

Silverdale

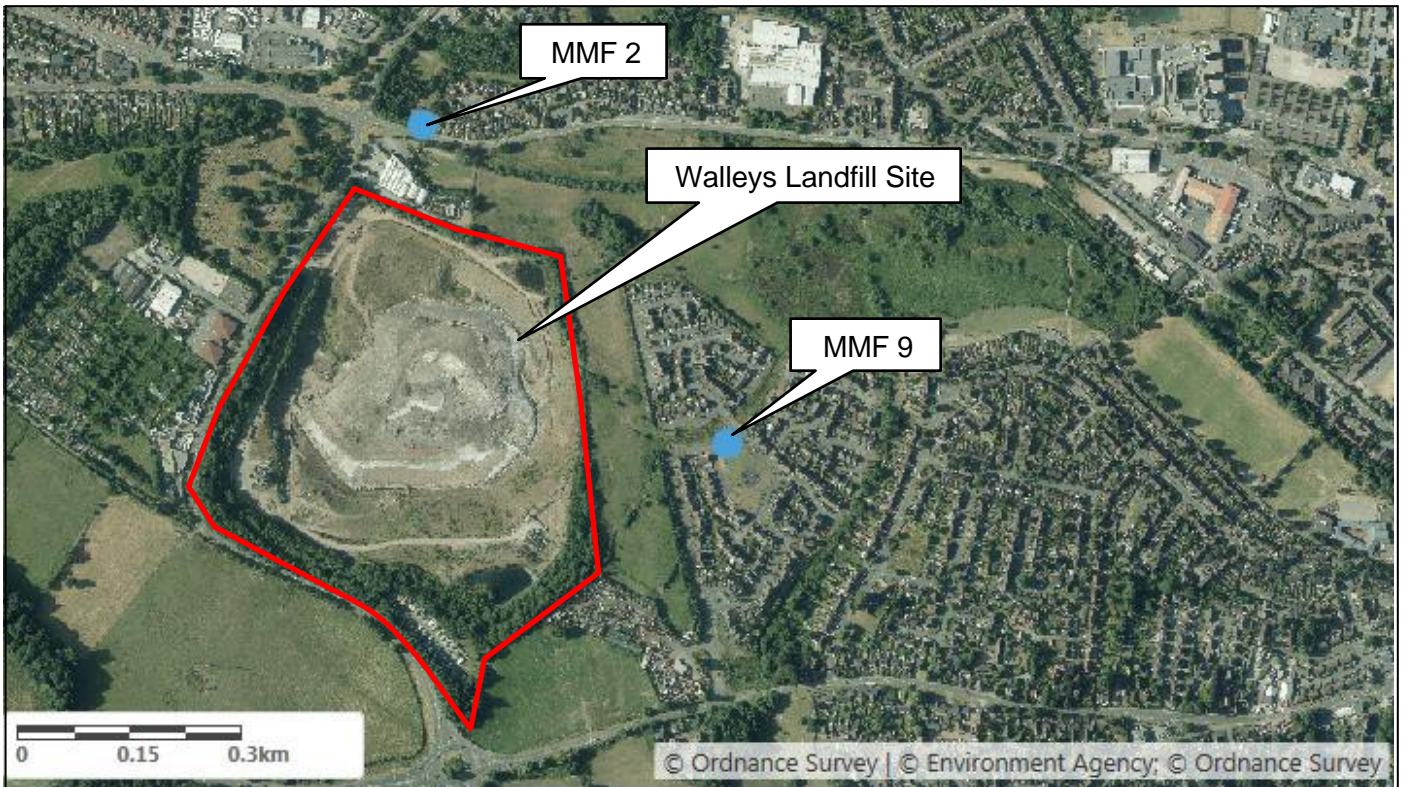
April 2021

Monthly Air Quality Monitoring Report March Monitoring Period

In March 2021 the Environment Agency deployed two Mobile Monitoring Facilities (MMFs) to Silverdale in response to ongoing odour issues in the vicinity of Walley's Quarry Landfill Site. MMF2 was deployed at a pumping station run by Severn Trent Water and was at a bearing of $\sim 135^\circ - 230^\circ$ from the landfill site and MMF9 was deployed at Galingale View and was at a bearing of $\sim 225^\circ - 320^\circ$ from the landfill site. Figure 1 shows the MMF monitoring locations on a map. The monitoring sites were chosen because they were within residential areas where complaints had been received and had access to the necessary power supply and hard standing that the MMFs required. Walley's Quarry Landfill site temporarily stopped and then reduced waste acceptance operations on Monday 15 March 2021.

The reported pollutants are hydrogen sulphide (H_2S), methane (CH_4), oxides of nitrogen (NO_x , NO , NO_2) and a number of different particulate matter size fractions (Total Suspended Particulate (TSP), PM_{10} and $\text{PM}_{2.5}$). The H_2S data is compared against the WHO guideline values for both odour annoyance and health. The particulate data and the NO_x data will eventually be compared against the objectives of the UK Air Quality Strategy (AQS), but as these are annual standards the current data set is too small for such a comparison to be made at the moment.

