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Technical Memorandum

Sister Plot C – Baseline Noise and Vibration Survey

1 Introduction

- 1.1 Sol Acoustics Ltd ("Sol") has been commissioned by ID Manchester Limited ("IDM") to undertake an environmental noise survey as part of an Environmental Impact Assessment ("EIA") for the Sister Plot C development in Manchester to establish the prevailing acoustic conditions at the site.
- 1.2 This report provides details of the acoustic survey and assessment of the prevailing acoustic environment.

2 Site Description

- 1.1.1 Plot C forms part of the wider masterplan for the campus known as Sister. Plot C site is located on the corner of Altrincham Street and London Road (A6) in Manchester. The existing site comprises office and educational premises forming part of the North Campus of the University of Manchester, namely, the Barnes Wallace Building, the Moffat Building, The Morton Laboratory, and Staff House.
- 1.1.2 To the north the site extends to include a section of Altrincham Street and viaduct with elevated railway, to the east the site is bound by London Road (A6). To the south and west the is bordered by other university buildings belonging to the North Campus. The recently renovated Renold building is directly west of the site across the proposed Sister Square (part of the Plot C proposals), and further to the south at the boundary of the North Campus is Mancunian Way (A57(M)) which is partially elevated.
- 2.1 The nearest noise sensitive receptors are the offices of the Renold Building to the west and the student residential development currently under construction adjacent to the northeast of the site.
- 2.2 An overview of the site and surroundings is presented in Figure 1.

