140-146 Camden Street

ENVIRONMENTAL NOISE SURVEY
AND NPPF ASSESSMENT
REPORT 19181/NPPF1-RevA

For :

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Revision No.	Date	Description
RevA	03-06-2014	Change of Date

1.0 INTRODUCTION

It has been proposed to demolish the existing site on 140-146 Camden Street and build a 10-storey mixed use building.

Hann Tucker Associates have been asked to carry out an Environmental Noise Survey to determine to what extent the development meets Camden Council's planning criteria with regards to noise, as laid out in the National Planning Policy Framework (NPPF).

Although the National Planning Policy Framework (March 2012) replaces Planning Policy Guidance 24: Planning and Noise (3 October 1994) it is common currently for Local Authority's to still require noise assessment reports to be undertaken using the methodology detailed in the Planning Policy Guidance 24. This report presents the methodology and findings of our noise survey and PPG24 assessment.

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2.0 OBJECTIVES

To establish by means of a detailed 24 hour survey the existing $L_{Amax,}$ $L_{A10,}$ L_{Aeq} and L_{A90} environmental road, rail and air traffic noise levels at two secure and accessible on-site position, using fully computerised unmanned monitoring equipment.

To establish by means of a detailed 24 hour fully automated noise monitoring, the number of L_{Amax} noise events which exceed 82dBA at the measurement position.

Based on the results of the unmanned survey to undertake a noise assessment to assess the suitability of the proposed development for residential use in accordance with the objectives described in PPG24. The assessment would include where necessary review of outline mitigation proposals.

Based on the results of the noise survey data, to determine the Noise Exposure Category (NEC) the development site in accordance with Planning Policy Guidance (PPG) 24: Planning and Noise.

3.0 SITE DESCRIPTION

3.1 Location

The site is located 140-146 Camden Street and falls within London Borough of Camden's jurisdiction. See Location Map below.

Location Map

3.2 Description

The site is on the corner of Camden Street and Bonny Street. Across Bonny Street and Camden Street are residential properties. To the south is a canal. Subjectively, the dominant noise source is thought to be road traffic on Camden Street.

4.0 ACOUSTIC TERMINOLOGY

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

5.0 METHODOLOGY

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 13:00 hours on Tuesday 14 May 2013 Wednesday 15 May 2013.

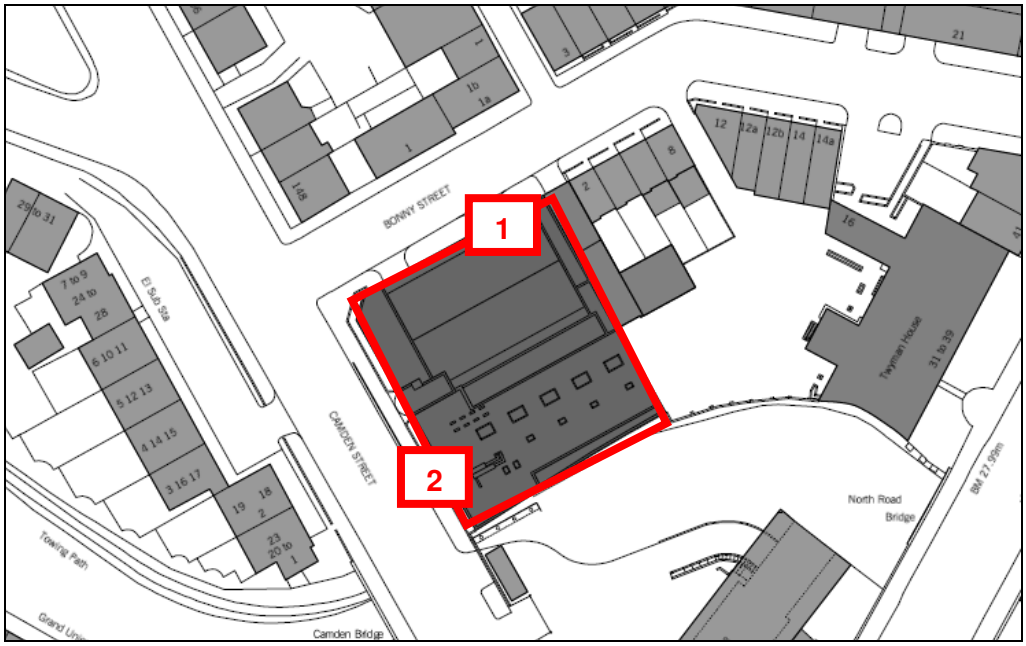
Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the wind conditions were moderate. The sky was generally overcast with some precipitation. We understand that generally throughout the survey period the weather conditions were similar to this. These conditions are considered suitable for obtaining representative measurement results.

