ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 2074

19 September 2014

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1 TO 5 PORTPOOL LANE

ENVIRONMENTAL NOISE IMPACT ASSESSMENT

ACOUSTIC CONSULTANCY REPORT 2074/ENIA

Revision	Date	Issued By	Revision Notes
-	4 August 2014	Chris Middleton	Initial issue
A	19 September 2014	Chris Middleton	Revised for planning issue

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1.0 SUMMARY

The proposal is to construct a new building with offices at basement and ground floor level with apartments above, as shown on the planning application drawings.

An environmental noise survey has been undertaken to determine the noise levels generated by the dominant noise sources affecting the development site.

The measured incident noise levels have been checked against the thresholds defined in Camden development policy DP28, with the conclusion that the site should be suitable for residential development with appropriate noise attenuation. Suitable acoustic performance specifications for the glazing and ventilation openings have been calculated, and with the proposed double glazed units and MVHR the development conforms to Camden's guidelines.

The environmental noise impact of the proposed plant installations on existing noise sensitive properties in the surrounding area has been checked, and would also be compliant with policy DP28.

Noise transmission from the proposed plant to the proposed flats has also been calculated, with negligible resultant noise levels inside the proposed flats.

Guidance on acoustic separation between the residential and commercial uses is also provided, and for office use on the lower levels the means of compliance with Building Regulations Requirement E1 should be sufficient.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The site is located on Portpool Lane, a predominantly residential Central London street, and is currently an office block. Portpool Lane is a cul-de-sac to motor vehicles and joins the A5200 Grays Inn Road some 25 metres away to the west.

There is an apartment block adjoining the site to the east, with others to the north and on the opposite side of Portpool Lane, along with the 'Bourne Estate' gardens. To the west of the site are mixed use buildings fronting onto Grays Inn Road, generally with commercial units at ground level and offices or residential apartments above.

Portpool Lane joins Clerkenwell Road around 100 metres away to the north and High Holborn around 300 metres away to the south. The nearest overground railway is about 450 metres away to the east.

2.2 Proposed Development

The proposal is to construct a new building to form offices at basement and ground floor level with apartments above, as shown on the planning application drawings.

2.3 National Planning Policy

The National Planning Policy Framework (NPPF) sets out the general terms of reference for sustainable development, including noise. Section 123 states that:

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 tranquility which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

However, neither the NPPF nor the supplementary guidance Noise Policy Statement for England (NPSE) contain any fixed noise criteria, assessment methods or references to established standards such as BS 4142 or BS 8233.

For this development the key principles to be applied from the NPPF are

i. to ensure that the development provides satisfactory health and quality of life for the new occupants of the residential houses

ii. to ensure that existing businesses in the surrounding area may continue in their business without unreasonable restrictions arising from the development of the site

iii. to protect existing residents from noise generated by the development.

The first and second of the above principles can be addressed by designing the new dwellings with adequate control of external noise intrusion, while the third requires consideration of environmental noise emissions from new plant installations.

2.4 Local Planning Policy

The introduction to the Camden development policy DP28 reads as follows:

> *The Council will seek to ensure that noise and vibration is controlled and managed and will not grant planning permission for:*
>
> *i) development likely to generate noise pollution; or*
>
> *ii) 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 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 the development. Where these phases are likely to cause harm, conditions and planning obligations may be used to minimise the impact.*

DP28 goes on to provide tables of noise thresholds for existing external noise affecting new noise sensitive developments (Tables A and B) and for new plant noise affecting existing noise sensitive developments (Table E).

2.5 Strategy for Acoustic Assessment

The following strategy has been used for the acoustic assessment of the proposed development:-

i. undertake an environmental noise survey to determine the noise levels on the site, as described in Section 3.0 below

ii. provide guidance on the measures necessary to control external noise intrusion to the dwellings, as described in Section 4.0 below

iii. calculate environmental noise emissions from new plant installations, as described in Section 5.0 below

iv. provide guidance on acoustic separation between the residential and commercial uses, as described in Section 6.0 below.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Instrumentation

The survey was conducted using the following instrumentation:-

Svantek Svan 958 4 Channel Sound and Vibration Analyser
2 no. Svantek SV22 ½ inch Microphones with Windshields
Norsonic 1251 Microphone Calibrator

The sound level meter was calibrated at the beginning of the survey period, and the calibration checked at the end. No significant drift occurred.

3.2 Procedure

An environmental noise survey was undertaken between 15:10 hours on Thursday 24 July 2014 and 13:10 hours on Monday 28 July 2014, thereby covering a 4 day period including a weekend.

Two measurement positions were selected in order to obtain representative measurements of the noise climate at the front and rear of the existing building.

