

# TACKLING AIR POLLUTION IN CHELTENHAM

Why Cheltenham Borough Council should not revoke the borough-wide Air Quality Management Area

17 February 2020

## Executive summary

The cabinet of Cheltenham Borough Council (CBC) recently agreed (at a meeting on 21st January 2020) to revoke the existing borough-wide Air Quality Management Area (AQMA), and replace it with a new and very small AQMA along a 250 metre stretch of road in the centre of town.

Cheltenham Green Party urges the Borough Council to reverse this decision and maintain the existing borough-wide AQMA.

This report presents evidence that:

- CBC's own air pollution data shows that there has been no significant improvement in Cheltenham's air quality over the last 9 years.
- CBC's Air Quality Action Plan has had no effect on traffic volumes in the centre of town
- The Bureau Veritas modelling used to justify shrinking the AQMA to a 250m stretch of road does not come close to DEFRA's required level of accuracy for such modelling exercises
- Even taking the Bureau Veritas study at face value does not support the decision to revoke the AQMA just to one single location
- The decision to revoke the AQMA contravenes DEFRA guidance on when an AQMA may be revoked
- The decision to focus on a 250 metre stretch of road as a new AQMA ignores evidence that PM<sub>2.5</sub> pollution is in excess of WHO limits in areas which are a long way from the town centre.

There can therefore be no justification for revoking the existing borough-wide AQMA.

DEFRA's Clean Air Strategy, published in May 2019, commits the government to implementing the World Health Organisation (WHO) guidelines on particulate air pollution. Very shortly, CBC will have to recognise that most of Cheltenham is likely to be in breach of the WHO guidelines on PM<sub>2.5</sub> pollution. The decision to revoke the Air Quality Management Area will be seen as misguided at best, negligent at worst. Particularly if a revised AQAP, based on this new AQMA, is seen to have the effect of simply diverting traffic from one road inside the AQMA to another road outside the AQMA.

Other towns such as Oxford have made significant progress on air quality over the same period. Rather than pretending that there is only a problem on either side of a 250 stretch of road in the town centre, CBC needs to work closely with the County Council to devise a much more radical Air Quality Action Plan that tackles air pollution across the whole of Cheltenham.

If other towns in Britain can do this, why can't Cheltenham?

# 1 Introduction

The cabinet of Cheltenham Borough Council (CBC) recently agreed (at a meeting on 21st January 2020) to revoke the existing borough-wide Air Quality Management Area (AQMA).

The arguments for making these changes, taken from the cabinet paper, are copied below:

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## **Executive summary**

*The Council (CBC) declared a whole borough Air Quality Management Area (AQMA) in November 2011. This was followed by an Action Plan, which set out those actions considered necessary to improve air quality across the town.*

*Since this date, there has been a slow but steady improvement in air quality and we can show that most of Cheltenham meets the relevant legal standard, with a generally positive trajectory in relation to oxides of nitrogen (NO<sub>x</sub>), which is the main pollutant of concern. This means that the whole borough AQMA should now be revoked, an action supported by the Department for Environment, Food and Rural Affairs (DEFRA). The remaining area that breaches the legal limit for NO<sub>2</sub> should be declared a new, smaller and more focused AQMA.*

## **Recommendations**

**Cabinet is recommended to:**

- 1. revoke the existing borough-wide AQMA;**
  - 2. declare a new AQMA in the area identified as having the worst air pollution levels;**
  - 3. approve the redeployment of existing equipment to monitor those sites which are closest to exceeding the legal limit.**
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**All the key arguments presented to the cabinet are incorrect.**

