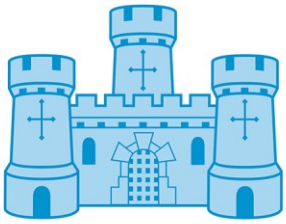

NEWCASTLE·UNDER·LYME
BOROUGH COUNCIL

2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: August 2023

Information	Newcastle-under-Lyme Borough Council Details
Local Authority Officer	Darren Walters (Environmental Protection Team Business Manager)
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Report Reference Number	LAQM/ASR2023
Date	August 2023

Annual Status Report (ASR) 2023 - Air Quality Endorsement from the Director of Health & Care, Staffordshire County Council.

Staffordshire County Council (SCC) is committed to working with partners to ensure that Staffordshire will be a place where improved health and wellbeing is experienced by all. Poor air quality has a negative impact on public health, with potentially serious consequences for individuals, families, and communities. Identifying problem areas and ensuring that actions are taken to improve air quality forms an important element in protecting the health and wellbeing of Staffordshire residents. Improving air quality is often a complex issue, presenting a multi-agency challenge – so it is essential that all agencies work together effectively to deliver improvements where they are needed.

As Director of Health and Care across Staffordshire I endorse this Annual Status Report which sets out the position in all the Local Authorities across Staffordshire and Stoke-on-Trent focusing on human made pollution with particulate matter.

The Air Aware project "phase 2" ran until March 2023 with Defra Funding. The Air Aware project continues with joint funding from Staffordshire Public Health and Connectivity Teams to March 2025. The project delivers behaviour change to increase active travel, decrease car use, and raise awareness of air quality issues through five elements. These are business and school engagement, communications and campaigns, electric vehicles, and air quality monitoring in three targeted locations, Burton, Leek, and Cannock. Campaigns include Anti-Idling, walking and cycle activities and Clean Air Day. These have been countywide engaging a large number of businesses and schools. The programme focuses on reducing levels of NO_2 and PM, which are monitored at key locations.

A number of the Staffordshire Authorities are currently involved in implementing measures to reduce levels of NO_2 within their areas, which are detailed elsewhere in their ASR. Since the update of the Environment Act 2021 there is now a statutory duty imposed on Local Authorities in England to reduce $PM_{2.5}$, a number of the measures are complementary with those being undertaken to reduce NOx. A mapping exercise completed by the Staffordshire Air Quality Forum members details the measures currently in place which are considered to have an impact in reducing $PM_{2.5}$ within the County. These can be viewed in Table 2.4

In addition, Levelling up Fund 2 Schemes will improve a number of major roads around the county, reduce journey times, put greener, cleaner buses on main roads, improve walking and cycling routes and reduce the impact of housing and commercial developments. They will benefit East Staffordshire, Cannock Chase, and Stafford Borough. Total package cost circa £20m.

Finally, Officers from Newcastle Borough Council, Stoke City Council and Staffordshire County Council are jointly working under Ministerial Direction to improve transport related air pollution in North Staffordshire.

Dr Richard Harling

Director of Health and Care
Staffordshire County Council
[6th June 2023]

Executive Summary: Air Quality in Our Area

Air Quality in Newcastle-under-Lyme Borough Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

The main pollutant of concern in the Borough is nitrogen dioxide (NO_2). Nitrogen Dioxide (NO_2) is one of a group of highly reactive gases known as oxides of nitrogen or nitrogen oxides (NO_x). Nitrogen Oxides are released into the atmosphere when fossil fuels (coal, natural gas, and petroleum) are used in power stations, area heating and vehicle engines.

NO_x emissions from burning fossil fuels are mainly released as nitric oxide (NO), although some sources can release a substantial amount of NO_x as NO_2. Reactions in the atmosphere can subsequently turn NO into NO_2.

Breathing air with high concentrations of NO_2 can irritate and inflame the airways and lungs, with those suffering with respiratory diseases such as asthma being particularly affected.

Road transport is the largest source of NO_2 emissions in the UK and is the major contributor to concentrations within the Borough. Strict European standards require

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[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

emissions from vehicles to improve over time. This is achieved by improvements in engine design and fitting three-way catalysts to road vehicles. The role that road transport plays in air quality is greater within urban areas.

The Borough of Newcastle under Lyme is located in North Staffordshire, with the town of Newcastle being the major urban area, together with the smaller town of Kidsgrove. Covering an area of 21,096 hectares (81 square miles) the Borough has a population of 129,600. The Borough is in a strategic location between roads running north from London to Carlisle, and west to Chester. Two major trunk roads pass through the Borough, along with a number of major roads which converge on the two main towns of Newcastle, and Kidsgrove;

- The M6, which is currently one of the most heavily trafficked and congested roads in the country
- The A500, a major road linking Newcastle under Lyme and Stoke on Trent with junctions 15 and 16 of the M6. These motorway junctions are adjacent to the Borough's boundary and so contribute to traffic congestion in the area.
- A34, A52, A525, A523 and A53 pass through Newcastle
- A50, A5011 and A34 pass through Kidsgrove

A high proportion of traffic travels into/through the four Air Quality Management Areas (AQMAs) within the Borough which have been declared for Nitrogen dioxide (NO_2), these are;

- AQMA 1: Liverpool Road, Kidsgrove
- AQMA 2: Newcastle-under-Lyme Town Centre
- AQMA 3: Maybank-Wolstanton-Porthill
- AQMA 4: Little Madeley

Road traffic is the most significant source of pollution to the Borough; however, other sources include industrial and domestic emissions. Certain industries (Permitted Processes) are regulated by the Borough Council in accordance with the Environmental

Permitting (England and Wales) Regulations 2016 (5). Currently there are 43 Part B processes and 3 Part A2 processes within the Borough. The Environmental Permits for processes regulated by the Borough Council can be found on the Public Register (6).

The Environment Agency is responsible for the regulation of Part A processes, also under the Environmental Permitting (England and Wales) Regulations 2016. One Part A process within the borough is a landfill. Over the past 12 months, intensive work has been carried out by the Borough in conjunction with the Environment Agency, UK Health Security Agency, and Staffordshire County Council Public Health, to investigate complaints concerning gaseous emissions from this landfill, situated approximately 1.3 kilometres outside of AQMA 2: Newcastle-under-Lyme Town Centre. [7]

Complaints relating to odours from the site have been received from properties across the Borough. Although methane is the primary component of landfill gas, a number of other compounds, including nitric oxides are associated with the breakdown of waste substances. The Environmental Permits for other activities regulated by the Environment Agency can be found on their Public Register (8).

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[9] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, due to be published in 2023, will provide more

[5] The Environmental Permitting (England and Wales) Regulations 2016 (legislation.gov.uk)

[6] https://www.newcastle-staffs.gov.uk/protection/environmental-permit

[7] https://consult.environment-agency.gov.uk/west-midlands/walleys-quarry-landfill-sliverdale/

[8] Public registers (data.gov.uk)

[9] Defra. Environmental Improvement Plan 2023, January 2023

information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[10] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Pollutant concentrations in all areas were higher than in previous years, due to a return to relatively normal traffic conditions following a decrease in traffic levels during the Government's enforced travel restrictions in response to the Covid-19 pandemic. Vehicle miles travelled on Great Britain's roads increased by 8.8% in 2022 compared to the previous year.

Provisional estimates show motor vehicles travelled 323.8 billion vehicle miles in Great Britain in 2022. Traffic levels were broadly in line with pre-pandemic levels (2019) [(11)].

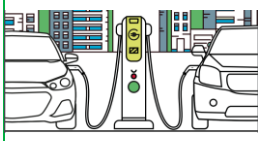
[10] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

[11] https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra

Table 1.1 - Local actions to improve air quality achieved in 2022

PROJECT	ACTION	OUTCOME/ IMPACT
 **Ministerial Direction number 1. Mandating compliance with the EU's NO_2 annual mean limit value (which applies to the majority of areas which are publicly accessible) in the shortest possible time for the A53 from Basford Bank to Victoria Street**	An options appraisal to achieve compliance with the EU's NO_2 annual mean limit value (which applies to the majority of areas which are publicly accessible) in the shortest possible time, has identified that a traffic management scheme involving bus gate restrictions at peak times of the day would achieve compliance in the shortest possible time when compared to a benchmark Clean Air Zone. This together with measures in the neighbouring city of Stoke on Trent form the basis of the North Staffordshire Local Air Quality Plan	A full business case is to be prepared for submission to the Defra minister in 2023. Subject to acceptance, it is anticipated that the bus gate and associated measures will be in place early in 2025. For up-to-date information on progress with the associated North Staffordshire Local Air Quality Plan Click here
Ministerial Direction number 2.	Works have been completed to 23 buses with CVRAS accredited exhaust abatement technology and replacement of hydraulic fans with electrical systems	Modelling shows that this will result in a reduction of 1µg/m^3 of NO_2 along the A53 and wider route. Monitoring to continue for 5 years to evaluate impact. Click here

PROJECT	ACTION	OUTCOME/ IMPACT
Mandating compliance with the EU's NO_2 annual mean limit value (which applies to the majority of areas which are publicly accessible) in the shortest possible time for the A53 from Basford Bank to Victoria Street– by a bus retrofit scheme requiring the upgrade of buses to Euro IV emissions standard by winter 2020 (NULBC lead)		

PROJECT	ACTION	OUTCOME/ IMPACT
 **Low / zero emission taxi infrastructure charging scheme**	Sites are operational and available for public use. Sites are currently being commissioned.	RAPID off-street EV Charging Infrastructure has been installed at four locations across the Borough. A total of 10 charging stations have been provided for use by the licensed taxi trade and general public. Drivers are also able to access delivery partner sites in the Stafford Borough and Stoke-on-Trent City Council areas under this joint project. It is planned to engage with the licensed taxi trade to show the business case and to demonstrate how EV can work successfully for them. For further information Click here
Air Aware' initiative	In progress. This project is being delivered by Staffordshire County Council with the support of District Councils.	Developments and further information can be found at For further information Click here
Continued Engagement with HS2 Ltd and contractors re	Borough Council Environmental Health staff continue to engage with HS2 Ltd and its contractors to ensure that the environmental health related effects of the scheme (air quality, noise,	HS2 have committed to best practice in the management of environmental health effects and is committed to not causing any exceedances of Air Quality Standards. The Council will continue to actively engage with

PROJECT	ACTION	OUTCOME/ IMPACT
design, build and operation of HS2 Phase 2a	land contamination, light) as it passes through the Borough are fully considered and assessed	HS2 during all phases leading to the operation of the railway within the Borough.
Walley's Quarry Landfill – NULBC and EA joint air quality monitoring[12] 	A network of air quality monitoring stations, part funded by the Borough Council, has been setup around Walley's Quarry landfill in Silverdale. This follows significant complaints of odour reported in early 2021. The monitored pollutants are hydrogen sulphide, methane, oxides of nitrogen, sulphur dioxide and different particulate matter size fractions (Total Suspended Particulate (TSP), PM_{10} and $PM_{2.5}$). The hydrogen sulphide data is compared against the World Health Organisation (WHO) guideline values for both odour annoyance and potential health impacts.	Data, provided to UKHSA by the EA up to the end of August 2022, have been compared to appropriate health-based air quality guidelines and standards or assessment levels for hydrogen sulphide, particulate matter, nitrogen dioxide, sulphur dioxide, methane and volatile organic compounds (VOCs comprising benzene, toluene, ethylbenzene and xylene (BTEX)). It should be noted that the four MMFs monitor the ambient air in the locality and not exclusively, the emissions from the landfill site 2 compared to the odour annoyance guideline and odour detection thresholds respectively. Air concentrations of particulate matter, nitrogen dioxide, sulphur dioxide, methane and VOCs are

[12] https://consult.environment-agency.gov.uk/west-midlands/walleys-quarry-landfill-sliverdale/#section5

PROJECT	ACTION	OUTCOME/ IMPACT
		lower than appropriate health-based and odour standards, guidelines or assessment levels, and therefore, the risk to health from these substances is minimal. The hydrogen sulphide data up to the end of August 2022 shows continuing low-level exposure to the population around the landfill site. All four MMF sites show a monthly average concentration in August below the long-term (lifetime) health-based guidance value. The cumulative average concentrations for MMF1, MMF2 and MMF6 are below the long-term (lifetime) health-based guidance value. At MMF9, the cumulative average concentration remains above the long-term (lifetime) health-based guidance value.[13]

[13] https://consult.environment-agency.gov.uk/west-midlands/walleys-quarry-landfill-sliverdale/user_uploads/ukhsa-human-health-risk-assessment-air-quality-monitoring-report---august-2022.pdf

Conclusions and Priorities

Monitoring data for 2022 shows a single exceedance of the annual mean objective for NO_2 concentrations at site N145, on the A34 near the entrance to Beata Road. Monitoring at this site commenced in 2020; this is the first year of exceedance at this location since monitoring began. Monitoring will continue at this location although it is not a relevant location for LAQM, having been established for other purposes.The annual mean NO_2 concentrations were below the annual mean objective at all other locations and below 10% of the annual mean objective, with the exception of one site, this being site DT104, 7 King Street, Newcastle where a concentration of 37.8 µg/m^3 was measured. Work is being undertaken in the neraby area to comply with a Minsiterial Direction to secure sustained compliance with the annual mean NO_2 EU Limit Value. Monitoring will continue across all areas of the Borough for the forseeable future.

In addition to working to reduce and maintain NO_2 concentrations below the annual objective in all areas of the Borough, we will continue to assess planning applications to ensure that future developments and changes to the road networks across the Borough do not lead to an increase in the NO_2 concentration above the annual mean objective of 40µg/m^3. We will also continue to regulate installations to ensure that emission limits are not exceeded and also regulation of smoke control and waste burning to reduce impacts on local air quality.

Table 1.2 - 2022 Monitoring Conclusion Summary

	CONCLUSIONS	SUMMARY
1	No exceedances within or outside of existing AQMAs	A single exceedance (40.5 µg/m³) was measured in 2022 at site N145 (located on Talke Road). This location is not near any relevant exposure for the annual mean NO_2 objective, so this is not a relevant location for LAQM purposes and there is no expectation for the Council to consider this further under the LAQM regime. However, given the proximity to

		a public footpath, further clarification will be sought from DEFRA'S Joint Air Quality Unit (JAQU) as to whether this location is relevant for the purposes of the EU derived NO_2 annual mean limit value. The Council will follow JAQU's advice on any actions required by the Council. This will be reported in the next ASR scheduled for June 2024."
2	Significant trends	**AQMA 1: Liverpool Road, Kidsgrove** – no clear trend. Five years of results less than 10% of the UK annual mean objective for NO_2 not yet achieved. In 2022 there was one site within 10% of the annual mean objective in the AQMA: • DT94 36.2 µg/m^3 – 116 Liverpool Road Kidsgrove. See HERE for Google Street View of this location. See Figure A-1 for trends in monitoring data for the period 2018 to 2022 and Figure D-6, Figure D-7 and Figure D-8 for the monitoring locations and boundary of the AQMA. **AQMA 2: Newcastle-under-Lyme Town Centre** – no clear trend. Five years of results less than 10% of the UK objective not yet achieved. For 2022, there was one site within 10% of the annual mean objective: • DT104 37.8 µg/m^3 – 7 King Street Newcastle. See HERE for Google Street View of this location

		See Figure D-13 and Figure D-14 for the map of monitoring locations and the AQMA map and Figure A-2 for trends for the period 2018 to 2022. **AQMA 3: Maybank-Wolstanton-Porthill** - downward trend. Five years of results less than 10% of the UK objective achieved starting in 2016. For 2022, the highest monitored concentration occurred at DT9, where an annual mean NO_2 concentration of 28.4 µg/m^3 was measured. See Appendix Figure A-3 for trends for the period 2018 to 2022 and Appendix Figure D-11 for locations of monitoring and the AQMA map. See HERE for a Google Street View of the area around DT103. **AQMA 4: Little Madeley** – downward trend. All monitoring below the objective for 8 consecutive years (2015-2022). As a result, this AQMA can be revoked. In 2022, the highest annual mean NO_2 concentration measured in this AQMA was 19.4 µg/m³. See Figure A-4 for details of monitoring results for 2018 to 2022 and Figure D-15 for monitoring location and the AQMA map. See HERE for Google Street View of this location.
3	Revoking of AQMA 4: Little Madeley	Monitoring data for the five years 2015 to 2022 shows concentrations below 36 µg/m³ (10% of the objective). A downward trend is shown

		during that period. Therefore, AQMA 4: Little Madeley is planned to be revoked in Winter 23/24.
4	Review AQMA 3: Maybank-Wolstanton-Porthill	NO_2 concentrations within this AQMA for years 2016 to 2021 have been below 36µg/m^3 at five of the six long-term monitoring sites. We propose to keep this AQMA in operation to assess the effects of the Etruria Valley Link Road and the impacts of the measures introduced to bring about compliance with the NO_2 Annual Mean Limit Value on the A53 in Newcastle-under-Lyme and Stoke on Trent. Further information on the work being undertaken to achieve compliance with the EU Limit Value can be found here https://www.newcastle-staffs.gov.uk/protection/air-quality-management/6
6	Exceedances of air quality objectives outside any existing AQMAs, which have led to the amendment or designation of a new AQMA	None identified in 2022
7	New developments which may impact upon air quality	New additional town deal funds and demolition of old council building freeing up area for major development. Including multi-storey carpark, showing a modelled exceedance at a relevant location, remainder of site not privy to a full

		AQIA as of yet. Kidsgrove town centre also in receipt of town deal money – to be used to upgrade rail station which may increase traffic through the AQMA, although existing monitoring will monitor impacts on AQ and identify additional exceedances.
8	Air Quality Action Plan update	Actions plans for the three AQMA's AQMA 1: Liverpool Road, Kidsgrove, AQMA 2: Newcastle-under-Lyme Town Centre and AQMA 3: Maybank-Wolstanton-Porthill will require updating following the revocation of AQMA 4: Little Madeley. We plan to consult on this early in 2023.

Local Engagement and How to Get Involved

If residents and businesses reduce the amount of fuel and chemicals used, it will improve air quality. The following ways can help:

Commute

- Visit Air Aware Staffordshire which includes;
  - Bulletins for inspiration and information on ways and initiatives to reduce pollution from travelling,
  - Leaving the car at home one day a week. Further information can be found at www.staffssaferroads.co.uk/
  - Turning off car engines when vehicle is idle
  - Consider car sharing your journey further guidance can be found at https://liftshare.com/uk
  - Using a low/ zero carbon vehicle
  - Servicing vehicles
  - Working from home

- Using public transport
- Travel planning App's are available for most smart phones. Further details can be found at https://www.travelsmartapp.com/
- Consider an electric vehicle

School Run

- Walking or cycling to school is not only good for health but it will save on fuel costs and help reduce local air pollution. Further guidance can be found within Travel into School https://www.staffordshire.gov.uk/Education/Schooltransport/Active-school-travel/Travelling-into-School.aspx
- Take turns with friends, neighbours, or family to drive or walk the children to school. Check whether your school has a travel plan.

