Appendix 2: Investigating traffic displacement concerns

The purpose of Bath's Clean Air Zone is to reduce air pollution and improve vehicle compliance in line with minimum emission standards, while minimising the impact of the CAZ on normal traffic flows in and around Bath.

Traffic flows have been substantially impacted by the Covid-19 lockdowns in 2020 and are now returning to pre-pandemic levels and in the case of LGV's and HGV's, exceeding pre-pandemic levels[1]. Data gathered from permanent automatic traffic counts in and around the zone tell us that in 2022 Q3, general traffic flows across a 7-day week were down by 7% in the urban area outside of the zone, and down by 12% in the wider B&NES area, compared with 2017/2018 (our baseline years).

Additionally, as published within the Central Evaluation Report produced by Ipsos UK, it was further found that there *is no significant deviation in the weekday traffic flow trends (incrementally increasing January to July 2021) at any of the eight ATC sites, whether outside the CAZ (three sites) or within (five sites). This suggests the CAZ launch had a minimal impact on the aggregate level of traffic inside and outside the CAZ area[2]*.*

A key commitment for the council is to monitor any concerns arising from the introduction of the CAZ, so we are investigating 10 discrete locations where the public has expressed concern over a perceived increase in traffic in their communities since the zone's launch. In addition, we have provided extra permanent ANPR cameras to monitor traffic flows and fleet composition through Bathampton where the community expressed concerns about potential displacement during the development of the Full Business Case.

Traffic modelling was completed at the Full Business Case stage of the CAZ. This modelling provided a forecast on how the scheme may affect the volumes of traffic in Bath once a charging CAZ was introduced. Where applicable within this appendix, we

[1] Office for National Statistics. Economic activity and social change in the UK, real-time indicators, 2021. https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/economicactivityandsocialchangeintheukrealtimeindicators/23september2021

[2] Department for Environment, Food and Rural Affairs. Evaluation of local NO_2 plans, 2022. http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=20688&FromSearch=Y&Publisher=1&SearchText=AQ0851%20&SortString=ProjectCode&SortOrder=Asc&Paging=10

*Please note this is based on analysis from the first 6-months of the CAZ.

refer to the modelling forecast when making comments about monitoring outcomes. The Transport Modelling Forecast Report can be accessed using the following link: https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_evi_674726.br_.042.fbc-17_t4_transport_model_forecast_draft.pdf

The areas of concern, and what we're doing to log, investigate and monitor these are listed in the figures and table below. The work is ongoing and will be updated in subsequent reports.

In terms of air quality, we report the nearest diffusion tube data for the area in question, to understand the local air quality situation. The legal limit for annual average NO_2 pollution is 40 µg/m^3. To ensure compliance with the Ministerial Direction, we are generally concerned with any site where NO_2 concentrations are currently over 36 µg/m^3, to ensure that they don't breach the 40 µg/m^3 limit as an annual mean.

Throughout this report we mention the traffic volumes during AM-peak, PM-peak, and inter-peak times. The AM peak refers to the hour where the highest volume of traffic occurs during the morning. The PM-peak refers to the hour where the highest volume of traffic occurs during the evening, the inter-peak period is between these two times.

Additionally, traffic volumes are often averaged using both a 5-day and 7-day average. A 5-day average has been calculated using the volumes recorded Monday-Friday (weekday). A 7-day average has been calculated using all seven days of the week.

Throughout this report we also reference a range of monitoring methods, the following bullet points outline these methods and the data that they provide.

- **Temporary Radar Counter-** Records the volume of traffic only. No speed or classification data is available.
- **Temporary Automatic Traffic Counters (ATC)-** Records the volume and speed of vehicles. The classification is also recorded however, this is based on axle-distance so is not always accurate, particularly when classifying cars/vans and small HGVs
- **Temporary automatic number plate recognition camera (ANPR)-** ANPR cameras can accurately record the volume and classification of vehicles. In addition, the compliance status of the vehicle can also be determined by the vehicle's registration number., i.e., whether a vehicle is of Euro 6 diesel or Euro 4 petrol standard.

*Traffic flow data is published in the 2022 Q3 CAZ Performance Report accompanying this appendix. Due to unprecedented changes in travel behaviour during the Covid-19 lockdowns, we are discounting data from 2020 for comparison purposes. In 2019 there was insufficient data collected for comparison purposes, and 2017 has also been used where months within 2018 were unavailable.

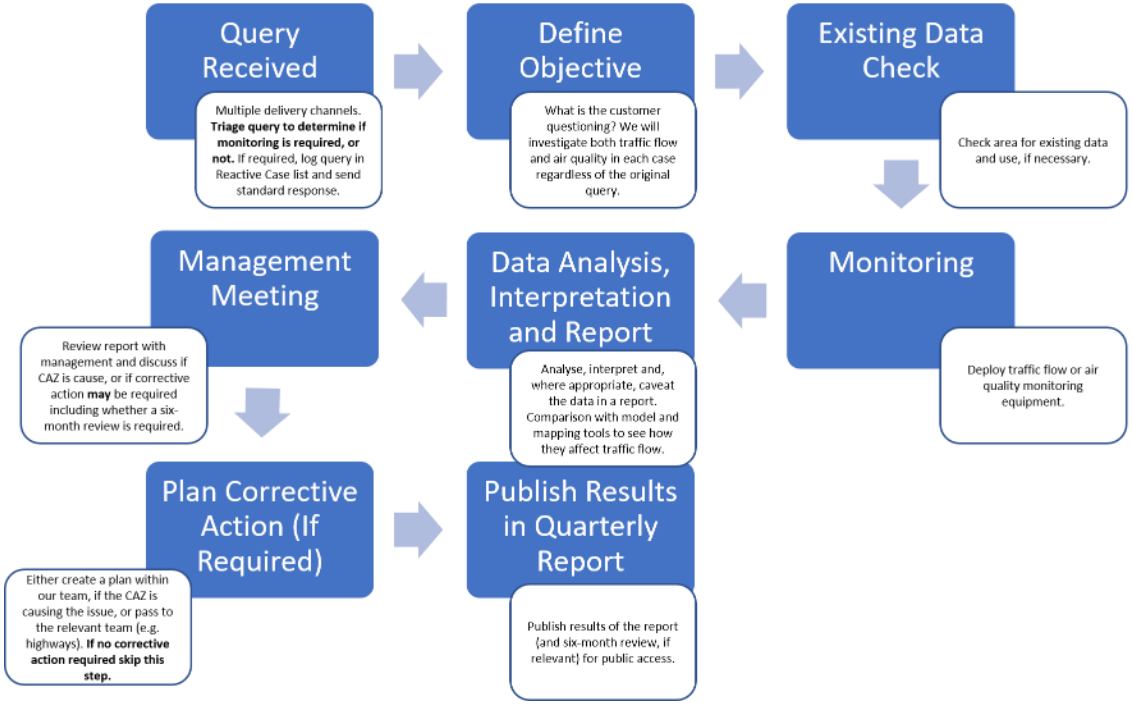
The following summary table provides an update on the locations of concern that are within this appendix and the status of the case regarding the monitoring we have completed.

Location of Concern	**Status of case**
Whiteway Road	Ongoing review required
Lansdown Lane	Ongoing review required
Oldfield Park (Lyndhurst Road)	Ongoing review required
Charlcombe Lane	To be reviewed annually
Upper Camden Place	To be reviewed annually
Twerton High Street	Monitoring concluded in December 2022
Shophouse Road	Ongoing review required
Bradford Road and Brassknocker Hill	Ongoing review required
Englishcombe Lane	Ongoing review required
Cavendish Road	To be reviewed annually

How we're investigating possible traffic displacement

Since the launch of the CAZ in March 2021, we have logged and investigated comments from residents about potential CAZ-related impacts. Figure 1 shows the process for following up and investigating these queries.

Figure 1: Process for following up and investigating traffic displacement concerns



Locations in the vicinity of Whiteway Road, Lansdown Lane and Oldfield Park have been regularly monitored in response to concerns about potentially displaced traffic since the launch of the CAZ in March 2021. Within this appendix, we have provided detailed information on the outcomes of the most recent ANPR and video monitoring, which took place at these locations in October 2022.

