



**Waterview Tunnel
Joint Operation**



Waterview Tunnel

16/07/2017 PM_{2.5} Exceedance Report

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1 BACKGROUND

In accordance with the Waterview Connection BOI Operational Air Quality Conditions, the NZTA is required to undertake ambient air quality monitoring in real time to monitor potential effects associated with the operation of the ventilation system from the tunnels. Ambient monitoring includes fine particulates (PM₁₀ and PM_{2.5}) and nitrogen dioxide. Results are to be compared with the relevant National Environmental Standards for air quality and/or the Auckland Regional Air Quality Targets.

The location of the ambient monitoring stations is shown in Appendix A.

Condition OA.5 requires that if the monitoring shows that concentrations of contaminants in ambient air at the monitoring locations exceeds the relevant standards, then the NZTA shall undertake an investigation into the cause of the exceedance and report this to the Peer Review Panel and the Major Infrastructure Team Manager, Auckland Council.

On the 16th July, the station located South of the tunnel registered a daily average of 26.46 µg/m³, exceeding the 25 µg/m³ limit set in the Regional Air Quality targets.

2 DATA ANALYSIS

The relevant data are included in Appendix B and include:

- Hourly and daily averages of NO₂, PM_{2.5} and PM₁₀.
- Traffic and temperature graphs

Analysis of the data shows that the PM_{2.5} hourly concentrations above the limit of 25 µg/m³ happened before 7am and after 8pm, when the traffic inside the Southbound Tunnel (the one discharging South) was very low, under 900 vehicles/hour and also coincided with the temperatures dropping below 10.

The NO₂ concentrations, following the traffic data, don't show any relevant increase during the periods of high PM_{2.5} concentrations.

There was very little wind but similar to that of the previous days, so wind speed and direction don't seem to be relevant factors.

The night from the 15th to the 16th July has registered the lowest temperatures of the month so far, reaching temperatures as low as 4°C. This, combined with the fact that the PM_{2.5} concentration kept increasing while the traffic numbers were very low indicates that tunnel traffic is not the cause for the exceedance.

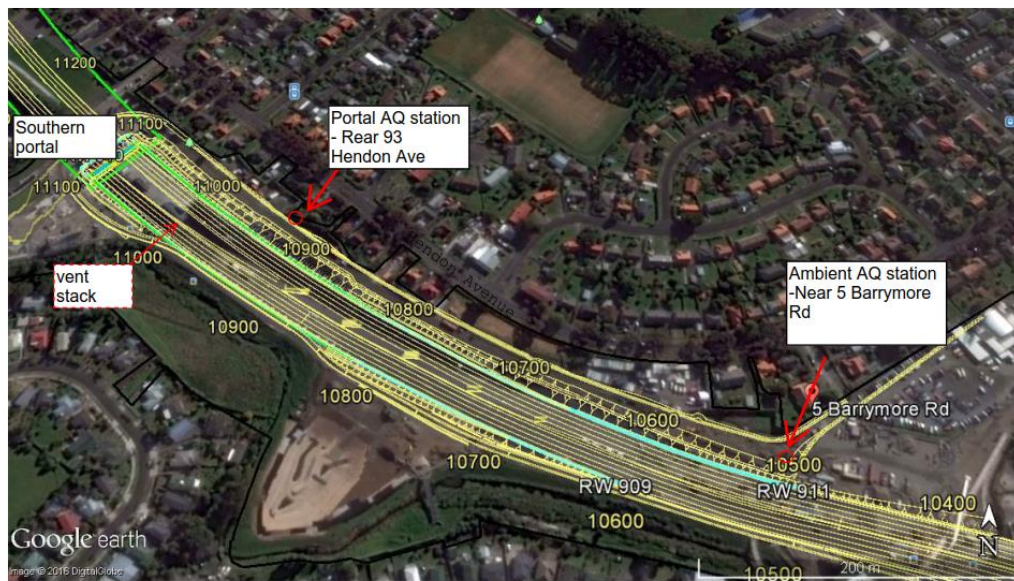
3 CONCLUSION

The most likely cause for the PM_{2.5} concentration exceedance registered on the 16th July is domestic smoke, similar to elevated levels we have seen during the baseline monitoring prior to the tunnel opening, as shown in Appendix C.

The 27th June the station in the North registered a daily average of 24.86 µg/m³, close to the limit. That night, the registered temperatures were also very low, dropping down to 6 in the early hours of the morning.

APPENDIX A

Air Quality Monitoring Stations



Location of portal and southern Air Quality monitoring stations



Location of southern Air Quality monitoring station



Location of northern Air Quality monitoring station

APPENDIX B

Graphs

Waterview North Non-Validated Daily Summary Report

PM_{2.5} (µg/m³)

Date	Daily Average
16/07/2017	25

Maximum (Hourly)	60
Hour ending	01:00

Minimum (Hourly)	4
Hour ending	16:00

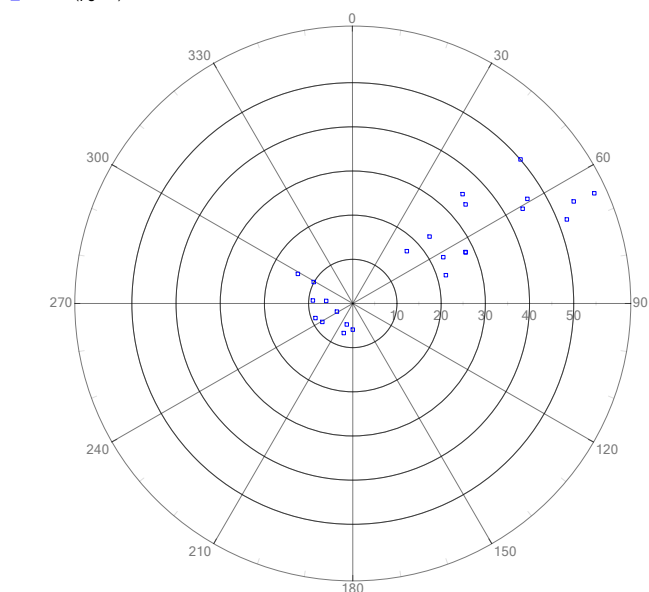
Dust Scatter

Polar Scatter
□ PM_{2.5} (µg/m³)

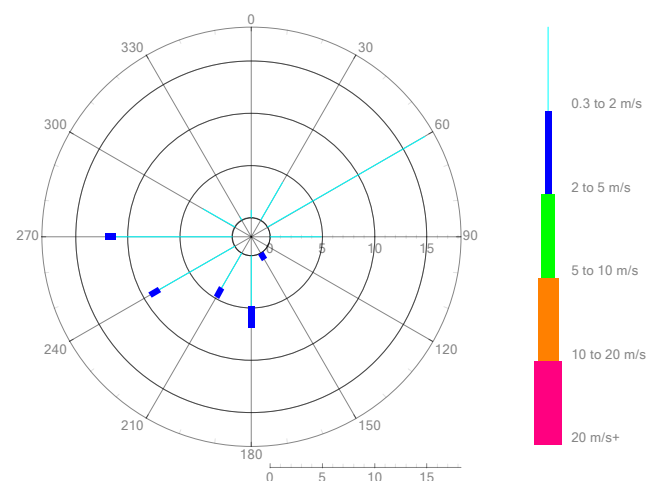
Sunday, 16 July 2017 Wind Rose

Wind Rose

Sunday, 16 July 2017



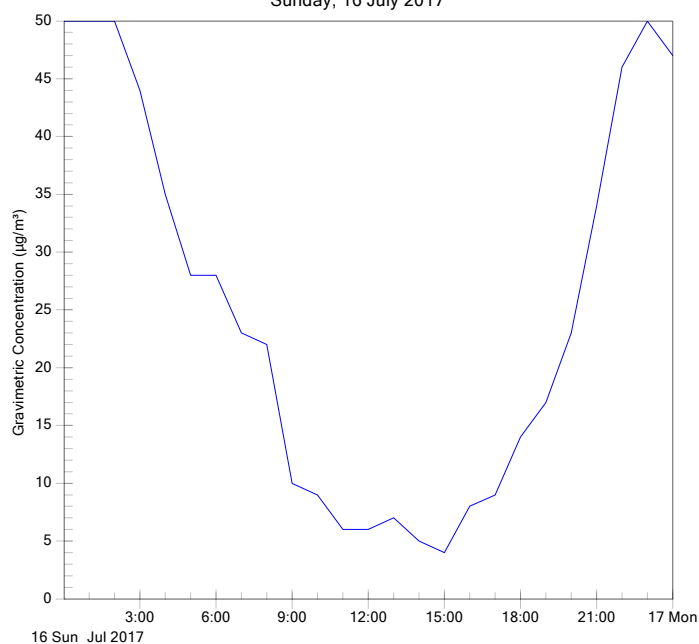
100.0% valid data present



35.1% calm
100.0% valid data present

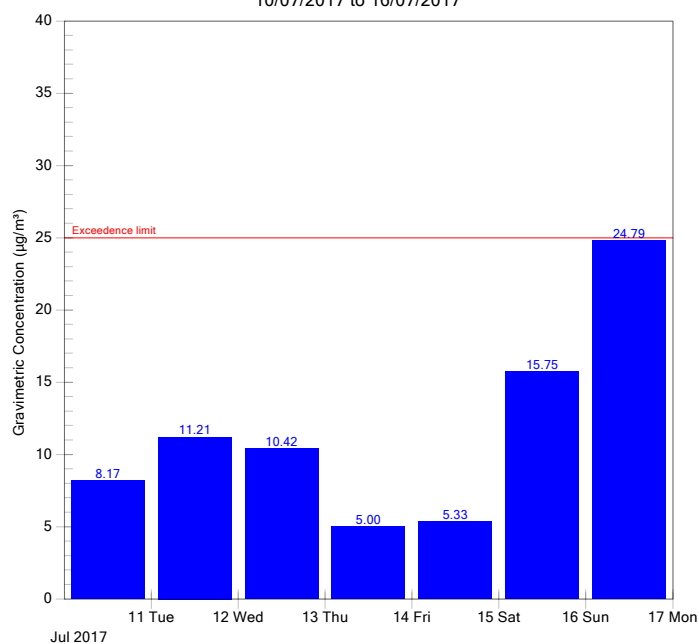
PM_{2.5} Hourly Averages (µg/m³)

Sunday, 16 July 2017



PM_{2.5} Daily Averages (µg/m³)

10/07/2017 to 16/07/2017



**Note: The data presented in this report has not been validated and is subject to change in the monthly validated report.
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Waterview North Non-Validated Daily Summary Report

PM₁₀ (µg/m³)

Date	Daily Average
16/07/2017	31

Maximum (Hourly)	67
Hour ending	01:00

Minimum (Hourly)	8
Hour ending	15:00

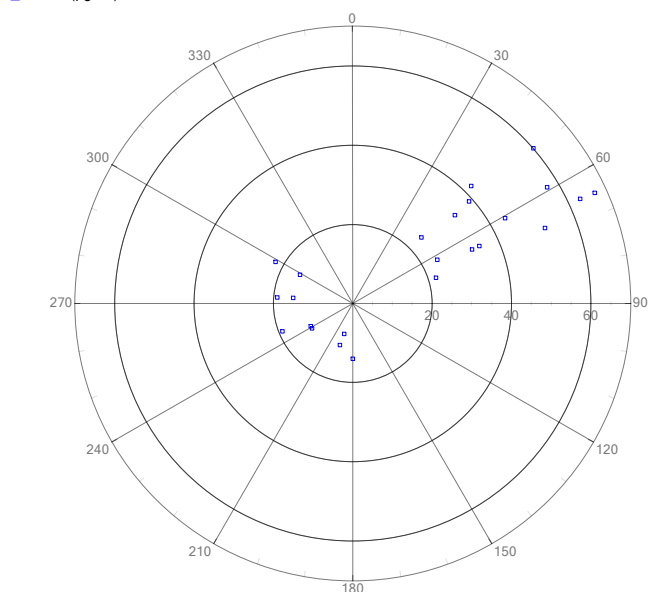
Dust Scatter

Polar Scatter
□ PM₁₀ (µg/m³)

