



The Hut Group

16-24 KENNEDY STREET

Environmental noise survey report





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CONTENTS

1	INTRODUCTION	1
2	SITE DESCRIPTION	1
3	CRITERIA	2
3.1	MANCHESTER CITY COUNCIL CRITERIA	2
3.1.1	EXTERNAL PLANT NOISE LIMITS	2
3.1.2	EMERGENCY PLANT NOISE LIMITS	2
3.1.3	MAXIMUM OPERATIONAL NOISE LIMITS	2
3.1.4	INTERNAL AMBIENT NOISE LEVELS	2
3.2	BS4142:2014 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND (+A1:2019)	2
4	ENVIRONMENTAL NOISE SURVEY	3
4.1	OVERVIEW	3
4.2	WEATHER CONDITIONS	3
4.3	MEASUREMENT EQUIPMENT & PERSONNEL	3
4.4	MEASUREMENT RESULTS	3
5	EXTERNAL PLANT	6
5.1	PLANT NOISE LIMITS	6
5.1.1	EMERGENCY PLANT	6
5.2	ASSESSMENT	7
5.2.1	PLANT NOISE	7
6	OPERATIONAL NOISE	7
6.1	CRITERIA	7

6.2	INITIAL ASSESSMENT	8
7	CONCLUSION	8

APPENDICES

APPENDIX A

SUMMARY OF UNATTENDED NOISE MONITORING TO DETERMINE
REPRESENTATIVE BACKGROUND NOISE LEVEL

APPENDIX B

SUMMARY OF NOISE MONITORING EQUIPMENT

APPENDIX C

TECHNICAL GLOSSARY

APPENDIX D

LIMITATIONS

1 INTRODUCTION

WSP has been appointed to undertake an environmental noise survey for the proposed redevelopment of 16-24 Kennedy Street, Manchester.

The proposed development consists of a renovation of 2 existing office buildings (16 & 20 Kennedy Street) and 1 private residence (24 Kennedy Street) to provide ESPA training studios, meeting rooms, a hotel with event space, luxury aparthotel and rooftop event spaces.

An environmental noise survey has been carried out to determine the background sound levels (L_{A90} , dB) at the nearest noise sensitive receptors. The measured background sound levels have been used to set limits from any proposed building services and due to operational noise from events within the hotel in line with Manchester City Council's requirements.

The report sets out the survey methodology, results of the measurements and assessment.

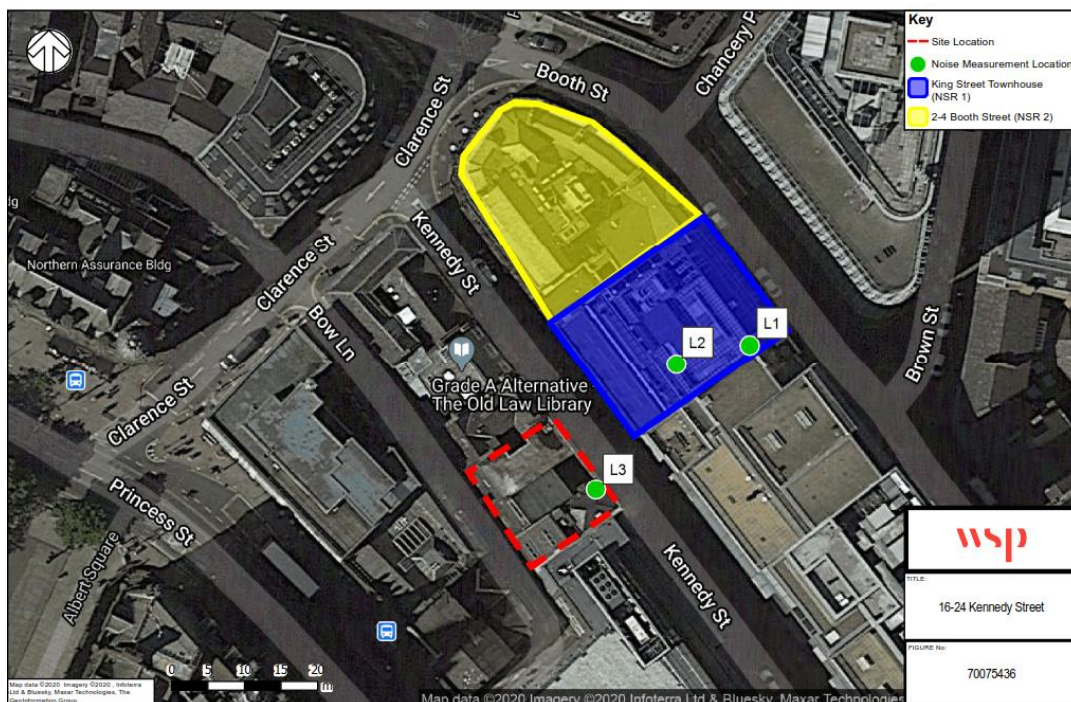
2 SITE DESCRIPTION

The site is located, in the centre of Manchester and is bounded by Kennedy Street to the west and Bow Lane to the east. The nearest noise-sensitive receptors are considered to be King Street Townhouse Hotel (highlighted in blue) and the apartments at 2-4 Booth Street (highlighted in yellow), directly opposite the Kennedy Street side of the development.

To the rear of the site is Bow Lane and the site faces the rear of existing offices. There are a number of existing outdoor heating/cooling units fixed to the external wall of the offices at first floor.

Figure 2-1 shows the location of the existing hotel along with the nearest noise sensitive receptors and location of the unattended noise monitoring equipment.

Figure 2-1 - Site plan showing measurement locations



3 CRITERIA

3.1 MANCHESTER CITY COUNCIL CRITERIA

3.1.1 EXTERNAL PLANT NOISE LIMITS

Manchester City Council's *Planning & Noise Technical Guidance (December 2015)* requires that:
Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.

It notes that the rating level is to be determined based on the methodology set out in BS 4142:2014.

3.1.2 EMERGENCY PLANT NOISE LIMITS

For emergency plant items, that will only operate outside an emergency for short periods to be tested, a higher noise limit is typically permitted. It is understood that MCC permit a level 10 dB above the existing background sound level (L_{A90}) at the nearest noise sensitive location.

3.1.3 MAXIMUM OPERATIONAL NOISE LIMITS

MCC specifies that:

Entertainment noise (L_{Aeq}) should be controlled to 10 dB below the background noise level (L_{A90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location.

3.1.4 INTERNAL AMBIENT NOISE LEVELS

For hotel guestrooms and offices MCC do not typically specify internal ambient noise levels. These are typically designed to specific operator requirements.

3.2 BS4142:2014 METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND (+A1:2019)

BS 4142:2014 *Methods for rating and assessing industrial and commercial sound* (+A1:2019, herein referred to as BS4142:2014) provides typical guidance for assessing noise emissions from new items of building services plant against the existing background noise level at the nearest noise sensitive receptors.

It states that if the noise rating level is ≥ 10 dB higher than the existing background noise level (L_{A90} dB), it provides a likely indication of a significant adverse impact. If the level is 5 dB above the existing background noise level, it provides a likely indication of an adverse impact. Where the level doesn't exceed the background noise level it is an indication of having a low impact.

It also identifies that where noise contains 'attention catching features' such as bangs, whistles, etc or is intermittent, penalties should be applied in the noise assessment.

4 ENVIRONMENTAL NOISE SURVEY

4.1 OVERVIEW

At positions L1 and L2, unattended noise monitoring equipment was installed on the roof of King Street Townhouse and left to continually record sound levels from 11:00 hrs on Thursday 24 September 2020 until 09:45 hrs on Tuesday 29 September 2020. The equipment installed at position L2 didn't record after 17:15 hrs on Saturday 26 September 2020. However, comparing the results with those at position L3, there is very little variation in background sound level. As a result the measurement duration is considered sufficient to obtain representative results.

At positions L1 and L2, the microphones were located approximately 1.5 m above roof level and at least 1 m from any other reflective surface.

At position L3 on Figure 2-1, unattended noise monitoring equipment was left to continually record sound levels from 11:45 hrs on Friday 16 October 2020 until 11:15 hrs on Monday 19 October 2020. The microphone was extended from a third floor window of 24 Kennedy Street, approximately 1 m from the façade.

The measurement positions were chosen as it provided a safe and secure location for the equipment and, is considered to be reasonably representative of the nearest noise sensitive receptors.

The dominant noise source noted during equipment set-up and collection was traffic along Booth Street, Kennedy Street and the surrounding roads, all with noise from existing external plant on the surrounding buildings. At position L1, noise from existing roof top plant items on King Street Townhouse dominated.

4.2 WEATHER CONDITIONS

For the measurements between 24 and 29 September, generally, the weather remained dry, though there was intermittent rain on 29 September, with temperatures ranging from 9-12 °C. The wind speed was typically <5 m/s.

For the measurements between 16 and 19 October, generally, the weather remained dry throughout the duration of the survey, with temperatures ranging from 8-11 °C. The wind speed was typically <5 m/s.

Weather conditions during both surveys were considered suitable for obtaining representative background sound levels.

4.3 MEASUREMENT EQUIPMENT & PERSONNEL

Details of the measurement equipment are provided in Appendix B.

Unattended noise monitoring equipment was installed and collected by Chris Clayden.

4.4 MEASUREMENT RESULTS

A summary of the ambient noise levels measured is provided in Table 4-1

Table 4-1 – Summary of ambient noise levels at measurement position L1

Position (see Fig 2-1)	Date	$L_{Aeq,16hrs}$ (dB) Daytime (07:00-23:00)	$L_{Aeq,8hrs}$ (dB) Night (23:00-07:00)	L_{AFmax} (dB) ² Daytime (07:00-23:00)	L_{AFmax} (dB) ² Night (23:00-07:00)
L1	24/09/20	60 ¹	60	71	69
	25/09/20	61	60	81	66
	26/09/20	61	60	83	68
	27/09/20	60	60	68	71
	28/09/20	61	60	71	73
	29/09/20	61 ¹	-	69	-
L2	24/09/20	56	54	73	71
	25/09/20	59	54	82	66
	26/09/20	56 ¹	-	82	-
L3	16/10/20	58 ¹	57	90	84
	17/10/20	57	56	82	79
	18/10/20	57	57	86	81
	19/10/20	62 ¹	-	98	-

¹Partial measurement period due to equipment set-up/ collection

²Highest recorded L_{AFmax} .

The representative background sound levels ($L_{A90,T}$, dB) have been determined based the guidance in MCC's *Planning & Noise Technical Guidance (December 2015.)*

The arithmetic average of each octave band, for each time period over the duration of the survey has been calculated. The minimum of the averages has then been used to determine the representative background sound level. Full details of the measured L_{90} levels during each 15 minute period at night and 1-hour period during the day are provided in Appendix A.