Measurements were taken continuously of the A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Positions

The noise level measurements were undertaken at 2No. positions around the development site. The measurement positions are described in the table below.

Position No	Description
1	The sound level meter was located to the north of the site. The microphone was attached to a pole approximately 6 m above ground level and approximately 1m from the façade overlooking Bonny Street.
2	The sound level meter was located to the north of the site. The microphone was attached to a pole approximately 8 m above ground level and approximately 1m from the façade overlooking Camden Street.



Plan showing measurement positions

5.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Latest Verification
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3157	LD calibration on 15/08/2012
Position 1 Type 1 ½" Condenser Microphone	Larson Davis	2541	2470596	LD calibration on 15/08/2012
Position 2 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3533	LD calibration on 14/03/2013
Position 2 Type 1 ½" Condenser Microphone	PCB	377B02	106047	LD calibration on 14/03/2013
Type 1 Calibrator	Larson Davis	CAL200	3082	LD calibration on 21/03/2013

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

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 Graphs 19181/TH1.01 and 19181/TH1.04 enclosed presenting the 15 minute A-weighted (dBA) L_{10}, L_{90}, L_{eq} and L_{max} levels at the measurement position throughout the duration of the survey.

6.1 L_{eq} Noise Levels

In order to compare the results of our survey with suitable guidelines it is necessary to convert the measured $L_{Aeq(15\ minute)}$ noise levels into single figure daytime $L_{Aeq(16\text{-}hour)}$ (07:00-23:00 hours) and night-time $L_{Aeq(8\text{-}hour)}$ (23:00-07:00 hours) levels.

The daytime $L_{Aeq(16\text{-}hour)}$ and night-time $L_{Aeq(8\text{-}hour)}$ noise levels for each position are presented in the Tables below.

Position	Daytime $L_{Aeq(16\text{-}hour)}$	Night-Time $L_{Aeq(8\text{-}hour)}$
1	63dB	56dB
2	71dB	65dB

N.B. The above levels have been corrected for façade reflections where appropriate, for comparison with the free field levels stated in PPG24.

6.2 Night-time L_{max} Results

The following Table presents the number of L_{max} events which exceeded 82dBA during the night-time period.

Time	No of Events	
	Position 1	Position 2
23:00-00:00	0	2
00:00-01:00	0	0
01:00-02:00	0	0
02:00-03:00	0	1
03:00-04:00	0	3
04:00-05:00	0	1
05:00-06:00	0	0
06:00-07:00	0	2

N.B. The above levels have been corrected for façade reflections where appropriate, for comparison with the free field levels stated in PPG24.

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 nearby construction works, traffic noise and a nearby generator unit.

8.0 PPG24 ASSESSMENT

8.1 PPG24 Planning Policy Guidance

Annex 1 of PPG24 states the following:

Noise Exposure Categories for Dwellings

When assessing a proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NECs) the proposed site falls, taking account of both day and night-time noise levels. Local planning authorities should then take into account the advice in the appropriate NEC, as below:

NEC	
A	*Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.*
B	*Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.*
C	*Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.*
D	*Planning permission should normally be refused.*

Recommended Noise Exposure Categories for New Dwellings Near Existing Noise Sources