Workplace energy, transport and infrastructure

Bespoke workplace travelling plans to support employees and employers to use more environmentally sustainable methods of travel into work and use of vehicles for work. For further information visit https://www.staffordshire.gov.uk/Business/Workplace-health/Active-travel-and-air-quality-in-the-workplace.aspx

Grants may be available to support your business in becoming more energy efficient and towards the purchase of cleaner vehicles and support with charging infrastructure. Further information can be found from the following and also your energy supplier;

Office for Low Emission Vehicles https://www.gov.uk/government/organisations/office-for-low-emission-vehicles

https://energysavingtrust.org.uk/

https://sben.co.uk/

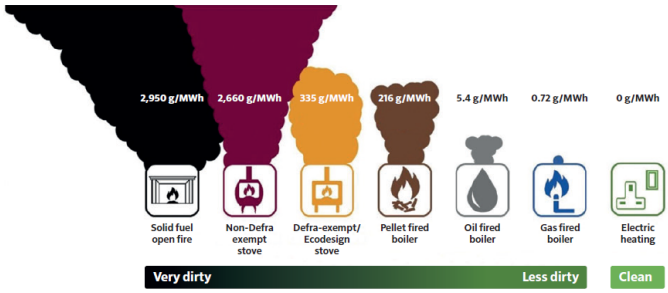
Around The Home

- Use water-based or low solvent paints, glues, varnishes and wood preservatives, look for brands with a low VOC content.
- Make sure your home is well ventilated especially during DIY or cleaning.
- Have your central heating system checked regularly to avoid risking exposure to toxic carbon monoxide. Make sure you use a Gas Safe Registered engineer.
- Keep wood stoves and fireplaces well maintained, and make sure that wood burners are exempted for use in smoke control areas. Visit https://uk-air.defra.gov.uk/library/burnbetter/ for advice.

✓ Ready to use wood bought from a Woodsure Certified Supplier, will offer the following benefits:

- Dry, Ready to Burn wood/logs & briquettes make any appliance more efficient. Look for the Woodsure logo.
- Burning dry wood instead of wet wood is part of the solution to reducing the impact on our environment.
- Burning wet wood increases emissions and has a greater impact on air quality.

- Any appliance and chimney system will suffer from smoke produced from wet wood, which increases maintenance and repair requirements, making it harder for chimney sweeps to keep systems in safe, effective condition.



Note: The air pollution emissions will also depend on the age of the appliance, how it is maintained and used and the fuel burned (for example, dry or wet wood).

The following definitions were used: *Solid fuel open fire*: wood burned in an open fire. *Non-Defra-exempt stove*: wood in a conventional stove. *Defra-exempt/Ecodesign stove*: wood in an advanced/ecolabelled stove. *Pellet fired boiler*: wood in pellet stoves and boilers. *Oil fired boiler*: fuel oil in a medium (>50KWth <1MWth) boiler. *Gas fired boiler*: natural gas in a small (≤50kWth) boiler.

Source: Emission factors taken from EMEP 2019 Guidebook[12] (1A4 small combustion tables). Adapted from the Clean Air Strategy[13] with updated data

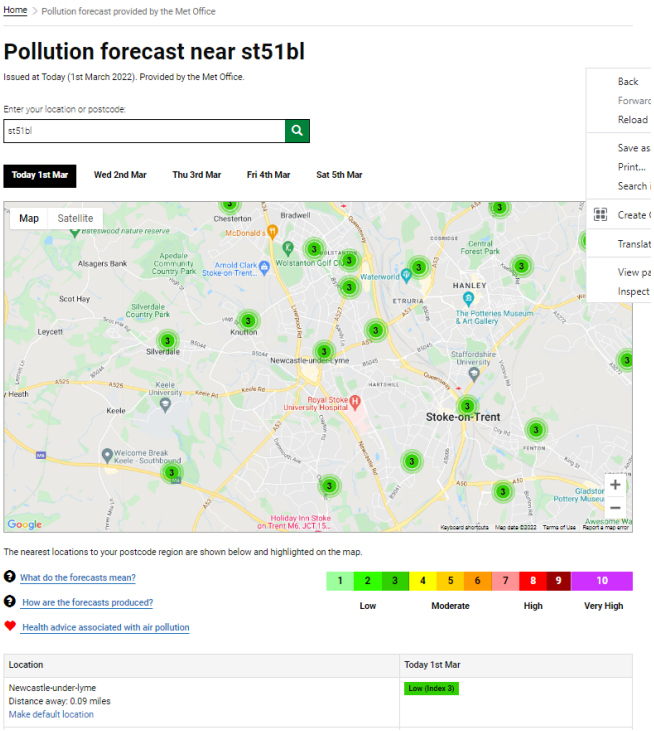
- Burning waste and treated wood (e.g. old furniture) can emit harmful

✓ Be energy efficient- make sure your house is well insulated and use energy efficient appliances. Your energy supplier may offer grants to insulate your home. Staffordshire County Council currently offers targeted grants. To make you home warmer and more energy efficient https://www.staffordshire.gov.uk/Warmer-Homes/Staffordshire-Warmer-Homes.aspx

✓ Purchase "Green Power" for the electricity in your home. (Contact your energy supplier or Staffordshire Warmer Homes)

✓ Avoid using bonfires to dispose of waste and never burn household waste, especially plastics, rubber and treated timber. See our webpages for advice on recycling, household rubbish and garden waste.

✓ Before organising days out, check the DEFRA air pollution forecast



For general information and air quality forecasts, Defra provide information at the following website: https://uk-air.defra.gov.uk. Forecasting uses a user-friendly index band to quickly demonstrate general short term air levels in a localised area, and supplements this with advice for 'at risk individuals' and the general public.

Newcastle-under- Lyme Borough Council's air quality reports and action plan documents are accessible from the following link https://www.newcastle-staffs.gov.uk/airquality

For enquires or suggestions on how to improve air quality please feel free to contact us:

Write to:	The Environmental Protection Team, Newcastle-under- Lyme Borough Council Castle House, Barracks Road Newcastle under Lyme.ST5 1BL
Email:	environmental_health@newcastle-staffs.gov.uk
Telephone:	01782 717717

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Newcastle-under-Lyme Borough Council with the support and agreement of the following officers and departments:

- Head of Regulatory Services – Nesta Barker

This ASR has been approved by:

Councillor Trevor Johnson – Portfolio Holder for Environment and Recycling

This ASR has been signed off by the County Council Director of Public Health ,Dr Richard Harling.

If you have any comments on this ASR please send them to the Environmental Protection Team at:

Environmental Protection Team, Regulatory Services, Newcastle under Lyme Borough Council, Castle House, Barracks Road, Newcastle under Lyme. ST5 2BL

01782 717717

Environmental_health@newcastle-staffs.gov.uk

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Tables

Local Air Quality Management

This report provides an overview of air quality in Newcastle-under-Lyme Borough Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Newcastle-under-Lyme Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table F.1.

Actions to Improve Air Quality

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 should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by Newcastle-under-Lyme Borough Council can be found in Table.3. The table presents a description of the four AQMAs that are currently designated within Newcastle-under-Lyme Borough Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean

In 2023, we propose to revoke “AQMA 4 - Little Madeley” as the results for the NO_2 annual mean have been consistently below the UK objective for the past 5 years (see monitoring/additional section).

Table.3 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 1: Liverpool Road, Kidsgrove	Jan-15	NO_2 Annual Mean	Exceedance of the NO_2 annual mean objective along Liverpool Road A50, Kidsgrove.	NO	48	36.2	3	Newcastle under Lyme Air Quality Action Plan 2019 – 2024	www.newcastle-staffs.gov.uk/environment/air
AQMA 2: Newcastle-under-Lyme Town Centre	Jan-15	NO_2 Annual Mean	Exceedance of the NO_2 annual mean objective. Covers Newcastle under Lyme Town Centre including the ring road A53, King Street, George Street and London Road to the boundary with the City of Stoke on Trent AQMA	YES	58.8	37.8	3	Newcastle under Lyme Air Quality Action Plan 2019 – 2024	www.newcastle-staffs.gov.uk/environment/air

AQMA 3: Maybank-Wolstanton-Porthill	Jan-15	NO_2 Annual Mean	Covers the principal routes between Maybank, Wolstanton and Porthill. Declared due to exceedances of the NO_2 annual mean in Maybank High Street and in the Porthill area	YES	46.5	28.4	5	Newcastle under Lyme Air Quality Action Plan 2019 – 2024	www.newcastle-staffs.gov.uk/environment/air
AQMA 4: Little Madeley	Jan-15	NO_2 Annual Mean	Declared around two properties at Little Madeley due to an exceedance of the NO_2 annual mean arising from the M6 motorway.	YES	52.1	19.4	8	Newcastle under Lyme Air Quality Action Plan 2019 – 2024	www.newcastle-staffs.gov.uk/environment/air

☒ **Newcastle-under-Lyme Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

☒ **Newcastle-under-Lyme Borough Council confirm that all current AQAPs have been submitted to Defra**

Progress and Impact of Measures to address Air Quality in Newcastle-under-Lyme Borough Council

Defra's appraisal of last year's ASR concluded

DEFRA's appraisal comments	Council Response
The report provides some of information specified in the Guidance. However, the comments in bold must be addressed in order for the report to be accepted:	
1. **The Site ID in Table A.3 for the automatic monitoring site is incorrect and should be CM1, to match that of Table A.1. Similarly, the other columns need to be updated accordingly to reflect incorrect values in the X OS Grid, Y OS Grid, Site Type and Valid Data Capture columns.**	This has been addressed and the report has been resubmitted for appraisal and approval.
2. The AQAP link is broken and needs to be corrected with a working link.	The weblink has been updated to https://www.newcastle-staffs.gov.uk/protection/air-quality-management
3. Subscripts and superscripts should be used correctly, there are instances where this is not case.	This has been addressed in the resubmitted report.
Positive aspects of this report include:	
4. The Council provide detailed information regarding addressing the importance of $PM_{2.5}$ emissions in this ASR. This includes the use of monitoring data from nearby authorities, reference to the	This comment is welcomed and the same approach has also been taken in this report.

Public Health Outcomes Framework, and measures being undertaken within Newcastle-under-Lyme to reduce $PM_{2.5}$ and PM_{10} emissions. This is to be commended, and this practice is encouraged to continue going forward.	
5. **The Council have included a detailed table, in this year's ASR, which includes comments from last year's ASR appraisal and responses to these comments. This is encouraged to continue in future ASRs.**	This comment is welcomed, and the same approach has also been taken in this report
6. **Trends have been presented with a robust comparison to the Air Quality Objectives.**	This comment is welcomed, and the same approach has also been taken in this report

Newcastle-under-Lyme Borough Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table. **7**., with the type of measure and the progress Newcastle-under-Lyme Borough council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table. **7**.

More detail on these measures can be found in their respective Action Plans[14] . Key completed measures are:

[14] The Air Quality Action plan for the Borough can be found at www.newcastle-staffs.gov.uk/environment/air

Table. 4 –Completed air quality action plan measures in 2022

MEASURE	SUMMARY
Upgrade of buses to Euro VI standard by winter 2020	Works were completed for 23 buses in late 2020. The Council continues to monitor compliance and NO_2 levels on the affected road covered by the associated ministerial direction. There are also small benefits to other locations where the Euro VI buses serve.
LSTF funding of cycling walking and bus links between Newcastle-under-Lyme and Stoke.	A new footpath and cycling link has been installed as part of HE junction improvement works between the A500 at Wolstanton and Porthill Works are also being undertaken to improve cross valley connectivity for walking and cycling in connection with the construction of the Etruria Valley Link Road.
Electric Vehicles	The Borough Council is currently utilising three electric vans for use by the Borough Council's Pest Control and Dog Warden Team.
Scheme to Reduce congestion on Liverpool Road, Kidsgrove	A revised scheme to reduce congestion on Liverpool Road, Kidsgrove has been implemented by the County Council. This will see optimisation of traffic light signals at the junction of Liverpool Road / The Avenue and also a partial ban on turns out of Heathcote Street onto Liverpool Road.
Fleet Efficiency	The Councils waste collection and street scene fleets are now fully Euro 6.

The following measures have been placed on hold:

Table. 5 – Action Plan Measures delayed

MEASURE	SUMMARY
Inclusion of air quality related planning policies in new joint local plan	Delayed pending publication of the revised local development plan for Newcastle under Lyme.
Develop policies to promote EV charging infrastructure in the Development Planning Process	Building regulations now require EV infrastructure and charging in new build and refurbished buildings where there is car parking. Plans are being developed at a county level to promote EV infrastructure across the wider county which will also include the NULBC estate.
Develop policies to support alternative vehicle fuelling technologies	Delayed pending publication of the revised local development plan for Newcastle under Lyme. Work is still continuing on drafting policies.
Voluntary Quality Network Partnership with bus operators	A decline in bus passenger travel and withdrawal and reliability of bus services is of major concern. Outside of a VQNP with operators, there is engagement with operators on an informal basis to identify issues and to jointly address challenges this is led by the City and County Highways Authorities.
Kidsgrove Railway Station Transport hub	The station is now fully accessible for all passengers following a £6million upgrade An approved Town Deal project includes an improved, modern station building, a new transport interchange, and a 200-space car park. There will also be better access to the nearby Trent and Mersey Canal. For information click here.

Newcastle-under-Lyme Borough Council's priorities for the coming year are;

Table.6 – Action Plan Priorities for the coming year

PROJECT NAME	SUMMARY
Revoke AQMA 4: Little Madeley	Consultation on revocation will commence in Summer 2023 based on NO_2 diffusion tube results only. A full report will be taken to the Council's Public Protection Committee to be presented in Winter 22/23 with a recommendation to revoke. DEFRA to be formally notified.
Review monitoring results for AQMA 3: Maybank-Wolstanton-Porthill	NO_2 concentrations have been at or below 36µg/m^3 at five of the six monitoring locations for the years 2016 to 2019. Concentrations for 2021 are lower than previous years due to reduced traffic emissions during travel restrictions. This AQMA will remain in place until monitoring confirms that all concentrations remain below 36µg/m³ (10% of the objective) at all sites, following traffic number returning to normal.
Continue with current air quality monitoring.	To support LAQM process. No changes planned
Support uptake of ULEV	Continue with electric vehicle projects listed above.
Complete air quality developer guidance document.	As mentioned above.
Partnership working with Staffordshire County Council and other Staffordshire Authorities	Continue process that is delivering measures listed above.

Newcastle-under-Lyme Borough Council worked to implement these measures in partnership with the following stakeholders during 2022:

- Staffordshire County Council
- First Potteries
- Stoke on Trent City Council, Stafford Borough Council and Swarco

Whilst the measures stated above and in Table. **7** will help to contribute towards compliance, Newcastle-under-Lyme Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to sustain compliance and enable the revocation of Kidsgrove; Newcastle under Lyme Town along with the Wolstanton, Porthill and Maybank AQMA's.

Table. 7 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
K1	Kidsgrove Railway Station Transport hub including parking and improved bus/rail interchange with new bus facilities closer to the station, Real Time Passenger Information provided at Kidsgrove station and at the bus stops, disabled/cycle parking, drop off and taxi facilities, and safer pedestrian and cycle access routes to the station	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2015	2025	Kidsgrove Town Deal Board & East Midlands Trains	Developers & highway infrastructure funding	NO	Partially Funded	£1 million - £10 million	Planning	Has potential to increase patronage / increase use of public transport and private car	Delivery of measure	Business Case and approval from DCLG required	Business case requires approval and funding to deliver project
K2	Traffic light optimisation to reduce congestion along Liverpool Road and prevention of right turn into Heathcote Street from A50	Traffic Management	UTC, Congestion management, traffic reduction	2016	2021	Staffordshire county Council	Staffordshire CC	NO	Funded	£50k - £100k	Completed	Reduced vehicle emissions	Delivery of measure	Completed	Community support / Funding. Scheme to be revised from original proposal to allow right turn.
K3	Review location of bus stops to facilitate traffic flow around Liverpool Road / The Avenue	Traffic Management	UTC, Congestion management, traffic reduction	2018	2020	Staffordshire county Council	Staffordshire County Council	NO	Funded	£10k - 50k	Aborted	Reduced vehicle emissions	Delivery of measure	Postponed pending review of monitoring results	Community support Objection from a resident has caused the scheme to be withdrawn for time being. We will monitor the impact of the Heathcote Street scheme on air quality, before we decide whether we need to pursue delivery of this proposal
N3	Wayfinding strategy Newcastle under Lyme Town Centre and outlying areas for walking and cycling	Promoting Travel Alternatives	Promotion of walking	2016		Lead by Newcastle under Lyme Borough Council with support from Staffordshire County Council, Sustrans and Town Centre Business Improvement District	Future High Street Fund	NO	Funded	£50k - £100k	Planning	Not quantified	Delivery of strategy	Business Case and approval from DCLG required	Business case requires approval and funding to deliver project

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
N7	Ring-Road enhanced signage & subway improvements	Traffic Management	Other	2016	2021	Lead by Newcastle under Lyme Borough Council with support from Staffordshire County Council, Sustrans and Town Centre Business Improvement District	Staffordshire CC	NO	Funded	£10k - 50k	Completed	Reduced vehicle emissions	Delivery of strategy	Strategy and plans still under development. Improvements in air quality and congestion considered as a priority along with walking cycling and public transport connectivity.	Completed signage and partial subway enhancements
N9	RTPI and subsidised bus travel / green travel plans sought for large-scale multi occupancy residential accommodation. Town centre expected to accommodate 3000 students for local universities	Policy Guidance and Development Control	Other policy	2016	2022	Staffordshire County Council with support via conditions on planning applications for inclusion in high occupancy student / keyworker accommodation	Staffordshire County Council through Section 106 contributions and Future High Street Fund	NO	Partially Funded	£100k - £500k	Implementation	Increased bus journeys from stops	Reduced vehicle emissions	A number of developments within the town centre are capitalising on proximity to public transport links, cycling infrastructure improvement on development and in network sought through planning. Travel planning sought via planning and monitored via county highways. Reduced rate bus passes for university students promoted.	Financial viability of development schemes to support required S106 / Resistance from developers.
MD 1	Ministerial Direction to implement bus retrofit scheme for public bus service using A53 between Sandy Lane and A500/A53 Roundabout at latest by 2021 and in the soonest possible timeframe	Promoting Low Emission Transport	Other	2018	2020	NULBC / First PMT / JAQU	DEFRA grant (100%)	YES	Funded	£100k - £500k	Completed	EU NO2 Annual mean exceedance non-compliance reduced by 1 year.	23 Buses retrofitted by end of 2020	Completed	Traffic Regulation Condition is to be sought to require operator to utilise Euro IV or better moving forward
MD 2	Ministerial Directions served on NULBC and SOTCC requiring Further Evaluation of measures to achieve compliance with the Ambient Air Quality Directive requirements for Nitrogen Dioxide in	Traffic Management	Other	2019	2022	National Highways / Staffs County Council / Stoke on Trent City Council and Newcastle under Lyme Borough Council Environmental Health	DEFRA grant (100%)	YES	Funded	£1 million - £10 million	Planning	EU NO2 Annual mean achieved in shortest possible timescale	Compliance with EU NO_2 limit value	Covid 19 has affected initial compliance date. Options appraisal undertaken and preferred option of bus gate and traffic management agreed for consultation agreed by JAQU	Preferred option of time restricted bus gate at peak hours and reduced turning across traffic is subject to public consultation.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	the soonest possible timeframe														
W1	Improvements to Wolstanton and Porthill Junctions on A500 to reduce congestion	Traffic Management	UTC, Congestion management, traffic reduction	2016	2021	National Highways	Highways Agency	NO	Funded	> £10 million	Completed	Reduction in congestion / improved journey times	Modelling of air quality impacts and monitoring	Completed in 2021	Funding identified by HE. Project flagged as high risk for air quality along A500 due to exceedance of EU action level
W2	Short term routing strategy to mitigate impact of congestion associated with works to A500	Traffic Management	UTC, Congestion management, traffic reduction	2019	2021	National Highways / Staffs County Council / Stoke on Trent City Council and NULBC Environmental Health	Highways Agency	NO	Funded	£100k - £500k	Completed	Potential short term negative impact during build	Modelling of air quality impacts and monitoring	No negative impacts identified during build	Negative impacts not identified through monitoring or congestion impacts
W3	Evaluate the impact of the Etruria Valley Link Road in the May Bank, Porthill, Wolstanton area and provide appropriate mitigation	Traffic Management	Strategic highway improvements,	2010	2022	Lead by Stoke on Trent City Council with planning application to Newcastle under Lyme Borough Council/ Staffordshire County Council involved	Stoke on Trent City Council scheme	NO	Partially Funded	£10k - 50k	Implementation	unclear	Modelling of air quality impacts and monitoring	Minor adverse impact but no exceedances identified in 2021	Potential negative effects on Maybank Porthill, Wolstanton AQMA. Potential to improve AQ in Stoke on Trent at Basford Bank where hourly mean NO2 is being exceeded. Scheme has the potential to add a positive contribution to mitigation measures in this area Monitoring will continue in both areas for at least 5 years post opening to evaluate success. AQMA to remain as a safeguard.
M1	Continue to monitor NO2 at relevant location in Little Madeley	Other	Other	2010	2023	Newcastle under Lyme Borough Council Environmental Health	Newcastle under Lyme Borough Council	NO	Funded	< £10k	Implementation	As per reported results	Monitoring	Compliance demonstrated since 2016. AMQA revocation planned to be subject to consultation and revocation in 2022	Nil
M2	Engage with NH concerning proposals to introduce smart managed motorway / hard shoulder running in Madeley area between junctions 15 and 16 of the M6 motorway	Traffic Management	Other	2010	2032	Lead by National Highways	National Highways	NO	Not Funded	< £10k	Not taken forward	Has potential to reduce congestion and vehicle emissions	Project delivered	Not yet commenced	Scheme not yet identified. Sections either side of junctions 15 and 16 of the M6 are being smart managed with hard shoulder running. Local geography is an issue to identifying appropriate solutions
BW 1	Borough Wide Air Quality Strategy	Policy Guidance and	Air Quality Planning and	2019	2023	Newcastle under Lyme Borough Council	Newcastle under Lyme Borough Council	NO	Not Funded	< £10k	Planning	Reduction in emissions	Strategy in place	Funding secured, planning phase	To launch alongside Local Plan