Figure 1. Map showing the location of the two monitoring sites



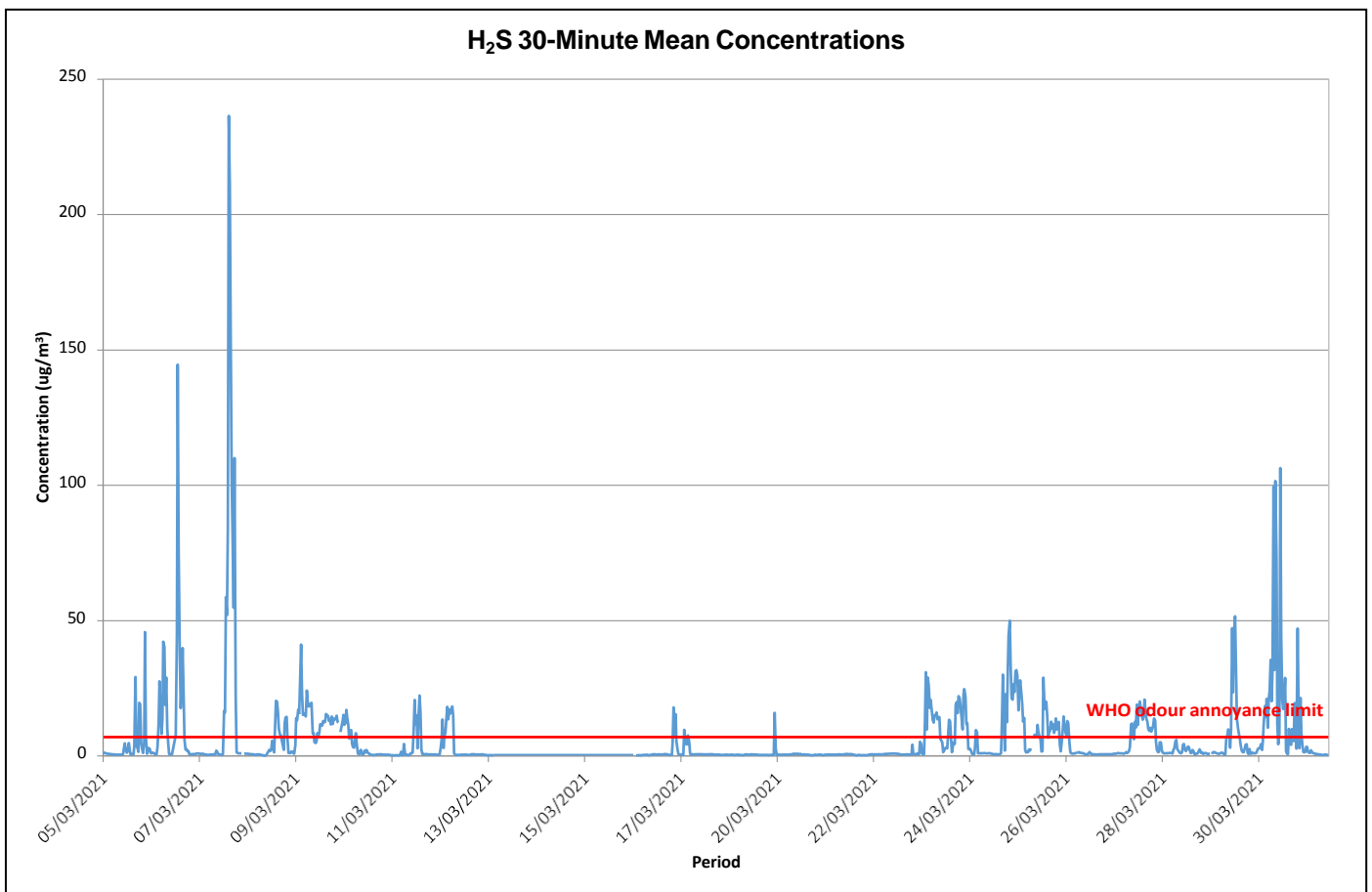
MMF2 (Pumping Station) Results

Rectified data (ie data that has been subjected to quality assurance checking and calibration adjustment) for each pollutant, from the 4th March 2021 until the 31st of March 2021, is shown in a series of time series plots below.