These are shown on the attached site plan 2074/SP1 and described below:

i. at the south-west corner of the building, at 1 metre out from the roof edge
ii. at the north-west corner of the building, at 1.5 metres above the roof

At both measurement positions the Svantek 958 sound level meter was set to log the 100ms short term dB(A) and octave band L_{eq} sound pressure levels for the duration of the survey, for subsequent post processing.

3.3 Results

The logged data has been post-processed to determine the 5-minute L_{90}, L_{eq} and L_{max} dB(A) sound pressure levels, which are presented on the attached time history graphs 2074/TH1 and TH2 for measurement positions 1 and 2 respectively.

There was limited variation in $L_{eq,T}$ from day to day, and average $L_{eq,T}$ spectra for all day-time and night-time periods are plotted on the attached graphs 2074/G1 and 2074/G2.

Please refer to Appendix A for explanation of the statistical noise units and the "A" weighted dB scale - dB(A) - used in this Report.

3.4 Existing Noise Climate

As the survey was predominantly unmanned, it is not possible to give a detailed description of the noise climate for the entire survey period. However, at the beginning and end of the survey the levels were controlled by a combination of local road traffic and occasional aircraft, and in the absence of any other significant noise sources locally, it is reasonable to assume that the levels were generally controlled by those sources for the duration of the survey.

3.5 Weather Conditions

As the survey was predominantly unmanned, it is not possible to give a detailed description of the weather forecast for the entire survey period. However, at the beginning and end of the survey, the weather was dry with no more than a light breeze, with generally similar conditions forecast for the intervening period.

4.0 EXTERNAL NOISE INTRUSION INTO NEW DWELLINGS

4.1 Incident noise levels

When assessing external noise intrusion into new dwellings, it must be borne in mind that the noise climate may change in the future. The following discussion is by necessity based on the results of the environmental noise survey described in Section 3.0 above.

$L_{eq,T}$ for the day, evening and night time periods have been calculated from the results as follows:

	$L_{eq,\ 12\ hour}$ 07:00 - 19:00	$L_{eq,\ 4\ hour}$ 19:00 - 23:00	$L_{eq,\ 8\ hour}$ 23:00 - 07:00	Typical L_{max} 23:00 - 07:00
Portpool Lane (position 1)	61 dB(A)	60 dB(A)	58 dB(A)	71 dB(A)
Rear (position 2)	57 dB(A)	56 dB(A)	53 dB(A)	66 dB(A)

With minimal traffic on Portpool Lane, it is reasonable to assume that the levels measured at position 1 are representative of the facade as a whole. At the rear, the levels are likely to be lower than those measured at position 2, having superior acoustic screening from the traffic on Grays Inn Road, and the incident noise levels for the rear elevation can therefore be considered a worst case scenario.

The Noise Thresholds for sites adjoining roads in DP28 are as follows, all applicable at 1 metre external to a sensitive facade:

	$L_{eq,\ 12\ hour}$ 07:00 - 19:00	$L_{eq,\ 4\ hour}$ 19:00 - 23:00	$L_{eq,\ 8\ hour}$ 23:00 - 07:00	L_{max} 23:00 - 07:00
Table A	72 dB(A)	72 dB(A)	66 dB(A)	-
Table B	62 dB(A)	57 dB(A)	52 dB(A)	82 dB(A)

The DP28 guidance is that where noise levels on a site exceed the Table A values 'planning permission will not be granted', while for noise levels exceeding the Table B values 'attenuation measures will be required'.

A comparison of the measured levels with the DP28 threshold values reveals that the incident noise levels are in all cases below the Table A values but slightly above the Table B values.

On that basis the site is suitable for residential development in principle, with appropriate noise attenuation measures.

4.2 Internal Noise Design Criteria

DP28 references the Camden Noise Strategy (2002) which itself references the World Health Organisation internal ambient noise criteria for dwellings, as follows:

	$L_{eq, T}$	L_{max}
Day 07:00 - 23:00	35 dB(A)	-
Night 23:00 - 07:00	30 dB(A)	45 dB(A)

4.3 Analysis of External Noise Intrusion

The proposal is to ventilate the apartment using full ducted MVHR type ventilation units, eliminating the need for trickle ventilation openings.

Based on the incident noise levels in Section 4.1 above and the internal noise criteria in Section 4.2 above, overall noise reduction requirements for the front and rear facades are as follows:

Facade	Overall noise reduction required by parameter		
	$L_{eq, 16\ hour}$ 07:00 - 23:00	$L_{eq, 8\ hour}$ 23:00 - 07:00	L_{max} 23:00 - 07:00
Portpool Lane (position 1)	26 dB(A)	28 dB(A)	26 dB(A)
Rear (position 2)	22 dB(A)	23 dB(A)	21 dB(A)

The sound insulation performance of the walls should easily exceed that of the glazing, and it is therefore the glazing that will determine the overall sound insulation of the building facades.

