

MAY 2020

NORTH STAFFORDSHIRE LOCAL AIR QUALITY PLAN

UNAPPROVED OUTLINE BUSINESS CASE
APPENDIX 22 - Monitoring and Evaluation Plan



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1 Introduction

1.1 Background

In October 2018, Stoke-on-Trent and Newcastle-under-Lyme were issued a Ministerial Direction to produce a local air quality plan to address their respective nitrogen dioxide (NO₂) problems. Stoke-on-Trent City Council (SoTCC), Newcastle-under-Lyme Borough Council (NuLBC) and Staffordshire County Council (SCC) are working together to produce a joint plan.

This Plan will help to protect and promote the health of the local population by improving air quality and reducing the impact of air pollution on the environment. In so doing, the local authorities are complying with the UK Air Quality Plan and bringing NO₂ air pollution within statutory limits in the shortest possible time.

The three predicted NO₂ exceedance locations on the local road network, based on the local model are:

- The A53 (Etruria Road) between Victoria Street and Basford Park Road. The maximum predicted annual mean NO₂ concentration in 2022 along these links is 43µg/m³.
- The A5008 (Bucknall New Road) at the junction between Potteries Way and Lindop Street. The maximum predicted annual mean NO₂ concentrations in 2022 along this link is 42µg/m³.
- The section of the A50 (Victoria Road) between Maud Street and Hitchman Street. The maximum predicted annual mean concentration in 2022 along this link is 46µg/m³.

The background to the identification of these three locations is contained in the Initial Evidence Summary (IES). The conclusion reached from the modelling of current and future air quality is that intervention is needed to bring about compliance with annual mean NO₂ limit values in the shortest time possible.

An Outline Business Case (OBC) is to be submitted to the Department for Transport (DfT) and Department for Environment, Food and Rural Affairs (Defra) Joint Air Quality Unit (JAQU) in May 2020 which explain how the authorities have determined their preferred option.

1.2 Preferred Option

A detailed description of the preferred options is as follows:

1. A50 Victoria Road bus gate

A bus gate will be installed on the A50 Victoria Road exit of the King Street/City Road/Victoria Road junction. Traffic will be restricted to buses, cyclists and taxis between Monday and Friday from 7am to 10am and 4pm to 7pm.

The splitter island will be widened and the kerbs re-aligned to provide a single lane bus gate. An Automatic Number Plate Recognition (ANPR) camera will be located at the bus gate to monitor compliance and two rotating prism signs will be installed at the entrance to the bus gate. The prism signs will enable the display of multiple messages and will be blank when the bus gate is not in use.

Bus gate advanced direction signing will be provided on the local highway network on all approaches to the Victoria Road/City Road and A50/King Street junctions, including Prism and Variable Message Signs.

The scheme costs include installation, the Traffic Regulation Order, ten-years of maintenance, monitoring and operation, and decommissioning at the end of the project. It is expected that the cameras may need to be replaced after five years.

An Ultra Low Emission Vehicle (ULEV) exemption, allowing ULEVs to drive through the bus gate, will be assessed, and if considered deliverable, will be added to the scheme in the Full Business Case (FBC).

2. A53 Etruria Road bus gate

A two-lane bus gate will be installed on the A53 Etruria Road westbound exit of the A53/A500 roundabout, with appropriate amendments to the existing road markings at the bus gate and on the circulatory carriageway. Traffic will be restricted to buses, cyclists and taxis between Monday and Friday from 7am to 10am and 4pm to 7pm. Two rotating prism signs will be installed at the entrance to the bus gate to enable the display of multiple messages and will be blank when the bus gate is not in use. Two ANPR cameras will be installed to manage compliance.

Advanced direction signing will include prism signs on all approaches to the A500/A53 Etruria Road roundabout. Changes to destination signs on the A500 mainline carriageway in both directions are also proposed. This will include appropriate re-routing to the hospital and will also include variable message signs.

The scheme costs include installation, the Traffic Regulation Order, ten-years of maintenance, monitoring and operation, and decommissioning at the end of the project. It is expected that the cameras may need to be replaced after five years.

A ULEV exemption, allowing ultra-low emission vehicles to drive through the bus gate will be assessed and if considered deliverable will be added to the scheme in the Full Business Case (FBC).

3. Traffic Management east and west of Victoria Road

Traffic management measures will be required on roads to the east and west of Victoria Road in order to ensure that the adjacent local communities are not adversely impacted by traffic re-routeing through these areas when the bus gates are in operation.

The following measures will be required to the East of Victoria Road:

- Replace existing worn and ineffective road humps in Beville Street, Stanier Street, Wileman Street, Philip Street, Elliot Road, Wedgwood Road, Warrington Street and Vivian Road and enhance the impact of the scheme by providing additional humps and carriageway re-surfacing.
- Provide new road humps and carriageway re-surfacing along Park Street, Minerva Road, Frederick Street, Cumberland Street and Clarence Street.
- Introduce one-way operation (direction of travel west to east) in Wileman Street (part) and Stanier Street (part).

- Provide an environmental weight restriction on the traffic calmed routes to prevent inappropriate large vehicles travelling through the area.
- Extend 20 mph zone to cover the whole traffic calmed area.

The following measures will be required to the West of Victoria Road:

- Replace existing worn and ineffective road humps in Manor Street, George Street, Edward Street and Hitchman Street and enhance the impact of the scheme by providing additional humps and carriageway re-surfacing.
- Provide new road humps and carriageway re-surfacing in Maud Street, Fountain Street and William Street. This includes two raised tables to improve safety at Christ Church C of E Primary School.
- Enhance signage to improve the enforcement of the existing environmental weight restriction in Manor Street.
- Closure of Hitchman Street at its junction with Victoria Road, maintaining access for pedestrians and cyclists.
- The existing western footway along Victoria Road at Hitchman Street will be extended to enhance the pedestrian environment.
- A 20mph zone to include the whole traffic calmed area.

4. Transport improvements along A53 Etruria Road

The bus gate on A53 Etruria Road will significantly reduce traffic flows in the peak periods along this corridor and improve bus reliability. This will necessitate the review of signal timings at junctions along the corridor in order to maximise air quality benefits.

The increase in spare capacity along the corridor will create the opportunity for the provision of signalised pedestrian crossing facilities on all arms of the A53/Gladstone Street/Basford Park Road junction and the A53/Albert Street/Sandy Lane junction.

An existing bus stop along the A53 Etruria Road is located on the hill where it is observed that traffic can queue behind buses serving the stop. It is recommended that the bus stop is relocated to the east of Kingsfield Oval, opposite the New Vic Theatre where it is likely to have a reduced impact on air quality. Accessibility will be enhanced through the provision of bus access kerbs and levelled footways. Real Time Bus Passenger Information (RTPI) will also be provided along the A53 corridor.

5. Bus retrofit programme

To deliver compliance on Bucknall New Road and Victoria Road the buses that use these routes will be retrofitted to achieve Euro VI emission standards. This involves the installation of the appropriate exhaust modification depending on vehicle type and age and associated e-cooling fan to minimise ongoing maintenance. This will be an expansion of the existing bus retrofit programme being delivered on the A53 as part of the separate NuLBC Ministerial Direction.

75% of buses that travel along the Bucknall New Road corridor and all buses travelling along Victoria Road require this improvement to ensure that compliance is achieved. Funding will be required for the retrofitting of 50 buses to ensure that the appropriate

number of scheduled services can continue to operate on Bucknall New Road and Victoria Road. The two main operators are First Bus and D&G, and the smaller operators include Scraggs and Stantons of Stoke.

To market the cleaner bus fleet, enhance their visibility and encourage greater bus use, it is recommended that all buses that have been retrofitted are provided with a new branding in the form of a partial bus wrap. To monitor bus operator use of retrofit vehicles, ANPR cameras will be installed on Victoria Road, Bucknall New Road, at the junction with St Ann Street, and on the A53 to the east of the junction with Albert Street/Sandy Lane.

