# 156 West End Lane

## Noise Impact Assessment

November 2015

# A2 Dominion Developments Limited

## Noise Impact Assessment

| | |
|---|---|
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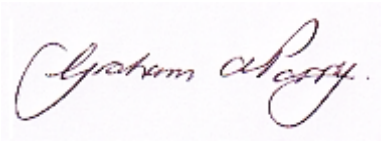
| Approved By: |  <br>Graham Parry<br>Managing Director |
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# 1. INTRODUCTION

ACCON UK Limited (ACCON) has been instructed by Silver Development and Construction Consultancy on behalf of A2Dominion Developments Limited to carry out a noise impact assessment in support of the planning application for the redevelopment of 156 West End Lane, in the London Borough of Camden (LBC). The site currently contains a 5 storey office building previously occupied by Camden Council and a showroom let to Travis Perkins with a timber yard situated to the rear of the building.

The proposed development includes the demolition of all existing buildings and redevelopment of the site to provide 164 mixed-tenure homes (Use Class C3), new floorspace for town centre uses (Use Classes A1, A2, A3, D1 or D2), new employment floorspace (including four dedicated units for start-up businesses) (Use Class B1), a community meeting room and new and improved public open spaces, together with associated new landscaping, on-site access, servicing and disabled car parking

The development site is located to the east of West End Lane in the West Hampstead area of London. The area is characterised by dense urban development, mainly consisting of residential developments, with local shops and other commercial premises. The Thameslink railway is located approximately 20m to the south of the proposed development site boundary. The site is within the administrative area of the London Borough of Camden. The proposed site layout plan is provided in **Figure 1.1** below.

**Figure 1.1: Proposed Site Layout Plan - Ground Floor**


The purpose of this assessment is to determine the impact of noise on future residential occupants of the proposed development site. Recommendations for mitigation have also been made to minimise the impact of noise.

A glossary of acoustic terms is provided in **Appendix 1**.



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# 2. THE NATURE, MEASUREMENT AND EFFECT OF NOISE

Noise is often defined as sound that is undesired by the recipient. Whilst it is impossible to measure nuisance caused by noise directly, it is possible to characterise the loudness of that noise. 'Loudness' is related to both sound pressure and frequency, both of which can be measured. The human ear is sensitive to a wide range of sound levels. The sound pressure level of the threshold of pain is over a million times that of the quietest audible sound. In order to reduce the relative magnitudes of the numbers involved, a logarithmic scale of decibels (dB) is normally used, based on a reference level of the lowest audible sound.

The response of the human ear is not constant over all frequencies. It is therefore usual to weight the measured frequencies to approximate the human response. The resulting 'A' weighted decibel, dB(A), has been shown to correlate closely to the subjective human response.

When related to changes in noise, a change of ten decibels from say 60 dB(A) to 70 dB(A) would represent a doubling in 'loudness'. Similarly, a decrease in noise from 70 dB(A) to 60 dB(A) would represent a halving in 'loudness'. A change of 3 dB(A) is generally considered to be just perceptible[1]. **Table 2.1** details typical noise levels.

**Table 2.1: Typical Noise Levels**

| Approximate Noise Level (dB(A)) | Example |
|---|---|
| 0 | Limit of hearing |
| 30 | Rural area at night |
| 40 | Library |
| 50 | Quiet office |
| 60 | Normal conversation at 1 m |
| 70 | In car noise without radio |
| 80 | Household vacuum cleaner at 1 m |
| 100 | Pneumatic drill at 1 m |
| 120 | Threshold of pain |

[1] Communities & Local Government (1994). Planning Policy Guidance 24: Planning & Noise.



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# 3. LEGISLATION AND POLICY

## 3.1. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was released in March 2012 and has replaced the Planning Policy Guidance which previously covered planning and pollution control and new development in England. The purpose of the planning system is to contribute to the achievement of sustainable development. There are three dimensions to sustainable development: economic, social and environmental. The environmental role is to contribute to protecting and enhancing our natural, built and historic environment; and as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate to adapt to climate change including moving to a low carbon economy.

One of the core planning principles is to contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser value, where consistent with other policies in the Framework. 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.

