

4.0 Progress report for Particulates (PM₁₀)

4.1 The national perspective

There are a wide range of emission sources which contribute to PM₁₀ concentrations in the UK. Sources of particles can be divided into three main categories:

- **Primary particles**

Derived directly from combustion sources including road traffic, power generation and industrial processes.

- **Secondary particles**

Formed by chemical reactions in the atmosphere. These comprise principally of sulphates and nitrates.

- **Coarse particles**

Comprised of emissions from a wide range of sources including re-suspended dust from road traffic, construction works, mineral extraction processes, wind blown dusts and soils, sea salt and biological particles.

The expected reduction in particle emissions in future years is different for each category of particle. For example, primary particle emissions from road transport will be governed by new legislation on vehicle emission standards whilst emissions of secondary particles will be largely governed by controls on industrial emissions of sulphur dioxide and oxides of nitrogen. Emissions of coarse particles are largely uncontrollable and are not expected to decline significantly in future years.

4.2 The local perspective

In the First Stage Review and Assessment of Air Quality in York PM₁₀ was assessed against the following objective:

'The annual 99th percentile of daily maximum running 24 hour averages not to exceed 50µg/m³ by the end of 2005.'

The First Stage Review and Assessment of Air Quality in York concluded that this objective was unlikely to be met in York and that the authority should proceed to a detailed assessment for this pollutant.

Prior to the Second and Third Stage Review and Assessment of Air Quality in York being undertaken, the air quality objectives for PM₁₀ were revised. These revised objectives were used for the purpose of the Second and Third Stage Review and Assessment of Air Quality in York and were as follows:

‘A 24 hour mean objective for PM₁₀ of 50µg/m³, not to be exceeded more than 35 times a year, to be achieved by the end of 2004.’

‘An annual mean of 40µg/m³ to be achieved by the end of 2004.’

The Second and Third Stage Review and Assessment of Air Quality in York concluded that these revised objectives would be met in York without the need for further action at a local level.

The update and screening assessment for PM₁₀ concluded that no further detailed assessments of PM₁₀ emissions from industry or traffic were needed. However, it was concluded that there was a need to undertake further investigation into PM₁₀ concentrations in villages where there is still a high proportion of domestic solid fuel burning. This work was fully documented in City of York Council’s Detailed Assessment report submitted to DEFRA in April 2004. The detailed assessment concluded that domestic solid fuel burning did not pose a significant problem in York’s surrounding villages.

4.3 Assessment of PM₁₀ data for the area outside the AQMA

4.3.1 PM₁₀ monitoring results from real-time monitoring stations outside the AQMA

City of York Council has undertaken real time air pollution monitoring of PM₁₀ at three locations outside the AQMA. These are:

- Clifton Moor (roadside monitoring site)
- Rawcliffe (roadside monitoring site)
- Bootham (urban background site)

The location of these monitoring sites are shown on figure 60. Monitoring at all the sites was undertaken using a TEOM. The results of the PM₁₀ monitoring undertaken at Rawcliffe and Bootham are shown in table 13. Data is shown in calendar year format. No data is shown for Clifton Moor as a full calendar year of monitoring data is not available.

In October 2000 the air pollution station previously located at Clifton Moor was moved to Rawcliffe. It remained at this site until April 2006 when the Rawcliffe monitoring station was closed down. The TEOM has since been relocated to Boroughbridge Road and has been operational at this site since September 2006. Data from this new site will be provided in future reports.

