City of
Stoke-on-Trent

2019 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management

June 2019

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REPORT SIGN OFF SHEET

City of
Stoke-on-Trent

Report Title	2019 Air Quality Annual Status Report
Prepared by	Public Protection
Endorsement	Monitoring and managing air quality remains a priority for Stoke-on-Trent City Council. Identifying problem areas and ensuring that actions are taken to improve air quality forms an important element in protecting the health and wellbeing of our residents and we are committed to an ongoing programme to deliver improvements where they are needed.
Approved for submission to Defra by	**Signature:**  Jacquie Ashdown Assistant Director of Wellbeing & Director of Public Health Stoke-on-Trent City Council **Date:** **02/07/19**

Executive Summary: Air Quality in Our Area

Air Quality in Stoke-on-Trent

Poor air quality is associated with a number of adverse health impacts and the largest environmental risk to public health in the UK . It is recognised as a contributing factor in the onset of heart disease and cancer particularly affecting the most vulnerable in society: children and older people, and those with pre-existing heart and lung conditions. There is also often a strong correlation with other equalities issues, with areas with poor air quality often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion [3].

The main pollutant of concern in Stoke-on-Trent is nitrogen dioxide (NO_2). High concentrations of NO_2 are associated with busy, congested roads. In 2018, we monitored NO_2 at 72 locations throughout the city. Most of the monitoring locations were at, or close to, residential properties next to busy roads and road junctions. Where monitoring has been undertaken for five years or more, our graphed data continues to show a downward trend in concentrations of NO_2 in all areas. However, concentrations in the Etruria area remain high, especially where the A53 (Etruria Road) enters a steep-sided cutting with trees that form a canopy over the road, which together may inhibit dispersal of pollutants.

The current Stoke-on-Trent Air Quality Management Area (AQMA) covers the whole of the city. A copy of the AQMA order can be found online here.

Progress on reviewing and updating our Air Quality Action Plan (AQAP), which was highlighted in our previous report, has been delayed as resources have been diverted towards complying with the legal requirement of Ministerial Directions issued jointly to Stoke-on-Trent City Council and Newcastle-under-Lyme Borough Council. The latest Direction requires the authorities to produce a Third Wave Local Plan to identify actions that would bring forward compliance with the NO_2 EU limit value in the shortest possible time on a section of the A53.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Defra's Pollution Climate Mapping (PCM) model showed an exceedance of the NO_2 EU limit value in this area and a first Ministerial Direction was issued to Stoke and Newcastle Councils. Local monitoring in accordance with the Direction indicated that the non-compliant area involved more locations than identified by the PCM model leading to a second Direction. The original area of non-compliance at the A53 was between the A500/Etruria Road roundabout and Festival Park roundabout. This section of the road has no residential properties close to the road and so the UK Air Quality Objective (UK AQO) is not applicable and therefore not exceeded at this location. The first Ministerial Direction was complied with and a Feasibility Report was submitted to Defra by the deadline date of 31 July 2018.

The work being undertaken to comply with the current Ministerial Direction requires Stoke and Newcastle-u-Lyme local authorities to consider areas both within and outside of the PCM non-compliant area. Therefore, all exceedances of the UK NO_2 objective and EU NO_2 non-compliance are being considered in the Third Wave Local Plan.

We are continuing to work towards improving air quality and ensuring that residents are not subject to additional pollution sources by liaising with colleagues within the planning and highways departments of the council and with neighbouring authorities. An important continuing action is to review and comment on planning applications with regard to air quality, alerting planners if we have any concerns that a development may result in air quality which may be harmful to health.

Actions to Improve Air Quality

The review of our current action plan has been slower than anticipated for the reasons stated above and regrettably we have been unable to make the forecast progress on this since the 2018 ASR. However, the work we have done and continue to do to comply with Ministerial Directions will identify further actions to improve air quality across the City and will be documented in a Third Wave Local Plan. That Plan will initially then sit alongside our existing AQAP, and we will subsequently consider the benefits of combining the two plans for ease of reference.

Actions to improve Air Quality cannot be achieved in isolation and other Council plans, projects and strategies contribute directly or indirectly. Hence our specialist air quality officers work closely with colleagues in public health, planning, transport, and

economic development to ensure air quality is linked into their work and strategies. Of note currently is work on the Councils Green Space strategy; funding bids for Transforming Cities, and Taxi and Private Hire Electric Vehicle charging Infrastructure.

Similarly public and community support is necessary to translate action plans into positive outcomes and examples of how we engage to achieve this are highlighted below.

Conclusions and Priorities

The AQMA encompasses the whole of the city, therefore, all exceedances of the NO_2 objective in 2018 have occurred within the AQMA. There are currently no planned changes to the AQMA boundary.

Our air quality priority for 2019/20 is to complete the Third Wave Local Plan to comply with the Ministerial Direction and identify measures to reduce air pollution. However, the timescale for producing the report is very challenging. It is anticipated that following acceptance of the Third Wave Local Plan, a further Ministerial Direction will be issued requiring Stoke-on-Trent City Council to implement the agreed actions to bring forward compliance in the shortest possible time. Ongoing monitoring and reviewing of compliance with the EU NO_2 limit value will be required

Local Engagement and How to get Involved

We can all help to improve air quality. Further information is available on The Clean Air Hub. In addition to air quality, some of the actions that we take can also help to improve physical and mental wellbeing:

- avoid using the car, especially for short journeys – walk instead, new signposting in the City gives information on distances and route finding.
- encourage people to walk – check out our local parks
- encourage increased use of cycle-trails (lanes) – check out local cycling trails.
- promote the use of public transport such as buses – see the council's travel page
- promote the availability of lift sharing – see Staffordshire Share-a-lift

Comments from representatives of community groups or residents associations in the hot-spot areas are always welcome and are encouraged to take part in our consultation exercises, by contacting:

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1 Local Air Quality Management

This report provides an overview of air quality in Stoke-on-Trent during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Stoke-on-Trent City Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Stoke-on-Trent City Council can be found in the following Table 2.1.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://www.stoke.gov.uk/directory_record/80/stoke-on-trent_air_quality_management_area_order_2011

A full list of AQMAs is available at https://uk-air.defra.gov.uk/aqma/list.

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Stoke-on-Trent Air Quality Management Area 2011	Declared 04/04/2006	NO_2 Annual Meant	Stoke-on-Trent	An area encompassing the whole of the city	YES	52	µg/m³	73	µg/m³	Stoke-on-Trent City-wide Action Plan 2014	2014	https://www.stoke.gov.uk/downloads/file/64/city_aqap_2014pdf
Stoke-on-Trent Air Quality Management Area 2011	Amended 09/05/11	NO_2 1 Hour Mean	Stoke-on-Trent	An area encompassing the whole of the city	YES	52	µg/m3	73	µg/m3	Stoke-on-Trent City-wide Action Plan 2014	2014	https://www.stoke.gov.uk/downloads/file/64/city_aqap_2014pdf

☒ **Stoke-on-Trent City Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

2.2 Progress and Impact of Measures to address Air Quality in Stoke-on Trent

Defra's appraisal of last year's ASR provided the following comments:

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

1.Example calculations for data corrections have been provided within the report which are useful and encouraged for all future reports.

2.The Council plans to maintain their City wide AQMA status for the time being.

3.The report provides limited discussion of planning applications and local developments that may further impact future air quality. Future reports should provide appropriate discussion. For further guidance please refer to LAQM Technical Guidance 16 (TG16).

4.The report states a Feasibility Study for mitigation measures along the A53 was recently undertaken and completed for Defra. It would have been interesting for any such results or findings to be included within this report. However given the timing of the study deadline and the submission of this report it is recognised that there was limited opportunity to incorporate it. The Council may wish to include any major finding in next year's report, or if measures are implemented as a consequence of this study during the next reporting period, 2019 ASR should provide some level of discussion regarding this.

5.The Council provide very detailed discussion of PM2.5 issues, mitigation measures and the Public Health Outcomes Framework, in reference to neighbouring authorities. This is excellent and a similarly comprehensive section should be included in future reports.

6.NO_2 concentrations continue to exceed AQOs at many sites around the City. The Council have been successful in minor reductions over the last few years. However given the current levels of exceedance the Council has an enormous task to bear, and should dedicate appropriate resources to this challenge.

7.The AQAP is comprehensive and contains all required information, alongside updated discussion of progress and barriers. A number of measures (particularly traffic management measures) are expected to be completed during the next reporting period.

8.Generally the report is very well written and satisfies the criteria specified in relevant standards. However concerns around current NO_2 concentrations must be addressed as soon as possible.

To continue to address air quality concerns it was intended to review and update the existing AQAP as highlighted in our previous report. However this has been delayed as resources have been redirected towards complying with the legal requirement of Ministerial Directions issued jointly to Stoke-on-Trent City Council and Newcastle-under-Lyme Borough Council. The latest Direction requires the authorities to produce a Third Wave Local Plan to identify actions that would bring forward compliance with the NO_2 EU limit value in the shortest possible time on particular sections of the A53 main road and at other traffic hot-spots around the City.

In complying with the latest Direction a preferred option and business case for action is being developed for agreement with Government. This is scheduled to be submitted for consideration by 31 October 2019.

It is expected that the preferred actions identified to comply with the Ministerial Direction will also bring improvement to air quality in all areas of the City.

Table 2.2 highlights how continuing actions to address air pollution contained within the existing AQAP have continued the year on year trend of improving air quality in Stoke-on-Trent.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
AQ10	Staffordshire ECO Stars Fleet Recognition Scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Stoke-on-Trent CC, Newcastle-under-Lyme BC, Stafford BC, Staffordshire Moorlands BC, Cannock Chase DC, Lichfield DC, East Staffordhsire BC, South Staffordshire DC, Defra AQ Grant	2014	2015-16	Reduced emissions	Expected emission reduction 7 tonne NOx/yr, 2.22 tonne PM10/yr, 11615 tonne CO2/yr	Funding bid submitted	2017	Funding not availalbe to extend programme.
AQ8	Stoking Employment in North Staffordshire	Promoting Travel Alternatives	Workplace Travel Planning	Partnership with Staffordshire County Council and NS Chamber of Commerce: Local Sustainable Transport Fund	2011/12	2012-15	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 17,750 kg/yr	PROGRAMME COMPLETED	2016	NA
AQ5a	Station Gateway (Phase 1), University Quarter (Phase 2) and Uni Boulevard (Phase 3)	Promoting Travel Alternatives	Promote use of rail and inland waterways	LA lead and City Council Capital funding and Local Growth Deal funding	2014/15	Unknown	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 480 kg/yr	Proposals being assessed as part of the current City Centre Access Study	2017/18	Phase 1 completed 2012. Phase 2 being progressed.
AQ5b	Leek Road Traffic Management	Traffic Management	UTC, Congestion	LA lead and City Council Capital	2014/15	2015 - 2017	Improved journey times. Improved	Calculated Annual NOx Reductions 480	Proposals being assessed as part of the current City	2017/18	Phase 1 completed 2016. Phase 2 being

	Improvements		management, traffic reduction	funding and Local Growth Deal funding			mode share of journey. Improved average congestion (miles/minute)	kg/yr	Centre Access Study		progressed.
AQ2	Cobridge Traffic Management Improvements (including Waterloo Road Corridor)	Traffic Management	UTC, Congestion management, traffic reduction	LA lead and funding source	2011/12	2012/13	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 389 kg/yr	Scheme completed	NA	NA
AQ4a	Lichfield Street Improvements	Transport Planning and Infrastructure	Bus route improvements	LA lead and funded: Local Transport Plan Capital Programme	2013/14	Unknown	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 322 kg/yr	Proposals being assessed as part of the current City Centre Access Study	Unknown	
AQ4b	Leek Road / Victoria Road Junction - Safety Scheme	Promoting Travel Alternatives	Promotion of walking	LA lead and funding source	2013/15	Unknown		Calculated Annual NOx Reductions 321 kg/yr	Proposals being assessed as part of the current City Centre Access Study	Unknown	
AQ1	Burslem Town Centre Traffic Management Improvements	Traffic Management	UTC, Congestion management, traffic reduction	LA lead and funding source	2013/14	2014-2017	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 299 kg/yr	Preliminary design	Completion expected Spring 2018	Phases 1 & 2 complete. Phase 3 completion expected Spring 2018
AQ3	Victoria Road Corridor Improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars,	LA lead and funding source	2011/12	2012/13	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 297 kg/yr	Scheme completed	NA	NA

			including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane								
AQ7a	Parking restrictions outside schools	Promoting Travel Alternatives	School Travel Plans	LA lead and funding source	2011/12	2012-14	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 272 kg/yr	Scheme completed	NA	NA
AQ7b	Walk to School Outreach– Living Streets	Promoting Travel Alternatives	School Travel Plans	Living Streets and local authority consortium: Local Sustainable Transport Fund	2011/12	2012-15	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 272 kg/yr	Programme in Delivery	Programme extended to 31/3/2020 through DfT Access Fund	
AQ7c	Access to Education - Sustrans	Promoting Travel Alternatives	School Travel Plans	Sustrans and local authority consortium: Local Sustainable Transport Fund	2011/12	2012-15	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 272 kg/yr	PROGRAMME COMPLETED	2016	NA
AQ4c	City Road Corridor Improvements	Promoting Travel Alternatives	Promotion of cycling	LA lead and funding source	2014/15	2015/16	Improved journey times. Improved mode share of journey. Improved average congestion	Calculated Annual NOx Reductions 266 kg/yr	Preliminary discussions	42735	

							(miles/minute)				
AQ9	Clean Air Grant	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging		2012	2013/14	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 57 kg/yr	In Delivery as per progress reports Project Reference 2622012	NA	NA
AQ6	Victoria Street / Shelton New Road Junction Improvement	Promoting Travel Alternatives	Promotion of walking	LA lead and funding source	2011/12	2012/13	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Calculated Annual NOx Reductions 21 kg/yr	Scheme completed	NA	NA
HDS1	Real Time Bus Information	Promoting Travel Alternatives	Other	In partnership with First Potteries and D&G Bus: Local Transport Plan Capital Programme	2017/18	2017/18	Improved journey times. Improved mode share of journey.	Not calculated	Improved equipment reliability being progressed with supplier. Potential new contract wef September 2017	43190	Reliability of system to enable full rollout/switch on; maintenance costs to be agreed
HDS2	Improved Access to Health and Leisure facilities	Transport Planning and Infrastructure	Other	LA lead and funding source	2015/16/17/18	2015/16/17/18	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Not calculated	Ongoing annual programme of work which will encourage walking and cycling as a means of transport to key leisure / Health destinations. Improved access to Tunstall Park now	Ongoing Annual Programme	

									completed incl pedestrian crossing & cycling facilities and road safety measures.		
HDS3	Programme of Bus Stop Improvements	Transport Planning and Infrastructure	Bus route improvements	Local Transport Plan Capital Programme	2015/16/17/19	2015/16/17/19	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Not calculated	Delivery of 3 Bus Stop Improvements incl Real Time information screens, new bus shelters & Raised kerbs	Ongoing Annual Programme	
HDS4	Wilson Road / New Inn Lane Junction Improvement	Traffic Management	UTC, Congestion management, traffic reduction	LA lead and funding source	2015/16	2016/17	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Not calculated	Detailed Design Complete. 3rd Party Land to be acquired	42825	
HDS5	Etruria Valley Major Highway & Transport Scheme	Transport Planning and Infrastructure	Other	LA lead and funding source	2013/14/15	2015/16/17/18/19	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Not calculated	Preliminary design complete	31/012/18	
HDS6	Leek Road Corridor Improvements(Growth Deal)	Traffic Management	UTC, Congestion management, traffic reduction	LA lead and City Council Capital funding and Local Growth Deal funding	2015/16	2015/16/17/18	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Modelling in progress	Outline Design and costing	43465	
HDS7	Etruria Road Corridor Improvements(Growth Deal)	Traffic Management	UTC, Congestion management, traffic reductio	LA lead and funding source	2015/16	2015/16/17/19	Improved journey times. Improved mode share of journey. Improved average	Not calculated	Outline Design and costing	43496	

			n				congestion (miles/minute)				
HDS8	City Centre Ring Road (completion)	Traffic Management	Other	LA lead and funding source	2015/16/17	2017/18/19	Improved journey times. Improved average congestion (miles/minute)	Not calculated	Feasibility, outline design, initial costing	43830	
HDS9	Arbourfield Drive / Dividy Rd Junction Improvement	Transport Planning and Infrastructure	Other	LA lead and funding source	2013/14	2014/15	Improved journey times. Improved average congestion (miles/minute)	Not calculated	Scheme under construction	31/04/2015	
HDS10	Trentham Lakes / A50 Strategic Signing	Traffic Management	UTC, Congestion management, traffic reduction	LA lead and funding source	2014/15	2015/16	Improved journey times. Improved average congestion (miles/minute)	Not calculated	Design underway	42277	
HDS11	Potteries Way / Bucknall Rd Junction Improvement	Traffic Management	UTC, Congestion management, traffic reduction	LA lead and funding source	2017/18	2018/19	Improved journey times. Improved average congestion (miles/minute)	Not calculated	Nil	43555	
HBE1	Community Rail Partnership	Promoting Travel Alternatives	Promote use of rail and inland waterways	LA lead and funding source	Commenced in 2005	ongoing	Increased use of local rail services	Not calculated	Above average passenger growth from work of partnership. Wider Stakeholder Partnership for the line also established to call for improved frequency and capacity on this East Midlands service	Ongoing – new East Midlands franchise due to start in 2018	Rail Industry timescales and constraints lead to long lead in time for requested service improvements
HBE2	Concessionary Bus Pass Scheme	Promoting Travel Alternatives	Other	LA lead and funding source	ongoing	ongoing	Maintaining use of local bus services	Not calculated	ongoing	ongoing	reducing bus network = reduced opportunities for bus travel for pass holders - could lead to more private car/taxi trips

HBE3	Home to Work Scheme	Promoting Travel Alternatives	Personalised Travel Planning	LA lead and funding source	Commenced 2011	ongoing	Number of clients assisted	Not calculated	PROGRAMME COMPLETED	Completed	
FP1	Fleet Renewal	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	LA lead and funding source	Commenced	2016/17	Reduced emissions	Not calculated	Completed 2016/17		
Sot2	Wayfinding Programme	Promoting Travel Alternatives	Promotion of walking	LA lead and funding source	2016/17	2017/18	Improved journey times. Improved mode share of journey. Improved average congestion (miles/minute)	Not calculated	Contracts let for design and build. Community engagement progressing well.	Ongoing	Delays in signs installed
Sot1	Participation in Rail North Association and West Midlands Rail	Promoting Travel Alternatives	Promote use of rail and inland waterways	LA lead and funding source	Commenced in 2015	ongoing	Increased use of local rail services	Not calculated	Ongoing – secured committed obligation of extra Northern Sunday services from May 2018, new rolling stock late 2018. Additional amount of service to local stations anticipated in new West Midlands franchise	Ongoing – extra Northern Sunday services from May 2018, new rolling stock late 2018. New West Midlands Franchise due to start this Autumn with improved amount of service at local stations	Additional improvements are difficult to achieve with constrained rail network capacity

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

Particulate matter, or PM, is the term used to describe particles found in the air, including dust, dirt and liquid droplets. PM comes from both natural and man-made sources, including traffic emissions and Saharan-Sahel dust. These particles can be suspended in the air for long periods of time, and can travel across large distances.

PM less than 10 micrometres in diameter (PM_{10}) pose a health concern because they can be inhaled into and accumulate in the respiratory system.

PM less than 2.5 micrometres in diameter ($PM_{2.5}$) are referred to as "fine" particles and are believed to pose the greatest health risks, as they can lodge deeply into the lungs and also pass into the bloodstream.

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less).

There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases. In England, the total cost due to $PM_{2.5}$ to the NHS and social care in 2017 is estimated to be £41.2million, rising to £76.1million when diseases are included where there is less robust evidence for an association. The diseases for which there is a stronger evidence of an association include: Coronary Heart Disease (CHD), Childhood asthma, Stroke, Lung Cancer. Those with less strong evidence of an association include: Chronic Obstructive Pulmonary Disease (COPD), Diabetes, and Low birth weight[4].

$PM_{2.5}$ is hence the particulate pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator 3.01[5] is based. The Royal College of Physicians (RCP) undertook a review in February 2016[6] where they found that long term exposure to air pollution impairs lung function growth in children, and that outdoor exposure is linked to lung cancer in adults.

[4] PHE. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report. May 2018. Accessed 27 June 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/708855/Estimation_of_costs_to_the_NHS_and_social_care_due_to_the_health_impacts_of_air_pollution_-_summary_report.pdf

[5] Public Health Outcomes Framework 2016 – 2019 indicator 3.01 Fraction of mortality attributable to particulate air pollution https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/30101/age/230/sex/4

[6] ['Every Breath we Take: The Lifelong Impact of Air Pollution; Report of a working Party, February 2016, ISBN 978-1-86016-567-2],

2.3.1 Particulate Matter (PM2.5) Levels in Stoke-on-Trent and Staffordshire

While a number of the Staffordshire Local Authorities currently monitor locally for $PM_{10,}$ Defra's Automatic Urban and Rural Network (AURN) site at Stoke-on-Trent Centre has a dedicated $PM_{2.5}$ monitor.

Table 2.3 1 presents data on the local level of $PM_{2.5}$ annual mean concentrations for Stoke-on-Trent and Staffordshire. Where the data is derived from PM_{10} monitoring this has been adjusted by applying a correction factor of 0.7 to derive the $PM_{2.5}$ component. The correction factor has been derived from the average of all ratios of $PM_{2.5}/PM_{10}$ for the years from 2010 to 2014 for forty sites within the Automatic Urban and Rural Network (AURN) where these substances are measured on an hourly basis and follows the guidance published in LAQM (TG16).

Table 2.3 1 Annual Mean PM_{10} and $PM_{2.5}$ results of monitoring by Staffordshire Authorities 2014 to 2018

Annual Mean PM10 and PM2.5 Results from monitoring Staffordshire Authorities 2013- 2017									
Authority	**Site Type**	**Monitor Location**	**OS Grid Ref**		**Year**				
					2014	**2015**	**2016**	**2017**	**2018**
Newcastle under Lyme	Roadside	Queen`s Gardens	E385057	PM_{10}	22	22.9	(5)	(5)	(5)
			N346137	$PM_{2.5}$	15.4(1)	16(1)	(5)	(5)	(5)
Cannock Chase	Roadside	Cannock A5190	E401392 N309954	PM_{10}	-	-	-	14	18
				$PM_{2.5}$	-	-	-	9.8	12.6
Stoke on Trent	Roadside	Basford	E386288	PM 10	-	-	-	23	23
			N346802	$PM_{2.5}$	-	-	-	16(1)	16(1)
	Roadside	A50 Roadside Meir	E392548	PM 10	-	20(2)	20(2)	18	19
			N342572	$PM_{2.5}$	-	14(2)	14(2)	13(1)	13(1)
	Urban Background	Stoke on Trent Centre	E388351 N347895	PM 2.5	10	12	12	9	9
	Roadside	Middleport	E385780	MP10	24	22	(3)	(3)	(3)
			N349376	PM2.5	17(1)	15(1)	(3)	(3)	(3)
East Staffordshire	Roadside	Derby Tum	E424671 N324019	PM 10	31	23	(4)	(4)	(4)
				PM 2.5	21.7(1)	16.1(1)	(4)	(4)	(4)

Notes:
(1)$PM_{2.5}$ results are derived from PM10 monitored results corrected with a 0.7 correction factor in accordance with TG16 – Annex B: Derivation of $PM_{2.5}$ to PM_{10} Ratio. All other results are directly monitored.
(2) Valid data capture for 2015 was 59%. The site was commissioned on 22 May 2015.
(3) Middleport monitor was decommissioned at the end 2015
(4) East Staffordshire`s monitors were decommissioned 2016
(5) Newcastle under Lyme monitors were Decommissioned 2016

As can be seen from the results, concentrations of $PM_{2.5}$ within Stoke-on-Trent and Staffordshire are below the 2020 EU limit value of 25µg/m³.

2.3.2 $PM_{2.5}$ and Mortality in Staffordshire & Stoke-on-Trent

Although the levels of $PM_{2.5}$ within Stoke on Trent are below the 2020 EU Limit value, the impact on adult mortality directly attributable to $PM_{2.5}$ is nonetheless still an important public health issue.

The mortality burden associated with long-term exposure to human-made particulate air pollution (measured as $PM_{2.5}$) for Stoke-on-Trent in 2017, expressed as the percentage of annual deaths from all causes in those aged 30+ (indicator 3.01 in the Public Health Outcome Framework (PHOF)) was 4.4% which is lower than that for the West Midland Region of 4.9% and the England average of 5.1%.[7]

The percentage estimated number of deaths attributable to $PM_{2.5}$ in adults over 30 has been translated into the estimated number of attributable deaths for each local authority area. The data for the City and Staffordshire is shown in Table 2.3 2 for 2017, the latest data available at the time of this report.

[7] PHOF. Fraction of mortality attributable to particulate air pollution in 2017. https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E06000021/iid/30101/age/230/sex/4

Table 2.3 2 Public Health Outcomes Framework Indicator 3.01- Fraction of annual all cause adult mortality attributable to anthropogenic (human made) particulate air pollution (measured as fine particulate matter, PM2.5) for Staffordshire Authorities 2013 to 2017[8]

Estimated numbers of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$*) for Staffordshire 2013 to 2017[8]
*** Fraction of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, $PM_{2.5}$*)**

	2013			2014			2015			2016			2017		
District/County	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths
Newcastle-under-Lyme	1295	4.9	60	55	4.7	60	55	4.2	50	1291	4.7	60	1197	4.2	50
Stafford	1261	4.9	60	65	4.8	60	60	4.7	60	1254	4.8	60	1267	4.3	50
East Staffordshire	1097	5.1	60	55	5.1	50	55	4.8	50	1065	5.6	60	1098	5.0	50
South Staffordshire	1102	5.1	60	55	5	50	55	4.7	60	1128	5.1	60	1239	4.5	60
Lichfield	1050	5.1	50	50	5	50	50	4.6	50	1044	5.5	60	1070	4.9	50
Staffordshire Moorlands	1085	4.7	50	45	4.5	50	45	4	40	1110	4.6	50	1127	3.9	40
Cannock Chase	787	5.1	40	45	5.1	40	45	4.6	40	879	5.4	50	940	4.7	40
Tamworth	592	5.5	30	35	5.4	30	30		30	615	6	40	634	5.3	30
Stoke-on-Trent	2412	5.2	125	2318	5.0	115	2479	4.9	110	2454	5.0	120	2490	4.4	110
Staffordshire County	8269	5	420	400	4.9	400	390	4.5	390	8386	5.2	430	8572	4.5	390

[8] 8 Source Public Health England https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/30101/age/230/sex/4

2.3.3 Actions being taken within Staffordshire to reduce $PM_{2.5}$

The City together with a number of other Staffordshire Authorities are involved in implementing measures to reduce $PM_{2.5}$ since these are complimentary to those being taken to reduce NO_2 levels which are detailed elsewhere in this report. A mapping exercise completed by the Staffordshire Air Quality Forum details the measures currently in place which are considered to have an impact in reducing $PM_{2.5}$ across the County. These are highlighted in Table 2.3 3. and accord with evidence based measures highlighted by Public Health England's review of interventions to improve outdoor air quality.[9]

[9] Source Public Health England https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/795185/Review_of_interventions_to_improve_air_quality.pdf

Table 2.3 3 Actions being taken within Staffordshire to reduce $PM_{2.5}$

Measures category	Measure Classification	Effect on reducing NOx and PM10 emissions(low, medium, high)	Reduces PM2.5 emissions	Local Authority								
				Stoke on Trent CC	Staffordshire Moorlands DC	Newcastle under - Lyme BC	Stafford BC	Cannock Chase DC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Traffic Management	**Urban Traffic Control systems, Congestion management, traffic reduction**	low	✓	✓	UTC in Leek Town Centre	UTC in areas of Newcastle Town Centre AQMA and Kidsgrove AQMA	UTC in Stafford Town Centre	UTC in Cannock Town Centre	Town Centre Regeneration Programme a number of schemes are currently being progressed which will aid traffic management. Many of these will then help improve traffic flow within the AQMA	LDC is liaising with Midlands Connect to increase volume of traffic using M6 Toll to reduce congestion on the A5 as well as lobbying Highways England to upgrade the A38 & A5 to expressways.		UTC in Tamworth Town Centre at Ventura Park
	Reduction of speed limits, 20mph zones	low	✓	✓			20mph zones near some schools in residential areas	20mph zones in Brereton, Hendesford and Rugeley & Plans for Norton Canes	20 mph zones near some schools in residential areas	.	20mph zones in Trysull, Bradley, Kinver and Bilbrook	
	Road User Charging (RUC)/ Congestion charging	low	✓					M6 Toll		M6 Toll	M6 Toll	
	Anti-idling enforcement	low	✓									
	Other		✓									
Promoting Travel Alternatives	**Workplace Travel Planning**	low	✓	A limited programme delivered through DfT Access Fund					Staffordshire CC has successfully acquired funding for a 2 year work & school travel plan programme for work in the vicinity of AQMAS in Staffs & Stoke. https://www.staffordshire.gov.uk/transport/greentravel/travelplans/home.aspx			
	Encourage / Facilitate home-working	low	✓	Agile working adopted by Stoke-on-Trent CC			✓	Homeworking policy adopted	Homeworking policy adopted	Homeworking policy adopted	Agile working policy adopted	Homeworking policy adopted
	School Travel Plans	low	✓	Modeshift STARS					https://www.staffordshire.gov.uk/activeschooltravel			
	Promotion of cycling	low	✓	Stoke-on-Trent Cycle Map & Guide					https://www.staffordshire.gov.uk/transport/cycling/Cycle-maps/cyclemaps.aspx			
	Promotion of walking	low	✓	Travel Smart					https:/www.staffordshire.gov.uk/environment/eLand/RightsofWay/PromotedRoutes/home.aspx			
	Staffordshire Share a Lift Scheme		✓	Stoke on Trent Share a Lift Scheme					https://www.staffordshire.gov.uk/transport/greentravel/carsharing/Car-sharing.aspx			

	Promote use of rail and inland waterways	medium	✓	North Staffordshire Community Rail Partnership	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf ✓	SCC is a member of West Midlands Rail Ltd which will bring a change in the way that local rail services are managed and operated. The County Council Draft Rail Strategy is available from: Link & Link	Improvements at Burton Rail Station commenced.	Staffordshire County Council has produced a Draft Rail Strategy, April 2016 to improve the way local rail services are managed and operated https://www.staffordshire.gov.uk/transport/transportplanning/Rail-strategy/Rail-Strategy.pdf		
Transport Planning & Infrastructure	**Local Transport Plans and District Strategies**	high	✓	Local Transport Plan					https://www.eaststaffsbc.gov.uk/sites/default/files/docs/planning/planningpolicy/examination/c/C43IntegratedTransportStrategyamended14thJuly2014.pdf			
	Public transport improvements-interchanges stations and services	low	✓			Kidsgrove Station interchange plans	Recent improvements completed at Stafford Rail Station	Planned improvements at Cannock Station as part of Mill Green development	Improvements at Burton Rail Station commenced.	Improvements planned at Lichfield City Station as part of Friarsgate development scheme. There are also plans to improve accessibility to all users at Lichfield Trent Valley Station		Planned improvements at Tamworth station
	Public cycle hire scheme	low	✓	Stoke Railway Station 'Brompton Dock' Bike Hire & Cycle Hub				In house Cycle to work scheme				
	Cycle network	low	✓	A comprehensive network of on-street & traffic free routes. A forthcoming LCWIP will identify where improved maintenance & connectivity required.	www.saffordshire.gov.uk/transport/cycling/cyclemaps/cyclemaps.aspx							

	Bus route improvements	high	✓	Transforming Cities Fund is currently investigated options for some limited improvements.	Potential bus stop upgraded in Cheadle Town Centre	RTPI routes 3 & 4 Newcastle Town Centre. Improved future bus services to Chatterley Valley	Improved bus priority and interchange on A518, Stafford post-SWAR	RTPI & improved stops at key locations within Rugeley. Upgraded bus stops to serve Cannock rail station	Removal of obstructions on New Street.	.	Bus stop upgrades in Wombourne.	Improved bus infrastructure route 2 Tamworth-Perrycrofts. RTPI Tamworth Town Centre and Ventura Park. Victoria Road, Tamworth upgraded interchange.
Alternatives to private vehicle use	**Bus based Park & Ride**	medium	✓					nil		New bus central station as part of Friarsgate development scheme		
	Car Clubs	low	✓					nil				
Policy Guidance and Development Control	**Planning applications to require assessment of exposure / emissions for development requiring air quality impact assessment**	high	✓				✓	Local plan - Policy CP16 - Climate Change and Sustainable Resource Use Cannock chase. Www.cannockchasedc.gov.uk/sites/default/files/local_plan_part_1_09.04.14_low_res.pdf	http://www.eaststaffsbc.gov.uk/planning/planning-policy/local-plan-2012-2031	https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Planning-policy.aspx		Local & National Validation requirements 2017: http://www.tamworth.gov.uk/sites/default/files/planning_docs/National-and-Local-Validation-requirements-2017.pdf
hhPolicy Guidance and Development Control	**Air Quality Strategy**		✓	Local Air Quality Strategy - Stoke-on-Trent City Council			✓	nil	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/air-quality			
	Planning Guidance for developers		✓	To develop planning guidance for developers and to develop into SPD once Local Plan Policies in Place			✓	http://www.cannockchasedc.gov.uk/residents/planning/planning-policy/supplementary-planning-policy-documents	http://www.eaststaffsbc.gov.uk/sites/default/files/docs/pollution/Air%20Quality%20Policy%20for%20Development%20Control%20%28Public%20Version%29.pdf			
	Developer Contributions based on damage cost calculation		✓	To develop policies to secure contributions to offset pollution				http://www.cannockchasedc.gov.uk/sites/default/files/local_plan_part_1_09.04.14_low_res.pdf	Yes			

	Planning Policies		✓	To influence policies to support improvements in emissions through development of Staffordshire abd Stoke-on-Trent Joint Local Plan			✓		http://www.eaststaffsbc.gov.uk/sites/default/files/docs/pollution/Air%20Quality%20Policy%20for%20Development%20Control%20%28Public%20Version%29.pdf	https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Planning-policy.aspx		
	STOR Sites (Short Term Operating Reserve) Energy Generation . Regulation via planning / permitting regime	high	✓									
	Low Emissions Strategy	high	✓									
Freight and Delivery Management	**Freight Consolidation Centre**	medium	✓									
	Route Management Plans/ Strategic routing strategy for HGV's	high	✓		https://www.staffordshire.gov.uk/transport/transportplanning/localtransportplan/appendixl-staffordshirefreightstrategy.pdf							
	Quiet & out of hours delivery	low	✓				✓	✓				
	Delivery and Service plans	medium	✓									
	Freight Partnerships for city centre deliveries	high	✓									
Vehicle Fleet Efficiency	**Driver training and ECO driving aids**	medium	✓	SOTCC provide driver assessment & driver CPC training service for drivers of large goods vehicles. SOTCC operational fleet fitted with Stop/Start technology where			✓	✓	✓			

				available to reduce fuel usage. 70% of SOTCC recycling waste collection vehicles have `Fuel Sense` technology fitted to reduce fuel usage.								
	Promoting low emission public transport	high	✓									
	Vehicle retrofitting programmes	medium	✓	70% of SOTCC operational fleet meet, the EURO VI emission standard 90% of SOTCC`s waste collection vehicles have electric bin lifting equipment fitted to reduce fuel usage.						Retrofitting of old Council owned HGVs and Buses with pollution abatement equipment will be considered by the Council where technically and financially feasible		
	Fleet efficiency and recognition schemes	medium	✓	SOTCC are a 3 star member of Eco Stars Fleet Recogniton Scheme	Staffordshire and Stoke-on-Trent Eco-Stars http://www.ecostars-uk.com/eco-stars-schemes/							
Promoting low emission transport	**Low emission zone (LEZ) Clean Air Zone (CAZ)**	high	✓									
	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	high	✓	SOTCC`s procurement process includes the valuation of alternatively fuelled vehicles for the operational fleet. Services are challenged to consider alternatively fuelled vehicle at the point of replacement.				Waste fleet vehicles comply with Euro VI.				
	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	high	✓	SOTCC`s procurement process includes the evaluation of alternatively fuelled vehicles for the operational fleet.			✓			LDC looking to replacing old vehicles within the fleet with more modern cleaner vehicles, which comply with the prevailing EURO standard. This will be extended to all Council owned vehicles.		