Analysis predicts that the internal noise criteria defined in Section 4.2 above can be achieved with glazing in accordance with the specifications set out in the attached table 2074/T1, taking into account the sound absorption provided by normal residential finishes and furniture.

5.0 ENVIRONMENTAL NOISE EMISSIONS

5.1 Basis of Assessment

Details of the proposed fixed plant installations serving the development are set out in the attached plant noise schedule 2074/PNS, with plant locations shown on the planning application drawings.

As all the plant is to be located in a sheltered alley between the proposed building and the adjoining 88-98 Grays Inn Road, it will be reasonably well screened from the various existing residential properties in the surrounding area, although some windows of the proposed flats will overlook the plant area.

Reference to the attached time history graphs reveals a minimum background (L_{90}) level of 39 dB(A).

5.2 Noise Impact Assessment on Existing Residential Properties

Based on the information in Section 5.1 above, analysis using Cadna/A noise mapping software has been undertaken, following the ISO 9613-2 method, with 1st order reflections and ground absorption taken into account where appropriate.

The resultant noise levels at the nearest residential windows are as follows:

	$L_{eq,T}$ dB at octave band centre frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Apartments north of site	41	37	35	31	26	22	14	12	33
Bourne Gardens south-east of site	29	26	23	16	10	4	-5	-14	19

Table E of DP28 stipulates that noise from plant and machinery should be controlled to at least 5 dB(A) below the existing $L_{90,5mins}$ at 1m external to noise sensitive facades, or 10 dB(A) below if the noise contains distinct tones or impulsive properties.

There is no absolute definition of tonality, although one commonly used is that if the noise level in any octave band exceeds that in both adjacent bands by 5 dB or more then the noise can be considered tonal. Reference to the predicted octave band $L_{eq,T}$ in the above table reveals that this is not the case.

Additionally, the plant associated with this development does not normally operate in an impulsive way. On that basis, the predicted levels of up to $L_{eq,T}$ 33 dB(A) at the nearby existing residential properties would be compliant with the DP28 requirements, being more than the required 5 dB(A) below the otherwise prevailing background level.

5.3 Noise Impact on Proposed Flats

As the proposed plant installations serve the proposed flats, it is not physically possible to remove them to a location where the resultant noise levels at the proposed dwellings are 5 dB(A) below the otherwise prevailing background level, in the same way as for existing dwellings.

However, as the apartments are to benefit from MVHR systems, the windows would not need to be open for satisfactory ventilation, and the comparison with the existing background level outside the windows of the proposed flats is less important than the resultant noise level inside the proposed flats. The development must be considered as a whole, taking into account the acoustic protection provided by the proposed glazing and the MVHR ventilation system.

Based on the information in Section 5.1 above and acoustic performance specifications for the glazing set out in the attached table 2074/T1, analysis predicts a resultant noise level of 24 dB(A) / NR19 inside the flats overlooking the plant area, well within the current BS 8233 : 2014 lowest limit of 30 dB(A) for dwellings during the night and close to inaudibility.

On that basis it is reasonable to conclude that the proposed plant is acoustically suitable for the proposed development.

6.0 ACOUSTIC SEPARATION BETWEEN OFFICE AND RESIDENTIAL AREAS

6.1 Introduction

Where offices, shops or similar small businesses are located adjacent to or beneath residential dwellings, it is important to ensure that noise breakout from the commercial units does not cause nuisance or disturbance to the occupants of the flats. This effectively means that noise generated by the ground floor units should be inaudible in the flats.

