

**184-192 Drummond Street
Kings Cross
London**

**Environmental Noise Survey and
Plant Noise Assessment Report**

24651/PNA1

8 September 2017

For:
Wates
14th Floor
One Euston Square
40 Melton Street
London
NW1 2FD



Hann Tucker Associates


Consultants in Acoustics Noise & Vibration

Head Office: Duke House, 1-2 Duke Street, Woking, Surrey, GU21 5BA (t) +44 (0) 1483 770 595
Manchester Office: First Floor, 346 Deansgate, Manchester, M3 4LY (t) +44 (0) 161 832 7041
(w) hanntucker.co.uk (e) enquiries@hanntucker.co.uk



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Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	04/08/2017	-	Jack Bowden Junior Assistant Consultant	Andrew Fermer Director BSc(Hons), MIOA
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1	08/09/2017	Updated to include latest Local Authority Requirements		Andrew Fermer Director BSc(Hons), MIOA

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1.0 Introduction

New items of building services are proposed to be installed at 184-192 Drummond Street. Hann Tucker Associates have therefore been commissioned to undertake an environmental noise survey and plant noise assessment for planning purposes.

2.0 Objectives

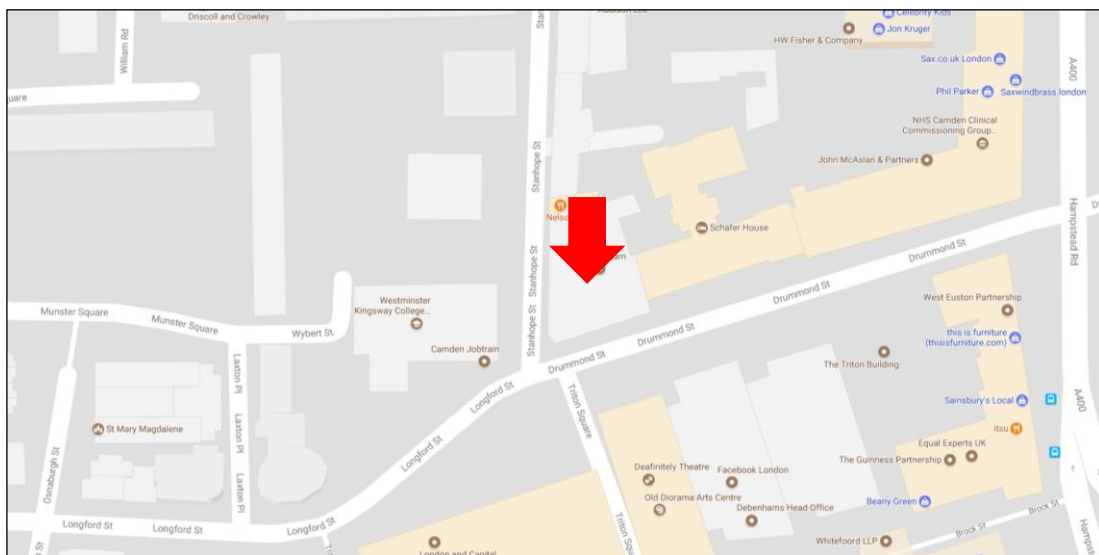
Establish by means of a detailed survey, the existing L_{A10} , L_{A90} , L_{Aeq} and L_{Amax} environmental road, rail and air traffic noise levels at roof level, using fully computerised unmanned monitoring equipment if required.

Present the above environmental noise data, with recommendations made for daytime and night-time plant noise emission limits, following liaison with the Local Authorities.

3.0 Site Description

3.1 Location

The site is located at 184-192 Drummond Street, Kings Cross, London, NW1 3HP. The location is shown in the Location Map below.



Location Map (Map Data © 2017 Google.)

The site falls within the jurisdiction of the London Borough of Camden Council.



3.2 Description

The site consists of ground plus 4 storeys and is bordered by Drummond Street to the south, Stanhope Street and a residential tower block to the west, commercial properties to the north, and student halls to the east. Surrounding buildings range from ground plus 3 to ground plus 6 storeys. The dominant noise source was traffic flow and pedestrian thoroughfare on Drummond Street. The nearest, potentially worst affected, noise sensitive receptor is the block of flats to the west of the site.

