

THEATRE SQUARE PROJECT ENVIRONMENTAL MONITORING REPORT

REPORT PREPARED BY JOHN F HUNT LTD

Report Reference:	004	Author:	Maddie Gowler
Report Date:	7.2.19	Authorised by:	Chet Thapa
Core Site Working Periods:	Weekdays – 08:00 hrs to 18:00 hrs Saturdays – 08:00 hrs to 13:00 hrs	Monitoring Period:	31.1.19 – 6.2.19

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Graph A.1.1: Guidance on the effects of vibration on buildings.

Table A.1.1: Guidance on the effects of vibration levels on human receptors inside buildings.

Table A.2.1: Guidance on the effects of noise levels on human receptors inside buildings.

Table A.3.1: Environmental Dust Standards.

1. Location

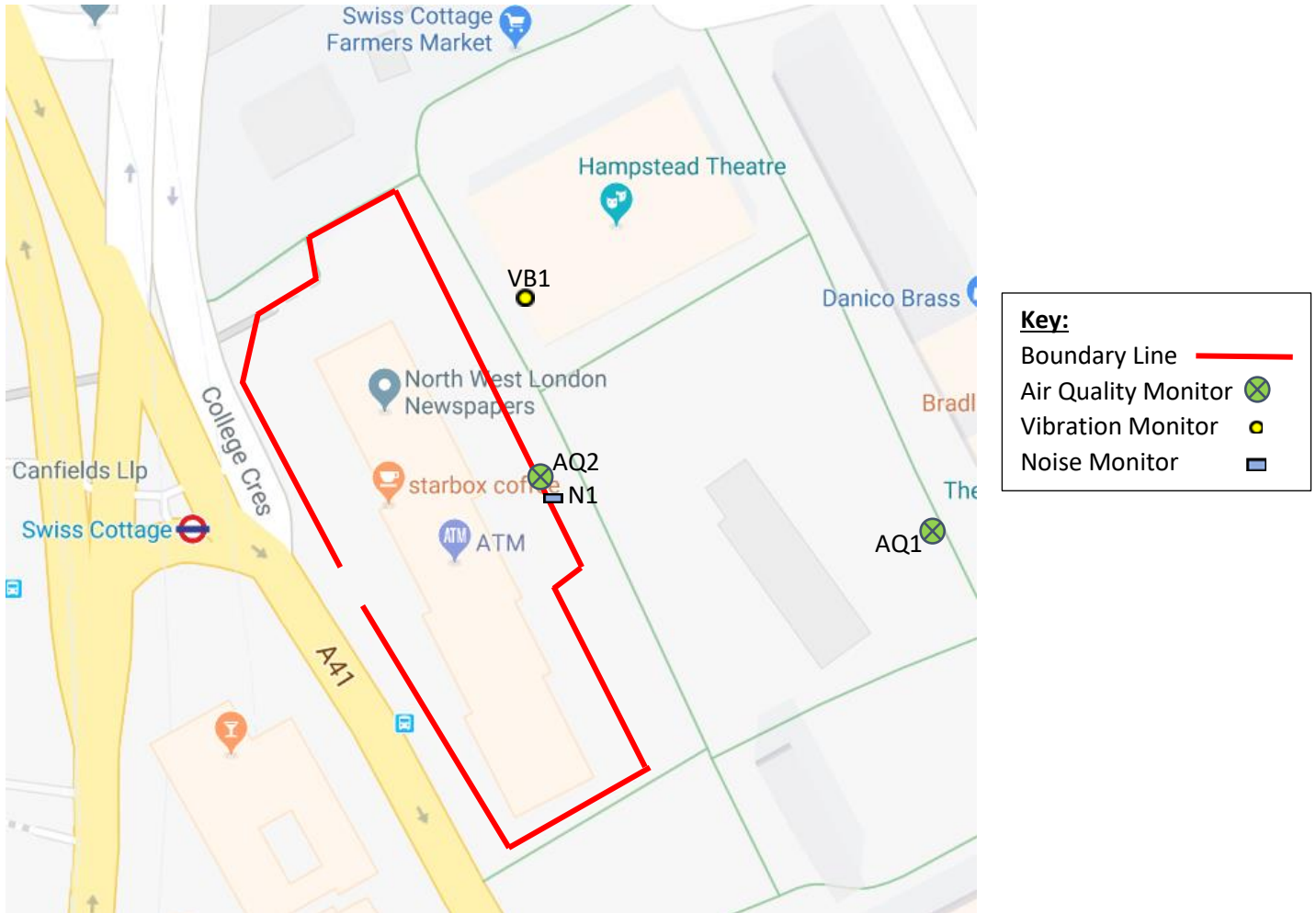


Figure 1.1: Map of Theatre Square highlighting boundary line, location of noise, air quality, and vibration monitors.

2. Monitoring Locations and Respective Action Limits

Parameter	Serial Number	Location	Receptor	15-minute Interval Amber Limit	15-minute Interval Red Limit	24 Hour Working Limit
Vibration						
VB1	4590	Basement of Hampstead Theatre	Commercial & Residential Properties	1mm/s	3mm/s	/
Noise						
N1	727	Eastern Boundary	Commercial & Residential Properties + Recreational Area	75dB	/	80dB
Air Quality				Real-time Data Amber Limit	Real-time Data Red Limit	
AQ1	807	Winchester Road	Residential Properties	200µg/m ³	250µg/m ³	50µg/m ³
AQ2	828	Eastern Boundary	Commercial & Residential Properties + Recreational Area	200µg/m ³	250µg/m ³	50µg/m ³

Table 2.1: Displaying location and serial number of vibration, noise, and dust monitors, serial numbers, local receptors, and the levels of action limits for different time periods for each parameter.

At the time of this report, there are only two air quality monitors and one noise monitor. In accordance with the CMP, two air quality and three noise monitors have been ordered and are scheduled to be installed next week (11.2.19 – 15.2.19) providing there are not any delays with the suppliers.

All action limits are within the guidance of British Standard BS 5228-2:2009 2014 Code of practice for noise and vibration control on construction and open sites – Part 2 Vibration, British Standard BS 5228-1:2009: 2014 Code of practice for noise and vibration control on construction and open sites – Part 1 Noise, and EC/UK Air Quality Standards. Assessment criteria for vibration, noise and dust can be found in the Appendix.

3. Actions to be taken following site action level exceedance

3.1. Amber Exceedance

Where an Amber exceedance occurs due to site activity, the site manager will monitor site emissions relevant to the alert and where necessary review methods of working. The site manager will also assess whether remaining work could continue to exceed the Amber threshold and if so, modify working methods, where practicable.

3.2. Red Exceedance

Where a Red exceedance occurs due to site activity, the site manager will stop the relevant activity whilst alternative construction methodology options are investigated, and where practicable adopted. If effective remedial action is not obvious, the site will consider an alternative technique or additional mitigation measures.

4. Complaints

Where a complaint is received, an investigation will be undertaken to establish whether the vibration is due to site activity. Where this is established, the site manager will adopt the process set out above for the receipt of an Amber exceedance. Where a complaint is received, details of the complaint, measured PPV mms-1 levels, the source and remedial action taken will be logged.

Date	Complaint Details	Site Activity and Action Taken

Table 4.1: Complaints received during monitoring period.

