2010 Detailed Air Quality Assessment of the vicinity of Myers Road Gloucester for **Gloucester City Council**

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

August 2010

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Summary

This report is required under the Environment Act 1995 Part IV. It is a detailed assessment of the residential area near to Myers Road Gloucester for particulate matter below 10microns in size (PM10). The report is required as the area meets the criteria for such an investigation given in Box 5.10 of the Technical Guidance for Air Quality Management issued in February 2009(Ref[1]). This area was identified as needing this assessment in the air quality Updating and Screening Assessment issued in May 2009.(Ref[2]).

There are two areas within the city that meet most of these criteria, but one, near the Bristol Road abandoned gasworks site, does not have relevant exposure, in this case dwellings, near to the fugitive source. It is important to make planners and the planning committee aware of such criteria, to ensure that new Air Quality Management Areas are not created by new development in inappropriate locations.

Conclusion

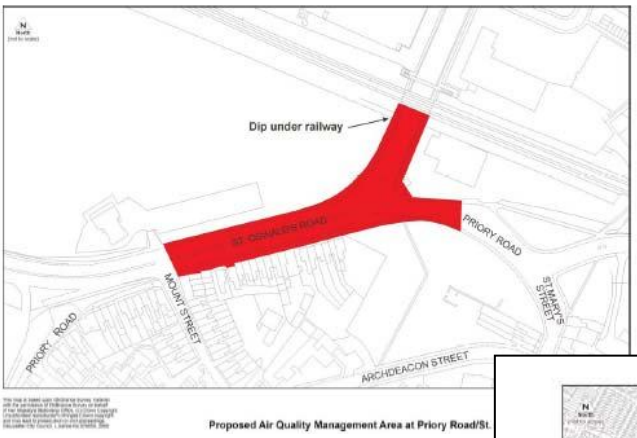
This detailed assessment shows that the residential area around Myers Road industrial area including the Armscroft Park area meets the air quality target for England for fine particles (PM10) and that there is no further need to consider the air quality of this area under current legislation.

However it is necessary for the industry in this area to remain vigilant to the possibility of causing dust nuisance to neighbours. They are urged to continue to use best practice to reduce the accumulation of dust on their premises and to minimise the deposit of dust on internal and external haul roads. [Dust nuisance can be a statutory offence under different legislation – the Environmental Protection Act 1990 – and is enforceable by the Environmental Protection Team of Gloucester City Council]

Introduction

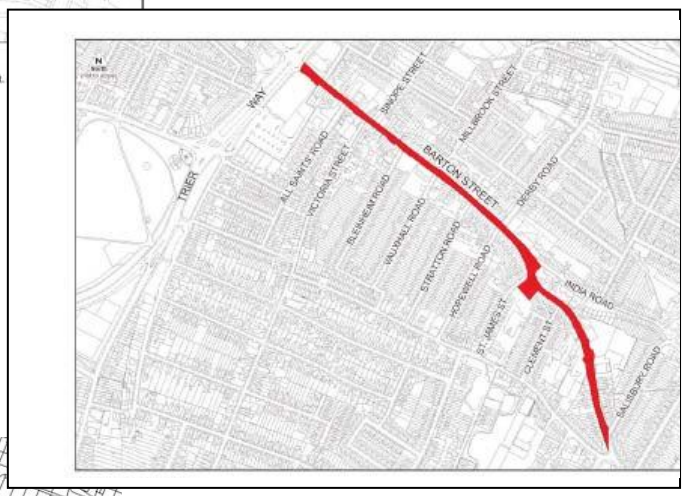
Part IV of the Environment Act 1995 requires local authorities to investigate the air quality in their area and if deemed necessary, to make plans to improve it. The air quality targets set out in regulation are shown in Appendix 1. As a result of studies made over the last ten years, the city currently has three Air Quality Management Areas (AQMAs) and is about to declare a fourth. All these areas have been the result of concentrations of nitrogen dioxide exceeding the national target, for which the principle sources are combustion, such as heaters for buildings and vehicle emissions. The relevant detailed reports and copies of the orders can be found following the link to *air quality* on www.gloucester.gov.uk/pollution. Note: this website is being altered and links may not work. Searching for "Air Quality" from the home page should find the reports.

The current AQMAs are:



Proposed Air Quality Management Area at Priory Road/St.