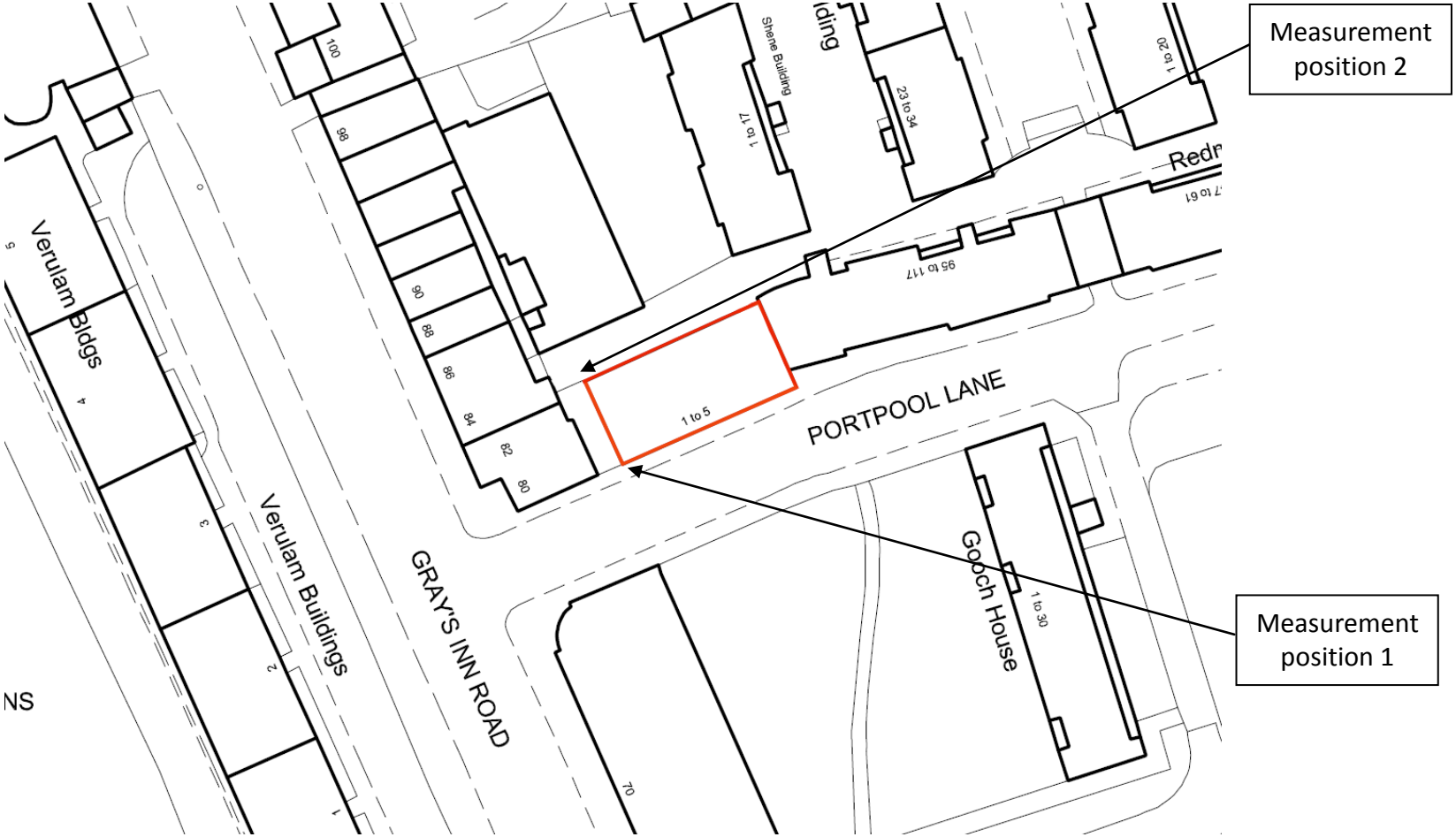
The amount of sound insulation required between the commercial units and the residential dwellings will be dependent how much noise will be generated inside the commercial units, which is clearly an unknown quantity and outside the control of the Developer or the future occupants of the flats.

6.2 Indicative Design Proposals

For a new building, Approved Document E of The Building Regulations requires the structures between the commercial units and the residential accommodation to provide airborne sound insulation of at least $D_{nT,w} + C_{tr}$ 45 dB, and a higher level of nominally 50 dB should be readily achievable.

This should provide adequate sound insulation against levels of up to around 75 dB(A) in the commercial units which would be sufficient for most small retail and office environments, for example. It would therefore seem appropriate for the Developer to provide a structure that satisfies the Approved Document E requirements and for the office or retail tenant to be responsible for providing any additional sound insulation they may require.

FOR ACOUSTIC DESIGN TECHNOLOGY



Notes	**Description** Site plan showing measurement positions	
	Project 1 to 5 Portpool Lane	
	Date 19 September 2014	**Drawing No.** 2074/SP1