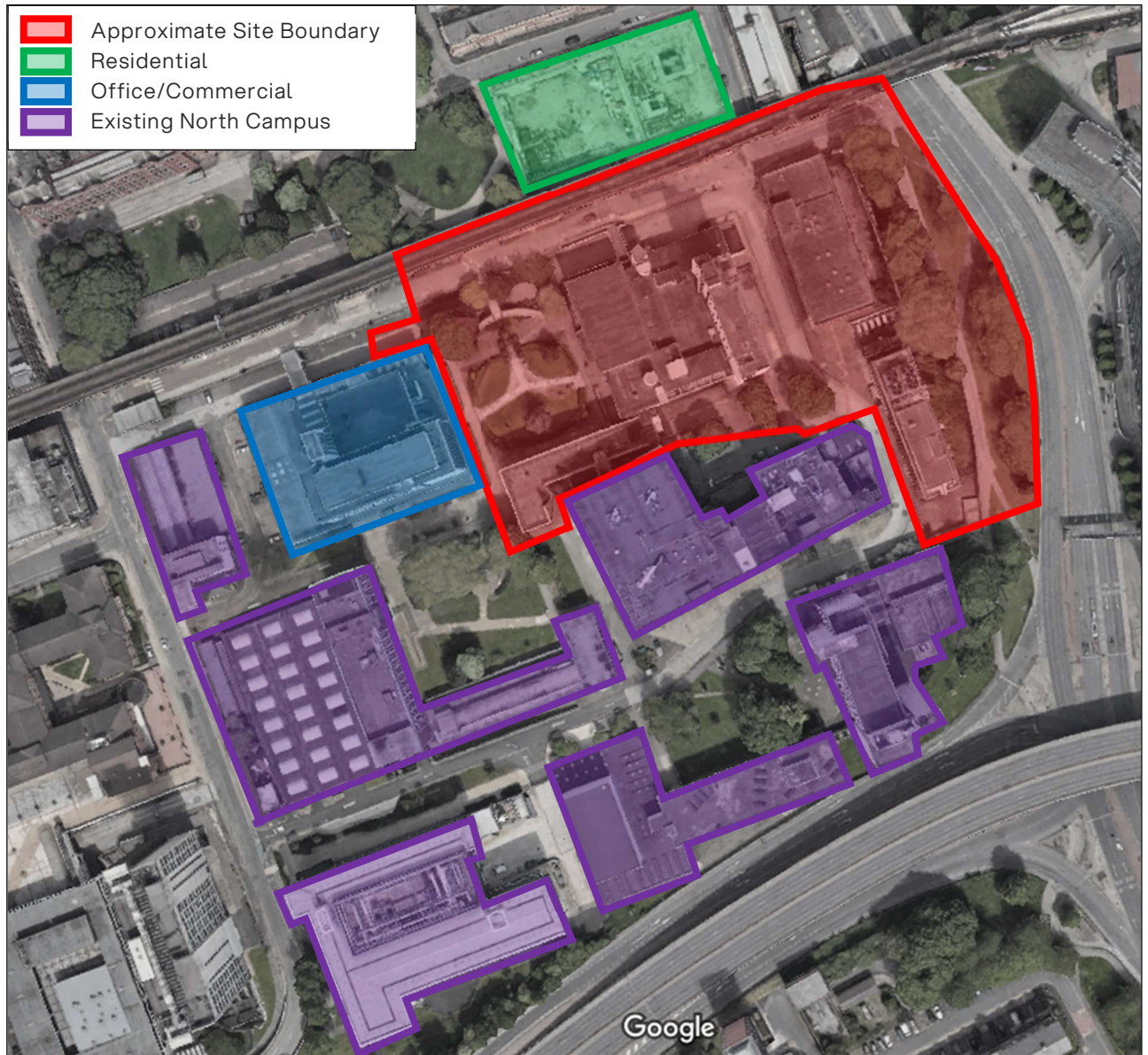


Figure 1: Proposed Development Site and Surroundings (Google Maps, 2024)

3 Baseline Environmental Noise and Vibration Study

3.1 Environmental noise and vibration surveys were conducted by Sol between approximately 13:00 hours on Thursday 27 June 2024 and 13:00 hours on Friday 28 June 2024, and between approximately 14:00 hours on Thursday 17 October 2024 and 13:00 hours on Wednesday 23 October 2024. The surveys consisted of 6No. noise measurement positions and a single vibration measurement position, as shown in Figure 2, and as described in Table 1.



Figure 2: Aerial image showing environmental noise and vibration monitoring locations (Google Maps, 2024)

Measurement Position	Description
MP1 (Unattended Noise Logger, June)	Mast mounted microphone protruding from a fourth floor window, approximately 1m from the northern façade of the Renold building. Sited in "façade" conditions.
MP2 (Unattended Noise Logger, June)	Mast mounted microphone protruding from a fourth floor window, approximately 1m from the southern façade of the Renold building. Sited in "façade" conditions.
MP3 (Unattended Noise Logger, October)	Mast mounted microphone secured approximately 1.5m above the roof of the Wright Robinson building. Sited in "free-field" conditions.
MP4 (Unattended Noise Logger, October)	Mast mounted microphone secured approximately 1.5m above the roof of the Maths and Social Sciences building. Sited in "free-field" conditions.
MP5 (Attended Noise Measurement, October)	Tripod mounted microphone approximately 1.5m above local ground level set back approximately 3m from the nearside edge of London Road (A6). Sited in "free-field" conditions.
MP6 (Attended Noise Measurement, October)	Tripod mounted microphone approximately 1.5m above local ground level set back approximately 3m from the nearside edge Sackville Street. Sited in "free-field" conditions.
MP7 (Unattended Vibration Logger, October)	Ground mounted sensor on the northern boundary of the Barnes Wallis building.

Table 1: Noise and vibration measurement positions

- 3.2 Type 1 Precision Grade sound measuring instrumentation was exclusively used and microphone windshields were fitted at all times. Full details of the instrumentation used and corresponding traceable calibration records are retained on file by Sol and are available for inspection if required.
- 3.3 The prevailing weather conditions during both surveys were generally suitable for the purposes of environmental noise measurements, with wind speeds less than 5m/s and rainfall intensity less than 2mm/h, with the exception of some short periods of rainfall between 01:00 and 04:00 on 19October 2024, and some short periods of higher wind speeds between 13:00 and 18:00 on 27 June 2024 and 14:00 and 16:30 on 20 October 2024. These periods shall be omitted from further analysis.

