REIT CREATE LTD
225 KENTISH TOWN ROAD, ,
LONDON

NOISE ASSESSMENT

JANUARY 2016

the journey is the reward

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1 Introduction

1.1 Mayer Brown Ltd has been appointed by Create REIT Limited to undertake a noise impact assessment in relation to a planning application seeking the conversion and change of use of 225 Kentish Town Road. The location of the proposed development is illustrated in **Figure 1.1** below.

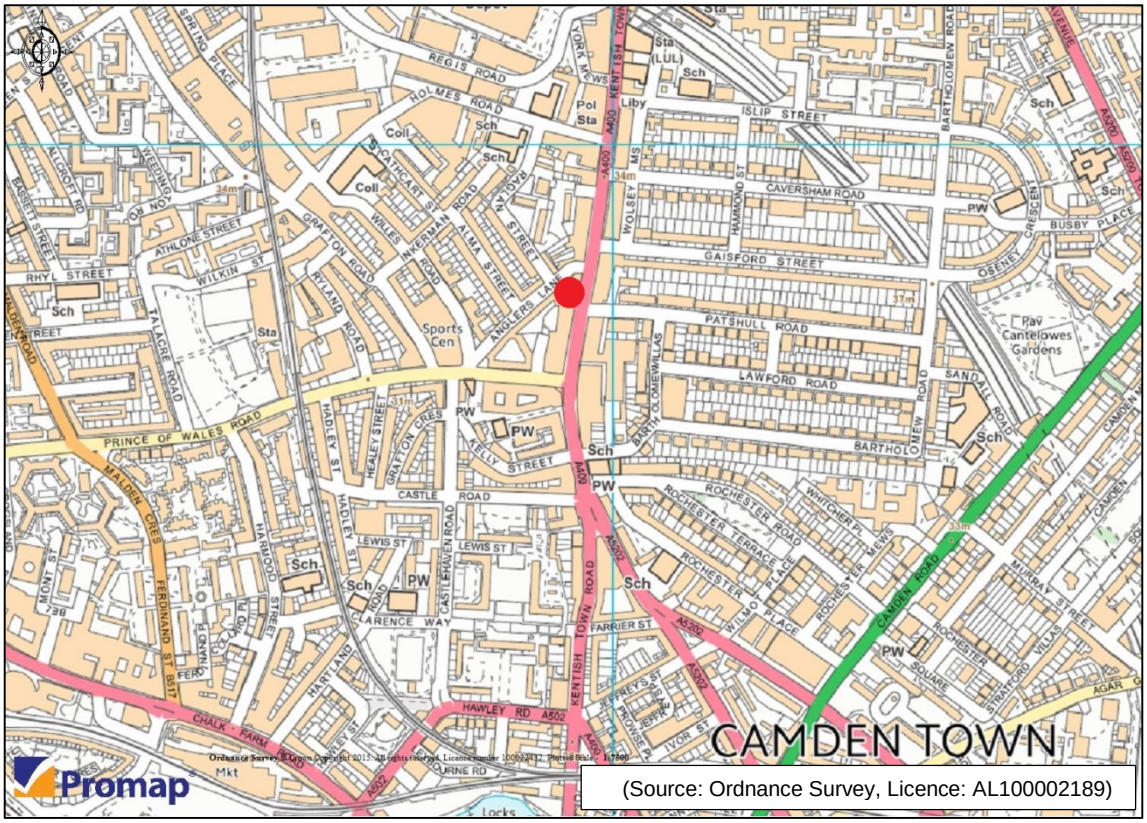


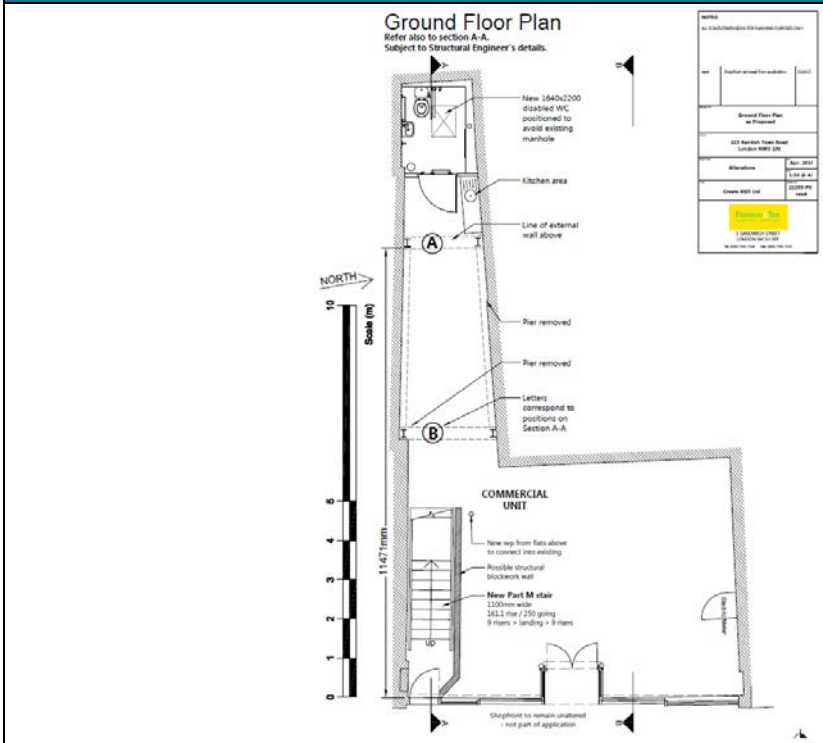
Figure 1.1: Site in Relation to the Local Highway Network

1.2 The Application Site is located in a mixed-use area bounded by Kentish Town Road to the east and Anglers Lane to the west. The site adjoins existing commercial uses - a Nando's Restaurant to the north and a Lidl Supermarket to the south – as illustrated in **Figure 1.2** below.

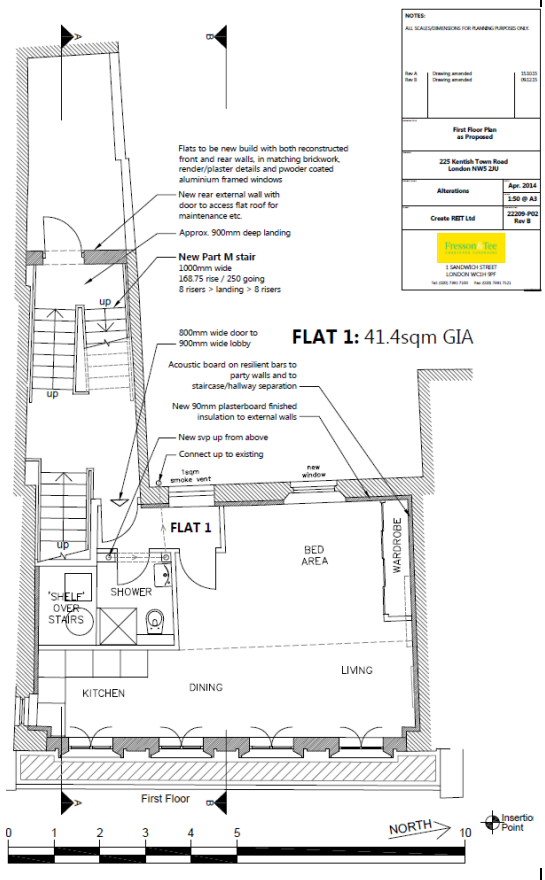
Figure 1.2: Existing Site Layout

1.3 The proposed development seeks the conversion 225 Kentish Town Road to provide with 4 new residential flats from 1st to 4th floor elevation and 1 commercial unit on the ground floor (which is to retain its current A2 use). The proposed floor plans are shown in **Figure 1.3**

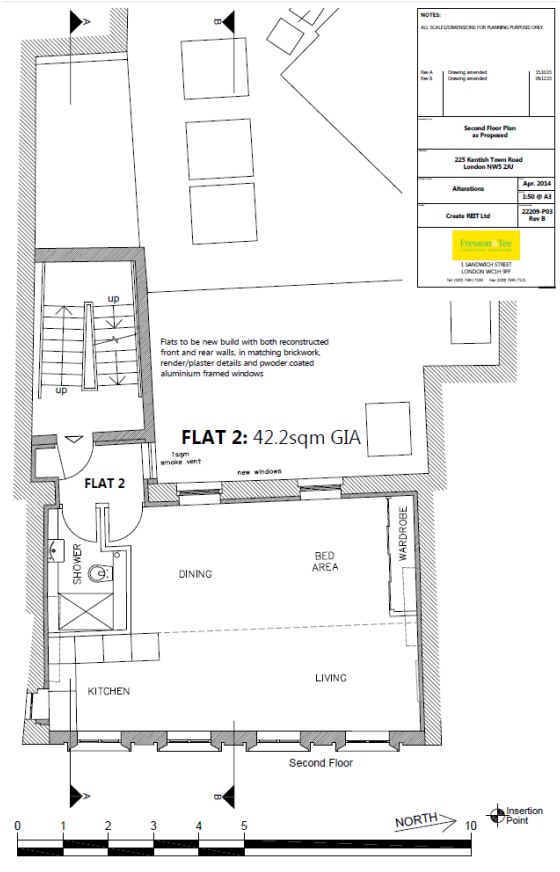
Proposed Ground Floor Plan



Proposed 1st Floor Plan



Proposed 2nd Floor Plan



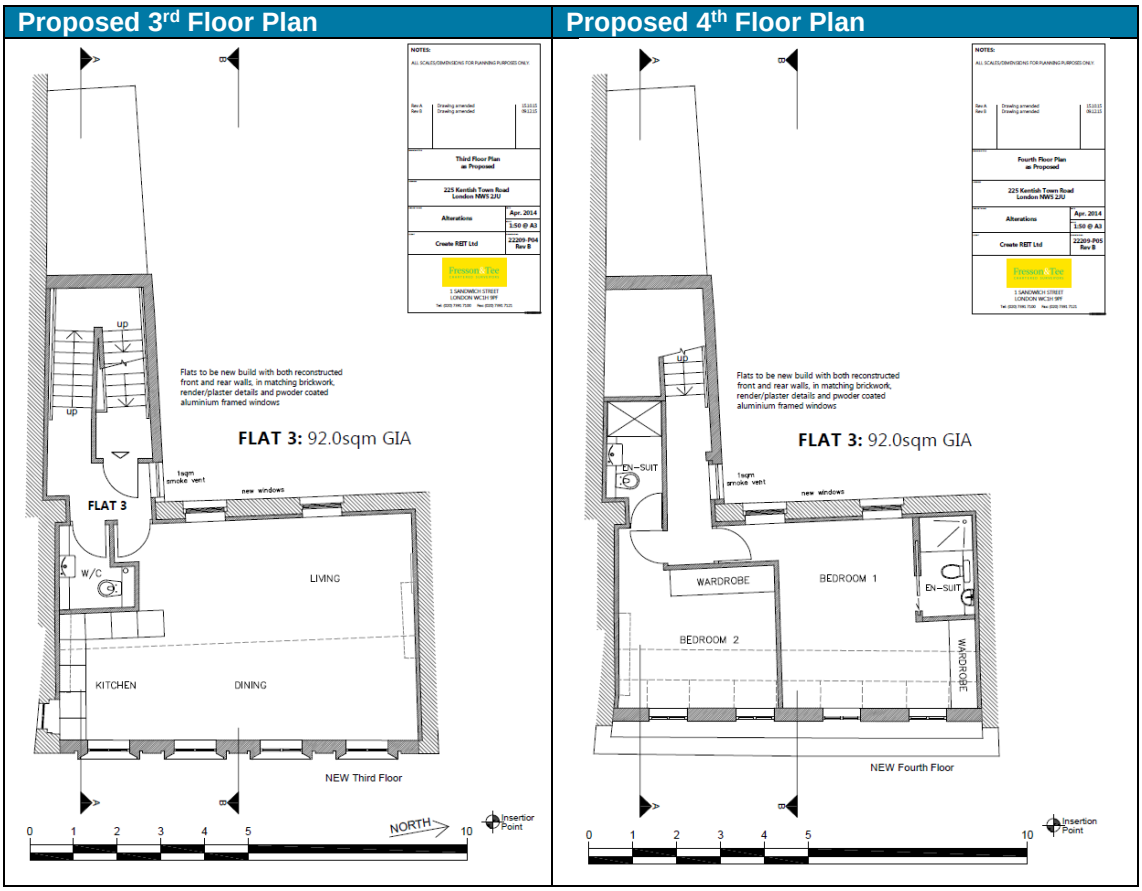


Figure 1.3: Proposed Floor Plans

1.4 A glossary of the acoustic terminology used in this report is given in **Appendix A**.

2 Planning Policy Context

2.1 This assessment takes account of the following national, regional and local planning and industry standard design guidance.

National Policy

National Planning Policy Framework, (NPPF, 2012)

2.2 The *"National Planning Policy Framework"* (NPPF) sets out the Government's requirements for the planning system

2.3 Paragraph 109 of the NPPF advises:

> *"The planning system should contribute to and enhance the natural and local environment by:*
>
> *…….*
>
> *preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability;…."*

2.4 With specific regard to noise, paragraph 123 of the NPPF states:

> *"Planning policies and decisions should aim to:*
>
> - *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
> - *mitigate and reduce to a minimum other adverse impacts 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; 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."*

2.5 With regard to the *'adverse impacts'* referred to in the first two of the above bullet points, the NPPF directs the reader to the advice contained in DEFRA's *"Noise Policy Statement for England"* (NPSE). This policy statement introduces the concept of a *"Significant*

Observed Adverse Effect Level" (SOAEL), *"Lowest Observed Adverse Effect Level"* (LOAEL) and *"No Observed Adverse Effect Level"* (NOAEL). However, whilst the intent of the NPSE in relation to the NPPF is clear, the NPSE does not, at this time, provide any quantitative threshold values for each identified level of "effect". Indeed, the NPSE carefully highlights that:

> *"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

National Planning Practice Guidance (NPPG, 2014)

2.6 In February 2014 National Planning Practice Guidance (NPPG) was published. The overall aim of this guidance is to tie together the principals of the NPPF and the Explanatory Note of the Noise Policy Statement for England.

2.7 The main objective is to:

> *"Identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation."*

2.8 A summary of the effects of noise exposure associated with both noise generating Proposed Developments and noise sensitive developments is presented within the NPPG and repeated as follows:

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	**No specific measures required**
	No Observed Adverse Effect Level (NOAEL)		
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 (LOAEL)		
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; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	**Mitigate and reduce to a minimum**
	Significant Observed Adverse Effect Level (SOAEL)		
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. 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 harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	**Prevent**

Table 2.1: NPSE Guidance

2.9 In light of the above, it can be seen that whilst the NPPF and associated planning practice guidance sets out stringent imperatives to ensure the satisfactory development of land in relation to possible noise impacts, the NPPF does not generally provide any detailed technical guidance defining what may be considered to constitute a *'significant'* or *'other'* adverse impact. In the absence of such technical guidance, reference needs to be been made to sustainable development standards set out in local planning policy and/or relevant industry standard guidance documents .