Paragraph 123 of the NPPF states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts (see Explanatory Note to the Noise Policy Statement for England (DEFRA)) 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 use since they were established (Subject to the provisions of the Environmental Protection Act 1990 and other relevant law); 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.



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## 3.2. Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) aims to *'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'*

## 3.3. Planning Practice Guidance

The Planning Practice Guidance (PPG) was published in March 2014 and updated in December 2014. The PPG provides advice on how to determine the noise impact on development:

*Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:*

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.*

*In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.".'*

The document goes on to provide a definition for the levels of noise exposure at which an effect may occur:

"***Significant observed adverse effect level:*** *this is the level of noise exposure above which significant adverse effects on health and quality of life occur.*

***Lowest observed adverse effect level:*** *this is the level of noise exposure above which adverse effects on health and quality of life can be detected.*

***No observed effect level:*** *this is the level of noise exposure below which no effect at all on health and quality of life can be detected.*"

It is important to understand that as the PPG does not provide any advice with respect to specific noise levels/ limits for different sources of noise, it is appropriate to consider other sources of advice and guidance documents when considering whether new developments would be sensitive to the prevailing acoustic environment.



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## 3.4. London Plan

The London Plan was originally adopted in 2011 and the latest revision was published in March 2015. Policy 7.15 relates to noise and states:

"***POLICY 7.15 REDUCING AND MANAGING NOISE, IMPROVING AND ENHANCING THE ACOUSTIC ENVIRONMENT AND PROMOTING APPROPRIATE SOUNDSCAPES***

***Strategic***

*A The transport, spatial and design policies of this plan will be implemented in order to reduce and manage noise to improve health and quality of life and support the objectives of the Mayor's Ambient Noise Strategy.*

***Planning decisions***

*B Development proposals should seek to manage 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* [Local Development Framework] *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.*"

## 3.5. London Borough of Camden

LBC's Development Policies are contained for 2010 – 2025 are contained within Local Development Framework (adopted November 2010). Development Policy 28 gives guidance on noise within the Camden area and contains criteria, by way of Noise Thresholds, which when assessing planning applications LBC will have regard to the Noise Thresholds. The policy is reproduced below.



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***Policy 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.*

*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 (sic) 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.*

The criteria relevant to the proposed development are summarised in **Tables 3.1** and **3.2** below.

**Table 3.1: LBC's noise levels on residential sites adjoining roads and railways at which planning permission will not be granted**

| Noise Description and Location of the Measurement | Period | Time (hrs) | Sites Adjoining Railways | Site 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 $L_{Aeq.4h}$ | 72 dB $L_{Aeq.4h}$ |
| Noise at 1 metre external to a sensitive façade | Night | 2300-0700 | 66 dB $L_{Aeq.8h}$ | 66 dB $L_{Aeq.8h}$ |



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**Table 3.2: LBC's noise levels on residential sites adjoining roads and railways at and above which attenuation measures will be required**

| Noise Description and Location of the Measurement | Period | Time (hrs) | Site Adjoining Railways | Site 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 $L_{Aeq.4h}$ | 57 dB $L_{Aeq.4h}$ |
| Noise at 1 metre external to a sensitive façade | Night | 2300-0700 | 55 dB $L_{Aeq.8h}$ | 52 dB $L_{Aeq.8h}$ |
| Individual noise events several times in one hour | Night | 2300-0700 | >82 dB $L_{Amax}$ (S time weighting) | >82 dB $L_{Amax}$ (S time weighting) |

## 3.6. British Standard BS 8233:2014

BS 8233: *Sound Insulation and Noise Reduction for Buildings – Code of Practice* sets out design criteria and limits for intrusive external noise. The guidelines are designed to achieve reasonable resting/sleeping conditions in bedrooms and good listening conditions in other rooms and the most appropriate to the residential environment are reproduced in **Table 3.3**.

**Table 3.3: Indoor Ambient Noise Levels for Dwellings**

| Activity | Location | 07:00 – 23:00 | 23:00 – 07:00 |
|---|---|---|---|
| Resting | Living room | 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 $L_{Aeq,8hour}$ |

## 3.7. World Health Organization Guidelines for Community Noise

The World Health Organization (WHO) has developed guidelines designed to minimise the adverse effects of noise. The guidelines relevant to residential noise exposure are detailed in **Table 3.4**. For each specific environment the stated noise levels are the maximum noise levels to avoid the health effect noted.