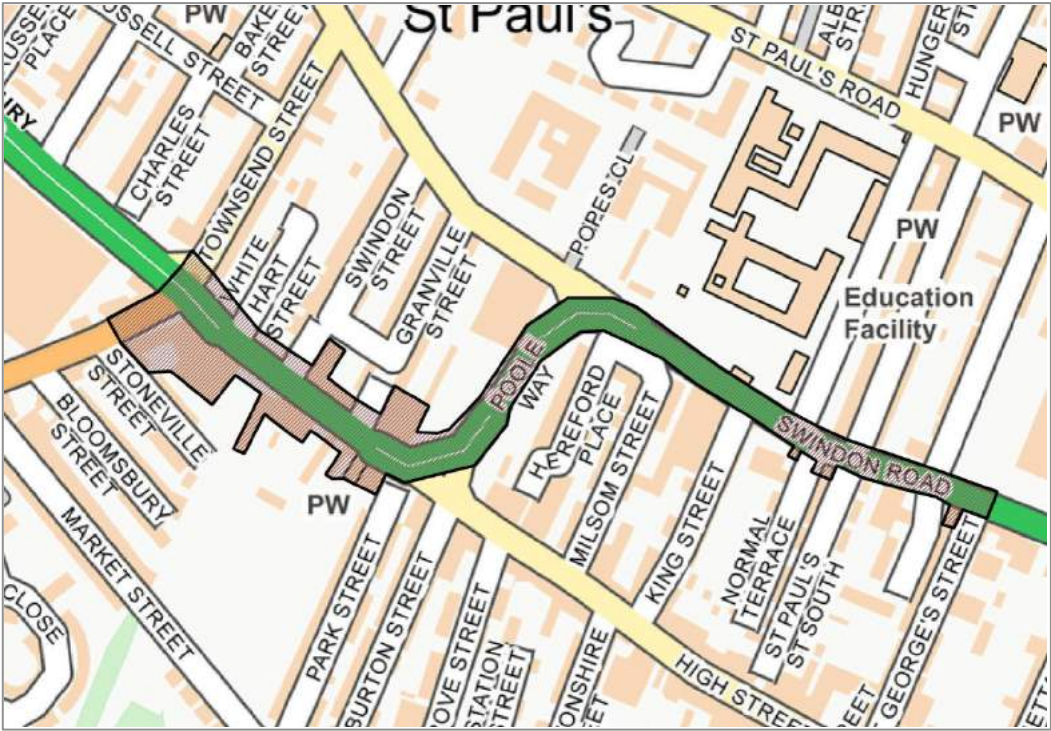
Specifically, the claims that:

- *"there has been a slow and steady improvement in air quality"* – this is not supported by CBC's own data.
- *"we can show that most of Cheltenham meets the relevant legal standard"* – the modelling in the Bureau Veritas report is so scientifically unreliable it cannot be used as the basis to make such a significant decision.
- *"... in relation to oxides of Nitrogen (NO<sub>x</sub>) which is the main pollutant of concern"* – oxides of Nitrogen/Nitrogen Dioxide (NO<sub>2</sub>) are not the only pollutant of concern. Recent scientific evidence shows that particulates (PM<sub>2.5</sub> especially) are an equal or greater risk to health, and are recognised as such in DEFRA's Clean Air Strategy 2019.
- *"...an action supported by DEFRA"*. DEFRA's Clean Air Strategy 2019 puts tackling PM<sub>2.5</sub> at the heart of its plans. Because CBC does not measure pollution from particulates, it cannot claim DEFRA support for an AQMA which is only concerned with NO<sub>2</sub>. The CBC decision also does not meet DEFRA's criteria for revoking an AQMA as given in Section 3.50 of DEFRA's Local Air Quality Management Technical Guidance (TG16) February 2018. **Cheltenham would be the first local authority in Britain to revoke an AQMA.**

The proposed new AQMA is restricted to a 250m stretch of Poole Way/Swindon Road. (see diagram overleaf). There is an obvious risk of 'unintended consequences' from focusing on such a small part of one road. Any new Air Quality Action Plan which aims to reduce NO<sub>2</sub> pollution and traffic only in the new AQMA, might achieve this at the expense of pushing traffic elsewhere, simply increasing air pollution in other areas of Cheltenham.

## 2 The proposed new Air Quality Management Area

The diagram below shows, in the dark green area and associated shaded area with a black outline, the proposed new AQMA.



### 3 Focusing on the 'part' at the expense of the 'whole'

The cabinet paper, and comments from cabinet members at the meeting, reiterate that the new Air Quality Action Plan (AQAP) will focus on securing improvements in pollution in "precisely" this small area of Poole Way and Swindon Road.

The cabinet paper also states (section 2.1, page 3): "*The Detailed Modelling Study focuses on emissions from road traffic, as any contribution to the levels of NO<sub>2</sub> from other sources is minimal*".