6. Bus infrastructure improvements

Enhanced bus infrastructure will be installed on routes that pass through or are parallel to the exceedance locations. This includes bus routes:

- To Abbey Hulton, Milton, Bentilee and Longton that converge at Bucknall New Road
- Along Victoria Road and parallel routes along College Road and A5007 City Road
- Along A53 Etruria Road between Newcastle town centre and Hanley City Centre, and parallel routes along the A52 and Shelton New Road

The improvements are required to ensure that bus patronage is maximised along corridors that are at risk of air quality exceedances and where traffic modelling suggests that traffic flows and journey times may increase as traffic re-routes to avoid the bus gates. The cost of the package includes the installation and ten-year maintenance of:

- 89 RTPI screens
- 17 new bus shelters of which 8 are replacement and 9 are new facilities
- 27 accessible kerbs at bus stops
- Installation of CCTV at 71 bus stops

1.3 Purpose

Funding for the preferred option described above, will be through JAQU's implementation fund. In accordance with JAQU's guidance, a monitoring and evaluation plan is therefore required with the OBC as set out in the supplementary note on monitoring and evaluation.

This document proposes a proportionate approach to monitoring and evaluation to reflect the traffic management focus of the preferred option and the project does not propose to undertake significant local work.

The focus for data collection is NO₂ concentrations obtained via diffusion tubes as this will provide evidence of compliance being achieved. Traffic flow data supports this by providing an understanding of why the NO₂ concentration results are the levels that they are. This data will be particularly useful should the NO₂ concentration data be unexpected in any way.

In addition to this, bus patronage data will continue to be collected to monitor delivery of the associated outcome and this will be reported locally.

1.4 JAQU Central Evaluation

JAQU will be undertaking a central evaluation of local authorities' NO₂ plans. Action undertaken by Highways England are excluded. The central evaluation aims to understand the impacts of measures introduced through a local authority's local plan and ensure that local authorities are on track to reduce NO₂ concentrations in the shortest possible time. This will draw on both existing local and national monitoring. Therefore, local authorities should maintain their current monitoring sites for NO₂ concentrations and traffic flows for the length of the evaluation.

The central evaluation will produce quarterly bulletins on the progress of local plans on reducing NO₂ concentrations and other key factors (such as changing traffic flows). This will be based on a comparison between the expected (as presented in the local authority's feasibility study) and the actual, monitored situation. The bulletins will be communicated regularly to local authorities. Should these bulletins show that a local plan is performing below expectation, JAQU will seek to determine the cause by working with the local authority.

Where it has been collected, local authorities are required to provide traffic data in the following types to the central evaluation:

Traffic count data: Local authorities are required to provide traffic flow, composition and speed data from Automatic Traffic Count sites (ATCs: two inductive loops per lane) or similar. This will allow the central evaluation team to track the ebb and flow of demand, before and after an intervention.

ANPR data: Local authorities are asked to collect ANPR data and upload it to the "ANPR - Monitoring and Evaluation" folder on Huddle.

Other traffic data: The central evaluation welcomes other traffic data that individual local areas might already collect, for example cycle counts, bus fleets, etc. The central evaluation team will liaise individually with local areas to agree on the reporting procedures for this data.

1.4.1 Local Monitoring and Evaluation of Plans

Local authorities have a responsibility to monitor the air quality outcomes in relevant areas but may choose to conduct further monitoring activity or evaluate the wider impacts of their measures in more detail. This could range from maintaining (and sharing) the existing monitoring to implementing new monitoring or undertaking a detailed local evaluation.

Any proposed local monitoring or evaluation activity should be considered an important part of running and implementing the proposed scheme.

Authorities should look to cover any associated running costs from the revenues generated by any proposed charging scheme. Where a local authority is not proposing to implement a charging scheme, or there is a shortfall, local authorities should clearly set this out in the monitoring and evaluation plan and should work with JAQU to find a suitable solution.

Local monitoring will be restricted to bus patronage data for this project as it directly relates to a secondary outcome.

1.5 Critical Success Factors and Scheme Outcomes

The primary critical success factor (CSF) in this study is that the package of measures that form the North Staffordshire Local Air Quality Plan (NSLAQP) must 'bring about compliance with NO₂ limit values in the shortest possible time'.

Additionally, in developing the NSLAQP, the assessment has taken account of the need to:

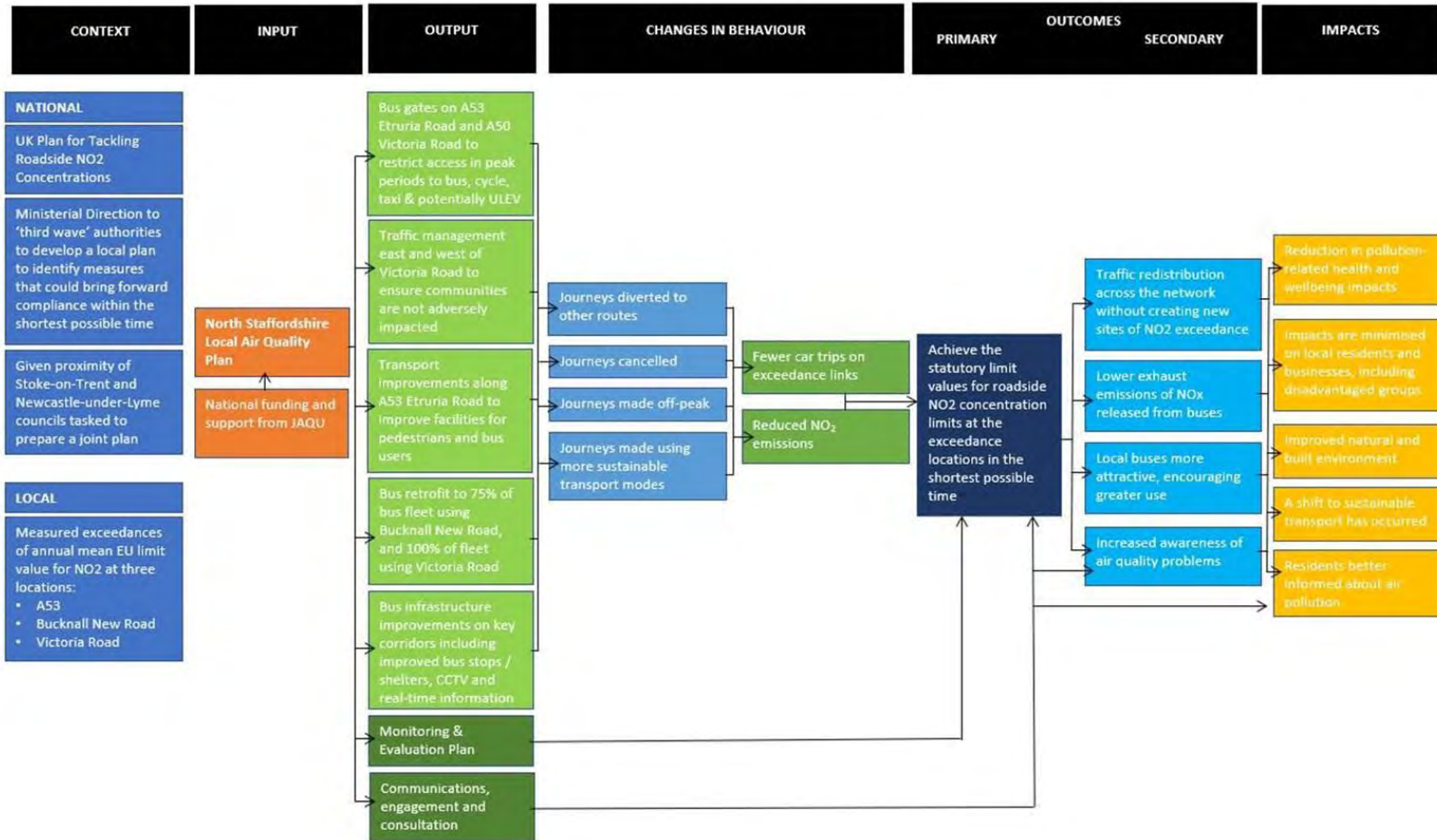
- Deliver a high level of confidence that compliance with the EU limit value will be achieved
- Minimise the social and economic impacts on local communities and residents

The scheme outcomes reflect this focus and are divided into primary and secondary outcomes. The primary outcomes relate to delivering NO₂ emission compliance and the secondary outcomes support this by ensuring that no new exceedances are created, local buses are more attractive and there is an increased use of sustainable modes.