Priory Road

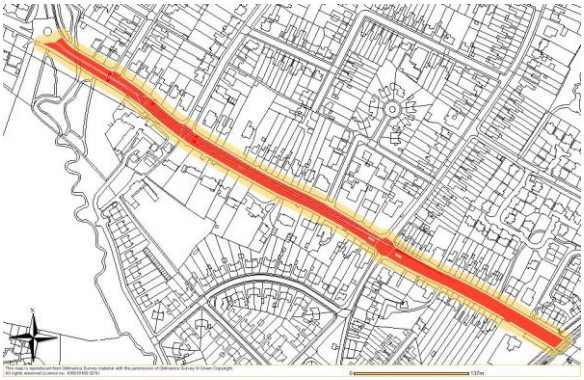


Barton Street

Painswick Road

The proposed new AQMA is the inner section of **Barnwood Road**.

The exact boundary of this is the subject of ongoing consultation with local residents and other stakeholders.



Fine Particles

This current report concerns a different pollutant, fine particles below 10 microns in size, known for simplicity as PM_{10}. Fine particles of this size are able to penetrate to the human lung and thus cause potential harm. The nose is good at removing larger particles. There is scientific debate and uncertainty about the sizes of particles that do most harm and how they should best be measured but **there is clear health evidence that fine particles in any quantity do reduce life expectancy (Ref[3])**.

For the purposes of this report Local Authorities are required to investigate if an area meets objectives set in air quality regulations (see Appendix 1). The objectives for Particles currently are that PM_{10} shall not exceed 50 μgm^{-3} as a 24-hour mean more than 35 times per year and that the annual mean shall not exceed 40 μgm^{-3}. Note data throughout this report is reported in μgm^{-3} [micrograms per cubic metre].

Research using automatic monitoring stations in London and elsewhere has shown that there can be elevated concentrations of PM_{10} near to haulage roads leading to waste transfer stations. This work prompted new guidance for local authorities for the Updating and Screening Assessment 2009. The guidance is shown in Table 1.

There are two areas within the city that meet most of these criteria, but one, in the Bristol Road industrial area, does not have relevant exposure, in this case dwellings, near to the fugitive source. It is important to make planners aware of such criteria, to ensure that new Air Quality Management Areas are not created by inappropiate development in such locations. The onus should be placed on developers to show that a new Air Quality Problem will not be created by their activities where there is possibility of doubt.

The second area, the subject of this detailed assessment, is the haul road from various businesses north of the railway triangle. This has regular visible deposits on Myers Road, complaints about dust, and a number of potentially dusty businesses clustered together. The private section of Myers Road has been surfaced with tarmacadam in the last couple of years. It was previously unsurfaced. The number of dust complaints in this area has fallen, with only two complaints at long intervals from one complainant since this resurfacing.

When the Updating and Screening Assessment for 2009 was produced, the most recent National data indicated that background PM10 in this area was 19. μgm^{-3}. This data has been updated with 2008 data since this project started, which, calculating forward to 2010 predicts that the background PM10 is now 14.8 μgm^{-3}. In both cases the guidance suggests that only receptors within 200m of the fugitive source, taken to be internal and external haul roads to the industrial area, should be of concern.

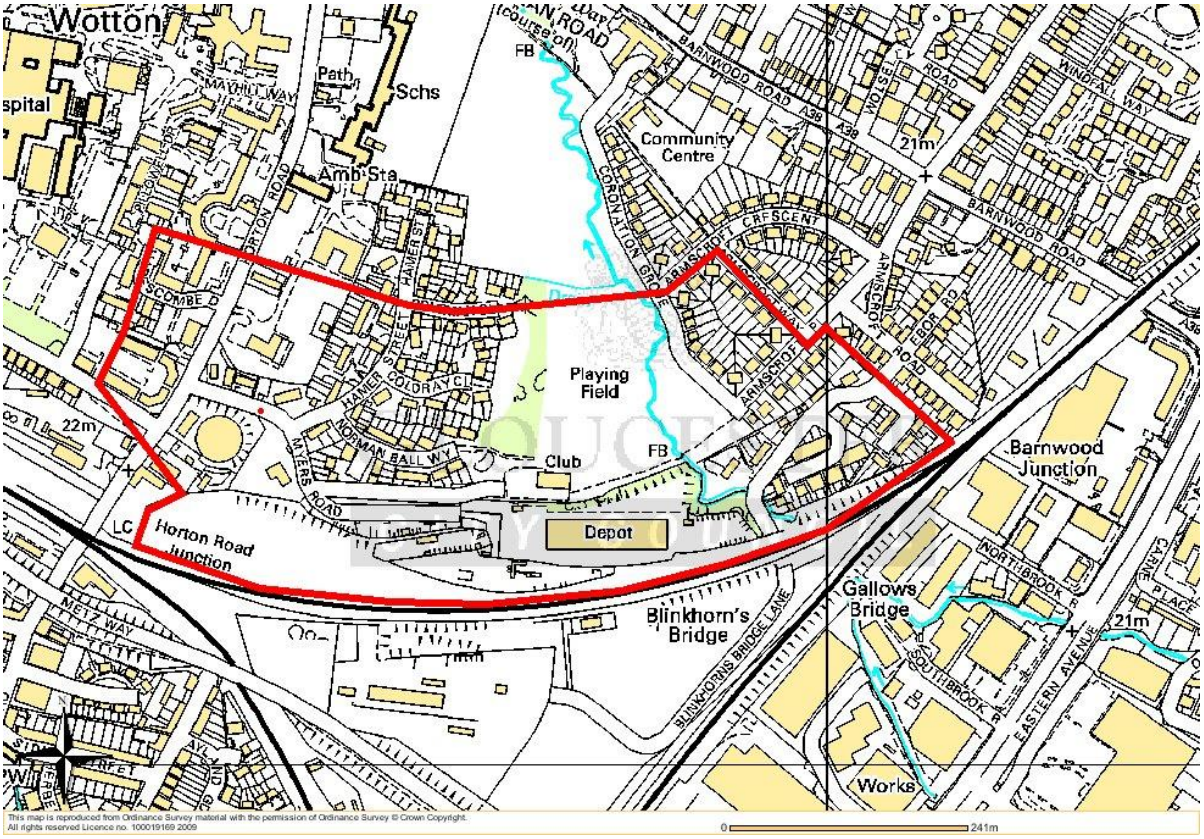
Table 1 taken from LAQM.TG(09)