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
		Development Control	Policy Guidance			Environmental Health									
BW 2	Air Quality Planning Guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2023	Newcastle under Lyme Borough Council Environmental Health	Newcastle under Lyme Borough Council	NO	Not Funded	< £10k	Postponed	Reduction in emissions	Strategy in place	Postponed	The Council has decided to develop its own Local Plan and the planning guidance will sit alongside this as a material document.
BW 3	Inclusion of air quality related policies in the Newcastle under Lyme Local Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2023	Newcastle under Lyme Borough Council Environmental Health and Planning	Newcastle under Lyme Borough Council	NO	Not Funded	< £10k	Plan under development	Reduction in emissions	Policies in JLP	Plan under development	The Council has decided to develop its own Local Plan and relevant polices are being identified. https://www.newcastle-staffs.gov.uk/planning-policy/local-plan
BW 4	Staffordshire and Stoke on Trent Eco-Stars	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2015	2020	Staffordshire Local Authorities	Staffordshire LA's	YES	Funded	£500k - £1 million	Completed	Reduction in emissions	Reduced vehicle emissions	Scheme has come to an end in Staffordshire. Several local and national operators including LA's have been appraised under the initiative	Slow take up by operators across County
BW 5	Eco Stars award for Council Street-Scene and Waste fleet	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2015	2019	Newcastle under Lyme Borough Council Street Scene Division	Staffordshire LA's	Yes	Funded	£500k - £1 million	Completed	Reduced vehicle emissions	Fleet achieves 5* rating	Implementation on-going	4* Ecostars award with action plan to move to 5*
BW 6	Green Travel Plan for new Civic Hub development in Town Centre	Promoting Travel Alternatives	Workplace Travel Planning	2015	2017	Lead by Staffordshire County Council as building owner in conjunction with Borough Council, Police, Library Service, Social Services, Aspire Housing	Newcastle under Lyme Borough Council	NO	Not Funded	< £10k	Completed	Reduced vehicle emissions	Completed	Completed 2019.	Now in monitoring phase https://publicaccess.newcastle-staffs.gov.uk/online-applications/applicationDetails.do?activeTab=externalDocuments&keyVal=OUTZZDBM01S00
BW 7	Voluntary Quality Network Partnership with bus operators	Alternatives to private vehicle use	Other	2016	2019	Staffordshire County Council / Stoke on Trent City Council/ Local Bus Companies	Staffordshire County Council as Highways Authority	NO	Not Funded	£50k - £100k	Aborted	Reduced vehicle emissions /	Voluntary quality network operative across area	Aborted	Requires commitment from bus operators and councils. Decline in bus passenger numbers and services affects financial viability for improvements. Local operators use older fleet vehicles across area.
BW 8	Develop policies to promote EV charging infrastructure and support alternative	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019		Newcastle under Lyme Borough Council / Staffordshire County Council	Newcastle under Lyme Borough Council	NO	Not Funded	< £10k	Aborted	Reduction in emissions	Planning Related EV policies in place	Policy drafted	Superseded by changes to Building Regulations in May 2022

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	vehicle fuelling technologies														
BW 9	Support and participate in appropriate initiatives to encourage uptake of Zero and Low Emission Vehicle Technologies	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2016	2022	Newcastle under Lyme Borough Council, Staffordshire Districts and Staffordshire County Council	OLEV, National Highways & 3rd party funded	YES	Funded	£500k - £1 million	Underway	Reduction in emissions	Details of technologies and initiatives	Successful bid to OLEV LETIS. Rollout of EV chargers across several sites. Plan to be fully operational by end of 2022 and provider to engage with taxi and PHV trade	Slow rollout of programme and impacts from Covid 19
BW 10	Review the Borough Council's Hackney Carriage and Private Hire Licensing Policy to reduce tail pipe emissions from this sector	Promoting Low Emission Transport	Taxi emission incentives	2016	2019	Newcastle under Lyme Borough Council	Newcastle under Lyme Borough Council	NO	Not Funded	< £10k	Completed	Reduction in emissions	Policies updated with conditions	Policy approved in spring 2019	Policy adopted 2019 to 2025. Policies to support air quality improvement and improvements to latest emission standards and reduction in licence vehicle age not taken forward. Vehicles can be no older than 7 years old at date of first licence with council and no upper limit on age, subject to six months testing from 10 years old. If fails a retest will no longer be licensed.
BW 11	Transition the Council Vehicle fleet to Zero and Low Emission Vehicle Technologies	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2016	2030	Newcastle under Lyme Borough Council	Newcastle under Lyme Borough Council	NO	Partially Funded	£1 million - £10 million	Underway	Reduction in emissions	Policies updated	EURO IV refuse fleet and recycling vehicles delivered March 2020. 3 EV vans for pest control and dog warden service have been delivered. EV chargers installed and operational for council fleet vehicles at Knutton Depot.	Requires budget for capital expenditure by council
HS2 Phase 2a route	Ensure that emissions associated with construction and operation including off network effects do not cause exceedances of objectives or limit values	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2017	2032	HS2 and contractors / Newcastle under Lyme Borough Council	HS2 and contractors	NO	Funded	£1 million - £10 million	Underway	Emissions do not breach objectives or limit values	Emissions do not breach objectives or limit values	Discussion to date have identified that HS2 and contractors have assessed air quality impacts and have Environmental Minimum Standards, Construction Plans and monitoring plans in place	Advance works to commenced in 2021 with route construction anticipated to commence by 2026 and coming into operation by 2033

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

The Environment Act 2021 established a legally binding duty on Government to set an annual mean target on the level of fine particulate matter ($PM_{2.5}$), these have been set in The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. Also as detailed in Policy Guidance LAQM.PG22 (Chapter 8), 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 are now two targets to work towards:

The annual mean concentration target, which requires that by the end of 31st December 2040. The annual mean level of $PM_{2.5}$ in ambient air must be equal to or less than 10 µg/m³ with an interim target of 12 µg/m^3 to be achieved by the end of January 2028 as set out in the Environmental Improvement Plan 2022.

The other major target is the population exposure reduction target. This requires that there is at least a 35% reduction in population exposure by the end of 31st December 2040 ("the target date"), as compared with the average population exposure in the three-year period from 1st January 2016 to 31st December 2018 ("the baseline period"), determined in accordance with regulation 8.

There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

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.

$PM_{2.5}$ is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) D01 Fraction of mortality attributable to particulate air pollution (2020), Public Health Outcomes Framework indicator [7] is based. Air pollution affects us all. It is associated with impacts on lung development in children, heart disease, stroke, cancer, exacerbation of asthma and increased mortality, among other health effects.[8]

The mortality burden of air pollution in England is estimated to be between 26,000 and 38,000 a year.[8]

Within Staffordshire it is estimated that in 2021(latest figures) (5.0%of all deaths can be attributed to exposure to $PM_{2.5}$, compared to 5.5% across England (29,850 deaths annually)[7]. Overall, the estimated cost to individuals and society is more than £20 billion annually for the UK.

Particulate Matter ($PM_{2.5}$) Levels in Staffordshire and Stoke-on-Trent

Only Stoke on Trent monitor locally for PM_{10}. However, a number of authorities, including Newcastle under Lyme, have been approached by Defra to host an Automatic Urban and Rural Network (AURN), which if suitable sites can be found would mean that these councils will have PM data specific to their area rather than having to rely on the $PM_{2.5}$ background maps provided by Defra.

As Newcastle under Lyme Borough does not monitor $PM_{2.5}$ or PM_{10}, a map indicating the areas with the highest four levels of background annual mean $PM_{2.5}$ concentrations and the areas with the lowest four levels of minimum background annual mean $PM_{2.5}$ has been derived from the Defra Background maps. This is shown in Appendix E1. Newcastle under Lyme Borough Council has determined that the highest background PM_{10} concentration is 9.7 µg/m^3, located in the 1km grid square which includes the M6 motorway at Keele. The lowest PM_{10} concentration is 6.1 µg/m^3, located in the rural part of the Borough at Tyrley.

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

Although the levels of $PM_{2.5}$ within the County and City of 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 within Staffordshire and Stoke-on-Trent. This is revealed in data obtained from UK Health Security Agency (UKHSA) used to inform Public Health Outcomes Framework indicator D01[5], as shown in Figure 1

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 within Staffordshire and are shown in Figure 2. The data presented to 2021 is the latest data available at time of publication of this report. Approximately 5.8% of deaths between 2018 to 2021 within the County can be attributed to PM2.5. (Note the method for calculating this figure changed in 2022 and we have only the data for 2018,2019,2020 & 2021 using this new method, As the 2020 data for this indicator includes the period from March 2020 onwards, the mortality data used in its calculation will reflect effects of the COVID-19 pandemic).

Table 8 Estimated average number of deaths by local authority area attributable to $PM_{2.5}$ within Staffordshire for adults over 30 - 2018 to 2021

District/County	Percentage
Newcastle-under-Lyme	5.5%
Stafford	5.5%
East Staffordshire	6.0%
South Staffordshire	5.8%
Lichfield	6.0%
Staffordshire Moorlands	5.3%
Cannock Chase	6.0%
Tamworth	6.4%
Stoke on Trent	5.9%
Staffordshire County	5.8%
England	6.3%

Table 9 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, $PM_{2.5}$) for Staffordshire Authorities 2018 to 20217

	2018			2019			2020			2021		
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
Newcastle-under-Lyme	1334	5.7	80	1282	6.8	90	1548	4.7	70	1409	5.5	70
Stafford	1336	5.8	80	1315	6.8	90	1565	4.5	70	1432	4.8	70
East Staffordshire	1093	6.3	70	1128	7.3	80	1355	5.1	70	1287	5.1	70
South Staffordshire	1211	6.3	80	1212	7.0	90	1418	4.9	70	1333	5.1	70
Lichfield	1087	6.4	70	1093	7.2	80	1272	5.2	70	1129	5.1	60
Staffordshire Moorlands	1108	5.2	60	1080	6.6	70	1276	4.5	60	1133	4.7	50
Cannock Chase	976	6.4	60	908	7.2	70	1046	5.1	50	1089	5.2	60
Tamworth	653	6.9	50	678	7.7	50	752	5.6	40	730	5.4	40
Stoke on Trent	2746	6.1	170	2490	7.2	180	3034	5.0	150	2790	5.2	150
Staffordshire	8798	6.1	530	8692	7.0	610	10227	4.9	500	9539	5	480

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

A number of the Staffordshire Authorities are currently involved in implementing measures to reduce levels of NO_2 within their areas, which are detailed elsewhere in this report. Whilst there is currently no statutory duty imposed on Local Authorities in England to reduce $PM_{2.5}$, a number of the measures are complementary.

Newcastle-under-Lyme Borough Council is taking the following measures as outlined in **Table 10** in conjunction with our partners at the County Council and other partners identified in the table to address $PM_{2.5}$.

Table 10 – Measures being undertaken within Newcastle under Lyme to reduce PM_{10} and $PM_{2.5}$

Category	Measure Classification	Effect on reducing NOx and PM_{10} emissions (low, medium, high)	Reduces $PM_{2.5}$ emissions	Existing Measure	Measure in Newcastle under Lyme
Traffic Management	Urban Traffic Control systems, Congestion management, traffic reduction	low	✓	✓	UTC in areas of AQMA 1: Liverpool Road, Kidsgrove and AQMA 2: Newcastle-under-Lyme Town Centre
Promoting Travel Alternatives	Workplace Travel Planning	low	✓	✓	www.staffordshire.gov.uk/Transport/Air-quality/Businesses.aspx
	Encourage / Facilitate home-working	low	✓	✓	Agile working policy adopted by Council
	School Travel Plans	low	✓	✓	Funded School Travel Plans for school expansions: 14 Newcastle Borough,
	Promotion of cycling	low	✓	✓	The Local Cycling and Walking Infrastructure Plan is currently under development by SCC
	Promotion of walking	low	✓	✓	
	Staffordshire Share a Lift Scheme		✓	✓	A new provider is currently being sought for the Staffordshire Lift Scheme
Transport Planning & Infrastructure	Local Transport Plans and District Strategies	high	✓	✓	The transport strategy for Newcastle-under-Lyme can be found HERE
	Public transport improvements- interchanges stations and services	low	✓	✓	Kidsgrove Station interchange plans
	Cycle network	low	✓	✓	SCC currently looking to implement improved mapping software for future developments
	Bus route improvements	high	✓	✓	RTPI routes 3 & 4 Newcastle Town Centre. Improved future bus services to Chatterley Valley
Policy Guidance and	Planning applications to require assessment of exposure /	high	✓	✓	Local Validation list draws attention to requirements

Development Control	emissions for development requiring air quality impact assessment				
	Planning Policies		✓	✓	Local plan under development to include policies which will benefit air quality
	STOR Sites (Short Term Operating Reserve) Energy Generation. Regulation via planning / permitting regime	high	✓	✓	1 STOR site regulated for emissions via Environmental Permit – Norkier Power Holditch
	Route Management Plans/ Strategic routing strategy for HGV's	high	✓	✓	The Local Transport Strategy for Newcastle-under-Lyme can be found HERE
Vehicle Fleet Efficiency	Promoting low emission public transport	high	✓	✓	Planned promotion of retrofitted buses on routes 3 / 4 and 4a in preference to private car
	Vehicle retrofitting programmes	medium	✓	✓	£370,000 DEFRA grant to retrofit 23 buses running on routes 3/ 4 and 4a to latest EURO IV. Completed November 2020
Regulatory & Policy	Active regulation of permitted installations and identification of unregulated activities requiring permit		✓	✓	Regulation permitted installations and identification of unregulated activities requiring permit
	Clean Air Act enforcement,		✓	✓	Smoke Control, Cable burning, Dark Smoke, Chimney heights
	Environmental Protection Act 1990 / Anti-Social Behaviour (Crime and Policing) Act 2014		✓	✓	Enforcement of Duty of Care in respect of trade waste burning (EPA s33 & S34) Statutory nuisance and CPW/CPN application for frequent burning

$PM_{2.5}$ in Staffordshire & Stoke-on-Trent - Next steps

As $PM_{2.5}$ is an issue requiring collaboration between the district, county and city authorities within Staffordshire, the following actions are proposed in addition to those outlined in the action plan. Progress on these and the action plan will be detailed in the 2022 ASR. This has been delayed due to the Covid Pandemic

- ✓To agree a target for reducing the fraction of All-Cause Mortality from $PM_{2.5}$ in each district, city and county authority.
- ✓To agree a target for reducing $PM_{2.5}$ exposure (calculated from PM_{10} exposure / background maps / local monitoring where available). This was delayed due to disruption caused by the Covid Pandemic.
- ✓To maintain compliance with the 2020 EU limit value of 25µg/m^3.
- To include Public Health Outcome Framework Indicator D01 in the Staffordshire and District Authority and City Council Joint Strategic Needs Assessment for 2019/2020 onwards and to report progress to the relevant Health and Wellbeing Boards.
- To continue to identify risks affecting $PM_{2.5}$ which need to be addressed at a national level.

- Undertaking a comprehensive review of current smoke control areas with a view to revoking and putting in place a single smoke control area to cover the Borough and areas being targeted for development. We anticipate that this will be completed by the end of the 22/23 financial year.
- Undertaking a data gathering exercise to map out where solid fuel burning stoves have been installed in accordance with current Building Regulations requirements and supplementing this with complaint and observational information.

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

This section sets out the monitoring undertaken within 2022 by Newcastle-under-Lyme Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

Automatic Monitoring Sites

Newcastle-under-Lyme Borough Council undertook automatic (continuous) monitoring at 1 site during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring site. The Council's website www.newcastle-staffs.gov.uk/laqm presents automatic monitoring results for Newcastle-under-Lyme Borough Council with automatic monitoring results also available through the UK-Air website .

A map showing the location of the monitoring site is provided in Appendix D. Further details on how the monitor is calibrated and how the data has been adjusted are included in Appendix C.

Non-Automatic Monitoring Sites

Newcastle-under-Lyme Borough Council undertook non- automatic (i.e., passive) monitoring of NO_2 at 80 sites during 2022. Forty triplicate sites (DT 107 to DT146) were set up in the 2020 monitoring period to provide baseline data in preparation of possible effects of traffic increase on dispersion routes resulting from actions in the upcoming North Staffordshire Air Quality Action Plan.

Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the 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 C.