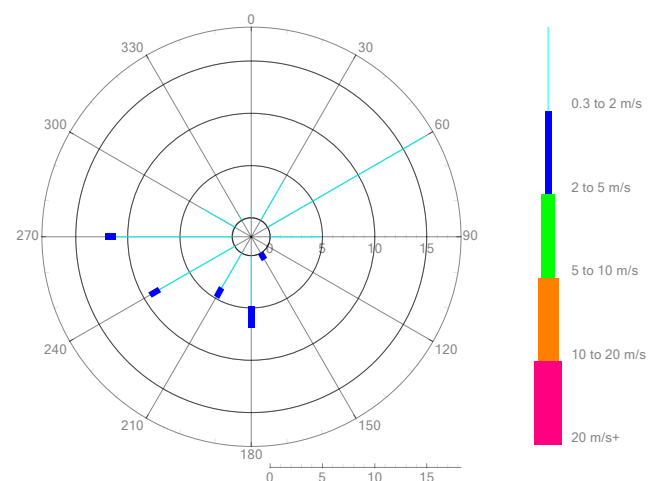
Sunday, 16 July 2017 Wind Rose

Wind Rose

Sunday, 16 July 2017



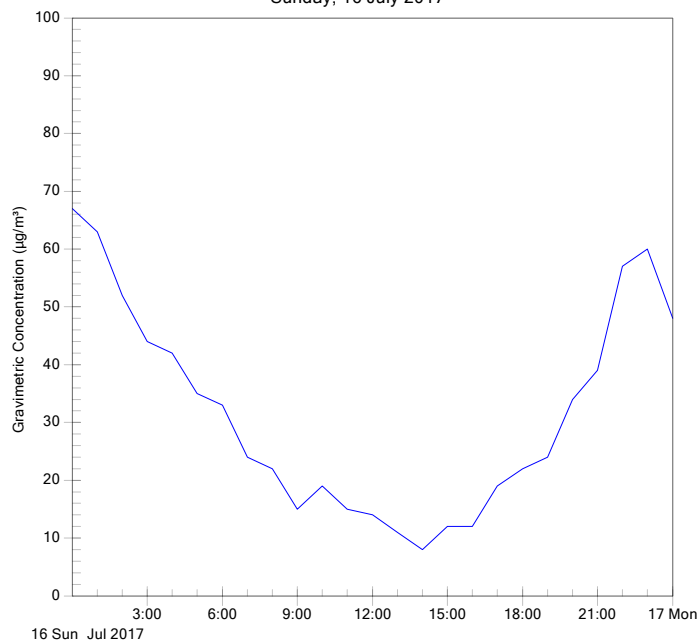
100.0% valid data present



35.1% calm
100.0% valid data present

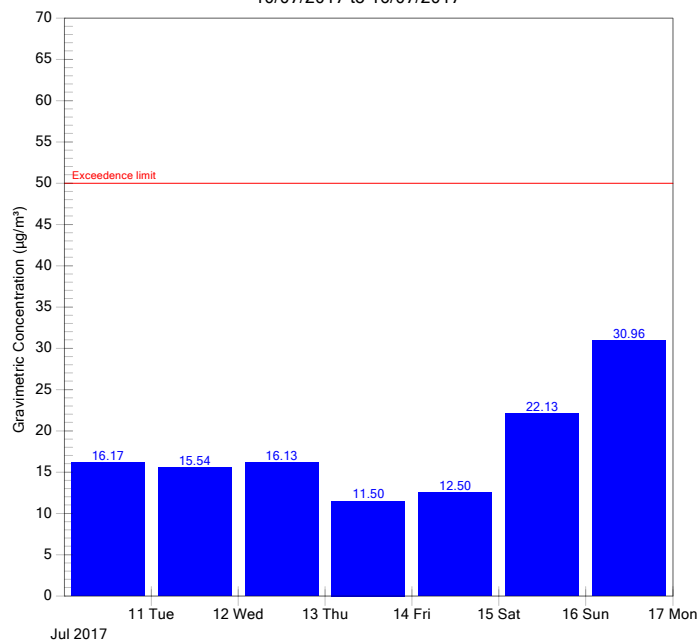
PM₁₀ Hourly Averages (µg/m³)

Sunday, 16 July 2017



PM₁₀ Daily Averages (µg/m³)

10/07/2017 to 16/07/2017



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Waterview North Non-Validated Daily Summary Report

NO₂ (µg/m³)

Date	Daily Average
16/07/2017	32.4

Maximum (Hourly)	76.4
Hour ending	18:00

Minimum (Hourly)	13.9
Hour ending	06:00

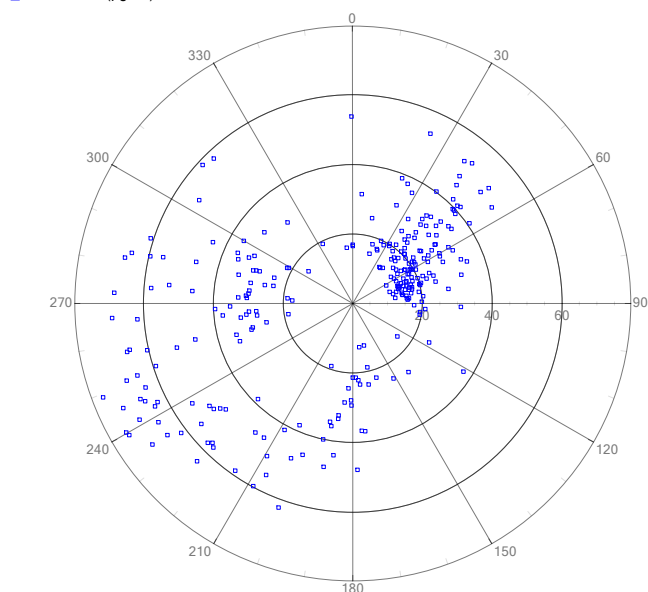
NO₂ Scatter

Polar Scatter
 □ NO₂ 5 min (µg/m³)

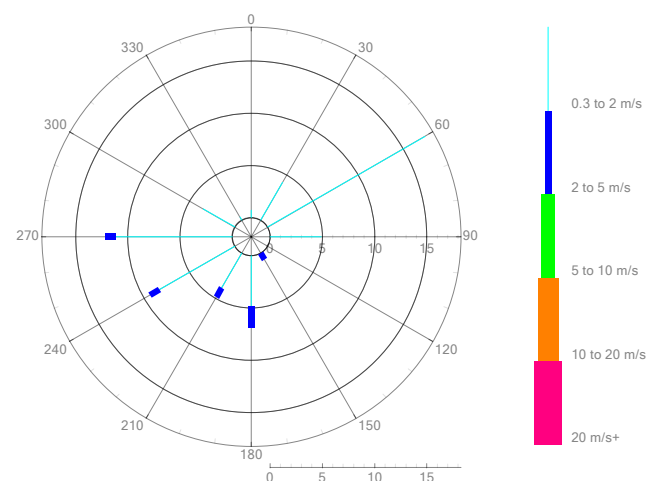
Sunday, 16 July 2017 Wind Rose

Wind Rose

Sunday, 16 July 2017



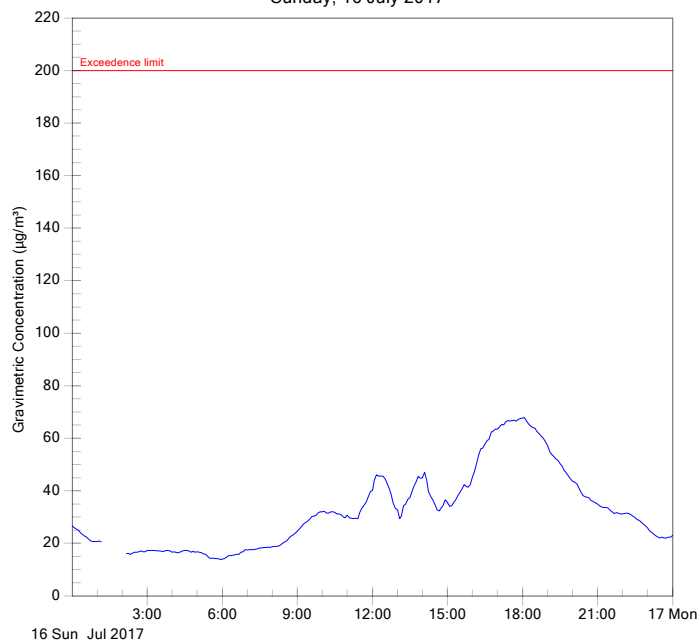
97.9% valid data present



35.1% calm
 100.0% valid data present

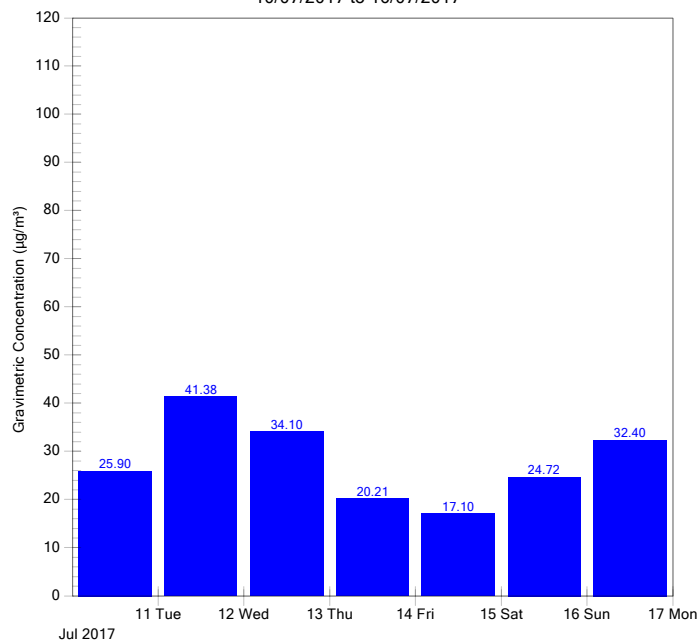
NO₂ Hourly Rolling Averages (µg/m³)

Sunday, 16 July 2017



NO₂ Daily Averages (µg/m³)

