Appendix 9.3 – Noise Survey Details & Summary Results

Procedure

Baseline noise surveys were performed over the following periods to ascertain prevailing environmental and entertainment noise levels on-site.

Survey Ref.	Dates (Times)	Survey Type	Purpose
A	[10:00] Friday 1 September 2023 to [10:00] Thursday 7 September 2023	Automated	Weekday & weekend environmental noise climate at various positions around the site to calibrate noise model.
B	[13:00] Thursday 12 October 2023 to [10:00] Thursday 19 October 2023	Automated	Tram-induced noise levels incident onto the south edge of Phase 2a site.
C	[21:00-23:00] Friday 13 October 2023	Manned	Entertainment noise levels associated with Deansgate Locks, The Deansgate roof terrace & Britons Protection beer garden. All bars were operational with a representatively high number of patrons within the designated outdoor spaces.
D	[16:00] Wednesday 13 December 2023 to [10:00] Thursday 14 December 2023	Automated	Entertainment noise levels during a Christmas Party event at Manchester Central Convention Complex.

The positions selected are described below and illustrated on Figure 9.1.

Survey Ref.	Position	Type	Description
A	1	Automated	On top of the viaduct, to the north-east edge of the 2a site, overlooking tram bridge and corner of Great Bridgewater St & Albion St.
	2	Automated	On top of the viaduct, to the north edge of the 2b site, overlooking Great Bridgewater St.
	3	Automated	On top of the viaduct, to the south-west edge of the 2b site, overlooking Trafford St and tram stations.
B	4	Automated	On top of the viaduct, to the east edge of the 2a site, overlooking tram bridge.
	5	Automated	On top of the viaduct, to the south edge of the 2a site, overlooking tram (at turning corner).
C	6	Manned	On the front terrace of Deansgate Locks circa 5 metres from the frontage of Revolution, Lola Lo and El Diablo.
	7	Manned	On Whitworth Street West, outside Deansgate Locks capturing patron street noise.
	8	Manned	On Manchester Central service yard access ramp at the rear of Deansgate Locks.
	9	Manned	Within Britons Protection beer garden (spatial average measurement).
	10	Manned	Microphone protruding 1 metre over the edge of The Deansgate roof terrace eastern balustrade.
D	11	Automated	Microphone protruding 1 metre out of Level 10 window on north-east corner of Viadux 1 building.

Survey Ref.	Position	Type	Description
	12	Automated	Microphone protruding 1 metre out of Level 20 window on north-east corner of Viadux 1 building.
	13	Automated	Microphone protruding 1 metre out of Level 30 window on north-east corner of Viadux 1 building.

The microphones were fitted with windshields and mounted/held in free-field conditions at least 1.5 metres above local ground level, with the exception of Positions 10-13 (see description above).

The automated equipment was programme to continuously log all relevant A-weighted broadband (dBA) and linear spectral noise level indices, including L_{eq}, L_{90}, L_{10} and L_{max}, over 5-minute, 15-minute and 1-hour intervals. Manned measurements logged all relevant A-weighted (dBA) and octave band noise indices over periods suitably representative of source noise levels over 5-minute intervals.

All measurements were taken in general accordance with BS 7445-1: 2003 '*Description and Measurement of Environmental Noise*'.

Instrumentation

The instrumentation used for the surveys is summarised below. The sound level meters were hand-calibrated at the beginning and end of the survey periods. No significant deviations in calibration level were noted (not more than 0.1 dB).

Description	Equipment	Serial Nr	Lab Calibration Expiry	Lab Calibration Certificate Nr
Class 1 sound level meter	Cirrus CR:171B (with MK:224 microphone)	G056718 (204055A)	8 Nov 2024	182767 (182766)
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	124663 (82835)	11 Aug 2024	12 Aug 2022
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	131635 (85533)	1 Nov 2024	2 Nov 2022
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	131642 (85571)	9 Nov 2024	10 Nov 2022
Class 1 sound level meter	Svantek 971A (with Type 7152 microphone)	127647 (84398)	12 Mar 2025	13 Mar 2023
Class 1 sound calibrator	Cirrus CR:515	57570	28 Nov 2024	1153776

Weather Conditions

Due to the nature of surveys A, B and D, i.e. unmanned, it is not possible to describe the weather conditions throughout the duration of the survey period. However, on each install and collection, weather conditions were considered suitable for obtaining representative readings. Based on internet weather reports, conditions generally remain suitable for representative readings with only occasional/brief periods of rainfall. Any adverse weather periods (e.g. heavy rainfall) have been excluded from the analysis.