Table 4-2 presents the lowest average octave band background sound levels for the day and night-time period.

Table 4-2 – Daytime and night-time background sound levels

		Representative background sound level ($L_{90,T}$ dB) at each octave band centre frequency (Hz)								
Position	Period	63	125	250	500	1k	2k	4k	8k	Overall A-weighted level (dB)
L1	Daytime 07:00-23:00	60	55	57	56	56	51	43	33	59 ($L_{A90,1hr}$)
	Night-time 23:00-07:00	59	55	57	56	56	51	44	34	59 ($L_{A90,15mins}$)
L2	Daytime 07:00-23:00	57	53	52	50	50	43	34	24	53 ($L_{A90,1hr}$)
	Night-time 23:00-07:00	56	53	51	50	49	42	34	24	52 ($L_{A90,15mins}$)
L3	Daytime 07:00-23:00	56	58	52	47	50	47	41	30	54 ($L_{A90,15mins}$)
	Night-time 23:00-07:00	56	57	51	47	51	47	41	30	54 ($L_{A90,15mins}$)

5 EXTERNAL PLANT

5.1 PLANT NOISE LIMITS

As noted previously, MCC requires that:

Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.

It notes that the rating level is to be determined based on the methodology set out in BS 4142:2014, taking account of any penalties due to tonality, intermittency etc.

Based on the representative background sound level in Table 4-2, the resultant rating level from building services plant associated with the development should not exceed the limits at the nearest noise sensitive receptors. The nearest noise sensitive receptors are considered to be King Street Townhouse and the apartments at 2-4 Booth Street, to the Kennedy Street side of the site. To the rear of the site on Bow Lane are existing offices.

The representative background sound levels at position L2 have been used to set limits along Kennedy Street (King Street Townhouse and 2-4 Booth Street). The measurements at position L3 have been used to set limits along Bow Lane.

These limits are cumulative and include contribution from all plant associated with this development.

Table 5-1 – Rating noise level limits for external plant, 1m from noise sensitive receptor

NSR location	Period	Maximum rating noise level from external plant, 1m from façade of nearest noise sensitive receptor $L_{Ar, Tr}$ (dB)
Kennedy Street	Daytime (07:00-23:00)	48
	Night-time (23:00-07:00)	47
Bow Lane	Daytime (07:00-23:00)	49
	Night-time (23:00-07:00)	49

5.1.1 EMERGENCY PLANT

Subject to approval by MCC, noise from emergency plant shall be limited to no more than 10 dB above the background sound level at the nearest noise sensitive receptor i.e. 15dB above the limits set out in Table 5-1. Testing of emergency plant shall be in line with any requirements of MCC and is typically restricted to normal working hours, Monday-Friday (09:00-16:00) and not permitted on Sundays or public holidays.

5.2 ASSESSMENT

5.2.1 PLANT NOISE

At this stage the final plant selections and locations have not been made. Once details are finalised, a detailed assessment of noise from external plant, including any low level louvres, will be carried out. If required, attenuation measures will be provided to meet the limits specified in Table 5-1.

The assessment, along with any on-site measurements of the final installed plant, shall be submitted to MCC to discharge any applicable planning conditions.

6 OPERATIONAL NOISE

6.1 CRITERIA

As noted previously, MCC requires that:

Entertainment noise (L_{Aeq}) should be controlled to 10 dB below the background noise level (L_{A90}) without the entertainment noise present, in each octave band at the nearest noise sensitive location.

This criterion applies to any operational noise (e.g. amplified music from the Level 1 and rooftop event spaces) associated with the development.

Based on the representative background noise levels as presented in Table 4-2, operational noise associated with the development should not exceed the levels presented in Table 6-1 below.

Table 6-1 – Maximum operational noise limits 1m from the nearest noise sensitive receptor.

NSR Location	Period	Octave band maximum operational noise levels (L_{eq} dB) 1m from façade of nearest noise sensitive receptor (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
Kennedy Street	Daytime 07:00 to 23:00	47	43	42	40	40	33	24	14	43
	Night-time 23:00 to 07:00	46	43	41	40	39	32	24	14	42
Bow Lane	Daytime 07:00 to 23:00	46	48	42	37	40	37	31	20	44
	Night-time 23:00 to 07:00	46	47	41	37	41	37	31	20	44

As the design develops, maximum internal operational noise limits for the development will be determined based on the sound insulation performance of the building envelope such that noise egress from it does not exceed these limits.

The cumulative level from amplified music within each of the event spaces, including any external terraces, will be considered.

6.2 INITIAL ASSESSMENT

At this stage the existing façade is being retained and two options for the treatment of external windows are being considered; either refurbishing the existing and providing secondary glazing where needed, or replacing the existing windows with new thermally double glazed units. The specification of any changes to the façade will take account of the expected operational noise levels within the development and be selected to adequately control noise break-out.

At roof level, where new external walls and roofs are proposed these shall be specified to provide adequate sound insulation to control noise egress from the event spaces. Maximum internal operational noise levels from amplified music will be controlled such that noise break-out through the building envelope will not cause the criteria in Table 6-1 to be exceeded. It is expected that the specification for all new and refurbished building envelope elements will provide sufficient attenuation to permit internal levels in the region $L_{Aeq} 100$ dB, with limits at low frequencies (63 Hz and 125 Hz) of $L_{eq} 90$ dB.

At roof level, some elements of the roof may be openable and access to external terraces provided. Noise break-out through external doors or rooflights will be controlled through operational management of the space (e.g. keeping doors external doors to terraces closed) when events involving high levels of amplified sound are taking place.

In addition, as the design progresses consideration will be given to the provision of sound limiters within the space, that is programmable and frequency weighted.

7 CONCLUSION

An environmental noise survey has been carried out at King Street Townhouse and 24 Kennedy Street, Manchester, to support the planning application for the redevelopment of 16-24 Kennedy Street.

The results have been used to determine the existing representative background sound level at the nearest noise sensitive receptors and set limits for external plant noise and operational noise (e.g. amplified music from event spaces) associated with the development.

A plant noise assessment will be required once final plant selections and locations are known.

The specification of any new or refurbished elements of the building envelope (e.g. windows, roof) will take account of the expected internal noise levels in the event space, which may involve amplified music. A detailed assessment of the sound insulation requirements and noise egress will be undertaken as the design progresses, and internal limits set so that the MCC criteria are met.

Appendix A

SUMMARY OF UNATTENDED NOISE MONITORING TO DETERMINE REPRESENTATIVE BACKGROUND NOISE LEVEL

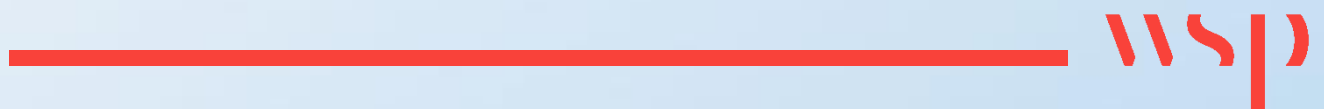


Table A-1 – Measured octave band daytime $L_{90,1hr}$ levels (07:00 to 23:00) Position L1

Date	Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								dBA
		63	125	250	500	1 k	2 k	4 k	8 k	
24/09/20	11:00	60.9	55.8	57.2	56.5	56.4	51	43.9	33.9	59.7
	12:00	60.7	55.7	57.2	56.3	56.2	50.8	43.6	33.4	59.5
	13:00	60.5	55.5	57	56.2	56.1	50.5	43.1	32.8	59.4
	14:00	60.8	55.6	57.1	56.5	56.3	50.8	43.7	33.5	59.6
	15:00	60.6	55.6	56.9	56.2	56.1	50.7	43.5	33.5	59.4
	16:00	60.3	55.2	56.8	56	55.9	50.5	43.3	33.1	59.2
	17:00	60.1	55.2	56.7	56	56	50.3	42.9	32.4	59.2
	18:00	59.7	54.9	56.4	56	56.1	50.4	43.2	33.1	59.2
	19:00	59.6	55.2	56.4	55.9	56	50.5	43.6	33.7	59.2
	20:00	59.4	54.9	56.5	55.9	56	50.5	43.4	33.5	59.2
	21:00	59.4	54.6	56.5	55.9	55.9	50.5	43.3	33.4	59.1
	22:00	59.4	54.8	56.4	56	56.1	50.6	43.5	33.5	59.3
25/09/20	07:00	61.4	56.4	57.5	56.6	56.7	51.3	44.1	33.8	59.9
	08:00	62.4	57.6	57.5	56.8	56.7	51.3	44.1	33.6	60
	09:00	62.4	57.3	57.7	56.8	56.7	51.3	44	33.7	60
	10:00	62	57.3	57.6	56.7	56.5	51.3	44.1	33.6	59.9
	11:00	61.9	57.2	57.7	56.8	56.6	51.2	43.8	33.1	59.9
	12:00	61.7	57	57.7	56.9	56.6	51.2	43.6	32.7	60
	13:00	61.8	57	57.6	56.8	56.5	50.9	43.3	32.3	59.8
	14:00	61.8	56.9	57.6	56.8	56.5	50.9	43.3	32.6	59.8
	15:00	61.9	56.6	57.6	56.8	56.6	50.9	43.5	32.9	59.9
	16:00	61.2	56.1	57.3	56.6	56.4	50.7	43.4	33	59.7
	17:00	61.2	55.9	57.2	56.6	56.4	50.8	43.6	33.1	59.7
	18:00	60.4	55.6	56.9	56.4	56.4	50.8	43.5	33.2	59.6
	19:00	59.8	55.1	56.8	56.2	56.2	50.8	43.8	33.5	59.5
	20:00	59.6	55.1	56.6	56.2	56.2	50.7	43.5	33.4	59.4
	21:00	59.6	55.1	56.6	56.1	56.2	50.7	43.5	33.4	59.4
	22:00	59.4	54.7	56.5	56.1	56.3	50.8	43.6	33.6	59.4

