

Nationwide Building Society Hampstead London

Environmental Noise Survey and Plant Noise Assessment Report

24604/PNA2 Rev3

13 January 2020

For:
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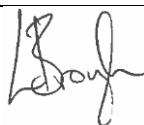

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Environmental Noise Survey and Plant Noise Assessment Report 24604/PNA2 Rev3

Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	12/09/2018	-	Luke Brough Assistant Consultant BSc(Hons), TechIOA, MAES	John Gibbs Director MIOA, MSEE, CEnv
1	27/09/2018	Commented on Local Authority Criteria	Luke Brough Assistant Consultant MSc, BSc(Hons), TechIOA, MAES	John Gibbs Director MIOA, MSEE, CEnv
2	06/11/2018	Inclusion of necessary attenuation by acoustic screening.	Luke Brough Consultant MSc, BSc(Hons), AMIOA	John Gibbs Director MIOA, MSEE, CEnv
3	13/01/2020	Plant noise calculation altered following revised plant selection and location.		
			Luke Brough Consultant MSc, BSc(Hons), AMIOA	John Gibbs Director MIOA, MSEE, CEnv



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1.0 Introduction

Building services plant has been newly installed at the Hampstead branch of Nationwide Building Society.

Hann Tucker Associates have been instructed to carry out an environmental noise survey and plant noise assessment in order to identify the currently prevailing background noise levels and assess the noise emissions from the installed plant.

2.0 Objectives

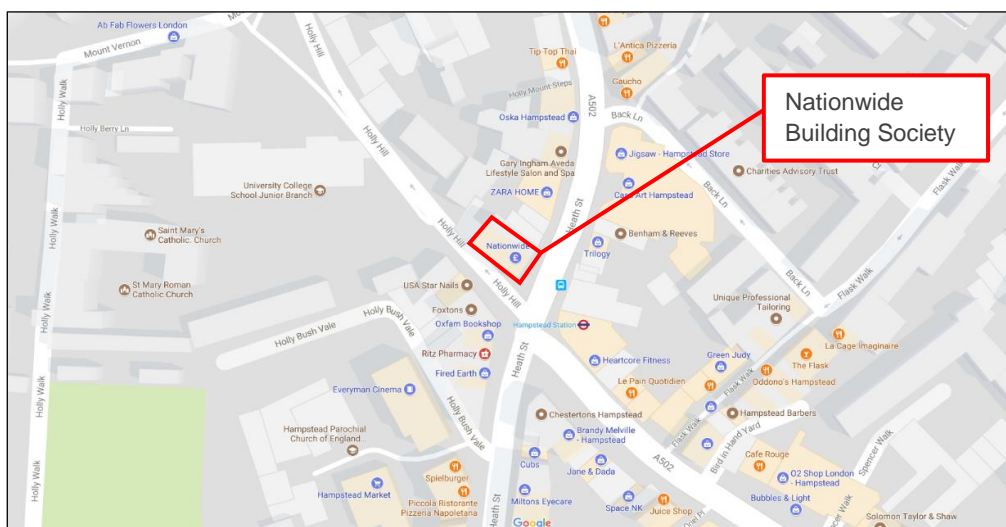
To establish the existing noise levels by means of fully automated noise monitoring over a period of approximately 24 hours at up to one secure and accessible position.

To assess the noise emissions from the installed plant based upon additional manned measurements.

3.0 Site Description

3.1 Location

The site is located on Heath Street, directly opposite Hampstead underground station. The majority of properties in this area are commercial but there are some residential properties to the north, including directly behind the site. The location is shown in the Location Map below.



Location Map (Map Data © 2017 Google)

The site falls within the jurisdiction of Camden Borough Council.



3.2 Description

The site is located on the corner of Heath Street and Holly Hill in the ground floor of a former fire station. It is a ground plus two storey building. The plant is located in a courtyard to the rear of the site.

The site is shown in the Site Plan below.



Site Plan (© 2017 The GeoInformation Group)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Survey Methodology

The survey was undertaken by Luke Brough, MSc, BSc (Hons) AMIOA.

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 13:15 hours on 3 September 2018 to 12:15 hours on 4 September 2018.

During the periods we were on site the wind conditions were calm. The sky was generally clear. We understand that generally throughout the survey period the weather conditions were similar.



These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{90} , L_{eq} and L_{max} sound pressure levels over 15 minute periods.

Manned measurements were taken of the plant in operation over 5 minute periods.

5.2 Measurement Position

The microphone was attached to a pole approximately 1.2 metres above the plant area level. Manned measurements were taken at a distance of 1m from the installed plant. The manned and unmanned measurement positions are shown on the plan below.