1.6 Logic Map

The logic map, in Figure 1-1, shows how the inputs, delivered through the timely receipt of funds from the Implementation Fund, will generate the outputs (the components of the preferred scheme that are delivered) that then drive a set of outcomes related to transport and air quality objectives. Achievement of these outcomes secures the desired impacts for the preferred option, which in terms of the project delivery relate to achieving and maintaining compliance with the ministerial direction and an improved awareness regarding air quality. These are closely aligned to the primary CSF and the secondary CSFs. The success of the outputs in achieving the desired outcomes and impacts is then confirmed through the monitoring and evaluation process.

Figure 1-1: Logic map



2 Data Requirements

2.1 Existing Monitoring

Table 2-1 identifies existing monitoring that will continue to be required in order to monitor the key outcomes of the preferred option as outlined above. As shown below, except for the automatic traffic counts (ATCs) on the A50, there are no other suitable permanent traffic counters for monitoring. It should also be noted that although the diffusion tubes and monitors collect data on a monthly and quarterly basis, the data is corrected annually to allow for seasonal variability.

Table 2-1: Existing Monitoring

Metric	Monitoring Method	Data Collection Frequency	Quantity	Data Type	Control
Air quality data	Diffusion tubes	Monthly	Network of 605 diffusion tubes collecting NO2 data focussed on the previously identified Air Quality Management Areas (AQMAs)	NO2 concentration levels	NULBC, SoTCC
Air quality data	Automatic Monitors	Quarterly	3 monitors (located in Hanley, Basford, Newcastle-under-Lyme)	NO2 concentration levels	NULBC, SoTCC
Strategic Road Network traffic flow data	Automatic counts	Monthly	1 relevant site (located on the A50 between Stanley Matthews Way and A500, source - WebTRIS database)	1-way hourly vehicle flows by vehicle classification averaged over a month by day/hour	Highways England
Bus patronage	Bus operator ticket data	Monthly	Total patronage for Stoke-on-Trent and separately Staffordshire administrative areas only (excludes analysis by service) for concessionary fare purposes	Bus passenger numbers per service	Bus operators, SCC, SoTCC
Vehicle Fleet Composition	ANPR data	Undertaken in 2019	15 locations	Vehicle composition split by vehicle type, fuel type, euro standards and compliance	NULBC, SoTCC

2.2 Additional Monitoring

The local authorities wish to undertake a proportionate amount of additional monitoring in order to understand the impact of the preferred option. There are several gaps in the existing data to

enable an understanding of both the air quality and traffic impact of the preferred option, so additional monitoring requirements are outlined in Table 2-2. The locations of the planned air quality data collection across North Staffordshire that would be collated is shown in in Figure 2-2, this shows automatic monitoring sites, diffusion tubes at local air quality management sites, additional diffusion tubes since the ministerial direction and proposed sites for monitoring and evaluations. Figure 2-6, Figure 2-7, Figure 2-8 and Figure 2-9, show the same information but focussed on Wolstanton/Porthill, A53/Newcastle-under-Lyme, Hanley and Fenton respectively. The diffusion tubes are triple located as agreed with JAQU at the start of the project to help with the reduced accuracy of diffusion tubes compared to other data collection methods. Permanent monitoring sites require land, planning consent and a power supply, hence are costly and more difficult to implement. In addition, the layout of the street of interest prevent this method of data collection.

Figure 2-6, Figure 2-7, Figure 2-8 and Figure 2-9, shows other data collection for monitoring including traffic counts, ANPR cameras (both bus gate/retrofit enforcement and a one-off survey) and the corridors of bus infrastructure improvements where bus patronage by service would be collated. The monitoring data will need to be collected as soon as possible before the implementation of the schemes to ensure the appropriate “before” data is collected.

The traffic data will be automatic traffic counters with vehicle classification, given the number of months per year that the classified data is required it is both easier and cheaper to use permanent sites.

The one-off ANPR survey covering a wider area of North Staffordshire than the bus gate and retrofit enforcements cameras will be post implementation, its timing will be informed by the enforcement cameras.

Table 2-2: Additional monitoring to support Central Evaluation

Metric	Monitoring Method	Data Collection Frequency	Quantity	Control
Air quality data	Diffusion tubes	Monthly	59 additional diffusion tubes to collect NO2 data at the identified exceedance locations	NULBC, SoTCC
Local traffic data	Automatic Traffic Counts	Monthly	13	SoTCC, NULBC
Vehicle fleet composition	ANPR cameras	Monthly	5 locations	SCC, SoTCC
Vehicle fleet composition	ANPR	One off cordon study	15 locations	SCC, SoTCC
Bus patronage	Bus operator ticket data	Monthly	Data by fare stage providing a broad indication of the number of passengers on each bus service. Will require analysis.	Bus operators, SCC, SoTCC

Funding will be required to deliver the Monitoring and Evaluation Plan as there is not expected to be adequate revenue generated from the bus gates to cover the costs.

Funding will be required to collect monthly air quality data at the 664 diffusion tube locations over the ten-year period. This includes 59 new sites.

ANPR data will be collected at the five locations set up to enforce the bus gates and retrofitted buses. In order to monitor network wide changes in vehicle compliance, these ANPR cameras will need to be supplemented by a one-off ANPR data collection survey covering 15 additional sites. These will be at the same locations as the previous ANPR data collection in 2019 which was used to disaggregate the North Staffordshire Multi Modal (NSMM) transport model demand into compliant and non-compliant vehicle matrices.

The aim of the preferred option is to reduce emissions below the exceedance level by re-distributing traffic away from the three exceedance locations, whilst avoiding the creation of new exceedance locations. Funding will be required to monitor the actual changes in traffic flows compared to modelled flows. 13 new permanent traffic counters will be required at the exceedance sites and along two screen lines on the local highway network that intercept the key routes that are predicted to be affected by the re-assignment of traffic.

Funding is required to measure the change in bus passenger numbers over the ten-year period as a result of improved bus reliability and investment in bus infrastructure. Where available, data by fare stage collected from ticket equipment will be received from the bus operators and concessions data can provide a broad indication of the number of passengers on each service each month.