For the results of previous ANPR monitoring surveys, particularly those published within Appendix 2 of the CAZ Annual Report, please use the following link: https://beta.bathnes.gov.uk/sites/default/files/Appendix%202%20Investigating%20traffic%20displacement%20concerns.pdf

1. Whiteway Road ANPR report

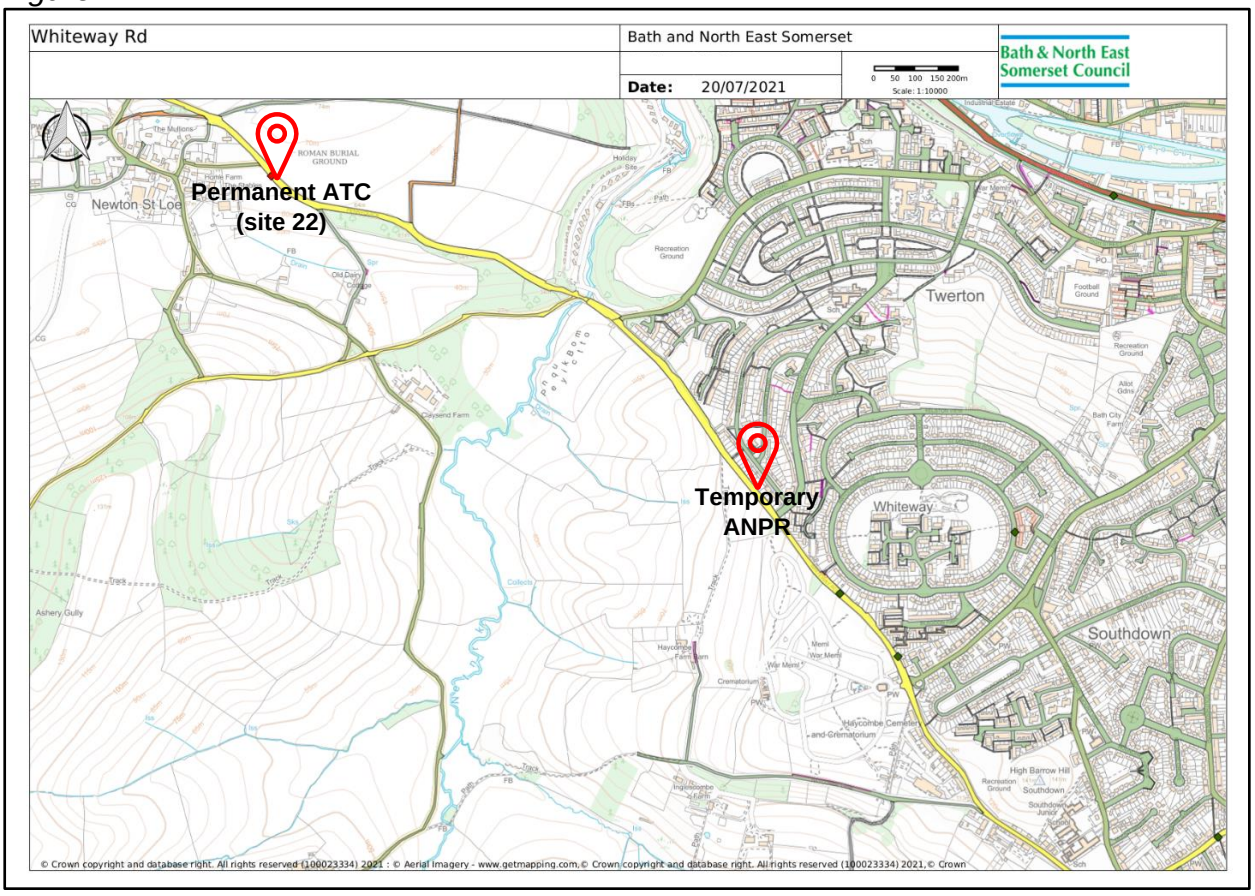
As outlined below, the objectives of the traffic monitoring surveys detailed below was to identify whether there has been an increase in HGVs, particularly those which are non-compliant, travelling along Whiteway Road as a result of the CAZ.

Site Locations

Figure 2 shows the permanent ATC location on Pennyquick Hill along with the temporary ANPR location on Whiteway Road. Temporary ANPR surveys were deployed, and data used in this analysis were from the following dates and sites:

- 2021 ANPR Survey- 25/09 – 1/10
- 2022 ANPR Survey- 25/04 – 01/05
- 2022 ANPR Survey- 7/10 – 13/10

Figure 2



HGV analysis

Vehicle classification data from Site 22 has been analysed for the following time periods:

- September 2020 (national data shows that HGV volumes were back to 100% of pre-pandemic levels during September 2020). This is used as the baseline HGV volumes before the CAZ was implemented.
- 15th March 2021 to 19th July 2021(used within first survey)

- 20th July 2021 to 14th October 2021 (used within second survey)
- 15th October to 12th May 2022 (used within first third survey)
- 13th May to 16th November 2022 (used within latest survey)

Figure 3 presents the findings of analysis from the permanent ATC on Pennyquick Hill, note that September 2020 is the baseline period,

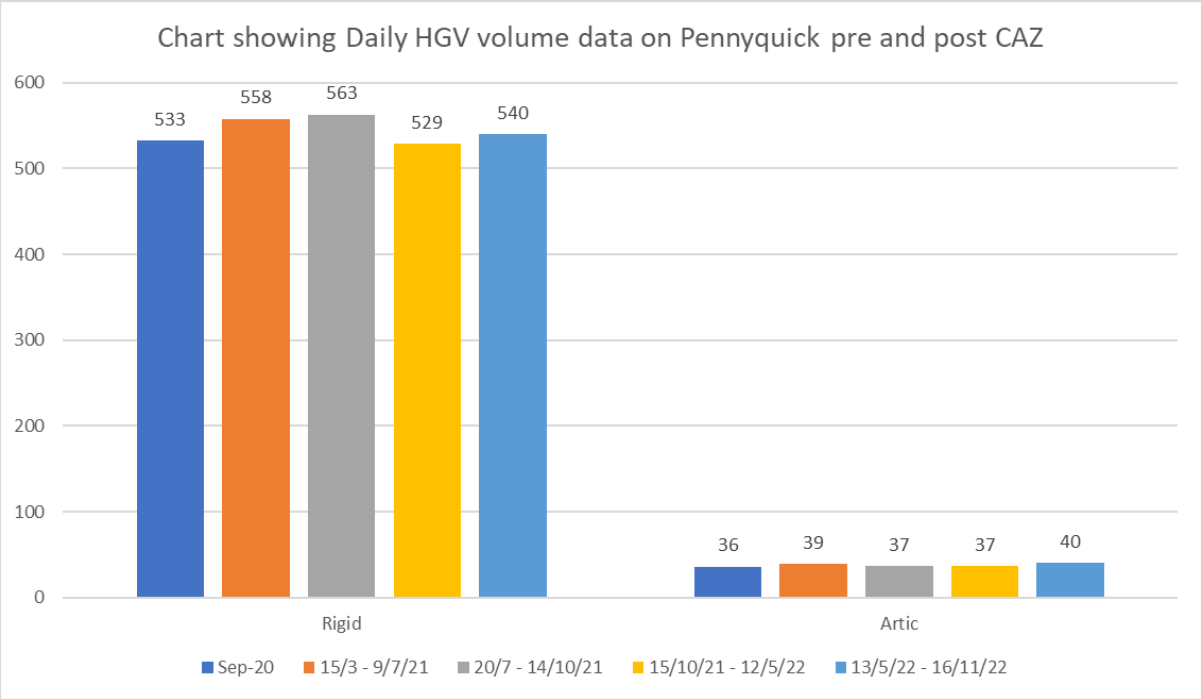


Figure 3

The data shows that as a percentage of overall traffic volume, HGVs accounted for 4.5% of all traffic in September 2020 (pre-CAZ), but since July 2021 (post-CAZ), the volume of HGVs as a percentage of overall traffic has remained consistent at 4.2%.