	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	high	✓	SOTCC installed electric charging infrastructure in 2017 for the operational fleet.			✓			LDC liaising with Planning to include as part of new developments.		
	Priority parking for LEV's	high	✓	Electric Vehicle charging spaces						Electric Vehicle charging spaces		
	Taxi Licensing conditions	medium	✓	Hackney Carriage & Private Hire Licensing Policy 2016-2019								
	Taxi emission incentives	medium	✓	Successful joint bid for funds to install Taxi ELV charging points								
Environmental permits	**Introduction/increase of environment charges through permit systems and economic instruments (Permit fees set centrally)**	medium	✓				✓	Unable to achieve at a local level without central government approval				
	Measures to reduce pollution through IPPC Permits going beyond BAT	medium	✓	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211863/env-permitting-general-guidance-a.pdf (Chapter 15)								
	Large Combustion Plant Permits and National Plans going beyond BAT	high	✓									
	Other		✓									
Other measures	**Smoky Diesel Hotline**		✓	https://www.gov.uk/report-smoky-vehicle								

	A5 and M6 Partnership		✓					http://www.hinckley-bosworth.gov.uk/info/10020/strategies_plans_and_policies/1272/a5_partnership		Strategy for the A5 2011-2026	Strategy for the A5 2011-2026	
	Domestic Smoke Control advice and Enforcement		✓	Smoke control advice	-	-	✓	http://www.cannockchasedc.gov.uk/residents/environmental-health/environmental-protection/chimney-smoke	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/smoke-control-areas	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1	https://www.sstaffs.gov.uk/environment/smoke-control-areas.cfm	
	Garden Bonfires - Advice and nuisance enforcement		✓	Garden bonfires advice	-	-	✓	http://www.cannockchasedc.gov.uk/residents/environmental-health/environmental-protection/bonfire-smoke-nuisance	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/bonfires	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1	https://www.sstaffs.gov.uk/crime-nuisances/bonfires-and-smoke.cfm	http://www.tamworth.gov.uk/air-quality
	Commercial burning advice and enforcement		✓		-	-	✓	http://www.cannockchasedc.gov.uk/residents/environmental-health/environmental-protection/bonfire-smoke-nuisance	http://www.eaststaffsbc.gov.uk/environmental-health/pollution/bonfires	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1		http://www.tamworth.gov.uk/air-quality
	Multi agency working with Fire Service and Environment Agency for trade burning		✓		-	-	✓	Information shared as appropriate		Information shared as appropriate		Information shared as appropriate
	Multi agency working with Staffordshire Fire Service and Local Authority Building Controlregarding chimney fires and complaints about DIY domestic heating systems		✓		-	-		Information shared as appropriate		Information shared as appropriate		

	Stoke-on-Trent Low Carbon District Heat Network		✓	Stoke-on-Trent Low Carbon District Heat Network								

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Stoke-on-Trent City Council undertook automatic (continuous) monitoring at two sites during 2017. In addition, there are two Automatic Urban and Rural Network (AURN) sites in the city. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://uk-air.defra.gov.uk/

There have been no changes to the location of automatic monitors during 2018.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C3.

3.1.2 Non-Automatic Monitoring Sites

Stoke-on-Trent City Council undertook non-automatic (passive) monitoring of NO_2 at 68 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

Only two sites were decommissioned at the end of 2017, DT72 and DT73. Both monitoring locations were put in place to assess the effect of shuttle buses travelling between the hospital staff car park and the hospital via a residential area. Both sites were found to be significantly below the objective and therefore no further monitoring was necessary.

Two new monitoring sites were commissioned in 2018, to determine the concentration of nitrogen dioxide adjacent to the A53 (Etruria Road) to the east of the A500 roundabout. Two sections of the A53 had been identified as exceeding the EU limit value from PCM modelling for Census ID 26555 located within Stoke-on Trent City Council administrative boundary and Census ID 74058 located within Newcastle-under-Lyme Borough Council administrative boundary. The concentration at site DT105 and DT106 (on opposite side of the carriageway within Census ID 26555) were 34 µg/m³ and 33 µg/m³ respectively. The tubes were located on lampposts,

near to bus stops and were therefore considered worst-case locations. The distances of the tubes from the kerb were 2.0 m and 0.6 m respectively. The EU limit value is measured at 4 m from the kerb. It is known that the concentration of NO_2 falls off with increasing distance from the road; therefore we can be reasonably confident that the limit value is not exceeded at either of these sites.

Maps showing the location of all diffusion tube monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C3.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias. Data capture for all monitors was at least 75%, therefore “annualisation” was not necessary. Where the monitor was closer to a road than the nearby human receptor, distance correction was carried out. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m3.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Where the monitoring location was sited closer to the road than the nearest receptor, a calculation was carried out to determine the likely concentration at the receptor. Details of where the calculation was applied and the resulting value at the receptor is included in the text accompanying the graphs in Figures A. 1 to A. 18. Distance correction calculations have been included in Appendix C 3.

The number of monitoring locations where the NO_2 concentration was greater than 40 µg/m³ was 18. This was a reduction in the number for 2017, when the number of exceedances was 27. At one monitoring location, the concentration was greater than 60 µg/m³ (DT17 72 µg/m³), this indicated that the annual mean objective may be exceeded at this location.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. No site exceeded the objective.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. The annual mean objective has never been exceeded at any site in the city.

Figure A.19 clearly shows that the annual mean concentration is significantly below the objective.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year. There has been no exceedance of the 24-hour mean.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years. Monitoring shows that the WHO guidelines have not been exceeded for the second successive year.

Figure A. 20 Shows a graph of $PM_{2.5}$ monitoring results since 2013.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Stoke-on-Trent Centre AURN	Urban Background	388355	347893	NO_2; PM2.5; O3; benzene	YES	Chemiluminescent; TEOM/FDMS; UV Absorbtion; Non-automatic pumped	4.7	4.7	4
CM2	Joiners Square	Roadside	388743	346457	NO_2	YES	Chemiluminescent	0.4	0.4	2.9
CM3	Middleport	Roadside	Decommissioned 2015							
CM4	Fenton	Industrial	Decommissioned 2013							
CM5	Basford	Roadside	386288	346802	NO_2	YES	Chemiluminescent	5.1	5.1	2.1
CM6	Stoke-on-Trent A50 Roadside AURN	Roadside	392584	342569	NO_2; PM10	YES	Chemiluminescent; TEOM/FDMS	11	11	4

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube collocated with a Continuous Analyser?	Height (m)
DT1	1994/01	Urban Background	386402	343705	NO_2	YES	9	1.5	NO	2.8
DT2	1999/01	Roadside	389884	347288	NO_2	YES	0.1	2	NO	2.5
DT3	1999/02	Urban Background	390612	350793	NO_2	YES	6.5	2	NO	2.7
DT4	2001/04	Roadside	392705	342518	NO_2	YES	0	9	NO	3
DT5	2001/11		Decommissioned end 2016		NO_2					
DT6	2001/13		Decommissioned end 2016		NO_2					
DT7	2002/01		Decommissioned end 2016		NO_2					
DT8	2003/02	Roadside	388355	347893	NO_2	YES	4.7	9.6	YES	3.3
DT9	2005/01	Roadside	387626	348515	NO_2	YES	0	4.6	NO	2.6
DT10	2005/02	Roadside	386929	349855	NO_2	YES	0	3.7	NO	2.4
DT11	2005/03		Decommissioned end 2016		NO_2					
DT12	2005/04		Decommissioned end 2016		NO_2					
DT13	2005/07	Roadside	392471	342631	NO_2	YES	3.3	1.7	NO	2.9
DT14	2005/08	Roadside	392587	342578	NO_2	YES	1.7	2	NO	2.9
DT15	2005/11	Roadside	389335.6	344693.4	NO_2	YES	0	2	NO	2.4
DT16	2005/13	Roadside	385975	346574.6	NO_2	YES	0	2.6	NO	2.6
DT17	2005/14	Roadside	386270	346782.4	NO_2	YES	0.8	1.8	NO	2.5

DT18	2005/15		Decommissioned end 2016		NO_2					
DT19	2005/16		Decommissioned end 2016		NO_2					
DT20	2005/17	Roadside	388842	346642	NO_2	YES	0	2	NO	2.3
DT21	2005/19	Roadside	Decommissioned end 2016		NO_2					
DT22	2005/20	Roadside	Decommissioned end 2016		NO_2					
DT23	2005/22	Roadside	388704	347607.7	NO_2	YES	0	2.8	NO	2.6
DT24	2005/23	Roadside	393201	342409	NO_2	YES	0	1.8	NO	2.7
DT25	2005/28		Decommissioned end 2016		NO_2					
DT26	2005/30		Decommissioned end 2016		NO_2					
DT27	2005/31		Decommissioned end 2016		NO_2					
DT28	2005/33		Decommissioned end 2015		NO_2					
DT29	2005/34	Roadside	386904	349828.4	NO_2	YES	0	5.8	NO	2.6
DT30	2005/36		Decommissioned end 2016		NO_2					
DT31	2005/39		Decommissioned end 2016		NO_2					
DT32	2005/41	Roadside	388697.9	346421.5	NO_2	YES	2.8	3.2	NO	2.5
DT33	2005/44		Decommissioned end 2016		NO_2					
DT34	2005/45	Roadside	389231.5	345026.3	NO_2	YES	0	1.9	NO	2.5
DT35	2005/47		Decommissioned end 2016		NO_2					
DT36	2005/48		Decommissioned end 2016		NO_2					
DT37	2005/50	Roadside	393260	342460	NO_2	YES	0	3.6	NO	2.5

DT38	2005/51		Decommissioned end 2016		NO_2					
DT39	2005/54		Decommissioned end 2016		NO_2					
DT40	2005/56	Roadside	392777	342409	NO_2	YES	0	11	NO	2.7
DT41	2005/57	Roadside	392741	342435	NO_2	YES	0	11	NO	2.6
DT42	2005/58	Roadside	392676.1	342481.4	NO_2	YES	2.6	16	NO	2.5
DT43	2005/59		Decommissioned end 2016		NO_2					
DT44	2005/62		Decommissioned end 2015		NO_2					
DT45	2008/05		Decommissioned end 2015		NO_2					
DT46	2008/09		Decommissioned end 2016		NO_2					
DT47	2008/10		Decommissioned end 2016		NO_2					
DT48	2008/12		Decommissioned end 2016		NO_2					
DT49	2008/13	Roadside	388536	347143	NO_2	YES	NA	2.8	NO	2.5
DT50	2009/02		Decommissioned end 2015		NO_2					
DT51	2009/04	Roadside	386380.4	346860	NO_2	YES	2.3	15	NO	2.7
DT52	2009/05	Roadside	385812.3	346545.9	NO_2	YES	1.9	2.6	NO	2.5
DT53	2010/01	Roadside	387938	345939	NO_2	YES	0	2.6	NO	2.5
DT54	2010/02		Decommissioned end 2014		NO_2					
DT55	2010/05	Roadside	393320	342206	NO_2	YES	0	5	NO	2.7
DT56	2012/01	Roadside	386288	346802	NO_2	YES	5.1	4.5	YES	2.1
DT57	2012/04		Decommissioned end 2016		NO_2					
DT58	2012/05		Decommissioned		NO_2					

			end 2015							
DT59	2012/06		Decommissioned end 2015		NO_2					
DT60	2012/07		Decommissioned end 2016		NO_2					
DT61	2014/01	Roadside	390710	350261	NO_2	YES	0	1.9	NO	
DT62	2014/02		Decommissioned end 2014		NO_2					
DT63	2016/01	Roadside	385928.8	346563.2	NO_2	YES	0	2	NO	2.6
DT64	2016/02	Roadside	385937	346531	NO_2	YES	1	1.6	NO	2.6
DT65	2016/03	Roadside	385943	346504	NO_2	YES	0	2	NO	2.5
DT66	2016/04	Roadside	385978.5	346315.8	NO_2	YES	0	1.7	NO	2.5
DT67	2016/05	Roadside	386023.5	346152.6	NO_2	YES	2.1	2.1	NO	2.5
DT68	2016/06		Decommissioned end 2016		NO_2					
DT69	2016/07		Decommissioned end 2016		NO_2					
DT70	2016/08		Decommissioned end 2016		NO_2					
DT71	2016/09		Decommissioned end 2016		NO_2					
DT72	2017/01	Roadside	386014	346137	NO_2	YES	2	2.4	NO	2.7
DT73	2017/02	Roadside	386020.1	345932.7	NO_2	YES	0	2.4	NO	2.6
DT74	2017/03	Roadside	393294.3	342508.6	NO_2	YES	1.6	1.9	NO	2.6
DT75	2017/04	Roadside	393369.6	342177.6	NO_2	YES	6.9	2.8	NO	2.6
DT76	2017/05	Roadside	385928.8	349765.3	NO_2	YES	0.9	1.7	NO	2.4
DT77	2017/06	Roadside	385957.1	349756.5	NO_2	YES	4.4	1.9	NO	2.4
DT78	2017/07	Roadside	386156.7	349596.1	NO_2	YES	0	2.4	NO	2.4
DT79	2017/08	Roadside	386240	349581	NO_2	YES	0	2.2	NO	2.4

DT80	2017/09	Roadside	386400	349571.1	NO_2	YES	0	2.5	NO	2.4
DT81	2017/10	Roadside	386456	349598	NO_2	YES	1.9	2	NO	2.3
DT82	2017/11	Roadside	386607.1	349656.3	NO_2	YES	0	2.2	NO	2.4
DT83	2017/12	Roadside	390703.2	350221	NO_2	YES	2.1	1.9	NO	2.3
DT84	2017/13	Roadside	386917.9	349850.5	NO_2	YES	0.5	3.1	NO	2.3
DT85	2017/14	Roadside	386959	349850	NO_2	YES	0	2.3	NO	2.2
DT86	2017/15	Roadside	386983	349861	NO_2	YES	0	2.1	NO	2.3
DT87	2017/16		Decommissioned after 1 month - too close to catering exhaust		NO_2					
DT88	2017/17	Roadside	387427.7	348830.1	NO_2	YES	1.9	1.5	NO	2.5
DT89	2017/18	Roadside	387499.4	348695.4	NO_2	YES	10.6	1.8	NO	2.5
DT90	2017/19	Roadside	387558.2	348623.1	NO_2	YES	0	1.7	NO	2.3
DT91	2017/20	Roadside	387659.4	348482.3	NO_2	YES	2.4	2.5	NO	2.6
DT92	2017/21	Roadside	388725	346464	NO_2	YES	0	4.7	NO	2.4
DT93	2017/22	Roadside	388673.1	346372	NO_2	YES	2.3	3	NO	2.3
DT94	2017/23	Roadside	388335	345880	NO_2	YES	1.8	2.7	NO	2.3
DT95	2017/24	Roadside	388230	345742	NO_2	YES	2.2	2.5	NO	2.3
DT96	2017/25	Roadside	388168.1	345663.4	NO_2	YES	1.7	5.2	NO	2.3
DT97	2017/26	Roadside	387972	346002	NO_2	YES	0	2.3	NO	2.3
DT98	2017/27	Roadside	388006.3	346155.9	NO_2	YES	2.2	2.4	NO	2.3
DT99	2017/28	Roadside	388656	347612	NO_2	YES	0	2.3	NO	1.8
DT100	2017/29	Roadside	388634.3	347613.8	NO_2	YES	0	2.5	NO	1.9
DT101	2017/30	Roadside	385999	345936	NO_2	YES	0	2.3	NO	2.6

DT102	2017/31	Roadside	386154.4	345834.5	NO_2	YES	0	2.9	NO	2.7
DT103	2017/32	Roadside	388114	345483	NO_2	YES	0	9	NO	2.4
DT104	2017/33	Roadside	387979	345650.1	NO_2	YES	0	2.6	NO	2.4
DT105	2018/01	Roadside	386591.3	347017.5	NO_2	YES	NA	2	NO	2.5
DT106	2018/02	Roadside	386660	347088	NO_2	YES	NA	0.6	NO	2.5

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2014	2015	2016	2017	2018
CM1	Urban Background	Automatic	98	98	28	28	28	26	23
CM2	Roadside	Automatic	96	96	37	**40**	**45**	38	33
CM5	Roadside	Automatic	85	85	**50**	**47**	**50**	**51**	**55**
CM6	Roadside	Automatic	98	98		**61**	**61**	**56**	**53**
DT1	Urban Background	Diffusion Tube	100	100	19	21	20	19	18
DT2	Roadside	Diffusion Tube	100	100	**42**	**43**	**44**	**49**	39
DT3	Urban Background	Diffusion Tube	100	100	17	18	19	18	16
DT4	Roadside	Diffusion Tube	100	100	36	38	37	37	32
DT5	Roadside	Diffusion Tube			34	33	34		
DT6	Roadside	Diffusion Tube			34	34	36		
DT7	Roadside	Diffusion Tube			31	33	34		
DT8	Roadside	Diffusion Tube	100	100	25	27	29	26	29
DT9	Roadside	Diffusion Tube	100	100	**44**	**51**	**48**	**51**	**45**
DT10	Roadside	Diffusion Tube	100	100	35	37	38	36	35
DT11	Roadside	Diffusion Tube			34	34	36		
DT12	Roadside	Diffusion Tube			**45**	**49**	**49**		

DT13	Roadside	Diffusion Tube	100	100	39	**42**	37	39	35	
DT14	Roadside	Diffusion Tube	100	100	**40**	**41**	**41**	**40**	37	
DT15	Roadside	Diffusion Tube	92	92	39	**43**	**43**	**44**	38	
DT16	Roadside	Diffusion Tube	100	100	**49**	**53**	**54**	**51**	**49**	
DT17	Roadside	Diffusion Tube	83	83	**76**	**77**	**80**	**71**	**72**	
DT18	Roadside	Diffusion Tube			39	36	**42**			
DT19	Roadside	Diffusion Tube			30	34	35			
DT20	Roadside	Diffusion Tube	100	100	37	**43**	**40**	39	35	
DT21	Roadside	Diffusion Tube			36	38	**40**			
DT22	Roadside	Diffusion Tube			37	38	39			
DT23	Roadside	Diffusion Tube	83	83	**40**	**41**	**44**	**43**	39	
DT24	Roadside	Diffusion Tube	92	92	**43**	**42**	**44**	**44**	**42**	
DT25	Roadside	Diffusion Tube			36	35	38			
DT26	Roadside	Diffusion Tube			28	29	31			
DT27	Roadside	Diffusion Tube			28	38	31			
DT28	Roadside	Diffusion Tube			30	29				
DT29	Roadside	Diffusion Tube	92	92	39	**42**	**41**	**43**	38	
DT30	Roadside	Diffusion Tube			32	34	37			
DT31	Roadside	Diffusion Tube			36	36	**40**			

DT32	Roadside	Diffusion Tube	100	100	38	38	**44**	37	34	
DT33	Roadside	Diffusion Tube			32	32	36			
DT34	Roadside	Diffusion Tube	100	100	**45**	**46**	**52**	**49**	**46**	
DT35	Roadside	Diffusion Tube			34	37	39			
DT36	Roadside	Diffusion Tube			34	38	38			
DT37	Roadside	Diffusion Tube	100	100	**41**	**44**	**45**	**45**	**42**	
DT38	Roadside	Diffusion Tube			33	35	37			
DT39	Roadside	Diffusion Tube			38	38	39			
DT40	Roadside	Diffusion Tube	100	100	**43**	39	**41**	36	39	
DT41	Roadside	Diffusion Tube	100	100	**40**	37	**41**	32	37	
DT42	Roadside	Diffusion Tube	100	100	**43**	37	37	31	34	
DT43	Roadside	Diffusion Tube			36	38	**41**			
DT44	Roadside	Diffusion Tube			33	33				
DT45	Roadside	Diffusion Tube			32	33				
DT46	Roadside	Diffusion Tube			33	37	37			
DT47	Roadside	Diffusion Tube			39	39	**40**			
DT48	Roadside	Diffusion Tube			**46**	**47**	**47**			
DT49	Roadside	Diffusion Tube	100	100	34	38	38	**40**	38	
DT50	Roadside	Diffusion Tube			22	22				

DT51	Roadside	Diffusion Tube	100	100	38	38	**40**	38	39	
DT52	Roadside	Diffusion Tube	83	83	**48**	**51**	**52**	**50**	**48**	
DT53	Roadside	Diffusion Tube	100	100	38	39	38	35	32	
DT54	Roadside	Diffusion Tube	100	100	32					
DT55	Roadside	Diffusion Tube	100	100	38	**41**	**40**	**40**	35	
DT56	Roadside	Diffusion Tube	100	100	**46**	**50**	**50**	**49**	**50**	
DT57	Roadside	Diffusion Tube			37	33	**40**			
DT58	Roadside	Diffusion Tube			33	32				
DT59	Roadside	Diffusion Tube			31	29				
DT60	Roadside	Diffusion Tube			36	34	37			
DT61	Roadside	Diffusion Tube	92	92	37	**41**	**42**	**42**	35	
DT62	Roadside	Diffusion Tube			28					
DT63	Roadside	Diffusion Tube	100	100			**55**	**53**	**51**	
DT64	Roadside	Diffusion Tube	83	83			38	38	36	
DT65	Roadside	Diffusion Tube	75	75			**41**	**41**	37	
DT66	Roadside	Diffusion Tube	100	100			34	33	30	
DT67	Roadside	Diffusion Tube	100	100			**53**	**50**	**49**	
DT68	Roadside	Diffusion Tube					26			
DT69	Roadside	Diffusion Tube					25			

DT70	Roadside	Diffusion Tube						27		
DT71	Roadside	Diffusion Tube						21		
DT72	Roadside	Diffusion Tube	92	92				33	35	
DT73	Roadside	Diffusion Tube	100	100				35	32	
DT74	Roadside	Diffusion Tube	100	100				**48**	**44**	
DT75	Roadside	Diffusion Tube	100	100				**44**	38	
DT76	Roadside	Diffusion Tube	100	100				38	37	
DT77	Roadside	Diffusion Tube	92	92				**46**	**48**	
DT78	Roadside	Diffusion Tube	100	100				**43**	38	
DT79	Roadside	Diffusion Tube	100	100				**40**	38	
DT80	Roadside	Diffusion Tube	100	100				33	32	
DT81	Roadside	Diffusion Tube	100	100				35	34	
DT82	Roadside	Diffusion Tube	100	100				35	33	
DT83	Roadside	Diffusion Tube	92	92				**42**	37	
DT84	Roadside	Diffusion Tube	100	100				38	36	
DT85	Roadside	Diffusion Tube	83	83				36	37	
DT86	Roadside	Diffusion Tube	100	100				38	36	
DT87	Roadside	Diffusion Tube								
DT88	Roadside	Diffusion Tube	100	100				37	30	

DT89	Roadside	Diffusion Tube	83	83				**40**	37	
DT90	Roadside	Diffusion Tube	100	100				39	35	
DT91	Roadside	Diffusion Tube	75	75				**51**	**43**	
DT92	Roadside	Diffusion Tube	100	100				35	32	
DT93	Roadside	Diffusion Tube	100	100				30	30	
DT94	Roadside	Diffusion Tube	100	100				36	31	
DT95	Roadside	Diffusion Tube	100	100				34	31	
DT96	Roadside	Diffusion Tube	100	100				32	29	
DT97	Roadside	Diffusion Tube	100	100				33	30	
DT98	Roadside	Diffusion Tube	100	100				29	27	
DT99	Roadside	Diffusion Tube	92	92				**52**	**49**	
DT100	Roadside	Diffusion Tube	75	75				**50**	**45**	
DT101	Roadside	Diffusion Tube	92	92				29	30	
DT102	Roadside	Diffusion Tube	100	100				31	33	
DT103	Roadside	Diffusion Tube	100	100				27	31	
DT104	Roadside	Diffusion Tube	83	83				**42**	**42**	
DT105	Roadside	Diffusion Tube	83	83					34	
DT106	Roadside	Diffusion Tube	83	83					33	

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations – background monitoring sites

A map of monitoring locations is shown in Figure D. 2.

A clear downward trend can be seen at all background locations. All sites have remained significantly below the annual mean objective since monitoring began.

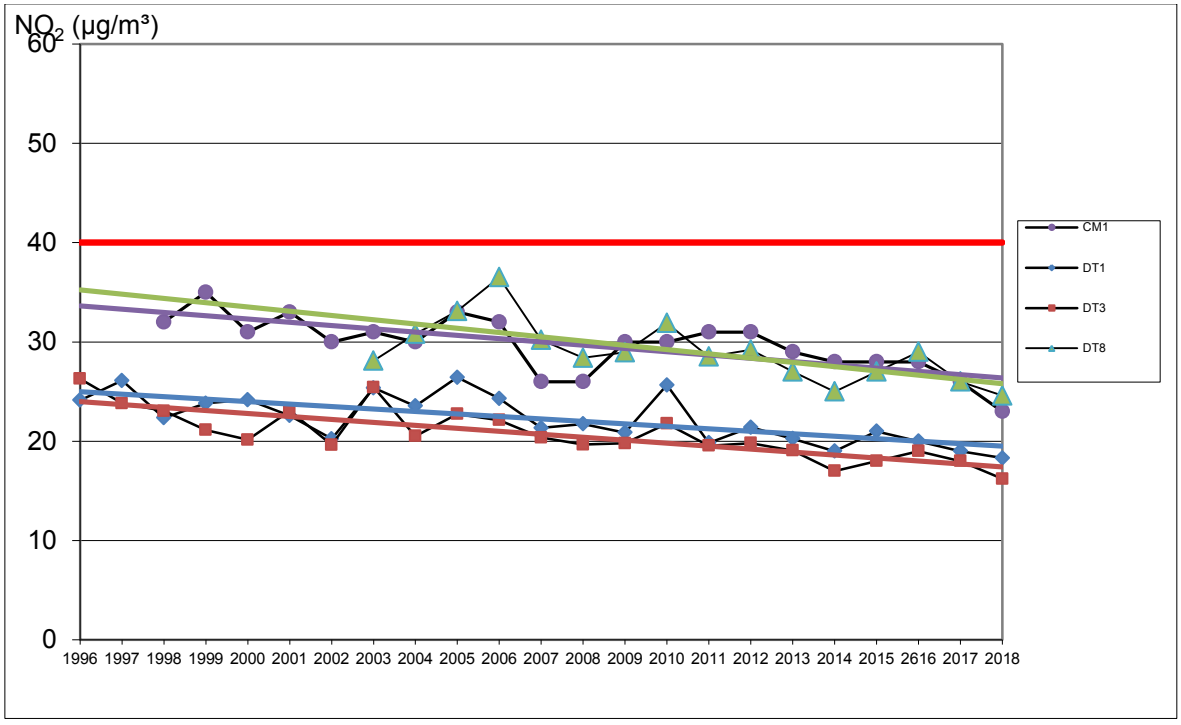


Figure A.2 – Trends in Annual Mean NO_2 Concentrations – Leek Road, Milton

A map of monitoring locations is shown in Figure D. 3.

There is no clear trend in this area. However, 2018 data shows that concentrations at both monitoring sites were below the annual mean objective. Distance correction was carried out for DT83 as the tube is closer to the road than the nearest receptor. The corrected concentration was 33 µg/m³. DT61 is not representative of human receptors, but represents worst-case as it is located at the traffic-light junction.

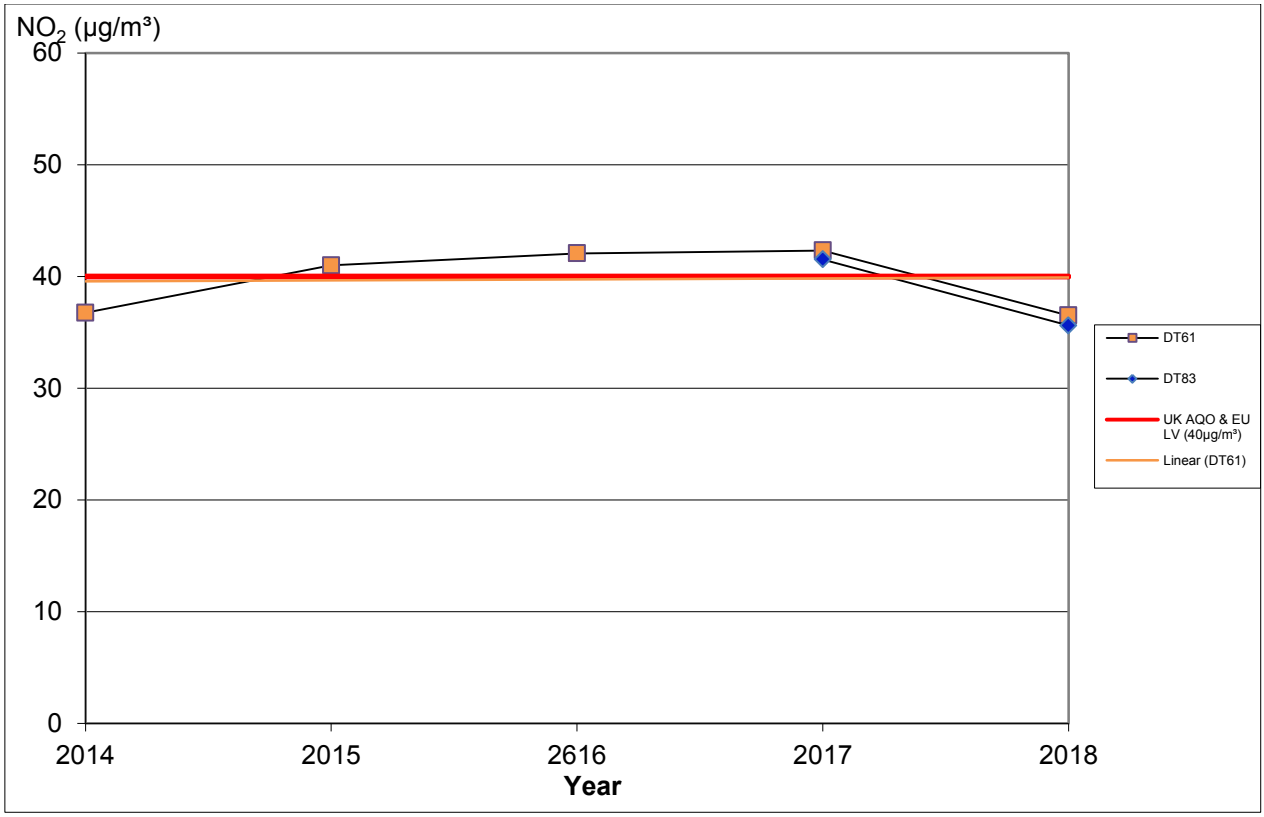


Figure A. 3 – Graph of Annual Mean NO_2 Concentrations – Newcastle Street

Maps of monitoring locations are shown in Figures D. 4, D. 5, D. 6 and D. 7.

No trend data is available for this area, as monitoring has only been carried out for two years. The graph shows a reduction in concentrations at all sites compared to the previous year, with the exception of DT77, which shows an increase. The concentrations at DT77 is above 40 µg/m³, however the tube is closer to the road than the receptor. Distance correction was calculated for this site resulting in a concentration of 39 µg/m³ at the nearest property; which is therefore below the objective. There is no obvious reason for the anomalous increase in concentration at this site.

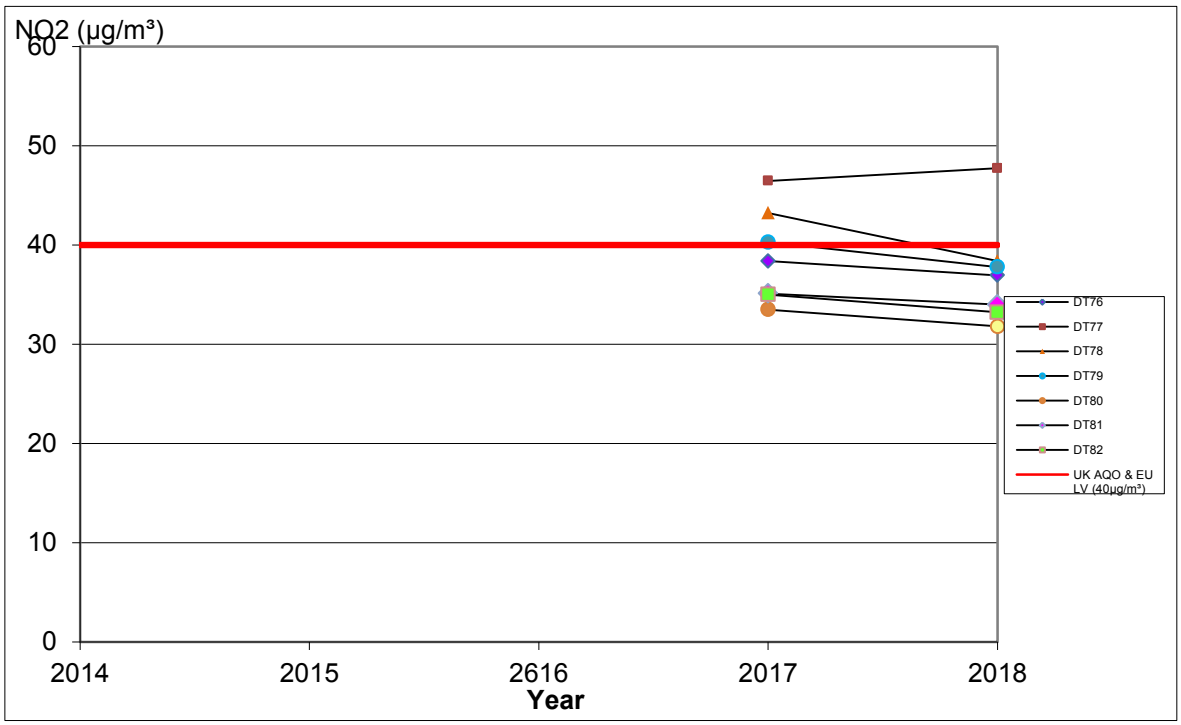


Figure A. 4 – Graph of Annual Mean NO_2 Concentrations – Burslem Centre

A map of monitoring locations is shown in Figures D. 8.

There has been a consistent downward trend in concentrations in this area since monitoring began.

DT84 is considered worst-case and is located at the junction of the A50 (Waterloo Road) and the B5051 (Moorland Road) adjacent to a building with no residential use. The remaining tubes in this area are located near to buildings with commercial use at ground floor and residential use at the first floor. All concentrations were below the objective, however, DT29, DT84 and DT85 were all within 10% of the objective.

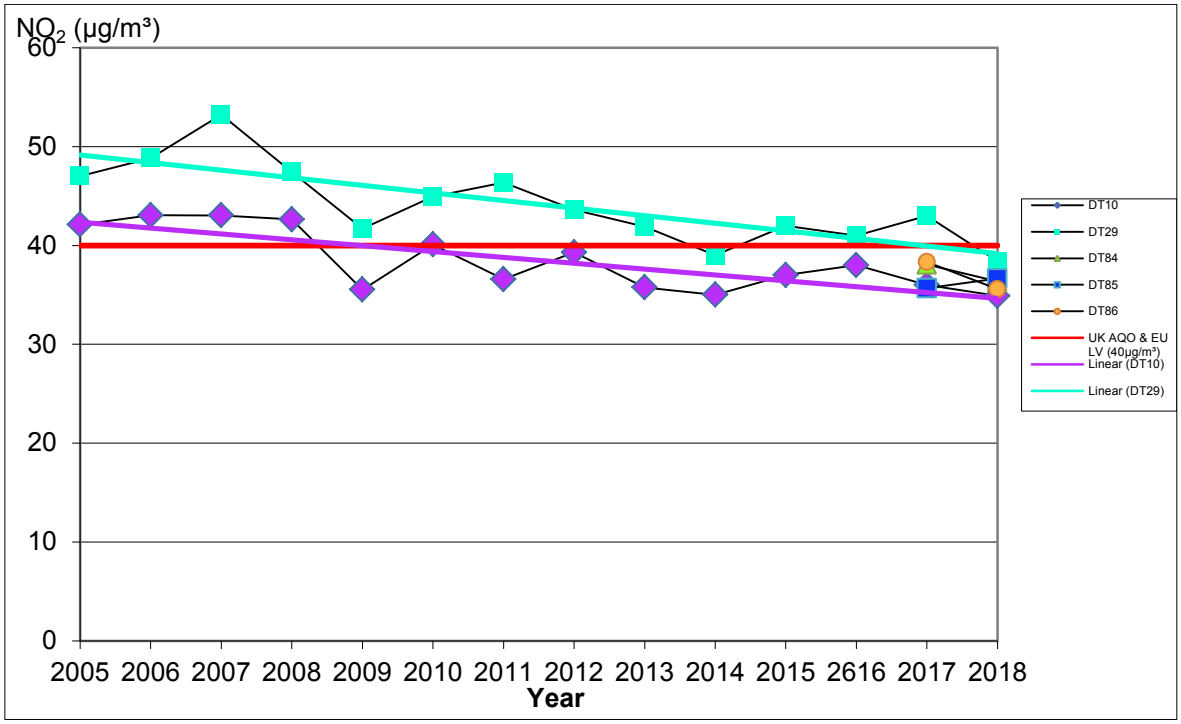


Figure A. 5 – Graph of Annual Mean NO_2 Concentrations – Cobridge

Locations of diffusion tubes are shown in Figures D. 9, D. 10 and D. 11.

There is a general downward trend in this area. However, concentration for DT9 remains above the objective. Tube DT91 is located closer to the road than the nearest residential property. Distance correction at this site results in a concentration at the façade of the property of 39 µg/m³ and is therefore below the objective. DT89 is also closer to the road that the property. The distance corrected result was 28 µg/m³.