Regional Planning Policy

2.10 Regional planning policy is set out in *"The London Plan"* and "*The Mayors Ambient Noise Strategy".*

The London Plan[1]

2.11 The London Plan is the overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years.

2.12 In Chapter 3 – London's People, paragraph 3.11 states the following:

2.13 *"Housing has a major impact on the health of residents, and the policies in this Plan are intended to enable Londoners to live in well designed, high quality homes, appropriately sized and energy efficient, warm and dry, safe, providing good access to high quality social infrastructure, green spaces, and limiting disturbance from noise…"*

2.14 Policy 5.3, Sustainable design and construction states:

2.15 *"Major development proposals should meet the minimum standards outlined in the Mayor's supplementary planning guidance and this should be clearly demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:*

2.16 *(…) minimising pollution (including noise, air and urban run-off)"*

2.17 Chapter 7 – London's Living Spaces and Places, paragraph 7.18, states the following:

2.18 *"The effects of traffic can have a significant impact on the quality of the public realm in terms of air quality, noise and amenity of a space. The negative effects of traffic should be minimised to ensure people's enjoyment of public realm is maximised."*

[1] The Greater London Authority (GLA) (2015) The London Plan. Spatial development strategy for London. Consolidated with alterations since 2011. GLA, London.

2.19 Policy 7.15 – Reducing and managing noise, improving and enhancing the acoustic environment and promoting appropriate soundscapes states that:

> *"**Strategic***
>
> *A). The transport, spatial and design policies of this plan will be implemented in order to reduce noise and support the objectives of the Mayor's Ambient Noise Strategy."*
>
> ***Planning decisions***
>
> *B. Development proposals should seek to reduce noise by:*
>
> *a) avoiding significant adverse noise impacts on health and quality of life as a result of new development;*
>
> *b) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens on existing businesses;*
>
> *c) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);*
>
> *d) separating new noise sensitive development from major noise sources (such as road, rail, air transport and some types of industrial development) through the use of distance, screening or internal layout – in preference to sole reliance on sound insulation;*
>
> *e) where it is not possible to achieve separation of noise sensitive development and noise sources, without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through the application of good acoustic design principles;*
>
> *f) having particular regard to the impact of aviation noise on noise sensitive development;*
>
> *g) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.*
>
> ***LDF preparation***
>
> *C. Boroughs and others with relevant responsibilities should have policies to:*
>
> *a) manage the impact of noise through the spatial distribution of noise making and noise sensitive uses;*
>
> *b) identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations"*

The Mayor's Ambient Noise Strategy[2]

2.20 The Mayor's Ambient Noise Strategy considers a wide range of issues relating to noise which may affect this particular development. These range from transportation noise sources to noise from construction activities.

2.21 The general objectives are identified as minimising the adverse impacts of road traffic noise and improving noise environments in London's neighbourhoods, especially for housing, schools, hospitals and other noise sensitive uses.

2.22 The strategy states the following policies for urban noise sensitive development:

2.23 *"Policy 69*

The London Plan, 2004 (Policy 4A.14) states that the Mayor will and boroughs should reduce noise by:

- *Minimising the existing and potential adverse impacts of noise on, from, within, or in the vicinity of, development proposals;*
- *Separating new noise sensitive development from major noise sources wherever practicable;*
- *Supporting new technologies and improved practices to reduce noise at source, especially in road, rail and air transport;*
- *Reducing the impact of traffic noise through highway management and transport policies;*
- *Containing noise from late night entertainment and other 24-hour activities, and where appropriate promoting well-managed designated locations."*

"Policy 70

The Mayor will, in strategic referrals which include residential development on sites with noise levels higher than Noise Exposure Category A of Planning Policy Guidance Note 24, or the equivalent level in any revision of guidance, seek specific evidence on the action to be taken to address noise."

2 Greater London Authority (GLA). (2004).The Mayor's Ambient Noise Strategy.GLA, London.

Local Planning Policy

2.24 The London Borough of Camden's adopted "Core Strategy 2010-2025" includes the following policy which seeks to protect the amenity of existing neighbours from new development:

CS5 – Managing the impact of growth and development

The Council will manage the impact of growth and development in Camden. We will ensure that development meets the full range of objectives of the Core Strategy and other Local Development Framework documents, with particular consideration given to:

a) providing uses that meet the needs of Camden's population and contribute to the borough's London-wide role;

b) providing the infrastructure and facilities needed to support Camden's population and those who work in and visit the borough;

c) providing sustainable buildings and spaces of the highest quality; and

d) protecting and enhancing our environment and heritage and the amenity and quality of life of local communities.

The Council will protect the amenity of Camden's residents and those working in and visiting the borough by:

e) making sure that the impact of developments on their occupiers and neighbours is fully considered;

f) seeking to ensure development contributes towards strong and successful communities by balancing the needs of development with the needs and characteristics of local areas and communities; and

f) requiring mitigation measures where necessary.

2.25 The London Borough of Camden's Local Development Framework *("Camden Development Policies 2010-2025")* includes the following policies:

DP26 – Managing the impact of development on occupiers and neighbours

The Council will protect the quality of life of occupiers and neighbours by only ranting permission for development that does not cause harm to amenity. The factors we will consider include:

a) *visual privacy and overlooking;*

b) *overshadowing and outlook;*

c) *sunlight, daylight and artificial light levels;*

d) *noise and vibration levels;*

e) *odour, fumes and dust;*

f) *microclimate;*

g) *the inclusion of appropriate attenuation measures.*

DP28 – Noise and vibration

The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:

a) *development likely to generate noise pollution; or*

b) *development sensitive to noise in locations with noise pollution, unless appropriate attenuation measures are provided.*

c) *Development that exceeds Camden's Noise and Vibration Thresholds will not be permitted.*

The Council will only grant permission for plant or machinery if it can be operated without cause harm to amenity and does not exceed our noise thresholds.

The Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. Where these phases are likely to cause harm, conditions and planning obligations may be used to minimise the impact."

2.26 The *'Noise and Vibration Thresholds'* referenced in DP28 are reproduced below:

Table A: Noise levels on residential sites adjoining railways and roads at which planning permission will not normally be granted

Noise Description and Location of Measurement	Period	Time	Sites Adjoining Railways	Sites Adjoining Roads
Noise at 1 metre external to a sensitive façade	Day,	0700 - 1900	74 dB $L_{Aeq,12h}$	72 dB $L_{Aeq,12h}$
Noise at 1 metre external to a sensitive façade	Evening	1900 – 2300	74 dB $L_{Aeq,12h}$	72 dB $L_{Aeq,12h}$
Noise at 1 metre external to a sensitive façade	Night	2300 - 0700	66 dB $L_{Aeq,12h}$	66 dB $L_{Aeq,12h}$

Table B: Noise levels on residential sites adjoining railways and roads at and above which attenuation measures will normally be required

Noise Description and Location of Measurement	Period	Time	Sites Adjoining Railways	Sites Adjoining Roads
Noise at 1 metre external to a sensitive façade	Day,	0700 - 1900	65 dB $L_{Aeq,12h}$	62 dB $L_{Aeq,12h}$
Noise at 1 metre external to a sensitive façade	Evening	1900 - 2300	60 dB $L_{Aeq,12h}$	57 dB $L_{Aeq,12h}$
Noise at 1 metre external to a sensitive façade	Night	2300 - 0700	55 dB $L_{Aeq,12h}$	52 dB $L_{Aeq,12h}$
Individual noise events several times an hour	Night	2300 - 0700	<82dB L_{Amax} (S time weighting)	<82dB L_{Amax} (S time weighting)

Table C: Vibration levels from uses such as railways, roads, leisure and entertainment premises and/or plant or machinery at which planning permission will not normally be granted

Vibration Description and Location of Measurement	Period	Time	Vibration Levels
Vibration inside critical areas such as a hospital operating theatre	Day, evening and night	0000 - 2400	0.1 VDV ms-$^{1.75}$
Vibration inside dwellings	Day & evening	0700 - 2300	0.2 to 0.4 VDV ms-$^{1.75}$
Vibration inside dwellings	Night	2300 - 0700	0.13 VDV ms-$^{1.75}$
Vibration inside offices	Day, evening and night	0000 - 2400	0.4 VDV ms-$^{1.75}$
Vibration inside workshops	Day, evening and night	0000 – 2400	0.8 VDV ms-$^{1.75}$

Table D: Vibration levels from uses such as railways, roads, leisure and entertainment premises and/or plant or machinery at which planning permission will not normally be granted

Noise Description and Location of Measurement	Period	Time	Noise Level
Noise at 1m external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) < L_{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1m external to a sensitive façade	Day, evening and night	0000-2400	10dB(A) < L_{A90}
Noise that has distinct bangs and impulses (bangs, clicks, clatters, thumps) at 1m external to a sensitive façade	Day, evening and night	0000-2400	10dB(A) < L_{A90}
Noise at 1 metre external a noise sensitive façade where L_{A90}>60dB	Day, evening and night	0000-2400	55dB L_{Aeq}

2.27 Camden's DP document indicates that *"noise sensitive"* development includes housing, schools and hospitals as well as offices, workshops and open spaces. As such the criteria above will need to be achieved at 1m from the façade of adjoining dwellings, offices, workshops and/or buildings in educational use.

2.28 With regard to external amenity areas, the development policies document state that:

> *"Outdoor amenity space provides an important resource for residents, which is particularly important in Camden given the borough's dense urban environment. It can include private provision such as gardens, courtyards and balconies, as well as communal gardens and roof terraces. The Council will expect the provision of gardens in appropriate developments, and particularly in schemes providing larger homes suitable for families. However, we recognise that in many parts of the borough this will not be realistic or appropriate. In these locations, the provision of alternative outdoor amenity space, for example, balconies, roof gardens or communal space will be expected. These amenity spaces should be designed to limit noise and disturbance of other occupiers and so not to unacceptably reduce the privacy of other occupiers and neighbours"*

BS 8233: 2014

2.29 BS 8233: 2014 *"Sound Insulation and Noise Reduction for Buildings"* offers the following design guidance for indoor ambient noise levels within dwellings:

Activity	Location	07.00 to 23.00 hours	23.00 t0 07.00 hours
Resting	Living Room	35dB $L_{Aeq,16hour}$	--
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	--
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 2.2: BS 8233 Indoor Ambient Noise Level Design Guidance

2.30 Note 4 to the above Table states:

> *"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values."*

2.31 Despite identifying that maximum values *'may'* be set, guidance values for differing types of noise/frequency of events is not given. It can, however, be noted that the recommendations of BS8233 are aligned with guidance set out in the World Health Organisation's *"Guidelines for Community Noise"*. On that basis, it would seem appropriate to seek to limit night-time noise intrusion such that maximum noise levels do not normally exceed a maximum internal value of 45dB $L_{Amax,fast}$. Section 3.4 of the WHO guidelines implies that *'not normally'* would be an occurrence of more than 10-15 times per night.

2.32 Note 7 to the above Table indicates that where *"development is considered necessary or desirable"*, the above guideline values can be relaxed by 5dB and *"reasonable"* internal conditions still be achieved.

2.33 With regard to external amenity spaces, Section 7.7.3.2 of BS 8233: 2014 states:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

"Guidelines for Community Noise" (World Health Organisation, 1999)

2.34 The criteria outlined in this document provide a summary of research regarding the effects of noise on the community. Section 2 of the Guidelines presents a general discussion regarding the types of noise affecting communities and their measurement. The guidelines promote the use of the $L_{Aeq,T}$ noise index. However, where there are

distinct events to the noise, such as with aircraft or railway noise, the guidelines recommend that measures of the individual events should be obtained (using, for example, L_{Amax} or L_{AE}), in addition to $L_{Aeq,T}$ measurements.

2.35 The guidelines identify three critical effects of noise on residential dwellings – speech interference, annoyance and sleep disturbance.

2.36 With regard to ***'speech intelligibility'***, section 4.2 of the Guidelines identifies that:

> *"Speech in relaxed conversation is 100% intelligible in background noise levels of about 35dB(A) and can be understood fairly well in background levels of 45dB(A).*
>
> *Speech with more vocal effort can be understood when the background sound pressure level is about 65dB(A)."*

2.37 With regard to ***'annoyance'***, section 3.8 of the Guidelines states:

> *"Annoyance in populations exposed to environmental noise varies not only with the acoustical characteristics of the noise (source, exposure), but also with many non-acoustical factors of social, psychological, or economic nature. These factors include fear associated with the noise source, conviction that the noise could be reduced by third parties, individual noise sensitivity, the degree to which an individual feels able to control the noise (coping strategies) and whether the noise originates from important economic activity."*

2.38 Section 4.2.7 of the Guidelines further states that:

> *"The annoyance response to noise is affected by several factors, including the equivalent sound pressure level and the highest sound pressure level of the noise, the number of such events, and the time of day. Methods for combining these effects have been extensively studied. The results are not inconsistent with the simple, physically based energy equivalent energy theory, which is represented by the L_{Aeq} noise index.*
>
> *…….*
>
> *During the daytime, few people are seriously annoyed by activities with L_{Aeq} levels below 55dB; or moderately annoyed with L_{Aeq} levels below 50dB".*

2.39 With regard to ***'sleep disturbance'***, Section 3.4 of the guidelines states:

"If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30dB(A) indoors for continuous noise. If the noise is not continuous, sleep disturbance correlates best with LAmax and effects have been observed at 45dB or less. This is particularly true if the background noise level is low. Noise events exceeding 45dB(A) should therefore be limited if possible. For sensitive people an even lower limit would be preferred. It should be noted that it should be possible to sleep with a bedroom window slightly open (a reduction of outside to inside of 15dB). To prevent sleep disturbance, one should thus consider the equivalent sound pressure level and the number and level of sound events. Mitigation targeted to the first part of the night is believed to be effective for the ability to fall asleep".

2.40 In section 4.3.1, the above guidelines are presented in terms of external noise levels incident on buildings:

"At night, sound pressure levels at the outside facades of the living spaces should not exceed 45dB L_{Aeq} and 60dB L_{Amax}, so that people may sleep with windows open".

BS 4142: 2014: "Methods for Rating and Assessing Industrial and Commercial Sound"

2.41 BS 4142 provide a rating and assessment methodology for assessing the potential adverse impact of industrial and commercial noise sources on neighbouring dwellings.

2.42 The assessment procedure initially compares the ***'Rating Level'*** of the source with the '***Background*** Noise ***Level'*** when the source is not present.

2.43 The ***'Rating Level'*** (L_{Ar}) referred to is the specific noise level of the noise source under investigation (in terms of the L_{Aeq} noise index), to which corrections are applied if the noise has certain audible characteristics. The following corrections (based on a subjective assessment of noise source characteristics is given:

Character Correction				
Feature / Perception	**Tonality**	**Impulsivity**	**Intermittency**	**Other acoustic characteristics**
Just Perceptible	+2dB	+3dB	When the specific sound has identifiable On/Off conditions that are readily distinctive.	+3dB

Clearly Perceptible	+4dB	+6dB	+3dB
Highly Perceptible	+6dB	+9dB	

Table 2.3: BS4142 Character Correction for Rating Level Calculation

2.44 The ***'Background Noise Level'*** (L_{A90}) represents the noise level that is exceeded for 90% of the stated measurement period. For assessment purposes, the background noise level needs to be determined without the noise source under investigation operating.