10/07/2017 to 16/07/2017



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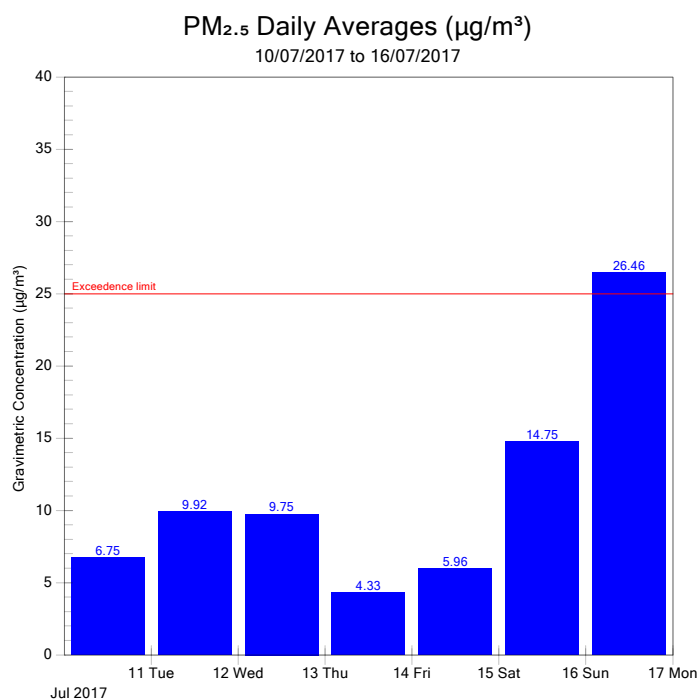
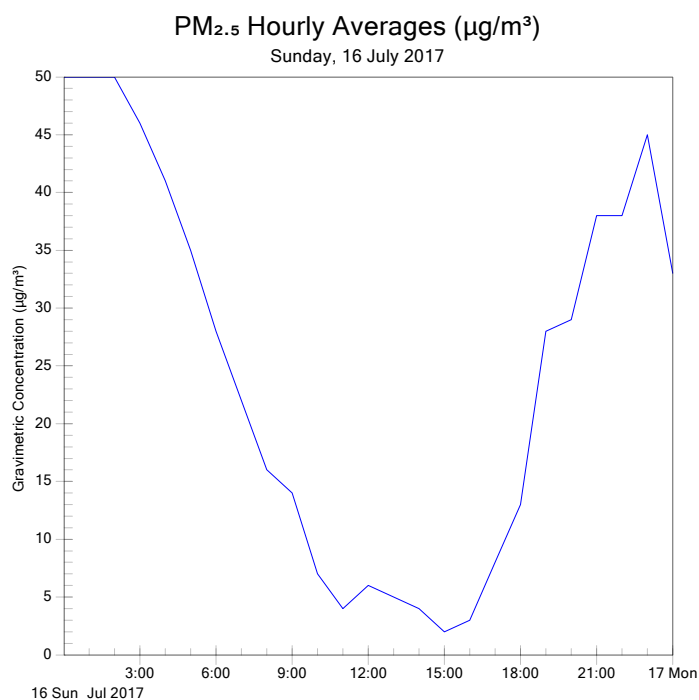
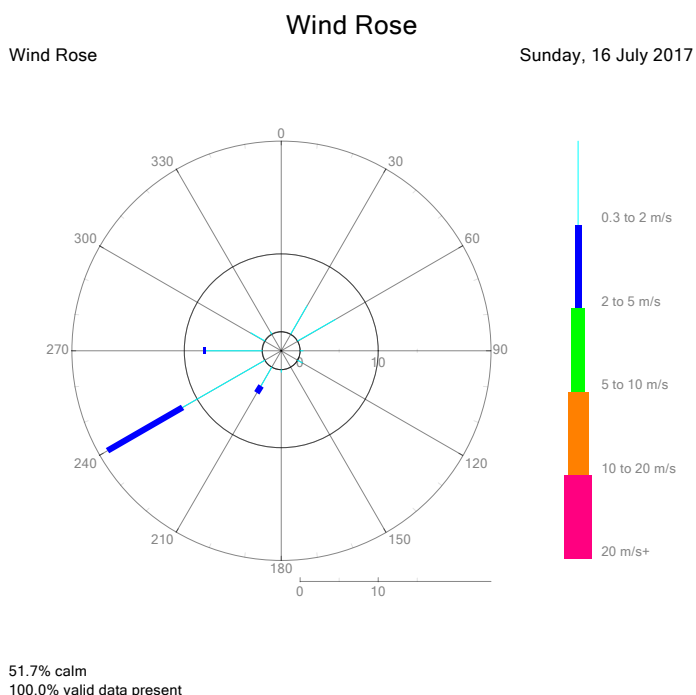
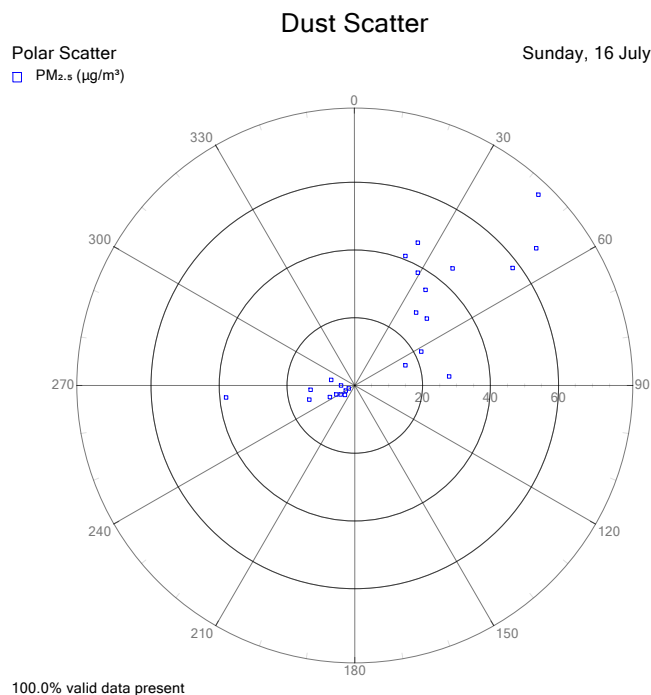
Waterview South Non-Validated Daily Summary Report

PM_{2.5} (µg/m³)

Date	Daily Average
16/07/2017	26

Maximum (Hourly)	78
Hour ending	02:00

Minimum (Hourly)	2
Hour ending	16:00



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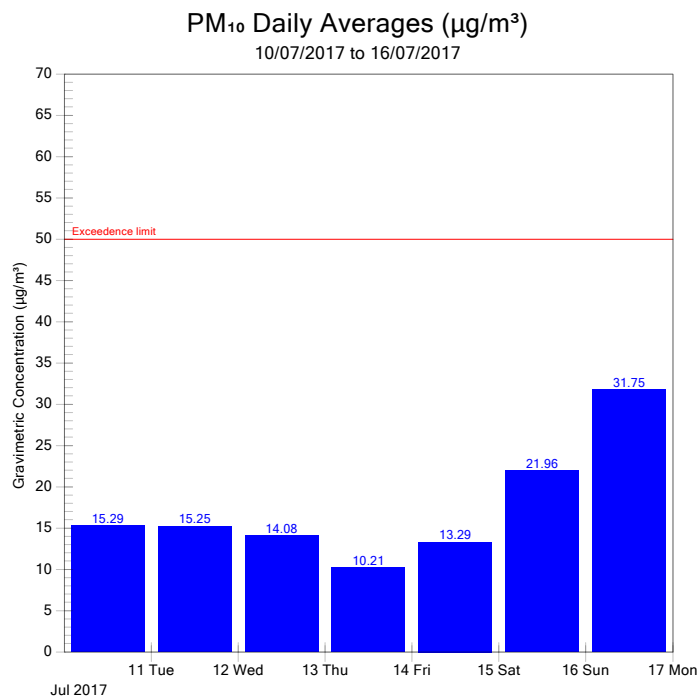
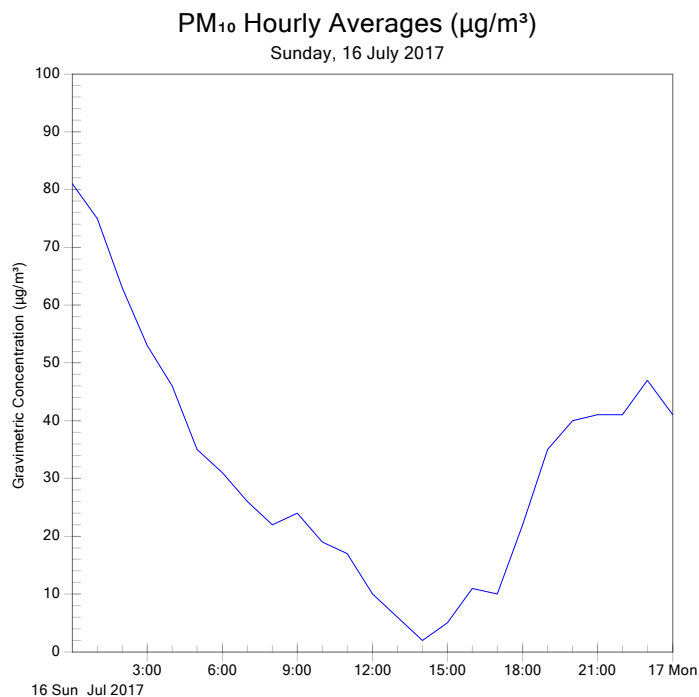
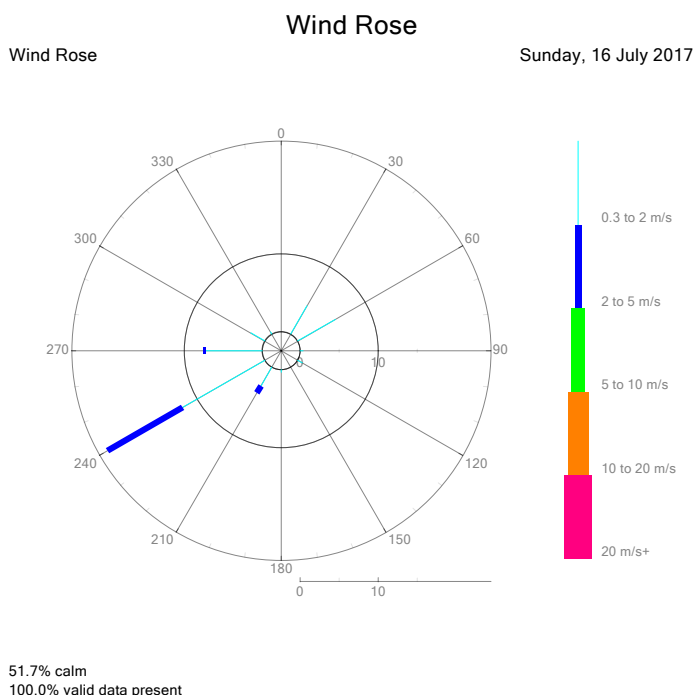
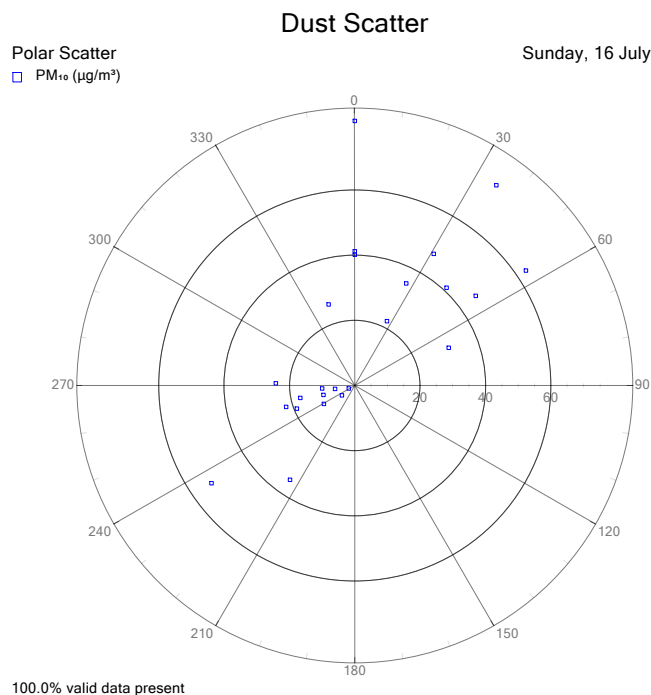
Waterview South Non-Validated Daily Summary Report

PM₁₀ (µg/m³)

Date	Daily Average
16/07/2017	32

Maximum (Hourly)	81
Hour ending	01:00

Minimum (Hourly)	2
Hour ending	15:00



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Waterview South Non-Validated Daily Summary Report

NO₂ (µg/m³)