Figure 2-1 Air quality data collection - overview

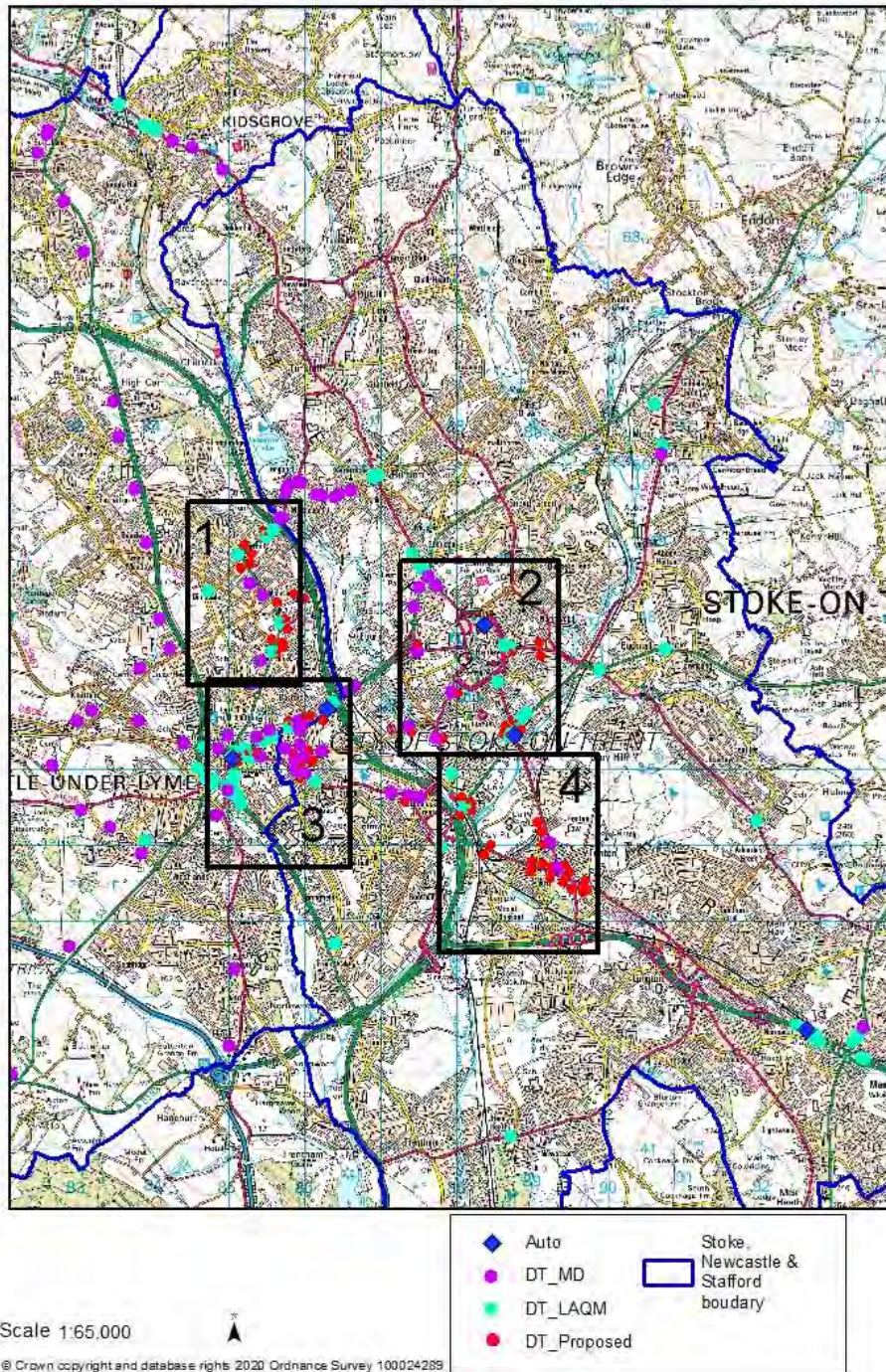
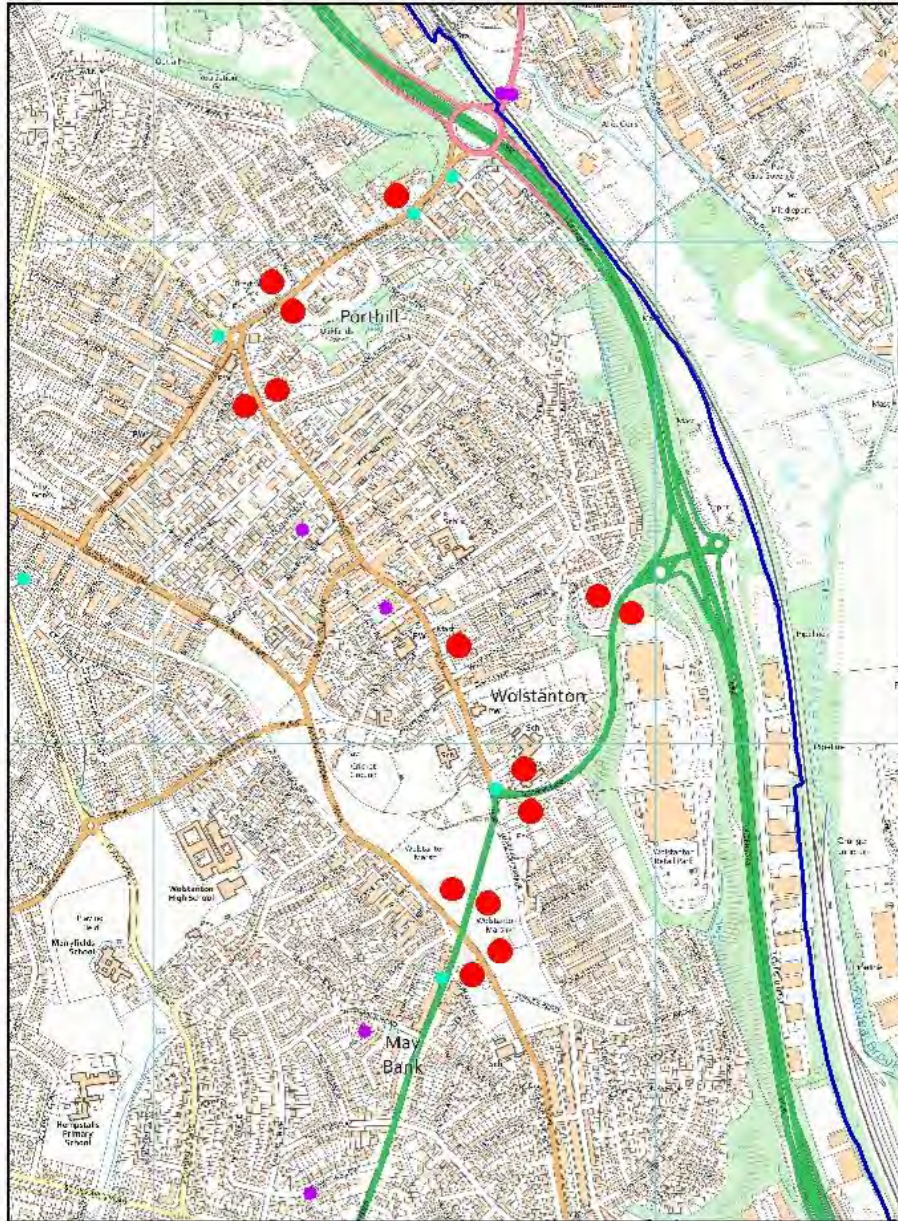


