



UNIVERSITY OF HERTFORDSHIRE – SPORTS SCIENCE

Environmental Noise Assessment

19861-MAL-XX-ZZ-RP-Y-9000

Willmott Dixon

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1.0 INTRODUCTION

An environmental noise assessment at the proposed site of University of Hertfordshire in Hatfield has been undertaken. The proposed works consist of a refurbishment of an existing building into a sports science centre department.

Such to establish the existing noise levels across the site, a noise survey has been undertaken. This report describes the noise survey, its results, and the outcomes of subsequent noise break-in and break out assessments.

2.0 ENVIRONMENTAL NOISE SURVEY

To establish the existing environmental noise levels on site, a 24-hour noise survey was conducted on the 23/04/2019 and 24/04/2019.

2.1 Site Description

The site in relation to its surroundings is presented below.

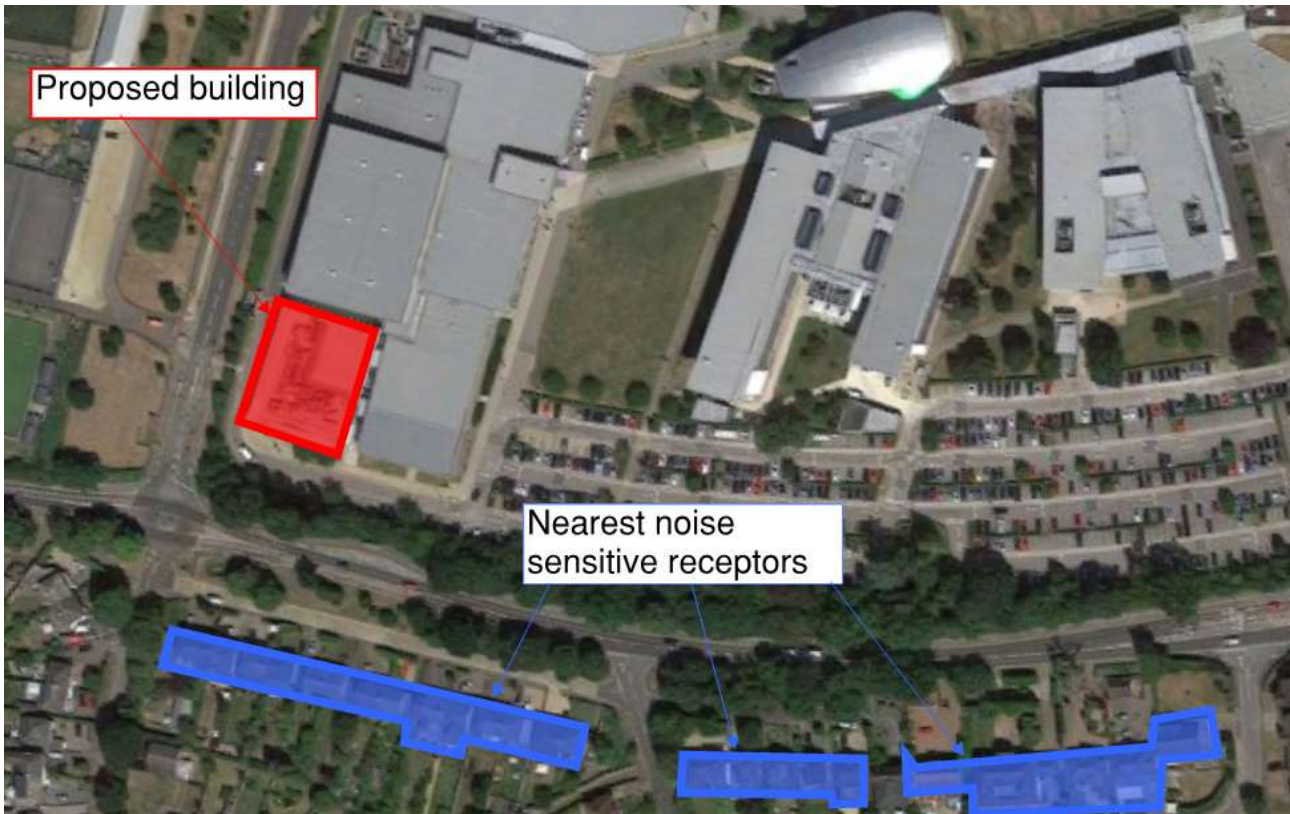


Figure 2.1: Proposed Development (Red) and Nearest Noise Sensitive Receivers (Blue)

2.2 Noise Sources

Noise levels varied across the site with the dominant noise source being road traffic along A1057 Road. A summary of the main noise sources is provided below.