Date	Daily Average
16/07/2017	25.1

Maximum (Hourly)	54.2
Hour ending	19:00

Minimum (Hourly)	13.5
Hour ending	12:00

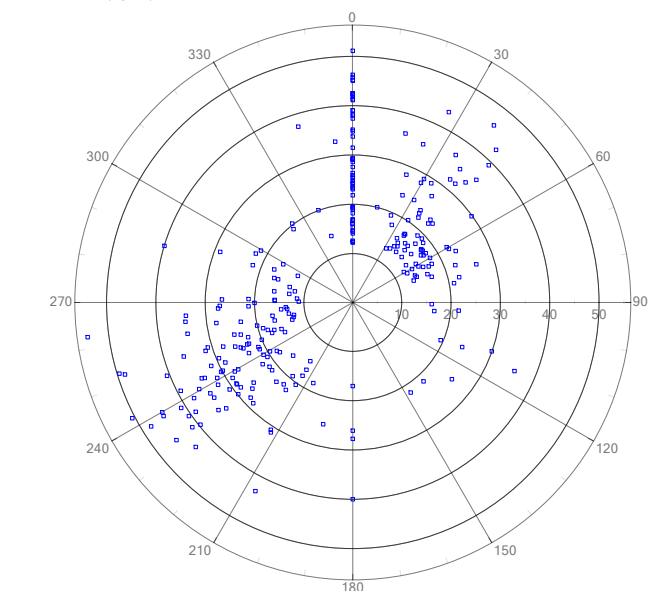
NO₂ Scatter

Polar Scatter
□ NO₂ 5 min (µg/m³)

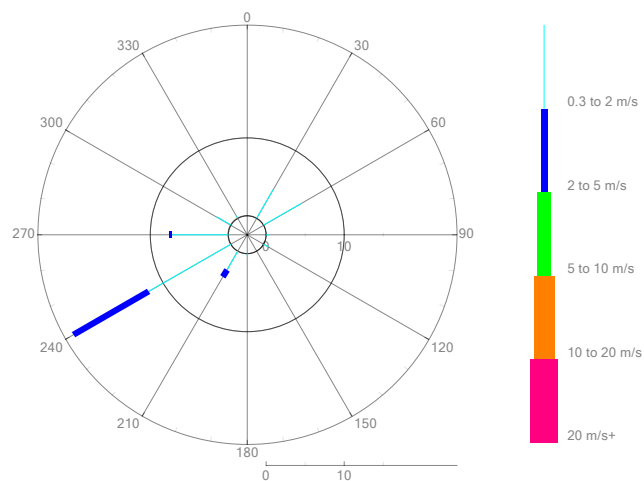
Sunday, 16 July 2017 Wind Rose

Wind Rose

Sunday, 16 July 2017



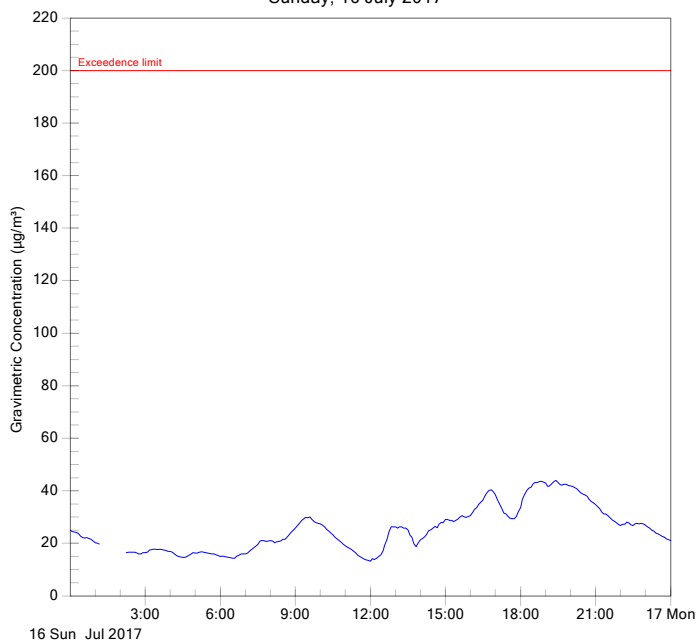
97.6% valid data present



51.7% calm
100.0% valid data present

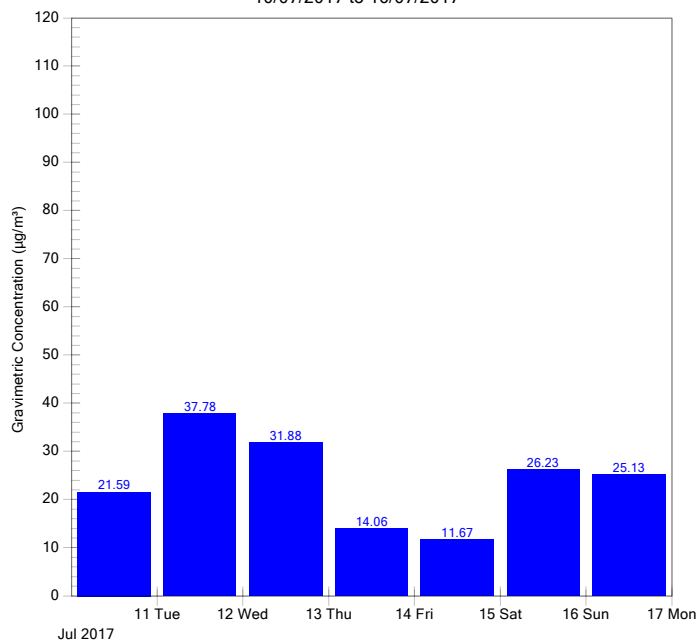
NO₂ Hourly Rolling Averages (µg/m³)

Sunday, 16 July 2017



NO₂ Daily Averages (µg/m³)

10/07/2017 to 16/07/2017



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Waterview Portal Non-Validated Daily Summary Report

NO₂ (µg/m³)

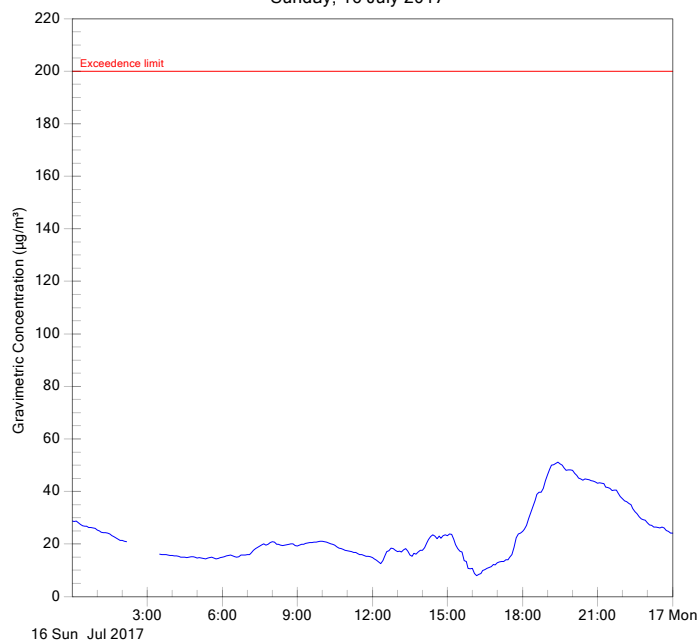
Date	Daily Average
16/07/2017	23.2

Maximum (Hourly)	54.4
Hour ending	19:00

Minimum (Hourly)	10.6
Hour ending	16:00

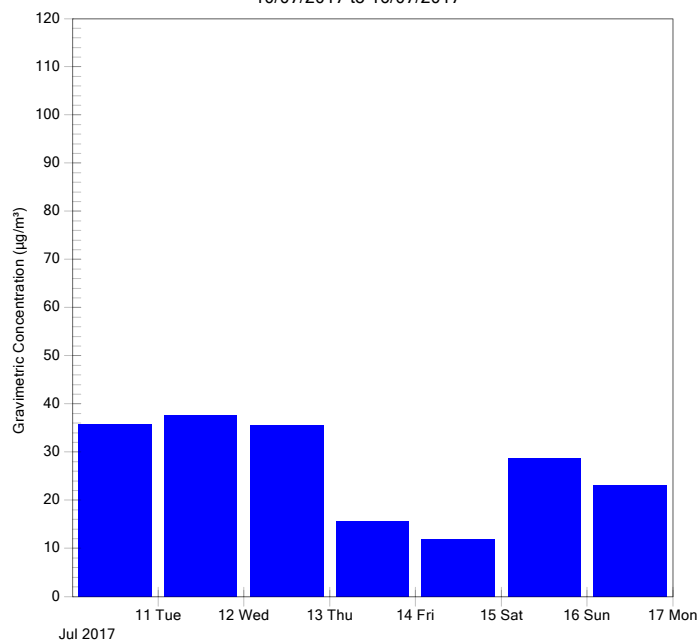
NO₂ Hourly Rolling Averages (µg/m³)

