

# Air Quality in Bristol and Bishopston – updates from three expert perspectives



by Jim Longhurst, Ben Williams, Gavin Spittlehouse and Tom Brook

Bishopston Society Occasional Paper #1 - January 2017

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## Air Pollution: a global crisis or a problem solved?

*In this first of three related articles, **Jim Longhurst** and **Ben Williams** set the scene by locating today's air quality problems in their historic context, then call for new, firmer action, including a change in our habits.*

It has been 60 years since the inception of the Clean Air Act, introduced to address the growing public health crisis that industrial and domestic coal burning was imposing on citizens throughout the UK. The development of the Act was instigated by the Great London Smog of 1952 which caused the premature deaths of at least 4,000 people at that time and many thousands more through the longer-term effects of the smog. The Act was championed in parliament by Gerald Nabarro MP who also proposed a Private Members Bill to address the problem.

In 1953 the Beaver Committee was established to “*examine the nature, causes and effects of air pollution and the efficacy of present preventative measures; to consider what further measures are practicable; and to make recommendations for action by government.*” The Committee’s recommendations suggested the creation of a policy framework for clean air and an act to cover domestic and industrial emissions of smoke from new and existing premises.

This Act and the subsequent act in 1968 changed the state of air quality in the UK from one of soot laden smoggy landscapes to that of relatively clear skies. Today, the challenge lies primarily with vehicle emissions and if we are to address them we will require steps that are equally as bold as those of the 1950s.

### **Ambient air pollution and diesel exhaust emissions are carcinogenic**

Air pollution is [the single largest environmental health risk globally](#). In 2012 the International Agency for Research on Cancer (IARC) concluded that diesel engine exhaust causes cancer in humans and a year later [the IARC classified outdoor air pollution similarly](#). Both are Class 1 cancer-causing agents and are considered as bad for our health as exposure to asbestos, tobacco smoke and ultraviolet radiation.

According to the World Health Organisation (WHO) [around 7 million people died prematurely as a result of air pollution in 2012](#), equivalent to one in eight of total global deaths, and 3.7 million of these premature deaths were attributable specifically to outdoor air pollution. In Europe, the WHO estimated that about 500,000 people die prematurely as a result of air pollution every year. In the UK ca. 40,000 people die prematurely as a result of it, primarily as a result of exposure to nitrogen dioxide and fine particulate matter. Within Bristol itself, [188 premature deaths were attributed to air pollution, compared to only 9 from road traffic incidents](#).

Air pollution does not affect everyone equally, disproportionately affecting children and the elderly, as well as those with existing health conditions. The poorest in society also suffer the most whilst contributing least to the problem. Clearly, air pollution has a significant impact on human health and laws have been introduced over the years to drive down concentrations nationwide.

### **Court action against Government Inaction**

In 1987, the World Health Organisation set health based guidelines for particulate matter, nitrogen dioxide (NO<sub>2</sub>), ozone and sulphur dioxide, amongst others. Based on the WHO health-based guidelines, the EU Air Quality Framework Directive and subsequent Directives were developed which Member States were required to convert into national law by 1998.

The EU limit value for NO<sub>2</sub> was to be achieved by 1st January 2010, however, UK remains non-compliant in many areas. After being taken to court for non-compliance by activist lawyers [ClientEarth](#), the UK government was ordered by the Supreme Court in April 2015 to draw up new air quality plans to address air pollution in the UK. The air quality plans were submitted to the European Commission in December 2015 (and we are still awaiting a response), however the consensus across the air quality profession was that these plans are not sufficient to address the public health challenge in as short a time as possible.

In October 2016 Client Earth returned to the High Court seeking a further court decision about the failure of the Government to take air quality and its legal obligations seriously. The High Court [ruled in favour of Client Earth](#), finding that the Government's 2015 Air Quality Plan failed to comply with the Supreme Court ruling or relevant EU Directives. The Government said it would not appeal against the decision and agreed in court to discuss with ClientEarth a new timetable for more realistic pollution modelling and the steps needed to bring pollution levels down to within legal levels.