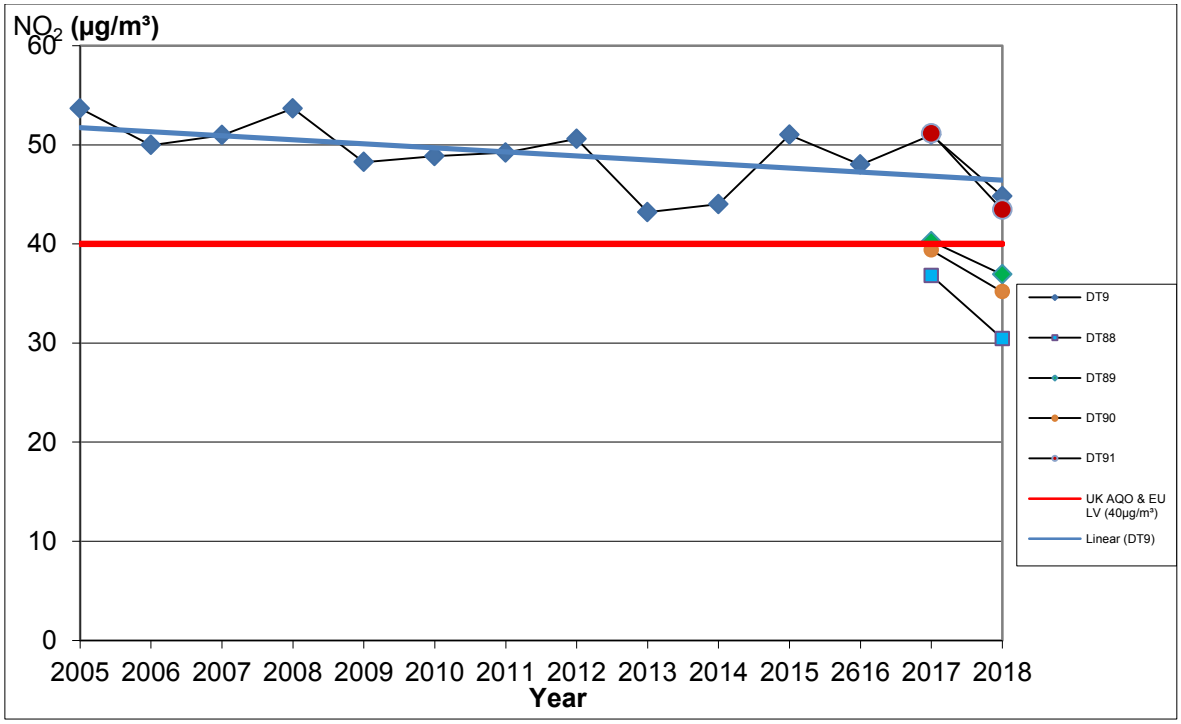


Figure A. 6 – Graph of Annual Mean NO_2 Concentrations - Hanley

The Location of continuous monitor CM1 and co-located diffusion tube DT8 are shown on Figure D. 2. DT23, DT99 and DT100 are shown in Figure D. 12 and DT49 is shown on Figure D. 13.

There is a general downward trend seen at both urban background and roadside locations in this area.

DT23, DT99 and DT100 are located near to the junction of the A5008 (Bucknall New Road) and the A50 ring road (Potteries Way). DT99 is located adjacent to a residential property and shows an exceedance of the objective. DT23 and DT100 are adjacent to commercial properties, therefore the objective does not apply. However, if the buildings were converted to residential use, the objective would apply.

DT49 is located at the junction of the A50 (Lichfield Street and Derby Street). A new residential development is currently under construction here. Monitoring indicates that the concentration is likely to be within 10% of the objection.

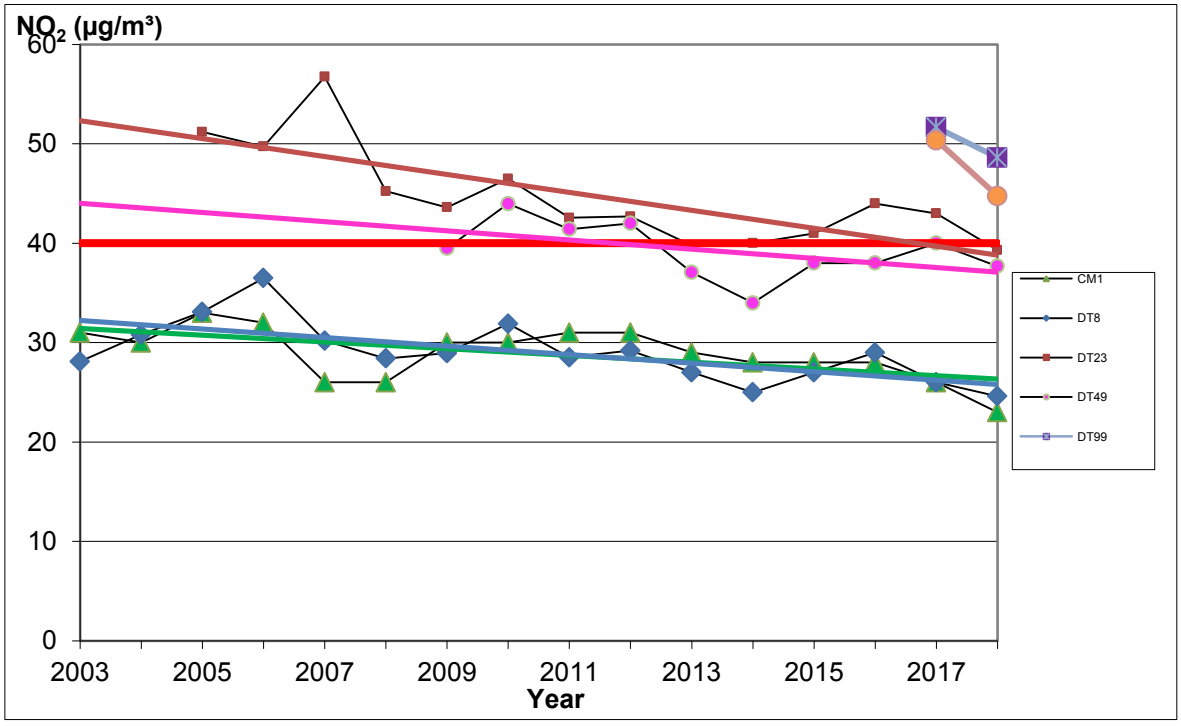


Figure A. 7 - Graph of Annual Mean NO_2 Concentrations – Bucknall

The location of DT2 is shown in Figure D. 14. The tube is located adjacent to residential properties at the junction of the A5272 (Dividy Road) and the A52 (Werrington Road). There has been a downward trend at this site over time, but concentrations have been inconsistent at this location. Though the 2018 result is below the objective, it remains within 10% of it.

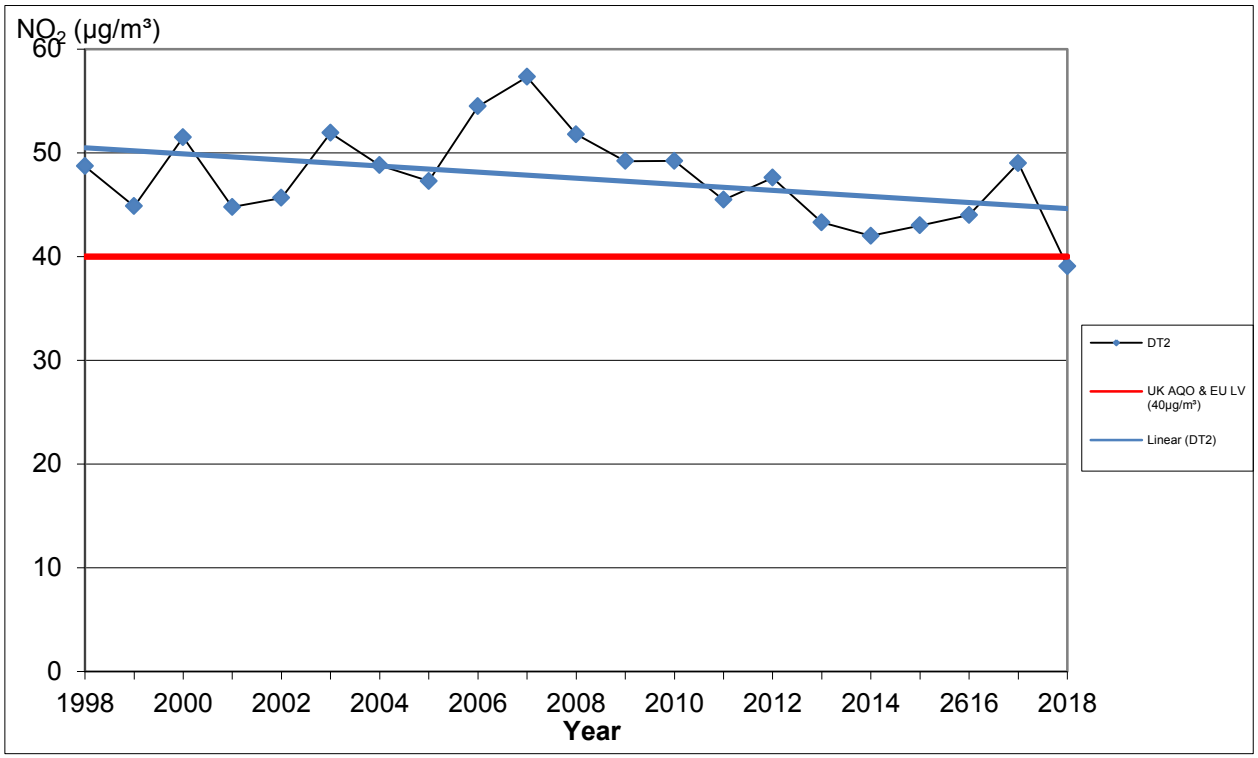


Figure A. 8 - Graph of Annual Mean NO_2 Concentrations – Leek Road, Joiners Square to Stoke

The locations of tubes are shown on Figures D. 15, D. 16, D. 17, D. 18 and D. 19.

Long-term monitoring shows a downward trend in this area. 2018 results show that all monitoring locations are significantly below the objective. Most sites are located closer to the road than the nearest residential property, therefore concentrations at the properties will be lower than those shown.

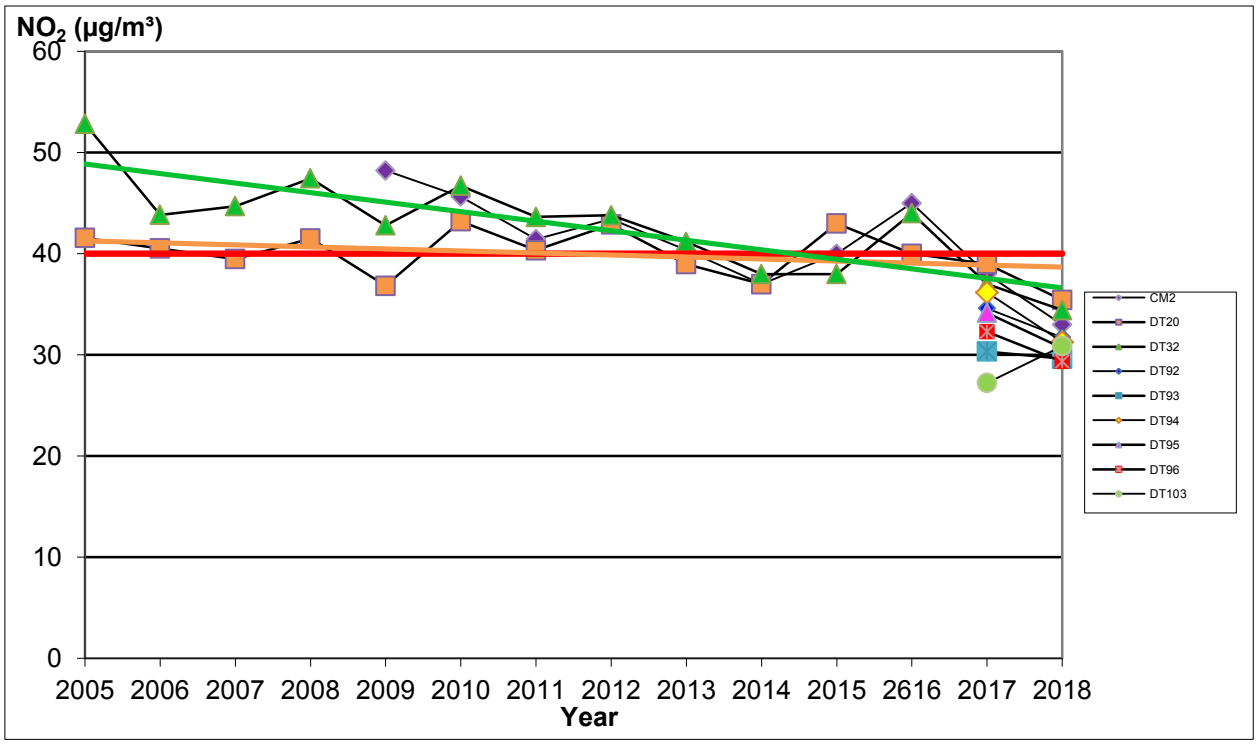


Figure A. 9 - Graph of Annual Mean NO_2 Concentrations – Station Road

The diffusion tube location is shown on Figure D. 20.

No trend data is available, as monitoring has only been carried out at this location for two years. The monitoring point is located outside Stoke-on-Trent Railway Station and therefore is not representative of residential property. The concentration has remained significantly below 60 µg/m³ and therefore the hourly mean objective is unlikely to be exceeded here.

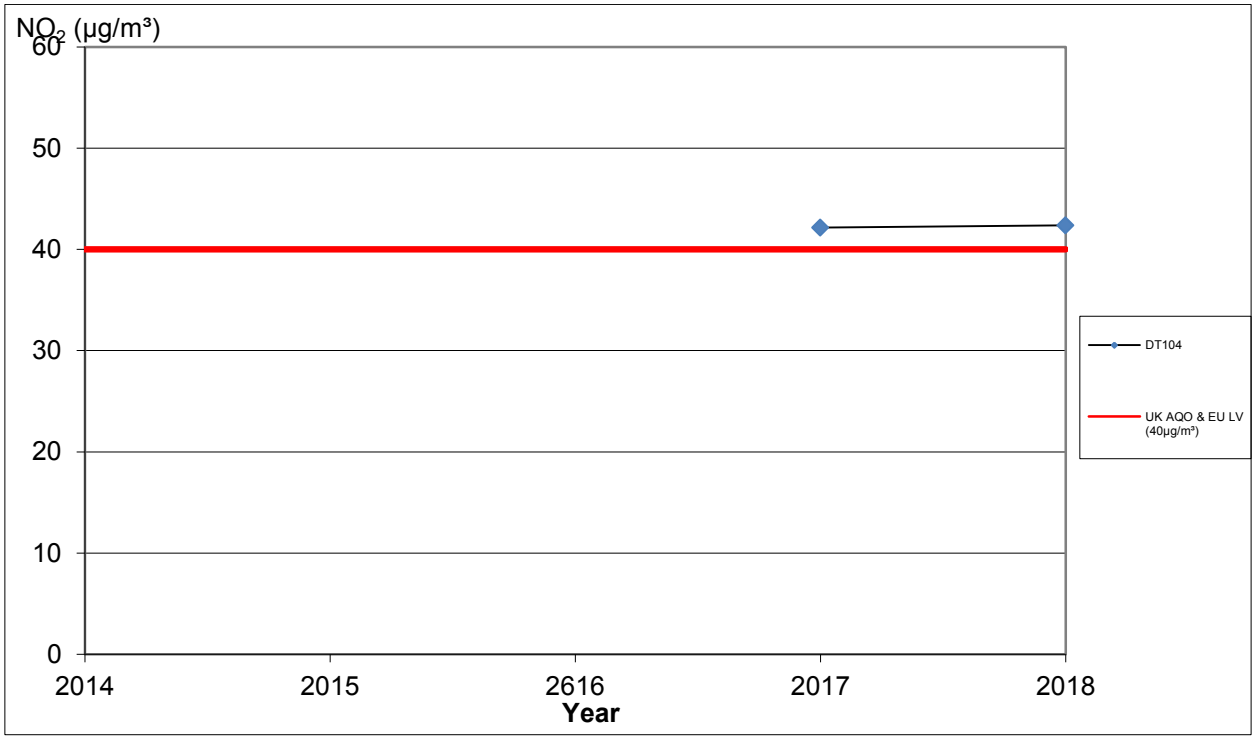


Figure A. 10 - Graph of Annual Mean NO_2 Concentrations – College Road

The locations of tubes are shown on Figure D. 21 and D. 22.

All results are significantly below the objective. DT97 is not representative of residential property, but was set up with DT98 to assess whether pollutant levels were high, as this road is used by buses travelling between the railway station and the city-centre.

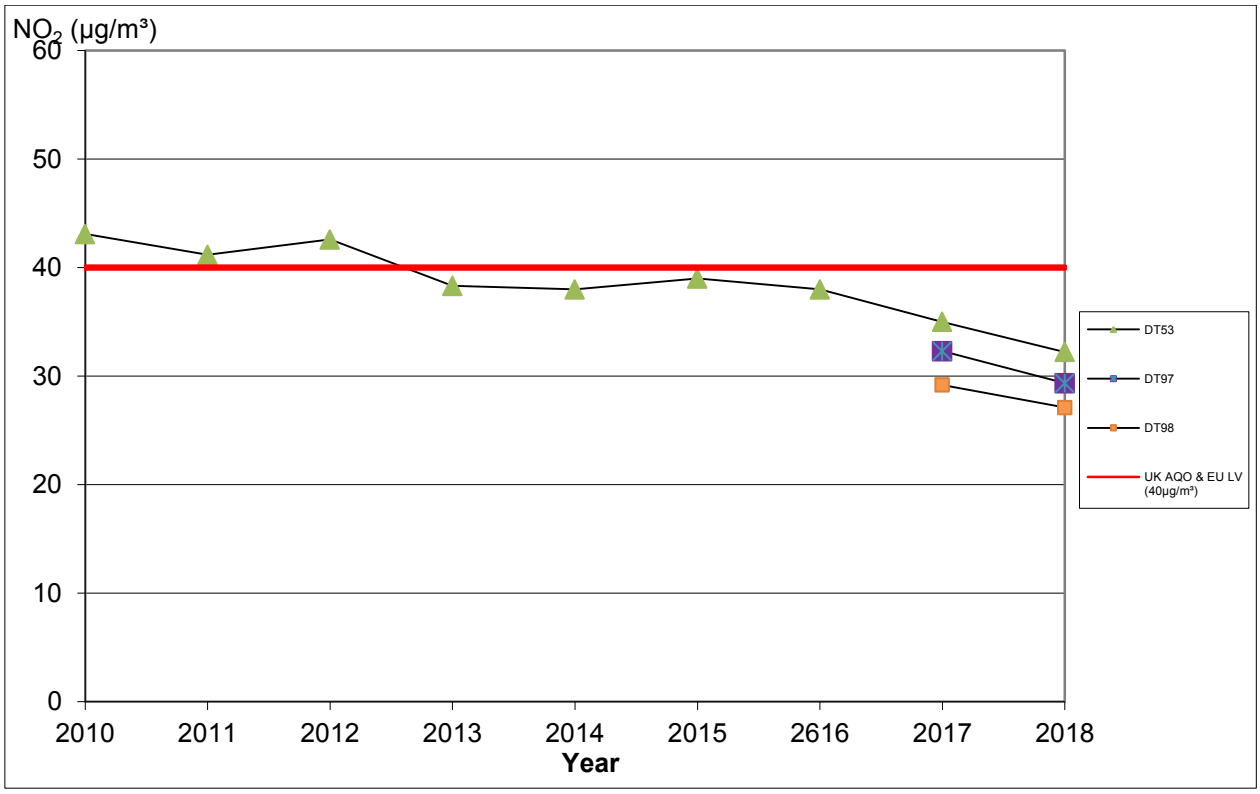


Figure A. 11- Graph of Annual Mean NO_2 Concentrations – A53 (Etruria Road)

The locations of tubes are shown on Figure D. 23, D. 24, D. 25 and D. 26.

Trend analysis shows a slight downward trend in concentrations.

Monitoring at DT105 and DT106 began in 2018, therefore no trend data is available. These two sites were set up to monitor concentrations to the east of the A500, at a stretch of road that Defra's Pollution Climate Mapping (PCM) model had identified as exceeding the EU limit value. The tubes were located adjacent to the road and near to bus stops to represent worst-case locations. The results show that concentrations at both locations are below the EU limit value.

Concentrations at DT51, adjacent to the A500/Etruria Road roundabout remain below the objective, but within borderline values.

All other monitoring sites remain above the objective even after appropriate distance correction has been applied.

This area is the main focus for work being carried out under the Ministerial Directions issued to Stoke-on-Trent City Council and Newcastle-under-Lyme Borough Council to investigate actions to bring forward compliance with the EU limit value in the shortest possible time.

The concentration at DT17 remains above 60µg/m³ and therefore indicates that the hourly mean objective is likely to be exceeded at this location.

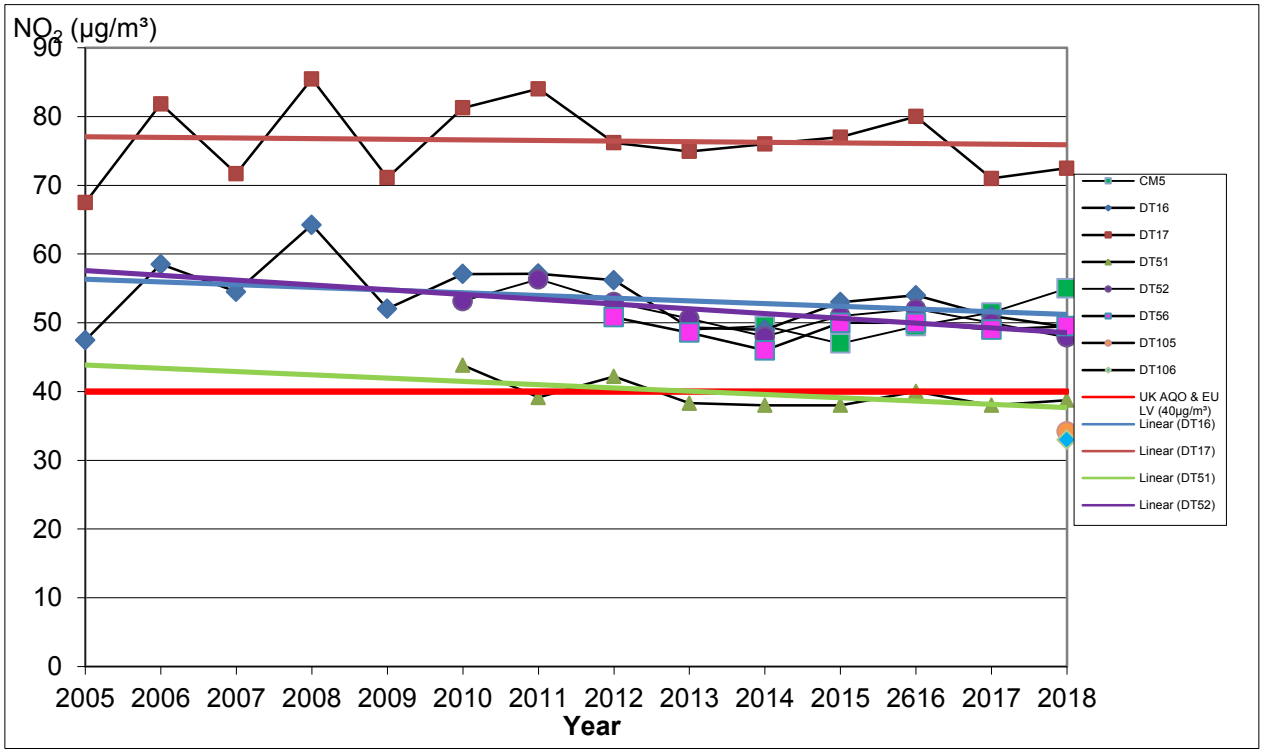

NO2 (µg/m³)
90
80
70
60
50
40
30
20
10
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2616
2017
2018
Year
CM5
DT16
DT17
DT51
DT52
DT56
DT105
DT106
UK AQO & EU LV (40µg/m³)
Linear (DT16)
Linear (DT17)
Linear (DT51)
Linear (DT52)

Figure A. 12 - Graph of Annual Mean NO_2 Concentrations – Victoria Street & Shelton New Road

A map of monitoring locations can be found at Figure D. 25, D. 27, D. 28 and D. 29.

No trend data is available here, as monitoring has only been undertaken for three years for DT63, DT64, DT65, DT66 and DT67 and for two years for DT72 and DT73.

These monitoring points were set up for the work being undertaken in support of the Ministerial Direction, as action taken on the A53 may result in traffic using alternative routes, such as Shelton New Road and Hartshill Road.

DT63 and DT67 both continued to exceed the objective. All other monitoring locations were below the objective, though DT64 and DT65 remained above 36 µg/m³ and therefore borderline.

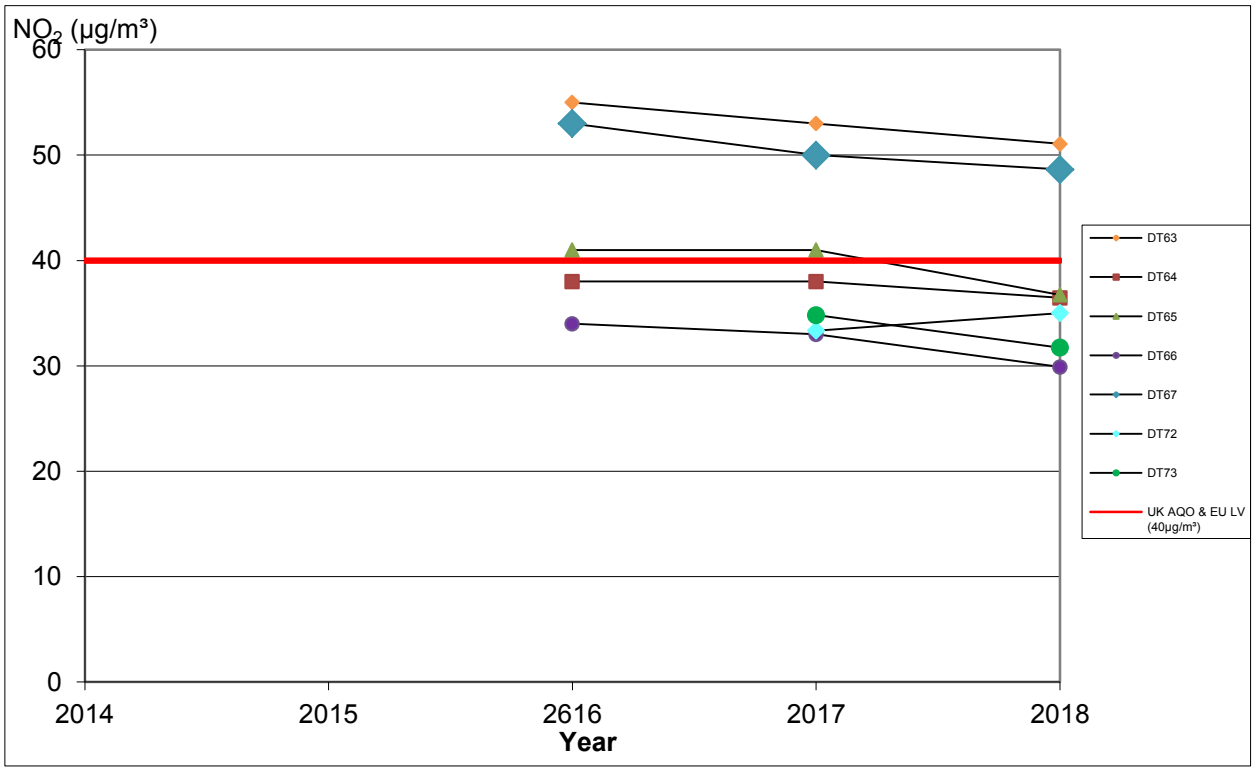


Figure A. 13 - Graph of Annual Mean NO_2 Concentrations – Hartshill Road

A map of monitoring locations can be found at Figure D. 29 and D. 30.

No trend data is available as monitoring has only been completed for two years.

Concentrations at both sites remain below the objective.

These monitoring points were set up for the work being undertaken in support of the Ministerial Direction, as action taken on the A53 may result in traffic using alternative routes, such as Shelton New Road and Hartshill Road.

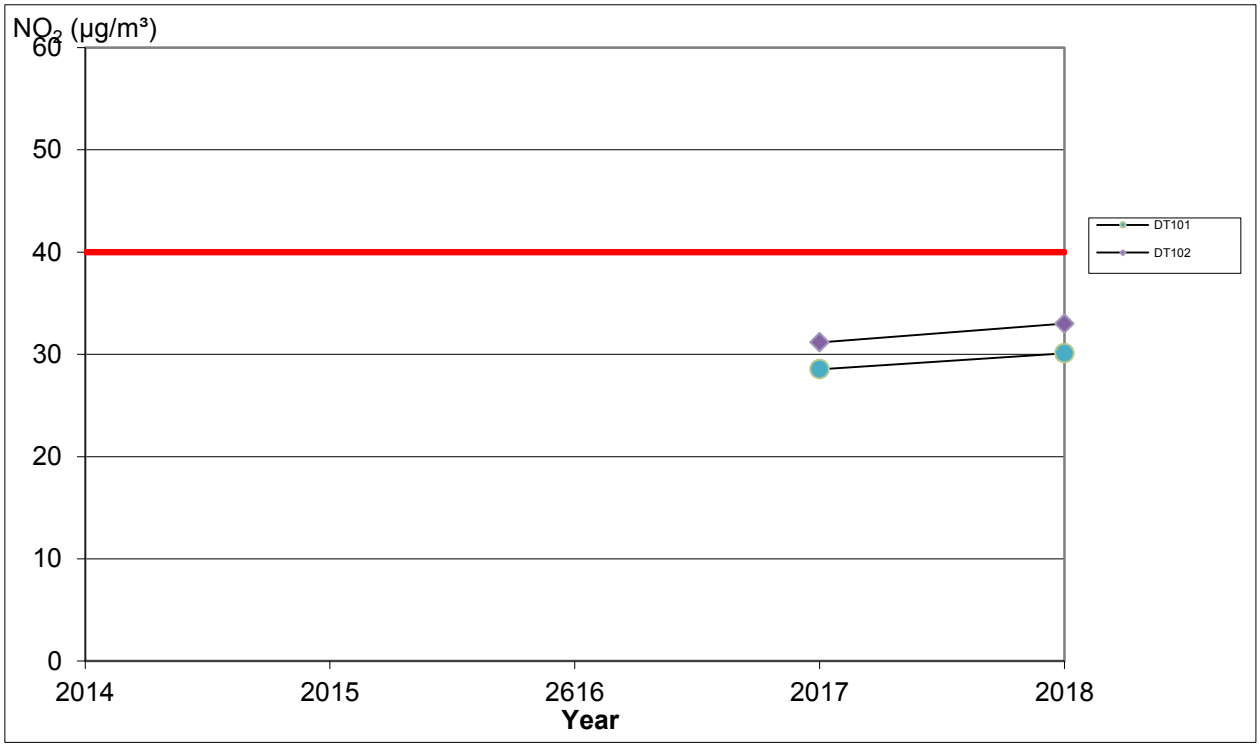


Figure A. 14 - Graph of Annual Mean NO_2 Concentrations – Victoria Road

Maps of monitoring locations can be found at Figure D. 31 and D. 32.

A downward trend is shown in this area. However, the concentration at DT34 remains above the objective and at DT15, it remains borderline at 38 µg/m³.

Victoria Street forms part of the A50 and links the A50 trunk road with the city-centre. The road is a main bus route linking the city-centre with the southern areas of the city. To the north of the monitoring sites are commercial and industrial areas which are served by HGVs using Victoria Road. The road is narrow with terraced properties to the back of pavement.

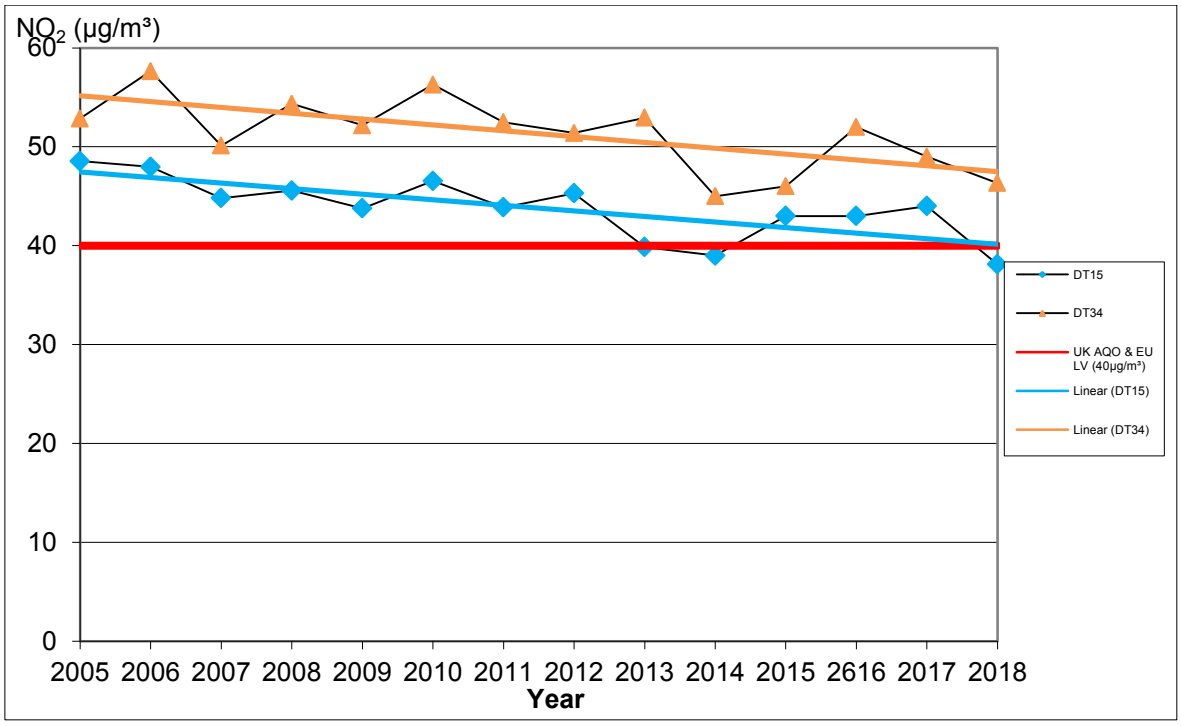


Figure A. 15 - Graph of Annual Mean NO_2 Concentrations – north of A50 Meir

A map of monitoring locations can be found at Figure D. 33 and D. 34.

The graph shows a downward trend in this area with all diffusion tube concentrations being below the objective. All monitors are located on Railway Road, which runs parallel to the A50 trunk road. DT4 is located at the façade of a property, but DT13 and DT14 are located closer the kerb of Railway Road and closer to the A50 than the nearest residential property and therefor the concentrations at the façades are likely to be lower than those shown.

CM6 is a continuous monitor located between the A50 trunk road and Railway Road. It is part of the Automatic Urban and Rural Network (AURN). Monitoring here remains significantly above 40 µg/m³, but all residential properties are located further away from the monitoring site.

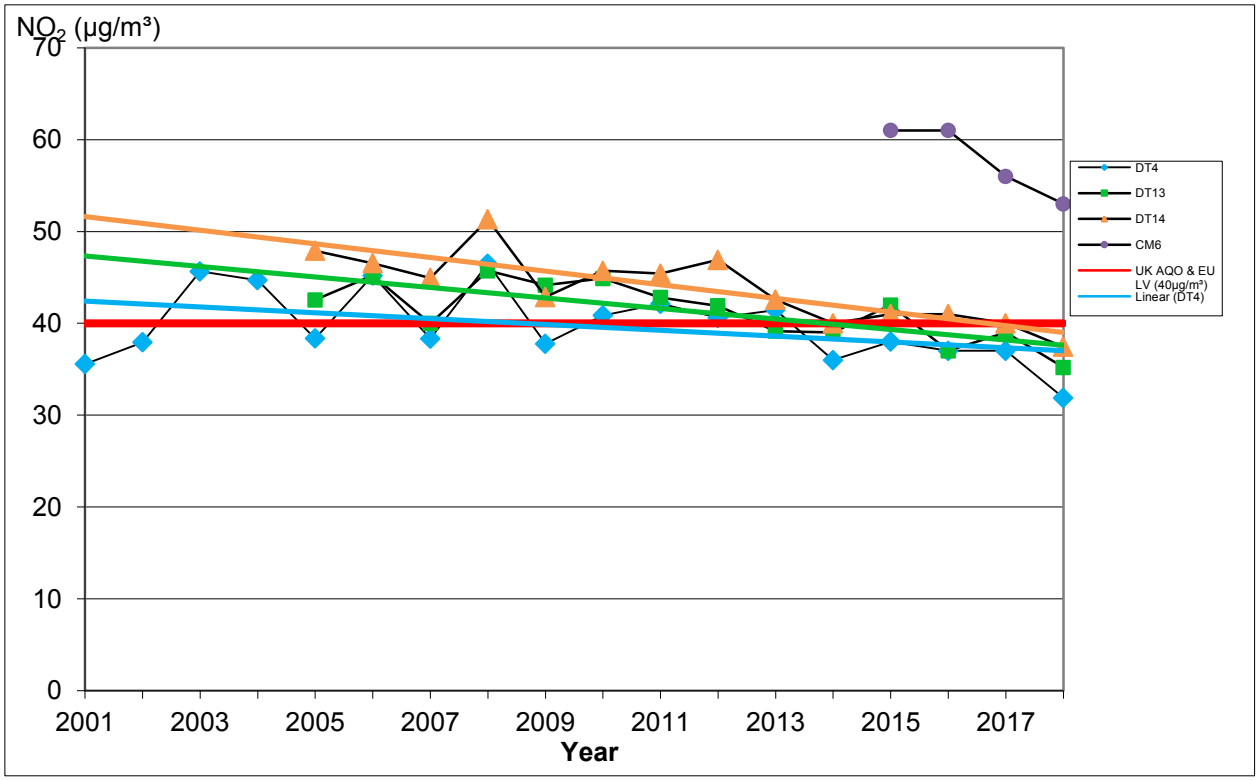


Figure A. 16 - Graph of Annual Mean NO_2 Concentrations – south of A50 Meir

A map of monitoring locations can be found at Figure D. 34.