2.45 The time of operation needs to be taken into account. During the day (normally taken to be 07.00 to 23.00 hours) a one hour measurement period is considered appropriate. During the night (normally taken to be 23.00 – 07.00 hours) a 15 minute time period is normally used.

2.46 The following guidance is then offered based on the outcome of this initial assessment:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB 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.

2.47 A note accompanying the above guidance states:

> *"Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."*

2.48 The initial estimate of the impact should then be modified to account for its context. Such considerations include:

- The absolute level of the sound - the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low. Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

- Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

- The character and level of the residual sound compared to the character and level of the specific sound.

- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

Design Manual for Roads and Bridges

DMRB

2.49 The DMRB provides methodologies of assessing the potential significance of changes in traffic noise levels due to additional road traffic that may be generated by a development.

2.50 **Table 2.4** details the magnitude of the changes in noise levels for both in the short and the long term as published in DMRB 11.3.7 (2011).

Short Term		Long Term	
Noise Change $L_{A10,18Hr}$ dB	Magnitude of Impact (Opening Year)	Noise Change $L_{A10,18Hr}$ dB	Magnitude of Impact (Future Year)
0.0	No change	0.0	No change
0.1 - 0.9	Negligible	0.1 - 2.9	Negligible

1.0 - 2.9	Minor	3.0 - 4.9	Minor
3.0 - 4.9	Moderate	5.0 - 9.9	Moderate
5.0+	Major	10.0 +	Major

Table 2.4: DMRB Traffic Noise Assessment Criteria

3 Existing Noise Environment

Noise Monitoring

3.1 Fully automated environmental noise monitoring at the site was undertaken between 15:00 hours on Thursday 26th November and 10:00 hours on Thursday 03rd December 2015.

3.2 Noise levels were monitored at two locations as described in **Table 3.1** and indicated on **Figure 3.1** below:

Monitoring Location	Description
1	Located on the eastern boundary of the Application Site overlooking Kentish Town Road. The microphone was at first floor elevation at approximately 4m above the ground. The microphone was at approximately 0.8m from the existing building façade and was fitted with the manufacturer's windshield.
2	Located on the western boundary at approximately 8m from Anglers Lane located to the west of the monitoring location. A kitchen extractor fan from Nando's was located at approximately 5m to the north east of the monitoring location. The microphone was at first floor elevation at 1.5m from a building façade. The microphone was fitted with the manufacturer's windshield.

Table3.1: Noise Monitoring Locations

3.3

Figure 3.1: Noise Monitoring Locations

Instrumentation

3.4 Measurement instrumentation details are given in **Appendix B**.

Noise Monitoring Results

3.5 Noise levels measured at Location 1 are presented on **Time History Graphs 1.1** to **1.7** attached at **Appendix C**.

3.6 Measured noise levels were dominated by road traffic noise on Kentish Town Road. The result graphs show a number of noise events generating high maximum noise levels. Scrutiny of the contemporaneous audio recordings made by the measurement instrumentation confirm these are typically associated with sirens on passing emergency vehicles.

3.7 The measurement data has been analysed to remove the influence of extraneous noise events. Typical daytime and night-time values for Location 1 are presented in Table 3.2 below:

Location 1 – Overlooking Kentish Town Road

Daytime Levels		
Day	**Date**	**$L_{Aeq, 16h}$ (dB)**
Thursday (Part)	26 Nov 2015	66.4
Friday	27 Nov 2015	67.6
Saturday	28 Nov 2015	67.0
Sunday	29 Nov 2015	67.3
Monday	30 Nov 2015	66.2
Tuesday	1 Dec 2015	66.9
Wednesday	2 Dec 2015	67.1
Thursday (Part)	3 Dec 2015	67.5
	Average	**67.0**

Night-time Levels			
Night	**Date**	**$L_{Aeq,\ 16h}$ (dB)**	**L_{AFmax} (dB)**
Thursday - Friday	26 – 27 Nov 2015	64.6	75.8
Friday – Saturday	27 – 28 Nov 2015	65.8	79.0
Saturday – Sunday	28 - 29 Nov 2015	65.5	76.3
Sunday – Monday	29 - 30 Nov 2015	64.3	74.5
Monday – Tuesday	30 Nov – 1 Dec 2015	66.6	76.9
Tuesday - Wednesday	1 - 2 Dec 2015	63.0	77.8
Wednesday - Thursday	2 - 3 Dec 2015	63.7	80.8
	Average	**64.9**	**76.7**

Table 3.2: Incident Sound Levels for Location 1

3.8 The above analysis indicates a typical daytime sound level of 67.0 dB $L_{Aeq,16hour}$ and night-time value of 64.9dB $L_{Aeq,8hours}$. The typical night-time maximum value is 76.7dB $L_{Amax,slow}$.

3.9 Noise levels measured at Location 2 are presented on **Time History Graphs 2.1** to **2.7** attached at **Appendix C**.

3.10 Measured noise levels were also dominated by road traffic noise on Kentish Town Road (albeit at a lower magnitude due to the inherent acoustic screening due to the intervening massing of the building) and by building services installations associated with adjoining commercial properties located on the flat roof area at the rear of the site.

3.11 Calculated typical daytime and night-time values for Location 2 are presented in Table 3.2 below:

Location 2 – "Rear" of site

Daytime Levels		
Day	**Date**	**$L_{Aeq, 16h}$ (dB)**
Thursday (Part)	26 Nov 2015	60.4
Friday	27 Nov 2015	60.0
Saturday	28 Nov 2015	59.3
Sunday	29 Nov 2015	61.0
Monday	30 Nov 2015	61.4
Tuesday	1 Dec 2015	61.2
Wednesday	2 Dec 2015	59.9
Thursday (Part)	3 Dec 2015	57.7
	Average	**60.3**

Night-time Levels			
Night	**Date**	**$L_{Aeq, 6h}$ (dB)**	**L_{ASmax} (dB)**
Thursday - Friday	26 - 27 Nov 2015	54.0	65.0
Friday – Saturday	27 - 28 Nov 2015	54.8	67.0
Saturday – Sunday	28 - 29 Nov 2015	53.7	61.2
Sunday – Monday	29 - 30 Nov 2015	52.8	60.1
Monday – Tuesday	30 Nov – 1 Dec 2015	53.7	62.5
Tuesday - Wednesday	1 - 2 Dec 2015	52.3	64.5
Wednesday - Thursday	2 - 3 Dec 2015	51.0	61.0
	Average	**53.3**	**63.7**

Table 3.3: Sound Levels Measured at Location 2

Weather

3.12 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, online data provided by the Met Office has been sourced to understand the weather conditions throughout the survey. The meteorological station is located at 1km to the south of the Application Site. The minimum, maximum and average values of relevant weather indices throughout the week of the survey period are reported in **Table 4.2**.

Parameter	Temperature (°C)	Wind Speed (mph)	Wind Direction (°)	Humidity (%)
Min.	3.0	2	W / SW	70
Max.	13.0	21		95
Average	10.0	13		86

Table 3.4: Weather Conditions During the Survey Period

4 Site Suitability

Local Authority Planning Policy

4.1 As noted earlier, DP28 of the London Borough of Camden's "*Development Policies 2010-2025"* documents sets out noise threshold values at which mitigation will be required and at which planning permission would normally be granted.

4.2 For road traffic noise, the threshold values at which planning permission would not normally be granted are 72dB L_{Aeq} for daytime/evening noise and 66 dB $L_{Aeq,8hour}$ for night-time noise.

4.3 Incident noise levels measured on Kentish Town Road equate to values of 67dB L_{Aeq} for daytime noise and 65 dB L_{Aeq} for night-time noise.

4.4 In light of the above, it can be concluded that, in the context of the guidance given in Table A of DP28, the existing noise environment does not exceed values at which planning permission would not normally be granted.

4.5 For road traffic noise, the threshold values at which attenuation measures will normally be required are 62dB $L_{Aeq, 12hour}$ daytime, 57dB $L_{Aeq,4hour}$ evening and 52dB $L_{Aeq,8hour}$ night-time.

4.6 It is thus clear that in order for residential development to be made acceptable in the context of policy DP28, the scheme will need to provide an appropriate level of noise mitigation to ensure noise intrusion is reasonably controlled. Proposed mitigation is presented in the following sections.

5 Noise Intrusion via Kentish Town Road Facade

Internal Acoustic Design Targets

5.1 BS 8233: 2014 provides the following guidance on internal noise levels within dwellings:

Area	Noise Criterion
Living rooms	Not greater than 35dB $L_{Aeq,8hour}$ (0700-2300 hrs).
Bedrooms	Not greater than 30dB $L_{Aeq,16hour}$ (2300-0700 hrs)

Table 5.1: BS8233: 2014 Internal Acoustic Design Targets

5.2 Whilst the guidance of BS 8233: 2014 suggests that additional criteria *"may"* be set to help control noise intrusion from regular night-time events, no specific guidance on numbers events/noise magnitudes is given. In the absence of such guidance, it is considered appropriate to consider the guidance set out in the World Health Organisation's *"Guidelines for Community Noise",* which recommends that night-time noise intrusion do not normally exceed a maximum internal value of 45dB $L_{Amax,fast.}$

Required Sound Insulation

5.3 The proposed treatment of the external elevations is shown on the drawings prepared by Messrs Fresson and Tee which accompany the application. These show the design intent to have a matching brickwork façade, with four recessed brick bays at each level with angled plaster surrounds to new aluminium framed windows.

5.4 The sound insulation of a building façade will be determined by the relevant proportion and sound insulation capabilities of the constituent building elements. For windows set in a masonry façade, noise intrusion will normally be determined by the acoustic performance of any windows elements and any "openings" that may be required (e.g. for ventilation purposes).

5.5 Based on the typical incident noise levels summarised in Table ?.? above, preliminary calculations have been undertaken to determine the sound insulation requirements of the external building elements, compatible with controlling noise intrusion in line with the

above requirements. For the purpose of these calculations, it is assumed that the masonry areas of the external wall will be compatible with maintaining a weighted sound reduction index of R_w 55dB.

5.6 In order to control noise intrusion into the proposed flats, it is calculated that the proposed windows will need to maintain a minimum weighted sound reduction index of R_w 31dB. This would typically be achievable with windows with double glazed units comprising 6mm glass/16mm airspace/6mm glass.[3]

5.7 It is therefore concluded that the noise intrusion into the proposed development via the Kentish Town Road elevation can be readily controlled in line with the guidance of BS 8233/the World Health Organisation's "Guidelines for Community Noise" with the use of appropriately specified double glazing.

5.8 If considered necessary, the specification of glazing can be directly controlled and enforced by means of an appropriate planning condition requiring details of the scheme to be submitted to and approved by the LPA, in accordance with paragraph 123 of the National Planning Policy Framework.

[3] **Note:** The sound insulation capabilities of a window system are not solely dictated by the glazing configuration and other factors, such as framing details, sealing arrangements, etc. may also influence the overall acoustic performance. The indicated guidance construction guidance is given to demonstrate the acoustic feasibility of the scheme and to assist with the initial costing of development proposals. It is recommended that a detailed design review of sound insulation requirements should be undertaken during the detailed design phase of the project to finalise specific acoustic performance requirements and for the acceptability of proposed constructions to be verified against these performance requirements by reference to specific manufacturer's acoustic test data on a sample construction assembly.

6 Alternative Means of Ventilation

6.1 Approved Document F (ADF) of the Building Regulations 2010 requires that all habitable rooms in dwellings have background ventilation. A partially open window will typically reduce traffic noise by around 10-15dB(A). It is clear, therefore, that reliance on openable windows to provide background ventilation will not be compatible with maintaining acceptable internal noise levels within the flats. As such, alternative means of ventilation will need to be provided to deliver the statutory requirements of ADF.

6.2 Alternative means of ventilation could include a mechanical ventilation strategy (such as the use of a whole house heat recovery system) or the use of an acoustically rated passive ventilation strategy (e.g. use of acoustically rated trickle ventilators).

6.3 The above approach is consistent with the guidance given in section 6.4.5.4 of BS 8233; 2014 which states:

> *"The Building Regulations' supporting documents on ventilation recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice."*

6.4 If trickle ventilators are used, it is recommended that these are selected to maintain a minimum acoustic performance rating of D_{new} 36dB (the value being taken as the cumulative requirement for the total number of vents required).

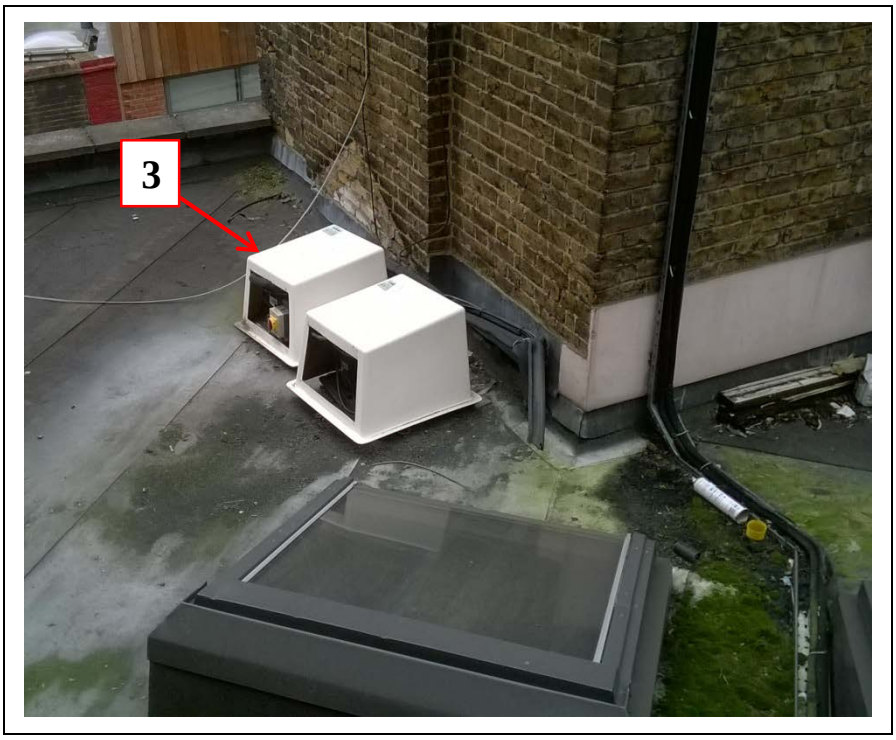
6.5 Noise intrusion via a whole house ventilation system should prove acceptable without further attenuation.