Noise Levels Corresponding to the Noise Exposure Categories for New Dwellings $L_{Aeq,T}$ dB				
Noise Source	*Noise Exposure Category*			
	A	*B*	*C*	*D*
Road Traffic *07.00 – 23.00* *23.00 – 07.00*	*<55* *<45*	*55 - 63* *45 - 57*	*63 - 72* *57 - 66*	*>72* *>66*
Rail Traffic *0700 – 2300* *2300 – 0700*	*<55* *<45*	*55 - 66* *45 - 59*	*66 - 74* *59 - 66*	*>74* *>66*
Mixed Sources *0700 – 2300* *2300 – 0700*	*<55* *<45*	*55-63* *45-57*	*63-72* *57-66*	*>72* *>66*

In addition to the above, PPG 24 also states that during the night (23:00 - 07:00 hrs):

> *"Sites where individual noise events regularly exceed 82dB L_{Amax} several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq(8\text{-}hour)}$ (except where the $L_{Aeq(8\text{-}hour)}$ already puts the site into NEC D)."*

8.2 Local Authority Discretion

The table in the previous section contains the recommended range of traffic noise levels for each NEC covering daytime and night-time periods. However, paragraph 9 of the main text of PPG24 states:

The table in Annex 1 contains a recommended range of noise levels for each NEC covering day and night-time periods. However, in some cases it may be appropriate for local planning authorities to determine the range of noise levels which they wish to attribute to any or each of the NECs. For example, where there is a clear need for new residential development in an already noisy area, some or all NECs might be increased by up to 3dBA above the recommended level. In other cases, a reduction of up to 3dBA may be justified.

8.3 Measured NECs

With reference to the above noise exposure categories for road traffic noise sources, the measured noise levels fall within the following categories for daytime and night-time periods.

Noise Exposure Category		
Position	**Daytime**	**Night-time**
1	B/C	B
2	C	C

8.4 Discussion

With reference to the noise exposure categories for dwellings, as detailed in Section 8.1, when assessing planning application for sites which fall into NEC B, PPG24 advises noise should be taken into account when determining planning applications, and where appropriate, conditions imposed to ensure an adequate level of protection against noise.

With reference to the noise exposure categories for dwellings, as detailed in Section 8.1, when assessing planning applications for sites which fall into NEC C, PPG24 advises planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure an adequate level of protection against noise.

It should be recognised that PPG24 does not reflect the situation that in London, noise levels and the demand for housing are both high, relative to the country in general. In our experience the majority of proposed residential sites in London fall into NEC C (or D) along at least one boundary. PPG24 unfortunately does not reflect the situation that higher noise levels are expected, and so the guidance is rather conservative.

It is also important to note that PPG24 considers external noise levels. However, given the intensely urban nature of the application site, the internal noise levels should be the overriding consideration in determining suitability for use.

Furthermore purchasers buying a property in London are able to exercise choice and accept a higher degree of noise, especially if acceptable internal noise levels can be achieved, as discussed in the following sections.

For these reasons it is common for planning permission to be granted for sites which partially fall into Noise Exposure Category C.

Paragraph 8 of PPG24 states:

"Categories B and C deal with situations where noise mitigation measures may make development acceptable."

9.0 SUITABLE INTERNAL NOISE LEVELS

PPG24 and the previous sections of this report consider the external noise levels. However noise levels within the proposed dwellings should be the overriding consideration.

9.1 BS 8233

PPG24 states in Annex 6: Paragraph 8 that *"Guidance on suitable internal noise levels can be found in BS 8233: 1987".*

BS 8233: 1987 has been withdrawn and replaced by British Standard 8233: 1999: "Sound insulation and noise reduction for buildings". Section 7.6.1 of BS 8233: 1999 states that reasonable resting and sleeping conditions in living rooms and bedrooms can be achieved by the following target $L_{Aeq,T}$ internal noise levels:

Room Type	$L_{Aeq,T}$	
	Good	Reasonable
Living Room	30dB	40dB
Bedrooms	30dB	35dB

The Standard also states *"For a reasonable standard in bedrooms at night, individual noise events (measure with F time-weighting) should not normally exceed 45dB L_{Amax}."*

9.2 World Health Organisation

The World Health Organisation document on "Guidelines for Community Noise" states the following guideline values for community noise in specific environments.