Date	Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								dBA
		63	125	250	500	1 k	2 k	4 k	8 k	
26/09/20	07:00	59.5	55.4	56.7	56.4	56.3	50.9	43.6	33	59.6
	08:00	59.6	55.6	56.7	56.5	56.4	51	43.5	33	59.6
	09:00	59.5	55.5	56.7	56.4	56.5	50.9	43.4	32.9	59.6
	10:00	59.7	55.4	56.8	56.4	56.4	50.9	43.5	32.9	59.6
	11:00	60	55.7	57	56.6	56.6	50.9	43.5	32.8	59.8
	12:00	60	55.7	56.9	56.5	56.5	50.8	43.5	32.9	59.7
	13:00	60.1	55.7	56.9	56.5	56.5	50.8	43.5	33	59.7
	14:00	60.3	55.7	57	56.5	56.4	50.9	43.5	33.1	59.6
	15:00	60.2	55.6	56.8	56.2	56.2	50.8	43.6	33.2	59.5
	16:00	60.2	55.4	56.7	56.2	56.2	50.8	43.6	33.4	59.4
	17:00	60.1	55.6	56.8	56.3	56.3	50.9	43.8	33.4	59.5
	18:00	60.1	55.6	56.8	56.3	56.2	50.8	43.6	33	59.5
	19:00	59.9	55.5	56.8	56.4	56.5	50.9	43.7	33.3	59.7
	20:00	60.2	56	56.8	56.4	56.4	50.8	43.4	32.9	59.6
	21:00	59.9	55.5	56.7	56.4	56.4	50.7	43.5	33	59.6
	22:00	60.1	55.4	56.7	56.3	56.3	50.7	43.4	33.1	59.5
27/09/20	07:00	60	55.5	56.8	56.6	56.5	51.1	44	34	59.8
	08:00	60.1	55.6	56.8	56.6	56.5	51.1	43.9	33.8	59.7
	09:00	60.3	55.8	56.9	56.7	56.7	51.1	43.9	33.9	59.9
	10:00	59.8	55.5	56.8	56.4	56.5	51	43.8	33.6	59.7
	11:00	59.7	55.6	56.7	56.2	56.3	50.8	43.6	33.3	59.5
	12:00	59.6	55.5	56.8	56.2	56.2	50.7	43.6	33.3	59.4
	13:00	59.5	55.2	56.7	56.2	56.2	50.7	43.3	33	59.4
	14:00	59.5	55.2	56.7	56.2	56.2	50.5	43.2	32.9	59.4
	15:00	59.5	55.4	56.7	56.2	56.2	50.5	43.2	33	59.4
	16:00	59.4	55.1	56.4	56	56	50.3	43	32.7	59.2
	17:00	59.4	55.1	56.5	56.1	56.1	50.4	43.1	32.9	59.3
	18:00	59.3	55.2	56.6	56.1	56.1	50.5	43.4	33.3	59.3
	19:00	59.1	55	56.6	56.1	56	50.5	43.4	33.4	59.2

Date	Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								dBA
		63	125	250	500	1 k	2 k	4 k	8 k	
	20:00	59.4	55.2	56.6	56.2	56.2	50.6	43.6	33.6	59.4
	21:00	59.8	55.1	56.6	56.2	56.3	50.8	43.7	33.6	59.5
	22:00	59.8	55.3	56.5	56.1	56.3	50.7	43.7	33.7	59.4
28/09/20	07:00	62.7	57.5	58	56.9	56.7	51.4	44.3	34	60.1
	08:00	63.9	58.3	58.2	57	56.7	51.6	44.3	34.3	60.2
	09:00	63.1	58.3	58	56.9	56.7	51.4	44.3	34.3	60.1
	10:00	62.2	57.6	57.9	57.1	56.9	51.5	44.2	34.3	60.2
	11:00	62.1	57.5	57.8	57	56.8	51.3	44.2	34.2	60.1
	12:00	62.1	57.3	57.7	57	56.7	51.2	44	34.1	60
	13:00	61.6	56.8	57.8	56.8	56.6	51.1	43.8	34	59.9
	14:00	61.2	56.5	57.6	56.5	56.5	50.9	43.8	34.1	59.8
	15:00	61	56.5	57.6	56.5	56.4	50.9	43.9	34.4	59.7
	16:00	60.7	56.3	57.5	56.4	56.4	50.8	43.8	34.7	59.7
	17:00	60.4	56	57.5	56.4	56.4	50.8	44	35	59.7
	18:00	59.9	55.5	56.8	56	56.2	50.8	44	35.2	59.4
	19:00	59.3	55.3	56.8	56	56.3	51	44.4	35.5	59.5
	20:00	59.1	54.9	56.7	56.1	56.3	50.9	44.2	35.3	59.5
	21:00	58.9	54.7	56.7	56.1	56.4	50.9	44.2	35.3	59.5
	22:00	59.2	54.6	56.9	56.3	56.5	51.1	44.2	35.4	59.7
29/09/20	07:00	60.6	55.9	57.3	56.4	56.5	51.1	44.3	35	59.8
	08:00	60.9	56.2	57.3	56.5	56.5	51.2	44.5	35.1	59.8
	09:00	61.1	56.5	57.3	56.5	56.4	51.2	44.5	35.2	59.8

Table A-2 – Arithmetic average octave band daytime $L_{90,1hr}$ levels Position L1

Time	Arithmetic average of measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
07:00	60.8	56.1	57.3	56.6	56.5	51.2	44.1	34.0	59.8
08:00	61.4	56.7	57.3	56.7	56.6	51.2	44.1	34.0	59.9
09:00	61.3	56.7	57.3	56.7	56.6	51.2	44.0	34.0	59.9
10:00	60.9	56.5	57.3	56.7	56.6	51.2	43.9	33.6	59.9
11:00	60.9	56.4	57.3	56.6	56.5	51.0	43.8	33.5	59.8
12:00	60.8	56.2	57.3	56.6	56.4	50.9	43.7	33.3	59.7
13:00	60.7	56.0	57.2	56.5	56.4	50.8	43.4	33.0	59.6
14:00	60.7	56.0	57.2	56.5	56.4	50.8	43.5	33.2	59.6
15:00	60.6	55.9	57.1	56.4	56.3	50.8	43.5	33.4	59.6
16:00	60.4	55.6	56.9	56.2	56.2	50.6	43.4	33.4	59.4
17:00	60.2	55.6	56.9	56.3	56.2	50.6	43.5	33.4	59.5
18:00	59.9	55.4	56.7	56.2	56.2	50.7	43.5	33.6	59.4
19:00	59.5	55.2	56.7	56.1	56.2	50.7	43.8	33.9	59.4
20:00	59.5	55.2	56.6	56.2	56.2	50.7	43.6	33.7	59.4
21:00	59.5	55.0	56.6	56.1	56.2	50.7	43.6	33.7	59.4
22:00	59.6	55.0	56.6	56.2	56.3	50.8	43.7	33.9	59.5
Lowest	59.5	55.0	56.6	56.1	56.2	50.6	43.4	33.0	59.4

Table A-3 - Measured octave band night-time $L_{90,15 \text{ min}}$ levels (23:00 to 07:00) Position L1

Date	Time	Measured $L_{90,15 \text{ mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
24/09/20	23:00	59.6	55.6	56.6	56	56.1	50.6	43.6	33.5	59.3
	23:15	59.6	55.4	56.7	56.2	56.1	50.7	43.6	33.7	59.4
	23:30	59.2	55	56.4	55.9	56.1	50.7	43.7	33.8	59.3
	23:45	59.2	55.1	56.4	55.9	56.1	50.5	43.5	33.6	59.2
	00:00	59.2	54.9	56.4	55.9	56	50.7	43.6	33.8	59.2
	00:15	59.1	55	56.5	55.9	56	50.8	43.7	33.8	59.3
	00:30	59.1	54.9	56.5	56	56	50.7	43.7	34.2	59.3
	00:45	58.8	54.4	56.5	55.9	56	50.8	43.8	34.1	59.3
	01:00	58.5	54.2	56.4	55.8	55.9	50.6	43.6	33.8	59.1
	01:15	58.7	54.4	56.4	55.9	55.9	50.6	43.7	34.1	59.2
	01:30	58.6	54.2	56.3	55.8	55.9	50.6	43.7	34	59.1
	01:45	58.5	54.2	56.4	55.9	56	50.7	43.8	34.1	59.2
	02:00	58.5	54.2	56.3	55.9	56	50.7	43.7	34	59.2
	02:15	58.6	54.3	56.5	55.9	56	50.7	43.8	34	59.2
	02:30	58.7	54.3	56.4	55.9	55.9	50.7	43.7	33.8	59.2
	02:45	58.6	54.3	56.4	55.9	55.9	50.6	43.7	33.8	59.2
	03:00	58.6	54.3	56.4	55.9	56	50.6	43.6	33.7	59.2
	03:15	58.7	54.3	56.4	55.9	56	50.5	43.4	33.4	59.2
	03:30	58.8	54.3	56.4	56	56.2	50.6	43.5	33.5	59.3
	03:45	58.9	54.5	56.5	56	56.2	50.7	43.6	33.5	59.4
	04:00	59.1	54.5	56.6	56	56.2	50.6	43.5	33.3	59.3
	04:15	58.9	54.3	56.6	56	56.2	50.7	43.6	33.5	59.4
	04:30	58.8	54.4	56.5	56	56.1	50.7	43.5	33.3	59.3
	04:45	58.8	54.6	56.6	56.1	56.3	50.7	43.5	33.4	59.4
	05:00	58.8	54.6	56.6	56.1	56.3	50.7	43.6	33.4	59.4
	05:15	59.6	55.3	56.8	56.2	56.3	50.7	43.6	33.4	59.5
	05:30	60	55.7	56.8	56.2	56.3	50.7	43.5	33.3	59.5
	05:45	60.5	56.3	57	56.3	56.5	50.9	43.6	33.3	59.7

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	06:00	60.8	56.4	57.2	56.9	56.7	51.6	44.2	33.8	60.1
	06:15	60.5	56.2	57.1	56.4	56.5	51	43.8	33.6	59.7
	06:30	60.6	55.8	57.3	56.5	56.6	50.9	43.8	33.6	59.8
	06:45	61.2	56.3	57.5	56.7	56.7	51.2	44.1	33.8	60
25/09/20	23:00	59.6	54.7	56.6	56.3	56.4	50.8	43.7	33.6	59.5
	23:15	59.3	54.7	56.7	56.3	56.5	50.9	43.8	33.7	59.6
	23:30	59	54.5	56.6	56.2	56.4	50.8	43.6	33.4	59.5
	23:45	58.9	54.4	56.5	56.2	56.3	50.7	43.5	33.3	59.4
	00:00	59	54.4	56.5	56.2	56.3	50.7	43.5	33.2	59.4
	00:15	58.8	54.2	56.4	56.2	56.4	50.7	43.5	33.3	59.5
	00:30	58.9	54.4	56.5	56.2	56.3	50.7	43.5	33.2	59.4
	00:45	58.9	54.6	56.5	56.2	56.3	50.8	43.5	33.1	59.5
	01:00	58.8	54.4	56.5	56.2	56.3	50.8	43.6	33.2	59.5
	01:15	58.7	54.5	56.6	56.2	56.3	50.8	43.5	33.2	59.5
	01:30	58.7	54.4	56.4	56.2	56.4	50.7	43.5	33.2	59.5
	01:45	58.9	54.5	56.5	56.2	56.4	50.8	43.6	33.4	59.5
	02:00	58.8	54.5	56.4	56.2	56.5	50.8	43.6	33.4	59.6
	02:15	58.9	54.6	56.6	56.1	56.4	50.7	43.5	33.3	59.5
	02:30	58.9	54.5	56.5	56.2	56.4	50.7	43.5	33.1	59.5
	02:45	58.8	54.5	56.5	56.2	56.4	50.7	43.4	33.1	59.5
	03:00	58.7	54.4	56.6	56	56.2	50.6	43.3	33	59.3
	03:15	58.8	54.8	56.7	56.1	56.2	50.7	43.4	33.2	59.4
	03:30	58.7	54.6	56.5	56.1	56.1	50.6	43.4	33.1	59.3
	03:45	59	54.7	56.6	56.1	56.1	50.6	43.2	32.9	59.3
	04:00	58.8	54.7	56.6	56.1	56.2	50.6	43.2	32.8	59.4
	04:15	58.7	54.6	56.7	56.1	56.1	50.6	43.2	32.8	59.3
	04:30	58.8	54.5	56.6	56.2	56	50.7	43.3	32.8	59.3
	04:45	58.8	54.8	56.6	56.1	56.1	50.6	43.2	32.8	59.3
	05:00	58.8	54.5	56.7	56.1	56.1	50.6	43.2	32.7	59.3