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**Table 3.4: WHO Community Noise Guideline Values**

| Specific Environment | Critical health effect(s) | $L_{Aeq}$ dB | Time Base (hours) | $L_{Amax}$ (fast) dB |
|---|---|---|---|---|
| Outdoor living area | Serious annoyance, daytime and evening | 55 | 16 | - |
| | Moderate annoyance, daytime and evening | 50 | 16 | - |
| Dwelling, indoors | Speech intelligibility and moderate annoyance, daytime and evening | 35 | 16 | - |
| Inside bedrooms | Sleep disturbance, night-time | 30 | 8 | 45 |
| Outside bedrooms | Sleep disturbance, window open (outdoor values) | 45 | 8 | 60 |

The WHO guidelines state that with respect to the $L_{Amax}$ threshold that, '*For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB $L_{Amax}$ more than 10 – 15 times per night'* (Vallet and Vernet 1991).



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# 4. NOISE MEASUREMENT SURVEY

In order to determine the extent to which the site is affected by road traffic and railway noise, a detailed noise measurement study has been carried out at the application site. Noise measurements have been carried out in order to determine the overall $L_{Aeq,16hr}$ (0700hrs – 2300hrs) and $L_{Aeq,8hr}$ (2300hrs – 0700hrs) for the day and night time periods. We have also determined the $L_{Aeq,12hr}$ (0700hrs – 1900hrs) and $L_{Aeq,4hr}$ (1900hrs – 2300hrs) for the day and evening time periods in line with reporting requirements of LBC.

The noise measurements utilised a Rion NL-52 Type 1 Precision Sound Level Meter, which holds a current certificate of calibration. Before and after the measurement period the equipment was calibrated in order to ensure that the equipment had remained within reasonable calibration limits (+/- 0.5 dB).

Noise measurements were carried out between 1150hrs on Tuesday 16th June 2015 and 1200hrs on Wednesday 17th June 2015.

During the noise monitoring period the weather was dry and sunny, with some light easterly wind (<3m/s) and a temperature of approximately 20°C during the day, dropping to approximately 15°C at night.

Noise measurements were carried out at 1m from the south facing façade of the third floor overlooking the Thameslink railway. **Appendix 2** shows the microphone location during monitoring. The measurement location is considered to be a facade position and representative of the location of the proposed façade of the new building.

Due to the measurement position being located at the façade a correction of -3dB has been applied to determine the equivalent free-field noise levels. The noise measurement data is tabulated in **Appendix 3** and summarised in **Table 4.1** below:

**Table 4.1: Summary of Corrected Free-Field Noise Levels**

| Period (hrs) | $L_{Aeq}$ dB Free-Field | Average[1] $L_{Amax,S}$ dB |
|---|---|---|
| 0700 – 1900 | 67.6 | 91.8 |
| 1900 – 2300 | 65.5 | 90.4 |
| 0700 – 2300 | 67.4 | 91.8 |
| 2300 – 0700 | 60.2 | 80.7 |

1. Arithmetic average of the highest $L_{Amax}$ within each hourly period for the time period of interest.

The dominant noise source in the area was continuous road traffic on West End Lane with frequent railway pass-bys. The frequency of trains during the day was approximately 20 pass-bys per hour. Two train events were observed during the initial site visit which showed railway noise contributing to the $L_{Amax,S}$ levels of over 85 dB. There were seven occurrences



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throughout the measurement period of peak noise measurements greater than 95 dB $L_{Amax,S}$ and a review of the measurement time history shows the most likely sources for these could be activity noise from the adjacent Travis Perkins site, which would not be present once the development has been completed.

The night-time $L_{Amax,S}$ levels were in the range 64 - 93 dB, with an average of 76.3 dBA. The time history of the noise measurement data for the night-time period (2300hrs – 0700hrs) is presented in **Figure A3.1** in **Appendix 3**. **Figure A3.1** shows the measured $L_{Amax,S}$ levels decrease below 80 dBA after 0045hrs when the trains stop running and then increase again after 0600hrs as the train service begins. One exceedance of 80 dBA is noted at roughly 0345hrs and a review of the measurement time history shows the most likely source is a freight train.