4 Baseline Environmental Noise and Vibration Survey Results

Noise

4.1 Table 2 provides a basic summary of the free-field baseline environmental noise levels measured during the survey:

Measurement Location	Typical Measured Noise Level (dB, Range L_{Aeq} , $L_{Amax,15min}$, $L_{A1,1h}$, $L_{A90,15min}$)				
	Daytime (07:00-23:00)			Night-time (23:00-07:00)	
	$L_{Aeq,T}$	$L_{A1,1h}$	$L_{A90,15min}$	$L_{Aeq,8h}$	$L_{A90,15min}$
MP1	56 (T = 16h)	64 – 74	49 – 58	55	45 – 52
MP2	58 (T = 16h)	64 – 69	55 – 61	58	49 – 60
MP3	66 – 69 (T = 16h)	67 – 85	60 – 67	62 – 64	51 – 66
MP4	75 – 77 (T = 16h)	77 – 82	66 – 76	71 – 72	56 – 75
MP5	73 (T = 1h)	80	63 – 64	-	-
MP6	66 (T = 1h)	72	59 – 60	-	-

Table 2: Summary of typical, measured environmental noise levels, broadband terms

4.2 Table 3 summarises the corresponding time-averaged ($L_{eq,T}$) daytime period ambient noise levels, in linear octave band frequency terms:

Measurement Location	Broadband (A-Weighted) Noise Level, dB $L_{Aeq,T}$	Unweighted Sound Pressure Level ($L_{eq,T}$, dB) @ Octave Band Centre Frequency (Hz)						
		63	125	250	500	1000	2000	4000
MP1 (T = 16h)	56	62	57	53	53	52	47	47
MP2 (T = 16h)	59	61	54	57	54	57	48	38
MP3 (T = 16h)	69	66	63	63	64	67	60	51
MP4 (T = 16h)	77	70	67	69	70	75	68	55
MP5 (T = 1h)	73	72	68	69	67	71	64	54
MP6 (T = 1h)	66	67	62	61	60	63	58	49

Table 3: Summary of time-averaged environmental noise levels, in octave band terms

4.3 A summary of all data measured at Measurement Positions MP1-MP4 is available in Appendix B.

Vibration

4.4 Table 4 summarises the measured z-axis VDV for each day, the presented data represents the highest measured levels across the three axes.

Date	VDV _{b,day} ms ^{-1.75}
17 October 2024	0.013
18 October 2024	0.014
19 October 2024	0.014
20 October 2024	0.011
21 October 2024	0.014
22 October 2024	0.014
23 October 2024	0.011