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e., the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 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.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Newcastle under Lyme Queen's Gardens	Roadside	385054	346134	NO_2	YES	Chemiluminescent	2	3	2

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DTK1	A34 Holy Trinity	Kerbside	385051	345726	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	22.0	3.0	No	2.5
DTK2	76 King St, N/C	Urban Centre	385469	346362	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	3.0	No	2.5
DTUB1	Wolstanton, Hartington St	Kerbside	384739	348326	NO_2	NO	7.0	2.0	No	2.5
DTUB2	Westlands, 4 Sneyd Crescent	Kerbside	383916	345059	NO_2	NO	23.0	2.0	No	2.5
DT3	Collingwood, 3 Newcastle Rd	Rural	378116	345488	NO_2	YES - AQMA 4: Little Madeley	0.2	128.0	No	2.5
DT6	106 Liverpool Rd	Suburban	384014	354429	NO_2	YES - AQMA 1: Liverpool Road, Kidsgrove	0.2	4.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT9	32 Porthill Bank	Suburban	385519	349055	NO_2	YES -AQMA 3: Maybank-Wolstanton-Porthill	0.2	6.0	No	2.5
DT11	34 London Road, N/C	Suburban	385112	345636	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.3	3.0	No	2.5
DT24	26 High St, May Bank	Roadside	385574	347530	NO_2	YES -AQMA 3: Maybank-Wolstanton-Porthill	0.2	3.0	No	2.5
DT28	Limbrick Cottage Shraleybrook	Rural	377994	350105	NO_2	NO	0.3	45.0	No	2.5
DT34	15 Barracks Road	Urban Centre	385059	345840	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	1.0	4.0	No	2.5
DT39	4/6 Liverpool Road, Kidsgrove	Suburban	383560	354739	NO_2	YES - AQMA 1: Liverpool Road, Kidsgrove	0.2	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT40	Banktop Court, Porthill	Suburban	385128	348811	NO_2	YES -AQMA 3: Maybank-Wolstanton-Porthill	0.2	20.0	No	2.5
DT46	1 London Road (Trinity Court)	Urban Centre	385073	345685	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	4.0	No	2.5
DT47	1 London Rd (Brook La)	Urban Centre	385023	345678	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.3	5.0	No	2.5
DT49	2 Vale View, Porthill	Urban Centre	385595	349129	NO_2	YES -AQMA 3: Maybank-Wolstanton-Porthill	0.3	6.0	No	2.5
DT64	Kidsgrove Carpets 57 - 59 Liverpool Road	Urban Centre	383950	354445	NO_2	YES - AQMA 1: Liverpool Road, Kidsgrove	0.2	10.0	No	2.5
DT72	134 High Street Newcastle	Roadside	384981	345750	NO_2	YES - AQMA 2: Newcastle-	0.2	3.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
						under-Lyme Town Centre				
DT73	21 London Road Newcastle	Roadside	385070	345738	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	4.0	No	2.5
DT74	39 London Road Newcastle	Roadside	385132	345640	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	4.0	No	2.5
DT76	11 Brunswick Street Newcastle	Roadside	385226	346156	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT84	102 King Street Newcastle	Roadside	385548	346400	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT85	106 King Street Newcastle	Urban Centre	385575	346413	NO_2	YES - AQMA 2: Newcastle-	0.2	5.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
						under-Lyme Town Centre				
DT86	Hassell C.P. School Barracks Road N/C	Urban Centre	385075	345910	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	5.0	No	2.5
DT87	Blue Chilli 1 King Street Newcastle	Urban Centre	385105	346225	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	5.0	No	2.5
DT88	27 Lower Street Newcastle	Urban Centre	384709	345881	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	5.0	No	2.5
DT89A, DT89B, DT89c	Queens Gardens	Urban Centre	385054	346134	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	1.0	5.0	Yes	2.5
DT92	41/43 Liverpool Road Kidsgrove	Urban Centre	383890	354461	NO_2	YES - AQMA 1: Liverpool	1.0	5.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
						Road, Kidsgrove				
DT93	118 Liverpool Road Kidsgrove	Urban Centre	384056	354393	NO_2	YES - AQMA 1: Liverpool Road, Kidsgrove	0.2	2.0	No	2.5
DT94	116 Liverpool Road Kidsgrove	Urban Centre	384030	354416	NO_2	YES - AQMA 1: Liverpool Road, Kidsgrove	0.2	4.0	No	2.5
DT95	76 London Road Newcastle	Roadside	385171	345539	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT96	On Lamppost Next JJ Design London Road Newcastle	Roadside	385131	345601	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	3.0	No	2.5
DT97	Blackfriars/ Lower Street	Roadside	384795	345796	NO_2	YES - AQMA 2: Newcastle-	0.2	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
						under-Lyme Town Centre				
DT98	Newcastle Taxis Brunswick Street	Roadside	385327	346148	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT100	Sainsbury's Carpark Near to Courts	Roadside	384689	346284	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT101	Blackburn House Lower Street Newcastle	Roadside	384806	345842	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT102	Maxims Lower Street Newcastle	Roadside	384609	346007	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT103	Grange Lange/High Street Wolstanton	Roadside	385682	347909	NO_2	YES - AQMA 3: Maybank-	0.2	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
						Wolstanton-Porthill				
DT104	7 King Street Newcastle	Roadside	385213	346270	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	0.2	2.0	No	2.5
DT105	The Avenue Kidsgrove	Urban Centre	383991	354418	NO_2	YES - AQMA 1: Liverpool Road, Kidsgrove	3.0	1.0	No	2.5
N107a, N107b, N107c	Knutton Lane	Roadside	384495	346298	NO_2	NO	4.0	2.0	No	2.5
N108a, N108b, N108c	24A Clayton Road, Newcastle	Roadside	384961	345346	NO_2	NO	5.0	2.0	No	2.5
N109a, N109b, N109c	Clayton Road (Opp Nuffield)	Roadside	385190	343318	NO_2	NO	10.0	3.0	No	2.5
N110a, N110b, N110c	Holiday Inn Layby	Roadside	385110	342314	NO_2	NO	49.0	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N111a, N111b, N111c	Talke Road A34 Bradwell	Roadside	383882	349558	NO_2	NO	25.0	2.0	No	2.5
N112a, N112b, N112c	A53 Whitmore Road	Roadside	382286	341956	NO_2	NO	120.0	2.0	No	2.5
N113a, N113b, N113c	A53 Whitmore Road/ Seabridge Lane	Roadside	383052	343666	NO_2	NO	107.0	2.0	No	2.5
N114a, N114b, N114c	9 Sneyd Avenue	Roadside	383953	344832	NO_2	NO	5.0	2.0	No	2.5
N115a, N115b, N115c	Newcastle Community School Layby	Roadside	383545	345195	NO_2	NO	20.0	2.0	No	2.5
N116a, N116b, N116c	Gallowstree Lane	Roadside	383157	345431	NO_2	NO	40.0	2.0	No	2.5
N117a, N117b, N117c	Clough Hall Drive	Roadside	383199	352740	NO_2	NO	10.0	2.0	No	2.5
N118a, N118b, N118c	154 Newcastle Road	Roadside	382934	353388	NO_2	NO	10.0	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N119a, N119b, N119c	Butt Lane Primary School	Roadside	382600	354062	NO_2	NO	15.0	2.0	No	2.5
N120a, N120b, N120c	Pets and Pastimes, Butt Lane	Roadside	382707	354305	NO_2	NO	2.0	2.0	No	2.5
N121a, N121b, N121c	One-Sure Insurance, Butt Lane	Roadside	382736	354385	NO_2	NO	10.0	2.0	No	2.5
N122a, N122b, N122c	Aldi Bus Stop, Liverpool Road, Kidsgrove	Roadside	384261	354207	NO_2	NO	10.0	3.0	No	2.5
N123a, N123b, N123c	Skate Park, Liverpool Road, Kidsgrove	Roadside	384638	354133	NO_2	NO	20.0	2.0	No	2.5
N124a, N124b, N124c	49 Kidsgrove Bank	Roadside	385019	353832	NO_2	NO	20.0	2.0	No	2.5
N125a, N125b, N125c	Adlington House Care Home, Wolstanton	Roadside	385387	348389	NO_2	YES - AQMA 3: Maybank-Wolstanton-Porthill	5.0	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N126a, N126b, N126c	Morris Square, Wolstanton	Roadside	385556	348224	NO_2	YES - AQMA 3: Maybank-Wolstanton-Porthill	20.0	2.0	No	2.5
N127a, N127b, N127c	Victoria Public House, May Bank	Roadside	385416	347424	NO_2	NO	10.0	2.0	No	2.5
N128a, N128b, N128c	34 Brampton Road	Roadside	385512	347373	NO_2	NO	20.0	2.0	No	2.5
N129a, N129b, N129c	Ebenezer House, Newcastle	Roadside	384968	346228	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	30.0	2.0	No	2.5
N130a, N130b, N130c	St Georges Church, Brampton	Roadside	385098	346395	NO_2	NO	20.0	2.0	No	2.5
N131a, N131b, N131c	25 King Street, Newcastle	Roadside	385463	346374	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	5.0	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N132a, N132b, N132c	120 Etruria Road	Roadside	385612	346436	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	5.0	2.0	No	2.5
N133a, N133b, N133c	Charlotte House, Etruria Road	Roadside	385926	346580	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	5.0	2.0	No	2.5
N134a, N134b, N134c	526 Etruria Road, Basford	Roadside	386009	346600	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	7.0	2.0	No	2.5
N135a, N135b, N135c	Andrew Place	Roadside	385518	346128	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	20.0	2.0	No	2.5
N136a, N136b, N136c	No 1 London Road Trinity Court on Road Sign	Roadside	385078	345687	NO_2	YES - AQMA 2: Newcastle-under-Lyme Town Centre	4.0	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N137a, N137b, N137c	Old Garage site, Cemetery Road	Roadside	382795	346011	NO_2	NO	0.0	2.0	No	2.5
N138a, N138b, N138c	Post Office Depot, Church Lane	Roadside	383113	346592	NO_2	NO	20.0	2.0	No	2.5
N139a, N139b, N139c	Church Lane/ Acacia Gardens	Roadside	383302	346727	NO_2	NO	20.0	2.0	No	2.5
N140a, N140b, N140c	Lower Milehouse Lane opposite Morrison's Delivery	Roadside	383930	347273	NO_2	NO	10.0	2.0	No	2.5
N141a, N141b, N141c	Pelican Crossing Lower Milehouse Lane near to Milehouse Restaurant	Roadside	384337	347534	NO_2	NO	5.0	2.0	No	2.5
N142a, N142b, N142c	A34 Bustop by Bakery	Roadside	384207	347915	NO_2	NO	50.0	2.0	No	2.5
N143a, N143b, N143c	Back of Road Sign near to Rosendale Avenue	Roadside	384021	348925	NO_2	NO	10.0	2.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N144a, N144b, N144c	A34 On Traffic Sign near to Parkhouse Industrial West (Screwfix)	Roadside	383764	349912	NO_2	NO	0.0	2.0	No	2.5
N145a, N145b, N145c	On Entrance to Beta Way on lamp post with Camera Sign.	Roadside	383670	350326	NO_2	NO	20.0	2.0	No	2.5
N146a, N146b, N146c	On Give way sign exit to High Carr Business Park.	Roadside	383587	350790	NO_2	NO	80.0	2.0	No	2.5

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.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
CM1	385054	346134	Roadside	99.9	99.9	23	25.6	18	23.2	26.0

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction**

Notes:

The annual mean concentrations are presented as µg/m^3.

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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%).

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
DTK1	385051	345726	Kerbside	100	100.0	37.2	**47.4**	27.4	31.4	33.5
DTK2	385469	346362	Urban Centre	100	100.0	26.0	28.9	20.1	21.4	24.9
DTUB1	384739	348326	Kerbside	100	94.2	17.7	17.9	12.3	13.6	14.3
DTUB2	383916	345059	Kerbside	100	94.2	15.3	15.0	9.9	10.8	11.2
DT3	378116	345488	Rural	100	88.5	24.8	27.3	18.4	18.3	19.4
DT6	384014	354429	Suburban	100	100.0	37.1	38.6	27.3	30.6	31.7
DT9	385519	349055	Suburban	100	100.0	29.3	33.2	24.6	26.9	28.4
DT11	385112	345636	Suburban	100	90.4	35.1	**56.5**	25.7	29.6	30.4
DT24	385574	347530	Roadside	100	90.1	30.4	34.8	22.9	25.3	26.7
DT28	377994	350105	Rural	100	100.0	25.2	25.9	18.1	21.3	19.3
DT34	385059	345840	Urban Centre	100	100.0	29.2	33.7	21.2	25.4	26.3
DT39	383560	354739	Suburban	100	100.0	31.7	34.9	23.6	26.9	27.3
DT40	385128	348811	Suburban	100	100.0	25.2	26.5	19.4	20.5	20.9
DT46	385073	345685	Urban Centre	100	92.3	27.3	28.3	18.6	21.7	24.2
DT47	385023	345678	Urban Centre	100	100.0	24.7	28.0	19.2	23.6	23.0
DT49	385595	349129	Urban Centre	100	92.3	27.2	31.9	21.9	25.1	25.7
DT64	383950	354445	Urban Centre	100	100.0	32.7	36.7	24.5	28.9	29.8
DT72	384981	345750	Roadside	100	92.3	26.9	36.7	24.3	27.4	30.5
DT73	385070	345738	Roadside	100	100.0	29.3	32.6	27.7	30.8	31.9
DT74	385132	345640	Roadside	100	100.0	31.9	35.7	22.6	27.2	29.3
DT76	385226	346156	Roadside	100	65.4	33.1	37.7	27.1	35.0	35.3
DT84	385548	346400	Roadside	100	100.0	33.6	37.1	27.0	28.5	30.3
DT85	385575	346413	Urban Centre	100	92.3	38.8	**44.2**	27.9	34.9	34.4
DT86	385075	345910	Urban Centre	100	100.0	27.9	28.6	21.3	22.0	22.3
DT87	385105	346225	Urban Centre	100	100.0	34.9	39.4	25.6	32.2	34.9
DT88	384709	345881	Urban Centre	100	100.0	28.2	30.8	20.8	23.1	25.0
DT89A, DT89B, DT89c	385054	346134	Urban Centre	100	100.0	29.8	30.1	20.9	24.5	25.7
DT92	383890	354461	Urban Centre	100	90.1	31.9	33.3	22.5	26.3	27.8
DT93	384056	354393	Urban Centre	100	100.0	28.2	31.5	21.7	24.7	26.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
DT94	384030	354416	Urban Centre	100	100.0	31.8	**47.2**	30.2	37.5	36.2
DT95	385171	345539	Roadside	100	71.2	28.5	33.2	24.6	27.9	27.9
DT96	385131	345601	Roadside	100	100.0	35.8	39.5	28.9	28.1	29.6
DT97	384795	345796	Roadside	100	100.0	27.6	29.8	19.7	16.9	19.7
DT98	385327	346148	Roadside	100	100.0	36.5	38.8	24.3	30.1	35.5
DT100	384689	346284	Roadside	100	100.0	27.9	30.4	20.1	22.8	23.5
DT101	384806	345842	Roadside	100	100.0	32.8	32.9	21.6	26.0	26.6
DT102	384609	346007	Roadside	100	100.0	**44.1**	**44.8**	31.4	32.5	35.3
DT103	385682	347909	Roadside	100	100.0	25.1	23.1	17.1	16.6	19.5
DT104	385213	346270	Roadside	100	100.0	37.9	**58.8**	34.5	37.8	37.8
DT105	383991	354418	Urban Centre	100	100.0	26.0	29.7	18.7	21.2	21.3
N107a, N107b, N107c	384495	346298	Roadside	100	100.0			19.7	22.3	21.7
N108a, N108b, N108c	384961	345346	Roadside	100	100.0			19.5	20.9	22.3
N109a, N109b, N109c	385190	343318	Roadside	100	92.3			17.5	19.6	20.8
N110a, N110b, N110c	385110	342314	Roadside	100	100.0			21.1	23.5	25.2
N111a, N111b, N111c	383882	349558	Roadside	100	23.1			24.0	24.3	24.4
N112a, N112b, N112c	382286	341956	Roadside	100	100.0			14.8	16.2	17.1
N113a, N113b, N113c	383052	343666	Roadside	100	92.3			13.5	17.3	17.6
N114a, N114b, N114c	383953	344832	Roadside	100	100.0			16.1	17.5	19.3
N115a, N115b, N115c	383545	345195	Roadside	100	100.0			11.1	11.9	13.4
N116a, N116b, N116c	383157	345431	Roadside	100	100.0			16.4	17.1	18.5
N117a, N117b, N117c	383199	352740	Roadside	100	100.0			25.1	27.8	28.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
N118a, N118b, N118c	382934	353388	Roadside	100	100.0			18.5	20.8	21.4
N119a, N119b, N119c	382600	354062	Roadside	100	100.0			18.0	20.6	21.6
N120a, N120b, N120c	382707	354305	Roadside	100	100.0			24.2	28.7	29.1
N121a, N121b, N121c	382736	354385	Roadside	100	100.0			20.4	21.4	21.6
N122a, N122b, N122c	384261	354207	Roadside	100	100.0			20.8	23.0	22.4
N123a, N123b, N123c	384638	354133	Roadside	100	100.0			20.5	22.1	22.6
N124a, N124b, N124c	385019	353832	Roadside	100	100.0			32.3	31.7	33.0
N125a, N125b, N125c	385387	348389	Roadside	100	100.0			20.5	22.9	24.9
N126a, N126b, N126c	385556	348224	Roadside	100	100.0			18.3	19.8	21.5
N127a, N127b, N127c	385416	347424	Roadside	100	100.0			17.7	19.8	21.6
N128a, N128b, N128c	385512	347373	Roadside	100	100.0			22.7	24.5	25.8
N129a, N129b, N129c	384968	346228	Roadside	100	100.0			19.8	23.6	24.8
N130a, N130b, N130c	385098	346395	Roadside	100	100.0			24.9	27.4	29.6
N131a, N131b, N131c	385463	346374	Roadside	100	100.0			28.9	28.2	30.4
N132a, N132b, N132c	385612	346436	Roadside	100	100.0			25.2	27.7	28.8
N133a, N133b, N133c	385926	346580	Roadside	100	100.0			31.9	29.5	33.0
N134a, N134b, N134c	386009	346600	Roadside	100	100.0			24.0	25.0	28.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
N135a, N135b, N135c	385518	346128	Roadside	100	57.7			22.8	25.7	28.1
N136a, N136b, N136c	385078	345687	Roadside	100	90.4			22.2	25.9	28.4
N137a, N137b, N137c	382795	346011	Roadside	100	83.0			15.8	17.2	19.8
N138a, N138b, N138c	383113	346592	Roadside	100	88.5			19.5	19.9	21.0
N139a, N139b, N139c	383302	346727	Roadside	100	100.0			13.7	13.9	14.7
N140a, N140b, N140c	383930	347273	Roadside	100	100.0			21.9	23.5	25.2
N141a, N141b, N141c	384337	347534	Roadside	100	100.0			26.1	28.6	27.5
N142a, N142b, N142c	384207	347915	Roadside	100	100.0			20.8	21.9	24.9
N143a, N143b, N143c	384021	348925	Roadside	100	90.4			30.7	33.9	34.6
N144a, N144b, N144c	383764	349912	Roadside	100	100.0			16.7	17.7	18.3
N145a, N145b, N145c	383670	350326	Roadside	100	100.0			38.0	38.6	**40.5**
N146a, N146b, N146c	383587	350790	Roadside	100	100.0			21.9	24.2	25.5

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

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

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction**

Notes:

The annual mean concentrations are presented as µg/m^3.

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**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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%).