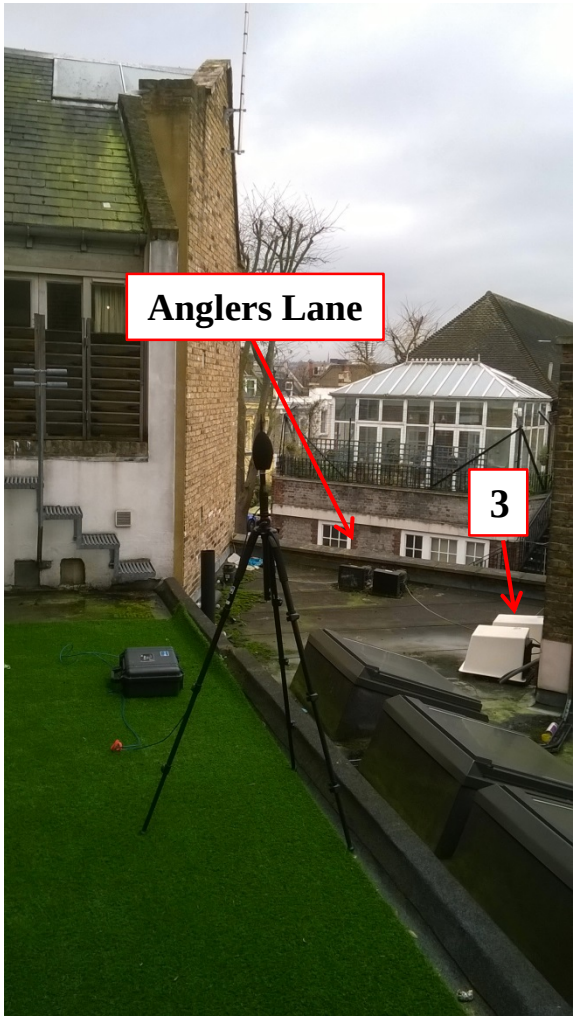
6.6 It is therefore concluded that alternative means of ventilation, compatible with controlling noise intrusion in line with the guidance of BS 8233 and the World Health Organisation's *"Guidelines for Community Noise"* can be provided.

6.7 If considered necessary, the specification of alternative ventilation can be directly controlled and enforced by means of an appropriate planning condition requiring details of the scheme to be submitted to and approved by the LPA, in accordance with paragraph 123 of the National Planning Policy Framework.

7 Noise Intrusion via Rear Elevation

7.1 As highlighted earlier, noise levels at the rear of the site are dominated by general vehicular activity in the vicinity of the site and noise from existing plant installations serving adjoining commercial premises installed on the flat roof area to the rear of the proposed flats. Noted plant including a kitchen supply fan (1) / extract fan (2) and a number of condenser units (3), as shown in the photograph below:





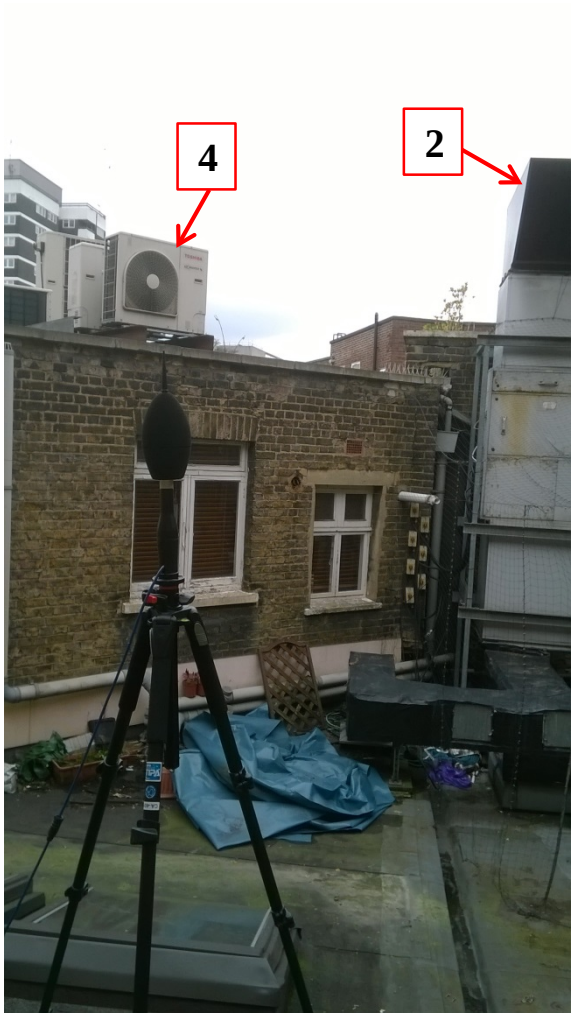


Figure 7.1: Photos of monitoring location 2 and plant units operating at the Site Surroundings

7.2 In order to determine existing levels of sound transfer from these units to the proposed flats, noise measurements were made in the existing 1st and 2nd floor areas of the building. The noise level measured were 45dB(A) and 48dB(A) respectively. Corresponding 1/3 octave band spectra are presented in **Figure 7.1** below:

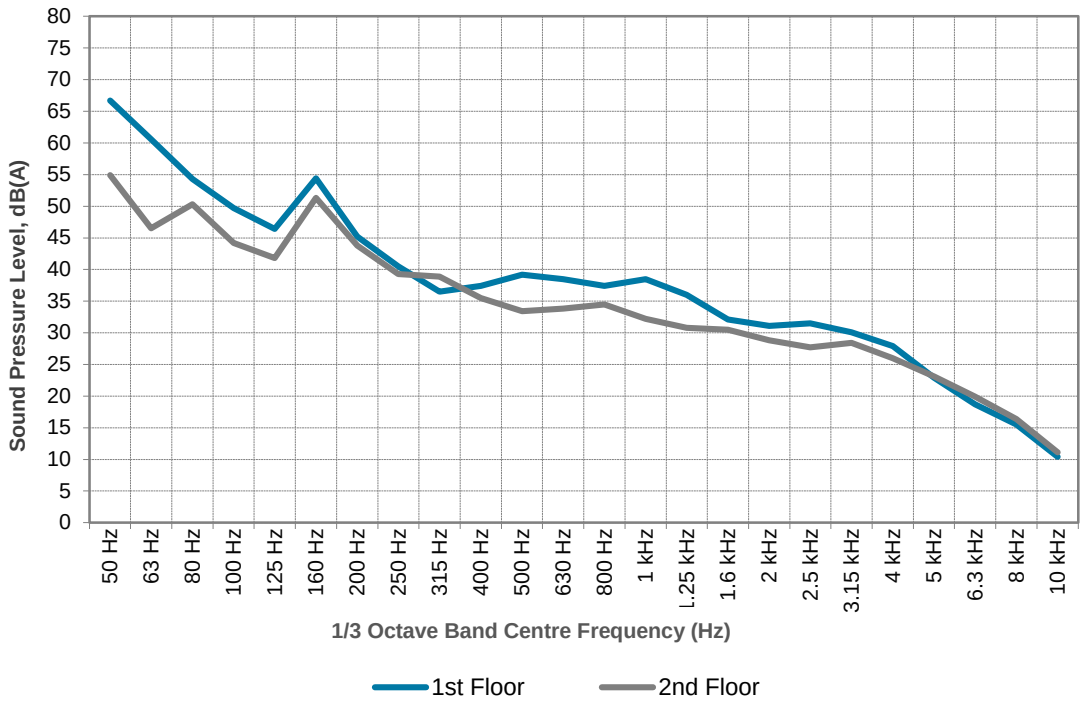


Figure 7.2: Noise Levels Measured in Existing 1st & 2nd Floor Accommodation

7.3 Subjectively, the measured noise levels were dominated noise "break-in" through the existing windows, including some degree of low frequency tonal energy (which cause the noted "peak" at 160Hz in the graph above).

7.4 It is noted that the existing windows are single glazed units in a poor state of repair. Based on site observations and measurements, it is expected that this glazing offers an approximate sound reduction performance of R'_w 26dB.

7.5 The dominant noise source appears to be the kitchen extract fan (which is located immediately adjacent to the external wall of the flats). The noise measurement data presented on **Time History Graphs 2.1** to **2.7** attached at **Appendix C** indicates that this fan does not operate overnight – the data indicates that the principal operational hours are 12.00 to 22.00 hours daily, with a brief additional 25 minute period between 09.00 and 09.25 hours.

7.6 As previously noted, the guidance of BS 8233: 2014 recommends that noise levels within dwellings are controlled to a level of 35dB(A) during the daytime. This suggests that existing noise levels will need to be reduced by 15-18dB(A) in order to deliver BS 8233: 2014 guidance values.

7.7 The proposed treatment of the rear elevation is shown on drawing no. 22209-P08 prepared by Messrs Fresson and Tee, which accompanies the application. These show the design intent is to retain the existing brick façade, but incorporate new replacement sash style windows.

7.8 In order to control plant noise intrusion into the proposed flats, it is recommended that the windows are selected to maintain a minimum weighted sound reduction index of R_w 44dB. This would typically be achievable with windows with sash windows incorporating double glazed, (e.g. units comprising 4mm glass/16mm airspace/6mm glass) with additional secondary glazing to the inside (e.g. units comprising 6.4mm laminated glass).[4]

7.9 In addition to airborne sound transfer via the windows, site observations suggested that there may also be some contribution of structureborne sound transfer from the extract fan. In order to minimise such transfer, it is recommended that an independent wall lining system (e.g. British Gypsum “Gyplyner IWL” finished with at least 2 layers of 12.5mm “Soundbloc” plasterboard and 50mm Isover “Steel Frame Infill Batts” cavity insulation) is applied to the internal face of the rear wall.

7.10 With the above mitigation in place, it is concluded that the noise intrusion into the proposed development via the rear elevation can be controlled in line with the guidance of BS 8233 and the World Health Organisation’s *“Guidelines for Community Noise”.*

7.11 If considered necessary, the specification of glazing can be directly controlled and enforced by means of an appropriate planning condition requiring details of the scheme to be submitted to and approved by the LPA, in accordance with paragraph 123 of the National Planning Policy Framework.

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[4] **Note:** The sound insulation capabilities of a window system are not solely dictated by the glazing configuration and other factors, such as framing details, sealing arrangements, etc. may also influence the overall acoustic performance. The indicated guidance construction guidance is given to demonstrate the acoustic feasibility of the scheme and to assist with the initial costing of development proposals. It is recommended that a detailed design review of sound insulation requirements should be undertaken during the detailed design phase of the project to finalise specific acoustic performance requirements and for the acceptability of proposed constructions to be verified against these performance requirements by reference to specific manufacturer’s acoustic test data on a sample construction assembly.

8 External Amenity Areas

8.1 The proposed development does not provide any external amenity spaces. Noise levels characterising external amenity spaces do not therefore form a material consideration in relation to the proposed development.

9 Commercial to Residential Separation

General

9.1 The proposed development will create a new commercial to residential separation between the existing ground floor commercial areas (which it is understood will retain A2 use) and the new 1st floor flat. The separating floor construction will need to offer adequate sound insulation

Approved Document E

9.2 Approved Document E (ADE) of the Building Regulations 2010 requires that party walls and separating floors provide a *"reasonable resistance to sound"*. For dwellings created by a material change of use, ADE requires that party walls/separating floors maintain a minimum sound insulation value of $D_{nTw} + C_{tr}$ of 43dB. However, ADE also cautions that:

> *"A higher standard of sound insulation may be required between spaces used for normal domestic purposes and communal or non-domestic purposes. In these situations, the appropriate level of sound insulation will depend on the noise generated in the communal or non-domestic space. Specialist advice may be needed to establish if a higher standard of sound insulation is required and, if so, to determine the appropriate level."*

9.3 Unfortunately, whilst ADE highlights the need for sound insulation between commercial and residential uses to be "uplifted", it does not provide any guidance on appropriate uplift values, nor are such values promoted in the other industry standard guidance documents referenced in this report.

9.4 The proposed use of the ground floor (offices) is expected to be characterised by modest levels of operational noise (human speech, office equipment, etc.) and it is assumed that such use is likely to operate during daytime hours only. On this basis, it is suggested that uplifting the ADE design target by 5dB would offer a noticeable improvement in sound insulation compared with the minimum ADE requirements and provide an adequate level of acoustic protection. In quantitative terms, this would mean an airborne sound insulation target of 48dB $D_{nT,w} + C_{tr}$. There is no need for the floor to provide impact protection given the proposed residential accommodation is to be located *'above'* the commercial use.

Proposed Construction

9.5 The separating floor which separates the ground floor commercial use is understood to comprise a minimum 150mm thick concrete slab cast on in-situ steel shuttering, underdrawn with a resiliently suspended mass acoustic ceiling (comprising 2 x layers of 15mm “Soundbloc” plasterboard on a “Casoline MF” suspension system incorporating acoustic hangers).

9.6 The sound insulation performance of this construction has been estimated using proprietary sound insulation prediction software. The construction is estimated to be capable of maintaining a minimum weighted sound reduction index of R_w 69dB. It can therefore be concluded that the separating floor between the ground and first floors should comfortably maintain an adequate level of sound insulation. The proposed commercial (office) to residential separation does not therefore raise any particular acoustic difficulty or constraint with regard to the principle of the proposed development.

10 Operational Noise

10.1 The proposed development does not include the provision of fixed plant installations, other than normal domestic services which will be contained within the fabric of the development. As such, operational noise associated with the development is not expected to be pose any risk to the amenity of existing noise sensitive properties in the vicinity of the site.

10.2 Notwithstanding the above, it is proposed that noise emissions from the development will be controlled in accordance with the London Borough of Camden's standard noiuse control requirements (as set out in Table D of DP28).

10.3 It is therefore proposed that noise emissions from any plant are set to be 10dB(A) lower than the minimum external background noise level ($L_{A90,\ 15min}$) measured at 1m from the external nearest noise-sensitive receptor façade. If the plant contains a distinguishable discrete continuous note the maximum $L_{Aeq,\ 15\ min}$ should not exceed 15dB below the minimum external background noise level.

10.4 **Table 5.4** shows the lowest monitored background noise levels from the noise survey and recommended acoustic design targets :

Location	Microphone Position	Minimum $L_{A90,\ 1h}$ (dB)	
		Day	Night
Kentish Town Road	1st Floor Façade	53	43
Anglers Lane		47	40

Table 10.1: Lowest Monitored Background Sound Levels $L_{A90,1h}$

10.5 It is therefore proposed that new plant installations will be design in accordance with the following environmental noise emission design targets:

Properties Fronting	Design Target, dB(A)	
	Day	Night
Kentish Town Road	43	33
Anglers Lane	47	30

Table 10.2: Proposed Environmental Noise Emission Design Targets

10.6 The small number of additional residential units proposed will not produce any significant additional vehicle movements. As such, the proposed development will not have any significant impact in relation to existing levels of road traffic noise characterising the site.

11 Construction Noise and Vibration

11.1 Construction activities have the potential to cause noise and vibration disturbance to both residential and commercial uses in the vicinity of a site.

11.2 An assessment of specific construction impacts will be dependent upon the specific nature of the works, selected equipment/working methodologies, construction programme, etc. Such detail is not available at this stage.