Figure 2-2: Air quality data collection – Wolstanton / Porthill

Area 1



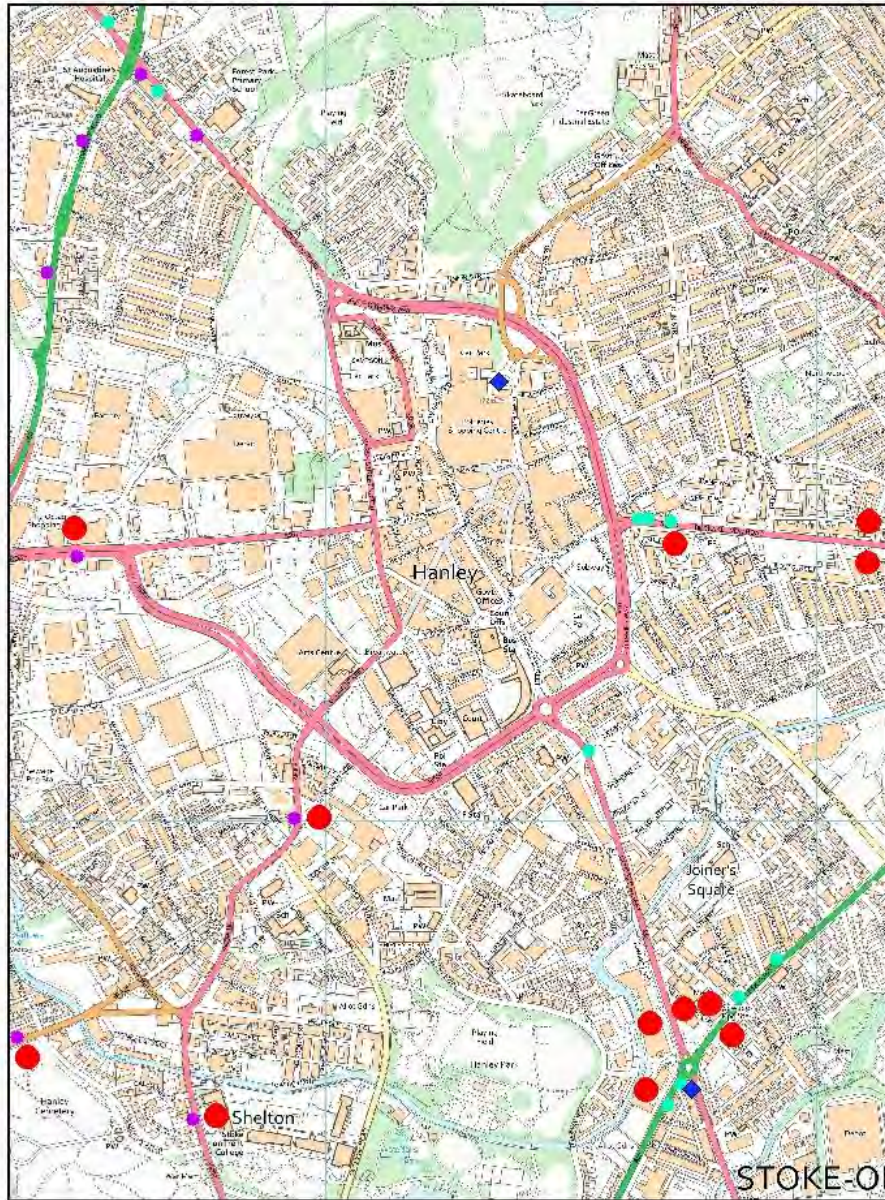
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Figure 2-3 Air quality data collection – Hanley

Area 2



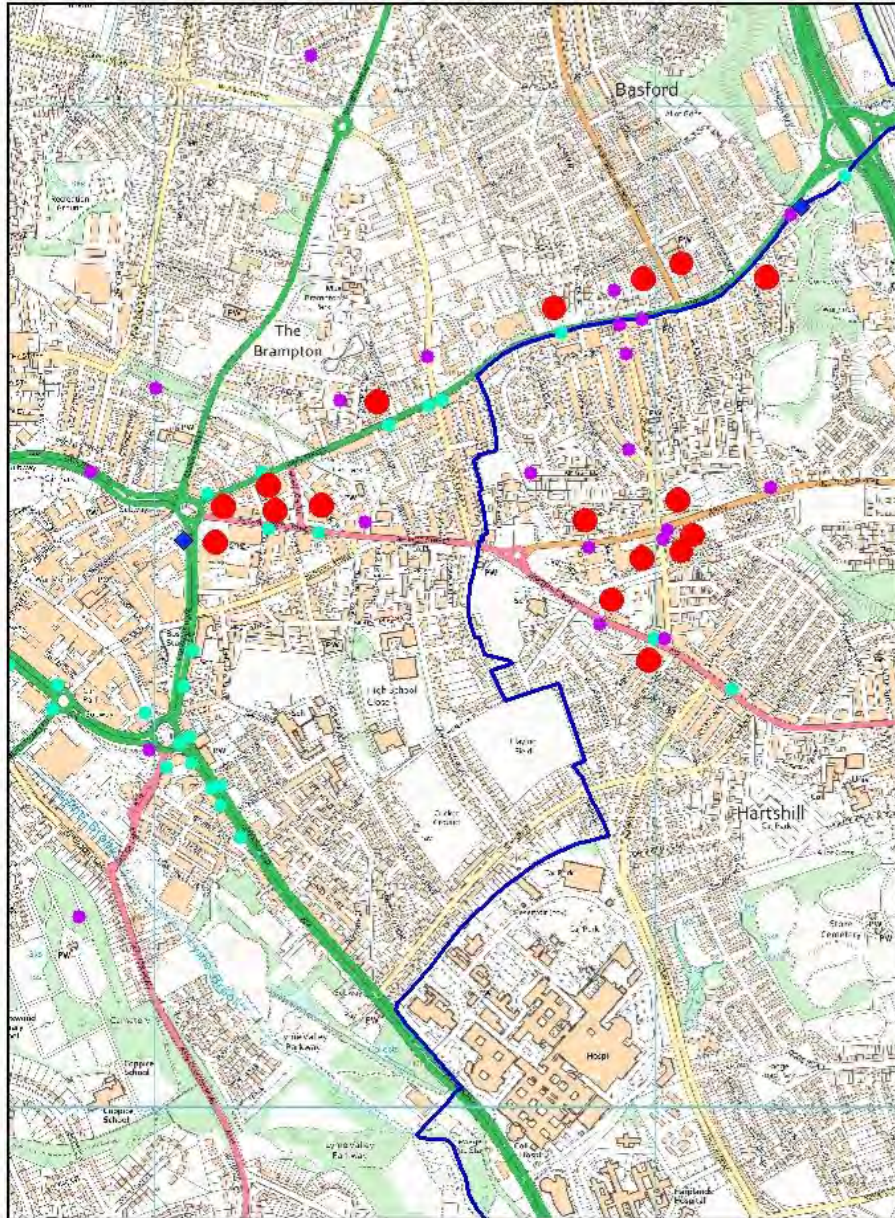
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Figure 2-4 Air quality data collection – A53 / Newcastle under Lyme

Area 3



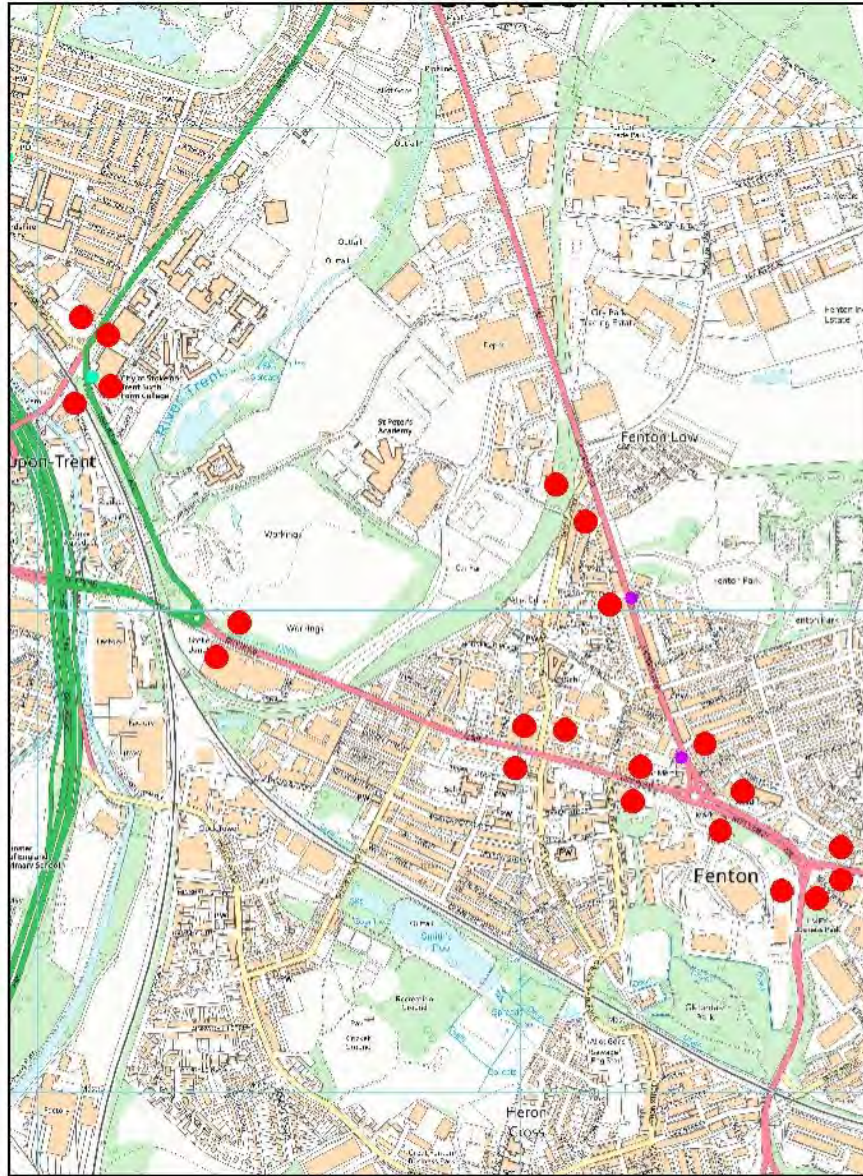
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Figure 2-5 Air quality data collection - Fenton

