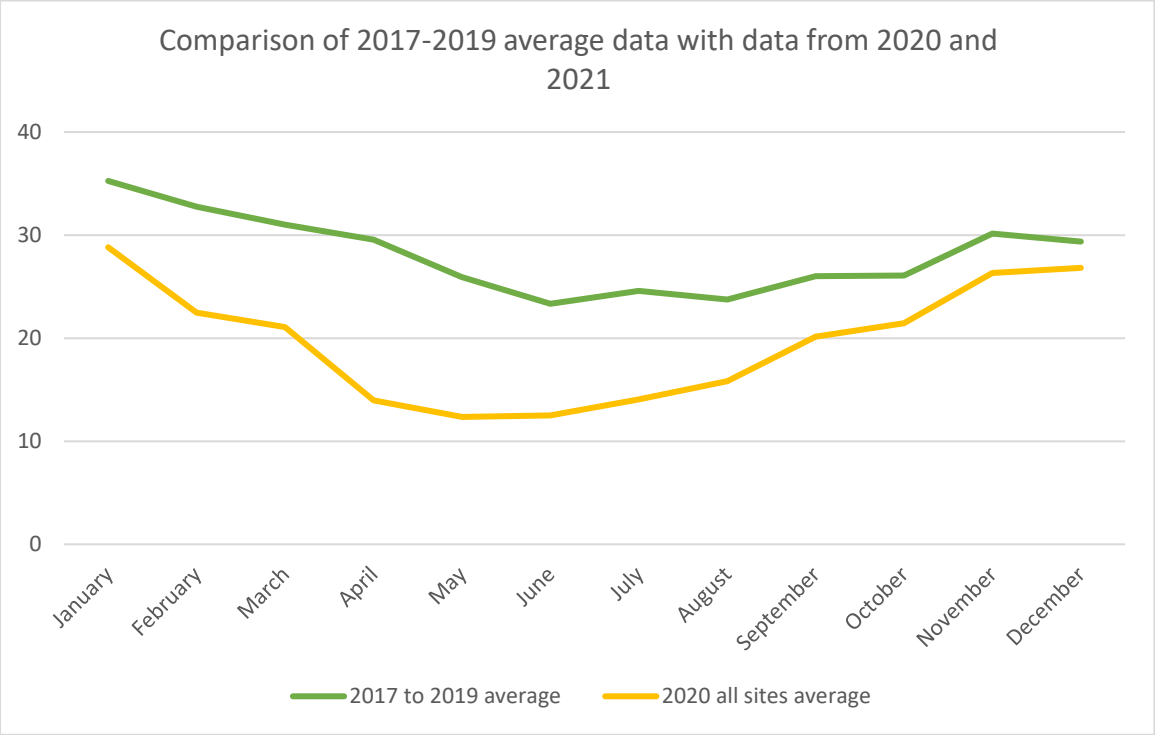
Air Quality in Cambridge – trends related to the COVID-19 lockdown, review of the last 18 months

This short note is to provide an analysis of air pollution trends related to reductions in traffic resulting from the COVID-19 lockdown.

- Lower traffic levels during lockdown resulted in lower measured levels of air pollution.
- As traffic levels increased, air pollution levels increased too.

Comparison of Nitrogen Dioxide levels before and during the pandemic



This graph shows the average of the nitrogen dioxide (NO_2) levels measured at the 5 Cambridge City Council continuously monitoring stations from the three years before the pandemic (top line in green) plotted against the measured air pollution levels in 2020 (second line down in yellow). Measured nitrogen dioxide levels in 2020 were already slightly below the average of the previous three years but dropped significantly when the lockdown restrictions were put in place at the end of March 2020.

The impact was recorded at all air quality monitoring locations across Cambridge, all measuring sites showed lower air pollution than would have been otherwise expected. This agrees with the national trend and is attributed to the reduction in traffic as a result of COVID-19 restrictions.

