

Air Quality Monitoring

Monthly Results

October 2018

Introduction:

This is the first of a series of briefing notes, intended to better inform members of up-to-date results of our monitoring of air quality around the town. Most of the results being discussed will be from the council's network of monitoring points using AQ Mesh pods, supplied by AirMonitors, a specialist in air quality monitoring equipment based in Tewkesbury. We currently operate 4 mesh pods, located at:

- Junction of A40 and Princess Elizabeth Way
- Outside Gloucester Road School
- 422 High Street
- Opposite St Gregory's Church

We are also imminently expecting the delivery of 5 more mesh pods on a short-term hire basis, which will be deployed at sites which may be affected by increased air pollution due to recent changes to traffic circulation in Cheltenham. All our MESH pods measure levels of NO₂ and PM10.

Data from these sites helps to inform our action to improve air quality around the town. We also use longer term data from 27 monitoring sites that use NOx tubes to measure levels of NO₂ around the town. In addition we operate an advanced air quality monitoring station at St Georges Street. The system at St Georges Street is very accurate and is cross referenced with the NOx tubes to improve accuracy. Data from the mesh pods is not quite so accurate, due to the technology they use, but provides a very useful indication of how levels of NO₂ and PMs change over a timescale of hours or days (mesh pods are also considerably cheaper than a fixed station).



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Origin of Air Pollution:

Both NO₂ and PM10 derive from a wide range of sources. In Cheltenham NO₂ mostly comes from road traffic, principally from diesel engines. PM10 are very fine airborne particles, and also largely comes from vehicles, both petrol and diesel. A contribution to PM10 levels also comes from other combustion sources such as domestic solid fuel burning. Near roads that are both busy and congested, levels of NO₂ may breach statutory limits. Levels of both these pollutants vary greatly through the day, due to traffic levels, and over longer periods due to changes in weather and seasonal patterns of car use. In general monthly averages are lowest in July /August and highest in January / February. Short-term levels can be significantly affected by climatic conditions ie southerly winds carrying PM10 laden dust from the continent (and beyond). Levels of PM10 can also be affected by short-term local activity, including road works or construction sites, and gritting operations to roads.

Statutory Limits:

All our measurements are compared to statutory limits. These are specified in The Environment Act 1995, as follows:

- NO₂: 40 µg /m³ annual average, and 200 µg /m³ averaged over 1hr may be exceeded up to 18 times a year.
- PM10: 40 µg /m³ annual average, and 50 µg/m³ averaged over 24hrs, not to be exceeded more than 35 times a year.

Our data has to be reported to DEFRA on an annual basis. Note that monitoring results have never detected an exceedance of the 1hr limit for NO₂, or the 24 hr limit for PM10. All our reports to DEFRA can be viewed on the council's website, here:

https://www.cheltenham.gov.uk/downloads/download/693/air_quality_reports

There are limits set for other pollutants, but previous monitoring has shown they are very unlikely to be near legal limits, so further continued monitoring has not been required. No statutory limit has been set for finer airborne particles, including PM2.5 which have recently attracted press attention. This is largely because measuring PM2.5s is very difficult, and very expensive. At the time the 1995 Act was drafted, monitoring PM2.5s was prohibitively expensive. Our Mesh pods will measure down to PM2.5 and although we monitor results we do not have to report them to DEFRA.



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Monthly Averages:

Data from the mesh pods has produced the following monthly averages for the calendar month of October 2018.

Location	Ave NO2 level (ug/m3)	Ave PM10 (ug/m3)
Gloucester Road	20.9	4.0
PE Way Roundabout	17.8	8.8
422 High Street	21.0	9.1
St Gregs	23.2	12.4

Graphs:

On the next few pages you will see a number of graphs of air quality parameters produced from MESH pod data.



