SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Pope's Road, Brixton

Planning noise and vibration report

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A	5 Nov 19		Philip Owen	Edward Farrer
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C	26 Mar 20		Edward Farrer	Andrew Long
D	27 Mar 20		John Sails	Edward Farrer

Summary

Sandy Brown has been commissioned by Trium Environmental Consulting (on behalf of AG Hondo Pope's Road BV) to provide acoustic advice in relation to the proposed development on land bound by railway lines to the north and south, Valentia Place to the east, and Pope's Road to the west, in Brixton, London, SW9 8JB (the 'site').

An environmental noise and vibration survey has been carried out at the site. The noise survey was carried out between 15 November 2019 and 22 November 2019. The vibration survey was undertaken on7 November 2019.

The representative free field background sound levels measured during the survey were L_{A90} 54 dB during the daytime and L_{A90} 44 dB at night.

Based on the requirements of the London Borough of Lambeth and on the results of the noise survey, all proposed plant must be designed, such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed L_{Aeq} 47 dB during the daytime and L_{Aeq} 37 dB during the night.

The average ambient noise levels measured during the survey were $L_{Aeq,16h}$ 60 dB during the daytime and $L_{Aeq,8h}$ 56 dB at night.

The vibration survey indicated that tactile vibration and re-radiated noise are unlikely to be problematic for the proposed development.

No adverse impacts are expected in respect of increases in traffic flow as a result of the development.

Contents

1 Introduction

Sandy Brown has been commissioned by Trium Environmental Consulting (on behalf of AG Hondo Pope's Road BV) to provide an assessment of noise and vibration in relation to the proposed office, retail and leisure development on land bound by railway lines to the north and south, Valentia Place to the east, and Pope's Road to the west, in Brixton, London, SW9 8JB (the 'site').

Environmental noise and vibration surveys have been carried out to establish:

- Background sound levels around the site and by nearby noise sensitive premises;
- Ambient and maximum noise levels at the site; and
- Vibration levels affecting the site.

The background sound levels measured during the survey have been used as the basis for setting limits for noise emission from the proposed building's services plant. These limits have been set in accordance with the requirements of the London Borough of Lambeth.

Ambient sound levels have been used to assess building envelope sound insulation requirements, to enable the achievement of appropriate internal noise levels within the proposed development.

Vibration levels have been used to assess the degree to which the proposed development will be affected by tactile vibration and re-radiated noise from the railway lines, which are situated adjacent to the north and south of the site. There is not anticipated to be any sources of vibration from the proposed uses on the site – and therefore no assessment of this has been undertaken.

This report provides details of the noise and vibration surveys, including measurement results.

2 Site description

2.1 The site and its surroundings

The site location in relation to its surroundings is shown in Figure 1.

The site, highlighted in red, is located adjacent to Brixton railway station, on the east side of Pope's Road. The site is bounded to the north and south by railway tracks. London Overground operate trains on the tracks to the south of the site and Southeastern operate trains on the tracks to the north. The tracks to the north of the site are not used as a regular services route. There is a further set of railway tracks used by Southeastern that cross under the Overground lines approximately 20 m to the west of the site.

Brixton Station Road runs parallel to the northern boundary of the site, immediately north of the railway tracks. Valentia Place runs parallel to the eastern boundary of the site, and Pope's Road runs parallel to the western boundary of the site

Figure 1 Aerial view of site showing noise measurement locations (courtesy of Google Earth Pro), V=vibration monitoring position, L = unattended noise monitoring and A = attended noise monitoring

2.2 Adjacent premises

On the western side of Pope's Road, there are retail units and Brixton railway station, as highlighted in green in Figure 1.To the north and south of the site, is Pop Brixton and Brixton Village respectively, highlighted in yellow. The nearest residential properties are located to the north and south of the site, highlighted in purple. Brixton recreation centre is located to the northwest of the site, diagonally opposite the site, across Pope's Road, highlighted in teal.

3 Development proposals

The development includes the demolition of the existing building and erection of a part G + 19, part G + 8 storey building comprising flexible A1/A3/B1/D1/D2 uses at basement, ground and first floor, with restaurant (A3) use on floor 8 and B1 accommodation on floors 2 to 19, with plant enclosures at roof level, and associated cycle parking, servicing and all necessary enabling works.