Noise Source	Noise Contribution	Description
Road Traffic	Dominant	Road traffic along the A1057 Road
Road Traffic	Intermittent	Road traffic along Albatross Way
Outdoor Activities	Intermittent	Students playing sports in facilities west of proposed building

Table 2.1: Summary Of Main Noise Sources

2.3 Noise Sensitive Receivers

Noise Sensitive Receiver	Distance from proposed building (m)
Residential housing on St Albans Road	68
Residential housing on Ellenbrook Lane	75

Table 2.2: Nearest Noise Sensitive Receivers

2.4 Measurement Positions

Measurement positions used throughout the survey are shown below.

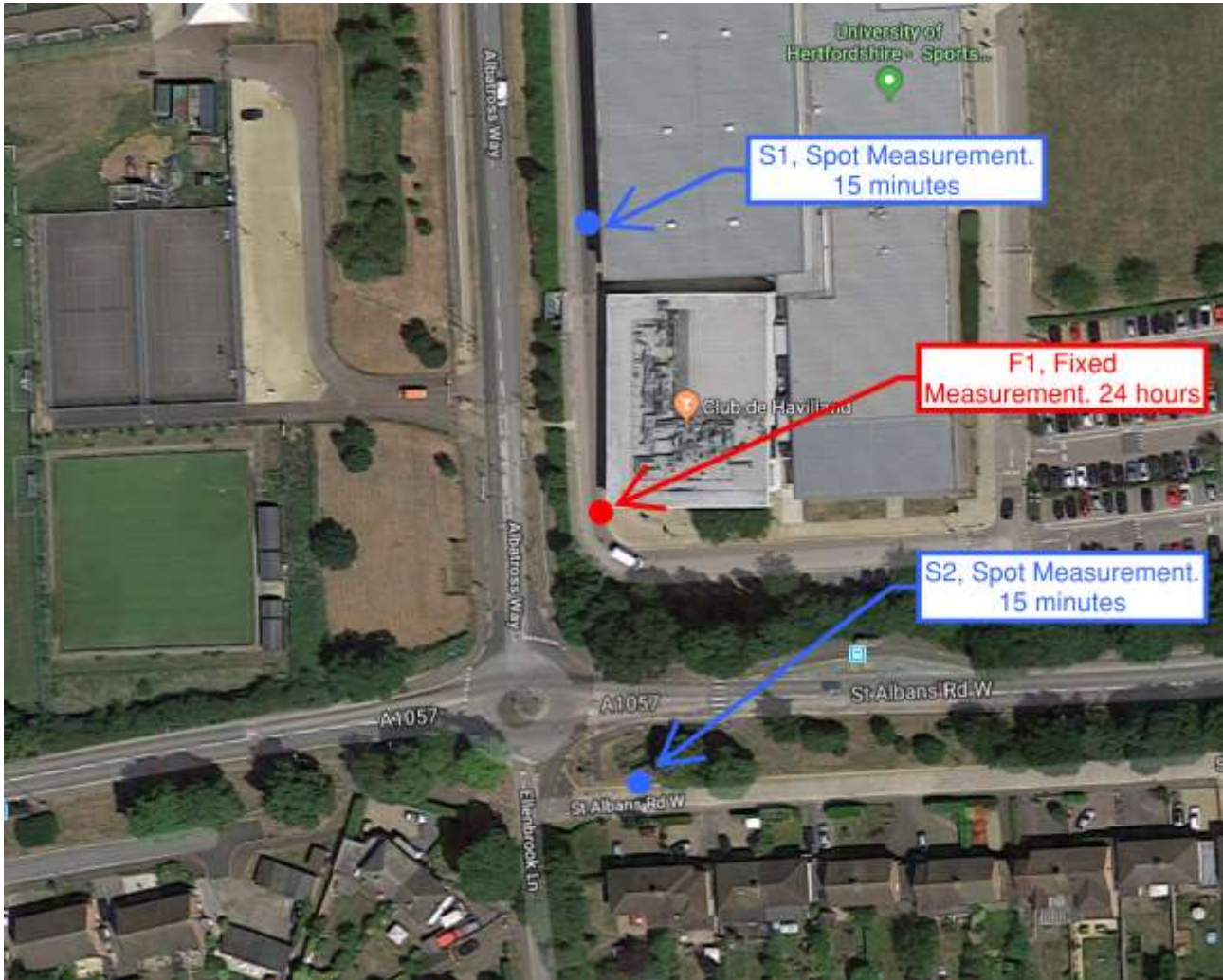


Figure 2.2: Measurement Positions External

2.5 Measured Noise Levels

2.5.1 Fixed Position

Noise levels were measured at the fixed position between 10:40, 23/04/2019 and 10:50, 24/04/2019. Measured noise levels are presented in the graph below. A summary of these noise levels is shown in the table.

