Lloyds Bank
Tottenham Court Road

ENVIRONMENTAL NOISE SURVEY
REPORT 22298/PNA1

For:

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Revision No.	Date	Description
0	10/8/2015	First Issue

1.0 INTRODUCTION

As part of a refurbishment some building services plant is proposed to be installed at the Barclays Bank Tottenham Court Road branch. The plant noise emissions will be subject to the requirements of the Local Authority.

Hann Tucker Associates have therefore been commissioned to undertake a detailed environmental noise survey of the site and propose suitable plant noise emission criteria based on the results of the survey and the requirements of the Local Authority.

The data has been used to assess the proposed plant and subsequently make recommendations to ensure the criteria of the Local Authority are met.

This report presents the survey methodology and findings.

2.0 OBJECTIVES

To establish, by means of detailed 24 hour daytime and night-time fully automated environmental noise monitoring, the existing A-weighted (dBA) L_{90}, L_{eq} and L_{max} environmental noise levels at a selected accessible roof level position at the site.

To measure L_{eq}, L_{90} and L_{max} octave band spectra noise levels for daytime and night-time periods at the measurement position in order to obtain a more detailed description of the noise climate.

Based on the results of the noise survey, and in conjunction with the Local Authority, to recommend suitable plant noise emission criteria and assess proposed plant.

3.0 SITE DESCRIPTION

3.1 Location

The site is located at 133 Tottenham Court Road, London and falls within the London Borough of Camden's jurisdiction. See Location Map below.

Location Map (maps.google.co.uk)

3.2 Description

Barclays Bank in the Tottenham Court Road is part of a ground plus five storey building. The nearest surrounding buildings are mainly offices with some retail usage on the ground floors. See Site Plan below.

Site Plan (maps.google.co.uk)

4.0 ACOUSTIC TERMINOLOGY

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

5.0 METHODOLOGY

The survey was undertaken by Nick Russell MIOA.

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 11:45 hours on Tuesday 4 August 2015 to 11:45 hours on Wednesday 5 August 2015.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period however at the beginning and end of the survey period the wind conditions were calm. The sky was generally clear and sunny. We understand that generally throughout the survey period the weather conditions were similar to this and 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.

5.2 Measurement Position

The noise level measurements were undertaken at one position at the development site. The microphone was located through a ventilation grille on the first floor of the bank and overlooking the rear of the building on the service road which runs off Howland Street.

The position was selected in order to assess the lowest noise levels at the development site for subsequent use in setting plant noise emission criteria and the approximate location is shown on the photo below.

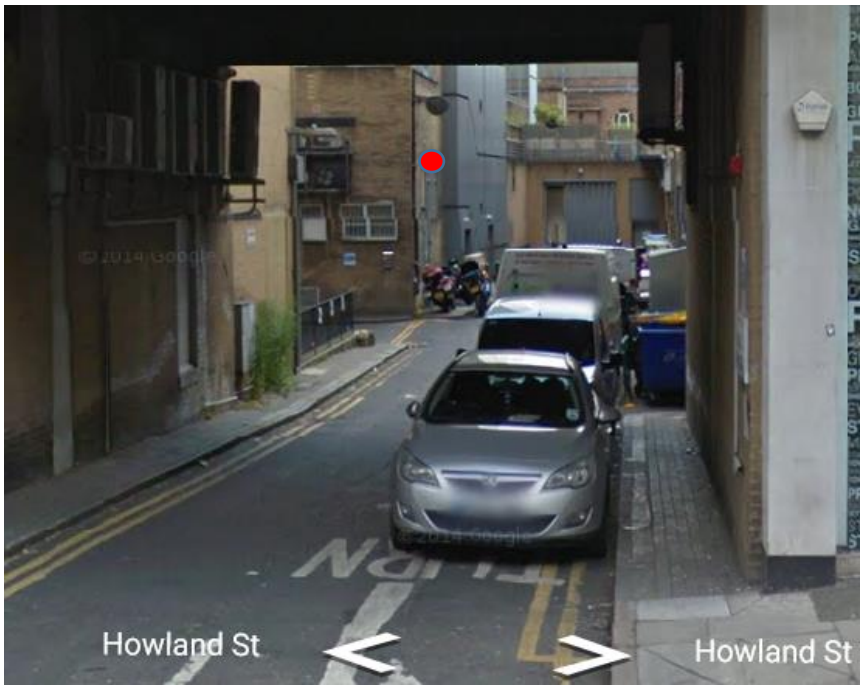


Photo Showing Unmanned Measurement Position (maps.google.co.uk)