5. Results

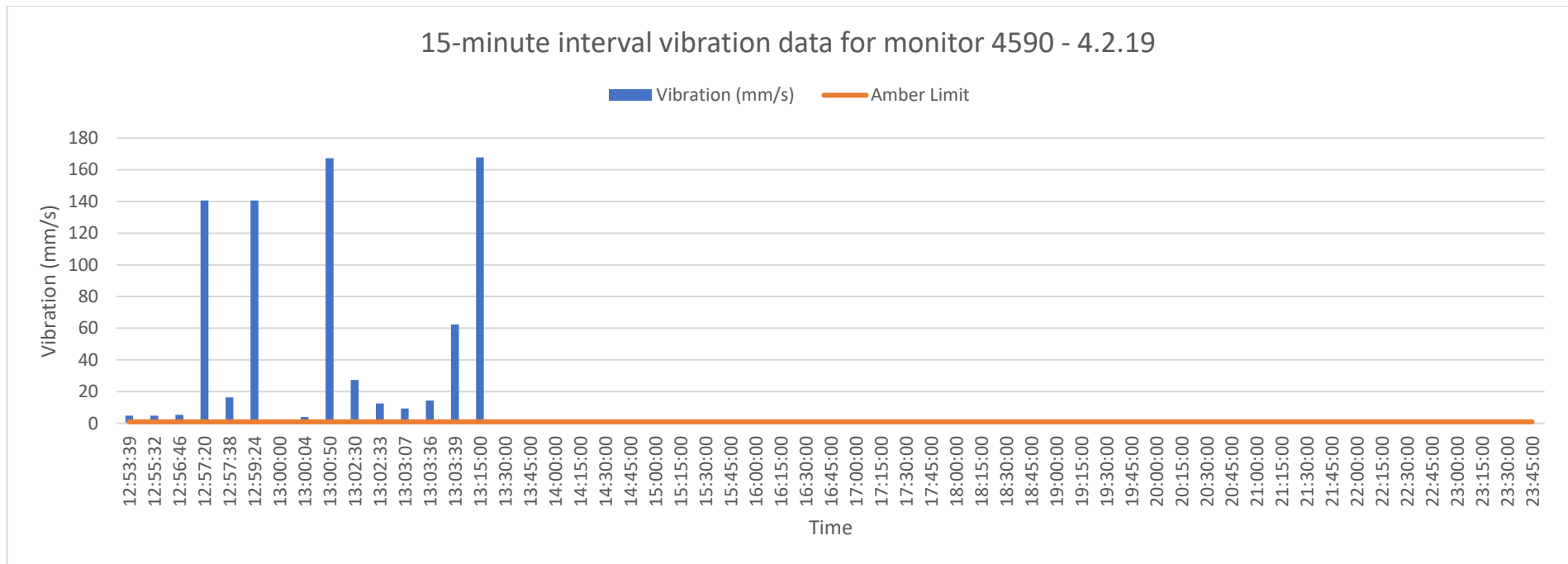
5.1. Vibration

Vibration Monitoring Equipment: AvaTrace M60

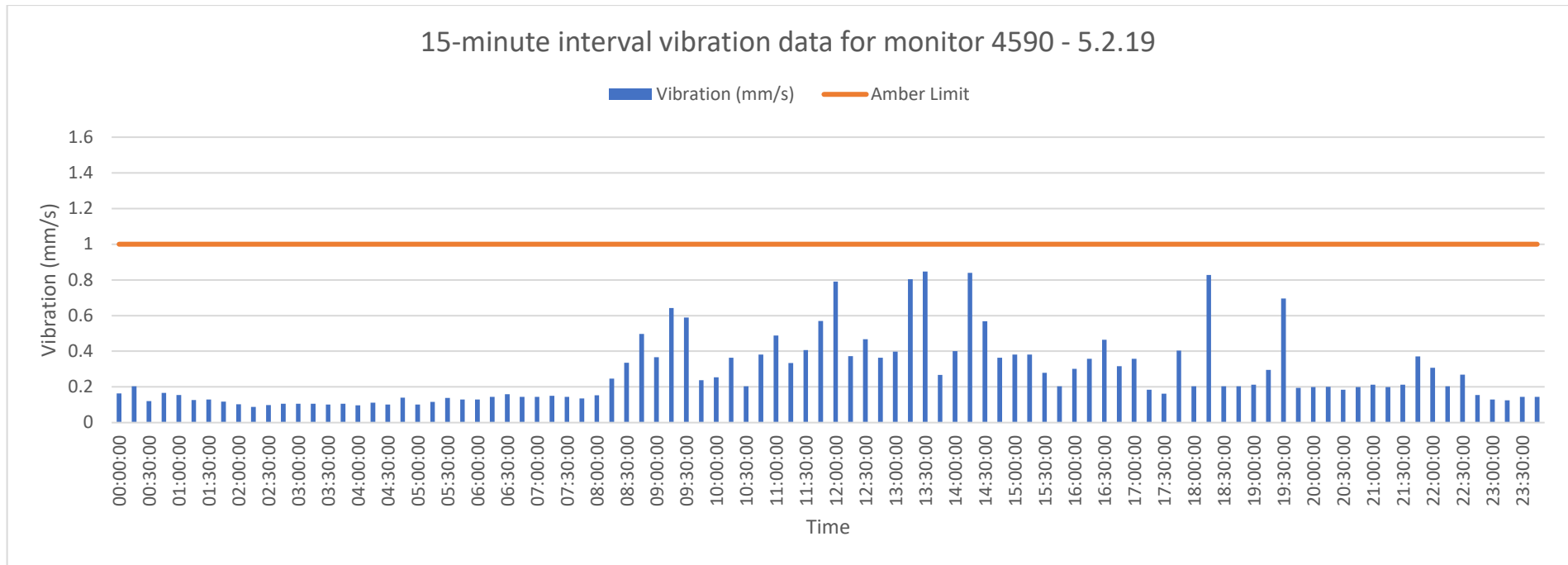
Serial Number: 4590

15-Minute Interval Data Exceedances		Daily Average Data Exceedances	
1mm/s	3mm/s	1mm/s	3mm/s
17	14	1	1

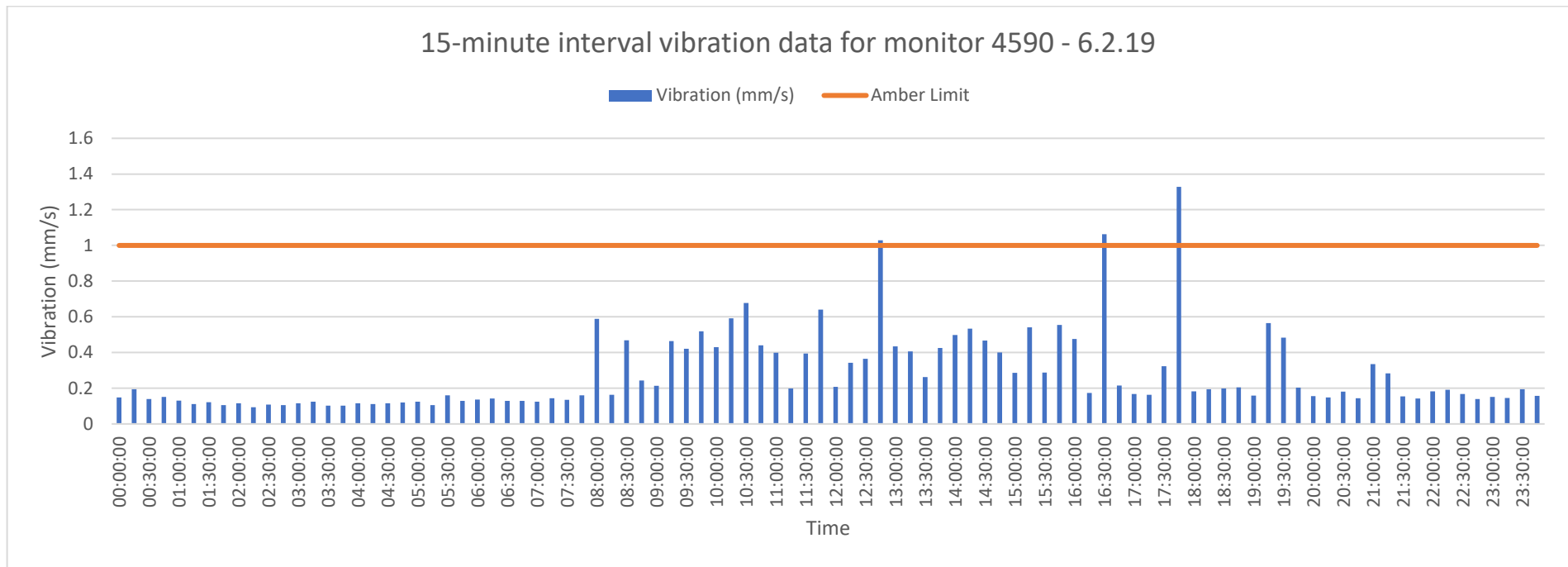
Table 5.1.1: Summary of monitor 4590 exceedances of the Amber and Red limits using two data sets. The 15-minute dataset exceedances will be representing the number of daily breeches of the limits, whereas daily averages will be representing the number of days the limit has been reached within the monitoring period.