If CBC officers are tasked with devising a new AQAP which delivers on the very limited objective of reducing NO<sub>2</sub> in this 250 metre stretch of road, they will inevitably suggest measures that reduce traffic within the proposed new AQMA.

The obvious danger is that traffic is simply diverted to other areas of town. Many of these areas are **where CBC has discontinued monitoring of air pollution!**

Traffic and air pollution form a complex 'system' across the town. Focusing efforts on one small 'part' of the system will inevitably just move the problem around. The cabinet paper actually makes this very point: "*the (original) decision to declare the whole-borough an AQMA was intended to improve air quality across the whole borough, rather than to potentially divert traffic around 5 distinct 'hotspots'*." (section 1.4, page 3)

The 2014 AQAP stated: "*The Cheltenham AQMA comprises the entire Borough area ... to avoid having to declare numerous separate AQMAs and also (emphasis added) **to prevent the possibility of simply shifting the air quality problem elsewhere...***".

The potential for 'simply shifting the air quality problem elsewhere' is demonstrated by CBC's NO<sub>2</sub> diffusion tube data for 2019 which shows several sites that are very close to the 40 ug/m<sup>3</sup> annual limit:

<i>Princess Elizabeth Way North:</i>	approx 600m outside proposed new AQMA,	less than 5% below legal limit
<i>81 London Road:</i>	approx 1000m outside proposed new AQMA,	less than 6% below legal limit
<i>340 Gloucester Road:</i>	approx 800m outside proposed new AQMA,	less than 10% below legal limit.

The rationale for this new decision is, (paraphrasing the cabinet paper, and comments by cabinet members at the meeting on 21 January) that the air quality problem across Cheltenham has been largely solved, and that there is only this one 250 metre stretch of road in the town-centre area that needs addressing.

This report demonstrates that this is incorrect, and **air pollution remains a serious issue across the whole of the town.**

## 4 Has there been a "slow and steady improvement in air quality" in Cheltenham?

### 4.1 CBC's own data from Nitrogen Dioxide diffusion tubes

The cabinet paper claims that there has been "a slow but steady improvement in air quality" since the AQAP in 2011. CBC's own air pollution monitoring data **directly contradicts this assertion**.

The table and chart below compares NO<sub>2</sub> levels, as measured by CBC's diffusion tube monitors, at 8 sites across the town, over the period 2011 to 2019.

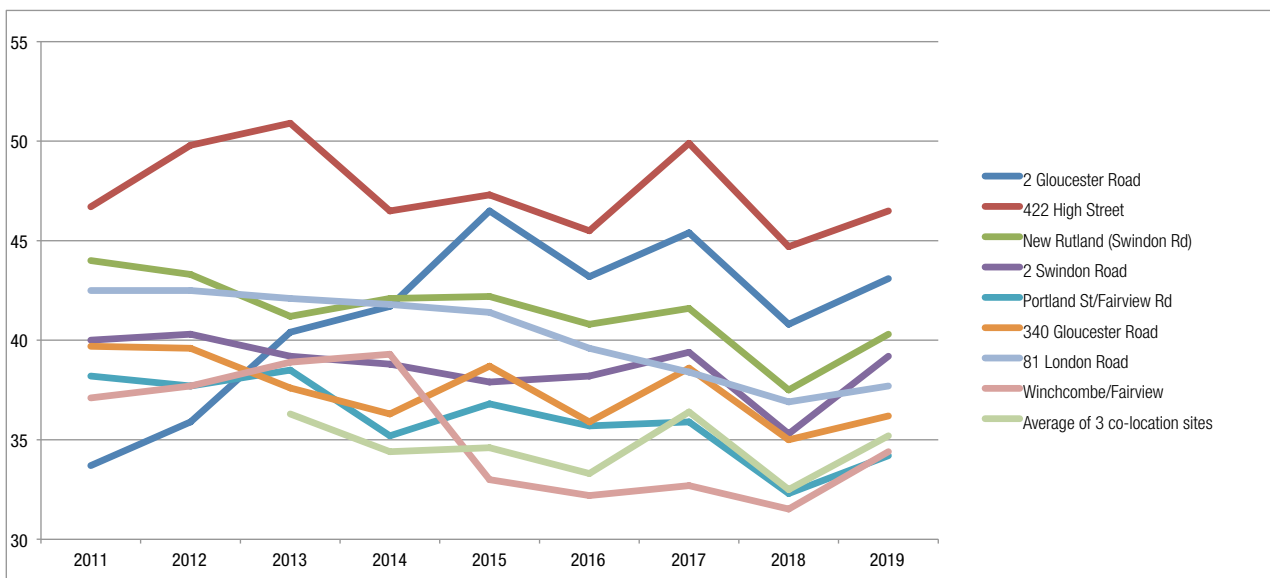
The 8 sites shown have not been 'selected' in any way – they are the only 8 sites that CBC has consistently monitored over the last 9 years. We have also shown the average reading of the 3 diffusion tubes sited at St Georges Street/Swindon Rd, where they are co-located with the reference monitor. This site has only been producing full data since 2013.