Specific Environment	Critical Health Effect(s)	L_{Aeq}	$L_{Amax,fast}$
Dwelling, indoors	Speech intelligibility and moderate annoyance	35dB	-
Inside Bedrooms	Sleep disturbance, night-time	30dB	45dB

The document also states *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dBA L_{Amax} more than 10-15 times per night, (Vallet & Varnet 1991)."*

The above levels are however the subject of much controversy, as indicated by one of the feature articles in the January/February 2003 edition of the Institute of Acoustics' publication.

In our opinion the above criteria for bedrooms should thus be regarded as preferred, rather than mandatory maxima to be achieved in all cases.

9.3 Proposed Criteria

On the basis of the above we would propose the following internal noise levels be adopted as <u>minimum</u> design targets in the <u>worst</u> affected dwellings.

Room Type	Period	Criterion
Living Areas	Daytime (07:00-23:00 hours)	40dB $L_{Aeq,\ 16hr}$
Bedrooms	Night-time (23:00-07:00 hours)	35dB $L_{Aeq,\ 8hr}$

The above levels correspond to "reasonable", as defined in BS 8233. If these criteria are adopted as <u>minimum</u> standards for <u>worst</u> affected dwellings, the <u>typical</u> levels in <u>typical</u> flats will approach, and in many cases exceed, "good" as defined in BS 8233.

Note: The criteria termed “reasonable” in BS8233: 1999 would generally be considered to be pretty stringent and acceptable. It would in fact be fair to substitute the word “reasonable” for “acceptable”. To expect “good” in the worst case dwellings would thus be consistent with BS 8233: 1999. If the worst case was designed to “good” this would lead to “over design” for other dwellings – which could be undesirable for various reasons (including cost and acoustic privacy between dwellings).

If planning permission is granted, planning conditions should be imposed to ensure an adequate level of protection against external noise, and the above criteria would form a reasonable basis for a condition.

10.0 MITIGATION MEASURES

Provision exists to provide additional sound insulation as required. The following noise mitigation measures are proposed:

- The external envelope of the new residences will incorporate suitably specified glazing and ventilation, so as to achieve the BS 8233 criteria summarised above.

At this stage of the design scheme the precise types of window to be used is not known. Nor have selections of acoustic vents been made.

The Local Planning Authority would expect to be provided with details of the sound insulation treatments when available. Therefore in granting consent it would be appropriate for planning condition to be imposed along the following lines, based on example condition 1 drawn from PPG24:

Construction work shall not begin until a scheme for protecting the dwellings against noise from road traffic has been submitted to and approved by the Local Planning Authority; for each applicable dwelling all works which form part of the scheme for that dwelling shall be completed before the dwelling is occupied.

11.0 ACHIEVABLE INTERNAL NOISE LEVELS

We have predicted the levels that would be achievable in the worst-case dwellings closest to the dominant noise source.

Typical noise reduction of a dwelling façade with windows set in brick/block wall.

Difference Between External and Internal Noise Levels			
Noise Source	**Single Glazing**	**Thermal Double Glazing**	**Secondary Glazing**
Road Traffic	31dBA	36dBA	37dBA
Civil Aircraft	30dBA	35dBA	38dBA
Military Aircraft	32dBA	38dBA	42dBA
Diesel Train	31dBA	35dBA	38dBA
Electric Train	33dBA	39dBA	44dBA

A simple assessment based on the above indicates the following noise levels may be expected within the proposed worst case dwellings with double glazing.

Day-Time $L_{Aeq(16\text{-}hour)}$ dBA	**Night-Time $L_{Aeq(8\text{-}hour)}$**
38 dBA	32 dBA

These predicted worst case internal noise levels meet the proposed criteria. It is thus demonstrated that acceptable internal noise levels are achievable.

13.0 CONCLUSIONS

A detailed 24 hour environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site.

From the measured environmental noise levels the corresponding noise exposure category of the site has been determined.

The site falls into Noise Exposure Category C. With reference to the noise exposure categories for dwellings, noise should be taken into account when determining planning applications and, where appropriate conditions imposed to ensure an adequate level of protection against noise.