When a government has to be forced by the High Court to act to protect human health and the environment one must conclude that the government does not take protecting our health seriously enough. So what can we do?

### **A way forward**

We shouldn't consider reducing air pollution as another regulation to be suffered, it should be considered as an opportunity to improve our health and wellbeing. Cars don't cause air pollution, we do by driving them, and consequently any solution will come from a change in our habits. By substituting car use if and when possible with a bus journey, or preferably by walking or cycling, we not only reduce air pollution but improve our health and wellbeing, and reduce the number of cars on the road. Other strategies to avoid higher levels of exposure to air pollution include walking and cycling along less busy traffic routes, and travelling outside peak hours. While difficult, these are the decisions we must make.

As well as being bound by EU Directives the UK has its own air quality objectives. Where these are exceeded and public exposure is present a local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan to bring the area back within the allowed concentration. In 2001 [Bristol declared an AQMA for particulate matter \(PM<sub>10</sub>\) and nitrogen dioxide \(NO<sub>2</sub>\)](#). This has been amended several times and is still in force in 2016 despite the requirement for

these pollutants to be below objective concentrations by the end of 2004 for PM<sub>10</sub> and the end of 2005 for NO<sub>2</sub>.

The AQMA covers the city centre and arterial roads running out from the centre including the Gloucester Road. Traffic is the overwhelming emission source for PM<sub>10</sub> and NO<sub>2</sub>. Reducing car based traffic whilst enhancing public transport patronage rates is the only solution to this problem until electric cars become the dominant mode of personal mobility.

In October 2016 over 150 delegates attended the Routes to Clean Air (RTCA) conference in Bristol and discussed the challenges and opportunities we face in addressing the air pollution crisis. It was clear from conference presentations that we have plenty of evidence on the impacts of air pollution however the statutory measures to address it are weak and enforcement is lacking.

We, the Air Quality Management Resource Centre, call for a new Clean Air Act, equally ambitious as the first Act 60 years ago, enshrining our right to breathe clean air within national legislation. Other organisations are leading the call, including Environmental Protection UK, the world's oldest environmental pressure group who were themselves instrumental in the creation of the 1956 Clean Air Act.

As a society we have come a long way since 1956, but we have further to go. We expect our food to be safe, our water to be clean, and without a shadow of a doubt we should demand the same of our air.

*Professor Jim Longhurst and Dr Ben Williams are researchers at the Air Quality Management Resource Centre at the University of the West of England, Bristol - <http://www1.uwe.ac.uk/et/research/aqmrc>.*

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## Air Quality In Bishopston: measurements and responses

**Gavin Spittlehouse** now develops the detail on pollution locally with a story about back garden gadget-based measurements, and gives his views on how we can respond.

A great deal of interest was expressed in local air pollution issues at the Bishopston Society AGM in October 2016. In this article I'll draw attention to local and national factors relating to air pollution affecting human health and to put these in a Bishopston context.

Air quality was in the national news through 2016, with the vehicle emissions scandal, growing evidence of the associated health issues, low emission zones, legal challenges to government policy (or lack thereof) and Bristol's Metrobus.