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	05:15	58.9	54.7	56.6	56.2	56.1	50.6	43.2	32.7	59.3
	05:30	58.9	54.5	56.5	56.2	56.1	50.7	43.3	32.8	59.3
	05:45	59.2	54.8	56.7	56.3	56.2	50.7	43.2	32.8	59.4
	06:00	59.5	55.4	56.9	57.1	56.5	51.4	43.7	33.1	59.9
	06:15	59.4	55	56.8	56.2	56.2	50.8	43.4	32.9	59.4
	06:30	59.6	55.5	56.8	56.3	56.3	50.9	43.5	33	59.5
	06:45	60	55.5	56.9	56.5	56.5	51.1	43.7	33.1	59.7
26/09/20	23:00	60.4	56	56.7	56.2	56.2	50.6	43.4	33.1	59.4
	23:15	59.8	55.9	56.7	56.2	56.2	50.6	43.4	33	59.4
	23:30	59.7	55.5	56.6	56.2	56.1	50.7	43.5	33.2	59.4
	23:45	59.6	55.1	56.5	56.2	56.1	50.6	43.5	33.3	59.3
	00:00	59.6	55.2	56.6	56.1	56.1	50.5	43.4	33.2	59.3
	00:15	59.9	55.3	56.6	56.2	56.1	50.5	43.5	33.3	59.3
	00:30	59.7	55.7	56.6	56.2	56.1	50.6	43.5	33.5	59.3
	00:45	59.7	55.7	56.5	56.2	56.1	50.6	43.4	33.2	59.3
	01:00	59.5	55.1	56.5	56.1	56.1	50.6	43.6	33.4	59.3
	01:15	59.6	55.4	56.6	56.1	56.1	50.6	43.5	33.4	59.3
	01:30	59.6	55.4	56.6	56.1	56.1	50.6	43.5	33.4	59.3
	01:45	59.7	55.7	56.6	56.1	56.1	50.7	43.6	33.6	59.3
	02:00	59.5	55.5	56.5	56.2	56.2	50.7	43.7	33.7	59.4
	02:15	59.6	55.5	56.5	56.1	56.2	50.7	43.6	33.5	59.4
	02:30	59.6	55.5	56.5	56.2	56.2	50.6	43.5	33.5	59.4
	02:45	59.5	55.5	56.5	56.2	56.3	50.7	43.5	33.4	59.5
	03:00	59.4	55.6	56.5	56.2	56.3	50.7	43.6	33.5	59.5
	03:15	59.2	55.2	56.4	56.2	56.4	50.7	43.6	33.7	59.5
	03:30	59.2	55	56.6	56.1	56.4	50.7	43.6	33.6	59.5
	03:45	59.2	55.1	56.5	56.2	56.3	50.7	43.5	33.5	59.4
	04:00	59.2	55	56.4	56.1	56.3	50.7	43.5	33.5	59.4
	04:15	59.2	55.1	56.4	56.1	56.3	50.7	43.5	33.4	59.4

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	04:30	59.2	55.1	56.5	56.1	56.3	50.7	43.4	33.4	59.4
	04:45	59.2	55.1	56.5	56.2	56.3	50.8	43.6	33.5	59.5
	05:00	59.2	55.1	56.5	56.2	56.3	50.8	43.6	33.5	59.5
	05:15	59.3	55.2	56.4	56.2	56.4	50.8	43.6	33.5	59.5
	05:30	59.8	55.4	56.7	56.4	56.5	50.9	43.8	33.8	59.7
	05:45	59.9	55.4	56.6	56.3	56.4	50.8	43.7	33.7	59.6
	06:00	60.1	55.7	56.6	57.1	56.7	51.7	44.2	34.1	60.1
	06:15	59.5	54.8	56.6	56.3	56.4	50.9	43.9	33.9	59.6
	06:30	60	55.5	56.8	56.5	56.6	51	43.9	34	59.8
	06:45	60.4	55.5	56.9	56.6	56.5	51.1	43.9	33.9	59.8
27/09/20	23:00	59.6	54.8	56.5	56.1	56.2	50.8	43.8	33.8	59.4
	23:15	59.4	55.1	56.5	56.1	56.2	50.8	43.7	33.9	59.4
	23:30	59.5	55.6	56.5	56.1	56.1	50.7	43.5	33.6	59.3
	23:45	59.1	55	56.5	56.1	56.2	50.9	43.9	33.9	59.4
	00:00	58.7	54.5	56.5	56.2	56.3	50.9	44	34.2	59.5
	00:15	58.6	54.4	56.5	56.1	56.3	50.9	44	34.1	59.5
	00:30	59.4	54.7	56.6	56.2	56.3	51	43.9	34.1	59.5
	00:45	59.9	55.3	56.6	56.2	56.3	51	43.9	34.2	59.5
	01:00	60.1	55.2	56.6	56.2	56.4	51	44	34.2	59.6
	01:15	60	55.2	56.6	56.1	56.2	50.9	43.9	34	59.4
	01:30	59.9	55.3	56.6	56	56.2	50.9	43.9	34.1	59.4
	01:45	59.9	55.4	56.7	56.2	56.3	50.9	43.9	34.1	59.5
	02:00	59.9	55	56.7	56.3	56.3	50.9	43.8	34.2	59.5
	02:15	60.1	55.3	56.7	56.4	56.5	51	43.8	34	59.7
	02:30	60.1	55.3	56.8	56.4	56.4	50.9	43.7	33.7	59.6
	02:45	60.2	55.6	56.8	56.5	56.5	51.1	44	34.2	59.7
	03:00	60.1	55.5	56.7	56.5	56.4	51.1	44	34.2	59.7
	03:15	60.2	55.4	56.8	56.5	56.4	51.1	44	34.1	59.7
	03:30	60.3	55.4	56.8	56.6	56.4	51.2	44	34.2	59.7

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	03:45	60.2	55.6	56.8	56.5	56.5	51.1	44	34.2	59.7
	04:00	60.2	55.5	56.8	56.4	56.4	51.1	43.9	34	59.7
	04:15	60.2	55.4	56.8	56.5	56.4	51.1	43.9	34	59.7
	04:30	60.3	55.6	56.8	56.4	56.4	51.1	44	34.1	59.7
	04:45	60.3	55.6	56.9	56.6	56.5	51.2	43.9	34	59.8
	05:00	60.4	55.8	57	56.6	56.5	51.2	44	34	59.8
	05:15	60.5	55.6	57	56.6	56.5	51.2	44	34	59.8
	05:30	60.2	55.7	57	56.7	56.6	51.2	44.1	34.1	59.9
	05:45	60.9	56.2	57.3	56.8	56.7	51.4	44.3	34.1	60
	06:00	61.7	56.5	57.4	57.2	56.8	52.1	44.6	34.4	60.3
	06:15	61.9	56.9	57.4	56.7	56.6	51.4	44.4	34.2	60
	06:30	62	57	57.7	56.6	56.5	51.4	44.3	34.1	59.9
	06:45	62	57	58	56.8	56.6	51.4	44.3	34	60
28/09/20	23:00	59	54.7	56.9	56.3	56.5	51.1	44.3	35.4	59.7
	23:15	59	54.8	56.9	56.5	56.6	51.2	44.4	35.5	59.8
	23:30	59.1	54.8	56.8	56.3	56.5	51	44.1	35.3	59.7
	23:45	58.9	54.5	56.7	56.3	56.4	51	44	35.2	59.6
	00:00	58.7	54.7	56.7	56.2	56.5	51	44.2	35.3	59.6
	00:15	58.8	54.5	56.7	56.2	56.4	50.9	44.1	35.3	59.6
	00:30	58.7	54.5	56.7	56.3	56.5	51	44.2	35.3	59.7
	00:45	58.7	54.6	56.7	56.2	56.5	50.9	44.1	35.2	59.6
	01:00	58.7	54.4	56.7	56.2	56.4	50.8	44	35.1	59.5
	01:15	58.7	54.6	56.8	56.2	56.5	50.9	44.1	35.1	59.6
	01:30	58.8	54.6	56.7	56.2	56.5	51	44.2	35.1	59.6
	01:45	58.8	54.5	56.7	56.1	56.3	50.9	44.1	35.1	59.5
	02:00	58.6	54.5	56.7	56.2	56.2	50.9	44.1	35.1	59.5
	02:15	58.8	54.8	56.8	56.2	56.2	50.9	44.1	35.1	59.5
	02:30	58.7	54.6	56.6	56.2	56.2	50.8	44	35	59.4
	02:45	58.6	54.6	56.6	56.2	56.2	51	44.1	35.1	59.5