Analysis of compliant and non-compliant vehicles

Using the following categorisation method, we have been able to determine whether vehicles travelling along Whiteway Road are classified as compliant or non-complaint. Note that cars are not charged within the CAZ, therefore, are not included in the below.

Compliant vehicles:

- Diesel and Euro 6 or newer
- Petrol and Euro 4 or newer
- Electric and hybrid

Non-compliant and exempt vehicles:

- Diesel and Euro 5 or older
- Petrol and Euro 3 or older

Table 1 shows the split of compliant and non-compliant vehicles seen on Whiteway road throughout the 7-day ANPR survey that was deployed in October 2022. Note that bus/coach is not shown within this dataset as the DVLA data does not include

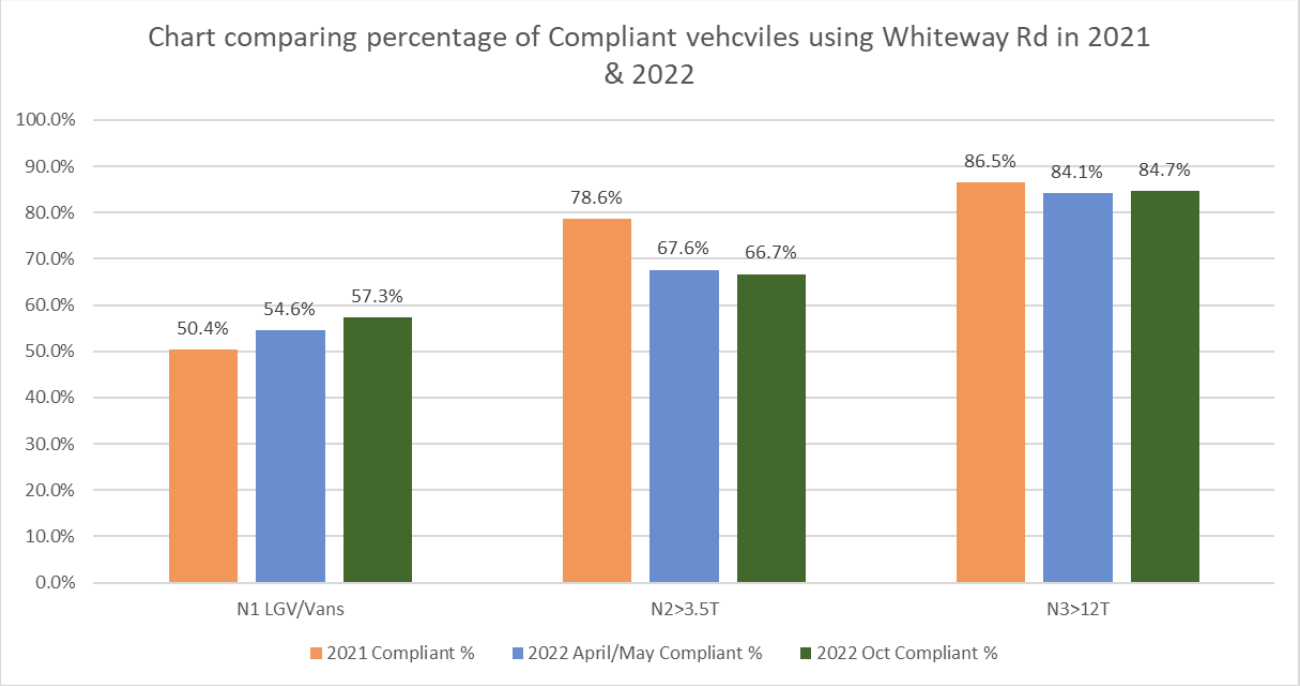
information regarding retrofit treatments, therefore, the compliance status would be inaccurate.

Table 1

	Total number of vehicles seen in the 7 day survey period	Not Compliant or Exempt				Compliant				
		Diesel & Euro Status 1-5	Petrol & Euro 1-3	Total Not Compliant or Exempt	Not Compliant or Exempt %	Diesel & Euro 6	Petrol & Euro 4 or newer	Electric	Total Compliant	Compliant %
N1 LGV/Vans	15446	6568	16	6584	42.6%	8650	91	115	8856	57.3%
N2>3.5T	745	246	0	246	33.0%	497	0	0	497	66.7%
N3>12T	798	122	0	122	15.3%	676	0	0	676	84.7%

Figure 4 shows the percentage of compliant vehicles when compared to the 7-days of ANPR data from September/October 2021 and from April/May 2022. As seen within the graph, LGV compliance has increased, whilst HGV compliance has reduced slightly on this route since 2021 but maintained the same level throughout 2022.

Figure 4



Comparison of compliance between Whiteway Road and the CAZ

The traffic data recorded within the CAZ is de-duplicated before being used for analysis. This means that only one entry per vehicle per 24-hour period is retained and any other entries from that vehicle within the same period would be removed (00:00 – 23:59hrs). To ensure that the same type of data is being compared, de-duplication has been carried out on the data recorded along Whiteway Road.

For example, if an LGV with the VRN 'A123 ABC' travelled along Whiteway Road on three occasions during a 24-hour period (00:00 to 23:59hrs), only one trip is retained, and the others are deleted.

Figure 5 shows a comparison of vehicle compliance between Whiteway Road and the CAZ. Note that cars are not charged within the CAZ and are therefore not included in this analysis.

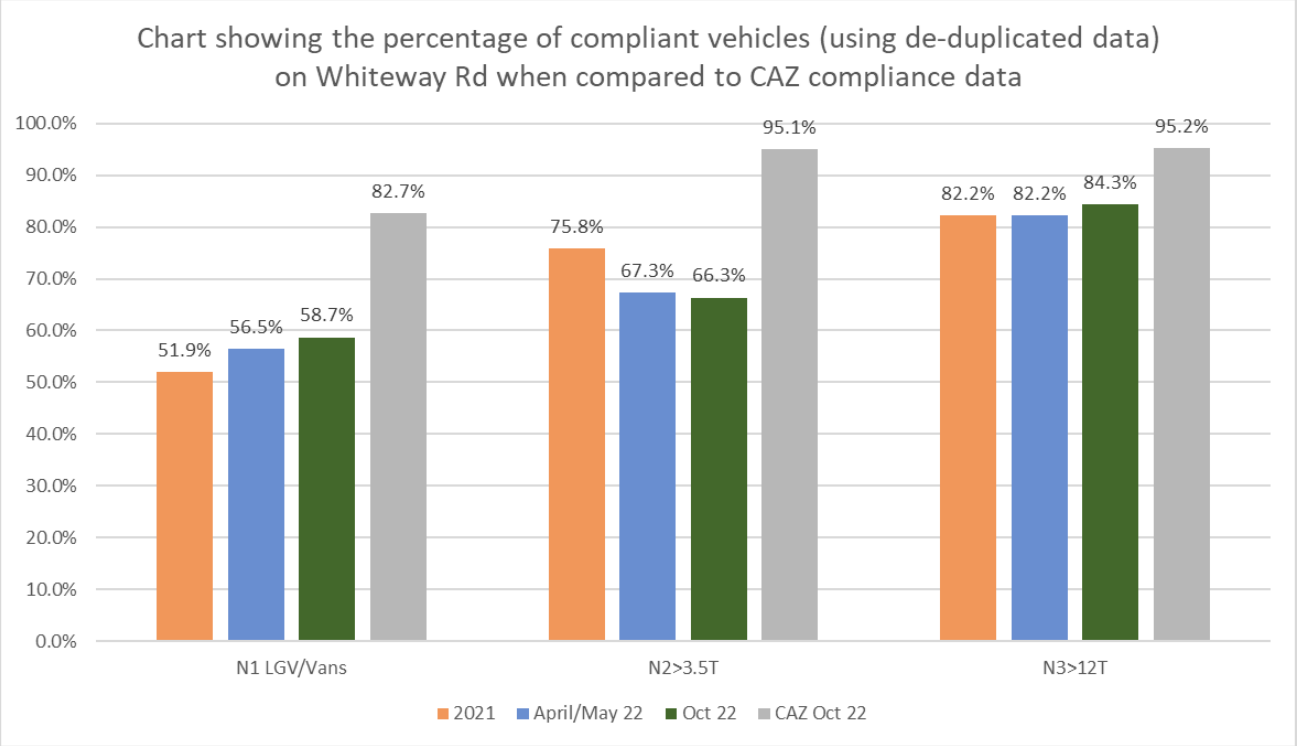


Figure 5

The key objective of these monitoring surveys was to determine whether there has been an increase in non-compliant, chargeable vehicles using Whiteway Road because of the CAZ. As there is no compliance data available pre-CAZ it is difficult to draw conclusions, however, Figure 5 does show the general compliance of vehicles travelling along Whiteway Road is less than those travelling within the CAZ.