11.3 Notwithstanding this, the potential temporary impacts of construction activities can be minimised through the implementation of appropriate construction management procedures. Such procedures can include:

- A general need for any contractor to implement the “best practicable means” for undertaking the works in line with the general guidance of BS5228:2009+A1:2014 (Parts 1 and 2);
- The use of prefabricated materials wherever possible;
- Optimising the site layout to locate noise generating activities as far as possible away from sensitive receptors; and
- Good housekeeping and management, i.e.
    - Review of plant and activities to ensure noise minimisation measures are in place and operating;
    - Public relations, e.g. provision of telephone numbers for complaints, pre-warning of noisy activities, sensitive working hours;
    - Controlling of site traffic and setting up of access routes away from sensitive receptors;
    - Provision of noise monitoring during activities likely to affect sensitive receptors; and
    - Appropriate working hours
- The use of ‘silenced’ plant and equipment to be used;
- The provision of screening around those parts of the site at which activities are likely to generate noise;
- Noise generating plant should be located at a low level and as distant as possible from sensitive receptor;

- Plant should operate at low speeds, where possible, and incorporate automatic low speed idling;
- All plant should be properly maintained (greased, blown silencers replaced, saws kept sharpened, teeth set and blades flat, worn bearings replaced, etc);
- Consideration to be given to temporary screening or enclosures for static noisy plant to reduce noise emissions and plant should be certified to meet any relevant standards;
- Early and good public relations with the adjacent tenants and occupants of buildings will also reduce the likelihood of complaints; and
- Controlling the opening hours of the site.

11.4 Given the nature and scale of the proposed development, significant adverse noise and vibration impacts during the construction works are not anticipated. If considered necessary, however, the potential impact construction phase noise and vibration could be controlled by means of appropriate planning condition(s), e.g. restricting the working hours of the site, or through the submission of a Construction Environmental Management Plan, which could include detailed noise control proposals for the site. The use of such conditions, if considered necessary, would comply with paragraph 123 of the National Planning Policy Framework.

12 Conclusions

Existing Noise Environment

12.1 A detailed environmental noise survey has been undertaken to determine the existing environmental noise climate at the site. The front of the building (overlooking Kentish Town Road) is dominated by road traffic noise. Noise levels at the rear of the site are also influenced by traffic noise (albeit screened by the massing of intervening buildings) and by plant noise emissions serving adjoining commercial premises. Additional measurements have been made internally within the development to assist in reviewing current levels of noise transfer from the existing plant installations at the rear of the site.

Planning Policy Context and Design Guidance

12.2 The requirements of national, regional and local planning policy relevant to the proposed change of use are discussed. Reference has also been made to industry standard design guidance.

Site Suitability

12.3 The suitability of the site for residential development has been reviewed in the context of the specific guidance set out in Policy DP28 of the Camden's Development Policies document. This concludes that the site is suitable for residential development, subject to the implementation of appropriate mitigation.

Noise Intrusion via Kentish Town Road Elevation

12.4 Noise levels incident on the Kentish Town Road elevation of the building are dominated by traffic noise. Preliminary calculations confirm that noise intrusion can be adequately controlled using appropriately specified windows with double glazed units and alternative means of ventilation. If considered necessary, the specification of glazing and alternative means of ventilation can be directly controlled and enforced by means of an appropriate planning condition requiring details of the scheme to be submitted to and approved by the LPA, in accordance with paragraph 123 of the National Planning Policy Framework.

Noise Intrusion via Rear Elevation

12.5 Internal noise measurements indicate that noise intrusion via windows in the rear elevation of the building can be adequately controlled by replacement double glazed windows and the use of additional internal secondary glazing. It is also recommended that an internal wall

lining in applied to the external walls to minimise any residual structureborne sound transfer from existing plant installations. If considered necessary, the specification of glazing/wall linings can be directly controlled and enforced by means of an appropriate planning condition requiring details of the scheme to be submitted to and approved by the LPA, in accordance with paragraph 123 of the National Planning Policy

External Amenity Areas

12.6 The proposed development does not propose any external amenity areas.

Commercial to Residential Separation

12.7 The proposed development will create a new commercial to residential separation between the existing ground floor (office) use and first floor flat. The sound insulation performance of the separating floor construction has been reviewed and it is concluded that the separating structure should comfortably provide adequate airborne sound insulation between these spaces.

Operational Noise

12.8 Environmental acoustic design targets for building services installations associated with the development have been recommended in accordance with the technical requirements of DP28 of the London Borough of Camden's Development Policies documents.

Construction Noise and Vibration

12.9 The nature and scale of the proposed development is not expected to give rise to any significant adverse noise and vibration impacts during construction works. If considered necessary, however, the potential impact construction phase noise and vibration could be controlled by means of appropriate planning condition(s), e.g. restricting the working hours of the site, or through the submission of a Construction Environmental Management Plan, which could include detailed noise control proposals for the site. The use of such conditions, if considered necessary, would comply with paragraph 123 of the National Planning Policy Framework.

APPENDIX A: Glossary of Acoustic Terminology

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.

dB(A) : 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 dB(A) level.

Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.

L10 & L90: 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 L10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L90 is the average minimum level and is often used to describe the background noise.

It is common practice to use the L10 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.

Leq : The concept of Leq (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.

Leq 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 Leq very straightforward.

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

APPENDIX B: Instrumentation

The sound level meters and calibrator employed comply with national and international standards: IEC 61672 – 1:2002 Class 1, IEC 60651 Type 1, IEC 60804 Type 1, IEC 61260 Class 1.

NAME	Description	Model Number	Serial Number	Mic. Sensitivity	Latest Lab. Calibration Date
Sound Level Meter Location 1	SLM	Nor140	1405948	54.9 mV/Pa -25.2dB @ 1V/Pa Capacitance: 21.6 pF	20/03/2014
	Microphone	Nor1225	208221		
	Preamplifier	Nor1209	15806		
Sound Level Meter Location 2	SLM	Nor140	1405946	50.4 mV/Pa -26.0dB @ 1V/Pa Capacitance: 21.5 pF	20/03/2014
	Microphone	Nor1225	414899		
	Preamplifier	Nor1209	15799		
CAL	Calibrator	Nor1251	34058	114dB @ 1kHz	26/03/2014

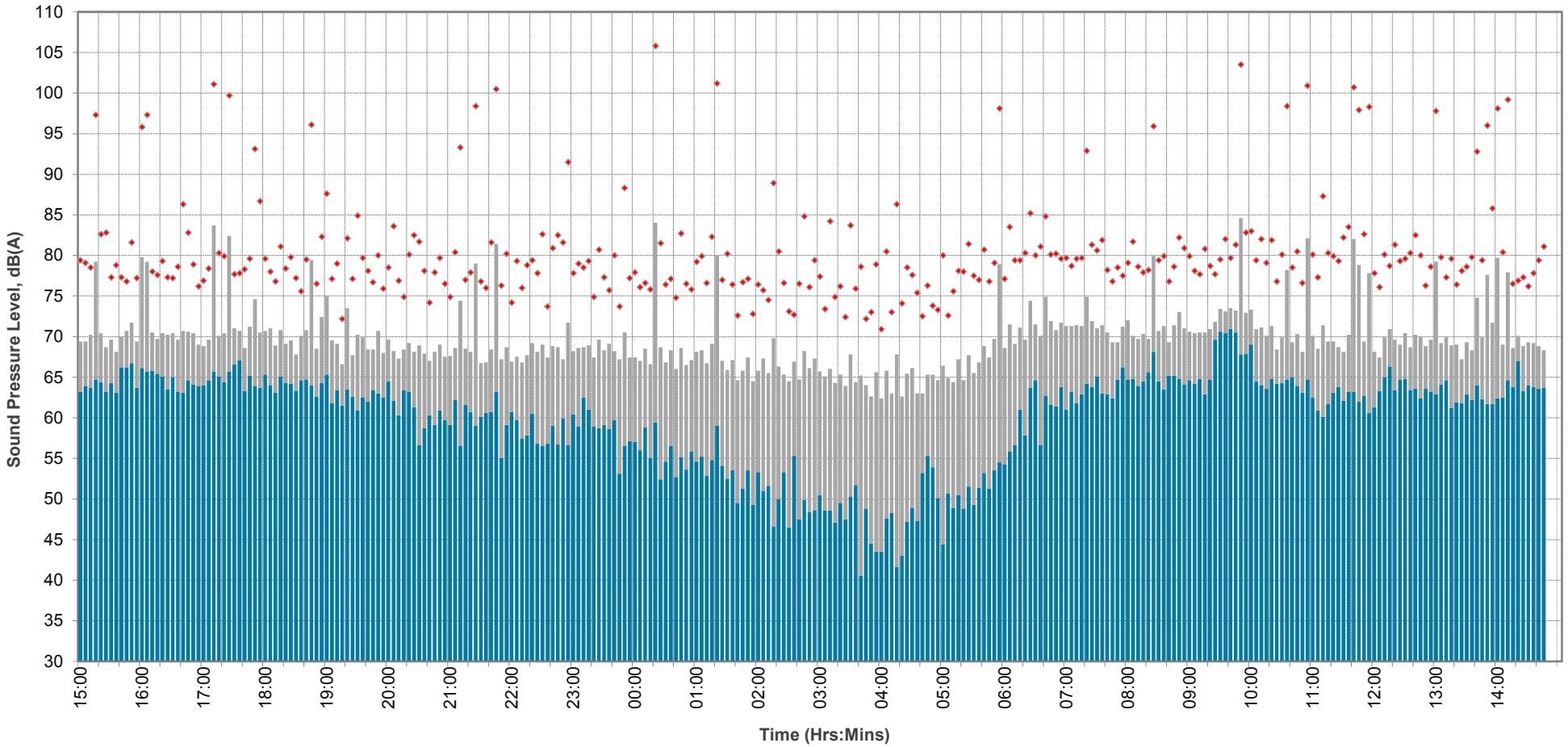
Table B.1: Instrumentation

Each sound level meter was calibrated prior to and on completion of the survey. The calibrator generates a 114.0 dB pure tone @ 1 KHz. No significant changes were found to have occurred. Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable and the microphones were fitted with the outdoor windshield.

APPENDIX C: Time History Profiles

Time History Graph 1.1

Project:	225 Kentish Town Road,
Measurement Location:	Position 1 (Overlooking Kentish Town Road)
Survey Period:	26 - 27 November 2015

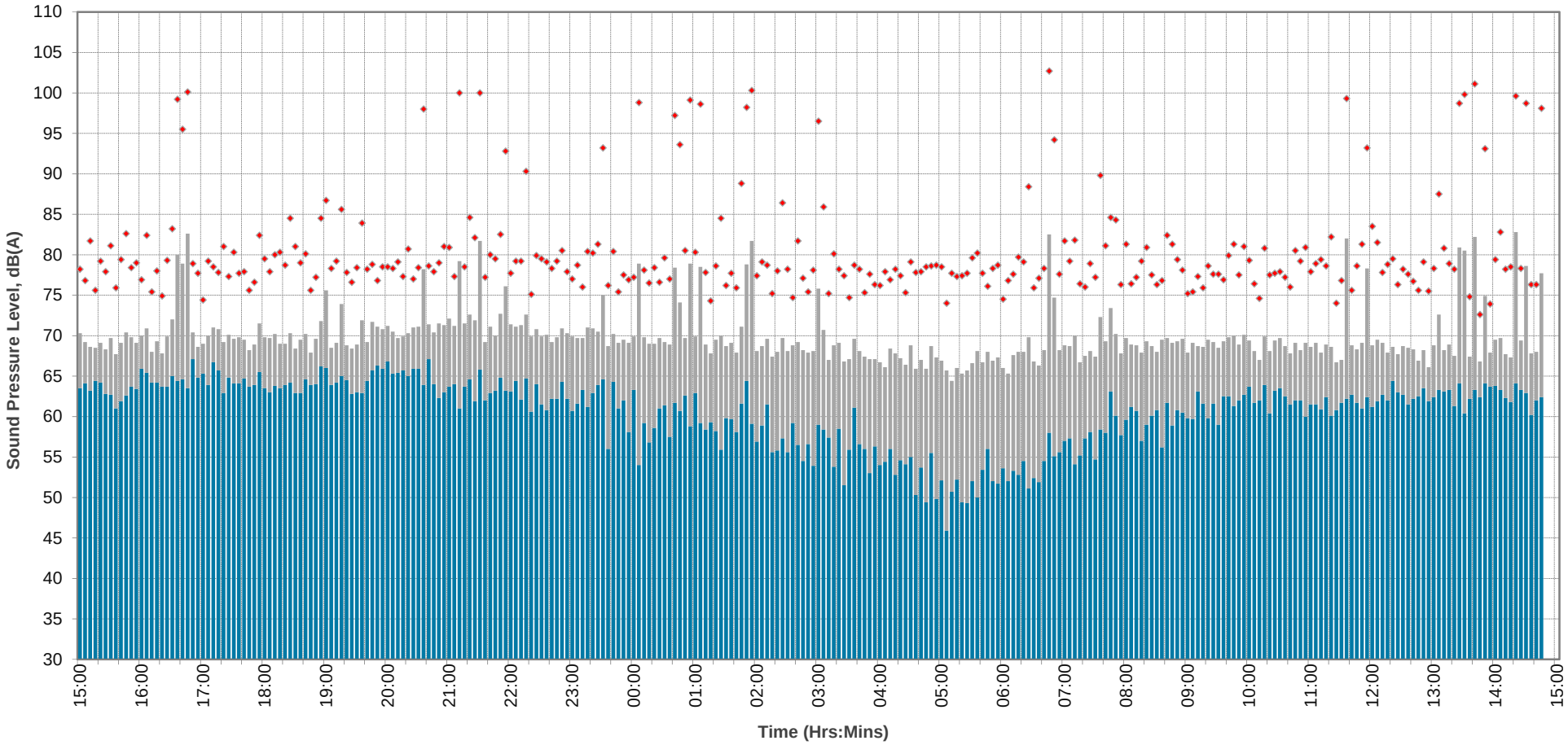


KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
Telephone: 01483 750508 Fax: 01483 750437

Time History Graph 1.2

Project:	225 Kentish Town Road,
Measurement Location:	Position 1 (Overlooking Kentish Town Road)
Survey Period:	27 - 28 November 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

