



Mediacom

124 Theobald's Road, London.

Environmental Noise Report

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1. Executive Summary

Proposals are to replace two chillers on the plant deck at 124 Theobald's Road, London. This report addresses the potential noise impact from the two new chillers.

Ambient noise levels have been measured at 124 Theobald's Road, on a 3rd floor balcony which faces Richbell House. The data collected here is taken to be representative of the noise levels at Richbell House. These measured noise levels have been used to determine limiting noise levels for the new items of services plant.

The London Borough of Camden Development Policy DP28 requires that any fixed services plant be designed so that the cumulative noise is no greater than a level which is 10 dB(A) below the existing background noise level.

Limiting noise levels have been set to meet this criterion. Calculations have been provided to demonstrate the predicted cumulative noise of the two proposed chillers.

This information is shown in Table 1, below.

Nearest noise sensitive receiver location	Lowest measured background noise level dB(A) L ₉₀ , 5mins		London Borough of Camden Criterion dB(A) L _{eq}		Predicted cumulative noise level dB(A) L _{eq}	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)	Daytime (07:00-23:00)	Night-time (23:00-07:00)	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Richbell House	51	48	41	38	36.8	36.8

Table 1 - Limiting noise levels (dB(A) re 20µPa)

The above information shows that the requirement of the London Borough of Camden is met with the proposed chiller units operating.

2. Introduction

Two chillers at 124 Theobald's Road, London are to be replaced. The existing units will be removed and the new units located in exactly the same position.

An environmental noise survey has been undertaken at the site to establish the existing background noise levels.

Noise data is available from the manufacturer of the proposed chillers.

Limiting noise levels have been set for new items of services plant, based on prevailing noise levels that have been measured at the site. The levels are based on the criterion in The London Borough of Camden's Development Policy DP28, which requires the cumulative noise from all replacement plant to not exceed a level which is 10 dB(A) below the existing background noise level.

3. Site description

124 Theobald's Road is located in the Holborn area of London. The site is in an established commercial/residential area. Figure 1 below gives the approximate site location, highlighted in red.



Figure 1 - Site location

The chillers are located on a high-level plant deck on the façade which faces towards the north-west. The following Figure shows the location of the existing (and therefore proposed) chillers, and the location of Richbell House which is taken to be the nearest noise-sensitive premises.



Figure 2 – View of Richbell House and existing chillers at 124 Theobald's Road

4. Noise surveys

A sound level meter was set up on a balcony of 124 Theobald's Road to determine the existing prevailing noise levels.

Measurements were taken at the position shown below:

