Bath's Clean Air Zone

Annual report summary 2021

Bath & North East Somerset Council

Improving People's Lives

This report can be made available in a range of languages, large print, on tape, electronic and other accessible formats from the Clean Air Zone Team.

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Introduction

For years, several locations in Bath have suffered unacceptable levels of air pollution which has put people's health at risk, especially those with heart and lung conditions. The chief contributor is road traffic, responsible for up to 92% of the city's nitrogen dioxide (NO_2) concentrations.

In 2017, the government directed the council to drive down NO_2 to within legal limits in the 'shortest possible time' and by the end of 2021 at the latest.

The Air Quality Standards Regulations 2010 require that the annual mean concentration of NO_2 must not exceed 40 micrograms per cubic metre of air ($\mu g/m^3$). In Bath, however, we have witnessed annual mean NO_2 concentrations regularly exceeding 60 $\mu g/m^3$ in some locations.

Following the ministerial direction, we undertook significant technical work which showed that a charging clean air zone would be the only measure capable of driving the levels of behaviour change required to meet this target.

During 2018, we held several well-attended public consultations resulting in the council's decision to approve a class C charging clean air zone. We also secured sufficient funds from the government to install the zone and provide financial support to help local motorists replace their polluting vehicles.

The zone was launched on 15 March 2021, charging all higher emission vehicles to drive in the city centre. This excludes private cars and motorbikes which do not have to pay in a class C zone. A higher emission vehicle has a pre-euro 6 diesel or pre-euro 4 petrol standard engine.

This document summarises the key findings from our annual report for 2021, presenting analysis of air quality, vehicle compliance and traffic movement data collected during the zone's first year of operation. To assess the zone's success, data from 2021 is compared to baseline data collected before the Covid-19 pandemic.

caused by vehicle emissions

Government directs council to act in 'shortest possible time'

Summary of findings

Data collected from air quality monitoring stations in 2021 indicate that the zone is working to improve air quality across the city.

Compared with 2019 (our pre-Covid baseline year) we note the following:

- a decreasing trend in NO_2 concentrations at all sites in Bath
- a 21% reduction in annual mean NO_2 concentrations within the zone
- a 22% reduction in annual mean NO_2 concentrations in the urban area outside the zone
- 8 fewer sites exceeding the limit value of 40 µg/m^3 (as an annual mean).

In 2019, 11 sites in Bath exceeded the limit value for annual mean NO_2 concentration, reducing to three sites in 2021. These sites all show decreasing trends, but they remain a concern and are being carefully monitored.

Additionally, by the end of December 2021, we saw 50% fewer chargeable, polluting vehicles driving in the zone than we saw during the first week of launch (March 2021). The council's financial assistance scheme has contributed to this reduction, helping to replace around 720 polluting vehicles (regularly driven in the zone) with cleaner, compliant ones.

Covid-19 lockdowns and the temporary closure of Cleveland Bridge (June to November 2021), have had a significant impact on the volume and direction of traffic through the city, which means the impact of the zone alone on air quality remains inconclusive until further data is collected during 2022.

Our work is overseen by the government's Joint Air Quality Unit (JAQU) and experts are also independently verifying our work. We keenly await the outcome of the government's review of our Annual Report and associated data.

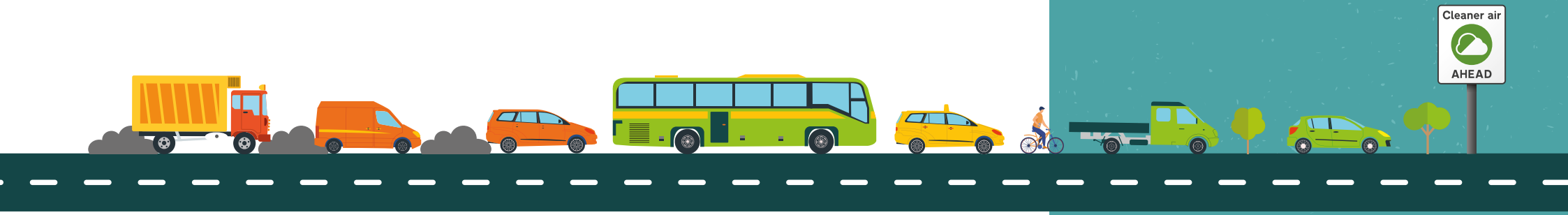
The zone is one of many council initiatives across the Bath & North East Somerset area that will help improve air quality, promote sustainable transport and tackle the climate emergency.

Other cities around the UK have also introduced zones, including Birmingham (Class D) and Portsmouth (Class B). More cities are introducing zones, with some likely going live in 2022/23 including Bradford and Bristol.

Our findings are explained in more detail on page 12-15 and in our full Annual Report.

Within the zone

Urban area outside of the zone



Air pollution in Bath

Air pollution is a leading public health risk with an estimated 28,000 to 36,000 deaths annually attributed to it in the UK[1]. A major source of poor air quality contributing to nitrogen dioxide (NO_2) pollution and particulate matter (PM) pollution, is road traffic.

Particulate matter pollution, referred to as PM_{10} or $PM_{2.5}$, is made up of tiny bits of material from all sorts of places including smoke from fires, exhaust fumes, smoking or the dust from brake pads on vehicles. These particles are too small to see, and we can breathe them in without noticing.