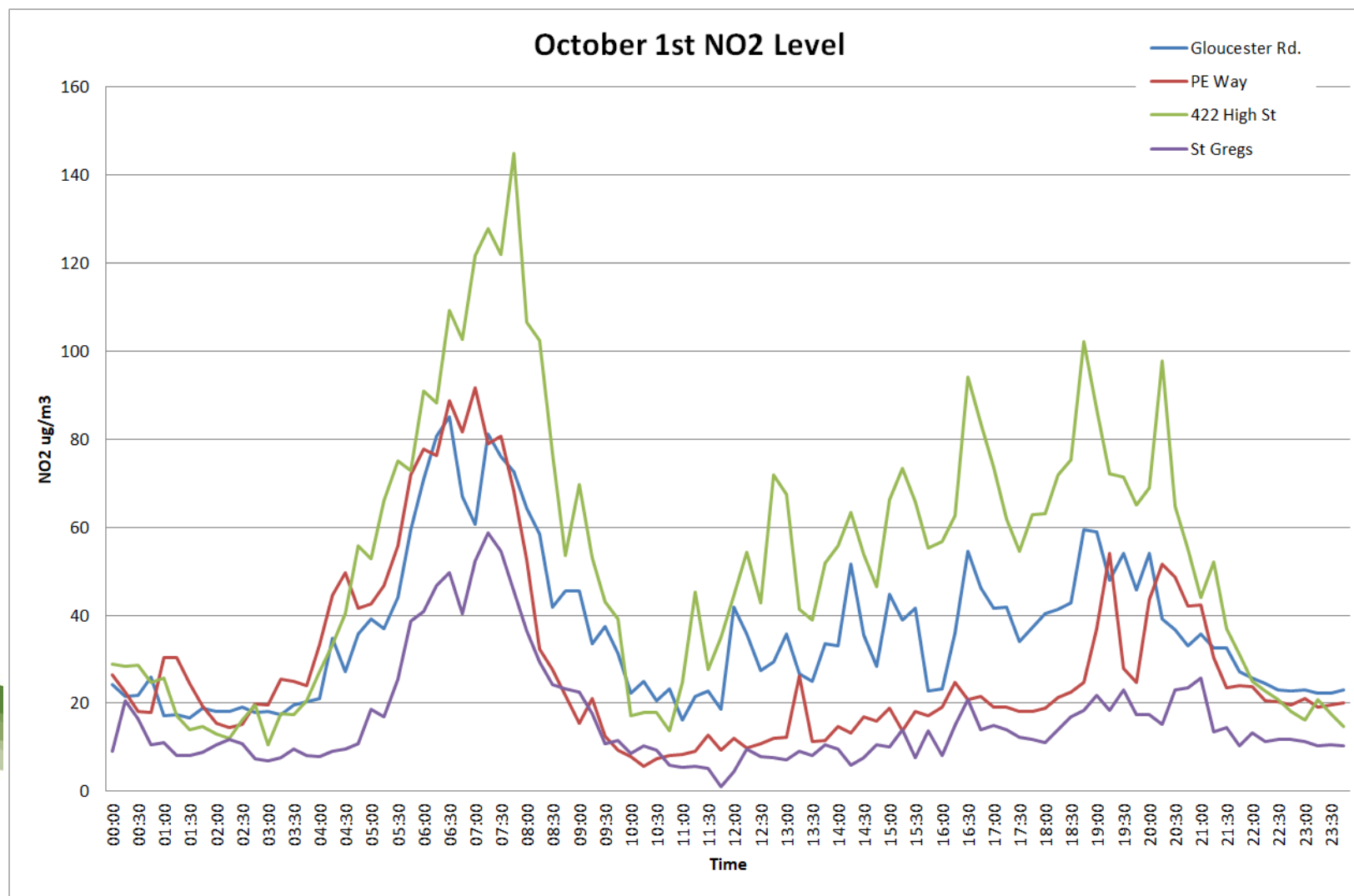
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Graph 1 October 1st NO2 level (Monday)