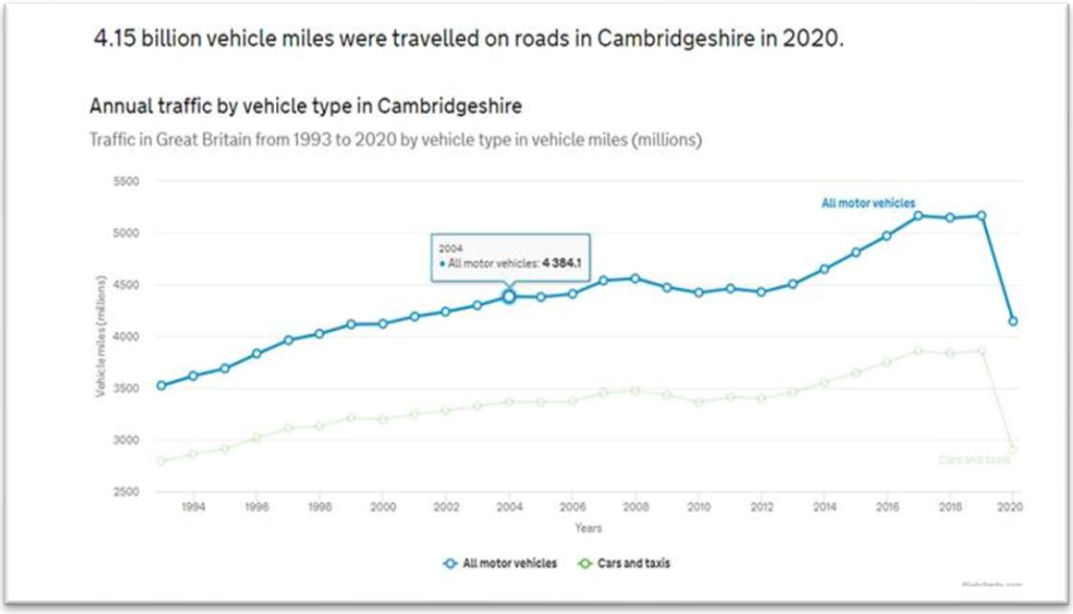
The continuous monitors recorded annual averages significantly lower than in 2019, especially in the city centre at Gonville Place and Parker Street. The diffusion tubes also measure nitrogen dioxide; these low cost devices are located at more than 70 locations in Cambridge. The data from the diffusion demonstrate that the greatest improvements in air quality during lockdown were in areas where traffic/air pollution is higher, and that the impact is less noticeable away from busy roads.

Traffic Data

The Department for Transport and Cambridgeshire County Council data for 2020 record significantly lower traffic counts than in 2019.

Over the whole year, traffic levels recorded by DfT were 4.15 billion vehicle miles in Cambridgeshire, down by 20% from 5.16 billion in 2019. The chart below shows the increase in vehicle miles in Cambridgeshire from 1994 (3.5 billion miles) to 2019 and 2020.

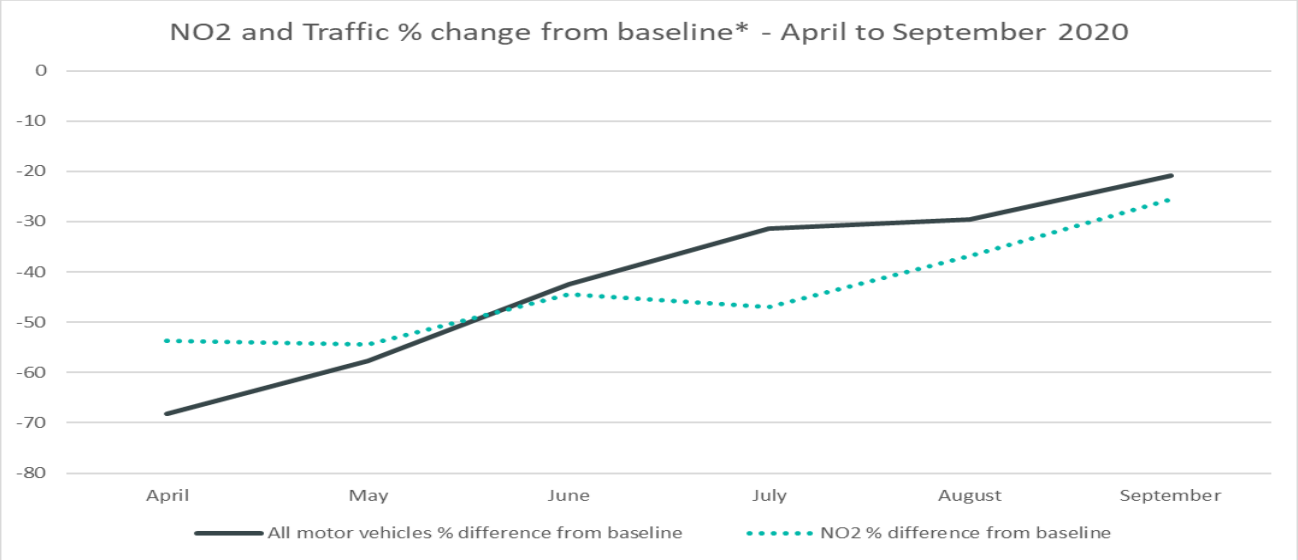
Traffic levels from 1994 to 2020



The Cambridgeshire County Council Traffic Monitoring Report for 2020 recorded 20% less traffic on the Radial screen line (traffic coming into and going out of Cambridge) and 17% less traffic on the Cam screen line (traffic coming into and out of the central part of Cambridge).