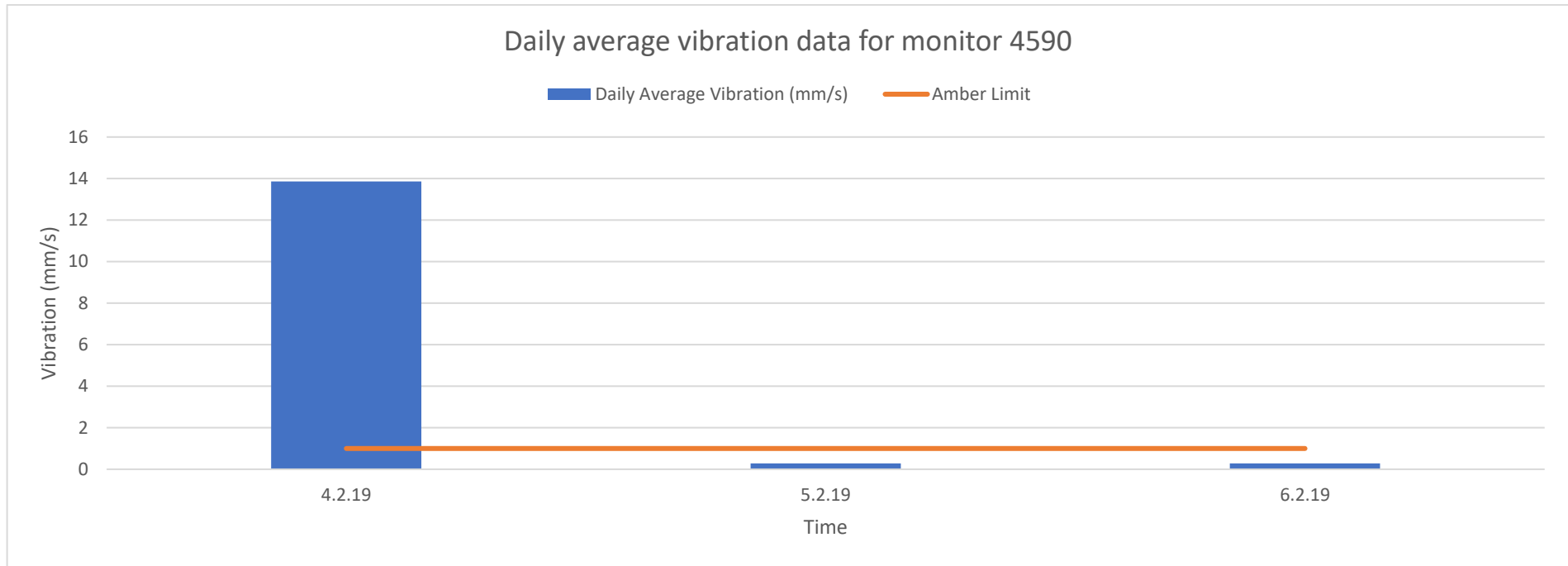
Graph 5.1.1: Vibration results and exceedances using 15-minute interval data for monitor 4590 – 4.2.19.



Graph 5.1.2: Vibration results and exceedances using 15-minute interval data for monitor 4590 – 5.2.19.



Graph 5.1.3: Vibration results and exceedances using 15-minute interval data for monitor 4590 – 6.2.19.



Graph 5.1.4: Vibration results and exceedances using daily average data for monitor 4590.

Notes:

Peaks on the 4.2.19 between 12:53 – 13:15 were due to the positioning of the monitor during set up. These are not indicative of site activities. The peaks on 6.2.19 at 12:45 and 16:30 can be attributed to stockpiling rubble from the demolition. The peak at 17:45 was not due to site activities as there were no works occurring on site. This can be attributed to human activity in the room below where the monitor is located.