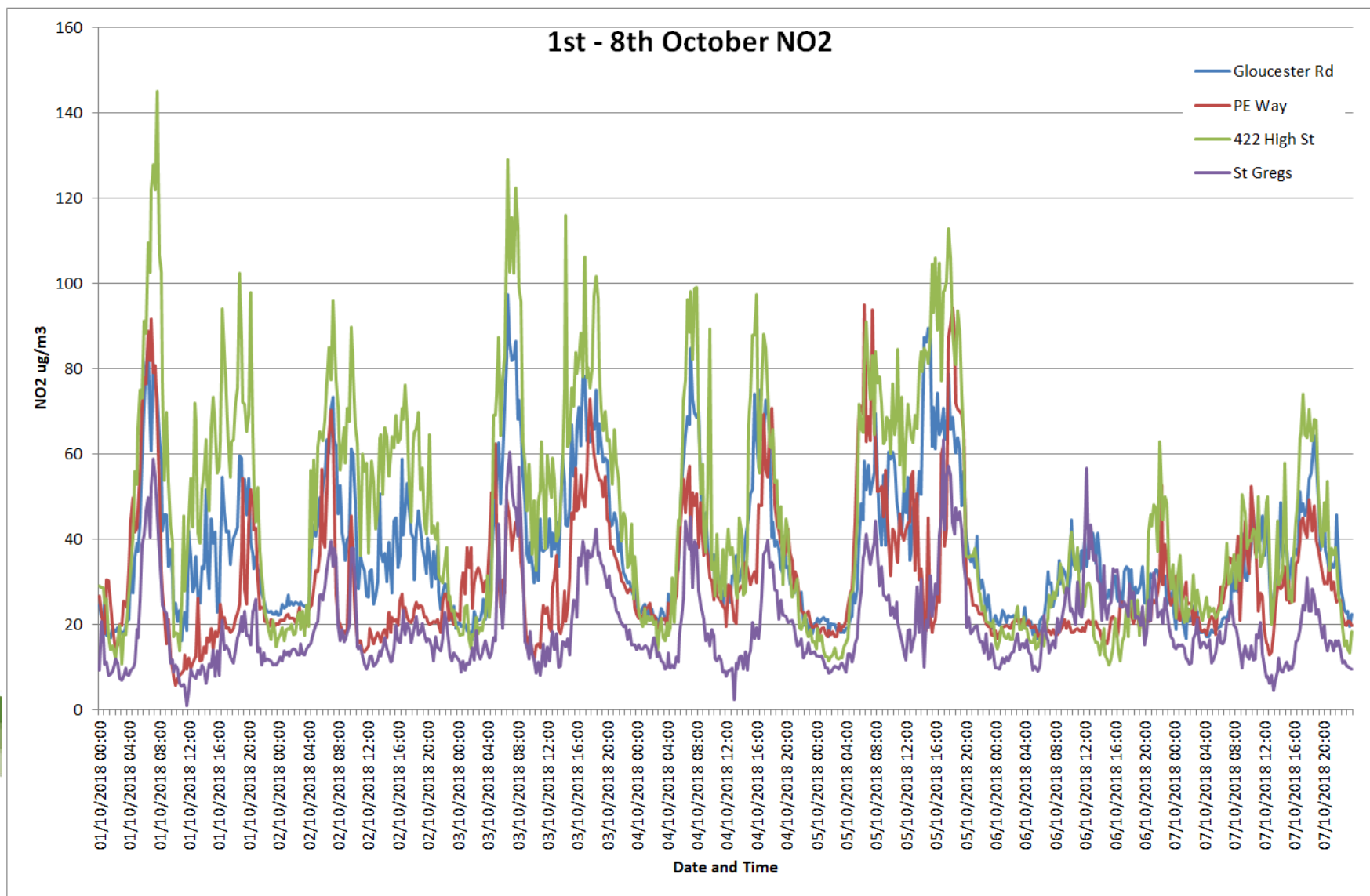
- This shows a typical daily pattern for the variation in NO2 at all 4 of our current sites. All sites show a sharp peak in morning, then a drop during middle of day, and a more rounded peak in evening. The lowest levels are recorded overnight. There are no breaches of the 1hr exposure limit (200ug/m3).



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Graph 2 October 1st – 8th NO2 level