Area 4



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Figure 2-6: Automatic traffic count locations

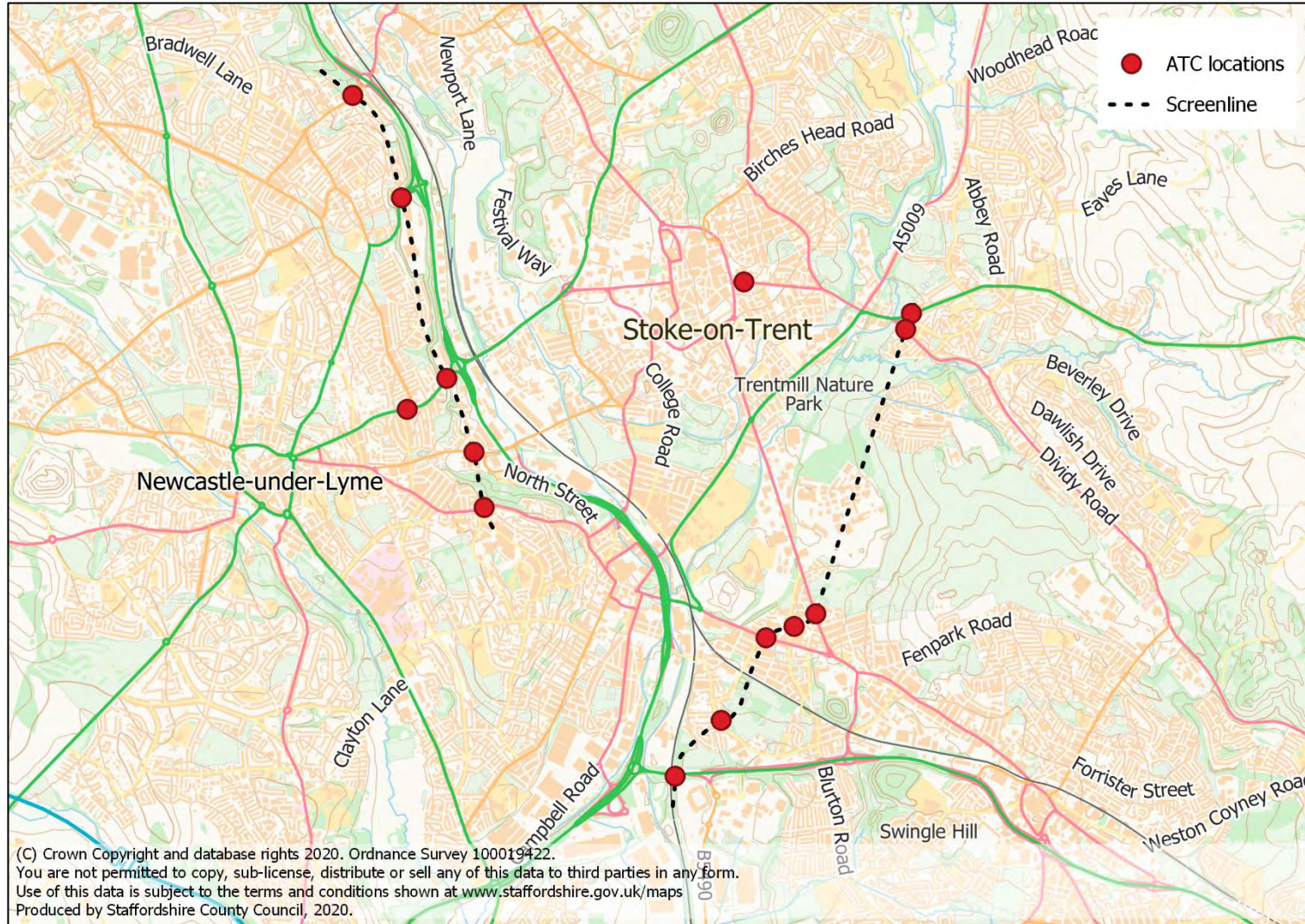


Figure 2-7: ANPR camera locations for enforcement of bus gates and retrofit

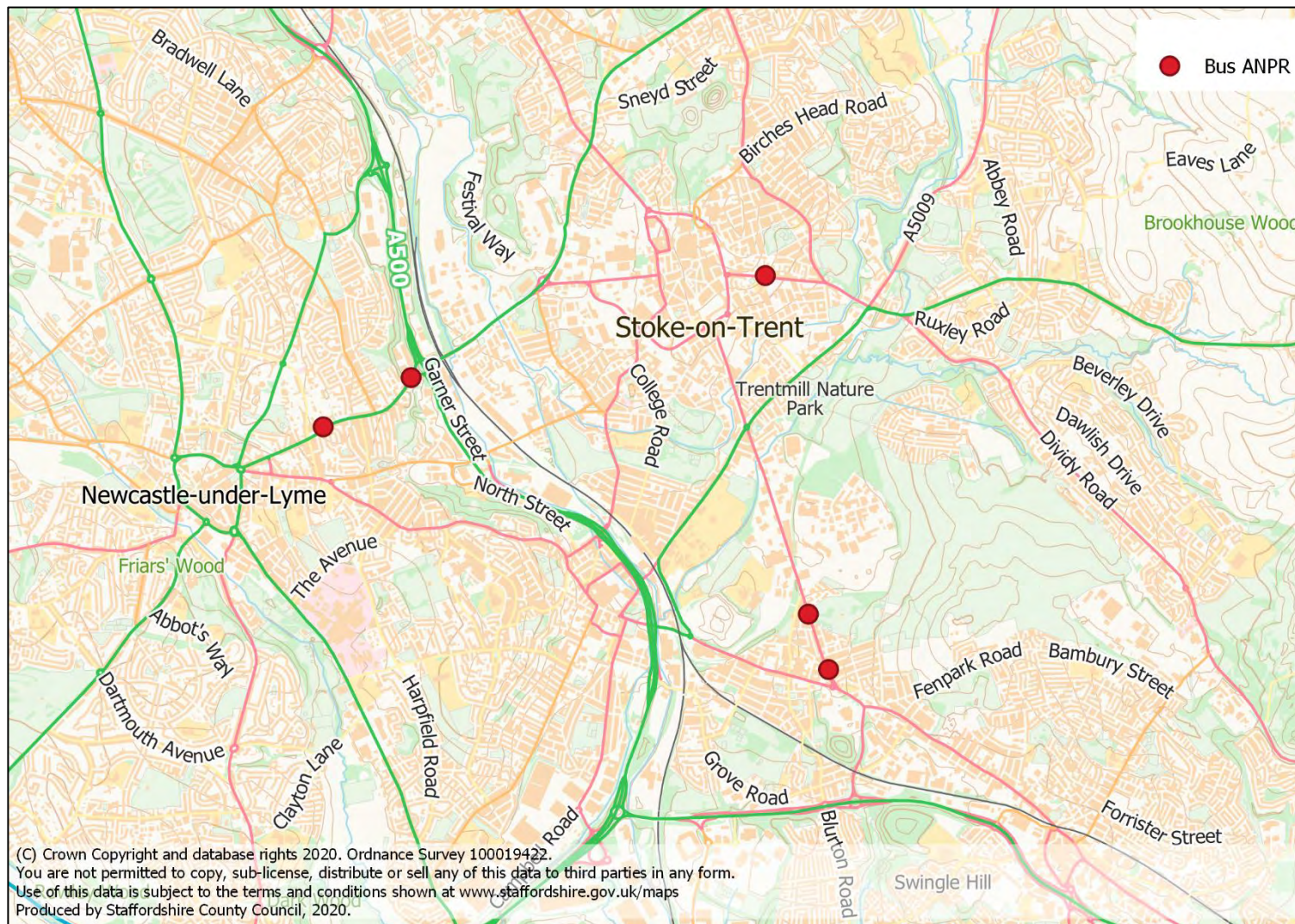


Figure 2-8: ANPR camera location for one-off post implementation survey.