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	03:00	58.6	54.7	56.6	56.1	56.2	51	44.2	35.1	59.5
	03:15	58.4	54.4	56.3	55.8	55.9	50.8	44	35	59.2
	03:30	58.3	54.4	56.3	55.8	55.9	50.6	43.9	34.8	59.1
	03:45	58.3	54.3	56.4	55.8	55.8	50.5	43.6	34.5	59.1
	04:00	58.2	54.2	56.3	55.8	55.9	50.6	43.8	34.7	59.1
	04:15	58.3	54.2	56.3	55.8	55.9	50.8	44	34.9	59.2
	04:30	58.4	54.2	56.3	55.8	55.9	50.7	43.9	34.7	59.2
	04:45	58.4	54.3	56.3	55.8	55.9	50.7	44	34.8	59.2
	05:00	58.4	54.3	56.4	55.9	56	50.7	44	34.8	59.2
	05:15	58.9	54.8	56.4	55.9	56	50.7	44	34.8	59.2
	05:30	59.3	55	56.4	55.9	55.9	50.6	43.8	34.7	59.2
	05:45	60	55.4	56.6	56.3	56.4	51	44.2	34.9	59.6
	06:00	60.6	55.8	56.8	56.8	56.6	51.5	44.4	35.1	59.9
	06:15	60.7	55.9	56.9	56.3	56.4	51	44.3	35	59.6
	06:30	60.7	55.9	57	56.3	56.4	51.1	44.3	35.1	59.7
	06:45	60.8	55.9	57.2	56.4	56.5	51.2	44.4	35.2	59.8

Table A-4 - Arithmetic average octave band night-time $L_{90,15\text{min}}$ levels Position L1

Time	Measured $L_{90,1\text{hr}}$ (dB) at each octave band centre frequency								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
23:00	59.6	55.2	56.7	56.2	56.3	50.8	43.8	33.9	59.5
23:15	59.4	55.2	56.7	56.3	56.3	50.8	43.8	34.0	59.5
23:30	59.3	55.1	56.6	56.1	56.2	50.8	43.7	33.9	59.5
23:45	59.1	54.8	56.5	56.1	56.2	50.7	43.7	33.9	59.5
00:00	59.0	54.7	56.5	56.1	56.2	50.8	43.7	33.9	59.5
00:15	59.0	54.7	56.5	56.1	56.2	50.8	43.8	34.0	59.5
00:30	59.2	54.8	56.6	56.2	56.2	50.8	43.8	34.1	59.5
00:45	59.2	54.9	56.6	56.1	56.2	50.8	43.7	34.0	59.5
01:00	59.1	54.7	56.5	56.1	56.2	50.8	43.8	33.9	59.5
01:15	59.1	54.8	56.6	56.1	56.2	50.8	43.7	34.0	59.5

Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
01:30	59.1	54.8	56.5	56.1	56.2	50.8	43.8	34.0	59.5
01:45	59.2	54.9	56.6	56.1	56.2	50.8	43.8	34.1	59.5
02:00	59.1	54.7	56.5	56.2	56.2	50.8	43.8	34.1	59.5
02:15	59.2	54.9	56.6	56.1	56.3	50.8	43.8	34.0	59.4
02:30	59.2	54.8	56.6	56.2	56.2	50.7	43.7	33.8	59.4
02:45	59.1	54.9	56.6	56.2	56.3	50.8	43.7	33.9	59.4
03:00	59.1	54.9	56.6	56.1	56.2	50.8	43.7	33.9	59.4
03:15	59.1	54.8	56.5	56.1	56.2	50.8	43.7	33.9	59.4
03:30	59.1	54.7	56.5	56.1	56.2	50.7	43.7	33.8	59.4
03:45	59.1	54.8	56.6	56.1	56.2	50.7	43.6	33.7	59.4
04:00	59.1	54.8	56.5	56.1	56.2	50.7	43.6	33.7	59.5
04:15	59.1	54.7	56.6	56.1	56.2	50.8	43.6	33.7	59.5
04:30	59.1	54.8	56.5	56.1	56.1	50.8	43.6	33.7	59.5
04:45	59.1	54.9	56.6	56.2	56.2	50.8	43.6	33.7	59.6
05:00	59.1	54.9	56.6	56.2	56.2	50.8	43.7	33.7	60.1
05:15	59.4	55.1	56.6	56.2	56.3	50.8	43.7	33.7	59.6
05:30	59.6	55.3	56.7	56.3	56.3	50.8	43.7	33.7	59.7
05:45	60.1	55.6	56.8	56.4	56.4	51.0	43.8	33.8	59.8
06:00	60.5	56.0	57.0	57.0	56.7	51.7	44.2	34.1	59.5
06:15	60.4	55.8	57.0	56.4	56.4	51.0	44.0	33.9	59.5
06:30	60.6	55.9	57.1	56.4	56.5	51.1	44.0	34.0	59.5
06:45	60.9	56.0	57.3	56.6	56.6	51.2	44.1	34.0	59.5
Minimum	59.0	54.7	56.5	56.1	56.1	50.7	43.6	33.7	59.4

Table A-5 – Measured octave band daytime $L_{90,1hr}$ levels (07:00 to 23:00) Position L2

Date	Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								dBA
		63	125	250	500	1 k	2 k	4 k	8 k	
24/09/20	11:00	59.4	55.1	53.6	52.3	51.4	45.2	36.9	25.8	54.9
	12:00	59.3	55	53.6	52.3	51.4	45.3	36.8	25.4	54.9
	13:00	59	55	53.5	52.2	51.3	45	36.1	24.6	54.8
	14:00	59.5	55.4	53.4	51.9	50.4	44.5	36	24.6	54.3
	15:00	59.1	55.1	53.4	51.8	50.2	44.4	36.1	24.9	54.1
	16:00	58.4	54.4	53	51.6	50.7	44.8	36	24.8	54.3
	17:00	58.1	54.5	53	51.5	50.3	44.3	35.4	23.8	54
	18:00	57.9	54.5	52.8	51.3	49.8	43.8	35.2	24.1	53.6
	19:00	56.3	54.1	52.2	51.1	50.1	43.9	35.6	25.2	53.6
	20:00	56.2	53.8	51.7	50.5	49.8	43.4	34.5	24.2	53.2
	21:00	55.7	53.1	51.4	50.1	49.7	43.3	34.3	23.8	53
	22:00	55.8	52.8	51.2	50	49.6	43.2	34.2	23.8	52.9
25/09/20	07:00	59.9	55.7	54.1	52.3	51.3	45.3	36.5	25.7	55
	08:00	61	56.4	54.4	52.9	51.8	46.1	37.5	25.8	55.5
	09:00	61.5	56.7	54.5	52.8	51.5	45.7	37.4	25.7	55.3
	10:00	61.3	56.5	54.4	52.7	51.3	45.8	37.2	25.7	55.2
	11:00	61	56.9	54.7	52.9	51.6	45.9	37.2	25.2	55.5
	12:00	60.7	56.7	54.7	53	51.8	45.7	36.6	24.7	55.5
	13:00	60.7	56.4	54.6	52.9	51.6	45.5	36.2	24.1	55.4
	14:00	60.8	56.8	54.8	53.1	51.6	45.4	36.3	24.4	55.4
	15:00	61	57	54.9	53.1	51.5	45.3	36.3	24.9	55.4
	16:00	60.5	56.2	54.3	52.7	51.2	44.8	35.9	24.9	55
	17:00	60.1	55.7	54.1	52.4	51	44.6	36	24.9	54.8
	18:00	59.1	55.1	53.5	52.1	51	44.6	35.7	24.8	54.6
	19:00	57.3	54.5	53	51.8	51	44.7	36	25.2	54.4
	20:00	57.9	54.9	52.8	51.3	50.4	44	35.1	24.9	53.9
	21:00	57.5	54.5	52.3	51	50.2	43.7	34.6	24.5	53.6
	22:00	57.6	53.9	51.9	50.6	49.9	43.4	34.5	24.4	53.3

Date	Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								dBA
		63	125	250	500	1 k	2 k	4 k	8 k	
26/09/20	07:00	57.8	54.7	52.6	51.2	49.9	43.3	35.1	24.8	53.6
	08:00	58.5	55.1	52.8	51.2	49.5	43.2	35.2	24.5	53.4
	09:00	58.1	55.1	52.8	51.2	49.6	43.6	35.2	24.4	53.5
	10:00	58	55.3	52.9	51.4	50.1	44	35.5	24.5	53.9
	11:00	58.3	55.3	53.2	51.6	50.4	44.1	35.4	24.5	54.1
	12:00	58.6	55.2	53.3	51.7	50.6	44.2	35.6	24.8	54.2
	13:00	58.7	55.2	53.2	51.7	50.6	44.3	35.6	24.9	54.2
	14:00	59	55.1	53.3	51.9	50.9	44.6	35.7	25	54.5
	15:00	58.8	55.2	53.3	52	51	44.8	36	25.1	54.6
	16:00	58.5	55.1	53.2	51.9	50.8	44.6	36	25.2	54.4

Table A-6 – Arithmetic average octave band daytime $L_{90,1hr}$ levels Position L2

Time	Arithmetic average of measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
07:00	58.9	55.2	53.4	51.8	50.6	44.3	35.8	25.3	54.3
08:00	59.8	55.8	53.6	52.1	50.7	44.7	36.4	25.2	54.5
09:00	59.8	55.9	53.7	52.0	50.6	44.7	36.3	25.1	54.4
10:00	59.7	55.9	53.7	52.1	50.7	44.9	36.4	25.1	54.5
11:00	59.6	55.8	53.8	52.3	51.1	45.1	36.5	25.2	54.8
12:00	59.5	55.6	53.9	52.3	51.3	45.1	36.3	25.0	54.9
13:00	59.5	55.5	53.8	52.3	51.2	44.9	36.0	24.5	54.8
14:00	59.8	55.8	53.8	52.3	51.0	44.8	36.0	24.7	54.7
15:00	59.6	55.8	53.9	52.3	50.9	44.8	36.1	25.0	54.7
16:00	59.1	55.2	53.5	52.1	50.9	44.7	36.0	25.0	54.6
17:00	59.1	55.1	53.6	52.0	50.7	44.5	35.7	24.4	54.4
18:00	58.5	54.8	53.2	51.7	50.4	44.2	35.5	24.5	54.1
19:00	56.8	54.3	52.6	51.5	50.6	44.3	35.8	25.2	54.0
20:00	57.1	54.4	52.3	50.9	50.1	43.7	34.8	24.6	53.6
21:00	56.6	53.8	51.9	50.6	50.0	43.5	34.5	24.2	53.3
22:00	56.7	53.4	51.6	50.3	49.8	43.3	34.4	24.1	53.1

Time	Arithmetic average of measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								
	63	125	250	500	1k	2k	4k	8k	dBA
Lowest	56.6	53.4	51.6	50.3	49.8	43.3	34.4	24.1	53.1

Table A-7 - Measured octave band night-time $L_{90,15 \text{ min}}$ levels (23:00 to 07:00) Position L2