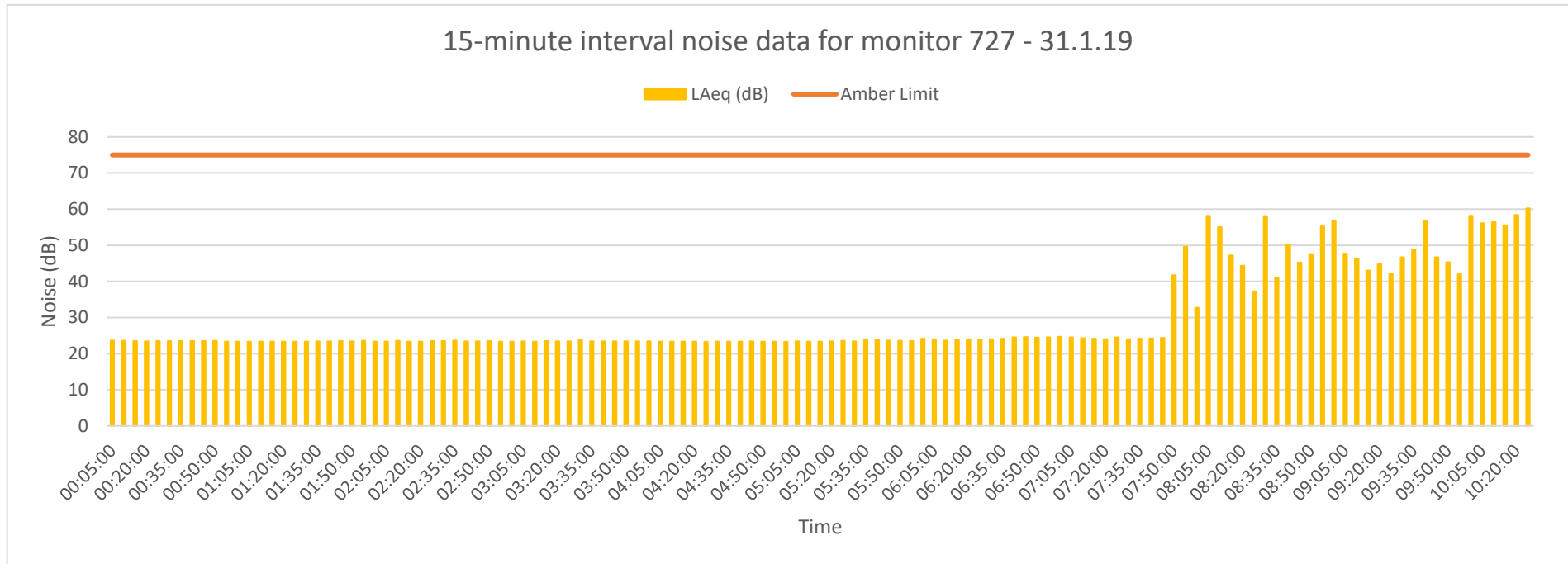
5.2. Noise

Noise Monitoring Equipment: EM2030

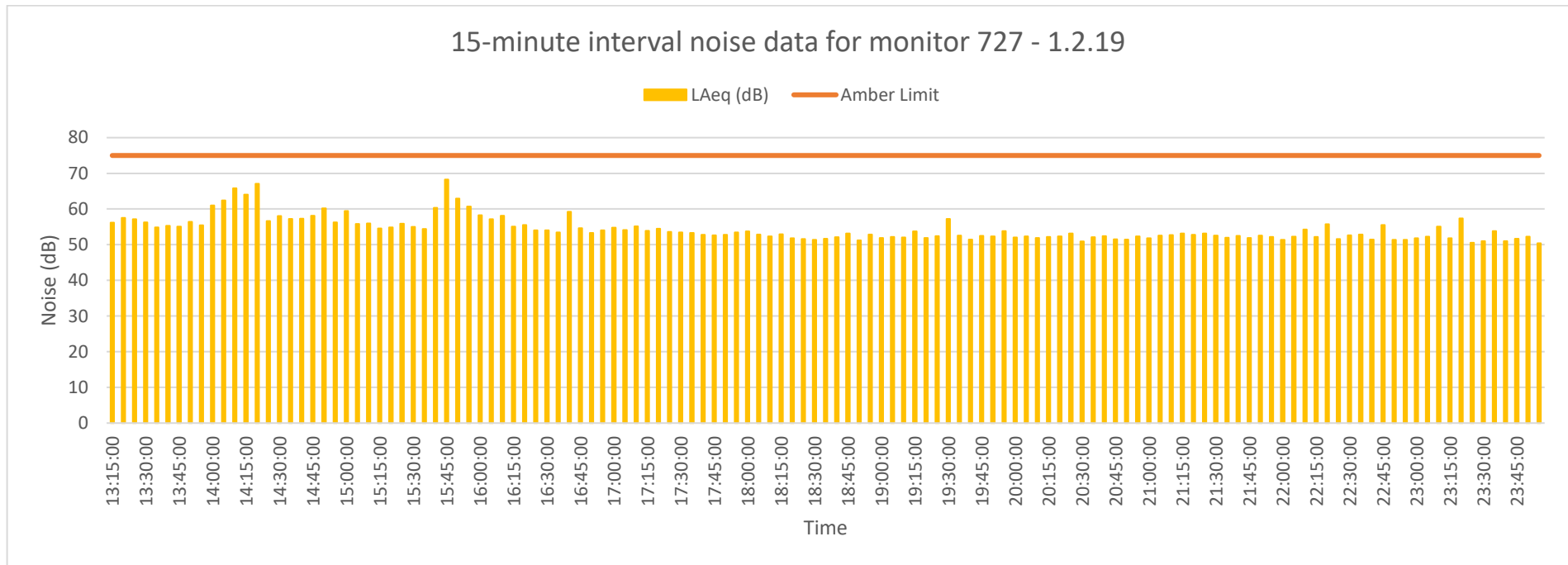
Serial Number: 727

15-Minute Interval Data Exceedances		Hourly Average Data Exceedances		Daily Average Data Exceedances	
75dB	80dB	75dB	80dB	75dB	80dB
0	0	0	0	0	0

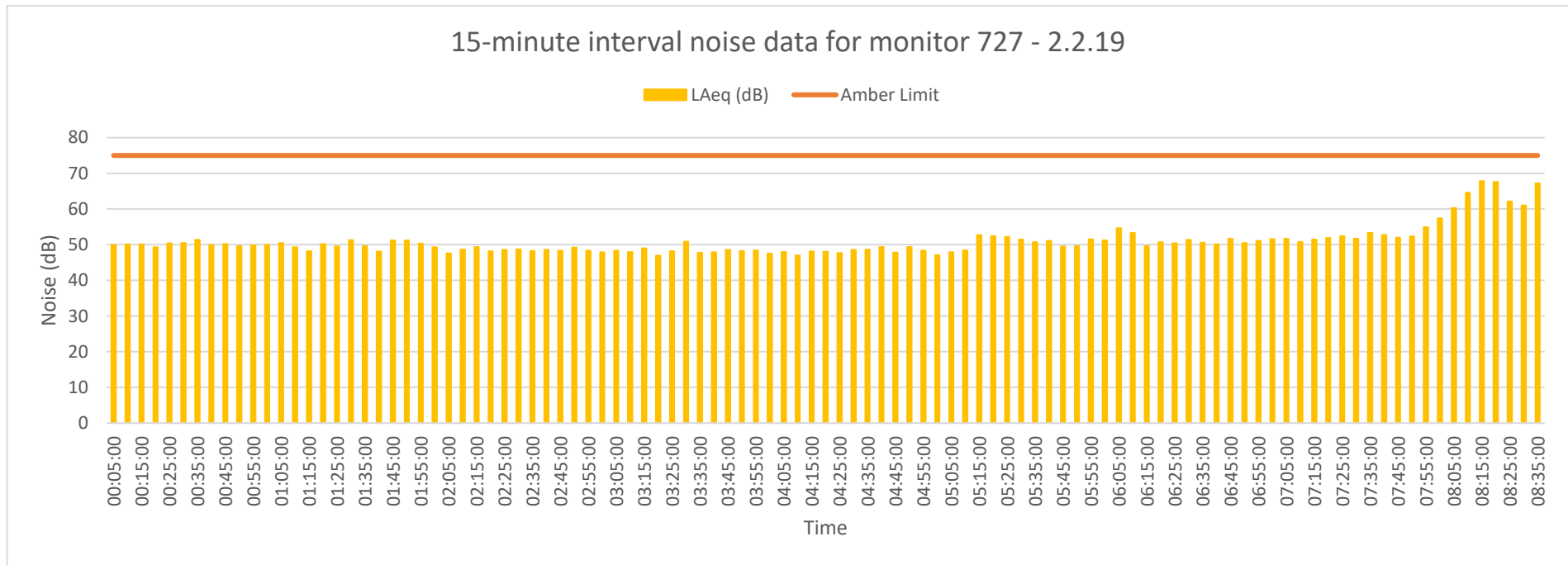
Table 5.2.1: Summary of monitor 727 exceedances of the Amber and Red limits using three data sets. Real-time and hourly average dataset exceedances will be representing the number of daily breeches of the limits, whereas daily averages will be representing the number of days the limit has been reached within the monitoring period.



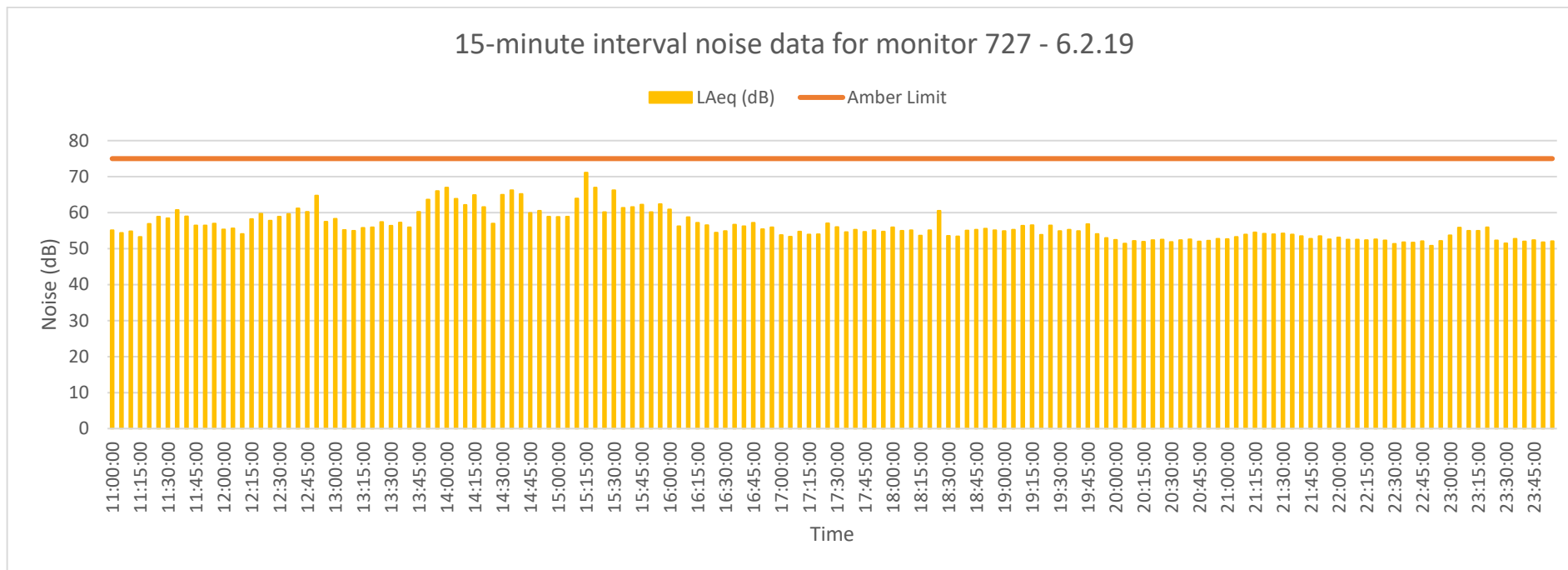
Graph 5.2.1: Noise results and exceedances using 15-minute interval data for monitor 727 – 31.1.19.