3.1 Potential noise sources from the proposed development

The potential noise sources from the proposed development can be broadly divided into two categories:

- Building services plant;
- Internal activity from offices, retail, and A3 uses; and
- Increases in road traffic along the local roads.

The offices and retail will operate typically and therefore noise breakout will be adequately controlled by virtue of the building envelope, which will be designed to achieve appropriate internal noise conditions.

The potential impact of building services plant has been assessed and mitigation measures have been suggested to minimise the impact on existing noise sensitive premises around the proposed development.

The potential impact of increases in road traffic along local roads has been assessed and no significant adverse impacts are expected.

4 Assessment criteria

4.1 NPPF and NPSE

The National Planning Policy Framework, June 2019 (NPPF) sets out the UK government's planning policies for England. It supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers.

The NPPF states:

> *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> - *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*

- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

and

> *"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

The NPSE states that its aims are as follows:

> *"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."*

As such, neither document sets out specific acoustic criteria for new commercial developments, but they require the consideration of the effect of existing noise on the new development and the effect of noise from the development on its surroundings.

4.2 Noise egress

4.2.1 Standard guidance

BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound* (BS 4142) provides a method for assessing noise from items such as building services plant against the existing background sound levels at the nearest noise sensitive premises.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc., a penalty (based on the type and impact of those features) is applied.

4.2.2 Local authority requirements

There is no specific guidance in relation to building services noise egress limits in the Adopted London Borough of Lambeth's Local Plan (January 2020 Draft plan), Unitary Development Plan (superseded) or Core Strategy (superseded) documents.

However, for previous developments in the area, Lambeth have required that assessments are carried out in accordance with BS 4142:2014 and that the specific sound level of noise emitted from the proposed building services plant is 10 dB less than background levels.

4.3 Noise ingress

The London Borough of Lambeth has no guidance or criteria that relates to control of internal noise levels within retail or office developments. Nevertheless, appropriate internal conditions will be provided through meeting the operator/developer's specification.

4.4 Tactile vibration criteria

4.4.1 Standard guidance

Tactile vibration is that which is perceived as mechanical motion. BS 6472-1:2008 *Guide to Evaluation of Human Exposure to Vibration in Buildings Part 1: Vibration Sources Other Than Blasting* provides procedures for assessing the potential human response to vibration.

Vibration is assessed in terms of the equivalent VDV. This relates the level and duration of vibration. The BS 6472-1:2008 assessment criteria are presented in Table 1.

Table 1 BS 6472-1: 2008 tactile vibration assessment criteria

VDV ($m/s^{1.75}$) above which might result in various probabilities of adverse comment within residential buildings.			
Place	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential buildings 16 hr day	0.2 – 0.4	0.4 – 0.8	0.8 – 1.6
Residential building 8 hr night	0.1 – 0.2	0.2 – 0.4	0.4 – 0.8

For offices and commercial buildings, BS 6472-1:2008 goes on to state that a multiplying factor of 2 should be applied to the above vibration does value ranges for the 16 h day period when the buildings will be occupied.

It is important to note that people exhibit wide variations of vibration tolerance. Specific values are dependent upon social and cultural factors, psychological attitudes and the expected degree of intrusion.

4.4.2 London Borough of Lambeth's requirements

There are no specific policies listed in the London Borough of Lambeth's Local Plan that relate to vibration within retail units, offices or gyms.

5 Survey method

5.1 Noise survey method

The noise survey included unattended and attended measurements.

5.1.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over a period of 8 days.

Details of the equipment used and the noise indices measured are set out in Appendix A.

The unattended measurements were taken over 1 minute periods between 12:57 on 15 November 2019 and 15:59 on 22 November 2019. The equipment was installed and collected by acoustic technicians Matt Higgins and Mason Ford.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'L'. A photograph showing the measurement location is provided in Figure 2 Measurements were taken 1 m above roof level and at least 3.5 m from other significant reflecting surfaces. The measurement position was approximately 10 m away from, and in direct line of sight to, the train tracks on the northern side of the site. This location was chosen as it was reasonably representative of those at the nearest noise sensitive premises.

Figure 2 Photo of unattended measurement location at front of building facing Pope's Road

5.1.2 Attended measurements

The attended noise measurements were carried out on 15 November 2019 by Matt Higgins and Mason Ford. The measurement location is shown as Position A in Figure 1. A photograph showing the measurement location is provided in Figure 3.