The site is shown in the Site Plan below.



Site Plan (Imagery © 2017 The GeoInformation Group, Map Data © 2017 Google.)

4.0 Acoustic Terminology

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

5.0 Acoustic Standards and Guidelines

5.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010. The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which is to:

“Promote good health and a good quality of life through the effective management of noise



within the context of Government policy on sustainable development.”

That vision is supported by the following aims which are reflected in three of the four aims for planning policies and decisions in paragraph 123 of the NPPF (see paragraph 8.2 (b) below):

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledge in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three aims listed in paragraph (b) above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *“all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development.”* The final aim envisages pro-active



management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

5.2 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) was published in March 2012 and replaced the previous national planning guidance document Planning Policy Guidance 24: *Planning and Noise* (PPG24).

The main reference to noise within the NPPF is at paragraph 123, reproduced below:

“123. Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts²⁷ on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts²⁷ on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;²⁸ and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

The reference numbers 27 and 28 point respectively to the Explanatory Note to the NPSE and the provisions of the Environmental Protection Act 1990 *“and other relevant law”*.

The spirit of the Localism Act and the NPPF would suggest that of the guidelines cited, it is guidelines adopted as policy by the Local Planning Authority (if such exist) that should prevail, at least until the Government publishes relevant technical guidance under the NPPF.

5.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at <http://planningguidance.planningportal.gov.uk/blog/guidance/>. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not



provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Perception	Examples of Outcomes	Increasing effect level	Action
Not noticeable	No effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
		Lowest Observed Adverse Effect Level	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

5.4 Local Authority Requirements

The site falls within the London Borough of Camden. We understand the London Borough of Camden’s advice relating to noise emissions from air conditioning plant is as follows:

“Noise levels at a point 1 metre external to sensitive facades shall be at least 10dB(A) less than the existing background measurement (L_{A90}), 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 15dB(A) below the L_{A90} , expressed in dB(A)".

5.5 BS 4142:2014

When setting plant noise emission criteria reference is commonly made to BS 4142: 2014 "*Methods for rating and assessing industrial and commercial sound*".

BS 4142 states that: "*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs*". *An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:*

- "*Typically, the greater this difference, the greater the magnitude of the impact.*"
- "*A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*"
- "*A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*"
- "*The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*"

The determination of the "rating level" and the "background level" are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to "No Observed Effect Level" as defined in the Noise Policy Statement for England.

5.6 World Health Organisation Guidelines on Community Noise

BS8233:2014 is based upon the current World Health Organisation (WHO) guidance "*Guidelines on Community Noise*". A summary of the noise guidelines relevant to the proposed



scheme is presented in the table below.

Residential Environment	Critical Health Effect(s)	L _{Aeq}	L _{AFmax}	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

These WHO guidelines are based, in almost all cases, on the lower threshold below which the occurrence rates of any particular effect can be assumed to be negligible.

5.7 British Standard BS8233: 2014

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” provides guidance for the control of noise in and around buildings.

BS8233:2014 Section 7.7.2 titled “Internal ambient noise levels for dwellings” states:

“In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	Location	Desirable Internal Ambient Criteria	
		07:00 – 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB L _{Aeq,16hour}	-
Dining	Dining Room/Area	40 dB L _{Aeq,16hour}	-
Sleeping (Daytime Resting)	Bedroom	35 dB L _{Aeq,16hour}	30 dB L _{Aeq,8hour}

5.8 Statutory Noise Nuisance

There is no quantitative definition of statutory noise nuisance. It is generally accepted however, that if the plant noise level is at least 5dB (or 10dB if tonal) below the minimum background L_{90(15minutes)} at 1m from the nearest noise sensitive window, then the risk of a statutory noise nuisance is avoided. By adopting this as a design criterion the guidance contained in BS 4142:2014 should also be complied with.