The graph shows a downward trend in this area with all diffusion tube concentrations being below the objective. However, some remain at borderline concentrations. DT40 and DT41 are a similar distance from the A50 trunk road as the nearby residential properties, but DT42 is closer to the road than the nearest house.

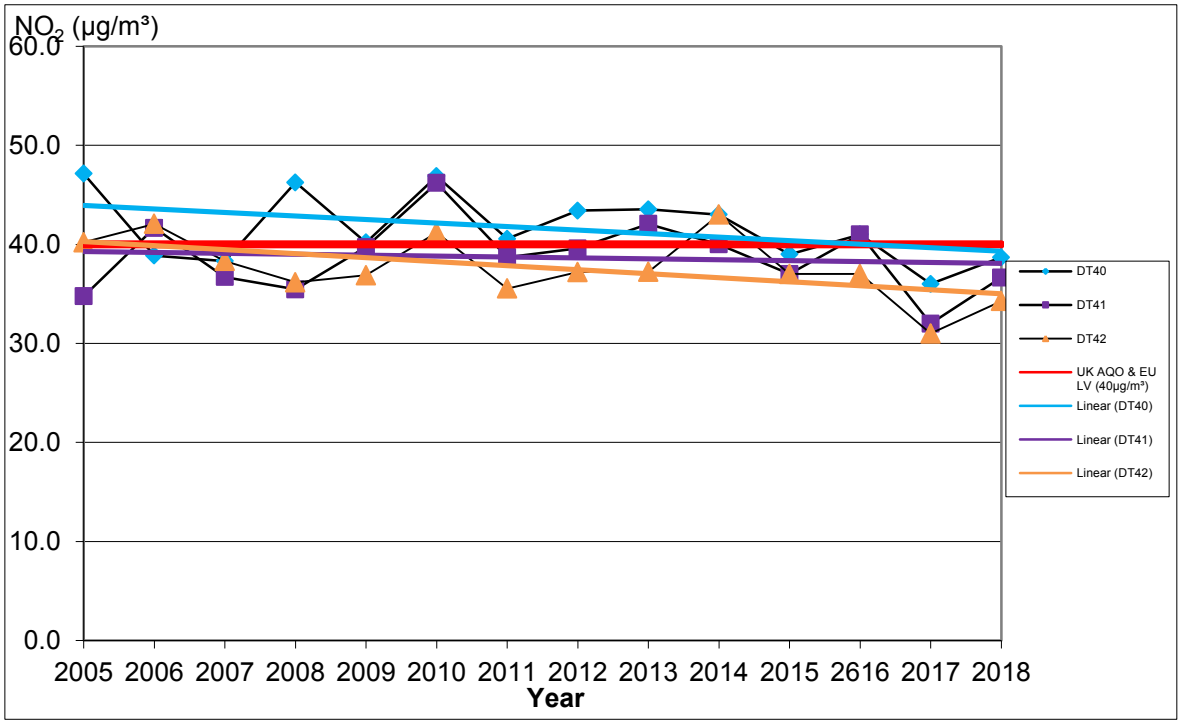


Figure A. 17 - Graph of Annual Mean NO_2 Concentrations – Uttoxeter Road, east of the Meir tunnel

A map of monitoring locations can be found at Figure D. 35.

The graph shows a downward trend in this area.

DT55 is a similar distance from Uttoxeter Road and the A50 trunk road at the nearby property. DT75 is closer to the road than the nearest property. Distance correction for this tube results is a concentration of 31 µg/m³. Results for both diffusion tube locations are below the objective.

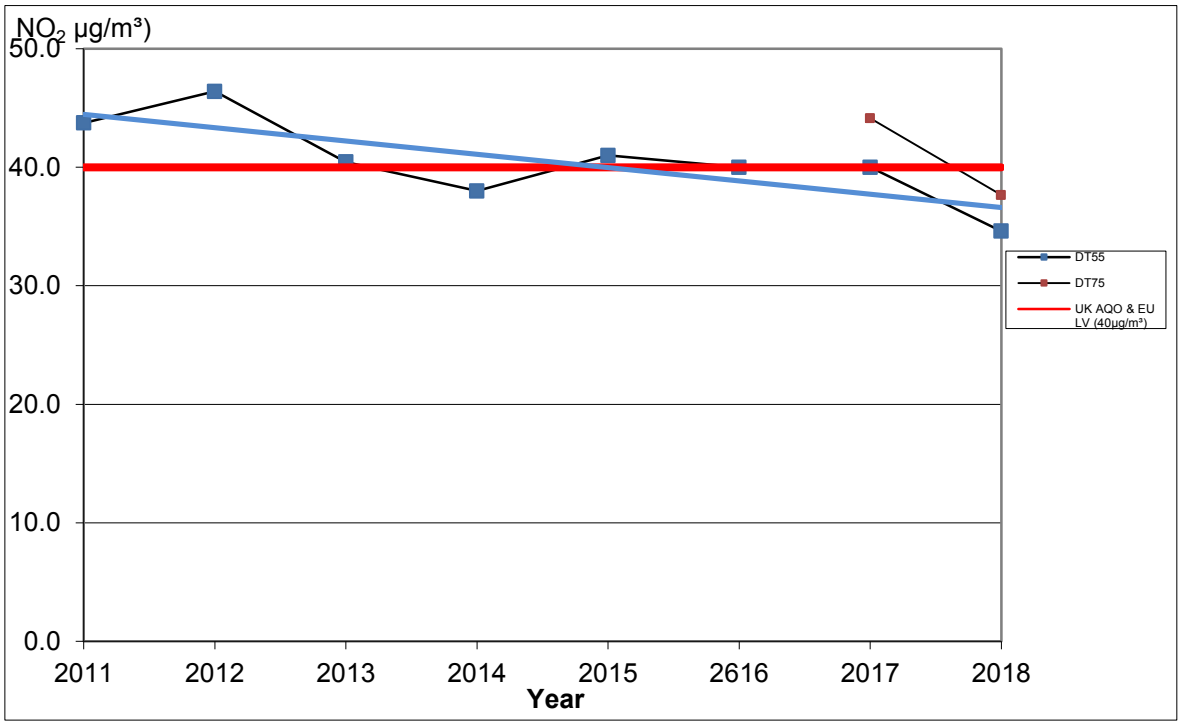


Figure A. 18 - Graph of Annual Mean NO_2 Concentrations – Weston Road, Meir

A map of monitoring locations can be found at Figure D. 36.

The graph shows a downward trend in this area. However, concentrations remain above 40 µg/m³ at all three locations. DT24 is located on a commercial property with residential accommodation above. There are a number of shops on either side of Weston Road at this location. In addition there is a pedestrian crossing adjacent to the property where the diffusion tube is sited, resulting in stop/start traffic for much of the day. DT37 is also located on a commercial property with residential above. DT74 is located closer to the road than the nearby residential property. Distance correction for this site resulted in a concentrations of 40µg/m³ and therefore though the objective is not exceeded, it is classed as borderline.

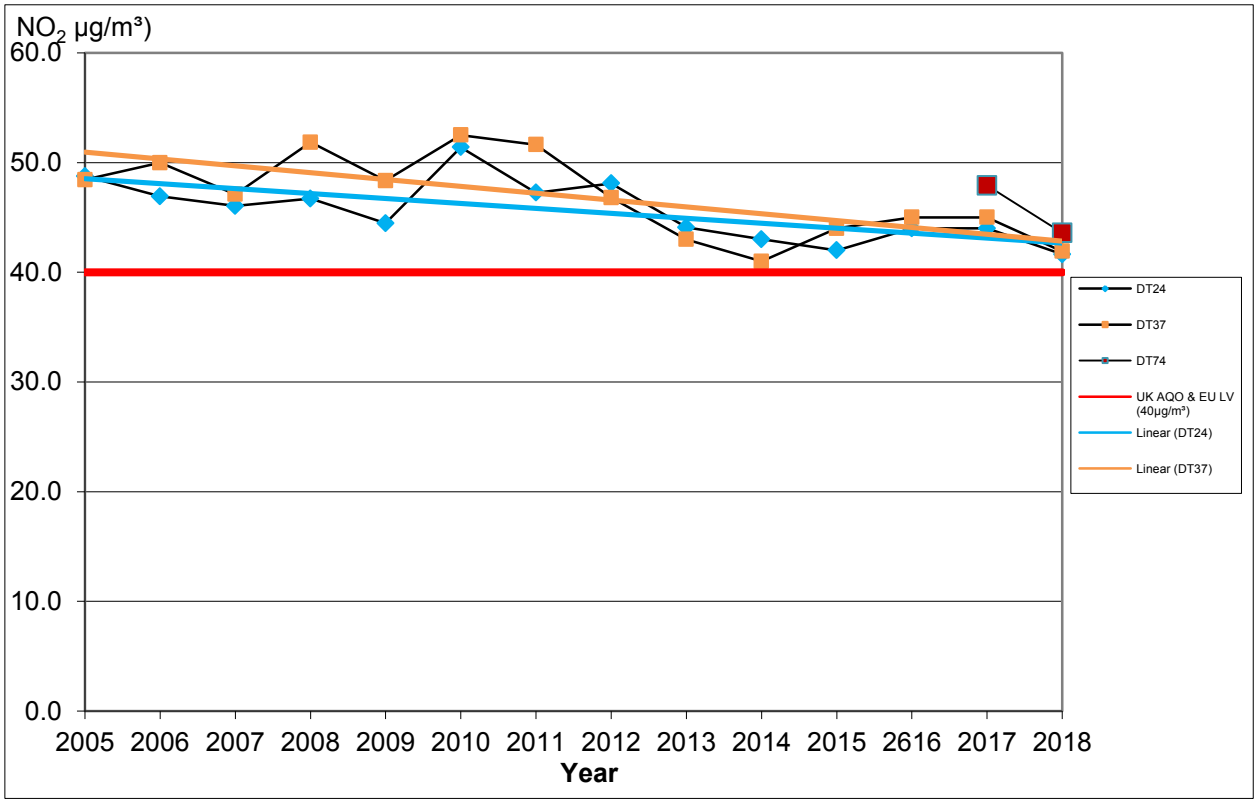


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 1-Hour Means > 200µg/m^3 [3]				
					2014	2015	2016	2017	2018
CM1	Urban Background	Automatic	98	98	0	0	0	0	0
CM2	Roadside	Automatic	96	96	0 (124)	1	0 (127)	0	0
CM5	Roadside	Automatic	85	85	4	0	2 (160)	2	3
CM6	Roadside	Automatic	98	98	-	3 (179)	12	4	1

Notes:

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM_{10} Monitoring Results

	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	PM_{10} Annual Mean Concentration ($\mu g/m^3$) [3]				
				2014	2015	2016	2017	2018
CM1	Urban Centre	Decommissioned 2015	NA	18	17	-	-	-
CM3	Roadside	Decommissioned 2015	NA	24	22	-	-	-
CM4	Industrial	Decommissioned 2013	NA	-	-	-	-	-
CM5	Roadside	85	85	-	-	-	23	23
CM6	Roadside	95	95	-	18	20	18	19

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ are shown in **bold.**

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A. 19 – Trends in Annual Mean PM_{10} Concentrations

No trend analysis is available as only four years of data is available. However, the annual mean concentration at both monitoring sites is significantly below the objective.

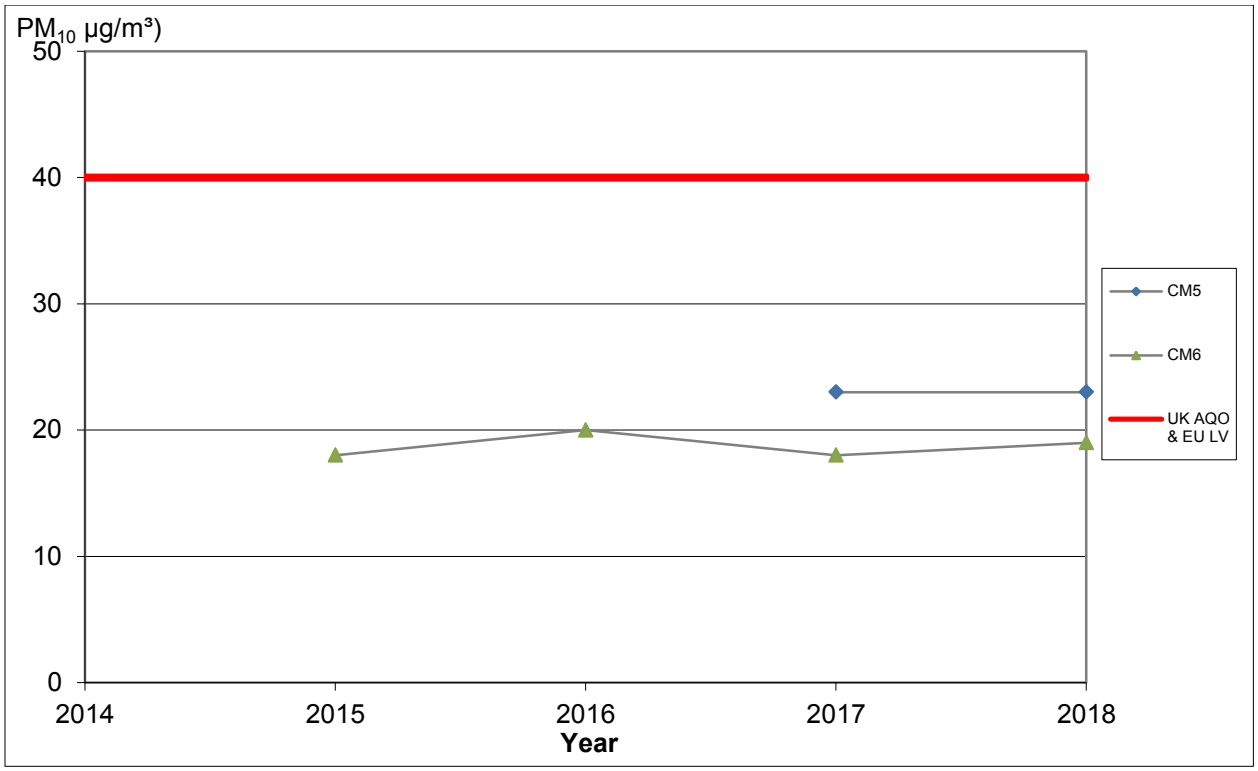


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
CM1	Urban Centre	Decommissioned 2015	NA	8	0 (29)	-	-	
CM3	Roadside	Decommissioned 2015	NA	15	7	-	-	-
CM4	Industrial	Decommissioned 2013	NA	-	-	-	-	-
CM5	Roadside	85	85	-	-	-	10	0
CM6	Roadside	95	95	-	1 (29)	5	3	1

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
CM1	Urban Centre	92	92	13	12	12	9	9

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

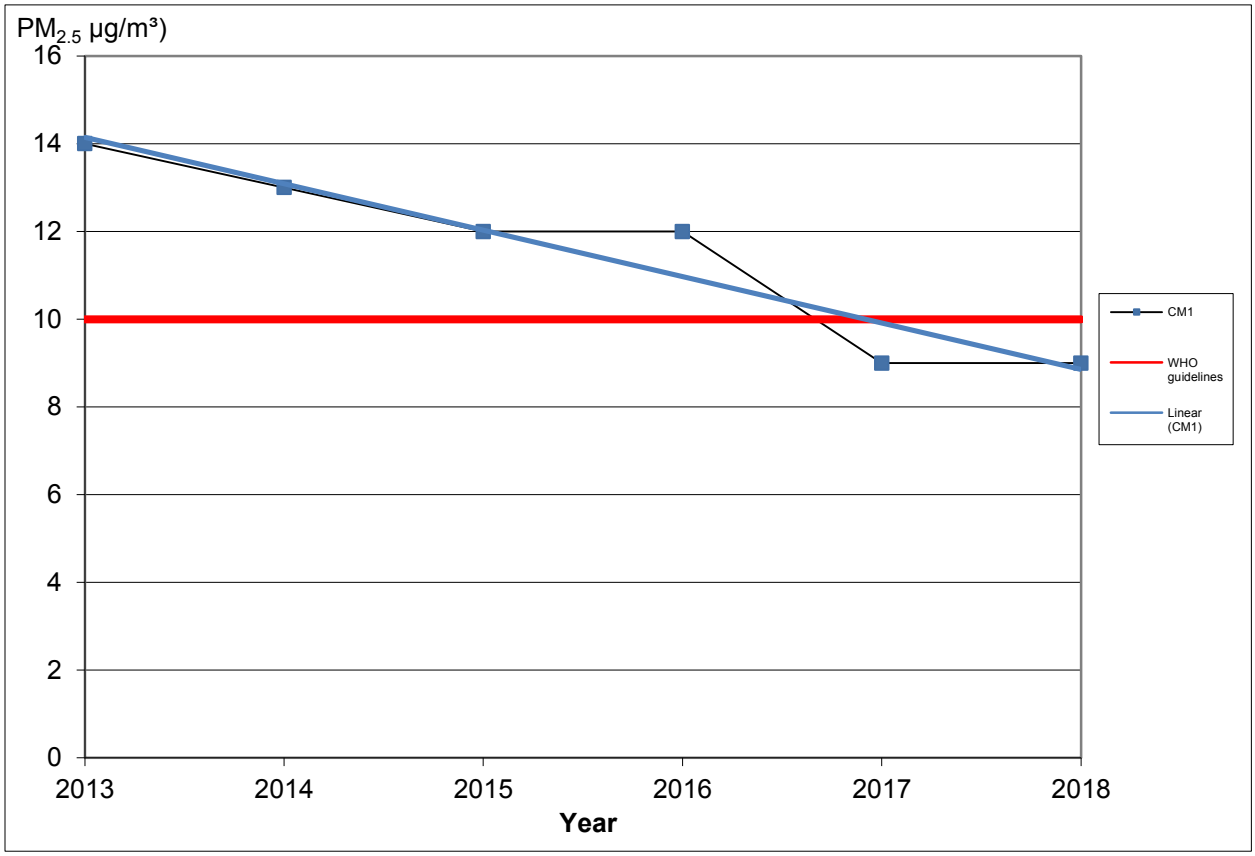
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A. 20 – Trends in Annual Mean $PM_{2.5}$ Concentrations

A downward trend is shown for $PM_{2.5}$ monitoring. The annual mean concentration has remained below the WHO guidelines for the second year.



Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2018

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DT1	27.9	26.3	23.9	20.8	15.6	14.5	17.5	14.8	20.1	23.4	24.0	23.7	21.0	18.3	
DT2	62.0	49.4	39.5	42.9	44.5	41.6	50.1	42.5	45.8	40.0	39.2	41.4	44.9	39.1	38.9
DT3	29.2	24.5	20.3	15.9	9.5	10.9	14.3	13.8	23	21.2	21.5	19.6	18.6	16.2	
DT4	43.6	38.3	38.5	35.9	33.3	30.3	38.5	36.2	33.9	41.7	33.1	36.6	36.7	31.9	31.3
DT8A	30.5	34.2	27.6	24.1	25.2	20.7	28	26.2	27.7	31.5	28.2	31.2	27.9	24.3	26.4
DT8B	35.1	34.2	27.5	25	24.4	18.5	28.8	25.9	28.6	29.8	28.2	33.2	28.3	24.6	26.4
DT8C	35.2	33.8	26.3	26.4	22.8	20.3	28.1	27.1	29.1	32.8	28.7	31.7	28.5	24.8	26.4
DT9	63.7	54.5	49.1	49.7	46.9	43.6	55.9	50.7	58	41.2	48.7	56	51.5	**44.8**	
DT10	42.9	40.2	39.5	38.9	42.1	38.6	40.5	36.6	41.9	47.5	34	38.6	40.1	34.9	
DT13	46.9	42.8	39.6	42.5	37.9	34.5	35.1	35.4	39.5	46.4	39.3	45.6	40.5	35.2	
DT14	46.5	44.8	39.6	46.4	41.6	36.6	35.4	39.2	38.6	43.5	57.6	46.7	43.0	37.4	
DT15	53.6	47	43.5	I/S	40.4	34.6	47.9	43.5	41.5	46.5	34.4	48.8	43.8	38.1	
DT16	63.6	62.4	58.2	57.9	57.1	49	58.1	53.9	58.2	54	49.5	59.8	56.8	**49.4**	
DT17	92.3	83.5	86.1	55.8	I/S	84.8	91.1	I/S	87.4	73.9	85	93.4	83.3	**72.5**	**67.9**
DT20	50.1	48.7	36	35.9	30.3	34.6	36	35.5	44.2	49	39	49.3	40.7	35.4	
DT23	50.7	48.3	44.5	41.8	44.9	40.6	49.9	40.7	51.3	I/S	39.2	I/S	45.2	39.3	

DT24	46.6	48.5	I/S	47.1	53	43.6	54.5	46.7	48.3	52.6	40.4	45.1	47.9	**41.6**	
DT29	53.1	47.2	42.6	45.7	I/S	34.7	44.5	40.4	43.8	45.7	45.1	42.7	44.1	38.4	
DT32	46	43.7	38.3	41.2	41.6	37.9	35	29.7	34.7	43.9	41.4	41.6	39.6	34.4	31.6
DT34	56.8	58.5	56.6	52.9	54.6	52.8	54.3	38.8	47.9	59.8	60	46.1	53.3	**46.3**	
DT37	53.4	54.7	44.4	51	47.4	42	48.1	42.1	45.3	51.7	48.5	49.6	48.2	**41.9**	
DT40	41.7	52.3	53	47.9	53.5	51.3	41.5	31.8	28.4	43.3	49.8	39.1	44.5	38.7	
DT41	40.3	52.7	53.7	47.2	50.4	48.9	40.9	28.8	26.2	38.8	38.3	39.4	42.1	36.7	
DT42	32.4	47	46	42.6	48.8	40.2	39.8	28.7	28.1	44.2	35	39.9	39.4	34.3	
DT49	52	48.9	42.3	38.4	32.3	31.6	44.8	41.5	44.3	51.7	41.4	50.6	43.3	37.7	
DT51	46.5	53.5	41.3	45.7	51.2	45.4	44.3	37.3	39.6	49.5	43	37.2	44.5	38.8	37.4
DT52	58.2	60.2	56.2	63.1	56.4	49.8	I/S	I/S	52.2	49.4	51.2	53.6	55.0	**47.9**	**43.7**
DT53	42.3	43.8	36.3	36.8	33.3	27.5	31.1	31.5	40.8	41.5	36.9	42.7	37.0	32.2	
DT55	48.3	45.3	40.7	42.1	31.4	31.2	35.7	35.9	38.6	41.7	44.5	41.9	39.8	34.6	
DT56A	62.3	59.9	52.5	60.1	57.2	45.4	54.3	46.7	48.5	57.3	56.2	52.1	54.4	**47.3**	**42.4**
DT56B	63.6	64.5	52.9	91.1	56.5	44.7	58	50.5	50.4	58.9	62.2	55.9	59.1	**51.4**	**42.4**
DT56C	64.7	64.1	55.8	63.7	63.1	48	53.7	52.7	53.7	60.4	51.3	55.1	57.2	**49.8**	**42.4**
DT61	47.3	44.5	36.1	39.1	39.9	34.6	43.1	32.7	I/S	41.9	36.7	46.4	40.2	**40.2**	
DT63	66	58.9	55.1	55.2	58.5	53.2	60.9	56.3	61.4	63.1	45.9	69.9	58.7	**51.1**	
DT64	45.7	46.9	45.2	42.5	I/S	27.2	37.4	I/S	37.5	42.3	45.1	49.2	41.9	36.5	34.4
DT65	I/S	I/S	I/S	40.1	34.5	32.2	44.4	38.2	46.1	50.8	40	53.9	42.2	36.8	
DT66	40.9	43	37.2	32.8	28	24.3	29.7	29.3	33	39.1	32.8	42.3	34.4	29.9	
DT67	67.1	57.9	39.8	53	55.8	93.6	56.4	42.7	42.7	57.5	52.3	52	55.9	**48.6**	**43.5**
DT72	43.8	44.6	44	44	< 1.0	44.4	40.1	25.5	29.1	40.3	44.4	42.5	40.2	35.0	32.4
DT73	45.5	41.8	36.4	34.8	32.8	27.1	36	29.8	33.8	38.8	35.9	45	36.5	31.7	
DT74	56.4	55.4	45.8	49.6	50.5	46.9	52.5	50.3	49.4	47.2	44.9	52.4	50.1	**43.6**	39.9
DT75	51.9	44.7	43.2	51.5	32.8	31.9	39.6	43	47.5	40.6	40.6	52	43.3	37.6	31.2
DT76	48.6	45.2	44.8	43.6	40.2	44.2	37.8	33.7	37.9	45.3	49.1	39.1	42.5	36.9	35.0

DT77	I/S	57.5	44.6	53.9	59.5	54.6	58.7	43.7	49	65.2	57.5	59.2	54.9	**47.7**	39.3
DT78	53.2	48.4	45.3	41.4	38.7	38	46.3	38.7	44	42.2	42.8	50.4	44.1	38.4	
DT79	51.3	48.3	46.7	41.8	36.3	33.9	45.8	38.5	39.8	46.2	42.9	49.7	43.4	37.8	
DT80	44.8	42.6	37.2	37.1	34.5	30.7	35.9	30.8	32.1	36.1	40.6	36.3	36.6	31.8	
DT81	43.3	42.4	38.2	37	36.1	34.6	40.1	34.1	38.9	43.6	35.2	45.4	39.1	34.0	31.4
DT82	44.2	39.9	37.1	37.6	38.5	33	37.4	34.5	35.6	40.5	35.3	44.5	38.2	33.2	
DT83	45.6	49.1	39.5	39.6	40.7	I/S	45.9	34.9	41.5	46.5	31.8	47.3	42.0	36.6	33.3
DT84	45.4	48.7	39.3	40.4	43.3	42.9	45.8	36.7	42.6	44.8	33.1	38.4	41.8	36.4	35.7
DT85	< 1.0	76.2	I/S	37.4	38.3	36.6	36.6	32.7	36.5	41.6	39.2	46.1	42.1	36.6	
DT86	49.6	43.8	41.5	39.2	35.2	33.1	40.6	39	40.4	40.6	40.7	46.9	40.9	35.6	
DT88	40.7	39.5	28.3	35.2	31.6	28.3	37.6	30	33.7	37.3	31.4	46.3	35.0	30.4	28.0
DT89	49.6	42.2	36.2	38.8	37.1	32.1	I/S	I/S	45.3	48.4	45.2	49.5	42.4	36.9	28.3
DT90	46.5	45.5	38.7	38.8	45	40.8	43.3	31.9	34.5	37.3	41.7	41.1	40.4	35.2	
DT91	59.4	47.2	48	I/S	I/S	I/S	52.9	46.8	53.6	47.8	40.4	53.2	49.9	**43.4**	39.1
DT92	42.8	42.7	35.6	32.1	35.4	32.9	30.9	31.1	33.6	45.9	37.5	37.1	36.5	31.7	
DT93	43.1	41.2	33.8	32.1	32.5	30.5	29.3	27.1	29.5	39.1	39.1	31.4	34.1	29.6	27.8
DT94	51.1	45.3	40.4	32.9	24.8	25	30.8	29.4	38.5	37.2	36.2	39.6	35.9	31.3	30.0
DT95	47.7	40.5	35.5	35.8	30.3	25.6	30.6	26.1	32.1	41.7	38.2	39.1	35.3	30.7	28.6
DT96	45	41.5	32	30.6	28.4	19.6	31.2	29.1	32.7	37.8	34.8	42.1	33.7	29.3	27.6
DT97	45.3	41.9	31.6	34.9	18.4	25	30.9	26.8	31.9	38.1	41.4	44.3	34.2	29.8	
DT98	37.6	34.6	31.6	27.6	27.4	25.5	29.3	25.5	29.5	36.2	30.8	38.4	31.2	27.1	25.5
DT99	56.4	56.1	54.5	57.8	64.1	58	63.1	47.7	59.5	I/S	41	56.5	55.9	**48.6**	
DT100	61	13.2	I/S	I/S	63	53.9	61.9	50.7	59.3	52.4	47.6	I/S	51.4	**44.8**	
DT101	37.7	39.9	38.2	33	37.9	33.6	I/S	26.1	26.5	38.2	33.8	35.8	34.6	30.1	
DT102	42.2	42.1	41.7	34.6	41.2	37	29.4	29.6	36.2	39.8	36.6	44.9	37.9	33.0	
DT103A	43	39.5	33.6	33.6	31.4	28.7	31.7	33.4	36.8	40.5	39	44.1	36.3	31.6	
DT103B	46.1	40.6	36.9	34.9	31.4	30.7	37.6	28.8	32	39.2	33.4	40	36.0	31.3	

DT103C	40.5	38.5	29.8	33.9	34.5	32.8	31.6	29	33.4	30.1	38	38.3	34.2	29.8	
DT104	56.9	52	47.1	43.5	43.3	39.1	50.1	43.1	54.5	56.5	40.3	58	48.7	**42.4**	
DT105	N/A	N/A	38.5	40.3	31.9	29.7	38.3	34.6	43.3	44.6	39.6	52	39.3	34.2	
DT105	N/A	N/A	43.3	39.1	35.4	31.8	37.1	33.3	40.1	40.7	41.3	37	37.9	33.3	

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **Where applicable, data has been distance corrected for relevant exposure**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

C1 Changes to sources

There have been no changes to sources that would require in changes to the AQMA boundary.

Several air quality assessments were submitted in support of planning applications and are listed with appropriate link below. None were shown to be significantly detrimental to air quality.

No air quality assessment concluded that there would be a detrimental effect on air quality, due to increased emissions.

Planning application **61804/FUL**, **62832/FUL** and **63229/FUL** were each likely to introduce residents into an area of poor air quality. The applicant in each case has agreed to the mitigation measure of installing forced ventilation to the affected rooms.

61768/FUL for a link road through Etruria Valley is expected to offer mitigation and reduce concentrations of NO_2 in the EU limit value non-compliant area of the A53. Updated modelling will be submitted in the Ministerial Direction Local Plan work that is currently underway.

62102/OUT Residential and commercial development including car park (outline) and demolition of existing building, Land at Pyenest Street, Shelton, Stoke-on-Trent https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68015

61768/FUL Construction of a new highway link road comprising improvements to the Wolstanton roundabouts, construction of a new viaduct over Fowlea Brook and the West Coast Mainline railway, connections between Shelton Boulevard and Newport Lane including replacement bridge over the Trent and Mersey Canal (and new bus gate to south of the bridge), new connection between Shelton Boulevard and Festival Way including new bridge over the Trent and Mersey Canal, off-site improvements (at Grange Lane/Church Lane, Newport Lane and Festival Way/Marina Way/ Ridgehouse Drive), new landscaping and associated works (Cross boundary application) Land to the north of Shelton Boulevard, the south of Newport Lane and

in-between Festival Way and the A500 (Queensway), Stoke-on-Trent https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_67681

61804/FUL Erection of one hundred and twenty-eight dwellings including associated access, parking and landscaping Land between Lichfield Street and Eastwood Road, Hanley, Stoke-on-Trent

The air quality assessment submitted in support of this application concluded that Blocks 2 and 3 may introduce residents into an area of poor air quality. The applicant stated that site constraints would prevent building further from the road, therefore it was agreed that mitigation in the form of forced ventilation would be provided in rooms at or below 4.6 m elevation from the road on Derby or Lichfield Street, and that the air intake would be sited on the furthest façade from the roads.

https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_67717

61884/HYB Hybrid application (part full, part outline): Full application for a four-pump Petrol Filling Station, 'drive-to' pay kiosk including new access, road works and associated landscaping. Outline application for a 'drive-through' restaurant (Use Class A3/A5) Land at junction of Williamson Street and Scotia Road, Tunstall, Stoke-on-Trent, ST6 6AS https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_67797

62252/MAS Erection of dwellings Land adjacent to Bourne Street, Derry Street and Tweed Street, Heron Cross, Stoke-on-Trent https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68165

62288/FUL Erection of employment building (B1(c) B2 or B8 use) with ancillary office area, associated vehicle parking and turning, landscaping, access from Shelton Boulevard and external works Etruria Valley, Shelton Boulevard, Etruria, Stoke-on-Trent, ST1 5GR https://planning.stoke.gov.uk/online-

applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68201

62547/FUL Full permission for development of two warehouse buildings (Use Class B8) with ancillary offices and external works including parking and servicing, boundary treatments including acoustic fence, drainage and hard/soft landscaping. Land at Whittle Road, Meir Park, Stoke-on-Trent, St3 7UN https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68462

62706/FUL Change of use to create 6 residential units 6 Jasper Street, Hanley, Stoke-on-Trent, ST1 3DA https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68621

62832/FUL Change of use to 10 bedroom house of multiple occupation Wagon and Horses, 691 Dividy Road, Bentilee, Stoke-on-Trent, ST2 0AH

The change of use to housing may introduce residents into an area of poor air quality. However, the applicant is required to mitigate in the form of forced ventilation to rooms with a façade on Dividy Road, with the inlet to the ventilation being at the rear of the property. https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68747

62880/OUT Demolition of existing buildings and residential redevelopment (outline) Platinum UK Homes Improvements Ltd, 35 King Street, Stoke-on-Trent, ST4 3LZ https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68795

62889/HYB Hybrid application (part full / part outline): Full application for the erection of 29 dwellings including landscaping, open space and access (including alterations) from New Inn Lane. Outline application for residential development of up to 471 dwellings, primary school, vehicular access from New Inn Lane and Kings Road, associated landscaping, open space and biodiversity enhancements (including woodland, parkland and wetland), associated infrastructure works including off-site

highway improvements at New Inn Lane, Kings Road, and the junctions of Mayne Street, Stone Road and the A500 Hanford Roundabout Land at New Inn Lane, Hanford, Stoke-on-Trent ST4 8EX https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68804

63033/FUL Installation of 'intermittent' kiln including 3m high external kiln stack Churchill China, Marlborough Works, Sandyford, Stoke-on-Trent, ST6 5PB https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_68948

63095/FUL Partial demolition of workshop building and construction of sixty-five apartments with communal facilities, twenty-eight dwellings, ancillary gardens and parking Former Workshops for the Blind, City Road, Fenton, Stoke-on-Trent ST4 2PL https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_69010

63096/FUL Demolition of Local Centre buildings and erection of two three-storey apartment blocks (forty-two units in total) with associated car parking, reconfiguration of car park to provide market facilities including WCs, office space and storage Former Fenton Local Centre and car park, Baker Street, Fenton, Stoke-on-Trent ST4 3AF https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_69011

63224/FUL Construction and operation of a gas powered stand-by electricity generation facility comprising four gas powered generators with 5m high exhaust stacks, containerised switch room, 'DNO' room, welfare, storage and parking facilities, acoustic fencing and gates in lieu of the Diesel 20MW STOR scheme approved under planning permission ref. 58734/FUL Land adjacent to Outclough Farm, Chatterley Whitfield, Stoke-on-Trent, ST6 8UW https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_69139

63229/FUL Change of use to 9 one-bedroomed self-contained flats Victoria Road Methodist Church, Victoria Road, Fenton, Stoke-on-Trent

The change of use to housing may introduce residents into an area of poor air quality. However, there are existing residential properties next to the application site.

The applicant agreed mitigation in the form of forced ventilation to rooms with a façade on Victoria Road, with the inlet to the ventilation being at the rear of the property. https://planning.stoke.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=_STOKE_DCAPR_69144

63621/FUL Demolition of existing buildings and erection of a food store (Use Class A1) with access and associated parking Land at Cobridge Road, Hanley, Stoke-on-Trent https://planning.stoke.gov.uk/online-applications/simpleSearchResults.do?action=firstPage

C2 Monitoring/Modelling conclusions

Monitoring has shown that the UK AQO is exceeded in some areas of the city. The current AQMA covers the whole of the city, therefore modelling and monitoring completed since the last report have not shown a requirement for the AQMA to be amended or revoked.