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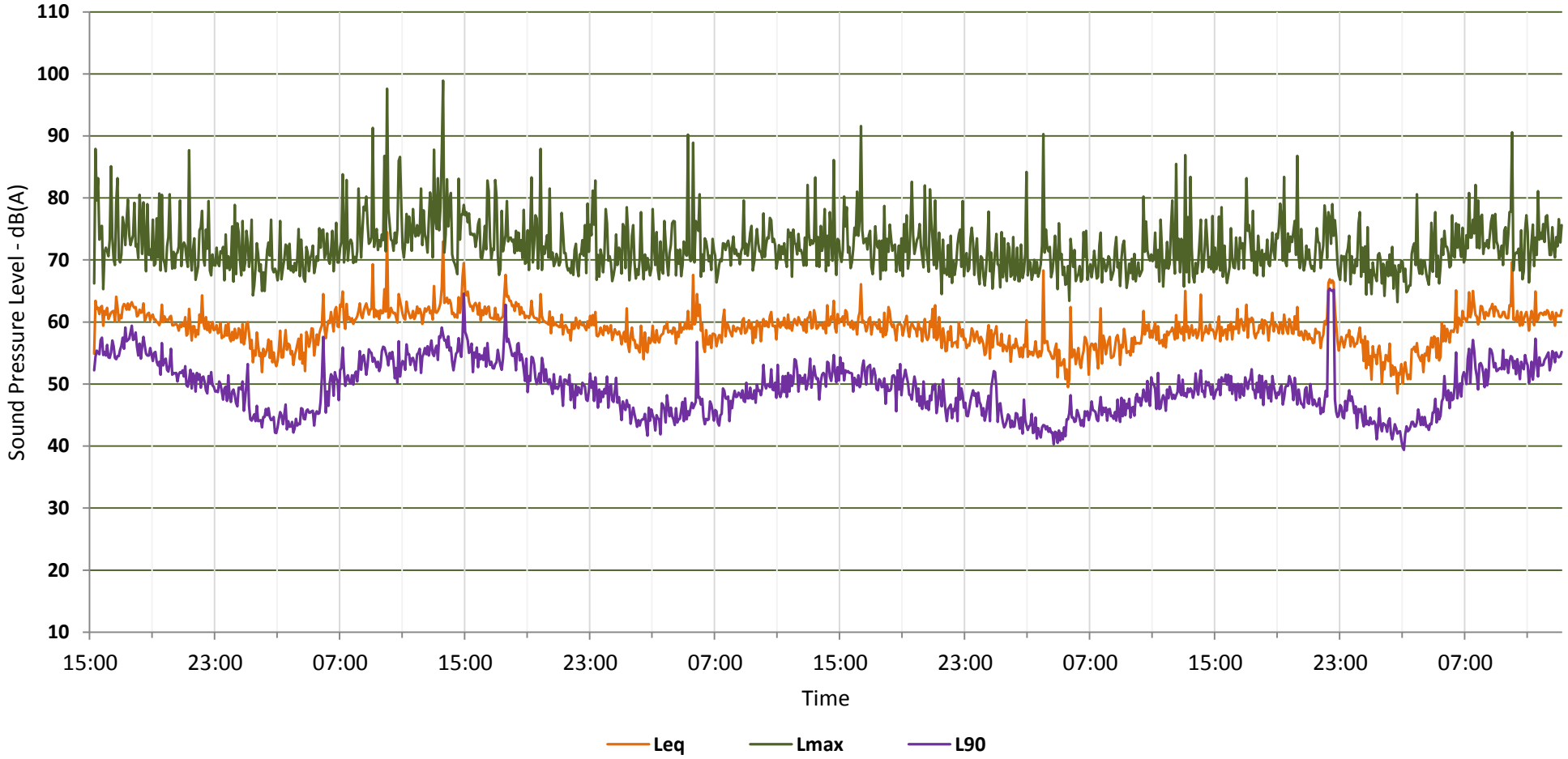

Notes	Description	
	Time history graph for measurement position 1	
	Project	
	1 to 5 Portpool Lane	
	Survey Date	**Drawing No.**
	24 - 28 July 2014	2074/TH1

