

Information/Discussion Paper

Overview and Scrutiny – 25th November 2024

Air Quality Update

This note contains the information to keep Members informed of matters relating to the work of the Committee, but where no decisions from Members are needed.

1. Why has this come to scrutiny?

- 1.1** The Environment Act 2021 strengthened the local authority air quality management framework to enable greater local action on air pollution. We continue to appraise air quality with the main emphasis on the pollutants which are most relevant to Cheltenham and most challenging in respect of compliance, the primary pollutants, namely nitrogen dioxide (NO₂) and particulate matter (PM)
- 1.2** This paper explores air quality in Cheltenham, including the national context, how we measure pollutants and actions we are taking and intend to take to address pollutant levels. We have also provided additional information on the work of our Air Quality Education Officer.
- 1.3** We also wish to draw to members attention the Department of Environment and Rural Affairs (DEFRA) appraisal of our Annual Status report (ASR) 2024.

2. Summary of the Issue

- 2.1** Our ASR was approved for publication in August 2024. Positive statements from the report include:
 - The Council have continued to provide clear evidence of several key actions to improve air quality which have been completed during the current reporting year.
 - The Council have clearly listed their priorities for the coming year. This is commended and is indicative of good practice.
 - The Council have provided excellent mapping of all monitoring locations within the Borough and included air quality management area (AQMA) boundaries, which is commended.
 - The council have provided extensive trend graphs and analysis for all monitoring data, which is welcomed.
 - An additional passive diffusion tube monitoring location was commissioned in 2023, as well as a new monitoring station on Gloucester Road to monitor PM₁₀ and PM_{2.5} concentrations. This is welcomed.

The report is now available through the council website, or via DEFRA. Despite the regulatory compliance and high levels of monitoring being carried out, there is further action required to maintain progress and improve levels of air pollution.

2.2 In broad terms levels of nitrogen dioxide, chiefly from vehicle exhausts continues to fall slowly but steadily. Monitoring results for this pollutant are expected to show that the entire borough will fall within legal limits again this year, for the third year running. This continued compliance will make the need for a declared Air Quality Management Area (AQMA) and the resultant Air Quality Action Plan (AQAP) obsolete.

2.3 Activity in the UK around air quality is becoming increasingly focussed on levels of airborne fine particulate matter, known as PM2.5. This pollutant is derived from a wider range of sources than just road traffic, and action to reduce levels of PM2.5 need to address this variety of sources, especially domestic combustion of solid fuels.

3. Summary of evidence/information

3.1 Concerns about air quality are frequently confused or combined with those about climate change or global heating. The following table identifies (in brief) some key similarities and differences between the two topics:

	AQ	Climate / Global Heating
Main pollutants of concern	NO2, PM2.5, PM10	Carbon dioxide, methane, nitrous oxide, Fluorinated greenhouse gases (F-gases), water vapour
Sources / causes	NO2 – Road traffic (Industry) PMs – Traffic (inc. electric), domestic combustion, agriculture, distant natural sources.	Fossil fuel use in electricity generation, transport, industry, and domestic heating. Other industrial sources, including landfill. Agriculture processes, deforestation and also from some natural processes.
Effect	Direct links to increase in: <ul style="list-style-type: none"> • Heart disease • Stroke • Asthma (NO2) • Lung Cancer • Dementia • Diabetes • Slower learning 	Global temperature rise. Rise in sea level Reduced bio-diversity Increase in extreme weather events. Changing cropping patterns.
Victims	Local. Young people. Sensitized & sick (generally	Global Poor countries worst affected.

	elderly). Disadvantaged communities.	
Actions	Reduced fossil fuel use in transport. Reduce domestic solid fuel use. Reduce cumulative effect of multiple sources: building site dust, industry, agricultural fertilisers.	Reduced fossil fuel use in transport. “Clean” energy sources. Sustainable sourcing to reduce demands producing deforestation.

3.2 Often, actions by the public and businesses to improve either, will improve both. But action specifically targeted at local air quality tends to be more effective in that area than the incidental effect on local air quality of climate oriented activity.