Nitrogen dioxide (NO_2) comes from burning fuels or other materials, so concentrations are especially high around roads. But they are also produced from home gas boilers, bonfires, and other sources. You cannot see or smell nitrogen oxides, but they mix with the air we breathe and are absorbed into our bodies. Vehicle exhaust emissions contribute 35 per cent of all UK nitrogen oxide emissions (NOx) which is the single greatest source[2].

Particulate matter pollution in Bath was not found to exceed legal limits and there has been a downward trend in levels in Bath since 2017. However, annual average nitrogen dioxide (NO_2) concentrations have regularly exceeded the legal limit of 40 µg/m^3 at several locations in the city, chiefly caused by vehicle emissions.

The problem is made worse by Bath's topography. The city sits in the bottom of a valley surrounded by hills, and its central roads are flanked by tall buildings. This means that in certain conditions vehicle emissions get trapped, causing high levels of NO_2 in certain locations. In general, areas outside of the city, even where traffic levels are high, do not experience such high levels of NO_2 because the pollution can disperse more quickly.

[1]Public Health England. Review of interventions to improve outdoor air quality and public health, 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938623/Review_of_interventions_to_improve_air_quality_March-2019-2018572.pdf

[2]DEFRA. Air quality: explaining air pollution – at a glance, 2019. https://www.gov.uk/government/publications/air-quality-explaining-air-pollution/air-quality-explaining-air-pollution-at-a-glance

You cannot see or smell nitrogen oxides, but they mix with the air we breathe and are absorbed into our bodies.

trap emissions

How air pollution affects our health

Air pollution particles and gases enter our bodies and can damage our cells in different ways. They usually get into our lungs and can then move into our blood to reach organs such as our heart and brain.

Any amount of pollution can be damaging to our health, but the more that you are exposed to, the bigger the risk and the larger the effect on you and your family. Some people are more vulnerable to the impacts of air pollution than others.

Those more at risk from air pollution include children, pregnant, vulnerable and older people, including those with lung and heart conditions (such as asthma, chronic obstructive pulmonary disease, lung cancer, coronary artery disease, heart failure and high blood pressure).

Long-term exposure to air pollution is linked to premature death associated with lung, heart and circulatory conditions, while short-term exposure can cause asthma attacks and increase hospital admissions. Research shows that high levels of NO_2 can affect children's lung development and that children who grow up in highly polluted areas are more likely to develop asthma.

Clean air is important for everyone. It will alleviate stress on our health system, improve people's lives and make our society more equitable.

Worsens heart and lung conditions

in the UK per year

Why we need a charging zone

A charging clean air zone works by levying a charge on motorists with older polluting vehicles i.e., pre-euro 6 diesel or pre-euro 4 petrol vehicles. Both the inconvenience and the charge is designed to discourage motorists from driving in polluted areas (the zone) and speed up the natural replacement of polluting vehicles with cleaner, compliant ones that do not incur a charge.

Because excessive pollution in Bath is mostly caused by vehicle emissions, encouraging cleaner, less polluting vehicles is an effective way to quickly drive down pollution without restricting vehicle use in the city centre.

In Bath, the clean air zone was introduced alongside a financial assistance scheme which is helping local businesses and individuals to replace or upgrade polluting vehicles regularly driven in the zone.

The Euro 6/VI emission standard came into force in 2015 and has significantly reduced emissions, particularly for buses and coaches with larger diesel engines. A separate fund has supported bus companies to upgrade scheduled, higher emission buses to Euro VI standard.

Why we don't charge private cars

The two options capable of meeting the target set for us by the government were a Class D charging clean air zone (charging all higher emission vehicles including cars and motorbikes) or a Class C charging clean air zone (charging all higher emission vehicles, except private cars and motorbikes) alongside additional traffic management.