Box 5.10: Updating and Screening Checklist **(E) Fugitive or uncontrolled Sources** Dust emissions from a range of fugitive and uncontrolled sources can give rise to elevated PM_{10} concentrations. Dust arises from the passage of vehicles over unpaved ground and from the passage of vehicles along public roads that have been affected by dust and dirt tracked out from dusty sites. It also arises from the handling of dusty materials, the cutting of concrete etc. There is also wind-blown dust from stockpiles and dusty surfaces. Only locations not covered by previous rounds of Review and Assessment, or where there is new relevant exposure, should be covered in this section. **PM_{10}** **Approach**	
Steps that must be taken to complete the assessment	**Notes relevant to each step**
1. Obtain details of any air quality assessment already carried out for the relevant source.	An assessment may already have been carried out as part of the planning or authorisation process. If this is the case, confirm that the assessment is sufficient for Review and Assessment purposes. Only consider sources for which planning approval has been granted.
2. Establish whether there is relevant exposure "near" to the source(s) of dust emissions.	Relevant exposure is defined in Box 1.4. If the relevant exposure is away from off-site roads used as access routes to the site then "near" is defined in relation to the local background PM_{10} concentrations, taken from the national maps (Chapter 2) as follows: For **2004 objectives,** near is within: 1000 m for a background >28 µg/m_3; 400 m for a background >26 µg/m_3; and 200 m for any background. These distances are from the source, which may not always coincide with the boundary of the site. If there is no relevant exposure near to the source then there is no need to proceed further. If the relevant exposure is within 50 m of an off-site road used to access the site and there are visible deposits on the road, then these sections of road, which may extend up to 1000 m from the site entrance, are considered to be "near", as long as the background is above 25 µg/m_3 for the 2004 objectives
3. Determine whether there are dust concerns associated with the facility.	Base this assessment on dust complaints and/or experience gained from site visits.
Question	
Is there relevant exposure "near" to a source of dust emissions?	
Are there recent complaints about dust?	
Does visual inspection indicate significant dust emissions or dust tracked out of the site onto public roads?	
Action	
If the answer is YES to the first question and to either the second or third questions, it will be necessary to proceed to a detailed Assessment for PM10 at these locations.	

Description of the area

Map 1 Myers Road Area.

The red line indicates dwellings within 200m of the road of concern



Myers Road is part public highway and part private road, leading to a number of potentially dusty businesses. These are:

A waste transfer station. This business also includes a sand and gravel business. The sand and gravel stacks are to the west of the waste transfer building in the open. The main waste transfer operation takes place inside a building, where wastes received in skips are tipped, sorted and materials recovered where possible. This activity gives rise to complaints of noise from time to time. There is a haul road all around the building that can become very dusty. Complaints of dust arise from time to time, the dust is observed to be mostly from the road, raised by moving vehicles. Complaints are usually met by the road being damped down or wet swept by the occupier. The planning and regulatory history of this site is complex.