6.0 Survey Methodology

6.1 Procedure

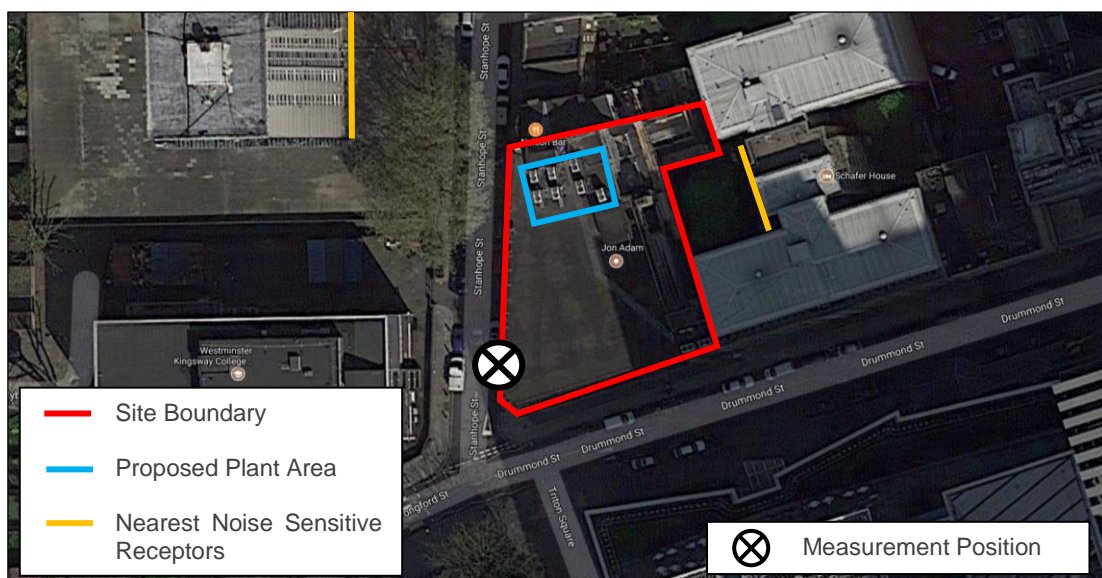
Fully automated environmental noise monitoring was undertaken from approximately 16:00 hours on Wednesday 2 August to 16:00 hours on Thursday 3 August.

During the periods we were on site the wind conditions were *calm and the sky was generally overcast*. We understand that generally throughout the survey period the weather conditions were dry with occasional light showers. 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.

6.2 Measurement Position

The microphone was attached to a pole approximately 25 metres above ground level on the western façade of the building. This microphone was at least 1 metre from reflecting surfaces.



Plan Showing Unmanned Measurement Positions (Imagery © 2017 The GeoInformation Group, Map Data © 2017 Google.)



6.3 Instrumentation

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

Description	Manufacturer	Type	Serial Number	Calibration
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3444	Calibration on 16/05/2017
Position 1 Type 1 ½" Condenser Microphone	PCB	377B02	122885	Calibration on 16/05/2017

The sound level meter, including the extension cable, was calibrated prior to and on completion of the surveys. 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 windshield.

7.0 Results

The results have been plotted on Time History Graph 24651/TH1.1-1.2 enclosed, presenting the 15 minute A-weighted (dBA) L₁₀, L₉₀, L_{max} and L_{eq} noise levels at the measurement position throughout the duration of the survey.

The lowest L_{A90 (15 min)} measurement recorded during the survey is presented in the table below:

Lowest Measured L _{A90(15min)} Background Noise Level (dB re 2 x 10 ⁻⁵ Pa)		
Daytime (07:00 – 23:00) Hours	Night-Time (23:00 – 07:00) Hours	24 Hours
50 dBA	47 dBA	47 dBA

8.0 Discussion Of Noise Climate

During the periods we were on site the dominant noise sources was noted to be traffic flow and pedestrian thoroughfare on Drummond Street.



9.0 Plant Noise Emission Criteria

The site falls within the London Borough of Camden. We understand the London Borough of Camden's advice relating to noise emissions from plant is as follows:

"Noise levels at a point 1 metre external to sensitive facades shall be at least 10dB(A) less than the existing background measurement (L_{A90}), 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 15dB(A) below the L_{A90} , expressed in dB(A)".