Figure A-1 – Trends in annual mean NO_2 concentrations 2018 to 2022 – AQMA 1 Kidsgrove

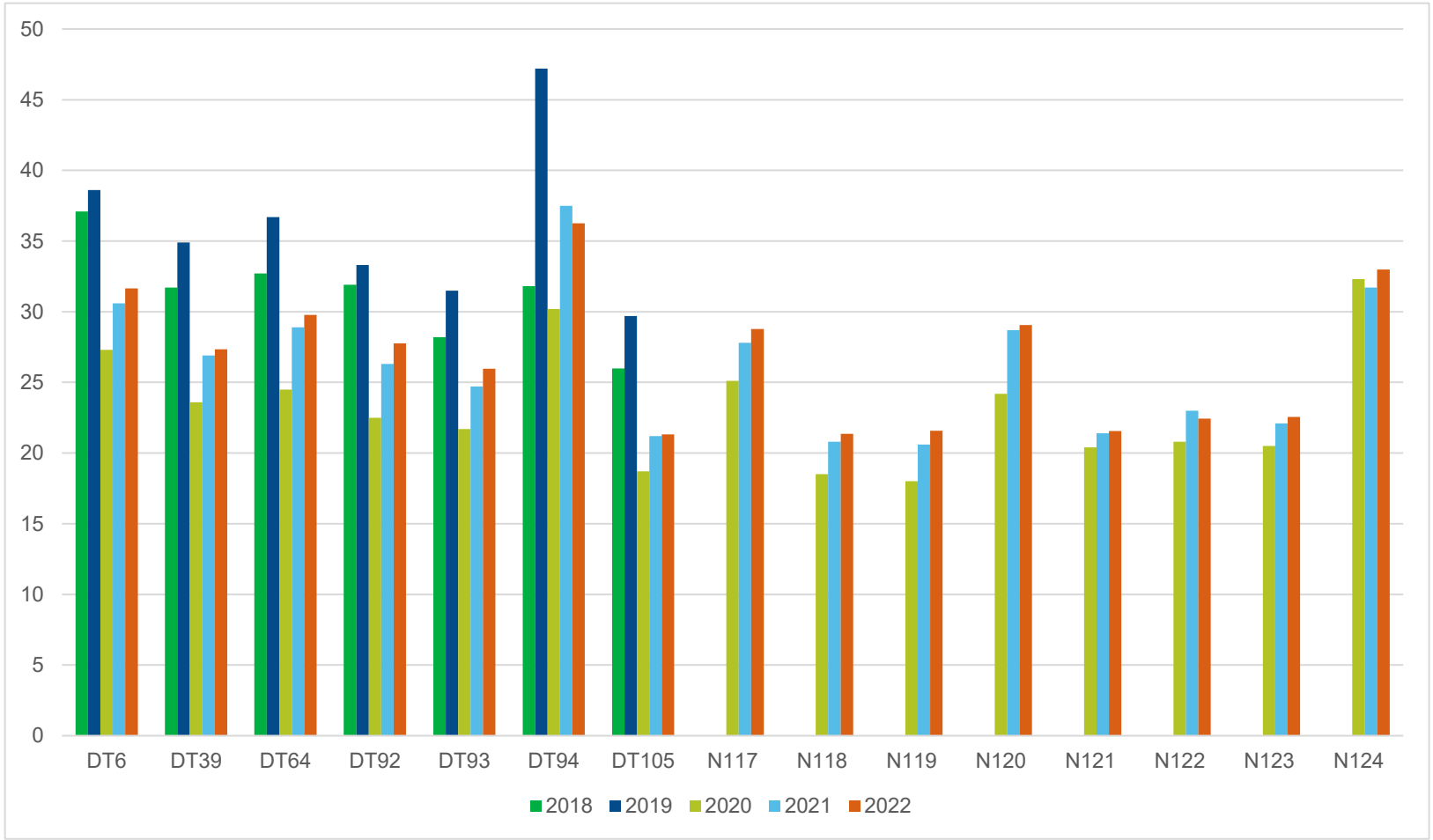

Figure A-2 - Trends in annual mean NO_2 concentrations 2018 to 2022 – AQMA 2 Newcastle Town

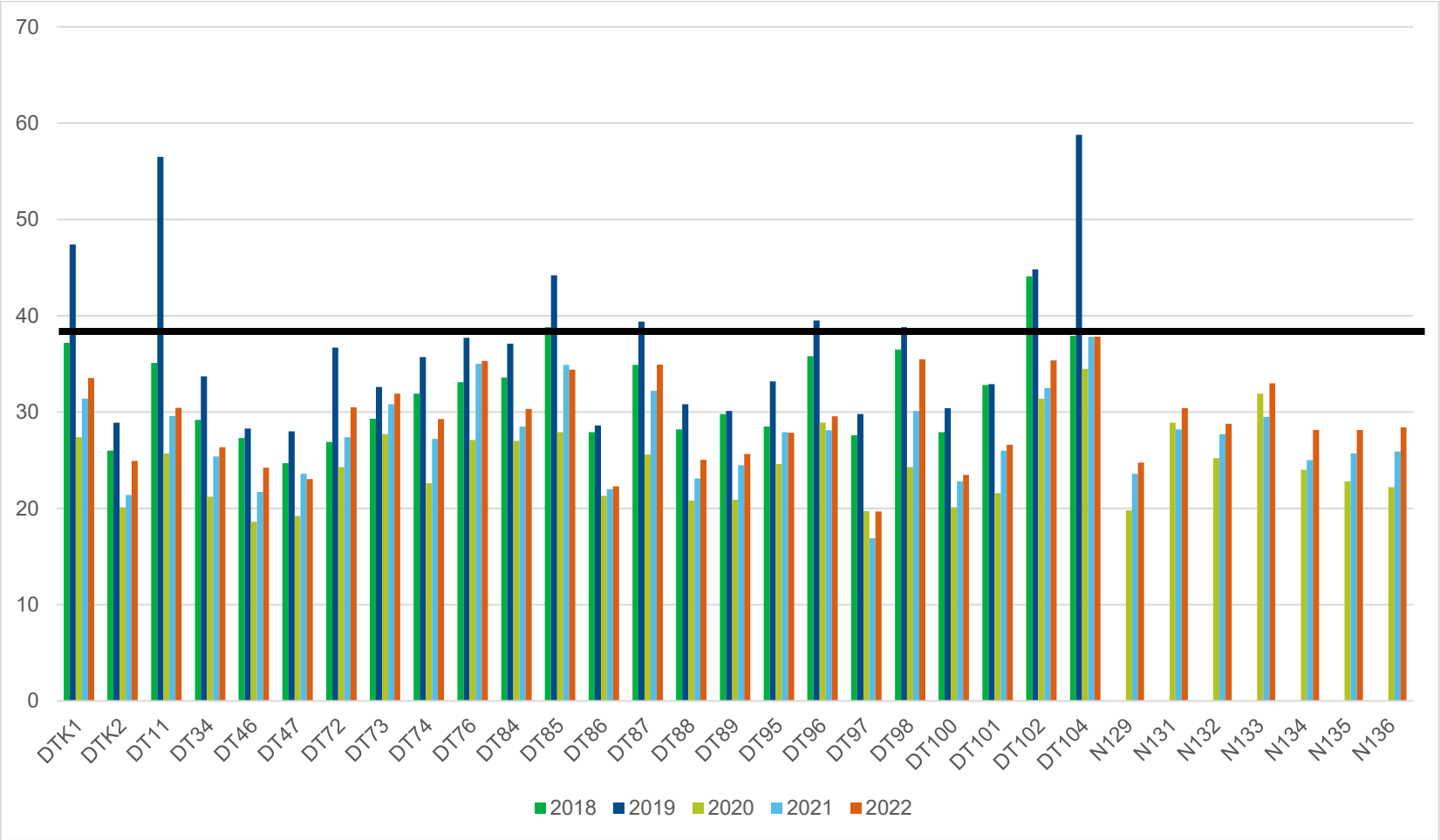
70
60
50
40
30
20
10
0
DTK1
DTK2
DT11
DT34
DT46
DT47
DT72
DT73
DT74
DT76
DT84
DT85
DT86
DT87
DT88
DT89
DT95
DT96
DT97
DT98
DT100
DT101
DT102
DT104
N129
N131
N132
N133
N134
N135
N136
2018
2019
2020
2021
2022

Figure A-3 - Trends in annual mean NO_2 concentrations 2018 to 2022 – AQMA 3 Maybank, Wolstanton, Porthill

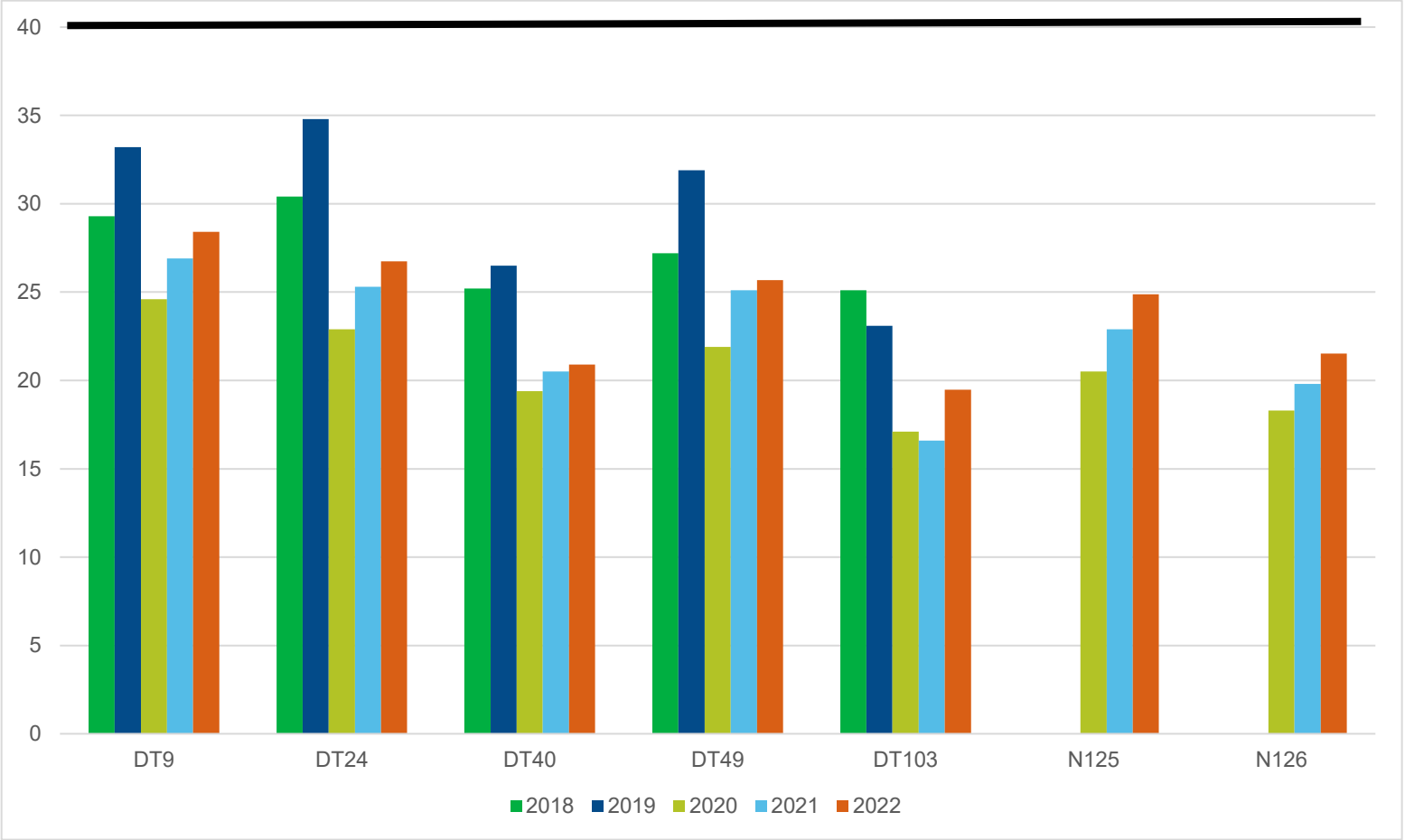

Figure A-4 - Trends in annual mean NO_2 concentrations 2018 to 2022 – AQMA 4 Little Madeley, Collingwood

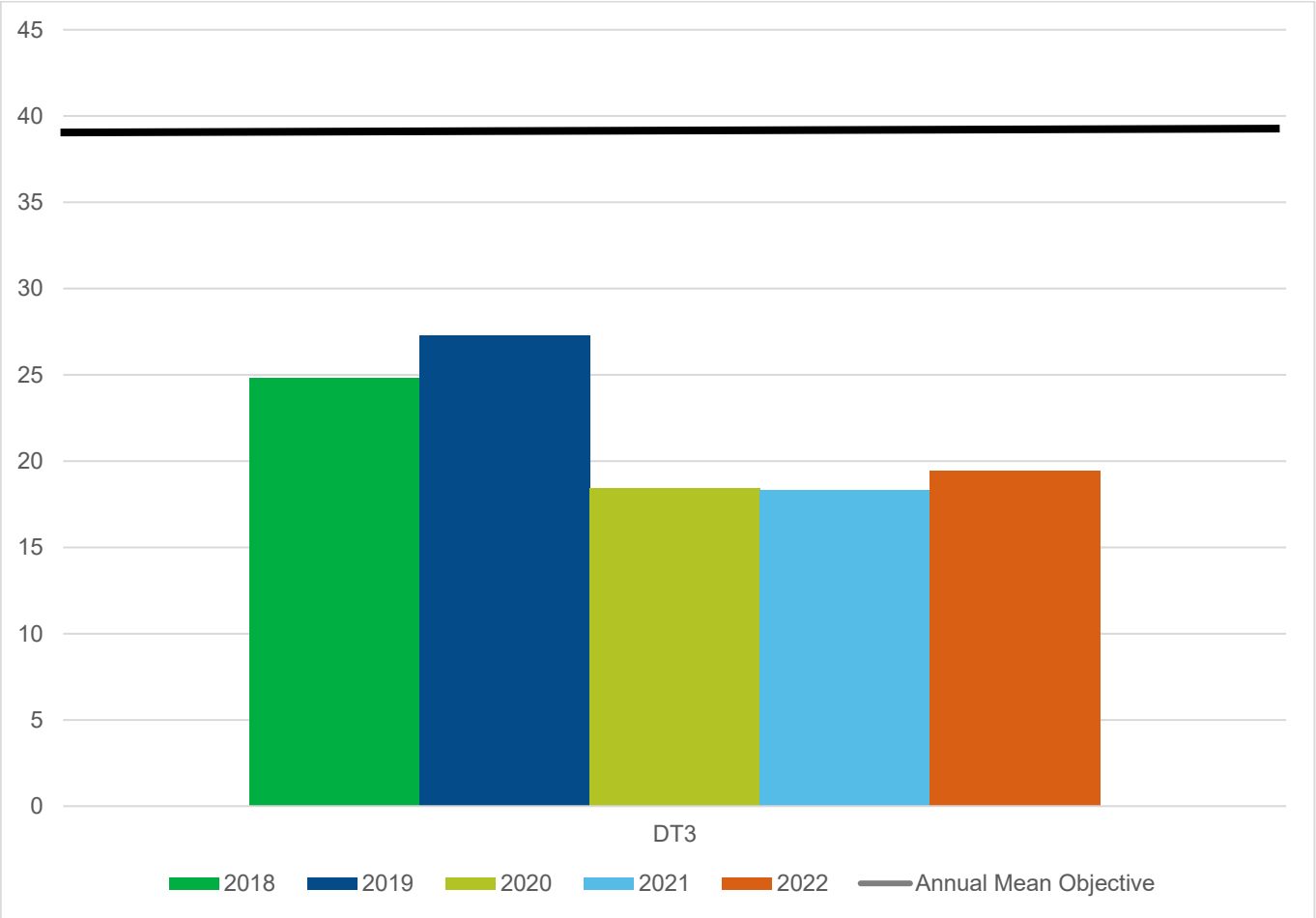
45
40
35
30
25
20
15
10
5
0
DT3
2018
2019
2020
2021
2022
Annual Mean Objective

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
CM1	385054	346134	Roadside	100	99.9	0	0	0	**0**	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

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**.

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

(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%).