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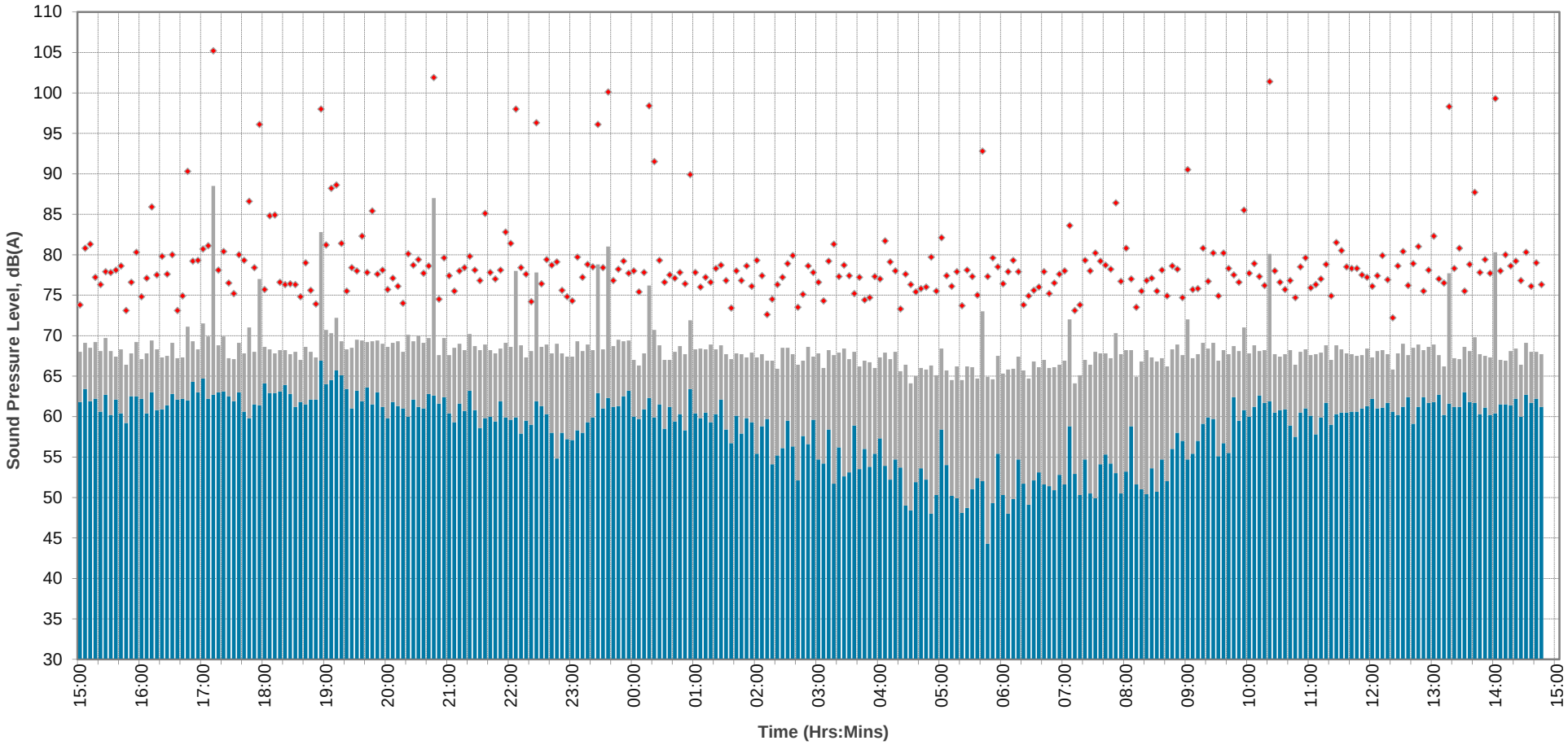
Time History Graph 1.3

Project:	225 Kentish Town Road,
Measurement Location:	Position 1 (Overlooking Kentish Town Road)
Survey Period:	28 - 29 November 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

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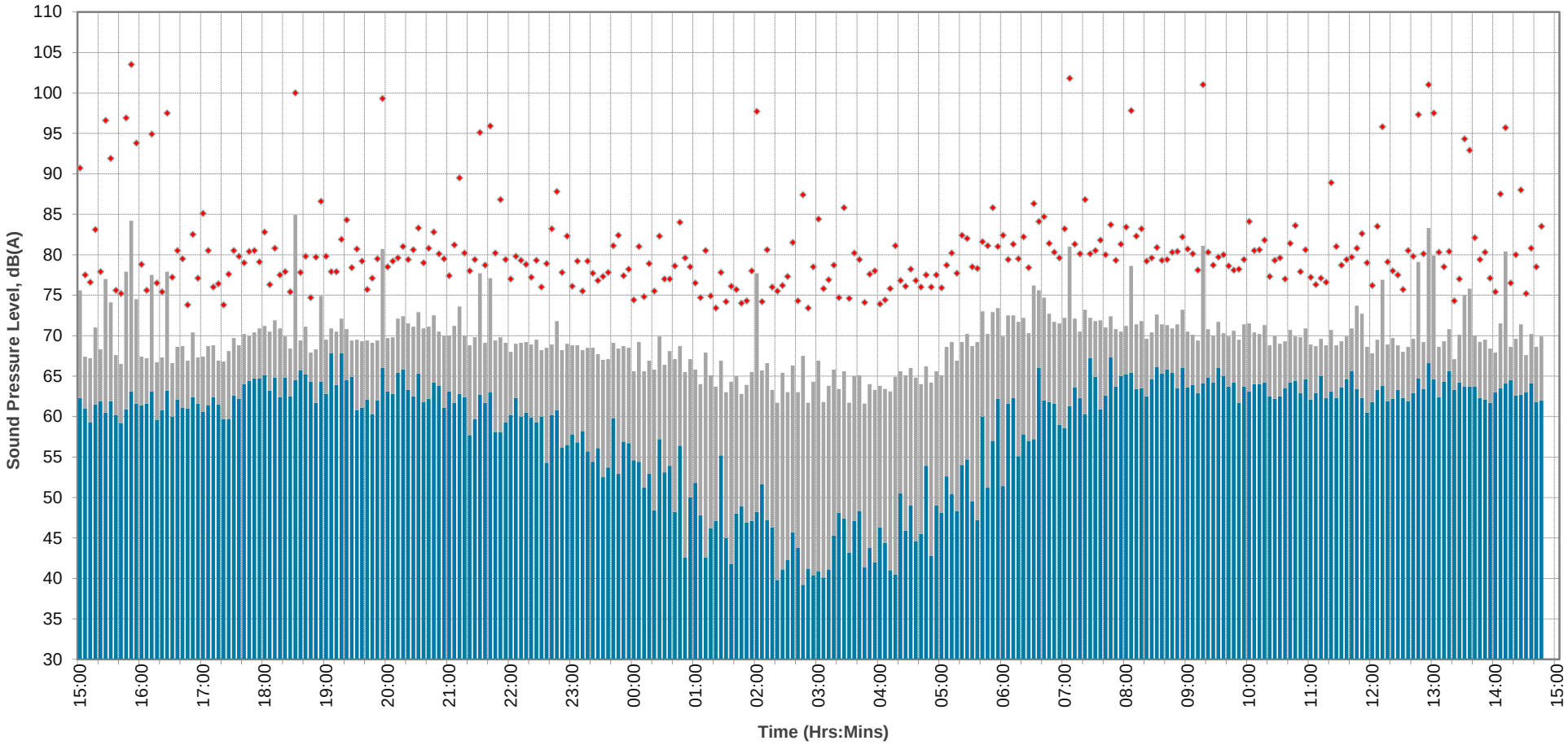
Time History Graph 1.4

Project:	225 Kentish Town Road,
Measurement Location:	Position 1 (Overlooking Kentish Town Road)
Survey Period:	29 - 30 November 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
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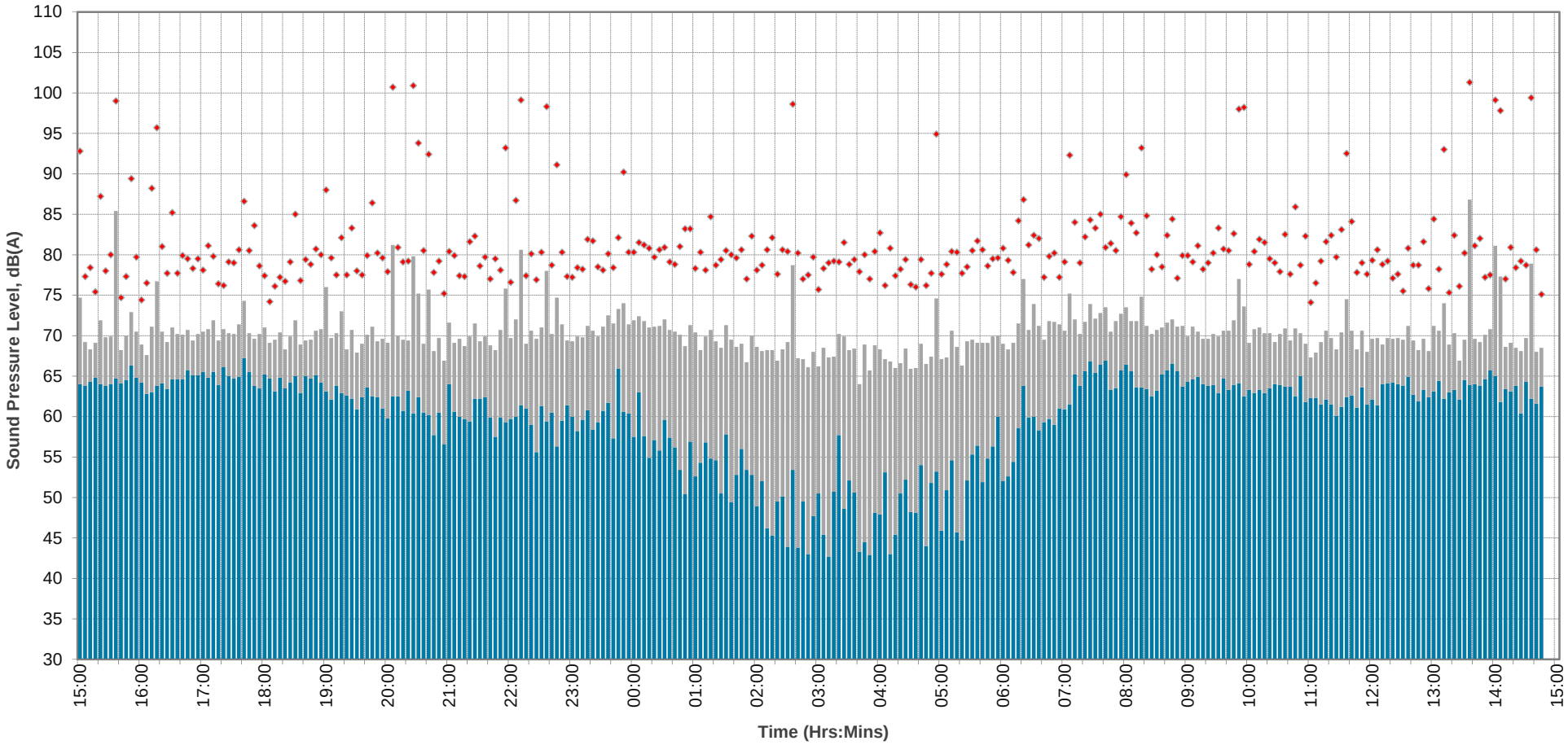
Time History Graph 1.5

Project:	225 Kentish Town Road,
Measurement Location:	Position 1 (Overlooking Kentish Town Road)
Survey Period:	30 November - 1 December 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
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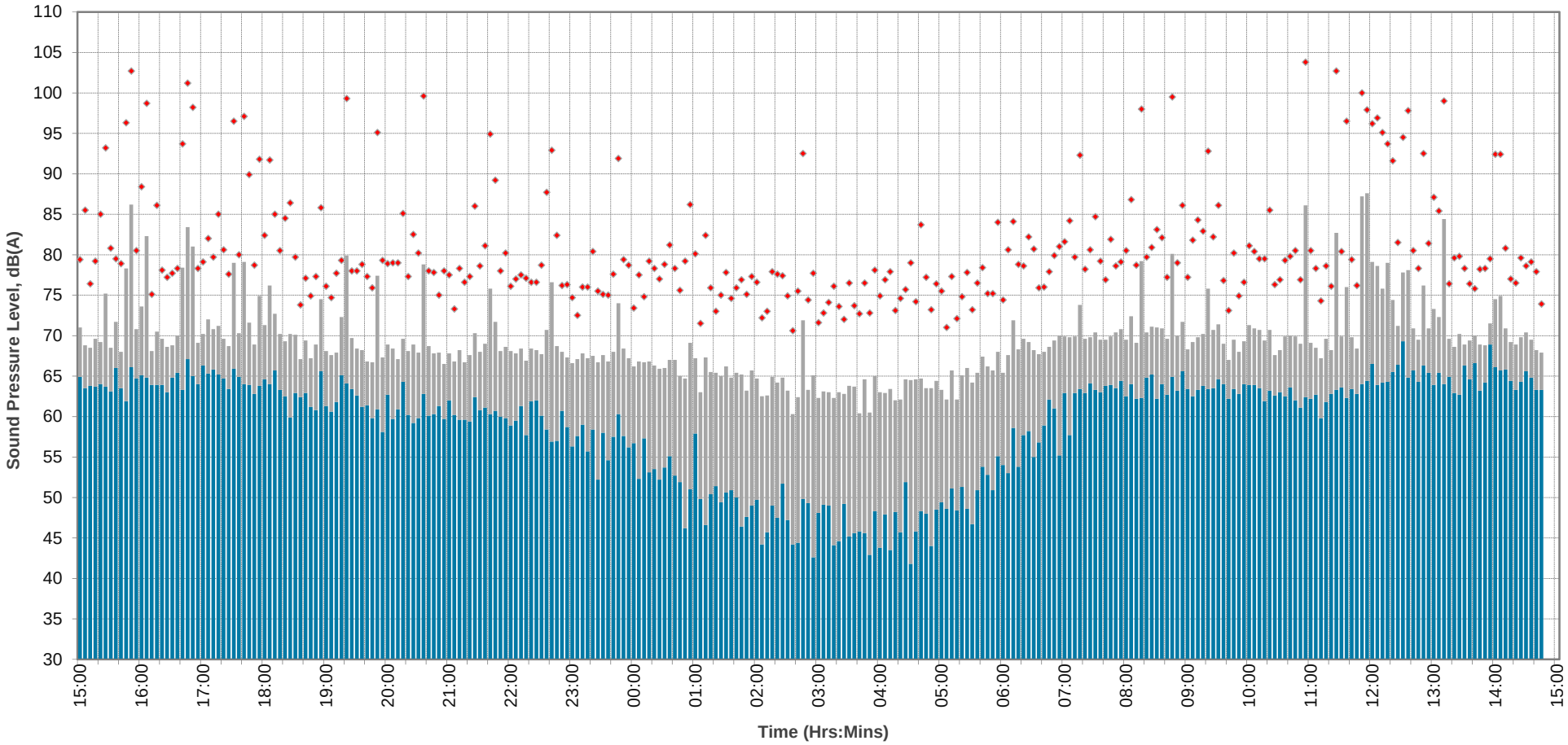
Time History Graph 1.6

