp1) were measured in the range 46 to 53 dB (A). The lowest $L_{A90,\ 10mins}$ background noise levels recorded at (mp1) during the daytime hours were consistently measured in the range 46 to 48 dB (A).

6.2 Proposed Air Conditioning Outdoor Plant

The air conditioning equipment of neighbouring premises would have being selected as low noise emission plant to meet the requirements of the Local Planning Authority. The proposed outdoor air conditioning unit will be effectively screened by the rear wall and roof above the ground floor part of the shop and its location and distance from the closest potential noise sensitive residential dwelling would ensure that the minimum of noise would be transmitted to the properties. Under actual operating conditions the performance of the air conditioning unit produce very low levels of noise to atmosphere. The sound data characteristics of the Toshiba RAV –SM803AT-E are detailed in Toshiba Technical Data Sheet pdf. The data sheet for the Toshiba RAV –SM803AT-E gives a sound pressure level at 1m as 48dB (A) Cooling, 50dB (A) Heating.

6.3 Predicted Operational Noise Levels

Extrapolating the sound pressure level data the predicted noise level at 1m outside the nearest window from the proposed air conditioning external unit is 25dB(A) (cooling and heating conditions). There will be no increase in existing noise levels outside the façade of the nearest potential noise sensitive residential dwellings at 35 Heath Street.

7. Conclusions

The noise measurement survey has established environmental noise levels in the vicinity of potential noise sensitive residential dwellings on the 1st floor at the application site in closest proximity to the proposed location of the air conditioning external unit.

The noise measurement survey confirmed baseline noise levels at the rear of 35 Heath Street. The lowest background noise level being 46 dB (A) on Tuesday 18th November.

The air conditioning unit would operate to a level at least 20 dB below the lowest measured background noise without the need for any further attenuation devices.

There will be no increase in noise levels above background noise levels when the air conditioning condenser unit is under actual operating conditions.

The Council's noise criterion will be met in the vicinity of the nearest potential noise sensitive properties by the new equipment.

A noise mitigation strategy is not required.

My overall conclusion is that noise from the Toshiba air conditioning unit when installed externally at the location as proposed, will have no impact on the residential amenity in Heath Street or on the surrounding area.

References

1. London Borough of Camden Council Local Development Framework Core Strategy adopted 2008

2. Camden Council Environmental Statement for Sites and Detailed Policies Document SDPD adopted 2012 DM4 Safeguarding Amenity

3. Camden Council Replacement Unitary Development Plan 2006 Appendix 1 – Noise and Vibration Thresholds

4. BS 4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas

5. BS 4142:2014 Methods for rating and assessing industrial and commercial sound

6. National Planning Policy Framework

7. Noise Policy Statement England March 2010

8. BS 8233:1999 Sound Insulation and Noise Reduction for Buildings – Code of Practice

9. BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

10. World Health Organisation “Guidelines for Community Noise” 1999

11. Department of Transports ‘Design Manual for Roads and Bridges’

12. IEMA and IOA “Guidelines for Noise Impact Assessment”

13. BS7445: 2003 Description and Measurement of Environmental Noise Parts 1-3

Appendix 1: Noise Measurement Units - Terminology

Decibel (dB): The logarithmic measure of sound level. 0dB is the threshold of normal hearing; 140dB is the threshold of pain. A change of 1dB is detectable only under laboratory conditions.

dB(A): Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessments of loudness. A change of 3dB(A) is the minimum perceptible under normal conditions, and a change of 10db(A) corresponds roughly to doubling or halving the loudness of a sound.

$L_{A10,T}$: The 'A-weighted' noise level exceeded for the 10% of the specified measurement period (T). It has been shown to be a good indicator for traffic noise intrusion and is used in assessing the effect of traffic on residential or commercial premises. It gives an indication of the upper limit of fluctuating noise.

$L_{A90,T}$: The 'A-weighted' noise level exceeded for the 90% of the specified measurement period (T). In BS: 4142 it is used to define the background noise level, including occasional higher transient levels, such as individual passing cars or aircraft.

