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112-116 New Oxford Street

Plant Noise Assessment Report

Project:	112-116 New Oxford Street
Report Reference:	J0344_R01_Plant Noise Assessment
Date of Report:	1 December 2016
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1 INTRODUCTION

ALN Acoustic Design has been appointed to carry out a noise assessment in relation to the proposed installation of a number of items of plant equipment on the roof of the building at 112-116 New Oxford Street, WC1A, in the London Borough of Camden. The plant equipment will serve several floors of office space which are to be refurbished in the building below. This report sets out an assessment of the impact of the operational noise of the new equipment on noise sensitive receptors in the local area, in line with Local Authority policy.

112-116 New Oxford Street is a 7-storey building on the corner with Bainbridge Street. There is a Starbucks Coffee on the ground floor, and the upper floors are currently unoccupied. The surrounding area is predominantly commercial, with a mix of offices and retail units. On the opposite side of New Oxford Street is the Centre Point tower, in which a number of apartments are currently being built. These are considered to be the nearest noise sensitive premises to the proposed plant equipment for the purposes of this assessment.

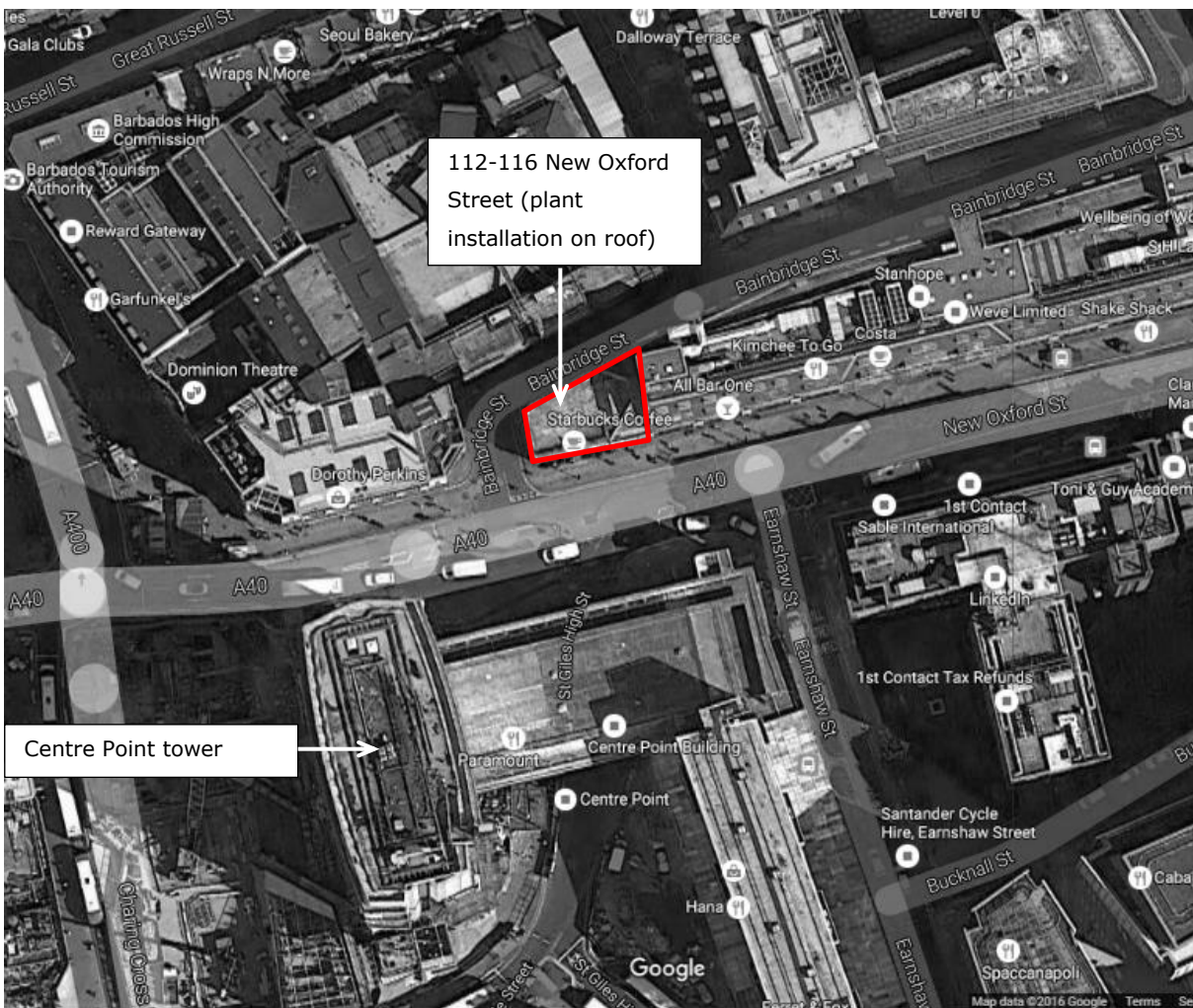


Figure 1: Aerial image of site and surrounding area (courtesy of Google)

2 ASSESSMENT CRITERIA

The site is located within the London Borough of Camden. The Camden Local Development Framework (LDF) sets out the planning criteria for noise and vibration used to determine applications for planning permission in the borough. An extract from Development Policy DP28 which is relevant to the proposed installation is provided below.