Plan Showing Measurement Position (© 2017 The GeoInformation Group)

5.3 Instrumentation

The instrumentation used during the survey is presented in the Table below:

Description	Manufacturer	Type	Serial Number	Annual Calibration
Type 1 ½" Condenser Microphone	ACO Pacific	7052E	68293	Calibration on 23/04/2018
Preamp	Svantek	SV18	72276	Calibration on 23/04/2018
Type 1 Data Logging Sound Level Meter	Svantek	971	72538	Calibration on 23/04/2018



The sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. No significant change was found to have occurred (no more than 0.3dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable.

The microphone was fitted with a windshield.

6.0 Results

The results have been plotted on Time History Graph 24604/TH2 enclosed, presenting the 15 minute A-weighted (dBA) L_{90} and L_{eq} noise levels at each measurement position throughout the duration of the survey.

The measured L_{Aeq} noise levels recorded during the survey are presented in the table below:

Measured $L_{Aeq,T}$ Noise Levels (dB re 2×10^{-5} Pa)	
Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
50dBA	42dBA

The modal L_{A90} (15 min) measurements recorded during the survey are presented in the table below:

Most Common (Modal) Measured $L_{A90(15min)}$ Background Noise Levels (dB re 2×10^{-5} Pa)	
Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours
46dBA	36dBA

The L_{Aeq} (5 min) manned measurements of the installed plant recorded during the survey are presented in the table below:

Description	Measured $L_{Aeq(5min)}$ Noise Level (dB re 2×10^{-5} Pa)
All plant running	53dBA
All plant except RAV-SM1603AT-ET1	49dBA



7.0 Discussion Of Noise Climate

During the periods we were on site the dominant noise sources were noted to be local road and air traffic.

8.0 Plant Noise Emission Criteria

Nationwide, Hampstead falls within the London Borough of Camden. The council's advice relating to noise emissions from air conditioning plant is as follows:

"A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion)."

In order to meet the above advice, noise emissions from the proposed plant should not exceed a level of 10dB below the measured background level $L_{A90(15min)}$. Therefore, based on the results of the noise survey and the advice above, we recommend the following plant noise emission level to be achieved with all plant running simultaneously at 1m external to the nearest noise sensitive façade.

Plant Noise Emission Criteria (dBA re:2x10 ⁻⁵ Pa)
36

We understand that the proposed units will be operational during daytime hours only.

It should be noted that the above criterion is subject to final approval by the London Borough of Camden.



9.0 Plant Noise Assessment

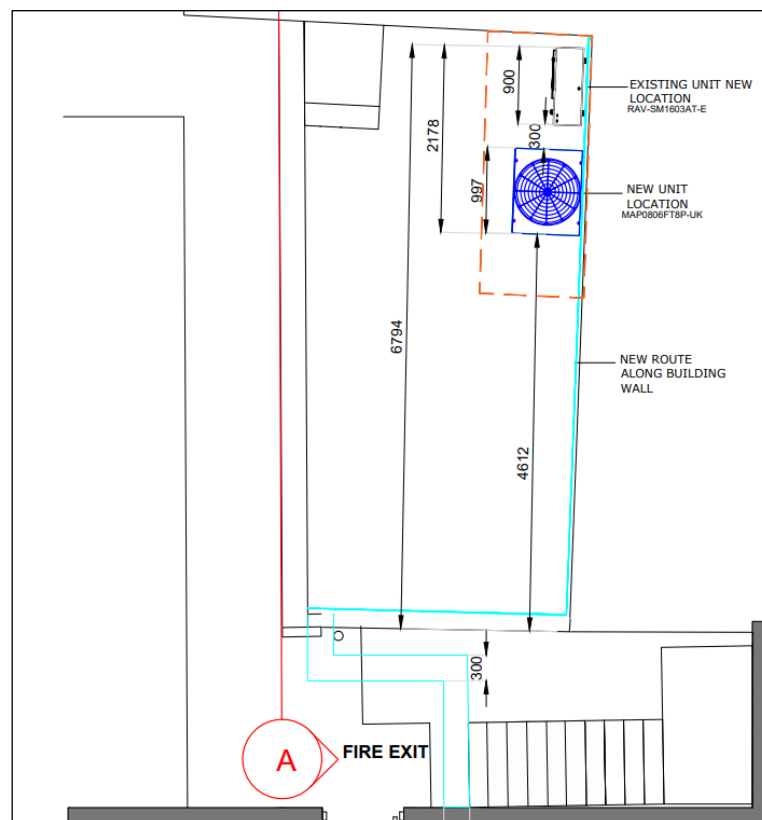
The proposed plant comprises one Toshiba RAV-SM1603AT-E condenser and one Toshiba MAP0806FT8P-UK heat recovery unit.

We understand the manufacturer's noise data for the equipment to be as follows:

Plant Description	Sound Pressure Level (dB re 2×10^{-5} Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
RAV-SM1603AT-E	59	60	54	52	46	42	37	34	53
MAP0806FT8P-UK	56	60	62	60	56	49	38	35	61

9.1 Location of Plant

The plan below shows the proposed location of the above plant items. Based on this drawing, the nearest residential façade is approximately 4m away, to the left of the below image.