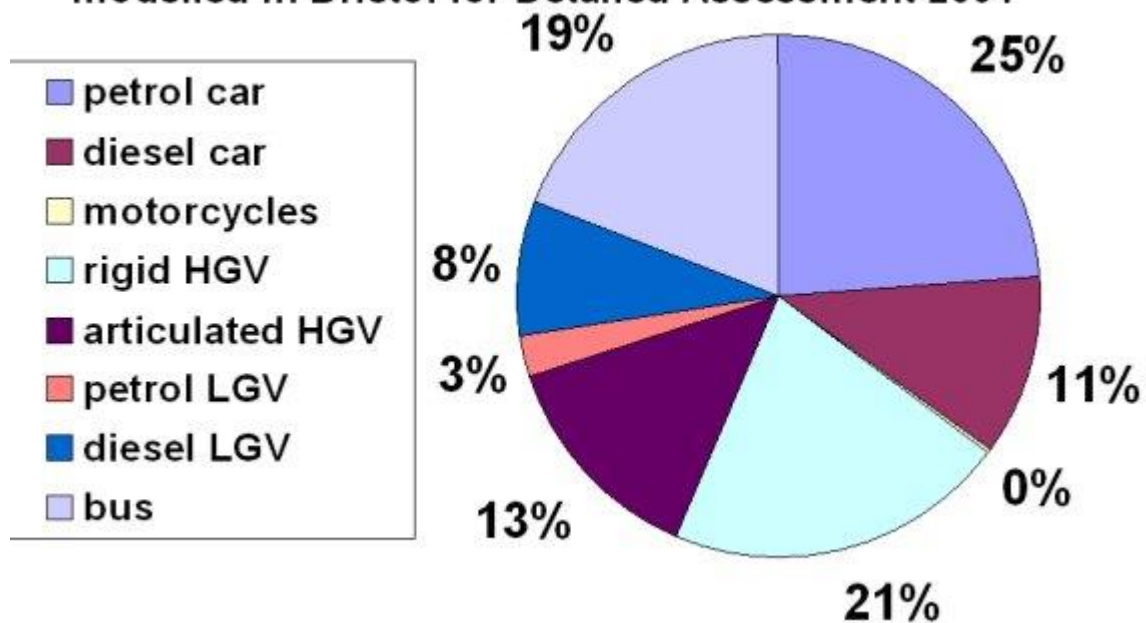
When we elected Marvin Rees as mayor last May, his manifesto [included](#) "pilot a low emissions zone in Bristol city centre". This has yet to happen and I understand that Marvin doesn't have the legal power to do so at present. However [meetings](#) have been held with the government with a view to progressing this.

Much of our air pollution in Bishopston comes from vehicle traffic. [Bristol's Air Quality Management Area](#) covers central Bristol up to The Arches and includes a long narrow corridor from The Arches up Gloucester Road as far as Monks Park Avenue. Air pollution is monitored in two ways:-

1. A few electronic measurement stations which provide detailed hourly statistics of several pollutants, available online in real time, but none along the Gloucester Road. (The nearest real-time data to Bishopston is in St Pauls, [a monitoring station run by DEFRA](#) ; see also [data from Bristol City Council at a few sites across the city.](#))
2. A much larger number of [diffusion tubes](#) which provide nitrogen dioxide (NO<sub>2</sub>) measurements over longer intervals, of which three are located on Gloucester Road, with annual results published online in retrospect. (The latest results can be found [on pinpoint](#) - select Environment and Planning and then select the air quality monitors map box; if you zoom in you can click on the monitoring site to see the last 5 years of annual NO<sub>2</sub> data for each site.

There are other local sources of air pollution, including garden bonfires; industry; household fireplaces (especially any burning coal or poor quality wood or using open fires or woodburners that don't comply with Bristol's city-wide [smoke control zone](#)); and central heating fumes. These are things that individuals can influence and they will be significant in some locations, but it's generally accepted that by far the most important local source of pollution is vehicle exhausts.

### Proportion of NOx emissions per vehicle type - roads modelled in Bristol for Detailed Assessment 2004



(image from [www.bristol.airqualitydata.com](http://www.bristol.airqualitydata.com) , which is an excellent place to start for both background information and local air pollution data.)

The annual NO<sub>2</sub> measurements at Bristol North Swimming Baths are as follows:-

- Annual Mean NO<sub>2</sub> µg/m<sup>3</sup> 2015: 51.6

- Annual Mean NO<sub>2</sub> µg/m<sup>3</sup> 2014: 50.4
- Annual Mean NO<sub>2</sub> µg/m<sup>3</sup> 2013: 52
- Annual Mean NO<sub>2</sub> µg/m<sup>3</sup> 2012: 43.1
- Annual Mean NO<sub>2</sub> µg/m<sup>3</sup> 2011: 44.5

World Health Organisation recommended [limits](#) are 40 µg/m<sup>3</sup>, which Bishopston exceeds by over 20%. The EU [limit](#) is also 40 µg/m<sup>3</sup>.