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'

Figure 2: Extract from Camden Local Development Framework Development Policy DP28

In summary, this policy requires that the plant emission noise level (L_{Aeq}) at any noise sensitive façade should be at least 5dB lower than the existing background noise level (L_{AF90}), unless the plant noise has certain tonal or impulsive qualities, in which case it should be 10dB below. The policy limits the plant noise to a maximum level of 55dB L_{Aeq} when the background noise level exceeds 60dB L_{AF90} .

The results of the noise survey to determine the existing background noise level are set out in Section 3 below.

3 NOISE SURVEY

An unattended noise survey was undertaken between the 22nd and 23rd November 2016 to establish the existing environmental noise conditions at the site.

3.1 Methodology

All noise measurements were made with a Norsonic 140 precision sound level analyser with a Norsonic weather protection kit. This equipment complies with BS EN IEC 61672 class 1. The meter uses a Nor 1225 free-field response microphone and NOR 1206 microphone pre-amplifier. The sound level meter was field-calibrated at the beginning

and end of measurements with a Nor 1251 sound calibrator, complying with BS EN IEC 60942 class 1. No significant calibration deviation occurred. Details of the equipment are given in Appendix B.

The microphone of the sound level meter was mounted on a tripod at the roof level of 112-116 New Oxford Street. This location is considered to be sufficiently representative of the background noise levels occurring at facades of the Centre Point tower (where plant noise is to be assessed).

The sound level meter was set up to make consecutive 15-minute measurements and left unattended to capture noise data over 24 hours, starting at 13:45 on Tuesday 22nd November 2016.

There was some light wind and rain at the start of the survey period, however the weather conditions are not considered to have had a significant impact on the noise survey results.

3.2 Survey Results

The equipment was attended for a short time at the start and end of the survey period. It was observed that the dominant source of noise at these times were busses and other vehicles on New Oxford Street below. Noise from various construction activities taking place near to the site was also audible at these times.

A time history plot of the 24 hour survey data is presented in Figure 3.

The lowest measured background noise level was 50dB $L_{AF90,15min}$ which occurred at 5:45am. It is proposed to use this level for determining the Local Authority upper noise limit. Although it is not expected that the proposed plant equipment would be operating at this time, noise levels measured during the daytime were affected by construction activity taking place in the area and therefore may not be representative of the typical underlying background noise conditions. This is a conservative approach, as background noise levels in the daytime would normally be expected to be higher, even in the absence of construction activity.