Table 4: Measured Vibration Dosage Value _{b,day} in the z-axis

4.5 The measured re-radiated groundborne noise time history is presented in Appendix B.

APPENDIX A

Glossary of Acoustic Terms

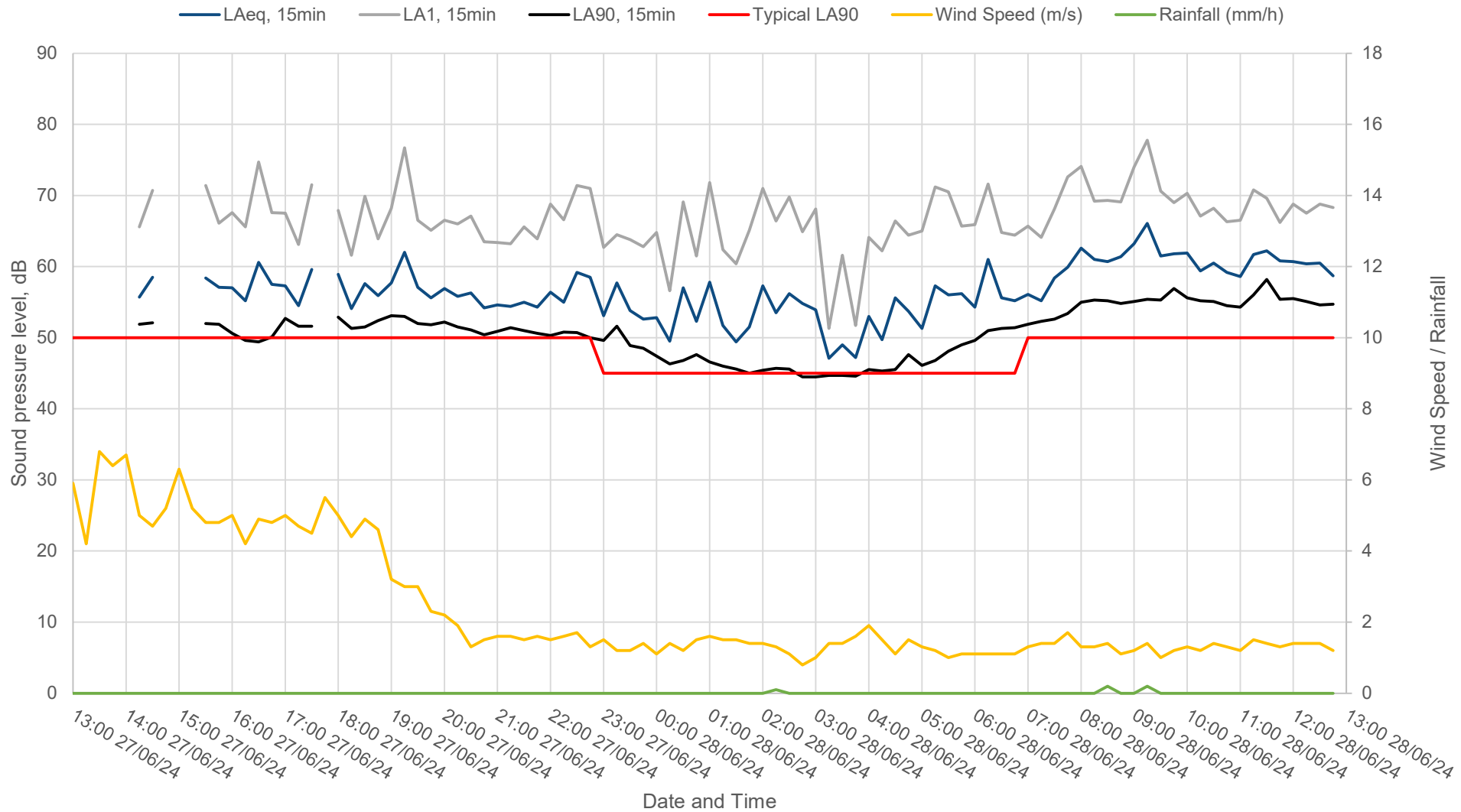
Term	Abbreviation	Description
Decibel	dB	A scale for comparing the ratios of two quantities, including sound pressure and sound power.
A-weighting	dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the change in sensitivity of the human ear at varying frequencies.
Sound Pressure Level	L_{pA}	A measure of the sound pressure at a particular location. Typically expressed in dB(A) referenced to 2×10^{-5} Pascals.
Equivalent Continuous Sound Level	$L_{Aeq,T}$	The steady level of sound over a prescribed period of time which would contain the same total sound energy as the actual fluctuating noise under consideration in the same period of time.
Statistical Sound Levels	L_{A10} and L_{A90}	The level of noise exceeded for a percentage of the time period being sampled, namely 10% or 90% respectively.
Background Sound Level	$L_{A90,T}$	The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time period being sampled.
Maximum Sound Level	L_{Amax}	The maximum sound or noise level determined with instrumentation set to either a fast time weighting, L_{AFmax} , or a slow time weighting, L_{Asmax} , as occurring during the time period being sampled.
Sound Power Level	L_{WA}	A measure of the total sound energy radiated from a source. Like sound pressure levels, this is also expressed in dB(A) terms, but it is referenced to 1×10^{-12} W.
Broadband		Sound sampled over a wide range of frequencies.
Narrow band		Sound sampled over a specific, restricted frequency range. Used to ascertain the amplitude and significant of individual, audible tones, and to assist in identifying particular sources of noise within a complex, multi-source soundscape environment.
Ambient Sound	$L_{eq,T}$	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, both near and far.
Specific Sound Level	$L_{eq,T}$	The Equivalent Continuous A-Weighted Sound Level at an assessment position produced by a specific sound over a given reference time interval, T_r
Rating Level	L_{Ar,T_r}	The Specific Sound Level plus any adjustment for the acoustic characteristic features of the noise (e.g. intermittency, tones etc.).
Residual Noise	$L_{Aeq,T}$	The ambient sound remaining at given position in a given situation, when the specific sound source is suppressed to such an extent that it no longer contributes to the ambient sound.
Sound Reduction Index	<i>SRI</i>	The reduction in sound energy when transmitted through a panel or similar planar element, typically used in relation to single octave or one-third octave frequency band values.
Weighted Sound Reduction Index	R_w	The Sound Reduction Index expressed as a single figure, as expressed against a reference curve.
Dynamic Insertion Loss	<i>DIL</i>	Reduction in acoustic energy resulting from the insertion of a noise control element (e.g. an attenuator, acoustic enclosure etc.).
Free Field		Noise measuring location that is free from the presence of sound reflecting objects (except the ground), usually taken to mean being at least 3.5 metres distance from reflective surface(s) or greater.