Date	Time	Measured $L_{90,15 \text{ mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
24/09/20	23:00	59.6	55.6	56.6	56	56.1	50.6	43.6	33.5	59.3
	23:15	59.6	55.4	56.7	56.2	56.1	50.7	43.6	33.7	59.4
	23:30	59.2	55	56.4	55.9	56.1	50.7	43.7	33.8	59.3
	23:45	59.2	55.1	56.4	55.9	56.1	50.5	43.5	33.6	59.2
	00:00	59.2	54.9	56.4	55.9	56	50.7	43.6	33.8	59.2
	00:15	59.1	55	56.5	55.9	56	50.8	43.7	33.8	59.3
	00:30	59.1	54.9	56.5	56	56	50.7	43.7	34.2	59.3
	00:45	58.8	54.4	56.5	55.9	56	50.8	43.8	34.1	59.3
	01:00	58.5	54.2	56.4	55.8	55.9	50.6	43.6	33.8	59.1
	01:15	58.7	54.4	56.4	55.9	55.9	50.6	43.7	34.1	59.2
	01:30	58.6	54.2	56.3	55.8	55.9	50.6	43.7	34	59.1
	01:45	58.5	54.2	56.4	55.9	56	50.7	43.8	34.1	59.2
	02:00	58.5	54.2	56.3	55.9	56	50.7	43.7	34	59.2
	02:15	58.6	54.3	56.5	55.9	56	50.7	43.8	34	59.2
	02:30	58.7	54.3	56.4	55.9	55.9	50.7	43.7	33.8	59.2
	02:45	58.6	54.3	56.4	55.9	55.9	50.6	43.7	33.8	59.2
	03:00	58.6	54.3	56.4	55.9	56	50.6	43.6	33.7	59.2
	03:15	58.7	54.3	56.4	55.9	56	50.5	43.4	33.4	59.2
	03:30	58.8	54.3	56.4	56	56.2	50.6	43.5	33.5	59.3
	03:45	58.9	54.5	56.5	56	56.2	50.7	43.6	33.5	59.4
	04:00	59.1	54.5	56.6	56	56.2	50.6	43.5	33.3	59.3
	04:15	58.9	54.3	56.6	56	56.2	50.7	43.6	33.5	59.4
	04:30	58.8	54.4	56.5	56	56.1	50.7	43.5	33.3	59.3
	04:45	58.8	54.6	56.6	56.1	56.3	50.7	43.5	33.4	59.4
	05:00	58.8	54.6	56.6	56.1	56.3	50.7	43.6	33.4	59.4

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	05:15	59.6	55.3	56.8	56.2	56.3	50.7	43.6	33.4	59.5
	05:30	60	55.7	56.8	56.2	56.3	50.7	43.5	33.3	59.5
	05:45	60.5	56.3	57	56.3	56.5	50.9	43.6	33.3	59.7
	06:00	60.8	56.4	57.2	56.9	56.7	51.6	44.2	33.8	60.1
	06:15	60.5	56.2	57.1	56.4	56.5	51	43.8	33.6	59.7
	06:30	60.6	55.8	57.3	56.5	56.6	50.9	43.8	33.6	59.8
	06:45	61.2	56.3	57.5	56.7	56.7	51.2	44.1	33.8	60
25/09/20	23:00	59.6	54.7	56.6	56.3	56.4	50.8	43.7	33.6	59.5
	23:15	59.3	54.7	56.7	56.3	56.5	50.9	43.8	33.7	59.6
	23:30	59	54.5	56.6	56.2	56.4	50.8	43.6	33.4	59.5
	23:45	58.9	54.4	56.5	56.2	56.3	50.7	43.5	33.3	59.4
	00:00	59	54.4	56.5	56.2	56.3	50.7	43.5	33.2	59.4
	00:15	58.8	54.2	56.4	56.2	56.4	50.7	43.5	33.3	59.5
	00:30	58.9	54.4	56.5	56.2	56.3	50.7	43.5	33.2	59.4
	00:45	58.9	54.6	56.5	56.2	56.3	50.8	43.5	33.1	59.5
	01:00	58.8	54.4	56.5	56.2	56.3	50.8	43.6	33.2	59.5
	01:15	58.7	54.5	56.6	56.2	56.3	50.8	43.5	33.2	59.5
	01:30	58.7	54.4	56.4	56.2	56.4	50.7	43.5	33.2	59.5
	01:45	58.9	54.5	56.5	56.2	56.4	50.8	43.6	33.4	59.5
	02:00	58.8	54.5	56.4	56.2	56.5	50.8	43.6	33.4	59.6
	02:15	58.9	54.6	56.6	56.1	56.4	50.7	43.5	33.3	59.5
	02:30	58.9	54.5	56.5	56.2	56.4	50.7	43.5	33.1	59.5
	02:45	58.8	54.5	56.5	56.2	56.4	50.7	43.4	33.1	59.5
	03:00	58.7	54.4	56.6	56	56.2	50.6	43.3	33	59.3
	03:15	58.8	54.8	56.7	56.1	56.2	50.7	43.4	33.2	59.4
	03:30	58.7	54.6	56.5	56.1	56.1	50.6	43.4	33.1	59.3
	03:45	59	54.7	56.6	56.1	56.1	50.6	43.2	32.9	59.3
	04:00	58.8	54.7	56.6	56.1	56.2	50.6	43.2	32.8	59.4
	04:15	58.7	54.6	56.7	56.1	56.1	50.6	43.2	32.8	59.3

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	04:30	58.8	54.5	56.6	56.2	56	50.7	43.3	32.8	59.3
	04:45	58.8	54.8	56.6	56.1	56.1	50.6	43.2	32.8	59.3
	05:00	58.8	54.5	56.7	56.1	56.1	50.6	43.2	32.7	59.3
	05:15	58.9	54.7	56.6	56.2	56.1	50.6	43.2	32.7	59.3
	05:30	58.9	54.5	56.5	56.2	56.1	50.7	43.3	32.8	59.3
	05:45	59.2	54.8	56.7	56.3	56.2	50.7	43.2	32.8	59.4
	06:00	59.5	55.4	56.9	57.1	56.5	51.4	43.7	33.1	59.9
	06:15	59.4	55	56.8	56.2	56.2	50.8	43.4	32.9	59.4
	06:30	59.6	55.5	56.8	56.3	56.3	50.9	43.5	33	59.5
	06:45	60	55.5	56.9	56.5	56.5	51.1	43.7	33.1	59.7

Table A-8 - Arithmetic average octave band night-time $L_{90,15\text{min}}$ levels Position L2

Time	Measured $L_{90,1\text{hr}}$ (dB) at each octave band centre frequency								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
23:00	56.5	53.3	51.4	50.1	49.5	43.0	34.2	24.2	52.8
23:15	56.8	53.5	51.9	50.5	49.7	43.2	34.4	24.1	53.1
23:30	56.6	53.4	51.8	50.3	49.7	43.2	34.7	24.3	53.1
23:45	56.3	53.0	51.2	50.0	49.5	43.1	34.1	24.0	52.8
00:00	56.3	53.1	51.2	49.9	49.3	42.8	33.9	23.9	52.6
00:15	56.1	52.9	51.1	49.9	49.3	42.8	34.1	24.0	52.6
00:30	56.1	52.9	51.1	49.8	49.3	42.9	34.5	24.2	52.6
00:45	56.2	53.0	51.0	49.9	49.3	42.8	34.2	24.3	52.6
01:00	55.9	52.8	51.0	49.8	49.2	42.8	34.1	24.0	52.6
01:15	56.0	52.8	51.0	49.8	49.2	42.7	34.1	24.1	52.5
01:30	55.8	52.8	51.2	49.8	49.0	42.4	34.0	24.1	52.4
01:45	55.8	52.7	50.9	49.7	48.8	42.2	33.9	24.1	52.2
02:00	56.0	52.8	51.0	49.8	49.0	42.5	34.0	24.2	52.4
02:15	56.1	52.7	50.9	49.7	49.0	42.5	34.0	24.2	52.4
02:30	56.2	52.9	51.2	49.9	48.9	42.4	34.1	24.2	52.4
02:45	56.1	52.8	51.2	49.9	49.0	42.5	34.1	24.2	52.4

Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
03:00	56.0	53.0	51.1	49.8	48.8	42.2	33.9	24.0	52.3
03:15	56.1	52.8	51.1	49.7	48.6	42.1	33.8	23.8	52.2
03:30	56.3	53.0	51.2	49.8	48.7	42.2	33.9	23.7	52.2
03:45	56.5	52.9	51.4	49.8	48.8	42.2	33.8	23.8	52.3
04:00	56.4	53.2	51.4	49.8	48.7	42.3	33.7	23.7	52.3
04:15	56.7	53.2	51.4	50.0	49.0	42.5	33.9	23.8	52.5
04:30	56.5	53.0	51.3	50.0	48.9	42.4	33.9	23.7	52.4
04:45	56.5	53.1	51.3	50.0	49.1	42.6	34.0	23.8	52.5
05:00	56.5	53.1	51.3	50.0	49.1	42.6	33.9	23.7	52.5
05:15	56.5	53.5	51.5	50.0	48.7	42.2	33.7	23.6	52.4
05:30	57.0	53.6	51.7	50.2	48.9	42.3	33.7	23.6	52.5
05:45	57.3	53.8	51.8	50.3	49.2	42.6	33.9	23.7	52.7
06:00	58.4	54.6	52.2	50.7	49.5	43.0	34.2	23.8	53.1
06:15	58.8	55.1	53.3	52.5	50.8	45.7	36.5	26.0	54.7
06:30	58.6	54.8	52.8	51.3	50.1	43.7	35.2	25.0	53.7
06:45	58.5	55.1	53.2	51.6	50.3	44.0	35.6	25.1	54.0
Minimum	55.8	52.7	50.9	49.7	48.6	42.1	33.7	23.6	52.1

Table A-9 – Measured octave band daytime $L_{90,1hr}$ levels (07:00 to 23:00) Position L3