H₂S

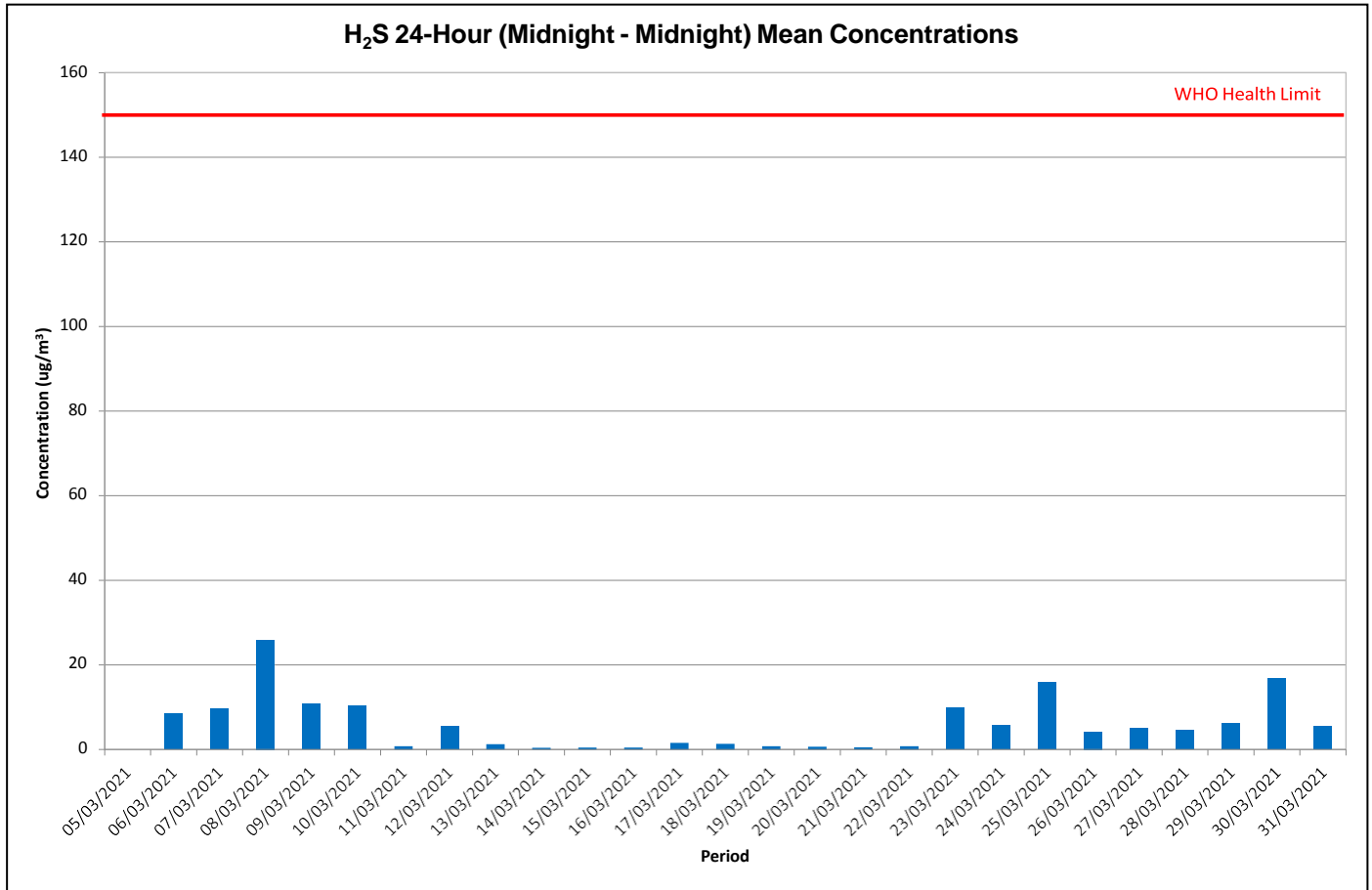
A time series plot of 30-minute average H₂S concentrations measured over the period is shown in Figure 2. This data allows direct comparison with the WHO Guidelines for Europe 2000, which have set a guide level of 7µg/m³ above which substantial complaints about odour annoyance can be expected. Levels of H₂S were above 7µg/m³ for 22% of the monitoring period.

Figure 2. Time series plot of H₂S 30-Minute Mean Concentrations (µg/m³).



A time series plot of 24-hour mean H₂S concentrations at the monitoring site is shown in Figure 3. This data can be compared directly with the relevant WHO Guideline for Europe 2000. The highest recorded 24-hour mean was 25.9µg/m³, which is lower than the 150µg/m³ limit set as a guideline by WHO, in the context of human health.

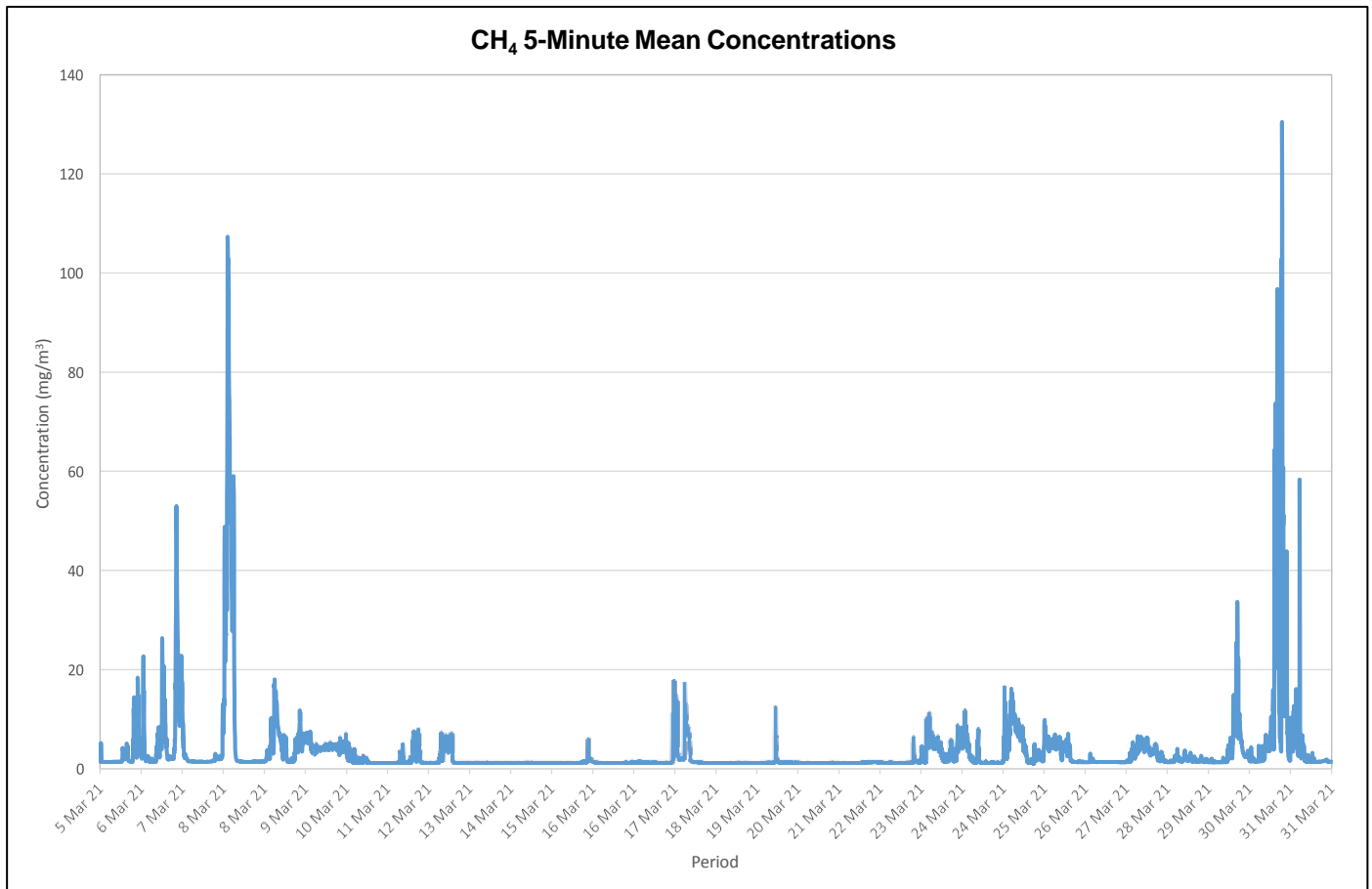
Figure 3. Time series plot of H₂S 24-Hour (Midnight - Midnight) Mean Concentrations (µg/m³).



