Birmingham City Council

Clean Air Zone (CAZ) Baseline Report

May 2021

Table of Contents

Contents

Introduction

On 1 June 2021 Birmingham City Council launched the country's first Class D Clean Air Zone in central Birmingham. This report provides baseline air quality and traffic data for the scheme at the time of launch.

The scheme launched during the recovery phase following the third National Lockdown in response to the coronavirus pandemic in early 2021 and data in the fifteen months leading up to that time has been heavily influenced by behaviour changes brought about by the restrictions imposed on the country since the start of the first national lockdown in the country in March 2020. The impact of the pandemic will continue to influence behaviour and ultimately outcomes for some time until a 'new normal' can be established.

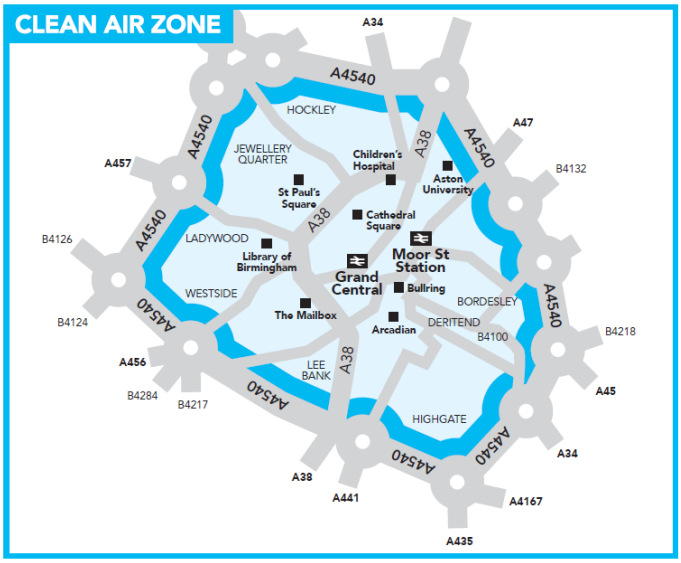
A number of measures are used to define the baseline position and in this report we consider air pollution concentrations, traffic flows and composition in advance of go live.

What is the Clean Air Zone (CAZ)?

A Clean Air Zone is an area where targeted action is taken to improve air quality, in particular by discouraging the most polluting vehicles from entering the zone. No vehicle is banned in the zone, but those which do not have clean enough engines will have to pay a daily charge if they travel within the area.

The Government has stipulated in a Ministerial Direction that Birmingham needs a Clean Air Zone and that we need to reduce levels of nitrogen dioxide (NO_2) in the air to a maximum average of 40µg/m^3 in the shortest possible time. The area to be encompassed by the Birmingham CAZ has been determined through an extensive technical exercise and public consultation and is shown in Figure 1 below.

Figure 1. Map of the Birmingham Class D Clean Air Zone



The Birmingham CAZ commenced on 01 June 2021 and operates in the central Birmingham area within the A4540 Middleway, but not on the ring road itself. The CAZ operates 24-hours a day, 365 days of the year. Vehicles must meet strict emissions standards to drive in the CAZ area:

- Euro 4 or better for petrol cars and vans (vehicles less than sixteen years old in 2021)
- Euro 6 or better for diesel cars (vehicles less than seven years old in 2021)
- Euro 6 or better for diesel vans (vehicles less than six years old in 2021)
- Euro VI or better for lorries, buses and coaches

Vehicles that do not meet these standards must pay a charge:

- Cars and light goods vehicles (vans) - £8 per day
- Coaches and HGVs - £50 per day

Further information on the Birmingham CAZ can be found at: https://www.brumbreathes.co.uk/

The Full Business Case for the Birmingham CAZ can be found at: https://birmingham.cmis.uk.com/birmingham/Decisions/tabid/67/ctl/ViewCMIS_DecisionDetails/mid/391/Id/dbb0a2ee-0e5c-4c26-bb25-5e8ffacb8066/Default.aspx

The air quality and traffic modelling reports for the Birmingham CAZ can be found at: https://www.birmingham.gov.uk/downloads/download/2347/clean_air_zone_caz

Assessing the trends prior to CAZ launch

The purpose of the CAZ is to improve air quality in and around central Birmingham by reducing the number of older more polluting vehicles that enter the city centre area. The impact of the CAZ will be assessed using a range of different metrics including:

- Air quality monitoring data (nitrogen dioxide)
- Numbers of vehicles of differing types
- The breakdown by age of the different vehicles to show fleet change over time
- Traffic flow data

The intention is to use these metrics to show how the CAZ drives changes in travel behaviour and vehicle use within the city and the intention is that they will be supported by additional metrics that explain the nature of these changes. It is further intended to develop a working dashboard that can display a range of data for public consumption.

This baseline report will however focus solely on the provision and analysis of information relating to air pollution concentrations and vehicle / traffic data to provide an early picture of the situation in Birmingham in advance of the launch of the CAZ.

Air pollution data

At present the Council monitor air pollution concentrations at a number of sites across the city with a greater concentration of monitoring sites within the city centre area, to assist in contextualising the position around the CAZ. A number of monitoring sites report pollution concentrations as being above the legal limit and the requirement to reduce these back down to under that limit and ultimately to protect public health is the rationale behind the CAZ. The Council make use of both automatic analysers which provide real time data on a near constant basis, allowing for greater trend analysis, and diffusion tubes which provide monthly average data. The output from both monitoring types are collated into monthly averages and ultimately into an annual average to allow a consideration of compliance with the legal limit.

Air pollution concentrations are however affected by many different factors including the weather and regional contributions from outside Birmingham and the West Midlands, as well as pollution imported from local schemes e.g. construction activities. It is important therefore to consider trends over a period of time, often measured in years.

In assessing a baseline for the CAZ it is important to recognise that Government monitoring and modelling as well as local i.e. Birmingham City Council monitoring and modelling comprising data from over many years have been combined to determine the need for the CAZ. The rationale for the CAZ is detailed in the Full Business Case documentation and this includes a dedicated air quality modelling report.

Air pollution concentrations

Within Birmingham the majority of local emissions of oxides of nitrogen (NO_X) stem from road traffic[1]. The purpose of the CAZ is to improve air quality in and around the city centre of Birmingham by reducing the number of older, more polluting vehicles that enter the area within the A4540 ring road. This will reduce the amount of NO_X emitted, which in turn will reduce nitrogen dioxide (NO_2) concentrations and bring Birmingham closer to compliance with the legal air quality limit values for NO_2.

This section of the report presents an analysis of data from Birmingham's air quality monitoring network. The data is publicly available on the Birmingham Air Quality website[2] and the data contained within the annually submitted Annual Status Report (also available on the website).

