

ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

ADT 2564

10 May 2018

JR Properties
40 40 Newbridge Lane
Stockport
SK1 2NA

OXFORD STREET, READING
ENVIRONMENTAL NOISE IMPACT ASSESSMENT
ACOUSTIC CONSULTANCY REPORT ADT 2564/ENIA

Revision	Date	Issued By	Checked by	Revision Notes
-	10 May 2018	Andrew Lockwood	-	-
			-	

1.0 SUMMARY

Planning permission is being sought for the demolition of the public house at the junction of Oxford Road and Bedford Road, and the construction of new mixed use development comprising a Class A1/A2/A3/A5 retail unit at ground floor and 6 new apartments above, as shown on the planning application drawings.

Acoustic Design Technology Limited have undertaken an environmental noise survey to determine the existing ambient noise levels in the vicinity of the application site. This has shown that the noise climate in the vicinity is controlled by road traffic noise; no evidence of any noise breakout from The Face Bar can be found in the logged data.

The survey data has been used to determine the sound insulation requirements necessary to control external noise intrusion to acceptable levels inside the new dwellings.

Preliminary modelling and analysis has shown that external noise intrusion could be controlled in accordance with the Local Authority's requirements, and possible sound insulation measures have been provided.

2.0 BASIS OF ASSESSMENT

2.1 Site Location

The application site is located at the junction of Oxford Road and Bedford Road in Reading. The application site is currently occupied by a derelict public house called The Royal.

The surrounding area comprises a mixture of residential, commercial and other properties. Residential properties include 10 Trinity Place, a large block of flats directly to the north, and a row of terraced houses on the opposite side of Oxford Road to the south, many of which have commercial units at ground level.

Other neighbouring buildings include two churches, a social club directly to the east on the other side of Trinity Place, and an entertainment venue called The Face Bar around 50 metres to the north-east.

2.2 Proposed Development

The proposal is to demolish the existing pub and construct a new four storey mixed use development comprising a retail unit at ground floor level and six residential flats on the upper three floors.

2.3 Assessment Criteria

A pre-application meeting has been held with Reading Borough Council and a response letter has been issued (160113/PREAPP) which includes details of the Council's internal and external noise design criteria, which are based on the recommendation of BS 8233:2014 and summarised as follows:

Room	Period	Maximum Level
bedrooms	23:00 – 07:00	30 dB $L_{Aeq,8hour}$ / 45 dB $L_{Amax,F}$
living rooms	07:00 – 23:00	35 dB $L_{Aeq,16hour}$
gardens and terraces	07:00 – 23:00	55 dB $L_{Aeq,16hour}$

Additionally, the letter states the following...

“The proposed development for use as residential is near to a late night club. The noise assessment should be carried out over a period to take this into account.”

2.4 Strategy for Noise Impact Assessment

Based on the information in Sections 2.1 to 2.3 above, the strategy for the noise impact assessment has been broken down into the following stages:

1. undertake an environmental noise survey to obtain baseline noise data, as described in Section 3.0 below
2. construct a basic 3D computer model to predict how the noise levels would vary around the proposed development
3. determine the sound attenuation measures necessary to control noise intrusion into the proposed dwellings to the levels required by the Council

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Introduction

Unattended noise monitoring was undertaken between 15:00 hours on Thursday 27 April and 09:00 hours on Tuesday 2 May 2017, and between 11:00 hours on Friday 5th May and 09:45 hours the following morning.

3.2 Instrumentation

The instrumentation used, and the field calibration values before and after the survey are detailed in Appendix A of this report.

3.3 Procedure

Three measurement positions were selected as described below and indicated on the attached site plan 2564/SP1:

- i at first floor level facing Oxford Road
- ii at first floor level facing Bedford Road
- iii at first floor level facing Trinity Place

For the first survey period, a microphone was suspended at first floor level, approximately 1 metre external to the existing façade of the pub at all three positions. The noise levels were logged continuously for the duration of the survey period using the Svantek sound level meter at positions 1 and 2, and the 01dB Solo sound level meter at position 3, both set to store the octave band and 'A' weighted 100ms short-term L_{eq} for subsequent post processing. Periodic audio recordings were also taken at position 3 to assist with the processing of the data.

Due to an equipment malfunction, the recorded data at position 1 was of no use, so the second survey was undertaken at this position, this time using the 01dB Solo sound level meter set up as before.