Date	Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								dBA
		63	125	250	500	1 k	2 k	4 k	8 k	
16/10/20	12:00	57.9	58.3	53.5	49.4	50.8	47.6	40.8	29.6	54.8
	13:00	58	58.4	53.4	49.2	50.7	47.5	40.7	29.5	54.7
	14:00	57.8	58.3	53.3	49	50.7	47.4	40.7	29.4	54.6
	15:00	57.8	58.4	53.4	49	50.7	47.3	40.6	29.5	54.6
	16:00	57.8	58.5	53.2	48.8	50.6	47.3	40.7	29.4	54.5
	17:00	57.7	58.4	53.5	49.3	50.8	47.5	40.9	29.8	54.8
	18:00	57.2	58.2	53.2	49.1	50.6	47.3	40.9	29.9	54.6
	19:00	57.3	58.2	52.8	48.1	50.5	47.1	40.7	29.8	54.3
	20:00	57.1	57.9	52.3	47.8	50.4	47.1	40.7	29.9	54.2
	21:00	56.6	57.7	52	47.5	50.6	47.1	40.8	29.9	54.2
	22:00	56.6	57.5	51.8	47.9	51.1	47.3	41.0	30.3	54.5
17/10/20	07:00	56.7	57.7	52	47.4	50.9	47.3	40.9	30.2	54.4
	08:00	57.0	57.9	52.1	47.5	50.7	47.3	41.0	30.3	54.3
	09:00	57.1	57.8	52.3	47.6	50.5	47.2	40.9	30.3	54.2
	10:00	57.2	58	52.3	47.9	50.5	47.4	40.9	30.3	54.3
	11:00	57.3	58.1	52.5	47.9	50.4	47.4	41.0	30.4	54.3
	12:00	57.	57.9	52.4	47.8	50.4	47.2	40.9	30.2	54.2
	13:00	57.0	58	52.6	48	50.5	47.3	41.1	30.4	54.3
	14:00	57.2	58.1	52.6	48.3	50.6	47.3	41.0	30.2	54.4
	15:00	57.2	58.1	52.8	48.3	50.5	47.3	41.1	30.5	54.4
	16:00	57.1	58.0	52.7	48.5	50.5	47.3	41.1	30.6	54.4
	17:00	57.0	58.0	52.9	49.0	50.8	47.4	41.1	30.2	54.6
	18:00	57.1	58.1	52.7	48.6	50.6	47.3	41.0	30.2	54.5
	19:00	57.0	58	52.8	48.8	50.7	47.4	41.0	30.1	54.5
	20:00	57.1	57.9	52.3	48.1	50.5	47.3	40.8	29.8	54.3
	21:00	56.7	57.8	52.0	47.7	50.5	47.2	40.7	29.7	54.2
	22:00	56.6	57.5	51.8	48	51.1	47.4	40.9	30.1	54.5
18/10/20	07:00	56.4	57.7	51.7	46.9	50.4	47	40.8	30	54.0

Date	Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency (Hz)								dBA
		63	125	250	500	1 k	2 k	4 k	8 k	
	08:00	56.5	57.7	51.8	47.2	50.1	47	40.7	30	53.9
	09:00	56.9	57.9	52.3	47.5	50.3	47.2	40.8	30.2	54.1
	10:00	56.7	57.9	52.4	47.4	50.3	47.1	40.7	29.9	54.1
	11:00	56.8	57.9	52.4	47.9	50.5	47.2	40.8	30.1	54.3
	12:00	56.9	58.0	52.4	47.7	50.5	47.1	40.8	30.1	54.2
	13:00	56.9	58.1	52.5	47.7	50.4	47.1	40.9	30.2	54.2
	14:00	57.2	58.2	52.6	48	50.4	47.1	40.9	30.2	54.2
	15:00	57.1	58.1	52.6	47.9	50.4	47.1	40.8	30.1	54.2
	16:00	57.1	58.0	52.3	47.9	50.5	47.2	40.8	29.9	54.3
	17:00	57.1	58.1	52.4	48.0	50.6	47.2	40.8	29.9	54.3
	18:00	56.8	57.9	52.3	47.5	50.4	47.0	40.8	30.1	54.1
	19:00	56.6	57.9	51.9	47.1	50.2	46.9	40.6	30	53.9
	20:00	56.7	57.8	51.6	46.8	50.2	46.9	40.6	29.8	53.8
	21:00	56.3	57.7	51.6	47.0	51.1	47.0	40.7	30.4	54.3
	22:00	56.1	57.6	51.4	46.7	51.5	47.1	40.6	30.2	54.5
19/10/20	07:00	58.1	58.6	53.8	49.1	51.1	47.5	41	30.4	54.9
	08:00	58.7	58.7	54	49.9	51.3	47.9	41.5	30.9	55.3
	09:00	58.4	58.5	53.8	49.4	51	47.8	41.2	30.6	55.0
	10:00	58.3	58.4	53.7	49.6	51	47.8	41.1	30.6	55.0

Table A-10 – Arithmetic average octave band daytime $L_{90, 1hr}$ levels Position L3

	Time	Arithmetic average of measured $L_{90, 1hr}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	07:00	57.1	58.0	52.5	47.8	50.8	47.3	40.9	30.2	54.4
	08:00	57.4	58.1	52.6	48.2	50.7	47.4	41.1	30.4	54.5
	09:00	57.5	58.1	52.8	48.2	50.6	47.4	41.0	30.4	54.4
	10:00	57.4	58.1	52.8	48.3	50.6	47.4	40.9	30.3	54.5
	11:00	57.1	58.0	52.5	47.9	50.5	47.3	40.9	30.3	54.3
	12:00	57.3	58.1	52.8	48.3	50.6	47.3	40.8	30.0	54.4
	13:00	57.3	58.2	52.8	48.3	50.5	47.3	40.9	30.0	54.4
	14:00	57.4	58.2	52.8	48.4	50.6	47.3	40.9	29.9	54.4
	15:00	57.4	58.2	52.9	48.4	50.5	47.2	40.8	30.0	54.4
	16:00	57.3	58.2	52.7	48.4	50.5	47.3	40.9	30.0	54.4
	17:00	57.3	58.2	52.9	48.8	50.7	47.4	40.9	30.0	54.6
	18:00	57.0	58.1	52.7	48.4	50.5	47.2	40.9	30.1	54.4
	19:00	57.0	58.0	52.5	48.0	50.5	47.1	40.8	30.0	54.2
	20:00	57.0	57.9	52.1	47.6	50.4	47.1	40.7	29.8	54.1
	21:00	56.5	57.7	51.9	47.4	50.7	47.1	40.7	30.0	54.2
	22:00	56.4	57.5	51.7	47.5	51.2	47.3	40.8	30.2	54.5
	Lowest	56.4	57.5	51.7	47.4	50.4	47.1	40.7	29.8	54.0

Table A-11 - Measured octave band night-time $L_{90,15 \text{ min}}$ levels (23:00 to 07:00) Position L3

Date	Time	Measured $L_{90,15 \text{ mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
16/10/20	23:00	56.5	57.4	51.5	47.2	51.1	47.3	40.9	30.1	54.4
	23:15	56.4	57.6	51.8	47.6	51.2	47.3	41	30.2	54.5
	23:30	56.3	57.3	51.8	47.4	51	47.2	40.8	29.8	54.3
	23:45	56.2	57.4	51.3	47	51	47.1	40.8	29.8	54.2
	00:00	56.2	57.4	51.5	47.2	51.2	47.3	41.1	30.6	54.4
	00:15	56	57.4	51.1	46.6	50.9	46.9	40.6	29.8	54.1
	00:30	56.1	57.4	51.1	46.5	50.7	46.8	40.6	29.9	54
	00:45	55.9	57.3	50.9	46.4	50.8	47	40.7	30.1	54
	01:00	55.9	57.3	51	46.3	50.8	47	40.7	30.2	54
	01:15	56	57.3	50.9	46.4	50.8	47	40.7	30.1	54
	01:30	56	57.3	50.9	46.4	50.9	47	40.8	30	54.1
	01:45	56	57.2	50.9	46.4	51	47.2	40.8	30.1	54.2
	02:00	56	57.2	51	46.4	51.1	47.2	40.9	30.1	54.2
	02:15	55.9	57.2	51	46.4	51	47.1	40.7	29.9	54.2
	02:30	56.1	57.3	51.3	46.7	51.1	47.2	40.9	30.2	54.3
	02:45	55.9	57.2	51	46.5	51.1	47.1	40.8	30.1	54.2
	03:00	55.9	57.3	50.9	46.4	51.1	47.2	40.8	30.1	54.2
	03:15	56	57.4	51.1	46.5	51.2	47.2	40.9	30.1	54.3
	03:30	55.9	57.4	51	46.5	51.2	47.1	40.8	30.1	54.3
	03:45	56	57.3	51	46.5	51.2	47.2	40.8	30.1	54.3
	04:00	56.1	57.4	51.1	46.8	51.2	47.2	40.9	30.1	54.3
	04:15	56	57.3	51	46.8	51.1	47.3	40.8	30	54.3
	04:30	56	57.3	51.1	46.7	51	47.3	40.8	30.1	54.3
	04:45	55.9	57.4	51.1	46.7	51	47.3	40.8	30	54.3
	05:00	56	57.4	51	46.7	51	47.2	40.9	30.2	54.2
	05:15	56	57.4	51.1	46.8	51	47.3	40.9	30.3	54.3
	05:30	56	57.4	51	46.7	51	47.3	40.9	30.3	54.3
	05:45	56.1	57.4	51.3	46.8	51.1	47.4	40.9	30.3	54.4

Date	Time	Measured $L_{90,15mins}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	06:00	56.5	57.8	52.1	47.8	51.5	47.9	41.2	30.5	54.9
	06:15	56.4	57.7	52	47.4	51.3	47.5	41	30.3	54.6
	06:30	56.5	57.7	51.8	47.4	51.2	47.4	41.1	30.3	54.5
	06:45	56.5	57.7	52.1	47.8	51.5	47.6	41.1	30.3	54.8
17/10/20	23:00	56.4	57.4	51.5	47.5	51.1	47.4	41.1	30.3	54.4
	23:15	56.2	57.3	51.5	47.3	51	47.4	41.1	30.4	54.4
	23:30	56.1	57.3	51.3	46.8	50.6	47.2	40.7	29.8	54.1
	23:45	56.1	57.3	51.3	46.9	50.7	47.1	40.8	30	54.1
	00:00	56	57.3	51.3	47	50.9	47.3	40.8	30	54.2
	00:15	56	57.3	51.2	46.9	50.9	47.4	40.9	30.2	54.3
	00:30	56	57.3	51.2	47	50.8	47.2	40.8	30.1	54.2
	00:45	56	57.2	51.2	47	50.8	47.1	40.8	30.2	54.1
	01:00	56	57.2	51.2	46.8	50.9	47.3	40.9	30.1	54.2
	01:15	55.9	57.3	51.2	46.7	50.8	47.1	40.8	30.2	54.1
	01:30	56	57.2	51.2	46.7	50.9	47.2	40.9	30.3	54.2
	01:45	56	57.4	51.2	46.7	50.9	47.2	40.9	30.3	54.2
	02:00	56	57.4	51.3	46.8	50.9	47.2	40.9	30.4	54.2
	02:15	55.8	57.2	51.1	46.7	50.9	47.2	41	30.4	54.2
	02:30	56	57.3	51.2	46.7	50.9	47.3	40.9	30.1	54.2
	02:45	55.9	57.2	51.2	46.8	50.9	47.3	41	30.3	54.2
	03:00	55.9	57.2	51.1	46.7	50.9	47.3	41	30.2	54.2
	03:15	55.9	57.2	51.2	46.7	50.8	47.3	40.9	30.3	54.2
	03:30	56	57.2	51	46.7	50.9	47.3	41	30.3	54.2
	03:45	55.8	57.2	51.1	46.7	50.9	47.3	41	30.3	54.2
	04:00	55.8	57.1	51	46.7	51	47.3	40.9	30.2	54.2
	04:15	55.8	57.1	51.1	46.7	51	47.3	40.9	30.3	54.2
	04:30	55.9	57.2	51	46.7	50.9	47.3	40.9	30.3	54.2
	04:45	55.9	57.3	51.2	46.7	51	47.3	40.9	30.2	54.3
	05:00	55.9	57.2	51.1	46.7	50.9	47.3	40.9	30.2	54.2