5.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Latest Verification
Type 1 Data Logging Sound Level Meter	Larson Davis	824	3533	LD calibration on 29/01/2015
Type 1 ½" Condenser Microphone	PCB	377B02	106047	LD calibration on 29/01/2015
Type 1 Calibrator	Larson Davis	CAL200	0687	LD calibration on 25/03/2015

The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1dB).

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 Larson Davis windshield.

6.0 RESULTS

The results have been plotted on Time History Graph 22298/TH1 enclosed presenting the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} levels at the measurement position throughout the duration of the survey.

The lowest $L_{A90\ (15min)}$ measurements are recorded in the table below:

Lowest Measured $L_{A90\ (15min)}$ (dB re $2x10^{-5}$ Pa)	
Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
54	52

7.0 DISCUSSION OF NOISE CLIMATE

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise sources were noted to be local road traffic.

8.0 PLANT NOISE EMISSION CRITERIA

The site is within the London Borough of Camden and we understand that their requirements are as follows:

> *"Noise levels at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment are in operation. Where it is anticipated that any plant/equipment 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) special attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10dB(A) below the LA90, expressed in dB(A)."*

Based on the above criteria, and the results of the environmental noise survey, the following future plant noise emission criteria should be achieved at 1 metre from the nearest noise sensitive facades based on the minimum measured L_{A90} noise level.

	Noise Emission Limit (dBA)	
Position/Facade	**Daytime (07:00 – 23:00 hours)**	**24 Hours**
Rear of Building	49dBA	47dBA

9.0 PLANT NOISE ASSESSMENT

9.1 Proposed Plant

We understand that the new external condensers are to be installed on the wall of the rear of the building.

The types and noise data for these units is presented in the following table:

Plant Description	Qty	Plant Make	Model Number	Noise Level at 1m (dBA)
External Condensers	2	Mitsubishi	PUHZ-RP50VH4	46
	1		PUHZ-RP125YKA	52
	1		PUHZ-RP100YKA	51
	1		PUMY-112YKM	51
	1		PUHZ-RP35VHA4	46

These condensers are designed to provide comfort cooling for the office areas and our understanding is that they could operate continuously.

9.2 Location of Plant

The condensers are located on the rear wall of the building in the service road. They are replacing the units that are currently installed and some of them can be seen in the photo in Section 5.2 above.

9.3 Location of Nearest Noise Sensitive Windows

The nearest noise sensitive windows to the proposed plant location are those within the office building on the other side of the service road. These windows are at a distance of approximately 10 metres away from the proposed plant.

We have carried out an assessment of the plant noise transmission to these windows as below.

	Calculation
Condenser Sound Pressure Levels at 1m	46/46/52/51/51/46dBA
Cumulative Level of All Units Operating Together	57dBA
Distance Loss 10/1m	-14dB
Calculated Noise Level at Window	**43dBA**

In the above calculations we have assumed that all units are operating together and have a line of sight to an office window. This is the worst case acoustically.

Our calculations therefore indicate that the proposed plant should meet both the day and night time requirements of the Local Authority proposed in Section 8.0 at the nearest noise sensitive window.

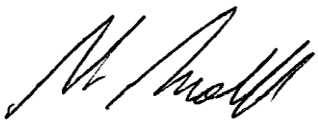
10.0 CONCLUSIONS

A detailed 24 hour daytime and night-time fully automated environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

Plant noise emission criteria have been recommended based on the results of the noise survey and in conjunction with the Local Authority.

An assessment has been carried out to determine the plant noise emissions at the nearest residential noise sensitive commercial and residential windows.

The assessment indicates that the noise levels from the condensers proposed meet the requirements of the Local Authority at the nearest noise sensitive windows and we can see no acoustic reason why this scheme should not be granted planning permission.



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Appendix A

The acoustic terms used in this report are as follows:

dB : Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.

dBA : The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dBA level.

Because of being a logarithmic scale noise 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_{10} & L_{90}: If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and 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 the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.