3.4 Results

The logged data from each position has been post processed to determine $L_{Aeq,T}$, $L_{A90,T}$ and L_{Amax} levels for each 5 minute period, and these have been plotted on the attached time history graphs 2564/TH1 to TH3 for positions 1 to 3 respectively.

Additionally, the average daytime and nighttime octave band $L_{eq,T}$ together with the $L_{Aeq,T}$, $L_{A90,T}$ and typical L_{Amax} levels are summarised on the attached table 2564/T1 to T3.

Please refer to Appendix B for explanation of the noise units and the A-weighting term used in this report.

3.5 Weather Conditions

As the surveys were largely unattended, it is not possible to provide a detailed description of the weather conditions throughout the monitoring periods.

However, at the beginning of the first survey period, it was dry with low wind speeds with similar conditions forecast until Sunday when rain and more breezy conditions were due to arrive.

For the second survey, the conditions were forecast to be dry and relatively still for the duration.

3.6 Description of Existing Acoustic Environment

At the beginning and end of both survey periods, the noise levels around the application site were controlled by road traffic, and the logged data is consistent with an urban environment controlled by road traffic noise.

4.0 NOISE IMPACT ASSESSMENT

4.1 Introduction

When assessing the impact of noise on the proposed development it must be borne in mind that the noise climate may change in the future. The following discussion is based on the results of the environmental noise survey described in Section 3.0 above.

4.2 Noise Sources

In the notes from the pre-application meeting, the Council expressed concerns about the possible impact of noise egress from “... a late night club”. From discussions with the staff in the Richer Sounds shop, it was ascertained that the only late night venue in the vicinity is The Face Bar, already mentioned in Section 2.1 above.

The logged data from position 3 (the position closest to, and with the clearest line of sight to the club) has been scrutinised for evidence of any noise egress from these premises, but none has been found either in the measured levels or the periodic audio recordings.

The survey results therefore indicate that road traffic is the only significant noise source affecting the application site.

4.3 Incident Noise Levels

The average daytime and nighttime levels computed from the logged data are summarised below:-

Location	Typical incident noise levels $L_{Aeq,T}$ dB	
	Day 07:00 - 23:00	Night 23:00 - 07:00
Position 1 – overlooking Oxford Road	69 dB	65 dB
Position 2 – overlooking Bedford Road	75 dB	67 dB
Position 3 – overlooking 10 Trinity Place	57 dB	52 dB

The footprint of the proposed development is different to that of the existing ones, so the noise monitoring positions are not fully representative of the levels that would be incident upon the facades of the proposed development.

CadnaA 2017 noise mapping software has therefore been used to predict the incident levels, based on the levels measured at the three noise monitoring positions. The noise maps 2564/NM1 and NM2 appended to this report show the highest predicted noise levels for each façade of the new building for the daytime and nighttime respectively.

4.4 Noise Design Criteria

Reading Borough Council's requirements for the control of noise into the proposed dwellings and external amenity areas are set out in Section 2.3 above. There are, however, no outdoor amenity areas in the proposed development.

4.5 External Noise Intrusion with the Windows Open

It is generally accepted that for buildings affected by traffic noise, the noise level inside a room with an open window will be between 10 and 12 dB(A) lower than the noise level outside the window.

The practical implication of this is that the Local Authority's requirements for indoor noise levels would only be achieved through open windows if the external noise levels were lower than:

Location / Activity	Period	Maximum Level
living rooms	07:00 - 23:00	45 - 47 dB $L_{Aeq,16hour}$
bedrooms	23:00 - 07:00	40 - 42 dB $L_{Aeq,8hour}$

Reference to the table in Section 4.3 above shows that the existing ambient noise levels are higher than this, which means that the indoor levels cannot be achieved with the windows open. This does not mean that the windows cannot be openable, but merely that an alternative means of ventilation must be provided to obviate the need to open the windows.

4.6 External Noise Intrusion with the Windows Closed

As the predicted incident noise levels vary considerably around the proposed development, it follows that the sound insulation requirements also vary.

The building has therefore been split into three zones as identified on the attached plan 2564/GZ1, and possible sound control measures for each are outlined below.

4.6.1 Zone 1

This is the noisiest zone with predicted incident daytime levels of up to around 72 $L_{Aeq,T}$.