The analysis seeks to understand the shifting trend in air pollution concentrations within and around the city centre CAZ area and present a baseline against which this trend can be further tracked as the monitoring and evaluation programme progresses. The data under consideration comprise:

- Modelled data from within the Full Business Case for the Clean Air Zone
- Monitored data from automatic monitoring stations

[1] Draft Air Quality Plan for the achievement of EU air quality limit value for nitrogen dioxide (NO2) in West Midlands Urban Area (UK0002), Sept 2015, Defra

[2] www.birminghamairquality.co.uk

- Monitored data from diffusion tube sites

Air pollution concentrations are highly sensitive to the prevailing meteorology, such as wind speed, wind direction, precipitation and temperature, as well as the associated long-range transport of pollutants from outside of Birmingham and beyond the West Midlands conurbation. Many pollutants have a seasonal cycle which may be caused by seasonally varying emissions, such as heating in wintertime or agricultural emissions during spring or from chemical reactions resulting in changes to atmospheric pollutants brought about by increased sunlight.

These variations can be short term and give rise to abnormal concentrations over a day, week or month, or they can persist over longer durations and/or can combine with other factors to result in an unexpectedly high or low annual concentration. This is why it is important to consider changes in air pollutant concentrations over a number of years to better determine and understand any trends.

Air pollution baseline

In determining the data for the baseline the approach has been to make use of all monitoring sites in the city irrespective of location to show any changes in pollution concentration over the years from 2016 to 2019. Whilst there is a good data series for 2020 this is considered to be unrepresentative of any 'normal' due to the impact of the coronavirus pandemic. The data is still presented but not used when considering any trends for this report.

A further data set in the form of the predicted air quality modelling undertaken for the CAZ Full Business Case is available. This model was used to predict concentrations at a number of receptor points across the city and a large number of individual points were modelled. These points covered some existing monitoring points as well as receptor points from the Government's Pollution & Climate Mapping (PCM) model as well as a series of bespoke points to infill at certain locations. The full methodology behind the modelling is detailed in the Full Business Case.

The model was run for a number of years and a range of scenarios. For this report data has been taken from three years / scenarios:

- 2016 to show an early baseline before the CAZ
- 2020 to show a prediction of without a CAZ in force
- 2022 with the CAZ and additional measures being in place

For this baseline analysis report not all receptor points have been chosen for each year / scenario, the focus has been on those points where the model predicted an exceedance of the legal limit in 2020 under do minimum circumstance i.e. without the CAZ in place. These are considered to represent the 'worst' non-monitored points on the network according to the model.

The locations of the data points are presented in Figures 2, 3, 4 and 5 on the following pages. A description of the details comprising the receptor points including site reference, site descriptor, geospatial coordinates, along with the monitored and modelled concentrations (as appropriate) is displayed in Appendix 1.