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DTK1	385051	345726	51.4	32.2	36.8	32.8	30.1	34.4	38.5	36.2	42.5	34.6	56.3	50.0	39.0	33.5	-	
DTK2	385469	346362	36.9	23.8	35.8	26.0	19.8	21.0	25.8	27.0	29.8	28.0	38.1	39.1	29.0	24.9	-	
DTUB1	384739	348326	27.0	13.1	18.4	13.6	10.2	11.3	13.5	13.0	16.9	18.0	I/S	26.7	16.6	14.3	-	
DTUB2	383916	345059	21.9	9.0	18.8	11.4	11.9	7.3	10.0	9.8	13.6	11.9	I/S	17.6	13.0	11.2	-	
DT3	378116	345488	30.6	27.7	23.0	19.6	21.1	19.5	20.9	18.0	18.7	I/S	25.5	25.3	22.6	19.4	-	
DT6	384014	354429	46.2	29.0	41.4	36.3	30.7	31.3	34.7	37.6	43.1	33.3	49.5	35.5	36.8	31.7	-	
DT9	385519	349055	43.4	29.5	35.8	27.1	26.6	29.8	29.4	33.5	32.5	32.3	37.1	41.9	33.0	28.4	-	
DT11	385112	345636	48.5	30.5	39.0	I/S	23.4	28.6	29.4	29.9	51.7	31.6	40.9	41.0	35.4	30.4	-	
DT24	385574	347530	43.2	28.1	32.9	26.1	I/S	26.1	25.9	27.3	31.0	26.7	35.8	40.9	31.1	26.7	-	
DT28	377994	350105	31.0	25.1	22.7	18.7	20.7	20.2	20.5	21.0	20.1	20.8	24.9	25.8	22.5	19.3	-	
DT34	385059	345840	39.1	22.7	34.2	30.8	24.8	26.2	26.7	31.3	32.4	28.3	37.9	36.2	30.6	26.3	-	
DT39	383560	354739	37.7	22.9	34.6	32.8	27.3	23.9	28.3	33.8	36.1	30.0	42.2	35.2	31.8	27.3	-	
DT40	385128	348811	32.4	21.0	29.2	21.4	20.0	14.9	20.2	22.2	23.9	25.4	29.5	31.9	24.3	20.9	-	
DT46	385073	345685	38.9	26.8	29.2	23.2	23.3	24.7	24.5	< 1.5	26.4	30.2	31.8	32.2	28.2	24.2	-	
DT47	385023	345678	33.8	18.1	34.1	30.9	18.3	17.4	24.6	28.6	30.8	20.9	34.6	33.6	26.8	23.0	-	
DT49	385595	349129	42.8	I/S	29.8	24.5	24.4	26.1	28.0	28.7	29.9	28.2	32.5	36.3	29.9	25.7	-	
DT64	383950	354445	44.7	31.4	40.2	29.3	28.1	29.6	31.3	31.5	34.9	34.6	40.2	42.2	34.6	29.8	-	
DT72	384981	345750	43.3	26.0	34.7	32.0	25.9	27.5	30.5	35.6	< 1.5	50.0	40.6	40.1	35.5	30.5	-	
DT73	385070	345738	50.9	27.3	42.1	34.5	27.3	28.8	35.1	39.7	41.9	31.6	53.1	41.7	37.1	31.9	-	
DT74	385132	345640	43.5	22.4	36.6	31.7	25.2	25.5	31.0	33.7	39.4	30.4	56.9	40.8	34.0	29.3	-	
DT76	385226	346156	45.6	34.5	44.3	41.8	34.6	39.3	34.1	34.0	< 1.5	I/S	I/S	I/S	38.5	35.3	-	
DT84	385548	346400	41.7	27.3	40.6	31.4	28.4	27.8	33.2	35.2	36.2	34.3	42.9	46.3	35.3	30.3	-	
DT85	385575	346413	48.9	30.1	44.1	38.1	35.4	32.7	I/S	38.3	45.0	39.0	46.5	44.4	40.0	34.4	-	
DT86	385075	345910	38.8	21.5	31.9	24.8	18.4	18.8	23.2	25.0	25.5	21.9	30.7	33.8	25.9	22.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT87	385105	346225	44.4	33.5	41.0	35.8	32.4	38.7	35.3	38.0	43.9	36.3	79.4	43.4	40.6	34.9	-	
DT88	384709	345881	38.4	23.6	34.7	27.4	24.1	25.5	25.1	28.2	30.4	26.3	32.1	35.7	29.1	25.0	-	
DT89A	385054	346134	40.5	1.4	35.3	30.2	21.5	20.4	24.0	29.6	33.2	27.6	37.8	40.0	-	-	-	Triplicate Site with DT89A, DT89B and DT89c - Annual data provided for DT89c only
DT89B	385054	346134	37.5	20.5	46.2	26.5	21.2	22.4	24.8	29.5	33.1	29.9	< 1.5	38.7	-	-	-	Triplicate Site with DT89A, DT89B and DT89c - Annual data provided for DT89c only
DT89c	385054	346134	35.1	21.3	35.5	26.5	21.6	20.8	24.4	29.5	32.0	28.3	I/S	56.0	29.8	25.7	-	Triplicate Site with DT89A, DT89B and DT89c - Annual data provided for DT89c only
DT92	383890	354461	39.9	25.6	40.1	26.9	I/S	22.8	26.5	28.4	32.4	31.0	42.2	41.2	32.3	27.8	-	
DT93	384056	354393	39.5	21.5	32.3	27.9	23.9	26.2	30.8	29.5	33.3	24.2	37.4	40.3	30.2	26.0	-	
DT94	384030	354416	49.7	31.4	46.8	44.1	35.5	32.4	41.4	48.8	53.4	35.6	47.0	44.6	42.1	36.2	35.9	
DT95	385171	345539	45.5	24.7	I/S	I/S	22.2	25.7	29.0	29.7	34.4	I/S	44.2	39.9	32.4	27.9	-	
DT96	385131	345601	51.7	28.6	38.6	30.2	27.1	30.1	30.6	30.4	37.1	29.2	41.6	42.7	34.4	29.6	-	
DT97	384795	345796	33.6	18.4	29.5	19.9	15.0	14.2	16.7	19.7	23.3	23.5	30.8	31.9	22.9	19.7	-	
DT98	385327	346148	52.3	38.1	41.0	34.4	29.6	35.8	31.7	32.0	35.1	67.0	45.6	44.7	41.3	35.5	-	
DT100	384689	346284	41.1	22.5	33.6	24.0	18.0	20.0	22.3	24.4	30.1	24.5	35.8	35.8	27.3	23.5	-	
DT101	384806	345842	38.1	18.6	34.8	32.4	23.7	24.9	28.0	34.6	37.7	27.4	37.0	37.3	30.9	26.6	-	
DT102	384609	346007	51.5	38.3	41.8	36.4	36.6	40.2	37.2	40.2	42.2	37.5	51.4	45.6	41.1	35.3	-	
DT103	385682	347909	28.6	14.1	30.1	21.7	23.6	14.8	18.6	21.0	22.5	19.6	26.7	30.6	22.6	19.5	-	
DT104	385213	346270	59.4	52.2	34.2	32.7	29.5	29.4	31.6	28.5	38.2	72.8	44.5	62.3	44.0	37.8	37.2	
DT105	383991	354418	34.6	24.2	28.0	19.6	16.8	19.8	19.7	22.7	25.2	26.3	30.6	32.2	24.8	21.3	-	
N107a	384495	346298	33.9	15.5	34.1	27.8	20.0	20.5	21.4	23.1	23.4	28.8	26.6	30.2	-	-		Triplicate Site with N107a, N107b and N107c - Annual data provided for N107c only
N107b	384495	346298	32.4	18.1	34.3	28.6	20.7	18.9	20.1	25.2	23.2	21.6	I/S	31.8	-	-	-	Triplicate Site with N107a, N107b and N107c - Annual data provided for N107c only
N107c	384495	346298	32.8	18.7	33.7	27.4	19.7	18.7	21.9	22.2	23.8	21.3	I/S	33.9	25.2	21.7	-	Triplicate Site with N107a, N107b and N107c - Annual data provided for N107c only
N108a	384961	345346	35.9	26.1	27.0	24.2	19.6	21.0	24.4	24.0	26.5	25.3	35.0	29.4	-	-	-	Triplicate Site with N108a, N108b and N108c - Annual data provided for N108c only
N108b	384961	345346	36.2	25.5	30.4	22.2	19.3	22.2	24.3	23.4	25.4	24.5	30.4	32.9	-	-	-	Triplicate Site with N108a, N108b and N108c - Annual data provided for N108c only
N108c	384961	345346	33.7	25.2	28.3	22.7	20.0	17.0	24.3	23.1	27.1	24.2	I/S	32.1	26.0	22.3	-	Triplicate Site with N108a, N108b and N108c - Annual data provided for N108c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N109a	385190	343318	I/S	21.6	28.5	18.5	18.2	22.0	22.7	21.4	26.4	24.1	27.4	32.8	-	-	-	Triplicate Site with N109a, N109b and N109c - Annual data provided for N109c only
N109b	385190	343318	I/S	19.7	27.4	21.5	18.5	20.7	22.8	22.6	26.5	25.6	29.7	32.9	-	-	-	Triplicate Site with N109a, N109b and N109c - Annual data provided for N109c only
N109c	385190	343318	I/S	16.1	27.9	20.5	18.0	21.1	22.7	22.9	26.8	29.2	I/S	32.6	24.1	20.8	-	Triplicate Site with N109a, N109b and N109c - Annual data provided for N109c only
N110a	385110	342314	34.4	25.2	30.6	24.8	25.4	25.4	31.6	32.9	31.4	29.6	30.6	32.5	-	-	-	Triplicate Site with N110a, N110b and N110c - Annual data provided for N110c only
N110b	385110	342314	35.0	26.1	29.8	23.0	27.3	31.4	31.4	33.2	29.4	27.2	25.7	32.5	-	-	-	Triplicate Site with N110a, N110b and N110c - Annual data provided for N110c only
N110c	385110	342314	34.9	24.7	30.4	24.0	26.5	30.2	31.5	31.3	30.1	I/S	30.7	31.5	29.3	25.2	-	Triplicate Site with N110a, N110b and N110c - Annual data provided for N110c only
N111a	383882	349558	49.3	31.1	28.0	I/S	I/S	I/S	I/S	I/S	I/S	I/S	I/S	I/S	-	-	-	Triplicate Site with N111a, N111b and N111c - Annual data provided for N111c only
N111b	383882	349558	46.4	30.2	28.4	I/S	I/S	I/S	I/S	I/S	I/S	I/S	I/S	I/S	-	-	-	Triplicate Site with N111a, N111b and N111c - Annual data provided for N111c only
N111c	383882	349558	48.8	29.6	31.7	I/S	I/S	I/S	I/S	I/S	I/S	I/S	I/S	I/S	35.9	24.4	-	Triplicate Site with N111a, N111b and N111c - Annual data provided for N111c only
N112a	382286	341956	24.6	15.2	23.6	18.0	15.2	15.6	17.3	19.2	18.5	19.6	22.6	27.3	-	-	-	Triplicate Site with N112a, N112b and N112c - Annual data provided for N112c only
N112b	382286	341956	27.1	14.8	21.8	18.6	15.3	15.5	17.5	19.0	18.2	20.3	23.9	28.4	-	-	-	Triplicate Site with N112a, N112b and N112c - Annual data provided for N112c only
N112c	382286	341956	26.4	16.4	22.8	17.0	14.5	15.4	18.1	18.3	17.8	I/S	32.3	26.2	19.9	17.1	-	Triplicate Site with N112a, N112b and N112c - Annual data provided for N112c only
N113a	383052	343666	23.9	I/S	22.5	16.4	15.3	18.0	16.8	20.2	20.0	22.5	33.9	26.8	-	-	-	Triplicate Site with N113a, N113b and N113c - Annual data provided for N113c only
N113b	383052	343666	20.2	I/S	23.6	14.1	16.6	17.2	17.5	18.4	19.3	20.6	16.8	28.3	-	-	-	Triplicate Site with N113a, N113b and N113c - Annual data provided for N113c only
N113c	383052	343666	23.3	I/S	23.5	16.9	16.9	16.7	17.1	19.6	19.7	I/S	27.2	27.3	20.4	17.6	-	Triplicate Site with N113a, N113b and N113c - Annual data provided for N113c only
N114a	383953	344832	29.8	15.8	28.1	18.4	14.0	15.8	18.8	19.3	22.8	20.6	19.1	31.6	-	-	-	Triplicate Site with N114a, N114b and N114c - Annual data provided for N114c only
N114b	383953	344832	31.3	15.4	28.2	15.7	15.0	15.1	19.4	< 1.5	37.1	21.3	45.5	33.6	-	-	-	Triplicate Site with N114a, N114b and N114c - Annual data provided for N114c only
N114c	383953	344832	32.3	16.4	27.2	17.9	15.2	15.4	18.7	19.2	22.1	< 1.5	I/S	31.9	22.5	19.3	-	Triplicate Site with N114a, N114b and N114c - Annual data provided for N114c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N115a	383545	345195	23.7	8.4	19.2	14.7	9.0	11.2	14.7	16.1	17.1	12.3	16.9	22.3	-	-	-	Triplicate Site with N115a, N115b and N115c - Annual data provided for N115c only
N115b	383545	345195	23.2	11.2	18.2	15.2	9.8	8.6	13.7	15.8	17.1	12.1	30.7	22.0	-	-	-	Triplicate Site with N115a, N115b and N115c - Annual data provided for N115c only
N115c	383545	345195	23.1	12.6	18.6	15.6	I/S	8.0	13.8	15.9	17.2	11.8	17.6	22.5	15.5	13.4	-	Triplicate Site with N115a, N115b and N115c - Annual data provided for N115c only
N116a	383157	345431	24.8	17.1	26.2	19.1	16.3	16.1	19.1	21.1	24.8	21.2	29.5	23.4	-	-	-	Triplicate Site with N116a, N116b and N116c - Annual data provided for N116c only
N116b	383157	345431	27.1	15.3	26.3	17.9	16.9	15.8	18.5	19.9	23.3	I/S	30.8	26.3	-	-	-	Triplicate Site with N116a, N116b and N116c - Annual data provided for N116c only
N116c	383157	345431	27.7	15.6	28.2	18.4	15.7	15.6	18.5	21.0	24.4	I/S	I/S	30.2	21.5	18.5	-	Triplicate Site with N116a, N116b and N116c - Annual data provided for N116c only
N117a	383199	352740	44.7	26.8	28.3	28.6	32.0	31.4	30.7	34.4	33.0	34.9	38.7	41.0	-	-	-	Triplicate Site with N117a, N117b and N117c - Annual data provided for N117c only
N117b	383199	352740	44.5	30.0	26.6	28.1	28.3	33.7	33.1	34.1	34.0	33.9	39.7	39.9	-	-	-	Triplicate Site with N117a, N117b and N117c - Annual data provided for N117c only
N117c	383199	352740	45.0	28.4	30.6	26.3	28.6	32.6	31.2	31.6	36.6	32.0	36.1	40.6	33.5	28.8	-	Triplicate Site with N117a, N117b and N117c - Annual data provided for N117c only
N118a	382934	353388	28.0	18.5	26.8	23.0	20.4	19.8	23.2	24.2	24.9	25.1	33.6	31.8	-	-	-	Triplicate Site with N118a, N118b and N118c - Annual data provided for N118c only
N118b	382934	353388	29.3	19.0	29.2	23.6	19.5	18.9	23.0	23.5	24.5	25.3	31.5	31.9	-	-	-	Triplicate Site with N118a, N118b and N118c - Annual data provided for N118c only
N118c	382934	353388	31.6	18.5	28.7	20.4	18.7	20.1	22.7	24.7	25.1	24.8	29.8	35.3	24.8	21.4	-	Triplicate Site with N118a, N118b and N118c - Annual data provided for N118c only
N119a	382600	354062	30.2	15.4	31.9	22.8	18.6	18.7	22.3	25.5	26.2	25.8	33.0	36.1	-	-	-	Triplicate Site with N119a, N119b and N119c - Annual data provided for N119c only
N119b	382600	354062	30.1	15.0	30.1	22.9	18.1	18.9	22.2	25.1	27.3	25.3	32.2	33.1	-	-	-	Triplicate Site with N119a, N119b and N119c - Annual data provided for N119c only
N119c	382600	354062	31.6	14.6	30.7	24.7	17.1	18.2	22.4	26.7	26.3	25.1	29.8	33.4	25.1	21.6	-	Triplicate Site with N119a, N119b and N119c - Annual data provided for N119c only
N120a	382707	354305	44.6	28.4	31.9	27.3	29.8	29.3	31.3	34.4	36.7	32.8	38.8	40.5	-	-	-	Triplicate Site with N120a, N120b and N120c - Annual data provided for N120c only
N120b	382707	354305	47.3	28.8	31.7	26.7	29.6	30.2	31.1	35.4	38.0	34.4	I/S	41.3	-	-	-	Triplicate Site with N120a, N120b and N120c - Annual data provided for N120c only
N120c	382707	354305	41.0	28.0	31.4	28.9	31.2	30.0	31.9	32.2	36.6	33.4	I/S	40.0	33.8	29.1	-	Triplicate Site with N120a, N120b and N120c - Annual data provided for N120c only

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N121a	382736	354385	35.5	19.9	26.0	22.9	18.6	21.1	20.6	22.6	25.5	25.0	29.5	32.0	-	-	-	Triplicate Site with N121a, N121b and N121c - Annual data provided for N121c only
N121b	382736	354385	35.6	18.2	23.6	22.6	20.1	19.0	21.7	23.5	24.6	23.4	I/S	32.2	-	-	-	Triplicate Site with N121a, N121b and N121c - Annual data provided for N121c only
N121c	382736	354385	37.6	21.7	23.8	22.4	21.3	16.9	21.4	21.2	25.1	34.5	I/S	33.3	25.1	21.6	-	Triplicate Site with N121a, N121b and N121c - Annual data provided for N121c only
N122a	384261	354207	37.3	23.2	30.4	28.0	21.3	17.4	20.5	23.2	28.2	22.0	29.1	31.0	-	-	-	Triplicate Site with N122a, N122b and N122c - Annual data provided for N122c only
N122b	384261	354207	36.5	22.7	28.1	28.4	21.2	19.8	21.1	24.6	27.7	I/S	29.0	30.5	-	-	-	Triplicate Site with N122a, N122b and N122c - Annual data provided for N122c only
N122c	384261	354207	36.1	22.9	33.2	30.4	20.7	18.8	22.3	25.6	I/S	I/S	I/S	32.8	26.1	22.4	-	Triplicate Site with N122a, N122b and N122c - Annual data provided for N122c only
N123a	384638	354133	I/S	26.4	26.8	20.5	21.3	19.3	23.5	21.3	23.9	I/S	36.3	36.6	-	-	-	Triplicate Site with N123a, N123b and N123c - Annual data provided for N123c only
N123b	384638	354133	32.6	25.1	26.8	19.5	21.9	22.3	23.4	21.4	24.2	30.7	23.6	37.3	-	-	-	Triplicate Site with N123a, N123b and N123c - Annual data provided for N123c only
N123c	384638	354133	35.5	27.9	27.8	20.8	21.2	18.6	23.1	21.6	24.3	28.0	I/S	35.6	26.2	22.6	-	Triplicate Site with N123a, N123b and N123c - Annual data provided for N123c only
N124a	385019	353832	55.0	39.6	34.8	35.5	32.4	30.8	35.2	30.9	35.3	40.1	37.3	49.2	-	-	-	Triplicate Site with N124a, N124b and N124c - Annual data provided for N124c only
N124b	385019	353832	54.9	41.7	40.5	34.5	31.2	28.6	33.8	27.7	38.7	39.7	46.2	45.0	-	-	-	Triplicate Site with N124a, N124b and N124c - Annual data provided for N124c only
N124c	385019	353832	44.9	42.7	39.6	34.9	30.5	31.4	32.9	32.2	38.8	40.3	46.6	48.9	38.3	33.0	-	Triplicate Site with N124a, N124b and N124c - Annual data provided for N124c only
N125a	385387	348389	39.7	28.6	29.9	24.4	23.1	21.7	25.3	24.7	27.9	28.5	35.2	36.0	-	-	-	Triplicate Site with N125a, N125b and N125c - Annual data provided for N125c only
N125b	385387	348389	38.2	26.7	29.6	23.2	22.6	22.9	25.3	< 1.5	43.7	26.8	34.9	35.7	-	-	-	Triplicate Site with N125a, N125b and N125c - Annual data provided for N125c only
N125c	385387	348389	41.0	27.9	32.5	25.5	20.8	22.4	24.7	I/S	I/S	26.9	34.3	35.4	28.9	24.9	-	Triplicate Site with N125a, N125b and N125c - Annual data provided for N125c only
N126a	385556	348224	38.5	21.6	28.0	20.2	18.4	16.3	23.5	21.1	26.7	24.7	21.6	33.6	-	-	-	Triplicate Site with N126a, N126b and N126c - Annual data provided for N126c only
N126b	385556	348224	40.4	19.9	27.8	20.6	18.3	18.2	21.9	20.7	25.6	25.2	32.6	35.0	-	-	-	Triplicate Site with N126a, N126b and N126c - Annual data provided for N126c only
N126c	385556	348224	32.8	22.0	28.4	20.6	17.4	19.8	21.8	20.5	27.6	25.3	32.7	35.8	25.0	21.5	-	Triplicate Site with N126a, N126b and N126c - Annual data provided for N126c only