Project:	225 Kentish Town Road,
Measurement Location:	Position 1 (Overlooking Kentish Town Road)
Survey Period:	1 - 2 December 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
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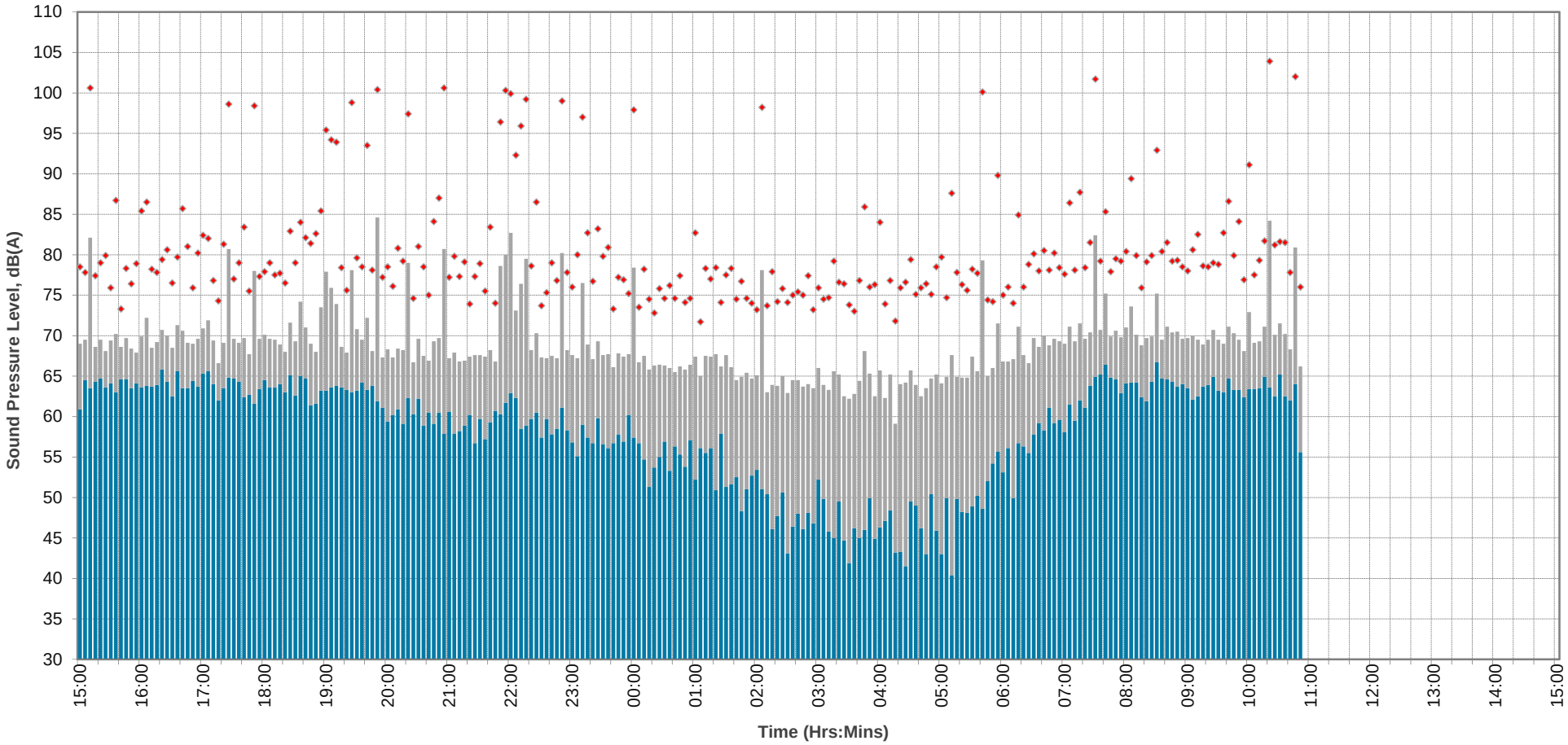
Time History Graph 1.7

Project:	225 Kentish Town Road,
Measurement Location:	Position 1 (Overlooking Kentish Town Road)
Survey Period:	2 - 3 December 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

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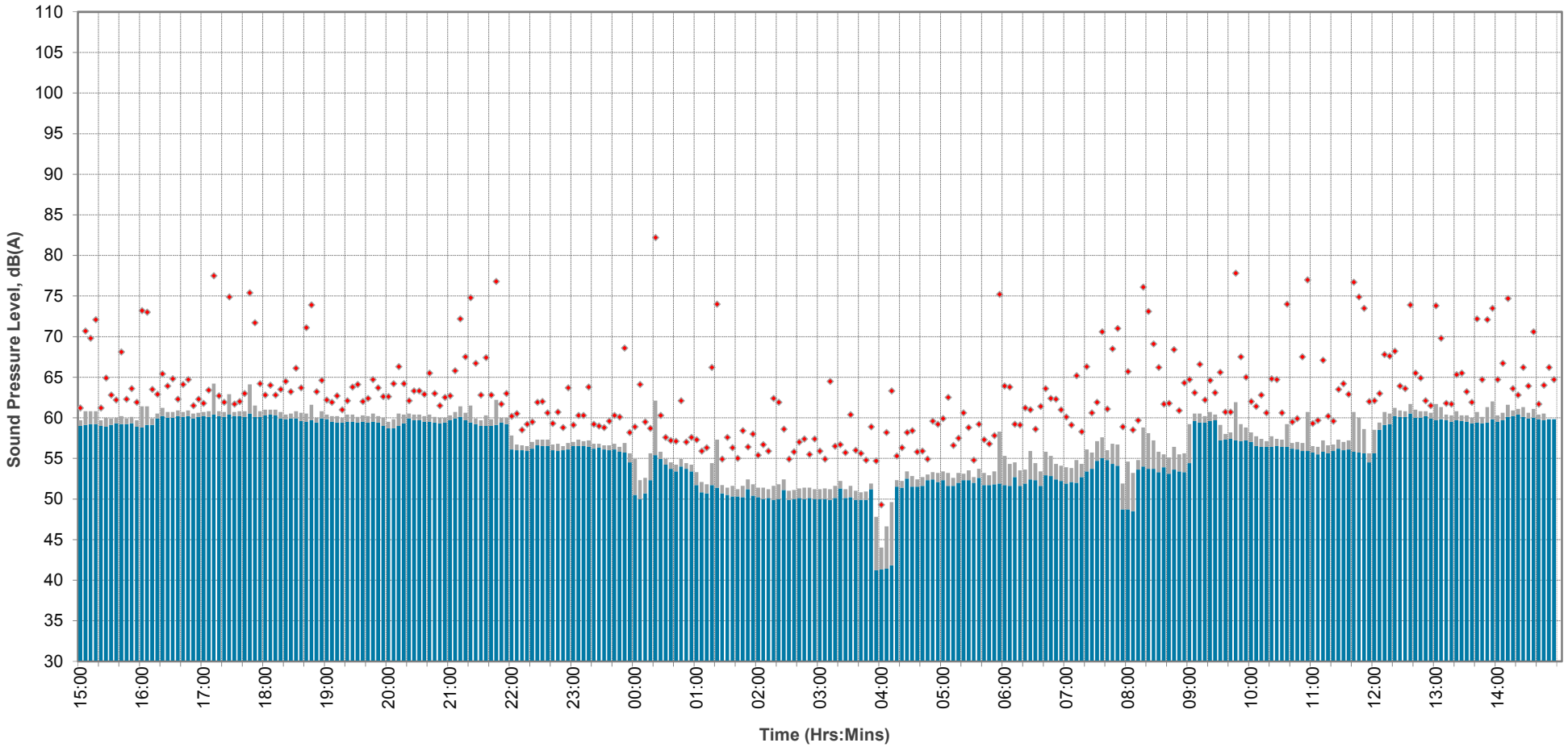
Time History Graph 2.1

Project:	225 Kentish Town Road,
Measurement Location:	Position 2 (Rear of Site)
Survey Period:	26 - 27 November 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
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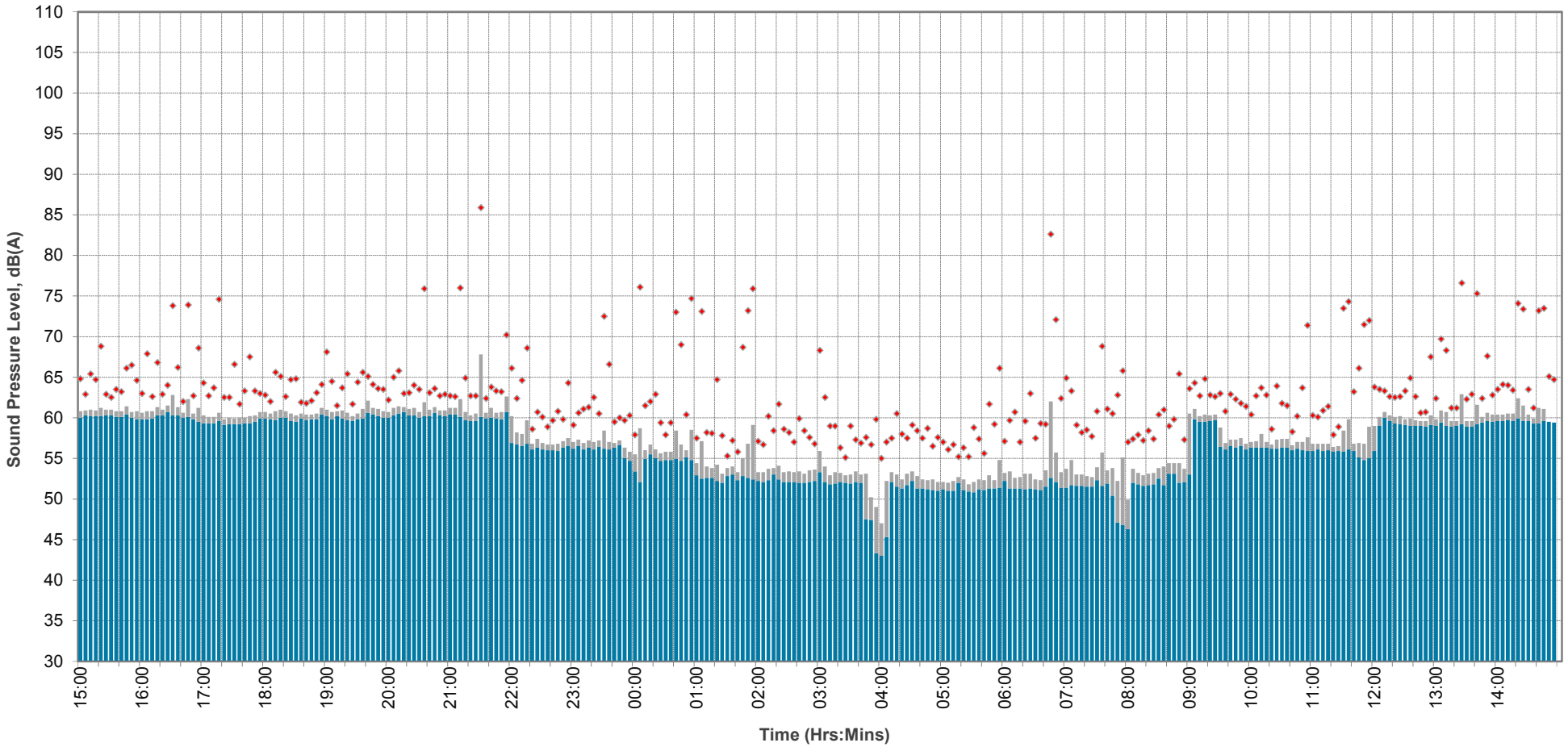
Time History Graph 2.2

Project:	225 Kentish Town Road,
Measurement Location:	Position 2 (Rear of Site)
Survey Period:	27 - 28 November 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

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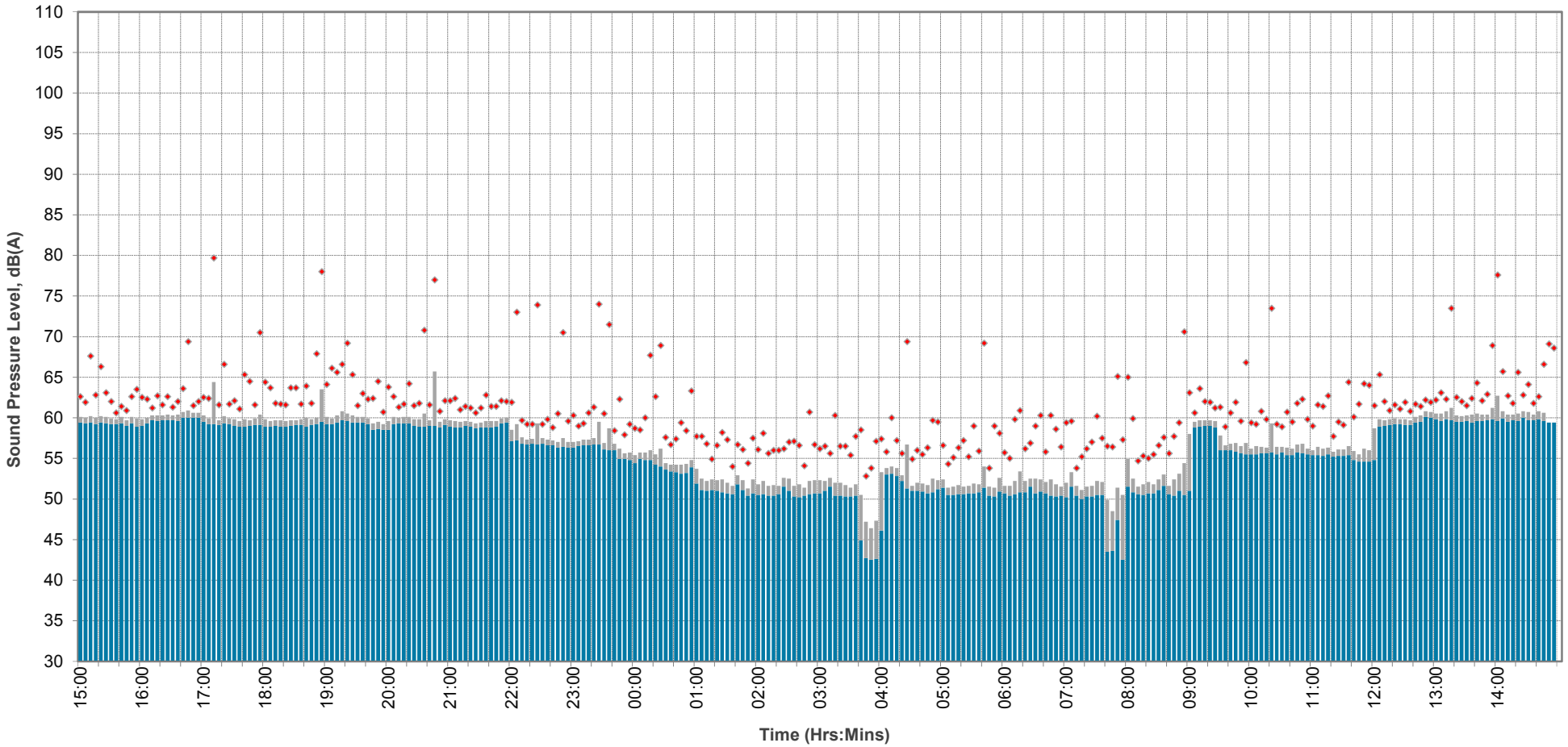
Time History Graph 2.3

Project:	225 Kentish Town Road,
Measurement Location:	Position 2 (Rear of Site)
Survey Period:	28 - 29 November 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