C3 QA/QC

Automatic monitors

Servicing

The council owned monitors are serviced every six months by a reputable service provider, in accordance with LAQM TG (16) paragraph 7.173.

Calibrations

Calibration of nitrogen dioxide analysers are carried out fortnightly by Stoke-on-Trent City Council personnel in accordance with Defra guidance LAQM TG (16) paragraph 7.171

Data management

Data management was carried by Stoke-on-Trent City Council in accordance with Defra guidance LAQM TG (16) paragraphs 7.174 to 7.178. Data from automatic

monitors was collected daily via modems and stored in a database on a central server using Envitech Europe Ltd Envista ARM software. During Daily Checks, Validation, Rescaling and Ratification procedures, all changes were recorded in a data review log together with comments and justification for any changes made.

Daily Checks

The following checks are carried out:

- Has data been polled since the previous check was carried out?
- Has an LSO calibration or engineer's calibration been completed since the previous check was carried out: if so, invalidate NOx, NO & NO_2 for time period of zero and span.
- TEOM filter change: invalidate PM_{10} data 60 minutes from the start time of the filter change.
- Overnight zero: check that the value is no greater than 4 ppb compared to the previous day.
- Overnight span: NO_2 data should not change by more than 5% from previous day.
- Missing data: attempt a manual poll of data.
- Data Screening: does data follow a typical trend? If it does not, investigate possible reasons why. Decide whether to invalidate data and/or whether a call-out to the service provider is needed.

Quarterly Review

Validation

Data is reviewed quarterly to identify, log and invalidate anomalous data. Suspected anomalous data is compared to data from other monitors in the city, including the AURN Stoke-on-Trent Centre and AURN Stoke-on-Trent A50 Roadside sites. Anomalous data is invalidated and the reason is recorded in the Validation Log.

Rescaling

LSO calibration data is compared to the cylinder specification to obtain a span correction factor. Correction for zero drift is also carried out. All factors that are applied are recorded with the data set that they are applied to.

Rescaling factors are calculated in the following way:

Worked example:

NOx

LSO calibration zero response: 3ppb

Cylinder specified concentration: 451 ppb

LSO span response: 447 ppb

Scaling factor (F) = Cylinder concentration

(span-zero)

Scaling factor (F) = 451 = 1.0577

(447- 3)

Raw ambient data recorded = 71 ppb

Subtract zero (3ppb) = 68 ppb

Multiply by scaling factor (1.0577) = 71.92 ppb

NO

LSO calibration zero response: 2ppb

Cylinder specified concentration: 450 ppb

LSO span response: 448 ppb

Scaling factor (F) = Cylinder concentration

(span-zero)

Scaling factor (F) = 450 = 1.0090

(448- 2)

Raw ambient data recorded = 59 ppb

Subtract zero (2ppb) = 57 ppb

Multiply by scaling factor (1.0577) = 57.51 ppb

NO_2

NO_2 = rescaled NOx – rescaled NO

NO_2 = 71.92 ppb – 57.51 ppb = 14.41 ppb

Conversion factor for NO_2 ppb to µg/m³ = 1.91

NO_2 = 14.41 x 1.91 = 27.5 µg/m³

Ratification

Rescaled data is again reviewed. Any remaining anomalous data is removed. The data is finalised and no further changes are made.

Diffusion tubes

The 2018 national bias adjustment factor for Staffordshire Scientific Services of 0.87 was applied to diffusion tubes. This factor was considered to represent monitoring locations in the city and be consistent with previous reporting. There is good data capture and good laboratory precision. Bias correction factor details are shown in Table C 1 below. The laboratory precision is shown in Table C 2

Annualisation was not required at any monitoring site as data capture was not less than 75%.

Where diffusion tubes were located closer to the road than the nearest property, distance correction has been applied. The calculations are shown in Table C 3.

Table C 1 - Bias Adjustment for Staffordshire Scientific Services

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/19

Follow the steps below in the correct order to show the results of relevant co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2019

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

Step 2: Select a Preparation Method from the Drop-Down List

Step 3: Select a Year from the Drop-Down List

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Staffordshire Scientific Services	20% TEA in water	2018	UC	Manchester City Council	12	37	35	5.0%	G	0.95
Staffordshire Scientific Services	20% TEA in water	2018	KS	Manchester City Council	12	61	62	-2.3%	G	1.02
Staffordshire Scientific Services	20% TEA in water	2018	SI	Manchester City Council	12	23	24	-4.7%	G	1.05
Staffordshire Scientific Services	20% TEA in water	2018	R	Bury Council	12	30	25	19.0%	G	0.84
Staffordshire Scientific Services	20% TEA in water	2018	KS	Marylebone Road Intercomparison	12	84	85	-0.7%	G	1.01
Staffordshire Scientific Services	20% TEA in water	2018	R	Salford City Council	11	44	40	10.5%	G	0.91
Staffordshire Scientific Services	20% TEA in water	2018	B	Salford City Council	9	18	14	24.6%	G	0.80
Staffordshire Scientific Services	20% TEA in water	2018	UB	Salford City Council	12	30	25	18.0%	G	0.85
Staffordshire Scientific Services	20% TEA in water	2018	R	stockport	12	43	37	15.6%	G	0.87
Staffordshire Scientific Services	20% TEA in water	2018	KS	Oldham Council	12	36	29	23.5%	G	0.81
Staffordshire Scientific Services	20% TEA in water	2018	R	Stoke-on-Trent City Council	10	57	56	2.7%	G	0.97
Staffordshire Scientific Services	20% TEA in water	2018	UB	Stoke-on-Trent City Council	11	26	23	13.1%	G	0.84
Staffordshire Scientific Services	20% TEA in water	2018	UB	Wigan Council	10	26	16	61.3%	G	0.62
Staffordshire Scientific Services	20% TEA in water	2018		Overall Factor[3] (13 studies)				Use		0.87

For Casella Stanger/Bureau Veritas/NPL/Bureau Veritas Labs/Low Grades 90% TEA in Acetone

For Casella Beal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins/ use Environmental Scientific Groups

From 2011 for Environmental Scientific Groups use ESG Glasgow

From 2011 for Harwell Scientific Services use ESG Didcot

For 2017 for SOCOTEC use ESG Didcot, as name changed mid year.

For 2018 SOCOTEC entered as Didcot and Glasgow. Glasgow analytic lab moved to Didcot mid 2018.

For Staffordshire CC SS/Staffordshire County Analyst use Staffordshire Scientific Services

For Bodycote Health Sciences and Clyde Analytical Laboratories use Exova.

For Rotherham MBC use South Yorkshire Labs.

For Dundee CC use Tayside SS.

For Leicester Scientific Services use Staffordshire Scientific Services.

For South Yorkshire Air Quality Samplers use South Yorkshire Labs. As of January 2010 sampler body changed. As of April 2010 sampler cap changed.

Table C 2 – Laboratory precision

Table 1: Laboratory summary performance for AIR NO_2 PT rounds AR0019, 21, 22, 24, 25, 27, 28 and 30

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

AIR PT Round	AIR PT AR019	AIR PT AR021	AIR PT AR022	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030
Round conducted in the period	April – May 2017	July – August 2017	September – October 2017	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	50 %	0 %	100 %	100 %	100 %	50 %	100 %	100 %
Gradko International [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 %	100 %	100 %	75 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [2]	NR [2]	100 %	NR [2]	NR [2]	NR [2]	25 %	50 %
Milton Keynes Council	75 %	0 %	75 %	100 %	75 %	100 %	100 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	75 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	50 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %
West Yorkshire Analytical Services	100 %	100 %	100 %	50 %	75 %	100 %	100 %	100 %

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.
[2] NR No results reported
[3] Northampton Borough Council, Kent Scientific Services, Cardiff Scientific Services, Kirklees MBC and Exova (formerly Clyde Analytical) no longer carry out NO2 diffusion tube monitoring and therefore did not submit results.

NO2 PT Summary – AIR PT Rounds AR019, 21, 22, 24, 25, 27, 28 and 30 Page 5 of 5

Table C 3 - Distance Correction Calculations

Enter data into the pink cells

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
CM1	9.6	4.9	17.3	23.0	24.4	
CM2	4.6	5.0	17.3	33.0	32.6	
CM5	4.5	9.6	17.3	55.0	**46.7**	Predicted concentration at Receptor above AQS objective.
CM6	3.3	14.3	17.3	53.0	*39.1*	Predicted concentration at Receptor within 10% the AQS objective.
DT2	2.0	2.1	17.3	39.1	*38.9*	Predicted concentration at Receptor within 10% the AQS objective.
DT4	5.0	6.0	17.3	31.9	31.1	

DT8	9.6	4.9	17.3	24.6	26.4	
DT17	1.8	2.6	17.3	72.5	**67.9**	Predicted concentration at Receptor above AQS objective.
DT32	3.2	6.0	17.3	34.4	31.6	
DT51	15.0	17.3	17.3	38.8	*37.4*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
DT52	2.6	4.5	17.3	47.9	**43.7**	Predicted concentration at Receptor above AQS objective.
DT56	4.5	9.6	17.3	49.5	**42.4**	Predicted concentration at Receptor above AQS objective.
DT64	1.6	2.6	17.3	36.5	34.4	

DT67	2.1	4.2	17.3	48.6	**43.5**	Predicted concentration at Receptor above AQS objective.
DT72	2.4	4.4	17.3	35.0	32.4	
DT74	1.9	3.5	17.3	43.6	*39.9*	Predicted concentration at Receptor within 10% the AQS objective.
DT75	2.8	9.7	17.3	37.6	31.2	
DT76	1.7	2.6	17.3	36.9	35.0	
DT77	1.9	6.3	17.3	47.7	*39.3*	Predicted concentration at Receptor within 10% the AQS objective.
DT81	2.0	3.9	17.3	34.0	31.4	
DT83	1.9	4.0	17.3	36.6	33.3	

DT84	3.1	3.6	17.3	36.4	35.7	
DT88	1.5	3.4	17.3	30.4	28.0	
DT89	1.8	12.4	17.3	36.9	28.3	
DT91	2.5	4.9	17.3	43.4	*39.1*	Predicted concentration at Receptor within 10% the AQS objective.
DT93	3.0	5.3	17.3	29.6	27.8	
DT94	1.8	2.7	17.3	31.3	30.0	
DT95	2.5	4.7	17.3	30.7	28.6	
DT96	2.0	3.7	17.3	29.3	27.6	