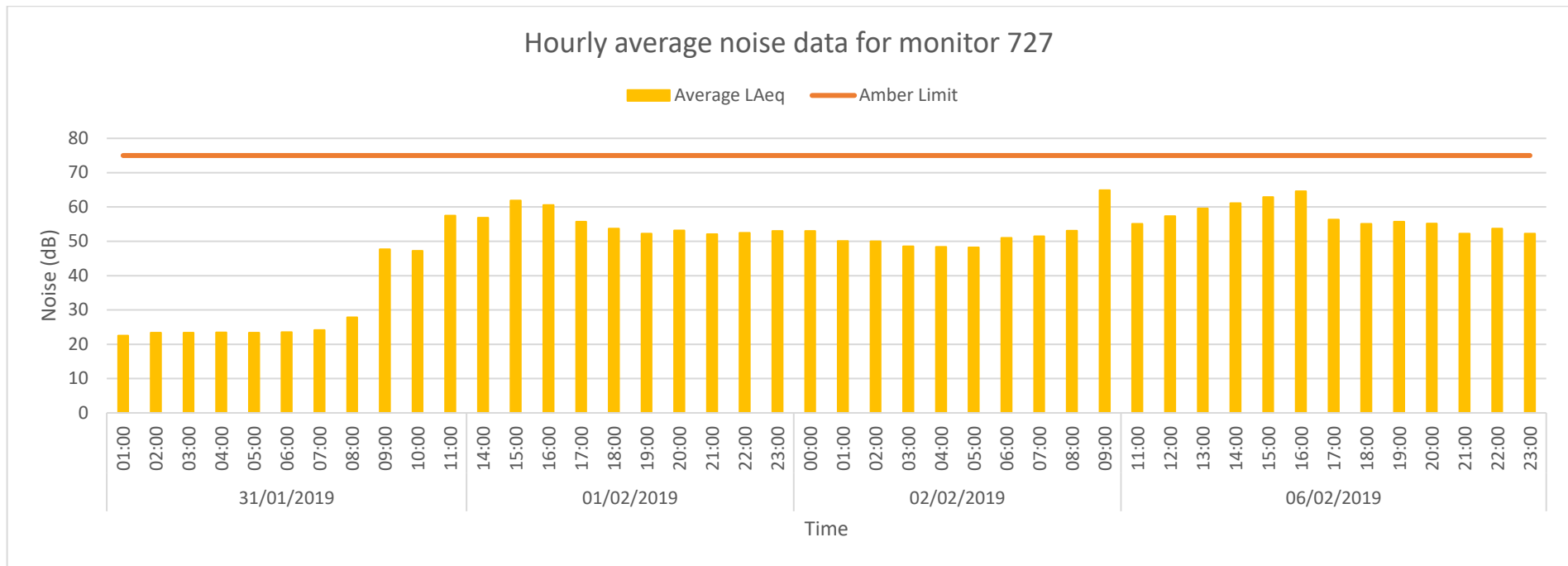
Graph 5.2.2: Noise results and exceedances using 15-minute interval data for monitor 727 – 1.2.19.



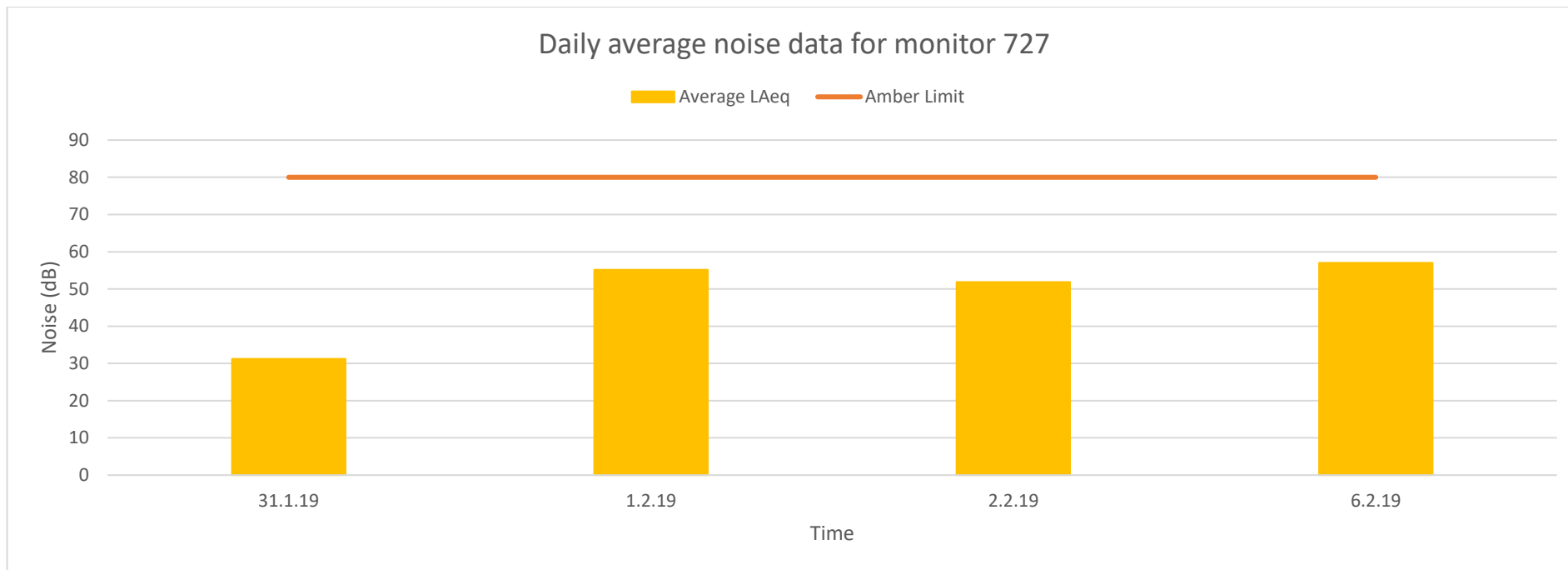
Graph 5.2.3: Noise results and exceedances using 15-minute interval data for monitor 727 – 2.2.19.



Graph 5.2.4: Noise results and exceedances using 15-minute interval data for monitor 727 – 6.2.19.



Graph 5.2.5: Noise results and exceedances using hourly average data for monitor 727.



Graph 5.2.6: Noise results and exceedances using daily average data for monitor 727.