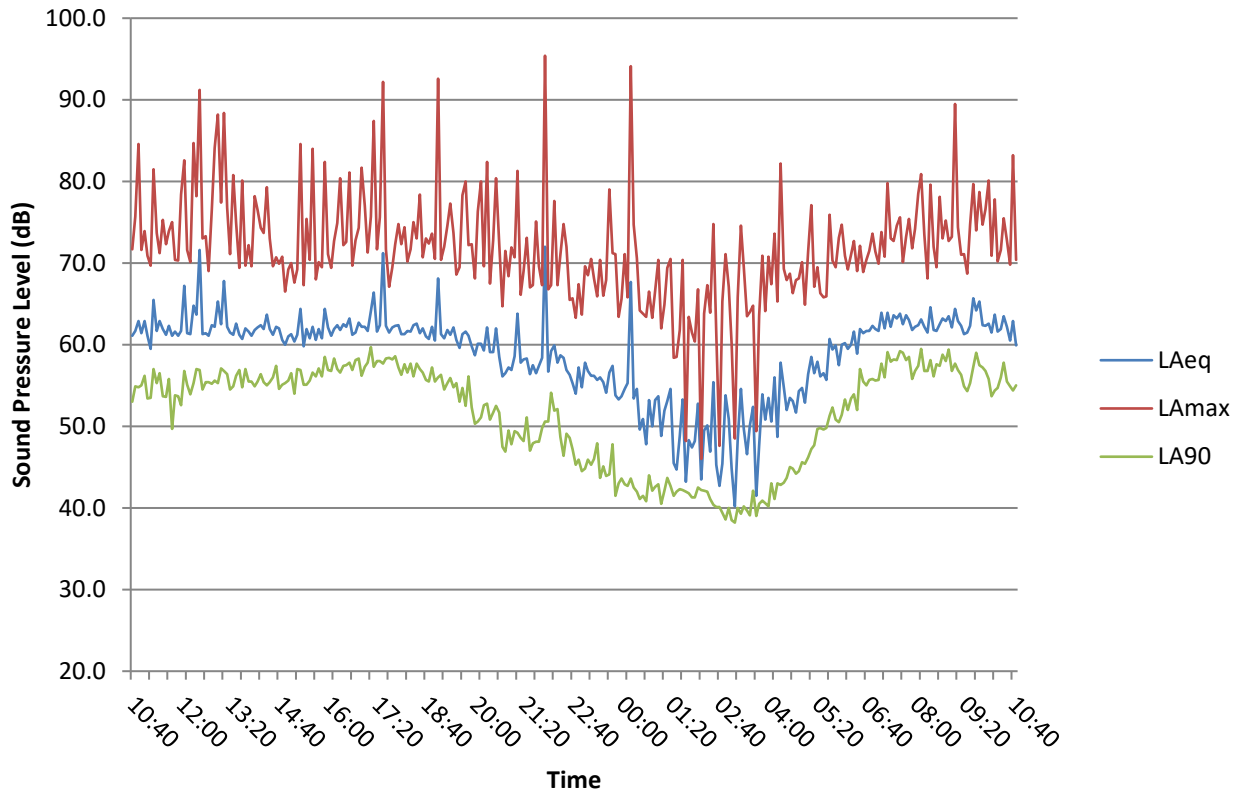


Table 2.3: Summary Of Fixed Position Measurements

Position	Period	Measured Noise Levels (dB)				
		Maximum	Minimum	Mean	Mode	
F1	Daytime (07:00-23:00)	L _{Amax}	95	63	74	70
		L _{Aeq,5min}	72	54	63	62
		L _{A90}	60	45	-	57
	Night-time (23:00-07:00)	L _{Amax}	94	46	67	71
		L _{Aeq,5min}	68	40	56	55
		L _{A90}	57	38	-	42

Table 2.4: Summary Of Fixed Position Measurements

2.5.2 Spot Positions

Additional spot measurements were taken between 09:05 and 10:40.