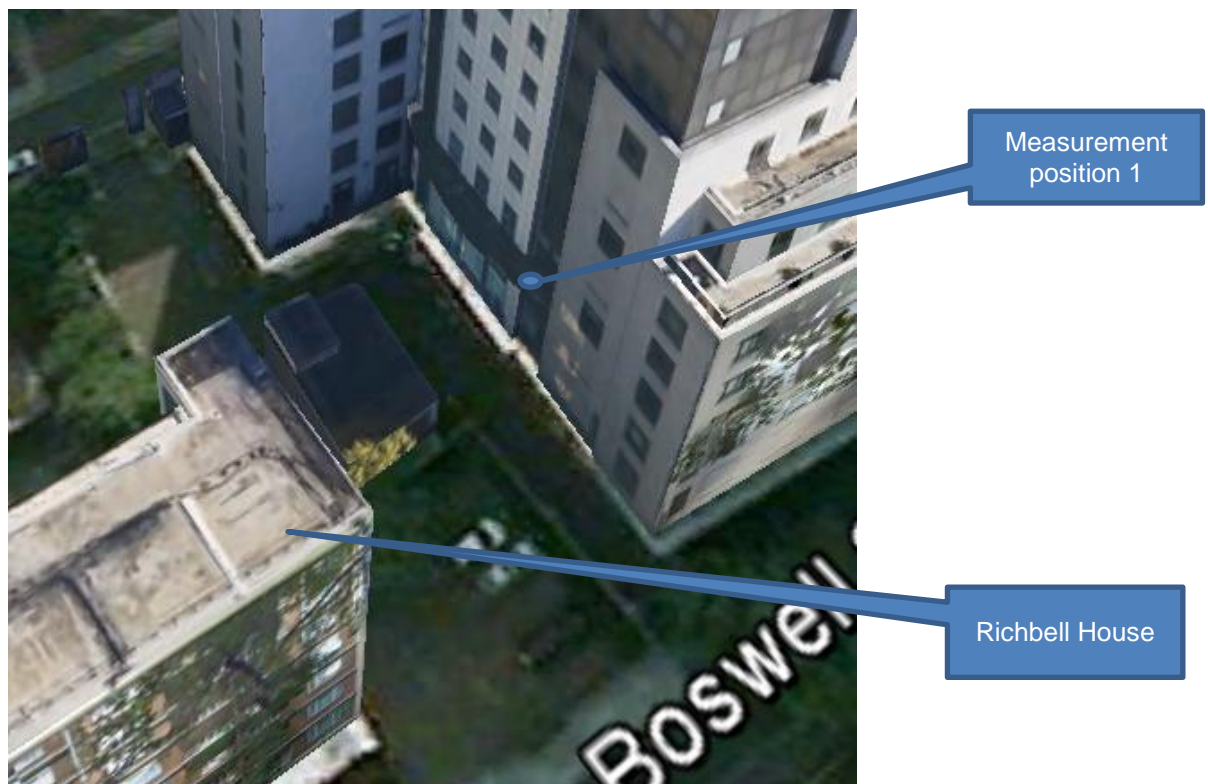


Figure 3 – Location of ambient noise survey & Richbell House

Measurements were taken between 15:00 hours on 26th October and 09:30 hours on 29th October 2012. The meter used was a Class 1 Sound Level Meter, calibrated prior to, and immediately after measurements. A copy of the relevant calibration certificate is available upon request. Full information regarding the survey is shown in Appendix A of this report.

The following Figure show the time history graph of measured noise levels. It is evident from the graphs below that Position 1, located below the roof deck, was not directly affected by existing services plant, with noise levels gradually decreasing / increasing during the night-time period.

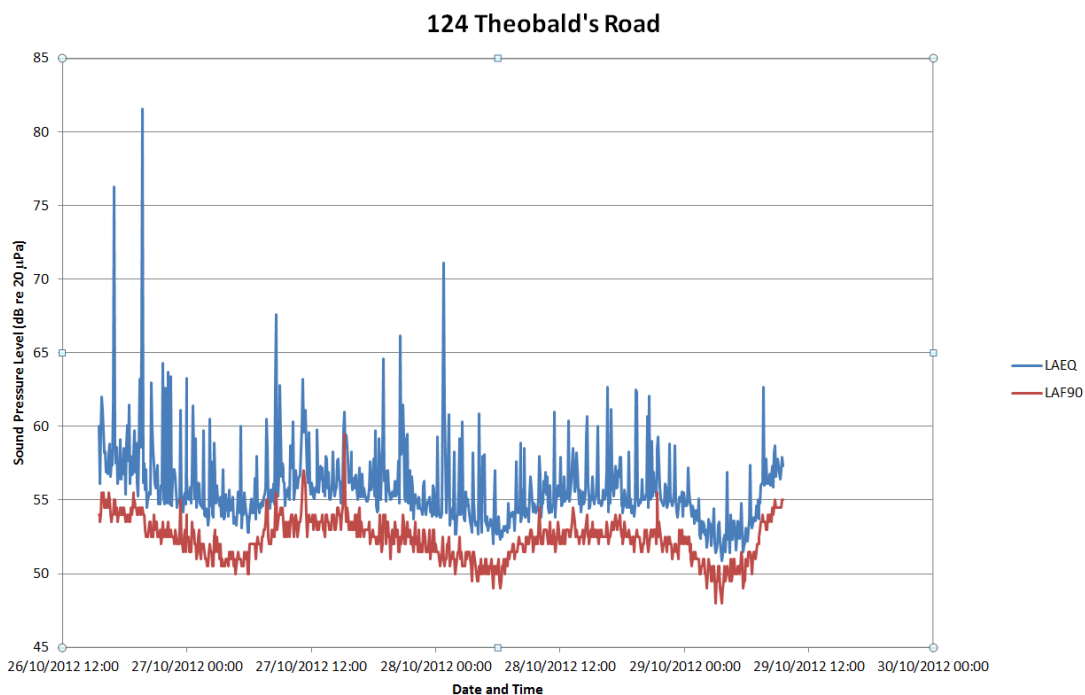


Figure 4 - Results from noise survey at Position 1

The following Table summarises measured noise levels at the measurement position:

Location	Period	Lowest $L_{A90,5mins}$
Position 1	Daytime	51.0 dB(A)
	Night-time	48.0 dB(A)

Table 2 - Summary of measured noise levels

It is considered that results from Position 1 are indicative of prevailing noise levels affecting the nearest noise sensitive receptor (i.e. as highlighted in Figure 2).

5. Control of noise from fixed services plant

5.1 Noise criteria for new items of services plant

To meet with Local Authority requirements, the cumulative noise from any future services plant must be designed to meet the following values, when assessed at 1 m from the nearest noise sensitive façade. Position 1 is considered indicative of noise exposure of the nearest noise sensitive receptor (as shown in Figure 2), therefore limiting noise levels are based on the lowest measured noise levels at this Position.

Nearest noise sensitive receiver location	Highest SPL at 1 m from noise sensitive receiver	
	Daytime	Night-time
Richbell House	41 dB(A)	38 dB(A)

Table 3 - Limiting Sound Pressure Level (SPL dB(A) re 20µPa)

5.2 Noise predictions for new items of services plant

The two new chillers are to be provided by Climaventa. The Technical Data sheet for the proposed units shows that the measured noise level of each unit is 59 dB(A) at 10 metres (see Appendix B of this report).