Appropriate internal noise criteria have been proposed. These are achievable using conventional constructions.

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Appendix A

The acoustic terms used in this report are explained below:

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.

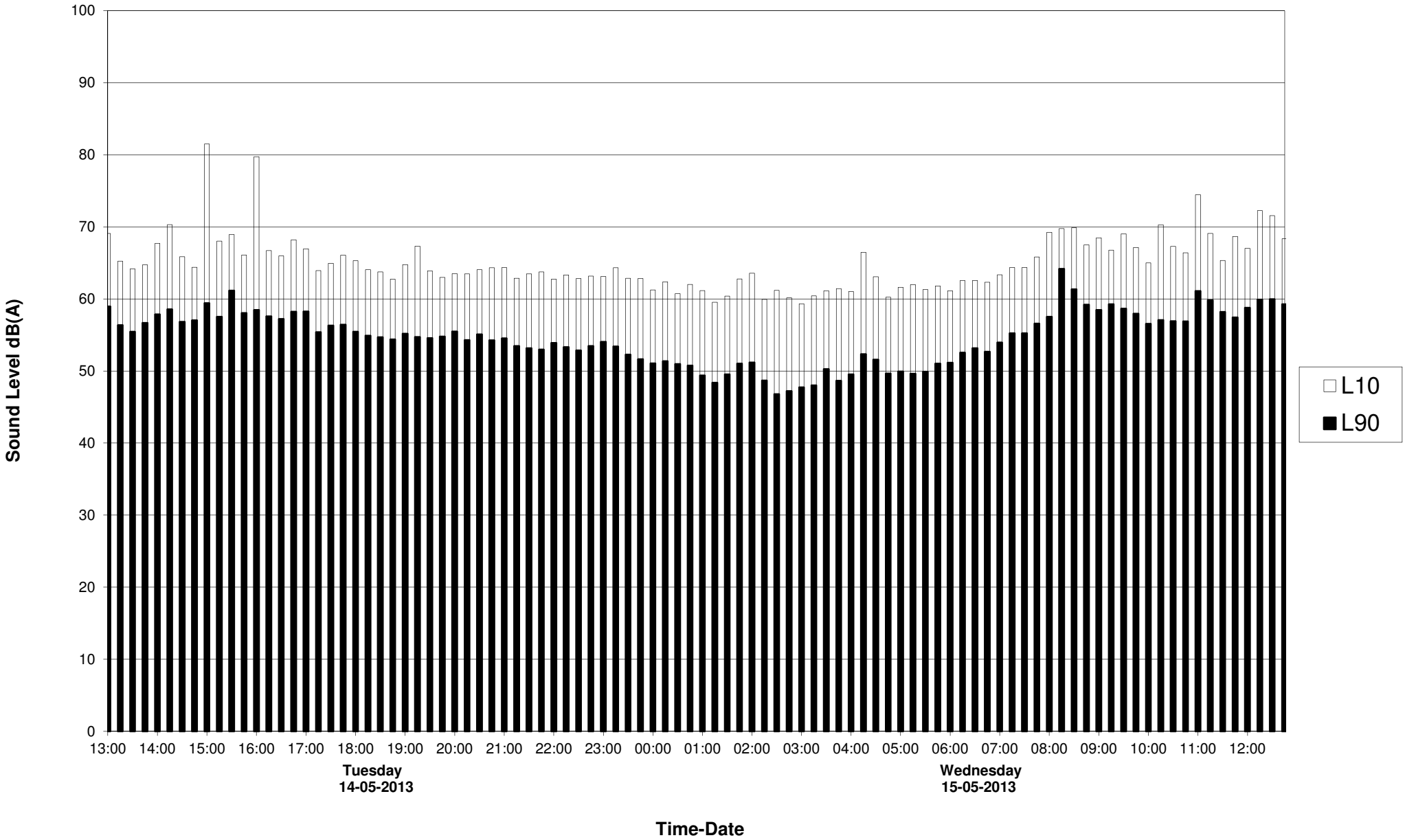
L_{eq} : The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

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.