The microphone was mounted on a tripod located approximately 8 m above the roof level, to the same height as the elevated train tracks and at least 3.5 m from any other reflective surface. The primary purpose of this measurement position was to capture event noise levels from train passes. The measurement position was approximately 10 m from the centre of the elevated railway tracks, where trains pass. The duration of each measurement varied, depending on the duration of the train event.

Details of the equipment used and the noise indices measured are provided in Appendix A.

Figure 3 Photo of attended measurement location along the north facing the railway tracks

5.2 Vibration survey method

The vibration measurement location is shown as V in Figure 1. Vibration measurements were taken within the delivery bay of the existing premises, in order to determine the vibration levels resulting from the passage of trains on the railway tracks adjacent to the site.

The measurements were taken on 7 November 2019 by Nicolas Lum and Jason Setiadi between 14:30 and 16:00. Measurements were undertaken to capture train pass events which lasted for 10-30 seconds per train movement. Background measurements were also taken for reference.

Vibration levels were recorded using a tri-axial accelerometer and data recorder. The equipment setup is shown in Figure 4. The accelerometers were arranged on a mounting block that was connected to a ground-bearing concrete slab. A metal washer was fixed to the slab using a thin layer of epoxy adhesive, away from the boundaries of the room, with the mounting block attached to the washer.

The vibration measurements were conducted in three axes as follows:

- X axis - Horizontal vibration, approximately parallel to the railway tracks;
- Y axis - Horizontal vibration. approximately perpendicular to the railway tracks; and
- Z axis - Vertical vibration.

Figure 4 Vibration measurement location and equipment setup

Details of the equipment used and the vibration indices measured are provided in Appendix A.

Re-radiated noise caused by vibration from train movements was not audible at the measurement locations.

5.3 Weather conditions

Weather conditions during the surveys are described in Appendix A, but was generally clear and dry.

6 Measurement results

6.1 Observations

6.1.1 Noise

The dominant noise source observed at the site during the surveys was from trains. Train passage on tracks to the south of the site were much more frequent than those on tracks to the north. All train movements observed to the north of the site were out of service. Trains were travelling at a relatively slow speed on all adjacent tracks when they passed the site.

Access to the shops, located directly below the measurement positions, is along the western edge of the site from Pope's Road and there is a market hosted on the street outside. These noise sources were dominant when there were no train movements.

Less significant noise sources included road traffic and aircraft movements.

6.1.2 Vibration

There was no perceptual vibration at the measurement location. The occurrence of train movements was determined by monitoring the direct noise from the railway tracks.

6.2 Noise measurement results

6.2.1 Unattended measurement results

A graph showing the results of the unattended measurements is provided in Appendix B.

Day and night-time ambient noise levels measured during the unattended survey are presented in Table 2.

Table 2 Ambient noise levels measured during the unattended survey

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Friday 15 November 2019	-	56
Saturday 16 November 2019	61	58
Sunday 17 November 2019	59	55
Monday 18 November 2019	60	56
Tuesday 19 November 2019	61	55
Wednesday 20 November 2019	60	56
Thursday 21 November 2019	60	57
Average	60	56

In line with British Standard (BS) 4142:2014+A1:2019, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Daytime and night time statistical analysis of representative values for the site are given in Figure 5 and 6.

From this analysis, the representative background sound levels measured during the survey were L_{A90} 54 dB during the daytime and L_{A90} 44 dB at night.