Following standard acoustic theory, the noise from such a unit will reduce by 6 dB per doubling of distance. The formula used to demonstrate this is:

$$L_{p(2)} = L_{p(1)} + 20\text{Log}(d^2/d^1)$$

Where $L_{p(1)}$ is the noise of the unit at 10 metres (dB(A)) – see Technical Data Sheet
 $L_{p(2)}$ is the noise of the unit at Richbell House (dB(A))
 d^2 is the distance from the chiller units to Richbell House (in metres)
 d^1 is the distance from the chiller unit shown on the data sheet (in metres).

Therefore, the calculation is as follows

$$\begin{aligned} L_{p(2)} &= 59 \text{ dB(A)} - 20\text{Log}(28/10) \\ &= 50.1 \text{ dB(A)} \end{aligned}$$

There is then a barrier effect to take into account. The proposed units on the plant deck are close to a barrier which is of a similar height to the units.

This, along with the fact that the nearest noise-sensitive window is at least 8m lower vertically than the units means that the attenuation provided by the barrier is 16.3 dB(A).

Therefore, the predicted noise of a chiller at Richbell House is

$$50.1 \text{ dB(A)} - 16.3 \text{ dB(A)} = 33.8 \text{ dB(A)}.$$

As there are two chiller units creating the same noise level, the formula to determine the cumulative noise level is

$$33.8 \text{ dB(A)} + 10\text{Log}(2) = 36.8 \text{ dB(A)}.$$

This predicted level is lower than the criteria set by London Borough of Camden for both the night-time (38dB(A)) and daytime (41dB(A)) periods.

6. Conclusions

This report documents the site survey data collected at 124 Theobald's Road, London.

Based on The London Borough of Camden's requirements, this document sets limiting noise levels not to be exceeded at the nearest noise sensitive receptors by new services plant.

Predictions show that the two proposed chiller units, when operating together, will be below the criteria set by the London Borough of Camden.

Appendix A – Noise survey details

A1 – Time and Date of Survey

15:30 hours on 26 October 2012 to 09.30 hours on 29 October 2012

A2 – Personnel

Ian Harley – Cundall Acoustics

A3 – Weather conditions

When the equipment was installed, weather conditions were dry and calm. Records show that rain did fall during the survey period but not during the critical night-time period.

A4 – Survey equipment & Installation details

CEL 633 Sound Level Meter; Serial number: 1211405

CEL 110/1 Sound Level Calibrator; Serial number 080610

The Sound Level meter was calibrated before and after the survey at a level of 114 dB and showed no drift during that time.

Appendix B – Climaventa Technical Data Sheet

Technical Selection

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TECS2 /SL-CA-E 0652

Version Software: NewELCA - Ver. 2.20.0.0
Version report : 2.0.0.5
Version DB : 2.42.0.0
Utente : Reid Graham



PERFORMANCES

COOLING MODE		
Cooling capacity	[kW]	681.8
Total power input	[kW]	201.6
EER	-	3.38
ESEER	-	5.77

CONDITIONS REFERRED TO			
	TA	Evap. Tin	Evap. Tout
	[°C]	[°C]	[°C]
COOLING	35	12.0	6.0

COOLING PART LOAD					
Load	[%]	100	75	50	25
Air Temp. °C	[°C]	35.0	30.0	25.0	20.0
Cooling capacity	[kW]	681.8	511.4	340.9	170.4
Total power input	[kW]	201.6	123.2	60.0	22.2
EER	-	3.38	4.15	5.68	7.68

EVAPORATOR			
Type	Nr.	Connection-Type	Connect_diameter
FLOODED	1	VICTAULIC	6"
Evap. Tin	[°C]		12.0
Evap. Tout	[°C]		6.0
Fluid			WATER
Glycol	[%]		0
Fouling factor	[m² °C/W]		0.000044
Flow rate	[m³/h]		97.8
Pressure drop	[kPa]		16.2

COMPRESSORS	
Type	CENTRIFUGAL
Nr.	2
Nr. of capacity steps	0
Min. cap. step	
Nr. of refrigerant circuits	1
Type of regulation	STEPLESS
Refrigerant	R134a

COIL SECTION	
Fan Type	EC FAN
Number of Fans	14
Flow rate	[m³/s] 54.93
ESP	[Pa] 0
Consumption	[kW] 0.85



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NOISE LEVELS

SOUND POWER LEVEL

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	TOT
[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
90	91	91	88	88	84	79	73	92

SOUND PRESSURE CALCULATION IN FREE FIELD CONDITIONS

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	TOT
[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB(A)]
57	58	58	55	55	51	46	40	59

Distance 10

ELECTRICAL DATA

Power supply	[V/ ph /Hz]	400/3/50
SA	[A]	0
FLA	[A]	463
Power input	[kW]	288

DIMENSIONS AND WEIGHTS

Length	[mm]	7000
Height	[mm]	2430
Width	[mm]	2260
Weight	[kg]	6040

FREE SPACE

Electrical panel side	[mm]	1800
Opposite side of el. panel	[mm]	1500
Condensing coil side	[mm]	2000
Opposite side of cond. coil	[mm]	2000



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