Sunday, 16 July 2017

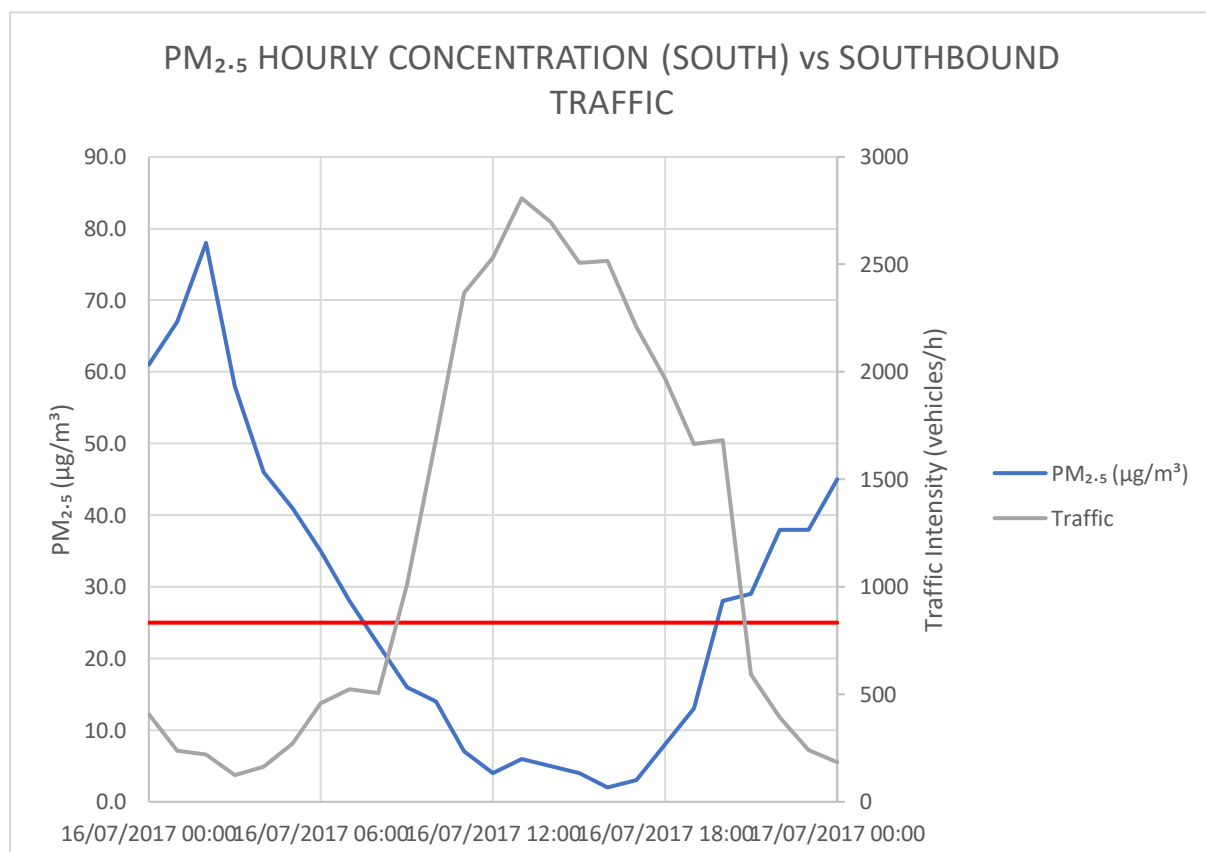
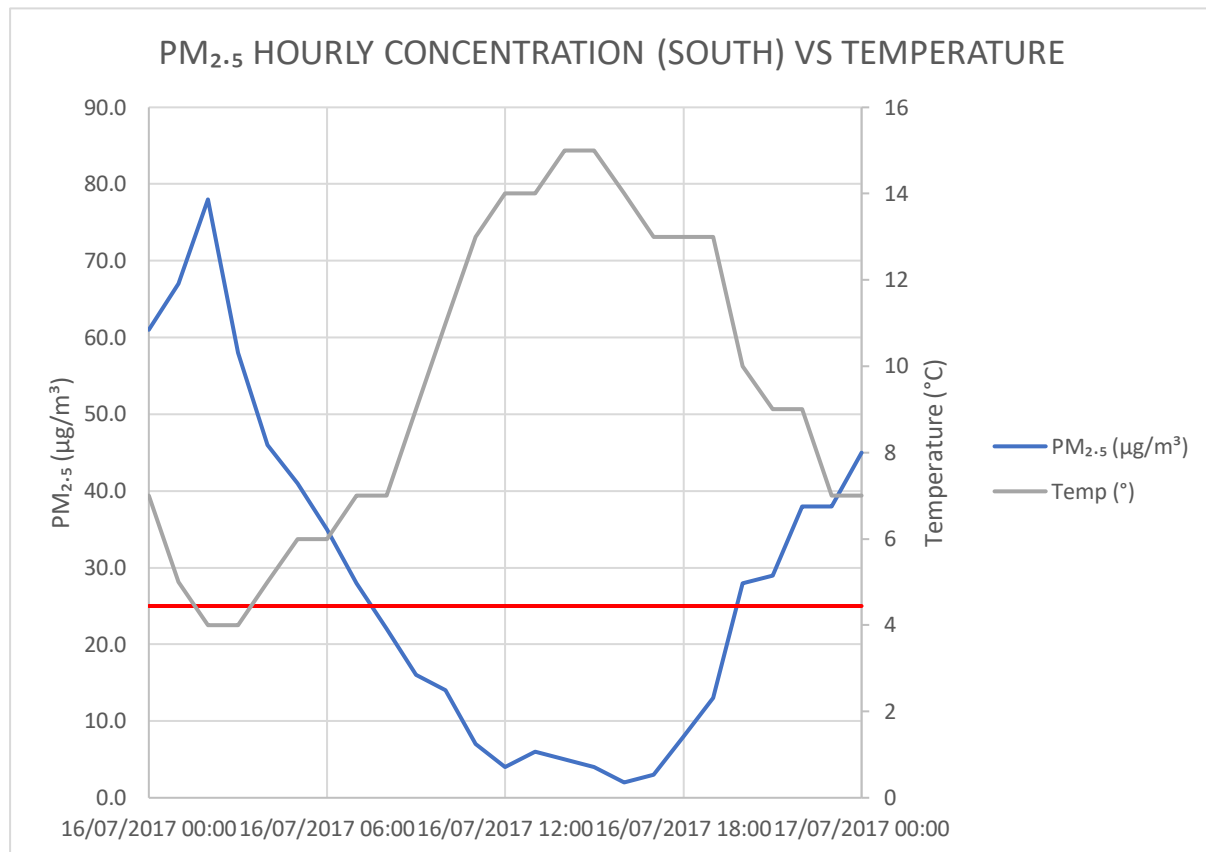


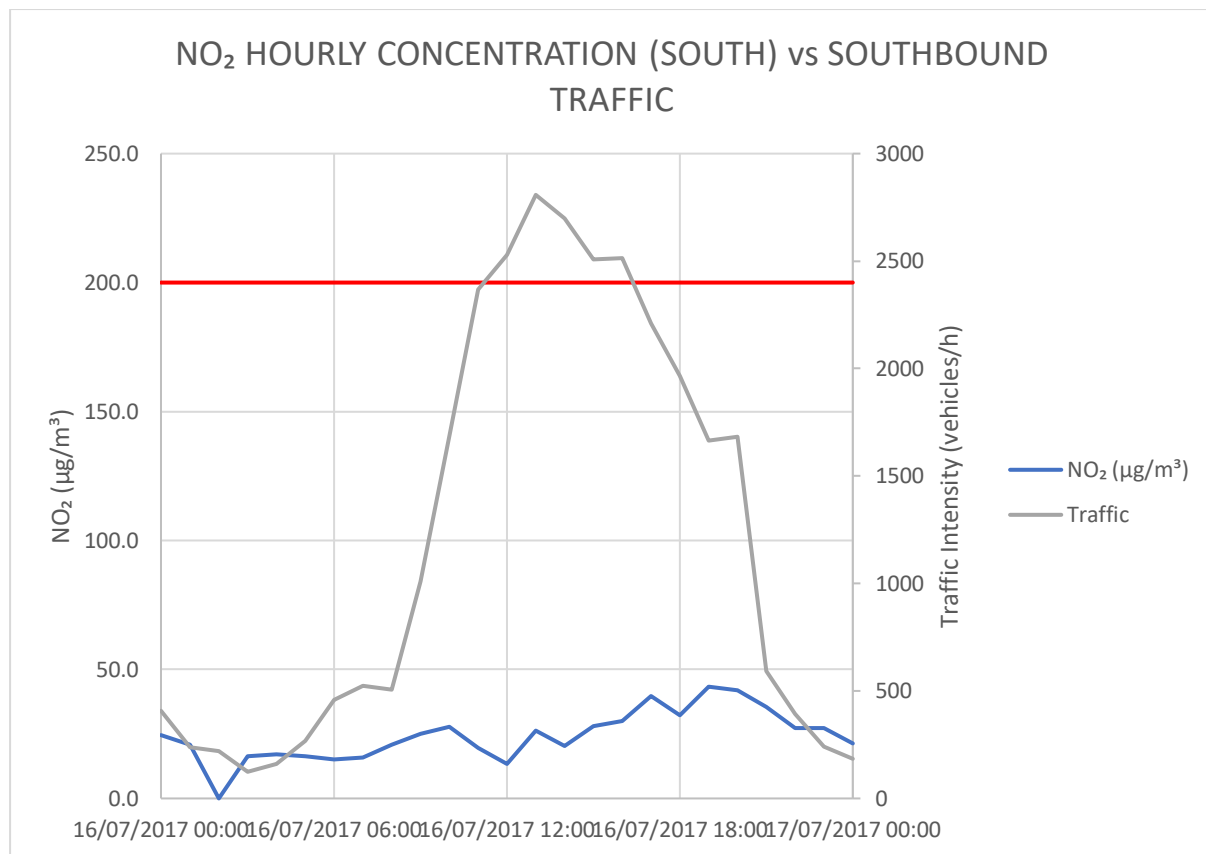
NO₂ Daily Averages (µg/m³)

10/07/2017 to 16/07/2017



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APPENDIX C

Baseline data

Waterview North Non-Validated Daily Summary Report

PM_{2.5} (µg/m³)

Date	Daily Average
27/06/2017	25

Maximum (Hourly)	54
Hour ending	23:00

Minimum (Hourly)	2
Hour ending	12:00

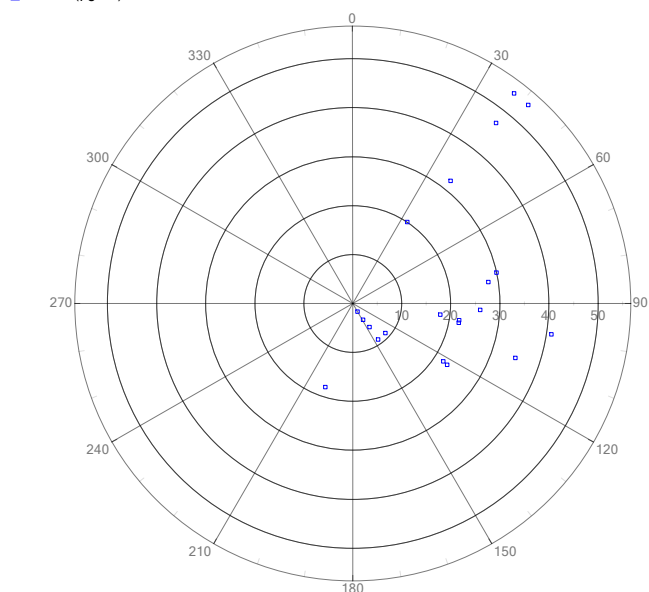
Dust Scatter

Polar Scatter
□ PM_{2.5} (µg/m³)

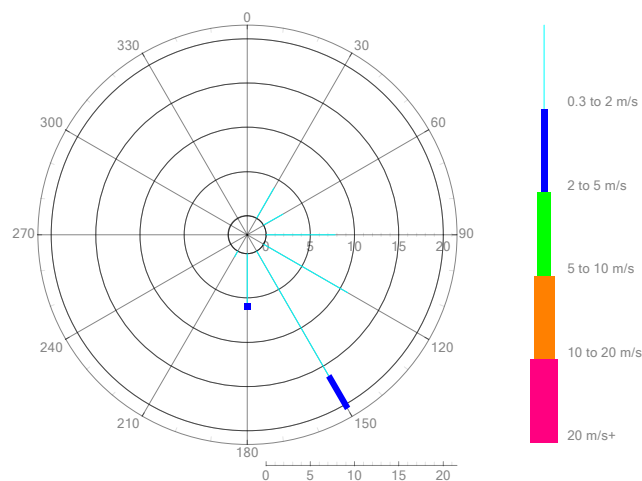
Tuesday, 27 June 2017 Wind Rose

Wind Rose

Tuesday, 27 June 2017



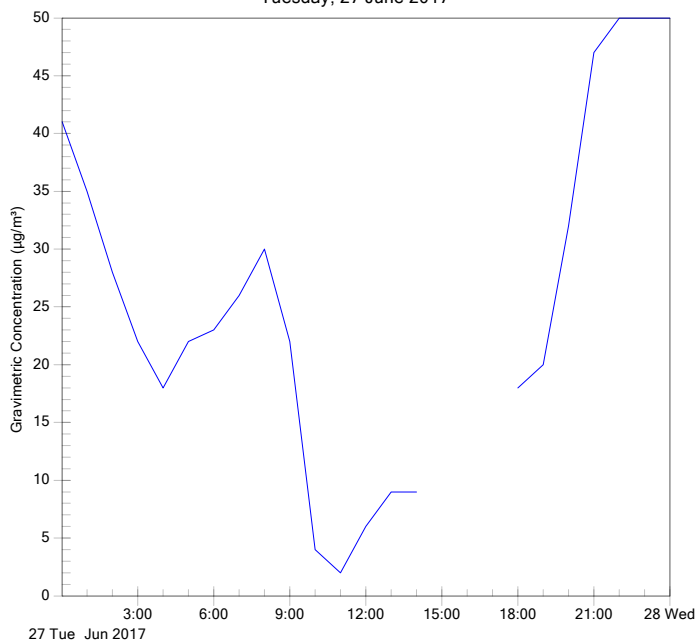
87.5% valid data present



47.3% calm
98.3% valid data present

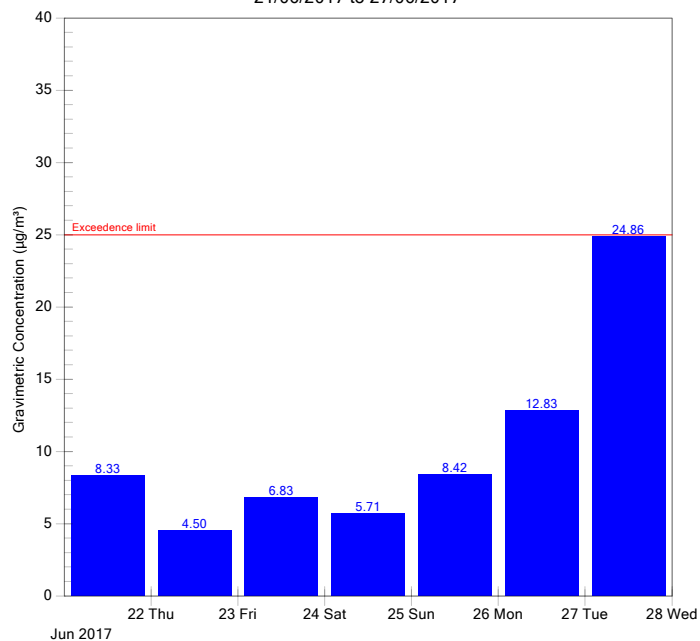
PM_{2.5} Hourly Averages (µg/m³)