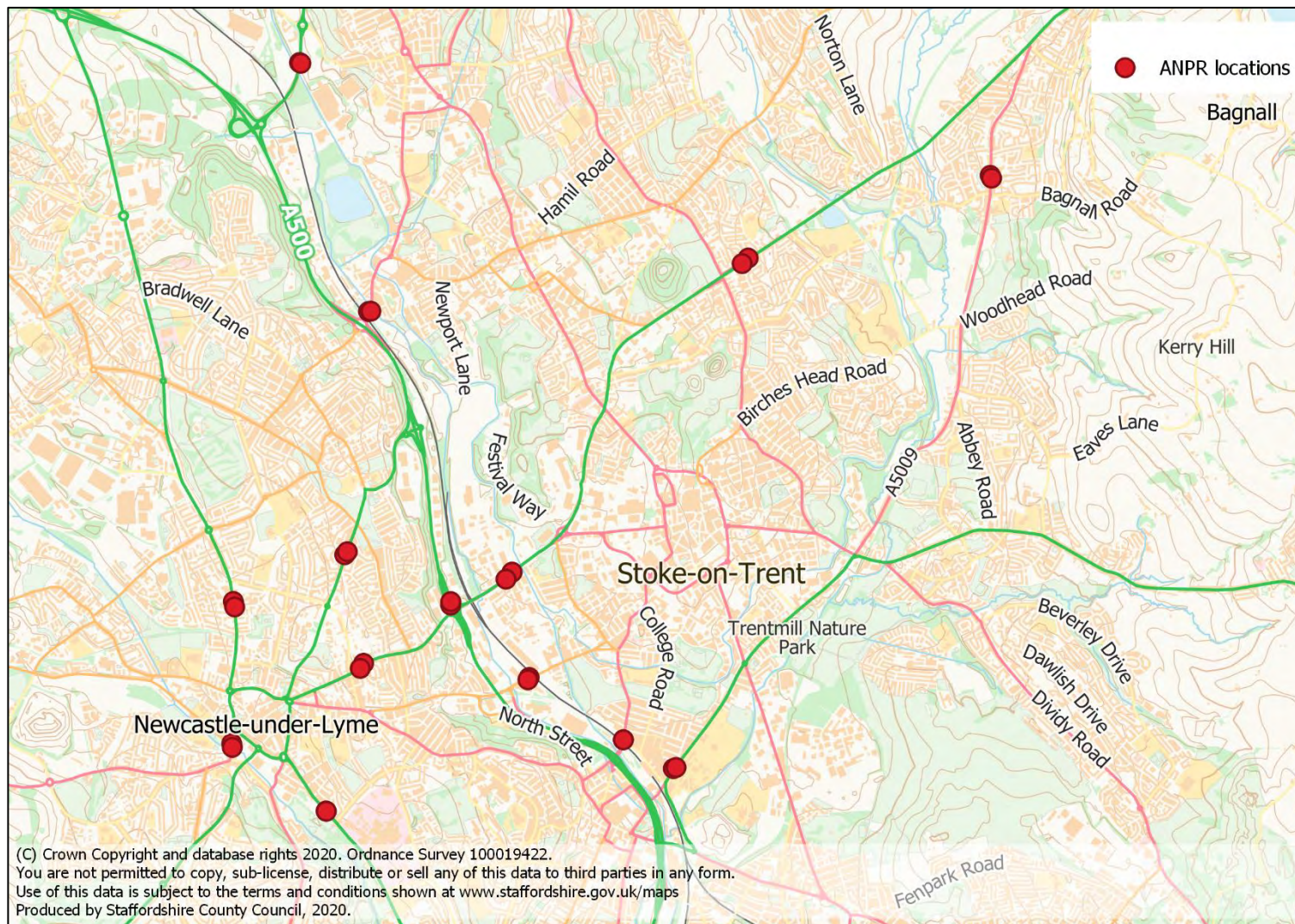
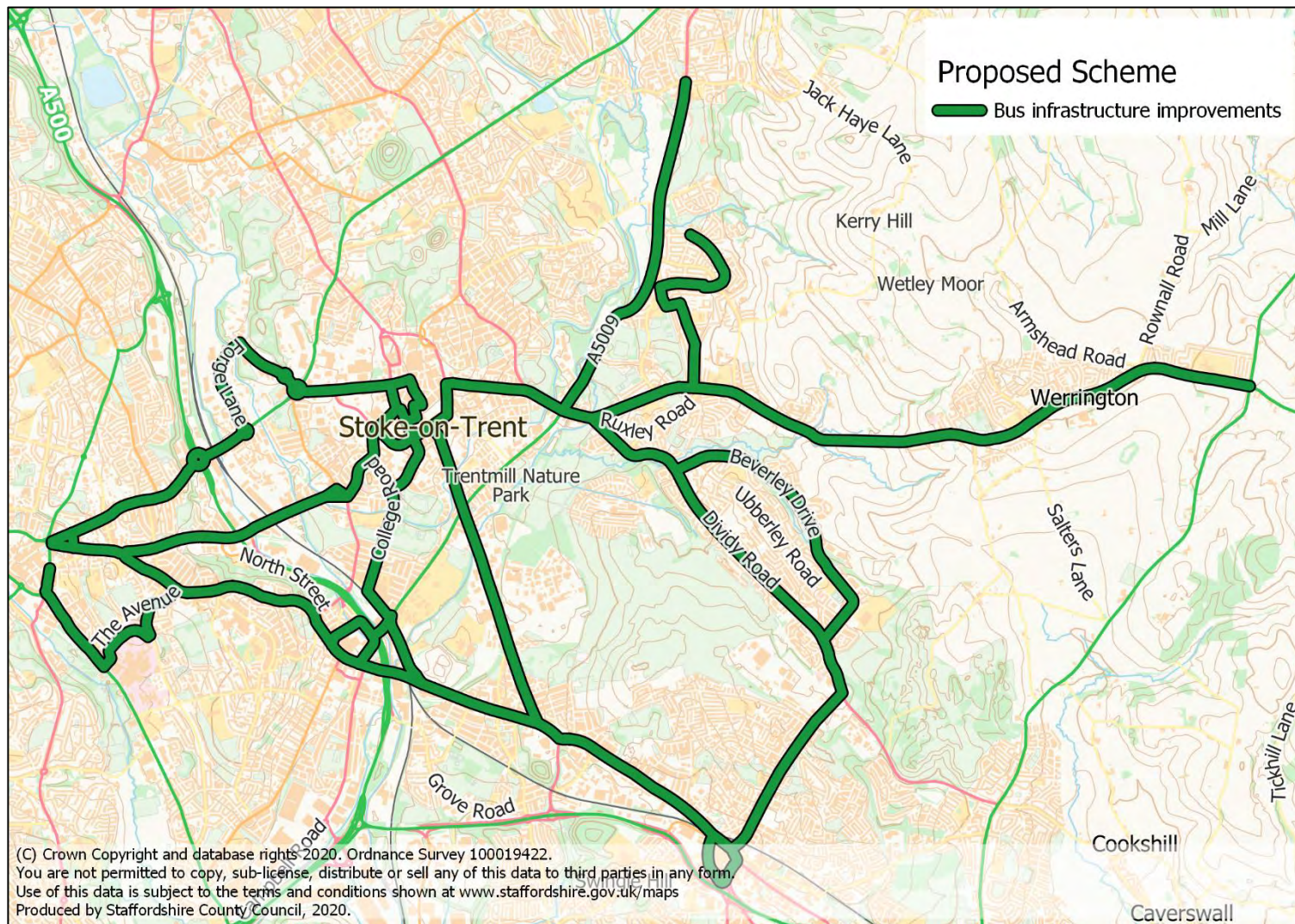


Figure 2-9: Bus infrastructure improvements



2.3 Additional Monitoring Justification

Table 2-3 outlines the intended purpose and justification for the additional monitoring described in Table 2-2.