	DT98	2.4	4.6	17.3	27.1	25.5	

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D. 1 – All NO_2 monitoring

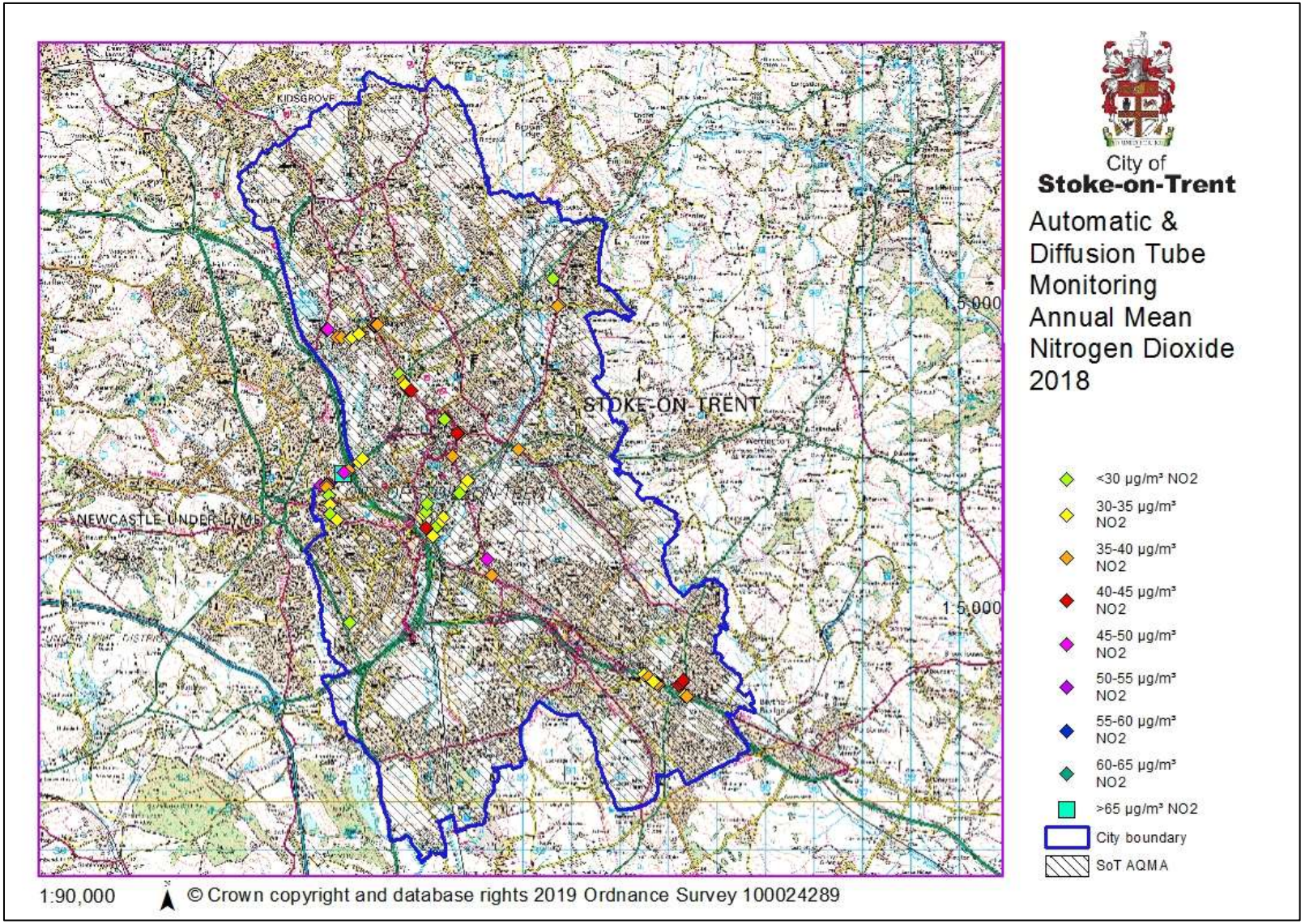


Figure D. 2 – Background NO_2 monitoring

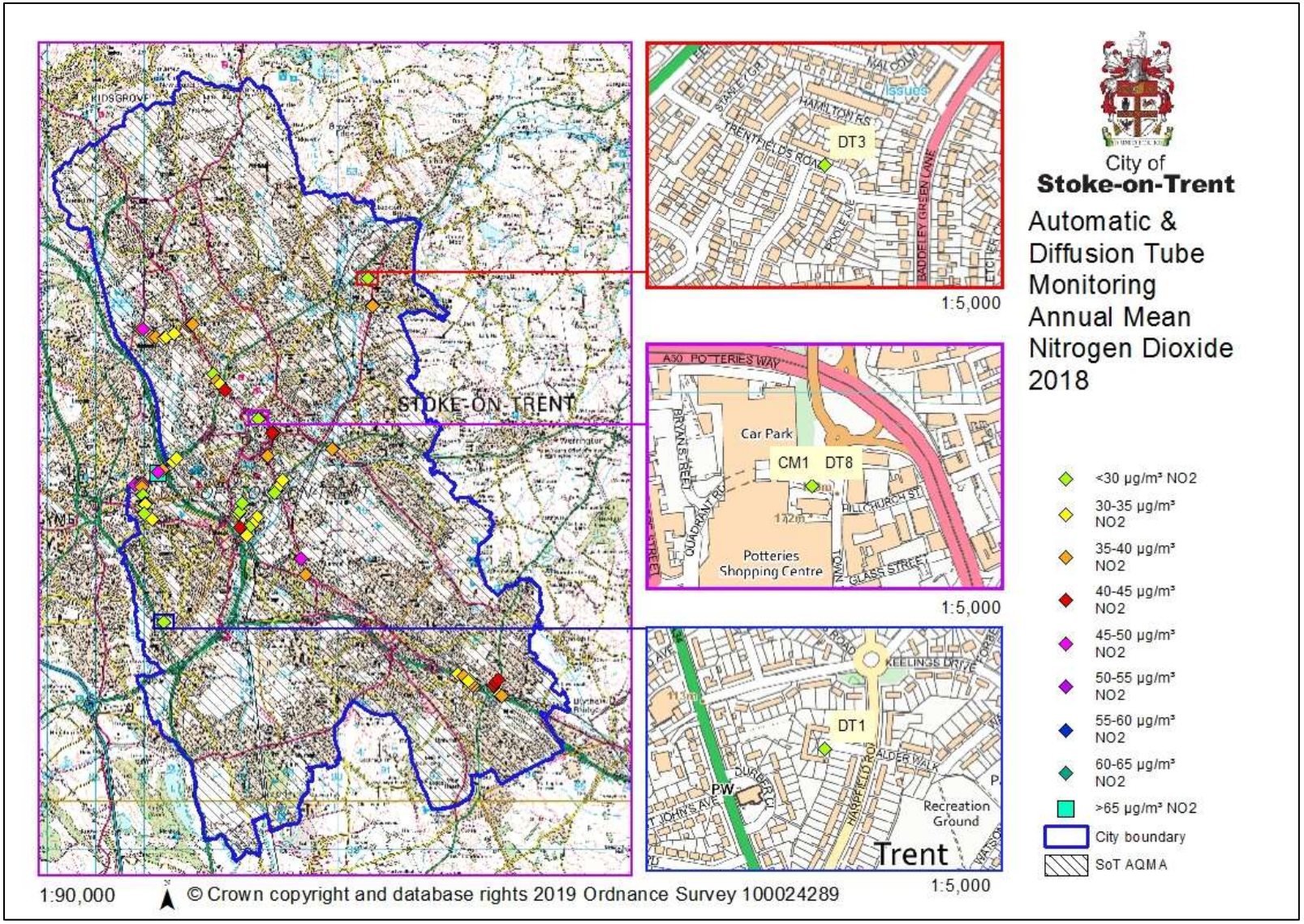


Figure D. 3 – Milton NO_2 monitoring

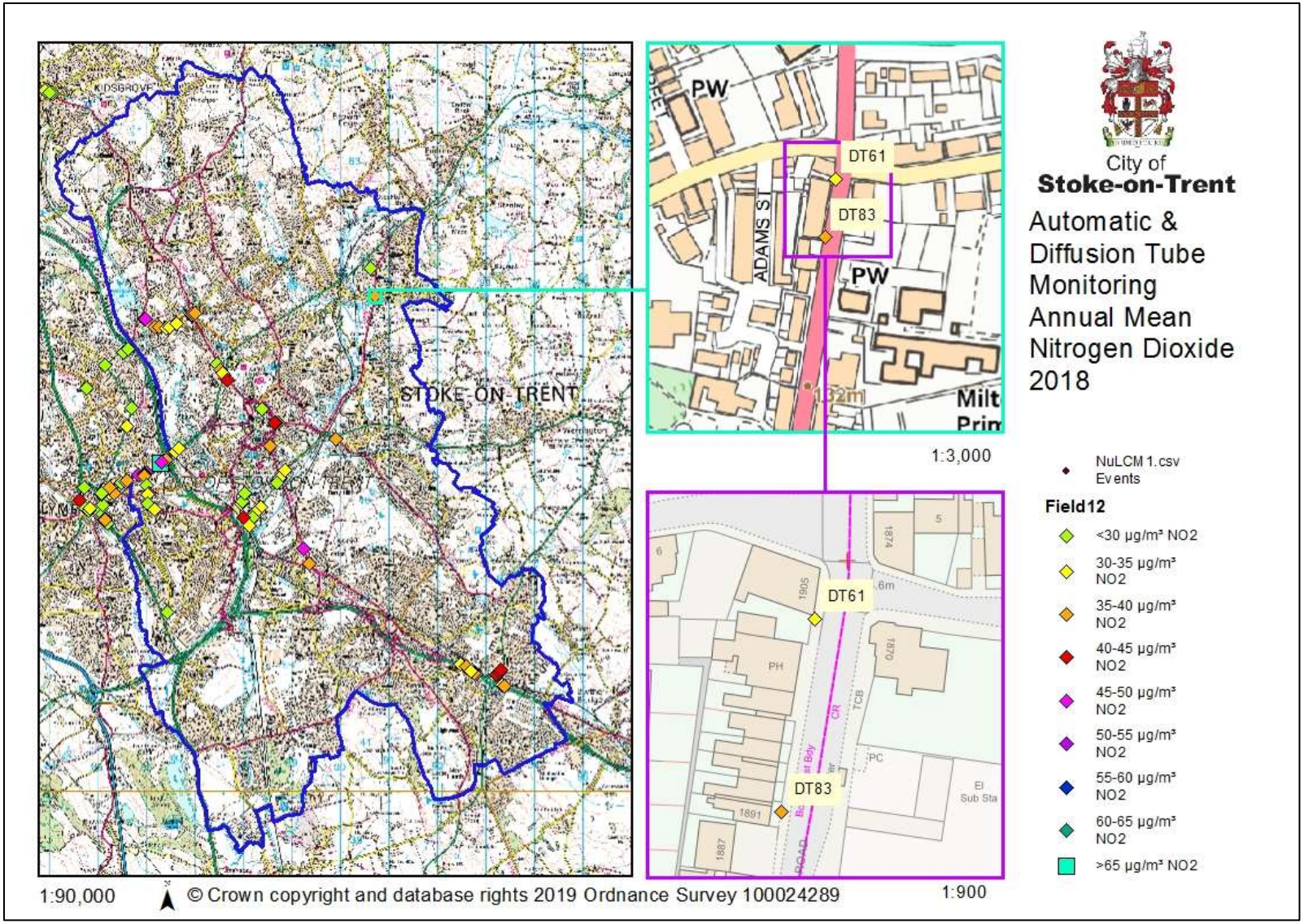


Figure D. 4 – NO_2 Newcastle Street 1 monitoring

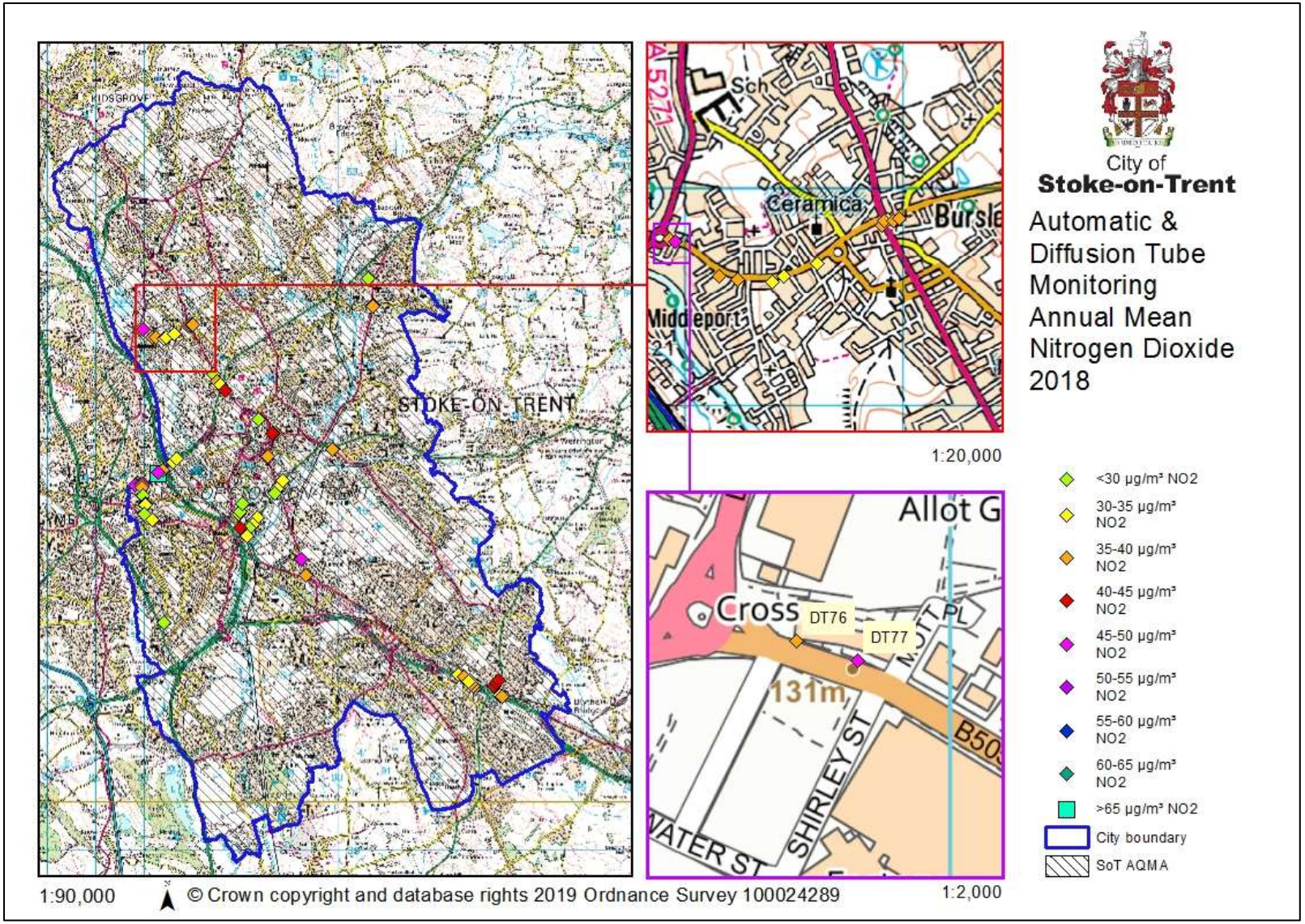


Figure D. 5 – Newcastle Street 2 NO_2 monitoring

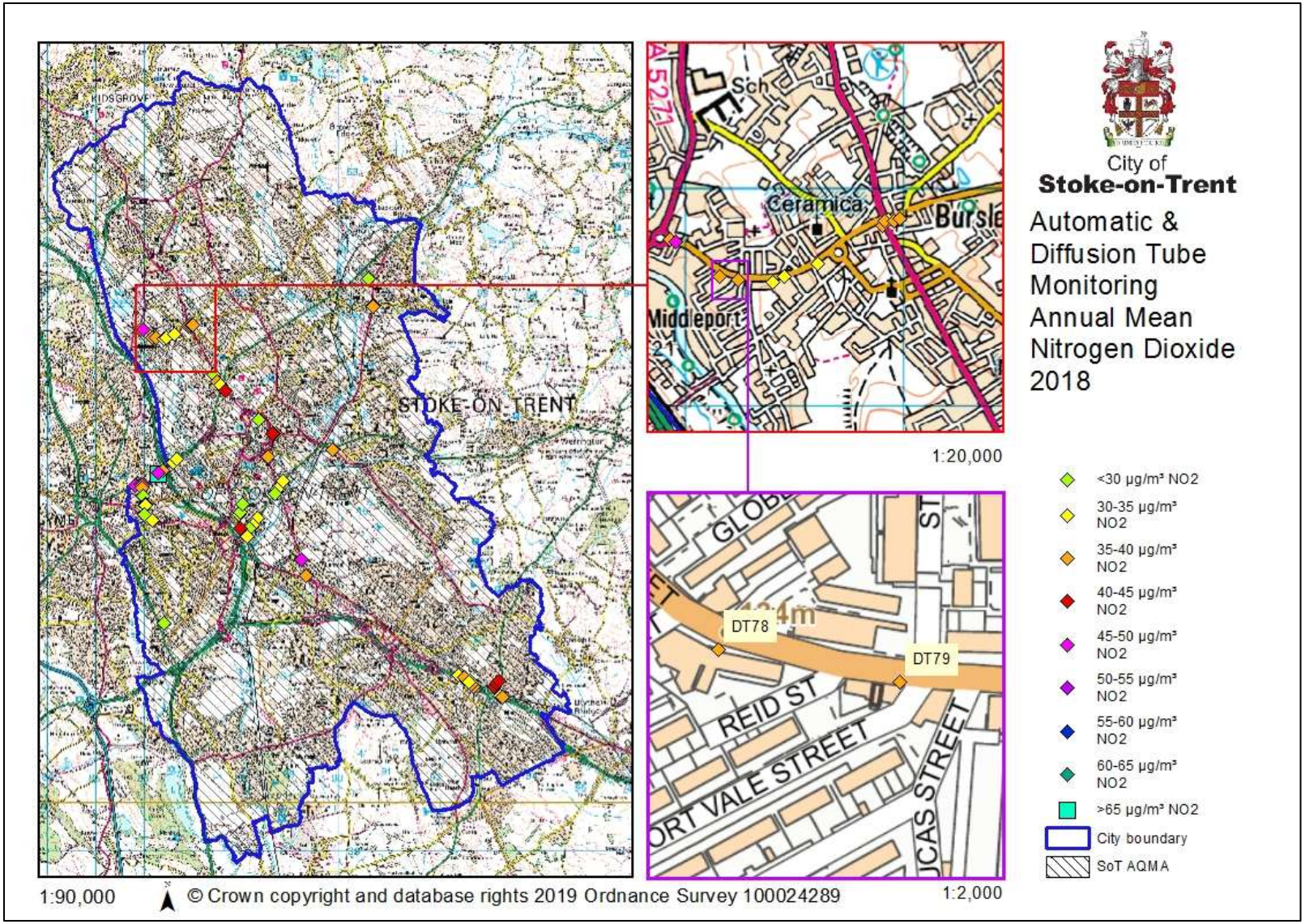


Figure D. 6 Newcastle Street 3 NO_2 monitoring

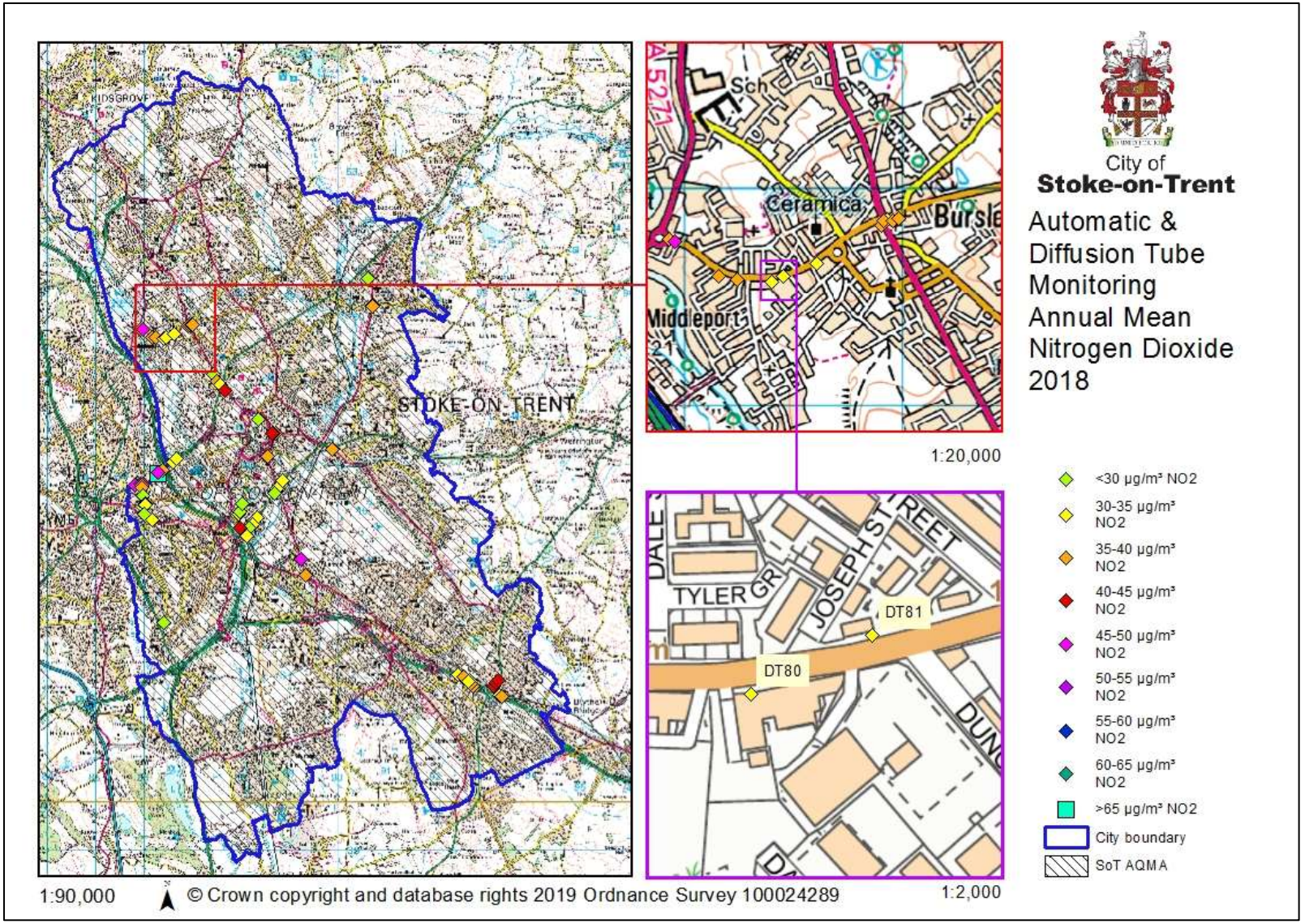


Figure D. 7 Newcastle Street 4 NO_2 monitoring

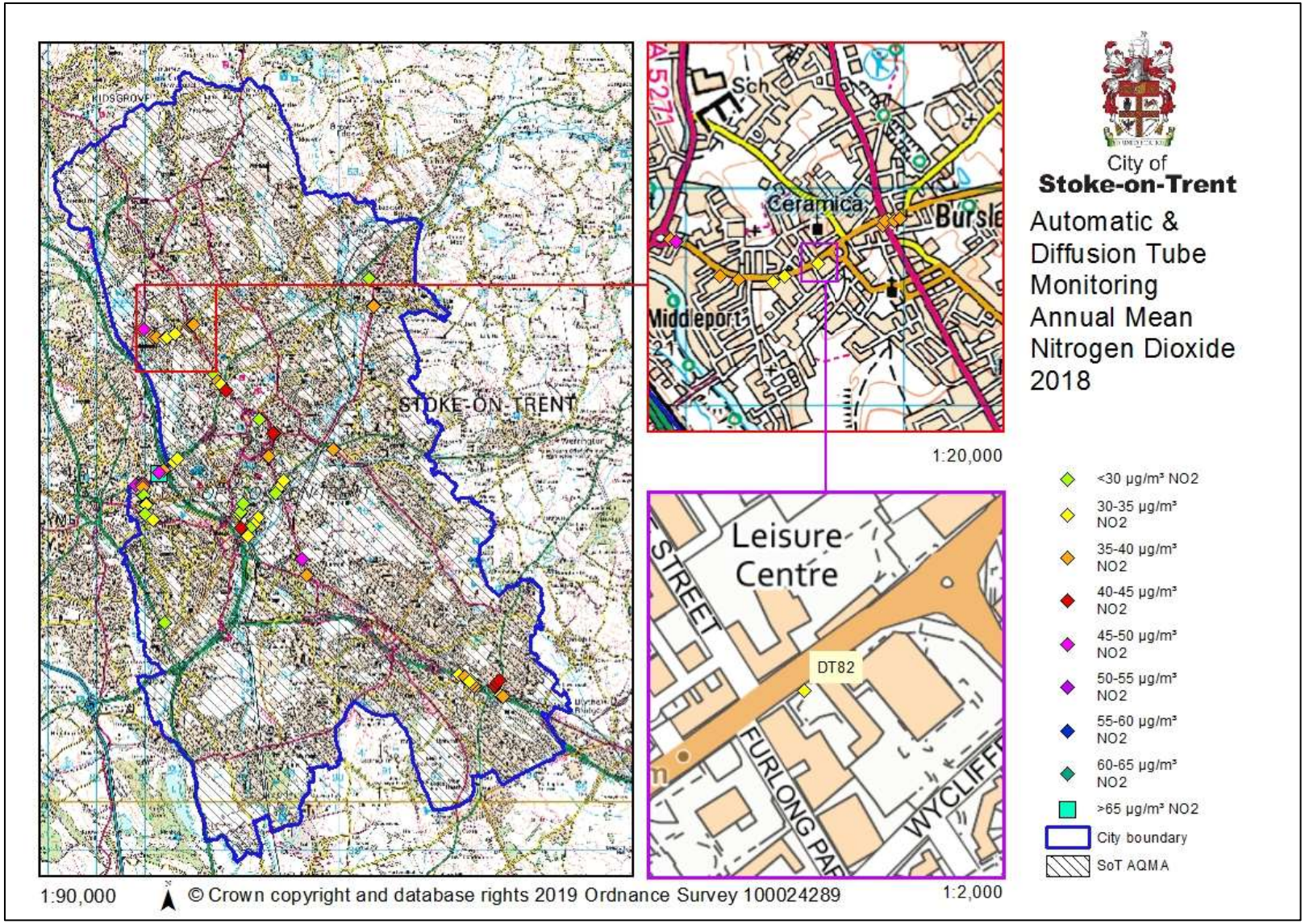


Figure D. 8 Burslem Centre NO_2 monitoring

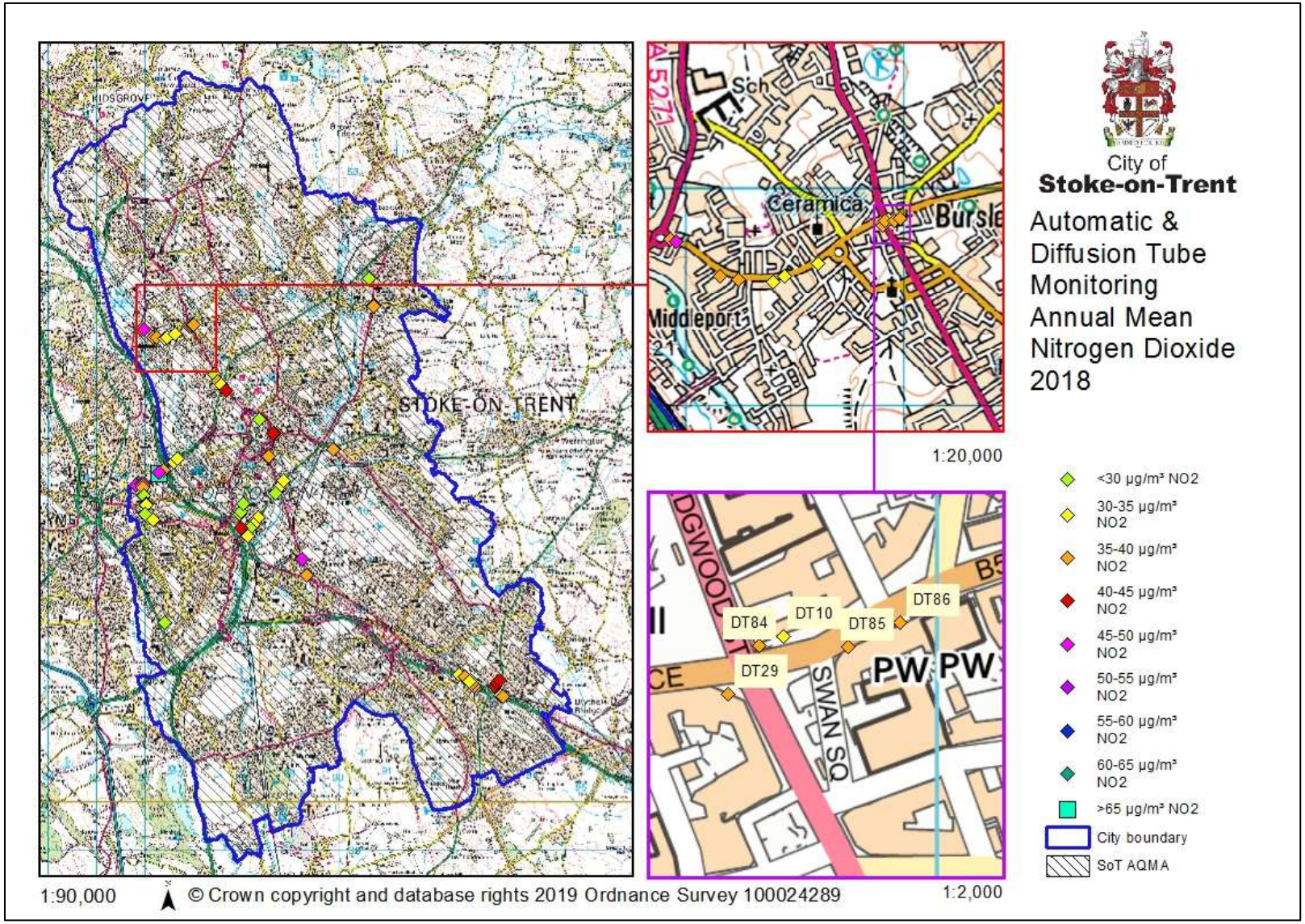


Figure D. 9 Cobridge 1 NO_2 monitoring

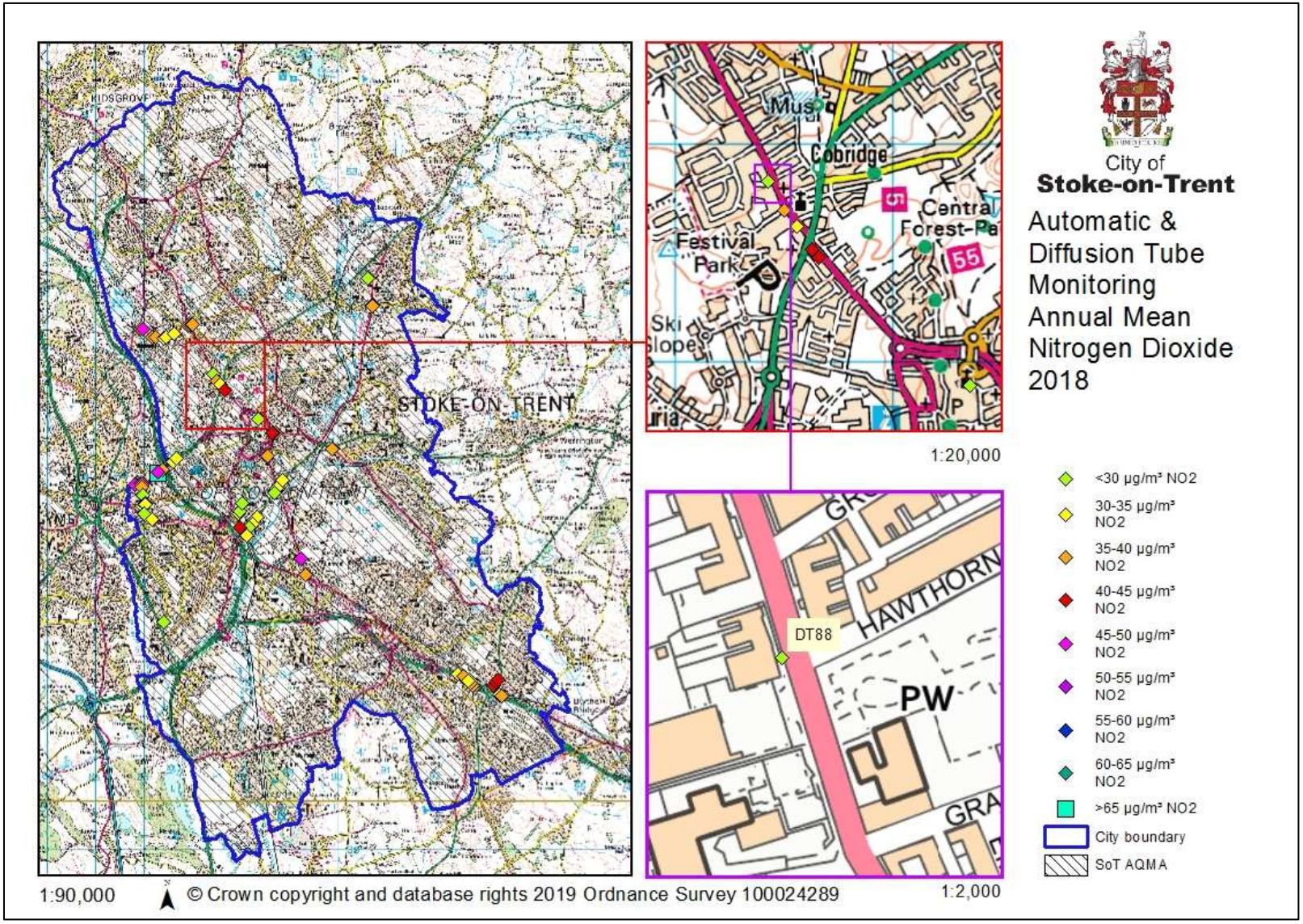


Figure D. 10 Cobridge 2 NO_2 monitoring

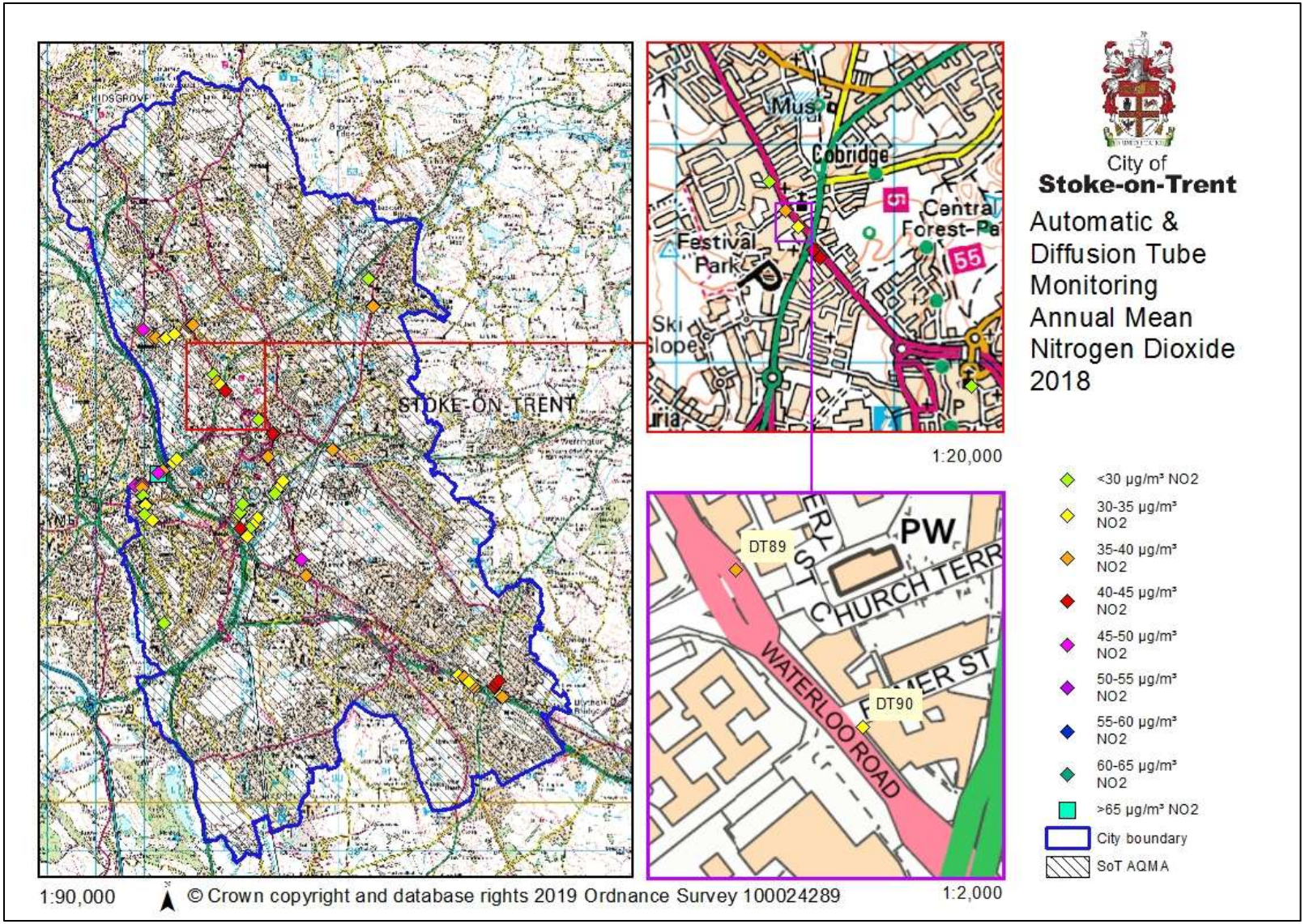


Figure D. 11 Cobridge 3 NO_2 monitoring

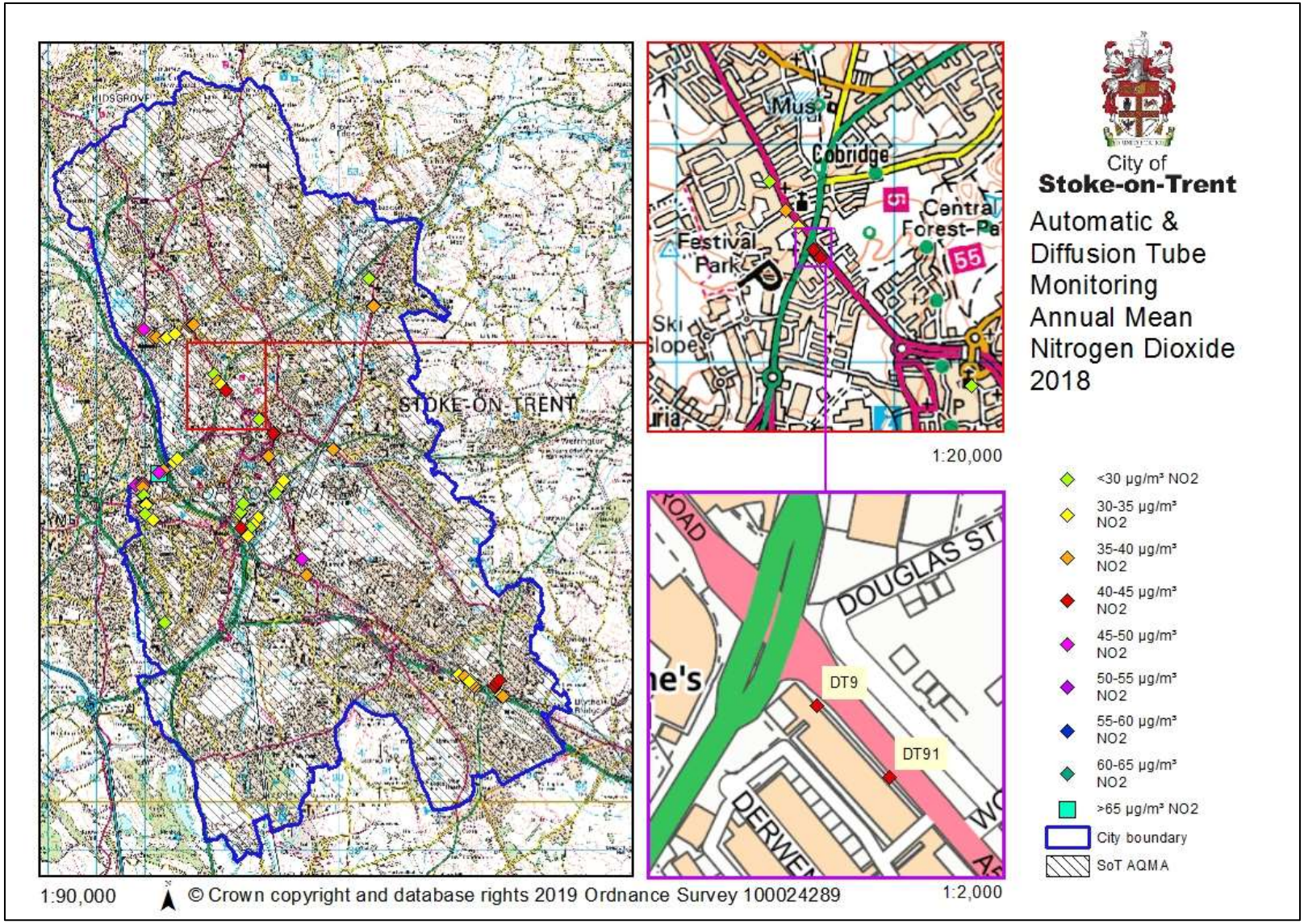


Figure D. 12 Hanley 1 NO_2 monitoring

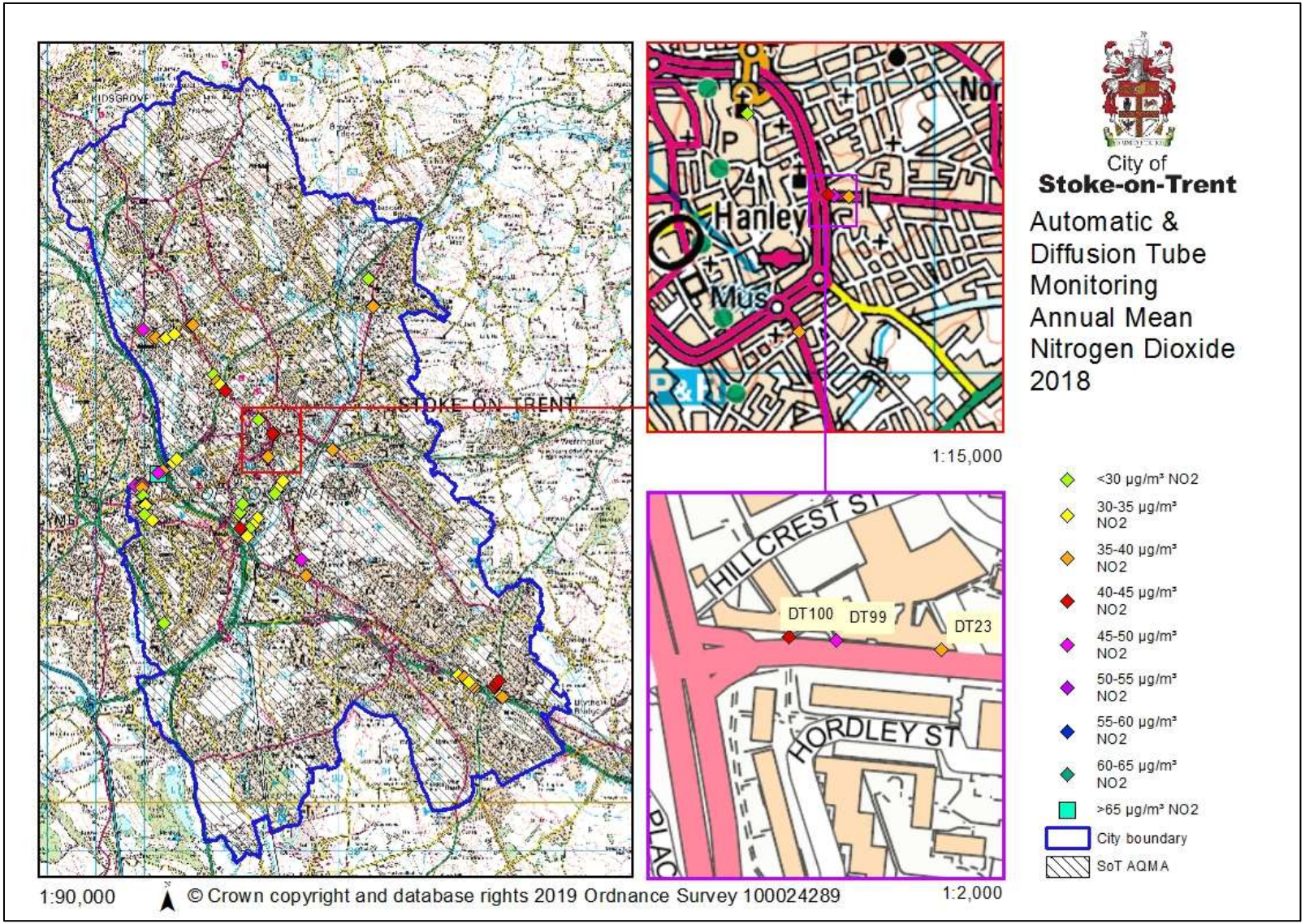


Figure D. 13 Hanley 2 NO_2 monitoring

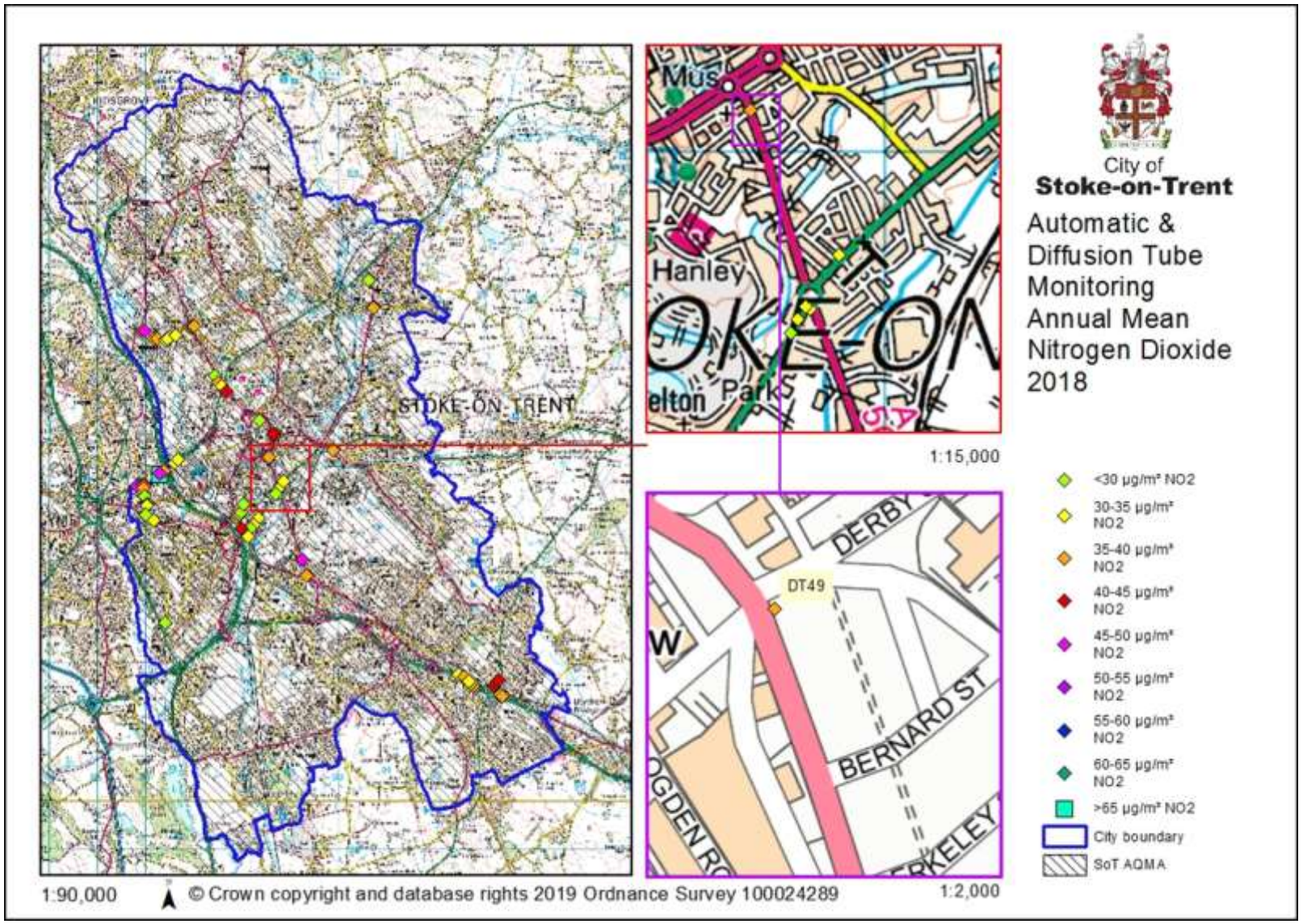


Figure D. 14 Bucknall NO_2 monitoring

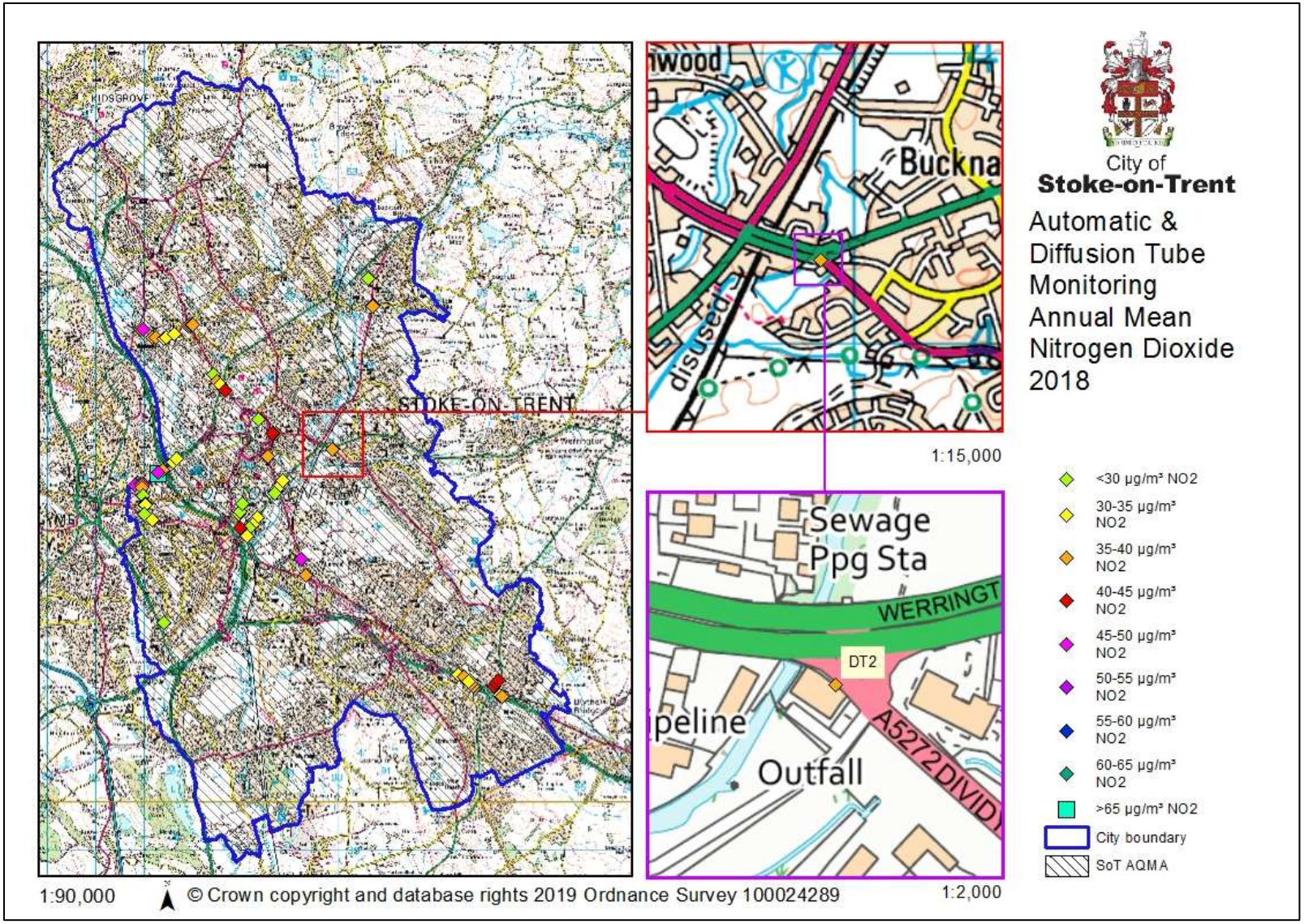


Figure D. 15 Leek Road/Victoria Road NO_2 monitoring

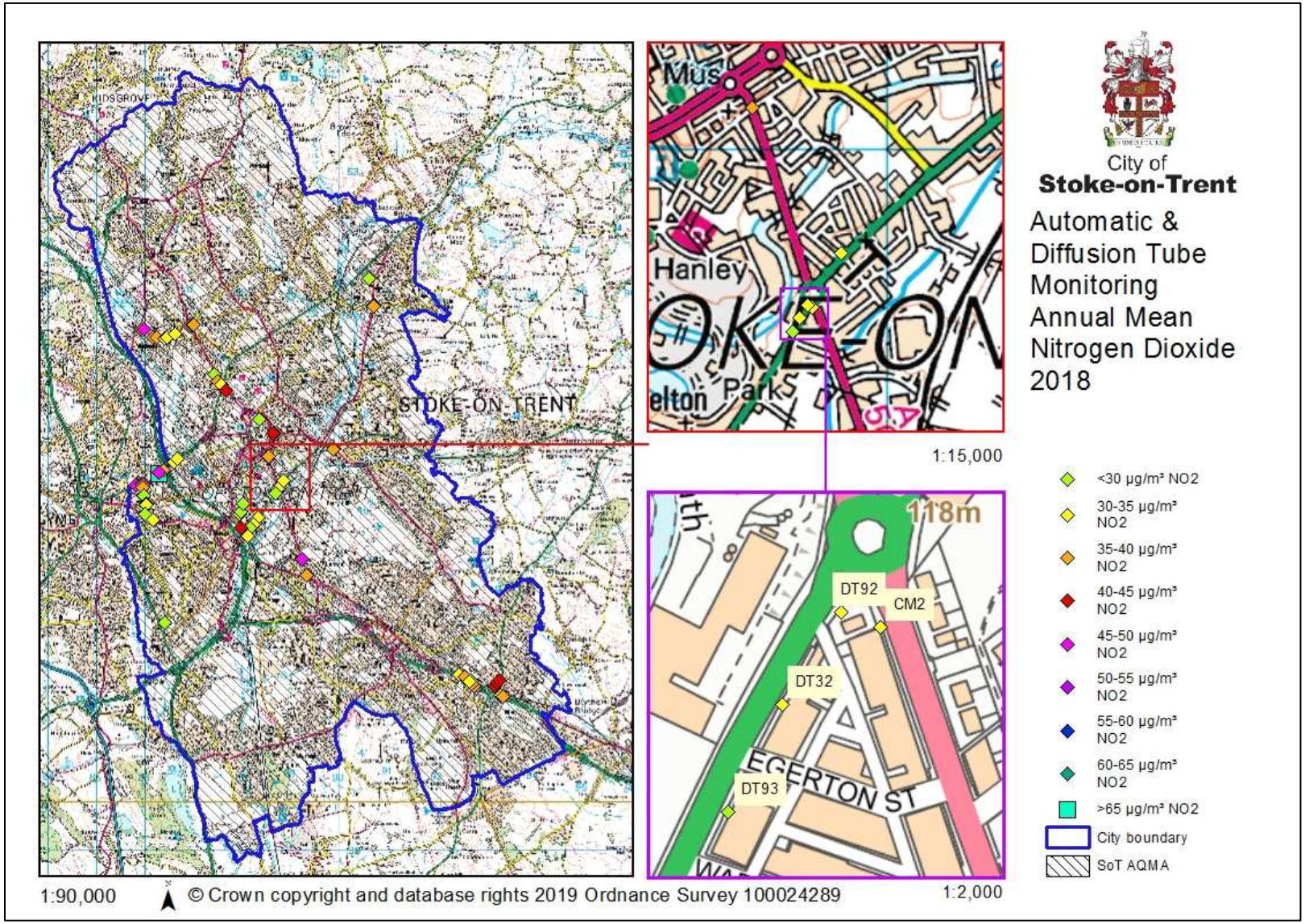
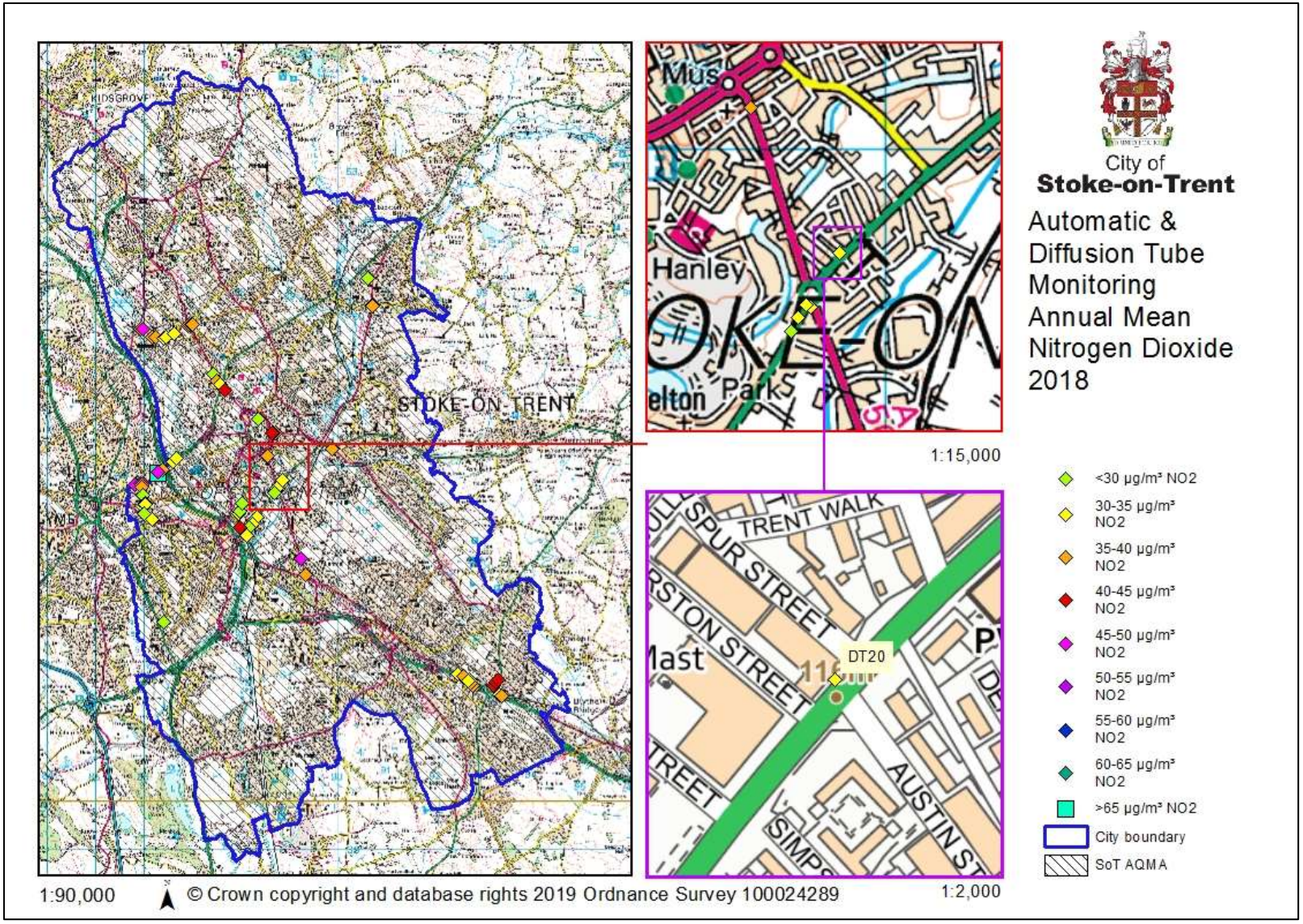


Figure D. 16 Leek Road 2 NO_2 monitoring



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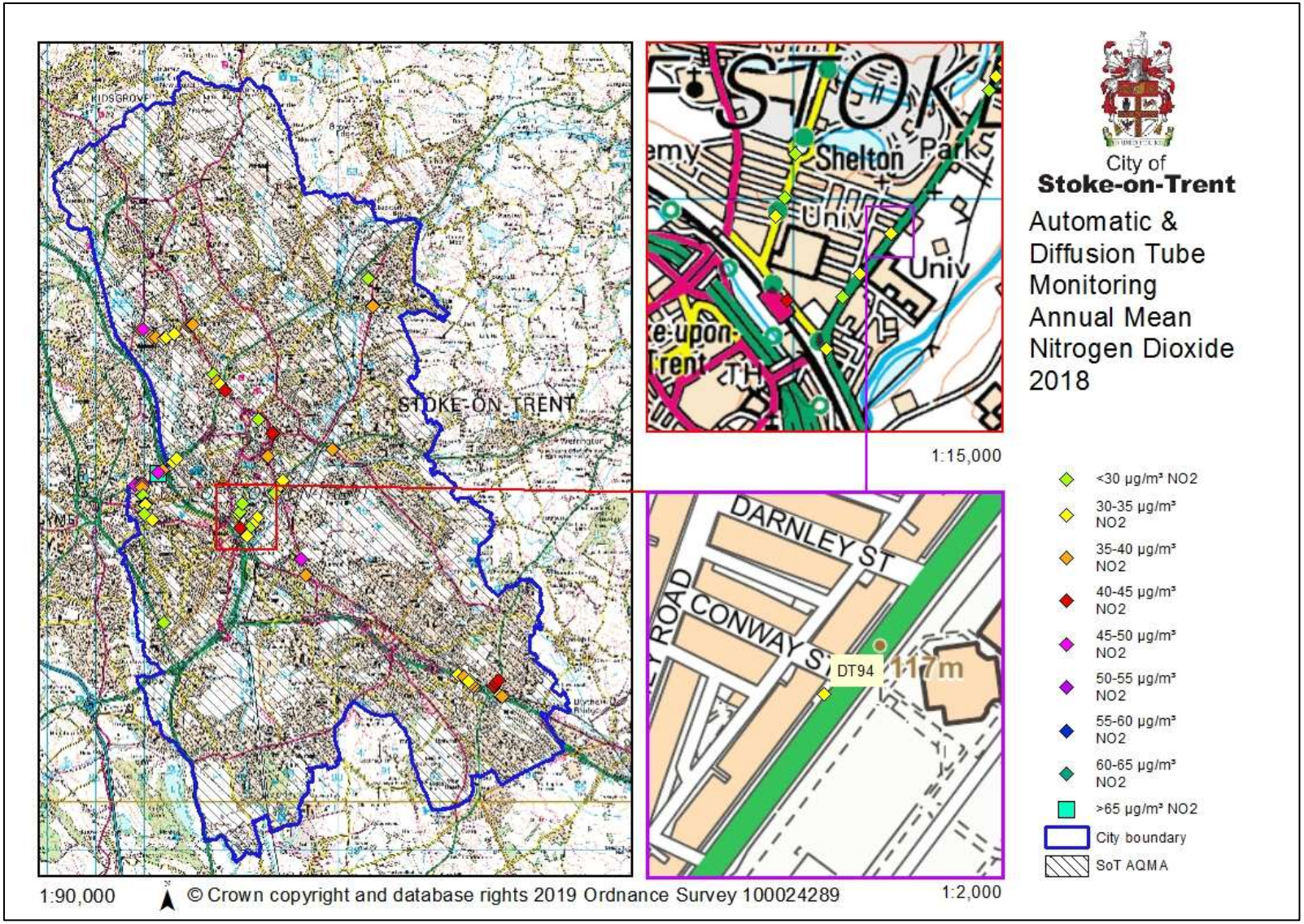