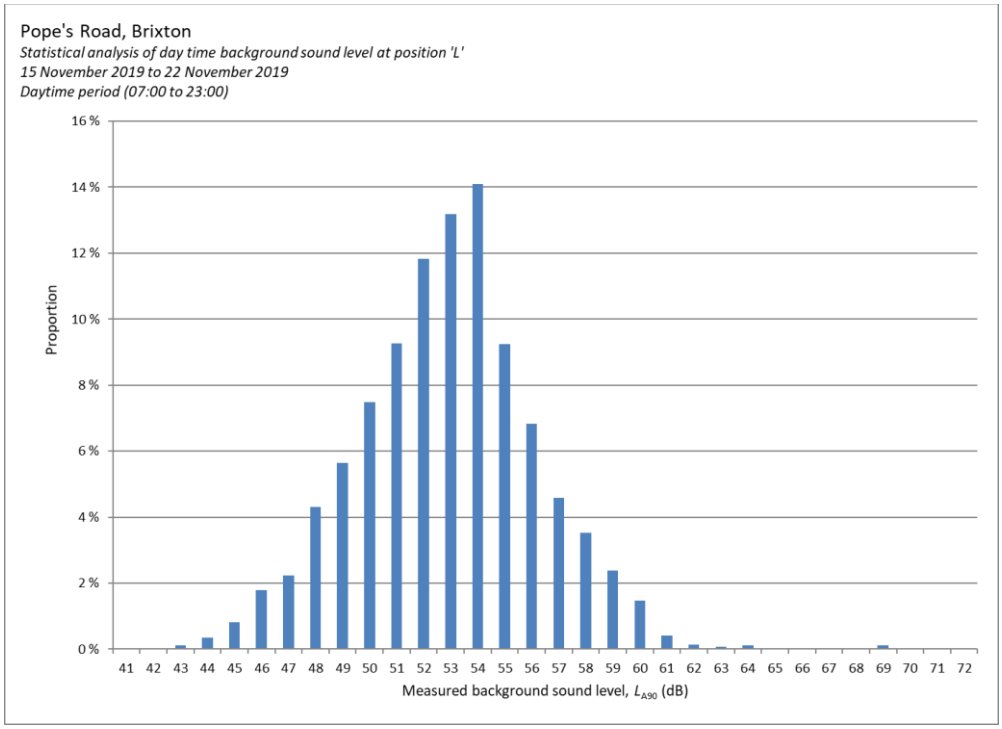


Figure 5 Day time background sound levels

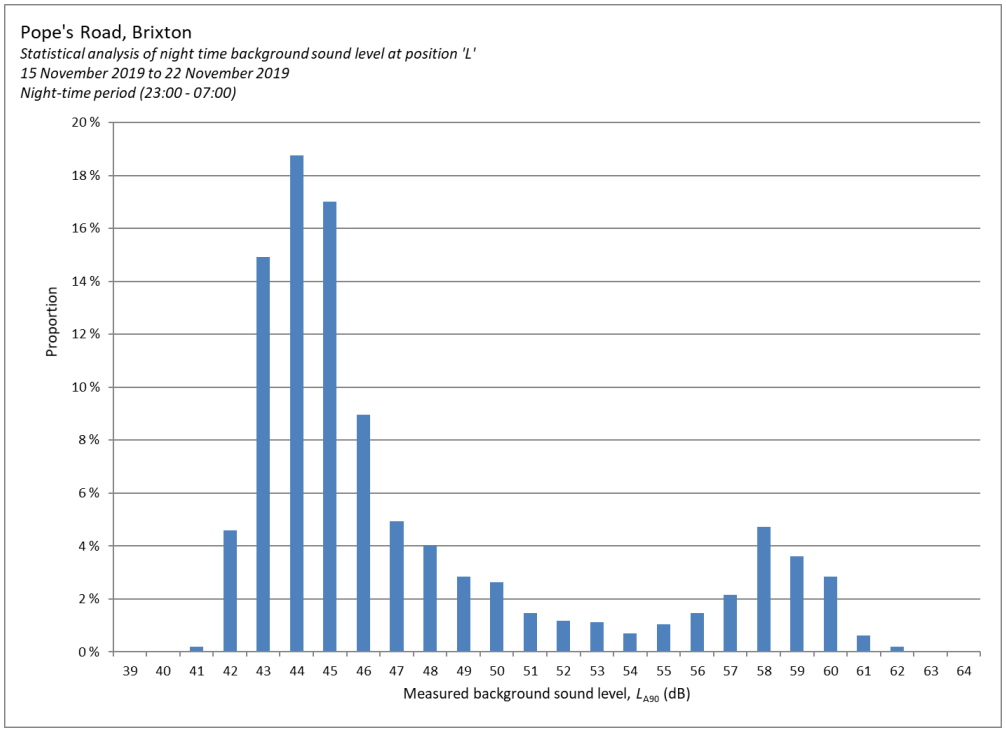


Figure 6 Night time background sound levels

6.2.2 Attended measurement results

Train movement noise levels recorded during the attended measurements are summarised in Table 3. Measurements were free-field.