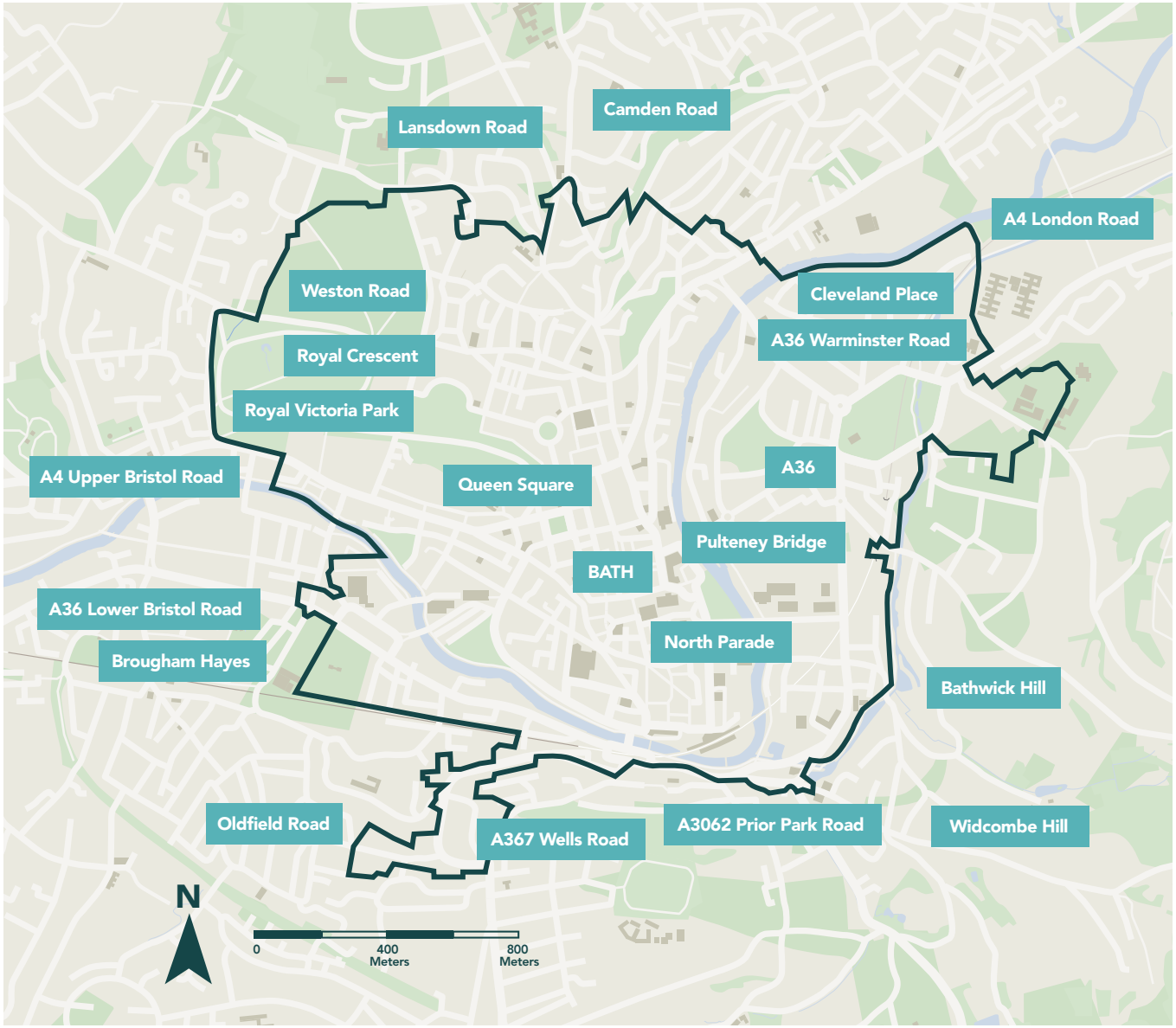
We engaged extensively with the public throughout 2018/19. The overwhelming opinion was that while we needed to tackle pollution, a class C CAZ would strike a better balance by tackling pollution while also protecting businesses and vulnerable residents that might be disproportionally affected by charging higher-emission cars.

Technical modelling suggested that we could achieve success with a Class C CAZ provided we also introduced traffic measures at Queen Square to address a particular NO_2 hotspot on Gay Street.

To further reduce emissions, the council was able to offer financial support to local businesses and individuals to help replace or upgrade many of the city's larger, more polluting vehicles.

The full business case for the CAZ was approved by central government in January 2020.

Zone boundary



The Clean Air Zone is as small as possible to minimise the social and economic impact of the scheme.

It's also designed to capture as many non-compliant vehicles as possible driving in the wider area to help tackle pollution both inside and outside of the zone.

How Bath's CAZ works

Bath's CAZ is a Class C charging clean air zone, which means that daily charges apply 24 hours a day, 7 days a week, 365 days a year to the following higher emission vehicles driving in the zone:

- Taxis, private hire vehicles (PHVs), vans (including pick-ups and N1 campervans), minibuses, and light goods vehicles (LGVs) - £9 per day
- Buses, coaches and heavy goods vehicles (HGVs) and private heavy goods vehicles (PHGVs) - £100 per day
- A discounted charge of £9 per day is also available for PHGVs, such as larger motorhomes and horse transporters, once registered with the Council.

Cars and motorbikes are not charged in a Class C CAZ, regardless of their emissions standard (except for taxis and PHVs).

A higher emission vehicle is any vehicle that does not comply with Euro 6/VI diesel or Euro 4/IV petrol emissions standards, and which is neither a compliant hybrid or a fully electric vehicle (ultra-low emission vehicle).