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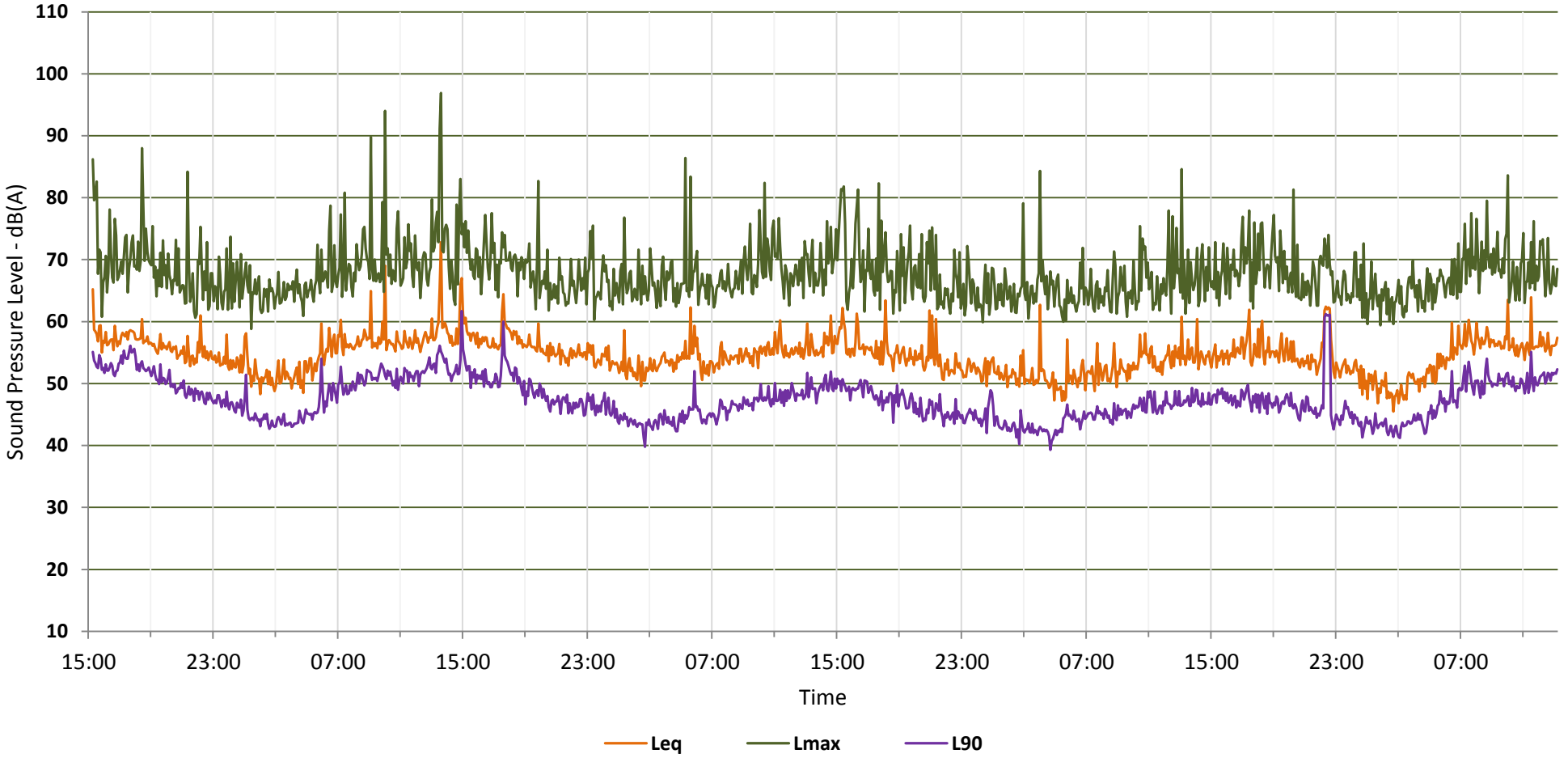

Notes	**Description** Time history graph for measurement position 2	
	Project 1 to 5 Portpool Lane	
	Survey Date 24 - 28 July 2014	**Drawing No.** 2074/TH2