Table 3 Noise levels from attended measurements

Start time	Duration (seconds)	Sound pressure levels (dB)	
		$L_{AFmax,T}$	$L_{Aeq,T}$
12:22:09	112	88	80
12:24:30	19	73	65
12:26:00	16	71	66
12:27:15	49	76	67
12:31:52	25	70	65
12:36:58	19	71	65
12:38:56	31	71	63
12:40:32	23	71	65
12:48:17	25	75	65
12:51:09	22	78	70
12:51:36	18	70	64
12:54:40	14	75	66
12:54:57	20	76	68
12:57:54	41	93	78
13:01:43	42	79	72
13:09:22	16	74	65
13:09:48	25	66	61
13:15:26	29	70	64
13:24:15	15	81	70
13:27:59	26	67	62

6.3 Vibration measurement results

The measured vibration does values (VDVs) in each direction are presented in Table 4.

A graph of train and background acceleration level in the vertical axis is presented in Appendix C.

Table 4 Measured VDVs in the delivery bay

Ref.	Start time (hh:mm)	Event	VDV ($m/s^{1.75}$)		
			X	Y	Z
1	14:44	Train	0.0005	0.0003	0.0012
2	14:46	Train	0.0004	0.0003	0.0006
3	14:46	Train	0.0006	0.0007	0.0019
4	14:49	Train	0.0004	0.0004	0.0015
5	14:52	Train	0.0005	0.0004	0.0015
6	14:53	Train	0.0006	0.0005	0.0019
7	14:55	Train	0.0004	0.0003	0.0011
8	14:56	Train	0.0003	0.0004	0.0016
9	15:04	Background	0.0004	0.0002	0.0003
10	15:10	Train	0.0003	0.0003	0.0011
11	15:15	Background	0.0002	0.0002	0.0002
12	15:16	Train	0.0003	0.0003	0.0016
13	15:17	Background	0.0003	0.0002	0.0002
14	15:22	Train	0.0002	0.0002	0.0008
15	15:25	Train	0.0003	0.0003	0.0016
16	15:25	Train	0.0002	0.0003	0.0011
17	15:28	Train	0.0002	0.0003	0.0014
18	15:29	Background	0.0002	0.0003	0.0002
19	15:35	Train	0.0001	0.0001	0.0004
20	15:39	Train	0.0003	0.0003	0.0010
21	15:41	Train	0.0002	0.0003	0.0010
22	15:43	Train	0.0003	0.0003	0.0012

Ref.	Start time (hh:mm)	Event	VDV ($m/s^{1.75}$)		
			X	Y	Z
23	15:45	Train	0.0002	0.0003	0.0012
24	15:50	Train	0.0002	0.0003	0.0008
25	15:50	Background	0.0002	0.0002	0.0001
26	15:51	Train	0.0002	0.0003	0.0010
27	15:53	Background	0.0002	0.0002	0.0001
28	15:55	Train	0.0002	0.0003	0.0011
29	15:55	Train	0.0003	0.0004	0.0006

7 Plant noise limits – noise egress

7.1 Basic limits

Based on the requirements of the London Borough of Lambeth and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 5.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as façade levels. These have been corrected relative to the measured free field background noise levels by the addition of 3 dB.

Table 5 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,1min}$ (dB)
Daytime (07:00-23:00)	47
Night-time (23:00-07:00)	37

7.2 Assessment

All building services plant will be designed to achieve the noise limits set out in Table 5, including any corrections for attention catching features. A planning condition would be imposed on the development, so that the noise emissions from the plant meets the criteria.

8 Vibration assessment

8.1 Tactile vibration

BS 6472 states that the assessment of tactile vibration should be based on the axis along which the highest VDV is measured. At the measured location, the highest VDVs were measured on the vertical (Z) axis.

Published timetables indicate that approximately 320 trains pass on the tracks adjacent to the site between 07:00 – 23:00. At night, between 23:00 – 07:00, 60 trains are timetabled to use the train lines adjacent to the site.

Based on the maximum vibration values fromTable 4 Table 6 and the number of trains passing on the tracks between 07:00 – 23:00 and 23:00 – 07:00, the total VDVs over a 16 hour day and an 8 hour night are as shown in Table 6.

Table 6 Total vibration dose values

Location	Maximum VDV measured ($m/s^{1.75}$)	Total VDV ($m/s^{1.75}$)	
		Daytime (07:00 – 23:00)	Night time (23:00 – 07:00)
Delivery bay	0.002	0.008	0.005

These predicted total VDVs, calculated to occur during the daytime and night periods, are lower than the thresholds of the 'low probability of adverse comment' categories noted in Table 1.