Methane

The average CH₄ concentration during this period was 3.42mg/m³.

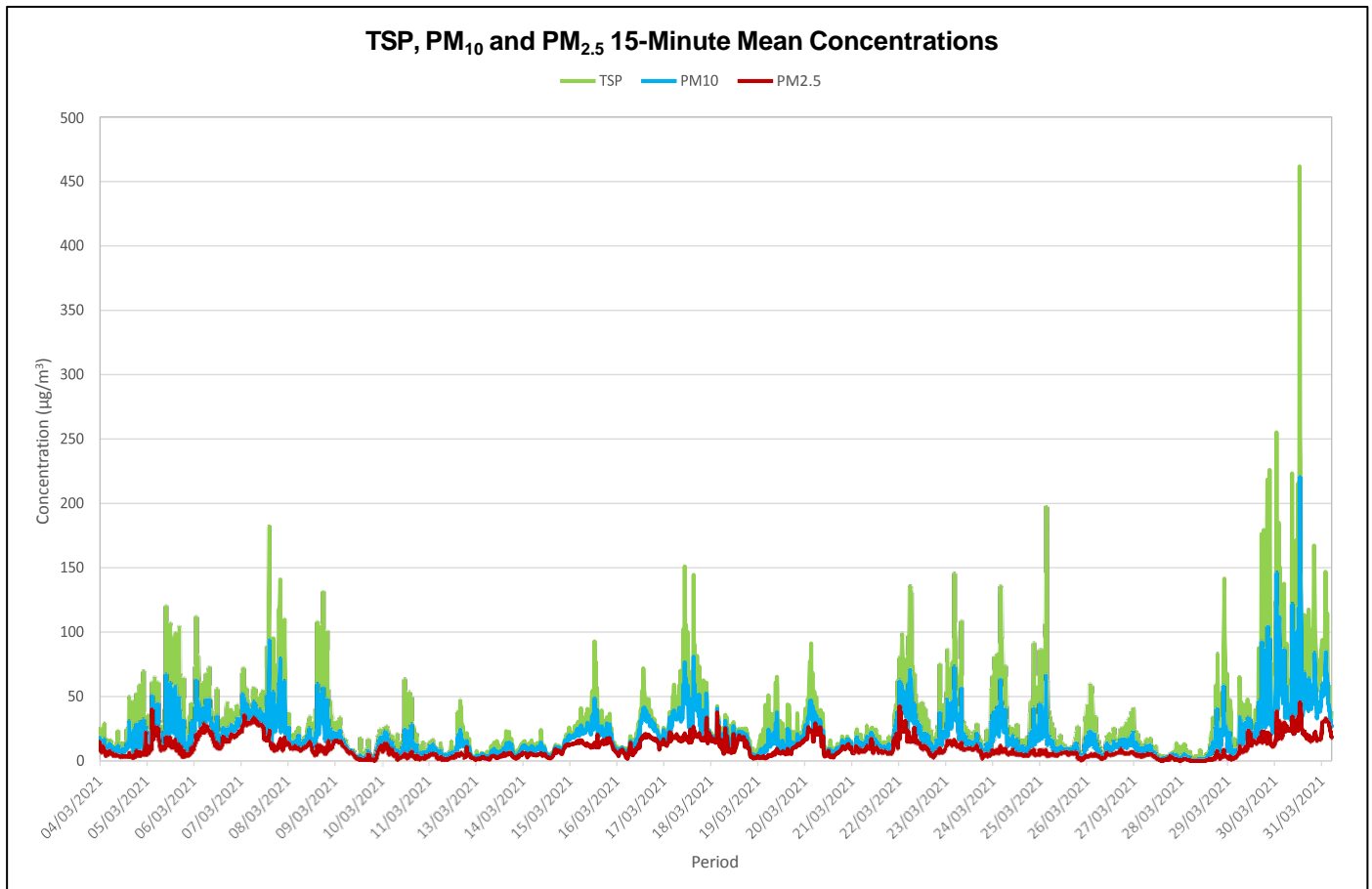
Figure 4. Time series plot of the methane (CH₄) 5-Minute Mean Concentrations (mg/m³).



Particulates

The average PM_{10} and $PM_{2.5}$ concentrations during this period were $19.0\mu\text{g}/\text{m}^3$ and $9.83\mu\text{g}/\text{m}^3$ respectively.