The attached sample calculation 2564/C1 shows that external noise intrusion could be controlled to 35 $L_{Aeq,T}$ inside a typical, habitable room (living room or bedroom) by means of a standard wall construction and R_w 40 acoustic double glazing. The nighttime levels are around 7 dB(A) lower than the daytime levels, so this would also control nighttime levels to below 30 $L_{Aeq,T}$.

The permanent ventilation requirements would have to be satisfied either by a ducted, mechanically assisted system of some kind (for example, a whole house ventilation system), or by very high performance acoustic ventilators such as the Greenwood MA3051 acoustic wall ventilator.

4.6.2 Zone 2

In this zone, the glazing specification could be reduced to standard domestic double glazing (typically 6 / 16 / 6 hermetically sealed double glazed units). However, permanent ventilation would again have to be as for Zone 1 above.

Alternatively, a combination of R_w 40 acoustic double glazing and high performance acoustic trickle vents such as the Renson 771 / 787 would also provide adequate sound insulation.

4.6.3 Zone 3

The incident noise levels in this area are fairly low, and could readily be controlled by means of standard double glazing and acoustic trickle ventilators.

4.7 Outdoor Amenity Areas

The proposed development does not include any outdoor amenity areas, so the Local Authority's requirements for gardens and terraces are not applicable to this development.

4.8 Conclusion

Environmental noise monitoring over a period of five days including an entire weekend produced no evidence of any noise from The Face Bar impinging on the application site. Rather, the survey demonstrated that the noise climate in the vicinity is controlled by road traffic noise.

The actual noise mitigation measures required will need to be developed should planning permission be granted. However, this initial assessment has demonstrated that external noise intrusion can be readily controlled in accordance with the Local Authority's requirements.

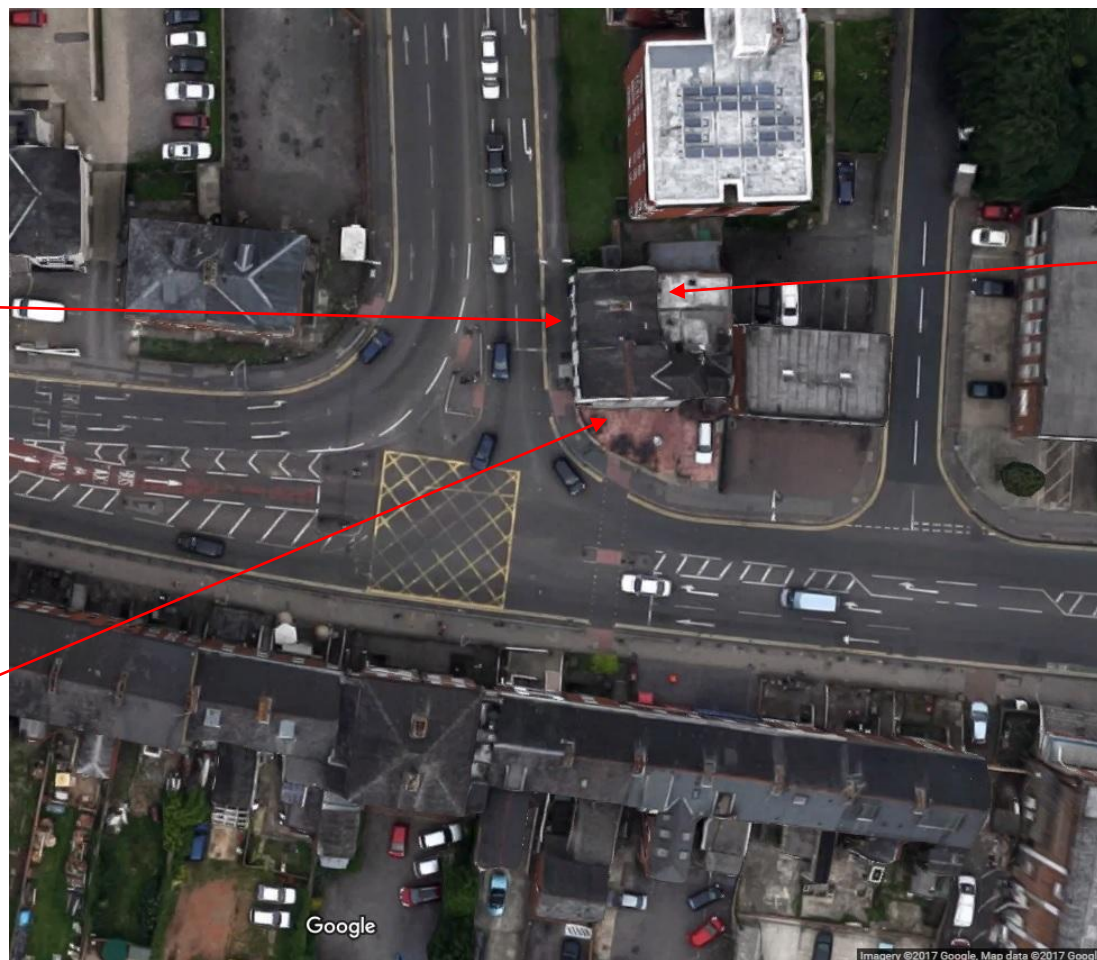
A handwritten signature in black ink, reading "Andrew Lockwood". The signature is written in a cursive style with a large, sweeping flourish at the end.