These annual measurements don't tell the whole story. Pollution levels vary significantly with factors such as proximity to the source (for example vehicle emissions are far higher at the roadside), time of day (air pollution tends to build up during the day when there is most traffic and then gradually clear overnight), time of year and weather (pollution will disperse more quickly on windy days).

I recently measured the NO<sub>2</sub> levels in my back garden in Bishopston over a two week period, using a diffusion tube provided and analysed by [Friends Of The Earth](#). The result was 21.6 µg/m<sup>3</sup>, significantly less than the latest annual average of 51.6 µg/m<sup>3</sup> (about 90 metres away). Unfortunately I don't have measurements at Bristol North Swimming Baths for the same period so I can't make a direct comparison. The air inside my house isn't likely to be any cleaner than the air outside my back door, so this should be a reasonable measure of what I was breathing at home in November.

Various electronic gadgets are available to measure air pollutants, I've tried the [Air Quality Egg](#) and the [Cleanspace Tag](#). These are interesting as they give you an idea of how air quality varies over a day or a week, but they are uncalibrated so they can't give you a reliable measurement. You can learn much of what they tell you by looking online for air monitoring data, but gadgets can be a great way to stimulate interest.

Nitrogen dioxide is just one of the harmful pollutants present in our air; sulphur dioxide, ozone and particulate matter are also present and are very significant in human health. The latter is often referred to as "PM10" - particles in the air with a diameter of less than 10µm (around a fifth of the diameter of a human hair). These are various toxic chemicals from many sources, especially emissions from diesel engines and other sources of smoke. Their size means that they can penetrate deep into the lungs. In 2014 Bristol was the [twelfth worst](#) place in the UK for PM10 levels. PM2.5 and smaller are considered even more [toxic](#).

These pollutants are [strongly associated with various respiratory diseases](#) from asthma to lung cancer to heart disease. Children are particularly at risk, so we should be concerned about schools close to busy roads. A link between traffic pollution and dementia has also been [suggested by recent research](#).

### **When is air pollution worst?**

Generally speaking it's when local traffic is busiest - weekday rush-hours. Air pollution builds up during the day and reduced overnight. Levels are also affected by weather conditions, particularly wind speeds. Peak pollution levels are far higher than these annual average levels, but are not measured in Bishopston.

### **Where is it worst?**

Generally speaking it's worst in high traffic areas. Levels can vary over a short distance, for example they might be far worse at the side of a busy road than 20 meters up a side-street.

### **Is it improving?**

Generally yes but as the figures above show, not everywhere. Vehicle engine technology is getting better (and vehicles are getting more efficient so burning less fuel). EU regulations have played a big part in pushing car manufacturers to reduce emissions, although the recent VW "defeat device" [scandal](#) raises many questions. However some areas will be getting worse as traffic levels increase, and where pollution is decreasing this is generally not happening fast enough.

### **What can we do about it?**

Individually: our lifestyle choices have an impact, especially what we vehicle drive, how much, when and how.

Collectively, we can demand action from our local and national politicians and we can influence polluters via our purchasing and investment choices. We can support national campaigns for awareness and action, such as [Client Earth](#) who recently won a high court [challenge](#) to force action from the government. London has a vocal campaign [organisation](#) - Bristol has many organisations and individuals (both inside and outside of local politics) pushing for cleaner air but not as yet a single focused campaign group.

*Gavin Spittlehouse is a lead member of Sustainable Bishopston - <http://sustainablebishopston.org.uk>.*

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## **Clean Air in Bristol – how we and the Council can respond**

*In our third and final contribution, **Tom Brook** fleshes out Bristol City Council's response to pollution and proposes local community action within The Bishopston Society.*

As we have seen, combating air pollution is a huge mountain to climb, both worldwide and for us locally in Bristol. 3.7 million deaths a year worldwide, 40,000 in the UK, 200 in Bristol – these are huge figures but they are not insurmountable. We should not view air pollution only as a challenge, but also as an opportunity to improve health, wellbeing, transportation, the economy and, of course, the environment.