3.3 What pollutants are we concerned about in Cheltenham?

Air pollution has been monitored, modelled and reported on for many years, with most current activity evolving since legislation passed in the early 1990s. Earlier legislation was aimed at dealing with visible smoke that was typified by the “London smog” incidents of the 1950s. The last 30years’ work has allowed us to determine that many pollutants are found locally at low levels that do not cause great concern and are well within legal limits or guidelines for exposure. The remaining pollutants of concern are:

Nitrogen dioxide (NO₂).

This pollutant largely derives from burning fossil fuels, so the main local source is road traffic. In some areas of the country industrial sources may contribute significant amounts of NO₂, but there are no significant industrial sources of NO₂ in Cheltenham. Levels of NO₂ are slowly declining across the country and this is reflected in local data. The reasons for this are complex, but include:

- Cleaner vehicles using the roads.
- Fewer vehicles using the road and quieter rush hours (a step change, post-covid).

Despite this generally improving picture, levels of NO₂ in small areas can be adversely affected by increased road congestion due to new development and changes to circulation patterns.

Particulate matter (PM_{2.5} & PM₁₀).

Particulates in air can be described as “anything in the air that isn’t a gas”. Particulates are the scientific terminology for dust and smoke. PM_{2.5} is material that will pass through a 2.5micron filter, and PM₁₀ will pass a 10micron filter. Some particulates arise naturally, from dusty, dry materials, and can be transported in the high atmosphere on an inter-continental scale,

such as the “Saharan sand” that is often seen accumulating on cars etc. Other particulates come from more local sources including burning solid fuels including wood or coal-type products, and other fossil fuels. Particulates also come from industrial sources including combustion processes. Agricultural sources are also a significant source (mainly of PM2.5), as PMs can be caused by the application of some types of fertilisers.

3.4 Over the last few years, national attention has shifted from levels of NO₂ towards PM2.5. This is partly because of the decline in NO₂ levels, but also because of increasing research into the effects of PM2.5, helped by improvements in modelling and measurement of PM2.5, which until 5-10 years ago was prohibitively expensive.

3.5 How do we measure air quality at CBC?

Local air quality management is carried out by Environmental Health Officers of the Public and Environmental Health Team, part of the Public Protection Division.

Description	Pollutants	Purchase cost	Running Costs (approx. annual)	Use	Where this equipment is installed.
2 x Beta Attenuation Monitors (BAMs)	PM2.5 PM10	Total cost of 2 monitors £35k	Electric £2000 Servicing & Data fees £2200	Measures PM2.5 & PM10 on main road. Allows assessment of modelling.	Gloucester Rd, Benhall
NOx monitor	NO NO ₂	£15k	Servicing / calibration / hire £8000 Data handling and QA £1000	Accurate NO ₂ measurement and cross-reference of NOx tubes	Corner of Swindon Rd /St.Georges St.
9 x AQ Mesh pods.	NO ₂ PM2.5 PM10 Indicative standard only	£7k each	Sim / data (solar powered) £2700	Assessment of potential localised effects, often at vulnerable locations. Re-locatable. Getting old.	Glos Rd, Benhall College Rd 422 High Street St Pauls Med Centre PE Way R'bout Winchcombe St

					Princess Elizabeth Way Glos Rd. School
2 x Earthsense Zephyrs	NO ₂ PM2.5 PM10 Indicative standard only	£8k each	Sim / data (solar powered) £700 (estimated)	Exclusively used by schools' education project	Moved around various school sites across borough
46 x NOx tubes	NO ₂	£4.60 per site, per month	£2260 pa	Cheap, reliable. Annual average calculated from monthly figures.	46 sites of interest, including major road junctions / housing close to congested roads

3.6 The situation in Gloucestershire is described in a report produced in 2023: [Air Quality in Gloucestershire](#). This considers the effects of air pollution across the county in some detail. It is worth noting that in the Executive Summary this report states: "In 2021 there were 355 deaths attributable to air pollution in Gloucestershire".