FOR ACOUSTIC DESIGN TECHNOLOGY

Measurement
Position 2

Measurement
Position 1

Measurement
Position 3



Notes

Description

Site Plan Showing Noise Monitoring Locations

Project

Oxford Street, Reading

Date

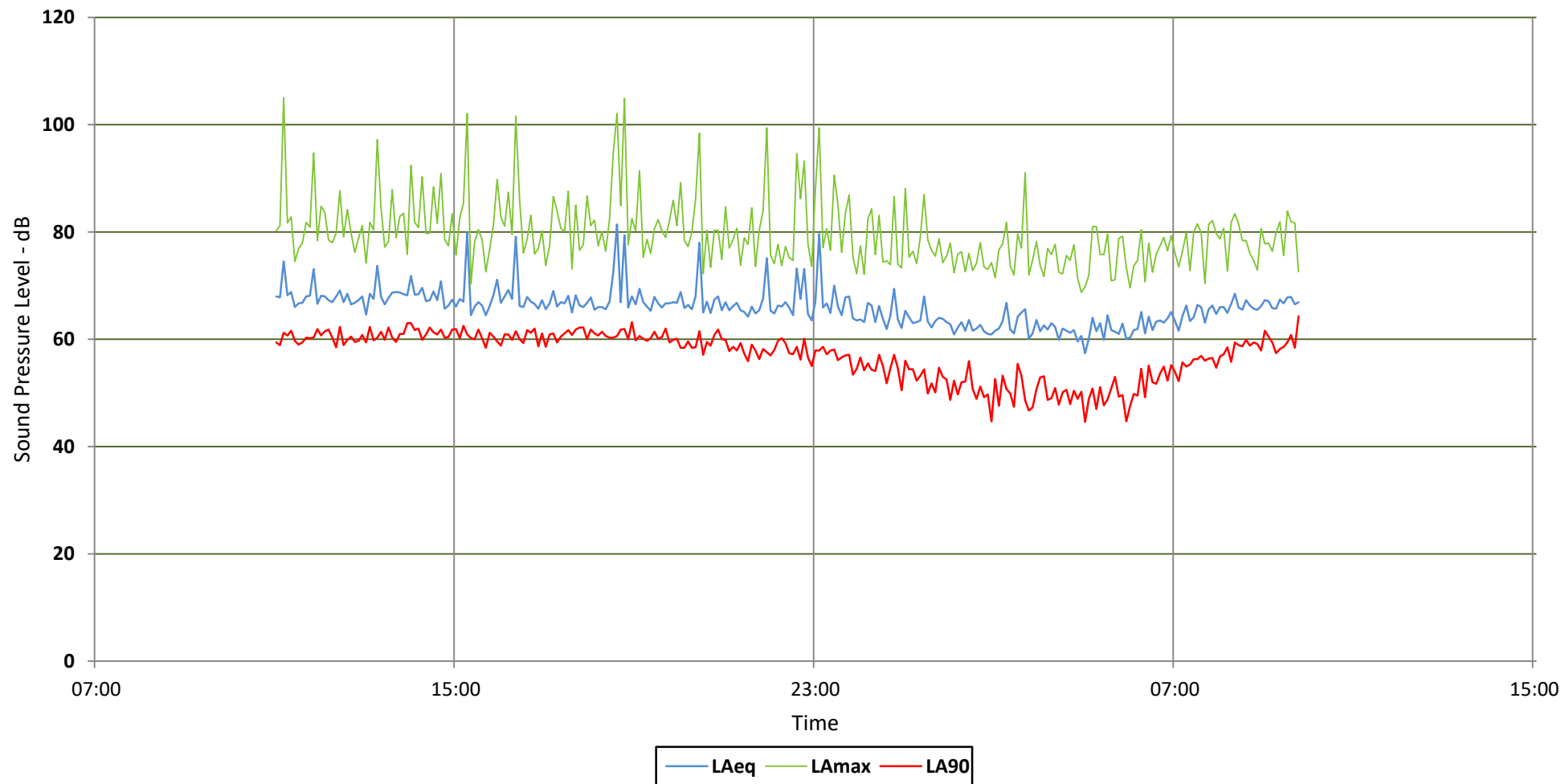
10 May 2018

Drawing No.