Across the world, national and municipal leaders are implementing policies to try and quell the tide of air pollution. In Beijing, citizens are only allowed to use their cars on alternate days. Closer to home, the likes of Paris and Madrid have been using this policy on an emergency basis. Meanwhile, in San Francisco, prices for parking spaces are now demand-responsive, readjusting parking patterns to make streets safer and less congested. Whilst in Istanbul, poor quality coal for heating has been banned, and in New York heating oil is being phased out.

So it's clear that a wide array of cities worldwide are involved in combating this invisible killer, and Bristol is no exception. We have denied applications for diesel electricity generators, established a freight consolidation centre, introduced Residents' Parking Schemes, introduced high-tech hybrid

buses, improved the wider bus fleet, provided electric vehicle charging points, and improved cycling infrastructure.

Going forward, the Mayor has committed to implement a Clean Air Zone, to improve public awareness of air pollution, to review the location of air pollution monitors and make data collected more accessible, to replace the Council's fleet with low emission and electric powered vans and cars, to support the introduction of hybrid and electric buses and taxis, and to promote walking and cycling through better, safer infrastructure. These plans were given unanimous support by Councillors from all parties at a recent Council meeting, so there is certainly the political will in the city to achieve this and more.

But what can local residents, and specifically the Bishopston Society, do to improve air pollution? Well, first things first, keep the pressure up on the Mayor, Councillors and other decision makers. You can also write to your MP and ask them to lobby government for more air pollution-control powers, as it's only with these that we can introduce measures such as the Clean Air Zone.

Organisations such as the Bishopston Society, with their respected community position and wide-reaching network, are perfect vehicles for pressuring government, both local and national, to act. The Society's potential to become the "anchor" organisation for the community makes it well placed to take up the fight against air pollution, involving multiple stakeholders in initiatives to improve the area.

In which case what "asks" could the community have? Well for example, as part of the planned review of air pollution monitors I believe we should get a monitor for Gloucester Road. We sit within Bristol's Air Quality Management Area, but have no real-time monitoring nearby - you can view the data at <http://www.bristol.airqualitydata.com> as already discussed. I also think we should do more to enforce legislation against idling by using signs and, where necessary, fines. Nottingham and some London boroughs are leading the way on this, and we should copy them.

If you support the ideas mentioned in this article, or have some ideas of your own, The Bishopston Society committee and I would be very interested in hearing from you. The key thing I'd like to impress is that no-one has all the answers. The actions the Council has planned will help, but I'm sure we're missing many other possible measures, so this is about knowledge and idea sharing as well as actually going ahead and actually implementing the initiatives. By working together I am sure we can make a real, positive difference.

*Tom Brook is Labour Co-op Councillor for Bishopston & Ashley Down - [cllr.tom.brook@bristol.gov.uk](mailto:cllr.tom.brook@bristol.gov.uk)*

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## More information

The above “troika” of articles was originally published on The Bishopston Society web site ahead of a public meeting featuring the authors, which took place on 4<sup>th</sup> April 2017.

A report of the meeting, with links, can be found via “Facing down the killer in our midst – public meeting calls for action on air pollution”, our meeting report, at <http://bishopstonsociety.org.uk/news/our-news/904-publicmeeting2017april>.

Subsequent and earlier coverage of air pollution and air quality can be found using the search facility on the front page of our web site at <http://bishopstonsociety.org.uk>.



More details of all our occasional papers can be found at <http://bishopstonsociety.org.uk/papers> and you can download or view this paper (and follow its hotlinks) from this web page.



*From left to right: Jim Longhurst, Gavin Spittlehouse, Dick Farrow (TBS meeting chair) and Tom Brook*

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