Prior to the implementation of the CAZ, small increases in traffic flow along Whiteway Road were modelled due to the additional traffic management measures along Queen Square. These additional measures around Queen Square may cause traffic to divert through other routes, therefore, modelling predicated an increase in the inter-peak flows along Whiteway Road (between 10:00 – 16:00)[3].

Additionally, it was modelled that this potential increase in traffic may result in a small net increase in NO_2 concentrations in the vicinity of Twerton[4]. The NO_2 concentrations along Whiteway Road for 2022 Q3 remain slightly elevated when compared to a 2019 baseline, however, the overall trend is static. This location will continue to be monitored.

[3] Jacobs. T4 Transport Modelling Forecast Report, 2020. https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_evi_674726.br_.042.fbc-17_t4_transport_model_forecast_draft.pdf

[4] Jacobs. Distribution and Equalities Impact Analysis, 2019. https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_g_674726.br_.042.fbc-19_social_distributional_impacts.pdf

In conclusion, the volume of the rigid and articulated HGVs on Whiteway Road in the most recent monitoring survey (7th – 13th October 2022) when compared to the September 2020 baseline are almost identical, this indicates that the CAZ has not increased HGV volumes along Whiteway Road. Additionally, the percentage of HGVs as overall traffic has remained consistent at around 4.2%.

While compliance rates do remain lower than within the CAZ, we are encouraged by the improvements along Whiteway Road and will continue to monitor traffic and air quality trends. A further ANPR survey will be carried out in 6-months' time at this location.

2. Lansdown Lane ANPR report

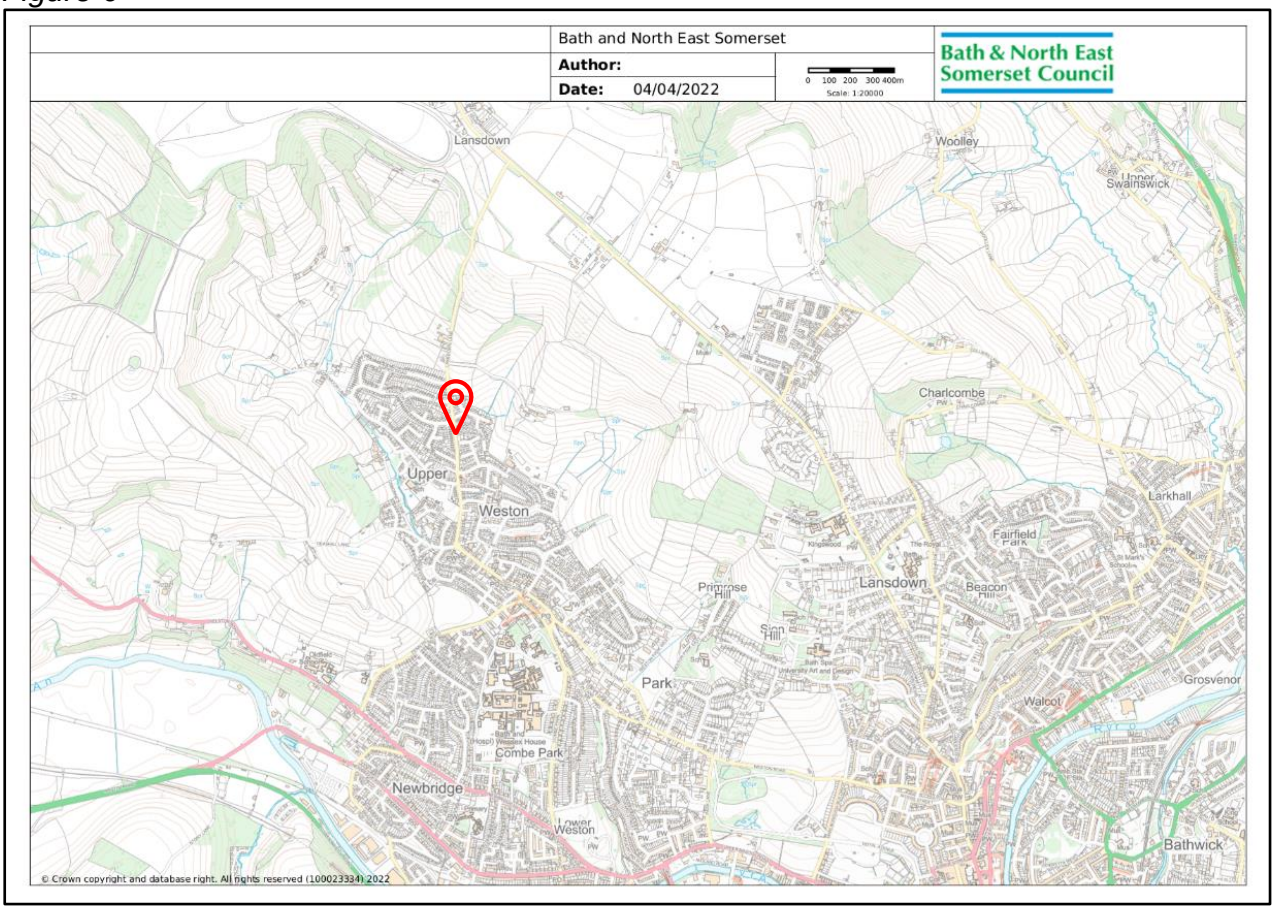
As outlined below, the objectives of the traffic monitoring surveys detailed below was to identify whether there has been an increase in total traffic, particularly in non-compliant light goods vehicles, travelling along Lansdown Lan as a result of the CAZ.

Site Locations

Figure 6 shows the site locations of the temporary ATC and ANPR surveys that took place on Lansdown Lane, the same location was used for both sets of surveys. Temporary ATC surveys were carried out in 2018, 2019 and 2021. The ANPR surveys were deployed on the following dates:

- 2021 survey- 20/08 – 26/08
- 2022 survey- 26/04 – 01/05
- 2022 survey- 7/10 – 13/10