Vibration levels anticipated to occur may vary, depending on the type of train and position of the future buildings. However, the measured vibration levels were below the lowest BS 6472 threshold and a significant increase in the number of trains would be required for the lowest threshold to be exceeded. Based on this, tactile vibration due to trains is considered unlikely to be problematic for the proposed development.

9 Increases in road traffic noise

Information relating to the expected road traffic flows for the future cases both with and without the development have been received from Trium Environmental Consulting.

The projected road traffic flow data are presented in Table 7, along with the expected change in noise level associated with the change in traffic flows.

Table 7 Increases in traffic flow

Link number	Link name	2024 future baseline		2024 future baseline with development		Difference	Expected change in noise level
1	Brixton Station Road	1,517	7.0%	1,557	7.0%	40	<1 dBA
2	B223 Atlantic Road	6,949	8.6%	7,065	8.6%	115	<1 dBA
3	Pope's Road	667	1.6%	707	1.9%	40	<1 dBA
4	Valentia Place	1,979	9.2%	2,167	8.9%	188	<1 dBA
5	A23 Brixton Road	31,618	15.4%	31,754	15.4%	137	<1 dBA
6	A203 Stockwell Road	14,422	11.1%	14,467	11.1%	46	<1 dBA

By comparison with standard guidance set out within the Institute of Environmental Management and Assessment (IEMA) and Institute of Acoustics (IOA) Guidelines for Noise Impact Assessment, an increase of < 1 dBA would mean that the noise increase would unlikely be discernible and would have a negligible impact on receptors.

10 Proposed mitigation measures

10.1 Plant noise egress

A planning condition, stipulating that the maximum sound pressure level is 10 dB less than background levels is recommended. The plant equipment would need to be designed to meet the criteria.

10.2 Increases in road traffic noise

No mitigation is considered necessary in respect of increases in traffic flow expected as a result of the development.

11 Conclusion

The minimum measured background sound levels were L_{A90} 54 dB during the day, and L_{A90} 44 dB during the night. Based on the requirements of the LBL, the relevant plant noise limits at the worst affected existing noise sensitive premises are L_{Aeq} 47 dB during the day and L_{Aeq} 37 dB during the night. These limits are cumulative, and apply with all proposed plant operating under normal conditions.

Assessments of tactile vibration indicate that these are unlikely to be problematic for the proposed development.

No adverse impacts are expected in respect of increases in traffic flow as a result of the development.

Appendix A

Survey details

Survey equipment

The unattended and attended noise measurements were taken using a Rion NL-32 sound level meter and a Rion NL-52 sound level meter, respectively.

Tri-axial acceleration measurements were carried out using a Rion PV-87 accelerometer and recorded using a Rion DA-20 data recorder.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Data Recorder	DA-20/10870889	Rion	11 Sep 21	TCRT19/1712
Accelerometer	PV-87/33827	Rion	10 Sep 21	TCRT19/1708
Accelerometer	PV-87/74274	Rion	9 Dec 21	TCRT19/1707
Accelerometer	PV-87/33829	Rion	9 Sep 21	TCRT19/1706
Vibration Calibrator	AT01/3015	AP Technology	10 Sep 21	TCRT19/1709
Sound level meter	NL-32/00623761	Rion	27 Sep 21	TCRT19/1740
Microphone	UC-53A/319233	Rion	27 Sep 21	TCRT19/1740
Pre-amp	NH-21/36669	Rion	27 Sep 21	TCRT19/1740
Calibrator	NC-74/34536129	Rion	27 Sep 21	TCRT19/1739
Sound level meter	NL-52/00264531	Rion	25 Jun 20	TCRT18/1553
Microphone	UC-59/09678	Rion	25 Jun 20	TCRT18/1553
Pre-amp	NH-25/64656	Rion	25 Jun 20	TCRT18/1553
Calibrator	NC-74/34367630	Rion	25 Jun 20	TCRT18/1551

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

Vibration indices

For each measurement period, a number of parameters were recorded. The most relevant of these are described below:

- The vibration dose value (VDV) in each of three axes, with the appropriate frequency weightings (as defined in BS 6472-1:2008).
- The maximum RMS acceleration levels in each of three axes, in one-third-octave bands, measured using the 'slow response' exponential time weighting.