Notes:

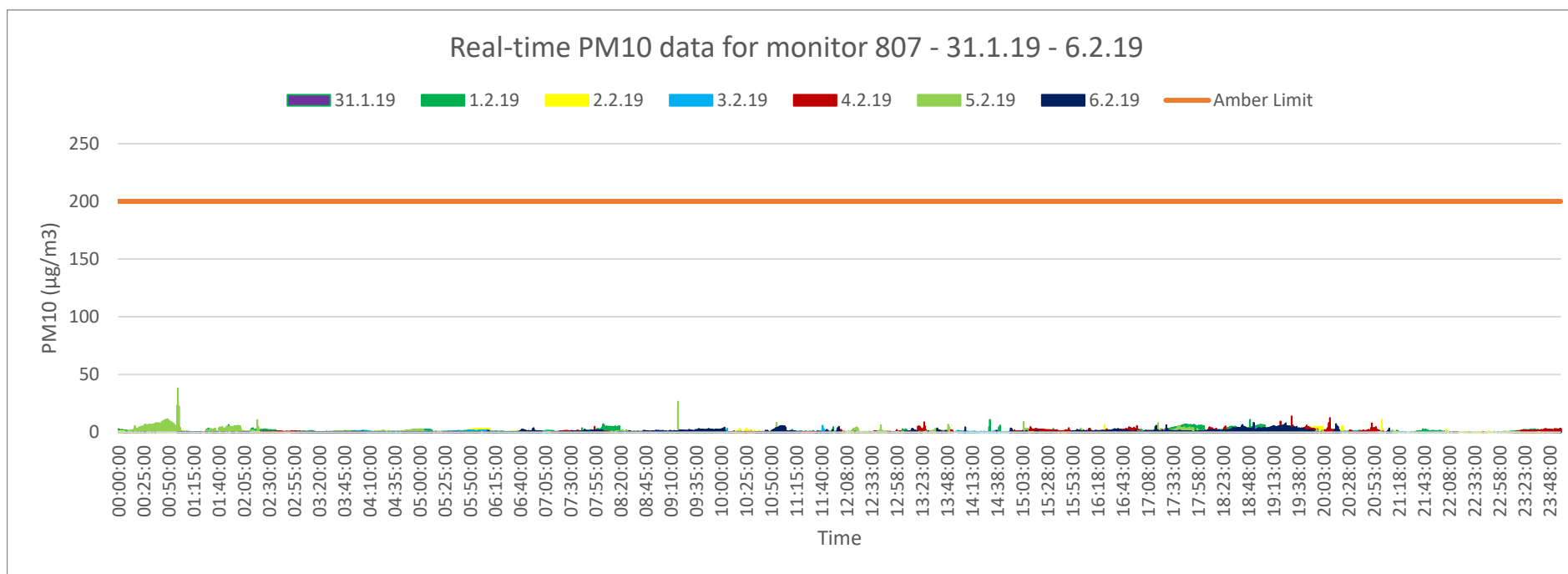
There have not been any exceedances of the Amber or Red noise limits. However, there were some connectivity issues resulting in a lack of recorded data for 3.2.19 – 5.2.19. This has now been resolved.

5.3. Air Quality

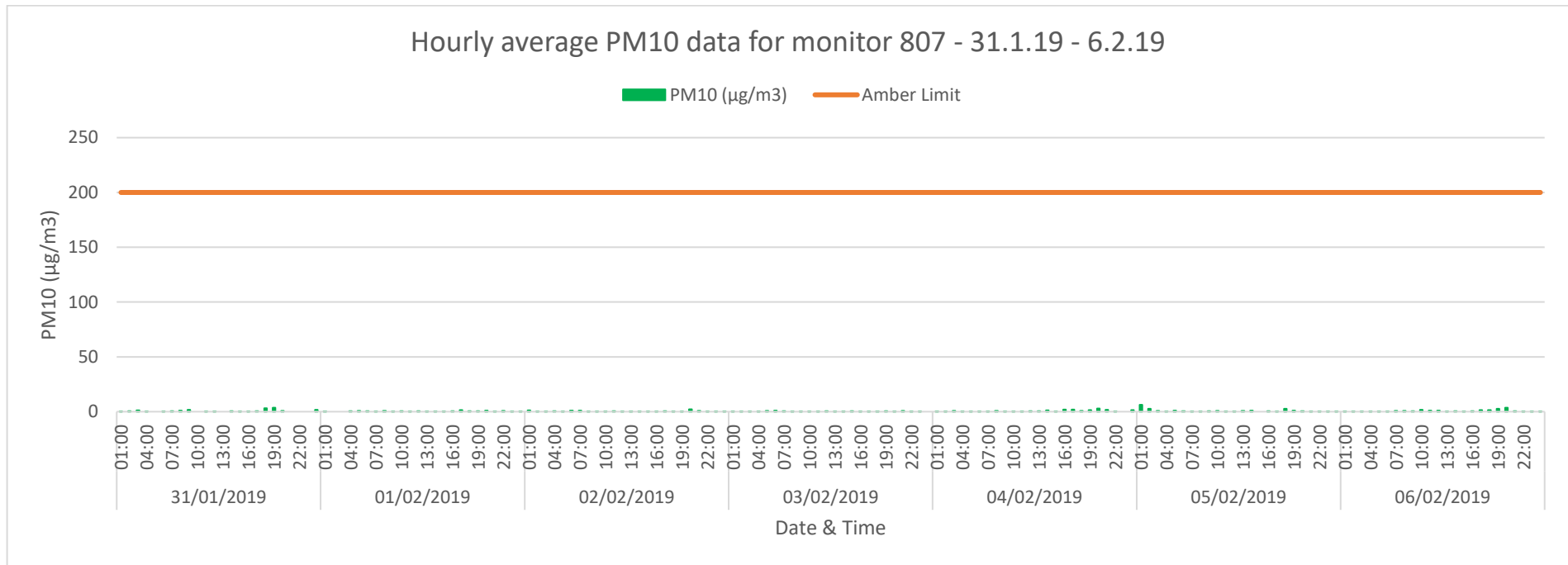
Air Quality Monitoring Equipment: Dust Sentry **Serial Number:** 807

Real-time Data Exceedances		Hourly Average Data Exceedances		Daily Average Data Exceedances
200µg/m ³	250µg/m ³	200µg/m ³	250µg/m ³	50µg/m ³
0	0	0	0	0