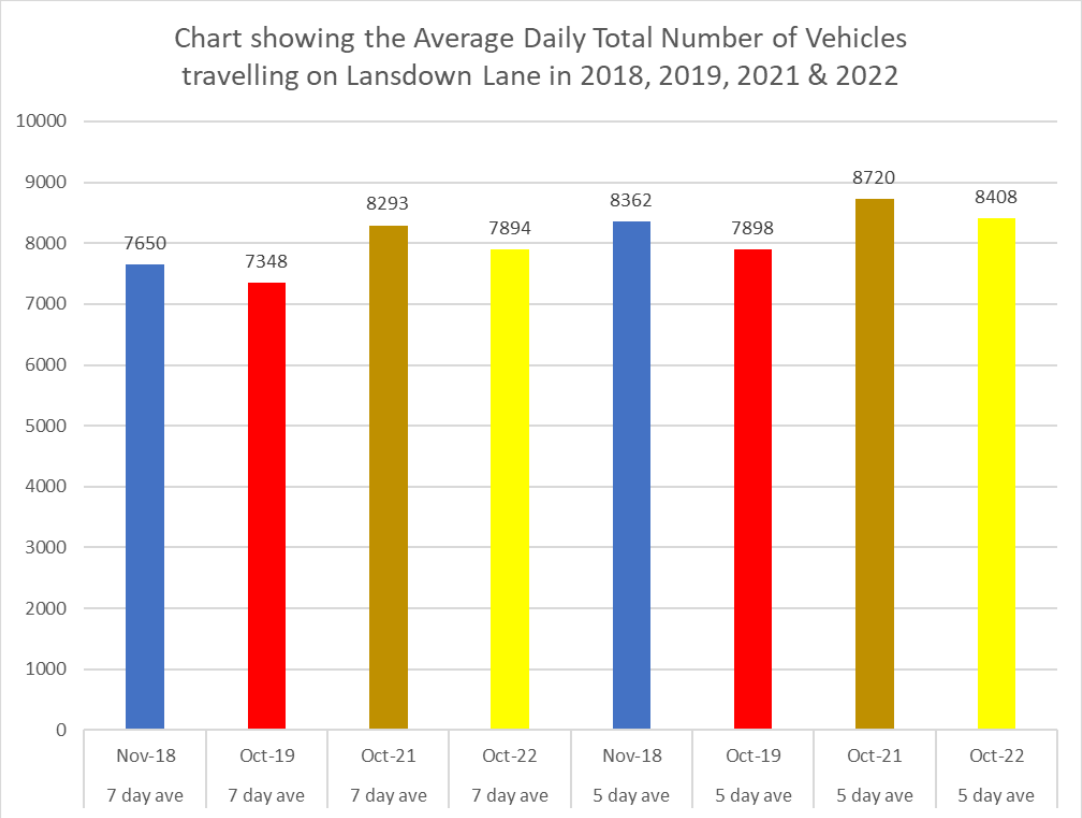
Figure 6



Overall vehicle volumes

Figure 7 shows the average total number of vehicles travelling along Lansdown Lane in both a 5-day and 7-day average. When comparing the data for 2022 with the previous 3 years of the data, October 2022 shows traffic volumes to be slightly higher than 2018 and 2019, but less than October 2021.

Figure 7



HGV volumes along Lansdown Lane

In 2018 and 2019 the temporary ATC surveys along Lansdown Lane used tube counters to gather classification data. These surveys use axle-distance to classify vehicles, and as a result cannot reliably differentiate between some larger cars, LGVs and small HGVs. Therefore, the pre-CAZ and post-CAZ ANPR surveys cannot be meaningfully compared.

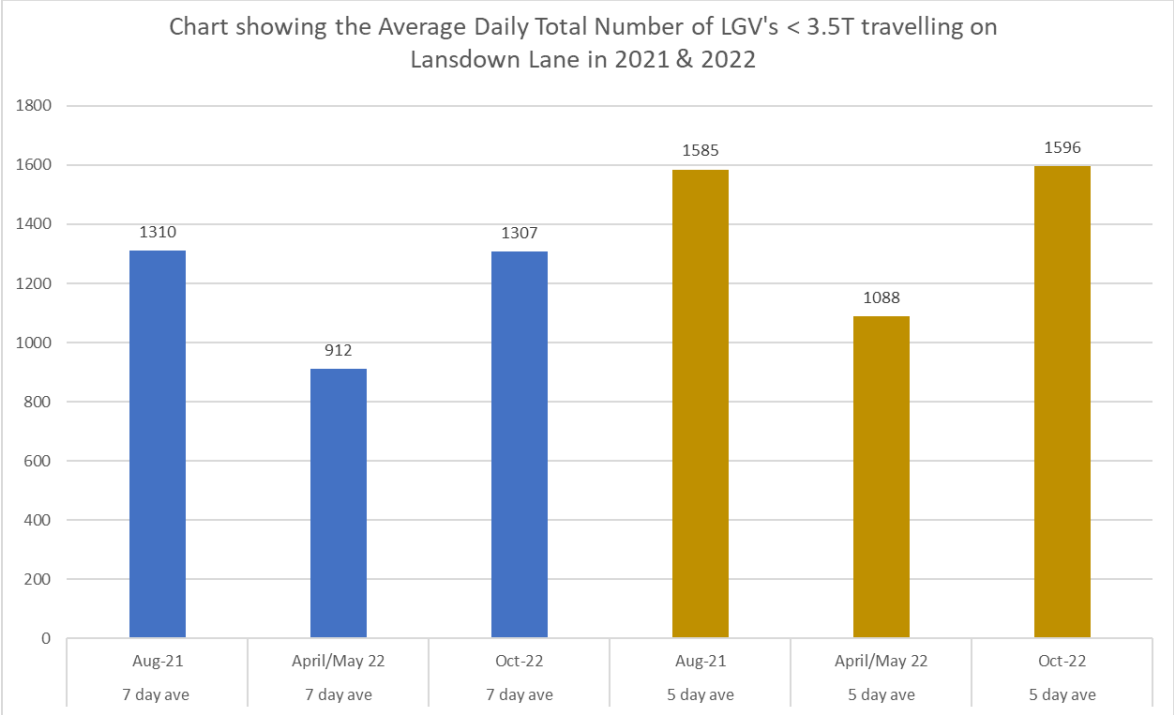
However, a comparison can be made between the August 2021, April/May 2022 and October 2022 ANPR surveys along Lansdown Lane, as this method of classification is far more accurate. Figure 7 shows that overall, there has been a steady decrease in HGV volumes over the past 15 months.

LGV volumes

In 2018 and 2019, the temporary ATC surveys along Lansdown Lane used tube counters to gather classification data. As stated above, this method cannot be used to accurately classify vehicles, therefore, a comparison can only be made between the 2021 and 2022 ANPR surveys.

As shown within Figure 8, when compared to August 2021, LGV volumes recorded in October 2022 remain similar, with volumes higher than April/May 2022.

Figure 8



Analysis of compliant and non-compliant vehicles

By using the following categorisation method, we have been able to determine whether vehicles travelling along Lansdown Lane are classified as compliant or non-compliant. Note that cars are not charged within the CAZ, therefore, are not included in the below.

Compliant vehicles:

- Diesel and Euro 6 or newer
- Petrol and Euro 4 or newer
- Electric and hybrid

Non-compliant and exempt vehicles:

- Diesel and Euro 5 or older

- Petrol and Euro 3 or order

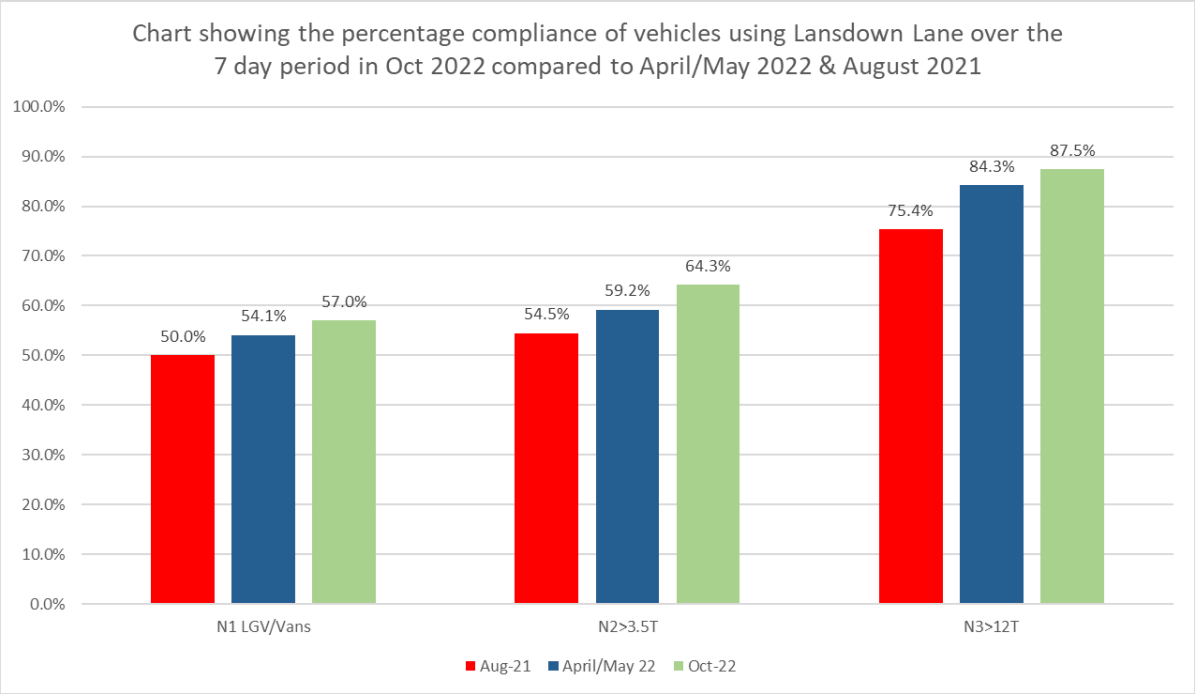
Table 2 shows the split of compliant and non-compliant vehicles seen on Lansdown Lane throughout the 7-day temporary ANPR survey that was deployed in October 2022. Note that bus/coach data is not shown within this dataset as the DVLA data does not include information regarding the retrofit treatments, therefore, the compliance status would be inaccurate.