In order to meet the above advice, noise emissions from the proposed plant should not exceed a level of 10dB below the lowest measured $L_{A90(15min)}$. Therefore, based on the results of the noise survey and the advice above, we recommend the following plant noise emission levels to be achieved with all plant running simultaneously at 1m external to the nearest noise sensitive façade.

Plant Noise Emission Criteria (dBA re:2x10 ⁻⁵ Pa)		
Daytime (07:00 – 23:00 hours)	Night Time (23:00 – 07:00 hours)	24 Hours
40 dBA	37 dBA	37 dBA

It should be noted that the above criteria are subject to final approval by the London Borough of Camden.

10.0 Approximate Plant Noise Emission Limits

We have not considered the residential dwellings to the east of the building as the worst case receptor as they are screened from the plant and compliance with the overlooking tower to the west should ensure compliance to both. As such, the following section presents our calculations of atmospheric plant noise emission limits from the plant, in order that the requirements of the local authority as presented in Section 9.0 above are met.



11.0 Plant Noise Impact Assessment

We understand the proposed plant comprises the following

Plant Description	Location	Qty	Plant Make	Model Number
CU01	Roof, as indicated on AMD drawing M-R01	1	Toshiba	MMY-MAP1204FT8-E
CU02		1	Toshiba	MMY-MAP0804FT8-E
CU03		1	Toshiba	RAV-SP804ATP-E
CU04		1	Toshiba	RAV-SP404ATP-E

11.1 Plant Noise Data

We understand the manufacturer's noise data for the aforementioned plant to be as follows:

Plant Description	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at 1 metre at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
CU01*	64	66	60	60	57	52	46	38	62
CU02*	59	61	55	55	52	47	41	33	57
CU03	50	52	46	46	43	38	32	24	48
CU04	46	54	47	44	40	38	28	24	45

*manufacturer's single figure supplied based on typical spectrum

11.2 Plant Noise Impact Assessment

The following table summarises our predictions of atmospheric noise emissions from CU01 and CU02 to the nearest noise sensitive residential window.

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m, CU01	64	66	60	60	57	52	46	38	62
Sound Pressure Level at 1m, CU02	59	61	55	55	52	47	41	33	57
Cumulative Sound Pressure Levels a 1m	65	67	61	61	58	58	47	39	64
Distance Correction, 40m	-29	-29	-29	-29	-29	-29	-29	-29	
Calculated Noise Level at Receptor	36	38	32	32	29	29	18	10	35

The following table summarises our predictions of atmospheric noise emissions from CU03 and



CU04 to the nearest noise sensitive residential window.

	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Sound Pressure Level at 1m, CU03	50	52	46	46	43	38	32	24	48
Sound Pressure Level at 1m, CU04	45	52	46	41	39	38	28	22	45
Cumulative Sound Pressure Levels a 1m	51	55	49	47	45	41	34	26	50
Distance Correction. 34m	-26	-26	-26	-26	-26	-26	-26	-26	
Calculated Noise Level at Receptor	25	29	23	21	19	15	8	0	24

The cumulative predicted level from all 4No. units at the nearest noise sensitive receiver is therefore 35dBA.

Our calculations indicate that the proposed plant should be capable of achieving the requirements of the Local Authority outlined in Section 9.0 for operation over a 24 hour period (the predicted level being 2dB below the Local Authority criteria).

12.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing noise levels.

Plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the Local Authority's requirements.

Assessment of the proposed plant indicates that the requirements of the Local Authority should be met.

Appendix A

The acoustic terms used in this report are defined as follows:

dB Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The _A subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that 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_{90,T} L₉₀ is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

L_{eq,T} L_{eq,T} is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

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.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2 x 10⁻⁵ Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10⁻¹² W).