140-146 Camden Street (Position 1 - North)
L_{A10} and L_{A90} Noise Levels
Tuesday 14 May 2013 to Wednesday 15 May 2013



Time History Graph 19181/TH1.01

140-146 Camden Street (Position 1 - North)
L_{Aeq} and L_{Amax} Noise Levels
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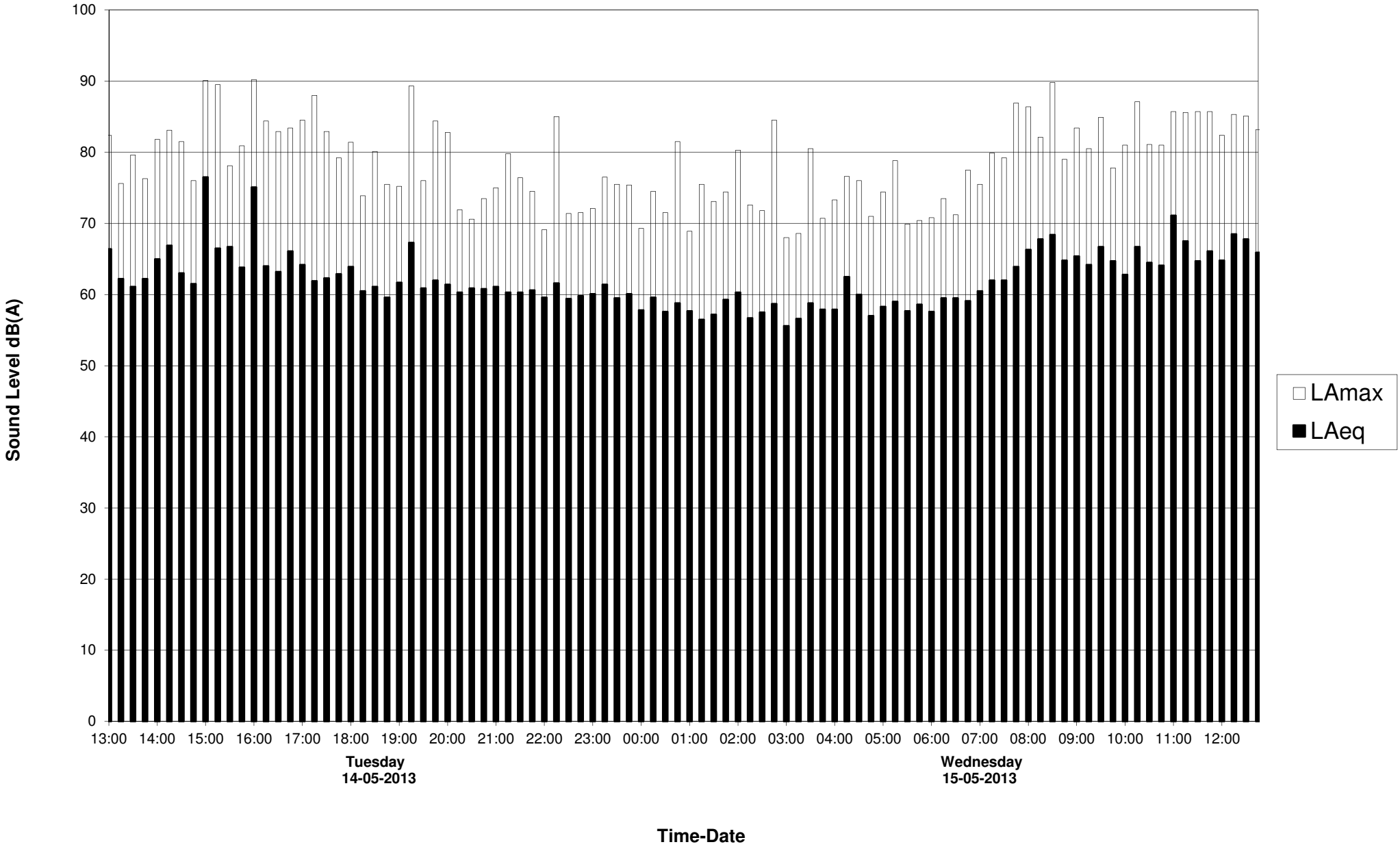