Spot Position	Times (hh:mm)	Measured Noise Levels (dB)			
			Maximum	Minimum	Mean
S1	10:10 – 10:20	L _{Amax}	79	72	75
		L _{Aeq,5min}	60	59	59
		L _{A90}	52	48	50
S2	10:25 – 10:40	L _{Amax}	83	79	81
		L _{Aeq,5min}	70	69	69
		L _{A90}	60	57	59
Internal Measurement	09:05 – 09:20	L _{Amax}	70	47	56
		L _{Aeq,5min}	41	35	39
		L _{A90}	32	36	34

Table 2.5: Summary Of Spot Measurements

3.0 NOISE BREAK-IN ASSESSMENT

3.1 Criteria

BB93 specifies maximum indoor ambient noise levels for all teaching and ancillary spaces. These levels are seen to be the overall noise levels, made up of the sum of building services noise, external noise break-in and any other noise sources present within the unoccupied, fully operational building.

BB93 also sets a maximum “L1” noise level of 60 dB $L_{A1,30min}$ in teaching spaces to assess short transient noise levels associated with aircraft, railways and other similar sources. This is achieved by default for spaces with indoor ambient noise levels up to 40 dB $L_{Aeq,30min}$, but requires assessment in spaces with indoor ambient noise level targets of 45dB $L_{Aeq,30min}$ or above.

3.1.1 BB93 Relaxations

3.1.1.1 Natural/Hybrid Ventilation

Where a natural ventilation strategy is to be employed, the indoor ambient noise limits can be relaxed by 5dB $L_{Aeq,30min}$ where the “normal condition” (outlined in the appendix) is achieved. However, this does not apply to spaces with an indoor ambient noise limit of 45dB $L_{Aeq,30min}$ or higher. For hybrid ventilation systems, the mechanical system noise component must comply with the limits set out in Table 1 of BB93, however the overall noise limit can also be relaxed by 5dB $L_{Aeq,30min}$.

3.1.1.2 Summertime/Intermittent Boost Ventilation

BB93 also permits a further relaxation during the summertime. Summertime is defined as the hottest 200 hours in peak summertime. During summertime, natural and hybrid ventilation systems are permitted to relax indoor ambient noise limits to an upper limit of 55 dB $L_{Aeq,30min}$.

3.1.1.3 Mechanical Ventilation

Mechanical ventilation systems are also permitted to relax indoor ambient noise limits by 5dB $L_{Aeq,30min}$ for the purpose of summertime / intermittent boost, under teacher control. Again, this does not apply to spaces with an indoor ambient noise limits of 45 dB $L_{Aeq,30min}$ or higher.

3.2 Design Target

Within the development it is understood that there will only be standard teaching spaces, that BB93 provides an indoor ambient noise level target of 40 dB $L_{Aeq,30min}$ for. With the additional natural ventilation relaxation of +5dB, that means the most onerous indoor ambient noise level requirement for this development is 45 dB $L_{Aeq,30min}$.

3.3 Assessment

As BB93 sets $L_{Aeq,30min}$ targets, the survey data has been averaged into 30 minute periods, which are summarised below. As the table shows, the highest measured noise level at the fixed position was **66 dB** $L_{Aeq,30min}$.

Time Period	$L_{Aeq,30min}$
10:40 - 11:10	62
11:10 - 11:40	63
11:40 - 12:10	63
12:10 - 12:40	66
12:40 - 13:10	63
13:10 - 13:40	64
13:40 - 14:10	62
14:10 - 14:40	62
14:40 - 15:10	61
15:10 - 15:40	62

Time Period	$L_{Aeq,30min}$
15:40 - 16:10	62
16:10 - 16:40	62
16:40 - 17:10	62
17:10 - 17:40	66
08:00 - 08:30	63
08:30 - 09:00	63
09:00 - 09:30	63
09:30 - 10:00	64
10:00 - 10:30	63

Table 3.1: Summary Of $L_{Aeq,30min}$ Data

3.3.1 Proposed Ventilation Strategy

It is understood that the proposed refurbishment building will be fully mechanically ventilated. Therefore, ventilation will not be reliant on openable windows. However, the windows will be openable in some spaces, and will be used at end user's discretion. Thus, noise ingress from openable window will not form a part of the assessment.