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N127a	385416	347424	32.7	21.8	28.0	21.4	17.5	16.9	21.4	21.7	26.7	24.7	32.5	35.4	-	-	-	Triplicate Site with N127a, N127b and N127c - Annual data provided for N127c only
N127b	385416	347424	33.8	21.1	30.0	21.7	15.1	17.3	21.7	22.3	25.9	26.3	34.9	35.9	-	-	-	Triplicate Site with N127a, N127b and N127c - Annual data provided for N127c only
N127c	385416	347424	32.8	23.2	26.9	22.2	16.7	20.4	20.5	22.1	26.6	23.3	32.6	38.9	25.2	21.6	-	Triplicate Site with N127a, N127b and N127c - Annual data provided for N127c only
N128a	385512	347373	39.5	16.8	35.5	I/S	I/S	23.1	I/S	30.2	33.4	21.7	38.7	38.4	-	-	-	Triplicate Site with N128a, N128b and N128c - Annual data provided for N128c only
N128b	385512	347373	38.3	15.7	33.5	27.0	23.1	23.3	28.6	30.8	< 1.5	29.3	I/S	38.5	-	-	-	Triplicate Site with N128a, N128b and N128c - Annual data provided for N128c only
N128c	385512	347373	38.5	17.2	33.6	23.7	23.5	25.8	28.1	22.4	I/S	44.6	I/S	40.8	30.0	25.8	-	Triplicate Site with N128a, N128b and N128c - Annual data provided for N128c only
N129a	384968	346228	38.9	22.2	37.7	26.4	22.8	17.7	22.0	22.8	43.7	26.3	36.7	35.8	-	-	-	Triplicate Site with N129a, N129b and N129c - Annual data provided for N129c only
N129b	384968	346228	38.7	26.5	36.6	28.1	22.6	20.8	22.3	22.6	31.0	28.4	36.5	35.5	-	-	-	Triplicate Site with N129a, N129b and N129c - Annual data provided for N129c only
N129c	384968	346228	35.9	26.2	36.3	27.1	22.6	17.6	22.6	I/S	29.5	27.3	39.8	35.3	28.8	24.8	-	Triplicate Site with N129a, N129b and N129c - Annual data provided for N129c only
N130a	385098	346395	44.6	25.1	36.9	29.9	25.3	29.5	30.8	31.3	36.9	32.4	52.3	46.2	-	-	-	Triplicate Site with N130a, N130b and N130c - Annual data provided for N130c only
N130b	385098	346395	39.4	26.1	36.9	33.2	24.0	31.8	30.3	32.2	36.8	31.6	50.6	43.6	-	-	-	Triplicate Site with N130a, N130b and N130c - Annual data provided for N130c only
N130c	385098	346395	43.7	27.0	31.6	33.2	24.7	30.8	30.4	31.3	36.7	33.4	51.9	43.1	34.4	29.6	-	Triplicate Site with N130a, N130b and N130c - Annual data provided for N130c only
N131a	385463	346374	46.2	32.7	38.4	32.8	29.1	26.6	32.6	30.3	37.9	34.5	41.0	47.2	-	-	-	Triplicate Site with N131a, N131b and N131c - Annual data provided for N131c only
N131b	385463	346374	48.6	31.0	37.6	32.7	30.3	27.8	33.3	32.8	37.5	34.0	38.1	44.5	-	-	-	Triplicate Site with N131a, N131b and N131c - Annual data provided for N131c only
N131c	385463	346374	39.9	26.8	39.7	34.3	26.9	30.0	34.7	34.1	36.4	33.1	I/S	43.9	35.3	30.4	-	Triplicate Site with N131a, N131b and N131c - Annual data provided for N131c only
N132a	385612	346436	47.3	33.1	29.3	28.9	30.7	30.9	32.3	30.9	34.0	29.6	34.9	42.1	-	-	-	Triplicate Site with N132a, N132b and N132c - Annual data provided for N132c only
N132b	385612	346436	49.3	35.4	29.9	28.0	29.1	29.1	30.6	31.8	33.3	32.2	35.5	41.5	-	-	-	Triplicate Site with N132a, N132b and N132c - Annual data provided for N132c only
N132c	385612	346436	46.5	32.6	30.5	27.0	32.0	28.2	31.7	30.6	35.1	28.6	37.6	41.3	33.5	28.8	-	Triplicate Site with N132a, N132b and N132c - Annual data provided for N132c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N133a	385926	346580	45.9	33.2	41.0	32.1	31.1	32.1	33.6	33.8	36.3	42.6	51.9	47.9	-	-	-	Triplicate Site with N133a, N133b and N133c - Annual data provided for N133c only
N133b	385926	346580	45.2	33.2	40.8	34.4	30.4	31.5	33.9	32.8	36.3	42.9	52.5	47.9	-	-	-	Triplicate Site with N133a, N133b and N133c - Annual data provided for N133c only
N133c	385926	346580	47.5	34.4	42.2	33.8	31.1	33.2	32.3	31.5	35.9	43.9	51.1	45.9	38.3	33.0	-	Triplicate Site with N133a, N133b and N133c - Annual data provided for N133c only
N134a	386009	346600	41.8	32.8	34.0	30.3	27.9	26.1	28.2	29.4	30.4	35.1	29.4	39.9	-	-	-	Triplicate Site with N134a, N134b and N134c - Annual data provided for N134c only
N134b	386009	346600	42.2	32.8	38.1	29.5	27.5	29.3	28.7	27.9	30.9	32.0	38.2	39.1	-	-	-	Triplicate Site with N134a, N134b and N134c - Annual data provided for N134c only
N134c	386009	346600	44.8	31.7	36.8	31.1	25.6	29.6	29.4	26.6	31.0	36.5	I/S	39.3	32.7	28.1	-	Triplicate Site with N134a, N134b and N134c - Annual data provided for N134c only
N135a	385518	346128	48.9	27.7	35.4	27.9	24.7	29.6	28.7	I/S	I/S	I/S	I/S	I/S	-	-	-	Triplicate Site with N135a, N135b and N135c - Annual data provided for N135c only
N135b	385518	346128	47.2	30.5	32.8	28.0	25.0	27.9	29.3	I/S	I/S	I/S	I/S	I/S	-	-	-	Triplicate Site with N135a, N135b and N135c - Annual data provided for N135c only
N135c	385518	346128	55.2	32.8	35.2	27.1	23.2	21.6	27.7	I/S	I/S	I/S	I/S	I/S	31.3	28.1	-	Triplicate Site with N135a, N135b and N135c - Annual data provided for N135c only
N136a	385078	345687	46.1	28.7	29.4	I/S	27.9	29.0	31.2	28.7	31.5	34.1	40.5	42.2	-	-	-	Triplicate Site with N136a, N136b and N136c - Annual data provided for N136c only
N136b	385078	345687	44.4	31.5	30.4	I/S	27.4	28.0	27.6	28.2	31.9	31.2	38.5	37.5	-	-	-	Triplicate Site with N136a, N136b and N136c - Annual data provided for N136c only
N136c	385078	345687	48.9	30.4	33.8	I/S	25.2	23.3	29.5	28.8	33.4	30.7	42.6	42.9	33.0	28.4	-	Triplicate Site with N136a, N136b and N136c - Annual data provided for N136c only
N137a	382795	346011	25.7	15.2	31.2	I/S	16.8	I/S	21.0	20.0	24.1	22.0	29.1	28.4	-	-	-	Triplicate Site with N137a, N137b and N137c - Annual data provided for N137c only
N137b	382795	346011	27.6	15.4	29.7	I/S	15.6	I/S	19.3	19.6	24.2	21.7	29.0	28.5	-	-	-	Triplicate Site with N137a, N137b and N137c - Annual data provided for N137c only
N137c	382795	346011	28.1	15.5	30.1	I/S	16.2	I/S	20.4	20.0	24.7	22.2	29.0	28.4	23.0	19.8	-	Triplicate Site with N137a, N137b and N137c - Annual data provided for N137c only
N138a	383113	346592	31.7	21.1	28.6	1.3	21.6	15.4	23.0	22.4	23.0	I/S	32.8	35.8	-	-	-	Triplicate Site with N138a, N138b and N138c - Annual data provided for N138c only
N138b	383113	346592	32.5	21.8	30.5	21.6	21.2	15.9	22.9	20.2	21.9	I/S	31.4	36.1	-	-	-	Triplicate Site with N138a, N138b and N138c - Annual data provided for N138c only
N138c	383113	346592	34.4	21.0	28.5	21.3	I/S	16.2	22.0	21.0	23.1	I/S	37.0	35.8	24.5	21.0	-	Triplicate Site with N138a, N138b and N138c - Annual data provided for N138c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N139a	383302	346727	24.7	14.2	20.2	14.6	12.1	12.0	14.2	13.5	15.3	16.6	22.4	26.4	-	-	-	Triplicate Site with N139a, N139b and N139c - Annual data provided for N139c only
N139b	383302	346727	24.7	13.8	21.1	15.1	11.6	10.5	13.5	14.2	15.4	17.2	23.5	24.6	-	-	-	Triplicate Site with N139a, N139b and N139c - Annual data provided for N139c only
N139c	383302	346727	25.4	13.0	20.1	15.5	12.5	11.0	13.7	14.2	14.2	17.8	25.1	26.8	17.1	14.7	-	Triplicate Site with N139a, N139b and N139c - Annual data provided for N139c only
N140a	383930	347273	38.0	21.4	32.2	29.6	24.2	23.1	26.2	27.6	27.2	30.0	36.0	38.0	-	-	-	Triplicate Site with N140a, N140b and N140c - Annual data provided for N140c only
N140b	383930	347273	39.1	24.1	32.9	28.3	23.3	23.0	25.7	27.3	27.5	29.6	37.5	38.1	-	-	-	Triplicate Site with N140a, N140b and N140c - Annual data provided for N140c only
N140c	383930	347273	40.7	I/S	33.7	26.4	23.9	20.2	26.6	27.4	27.9	I/S	37.3	34.3	29.3	25.2	-	Triplicate Site with N140a, N140b and N140c - Annual data provided for N140c only
N141a	384337	347534	44.9	27.0	35.9	29.9	25.3	26.2	29.4	31.6	34.1	31.5	40.8	35.6	-	-	-	Triplicate Site with N141a, N141b and N141c - Annual data provided for N141c only
N141b	384337	347534	49.3	28.6	36.5	30.4	25.7	24.9	26.7	30.1	34.4	33.5	43.8	34.6	-	-	-	Triplicate Site with N141a, N141b and N141c - Annual data provided for N141c only
N141c	384337	347534	44.2	26.9	33.1	27.8	24.6	24.9	29.7	30.8	29.5	33.3	38.0	28.0	31.9	27.5	-	Triplicate Site with N141a, N141b and N141c - Annual data provided for N141c only
N142a	384207	347915	40.2	23.2	32.1	24.2	19.1	18.3	23.2	23.9	28.5	I/S	29.6	64.5	-	-	-	Triplicate Site with N142a, N142b and N142c - Annual data provided for N142c only
N142b	384207	347915	39.8	24.3	33.5	23.7	19.4	20.7	22.9	42.8	< 1.5	24.4	33.8	44.4	-	-	-	Triplicate Site with N142a, N142b and N142c - Annual data provided for N142c only
N142c	384207	347915	39.6	22.1	29.9	24.5	18.8	20.1	< 1.5	25.4	29.2	24.7	31.4	45.7	28.9	24.9	-	Triplicate Site with N142a, N142b and N142c - Annual data provided for N142c only
N143a	384021	348925	53.1	36.5	43.0	40.2	37.8	39.8	36.9	38.6	41.4	30.7	45.8	I/S	-	-	-	Triplicate Site with N143a, N143b and N143c - Annual data provided for N143c only
N143b	384021	348925	52.8	36.2	46.8	40.9	35.9	39.6	37.1	37.8	43.1	35.7	< 1.5	I/S	-	-	-	Triplicate Site with N143a, N143b and N143c - Annual data provided for N143c only
N143c	384021	348925	52.3	35.9	46.3	39.8	35.1	37.6	39.9	39.2	41.0	37.1	44.6	I/S	40.2	34.6	-	Triplicate Site with N143a, N143b and N143c - Annual data provided for N143c only
N144a	383764	349912	30.5	13.7	29.6	21.1	14.7	14.6	17.7	22.4	24.4	19.9	27.8	29.3	-	-	-	Triplicate Site with N144a, N144b and N144c - Annual data provided for N144c only
N144b	383764	349912	22.3	14.0	32.1	21.2	13.0	14.7	17.8	22.9	22.9	18.3	27.6	29.2	-	-	-	Triplicate Site with N144a, N144b and N144c - Annual data provided for N144c only
N144c	383764	349912	27.6	14.3	30.4	23.1	14.1	11.9	17.7	22.4	23.8	16.9	25.4	26.7	21.3	18.3	-	Triplicate Site with N144a, N144b and N144c - Annual data provided for N144c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.86)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N145a	383670	350326	50.0	41.9	52.2	40.2	46.5	51.1	46.1	49.4	40.1	47.6	54.1	46.0	-	-	-	Triplicate Site with N145a, N145b and N145c - Annual data provided for N145c only
N145b	383670	350326	53.8	40.7	53.6	47.2	48.6	50.1	47.0	42.8	32.0	45.4	55.3	50.2	-	-	-	Triplicate Site with N145a, N145b and N145c - Annual data provided for N145c only
N145c	383670	350326	45.5	42.1	52.1	46.2	I/S	47.0	47.1	45.8	44.0	49.3	54.3	50.1	47.1	**40.5**	**25.3**	Triplicate Site with N145a, N145b and N145c - Annual data provided for N145c only
N146a	383587	350790	34.4	23.9	28.4	23.8	28.7	30.8	29.2	1.7	46.8	30.3	31.4	33.5	-	-	-	Triplicate Site with N146a, N146b and N146c - Annual data provided for N146c only
N146b	383587	350790	39.8	26.1	27.7	22.9	27.3	32.3	30.9	25.9	31.1	29.4	33.7	35.1	-	-	-	Triplicate Site with N146a, N146b and N146c - Annual data provided for N146c only
N146c	383587	350790	42.9	26.1	27.5	24.2	30.5	31.1	29.7	< 1.5	48.0	26.7	31.0	34.1	29.6	25.5	-	Triplicate Site with N146a, N146b and N146c - Annual data provided for N146c only

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column**

☒ **Newcastle-Under-Lyme confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System (confirm by selecting in box).**

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**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Newcastle-under-Lyme Borough Council During 2022

Intensive work has been carried out by Newcastle under Lyme Borough Council in conjunction with the Environment Agency, UK Health Security Agency, Staffordshire County Council Public Health and other bodies, to look into complaints concerning gaseous emissions from a landfill situated approximately 1.3 Kilometres outside of AQMA 2: Newcastle-under-Lyme Town Centre, regulated by the Environment Agency in accordance with the Environmental Permitting (England and Wales) Regulations 2016 (18)

The Committee on Climate Change has called for a ban on all biodegradable waste sent to landfill by 2025, if the UK is to reach 'net zero emissions' by 2050. It is hoped that through improvements in the management of the site in conjunction with the ban on biodegradable waste by 2025, levels of gaseous emissions, including nitric oxides, will decrease from this site.

Newcastle-under-Lyme Borough Council has not identified any additional new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by Newcastle-under-Lyme Borough Council During 2022

Newcastle-under-Lyme Borough Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Staffordshire Scientific Services Laboratory supplied and analysed diffused tubes for Newcastle under Lyme Borough Council using the 20% TEA in water preparation method.

The laboratory is UKAS accredited to ISO/IEC 17025:2017 [15] and participates in the AIR-PT scheme run by LGC [16] and the Field Intercomparison Scheme run by NPL [17]

Monitoring has been completed in accordance with the 2022 Diffusion Tube Calendar [18],

The subsequent valid data capture for the whole monitoring period was 100%.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Newcastle-under-Lyme Borough Council recorded data capture in excess of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Newcastle-under-Lyme Borough Council have applied a national bias adjustment factor of 0.86[19] to the 2022 monitoring data. A summary of bias adjustment factors used by Newcastle-under-Lyme Borough Council over the past five years is presented in Table C.1.

15 https://www.ukas.com/wp-content/uploads/schedule_uploads/00002/0719Testing-Multiple.pdf

16 https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html

17 https://laqm.defra.gov.uk/air-quality/air-quality-assessment/precision-and-accuracy/

18 https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-monitoring-calendar/

19 https://laqm.defra.gov.uk/air-quality/air-quality-assessment/national-bias/ spreadsheet version number 09/23 for Staffordshire Scientific Services

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	06/23	0.86
2021	National	09/22	0.85
2020	National	09/21	0.85
2019	National	03/20	0.93
2018	National	03/18	0.93

QA/QC of Automatic Monitoring

Air quality measurements from the automatic instruments are validated and ratified by Air Quality Data Management (AQDM) http://www.aqdm.co.uk to the standards described in the Local Air Quality Management – Technical Guidance LAQM (TG22) https://laqm.defra.gov.uk/technical-guidance

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NOx, O3, SO_2 and CO) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the

moment of the calibration since the instrument will continue to drift. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied, and all anomalies are appropriately edited. Generally, this operates at three-, six- or twelve-month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three- and six-monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include:

- the correct scaling of data
- ignoring calibrations that were poor e.g. a spent zero scrubber
- closely tracking rapid drifts or eliminating the data
- comparing the measurements with other pollutants and nearby sites
- corrections due to span cylinder drift
- corrections due to flow drifts for the particulate instruments
- corrections for ozone instrument sensitivity drifts
- eliminating measurements for NO_2 conversion inefficiencies
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods where instruments are warming-up after a power cut
- identification of anomalies due to mains power spikes
- correcting problems with the date and time stamp
- observations made during the sites visits and services

The identification of data anomalies, the proper understanding of the effects and the application of appropriate corrections requires expertise gained over many years of

operational experience. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. There are rarely simple faults that can be discovered by computer algorithms or can be understood without previous experience.

Further information about air quality data management, expert data ratification and examples of bad practices are given on the Air Quality Data Management (AQDM) website http://www.aqdm.co.uk

Automatic Monitoring Annualisation

The automatic monitoring location within Newcastle-under-Lyme Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Newcastle-under-Lyme Borough Council required distance correction during 2022.