2564/SP1



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants



Notes

Description

Time History Graph - Measurement Position 1

Project

Oxford Street, Reading

Survey Date

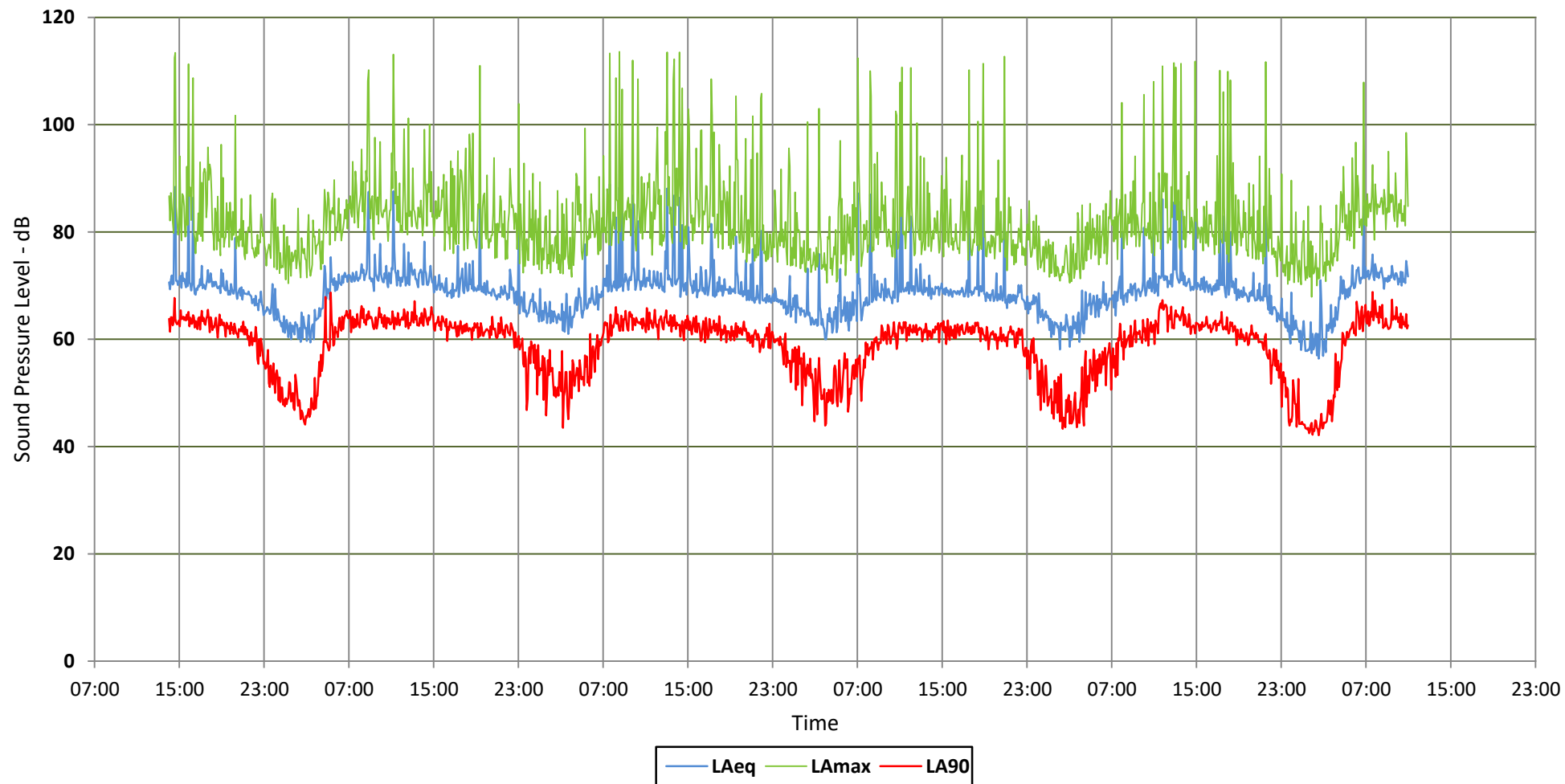
5 to 6 May 2017

Drawing No.