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# 5. NOISE IMPACT ASSESSMENT

The measured noise levels have been compared with the LBC noise criteria given in **Tables 3.1** and **3.2**, which provide noise levels above which planning permission would not normally be granted or mitigation would be required. This comparison is given in **Table 5.1** below.

**Table 5.1: Summary of Measured Noise Levels**

| Period | Measured Facade Noise Level dB | Maximum Noise Level for Roads (Refusal of Planning Permission) | Maximum Noise Level for Railways (Refusal of Planning Permission) | Noise Criteria Level (Mitigation Required) | Comment |
|---|---|---|---|---|---|
| Day (0700hrs – 1900hrs) | 71 $L_{Aeq,12hr}$ | 72 $L_{Aeq,12hr}$ | 74 dB $L_{Aeq,12hr}$ | 62 $L_{Aeq}$ | Mitigation Required |
| Evening (1900hrs – 2300hrs) | 69 $L_{Aeq,4hr}$ | 72 $L_{Aeq,4hr}$ | 74 dB $L_{Aeq,4hr}$ | 57 $L_{Aeq}$ | Mitigation Required |
| Night (2300hrs – 0700hrs) | 63 $L_{Aeq,8hr}$ | 66 $L_{Aeq,8hr}$ | 66 dB $L_{Aeq,8hr}$ | 52 $L_{Aeq}$ | Mitigation Required |
| Night (2300hrs – 0700hrs) | 84 $L_{Amax}$ | - | - | >82 $L_{Amax}$ | Mitigation Required |

It can be seen, by reference to **Table 5.1**, that noise levels measured during the daytime and evening periods are below the levels where planning permission would normally be refused, but are above the level where noise mitigation would be required by LBC. It is recommended by ACCON that sound insulation measures are provided in order to reduce the future internal noise levels such that they do not exceed the criteria provided within BS 8233 and the WHO guidelines.



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# 6. DESIGN REQUIREMENTS

In order to ensure an acceptable noise environment within habitable rooms a suitable standard of sound insulation should be provided in accordance with BS8233 and the WHO guidelines.

The measured $L_{Amax}$ during the night-time period regularly exceeds 60 dB (the limit quoted by the WHO guidelines outside a bedroom window at night, as reproduced in Table 3.4). This means that the indoor sound pressure level could exceed 45 dB more than 10 times per night, assuming a 13 dB reduction from an open window. Therefore noise mitigation should be provided in order to reduce the maximum internal noise levels, and an alternative form of ventilation, such as acoustic trickle vents, provided such that windows are not required to be regularly opened at night. To ensure that the internal living conditions are acceptable in accordance with both BS 8233 and the WHO guidelines the external building elements will need to be designed to provide appropriate levels of sound insulation. The sound insulation requirements have been considered for the west and south facing facades as they are exposed to the highest noise levels. Demonstrating that the appropriate internal noise levels can be achieved for rooms located on these facades will also ensure that the appropriate standards can be achieved for the rest of the development.

A typical glazing system in a 10/12/6 configuration, with acoustic laminate on the inside pane, to give a Sound Reduction Index (SRI) of 40 dB could be used. Additionally, the rest of the facade build-up should be constructed to achieve a SRI of 55 dB. This can be achieved using a standard brick/block cavity wall. These specifications should be confirmed by more detailed calculations when the design of the proposed building has been developed. **Tables 6.1** and **6.2** identify the predicted period and maximum internal noise levels respectively for habitable rooms on the most exposed façade of the proposed development.

**Table 6.1: Predicted Internal Noise Levels - $L_{Aeq}$**

| Location | External Noise Levels (dB) | | Proposed Glazing $R_w$ (dB) | Internal Noise Levels (dB) | | Compliance with Criteria | | |
|---|---|---|---|---|---|---|---|---|
| | Daytime $L_{Aeq,16hrs}$ | Night-time $L_{Aeq,8hrs}$ | | Daytime $L_{Aeq,16hrs}$ | Night-time $L_{Aeq,8\ hrs}$ | BS 8233 | WHO | LBC |
| Living Room/ Bedroom | 68 | 60 | 40 | 28 | 20 | ✓ | ✓ | ✓ |

