Air Quality Monitoring In Oxford – Factsheet

Background

1. Oxford, in common with many urban areas throughout the United Kingdom is subject to poor air quality particularly close to concentrations of road traffic.

2. An Air Quality Management Area (AQMA) for the whole of Oxford was declared in 2010 due to high levels of nitrogen dioxide (NO_2). This city-wide AQMA incorporated existing local AQMAs declared in 2001 and 2005.

Why We Monitor

3. Oxford City Council monitors air quality because we have a statutory duty to review local air quality in Oxford. The results are used to assess air pollution in relation to guidelines and objectives that are set by the European Union and the UK Government.

4. Monitoring data provides the basis for all our work on assessment of local air quality:
    - It gives an indication of where we have a problem with pollution;
    - It provides a measure of how much of a pollution problem we have in relation to limits;
    - It tells us whether air quality is improving;
    - It gives an indication of what measures are most effective to reduce pollution; and
    - It provides a background picture when new developments are considered

5. Our strategy for air quality monitoring began in 1995 when forty diffusion tubes were positioned at locations in the city centre, to monitor for nitrogen dioxide. The formal process of local air quality management in Oxford has been taking place since 1999.

What We Monitor

Nitrogen Dioxide (NO_2)

6. NO_2 is associated with adverse effects on human health. At high levels NO_2 causes inflammation of the airways. Long term exposure may affect lung function and respiratory symptoms. NO_2 also enhances the response to allergens in sensitive individuals. Regulations set objectives for long and short term exposure and exceedences of these objectives are reported to Defra annually.

Particulate Matter

7. Both short-term and long-term exposure to ambient levels of particulate matter (PM10 and PM2.5) is consistently associated with respiratory and cardiovascular illness and mortality as well as other ill-health effects. The associations are believed to be causal. It is not currently possible to discern a threshold concentration below which there are no effects on the whole population's health.

Ozone

8. Exposure to high concentrations of ozone may cause irritation to eyes and nose. Very high levels can damage airways leading to inflammatory reactions. Ozone reduces lung function and increases incidence of respiratory symptoms, respiratory hospital admissions and mortality.

How We Monitor

Continuous Monitors

9. We have three continuous monitoring stations located in the city. Continuous monitors are accurate and provide real time, high definition, hourly data.

10. Continuous monitoring stations require mains power and must be situated in a building or enclosure so options for location are limited and moving monitoring stations requires significant planning and entails considerable costs.

Site	Installation date	Pollutants Monitored
Oxford Centre, St Aldate's (kerbside)	November 1997	Nitrogen dioxide
St Ebbe's (urban background)	July 1997	Nitrogen dioxide, PM10, Ozone, PM 2.5 (from 2009)
Oxford High Street (kerbside)	July 2003	Nitrogen dioxide PM10

Diffusion Tubes

11. Diffusion tubes consist of a plastic tube, two stainless steel grids, and two end caps. The grids are soaked with a chemical that absorbs nitrogen dioxide which can be analysed in an approved laboratory after exposure. They are positioned close to the roadside often on lampposts and are changed monthly.

12. Diffusion tubes are very cost-effective and provide a monthly average pollution concentration at the location where they are exposed. Continuous monitoring is more accurate and provides hourly data throughout the year. However, continuous monitoring is significantly more expensive than using diffusion tubes.

How We Chose Where to Monitor

13. The aim from the outset has been to establish locations within the city where objectives may be exceeded, and to determine to what extent the objectives are exceeded by.

14. For the purposes of deciding which locations are significant, we consider in the first instance locations where there is relevant public exposure. The regulations make clear that likely exceedences of the objectives should be assessed in relation to "the quality of the air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present". It is important that assessments focus on locations where members of the public are likely to be regularly present for a period of time appropriate to the averaging period of the objective.

15. We maintain forty to seventy monitoring points at any one time, and have monitored at approximately one hundred and fifty unique locations across the city over the last twenty years. These locations are shown in Appendix 1. As a result we have established the locations which may exceed the objective.

16. We are currently exposing 75 diffusion tubes for twelve months of the year. Approximately half of this number are deployed within central Oxford at locations where we believe relevant exposure is most likely to be significant. The remainder are used outside of the central area, again being prioritised by locations where relevant exposure is most likely.

17. Practically speaking we cannot monitor at every location on a continuous basis. To make most efficient use of our resources we rotate a number of monitoring sites every year, ensuring such sites are covered on average every 2 to 3 years. As pollution levels are generally falling, the numbers of hot-spot locations are also falling, enabling us to return to these sites on a more frequent basis.

