Report VA1641.161118.NIA

OMD, Minerva House, 1-4 North Crescent

Noise Impact Assessment

18 November 2016

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Attachments

1. Introduction

It is proposed to replace a remove two redundant condenser units and install two new condenser units in the lightwell to the rear of OMD, Minerva House, 1-4 North Crescent. This lightwell currently contains at least 23 existing, permitted units, believed to be of similar capacity as the proposed new units.

Venta Acoustics has been commissioned by OMD UK to undertake an assessment of the potential noise impact of these proposals in support of an application for planning permission.

An environmental noise survey has been undertaken to determine the background noise levels at the most affected noise sensitive receptors. These levels are used to undertake an assessment of the likely impact with reference to the planning requirements of Camden Council.

2. Design Criterion and Assessment Methodology

2.1 Consultation with the Local Authority

Camden Council planning policy currently requires that noise emissions from plant is at least 5dB below the local background noise level as assessed at the most affected noise sensitive receivers. Noise levels should also not exceed the background noise level by more than 1dB in any octave band between 63Hz and 8kHz. The requirements are summarised below.

> *Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (L_{A90}), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted 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), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the L_{A90}, expressed in dB(A).*

However, recent discussions with Edward Davis, Environmental Health Officer at Camden Council have highlighted that a new set of criteria is at consultation stage currently, with the standard noise condition 1m from noise sensitive façades being a minimum of 10dB below than background (L_{A90}), or 15dB below the background should the plant have any tonal, intermittent or distinguishable characteristics. To ensure a robust assessment, the new 10dB below background criterion has been adopted for this assessment.

3. Site Description

As illustrated on attached site plan VA1641/SP1, the site building is located to the east of Tottenham Court Road. The proposed location for the new units is in a lightwell formed between Minerva House to the east and other commercial premises to the west.

The most affected noise sensitive receivers are expected to be the windows of the commercial premises directly across the lightwell having a line of sight view of the new units.

Many existing building services plant were noted within the lightwell servicing both OMD and the other premises.

4. Environmental Noise Survey

4.1 Survey Procedure & Equipment

In order to establish the existing background noise levels at the site, a noise survey was carried out between Wednesday 16th and Thursday 17th November 2016 at first floor level in the lightwell at the location shown in site plan VA1641/SP1. This location was chosen to be representative of the background noise level at the most affected noise sensitive receivers.

Continuous 5-minute samples of the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were undertaken at the measurement location.

The weather during the survey period was generally dry. The background noise data is not considered to have been compromised by these conditions.

Measurements were made generally in accordance with ISO 1996 2:2007 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*.

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-12202-E0	42647-A2A-12202-E0	4/10/16
Larson Davis calibrator	CAL200	13069	42530-13069	9/6/16

Table 4.1 – Equipment used for the survey

The calibration of the sound level meters was verified before and after use with no significant calibration drift observed.

4.2 Results

The measured sound levels are shown as time-history plots on the attached chart VA1641/TH1. The background noise level is determined entirely by the existing plant in the lightwell. The typical background noise levels measured were:

Monitoring Period	Typical $L_{A90,5min}$
07:00 – 23:00 hours	49dB
23:00 – 07:00 hours	54dB

Table 4.2 – Typical background noise levels

It is noted that the plant operated at an increased level during the evening and night time period of the first day and for most of the morning of the second day.

4.3 Plant Noise Emission Limits

On the basis of the measured noise levels and the planning requirements of the Local Authority, and considering that it is not expected that tonal noise will be generated by the proposed plant units, the following plant specific sound levels should not be exceed at the most affected noise sensitive receivers:

Monitoring Period	Design Criterion (L_{Aeq})
07:00 – 23:00 hours	39 dB
23:00 – 07:00 hours	44 dB

Table 4.3 – Specific sound pressure levels not to be exceeded at most affected noise sensitive receivers

5. Predicted Noise Impact

5.1 Proposed plant

The following plant is proposed for installation adjacent to the existing plant at ground floor level on the west façade of Minerva House at the location indicated on site plan VA1641/SP1.