2564/TH1



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants



Notes

Description

Time History Graph - Measurement Position 2

Project

Oxford Street, Reading

Survey Date

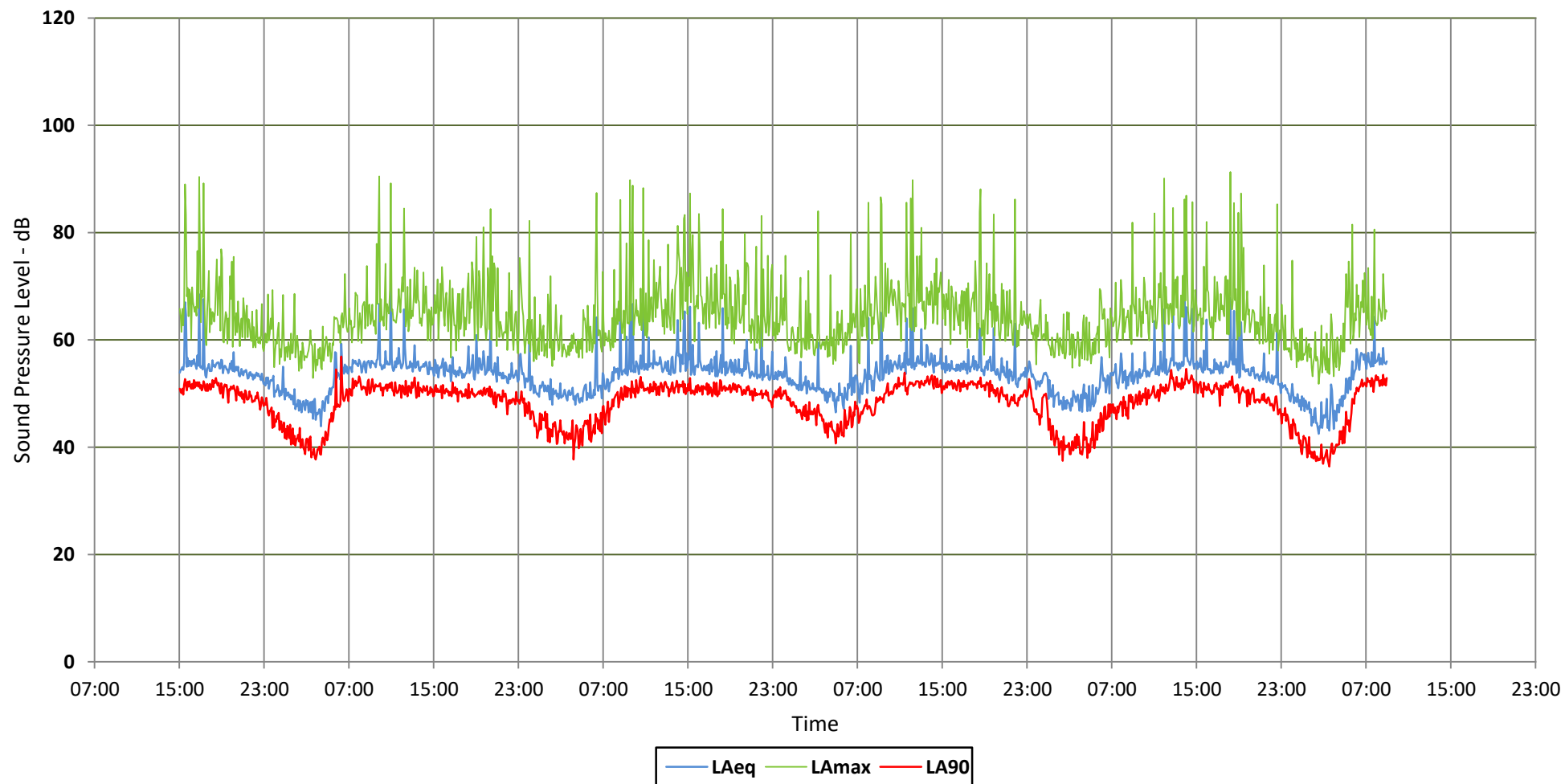
27 April to 2 May 2017

Drawing No.

2564/TH2



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants



Notes

Description

Time History Graph - Measurement Position 3

Project

Oxford Street, Reading

Survey Date

27 April to 2 May 2017

Drawing No.

2564/TH3



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants



Notes



Zone 3

Zone 2

Zone 1

Description

Sound Insulation Zones

Project

Oxford Street, Reading

Date

10 May 2018

Drawing No.

2564/SIZ1



ACOUSTIC DESIGN TECHNOLOGY
Noise and Vibration Consultants

SAMPLE FAÇADE CALCULATION

Living Room / Bedroom Overlooking Bedford Road - Daytime

			Octave Band Centre Frequency - Hz									
			63	125	250	500	1k	2k	4k	8k	dB(A)	NR
Incident noise level			76	69	65	61	68	67	57	52	72	
Direct Field												
Composite SRI of structure (from below)			25	31	33	40	45	47	52	56		
Direct L _p			51	38	32	21	23	20	5	-4		
Reverberant Field												
Composite SRI of structure (from below)			25	31	33	40	45	47	52	56		
10 log (S / A)			2	2	2	2	0	-1	-1	-1		
Constant (for line source)			1	1	1	1	1	1	1	1		
Reverberant L _p			54	41	35	24	24	20	5	-4		
Total L _p			56	43	37	25	26	23	8	-1	35	27
Composite SRI Calculation												
103 mm brick + 100 mm block with ties			7	28	34	40	45	50	55	55	55	
10/12/6.4 R _w 40 (Pilkington)			3	22	27	29	36	41	42	49	58	