Weather conditions

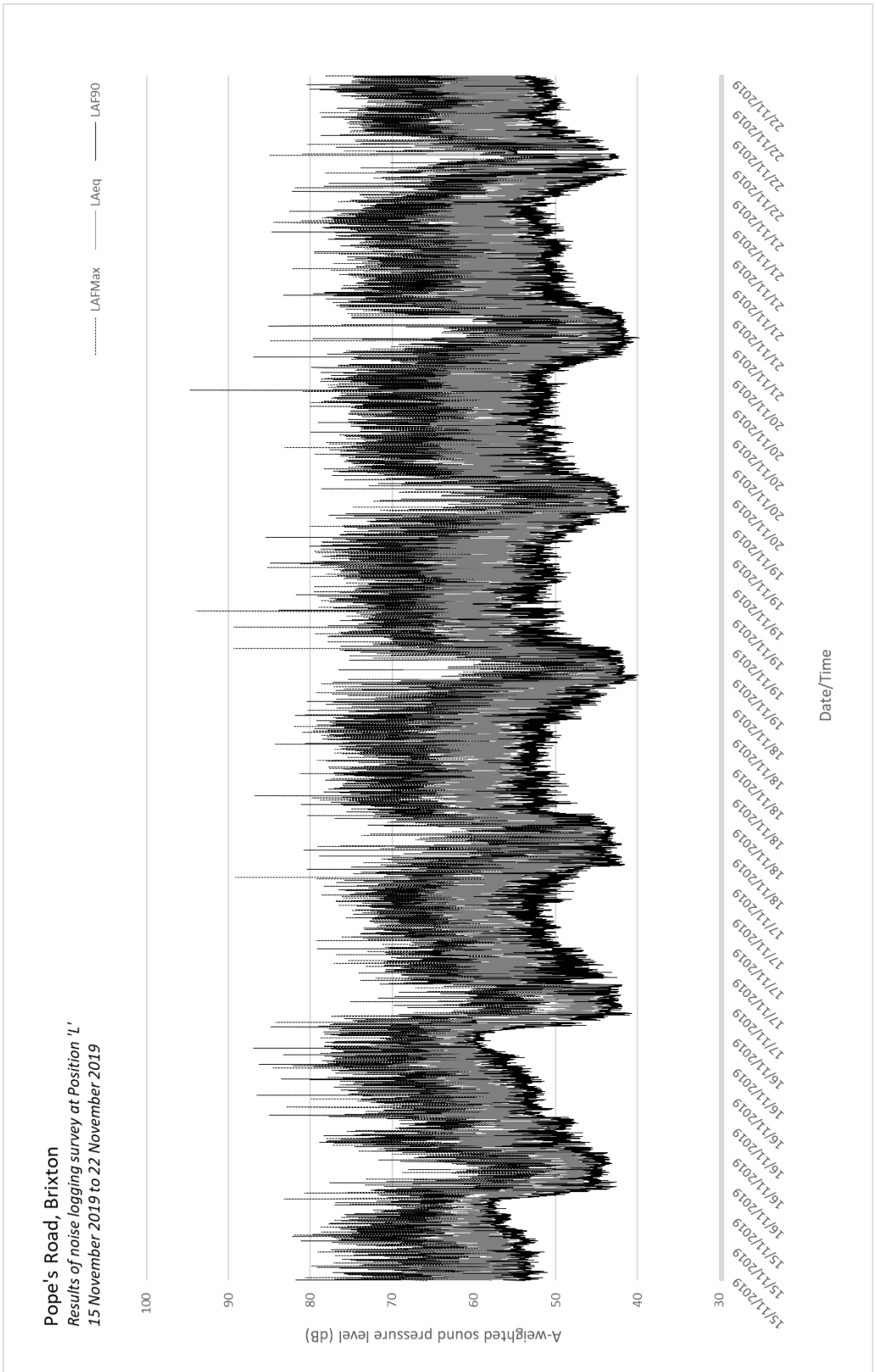
During the attended noise measurements, the weather was generally clear and dry, no rain occurred and wind speeds were less than 4.5 m/s.