$L_{Aeq,T}$: The Equivalent Continuous Sound Level can be considered as the continuous steady noise level which would have the same total A-weighted acoustic energy as the real fluctuating noise over a specified measuring period (T). It is a measurement unit suited to many types of noise excluding intermittent noises such as those associated with construction plant. It can be measured directly with an integrating sound level meter.

L_{Amax} : The highest A weighted noise level recorded during a noise event.

Free-field: Free-field measurements are measurements carried out where reflective surfaces are not present to influence results, for example on open ground with no nearby buildings.

Appendix 2: Noise Survey Equipment

The following RION acoustic measurement instrumentation was used for the automatic noise monitoring:

- Precision (Type1) Integrating Sound Level Meter Type NA-27 Ser. No. 01070594
- Prepolarized (Free-field) Microphone G.R.A.S. Type 40AE Ser. No.27086
- Microphone Pre-amplifier (Free-field) Type NH–20 Ser. No.73550
- Sound Calibrator Type NC-74 Serial.No.35062531
- Microphone windshield

The sound level meter was calibrated prior to commencement of the survey and the internal and acoustic calibration level checked regularly during and on completion of the survey to ensure accuracy. No change was found to have occurred.

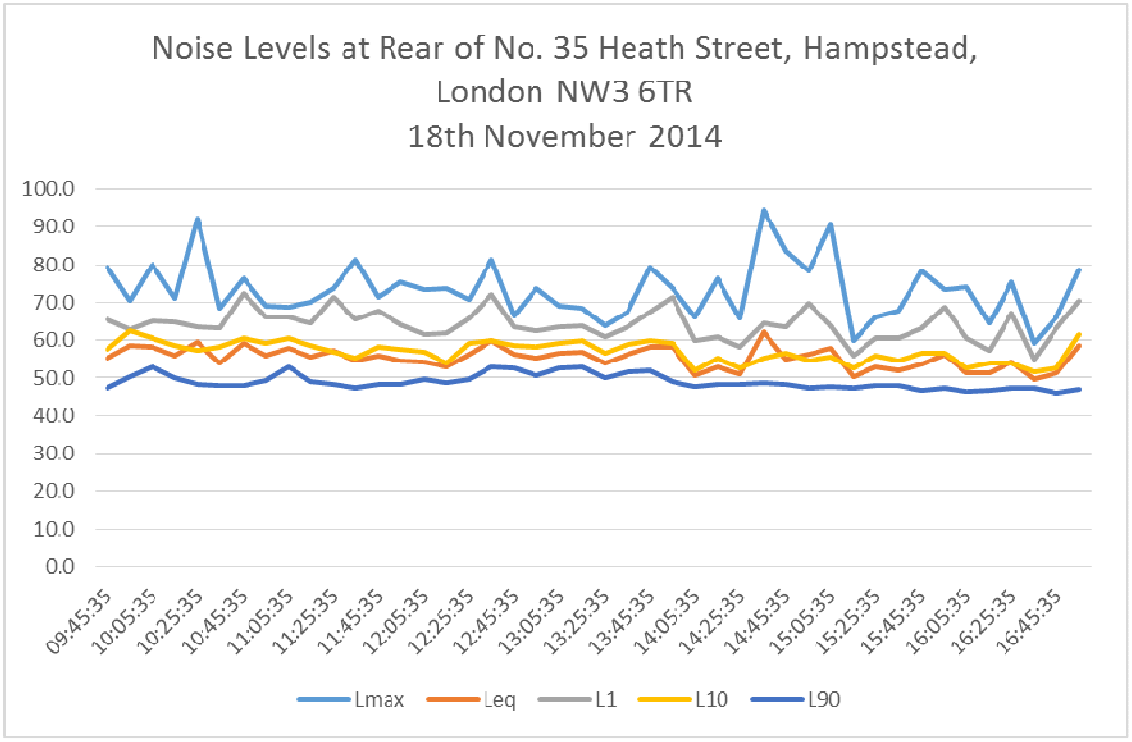
All acoustic measurement instrumentation has current Certificates of Conformance traceable to UK National Standards BS 7580: Part 1 1997 certified in December 2013 and March 2014.