It is understood that the existing building envelope is proposed to be retained. MACH has therefore taken a short-term spot measurement in a room on the western elevation with the sealed facade to identify the existing ambient noise levels achieved by the current glazing element. The results of this measurement is shown in Table 2.5, and shown that the internal level is measured at 39dB $L_{Aeq, 15mins}$, which is under the most onerous internal ambient noise level limit of the building of 40dB L_{Aeq} .

4.0 NOISE BREAK-OUT ASSESSMENT

4.1 Criteria

BS 4142:2014 “Methods for rating and assessing industrial and commercial sound” describes a method of determining the level of noise of an industrial nature, together with the procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity. As such, an assessment to BS 4142 is typically called for within planning conditions. The likelihood of complaints in response to a noise depends on various factors. BS 4142 assesses the likelihood of complaints by considering the margin by which the noise in question exceeds the background noise level. Additional information on BS 4142 methodology is provided within Appendix A.

4.2 Design Target

MACH has been in contact with the Environmental Health Technical Officer at Welwyn Hatfield Borough Council and has been advised the following:

“The impact of existing and new commercial noise sources should be assessed in accordance with BS4142:2014. When noise sources show signs of tonality we require noise levels to be 10dB below background noise level at the nearest receptor location. In instances where the noise source presents no tonality we require the noise level to be 5dB below the background noise level at the nearest receptor location.

In instances where large machinery or plant will be in operation we will require a pre testing noise impact assessment to be undertaken. This will be set as a discharge of condition and will require a further noise impact assessment to be undertaken and submitted for consideration. It is likely that any such condition will also stipulate maintenance requirements for the operation lifespan of the equipment.”

Based on the above, plant noise limits have been set as follows:

Presence of Tonality	Plant Noise Level Limit
Yes	10dB below background noise levels
No	5dB below background noise levels

Table 4.1: Plant Noise Level Limits

4.3 Assessment

Noise rating levels are to be assessed against the existing background noise levels, L_{A90} . For the purposes of assessment, MACH Acoustics has used the modal L_{A90} that occurred during the survey.

Plant noise break out should not adversely impact nearby residents but should also ensure that it does not impact the development itself. Therefore, plant noise break out must meet both of these requirements.

Position	Presence of Tonality	Time Period	Assessed Background Noise Level (dB L_{A90})	Plant Noise Limit dB $L_{Aeq,T}$	
				At Nearest Sensitive Receivers	At Nearest Teaching Window
Fixed	Yes	Daytime (07:00-23:00)	57	47	48
		Night-time (23:00-07:00)	42	32	-

Table 4.2: Plant Noise Limits

5.0 CONCLUSION

An environmental noise survey, noise break in assessment and noise break out assessment have been conducted. The following points can be concluded:

- An environmental noise survey was conducted from 23/04/19 to 24/04/19.
- Road traffic along A1057 was found to be the dominant noise source with some additional noise contribution from Albatross Way.
- Noise levels on site at daytime were found to be as high as 66 dB $L_{Aeq,30min}$.
- It is understood that the proposed building undergoing a refurbishment will be fully mechanically ventilated. Therefore, noise ingress from openable windows do not form the part of the assessment.
- Minimum background noise levels on site were measured to be 57dB and 42 dB L_{A90} in the daytime and night-time respectively.
- Plant noise limits have been set at 10dB below the existing background noise levels if tonality is present in the specific sound of plant units, meaning plant noise contributions should not exceed 47 dB and 32 dB $L_{Aeq,T}$ in the daytime and night-time respectively at the nearest noise sensitive receiver.
- Additionally, plant noise should not exceed 48 dB $L_{Aeq,T}$ at the nearest teaching window to ensure that BB93 indoor ambient noise level targets are not compromised.

APPENDIX A – METHODOLOGY

BS 7445:2003

Environmental noise measurements were conducted in accordance with BS 7445 “Description and measurement of environmental noise”.

BS 4142:2014

BS 4142 states that one should ‘*obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level and consider the following:*

- a) *Typically, the greater this difference, the greater the magnitude of the impact.*
- b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) *A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.*
- d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

The aforementioned rating level is based upon the specific noise level of the noise source in question. A correction should be applied to the specific noise level to obtain an increased rating level if ‘*a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.*’ To summarise, BS4142 section 9.2 advises the following in regards to corrections for acoustic characteristics:

- **Tonality** – *for sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*
- **Impulsivity** – *A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level., Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.*
- **Other sound characteristics** – *Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied*
- **Intermittency** – *When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*

BB93 – Normal Ventilation

BB93 states that;

“The “normal condition” for a natural or hybrid ventilation mode is defined as when the system is operating to limit the daily average carbon dioxide concentration to no more than 1,500ppm with the maximum concentration not exceeding 2,000ppm for more than 20 consecutive minutes on any day. This would normally equate to a minimum ventilation rate of approximately 5l/s per person. The mid-season design condition can be used in simple ventilation calculations and is defined as an outside temperature of 11 °C and an internal air temperature of 20 °C with no external wind effect...