3.7 Further detailed evidence on the health effects of poor air quality, including inequalities can be found in the [Chief Medical Officer's Annual Report 2022](#) and the position statement from the [Royal College of Paediatrics and Child Health](#)

3.8 National Policy, limits and obligations

National policy on air pollution sets legal limits for pollutants which, if exceeded require further action to reduce their levels. Limits are set for long-term (annual) exposure to reflect health effects on those living in polluted areas, and short-term exposure for chronic exposure incidents.

3.8.1 Other limits or targets, which are far more challenging are set by the World Health Organisation (WHO) as shown below:

Pollutant	DEFRA		WHO	
	Annual	Short-term	Annual	Short-term
NO₂	40ug/m ³	200ug/m ³ up to 18x per year	10ug/m ³	25ug/m ³ over 24hrs
PM2.5	10ug/m ³ by 2040		5ug/m ³	15ug/m ³ over 24hrs

PM10	40ug/m ³	50ug/m ³ as 24hr mean, up to 35x per year	15ug/m ³	45ug/m ³ over 24hrs
Ozone		100ug/m ³ up to 10x per year (as an 8hr average)	60ug/m ³	100ug/m ³ over 8hrs

When considering limits, it should be noted that although there is a commonly-held view that no pollution is acceptable, it is also not achievable.

3.8.2 The law requires that if any area is found to be failing to comply with limits of a particular pollutant, the local authority is required to declare an Air Quality Management Area (AQMA). Subsequently, the Authority is required to produce an Air Quality Action Plan (AQAP) which identifies steps to control that pollutant in that area, and possibly beyond the boundary of that area. The history of AQMAs in Cheltenham is that a very limited area at the corner of Bath Road and High Street was declared an AQMA for an excess of NO₂ in 2008. This was replaced by a whole-borough AQMA (again relating to NO₂) in 2011, in an attempt to highlight broader issues and attract funding for air quality improvement works. This whole-borough approach was found to be unjustified by expanded monitoring and failed to address pollution issues in the worst affected areas. As a result, with the approval of DEFRA, the 2011 whole borough AQMA was revoked in 2020 and replaced by a considerably smaller area, covering High St from Tewkesbury Rd / Gloucester Rd – Poole Way – Swindon Rd as far as St. George’s St. Current monitoring results (as reported in the 2024 ASR) suggest that post-covid levels of NO₂ pollution in this area have also fallen to below legal limits, and it is likely that the AQMA will need to be revoked in the near future.

3.9 What we do with the data.

The monitoring systems that we operate at Cheltenham Borough Council produce more data than the rest of the county combined. We use it to identify any areas of non-compliance with limits, and areas of poorer air quality where most action is needed. It is through gathering this data that we have over the years identified the areas of non-compliance that lead to the declaration of various configurations of air the quality management area.

Data from our systems is reported to DEFRA through the ASR and some is published on our website and by other agencies. Some of the monitoring equipment we use produces considerable volumes of data, which needs to be shared in a summarised form, and other data is subject to verification processes which may mean that only annual figures are available. Monthly results from NO_x tubes are published online and updated as data becomes available each month.

[Monthly NO₂ figures from Nox tubes.](#)

Monthly figures from particulate monitors has also recently been added to this

page:

[Monthly figures from particulate monitors.](#)

As can be seen from the results obtained from the NO₂ monitoring station in Swindon Road, levels of NO₂ dropped considerably during 2020 as traffic levels plummeted and with it traffic congestion:

	2019	2020	2021	2022	2023
Annual NO₂ (ug/m³)	36.0	24.7	25.3	27.0	25.3

Similar patterns of NO₂ levels can be seen at most other monitoring locations. Post-pandemic, levels of NO₂ pollution have not gone back to pre-2020 levels. This has been attributed to considerably more people working from home and reducing their commutes, or delaying their journey to avoid the busiest periods. Over the same time there has been a gradual but continuing rise in the use of cleaner, more efficient vehicles, including more hybrid and electric vehicles.