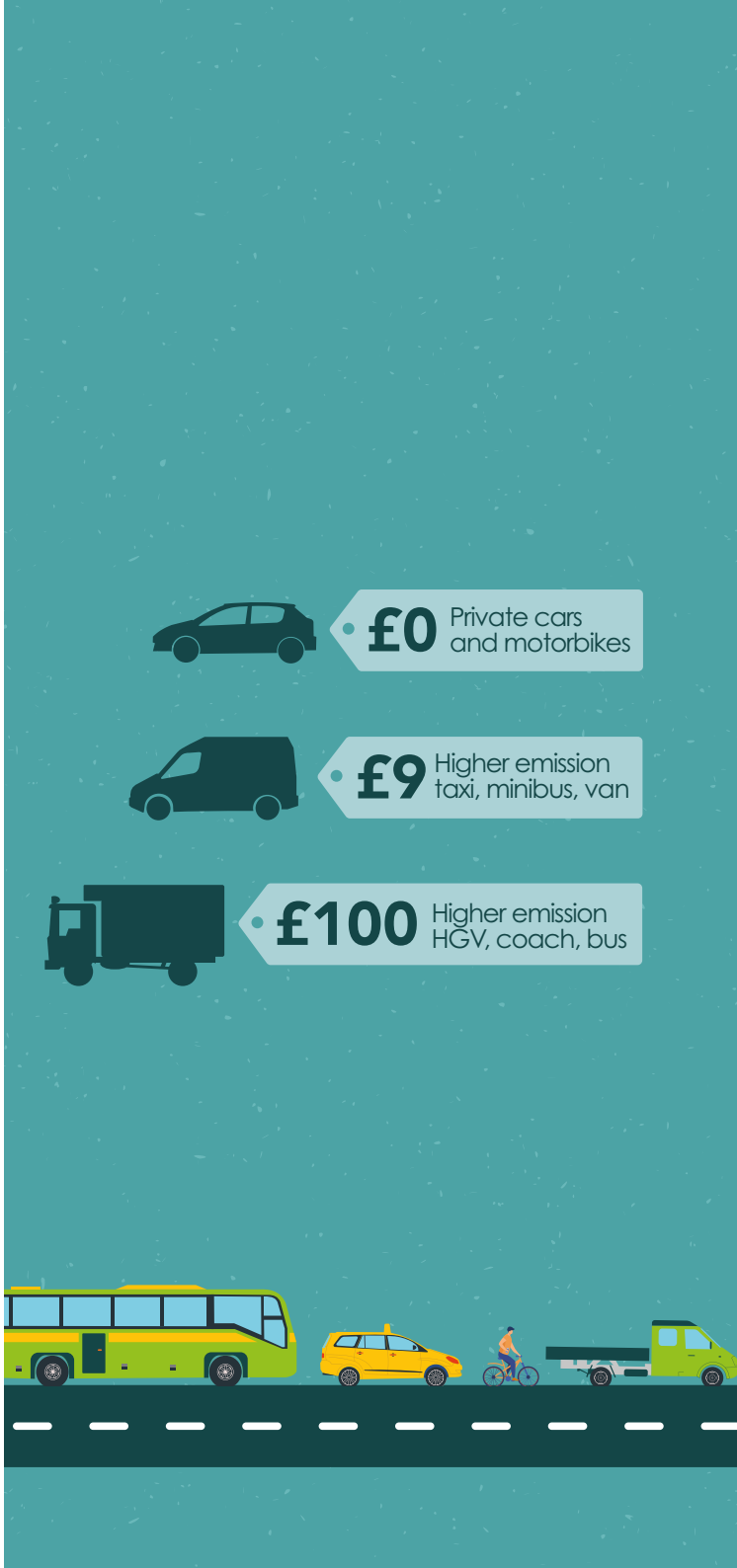
Motorists can use their registration number to check whether charges apply in any UK clean air zone by going to www.gov.uk/clean-air-zones

Exemptions

National exemptions apply permanently for ultra-low emission vehicles, hybrid and alternatively fuelled vehicles, disabled passenger tax class vehicles, disabled tax class vehicles, military vehicles, historic vehicles, and vehicles with retrofit technology accredited by the Clean Vehicle Retrofit Accreditation Scheme (CVRAS).

Local exemptions apply temporarily for two or four years (and for shorter periods) for certain vulnerable groups, hard-to-replace vehicles, and to encourage applications to the council's financial assistance scheme to upgrade or replace non-compliant vehicles.

For more information on local exemptions see www.bathnes.gov.uk/CAZexemptions



Financial assistance to upgrade or replace vehicles

£9.4 million of government funding was allocated to upgrade or replace polluting vehicles through the council's financial assistance scheme.

Eligible businesses and individuals could apply to the council's approved finance providers for interest-free finance (with a maximum repayment period of 60 months), plus grants of up to 35% of the net upgrade/replacement cost of the vehicle. They could also call on the support of a council advisor to assist them through the process.

To be eligible for the scheme, a local businesses or individual had to travel at least two days a week in the zone in a non-compliant chargeable vehicle and provide evidence of this using data from a telematic tracking device, fitted in the vehicle for 60 days.

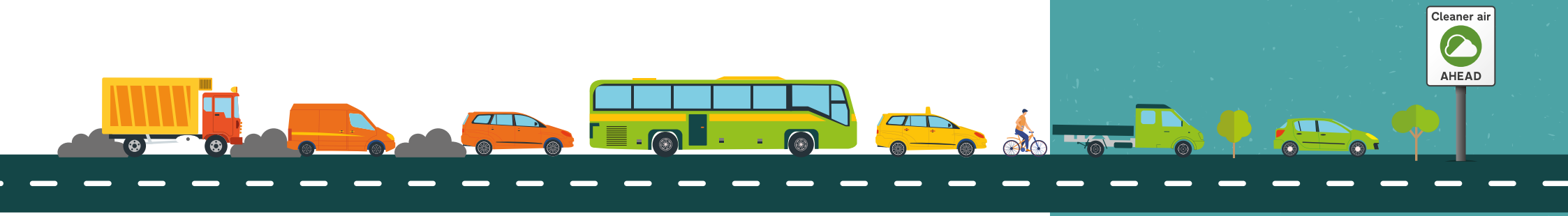
The scheme launched in November 2020 and by the end of 2021 it had helped replace 722 polluting vehicles with cleaner compliant ones. By the end of March 2022, 814 vehicles had been replaced. By the middle of 2022 we expect to see up to 1000 polluting vehicles replaced with the help of our scheme.

Supply chain issues have resulted in delays, so we are supporting drivers who have replacement vehicles on order with short-term exemptions. Vulnerable businesses and individuals with Euro 4 or 5 diesel vehicles who applied for and were eligible for finance, but failed the credit checks, were also eligible for an exemption.