**Table 6.2: Predicted Internal Noise Levels - $L_{Amax}$**

| Location | External Noise Levels (dB) | Proposed Glazing $R_w$ | Internal Noise Levels (dB) | Compliance with Criteria | | |
|---|---|---|---|---|---|---|
| | Night-time $L_{Amax}$ | | Night-time $L_{Amax}$ | BS 8233 | WHO | LBC |
| Living Room/ Bedroom | 81 | 40 | 41 | ✓ | ✓ | ✓ |



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# 7. CONCLUSION

A detailed noise measurement study has been carried out at the site in order to determine whether, as a result of road traffic and railway noise, there are any significant constraints on developing the land for residential purposes.

The study has identified that LBC would require noise mitigation to be installed on this site to protect future residents against noise from road traffic and railway noise. It has been shown that, through the specification of building envelope sound insulation as described in **Section 6**, a good internal noise environment can be achieved within the residential units of the proposed development. This can be implemented with appropriately specified sound insulating windows, wall construction and consideration of ventilation measures. On this basis the development will achieve compliance with the noise level criteria given in BS 8233 and the WHO guidelines for the daytime and night-time periods.

Meeting the target noise criteria ensures compliance with the overall aims of paragraph 123 of the NPPF in that noise is not expected to result in any significant adverse effects on health or quality of life for future occupants of the proposed development.



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# Appendix 1
# Glossary of Terms



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# Appendix 1: Glossary of Terms

| Term | Description |
|---|---|
| ***'A'-Weighting*** | *This is the main way of adjusting measured sound pressure levels to take into account human hearing, and our uneven frequency response.* |
| ***Decibel (dB)*** | *This is a tenth (deci) of a bel. Decibel can be a measure of the magnitude of sound, changes in sound level and a measure of sound insulation. Decibels are not an absolute unit of measurement but are an expression of ratio between two quantities expressed in logarithmic form.* |
| $L_{Aeq,T}$ | *The equivalent steady sound level in dB containing the same acoustic energy as the actual fluctuating sound level over the given period, T. T may be as short as 1 second when used to describe a single event, or as long as 24 hours when used to describe the noise climate at a specified location. $L_{Aeq,T}$ can be measured directly with an integrating sound level meter.* |
| $L_{A10}$ | *The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 10 per cent of a given time and is the $L_{A10T}$. The $L_{A10}$ is used to describe the levels of road traffic noise at a particular location.* |
| $L_{A50}$ | *The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 50 per cent of a given time and is the $L_{A50T}$.* |
| $L_{A90}$ | *The 'A'-weighted sound pressure level of the residual noise in decibels exceeded for 90 per cent of a given time and is the $L_{A90T}$. The $L_{A90}$ is used to describe the background noise levels at a particular location.* |
| $L_{Amax}$ | *The 'A'-weighted maximum sound pressure level measured over a measurement period.* |



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# Appendix 2
# Noise Monitoring Location



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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Client:<br>A2 Dominion Developments Limited | | Description:<br>Noise Monitoring Location | | Design | BM | 01.07.2015 | accon UK ENVIRONMENTAL CONSULTANTS |
| | | | | Drawn | BM | 01.07.2015 | |
| Rev:<br>A | Description:<br>FINAL | 156 West End Lane, Camden | | Approved | DY | 01.07.2015 | *Appendix Two*<br>Scale: Not to Scale |