Appendix 3: Noise Survey Results – 18th November 2014

Name:	M Sugiura	M-Time:	10 min
Date of survey:	18/11/2014	Measurem't mode:	Lx
Location:	Rear of No.35 Heath Street	Lmax/Lmin type:	AP
Instrument:	NA-27	F-weight (Sub) :	A
Store mode:	Auto store 2	T-weight (Sub) :	Fast

		Lmax	Leq	L1	L10	L90
1	09:45:35	79.5	55.2	65.4	57.7	47.5
2	09:55:35	70.5	58.5	63.0	62.5	50.4
3	10:05:35	80.0	58.2	65.2	60.7	53.0
4	10:15:35	71.1	55.9	65.0	58.7	50.0
5	10:25:35	92.3	59.6	63.5	57.1	48.3
6	10:35:35	68.5	54.0	63.2	58.4	48.0
7	10:45:35	76.5	59.3	72.4	60.7	48.1
8	10:55:35	69.2	55.8	66.1	59.2	49.4
9	11:05:35	68.8	57.8	66.0	60.6	53.0
10	11:15:35	70.1	55.6	64.6	58.7	48.9
11	11:25:35	73.8	57.3	71.3	57.0	48.5
12	11:35:35	81.5	54.5	65.4	55.2	47.5
13	11:45:35	71.3	55.9	67.7	58.2	48.3
14	11:55:35	75.4	54.7	64.2	57.7	48.5
15	12:05:35	73.5	54.4	61.7	56.8	49.8
16	12:15:35	73.8	52.8	62.0	54.1	48.8
17	12:25:35	70.7	56.3	65.9	59.2	49.7
18	12:35:35	81.2	59.9	72.1	60.0	53.0
19	12:45:35	66.6	56.2	63.6	58.7	52.5
20	12:55:35	73.6	55.3	62.4	58.3	50.8
21	13:05:35	69.1	56.5	63.5	59.1	52.6
22	13:15:35	68.6	57.0	63.7	59.9	53.0
23	13:25:35	63.7	53.9	60.9	56.6	50.0
24	13:35:35	67.6	56.1	63.5	59.0	51.5
25	13:45:35	79.2	58.4	67.4	59.8	52.0
26	13:55:35	73.9	58.4	71.3	59.3	48.9
27	14:05:35	66.3	50.6	59.9	52.0	47.6
28	14:15:35	76.3	53.0	61.0	55.2	48.5
29	14:25:35	65.8	51.1	58.2	52.6	48.5
30	14:35:35	94.5	62.3	64.6	55.4	48.6
31	14:45:35	83.8	54.9	63.4	56.7	48.5
32	14:55:35	78.5	56.2	69.8	54.7	47.5
33	15:05:35	90.7	57.8	63.9	55.7	47.7
34	15:15:35	59.8	50.4	55.8	52.5	47.4
35	15:25:35	66.2	53.1	60.5	56.0	47.9
36	15:35:35	67.9	52.1	60.6	54.5	48.1
37	15:45:35	78.3	53.7	63.1	56.5	46.6
38	15:55:35	73.5	56.1	68.9	56.7	47.5
39	16:05:35	74.0	51.3	60.5	52.5	46.4
40	16:15:35	64.5	51.3	57.2	53.8	46.6
41	16:25:35	75.3	54.4	67.0	53.8	47.3
42	16:35:35	59.1	49.6	55.1	51.5	47.3
43	16:45:35	66.3	51.4	63.2	52.5	46.0
44	16:55:35	78.6	58.7	70.4	61.6	46.9

Appendix 4: Time Histories of Noise Levels at the Rear of No. 35 Heath Street



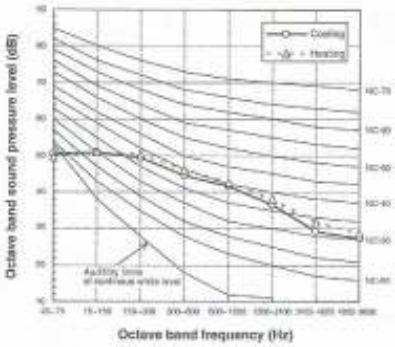
Appendix 5: Sound Characteristics of Toshiba Air Conditioning External Unit RAV-SM803AT-E