Time History Graph 19181/TH1.02

140-146 Camden Street (Position 2 - West)
L_{A10} and L_{A90} Noise Levels
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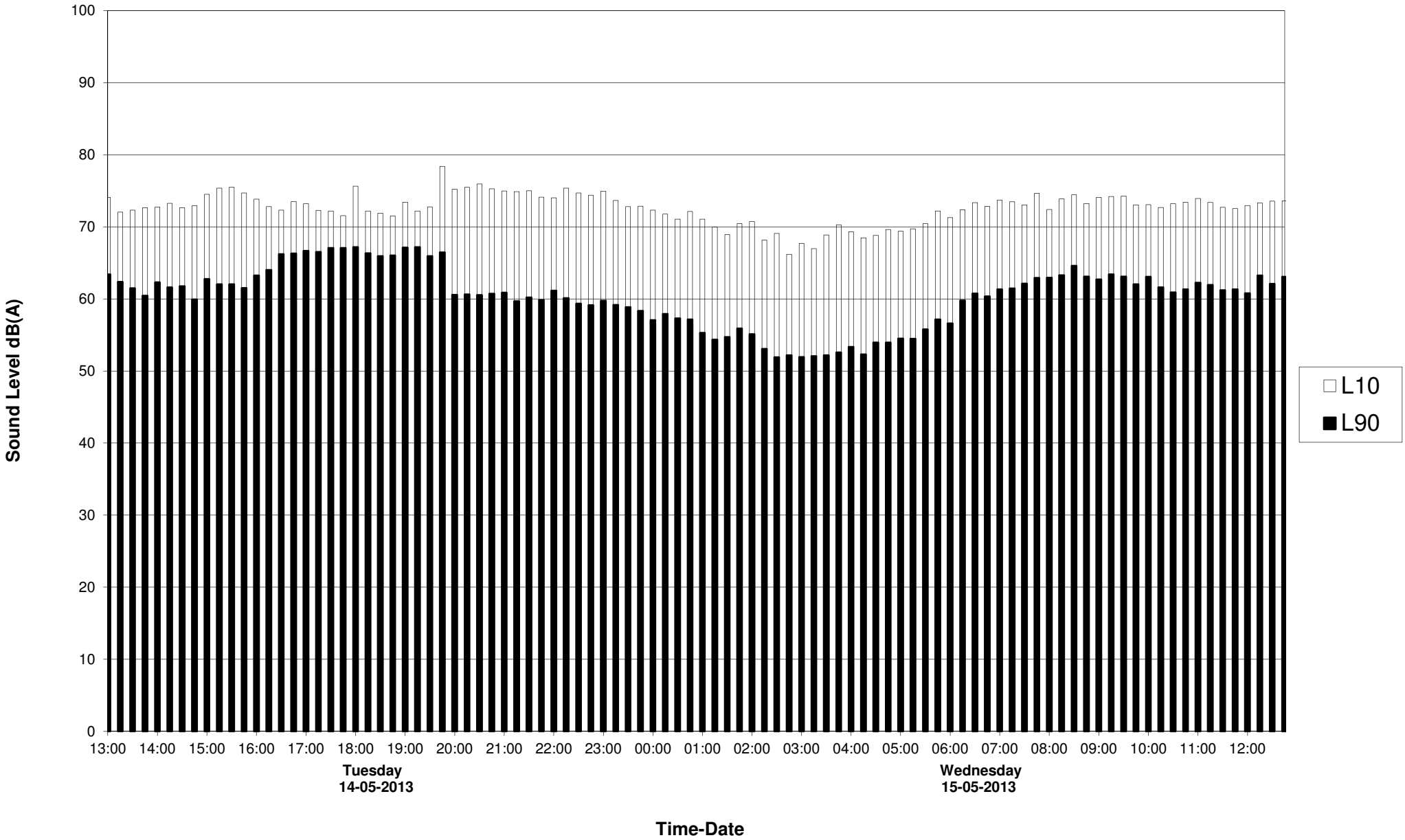