#### CBC data for NO<sub>2</sub> ug/m<sup>3</sup>, 2011 through to 2019.

	2011	2012	2013	2014	2015	2016	2017	2018	2019
2 Gloucester Road	33.7	35.9	40.4	41.7	46.5	43.2	45.4	40.8	43.1
422 High Street	46.7	49.8	50.9	46.5	47.3	45.5	49.9	44.7	46.5
New Rutland (Swindon Rd)	44.0	43.3	41.2	42.1	42.2	40.8	41.6	37.5	40.3
2 Swindon Road	40.0	40.3	39.2	38.8	37.9	38.2	39.4	35.3	39.2
Portland St/Fairview Rd	38.2	37.7	38.5	35.2	36.8	35.7	35.9	32.3	34.2
340 Gloucester Road	39.7	39.6	37.6	36.3	38.7	35.9	38.6	35.0	36.2
81 London Road	42.5	42.5	42.1	41.8	41.4	39.6	38.4	36.9	37.7
Winchcombe/Fairview	37.1	37.7	38.9	39.3	33.0	32.2	32.7	31.5	34.4
St Georges St (co location site)			36.3	34.4	34.6	33.3	36.4	32.5	35.2

■ 11 months data only     
 ■ 10 months data only     
 ■ no data or less than 10 months data

Figures highlighted in red are above the annual 40 ug/m<sup>3</sup> legal limit.