Tuesday, 27 June 2017



PM_{2.5} Daily Averages (µg/m³)

21/06/2017 to 27/06/2017



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Waterview North Non-Validated Daily Summary Report

PM₁₀ (µg/m³)

Date	Daily Average
27/06/2017	33

Maximum (Hourly)	68
Hour ending	00:00

Minimum (Hourly)	8
Hour ending	12:00

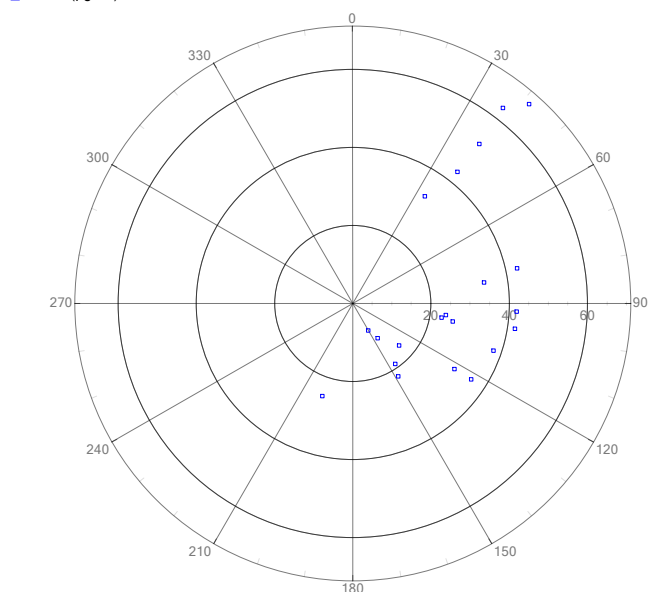
Dust Scatter

Polar Scatter
□ PM₁₀ (µg/m³)

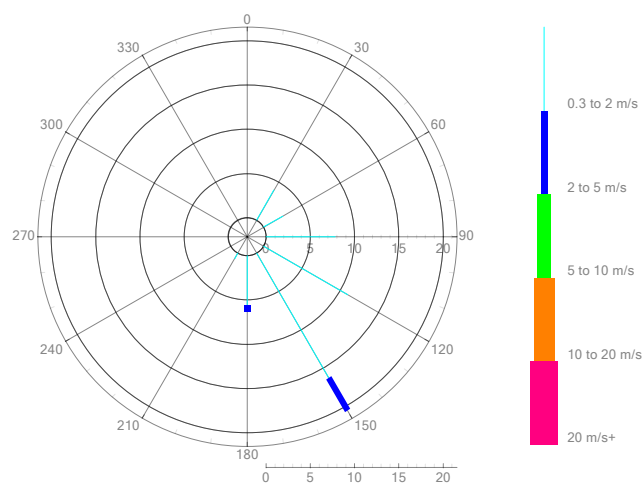
Tuesday, 27 June 2017 Wind Rose

Wind Rose

Tuesday, 27 June 2017



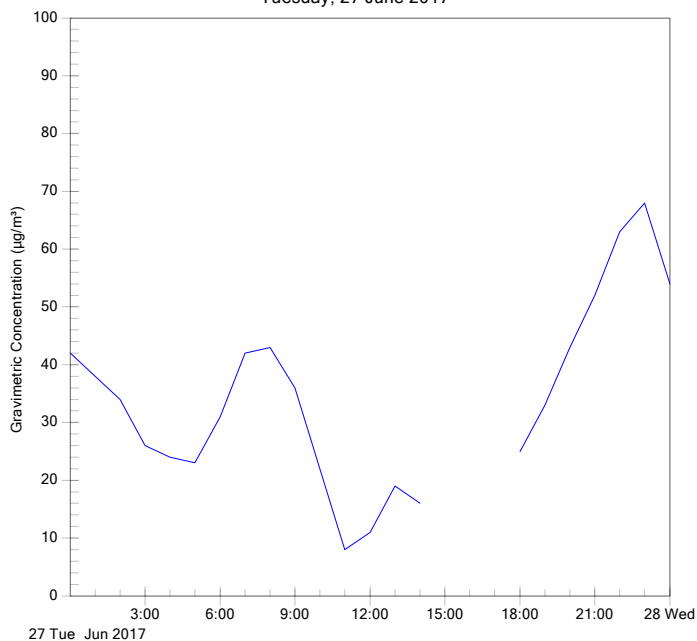
87.5% valid data present



47.3% calm
98.3% valid data present

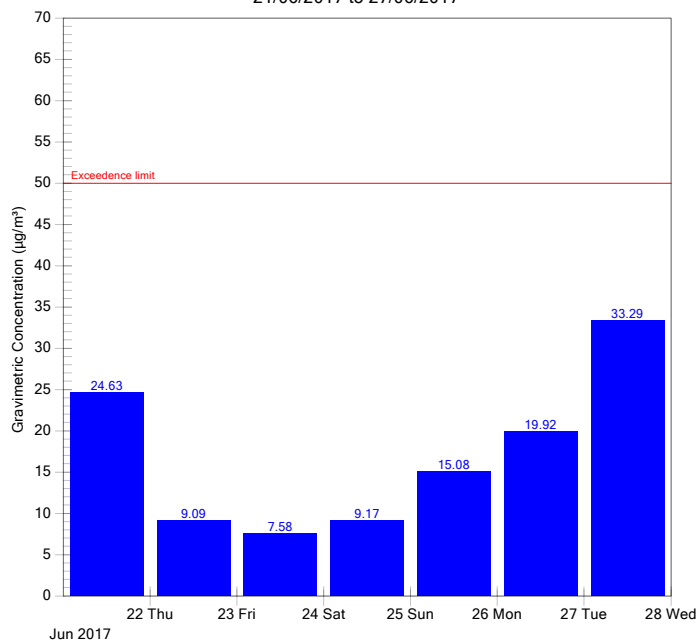
PM₁₀ Hourly Averages (µg/m³)

Tuesday, 27 June 2017



PM₁₀ Daily Averages (µg/m³)

21/06/2017 to 27/06/2017



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Waterview North Non-Validated Daily Summary Report

NO₂ (µg/m³)

Date	Daily Average
27/06/2017	

Maximum (Hourly)	68.4
Hour ending	09:00

Minimum (Hourly)	14.2
Hour ending	13:00

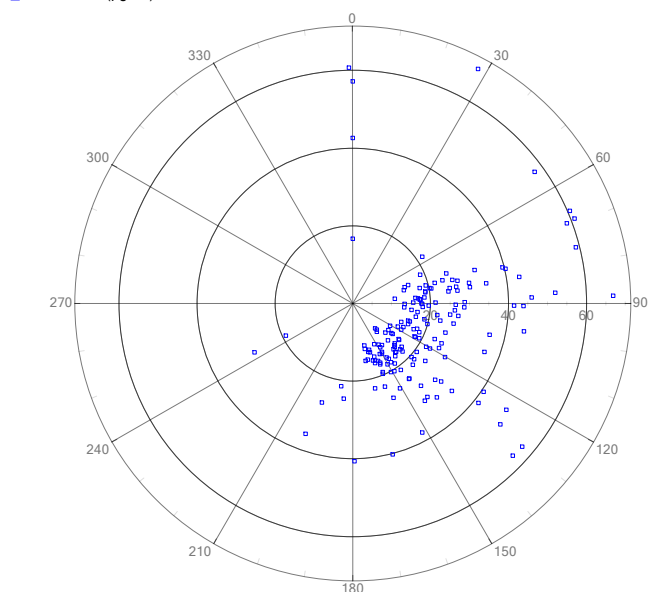
NO₂ Scatter

Polar Scatter
□ NO₂ 5 min (µg/m³)

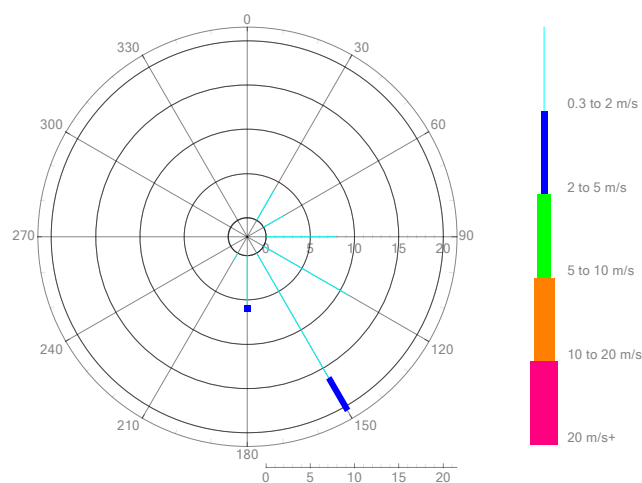
Tuesday, 27 June 2017 Wind Rose

Wind Rose

Tuesday, 27 June 2017



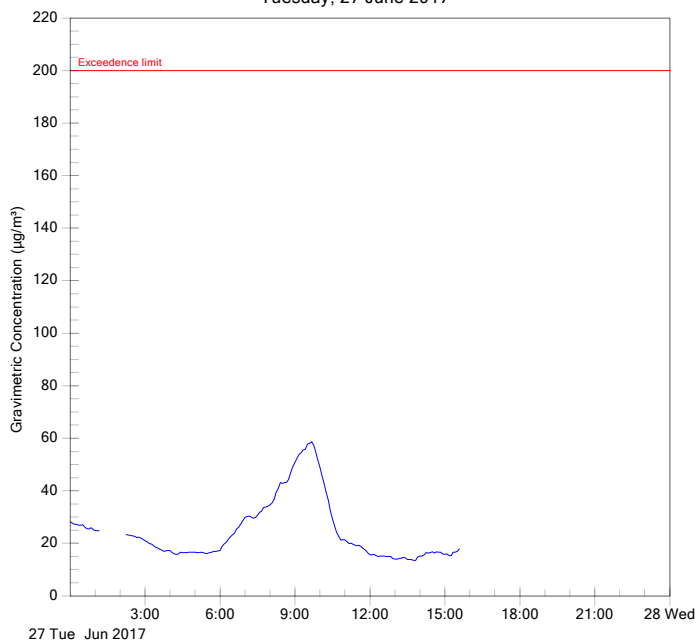
61.8% valid data present



47.3% calm
98.3% valid data present

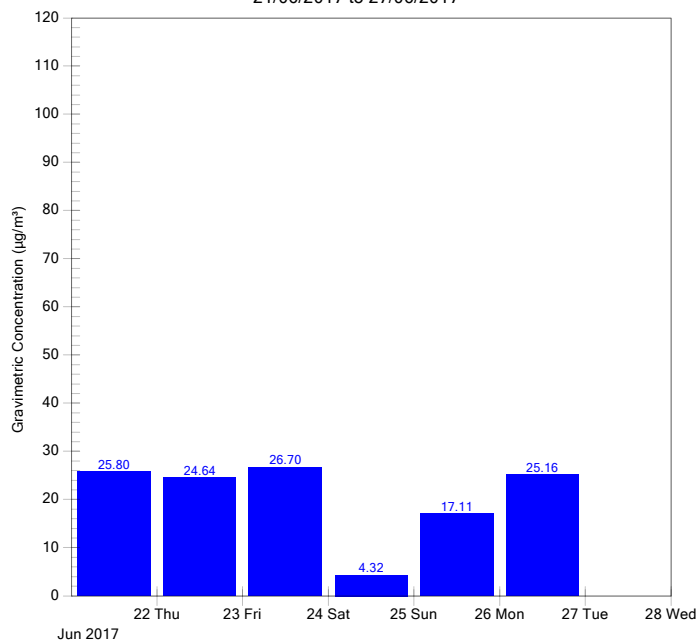
NO₂ Hourly Rolling Averages (µg/m³)