"We are committed to supporting the CAZ - working together helps make our city a better place."
Centurion Travel

"Our CAZ compliant fleet has raised our environmental profile – helping us win new work."
Bath Property Maintenance

"Retrofitting our coaches through the scheme was a really cost effective way of increasing our fleet compliance - we are pleased our coaches can be used and not made redundant."
Berkley Coaches



How revenue from the zone is spent

Charges in the zone are designed to change behaviours rather than generate income for the council. The council's priority has been to inform people about the charge, deter polluting vehicles from entering the zone, and encourage those with chargeable, non-compliant vehicles regularly entering the zone to upgrade their vehicles with financial support.

Revenue from charges and fines is used to pay for the running of the scheme. Any money made over and above this must be reinvested in sustainable transport projects.

Financial information on the zone is outside the scope of the Annual Report. However, in the first year of operation the zone generated £5.6 million from charges and penalty charges notices.

In Spring 2022, we took the decision to allocate £2.5 million of surplus revenue over the next two years to the West of England's Combined Authority (WECA) fund for sustainable transport improvements across the region.

£5.6m
from charges and penalties

£2.5m
surplus donated to sustainable transport improvements

Findings

The following sections highlight the main findings of the Annual Report looking at the zone's impact on air quality, traffic flow and vehicle compliance.

Covid-19 had an unprecedented impact on travel behaviour in 2020, so we draw on baseline data from 2019 to measure the effectiveness of the zone on air quality. We also use baseline data from 2017/18 to help us understand the impact of the zone on traffic flows. This is the latest year with sufficient comparable traffic count data.

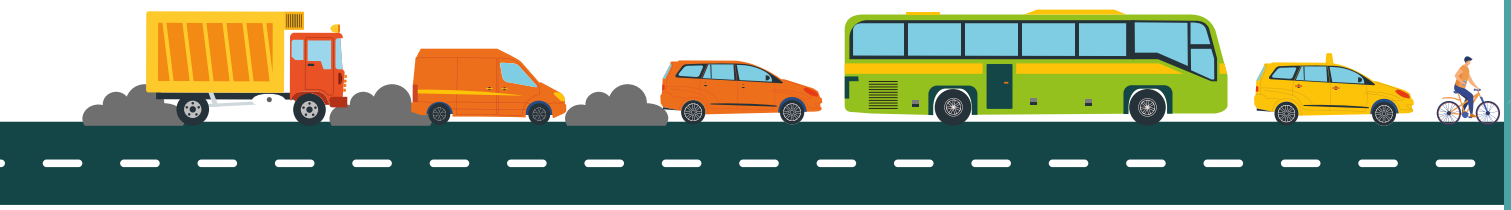
For more information on how we measure and present the data please see the full report.

How we monitor air quality

We have measured NO_2, PM_{10} and $PM_{2.5}$ in Bath and North East Somerset since the mid-1990s. Four automatic analysers measure NO_2 and particulate matter in permanent roadside locations in Bath. Lighter, mobile diffusion tubes measuring only NO_2 concentrations are placed at 160 kerbside locations.

66 diffusion tubes are in the clean air zone, 57 in the city's urban area outside of the zone, and a further 40 in the wider district. 50 key sites with higher levels of pollution have three diffusion tubes at each location to improve data confidence.

For more information about air quality across the area go to: https://www.bathnes.gov.uk/services/environment/pollution/air-quality



The impact of Covid-19 and Cleveland Bridge

The impact of the Covid pandemic is far-reaching. We've seen significant changes to traffic composition, including reduced peak-time traffic in the mornings, a greater spread of traffic throughout the city across the day, and a sharp increase in e-commerce and home deliveries, with more vans driving in our neighbourhood streets.

From June 2021, Cleveland Bridge was closed to traffic for structural repairs, reopening to cars and smaller vans in November. It will not open to heavier vehicles, such as larger vans, HGVs, buses and coaches until the structural repairs are complete. The bridge normally carries around 17,000 vehicles per day that were diverted through the centre of Bath or, for heavier vehicles, onto the A36 Warminster Road and A4 Bath Road. Air quality has been affected across the city.

Air quality results

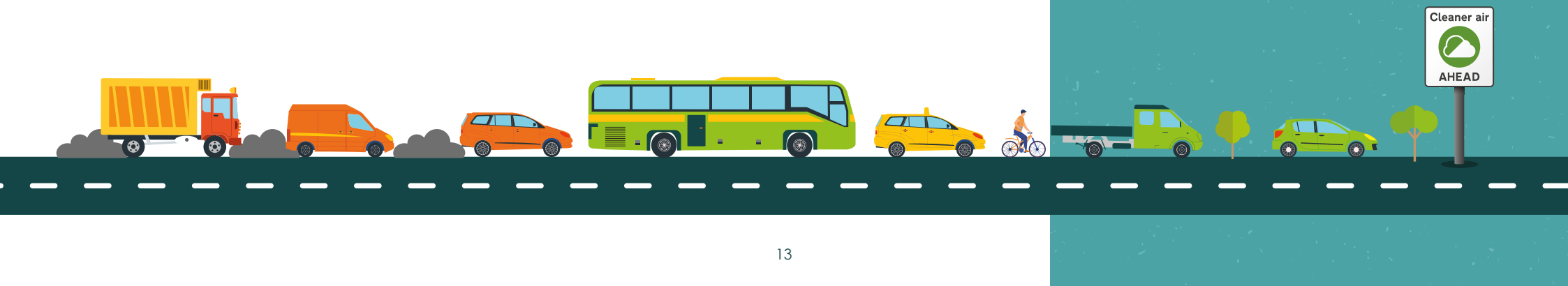
There are clear indications that the clean air zone is working to improve air quality across the area, not just within the zone.