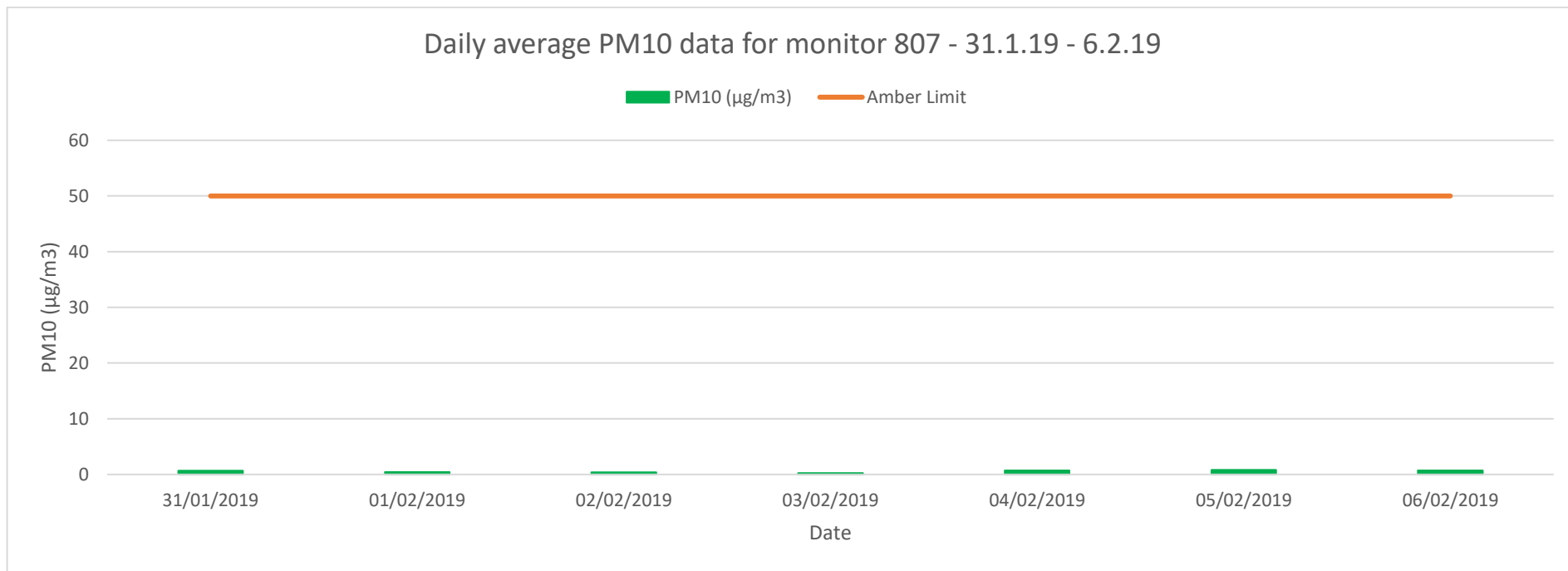
Table 5.3.1: Summary of monitor 807 exceedances of the Amber and Red limits using three data sets. Real-time and hourly average dataset exceedances will be representing the number of daily breeches of the limits, whereas daily averages will be representing the number of days the limit has been reached within the monitoring period.



Graph 5.3.1: Real-time PM10 data for monitor 807 – 31.1.19 – 6.2.19.



Graph 5.3.2: Hourly average PM10 data for monitor 807 – 31.1.19 – 6.2.19.

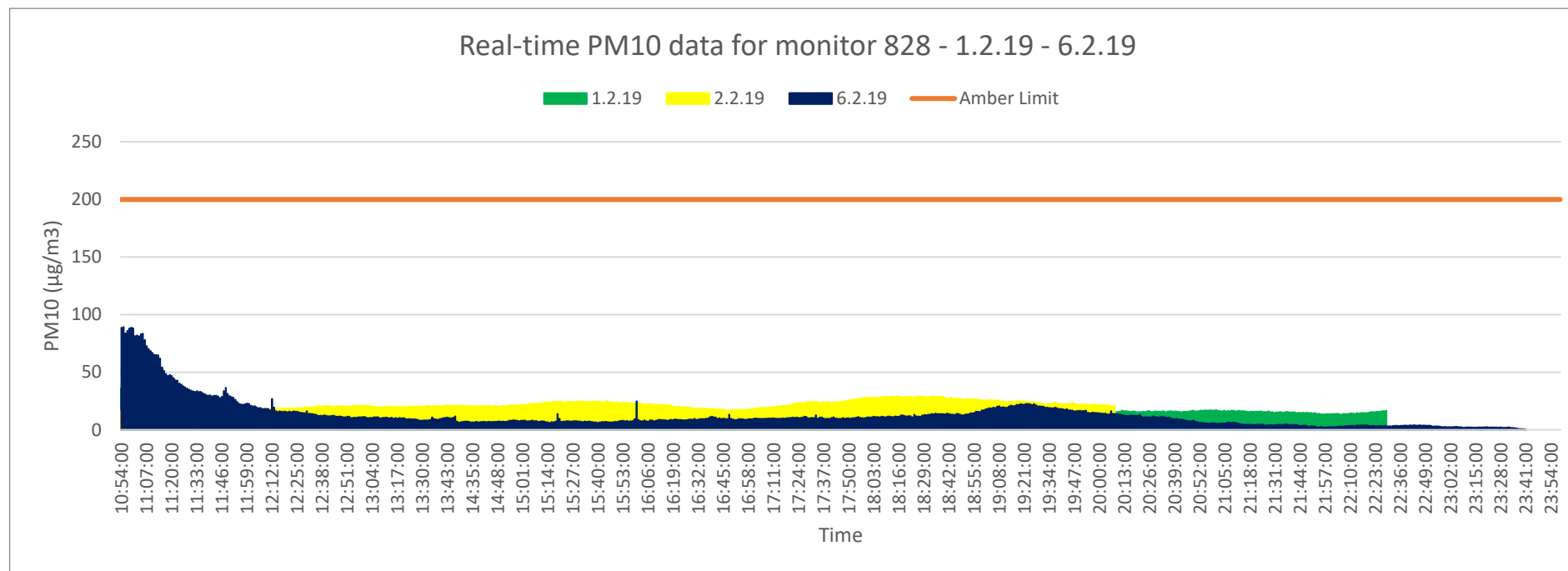


Graph 5.3.3: Daily average PM10 data for monitor 807 – 31.1.19 – 6.2.19.

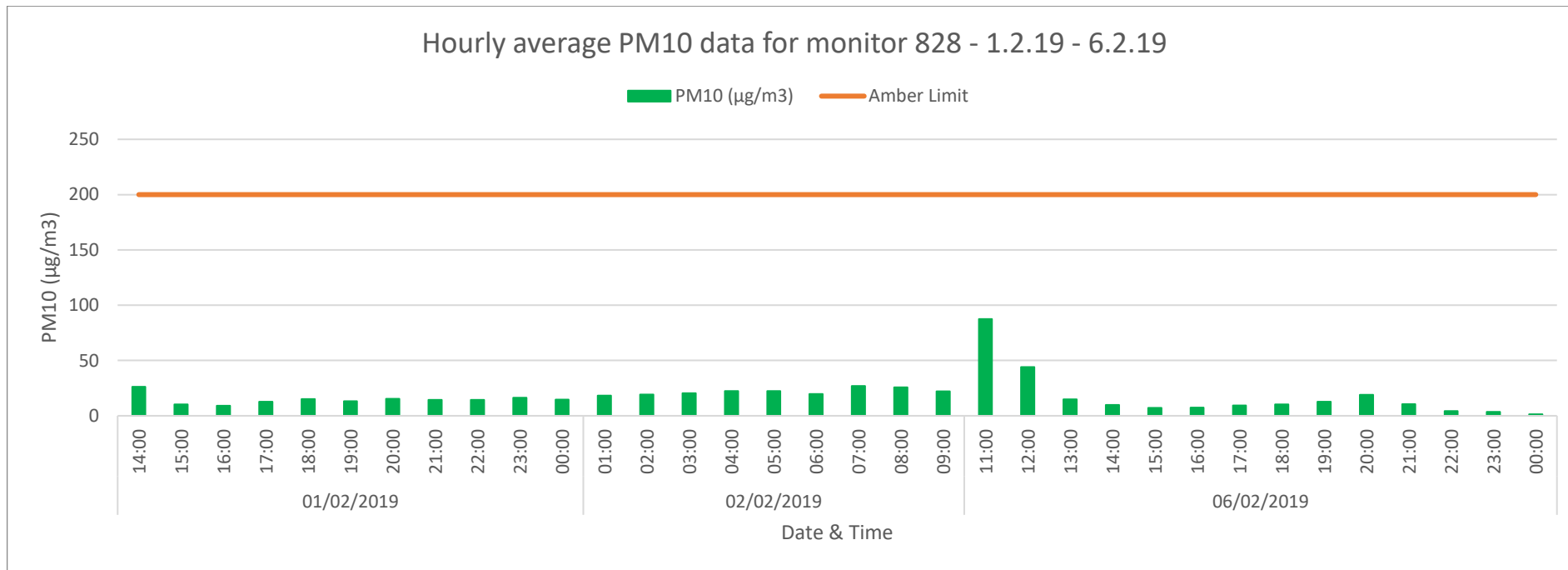
Air Quality Monitoring Equipment: Dust Sentry **Serial Number:** 828