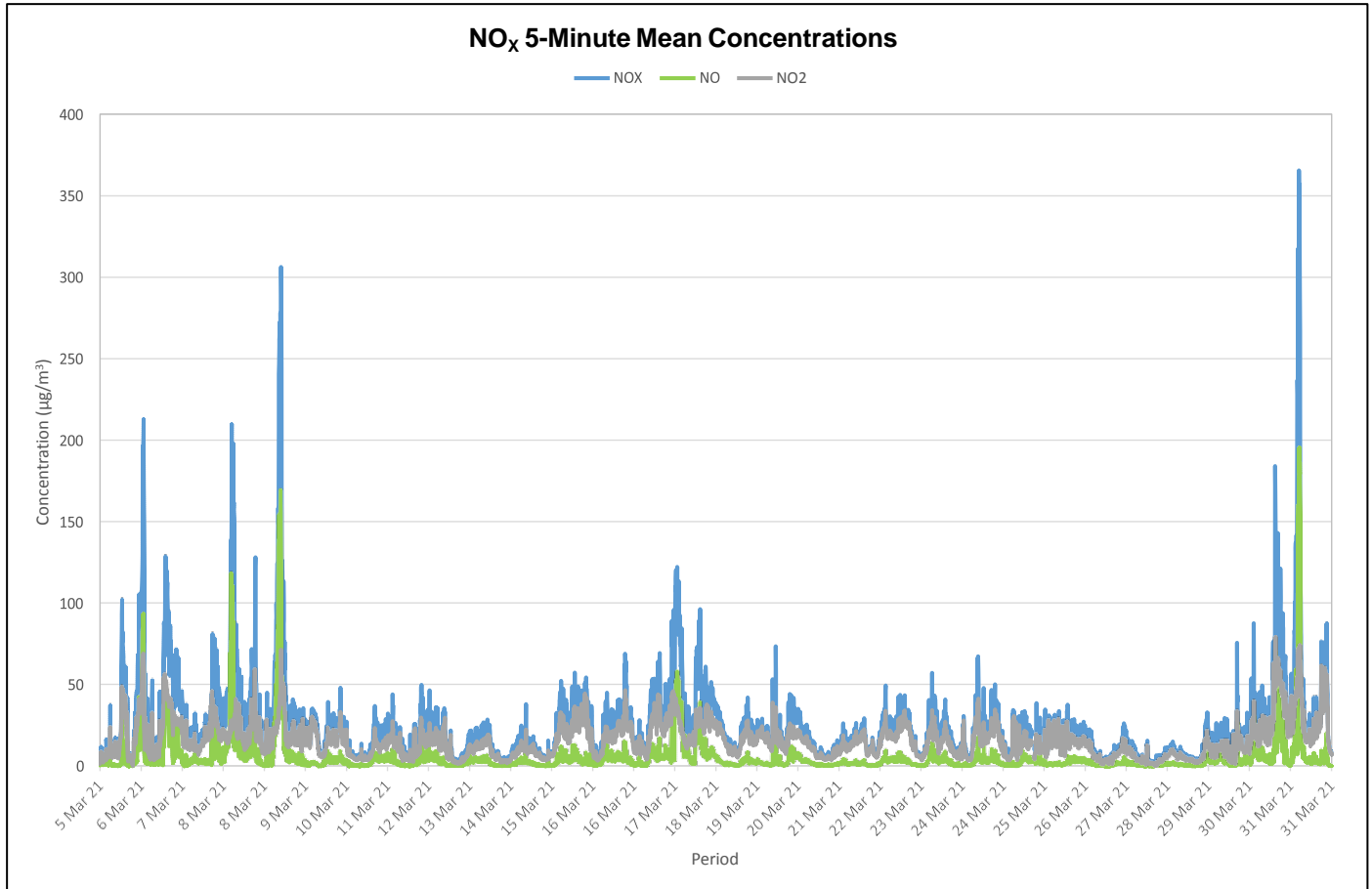
Figure 5. Time series plot of TSP, PM_{10} and $PM_{2.5}$ 15-Minute Mean Concentrations ($\mu\text{g}/\text{m}^3$).



Oxides of Nitrogen

The average NO_x and NO_2 concentrations during this period were $24.5\mu\text{g}/\text{m}^3$ and $15.8\mu\text{g}/\text{m}^3$.

Figure 6. Time series plot of the oxides of nitrogen 5-Minute Mean Concentrations ($\mu\text{g}/\text{m}^3$).