Figure D. 18 Leek Road 4 NO_2 monitoring

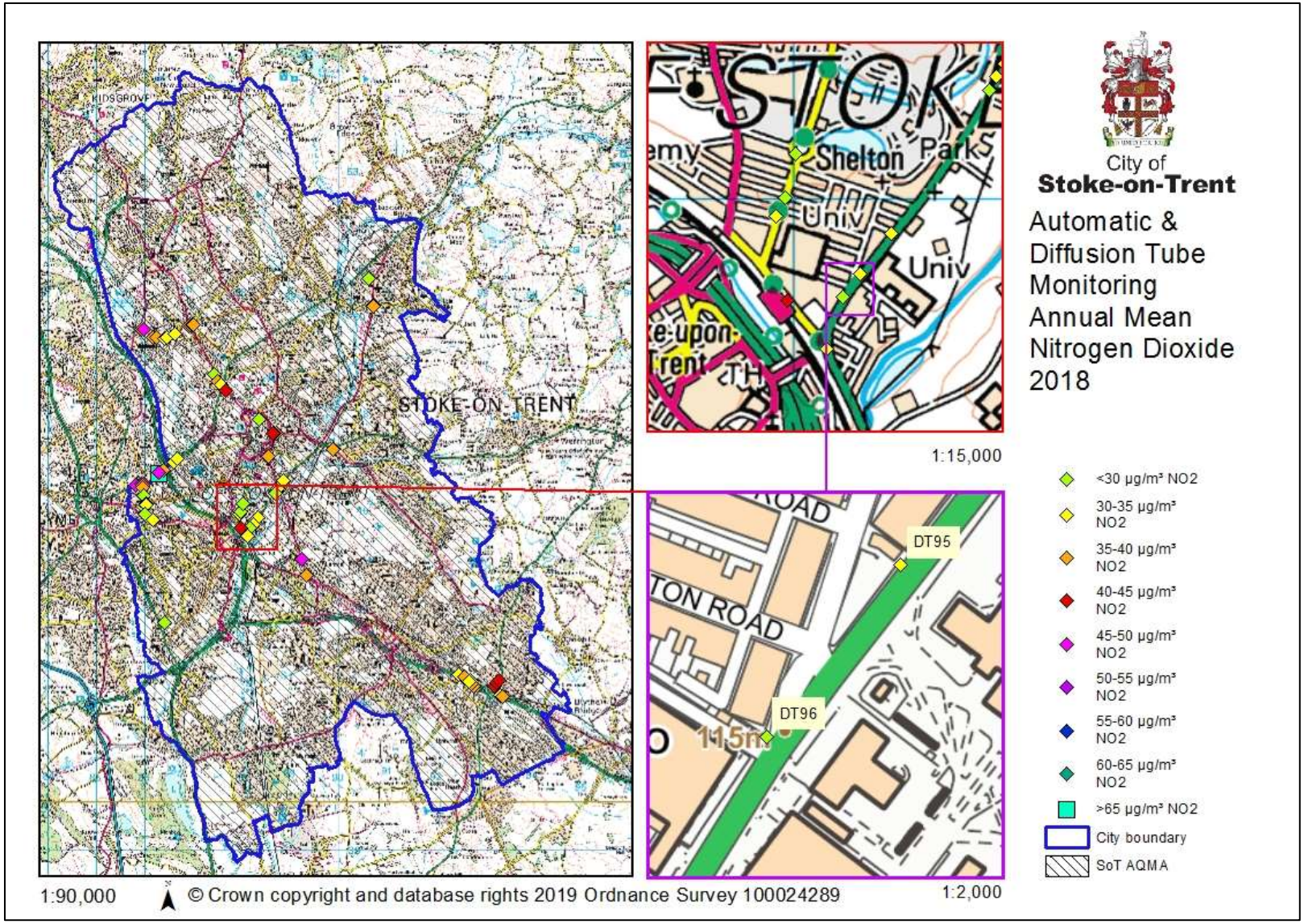


Figure D. 19 Leek Road Sixth Form College NO_2 monitoring

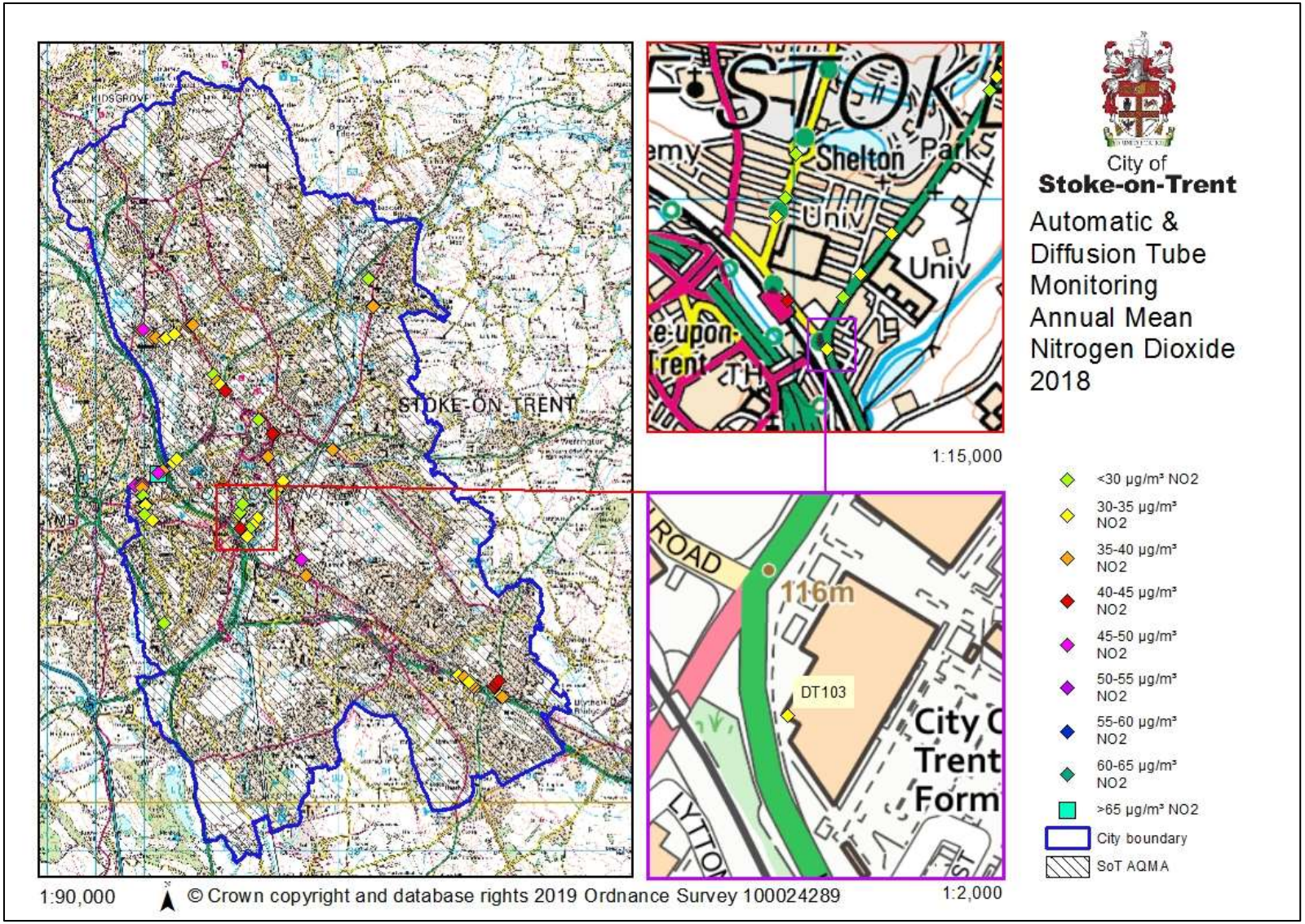


Figure D. 20 Station Road NO_2 monitoring

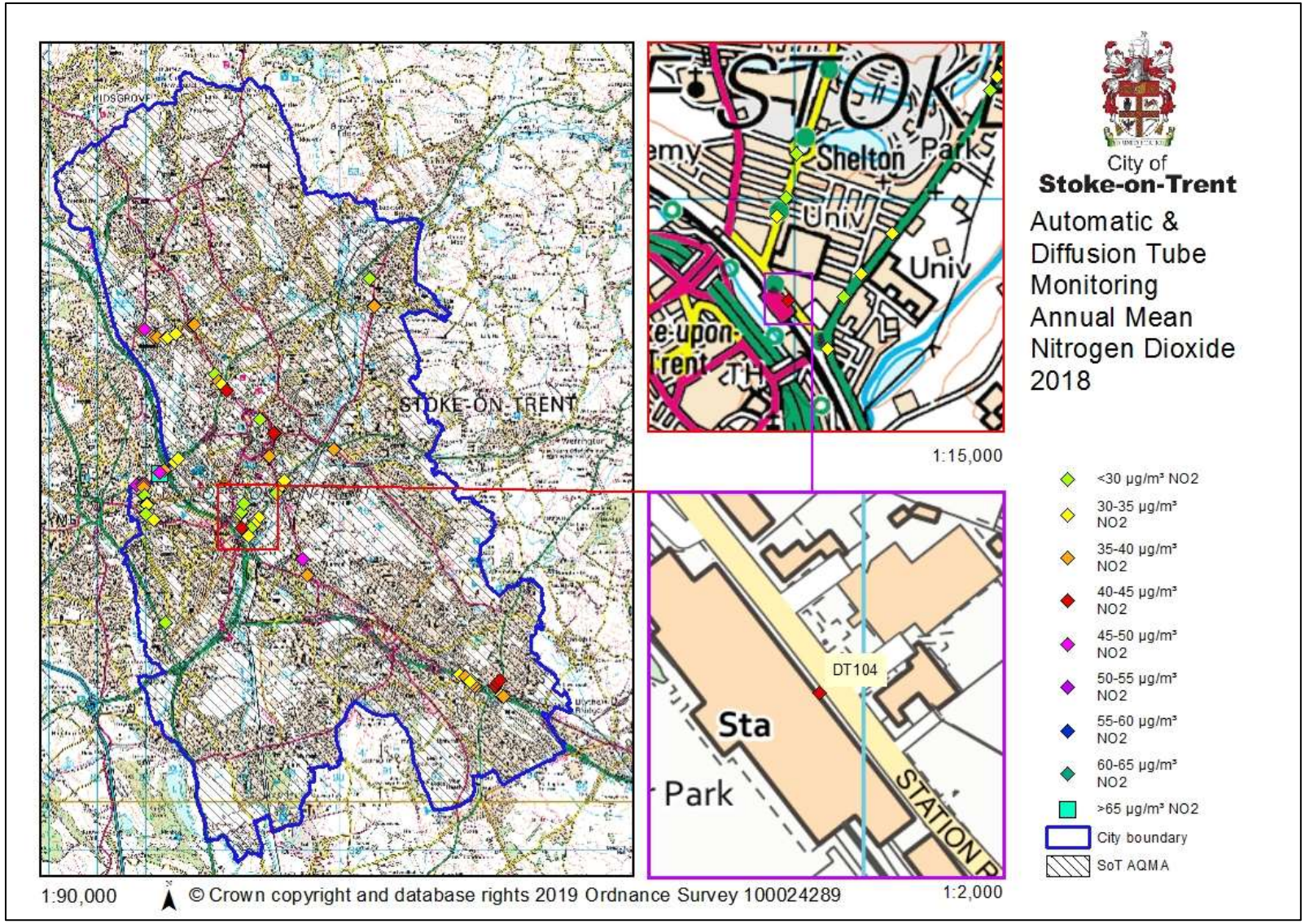


Figure D. 21 College Road 1 NO_2 monitoring

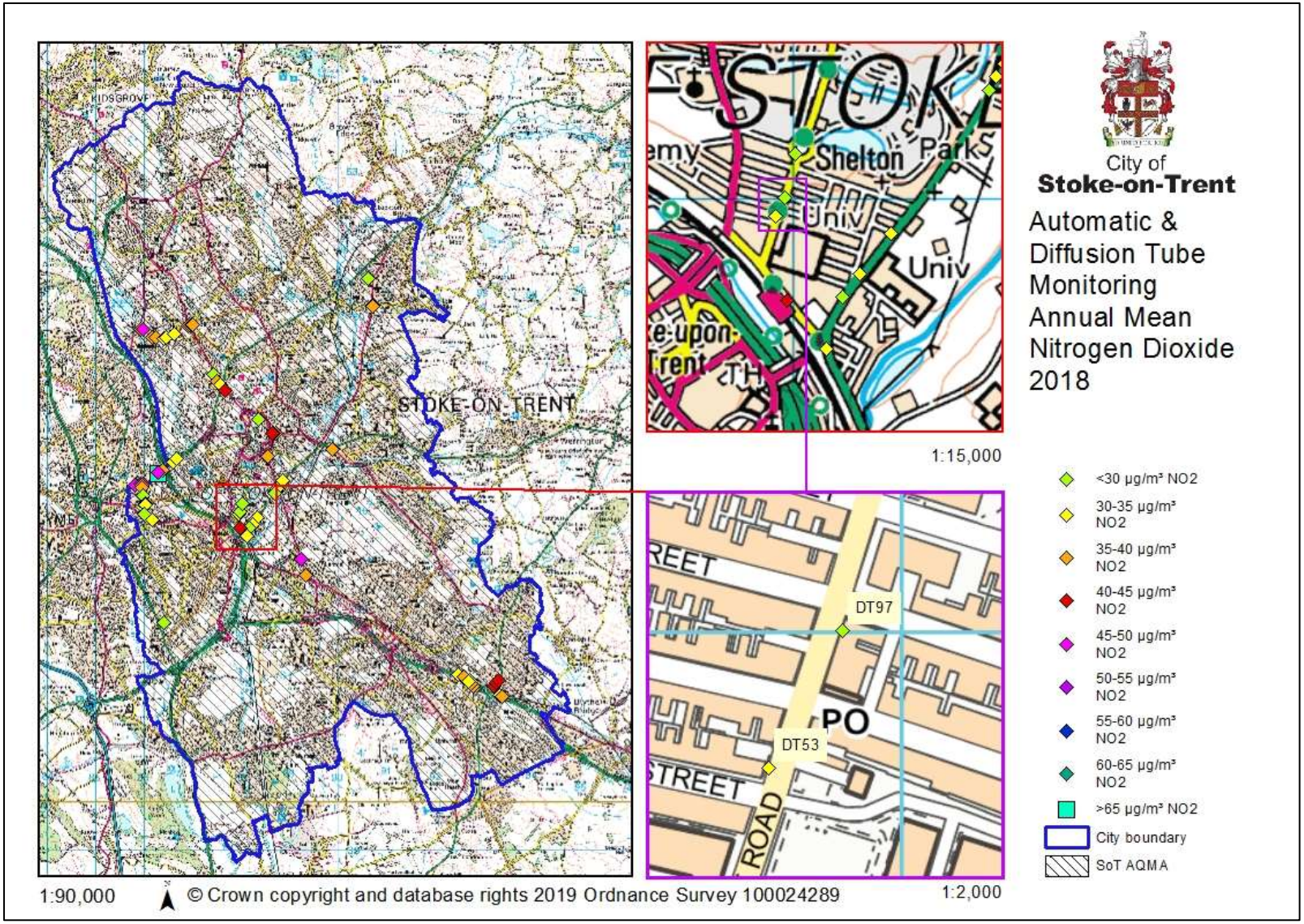


Figure D. 22 College Road 2 NO_2 monitoring

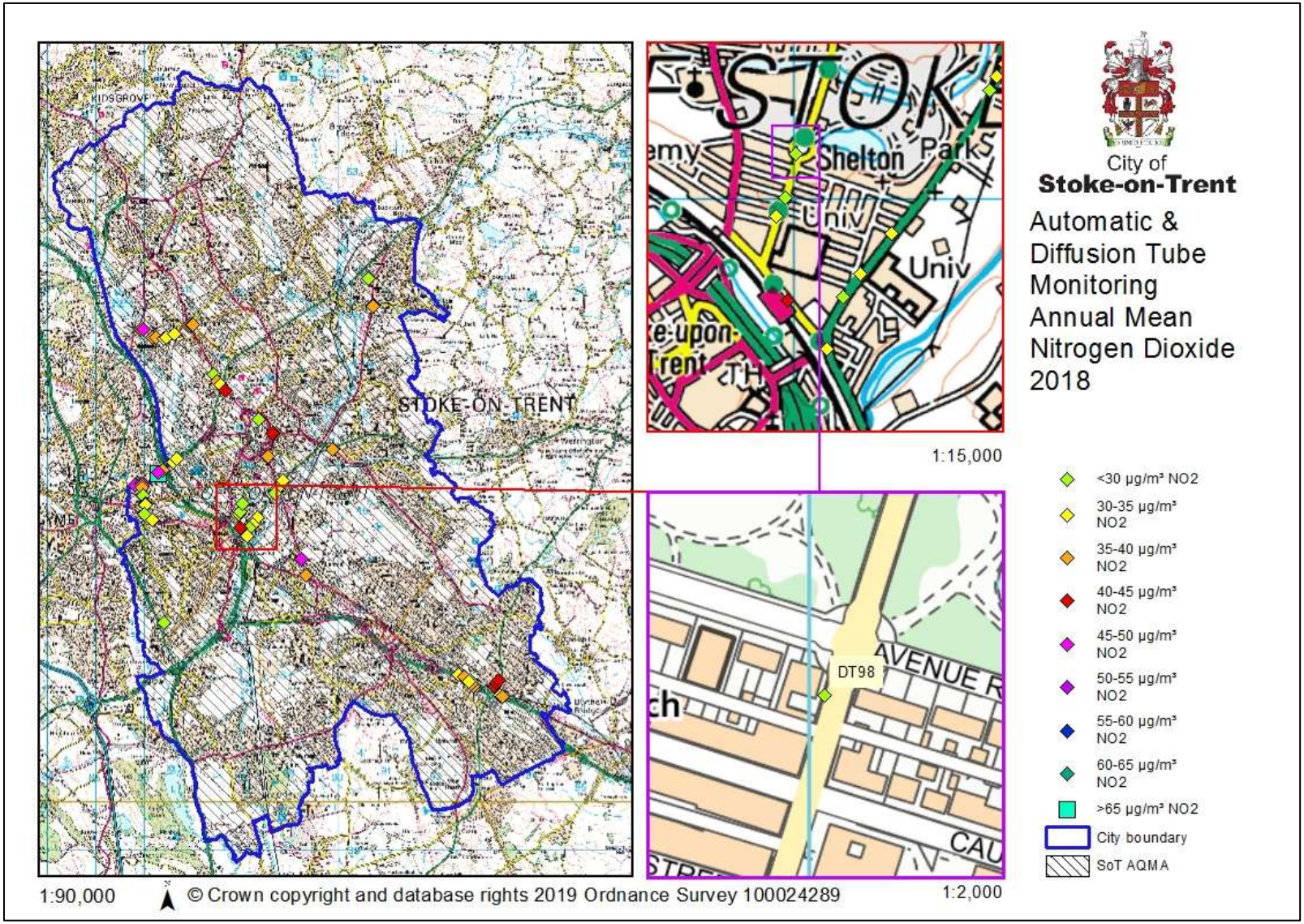


Figure D. 23 A53 East NO_2 monitoring

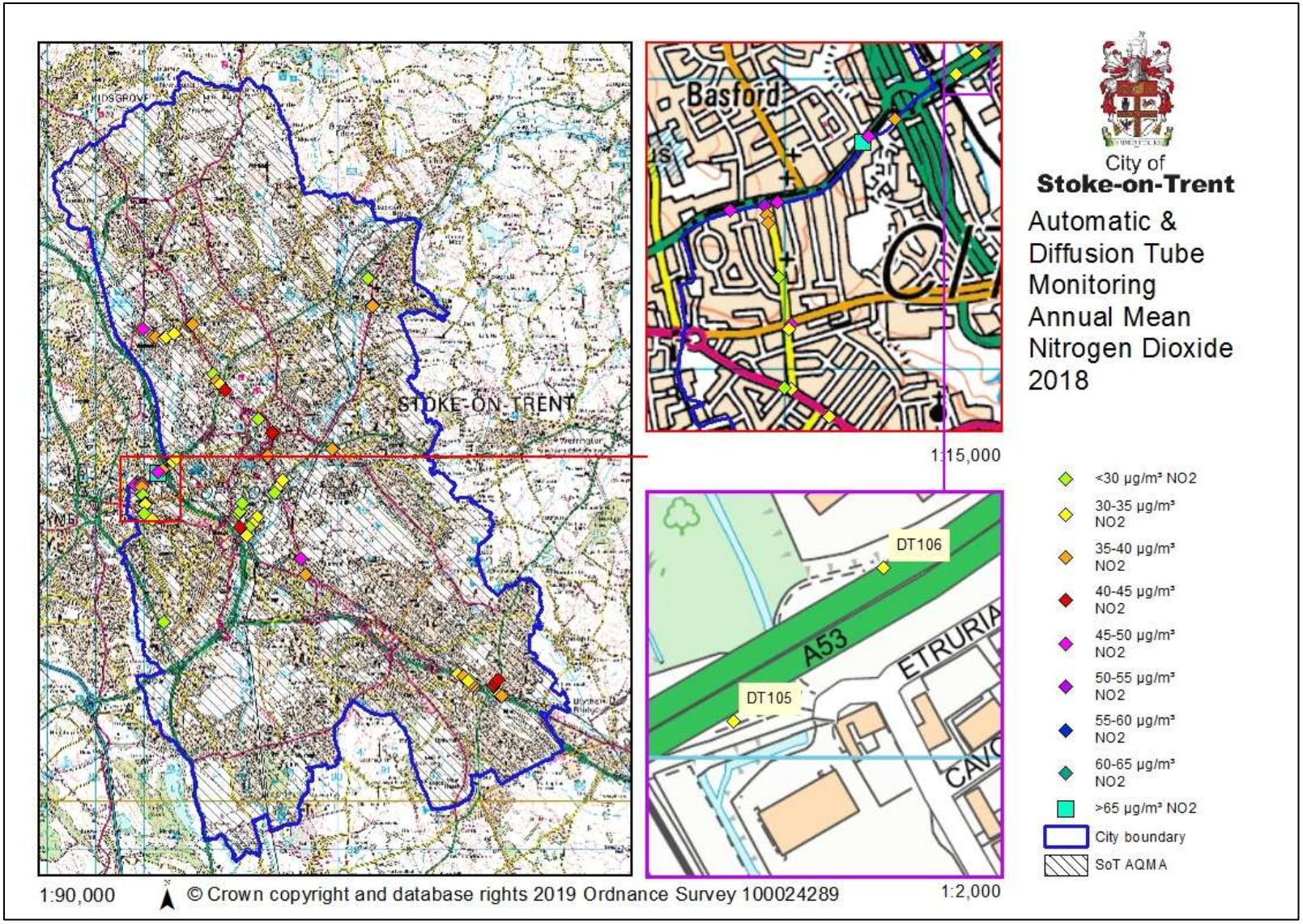


Figure D. 24 A53 West 1 NO_2 monitoring

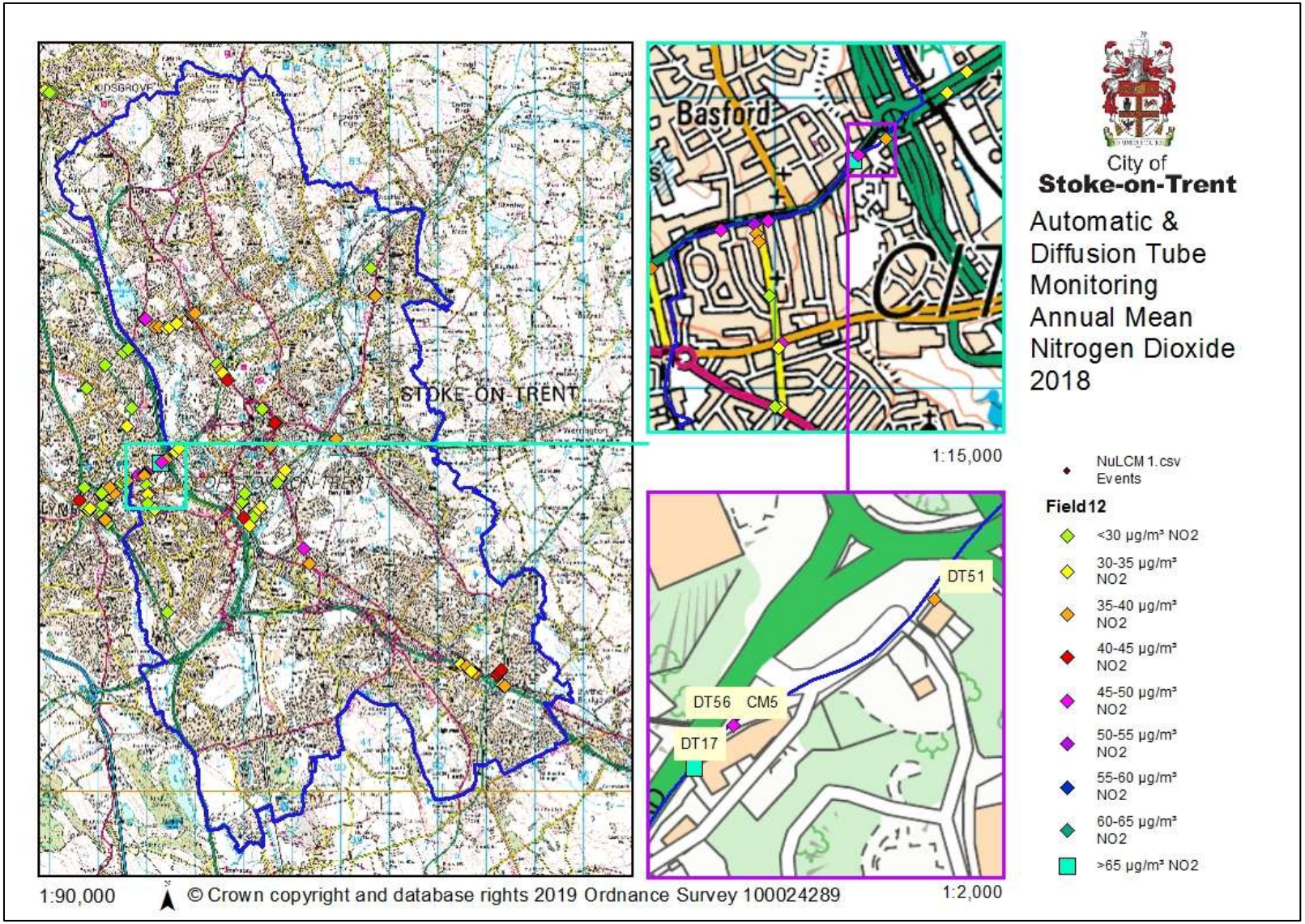


Figure D. 25 A53 West 2 & Victoria Street NO_2 monitoring

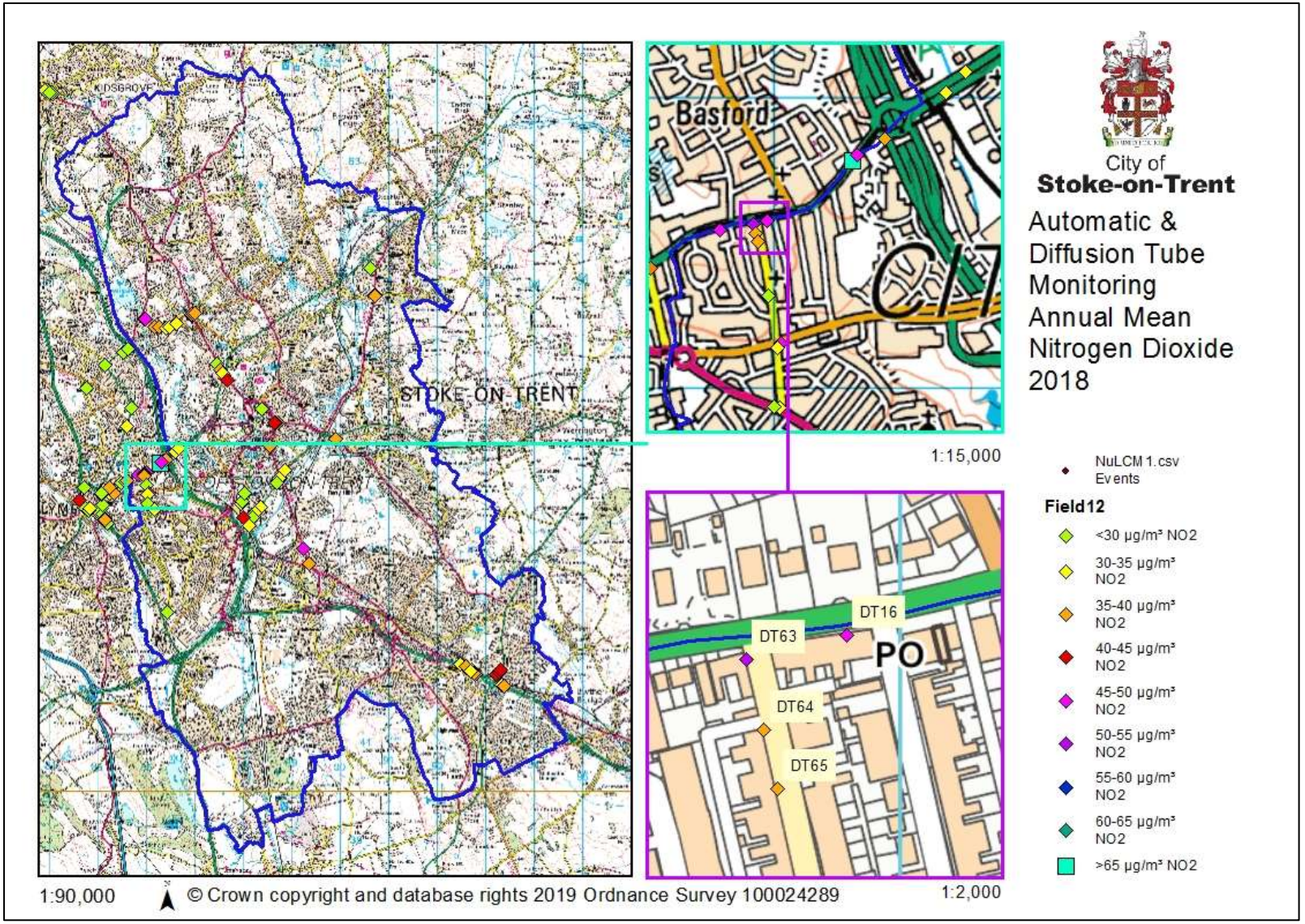


Figure D. 26 A53 West 3 NO_2 monitoring

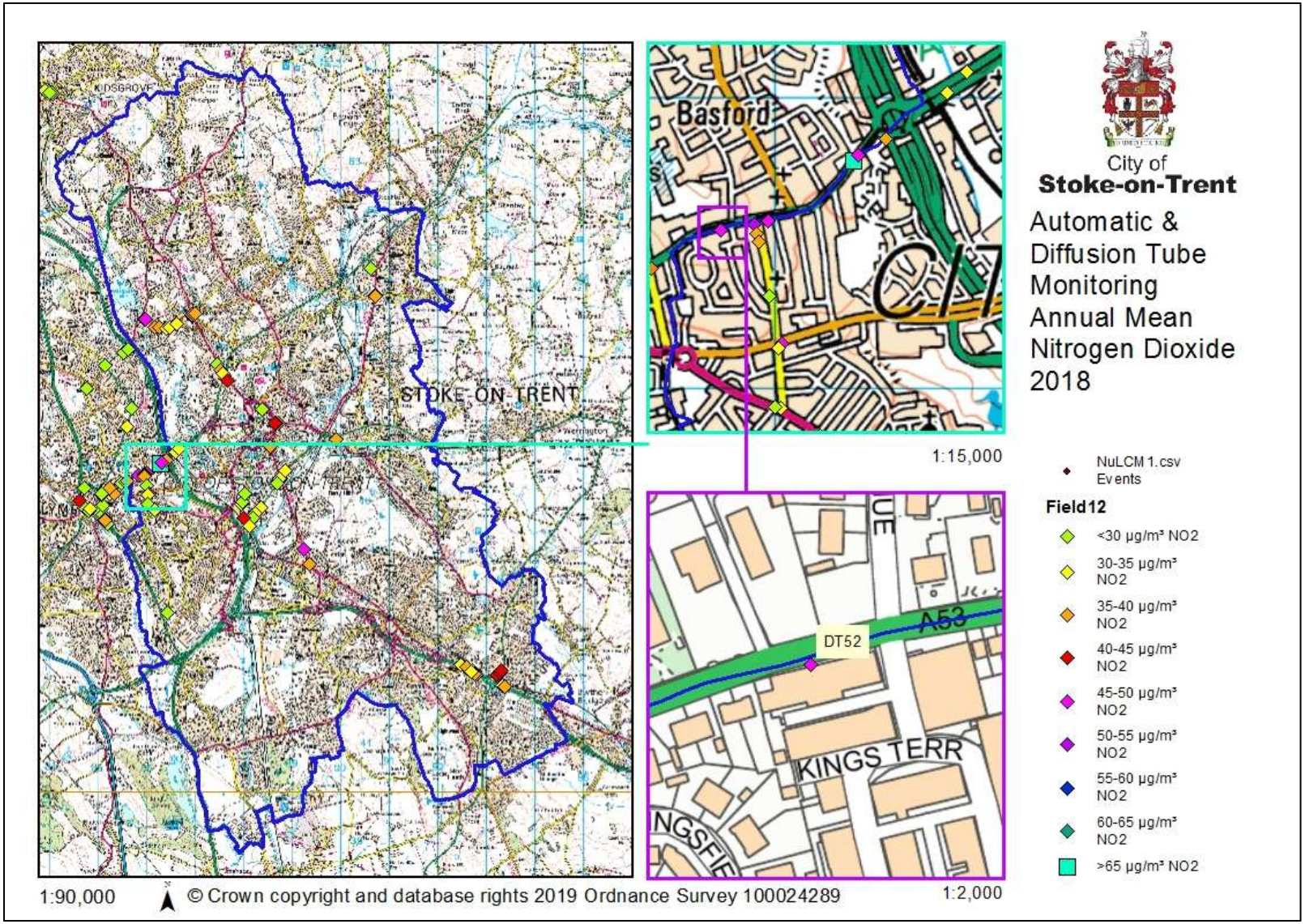


Figure D. 27 Victoria Street 2 NO_2 monitoring

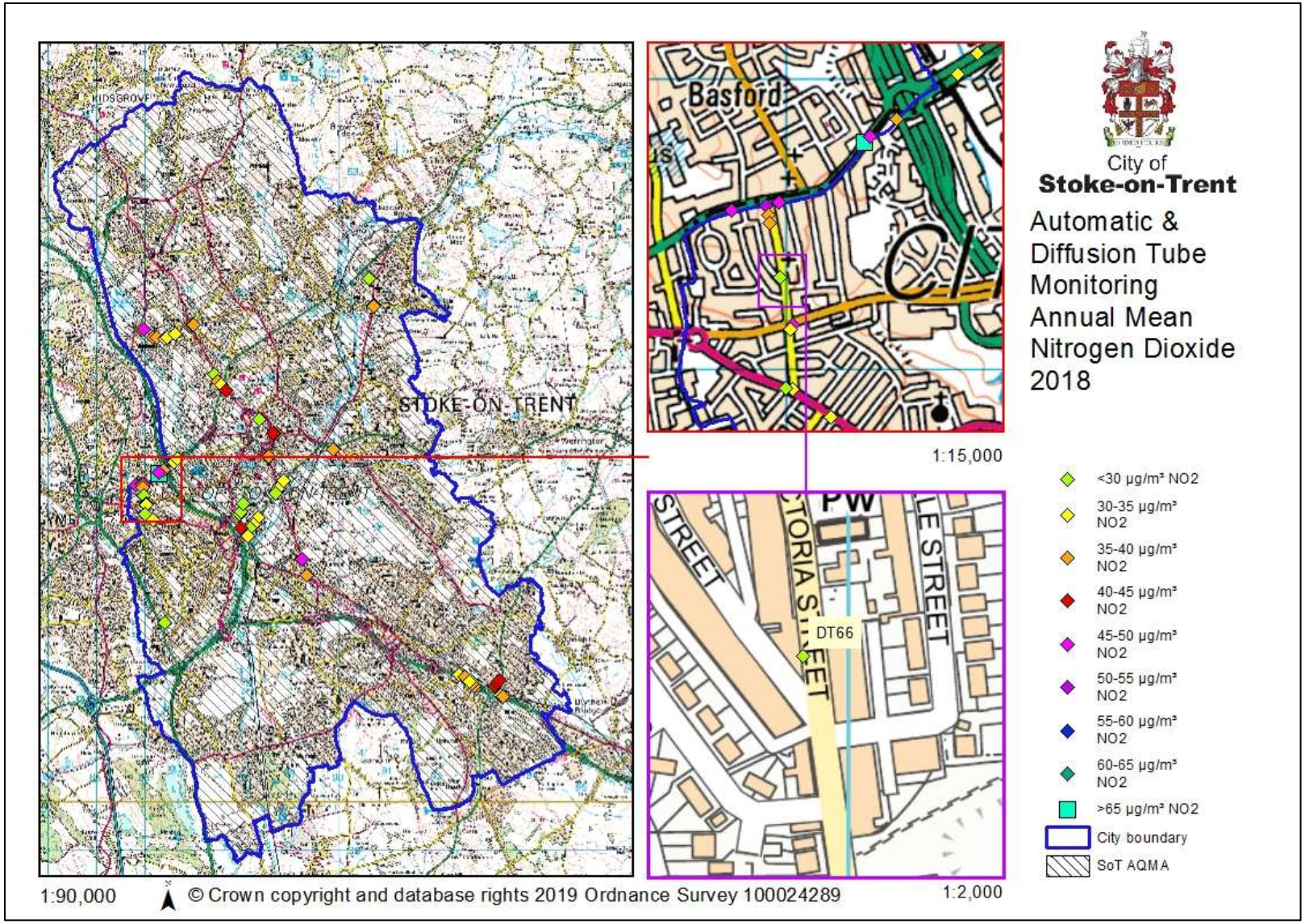


Figure D. 28 Victoria Street 3/Shelton New Road NO_2 monitoring

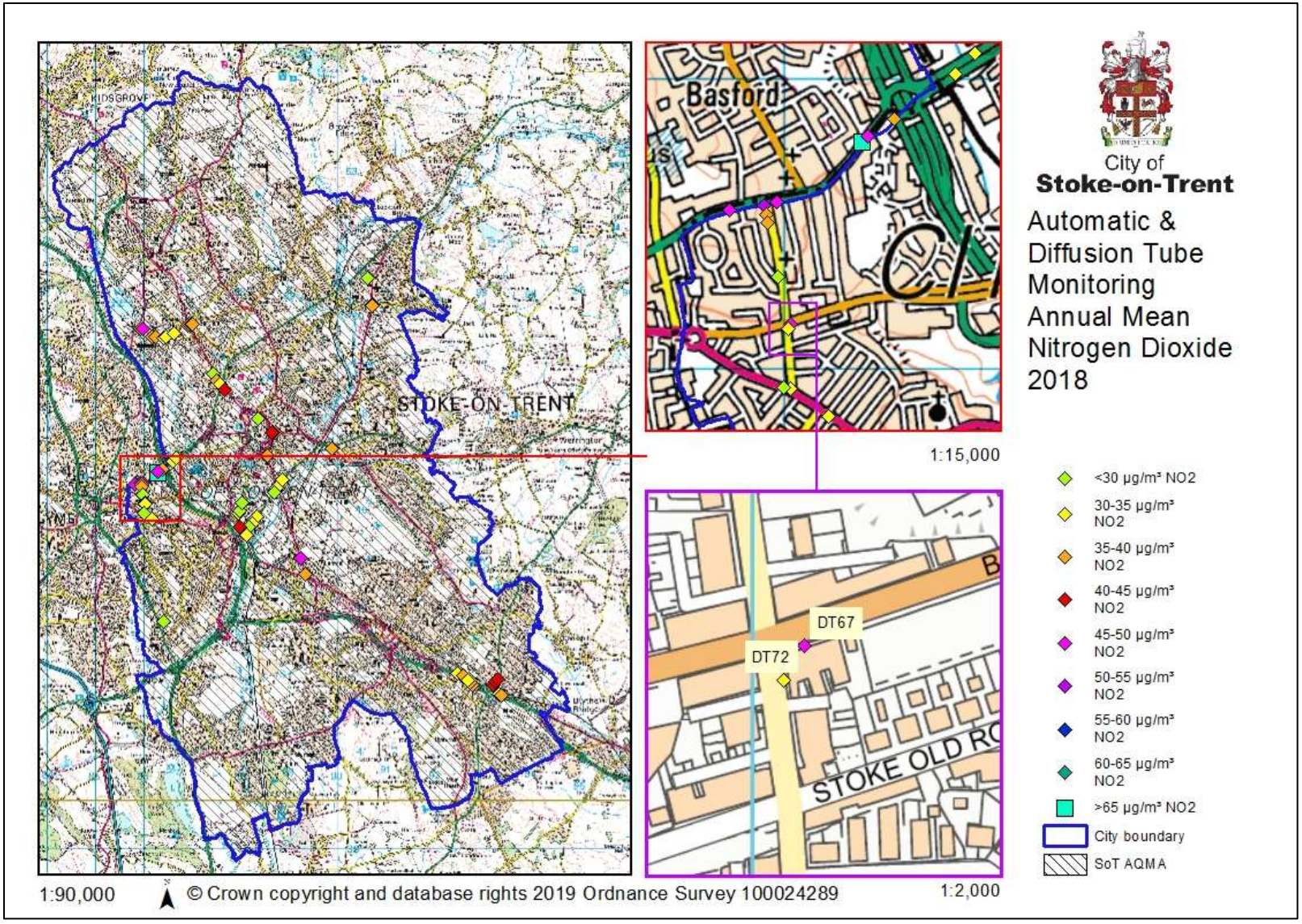