Our newly installed monitoring of PM_{2.5} and PM₁₀ is starting to build a picture of annual levels which suggests that at the monitoring location PM_{2.5} levels are currently around the 2040 target level.

	2023	2024 (to end June)
PM_{2.5} (ug/m³)	9.6	9.3
PM₁₀ (ug/m³)	17.0	15.6

3.10 Action taken to address the pollutants

The effects of action taken by Cheltenham Borough Council to reduce air pollution are difficult to separate from wider societal changes in behaviour. In particular there was a step-change in work and commuting habits during and after the covid pandemic.

3.10.1 The 2024 ASR contains more detailed discussion on efforts to implement actions identified in the AQAP that will contribute to controlling NO₂ in particular in the AQMA, but also more generally across the borough. Some actions in the AQAP will also contribute to reducing levels of PM_{2.5}. Many of these actions are delivered by partner agencies, including Gloucestershire County Council, with assistance from Cheltenham Borough Council. As discussed above, many projects delivered under a banner of “climate change” have a beneficial effect on local air quality, for example the continued expansion of roadside and parking area electric vehicle re-charging points.

3.10.2. Of note is the success of the Schools AQ Education Project Officer in engaging with young people in education settings, which is using the slogan “Care

for our Air”:

To date, the Care for our Air project has engaged with 3465 pupils across 19 schools in Cheltenham. This equates to 35% of all schools in Cheltenham having been engaged with in the first year of the project.

Highlights of the year include:

- High School Leckhampton running a successful anti-idling campaign focussing on their drop-off area which saw a drop in pollutants as a result, which the pupils then displayed at a Cheltenham Education Partnership event at the Wilson.
- The Catholic School of St Gregory the Greats achieving their bronze Mode Shift Stars award having completed 20 actions towards improving air quality.
- Charlton Kings Infant School achieving their Eco Schools’ Green Flag award with merit having focussed on the topic of transport – setting up Park and Stride locations, raising awareness of anti-idling and monitoring pollutants at their setting using an Earthsense Zephyr.
- Delivering a successful bus banner campaign across Cheltenham and the wider area in support of Clean Air Day which will have been seen by 294,610 people (according to Global, the advertising company who work with Stagecoach).
- Delivery of an anti-idling mural on the corner of Queen Street and Swindon Road for Clean Air Day, painted in Graphenstone paint which absorbs CO₂ as it dries.
- Collaborated with No Child Left Behind to run a Clean Air social media campaign in June, which culminated in a poster competition where the winner had their design displayed on a Cheltenham bus stop. We received 75 entries in this competition.
- Commenced delivery of the Pollution Revolution project for academic year 2024/25, which involves 6 of Cheltenham’s secondaries (both private and state) in building their own particulate matter monitors and measuring pollutants at their location. Once the pupils have analysed the data, each school will run an intervention at their setting to reduce pollutants.
- Application towards the Gloucestershire County Council Clean Air Fund (yet to be approved) with the ambition of running a schools and social media based anti-idling campaign.

With the support of the Director of Public Health we have submitted a bid to the Public Health Interventions Research Study Team (PHIRST) for this project to be officially evaluated.

3.10.3 The PM2.5 network around the UK has been established by Defra via a subset of stations on the automation urban and rural network (AURN). The majority are funded and operated by the Environment Agency (EA). We are currently working with Defra and the EA to affiliate one of our monitoring sites

which will ensure the continuation of robust and reliable data for publication.

3.10.4 We have submitted an expression of interest to take part in DEFRA's upcoming project with local authorities to review the resources available to enable us to contribute the delivery of the Environment Act 2021 fine particulate (PM2.5) targets as stated in the 2023 Air quality strategy.

4. Next Steps

4.1 When considering our approach to future air quality work, we need to consider work that is both required or recommended by regulation, and work which is optional but will have a positive effect on local air quality. We need to manage expectations within resource availability.