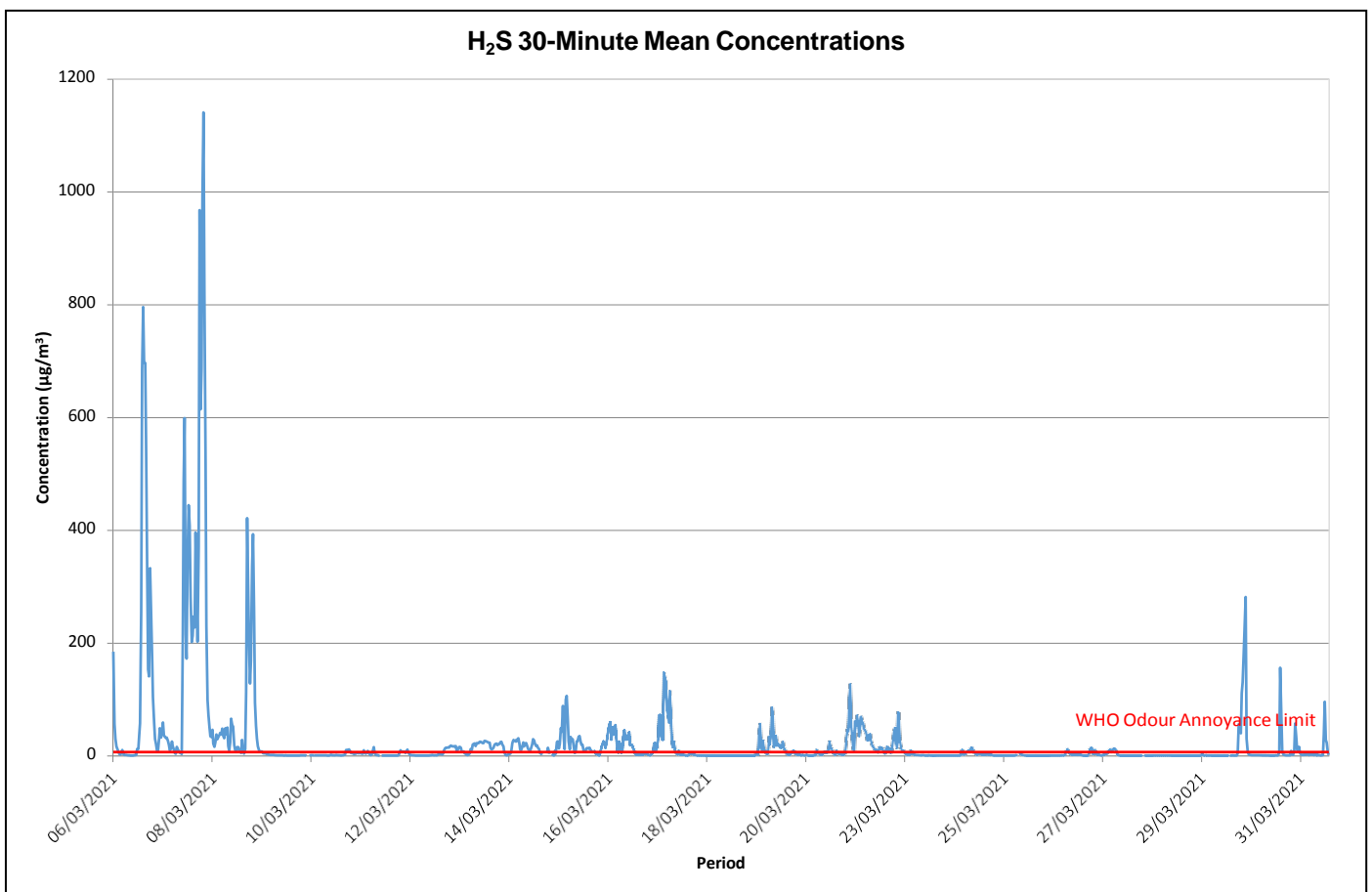
MMF9 (Galingale View) Results

Rectified data (ie data that has been subjected to quality assurance checking and calibration adjustment) for each pollutant, from the 5th March 2021 until the 31st of March 2021, is shown in a series of time series plots below.

H₂S

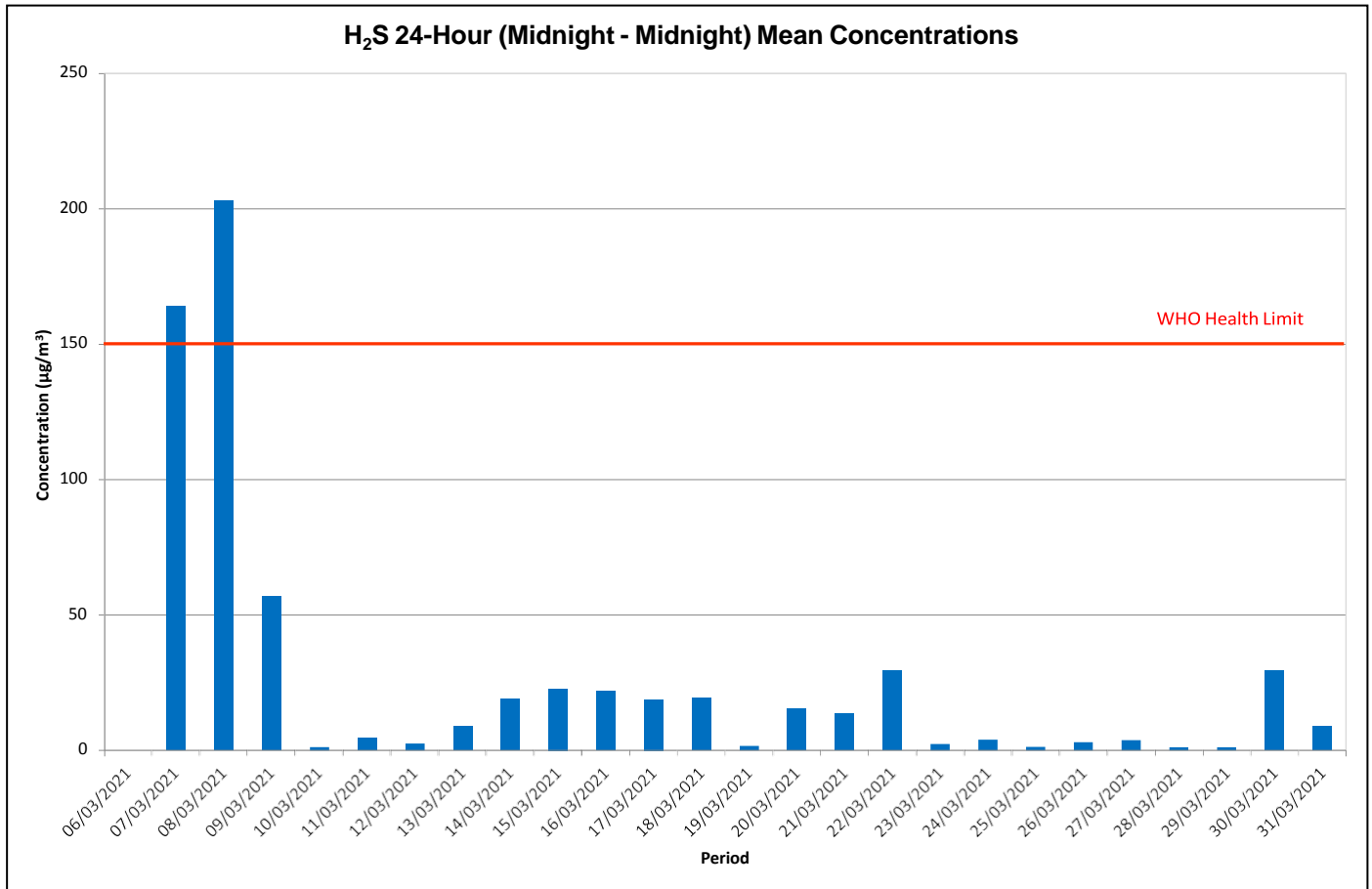
A time series plot of 30-minute average H₂S concentrations measured over the period is shown in Figure 7. This data allows direct comparison with the WHO Guidelines for Europe 2000, which have set a guide level of 7µg/m³ above which substantial complaints about odour annoyance can be expected. Levels of H₂S were above 7µg/m³ for 38% of the monitoring period.