Table 2

Oct-22	Total number of vehicles seen in the 7 day survey	Not Compliant or Exempt				Compliant				
		Diesel & Euro Status 1-5	Petrol & Euro 1-3	Total Not Compliant & Exempt	Not Compliant & Exempt %	Diesel & Euro 6	Petrol & Euro 4 or newer	Electric	Total Compliant	Compliant %
N1 LGV/Vans	9152	3920	12	3932	43.0%	5095	75	50	5220	57.0%
N2>3.5T	112	40	0	40	35.7%	65	0	7	72	64.3%
N3>12T	48	6	0	6	12.5%	42	0	0	42	87.5%

Figure 9 shows the percentage of compliant vehicles travelling along Lansdown Lane in the August 2021, April/May 2022 and October 2022 ANPR survey periods. It can be seen that compliance has increased throughout the LGV and HGV categories.

Figure 9



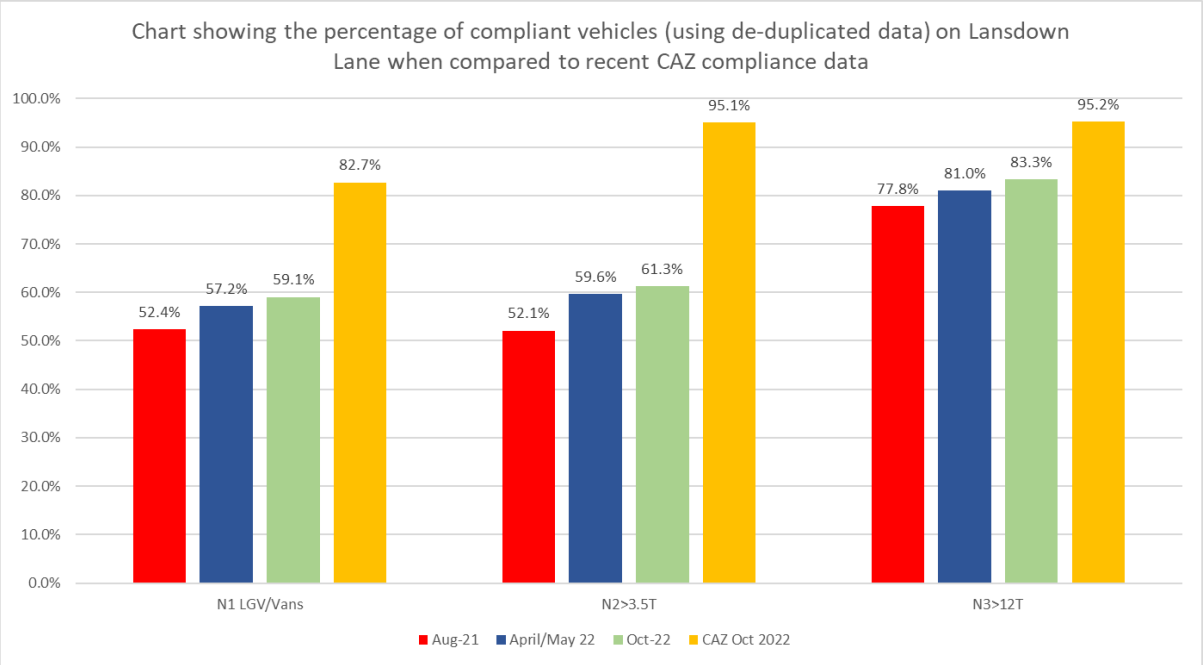
Comparison of compliance between Lansdown Lane and the CAZ

The traffic data recorded within the CAZ is de-duplicated before being used for analysis, this means that the only one entry per vehicle per 24-hour is retained and any other entries from that vehicle within the same period would be removed (--:00 – 23:59hrs). To ensure that the same type of data is being compared, de-duplication has also been carried out on the data recorded along Lansdown Lane.

For example, if an LGV with the VRN 'A123 ABC' travelled along Lansdown Lane on three occasions during a 24-hour period (00:00 to 23:59hrs), only one trip is retained, and the others are deleted.

Figure 10 shows a comparison of vehicle compliance between Lansdown and the CAZ. Note that cars are not charged within the CAZ and are therefore not included in this analysis.

Figure 10



The key objective of these monitoring surveys was to determine whether there has been an increase in non-compliant vehicles using Lansdown Lane as a result of the CAZ. As there is no compliance data available pre-CAZ launch it is difficult to draw conclusions, however, Figure 10 does show that the general compliance of vehicles travelling along Lansdown Lane is less than those travelling within the CAZ.

NO_2 concentrations along Lansdown Lane for 2022 Q3 remain slightly elevated when compared to a 2019 baseline, however, the overall trend is static.

Overall, we are encouraged by the increase in compliance and will continue to monitor any changes in air quality further. A further ANPR survey will be carried out in 6-months' time at this location.

3. Oldfield Park (Lyndhurst Road)

As outlined below, the objectives of the traffic monitoring surveys detailed below was to identify whether there has been an increase in HGVs, particularly those which are non-compliant, travelling along Lyndhurst Road/within Oldfield Park as a result of the CAZ.

Site locations

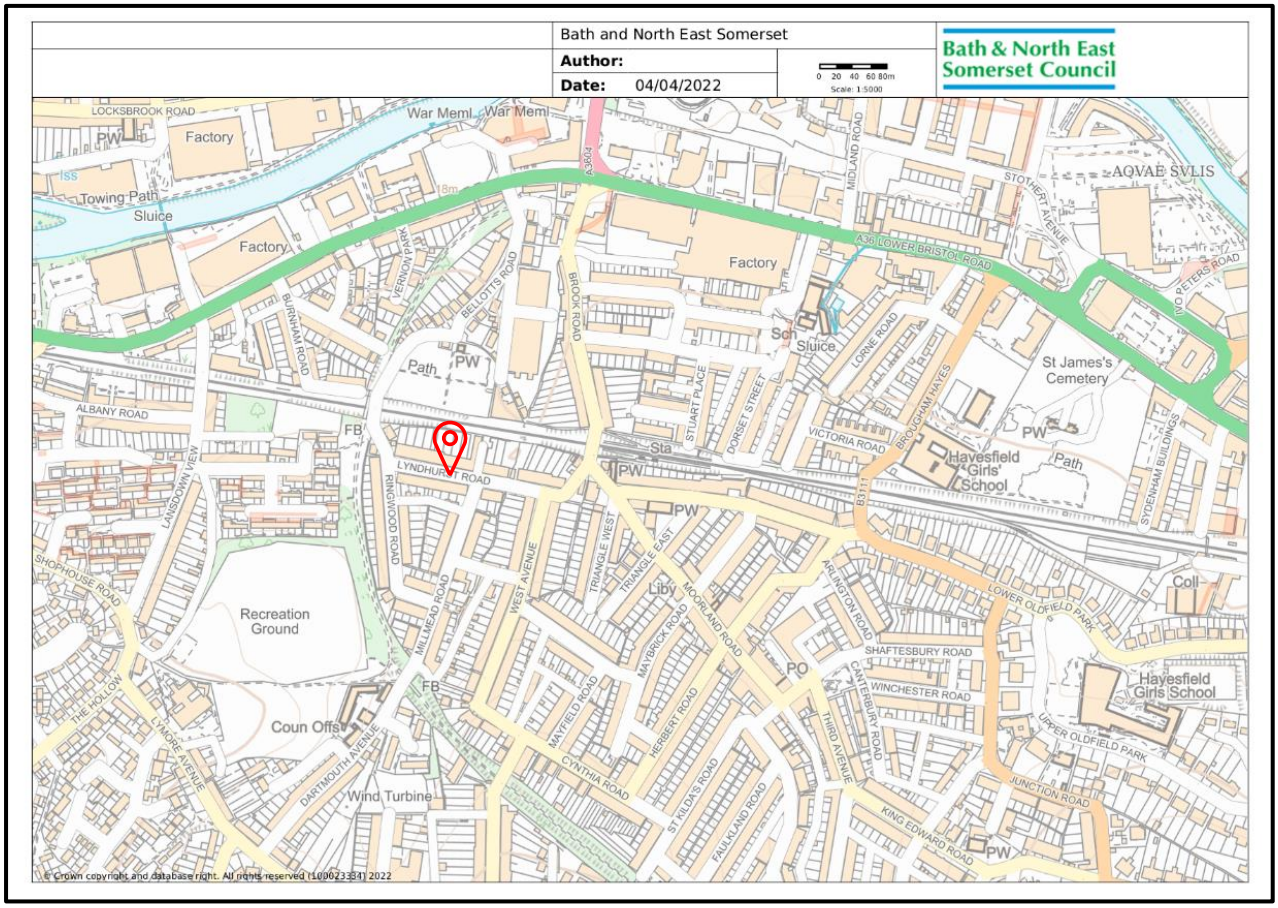
In response to perceived increases in HGVs along Lyndhurst Road as a result of the CAZ, a temporary ATC (pneumatic tube survey) was carried out along Triangle North onto Lyndhurst Road in July 2021 that indicted around 311 HGVs were using this