... Where there is a hybrid system, any mechanical system components should meet the IANL limits from table 1. The total noise level including external noise ingress may exceed the IANL limit from table 1 by up to 5 dB.”

APPENDIX B – MEASUREMENT EQUIPMENT

Name	Serial Number	Last Calibrated	Certificate Number	Calibration Due
Norsonic Precision Sound Analyser Type 118 RA	30601	Dec-17	TCRT17/1840	Dec-19
Norsonic Type 1206 Pre-amplifier	28622	Dec-17	TCRT17/1840	Dec-19
Norsonic Type 1225 Microphone	227118	Dec-17	TCRT17/1840	Dec-19
SVAN Precision Sound Analyser Type 959	11265	Oct-17	TCRT17/1702	Oct-19
SVAN Type SV12L Pre-amplifier	13243	Oct-17	TCRT17/1702	Oct-19
GRAS Type 40AE Microphone	86563	Oct-17	TCRT17/1702	Oct-19
Svantek Acoustic Calibrator SV33A	64140	Jan-19	266927	Jan-20

The measurement equipment listed above was used during the survey, where all equipment complies with BS EN 60942:2003 i.e. a class 1 device.

APPENDIX C – METEOROLOGICAL CONDITIONS


Date	Time	Temperature	Humidity	Wind	Wind Speed	Pressure	Precip.	Condition
23/04/2019	12:20 AM	12 C	72 %	NE	7 km/h	998.4 hPa	0.0 mm	Fair
	12:50 AM	13 C	67 %	NNE	6 km/h	998.4 hPa	0.0 mm	Fair
	1:20 AM	13 C	67 %	NE	7 km/h	998.4 hPa	0.0 mm	Fair
	1:50 AM	12 C	72 %	N	7 km/h	998.4 hPa	0.0 mm	Fair
	2:20 AM	12 C	67 %	NNE	9 km/h	997.4 hPa	0.0 mm	Fair
	2:50 AM	11 C	71 %	NNE	9 km/h	997.4 hPa	0.0 mm	Fair
	3:20 AM	11 C	71 %	NNE	9 km/h	997.4 hPa	0.0 mm	Fair
	3:50 AM	11 C	71 %	NNE	7 km/h	996.4 hPa	0.0 mm	Fair
	4:20 AM	11 C	67 %	NE	7 km/h	996.4 hPa	0.0 mm	Fair
	4:50 AM	11 C	67 %	NE	9 km/h	996.4 hPa	0.0 mm	Fair
	5:20 AM	10 C	76 %	NE	9 km/h	995.4 hPa	0.0 mm	Fair
	5:50 AM	10 C	76 %	ENE	11 km/h	995.4 hPa	0.0 mm	Fair
	6:20 AM	10 C	76 %	NE	15 km/h	995.4 hPa	0.0 mm	Fair
	6:50 AM	10 C	76 %	NE	13 km/h	995.4 hPa	0.0 mm	Fair
	7:20 AM	11 C	76 %	E	7 km/h	995.4 hPa	0.0 mm	Fair
	7:50 AM	11 C	76 %	ENE	9 km/h	995.4 hPa	0.0 mm	Fair
	8:20 AM	12 C	72 %	E	9 km/h	995.4 hPa	0.0 mm	Fair
	8:50 AM	13 C	72 %	ENE	13 km/h	995.4 hPa	0.0 mm	Fair
	9:20 AM	13 C	67 %	E	9 km/h	995.4 hPa	0.0 mm	Fair
	9:50 AM	14 C	67 %	E	11 km/h	995.4 hPa	0.0 mm	Fair
	10:20 AM	16 C	63 %	E	11 km/h	995.4 hPa	0.0 mm	Fair
	10:50 AM	16 C	59 %	E	11 km/h	995.4 hPa	0.0 mm	Fair
	11:20 AM	17 C	59 %	E	11 km/h	995.4 hPa	0.0 mm	Fair
	11:50 AM	18 C	56 %	ENE	13 km/h	995.4 hPa	0.0 mm	Fair
	12:20 PM	19 C	52 %	ENE	13 km/h	994.4 hPa	0.0 mm	Fair
	12:50 PM	20 C	49 %	E	15 km/h	994.4 hPa	0.0 mm	Fair
	1:20 PM	19 C	52 %	ENE	17 km/h	994.4 hPa	0.0 mm	Fair
	1:50 PM	19 C	52 %	ENE	17 km/h	994.4 hPa	0.0 mm	Fair
	2:20 PM	19 C	56 %	NE	17 km/h	994.4 hPa	0.0 mm	Fair
	2:50 PM	19 C	52 %	E	19 km/h	994.4 hPa	0.0 mm	Fair
	3:20 PM	19 C	52 %	ENE	19 km/h	993.4 hPa	0.0 mm	Fair
	3:50 PM	19 C	52 %	E	17 km/h	993.4 hPa	0.0 mm	Fair
4:20 PM	18 C	56 %	ENE	19 km/h	993.4 hPa	0.0 mm	Fair	
4:50 PM	17 C	55 %	E	17 km/h	993.4 hPa	0.0 mm	Fair	
5:20 PM	17 C	55 %	E	15 km/h	993.4 hPa	0.0 mm	Fair	
5:50 PM	17 C	59 %	E	13 km/h	993.4 hPa	0.0 mm	Fair	
6:20 PM	16 C	59 %	ENE	13 km/h	993.4 hPa	0.0 mm	Fair	
6:50 PM	15 C	67 %	ENE	11 km/h	993.4 hPa	0.0 mm	Fair	