Figure D. 29 Victoria Street 4/Hartshill Road NO_2 monitoring

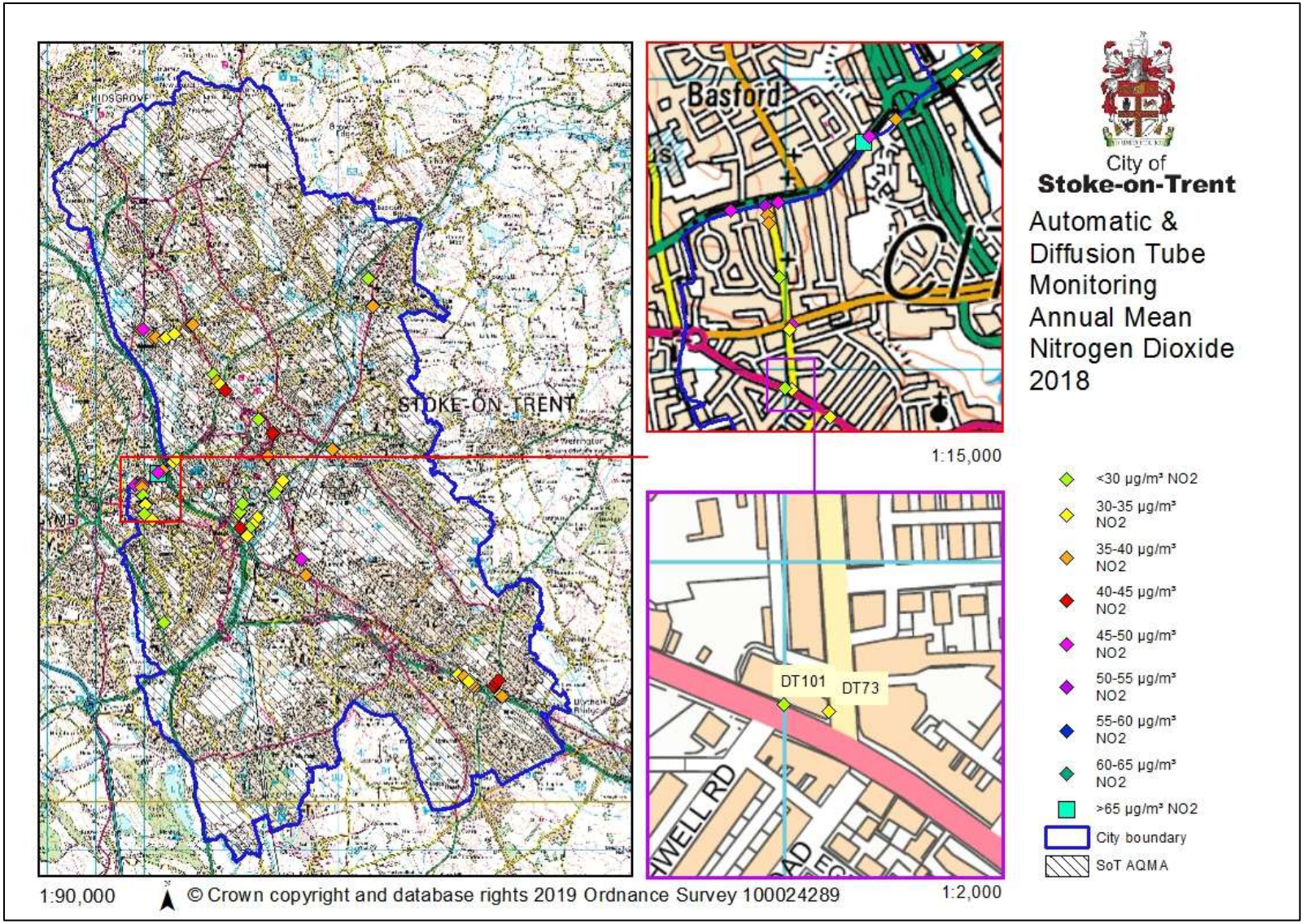


Figure D. 30 Hartshill Road 2 NO_2 monitoring

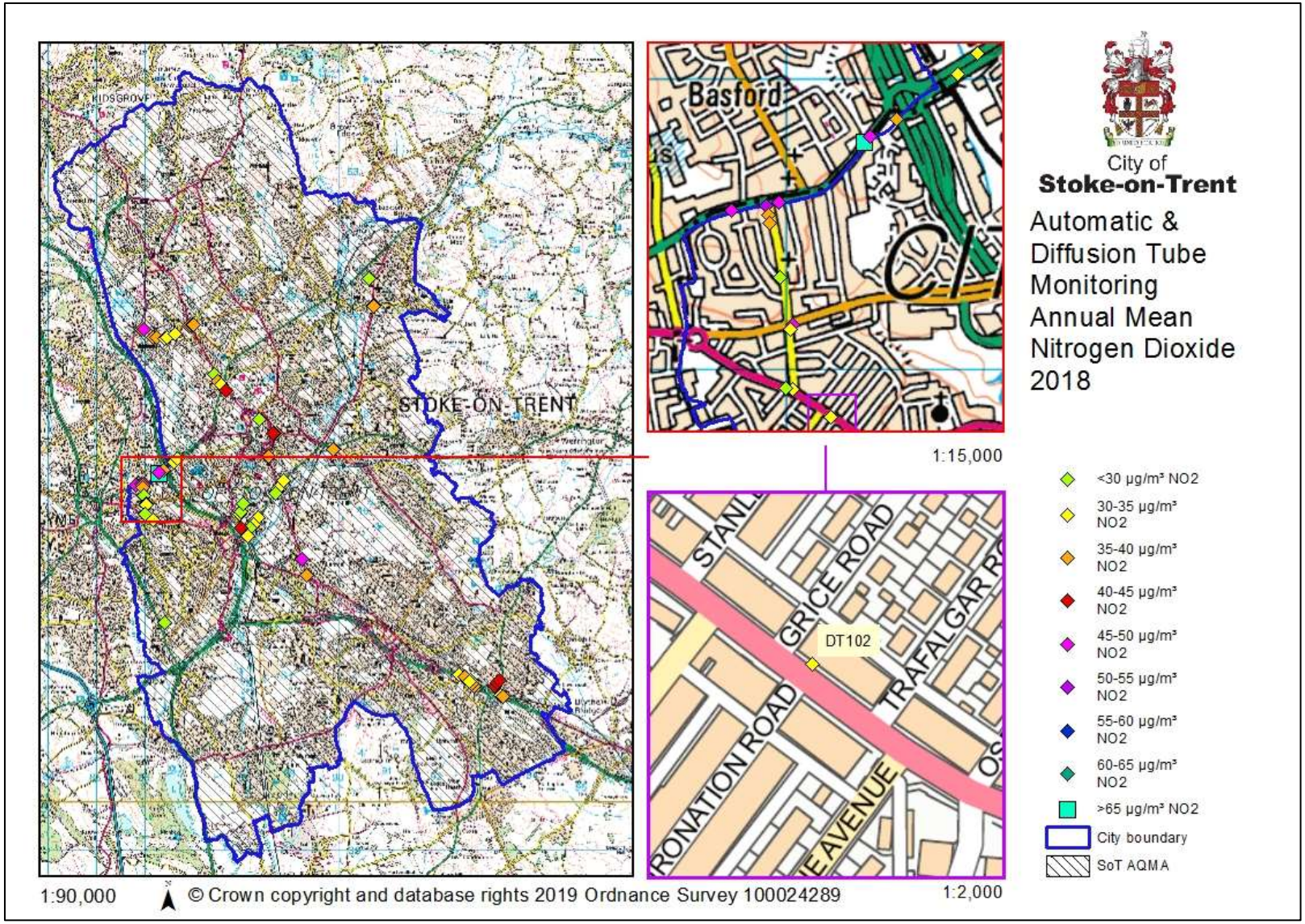


Figure D. 31 Victoria Road NO_2 monitoring

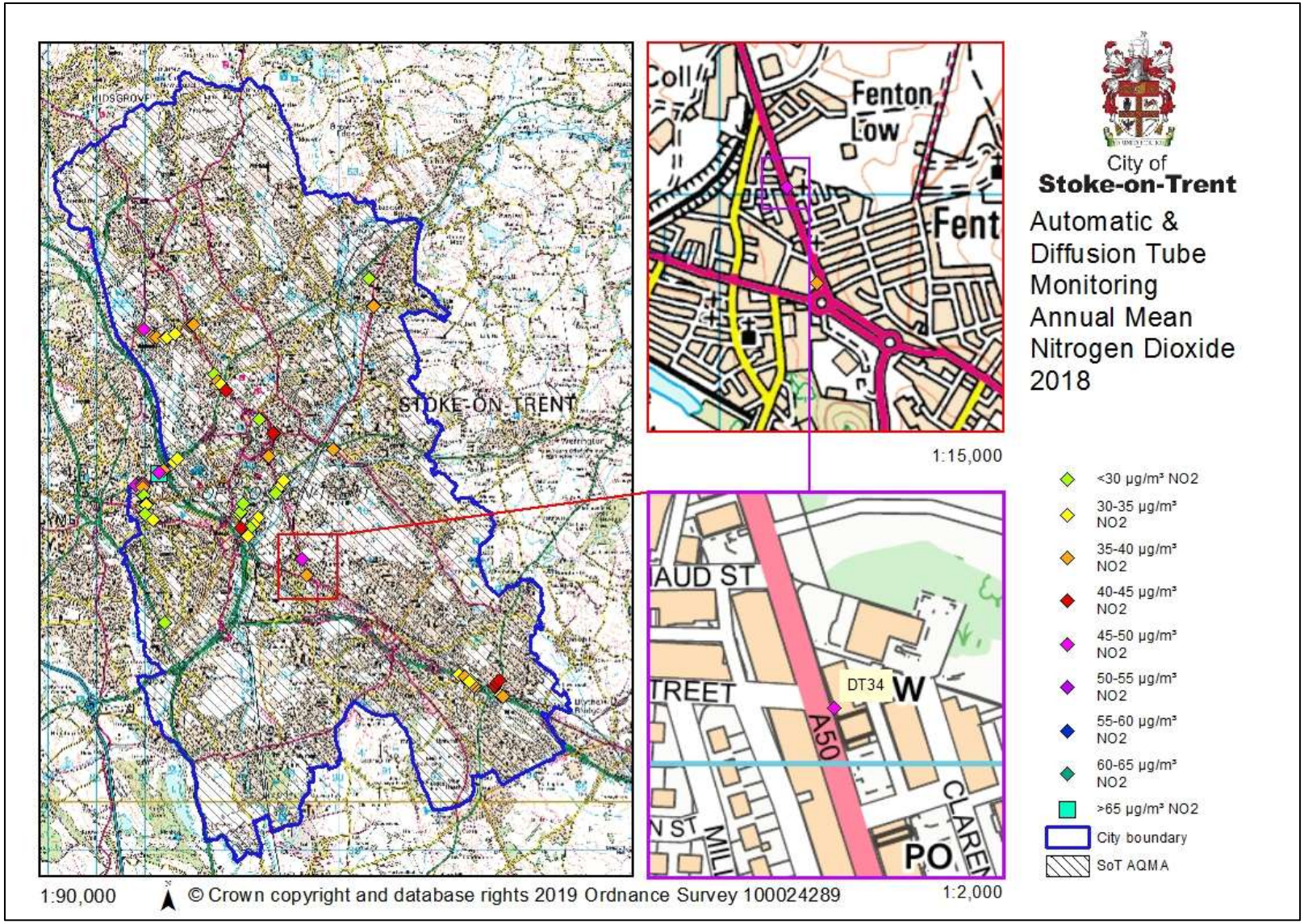


Figure D. 32 Victoria Place NO_2 monitoring

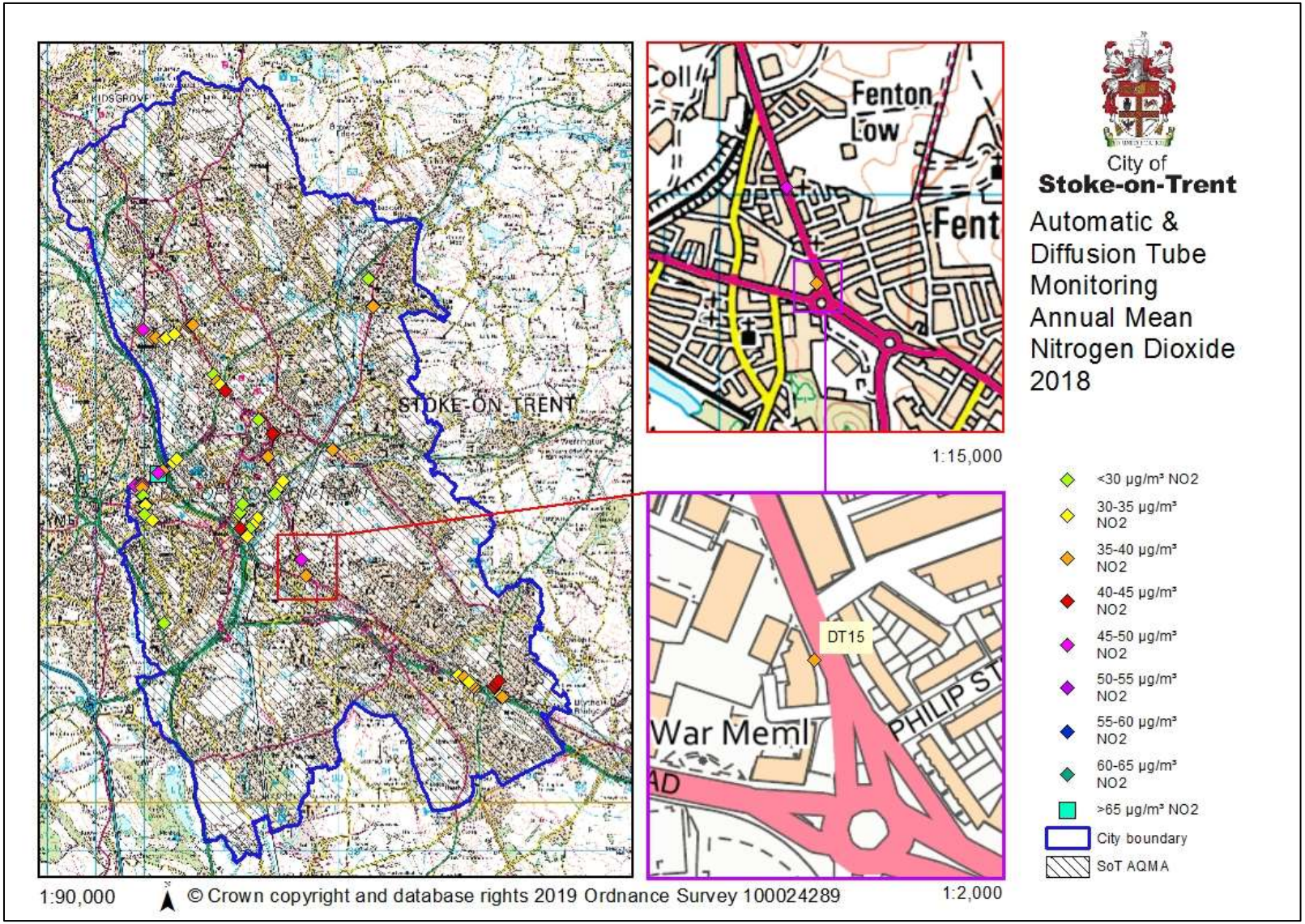


Figure D. 33 Meir A50 1 NO_2 monitoring

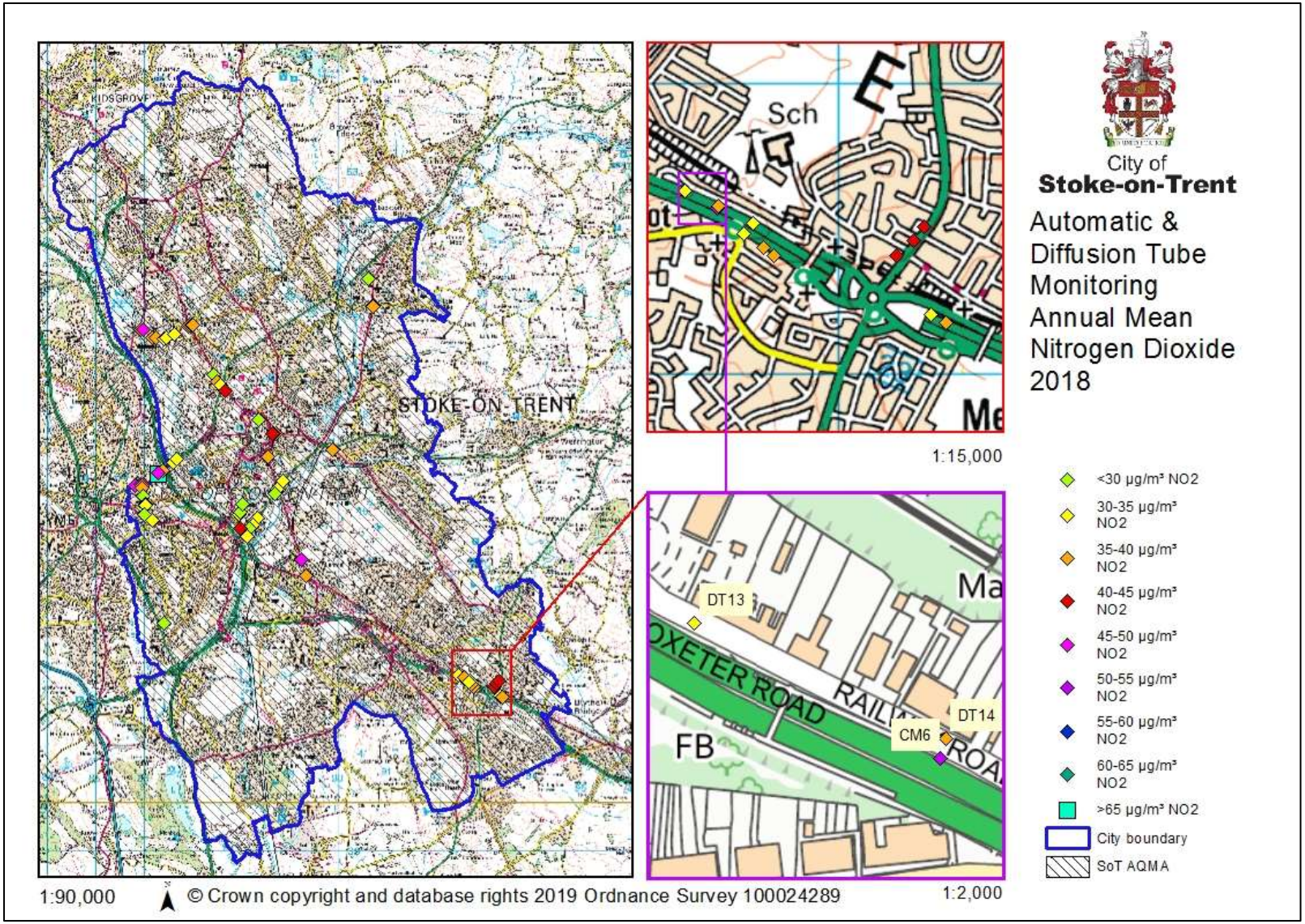


Figure D. 34 Meir A50 2 NO_2 monitoring

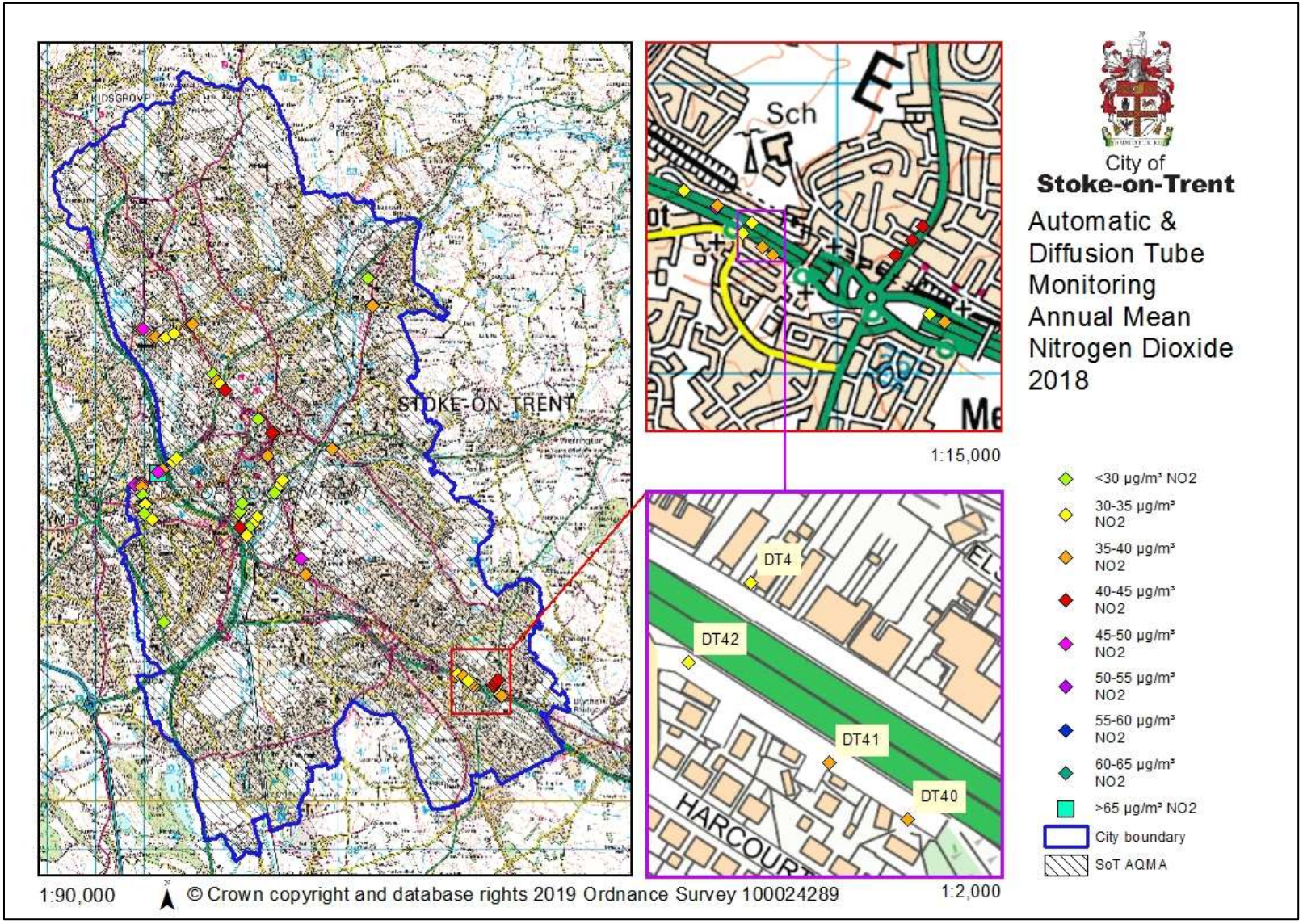


Figure D. 35 Meir A50 3 NO_2 monitoring

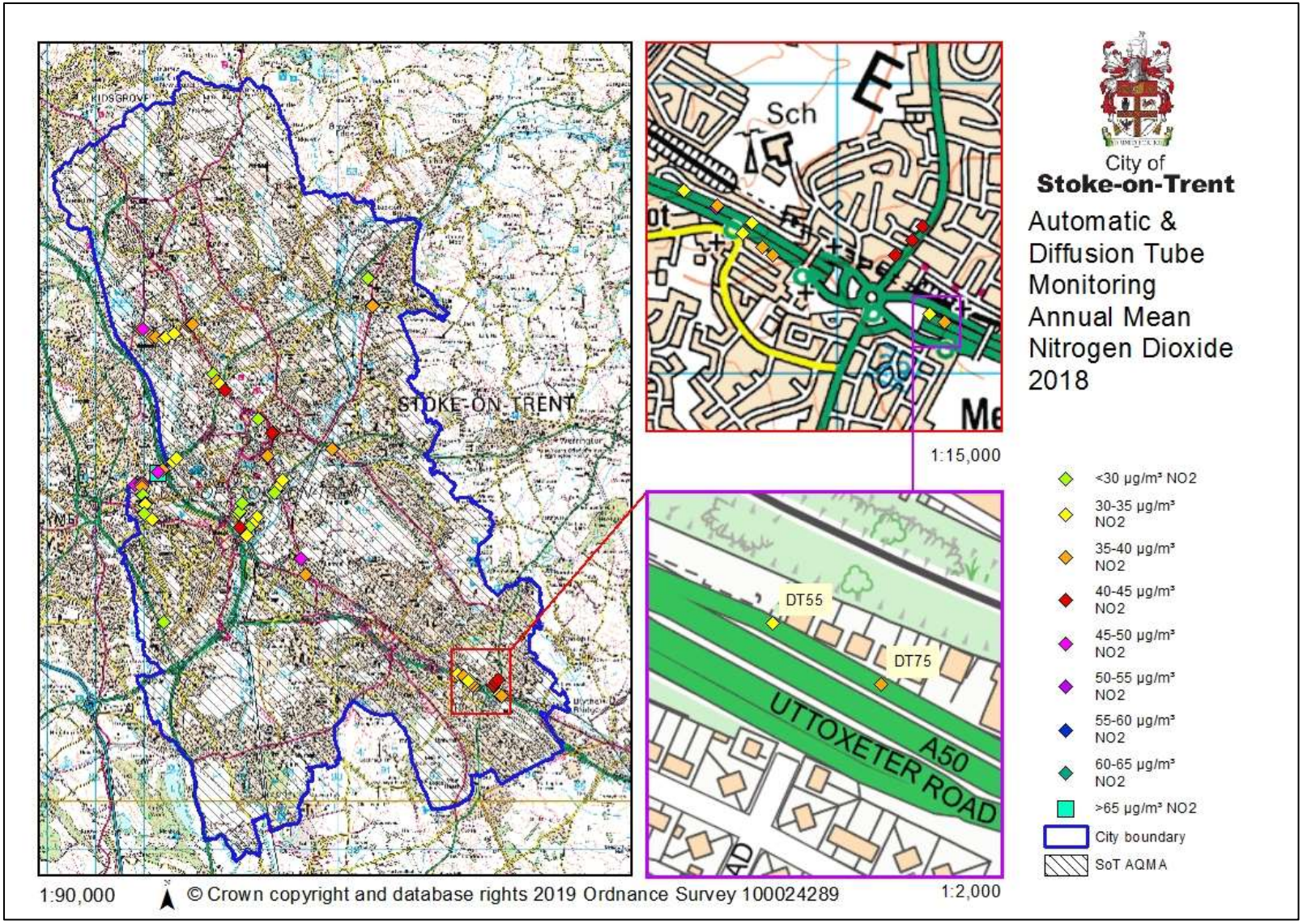
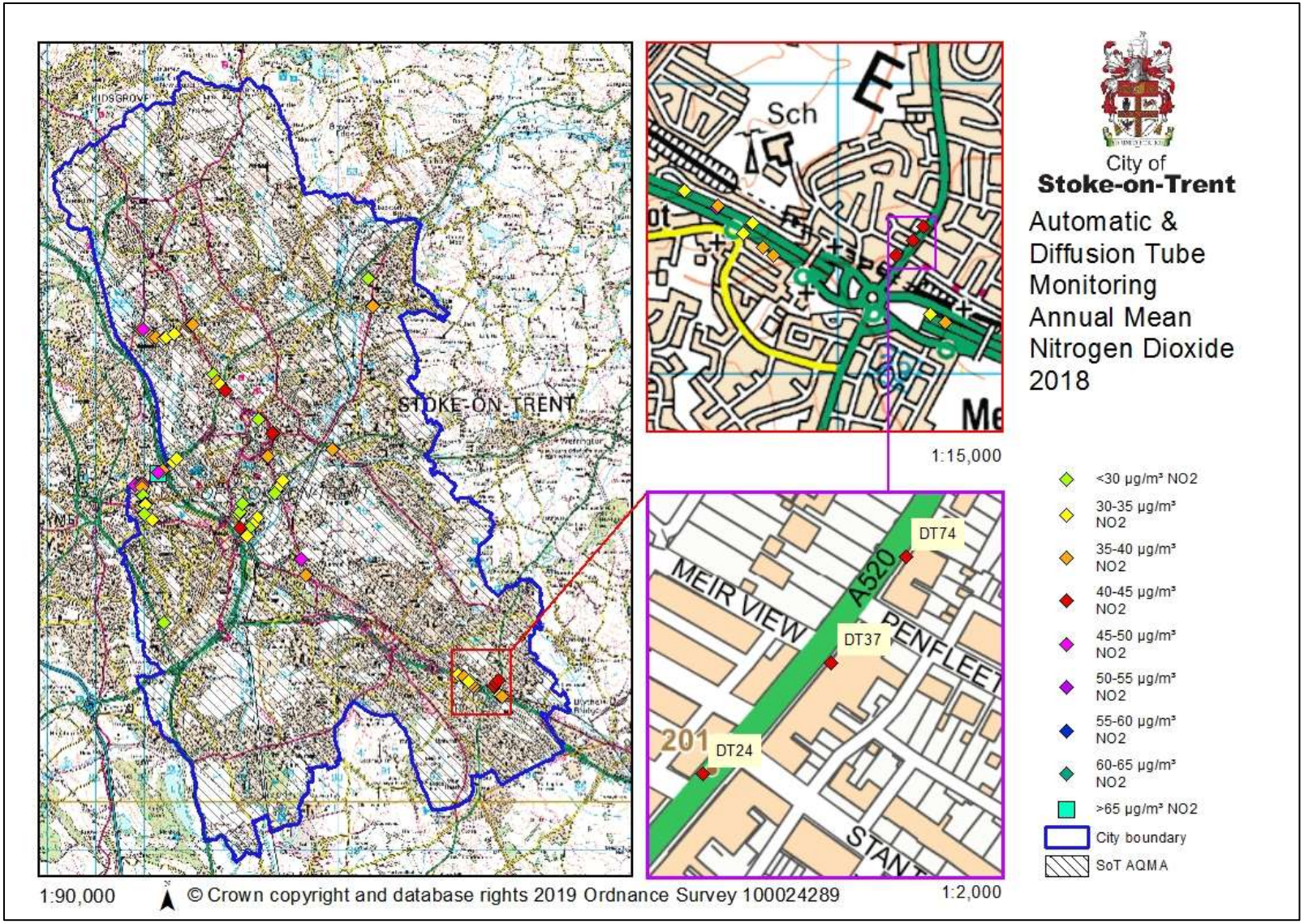


Figure D. 36 Meir Weston Road NO_2 monitoring



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[10]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[10] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
JAQU	Joint Air Quality Unit
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
MD	Ministerial Direction