Composite SRI			25	31	33	40	45	47	52	56		

APPENDIX A

Instrumentation

Manufacturer	Type and / or Model	Serial Number	Last Laboratory Calibration	Calibrator Output (dB)	Free Field Correction (dB)	Initial reading (dB)	Final reading (dB)
01dB	(Black) Solo Class 1 Sound Level Meter PRE 21 S Pre-Amplifier MCE 212 ½ inch Microphone	65201 15619 101204	September 2015	114.21	-0.10	114.1	114.1
Svantek ACO Svantek	Svan 971 Class 1 Sound Level Meter 7052E ½ inch Microphone SV18 Preamplifier	34392 54655 32179	October 2015	114.21	-0.13	114.1	114.1
Svantek Microtech Gefell Svantek	Svan 958 4 Channel Analyser MK250 ½ inch Microphone SV12L Preamplifier	23430 9633 30209	October 2016	114.04	-0.20	113.8	113.8

APPENDIX B

Acoustic Terminology

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.

A-weighting 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.

When the noise being measured has variable amplitude, such as traffic noise, it is necessary to qualify the basic dB unit. This may be done using a statistical index L_n dB, where n is any value between 0 and 100, and is the percentage of the sample time for which the stated 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 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 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:

$L_{eq,T}$ $L_{eq,T}$ 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. In other words, it is a measure of the "average" noise level

L_{max} L_{max} is the maximum time-weighted sound pressure level recorded over the stated time period