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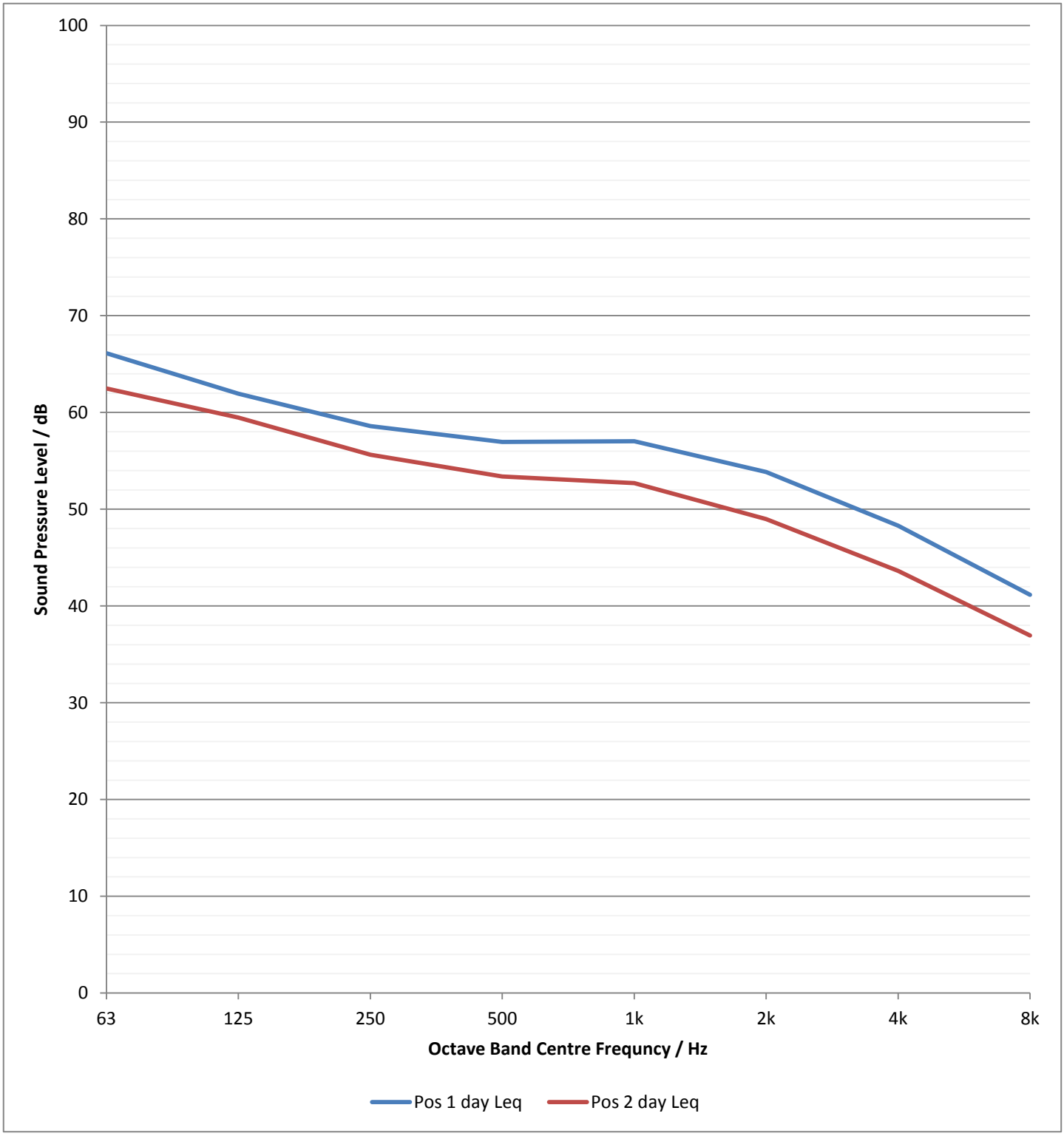

Description Day-time L_{eq} spectra	
Project 1 to 5 Portpool Lane	
Date 19 September 2014	**Drawing No.** 2074/G1

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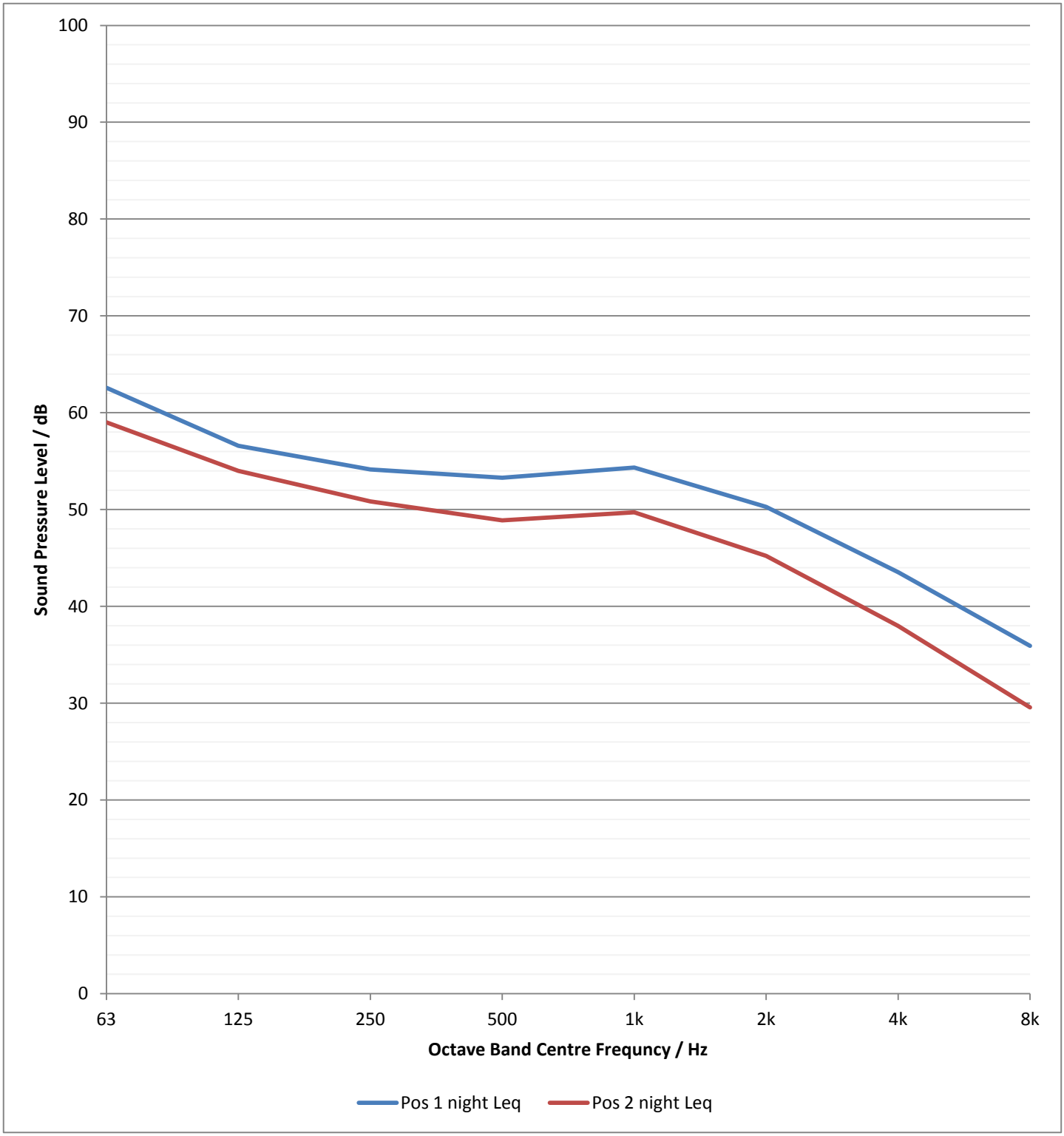