During survey C, weather conditions were suitable for obtaining representative readings. The sky was clear with patchy cloud cover and wind speeds were sufficiently low (below 4 m/s).

Observed Noise Climate

Due to the nature of surveys A and B, i.e. unmanned, it is not possible to describe the noise climate throughout the duration of the survey period. However, on install and collection the noise climate was noted to be dominated by the specific environmental noise sources described in the table above. Noise from construction works associated with Viadux 1 have been excluded from analysis as far as reasonably possible.

Similarly, for survey C, the noise climate was dominated entirely by the specific entertainment noise source described. For survey D, the noise climate pre- and post- event was dominated by general road/tram traffic sources.

Results & Analysis

A summary of the results, as used to inform subsequent assessments against current guidelines, is presented in the following tables. NB: Values for survey D (façade measurements) have been corrected to incident free-field values by subtracting 3 dB in accordance with BS 8233.

- **Environmental L_{Aeq} Ambient Noise Levels (Survey A & B)**
  The logarithmically-averaged 16-hour daytime and 8-hour night-time L_{Aeq} ambient noise levels
  *not full 16-hour period

Position	Period (Day/Night of…)	Ambient Noise Level (dB)	
		Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
1	Friday 1 September 2023	64*	60
	Saturday 2 September 2023	64	59
	Sunday 3 September 2023	61	57
	Monday 4 September 2023	64	59
	Tuesday 5 September 2023	64	58
	Wednesday 6 September 2023	65	60

Position	Period (Day/Night of…)	Ambient Noise Level (dB)	
		Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
2	Friday 1 September 2023	64	61
	Saturday 2 September 2023	63	62
	Sunday 3 September 2023	65	60
	Monday 4 September 2023	65	61
	Tuesday 5 September 2023	66	59
	Wednesday 6 September 2023	66	59

Position	Period (Day/Night of…)	Ambient Noise Level (dB)	
		Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
3	Friday 1 September 2023	61	57
	Saturday 2 September 2023	61	58
	Sunday 3 September 2023	59	58
	Monday 4 September 2023	62	58
	Tuesday 5 September 2023	63	58
	Wednesday 6 September 2023	63	59

Position	Period (Day/Night of…)	Ambient Noise Level (dB)	
		Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
4	Thursday 12 October 2023	64	60
	Friday 13 October 2023	64	Battery error
	Saturday 14 October 2023	Battery error	Battery error
	Sunday 15 October 2023	Battery error	Battery error
	Monday 16 October 2023	Battery error	Battery error
	Tuesday 17 October 2023	Battery error	Battery error
	Wednesday 18 October 2023	Battery error	Battery error

Position	Period (Day/Night of…)	Ambient Noise Level (dB)	
		Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
5	Thursday 12 October 2023	64	61
	Friday 13 October 2023	64	61
	Saturday 14 October 2023	64	61
	Sunday 15 October 2023	62	61
	Monday 16 October 2023	64	60
	Tuesday 17 October 2023	64	61
	Wednesday 18 October 2023	64	61

- **Environmental L_{Afmax} Maximum Noise Levels at Night (Survey A & B)**
  The 10th highest 5-minute L_{Afmax} maximum noise level night 'event'

Position	Maximum Noise Level (dB) At Night-time $L_{Amax,5min}$ (23:00-07:00)
1	77
2	80
3	78
4	76
5	76

- **Entertainment $L_{eq,5min}$ Noise Levels (Survey C)**
  Typical highest noise level, corrected for extraneous noise (e.g. traffic) where applicable

Position	$L_{eq,5min}$ Noise Level (dB) at Octave Band Centre Frequency (Hz)							dB $L_{Aeq,5min}$
	63	125	250	500	1k	2k	4k	
6	83	77	75	70	68	65	60	74
7	76	70	68	63	61	58	<55	66
8	70	65	63	57	56	<55	<55	62
9	66	60	61	65	62	<55	<55	65
10	61	57	61	66	63	55	<55	66

- **Manchester Central Low Frequency Entertainment $L_{eq,5min}$ Noise Levels (Survey D)**
  Typical highest low frequency noise level, total measured noise level, free-field

Position	$L_{eq,5min}$ Noise Level (dB) at Octave Band Centre Frequency (Hz)							dB $L_{Aeq,5min}$
	63	125	250	500	1k	2k	4k	
11 (Pre event)	70	64						62
12 (Pre event)	72	64						62
13 (Pre event)	71	63						61
11 (During event)	70	68						62
12 (During event)	72	71						62
13 (During event)	72	70						62
11 (Post event)	65	59						57
12 (Post event)	63	58						57
13 (Post event)	62	56						56

NB: No tram movements post event will account for the difference in pre- and post- event noise levels.