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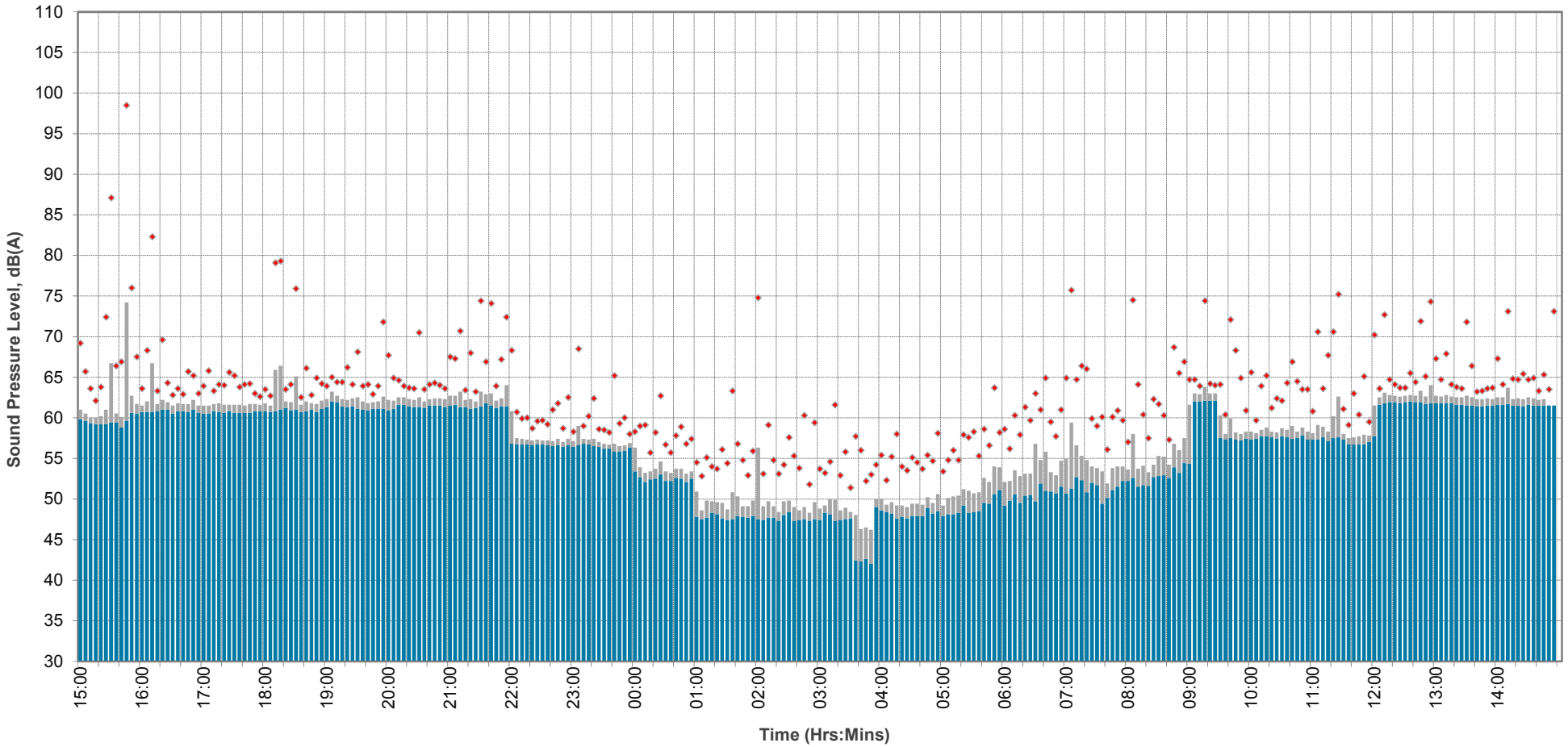
Time History Graph 2.4

Project:	225 Kentish Town Road,
Measurement Location:	Position 2 (Rear of Site)
Survey Period:	29 - 30 November 2015

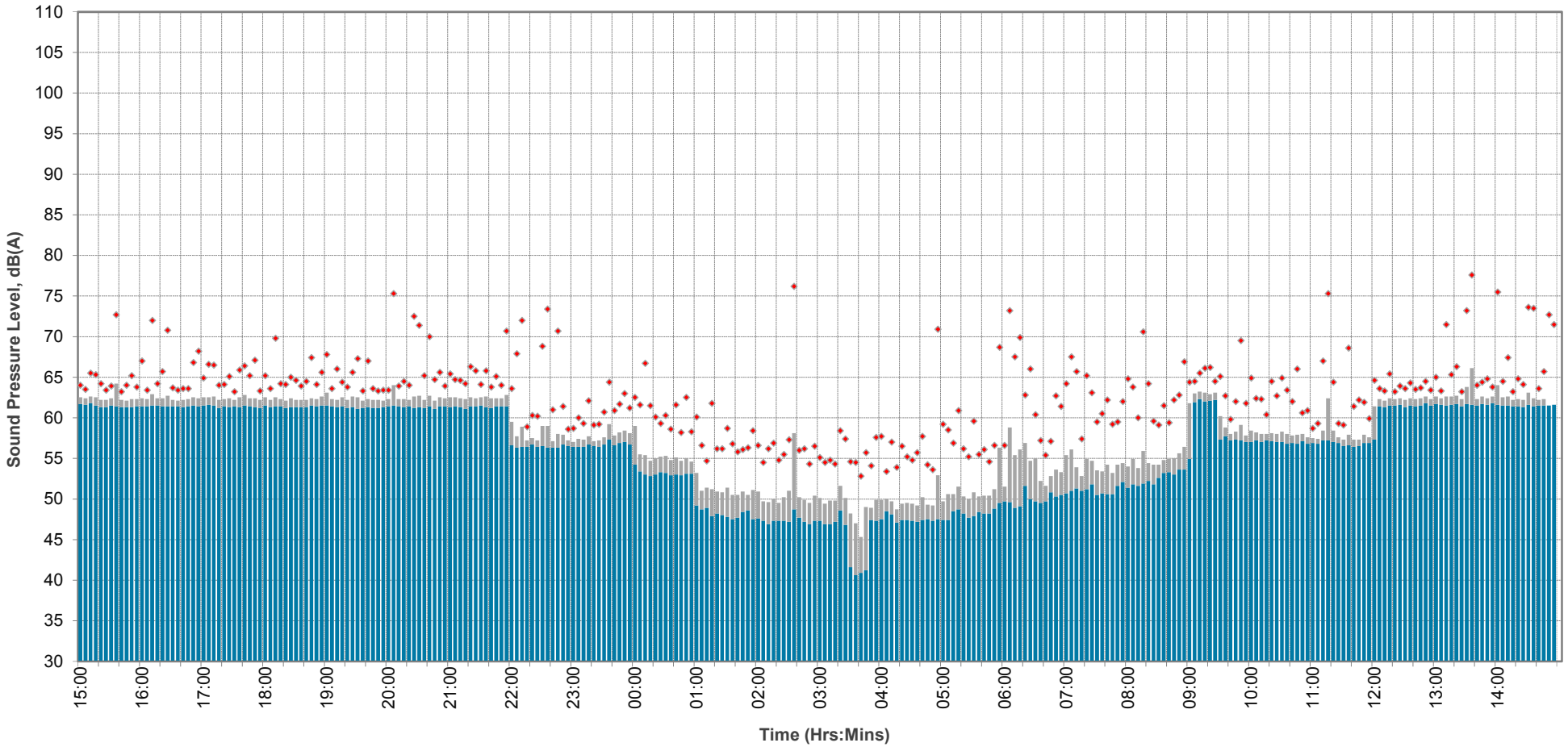


KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
Telephone: 01483 750508 Fax: 01483 750437

Time History Graph 2.5

Project:	225 Kentish Town Road,
Measurement Location:	Position 2 (Rear of Site)
Survey Period:	30 November - 1 December 2015

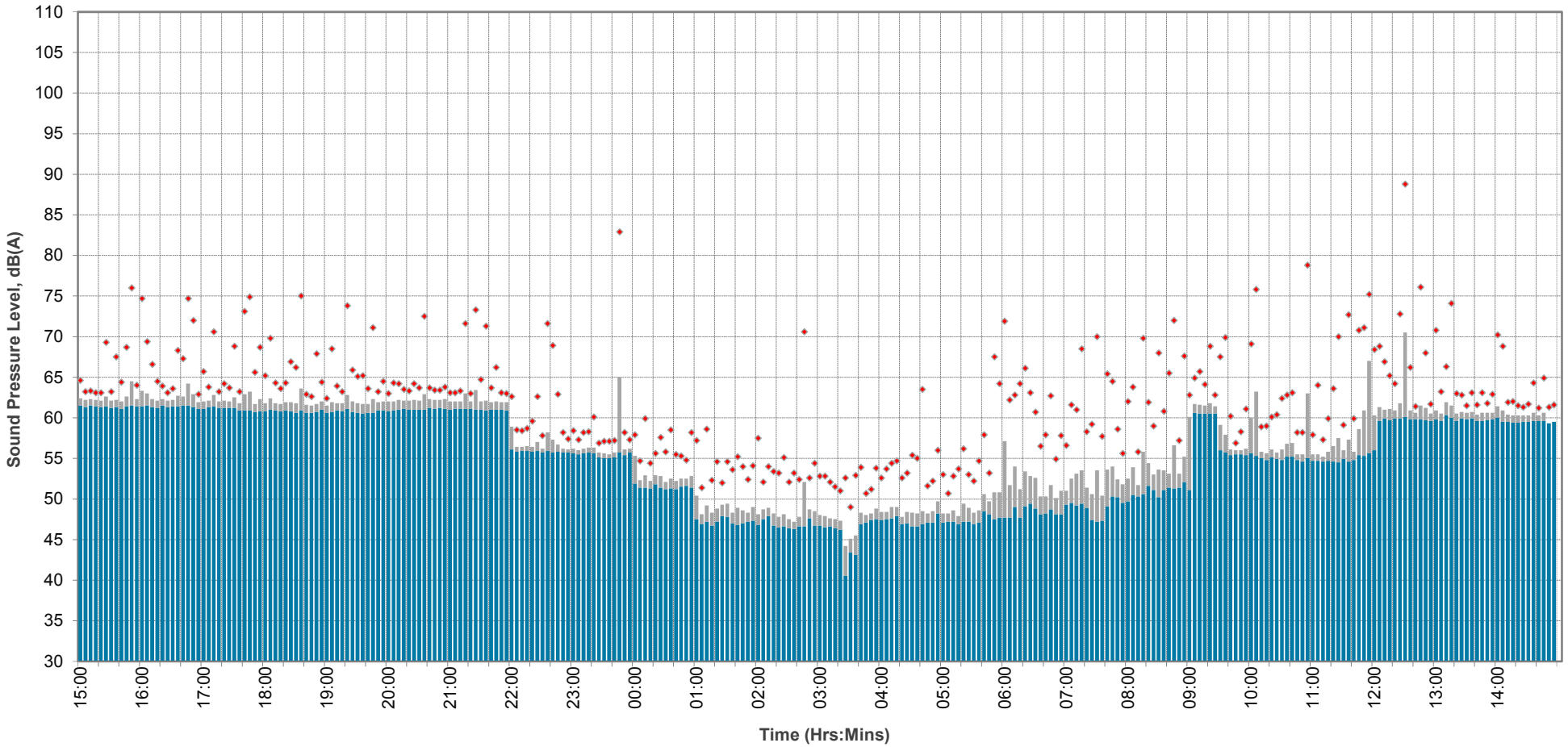


KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
Telephone: 01483 750508 Fax: 01483 750437

Time History Graph 2.6

Project:	225 Kentish Town Road,
Measurement Location:	Position 2 (Rear of Site)
Survey Period:	1 - 2 December 2015

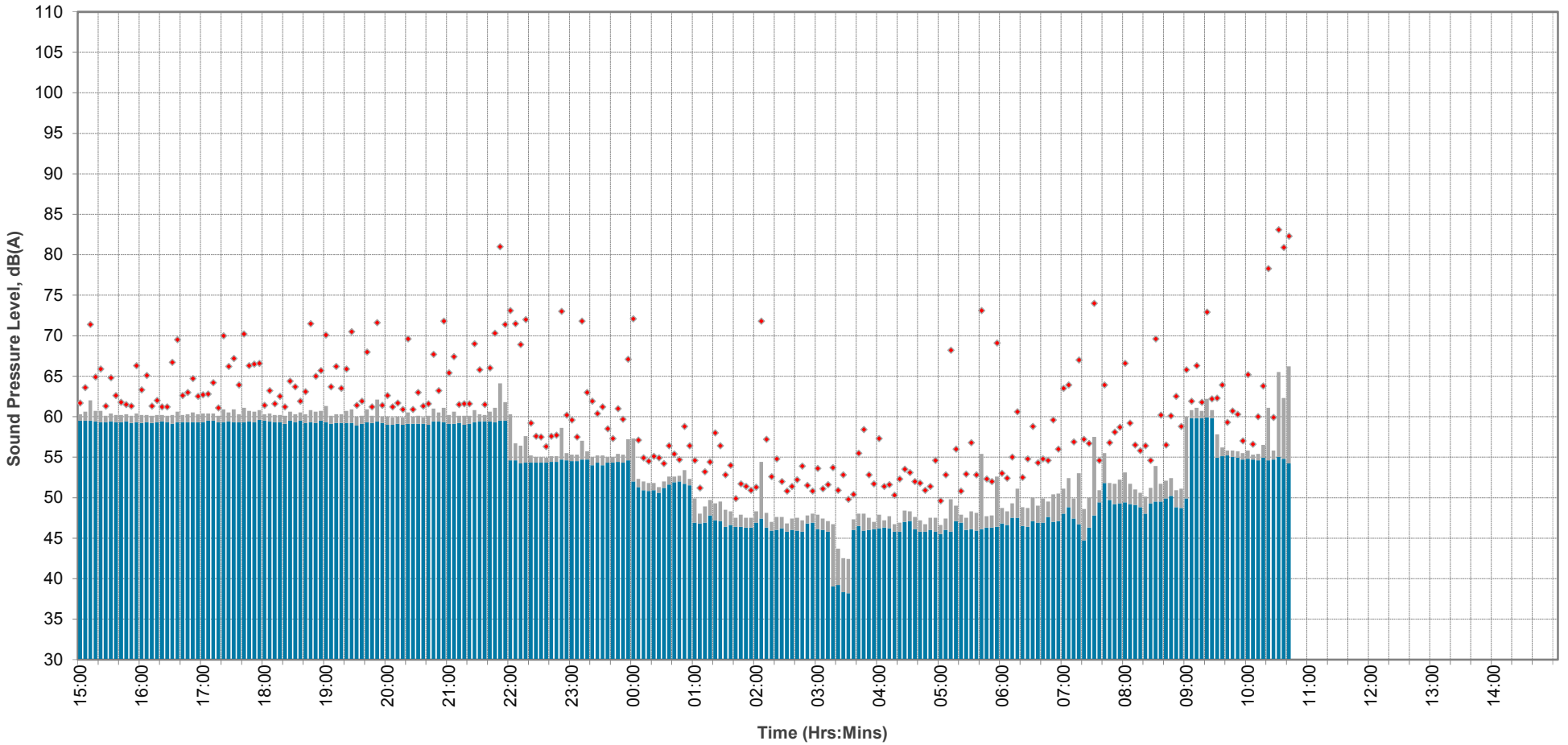


KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

Lion House, Oriental Road, Woking, Surrey GU22 2BR
Telephone: 01483 750508 Fax: 01483 750437

Time History Graph 2.7

Project:	225 Kentish Town Road,
Measurement Location:	Position 2 (Rear of Site)
Survey Period:	2 - 3 December 2015



KEY: $L_{A90,15mins}$ $L_{Aeq,15mins}$ $L_{Amax,slow}$

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