- All monitoring sites within and outside the zone saw an overall decreasing trend, with annual average NO_2 concentrations lower than 2019.
- Overall, the annual mean nitrogen dioxide (NO_2) concentration for 2021 in the zone is 21% lower than in 2019. This is an average reduction of 7 µg/m³*.
- The number of sites in the zone exceeding the legal limit value of 40 µg/m³ as an annual average fell from 10 sites in 2019 to 3 sites in 2021.
- Sites recording more than 40 µg/m³ as an annual mean are:
  - Walcot Parade 2: 43.1 µg/m³ in 2021 compared with 55.2 in 2019
  - Wells Road: 42.6 µg/m³ compared with 45.2 in 2019
  - Dorchester Street: 40.5 µg/m³ compared with 55.2 in 2019
- Overall, the annual mean nitrogen dioxide (NO_2) concentration for 2021 in the urban area outside the zone is 22% lower than in 2019. This is an average reduction of 5.5 µg/m³**.
- In 2021, no monitoring sites in the urban area outside the zone recorded an annual mean NO_2 concentration above the limit value of 40 µg/m³.
- Overall, the annual mean NO_2 concentration in the wider Bath and North East Somerset area is 18% lower than in 2019.

Some sites showed higher NO_2 concentrations as a quarterly average, but not as an annual average. Meteorological conditions (the weather) and local transport issues, such as diversions, influence pollution levels. Therefore, to determine trends and measure improvement, we always use annual mean (average) concentrations.

*This is the average reading from a total of 65 monitoring sites that recorded data in both 2019 and 2021, with at least 25% data capture at all sites.

**This is the average reading from a total of 56 monitoring sites that recorded data in both 2019 and 2021, with at least 25% data capture at all sites.



Traffic volume and flow results

Looking at traffic trends helps us understand the impact of the zone on traffic displacement and air quality.

The zone inevitably creates some traffic displacement because motorists with more polluting vehicles will seek to avoid it until they can upgrade or replace their vehicle. However, we monitor areas of concern to ensure that any displacement does not contribute to deteriorating air quality, safety, or amenity.

The closure of Cleveland Bridge and the impact of the Covid-pandemic on traffic flow means that we cannot draw clear conclusions on the impact of the zone on traffic displacement in 2021.

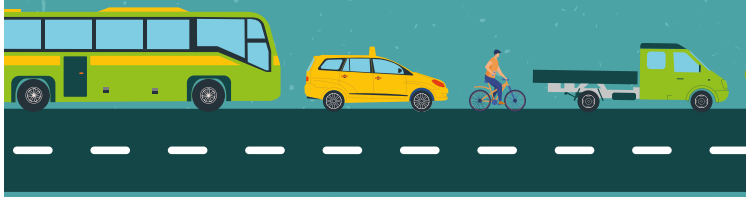
We use data from 2017/18 for comparing traffic flows, because there is insufficient data for periods in 2019.

You can find out more about the locations we are monitoring in our full report (Appendix 2)

- Nationally, traffic volumes returned to pre-pandemic levels by May 2021 at 101% of levels recorded before the first lockdown in February 2020.
- In Bath and North East Somerset, traffic levels are near to, but have not yet returned to pre-pandemic levels in any area.
- Compared to 2017/18, traffic volumes in 2021 were, on average, 13% lower within the zone, 12% lower in the urban areas outside the zone, and 15% lower in the wider B&NES area.
- The first half of 2021 saw significantly lower traffic volumes due to Covid-19 pandemic lockdowns. By December 2021, traffic in the zone had recovered to just below pre-pandemic levels.
- The work-from-home culture developed during the pandemic means traffic pattens have changed. There remains a morning and evening peak but the evening peak has reduced in intensity and is spread over more hours.
- The closure of Cleveland bridge significantly affected both the levels and direction of traffic from the end of June through November.
- Lighter vehicles could divert through the centre of town and past known NO_2 hotspots, and heavier vehicles along the A4 and A36.
- At sites where we monitor both traffic and air quality, there is indication that short term increases in traffic have caused air quality to deteriorate, despite an overall improvement at all sites when we look at annual mean concentrations.
- Chapel Row saw increased traffic volumes following the closure of Cleveland Bridge, coinciding with deteriorating air quality in the final quarter of the year.

An increase in e-commerce and home deliveries means we're seeing more vans on neighbourhood streets that are unlikely to be related to clean-air-zone avoidance.

We continue to monitor air quality and traffic flow



Vehicle compliance results

Charging clean air zones are designed to encourage people to replace older, polluting vehicles more quickly than they might otherwise.

To support motorists affected by charges and to further improve air quality, we introduced a generous financial assistance scheme worth £9.4 million to help local businesses and individuals replace polluting vehicles with cleaner, compliant ones.

Cars and motorbikes are not charged, regardless of emissions, and compliance rates are expected to improve naturally over the next few years.

A bus retrofit scheme, worth £1.4 million, was also introduced to encourage the upgrade of all scheduled buses in Bath to Euro 6/VI standard.

Compliance, or a compliant vehicle, means a vehicle that meets the minimum emission standards for the zone, which is Euro 6 diesel, a Euro 4 plus petrol vehicle, a compliant hybrid or an ultra-low emission vehicle.