Figure 7. Time series plot of H₂S 30-Minute Mean Concentrations (µg/m³).



A time series plot of 24-hour mean H₂S concentrations at the monitoring site is shown in Figure 8. This data can be compared directly with the relevant WHO Guideline for Europe 2000. The highest recorded 24-hour mean was 203µg/m³, which is higher than the 150µg/m³ limit set as a guideline by WHO, in the context of human health. The limit was exceeded on two days during the reporting period.

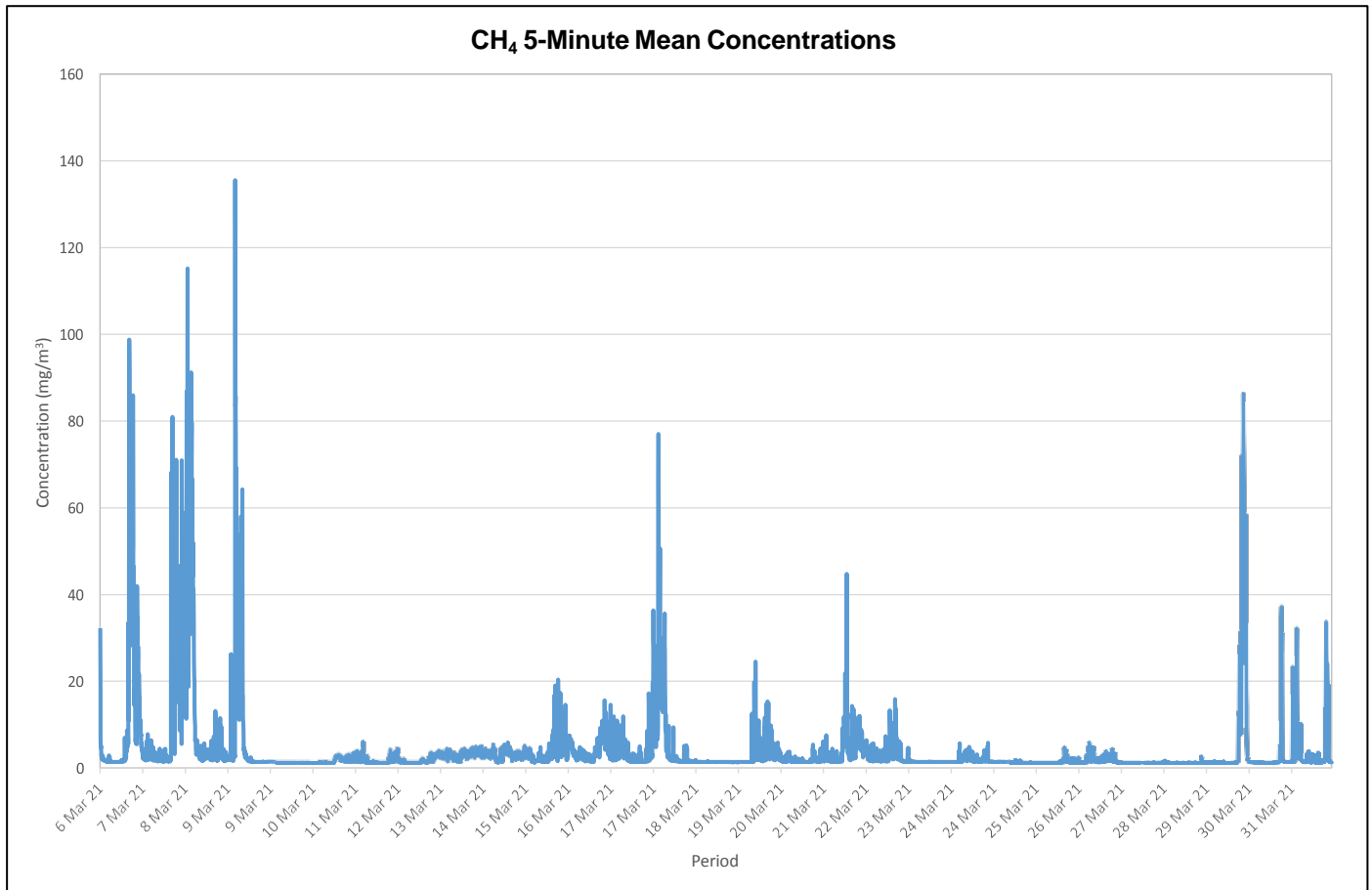
Figure 8. Time series plot of H₂S 24-Hour (Midnight - Midnight) Mean Concentrations (µg/m³).