It is common practice to use the L_{10} index to describe traffic noise, as being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic noise.

L_{eq} : The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

L_{eq} is defined as 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. 1 hour).

The use of digital technology in sound level meters now makes the measurement of L_{eq} very straightforward.

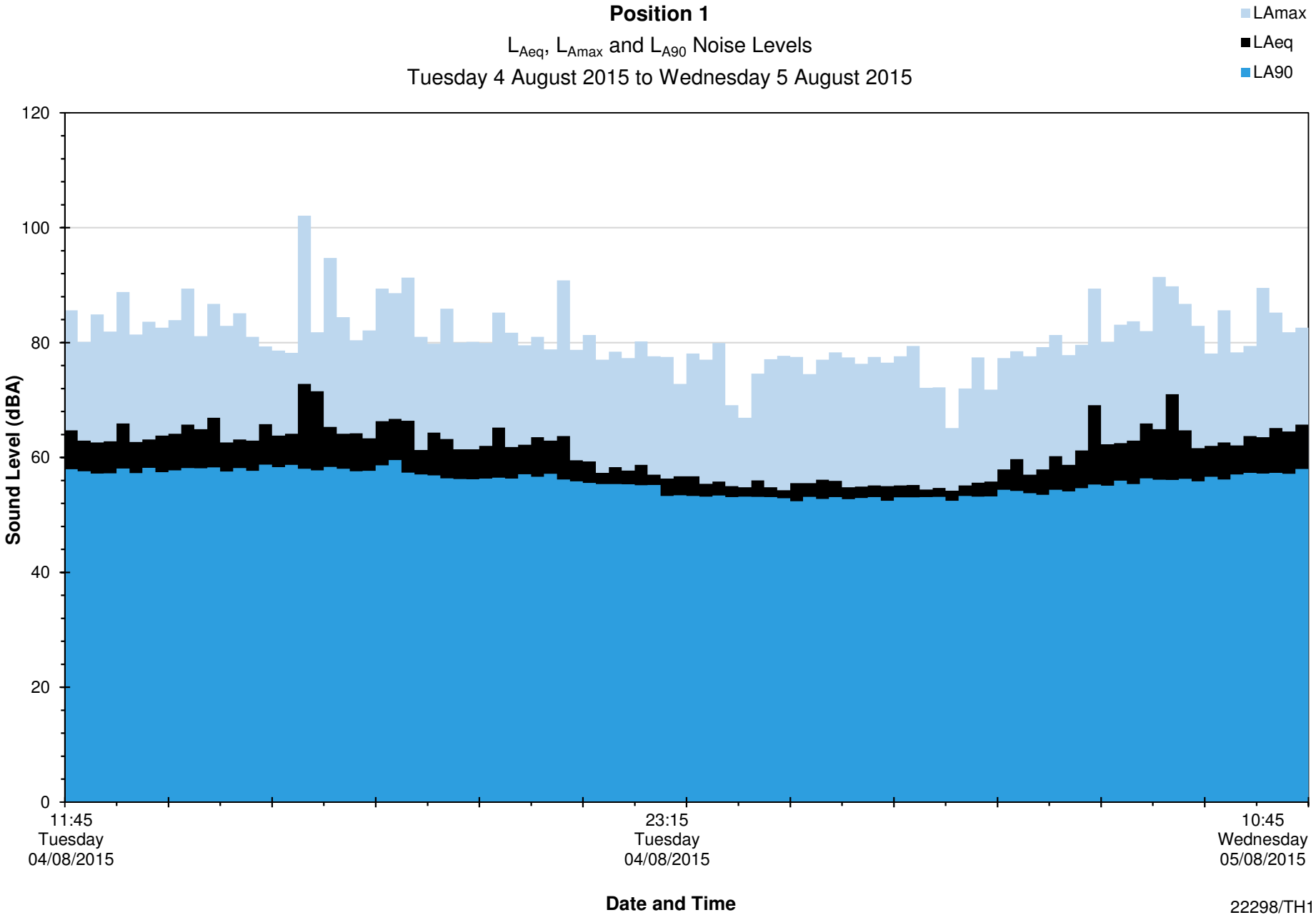
L_{max} : L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Lloyds Bank, Tottenham Court Road

Position 1

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

Tuesday 4 August 2015 to Wednesday 5 August 2015



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