A ready mix concrete batching plant. This business is regulated by Gloucester City Council as a Part B installation under the Environmental Permitting Regulations. There are sand and gravel piles and cement and PFA silos. The internal roads are all concrete and sometimes dusty, though the nature of the batching activity means that the road is usually wet, and less likely to be a direct source of dust. However, as the vehicles travel out, any adhering material may drop to the road. Drivers usually hose their vehicles down before leaving site to reduce this risk.

A series of coal yards. Comparatively little dust or traffic arises from this activity, but vehicles do have to traverse the main haul road.

To the north of the waste transfer station is a public park and rugby ground. To either side of the park are residential areas. To the east the Armscroft Park area is near internal haul roads of the waste transfer station/gravel business. There have been numerous complaints of dust from the nearest dwelling. There are estimated to be 230 people living within 200m of the internal haul road. In this area

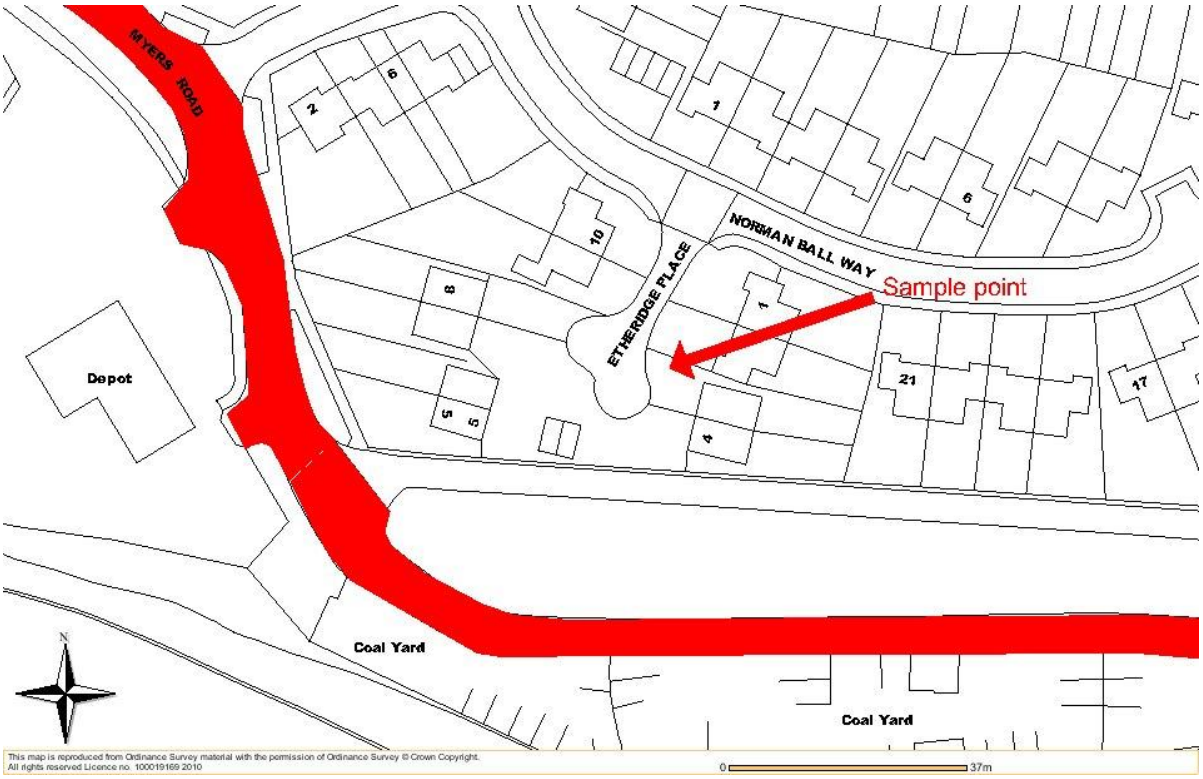
To the west of the park the area is a modern residential area, which only has access to the road network using the public part of Myers Road. There are estimated to be 374 people living within 200m of Myers Road, though the estate is about twice this size. There have been occasional dust complaints from residents in this area. The 200m area considered also includes new flats to the other side of Horton Road. There are other business and industrial sites off Myers Road that are not likely to give rise to significant dust, apart from their vehicles tracking along the road.

The total number of people estimated to live within 200m of Myers Road is 604.

To the south is the railway triangle, the nearest arm carrying rail traffic that passes through both Gloucester and Cheltenham stations, with more than 100 movements per day. The bend is quite sharp and there has been domestic complaint in the past of rust particles believed to be from railway wagon wheels. However the rail layout has been remodelled in recent years and there have been no dust borne complaints attributable to the railway since. The area to the south of the railway within the triangle is currently derelict, though the owners, National Rail, have been in discussion with the Council and the Gloucester Heritage Urban Regeneration Company about putting housing there. It is believed that some particulate monitoring may have been done for the developers, as we recommended, but this information has not been released to us. No formal planning application exists as yet.