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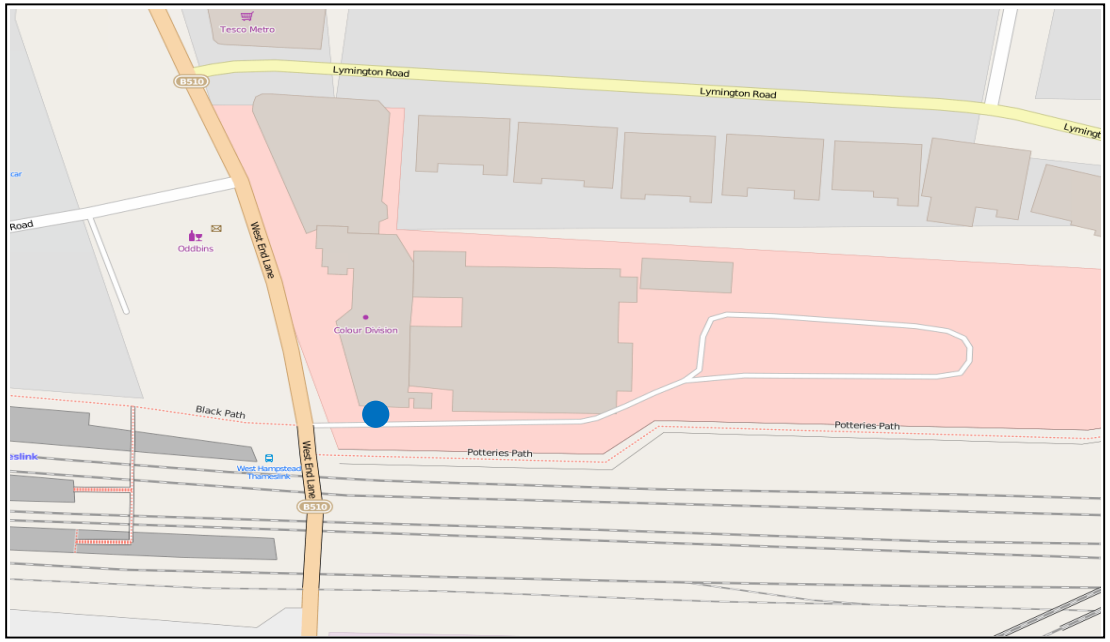


**LEGEND**

Noise Monitoring Position

N
W E
S

| | | | | | | |
|---|---|---|---|---|---|---|
| Client: A2 Dominion Developments Limited | | Description: Noise Monitoring Location | | Design | BM | 01.07.2015 |
| | | | | Drawn | BM | 01.07.2015 |
| Rev: A | Description: FINAL | 156 West End Lane, Camden | | Approved | DY | 01.07.2015 |

*Appendix Two*
Scale: Not to Scale



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# Appendix 3
# Noise Measurement Results



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| Time | $L_{Aeq}$ dB | $L_{Amax}$ dB | $L_{A10}$ dB | $L_{A90}$ dB |
|---|---|---|---|---|
| 07:00-08:00 | 70.0 | 93.4 | 71.0 | 58.8 |
| 08:00-09:00 | 72.0 | 96.7 | 72.3 | 59.2 |
| 09:00-10:00 | 70.6 | 93.4 | 72.0 | 59.3 |
| 10:00-11:00 | 73.4 | 100.0 | 72.1 | 58.7 |
| 11:00-12:00 | 70.4 | 96.7 | 71.6 | 59.0 |
| 12:00-13:00 | 70.1 | 95.4 | 71.6 | 59.5 |
| 13:00-14:00 | 71.2 | 97.1 | 73.0 | 59.1 |
| 14:00-15:00 | 69.8 | 93.0 | 70.7 | 58.4 |
| 15:00-16:00 | 69.0 | 92.4 | 70.3 | 58.4 |
| 16:00-17:00 | 69.3 | 91.6 | 69.7 | 58.2 |
| 17:00-18:00 | 71.2 | 95.6 | 73.1 | 58.4 |
| 18:00-19:00 | 71.9 | 97.1 | 71.9 | 58.6 |
| 19:00-20:00 | 69.1 | 93.5 | 70.1 | 57.2 |
| 20:00-21:00 | 69.3 | 99.9 | 69.6 | 55.9 |
| 21:00-22:00 | 67.3 | 87.7 | 68.0 | 55.4 |
| 22:00-23:00 | 67.9 | 92.6 | 66.9 | 54.2 |
| 23:00-00:00 | 64.6 | 89.6 | 66.5 | 51.9 |
| 00:00-01:00 | 64.9 | 89.9 | 65.5 | 49.2 |
| 01:00-02:00 | 58.5 | 80.3 | 62.3 | 44.3 |
| 02:00-03:00 | 56.7 | 77.4 | 59.0 | 43.2 |
| 03:00-04:00 | 60.8 | 85.7 | 62.1 | 42.3 |
| 04:00-05:00 | 57.5 | 76.2 | 61.7 | 43.3 |
| 05:00-06:00 | 62.4 | 84.4 | 65.7 | 47.6 |
| 06:00-07:00 | 65.6 | 86.0 | 68.1 | 54.1 |
| **07:00-23:00** | **70.4** | **94.8** | **70.9** | **58.0** |
| **23:00-07:00** | **68.5** | **83.7** | **68.7** | **55.7** |