Tuesday, 27 June 2017



NO₂ Daily Averages (µg/m³)

21/06/2017 to 27/06/2017



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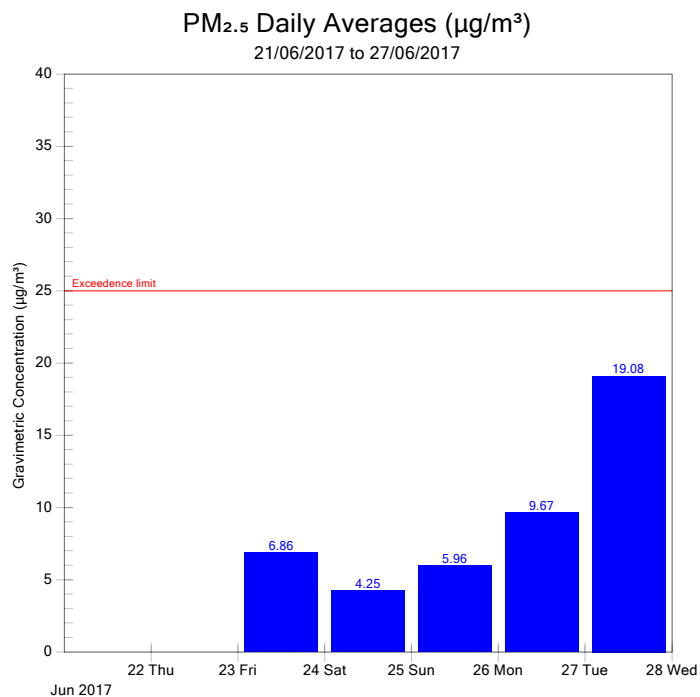
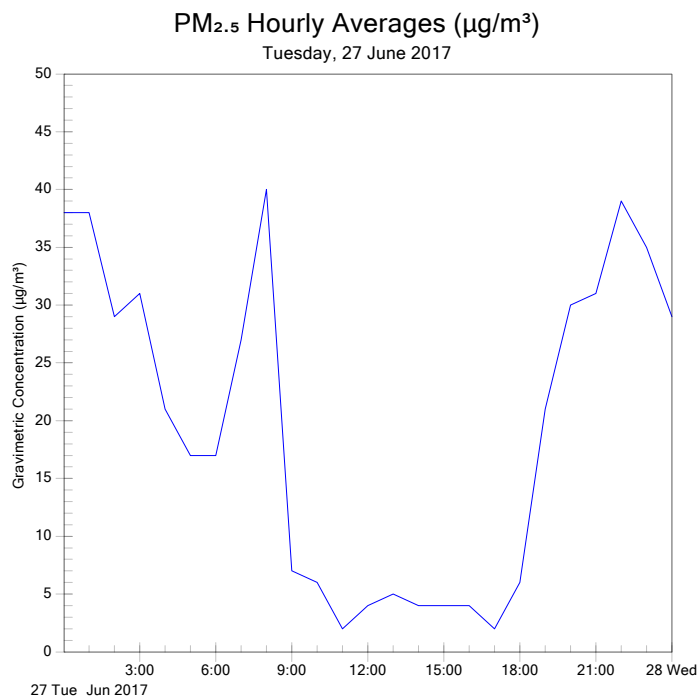
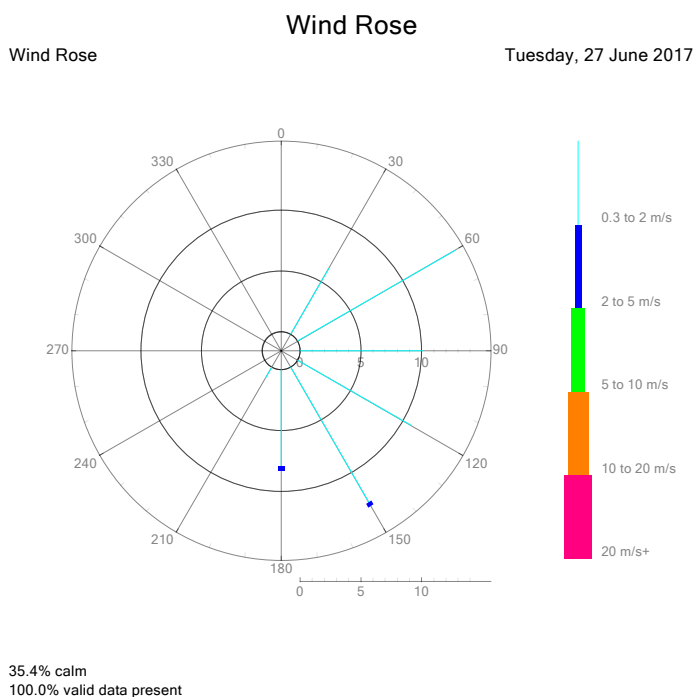
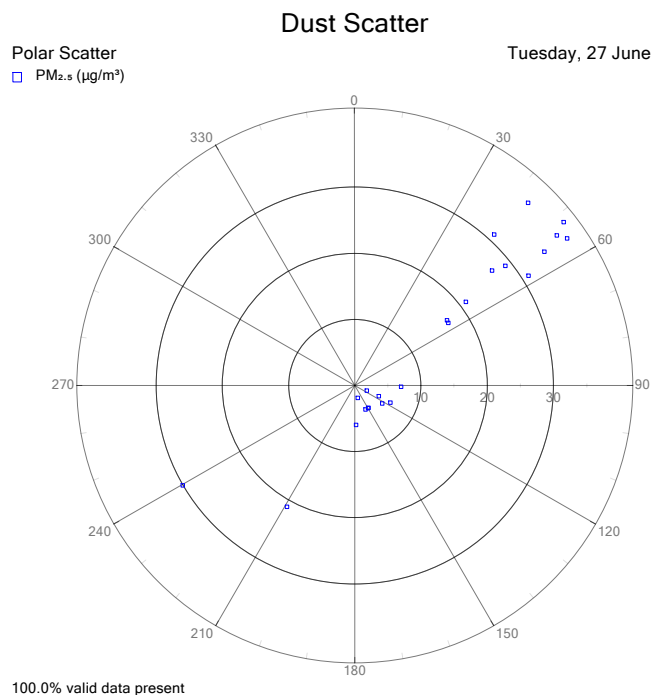
Waterview South Non-Validated Daily Summary Report

PM_{2.5} (µg/m³)

Date	Daily Average
27/06/2017	19

Maximum (Hourly)	40
Hour ending	09:00

Minimum (Hourly)	2
Hour ending	12:00



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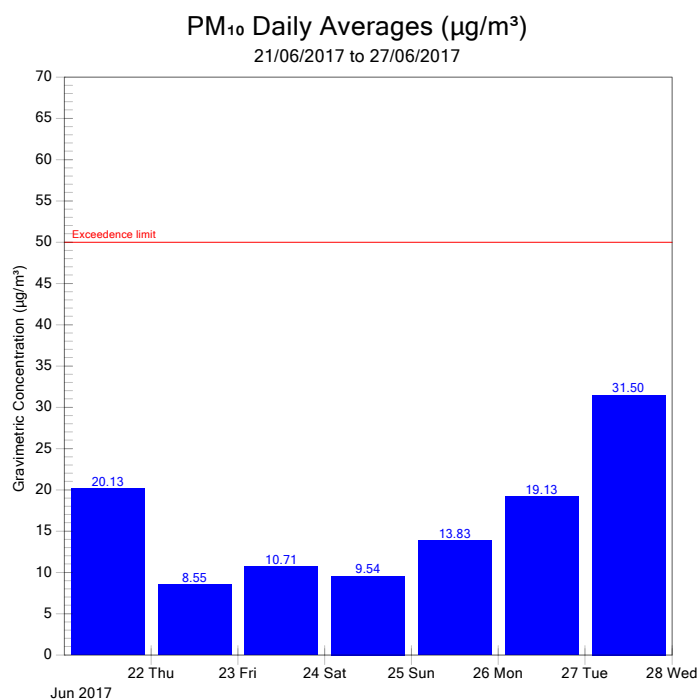
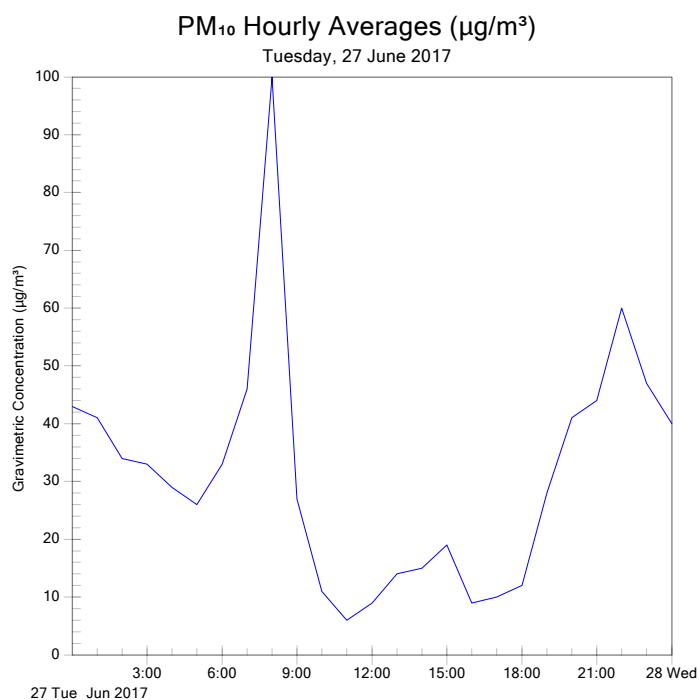
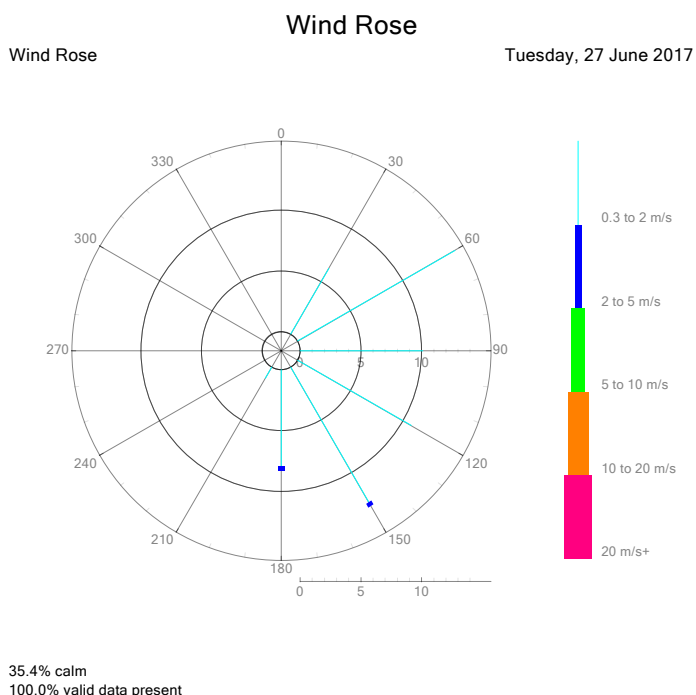
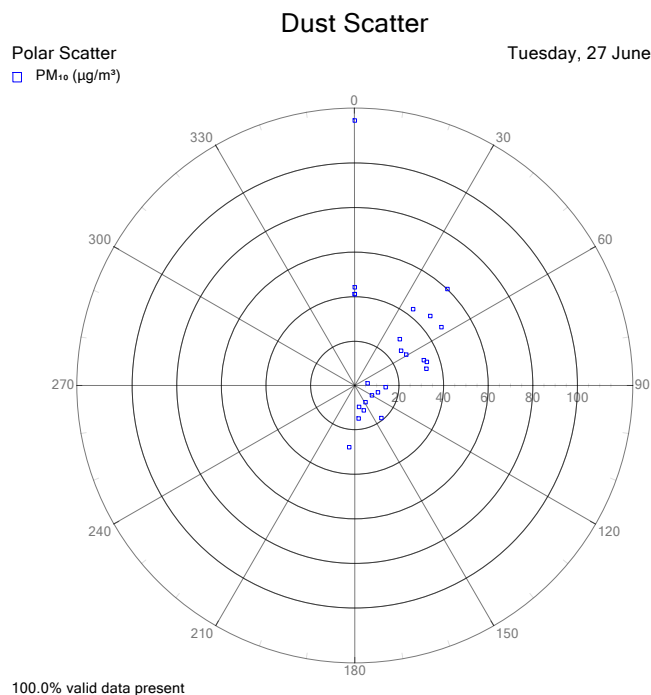
Waterview South Non-Validated Daily Summary Report