Map 2

The Road of concern (red) and the sampling position.



Choice of Sampler type and Position

It is important for detailed assessment that analysers are used that meet the European reference standard or equivalent to that standard. Quotations were sought from local suppliers for both Partisol 2025 sampling, and for Met-One BAM samplers. The quotation was for the supplier to hire the equipment and supply data to the council. Both suppliers were invited to visit the area and suggest suitable sampling locations. Both initially suggested kerbside sites on Myers Road. These had access to electricity and some protection from vandals. Kerbside sites were later rejected as being unrepresentative of what may be expected in homes and gardens in the area.

The Met-one BAM sampler was chosen as it did not require attention on site during the course of the study and was able to send its data by mobile telephone to the supplier. In the event, the power failed, which was reported to us quite quickly, but took some days to resolve- a fuse in the electricity company's circuit had failed. With the other type of sampler it is likely that up to three weeks would have been lost, as it relied on fortnightly visits.

After discussion, a site as near to the source that was also representative of domestic exposure was found in Etheridge Place. The site was on an open front garden and adjacent to a lamp post from which power could be taken. Being in a cul de sac, it was thought vandalism was unlikely, but the equipment was installed in a robust roadside box in any case. The site is shown in Map 2. It was 39 metres from the nearest kerb of Myers Road. Winds from northwest counterclockwise to east

southeast would be likely to carry material from the road towards the sampler. The site is downwind of the normally prevailing southwest wind.

Results

The instrument used was a Met-0ne BAM1020 fitted with an unheated PM10 inlet head supplied and maintained by Enviro Technology Services plc from Chalford. A Gill Windsonic ultrasonic wind speed and direction sensor was also fitted. Data and alarms were collected daily via the mobile telephone network.

The Beta Attenuation Monitor (BAM) has been shown to meet European equivalence criteria with correction for slope. This correction is obtained by dividing the raw analyser results by 1.21. The results quoted here have this correction applied.

Sampling commenced 0n 5th May 2010 and finished on 5th August. There was an interruption from 0700 21 June to 1400 29June due to power supply failure. A further interruption occurred between 10th and 13th July due to the machine's tape breaking, which was not immediately detected, but was then rapidly repaired. Data for 79 twenty-four hour periods was collected.

Data was supplied monthly as an excel file containing hourly averages of PM10 concentration as μgm^{-3} [micrograms per cubic metre], sample flow rate, wind speed, wind direction. Due to the location close to buildings, and hence potential turbulence, no reliance was placed on windspeed or direction information.

The weather during the trial included a long dry spell, when resuspended dust particles would be expected to be at their maximum, and a period of sustained strong wind blowing from Myers Road towards the receptor.

The targets concern the 24-hour mean and the annual mean. Graph 1 of 24-hour means shows no day exceeding the 50 μgm^{-3} limit. The 3-month mean excluding breaks in data is 23.4 μgm^{-3}. The background PM10 for this kilometre square is 14.9 (Ref[4])

Graph 2 shows the hourly data for the monitoring period, including incomplete twenty-four hour periods, also showing no particularly high short-term concentrations.