Date	Time	Temperature	Humidity	Wind	Wind Speed	Pressure	Precip.	Condition
	7:20 PM	15 C	63 %	ENE	11 km/h	993.4 hPa	0.0 mm	Fair
	7:50 PM	14 C	63 %	ENE	15 km/h	993.4 hPa	0.0 mm	Fair
	8:20 PM	13 C	67 %	ENE	9 km/h	993.4 hPa	0.0 mm	Fair
	8:50 PM	12 C	72 %	ENE	7 km/h	993.4 hPa	0.0 mm	Fair
	9:20 PM	11 C	76 %	NE	11 km/h	993.4 hPa	0.0 mm	Fair
	9:50 PM	12 C	72 %	NE	11 km/h	993.4 hPa	0.0 mm	Fair
	10:20 PM	11 C	76 %	NE	9 km/h	992.4 hPa	0.0 mm	Fair
	10:50 PM	11 C	76 %	NE	9 km/h	992.4 hPa	0.0 mm	Fair
	11:20 PM	11 C	71 %	NE	7 km/h	992.4 hPa	0.0 mm	Fair
	11:50 PM	11 C	76 %	NE	9 km/h	992.4 hPa	0.0 mm	Fair
24/04/2019	12:20 AM	10 C	76 %	NNE	9 km/h	991.4 hPa	0.0 mm	Fair
	12:50 AM	9 C	82 %	NNE	9 km/h	991.4 hPa	0.0 mm	Fair
	1:20 AM	9 C	82 %	NNE	9 km/h	991.4 hPa	0.0 mm	Fair
	1:50 AM	8 C	87 %	NE	9 km/h	991.4 hPa	0.0 mm	Fair
	2:20 AM	8 C	87 %	NE	7 km/h	991.4 hPa	0.0 mm	Fair
	2:50 AM	9 C	87 %	NNE	6 km/h	990.4 hPa	0.0 mm	Fair
	3:20 AM	9 C	87 %	VAR	4 km/h	990.4 hPa	0.0 mm	Fair
	3:50 AM	9 C	87 %	E	6 km/h	990.4 hPa	0.0 mm	Fair
	4:20 AM	9 C	87 %	E	6 km/h	990.4 hPa	0.0 mm	Fair
	4:50 AM	9 C	87 %	ESE	6 km/h	990.4 hPa	0.0 mm	Fair
	5:20 AM	9 C	87 %	VAR	6 km/h	989.4 hPa	0.0 mm	Fair
	5:50 AM	9 C	87 %	VAR	6 km/h	989.4 hPa	0.0 mm	Haze
	6:20 AM	9 C	87 %	E	7 km/h	989.4 hPa	0.0 mm	Haze
	6:50 AM	9 C	93 %	ESE	7 km/h	989.4 hPa	0.0 mm	Haze
	7:20 AM	10 C	87 %	SE	9 km/h	989.4 hPa	0.0 mm	Haze
	7:50 AM	10 C	94 %	SE	7 km/h	990.4 hPa	0.0 mm	Haze
	8:20 AM	12 C	88 %	VAR	4 km/h	989.4 hPa	0.0 mm	Fair
	8:50 AM	14 C	77 %	SE	7 km/h	989.4 hPa	0.0 mm	Fair
	9:20 AM	15 C	72 %	ESE	11 km/h	989.4 hPa	0.0 mm	Fair
	9:50 AM	16 C	72 %	ESE	13 km/h	989.4 hPa	0.0 mm	Fair
	10:20 AM	16 C	72 %	ESE	11 km/h	989.4 hPa	0.0 mm	Fair
	10:50 AM	16 C	72 %	SE	13 km/h	989.4 hPa	0.0 mm	Fair
	12:20 PM	16 C	72 %	SE	20 km/h	989.4 hPa	0.0 mm	Light Rain
	12:50 PM	16 C	82 %	SE	24 km/h	989.4 hPa	0.0 mm	Partly Cloudy
	1:20 PM	16 C	77 %	SSE	22 km/h	989.4 hPa	0.0 mm	Mostly Cloudy
	1:50 PM	16 C	77 %	SSE	20 km/h	988.4 hPa	0.0 mm	Mostly Cloudy
	2:20 PM	17 C	72 %	S	24 km/h	988.4 hPa	0.0 mm	Mostly Cloudy
	2:50 PM	16 C	68 %	S	19 km/h	989.4 hPa	0.0 mm	Mostly Cloudy
3:20 PM	15 C	72 %	S	22 km/h	989.4 hPa	0.0 mm	Mostly Cloudy	
3:50 PM	15 C	67 %	SSW	24 km/h	990.4 hPa	0.0 mm	Mostly Cloudy	