NOTES

DESCRIPTION

Predicted Incident Noise Levels - Daytime

PROJECT

Oxford Road, Reading

DATE

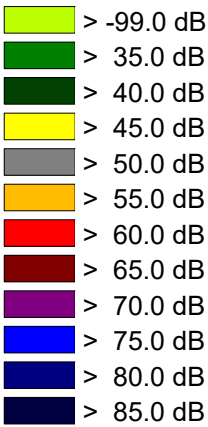
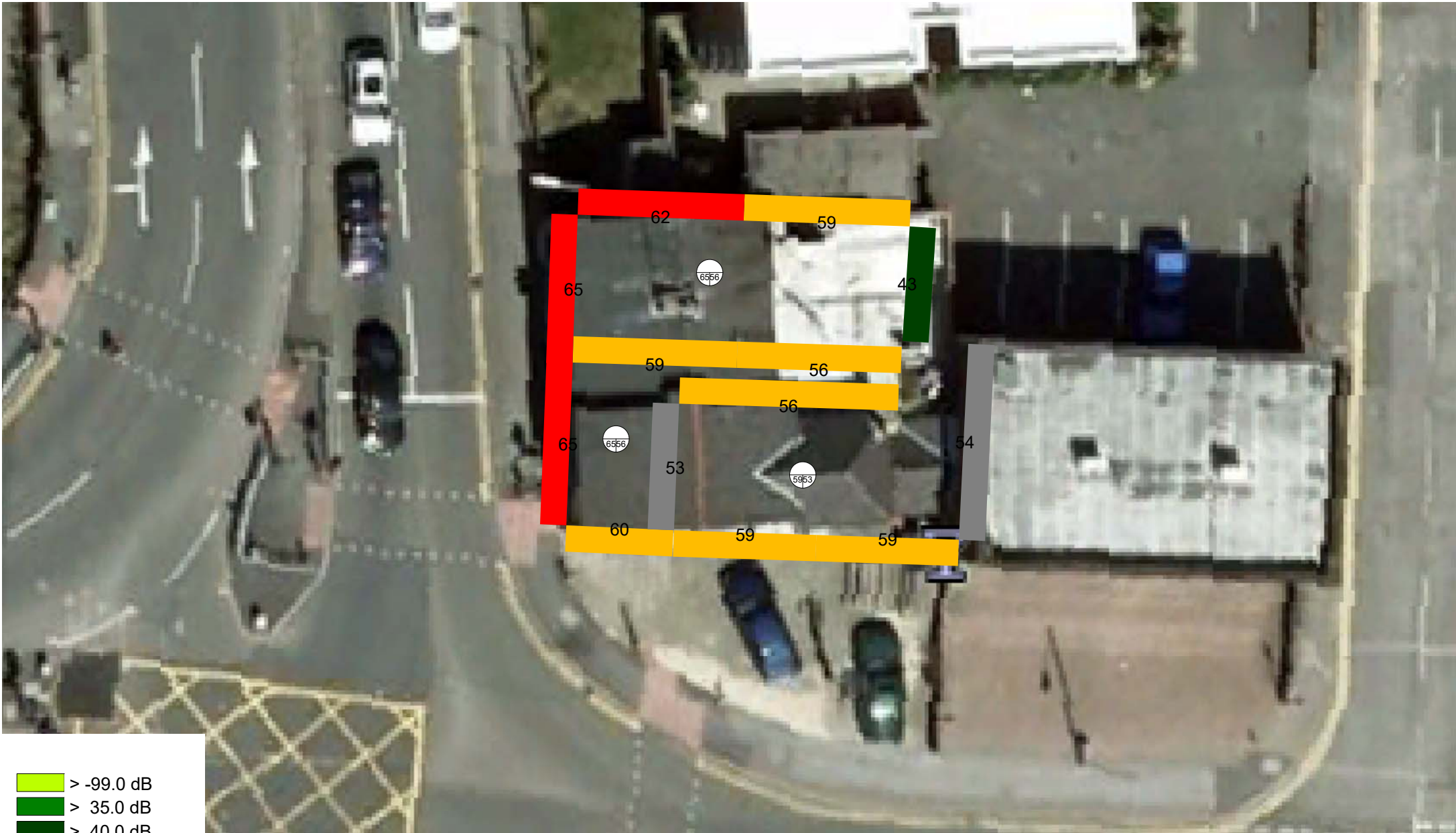
10 May 2018

PLOT NO.

2564/NM1



ACOUSTIC DESIGN TECHNOLOGY
Noise & Vibration Consultants



NOTES

DESCRIPTION

Predicted Incident Noise Levels - Nighttime

PROJECT

Oxford Road, Reading

DATE

10 May 2018

PLOT NO.

2564/NM2



ACOUSTIC DESIGN TECHNOLOGY
Noise & Vibration Consultants