Time History Graph 19181/TH1.03

140-146 Camden Street (Position 2 - West)
L_{Aeq} and L_{Amax} Noise Levels
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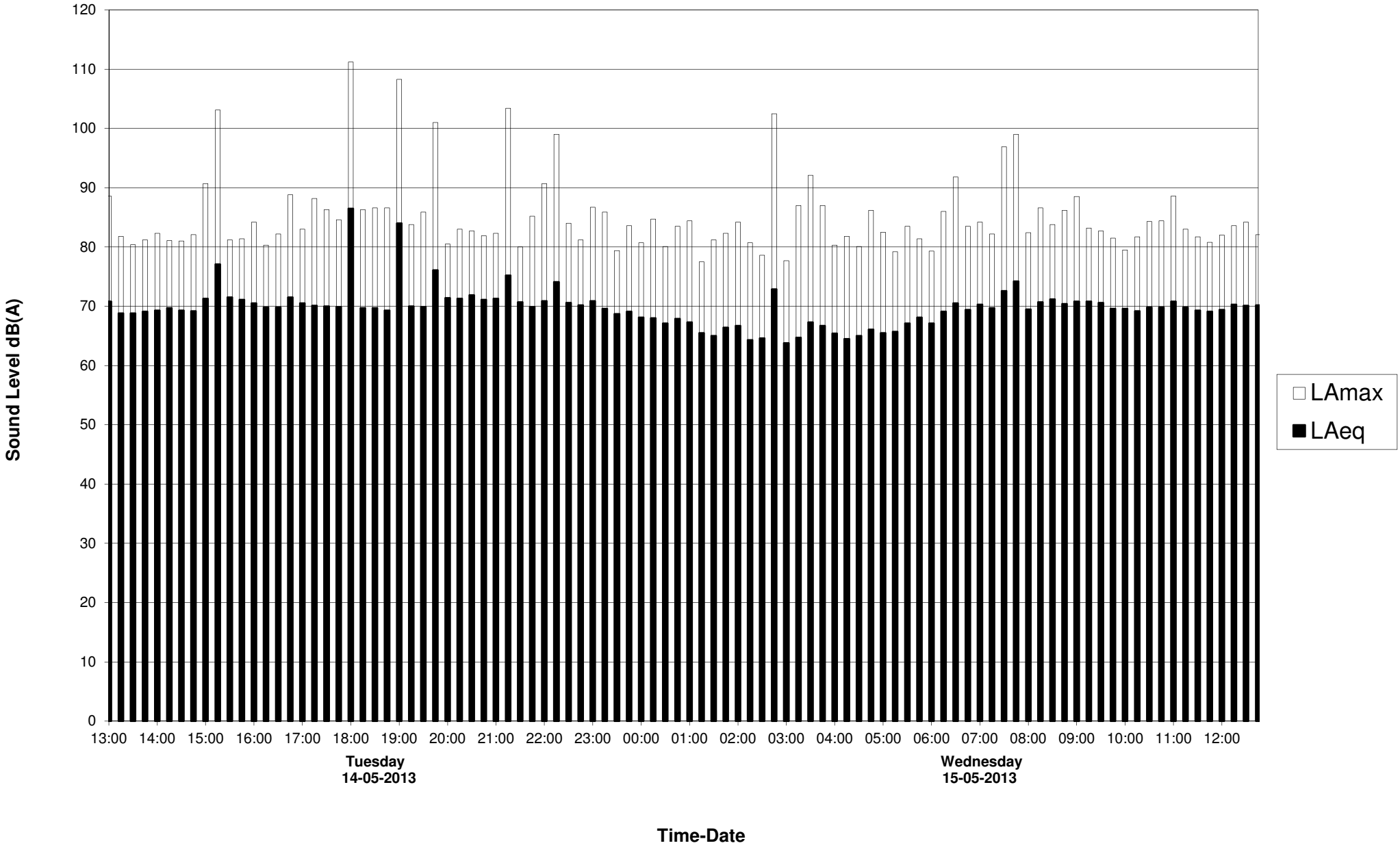

Time History Graph 19181/TH1.04