4.1.1 Revoke AQAM and produce and Air Quality Strategy.

Current DEFRA guidance suggests that it will become necessary to revoke the existing AQMA in the next year. An AQMA is usually required to be revoked where monitored levels have not exceeded limits or been within 10% of that limit at any location for 3 years. Compliance will be determined by the annual monitored levels of NO₂ which will be confirmed in early 2024. When the AQMA is revoked, the accompanying AQAP will become obsolete. In replacement a new Air Quality Strategy will be required, which will include plans to improve air quality across the borough. Air Quality Strategies written to these requirements are a new type of document and very few have been published nationally at this stage. It is likely that an external contractor will be required to conduct consultation with interested parties and produce the document and that additional resources will be required to implement any resulting action plan.

4.1.2 Revise Smoke Control Zones/Areas (SCA) alongside an education and enforcement campaign

Previous plans in relation to air quality improvement, including the 2024 AQAP have considered the need to make changes to boundaries of the existing smoke control zones. Modelling of pollution levels has shown that domestic solid fuel burning is the largest contributor to PM2.5 levels in the town. The current pattern of smoke control zones/areas forms a patchwork across the town, with boundaries that follow no obvious logic and in places run through the middle of houses. Making changes is largely a bureaucratic process that involves publicising changes and allowing public comments or objections. Where controls apply it is an offence to emit smoke from a domestic chimney, and a fixed penalty can be issued after following a rather complex system of issuing a warning letter, against anyone causing a visible smoke emission. The initial FPN is set at £175 - £300. In amending the boundaries there is considerable value in using the opportunity to publicise and educate residents on fuel and appliance requirements, rather than trying to pursue rigorous enforcement which requires considerable manpower input and small financial returns.

4.1.3 Run an anti idling campaign alongside education and enforcement.

CBC has recently moved towards delegating powers to officers to carry out enforcement of anti-idling powers against motorists. As with SCZ enforcement above, education needs to form a considerable part of any idling project before enforcement takes place. The legislation requires that drivers who allow their vehicle to idle are challenged at the roadside and invited to stop the engine. If they continue to allow idling the driver can be issued a fixed penalty to a maximum of £20. In practical terms, enforcement is likely to be thwarted by motorists moving a vehicle before a fine can be issued or turning their vehicle off before re-starting when the officer moves away. We have recently applied to GCC for grant funding for anti-idling material to be displayed at schools as part of the Education Officer's involvement.

4.1.4 Website Improvements

There is considerable opportunity to improve the information on, and practical uses of the CBC website. Currently the air quality web pages contain considerable historic information on pollution monitoring results and archived documents. This information may give context to changes we need people to make to their activity, but largely fail to actively promote change. The data we obtain needs to be displayed more contemporaneously and needs to explain and promote the need for different choices to be made.

4.1.5 Challenges

There are considerable financial challenges in delivering a programme of air quality improvements. The Air Quality Education Projects Officer has a 3-year fixed-term contract until 2026. This post is funded entirely by GCC following a successful bid to repurpose some of the Covid contain outbreak and management (COMF) fund, recognising that those affected by poorer air quality were disproportionately affected by Covid.

Our monitoring systems have ongoing costs including maintenance and data processing. Most of our existing hardware has been funded by using funding from central government sources, however DEFRA abruptly cancelled all existing air quality grants in May 2024 and no replacement sources of funding have been identified by the new government.

The current air quality service forms one aspect of the work of the Environmental Health Officers within the Protection team. They also have responsibilities for other functions such as the noise and statutory nuisance service, the environmental permitting regime, public health funerals and private water supplies. Without a dedicated Air Quality Officer there is insufficient capacity to do more than our statutory responsibilities and customer and partner expectations must be managed.

Background Papers

[Cheltenham 2024 ASR](#)
[Cheltenham 2024AQAP](#)
[RCPCH Position Statement](#)
[Chief Medical Officer's Annual Report 2022](#)
[DEFRA Air Quality Strategy 2023](#)

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Accountability

Cllr Victoria Atherstone, Cabinet Member Safety and Communities