route per week. This was thought to be potentially caused by vehicles using Lyndhurst Road to reach the A36 Lower Bristol Road instead of Livingstone Road/Brougham Hayes to reach the Moorland Road shopping area and avoid entering the CAZ.

In August 2021 and April/May 2022 ANPR cameras were deployed to obtain a more accurate breakdown of vehicle types using the route westbound, and to understand whether these vehicles would be compliant with the CAZ. An additional video survey was also carried out at the same location in October 2022 to further determined the split of vehicle types. The locations of these surveys can be seen in Figure 11.

- 2021 ANPR survey- 20/08 – 26/08
- 2022 ANPR survey- 25/04 – 01/05
- 2022 video survey- 19/10 – 21/10

Figure 11



Classification of vehicles travelling along Lyndhurst Road

In July 2021, the temporary ATC survey registered far more vehicles are HGVs than the ANPR surveys in 2021 and 2022. The pneumatic tube counters used in July 2021 classify vehicles by wheelbase and number of axles, and is therefore, not always accurate. Whereas an ANPR camera uses the type approval classification of the vehicle provided by the DVLA. The ANPR surveys overall found that whilst compliance was slightly lower than that within the CAZ, HGV volumes were much lower than those recorded in July 2021, and that the July 2021 survey had incorrectly classified vans as HGVs.

The raw data and results from these surveys can be found within Appendix 2 of the 2021 CAZ Annual Performance Report, available here.

In October 2022, an additional video survey was carried out to further investigate the classification of vehicles traveling along Lyndhurst Road. The survey took place over a period of 3-days between the hours of 7:00-19:00 and looked at traffic volumes travelling in both directions. Whilst this survey cannot be directly compared to the ANPR surveys in 2021 and 2022, it can provide an indicative overview of the classification of vehicles travelling along Lyndhurst Road.

Table 3

	19th October	**20th October**	**21st October**	**3-day average**
Car	2717	2997	3015	2910
LGV	393	420	419	411
OGV 1 (2 or 3 axles)	30	38	40	36
OGV 2 (4 or more axles)	0	0	3	1
Minibus	2	10	4	5
Bus	0	0	0	0
Other	59	63	50	57
Total traffic	3201	3528	3531	3420

Table 3 above shows that on average, cars make up 85% of traffic travelling along Lyndhurst Road with an additional 12% of total traffic being LGVs and just 1% being from ordinary goods vehicles (OGVs). Throughout the monitoring period in October 2022, only 3 large OGVs (with 4 or more axles) were recorded along Lyndhurst Road, however, this may include any vehicles that are towing a caravan or trailer and is therefore not necessarily an HGV.

Compliance of vehicles travelling along Lyndhurst Road

Unlike the previous ANPR surveys that have taken place, the video survey in October 2022 does not provide compliance data therefore, this cannot be compared to those compliance rates within the CAZ. However, as recorded in the previous ANPR surveys, we have been encouraged in the increases in compliance and have been continuously monitoring NO_2 concentrations within the vicinity of the area. These concentrations continue to decrease when compared to a 2019 baseline and remain below the Government’s annual objective.

Next steps

Overall, both the ANPR and video surveys have shown that the pneumatic counter used in July 2021 was inaccurate in classifying vehicles by wheelbase and the number of axles, and as a result many LGVs were wrongly classified as HGVs. Whilst the video survey that took place in October 2022 cannot provide classification, 85% of traffic recorded was cars with an additional 12% being LGVs, and only 1% being from Ordinary Goods vehicles.

Whilst we cannot determine the compliance of these vehicles, we are encouraged that nitrogen dioxide concentrations are continuing to decrease within the vicinity of Lyndhurst Road and that they remain below the annual objective. We will look to re-monitor this location with an additional video survey in 6-months’ time so a direct comparison can be drawn with the October 2022 survey.

The areas of investigation presented below in Table 4, are areas which have not been subject to temporary ANPR surveys, instead, other methods of monitoring have been used. For the results of previous monitoring surveys, particularly those published within Appendix 2 of the CAZ Annual Report, please use the following link: https://beta.bathnes.gov.uk/sites/default/files/Appendix%202%20Investigating%20traffic%20displacement%20concerns.pdf

Table 4: Further Locations of investigation, reporting the results of ATC surveys since 2022.

Area for investigation	**Status**	**Air quality monitoring results**	**2022 Annual Report review**	**2022 secondary monitoring (if required)**
Charlcombe Lane	Further 2022 monitoring complete.	The post-CAZ NO_2 concentration at Charlcombe Lane measured at 9.7 µg/m^3 in 2022 Q3 compared to 12.0 µg/m^3 in 2019 Q3.	Monitoring surveys in May 2022 were carried out along Charlcombe Lane, however, issues with the monitoring equipment meant the data recorded was inaccurate. These temporary ATC surveys were therefore repeated and deployed in June/July 2022 for a 7-day period. An update will be provided once the data has been received and analysed.	Monitoring along Charlcombe Lane took place in June 2022. Weekday traffic volumes were on average 31% lower than 2021, and 45% lower than the 2019 October baseline. Additional classification monitoring also found that on average, 89% of traffic using this road was cars, whilst 11% was vans. A second survey opposite the Wooley Lane junction found that weekday traffic volumes in May 2022 had decreased by 50% when compared to the 2019 baseline. Additionally,

Area for investigation	Status	Air quality monitoring results	2022 Annual Report review	2022 secondary monitoring (if required)
				83% of traffic along this road was cars, whilst 13% was vans. During a 12-hour period, only 10 larger rigid vehicles with 2/3 axles were recorded. An additional monitoring location was also added at the request of the Parish Council within the village. Whilst there is no baseline at this location, traffic volumes are lower than those recorded by the Wooley Lane junction. Additionally, 83% of traffic passing this location was cars, whilst 11% is LGVs (274 vehicles in total within a 12-hour period). As part of our annual ATC surveys, monitoring also took place in October 2022. Out of three locations, 1 survey failed to provide accurate data. However, the other