Date	Time	Measured $L_{90,15\text{mins}}$ (dB) at each octave band centre frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	dBA
	05:15	56	57.3	51.2	46.9	51.1	47.4	41	30.4	54.4
	05:30	55.9	57.2	51	46.7	51	47.3	40.9	30.2	54.2
	05:45	56	57.2	51.1	46.8	51	47.3	41	30.4	54.3
	06:00	56.2	57.6	52.3	48.3	51.5	47.9	41.2	30.5	54.9
	06:15	56.2	57.5	51.7	47.2	51.1	47.4	41	30.2	54.4
	06:30	56.3	57.7	51.7	47.2	51.1	47.5	41	30.2	54.5
	06:45	56.5	57.7	51.7	47.2	51.1	47.4	41	30.4	54.4

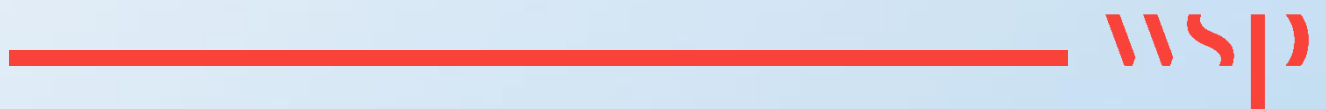
Table A-12 - Arithmetic average octave band night-time $L_{90,15\text{min}}$ levels Position L3

Time	Measured $L_{90,1\text{hr}}$ (dB) at each octave band centre frequency								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
23:00	56.5	57.4	51.5	47.4	51.1	47.4	41.0	30.2	54.4
23:15	56.3	57.5	51.7	47.5	51.1	47.4	41.1	30.3	54.4
23:30	56.2	57.3	51.6	47.1	50.8	47.2	40.8	29.8	54.2
23:45	56.2	57.4	51.3	47.0	50.9	47.1	40.8	29.9	54.2
00:00	56.1	57.4	51.4	47.1	51.1	47.3	41.0	30.3	54.3
00:15	56.0	57.4	51.2	46.8	50.9	47.2	40.8	30.0	54.2
00:30	56.1	57.4	51.2	46.8	50.8	47.0	40.7	30.0	54.1
00:45	56.0	57.3	51.1	46.7	50.8	47.1	40.8	30.2	54.1
01:00	56.0	57.3	51.1	46.6	50.9	47.2	40.8	30.2	54.1
01:15	56.0	57.3	51.1	46.6	50.8	47.1	40.8	30.2	54.1
01:30	56.0	57.3	51.1	46.6	50.9	47.1	40.9	30.2	54.1
01:45	56.0	57.3	51.1	46.6	51.0	47.2	40.9	30.2	54.2
02:00	56.0	57.3	51.2	46.6	51.0	47.2	40.9	30.3	54.2
02:15	55.9	57.2	51.1	46.6	51.0	47.2	40.9	30.2	54.2
02:30	56.1	57.3	51.3	46.7	51.0	47.3	40.9	30.2	54.3
02:45	55.9	57.2	51.1	46.7	51.0	47.2	40.9	30.2	54.2
03:00	55.9	57.3	51.0	46.6	51.0	47.3	40.9	30.2	54.2
03:15	56.0	57.3	51.2	46.6	51.0	47.3	40.9	30.2	54.2
03:30	56.0	57.3	51.0	46.6	51.1	47.2	40.9	30.2	54.2

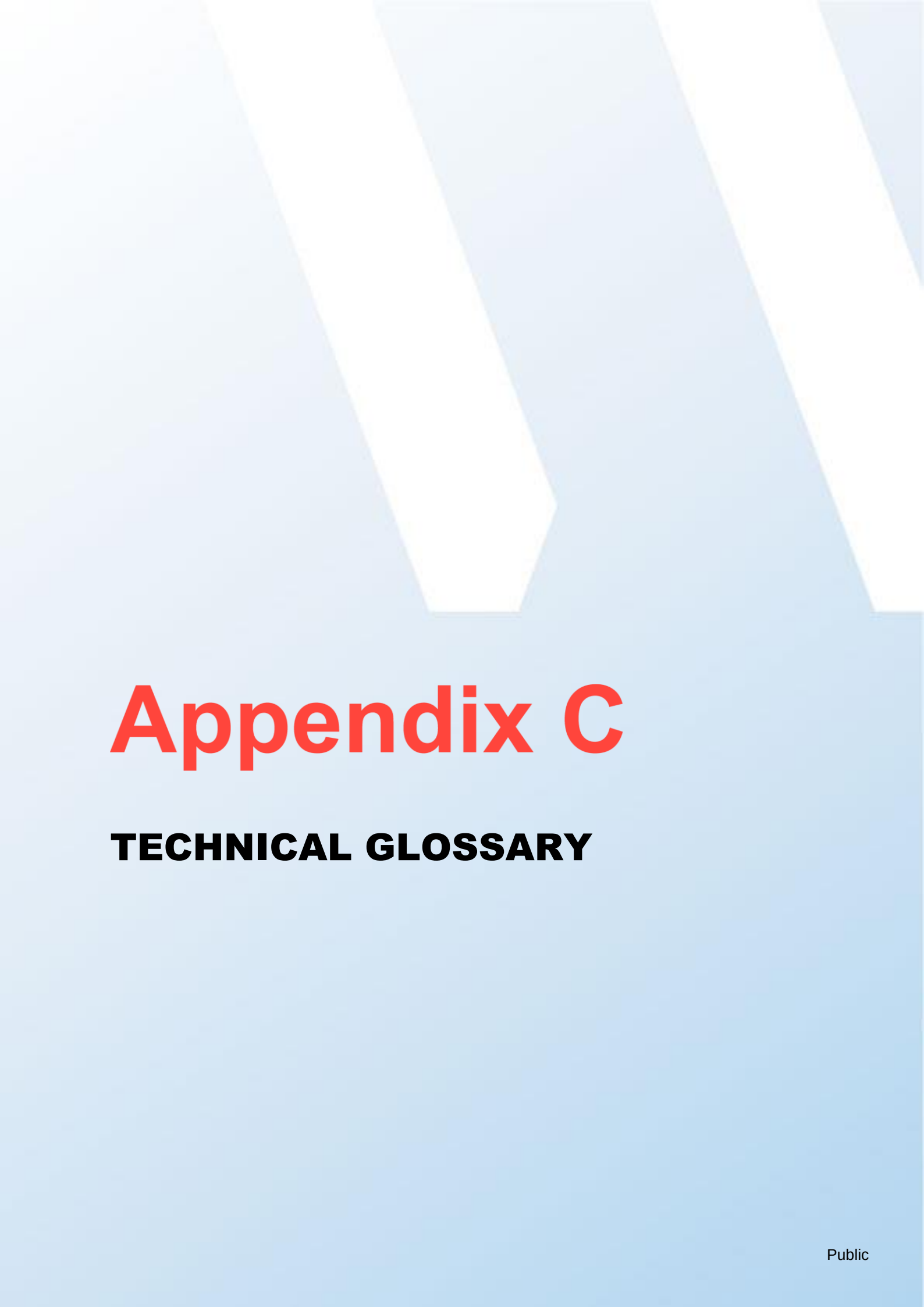
Time	Measured $L_{90,1hr}$ (dB) at each octave band centre frequency								
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dBA
03:45	55.9	57.3	51.1	46.6	51.1	47.3	40.9	30.2	54.3
04:00	56.0	57.3	51.1	46.8	51.1	47.3	40.9	30.2	54.3
04:15	55.9	57.2	51.1	46.8	51.1	47.3	40.9	30.2	54.3
04:30	56.0	57.3	51.1	46.7	51.0	47.3	40.9	30.2	54.2
04:45	55.9	57.4	51.2	46.7	51.0	47.3	40.9	30.1	54.3
05:00	56.0	57.3	51.1	46.7	51.0	47.3	40.9	30.2	54.2
05:15	56.0	57.4	51.2	46.9	51.1	47.4	41.0	30.4	54.3
05:30	56.0	57.3	51.0	46.7	51.0	47.3	40.9	30.3	54.2
05:45	56.1	57.3	51.2	46.8	51.1	47.4	41.0	30.4	54.3
06:00	56.4	57.7	52.2	48.1	51.5	47.9	41.2	30.5	54.9
06:15	56.3	57.6	51.9	47.3	51.2	47.5	41.0	30.3	54.5
06:30	56.4	57.7	51.8	47.3	51.2	47.5	41.1	30.3	54.5
06:45	56.5	57.7	51.9	47.5	51.3	47.5	41.1	30.4	54.6
Minimum	55.9	57.2	51.0	46.6	50.8	47.0	40.7	29.8	54.1

Appendix B

SUMMARY OF NOISE MONITORING EQUIPMENT



Measurement position	Equipment	Make/Model	Serial No.	Calibration due
L1	Sound Level Meter	01dB-METRAVIB Solo Master	60531	8 September 2021
	Pre-amplifier	01dB-Stell PRE 21 S	16422	
	Microphone	Microtech Gefell GmbH MCE212	333438	
	Calibrator	01dB-Mettravib Cal 21	31460	28 July 2021
L2	Sound Level Meter	01 dB CUBE	10621	14 May 2021
	Pre-amplifier	Acoem PRE 22	10635	
	Microphone	GRAS 40CD	207269	
	Calibrator	01 dB Metravib CAL 21	3434463	4 August 2021
L3	Sound Level Meter	01dB-METRAVIB Solo Master	65806	2 November 2021
	Pre-amplifier	01dB-Stell PRE 21 S	16461	
	Microphone	Microtech Gefell GmbH MCE212	166412	
	Calibrator	01dB-Mettravib Cal 21	35054825	24 July 2021



Appendix C

TECHNICAL GLOSSARY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc, according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 13 - Range of sound levels commonly found in the environment

Sound levels	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of pain

ACOUSTIC TERMINOLOGY

Terminology

Meaning

dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2 \times 10^{-5} \text{Pa}$).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1m in front of a large sound reflecting object such as a building façade.

Appendix D

LIMITATIONS





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