Figure 2. Location of automatic monitoring station

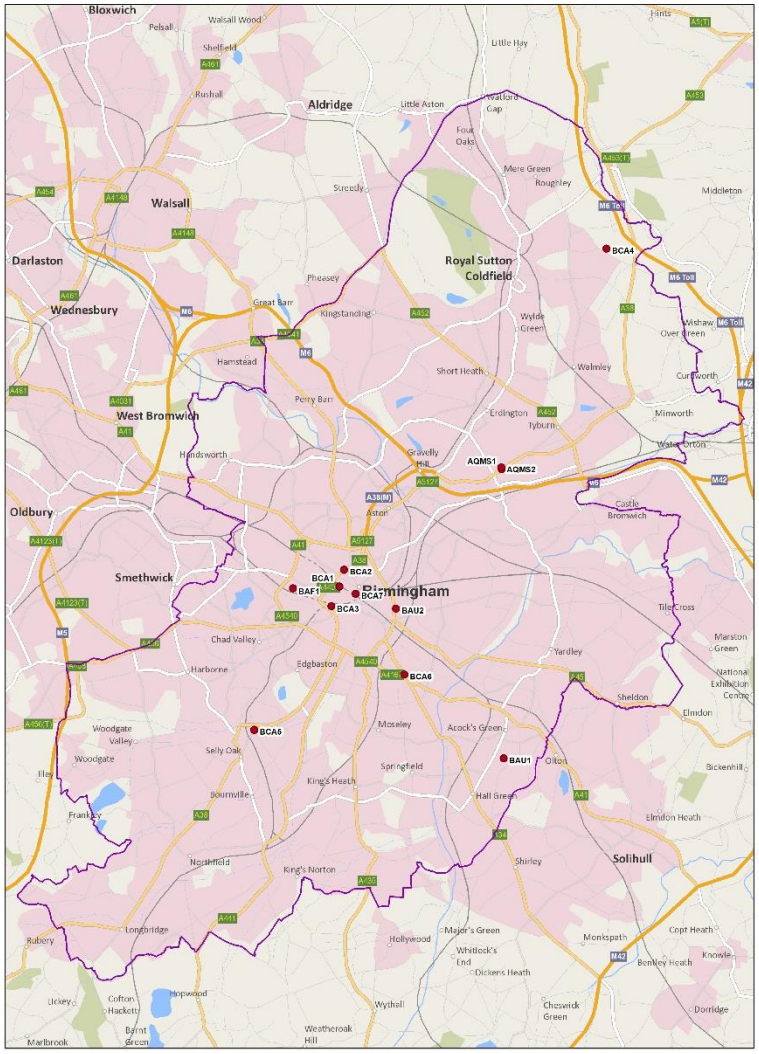


Figure 3. Location of city wide diffusion tube sites

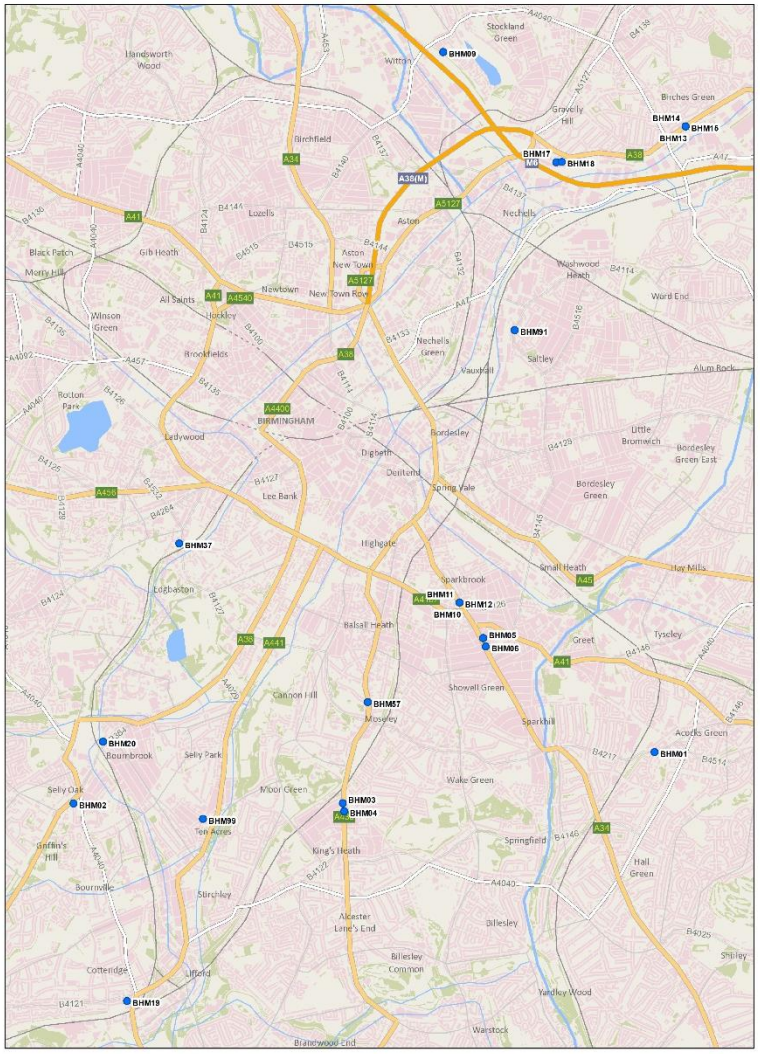


Figure 4. Location of CAZ area diffusion tube sites

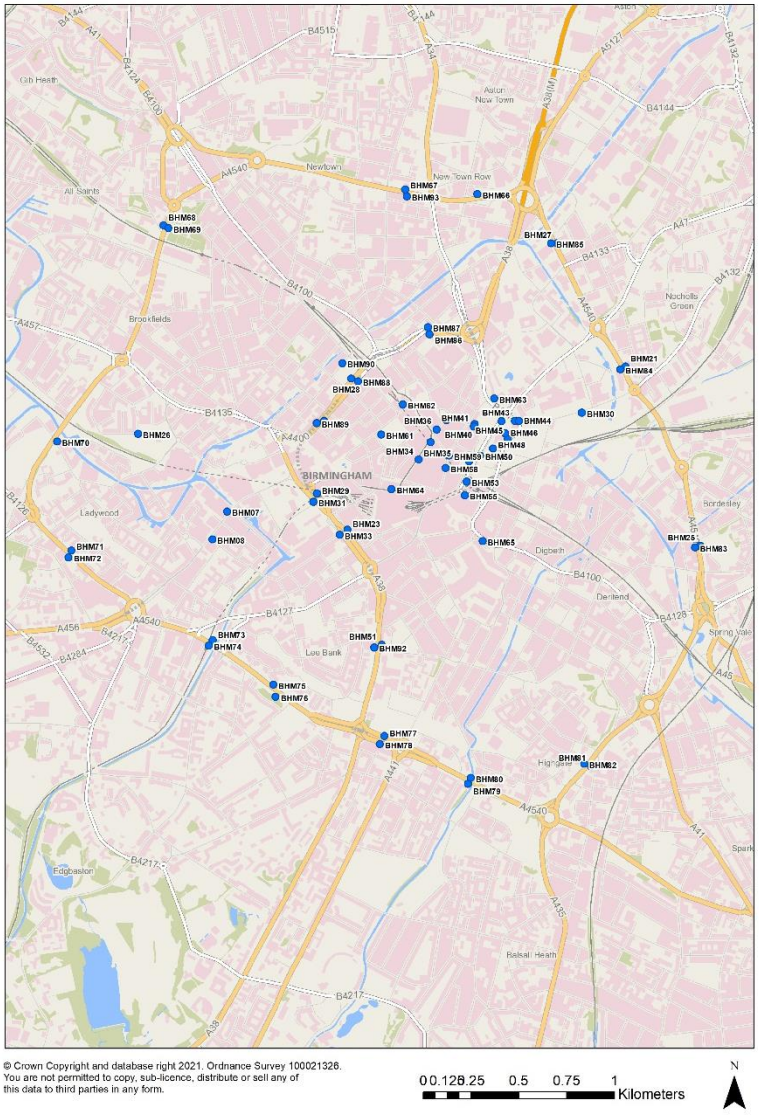
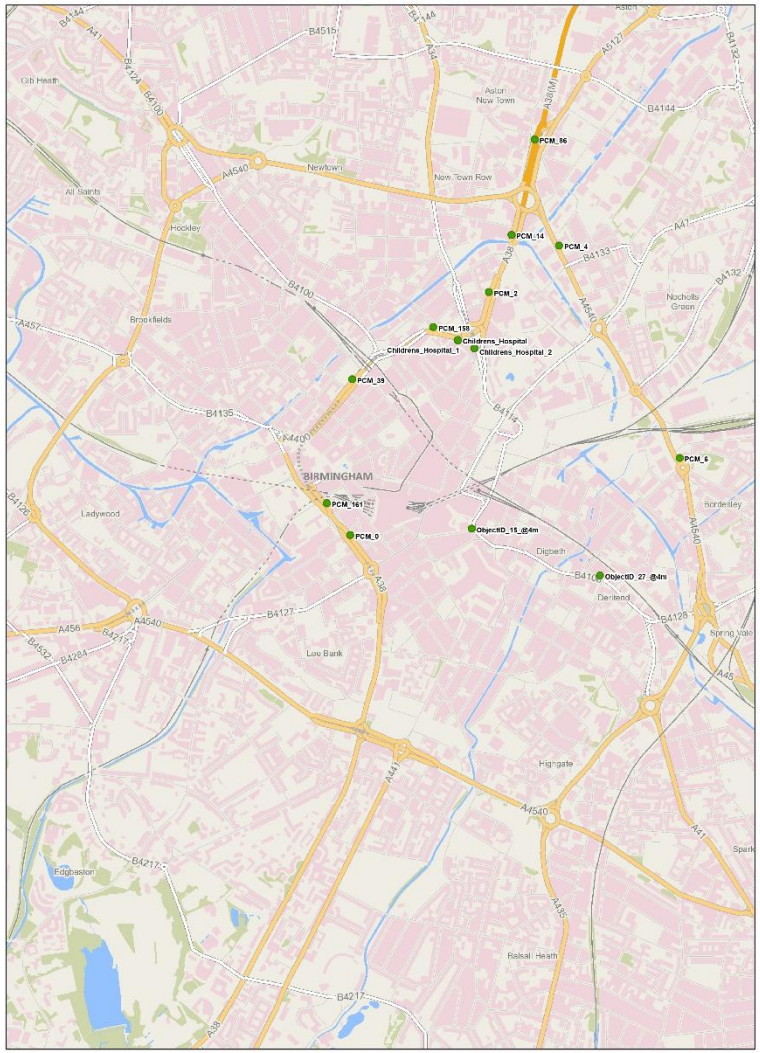


Figure 5. Location of dispersion modelling receptor points



Air pollution trend analysis

Most of the stations have data for the years 2016 to 2019 or for some of these years and this has allowed us to undertake an analysis to show the percentage change in NO_2 air pollutant concentrations over the period of the years. The percentage changes from 2016 to 2019, 2017 to 2019 and 2018 to 2019 are displayed in Table 2 on the following page. A negative value demonstrates a reduction in air pollution concentration whilst a positive value is indicative of an increase in NO_2 air pollution across that period.

Some particular Receptor Points bear further analysis:

BCA2 and BCA3 (St Chads Queensway and Lower Severn Street) have both seen a marked increase in pollution and this will bear further monitoring and evaluation as part of the CAZ to understand if this was a short term shift in 2019. The impact of the pandemic precludes us from reaching any conclusion on this with regards to 2020 data.

BCA4 (Sutton New Hall) appears to have shifted dramatically from 2018 to 2019 but the reality is the concentration dropped significantly in 2018 (from 2016 and 2017 levels) and with the general low concentration the shift back to 'normal' levels only appears to be a significant shift.

A count of the number of sites which experienced a change in pollutant concentration across the years has been undertaken and it is clear to see that the overall pollutant trend is downwards.