The Greater Cambridge Partnership (GCP) recorded a variety of transport related indicators from the beginning of the lockdown period. The next graph shows the difference in vehicle numbers compared with a neutral baseline of October 2019 (solid black line) plotted against the difference in air pollution compared with the previous three-year average. The chart shows two almost parallel lines demonstrating a clear link between fewer motor vehicles and lower levels of air pollution. As motor vehicles increased on the road, average nitrogen dioxide levels across all sites consequently increased, bringing levels closer to the baseline.

Monthly percentage change in recorded NO_2 and change in counted motor vehicles (GCP graph)

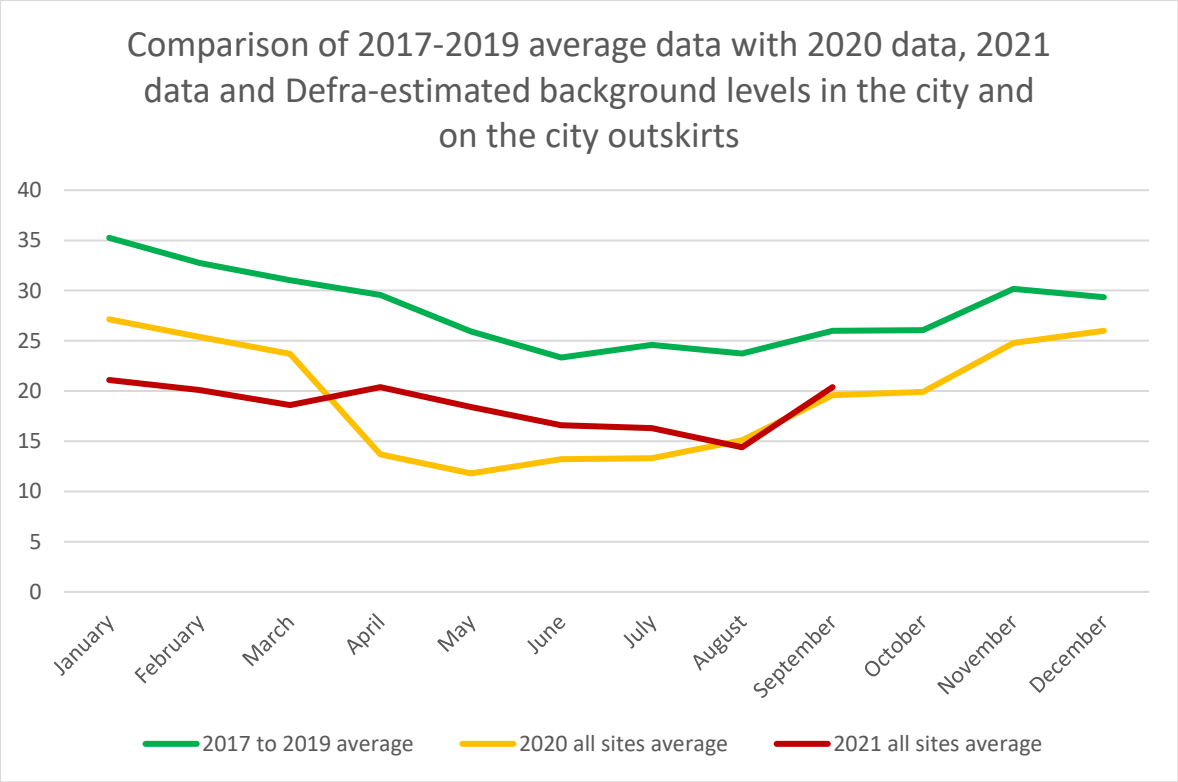


Recorded levels of particulate matter in 2020 fell slightly, unlike recent years where levels of particulate matter have remained stable. This corresponds with the national trend. Only a small proportion of overall particulate matter in Cambridge air is related to vehicular traffic, so the significant drops in traffic levels during lockdown periods has had only a small impact on overall particulate pollution levels in the city.

All sites continue to record a fall in air pollution compared with the average of the data for the 3 years, 2017 - 2019.

At the time of writing, air pollution measurements are not yet as high as they were before the pandemic; traffic levels are also lower in Cambridge.

This graph shows the average of the nitrogen dioxide (NO_2) levels measured at the 5 Cambridge City Council continuously monitoring stations from the three years before the pandemic (top line in blue), the measured air pollution levels in 2020 (second line down in orange) and the measured air pollution levels in 2021 to the end of September (third line in red).



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