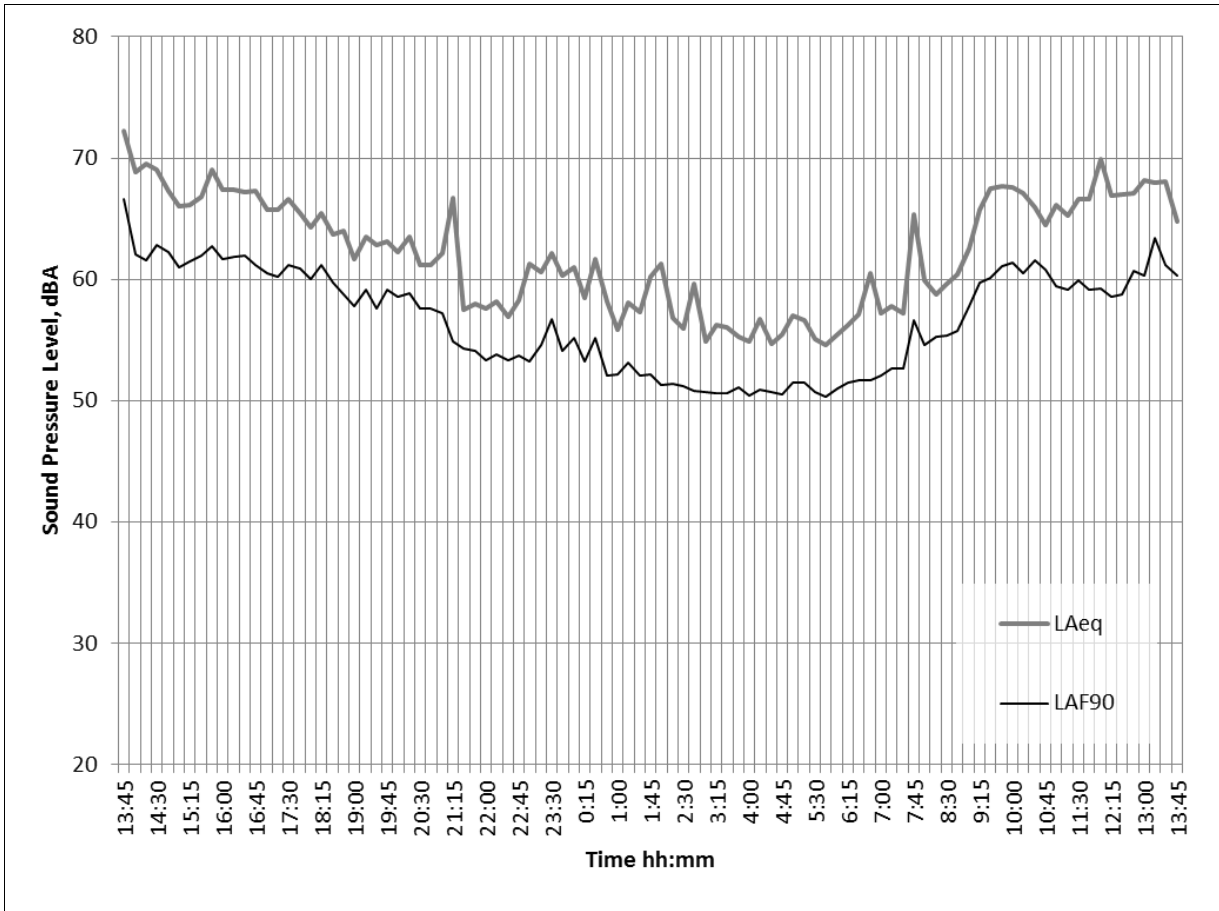


Figure 3: 24-hour noise survey results (free-field)

4 PLANT NOISE ASSESSMENT

4.1 Proposed Equipment

It is understood that the proposed plant equipment will comprise a number of air-source heat pump units, located along the northern edge of the roof area. The precise number of units and their specification are unknown at the time of writing this report. This is the only noise generating plant equipment to be located on the roof.

The distance between the plant equipment and the closest façade of the Centre Point tower (which on the completion of its refurbishment will contain the nearest noise sensitive premises) is at least 34m.

4.2 Noise Emission Limits

The noise levels measured at the survey location are considered to be representative of those occurring at the noise sensitive premises located in the vicinity of the proposed plant installation.

The London Borough of Camden policy requires that plant noise emissions at noise sensitive facades are at least 5dB below the existing background noise, or 10dB below if

the noise has a 'distinguishable, discrete, continuous note' or 'distinct impulses'. Noise emitted by modern air-source heat pumps has a broad-band spectrum without significant tonal components. Their operation is continuous and should not result in noticeable 'bangs, clicks, clatters or thumps'. It is therefore appropriate to apply the threshold at 5dB below background noise.

This sets an upper limit of **45dBA** at 1m from the window of any noise sensitive façade due to the cumulative operation of the operation of the proposed plant equipment.

Taking account of the noise attenuation over this distance, the maximum total sound power level for the equipment is 84dBA ($45\text{dB} + 20\log(34\text{m}) + 8\text{dB} = 84\text{dB}$). This limit applies to the total noise from all of the equipment, i.e. the logarithmic sum of the sound power levels of each item should not exceed 84dBA.

5 SUMMARY

A site noise survey has been carried out to establish existing background noise conditions in the area local to the proposed plant equipment installation. The results of the survey have been used to determine the maximum plant noise level at noise sensitive facades to be in compliance with the Local Authority noise policy. This has been used to calculate a maximum permissible total sound power level for the proposed equipment, based on the distance to the nearest noise sensitive façade.

6 APPENDIX A - SUMMARY OF ACOUSTIC TERMINOLOGY

SOUND PRESSURE LEVEL, SPL or L_p (decibels, dB)

A measure of the instantaneous sound pressure at a point in space. The threshold of hearing occurs at approximately $L_p=0$ dB (which corresponds to a reference sound pressure of $20\mu\text{Pa}$).

$$L_p(\text{dB})=20.\log_{10}(\text{Sound Pressure (Pa)}/20\mu\text{Pa})$$

A-WEIGHTED SOUND PRESSURE LEVEL, L_A (dBA)

A-weighted sound pressure level values are frequency-weighted in a way that approximates the frequency response of the human ear and allows sound levels to be expressed as a single figure value.

Alternative frequency-weightings are C-weighting and Z-weighting.

EQUIVALENT CONTINUOUS A-WEIGHTED SPL, $L_{Aeq,T}$ (dBA)

Energy average of the A-weighted sound pressure level over a time period, T. The level of a notional continuous sound that would deliver the same A-weighted sound energy as the actual fluctuating sound over the course of the defined time period, T.

MAXIMUM A-WEIGHTED SPL, L_{AFMax} (dBA)

Maximum A-weighted sound pressure level measured with fast time weighting.

BACKGROUND NOISE LEVEL, $L_{A90,T}$

The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval ,T, measured using time weighting, and quoted to the nearest whole number of decibels.

7 APPENDIX B - NOISE MONITORING EQUIPMENT DETAILS

The measurements were made with a Norsonic 140 precision sound level analyser. This equipment complies with BS EN IEC 61672 class 1. The meter uses a Nor 1225 free field response microphone and NOR 1206 microphone pre-amplifier.

The sound level meter was field-calibrated at the beginning and end of measurements with a Nor 1251 sound calibrator, complying with BS EN IEC 60942 class 1. No significant calibration deviation occurred.

All equipment was within the BS 7580-1:1997 recommended calibration period of 2 years.

Further details are available on request, including the calibration certificates for the equipment used.