Replaced by the end of 2021

Applied for financial support to upgrade/ retrofit

Driving in the zone by Dec 2021

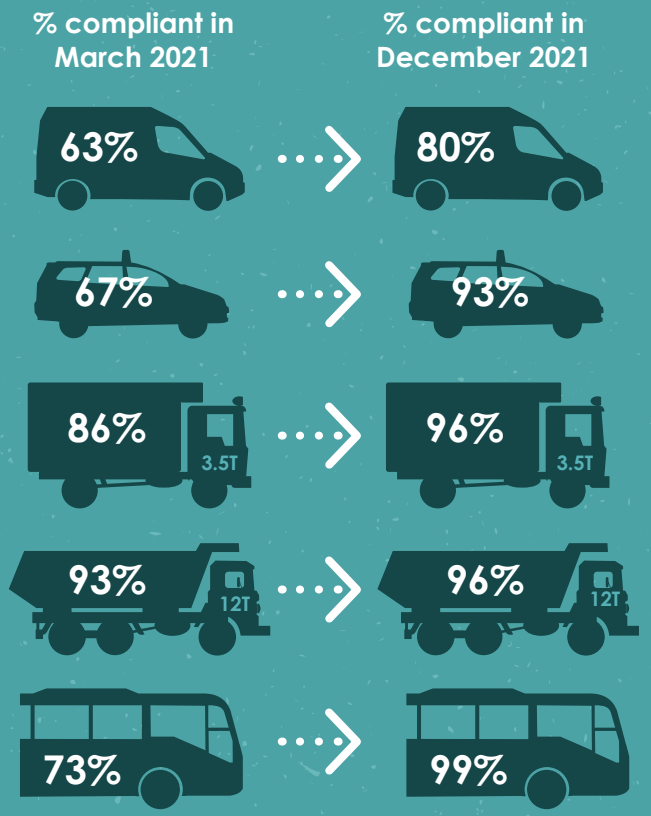
Key findings for fleet compliance as an impact of the zone and our mitigation/support are as follows:

- On average, 1,146 vehicles driven in the zone each day in March were non-compliant and chargeable. By December, this had halved to 550.
- Owners of over 1,500 vehicles applied for financial support to upgrade or retrofit their vehicle. 722 polluting vehicles were replaced by the end of 2021.
- We expect to upgrade 1,000 vehicles by the middle of 2022 through our financial support scheme. Delays are due to supply chain issues.
- 594 polluting vans have now been replaced with cleaner, compliant ones via the council's financial assistance scheme (with hundreds more replacements expected in the coming months).
- 91 polluting taxis/private hire vehicles have now been replaced with cleaner, compliant ones via the council's scheme.
- 22 non-scheduled, polluting buses and coaches have now been replaced via the council's scheme.
- Out of a total fleet of 226 scheduled buses, 88 were non-compliant when the bus retrofit programme started. By the end of December 2021, 85 of these had been successfully retrofitted to Euro VI standard. Three vehicles await a retrofit solution due to a shortage of parts.
- 14 non-compliant, chargeable HGVs have now been replaced via the Council's scheme (HGV compliance was already high at up to 93% compliance at the launch of the zone).

Driving in the zone each day

Travelling each day in the zone are cars

% improvement in compliance by vehicle type



Next steps

We are heartened to see air quality improving across the area and we would like to thank the public for its support, but we recognise that there is still more to do to drive down pollution at all locations in Bath.

- We await the government's review of our annual report and recommendations, now due autumn 2022.
- We will continue to operate and enforce a class C clean air zone and monitor air quality, traffic flow and vehicle compliance.
- We'll pay particular attention to sites that continue to exceed legal limits and consider specific initiatives to help.
- We will re-open our financial assistance scheme to encourage more businesses to upgrade or replace their vehicles.
- We will continue to promote long-term, sustainable habits around transport and private car use in line with the council's Journey to Net Zero policy.

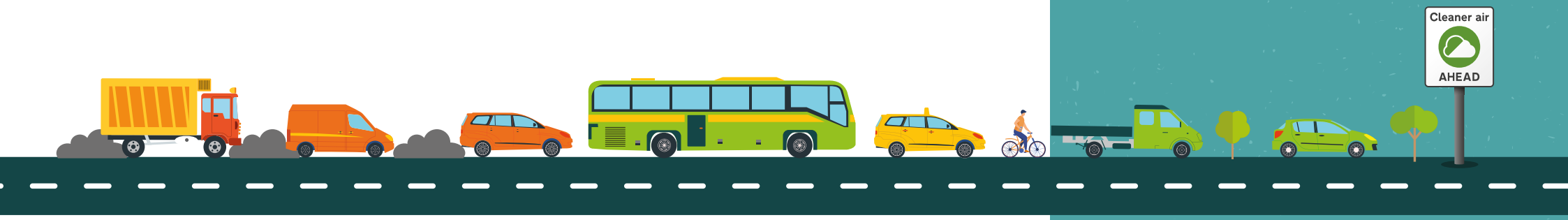
How you can help

There's lots you can do to help us drive down pollution in Bath.