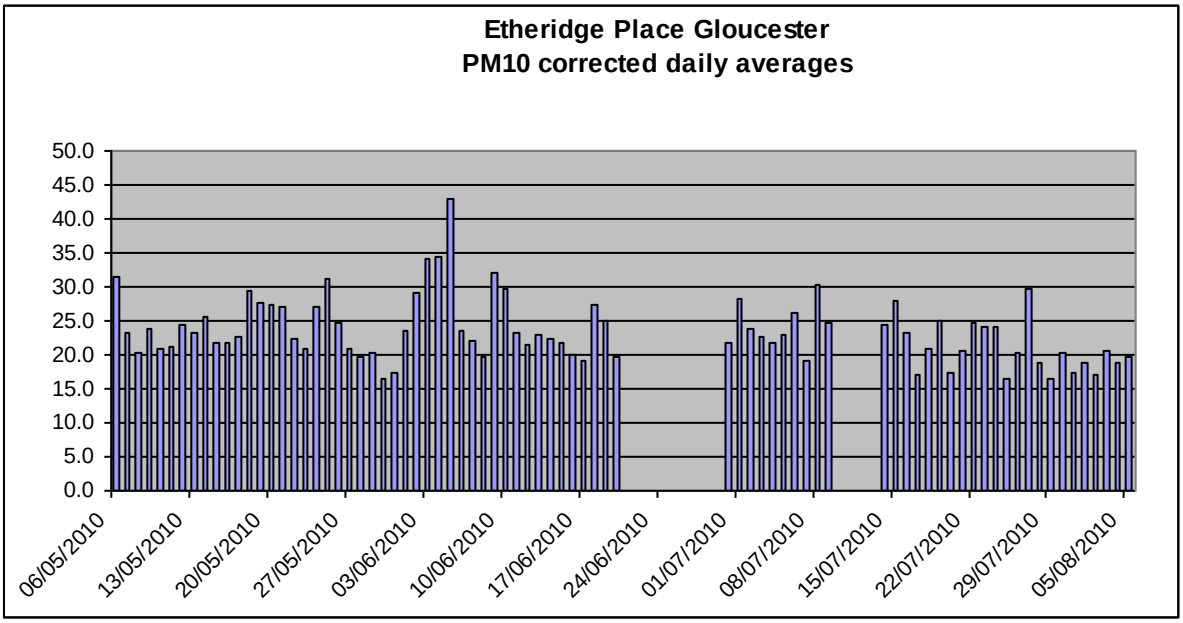
High concentrations of fine particles are sometimes due to region-wide effects. For comparison at Graph 3 are shown the PM10 data [24hour averages] for three stations in the National automatic network for the same period, chosen to surround Gloucester. Caution needs to be taken in interpreting these, as they have not been ratified and they represent only the non-volatile portion of PM10. (The Gloucester results include any volatile component). Examination of the volatile component for Bristol St Pauls shows it to be in low single figures. All three sites are in the Urban Background category, and may be further from roads than our site. This probably explains the lower concentrations observed at the three sites.

Conclusion

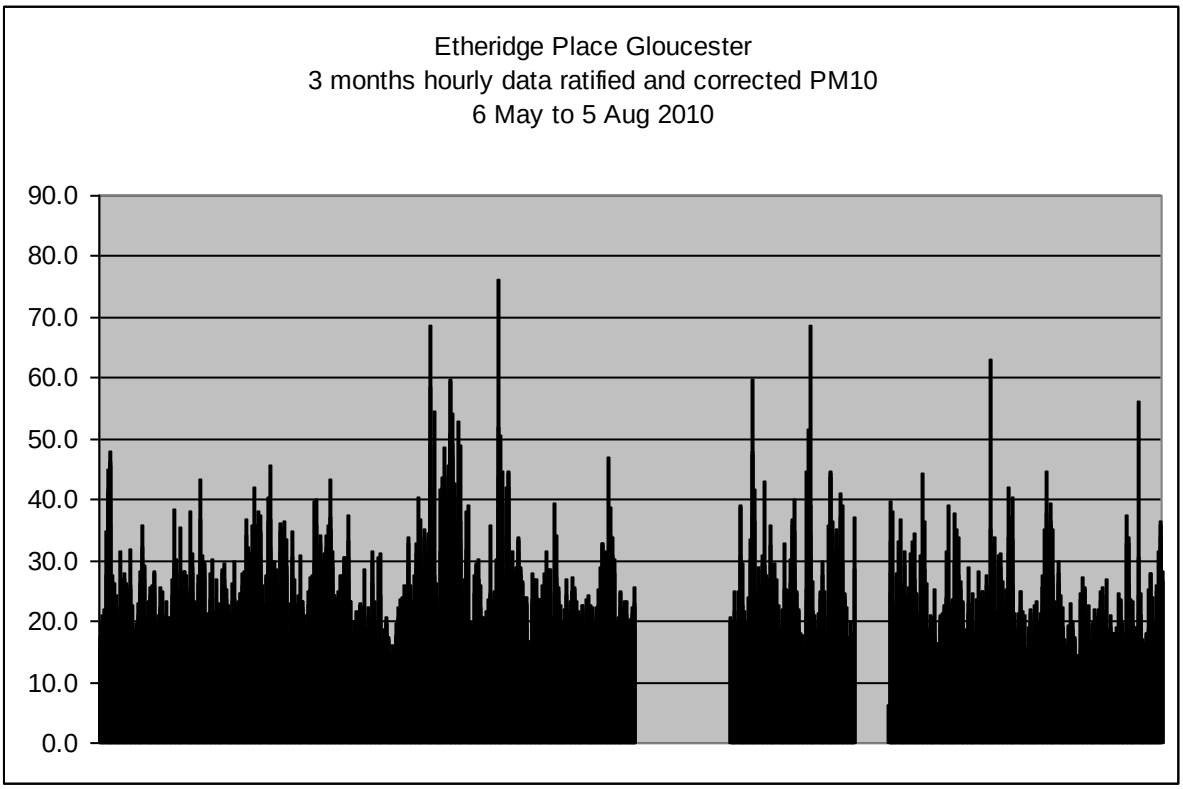
The result of this Detailed Assessment is that the target limits for fine particles are not approached at this location. There is thus no need to create an Air Quality Management Area, and the area need not be monitored further.