18. One important aspect of monitoring is that we are able to demonstrate trends in air quality over long time periods. In order to carry this out, we continue monitoring at a number of the same sites year on year, so that the results we report can provide a strong basis for showing trends that are independent of location.

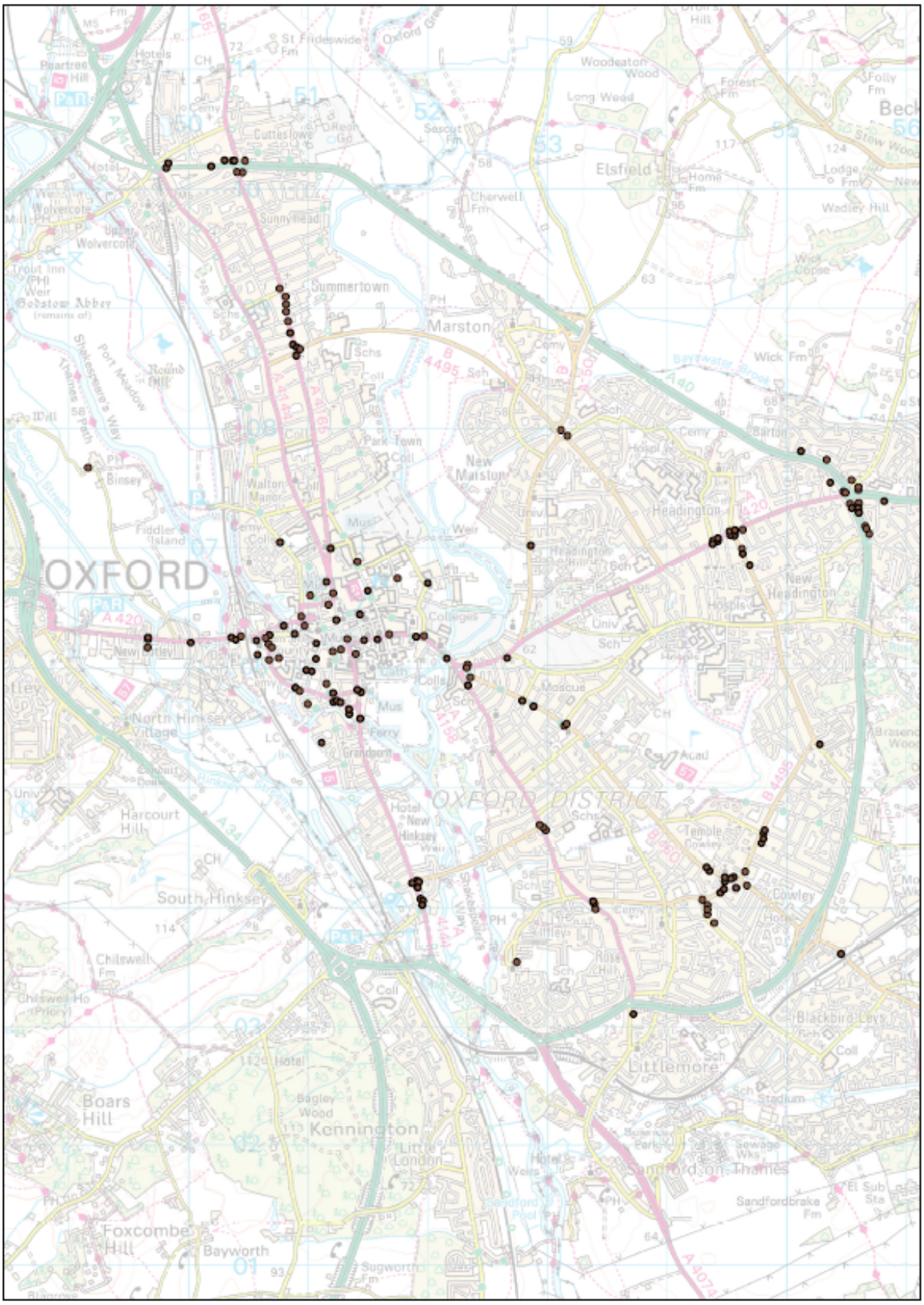
19. On the basis that we are required to demonstrate compliance with the air quality objectives, sites that continue to exhibit pollution levels above the objectives are prioritised, whereas sites that fall below objective levels are given a lower priority.

Further Information

We are required to report on progress annually to Defra. These reports are available here:
http://www.oxford.gov.uk/PageRender/decER/Previous_reports_occw.htm

A map showing the location of our monitoring sites and a summary of daily air pollution levels are available here:
http://www.oxford-airwatch.aeat.co.uk/index.php

Appendix 1



Location of diffusion tube monitoring in Oxford

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