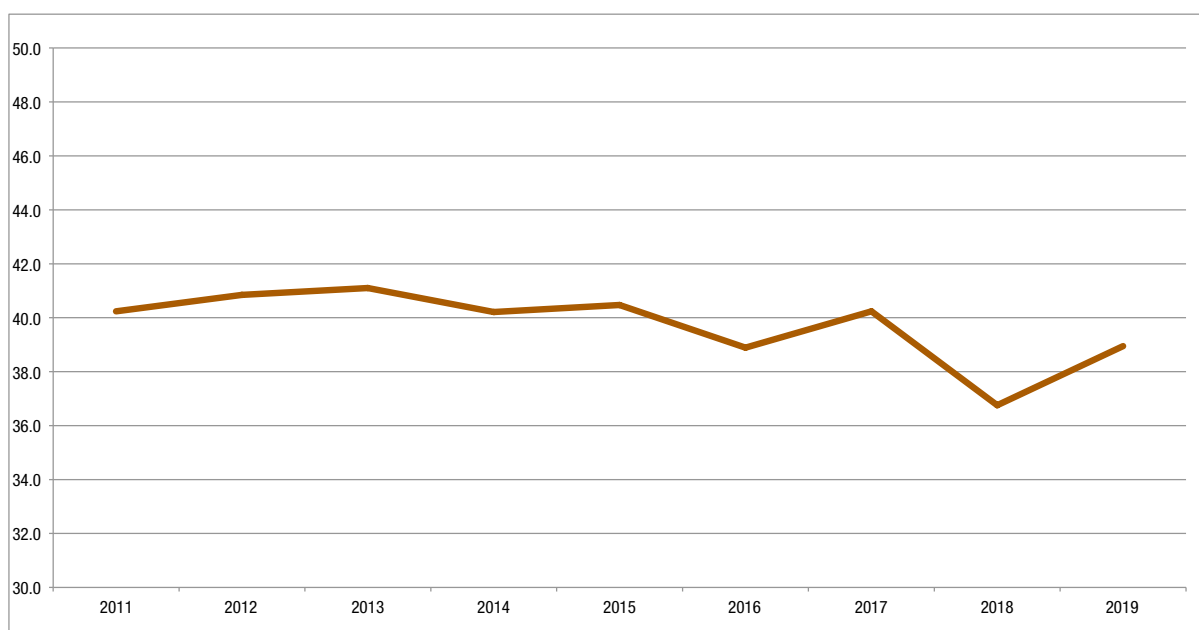


The 9 monitoring sites given above are broadly in the town centre. It isn't possible to look at air quality trends in other areas of the town, as CBC has not consistently monitored locations outside the town centre over the last 9 years. But this data clearly does not support the conclusion that there has been 'steady improvement' and a 'generally positive trajectory' in air quality in Cheltenham.

We can see the essentially static levels of air pollution in the town centre by looking at the average readings across the 8 sites for which there is full data for the 9 year period. (Data for the 3 co-location sites only exists for 7 years.)

**CBC data for NO<sub>2</sub> ug/m<sup>3</sup>, 2011 through to 2019, averaged across 8 town centre sites.**

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Average of 8 town centre sites	40.2	40.9	41.1	40.2	40.5	38.9	40.2	36.8	39.0



The variance between 2011 and 2019 is only 1.2 ug/m<sup>3</sup> NO<sub>2</sub> – around 2.9%. This is within the margin of error of diffusion tube sampling.

Bear in mind also that 12 out of the 72 data points (8 sites x 9 years) have some months where data is missing.

When looking at pollution data, DEFRA stresses that it is important not to look at a single year in isolation due to the influence of weather conditions.

The data shows that the average town-centre NO<sub>2</sub> levels for **2011 and 2017** were identical. There was a dip in **2018**, but this almost been completely reversed in **2019**.

Given the margin of error in diffusion tube monitoring, the issue of missing data from some of the monthly sampling, and the possible influence of weather conditions, the only conclusion is that air pollution levels in Cheltenham have remained broadly static over the last 9 years.

It may be that the policy decision to revoke the AQMA was taken on the basis of the 2018 dip. But the 2019 figures demonstrate why DEFRA stress that such decisions should not be taken by looking at one year in isolation.

**It is impossible to conclude from the data that there has been a 'slow but steady improvement in air quality'. A much more accurate statement would be that air quality has been essentially unchanged over the last 9 years.**

## 4.2 Department of Transport traffic counts show that traffic levels are unchanged over the last 10 years

Cheltenham's AQAP, and the cabinet paper on revoking the AQMA, both state that "*emissions from vehicular traffic are a major contributor to NO<sub>x</sub> levels*". Road traffic data from the Department of Transport shows that the AQAP has had no significant effect on traffic levels in the town centre – which supports the conclusion reached in the previous section that air quality in Cheltenham is essentially unchanged over the last 9 years

- DfT Traffic Count Point 18552 (Tewkesbury Road): a manual count in 2008 showed an Average Annual Daily Flow (AADT) of **20,731** vehicles. A manual count in 2018 showed an AADT of **20,632** vehicles.
- Traffic Count Point 70125 (North St/Portland Street): the manual count figures for 2008 and 2018 are **11,965** and **12,201** respectively.
- Traffic Count Point 38656 (Albion Street/Winchcombe Street): the manual count figures for 2010 and 2018 are **11,441** and **12,201** respectively.

CBC has had an Air Quality Action Plan in operation since 2011 – **but it has had no impact on traffic levels.**

## 4.3 CBCs progress on air pollution compared to other councils

By contrast, Oxford City Council has achieved **a decline of 37% in NO<sub>2</sub>** levels over the period 2008 to 2018. (See their latest Air Quality Annual Status Report 2018, which can be downloaded from: [https://www.oxford.gov.uk/info/20052/air\\_quality/1216/annual\\_air\\_quality\\_reporting](https://www.oxford.gov.uk/info/20052/air_quality/1216/annual_air_quality_reporting))

This is an example of what can be achieved by

- an Air Quality Action plan containing much more ambitious measures than the CBC Action Plan
- a borough council with a better working relationship with its County Council than exists between CBC and Gloucestershire County Council.