Table 1. Count of number of monitoring sites which experienced an increase or decrease in nitrogen dioxide pollutant concentrations across the specified years

Period	2016 to 2019	2017 to 2019	2018 to 19
Qty decreased	51	75	53
Qty increased	4	2	5

It is important to note that the general increases reported in 2017 and 2018 will in part be due to a shift to using national bias adjustment factors (0.89) which were slightly higher than the local values (between 0.8 and 0.82) calculated in the two proceeding (2015 and 2016) and two subsequent years (2019 and 2020). The intention going forward is to continue to use local bias adjustment factors.

Irrespective of the use of national bias adjustment factors in 2017 and 2018 the overall trend from the years 2016 to 2019 whilst using comparable bias adjustment factors is downwards and this corresponds with the findings by Government in the 2020 Annual Report for the Evaluation of Local NO_2 Plans[3].

[3] Local NO_2 Plans: baseline research findings, Feb 2021, Ipsos Mori & Institute for Transport Studies https://www.ipsos.com/sites/default/files/ct/publication/documents/2021-02/15012_localno2plans-baselineresearchfindings.pdf

Table 2. Percentage change in air pollutant (NO_2) concentration from the specified year to 2019

Receptor Point	2016	2017	2018
BAU1	-10%	0%	6%
BAU2	-26%	-14%	0%
BCA1			-8%
BCA2			24%
BCA3			19%
BCA4	19%	19%	171%
BCA5	12%	-7%	-7%
BCA6	-3%	6%	3%
BHM01	1%	-16%	
BHM02	-15%	-20%	
BHM03	-26%	-33%	
BHM04	-20%	-14%	
BHM05	-17%	-21%	-19%
BHM06	-30%	-37%	
BHM07	-37%	-34%	-9%
BHM08	-28%	-23%	-26%
BHM09	-19%	-28%	
BHM10	-14%	-9%	-3%
BHM11	-13%	-18%	
BHM12	-15%	-17%	-4%
BHM16	-24%	-33%	-17%
BHM17	-29%	-32%	-13%
BHM18	-25%	-28%	-14%
BHM19	-21%	-27%	
BHM20	-22%	-16%	
BHM21	-22%	-29%	
BHM23	-24%	-28%	
BHM24	-23%	-24%	-10%
BHM25	-23%	-19%	-21%
BHM26	-8%	-18%	
BHM27	-28%	-19%	-26%
BHM29	-21%	-28%	
BHM30	-25%	-27%	-12%
BHM31	-32%	-32%	
BHM34	-18%	-18%	-12%
BHM35	-21%	-21%	-14%
BHM36	-32%	-29%	-18%
BHM37	-23%	-23%	
BHM40	-14%	-34%	-27%
BHM41	12%	-30%	-22%
BHM42	-14%	-21%	-24%
BHM43	-16%	-19%	
BHM44	-19%	-26%	-15%
BHM45	-24%	-30%	
BHM46	-25%	-21%	-18%
BHM50	-26%	-32%	-19%
BHM51	-33%	-23%	-9%
BHM53	-9%		-19%
BHM55	-20%	-26%	-13%
BHM56	-31%	-29%	-32%
BHM57	-6%	-15%	-6%
BHM58	-19%	-28%	-27%
BHM59			-23%
BHM61	-35%	-17%	-17%
BHM62	-12%	-14%	-17%
BHM63	-34%	-16%	
BHM64	-7%	-33%	
BHM65	-27%	-29%	-23%
BHM67	-43%	-21%	-19%
BHM68		-26%	-19%
BHM69		-12%	-22%
BHM70		-12%	-12%
BHM71		-18%	-18%
BHM72		-12%	-15%
BHM74		-20%	-17%
BHM75		-28%	-19%
BHM76		-20%	-25%
BHM77		-25%	-33%
BHM78		-26%	
BHM79		-25%	-37%
BHM80		-13%	-4%
BHM81		-16%	-10%
BHM82		-27%	-35%
BHM83		-16%	
BHM84		-43%	
BHM85		-21%	-20%
BHM86		-27%	-27%
BHM87		-24%	-19%
BHM88		-6%	
BHM89		-30%	
BHM90		-22%	-20%
BHM91		-38%	
BHM92			-20%
BHM93		-18%	-22%

A negative value demonstrates a reduction in NO_2 air pollution concentration.

Air pollution concentrations by geographical spread

As well as assessing the trend in pollution concentration changes over time it is also possible to consider them on a geographical basis. The monitoring sites have been designated a location criteria of either:

- CAZ: sites that are situated within the CAZ boundary
- Ring Road: sites that are located on the A4540 ring road itself
- Wider City: Sites that are located outside of the ring road

Figure 6 on the following page shows the spread of tubes across the three area locations along with the concentration of nitrogen dioxide monitored for the years 2016, 2019 and 2020, the latter being the pandemic year. The reduction in concentration from 2016 to 2019 is clearly evident from this graph and whilst 2020 has been included the reality is that due to the pandemic the concentrations are further reduced outside of the general trend.

The following diagram Figure 7 displays the tube sites by the same geographical location spread albeit with no ring road locations[4], with the concentration for 2019 as a percentage of that for 2016 thereby making it easy to see at a glance the percentage reduction in concentration by tube location.

[4] The ring road sites were not set up in 2016

Figure 6. Air pollutant concentrations by diffusion tube site by year for 2016, 2019 and 2020 (pandemic year)