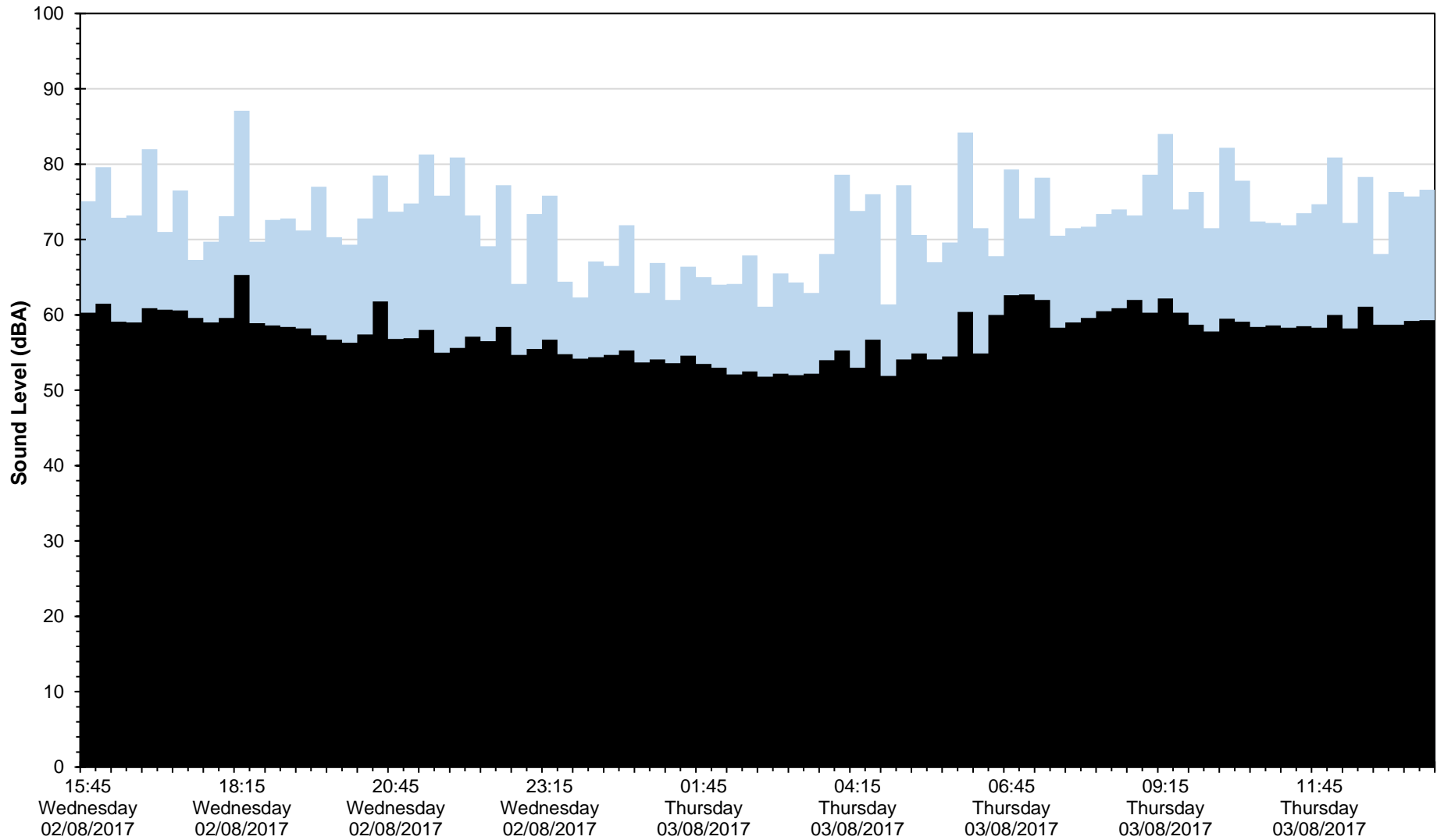
184-192 Drummond Street

Eastern Façade

L_{Aeq} and L_{Amax} Noise Levels

■ L_{Amax} ■ L_{Aeq}

Wednesday 2 August 2017 to Thursday 3 August 2017



Date and Time

24651/TH1.1