Methane

The average CH₄ concentration during this period was 4.12mg/m³.

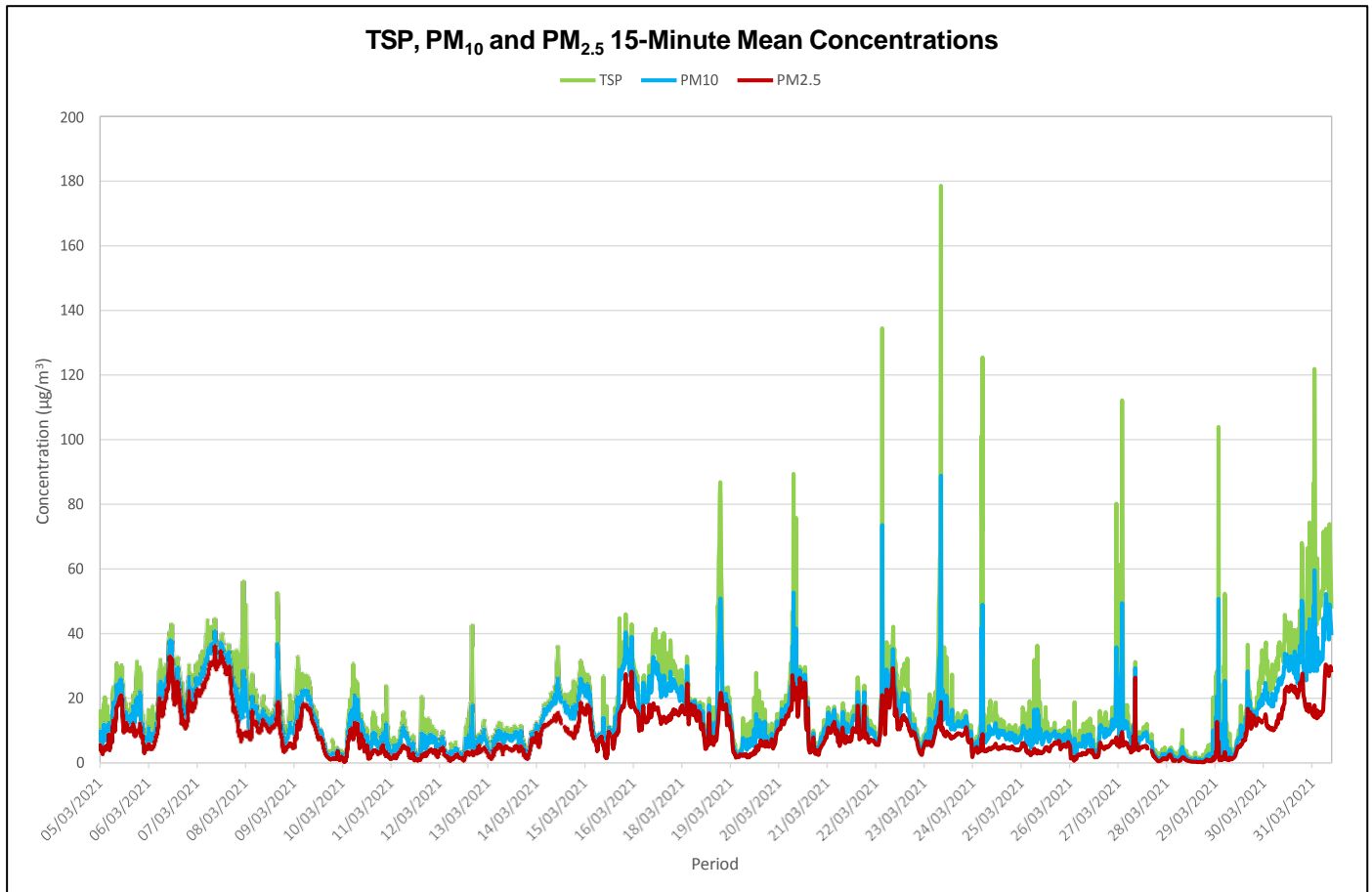
Figure 9. Time series plot of the methane (CH₄) 5-Minute Mean Concentrations (mg/m³).



Particulates

The average PM_{10} and $PM_{2.5}$ concentrations during this period were $13.4\mu\text{g}/\text{m}^3$ and $9.07\mu\text{g}/\text{m}^3$ respectively.

Figure 10. Time series plot of TSP, PM_{10} and $PM_{2.5}$ 15-Minute Mean Concentrations ($\mu\text{g}/\text{m}^3$).



Oxides of Nitrogen

The average NO_x and NO_2 concentrations during this period were $16.4\mu\text{g}/\text{m}^3$ and $11.4\mu\text{g}/\text{m}^3$.

Figure 11. Time series plot of the oxides of nitrogen 5-Minute Mean Concentrations ($\mu\text{g}/\text{m}^3$).