Date	Time	Temperature	Humidity	Wind	Wind Speed	Pressure	Precip.	Condition
	4:20 PM	14 C	72 %	SSW	22 km/h	991.4 hPa	0.0 mm	Cloudy
	4:50 PM	13 C	72 %	SSW	22 km/h	991.4 hPa	0.0 mm	Cloudy
	5:20 PM	13 C	67 %	SSW	26 km/h	991.4 hPa	0.0 mm	Mostly Cloudy
	5:50 PM	13 C	67 %	SW	24 km/h	992.4 hPa	0.0 mm	Mostly Cloudy
	6:20 PM	13 C	67 %	SW	22 km/h	992.4 hPa	0.0 mm	Partly Cloudy
	6:50 PM	13 C	67 %	SSW	15 km/h	992.4 hPa	0.0 mm	Fair
	7:20 PM	12 C	67 %	SSW	20 km/h	993.4 hPa	0.0 mm	Fair
	7:50 PM	12 C	67 %	S	15 km/h	993.4 hPa	0.0 mm	Fair
	8:20 PM	11 C	71 %	S	13 km/h	993.4 hPa	0.0 mm	Fair
	8:50 PM	11 C	71 %	S	13 km/h	994.4 hPa	0.0 mm	Fair
	9:20 PM	10 C	76 %	SSE	11 km/h	994.4 hPa	0.0 mm	Fair
	9:50 PM	10 C	76 %	SSE	9 km/h	994.4 hPa	0.0 mm	Fair
	10:20 PM	10 C	76 %	SSE	15 km/h	994.4 hPa	0.0 mm	Mostly Cloudy
	10:50 PM	9 C	82 %	SSE	9 km/h	994.4 hPa	0.0 mm	Partly Cloudy
	11:20 PM	8 C	87 %	SE	11 km/h	994.4 hPa	0.0 mm	Fair
	11:50 PM	7 C	87 %	SE	11 km/h	994.4 hPa	0.0 mm	Fair

The above data has been taken from timeanddate.com (<https://www.timeanddate.com/weather>).

APPENDIX D – SITE PHOTOGRAPHS

Location	Image
Fixed Position, F1	 A photograph showing a noise measurement setup. A black microphone on a stand is positioned behind a black metal fence. The area is heavily overgrown with green bushes and trees. In the background, a tall black pole and a street lamp are visible against a cloudy sky. The ground in the foreground has some small white flowers.

Location

Image

Spot
Measurement
Position, S1



Location

Image

Spot
Measurement
Position, S2



Location

Image

Internal Façade
Spot Measurement
Position