Note: this does not imply there is no risk of dust nuisance from larger particles. Operators must strenuously continue to follow best practice to minimise dust risk.

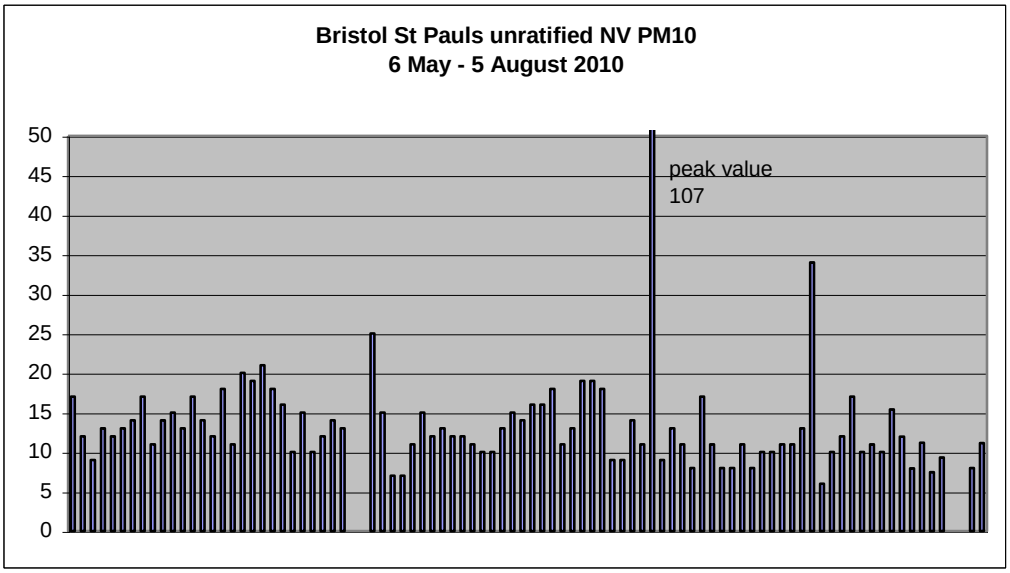
Graph 1

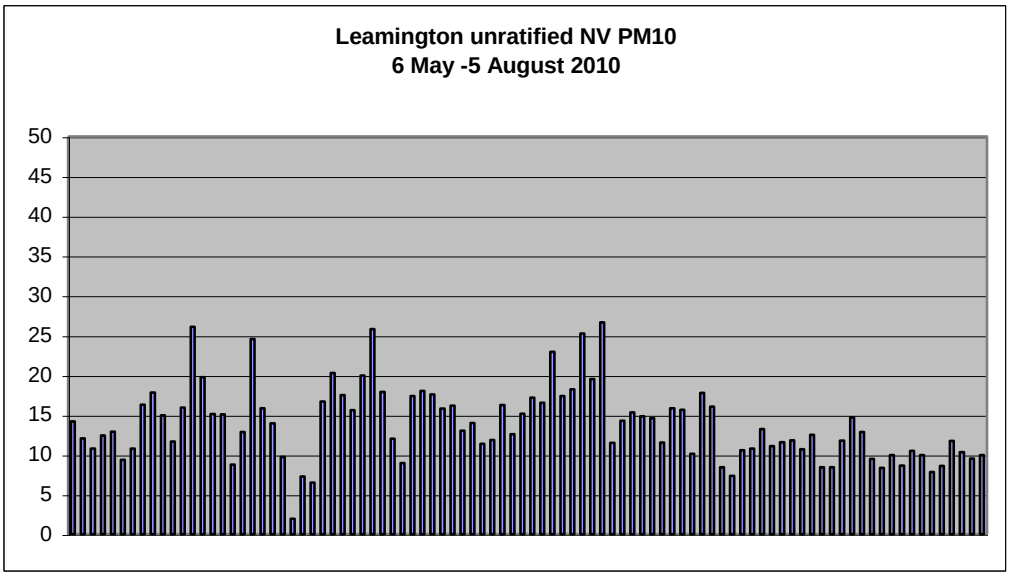


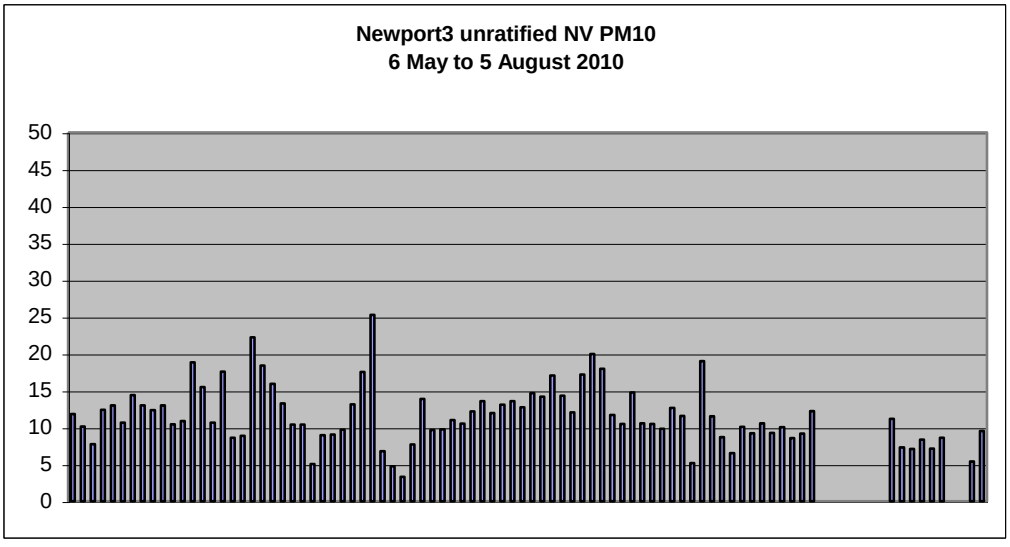
Graph 2



Graph 3


Bristol St Pauls unratified NV PM10
6 May - 5 August 2010
peak value
107
50
45
40
35
30
25
20
15
10
5
0


Leamington unratified NV PM10
6 May -5 August 2010
50
45
40
35
30
25
20
15
10
5
0


Newport3 unratified NV PM10
6 May to 5 August 2010
50
45
40
35
30
25
20
15
10
5
0

Appendix 1

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

Appendix 2

Letter sent to businesses before monitoring started

03 August 2009

Dear

To all businesses on Myers Road Gloucester

The Environment Act 1995 Part IV – Local Air Quality Management

The **2009 Air Quality Updating and Screening Assessment for Gloucester City Council**, required under the above legislation has been accepted by the Department for the Environment Farming and Rural Affairs. This document will be placed on our website and can be accessed through the link below. There will be a delay of a couple of weeks before it is placed there. In the meantime I am happy to send you either a printed or electronic copy should you wish.

This Assessment examined potential air quality problems across the city and is done every three years. This year new advice was given that there might be problems with dust emissions from fugitive sources that may cause elevated concentrations of fine particles (so-called PM_{10}) especially dust arising from the passage of vehicles along roads that have been affected by dust and dirt tracked out of dusty sites and wind-blown dust from stockpiles and dusty surfaces. The guidance suggests that dwellings within 200 metres of the road and internal haul roads might potentially be affected.