Proposed plant location (image courtesy of CF Roberts)



9.2 Plant Noise Impact Assessment

We understand that the proposed units will be operational during daytime hours only.

The following table summarises our predictions of atmospheric noise emissions from the plant to the nearest noise sensitive residential window.

	Sound Pressure Level (dB re 2×10^{-5} Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
RAV-SM1603AT-E	59	60	54	52	46	42	37	34	53
MAP0806FT8P-UK	56	60	62	60	56	49	38	35	61
Combined Sound Pressure Level (1m)	61	63	63	61	56	50	41	38	62
Full Acoustic Enclosure	-12	-19	-22	-22	-22	-19	-17	-16	-
Distance Correction (3m)	-7	-7	-7	-7	-7	-7	-7	-7	-
Façade Reflection	+3	+3	+3	+3	+3	+3	+3	+3	-
Calculated Noise Level at Receptor	45	40	37	35	30	27	20	18	36

Our calculations indicate that the proposed plant, in conjunction with the proposed mitigation measures, should be capable of achieving the requirements of the Local Authority outlined in Section 8.0.

10.0 Mitigation Measures

As detailed in the above table, in order to control plant noise emissions in line with the proposed criterion, we recommend a full acoustic enclosure with a lid. An overall reduction of 22dBA would be required. Please see Appendix B for our specification for acoustic enclosures, and a list of suitable suppliers.

11.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing noise levels.

The plant noise levels have been assessed against the requirements of the Local Authority.

The assessment indicates that the proposed plant, in conjunction with 22dBA attenuation from an acoustic enclosure, should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive residential window.

Appendix A

The acoustic terms used in this report are defined as follows:

dB Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

L_{90,T} L₉₀ is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

L_{eq,T} L_{eq,T} is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

Appendix B

24604 – NATIONWIDE BUILDING SOCIETY, HAMPSTEAD

SPECIFICATION FOR SMALL ACOUSTIC ENCLOSURES

The plant items shall be supplied complete with acoustic treatment which shall achieve adequate levels of attenuation to ensure that the following limiting sound pressure levels are not exceeded when measured at a distance of 1m (free field over a reflecting plane) in any horizontal or vertical direction under any load conditions.

Duty/Time	A-weighted Limiting Sound Pressure Level @ 1m (dB re 2×10^{-5} Pa)
Day 07:00 – 23:00 hours	40

Furthermore they shall not exhibit any significant tonal content.

Exceedances in excess of the measurement tolerance for a Type 1 sound level meter shall constitute a failure.

The enclosed outer panels shall be constructed from galvanized sheet steel having a minimum thickness of 1.6mm and fixed at 300mm (max) centres. The enclosure inner panels shall be constructed from punch-perforated (round-hole) galvanised sheet steel facing, having a minimum thickness of 0.7mm fixed at 300mm (max) centres. Flattened-expanded ("Expanet") sheet shall not be used, unless all edges of the sheet are mechanically fixed to the panel casing and galvanised steel cover strips are used to prevent rivet heads pulling through the perforated sheet (trapping the Expanet between two solid steel layers).

The inert, rot and vermin proof, non-hygroscopic and non-combustible mineral wool or glass fibre acoustic medium shall be packed to a density of not less than 48kg/m³. This shall be faced with a glass fibre cloth, or other approved infill protection membrane. Panels shall be constructed and assembled so that no egress of the acoustic medium will occur under the operating conditions.

Doors, access panels, windows and ventilation ducts or electrical cable penetrations shall be treated so as to maintain the specified acoustic insulation of the assembled enclosure.

Demountable sections shall be designed to allow easy disassembly and reassembly by unskilled personnel without affecting the acoustic performance.

The supplier shall ensure that the assembled enclosure is designed and constructed to withstand site operating conditions such as wind and snow loads, roof mounted plant, etc., as appropriate, and if outside, to be suitably weatherproofed.

The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure that fibre migration is prevented.

Any deviations from the above specification must be agreed by, and confirmed in writing to, Hann Tucker Associates.