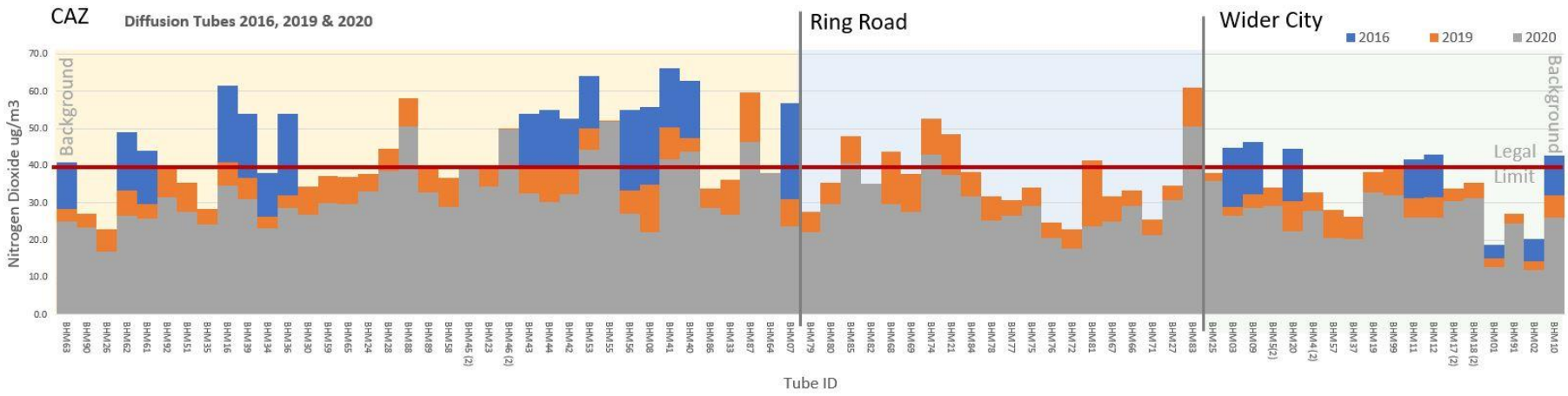
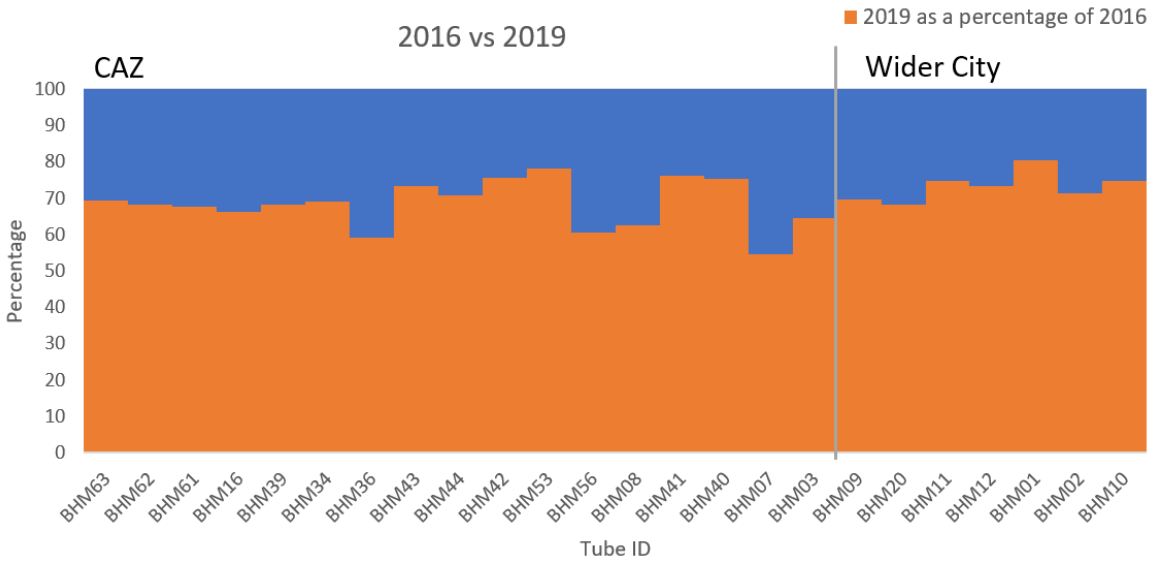


Figure 7. Percentage change in air pollutant (NO_2) concentration from 2016 to 2019 for diffusion tube sites



Traffic data

The Council have historically monitored traffic through the use of manned surveys and via a limited amount of automatic traffic counters. Furthermore, to provide additional data for the CAZ business case a number of discreet traffic surveys using automatic number plate recognition (ANPR) were undertaken during 2016 and 2017 and those outputs are available[5].

City Centre Cordon Counts

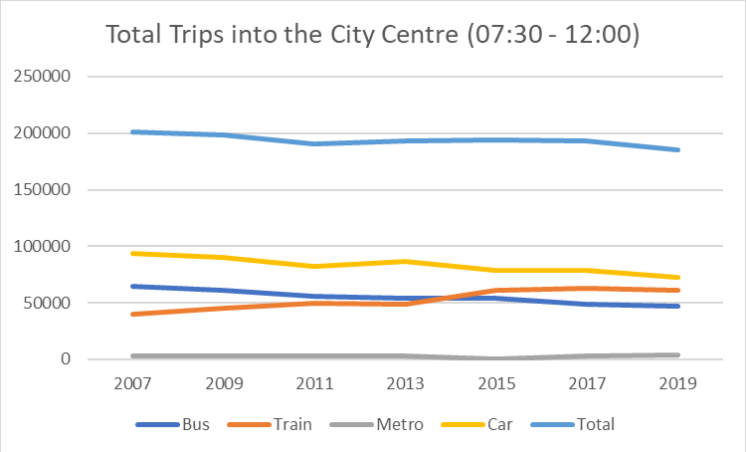
This survey takes place every two years and provides a snapshot of every vehicle entering the city centre (i.e. crossing the A4540 ring road) on an average weekday and also provides a modal split estimate (cars, buses, trains) during the morning period (07:30-12:00) – with the aim of capturing the majority of inbound trips. Data is available for the past 10 years. This data will be useful for monitoring the long-term impact of the CAZ on traffic levels and in particular in understanding the impact on other transport modes. This data can be used to show:

- Total number of vehicles entering the city centre on an average weekday (Table 3 / Figure 8)
- % mode share of vehicles entering the city centre (Table 4 / Figure 9)

Table 3. Trips into the city centre by vehicle type for the specified year on an average weekday

Year	2007	2009	2011	2013	2015	2017	2019
Bus	64801	60788	56203	54153	53951	48492	47232
Train	39866	44836	49279	49079	60723	62988	61009
Metro	2738	2700	2911	2963	546	2951	3896
Car	93408	90237	81854	86786	79106	78835	72,667
Total	200813	198561	190247	192981	194326	193266	184803

Figure 8. Trips into the city centre by vehicle type for the specified year on an average weekday

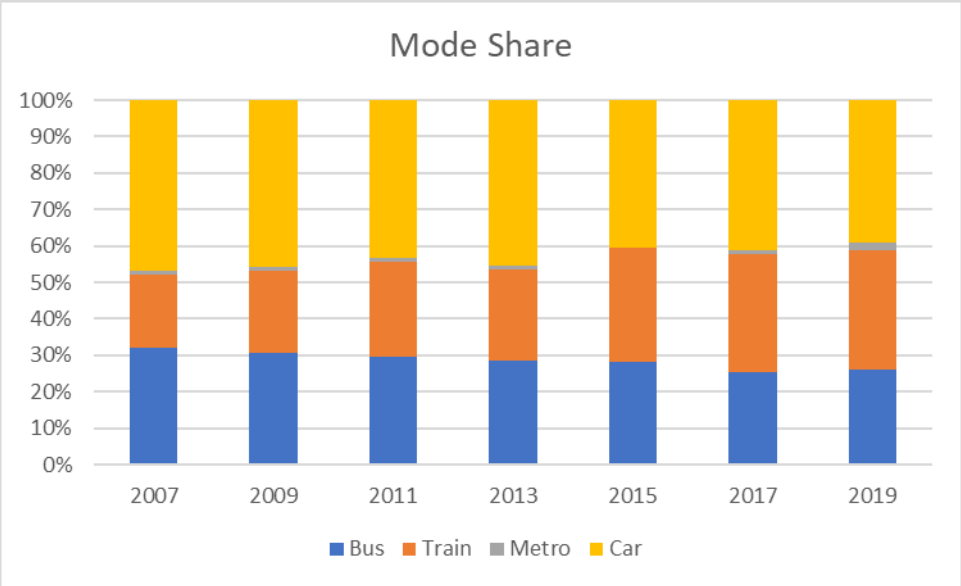


[5] All data captured as part of these surveys was anonymised and no personal data was retained

Table 4. Mode share for trips into the city centre by vehicle type for the specified year on an average weekday

Year	2007	2009	2011	2013	2015	2017	2019
Bus	32%	30%	28%	27%	27%	24%	24%
Train	20%	22%	25%	24%	30%	31%	30%
Metro	1%	1%	1%	1%	0%	1%	2%
Car	47%	45%	41%	43%	39%	39%	36%

Figure 9. Mode share for trips into the city centre by vehicle type for the specified year on an average weekday



The total number of trips coming into the city centre has dropped by just under 10% since 2007. This is consistent with the widely reported trend in the core cities of falling number of trips. The market share for rail has increased over the same period whereas the share for cars and buses has dropped by 8% and 6% respectively. Some of this decrease in car use can be attributed to significant works in the city centre that have been taking place since 2016, including construction of the metro and the redevelopment of Paradise Circus.