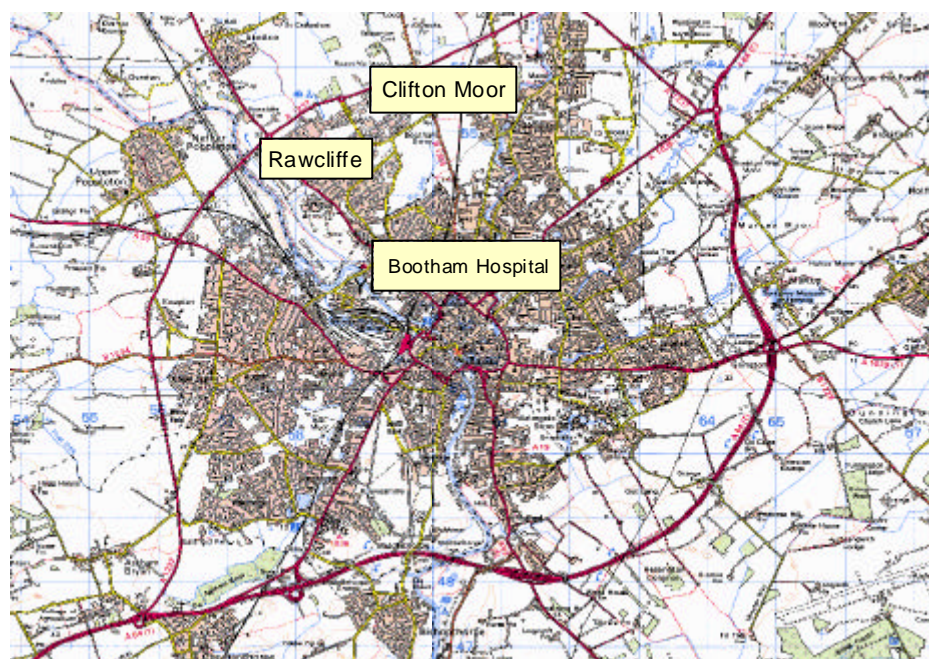
Full information about the air pollution station locations, data management procedures and other QA/QC procedures for the real time air pollution stations have been previously documented as part of the Second and Third Stage Review and Assessment of Air Quality in York.¹

¹ CITY OF YORK COUNCIL Second and Third Stage Review and Assessment of Air Quality in York – Technical Annex 2: Air Quality Monitoring in York Feb 2001

TEOMs are known to underestimate pollutant concentrations in relation to the European standard reference method for monitoring particulate matter which uses a gravimetric analyser. To account for this difference DEFRA require all TEOM data to be reported as a gravimetric equivalent. This is achieved by multiplying TEOM results by a factor of 1.3. All data provided in this report are in TEOM (GRAV) format.

Where concentrations of PM_{10} are found to be borderline in relation to the PM_{10} air quality objectives, DEFRA have indicated that equipment should be upgraded to a European standard reference method equivalent as early as possible. Where concentrations are well below the objective levels the TEOM (used with a gravimetric equivalence factor) remains a recognised means of monitoring for review and assessment purposes.

Figure 60 : Locations outside the AQMA where real time monitoring of PM_{10} has been undertaken



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Table 13 : PM₁₀ monitoring results for locations outside the AQMA

Parameter	Station	2000	2001	2002	2003	2004	2005	2006
Number of exceedances of 50 µg/m ³ (GRAV) 24 hour objective	Rawcliffe	-	13	11	13	2	1	-
	Bootham	0	3	3	11	0	1	3
Annual mean concentration µg/m ³ (GRAV)	Rawcliffe	-	27.1	25.5	25.1	22.9	21.9	-
	Bootham	18.9	20.2	20.4	22.5	19.0	19.0	21.4
90 th percentile of daily averages ug/m ³ (GRAV)	Rawcliffe	-	41.5	39.7	42.0	34.9	31.8	-
	Bootham	30.6	29.9	32.7	38.3	31.5	28.7	32.2
Percentage data capture	Rawcliffe	-	98.6	79.6	93.7	65.4	90.1	-
	Bootham	89.3	86.3	85.1	93.9	87.3	99.3	99.3

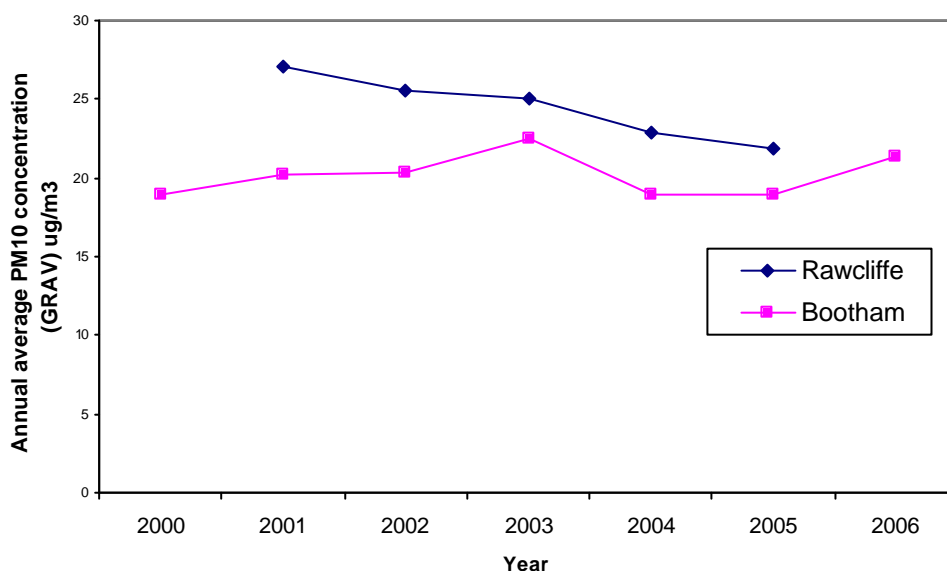
4.3.2 Trends in PM₁₀ concentrations outside the AQMA