## 5: Issues with the Bureau Veritas modelling study used to justify the decision to revoke the existing AQMA

### 5.1 Modelled predictions of pollution do not meet DEFRA guidelines for accuracy

The proposal to reduce the size of the AQMA is based entirely on a 'dispersion modelling' study by Bureau Veritas (BV).

This methodology takes:

- an estimated 'background' level of NO<sub>2</sub>
- inputs estimated traffic data at a range of locations across Cheltenham, into an emissions model to generate estimates of NO<sub>2</sub>/NO<sub>x</sub> from traffic
- converts the estimates of NO<sub>x</sub> from traffic into an estimate of NO<sub>2</sub>, and adds this to the background level of NO<sub>2</sub>, to give a 'modelled' prediction of NO<sub>2</sub> levels at the range of locations being studied
- The predicted results are then 'verified' by comparison with actual NO<sub>2</sub> readings from diffusion tubes

The modelled data from the Bureau Veritas study had a Root Mean Square Error (RMSE) when compared to actual readings, of 14.3. (A RMSE of 0 would indicate a perfect fit between the model and reality).

DEFRA Technical Guidance is unequivocal on acceptable levels of error between modelled and actual results.

*"If the RMSE values are higher than ±25% of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. For example, if the model predictions are for the annual mean NO<sub>2</sub> objective of 40µg/m<sup>3</sup>, if an RMSE of 10µg/m<sup>3</sup> or above is determined for a model, the local authority would be advised to revisit the model parameters and model verification. Ideally an RMSE within 10% of the air quality objective would be derived, which equates to 4µg/m<sup>3</sup> for the annual average NO<sub>2</sub> objective." (Section 7.542 of DEFRA's Local Air Quality Management Technical Guidance (TG16) February 2018.)*

The Bureau Veritas study, on which the decision to revoke the AQMA, has a Root Mean Square Error of 14.3 ug/m<sup>3</sup>. DEFRA say that it should not exceed 4 ug/m<sup>3</sup> in these circumstances. **The modelling study therefore does not come close to what DEFRA deems acceptable, and should have been discarded in its present form.**

### 5.2 The 'adjustment factor' fudge

Instead, to cope with the inconvenient truth about this major inaccuracy of the modelled results, Bureau Veritas then applied an 'adjustment factor' of 3.688 to its predictions, in order to get the modelled results within DEFRA's objective of ±25% of the objective being assessed.

Table A4 (page 40) of the Bureau Veritas report, shows that this adjustment factor of 3.688 has been calculated as a (slightly incorrect) average of adjustment factors from 16 verification points, which range from **5.34 to 2.49!** To have such a range over just 16 datapoints means that there can be no statistical confidence in the use of an average adjustment factor of 3.688.

A virtually identical dispersion modelling study was recently prepared by Air Quality Consultants (AQC) on behalf of Gloucestershire County Council, in relation to the planning application for the proposed new Leckhampton School.

- Both consultants used the ADMS-Roads dispersion model (AQC used version 4.1, BV used v4.1.1).

- Both calculated vehicle emissions using the Emissions Factor Toolkit (EFT) 9.0.
- Both used the same DEFRA background NO<sub>2</sub> concentration maps.
- AQC used meteorological data from a weather station in Fairford, BV used meteorological data from a weather station in Pershore.
- Both consultants verified their modelled outputs for the road contribution of NO<sub>x</sub> against actual data from CBC roadside diffusion monitoring tubes.

But AQC's conclusion was that the outputs from their model needed to be corrected **by a factor of 5.8**.

This provides further evidence of the inaccuracy and unreliability of this particular modelling methodology.

### 5.3 The Bureau Veritas study implies there are issues at 4 locations, not just the one area covered by the proposed new AQMA

Page 31 of the Bureau Veritas report (section 6.1) reports modelled exceedances or near exceedances at 4 locations:

- Location A – spanning A4019 Tewkesbury Road, A4019 Poole Way and A4019 Swindon Road – this is the proposed new AQMA
- Location B – A40 Gloucester Road / A4013 Princess Elizabeth Way roundabout, adjacent to GCHQ;
- Location C – A46 London Road / Berkeley Street intersection; and
- Along stretches of arterial roads connecting to the Town Centre (Prestbury Road, London Road and A46 Shurdington Road).