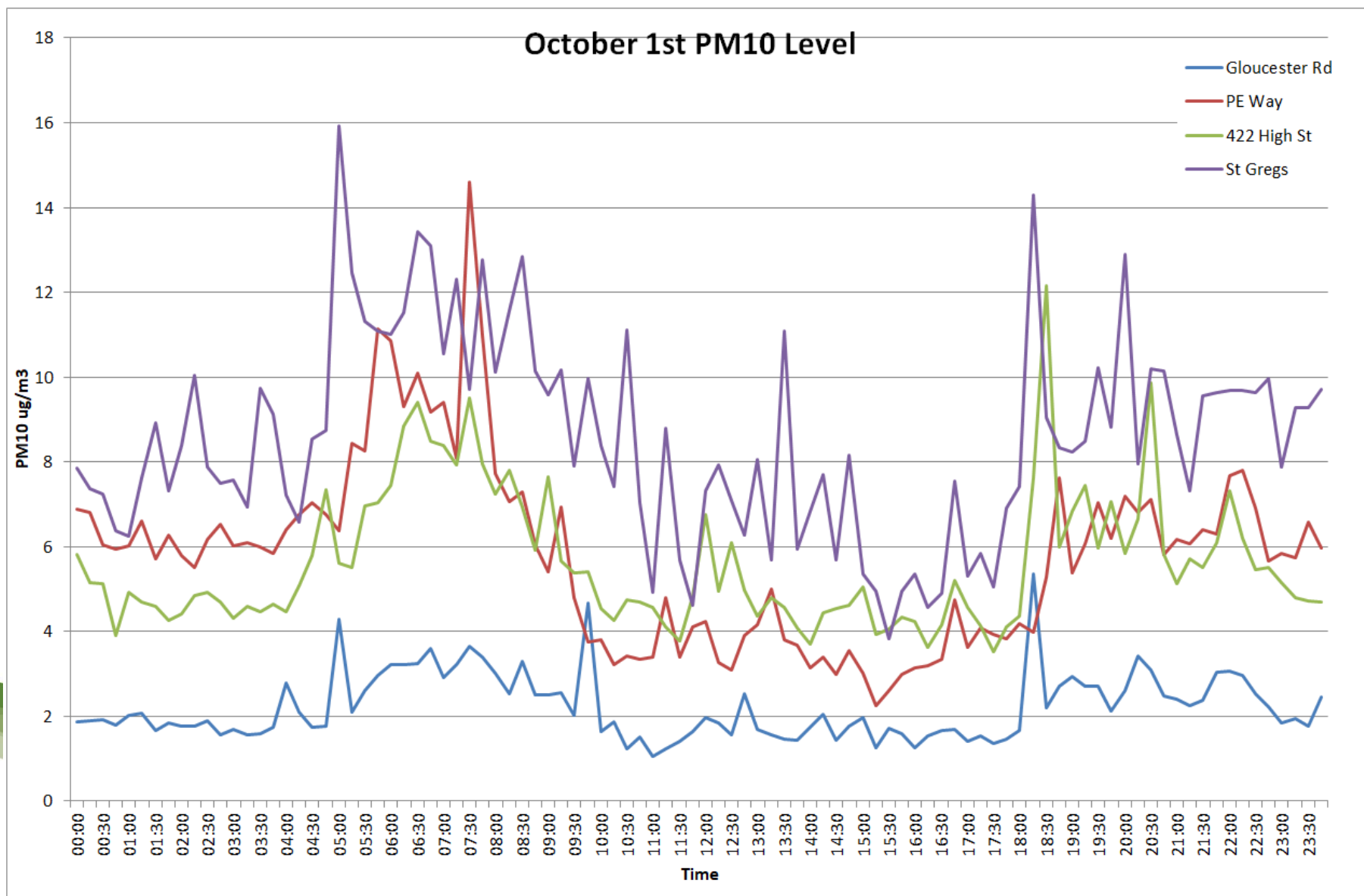
- This shows a typical week of NO2 levels. Note the difference between weekdays (with the trends outlined above) and weekends when levels are generally lower, and changes slower.



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Graph 3 PM10 for 1st October