Figure 61 shows annual average PM₁₀ concentrations from the real time monitoring stations outside the AQMA between 2000 and 2006.

At both sites annual average PM₁₀ concentrations are well below the 40µg/m³ objective level. Levels at the Rawcliffe roadside site fell year on year between 2001 and 2005. The situation at the Bootham background site is more complex. Levels rose steadily between 2000 and 2003, fell back in 2004 and 2005 and then appeared to rise again in 2006. It is difficult to predict what the annual average concentration at Bootham is likely to be during 2007.

As can be seen from table 13 above neither site has experienced any breaches of the daily average objective.

Figure 61: Annual average PM₁₀ concentrations outside the AQMA



4.4 Assessment of PM₁₀ data for the area inside the AQMA

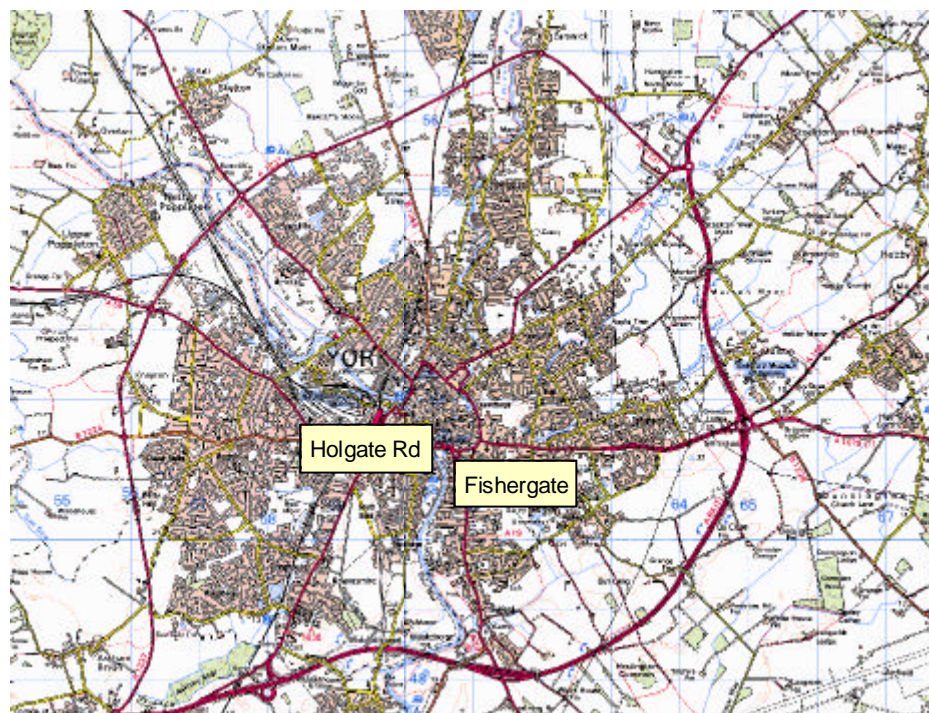
4.4.1 PM₁₀ monitoring results from real-time monitoring stations inside the AQMA

Currently there are two real time PM₁₀ monitoring sites located within the AQMA. These are at Fishergate and Holgate Road. The locations of these sites are shown on figure 62 below. Both the Fishergate site and Holgate Road sites currently use TEOMs to monitor PM₁₀ concentrations.

Results of the PM₁₀ monitoring undertaken within the AQMA are shown in table 14. Full information about the air pollution station location, data management procedures and other QA/QC procedures for the real time air pollution station have been previously documented as part of the Second and

Third Stage Review and Assessment of Air Quality in York² and the Interim Fourth Stage Review and Assessment of Air Quality in York³.