Description Night-time L_{eq} spectra	
Project 1 to 5 Portpool Lane	
Survey Date 19 September 2014	**Drawing No.** 2074/G2

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SPECIFICATIONS FOR GLAZING SYSTEMS
(to achieve 40 dB $L_{Aeq\ 16\ h}$ daytime / 30 dB $L_{Aeq\ 8\ h}$ & 45 dB L_{Amax} nighttime)

Minimum Sound Reduction Indices (R dB) for Glazing Systems (tested to ISO 140-3)

	Octave Band Centre Frequency - Hz								Indicative glazing Configuration
	63	125	250	500	1k	2k	4k	8k	
Portpool Lane	19	24	24	31	39	39	43	43	6.8 to 8.8 / 12 / 6
Rear elevation	18	24	20	25	35	38	35	35	4 / 16 / 4 or 6 / 12 / 6

TABLE 2074/T1

APPENDIX A

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

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 person. 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.

When the noise being measured has a variable amplitude, such as traffic noise, it is necessary to qualify the basic dB(A) unit. This may be done using a statistical index L_n dB(A), where n is an integer between 1 and 99, and is the percentage of the sample time for which the stated dB(A) level is exceeded. In defining the use of the index, both the value of n and the length of the sample period must be stated.

L_{10} L_{10}, being the dB(A) level exceeded for 10% of the time, has been shown to be a good indicator for traffic noise intrusion, and is used in assessing the effect of traffic noise on residential or commercial premises.

L_{90} L_{90} is the dB(A) level exceeded for 90% of the time, and is used as a measure of background noise level, as it excludes the effects of occasional transient levels, such as individual passing cars or aircraft.

In addition to the statistical noise indices defined above, the following noise units are also used to define variable amplitude noise sources:

L_{eq} The L_{eq} is defined as the notional steady sound pressure level which, over a stated period of time, would contain the same amount of acoustical energy as the actual fluctuating sound measured over the same period - i.e.: it is a measure of the "average" noise level

L_{max} The L_{max} is the maximum sound pressure level recorded over the measurement period.

1 TO 5 PORTPOOL LANE

PLANT NOISE SCHEDULE ADT 2074/PNS

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19/09/2014

Plant Description	Location	Data L_w / L_p	Octave Band Centre Frequency - Hz							
			63	125	250	500	1k	2k	4k	8k
Carrier 30RA-009 (6 no.)	side elevation	L_w		71	71	67	63	60	54	48
PUMY-P140VKM (2 no.)	side yard	L_p at 1m	60	55	52	52	48	44	36	40
RAV-SM803AT-E	side yard	L_p at 1m	51	52	51	49	45	40	34	32
RAV-SM1403AT-E	side yard	L_p at 1m	60	54	54	53	49	44	37	29
RAV-SM1603AT-E	side yard	L_p at 1m	60	60	53	52	47	40	38	35