PM₁₀ (µg/m³)

Date	Daily Average
27/06/2017	32

Maximum (Hourly)	119
Hour ending	09:00

Minimum (Hourly)	6
Hour ending	12:00



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Waterview South Non-Validated Daily Summary Report

NO₂ (µg/m³)

Date	Daily Average
27/06/2017	20.5

Maximum (Hourly)	104.1
Hour ending	10:00

Minimum (Hourly)	4.1
Hour ending	14:00

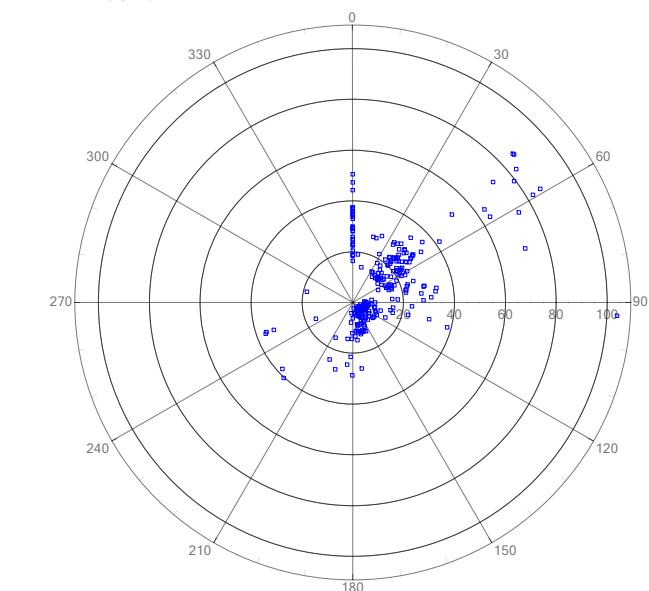
NO₂ Scatter

Polar Scatter
□ NO₂ 5 min (µg/m³)

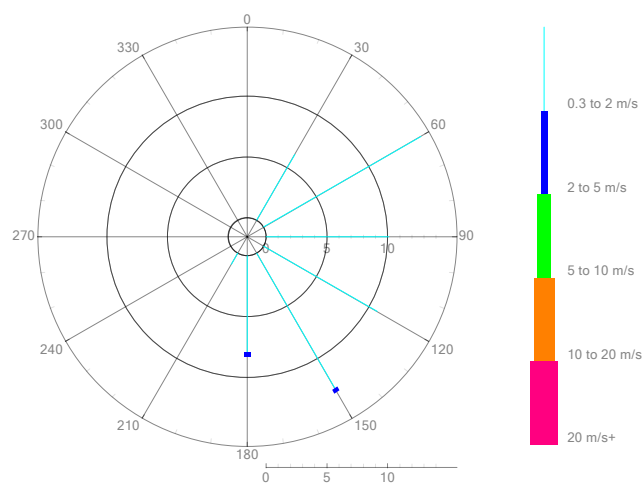
Tuesday, 27 June 2017 Wind Rose

Wind Rose

Tuesday, 27 June 2017



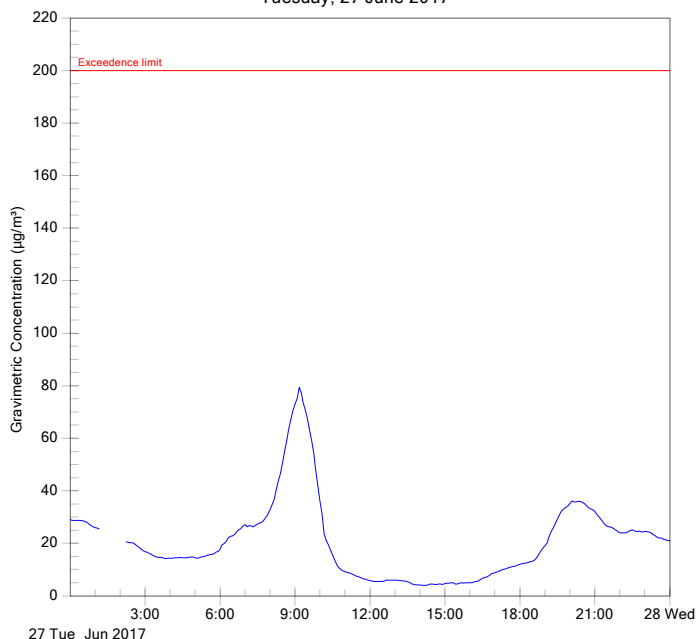
97.6% valid data present



35.4% calm
100.0% valid data present

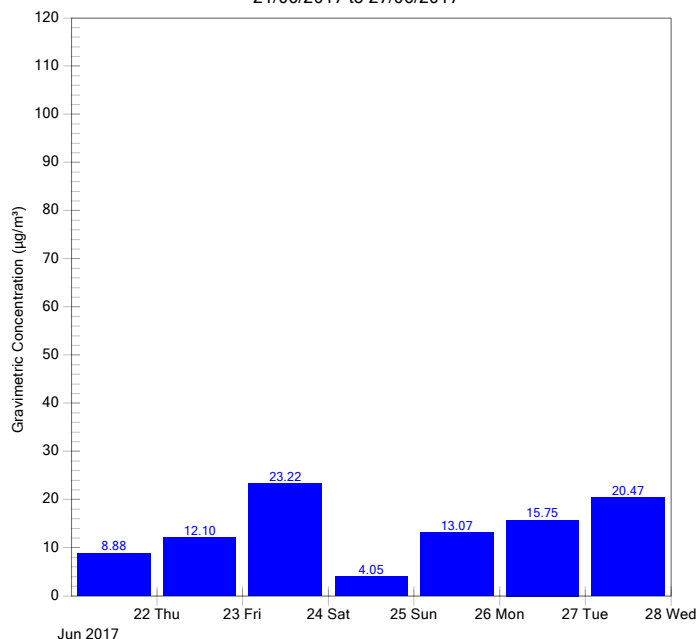
NO₂ Hourly Rolling Averages (µg/m³)

Tuesday, 27 June 2017



NO₂ Daily Averages (µg/m³)

21/06/2017 to 27/06/2017



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Waterview Portal Non-Validated Daily Summary Report

NO₂ (µg/m³)

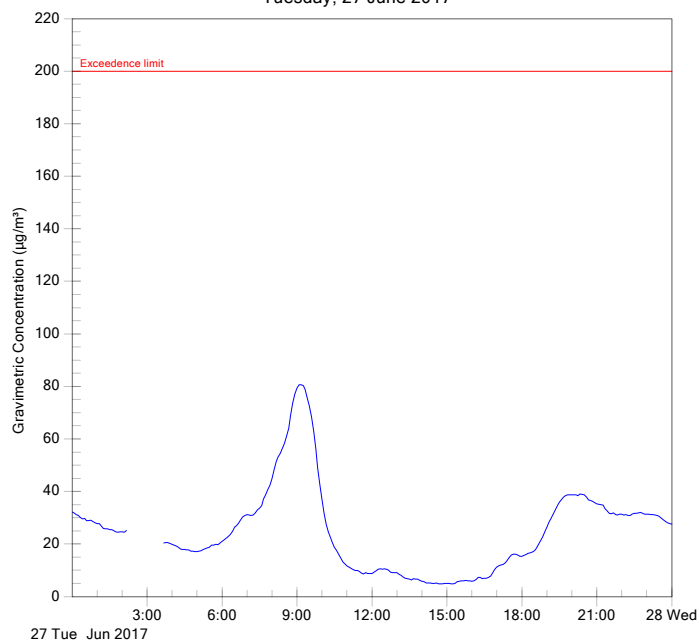
Date	Daily Average
27/06/2017	24.6

Maximum (Hourly)	111.4
Hour ending	09:00

Minimum (Hourly)	5.0
Hour ending	15:00

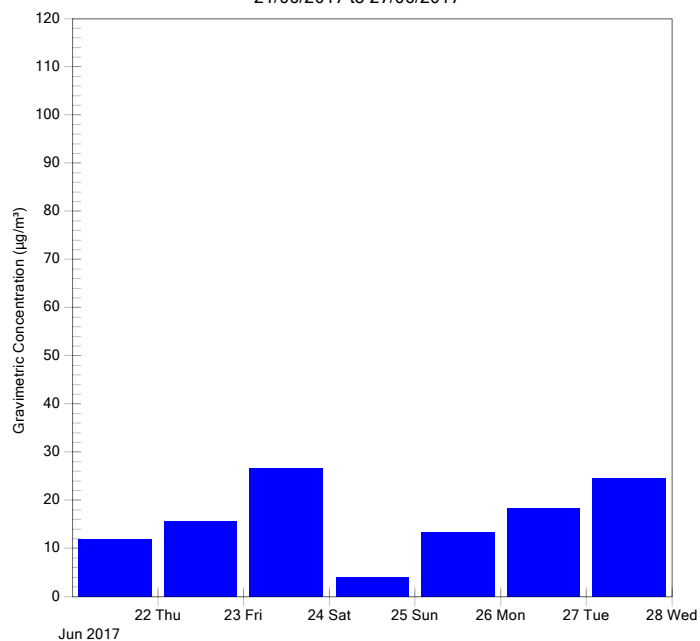
NO₂ Hourly Rolling Averages (µg/m³)

Tuesday, 27 June 2017



NO₂ Daily Averages (µg/m³)

21/06/2017 to 27/06/2017



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