Figure 62: Location of real time PM₁₀ monitoring equipment within the AQMA



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² CITY OF YORK COUNCIL Second and Third Stage Review and Assessment of Air Quality in York – Technical Annex 2: Air Quality Monitoring in York Feb 2001

³ CITY OF YORK COUNCIL Interim Fourth Stage Review and Assessment of Air Quality in York Jan 2003

Table 14: PM₁₀ monitoring results for locations within the AQMA

Parameter	Station	2000	2001	2002	2003	2004	2005	2006
Number of exceedances of 50 µg/m ³ (GRAV) 24 hour objective	Fishergate	5	13	26	42	7	5	13
	Holgate	-	-	-	-	8	2	11
Annual mean concentration µg/m ³ (GRAV)	Fishergate	24.6	21.7	29.5	32.2	24.1	25.5	27.0
	Holgate	-	-	-	-	24.6	23.7	25.9
90 th percentile of daily averages µg/m ³ (GRAV)	Fishergate	37.1	42.8	51.5	51.5	38.4	37.8	42.1
	Holgate	-	-	-	-	41.3	37.6	39.9
Percentage data capture	Fishergate	93.8	93.0	81.0	90.6	88.8	98.7	92.3
	Holgate	-	-	-	-	81.6	94.3	82.4

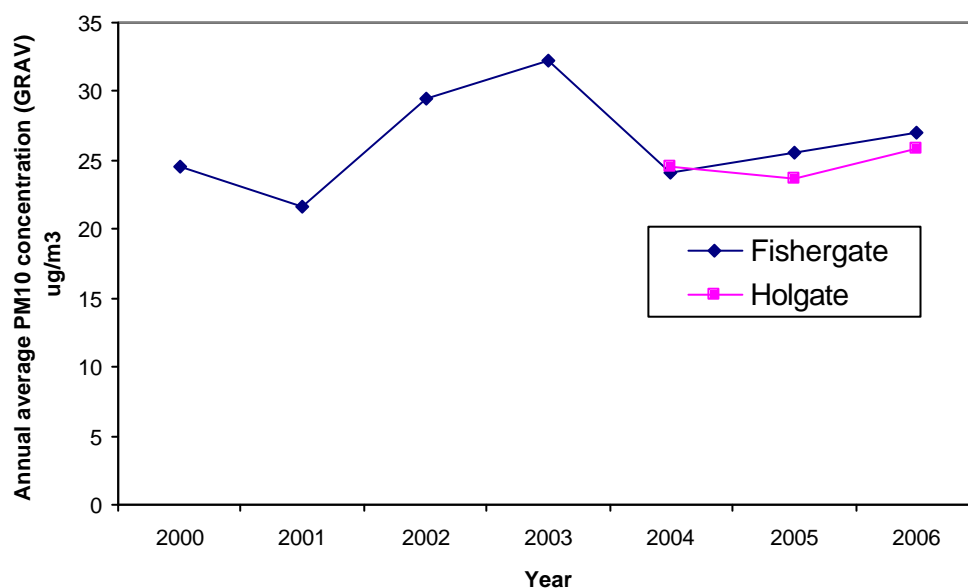
4.4.2 Trends in PM₁₀ concentrations within the AQMA

Figure 63 shows annual average PM₁₀ concentrations from the real time monitoring stations inside the AQMA between 2000 and 2006.

At both sites annual average PM₁₀ concentrations are well below the 40µg/m³ objective level. There is no evidence of a clear downward trend in PM₁₀ concentrations with levels at both Fishergate and Holgate higher in 2006 than in 2005. The highest annual average concentration recorded to date was at Fishergate in 2003. During this period the annual average concentration was 32.2 ug/m³ and there were 43 breaches of the 50ug/m³ 24 hour average objective (35 allowed per year).

Due to the recorded breach of the 24 hour objective at Fishergate in 2003 City of York Council is currently considering upgrading the roadside TEOMs to meet the European gravimetric equivalent standard. Air quality grant bids have been submitted to cover the cost of the necessary works. Any future action will depend on the outcome of these bids.

Figure 63: Annual average PM₁₀ concentrations within the AQMA



4.5 Conclusions

The PM₁₀ monitoring undertaken to date indicates that the annual average objective for PM₁₀ is currently being met at all real time monitoring sites in York. There remains some risk of the 24 hour objective being breached at roadside sites within the AQMA. Due to this potential risk CYC is considering upgrading the roadside TEOMs in the AQMA to meet the European gravimetric equivalent standard. The timescale for the upgrading programme will depend on the availability of sufficient funding.