Plant Item	Quantity	Proposed Model	Notes
Condensers	2	Toshiba SM564ATP-E	Dual mode operation

Table 5.1 – Indicative plant selections assumed for this assessment.

Consulting the manufacturer's datasheets, the sound pressure data is provide as a single A-weighted value. Spectral values have been assumed based on similar size and duty external, wall mounted condenser units.

The following noise emissions levels are attributed to the proposed plant items:

Plant Item: Toshiba SM564ATP-E	Octave Band Centre Frequency (Hz) Sound Pressure Level, L_p @1m(dB)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Heating Mode	50	43	48	46	44	36	30	21	**48**
Cooling Mode	48	41	46	44	42	34	28	19	**46**

Table 5.2 – Plant noise data used for the assessment.

5.2 Recommended Mitigation Measures

No additional mitigation measures have been assumed in the calculations of external noise.

5.3 Predicted noise levels

The cumulative noise level at the most affected noise sensitive receiver, some 9 meters away, has been calculated on the basis of the above information, with reference to the guidelines set out in ISO 9613-2:1996 *Attenuation of sound during propagation outdoors - Part 2: General method of calculation.*

The consider units are similar to the existing units in the lightwell and will have a very similar acoustic character. These units will therefore not change the acoustic character of the locality nor draw attention to themselves. An additional character penalty would not, therefore, be appropriate.

A summary of the calculations are shown in Appendix B.

Predicted Cumulative Noise Level	Design Criterion
L_{Aeq} 35dB (Heating Mode)	L_{Aeq} 39 dB
L_{Aeq} 33dB (Cooling Mode)	

Table 5.3 – Predicted cumulative noise level at most affected noise sensitive receiver and design criterion.

It should be noted that the predicted noise levels are calculated for both proposed new units operating simultaneously at full duty. This scenario of high demand on the units would reasonably be assumed to occur when the existing units are under a similar high demand and so noise levels in the lightwell are at their higher levels.

6. Conclusion

A baseline noise survey has been undertaken by Venta Acoustics to establish the background noise climate in the lightwell to the rear of OMD, Minerva House, 1-4 North Crescent in support of a planning application for the proposed introduction of two new condenser units.

This has enabled noise emission limits to be set at the most affected noise sensitive receiver such that the proposed installation meets the more onerous, new requirements of Camden Council .

The cumulative noise emission levels from the proposed plant have been assessed to be below the noise levels currently generated by the existing plant and compliant with the plant noise emission limits.

The proposed scheme is not expected to have a significant adverse noise impact and the relevant Planning Conditions have been shown to be met.