In1996 in the UK PM_{10} pollution is estimated to have brought forward 8,100 deaths and 10,500 hospital admissions were either brought forward or would not have happened. (COMEAP 1998)

As your business is on a potentially dusty road, I am writing to all businesses to let them know that over the next twelve months or so we will be monitoring the air in the area for fine particles to determine if there is or is not a problem. This is known as a Detailed Assessment. Only after this time will we know if there is an air quality problem.

A problem for fine particles will exist if the 24hr mean PM_{10} concentration is more than 50 ug/m^3 on more than 35 days a year, or the annual average exceeds $40ug/m^3$. If either of these objectives should be exceeded then the Council will have to declare an Air Quality Management Area and then in conjunction with you and your business and residential neighbours, devise an Action Plan to reduce the dust in the atmosphere. If the above limits are not exceeded then no action will be needed, though we look to you all to continue to consider neighbours as now, and keep dust levels to a minimum.

Yours sincerely,

Peter Watkins
Air Quality Officer

References

[1] TG09 Technical guidance for local air quality management 2009
[2] Updating and screening assessment for Gloucester issued 2009
[3] COMEAP Nov 2009 Long term exposure to air pollution: effects on mortality
[4] National Air Quality Mapping at http://laqm1.defra.gov.uk/review/tools/background.php