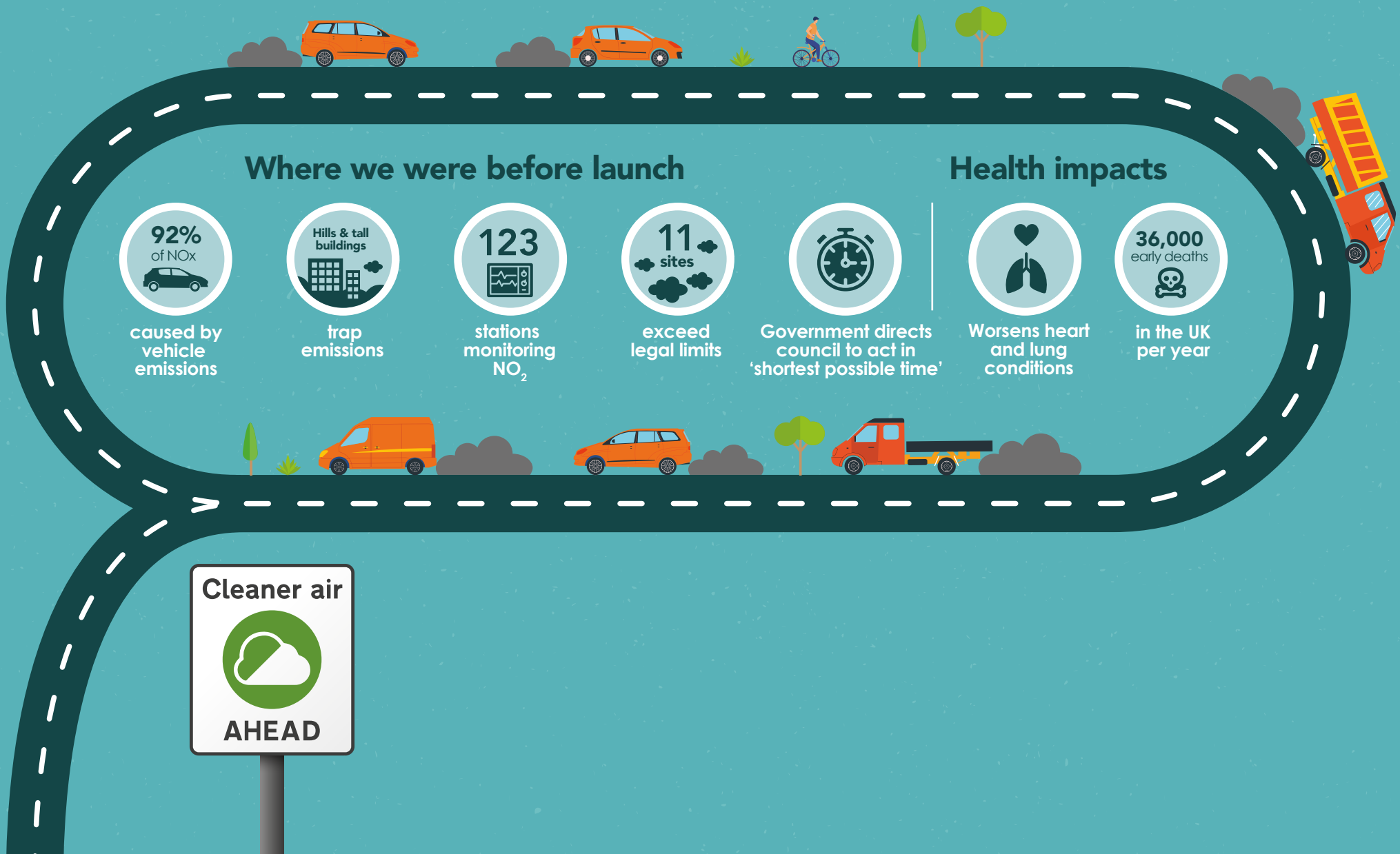
- Walk or cycle your short journeys in the city
- Consider taking public transport or using the park and ride
- When you replace your vehicle, consider a new or second-hand Euro 6 or 6d diesel vehicle, a compliant petrol vehicle, or an ultra-low emission vehicle
- Consider car-clubs and car-shares.

Further reading

- The Annual Report (in full) is available here.
- Additional information is available in the Cabinet Report, due July 2022.
- Read more information on the zone and how it works at www.bathnes.gov.uk/BathCAZ
- Read more about our Journey to Net Zero



Where we were



What we did

What we did

- **8,000** responses — to public consultation
- **Class C** ✓ — Charging CAZ approved

Support for those affected

- **£9.4m** — to upgrade vehicles
- **Exemption scheme** — to support vulnerable groups
- **£1.7m** — Bus retrofit scheme

Launch of the zone

- **15 March** 2021 — Zone launched
- **128** Cleaner air AHEAD — New signs
- **68** — ANPR cameras

£0 Cars and motorbikes

£9 Higher emission taxi, minibus, van

£100 Higher emission HGV, Coach, Bus

Cleaner air AHEAD

Week 1 of Bath's CAZ

- **40,000** unique vehicles — Driving in the zone each day
- **71%** private — no charge
- **6%** polluting — charged

On the right path..

- **720+** Polluting vehicles — Replaced with clean, compliant ones
- Chargeable vehicles in zone falls
- **85** — Scheduled buses upgraded

Improvement in compliance

- 86% to 96%
- 73% to 99%
- 63% to 80%
- 67% to 94%

Cleaner air AHEAD

Improvements

Air quality improvements

2021 post covid*
Traffic returns to near normal levels

21%
Air quality improves (inside and outside zone) **

8 more sites
now record NO_2 under legal limit

3 sites remain a concern
but show improvements

We continue to monitor air quality and traffic

£ surplus CAZ revenue
will be invested in sustainable transport

Help us on our journey

Most vehicles in Bath are cars

60% of car trips
start and end in Bath

To help, please walk or wheel short trips

2+
Consider using car-share or electric vehicles

Consolidate your deliveries

*Annual average compared with 2019 (pre-Covid)
** compared with baseline year, 2019