Steven Liddell MIOA

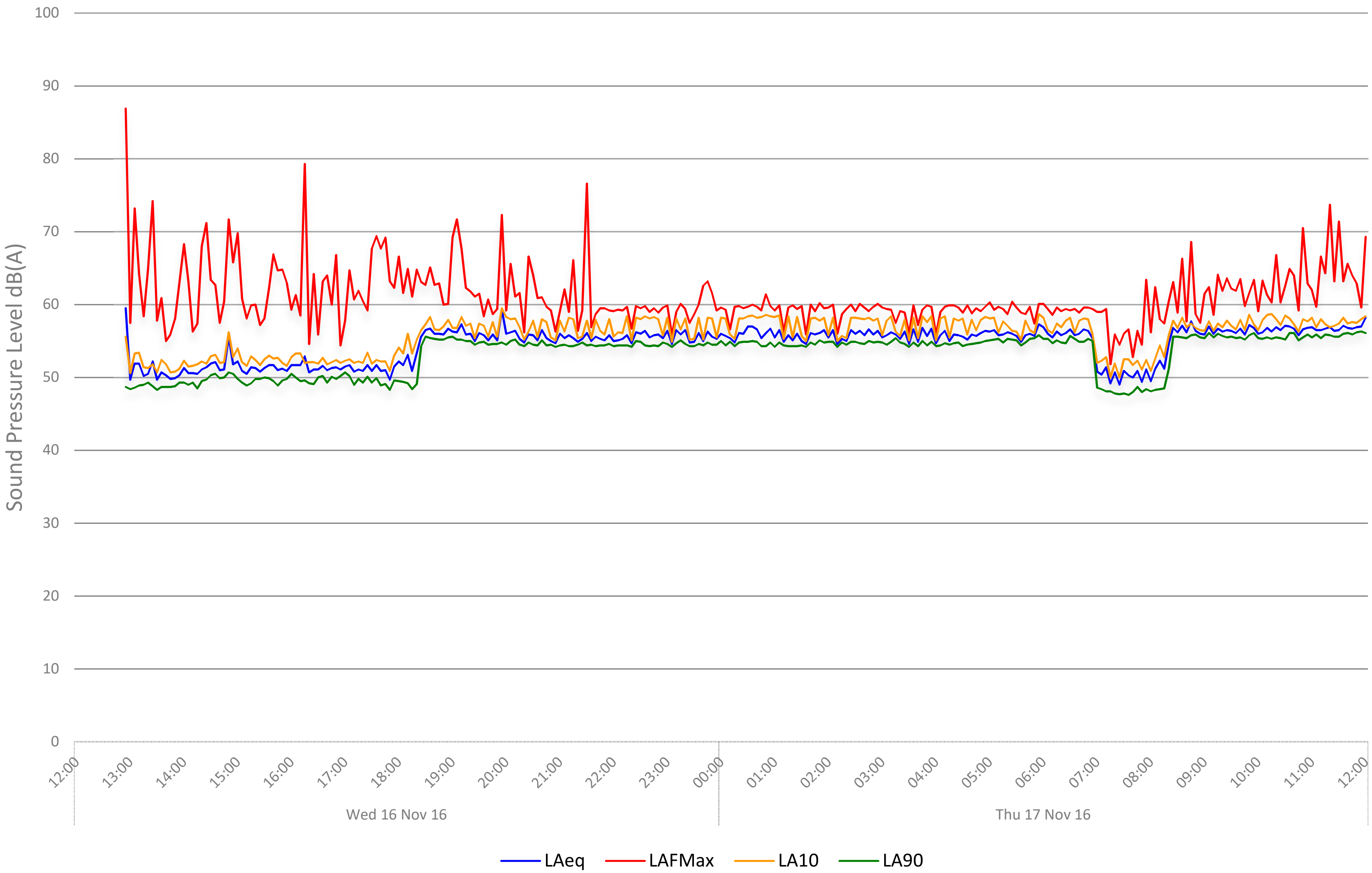
OMD, Minerva House, 1-4 North Crescent

Environmental Noise Time History: 1

Lightwell

Venta Acoustics

Figure VA1641/TH1



Acoustic Terminology & Human Response to Broadband Sound

1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as ‘loudness’, its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of ‘pitch’, with low frequencies producing low ‘notes’ and higher frequencies producing high ‘notes’.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the ‘A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated ‘A' weighted sound level is designated as dB(A) or L_A.
L_{eq} :	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max} :	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

1.3 Human Perception of Broadband Noise

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

1.4 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

APPENDIX B

VA1641 - OMD, Minerva House, 1-4 North Crescent

Noise Impact Assessment

Heating Mode

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Toshiba SM564ATP-E	Lp @ 1m	50	43	48	46	44	36	30	21	**48**
Number of Plant	2	3	3	3	3	3	3	3	3	
Correction for reverberant field		3	3	3	3	3	3	3	3	
Distance Loss	To 9m	-19	-19	-19	-19	-19	-19	-19	-19	
Level at receiver		**37**	**30**	**35**	**33**	**31**	**23**	**17**	**8**	**35**

Cooling Mode

		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Toshiba SM564ATP-E	Lp @ 1m	48	41	46	44	42	34	28	19	**46**
Number of Plant	2	3	3	3	3	3	3	3	3	
Correction for reverberant field		3	3	3	3	3	3	3	3	
Distance Loss	To 9m	-19	-19	-19	-19	-19	-19	-19	-19	
Level at receiver		**35**	**28**	**33**	**31**	**29**	**21**	**15**	**6**	**33**