Area for investigation	Status	Air quality monitoring results	2022 Annual Report review	2022 secondary monitoring (if required)
				two locations surrounding Charlcombe Lane have found decreases of over 20% in total weekday traffic volumes when compared to a 2019 baseline. Upon reviewing Charlcombe Lane, monitoring surveys since July 2021 have found no discernible impact on traffic flows as a result of the CAZ. Therefore, this location will now continue be reviewed annually as a part of the annual ATC surveys.
Upper Camden Place	Further 2022 monitoring (after the full reopening of Cleveland Bride) is in progress.	The post-CAZ NO_2 concentration at Upper Camden Place measured at 17.4 µg/m^3 in 2022 Q3 compared to 21.5 µg/m^3 in 2019 Q3.	A further radar ATC survey was carried out in April 2022. When compared to July 2021, traffic volumes had increase 30% across a 5-day and 7-day average. However, as mentioned traffic was still down 8% on	This location was re-monitored in October 2022, after the full reopening of Cleveland Bridge. Data from 2 weeks of monitoring showed that traffic volumes across a

Area for investigation	Status	Air quality monitoring results	2022 Annual Report review	2022 secondary monitoring (if required)
			pre-pandemic levels in this baseline period. When compared to 2017, 2022 volumes were down 23% across a 5-day average and 22% across a 7-day average. It is possible that this location may be affected by displacing traffic as a result of the partial Cleveland Bridge Closure. Therefore, it will be re-monitored after the full reopening.	weekday average remained 21% lower when compared to the 2017 baseline. When compared to July 2021, traffic volumes are 34% higher, however, traffic was still down 8% on pre-pandemic levels during this period. Furthermore, monitoring for a 2-week period in November has shown traffic volumes to be 37% lower than the 2017 baseline. Additionally, volumes were also 20% lower than October 2022 where the bridge had just fully reopened. This suggests that the increases previously identified may be associated with the closure of Cleveland Bridge and not the implementation of the CAZ.

Area for investigation	Status	Air quality monitoring results	2022 Annual Report review	2022 secondary monitoring (if required)
				This location will continue to be reviewed annually as part of the annual ATC surveys.
Twerton High Street	Initial monitoring in progress.	As this location was installed in 2021 there is no pre-CAZ baseline. However, in 2022 Q3 NO_2 concentrations averaged at 31.5 µg/m^3.	Upon reviewing this location in 2022, diffusion tube monitoring along Twerton High Street will remain in place until we can fully understand emerging trends.	Monitoring at this location will conclude in December 2022 as concentrations of NO_2 remain below the annual objective. An annual average will be calculated and published within the 2022 Annual CAZ Performance Report in the summer of 2023.
Shophouse Road	Further 2022 monitoring scheduled.	The nearest available monitoring site from Shophouse Road was The Hollow. The NO_2 concentration at this location in 2022 Q3 was 20.7 µg/m^3 compared to 19.4 µg/m^3 in 2019 Q3. Although NO_2 concentrations have	A further ATC survey was carried out in May 2022. When compared to July 2021 there has been a 5% drop in HGVs and a small decrease in total traffic volumes. However, both the 2021 and 2022 surveys do remain higher than the 2019 baseline.	A further ATC survey took place along Shophouse Road in October 2022. When compared to a 2019 baseline, there continues to be a 4-5% decrease in total HGV volumes. This overall suggests that the implementation of the CAZ has not led to an

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		increase marginally at this location, it must be noted that these values are raw and indicate. Additionally, these concentrations remain well below the objective limit of 40 µg/m^3.	Some of the increase may be accounted for due to the modelled increase in interpeak traffic along The Hollow. Additionally, the occasional full road closure along Jews Lane may also cause traffic to divert along Shophouse Road. However, this location will be reviewed in 6-months' time so the trends can be further understood.	increase in HGVs along Shophouse Road. However, as modelled, the total volumes of traffic recorded in 2021 and 2022 do remain higher than the 2019 baseline. This location will continue to be reviewed annually as part of the annual ATC surveys.
Bradford Road/ Brassknocker Hill	On hold until the effects of Cleveland Bridge opening can be fully understood.	The post-CAZ NO_2 concentration at Bradford Road measured at 20.9 µg/m^3 in 2022 Q3 compared to 31.5 µg/m^3 in 2019 Q2. The post-CAZ NO_2 concentration at Brassknocker Hill measured at 29.1 µg/m^3 in 2022 Q3 compared to 38.5 µg/m^3 in 2019 Q2.	Upon reviewing Brassknocker Hill it is likely that the increase in HGVs can be associated with the closure of Cleveland Bridge, therefore, this location will be reviewed after its reopening. Additionally, the issues surrounding those vehicles breaching the 7.5t weight restriction on Brassknocker Hill is an enforcement issue which be	Upon reviewing Brassknocker Hill after the full reopening of Cleveland Bridge, HGV volumes in November 2022 remain significantly lower than a November 2016 baseline. However, when compared to August and September in 2021, volumes remain increased despite the reopening of Cleveland Bridge.

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			investigated further by the Trading Standards team.	When reviewing Bradford Road after the full reopening of Cleveland Bridge, HGV volumes in November 2022 remain higher than both a November 2017 (pre-bridge closure) and November 2021 (during the bridge closure) baseline period. Both of these locations will be monitored and reviewed into 2023, this will allow traffic volumes to recover to pre-Cleveland Bridge closure volumes, and any further trends can be identified.
Englishcombe Lane	Further 2022 monitoring complete.	The post-CAZ NO_2 concentration at Englishcombe Lane measured at 11.0 µg/m^3 in 2022 Q3 compared to 13 µg/m^3 in 2019 Q2.	2 further radar ATC surveys were carried out in May 2022. When compared to September 2021 monitoring has shown on average an 19% increase in weekday traffic.	Monitoring in July 2022 found that traffic volumes were almost identical to those recorded in September 2021, with volumes being much lower than May 2022.

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			In addition, the AM-peak and PM-peak have shown a 15% increase when compared to September 2021. However, there was a modelled increase at Englishcombe Lane in the PM peak hour. However, at the time this survey was completed, roadworks along Moorland Road diverted a bus route, and potentially other traffic onto Englishcombe Lane. Therefore, this location will be re-monitored in July to help us understand any emerging trends.	Additionally, the AM and PM peaks are showing some variation in volumes compared to September 2021, however, they largely remain similar. This location was also re-monitored in October 22 as part of our annual ATC surveys. Like those volumes recorded in May 2022, October's volumes were again inflated when compared to September 2021, both the AM and PM peak also remained higher. This may be the result of roadworks along Rush Hill causing traffic to divert through Englishcombe Lane and Mount Road. Therefore, as this survey is likely unrepresentative of normal traffic flows this

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				location will be re-visited in 6-months' time.
Cavendish Road	Further 2022 monitoring complete.	The post-CAZ NO_2 concentration at Cavendish Road measured at 13.8 $\mu g/m^3$ in 2022 Q3 compared to 14.3 $\mu g/m^3$ in 2019 Q3.	A further ATC survey was carried out in May 2022. When compared to October 2021, traffic volumes have decreased by 4% as a weekday average. Additionally, there was a 2% reduction in the weekday AM-Peak and a 7% reduction in the PM-Peak. However, volumes of traffic do still show a potential increase of 13% when compared to the 2017 baseline period. Mean speed was recorded at 24mph. As modelled at the Full Business Case stage of the CAZ, additional traffic using Cavendish Road as	Monitoring from a 4-week period in September/October 2022 found that traffic volumes are similar to those recorded in 2017. Additionally, when compared to the same period in 2021, traffic volumes are 14% lower. Average mean speed was recorded at 21mph in September/October 2022. Additional monitoring for a 7-day period in November 2022 has also found traffic volumes to be near identical to those recorded in 2017. Furthermore, volumes remain on average 15% lower than those

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			a route back to Lansdown Road was a potential outcome associated with the Queen Square Traffic Management Scheme[5]. This location will therefore be reviewed and re-monitored in 6-months' time to understand any emerging trends.	recorded in October 2021. Average mean speed was recorded at 20mph in November 2022. Overall, traffic volumes along Cavendish Road remain at or below the 2017 baseline indicating that the Queen Square Traffic Management Scheme has not caused traffic to divert along this road. However, as an increase was modelled at the Full Business Case stage of the CAZ, this location will continue to be reviewed annually as part of our yearly ATC surveys.

[5] Jacobs. Queen Square Traffic Management Scheme, 2020. https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_cii_674726.br_.42.fbc-09_queen_square_traffic_management_scheme.pdf