Bureau Veritas themselves stress the uncertainty associated with their report. Section 4.5 (page 18) says:

*"Due to the number of inputs that are associated with the modelling of the study area there is a level of uncertainty that has to be taken into account when drawing conclusions from the predicted concentrations of NO<sub>2</sub>."*

Given this uncertainty, even if one was to disregard the points made about the unreliability of the whole study in 5.1 and 5.2 above, and take the BV report at face value, on what basis are Locations B, C and the arterial roads, being excluded from the proposed new AQMA?

Remember also that the modelling process yielded a range of required adjustment factors at different comparison sites (the range is between 5.34 and 2.49), and that an average adjustment factor of 3.688 was applied to all modelled sites, **to get them within a RMSE of ± 25%**.

But this level of potential error has been ignored, and the proposed new AQMA is based on just the 9 modelled sites predicted to be in excess of 40 ug/m<sup>3</sup> NO<sub>2</sub>.

Another 15 modelled sites are within 10% RMSE: these make up the other 3 locations listed by Bureau Veritas.

**But a total of 67 sites are within the range of ± 25% error.** If all these modelled sites were properly taken into account, the AQMA would have to cover the whole town centre area that was modelled.

**Even taking the Bureau Veritas study at face value does not support the decision to revoke the AQMA just to one single location.**

### 5.4 The decision to revoke the AQMA contravenes DEFRA guidance

Section 3.50 of DEFRA's Local Air Quality Management Technical Guidance (TG16) February 2018 states:

*"Pollutant concentrations may vary significantly from one year to the next, due to the influence of meteorological conditions, and it is important that authorities avoid cycling between declaring, revoking and declaring again, due simply to these variations. Therefore, before revoking an AQMA on the basis of*

*measured pollutant concentrations, the authority needs to be reasonably certain that any future exceedances (that might occur in more adverse meteorological conditions) are unlikely. For this reason, it is expected that authorities will need to consider measurements carried out over several years or more, national trends in emissions, as well as local factors that may affect the AQMA, including measures introduced as part of the Air Quality Action Plan, together with information from national monitoring on high and low pollution years."*

CBC is basing its decision to revoke the AQMA entirely on the Bureau Veritas modelling. As discussed above, this modelling study does not come close to DEFRA's required level of accuracy. Neither has CBC demonstrated that it has "*considered measurements over several years or more*". What limited data from NO<sub>2</sub> diffusion data that has been collected, does not meet the requirement for CBC to be "*reasonably certain that any future exceedances... are unlikely*"

To illustrate how extraordinary this decision is, **Cheltenham will be the only local authority in England, Scotland or Wales to have revoked an Air Quality Management Area**. No other authority (outside of Northern Ireland) believes it has made enough progress to do so – even those councils such as Oxford which, unlike Cheltenham, can point to some improvements.

## 6 Air pollution from particulates has been ignored in the decision to revoke the existing AQMA.

### 6.1 Particulates are at the heart of the government's Clean Air Strategy

The DEFRA Clean Air Strategy 2019 says there will be *"tough new goals to cut public exposure to particulate matter pollution, as recommended by the World Health Organisation"*. It says that *"comprehensive action is required across all parts of government and society to meet these goals."*

The Clean Air Strategy states that *"there will be a new, ambitious long-term target to reduce people's exposure to PM<sub>2.5</sub>... (so that) ... the number of people living in locations above the WHO guideline of 10ug/m<sup>3</sup> is reduced by 50% by 2025"*.

The DEFRA National Air Pollution Control Programme (March 2019) makes it clear that local authorities will have an *"implementation role, enforcement role, reporting and monitoring role"* for the new Clean Air Strategy.

**It therefore makes no sense for CBC to do a major re-evaluation of its approach to tackling air pollution in Cheltenham without any consideration of pollution from particulates.**

### 6.2 Evidence that PM<sub>2.5</sub> pollution is a serious problem in Cheltenham

CBC has never undertaken any monitoring of particulate pollution – unlike many other towns and cities. (Cambridge, has 5 sites continually monitoring particulates, as does Bath; Oxford has 2, just to give some examples.)