APPENDIX B

Survey Results

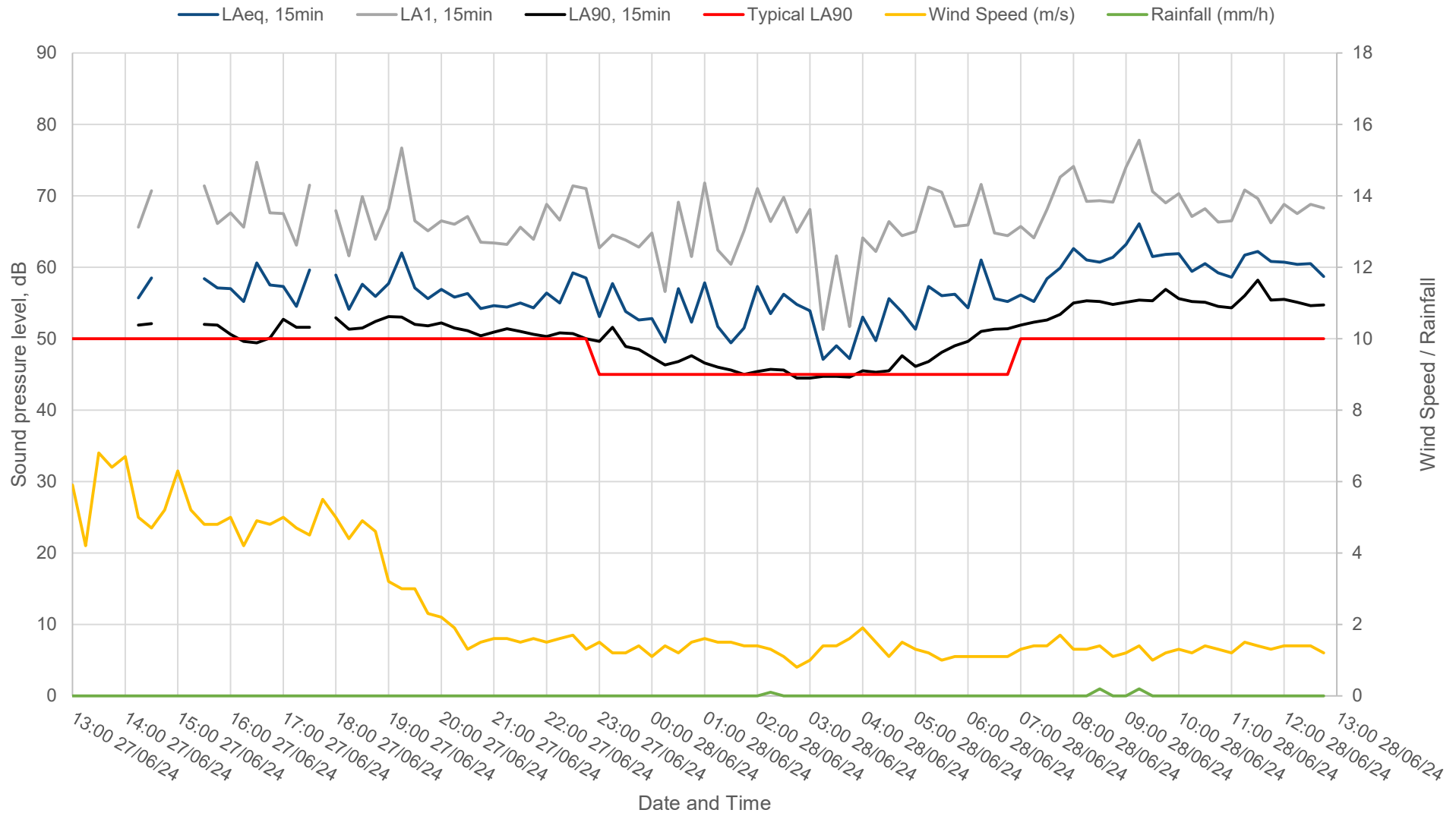
Measurement Position MP1

27/06/2024 - 28/06/2024

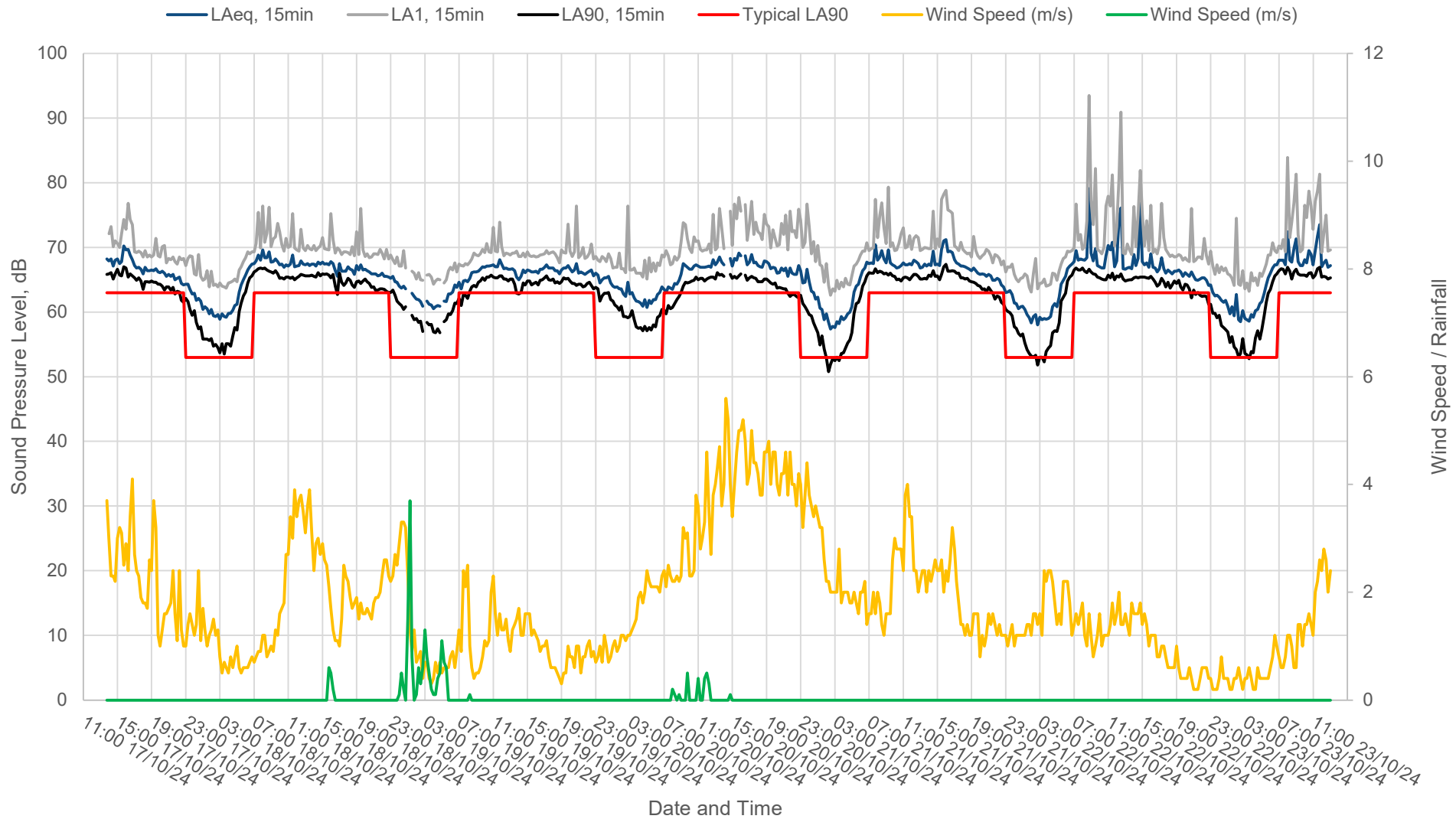