3-5. Sound characteristics

2-5HP

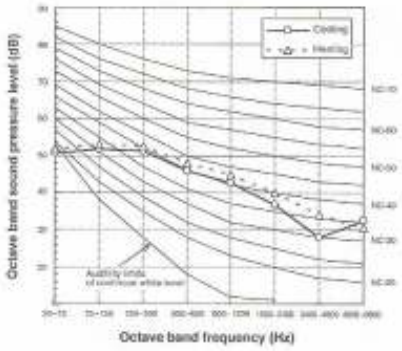
RAV-SM563AT-E

Sound pressure level (dB(A))	Cooling	Heating
	46	48



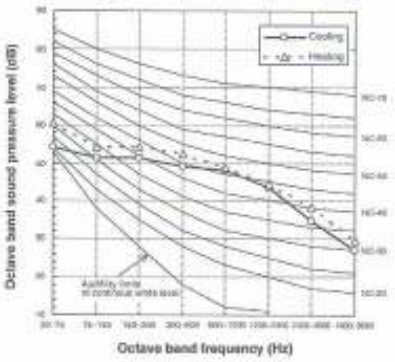
RAV-SM803AT-E

Sound pressure level (dB(A))	Cooling	Heating
	48	50



RAV-SM1103AT-E
RAV-SM1403AT-E

Sound pressure level (dB(A))	Cooling	Heating
	53	54



3-11

Appendix 6: Noise Calculations

Premises : Sweaty Betty, No.35 Heath Street, Hampstead, London NW3 6TR
Location of A/c unit : On back wall of the shop spanning the panel above the door

Octave Band Sound Power Levels of Toshiba External A/C unit
Model RAV-SM803AT-E

Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**
Lw cooling	59	57	56	51	47	43	34
Q=4	6	6	6	6	6	6	6
To one metre	-11	-11	-11	-11	-11	-11	-11
Lp at 1m	54	52	51	46	42	38	29
A weighting	-26.2	-16.1	-8.9	-3.2	0.0	1.2	1.0
A weighted level	27.8	35.9	42.1	42.8	42.0	39.2	30.0
Noise level at 1m	**48**						
Lw	59	57	56	51	47	43	34
Q=4	6	6	6	6	6	6	6
To 4m	-21.9	-21.9	-21.9	-21.9	-21.9	-21.9	-21.9
Lp at 4m	43.1	41.1	40.1	35.1	31.1	27.1	18.1
Attenuation due to screening of roof	11	12	14	18	20	23	25
Lp at 4m	32.1	29.1	26.1	17.1	11.1	4.1	-6.9
A weighting	-26.2	-16.1	-8.9	-3.2	0.0	1.2	1.0
A weighted level	5.9	13.0	17.2	13.9	11.1	5.3	-5.9
Noise level at 4m	21						

Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**
Lw heating	59	57	56	54	49	45	38
Q=4	6	6	6	6	6	6	6
To one metre	-11	-11	-11	-11	-11	-11	-11
Lp at 1m	54	52	51	49	44	40	33
A weighting	-26.2	-16.1	-8.9	-3.2	0.0	1.2	1.0
A weighted level	27.8	35.9	42.1	45.8	44.0	41.2	34.0
Noise level at 1m	**50**						
Lw	59	57	56	54	49	45	38
Q=4	6	6	6	6	6	6	6
To 4m	-21.9	-21.9	-21.9	-21.9	-21.9	-21.9	-21.9
Lp at 4m	43.1	41.1	40.1	38.1	33.1	29.1	22.1
Attenuation due to screening from roof	11	12	14	18	20	23	25
Lp at 4m	32.1	29.1	26.1	20.1	13.1	6.1	-2.9
A weighting	-26.2	-16.1	-8.9	-3.2	0.0	1.2	1.0
A weighted level	5.9	13.0	17.2	16.9	13.1	7.3	-1.9
Noise level at 4m	22						