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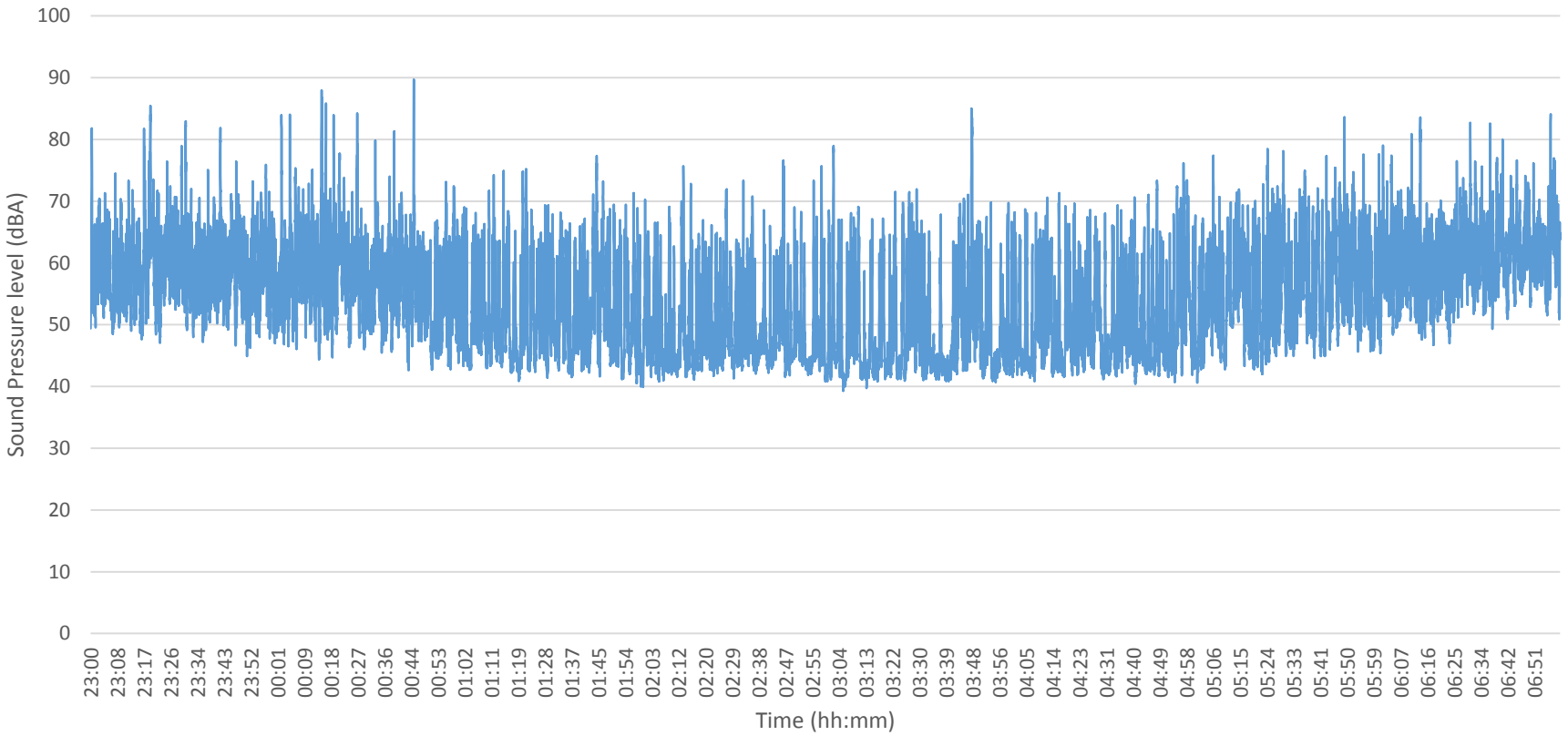
**Figure A3.1** Night Time - 156 West End Lane. Sound Pressure Level Time History



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