700-point survey

This survey provides information on a two year basis, which estimates the total amount traffic by distance travelled in the city (and the wider west midlands). The data is based on roughly 700 sample points across the West Midlands with 2 week surveys being undertaken at each of these locations on a 2 year cycle. In terms of the CAZ, this data essentially provides a control – to help isolate where impacts are related to the CAZ, as compared with other city-wide effects. This data can be used to show:

- Total number of kilometres (km) travelled by road in Birmingham (Table 5)

Table 5. Average weekday vehicle kilometres (in thousands) by time period

Survey years (two year periods)	2011 - 2012	2013 - 2014	2015 - 2016	2017 -2018
Vehicle km in thousands	7955	7927	8155	6947

Total traffic across the city was broadly consistent between the 2011 and 2016 survey periods, although a drop was seen during the 2017 to 2018 survey period.

Traffic Counts

An automated traffic counter is located on the A38(M) in the subway underneath Dartmouth Circus – this captures a significant proportion of traffic entering the city centre. This data is available historically for a number of years and a Figure for Average Annual Weekday Traffic (AAWT)[6] is provided. The AAWT is a useful and simple measurement of how busy a road is during the working week. The data in Table 6 below shows the AAWT values from 2012 to 2020.

Table 6. AAWT numbers on the A38(M) passing underneath Dartmouth Circus

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020
AAWT	66333	65279	67373	60463	59307	61785	63297	64410	50867

These flows have dropped over the period shown, although there is significant year to year variation. Although travel into the city centre has generally fallen (as discussed above) due to city centre changes, some of that traffic has re-routed onto the A38(M) as other routes become less attractive. It should also be noted that the Figure for 2020 is lower due to the COVID-19 pandemic.

Automatic Number Plate Recognition (ANPR) surveys

There have been three ANPR surveys undertaken for which data can be used to inform this baseline report. The first survey was a joint piece of work between the City Council under the aegis of the Low Emissions Towns & Cities Programme[7] and Amey. This survey sought to trial an ANPR network and involved seven cameras on a cordon around the city centre.

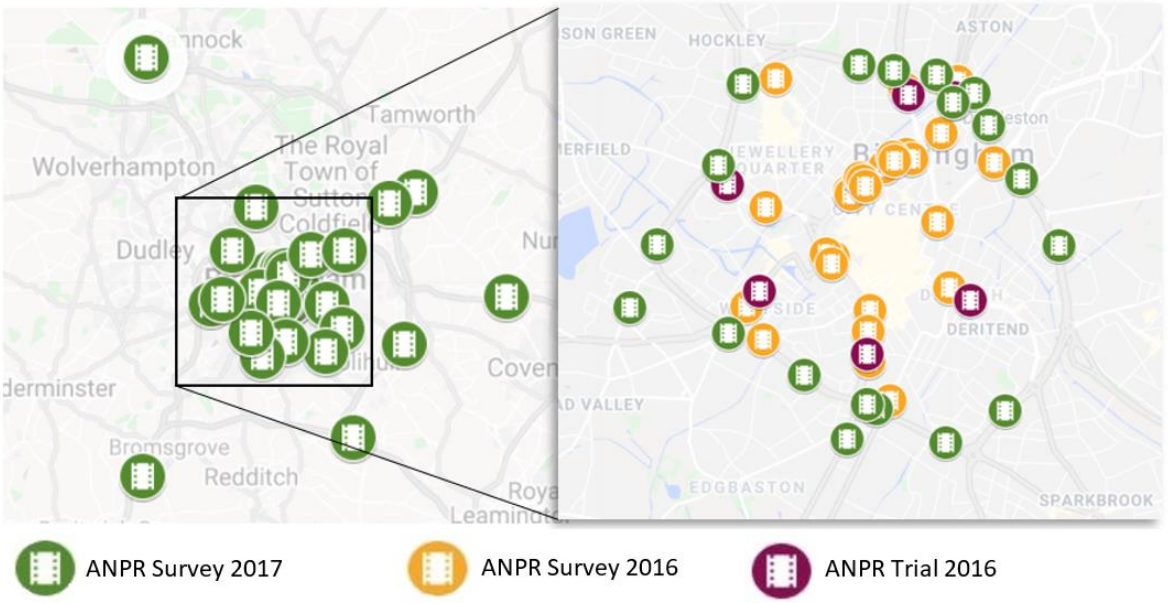
The Council commissioned two separate ANPR surveys to better understand the vehicle fleet mix and age in order to inform the early work around the outline business case for the CAZ. The first survey took place in November 2016 and was focussed on the city centre area, which would later become the CAZ geographical area, whereas the second survey took place in June 2017 and focussed on the ring road and the wider city.

[6] **Annual average weekday traffic** (AAWT) is the total volume of vehicle traffic, weekdays only, on a road or motorway for a year divided by the number weekdays in the year.

[7] The Low Emissions Towns & Cities Programme was a collaborative programme involving air quality experts from the seven West Midlands local authorities (Birmingham, Coventry, Dudley, Sandwell, Solihull, Walsall and Wolverhampton)

The location of the cameras for the three surveys are shown in Figure 10 below.

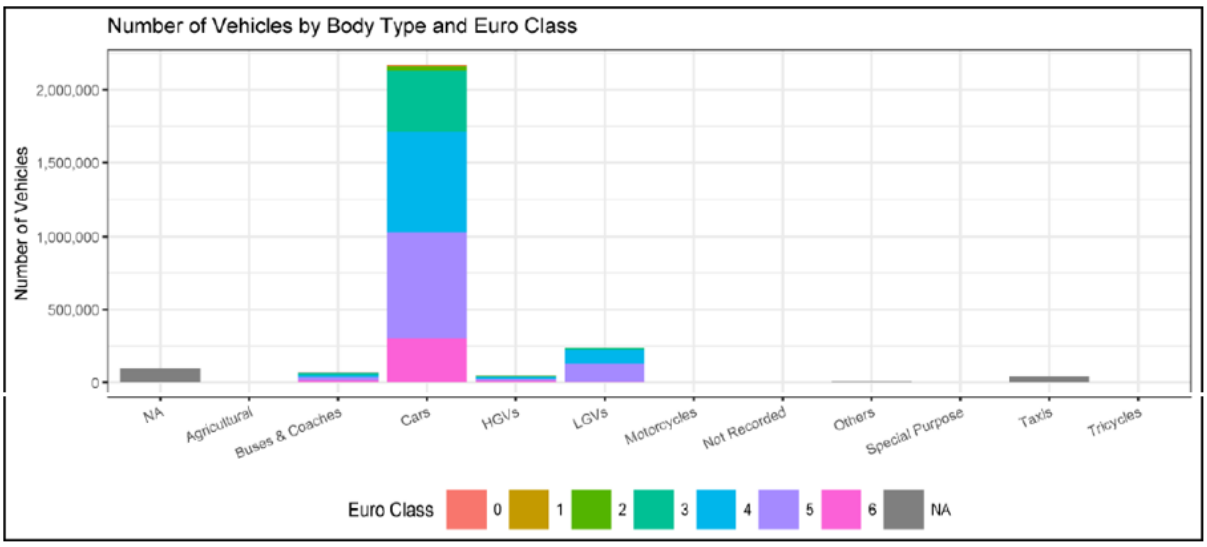
Figure 10. Location of cameras for the three CAZ surveys