Measurement Position MP2

27/06/2024 - 28/06/2024

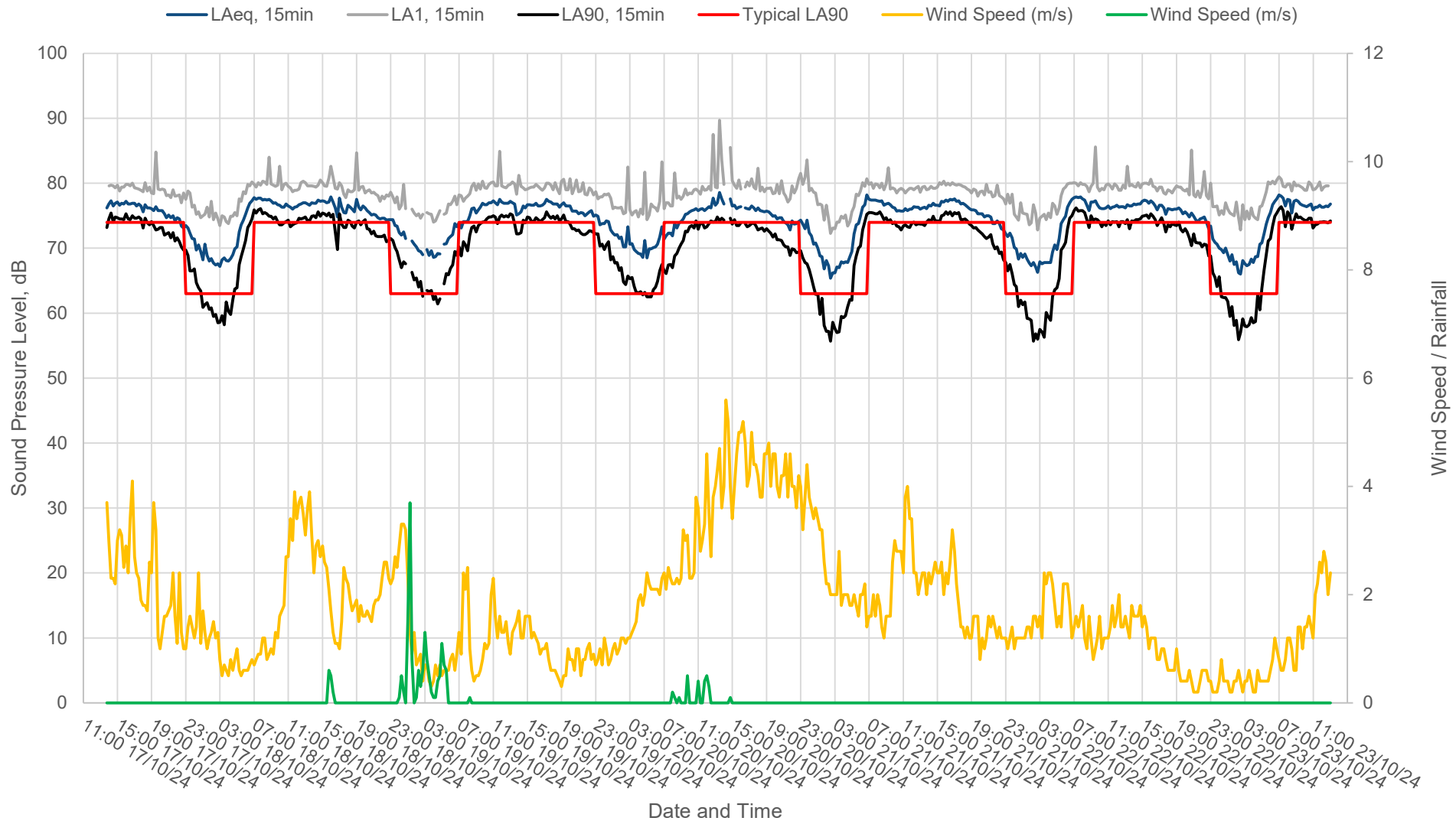


Measurement Position MP3 17/10/2024 - 23/10/2024



Measurement Position MP4

17/10/2024 - 23/10/2024



Measurement Position MP7

17/10/2024 - 23/10/2024

— PPV (z-axis)