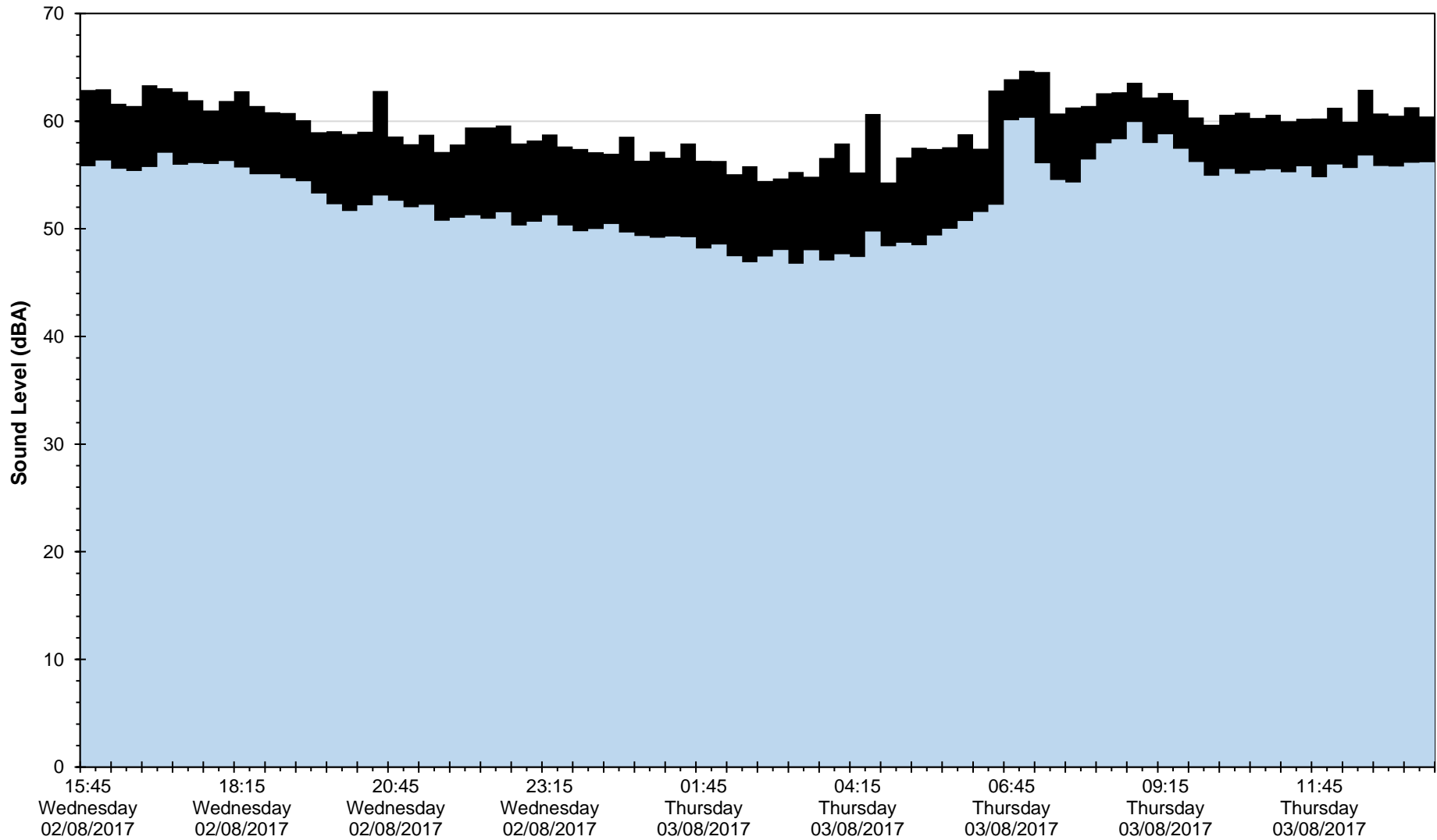
184-192 Drummond Street

Eastern Façade

L_{A10} and L_{A90} Noise Levels

■ LA10 ■ LA90

Wednesday 2 August 2017 to Thursday 3 August 2017



Date and Time

24651/TH1.2