2016 ANPR trial

2016 ANPR trial was commenced in March 2016 and ran for twelve months although data was only analysed against the DVLA dataset for the period 13/06/16 – 10/07/16 as this was identified as a good period of data collection. Although the data was collected and presented in the report in the form of graphs, the actual numerical data underpinning the graphs was never supplied and as such in some cases it is only possible to extrapolate data from the graphs. For example Figure 11 below shows the number of vehicles by body type from which it is possible to estimate actual numbers e.g. there are around 2,150,000 cars, which make up 81% of the vehicles counted. The survey data also contains count numbers by camera in this format.

Figure 11. Number of vehicles by body type and Euro class



As an indicator however it does show the predominance of Euro 4 and 5 vehicles in the “Birmingham car fleet”. Outputs from the seven cameras was combined to show the total number of vehicles and their Euro class as confirmed through the DVLA records.

Table 7. Number and percentage of vehicles by Euro class

Euro Class	Number of Vehicles	Percentage of Vehicles
Pre-Euro	4,039	0.15
Euro 1	6,111	0.23
Euro 2	32,298	1.21
Euro 3	461,037	17.29
Euro 4	793,870	29.77
Euro 5	896,567	33.62
Euro 6	328,592	12.32
Unknown	144,062	5.40
Total	2,666,576	100

The survey also analysed the split between fuel types across all vehicles. The majority of vehicles are petrol or diesel fuelled, and there were approximately 460,000 more diesel trips than petrol trips across the seven cameras. Focussing solely on petrol and diesel vehicles, trips by diesel vehicles tended to be a higher Euro class than petrol vehicles, with 54.61% of trips by diesel vehicles class as either Euro 5 or 6 compared to 37.47% for petrol vehicles. Additionally, 59.4% of trips by petrol vehicles were Euro 3 or 4, compared to 41.71% for diesel vehicles. This is shown in more detail in Table 8.

Table 8. Number and percentage of vehicles by Euro class

Propulsion Type	Euro 0	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6	NA	Total
Petrol (count)	3,221	4,249	24,645	270,302	343,175	265,329	120,587	1,310	1,032,818
Petrol (%)	0.31	0.41	2.39	26.17	33.23	25.69	11.68	0.13	100
Diesel (count)	808	1,801	7,376	185,358	437,051	614,327	200,618	44,889	1,492,228
Diesel (%)	0.05	0.12	0.49	12.42	29.29	41.17	13.44	3.01	100

2016 ANPR survey

The 2016 survey covered the period from 08 November 2016 through to 14 November 2016 and covered 29 locations within the city centre to understand the fleet mix and age of vehicles entering the city centre area. This survey records the actual number of “non-returns” from the DVLA i.e. where a vehicle registration mark does not have an associated Euro classification.

2017 ANPR survey

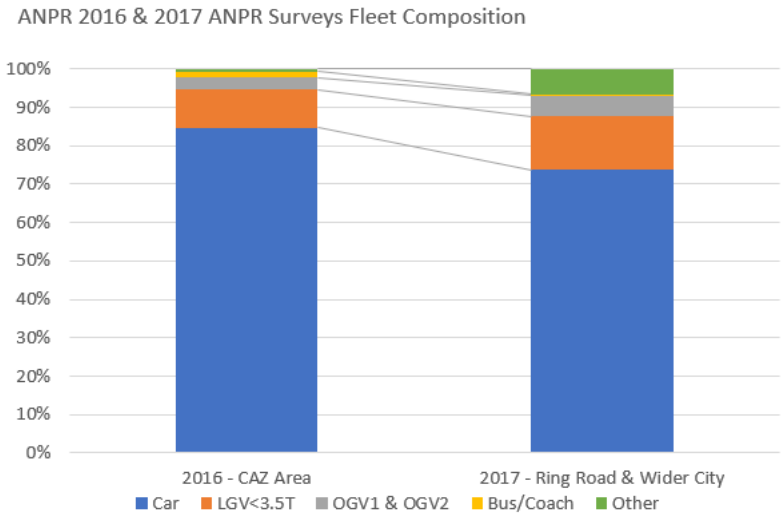
The 2017 survey covered the period 28 July 2017 through to 30 July 2017 and covered 47 locations including the motorway network and sought to better understand the journeys being made into

Birmingham from the outer city and the wider West midlands region. This survey does not record the actual number of “non-returns” from the DVLA i.e. where a vehicle registration mark does not have an associated Euro classification.

ANPR analysis

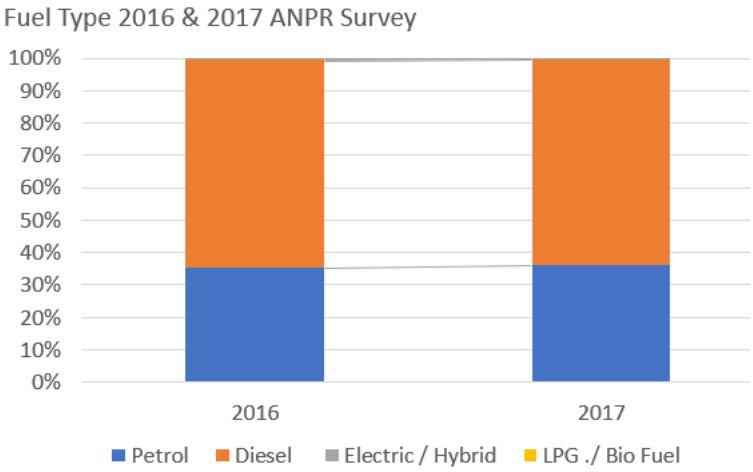
From the ANPR data it is possible to compare the fleet composition and it is clear that cars comprise a higher % of the vehicle split that enter the city centre area than are reported outside the city centre (Figure 12 below). This is supported by the 2016 ANPR Trial in which it was reported that 81% of vehicle trips into the city centre were made by cars.

Figure 12. Breakdown of vehicle types from the 2016 and 2017 ANPR surveys



It is also possible to assess the fuel types between the 2016 and 2017 surveys. Whilst there is a slight increase in the number of diesel vehicles entering the city centre, that difference is only slight (Figure 13 below). The 2016 ANPR trial suggested that diesel vehicles made up 59% of the vehicles entering the city centre area which is slightly less than the 2016 survey (around 65%).