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between 1°C at night and 10°C during the day, and average daily wind speeds varied between 1.1 m/s and 5.1 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

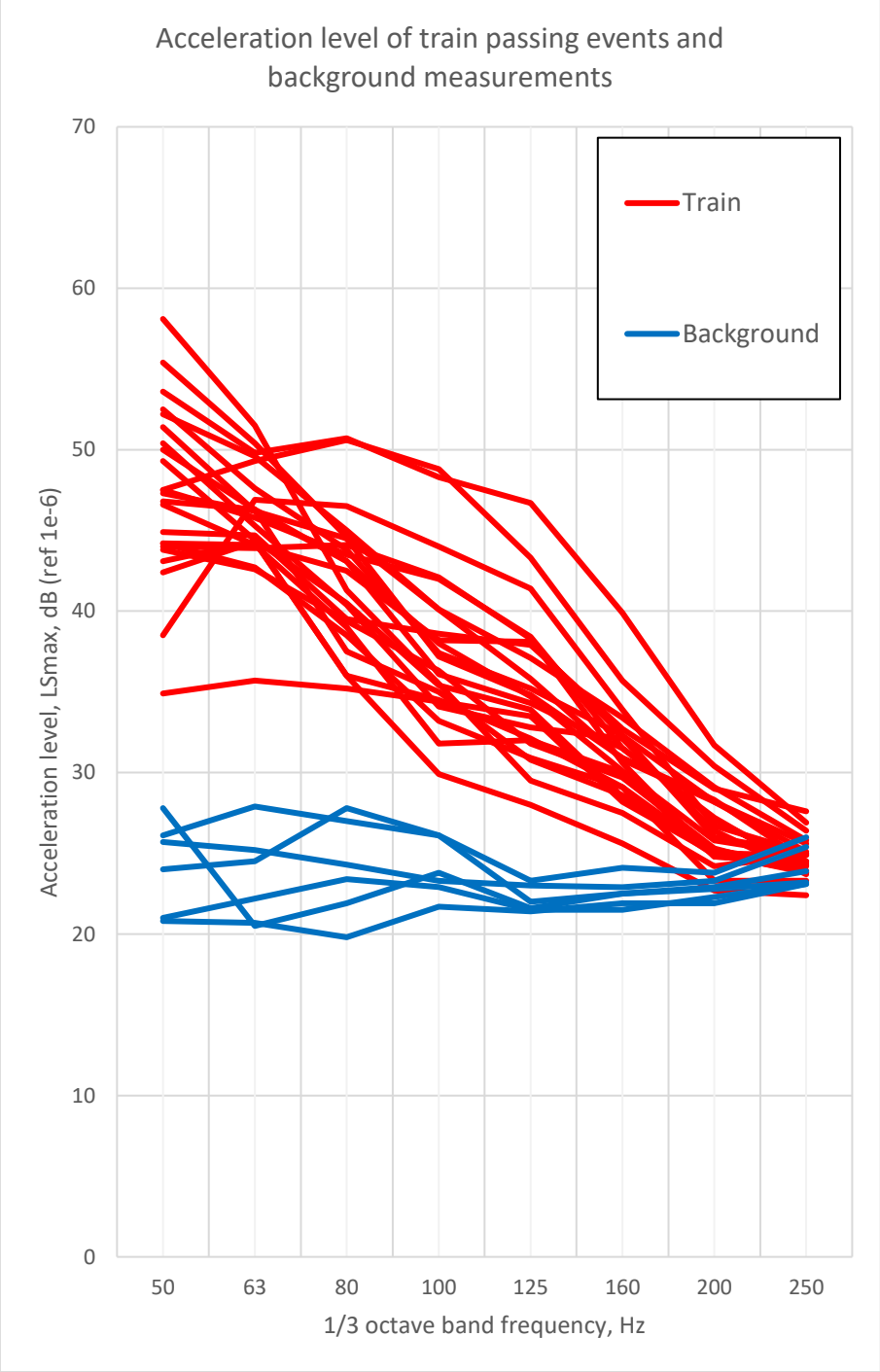
Appendix B

Results of unattended measurements at Location 'L'


Pope's Road, Brixton
Results of noise logging survey at Position 'L'
15 November 2019 to 22 November 2019
LAFMax
LAeq
LAF90
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
Date/Time
15/11/2019
16/11/2019
17/11/2019
18/11/2019
19/11/2019
20/11/2019
21/11/2019
22/11/2019

Appendix C

Measured RMS acceleration results at Location ‘V’


Acceleration level of train passing events and background measurements
Train
Background
Acceleration level, LSmax, dB (ref 1e-6)
70
60
50
40
30
20
10
0
50
63
80
100
125
160
200
250
1/3 octave band frequency, Hz