In the 2016 update of the AQAP, CBC justified its approach not to monitor particulates as follows:

*"As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.*

*No PM<sub>2.5</sub> monitoring was carried out by Cheltenham Borough Council during the period covered by this report. Historical Urban Background monitoring up to 2009 did not identify any exceedance of PM<sub>10</sub> levels, which correlate closely with PM<sub>2.5</sub> levels, but it is possible that roadside locations near to busy roads and junctions could exhibit elevated levels of PM<sub>2.5</sub>.*

*Unfortunately there is no currently practical or affordable method for measuring PM<sub>2.5</sub> levels at roadside locations where there is potential exposure in Cheltenham.*

*This Local Authority will look at measures to include consideration of PM<sub>2.5</sub> for ASRs\* subsequent to this one.* (\* Annual Status Report.)

The 'historical urban background monitoring' mentioned was derived from a 2005 DEFRA report where an estimate of 'background' particulate was derived from PM<sub>10</sub> monitoring at a small number of sites across the UK. The nearest two sites to Cheltenham at the time were Bristol and Birmingham. So this is a fairly flimsy basis on which to justify not measuring PM<sub>2.5</sub> (more dangerous than PM<sub>10</sub>) over the next 15 years...

Since then:

- there has been a surge in scientific and medical reports emphasising the health risks of PM<sub>2.5</sub> pollution in particular. These are so widely reported and well known, it is not necessary to reference them here.
- The World Health Organisation has been recommending (since 2005) limits on particulates which are much lower than the old DEFRA limits. As noted above, DEFRA now recognises it should move to these new, lower limits.
- Accurate and low-cost particulate monitors are now widely available.

Leckhampton with Warden Hill Parish Council (LwWHPC) has recently installed 2 Purple Air monitors on Leckhampton Road, and Church Road.

The PlanTower particle counters inside these monitors have been widely assessed by peer-reviewed academic papers (e.g. Nature, (2019) 9:7497 | <https://doi.org/10.1038/s41598-019-43716-3>), and also by the EU Commission (iScape Report 2017) which have all concluded that they correlate well with both USA and EU reference monitors for particulates at the 1.0 ug and 2.5 ug particle size thresholds.

The Leckhampton Road monitor has been operating continuously for over 7 months, and the Church Road monitor for one month, and data is publicly available from the Purple Air website.

In summary:

- the 'annual mean' level for PM<sub>2.5</sub> on Leckhampton Road, (averaged over the period Monday 15 July 2019 to Sunday 5 January 2020) was **11.80 ug/m<sup>3</sup>**. This means that it is almost certain that when a full year's results are included, (i.e. by July 2020), Leckhampton Road will be in breach of the WHO threshold that people should not be exposed to an annual mean level greater than 10 ug/m<sup>3</sup>.
- The other WHO threshold relating to PM<sub>2.5</sub> pollution, is that people should not be exposed to a **daily** mean greater than **25 ug/m<sup>3</sup>**. The data from the LwWHPC monitors shows that this threshold is being breached **1 day in 5** in January, and 1 day in 10 over the 7 month period from July 2019.
- The **highest daily average** reading recorded was **over 40 ug/m<sup>3</sup>**. The **highest hourly average** recorded was **over 80 ug/m<sup>3</sup>**.

**This evidence demonstrates that CBC is incorrect in its belief that there is no issue with pollution outside the town centre.** Leckhampton is suffering from levels of particulates above the WHO guidelines that DEFRA is committed to implement.

There is a correlation between levels of NO<sub>2</sub> pollution and levels of particulates. Leckhampton with Warden Hill Parish Council has been measuring levels of NO<sub>2</sub> pollution across its parish for over 18 months. In Leckhampton Road, NO<sub>2</sub> pollution is typically around 20 ug/m<sup>3</sup> on an annual mean basis. (Data derives from the same type of Gradko diffusion tubes used by CBC, and is available on the LwWHPC website).

Given that many areas **across Cheltenham** show levels of NO<sub>2</sub> pollution significantly higher than this, and that there is a correlation between NO<sub>2</sub> and PM<sub>2.5</sub> pollution, **it is certain that levels of particulates will be even higher in many areas of the town.**

*For further information, please contact:*

*Peter Frings*

*Cheltenham Green Party*

*e: peterfrings@macace.net*