SUITABLE SUPPLIERS
of
ACOUSTIC ENCLOSURES

Name & Address	Telephone Number	Contact
IAC Acoustics IAC House Moorside Road Winchester SO23 7US	0843 504 7826	Geoff Crowhurst
Allaway Acoustics Ltd 1 Queens Road Hertford SG14 1EN	01992 550825	Jim Grieves Roger Wade
Acoustic Engineering Services (UK) Ltd The Redwood Suite Guardian House Borough Road Godalming Surrey GU7 2AE	01483 495963	Barry Austin Mark Stagg
QuietStar Limited 1 Glen Road Fleet Hampshire GU51 3QS	01252 674327	Scott Simmons

SUITABLE SUPPLIERS
of
ACOUSTIC ENCLOSURES FOR SMALL AIR CONDITIONING UNITS

Name & Address	Telephone Number	Contact
Environ Technologies Ltd Regus House 1010 Cambourne Business Park Cambourne CB3 6DP	0870 383 3344	Steve Cox
Acoustic Engineering Services (UK) Ltd The Redwood Suite Guardian House Borough Road Godalming Surrey GU7 2AE	01483 495963	Barry Austin Mark Stagg

Nationwide Building Society

Position 1

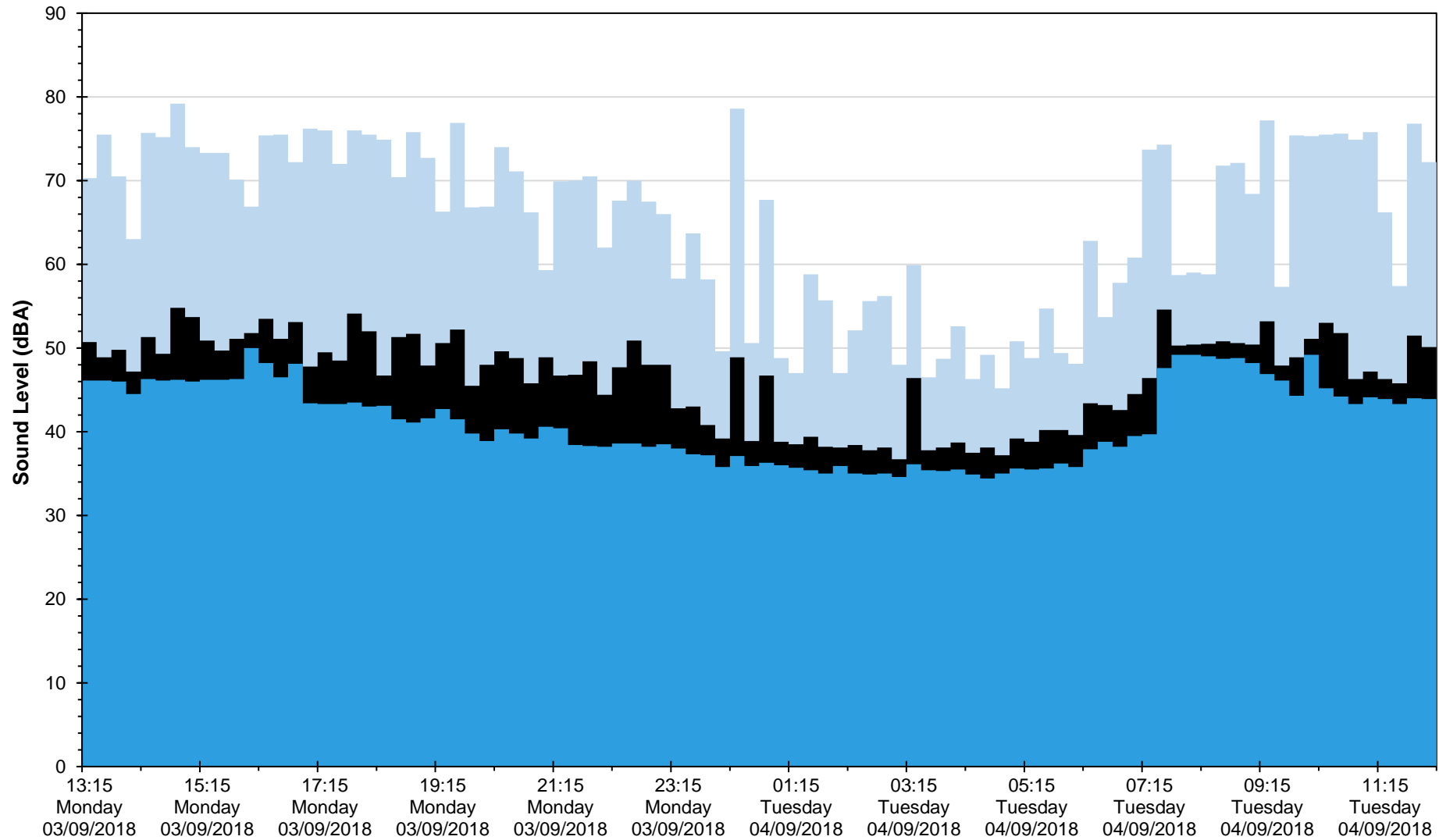
L_{Aeq} , L_{Amax} and L_{A90} Noise Levels

Monday 3 September 2018 to Tuesday 4 September 2018

■ L_{Amax}

■ L_{Aeq}

■ L_{A90}



Date and Time

24604/TH2