Table 2-3: Additional Monitoring Justification

Metric	Justification
Air quality data	<p>There is currently a network of 605 diffusion tubes primarily located around AQMAs. It has been determined that an additional 59 diffusion tubes will be required in order to supplement the monitoring of NO₂ levels across North Staffordshire as a result of the preferred option. These are located at the identified sites of exceedance and the surrounding roads that are likely to be impacted from the redistribution of traffic.</p> <p>The monitoring of NO₂ levels will help determine if the preferred scheme is delivering compliance in line with the Ministerial Direction and when compliance has been achieved.</p>
Local Traffic Data	<p>No traffic count data is currently collected within the study so the project cannot provide any data to the central evaluation team to undertake the mandatory analysis. A proportionate series of 13 permanent count locations is proposed forming two cordons and two isolated counts at two of the exceedance locations. Costs have been estimated for using the latest solar-powered equipment, which will provide accurate vehicle classification and where data is automatically uploaded to a cloud hosted system minimising staff resource cost. It is likely that some maintenance and equipment renewal will be required because of the duration for monitoring.</p>
Vehicle Fleet Composition	<p>The scheme specifies the delivery of ANPR cameras at the two bus gates and along the routes used by retrofitted buses. For the bus gates, this will enable enforcement and issuing of any Penalty Charge Notices (PCNs) as necessary. Enforcement of the use of retrofitted buses on the appropriate road links rests with the Traffic Commissioner, however it is standard practice for the Local Authority to be approached to provide evidence. ANPR data is a standard data source for this type of enforcement and the cameras will also serve as a deterrent.</p> <p>The central evaluation team can also be provided with access to the raw data to enable them to undertake vehicle fleet composition monitoring and provide an initial indication of when the fleet may have reached natural compliance. An ANPR data collection study using the same locations as within the model submitted as part of the IES will then be undertaken to confirm this. The locations of these cameras would provide a better and wider sample of vehicles.</p>

3 Monitoring Costs

As the preferred option in the NSLAQP does not include a Clean Air Zone (CAZ), it is proposed that any shortfall in funding for monitoring and evaluation of the scheme is to be provided by JAQU. Table 3-1 notes the monitoring and evaluation metrics and their associated costs. Further detail on the funding required for monitoring and evaluation of the preferred scheme can be found in the Financial Case.

Table 3-1: Cost estimate of monitoring, evaluation and benefits realisation metrics, over 10 years (2020 prices)

Monitoring and Evaluation Metrics	Cost Estimate	Details
Air quality data	£613,300	664 diffusion tubes (includes existing and new tubes) per month Includes staff costs to collect and collate data for both NuLBC and SoT
One-off ANPR data collection	£150,000	Based on 15 ANPR data collection locations over 7 full days (i.e. 7 days x 24 hours) in 2025, including staff costs for site monitoring. Excludes post-processing analysis of the data
ANPR network Retrofitted buses Bus gates on Victoria Road and A53	£270,000	Maintenance of 9 ANPR cameras – 3 pairs for bus retrofit and 3 cameras
Automated Traffic Count (ATC) data	£181,100	13 new ATC location to have data collection and analysis. This includes cost of purchase, installation, monitoring and analysis over an 11-year period (1 year before and 10 years post implementation)
Bus patronage	£102,300	The data is free from the bus operators annually at a service level however it needs to be processed and analysed over an 11-year period (1 year before and 10 years post implementation)

4 Delivery Plan

4.1 Timeline of data collection

Data will be collected for the purpose of monitoring and evaluation up until one year after compliance is achieved. Existing and additional monitoring will be undertaken during the period of scheme delivery to provide some before scheme data and then the data collection will be continuous throughout the period of operation.

4.2 Data reporting

The authorities plan to share collected data with JAQU every three months, in line with guidance. Data will continue to be collected and shared with JAQU up to one-year after compliance is achieved. Bus patronage data will be reported locally.

The following reporting will be undertaken as per JAQU guidance:

- Before and after reports – sharing monitoring of NO₂ and traffic flow data every three months. The authorities will liaise with JAQU regarding any issues.
- Feasibility study monitoring – including vehicle fleet composition and bus patronage data by service, some of which is readily available.

4.3 Corrective action plan

Members of JAG and JOG will receive copies of the quarterly bulletins produced by central evaluation and therefore, in the event that further investigation is required all three local authorities, will be fully informed and engaged.

In the case of any issues noted through the monitored data, such as air quality compliance not being achieved or additional sites of exceedance arising, the authorities will look to correct these through outlined action plans.

JAQU guidance refers to the following two case study measures which might be needed if an element of the preferred option underperforms, such as air quality compliance not being achieved.

- **Rapid assessment case study** – this will provide quick and targeted data collection and analysis to understand why a scheme (i.e. a bus gate) within the preferred option is underperforming, which could include additional data collection and analysis and will be used to help inform any required policy change in order to achieve the local plans objectives. It is possible there could be multiple rapid assessments dependent on performance.
- **Deep dive case study** – this has a broader scope in that it would either focus on multiple schemes within the preferred option to provide a wider understanding of its impacts or on one element but provide a comparison with how similar measures have performed in another local authority area. This approach is more likely to be used if compliance was not being achieved across multiple locations.

Members of JOG will liaise with colleagues in JAQU to determine the most appropriate course of action which will then be considered by JAG. Consideration will need to be given to the resource implications of additional data collection and analysis.

The Management Case provides details of the project organisational structure and these processes will be adhered to.

The monitoring and evaluation plan is based on the preferred option working as forecast and therefore no contingency costs have been allocated; instead this cost is allowed for in the risk register and resultant quantified risk assessment.

5 Benefits Realisation

The preferred scheme aims to bring benefits to North Staffordshire as soon as possible, with particular focus on improvements in air quality. This will therefore adhere to the primary Critical Success Factors (CSF) of the Ministerial Direction for air quality objectives and benefits to be realised within the shortest timeframe possible. Table 5-1 outlines the key outcomes, as identified earlier in this Plan and notes the potential benefits arising from each outcome.

Table 5-1: Preferred scheme key outcomes and benefits realised

Primary outcome	How the benefit will be realised
Achieve the statutory limit values for roadside NO ₂ concentration limits at the exceedance locations in the shortest possible time.	Improved public health, better air quality should improve health and reduce the risk of illnesses such as heart disease, lung disease or asthma.
Secondary outcome	
Increased awareness of air quality problem	Residents and businesses better informed about air pollution
Local buses more attractive encouraging greater use	Increase in bus patronage and journey quality
Traffic redistribution across the network without creating new sites of NO ₂ exceedance	Traffic management measures aim to reroute traffic away from the exceedance sites without creating new exceedance locations.
Lower exhaust emissions of NO _x , released from buses	Bus retrofitting will reduce the amount of exhaust emissions released from more polluting, older bus engines, therefore reducing emissions across the designated bus routes.