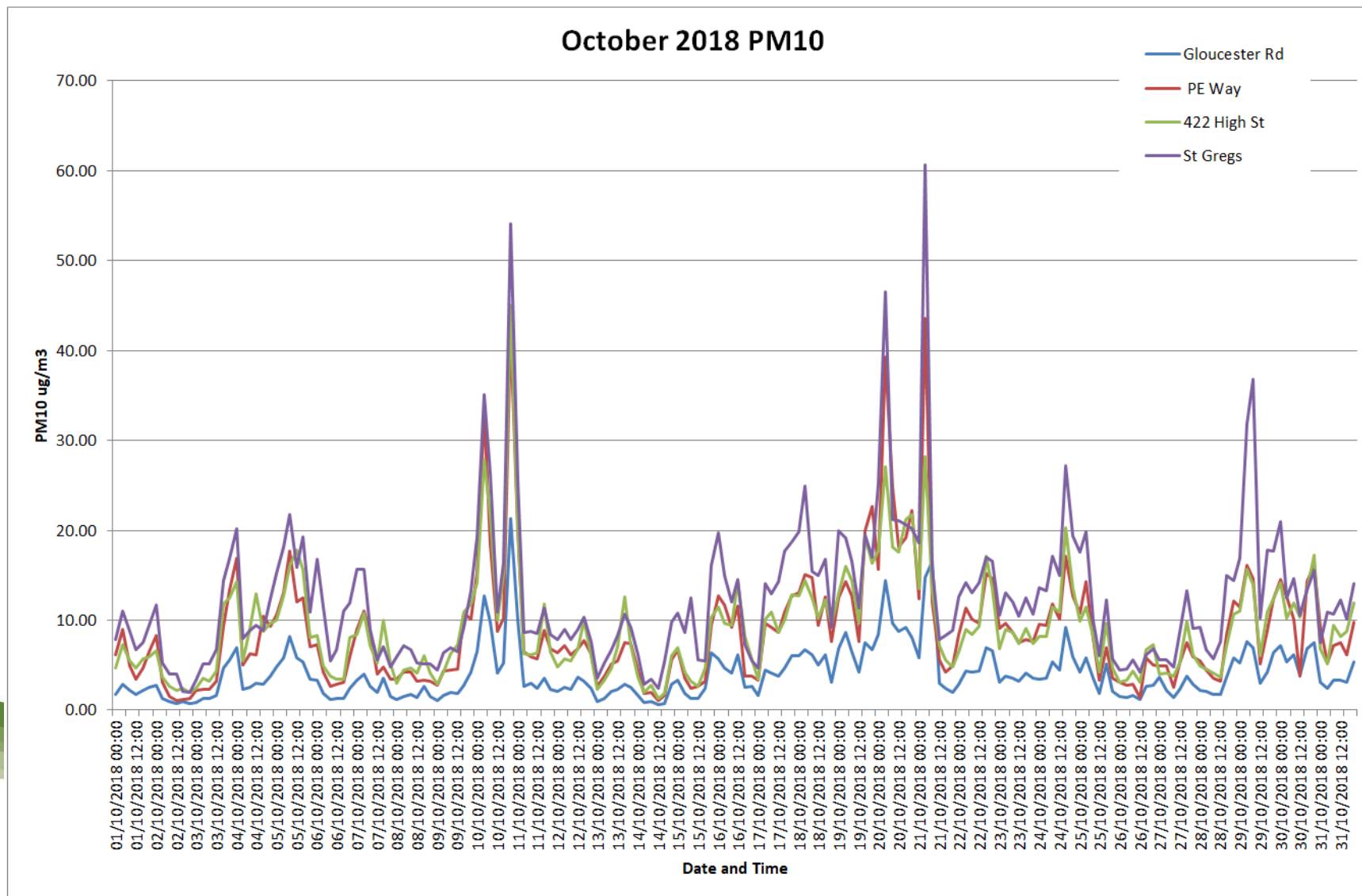
- This shows a daily pattern for PM10 at all 4 monitoring points. Levels at individual stations are highly variable. As for NO2, there is a morning peak and another rise in levels in the afternoon / evening. We will be carrying out more examination of these levels over a longer period.



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Graph 4 PM10 1st – 31st October

- This graph shows figures for a calendar month. Note the “spikes” on 10/10/18, 20/10/18 and 21/10/18. These affected all 4 monitoring stations at times of day when traffic was relatively quiet, so were likely caused by atmospheric conditions. Levels are well below the 24hr exposure limit at all times.



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As you can see, we are already gathering huge amounts of data to better inform our future actions. Analysis of this data takes some time and needs to be performed carefully to get an accurate picture of what the data mean. In future briefings we will look in detail at sources of pollution and the levels in different areas.

If you have questions on air pollution, or topics you would like covered, please contact us at: EnvHealth@cheltenham.gov.uk



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