Figure 13. Breakdown of fuel types from the 2016 and 2017 ANPR surveys



New Datasets

A number of new datasets are being brought onstream as a part of the CAZ monitoring and other related projects. Unfortunately, due to the coronavirus pandemic and delays in commissioning these are unable to be used as a part of this baseline report, but will be used later as a part of the on-going monitoring programme. These will provide extra detail to the indicators described above. A dashboard is currently under development that will allow these datasets to be accessed quickly and the intent is to have some measure of public accessibility to this data.

In support of the CAZ there will be 67 automatic number plate recognition (ANPR) cameras, data from which will be interrogated to show the amount of traffic entering the city centre by vehicle type. No personal data will be collected or held by the monitoring and evaluation team.

Around 100 new automatic traffic counters have been deployed by Birmingham City Council and Transport for West Midlands in locations around the city to provide near real time data about traffic conditions. They also make some attempt to categorise the vehicles by type. For the CAZ these will be split into the following categories – traffic within the city centre, traffic on the ring road, and traffic in the rest of the city. These will be used to monitor the impact of the CAZ, and potentially identify locations where the impact is greatest

The traffic counters will also be interrogated to determine the amount of delay experienced by traffic. We know that air quality levels are likely to be poorer in congested conditions, so a delay indicator is under development.

In addition to the actual count infrastructure the CAZ Full Business Case also included a traffic modelling report which has been used to understand some of the predictive trends in advance of the CAZ go-live.

CAZ traffic modelling report

The traffic modelling undertaken as part of the CAZ Full Business Case considered a number of scenarios which could be introduced to alter driver, business and passenger behaviour in order to determine which was most likely to result in sufficient reduction in emissions as to deliver legislative compliance with the air quality legal limits.

One aspect of the methodology was to consider changes to the local road and strategic highway networks along with determining potential traffic growth to understand any additional pressures the network will face in the run-in to and subsequent launching of the CAZ. The full methodology adopted is contained within the traffic modelling report.

The output models of traffic flows are detailed in the modelling report. The primary model of interest for this baseline report is the ‘Do Minimum Without CAZ’ scenario as that model predicted traffic growth in the absence of a CAZ and the modelling team adopted the growth rates derived from the ‘Do Minimum Without CAZ’ scenario for the 2020 modelling of the CAZ. Accordingly, these predicted growth rates are consistent throughout the range of scenarios. A further prediction of growth from 2020 to 2022 was devised to allow the creation of a 2022 traffic (and air quality) model. The growth rates predicted in the modelling are shown in the following tables (9 and 10).

Table 9. Birmingham predicted traffic growth 2016-2020

Peak Period:	**AM**			**Inter**			**PM**		
Sector	Car / Taxi	LGV	HGV	Car / Taxi	LGV	HGV	Car / Taxi	LGV	HGV
City Centre	7.9%	10.8%	3.5%	8.0%	10.8%	3.6%	7.4%	10.8%	3.6%
Rest of Birmingham	3.7%	10.7%	3.2%	3.7%	10.7%	3.1%	3.7%	10.7%	3.1%
Birmingham (Total)	**4.2%**	**10.7%**	**3.2%**	**4.2%**	**10.7%**	**3.2%**	**4.1%**	**10.7%**	**3.2%**
Rest of West Midlands	4.4%	10.6%	2.9%	5.3%	10.7%	2.9%	4.6%	10.8%	3.0%
Total	**4.3%**	**10.7%**	**3.0%**	**4.7%**	**10.7%**	**3.0%**	**4.4%**	**10.7%**	**3.0%**

Table 10. Birmingham predicted traffic growth 2020-2022

Peak Period:	**AM**			**Inter**			**PM**		
Sector	Car / Taxi	LGV	HGV	Car / Taxi	LGV	HGV	Car / Taxi	LGV	HGV
City Centre	0.4%	4.7%	0.8%	0.4%	4.7%	0.8%	0.4%	4.7%	0.8%
Rest of Birmingham	2.1%	4.7%	0.8%	2.1%	4.7%	0.8%	2.1%	4.7%	0.8%
Birmingham (Total)	**1.9%**	**4.7%**	**0.8%**	**1.9%**	**4.7%**	**0.8%**	**1.9%**	**4.7%**	**0.8%**
Rest of West Midlands	1.9%	4.7%	1.2%	1.9%	4.7%	1.2%	1.9%	4.7%	1.2%
Total	1.9%	4.7%	1.1%	1.9%	4.7%	1.1%	1.9%	4.7%	1.1%

The data is consistent with that reported in the Baseline Deep-Dive report for Birmingham which suggests that, in the absence of intervention, car and taxi traffic in Birmingham city centre would be expected to grow by around 4% in the period from 2016 to 2020, HGV traffic would be expected to grow by 3% and LGV traffic would grow by more than 10%.

Further to the predicted growth rates the report also sought to forecast the reduction in non-compliant vehicles entering the CAZ area as a result of the CAZ class D intervention and additional measures and from which predictions were made around likely compliance rates. Whilst they still have some relevance it is recognised that they will have been influenced significantly by the launch of the CAZ in mid-2021 (as opposed to 2020) and the impact of the coronavirus pandemic. The predictions suggested a reduction in non-compliant vehicles by 2022 of 90% for cars, 51% for LGV, and 88% for HGV.

The following table, excerpted from the report shows the predicted annual average daily flows entering the clean air zone by vehicle type and whether they are compliant or non-compliant.

Table 11. Annual average daily vehicle numbers entering the CAZ by vehicle type

Do Minimum	**Car**	**Taxi**	**LGV**	**HGV**	**Bus**	**Total**
Compliant	125,900	2,700	13,100	4,600	3,300	149,500
Non-compliant	37,100	6,500	9,100	2,500	2,200	57,400
Total	**163,000**	**9,200**	**22,200**	**7,000**	**5,500**	**206,900**
CAZ Scenario	**Car**	**Taxi**	**LGV**	**HGV**	**Bus**	**Total**
Compliant	142,700	9,500	17,200	6,700	5,500	181,500
Non-compliant	2,900	-	3,600	100	-	6,600
Total	**145,600**	**9,500**	**20,800**	**6,800**	**5,500**	**188,100**

Next Steps

This baseline report is the first report seeking to assess the impact of the Clean Air Zone. This report will be followed by a number of reports following launch of the CAZ. It is intended to release a number of supporting documents which will explain the operation of the CAZ. At present the following reports are proposed:

- Fact sheets on a four to six week timeframe which will contain simple data
- A half yearly report to explain in detail how the CAZ is performing
- An annual report to link the performance of the CAZ into the annual air quality reporting

These reports will be underpinned by a report mapping exercise which will show how these reports link into the Government's own reports around the Clean Air Zone and any other relevant reports produced by Birmingham City Council.

Finally, it is intended to centralise all relevant traffic and air quality data in an on-line interactive dashboard to which the public will have access. This is more of a long term aim and will be developed once the primary reporting mechanisms are established.

Contact

For further information about any aspect of the Clean Air Zone or to contact the wider CAZ team please visit https://www.brumbreathes.co.uk/