Real-time Data Exceedances		Hourly Average Data Exceedances		Daily Average Data Exceedances
200µg/m ³	250µg/m ³	200µg/m ³	250µg/m ³	50µg/m ³
0	0	0	0	0

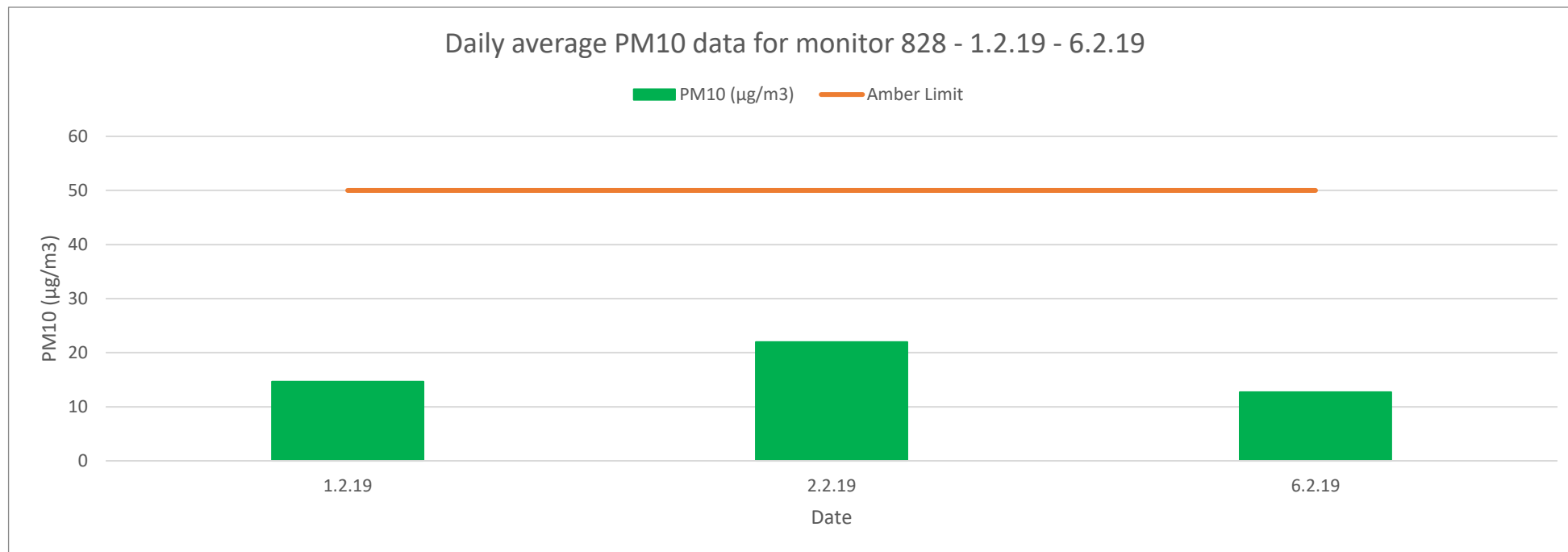
Table 5.3.2: Summary of monitor 828 exceedances of the Amber and Red limits using three data sets. Real-time and hourly average dataset exceedances will be representing the number of daily breaches of the limits, whereas daily averages will be representing the number of days the limit has been reached within the monitoring period.



Graph 5.3.4: Real-time PM10 data for monitor 807 – 1.2.19 – 6.2.19.



Graph 5.3.5: Hourly average PM10 data for monitor 807 – 31.1.19 – 6.2.19.



Graph 5.3.6: Daily average PM10 data for monitor 807 – 31.1.19 – 6.2.19.

Notes:

There have not been any exceedances of the Amber or Red PM10 limits for either monitors 802 or 828 for the monitoring period 31.1.19 – 6.2.19. There were however some connectivity issues regarding 828, resulting in a lack of data between 3.2.19 – 5.2.19. This has now been resolved.

APPENDIX

A. Assessment Criteria

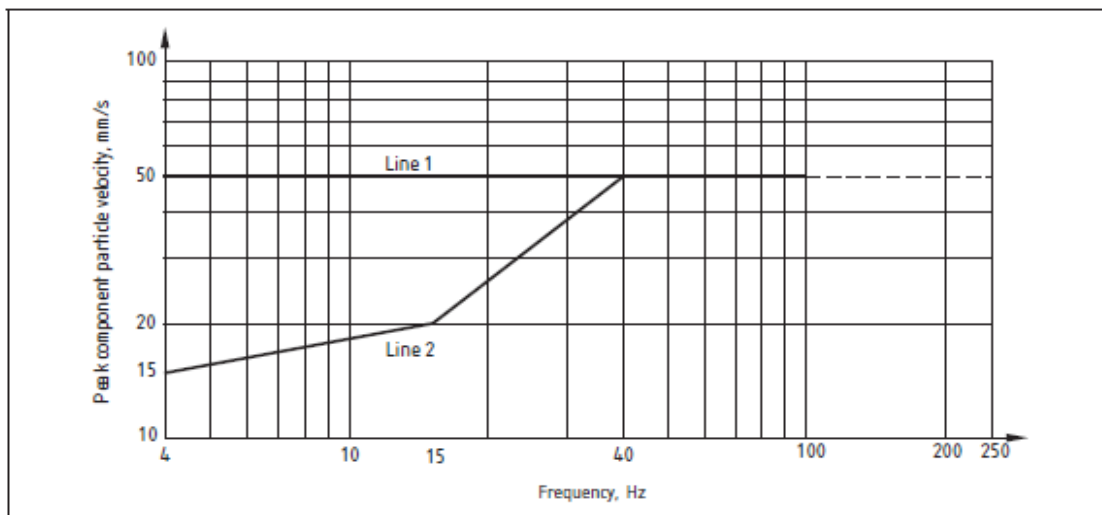
A.1. Vibration Criteria

British Standard BS 5228-2:2009: 2014 Code of practice for noise and vibration control on construction and open sites – Part 2 Vibration, provides guideline PPVs for assessing the effects of vibration on humans. These guideline PPVs are presented below in Table A.1.1.

Vibration Level	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if <u>prior warning</u> and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

Table A.1.1: Guidance on the effects of vibration levels on human receptors inside buildings.

Figure B.1 Transient vibration guide values for cosmetic damage



Graph A.1.1: Guidance on the effects of vibration on buildings.

A.2. Noise Criteria

British Standard BS 5228-1:2009: 2014 Code of practice for noise and vibration control on construction and open sites – Part 1 Noise, provides guideline levels for assessing the effects of noise on humans. These guidelines are presented below in Table 3.2.1.

Table E.1 Example threshold of significant effect at dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night-time (23.00–07.00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07.00–19.00) and Saturdays (07.00–13.00)	65	70	75

NOTE 1 A significant effect has been deemed to occur if the total L_{Aeq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total L_{Aeq} noise level for the period increases by more than 3 dB due to construction activity.

NOTE 3 Applied to residential receptors only.

^{A)} Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

^{B)} Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

^{C)} Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

^{D)} 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

Table A.2.1: Guidance on the effects of noise levels on human receptors inside buildings.

A.3. Dust Criteria

Authority	Pollutant	Objective	Measured as	Relevance
EC/UK Air Quality Standard	PM10	250µg/m ³ . Exceeded < 35 times/annum	15-minute intervals	Air quality in relation to public health

Table A.3.1: Environmental Dust Standards.

Measured levels exceeding 250µg/m³ are considered to represent a significant impact to the surrounding environment over a 15-minute mean. Therefore, it is important to assess any methods of work that represent a risk and implement dust suppression techniques accordingly.