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

Figure D-5 – Map of Non-Automatic monitoring sites

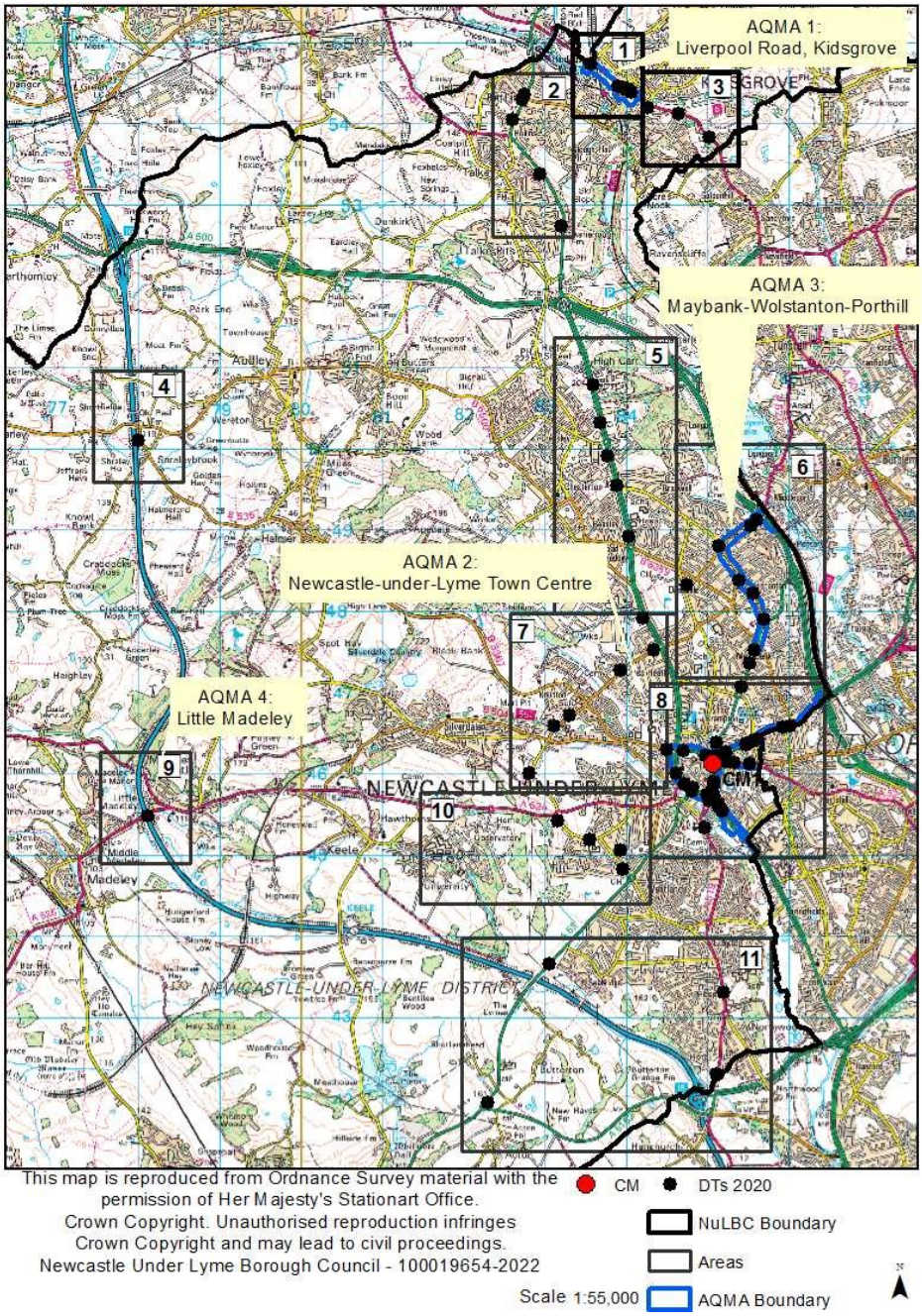


Figure D-6 – Map of monitoring area AQMA 1: Liverpool Road, Kidsgrove

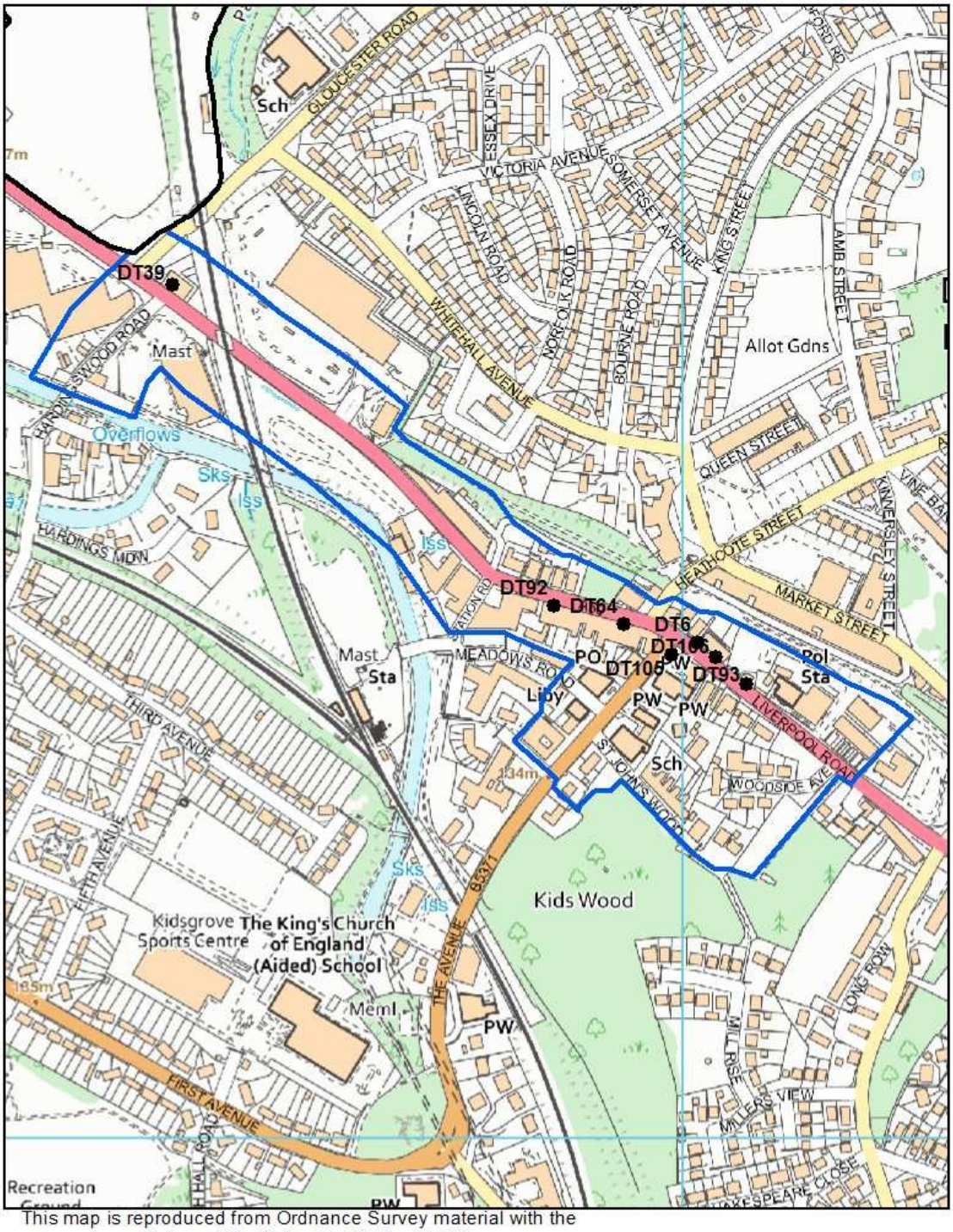


Figure D-7 – Map of monitoring area Kidsgrove 2 - Outside Kidsgrove AQMA

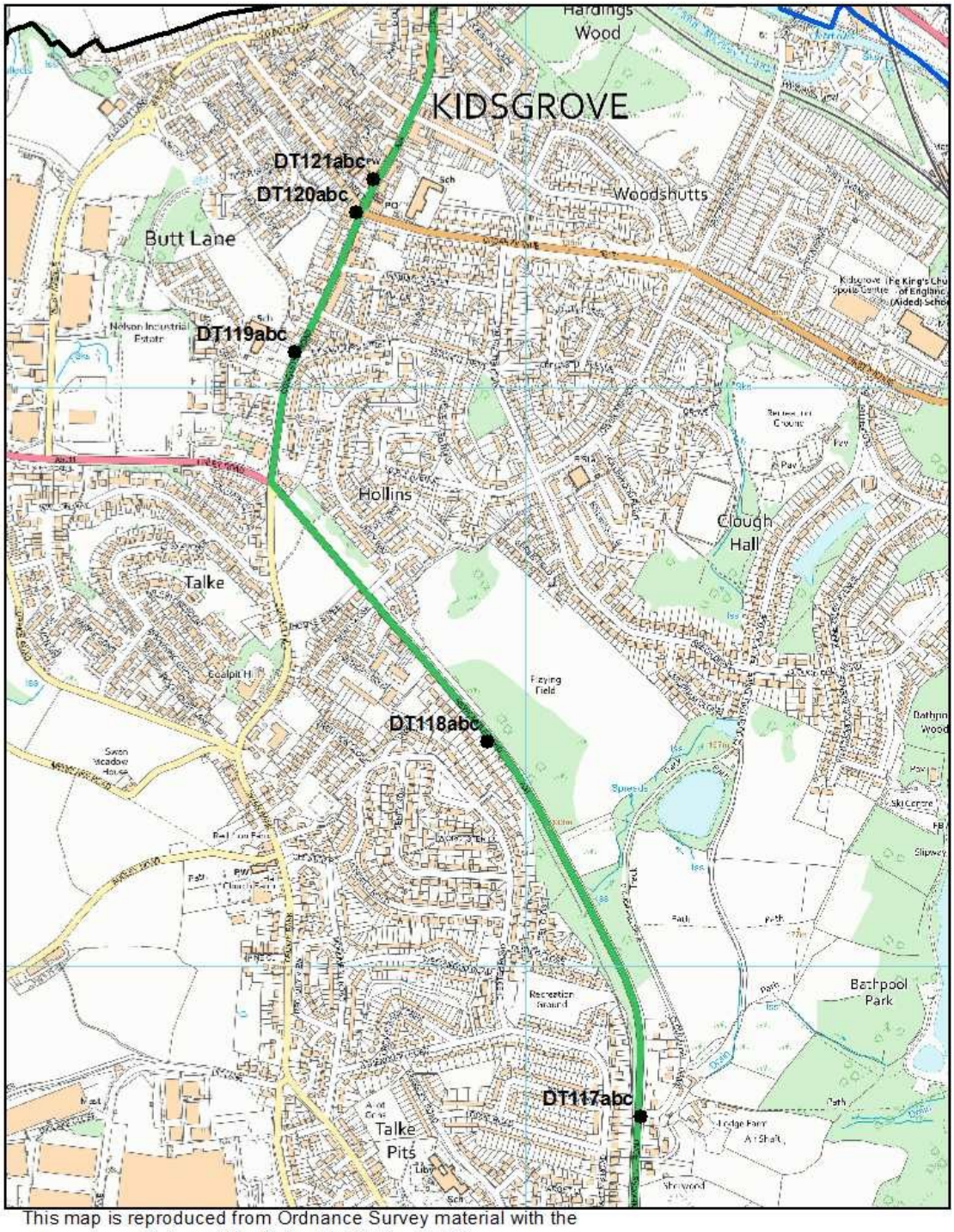
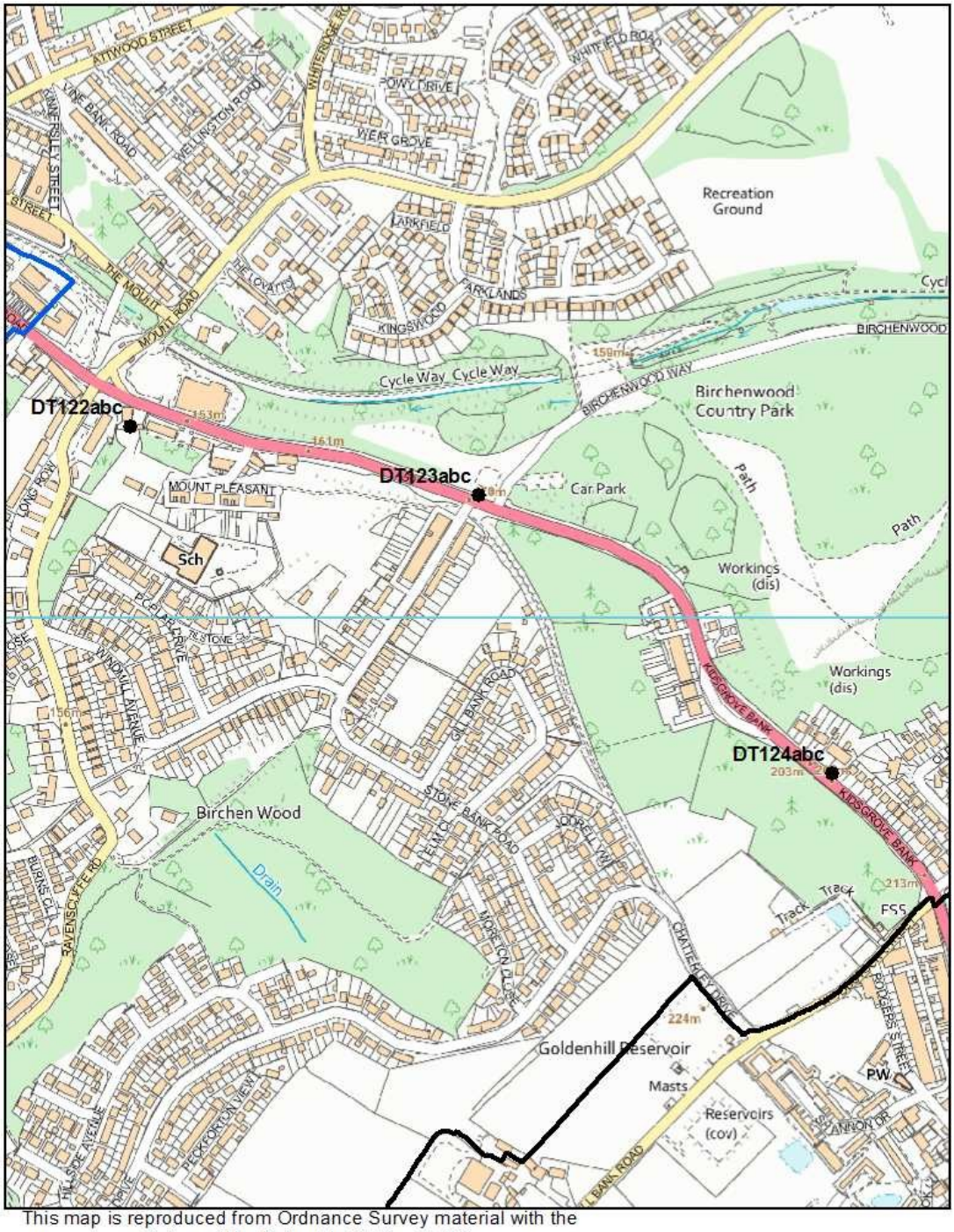


Figure D-8 - Map of monitoring area Kidsgrove 3 - Outside current AQMA



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Newcastle Under Lyme Borough Council - 100019654-2022

DTs 2020
NuLBC Boundary
AQMA Boundary

Scale 1:5,000

Figure D-9 - Map of monitoring Area 4 – Shirley Brook (not within an AQMA)

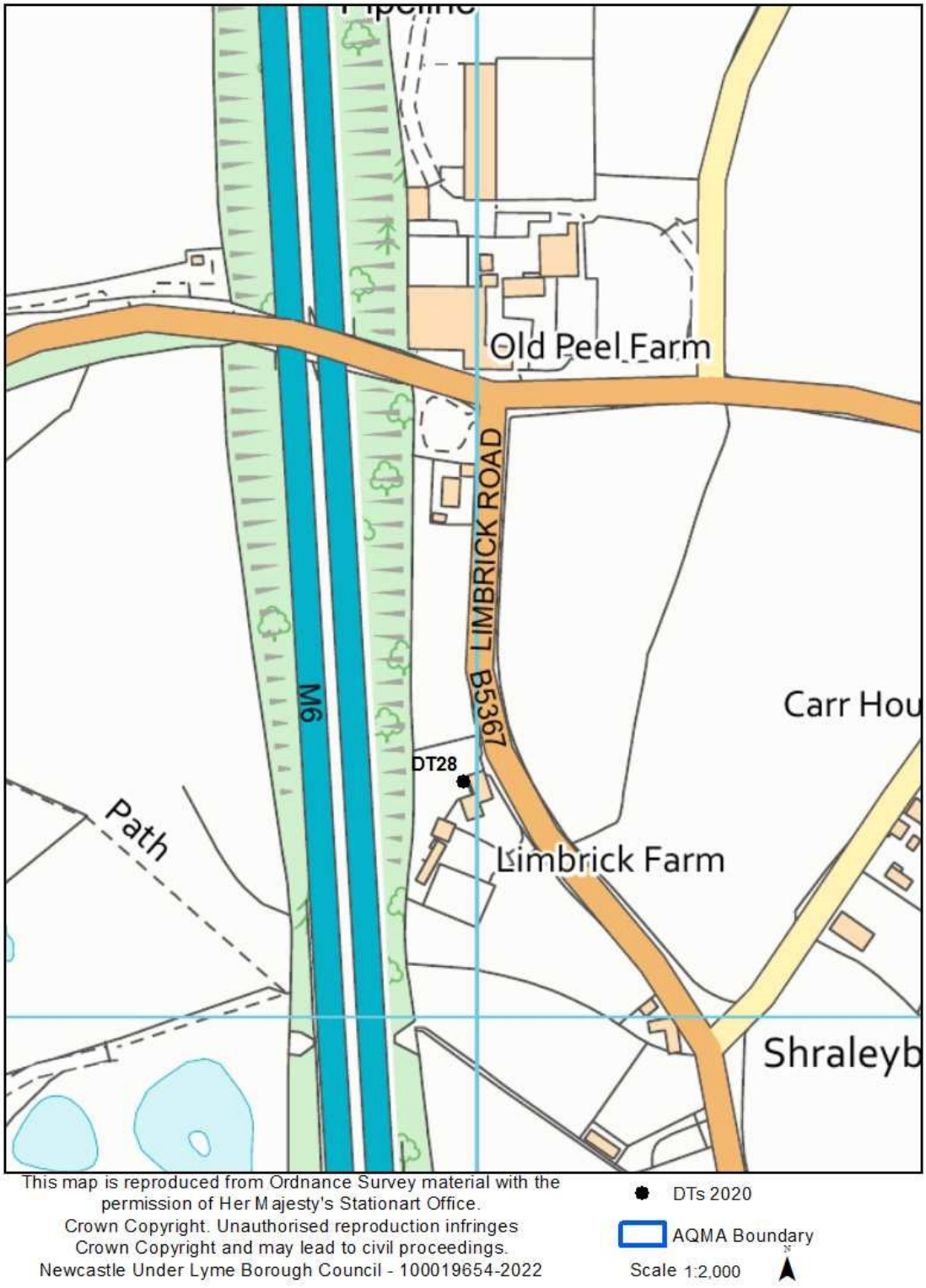


Figure D-10 - Map of monitoring Area 5 - Chesterton (not within an AQMA)

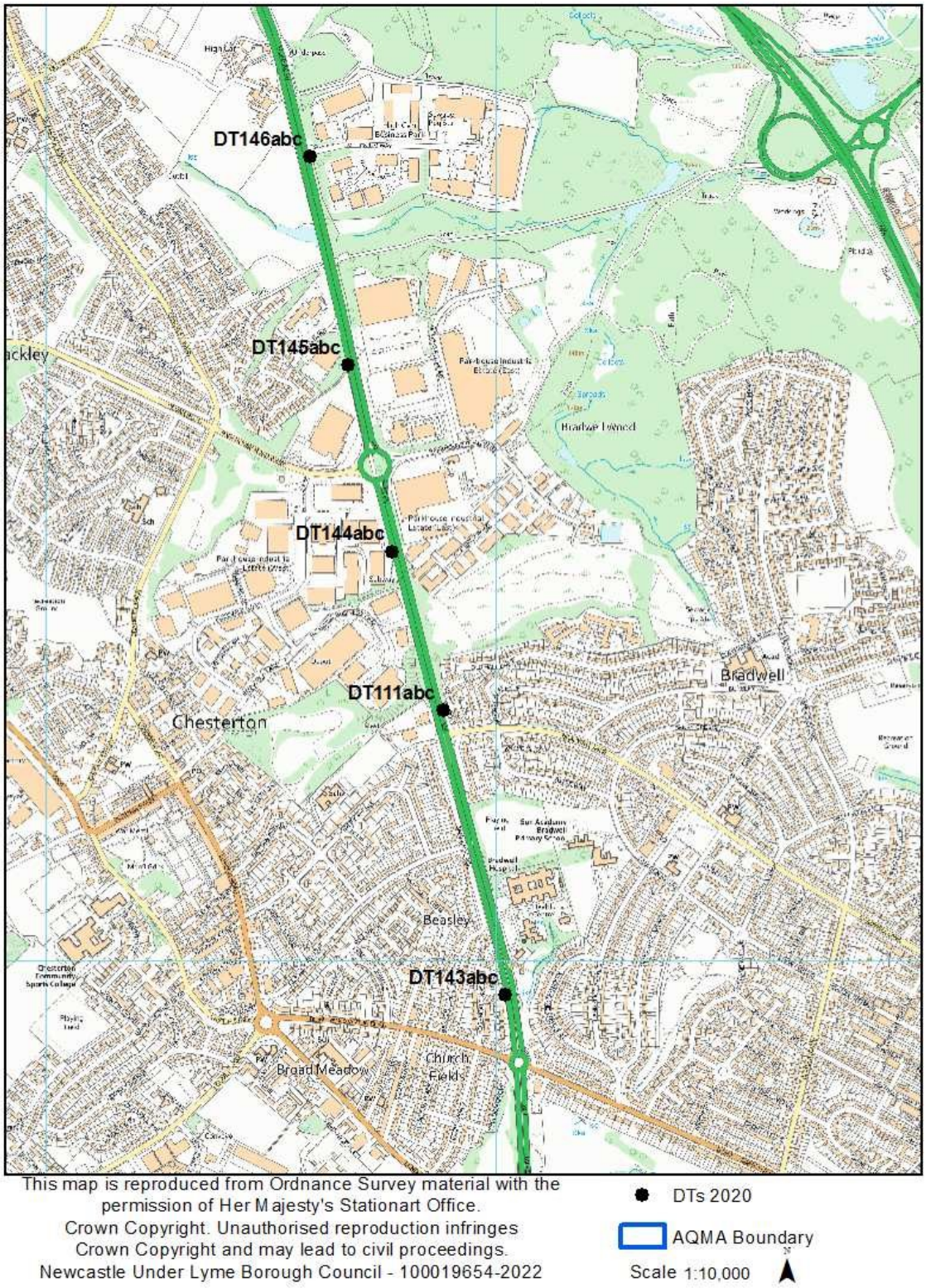


Figure D-11 - Map of monitoring Area - AQMA 3: Maybank-Wolstanton-Porthill

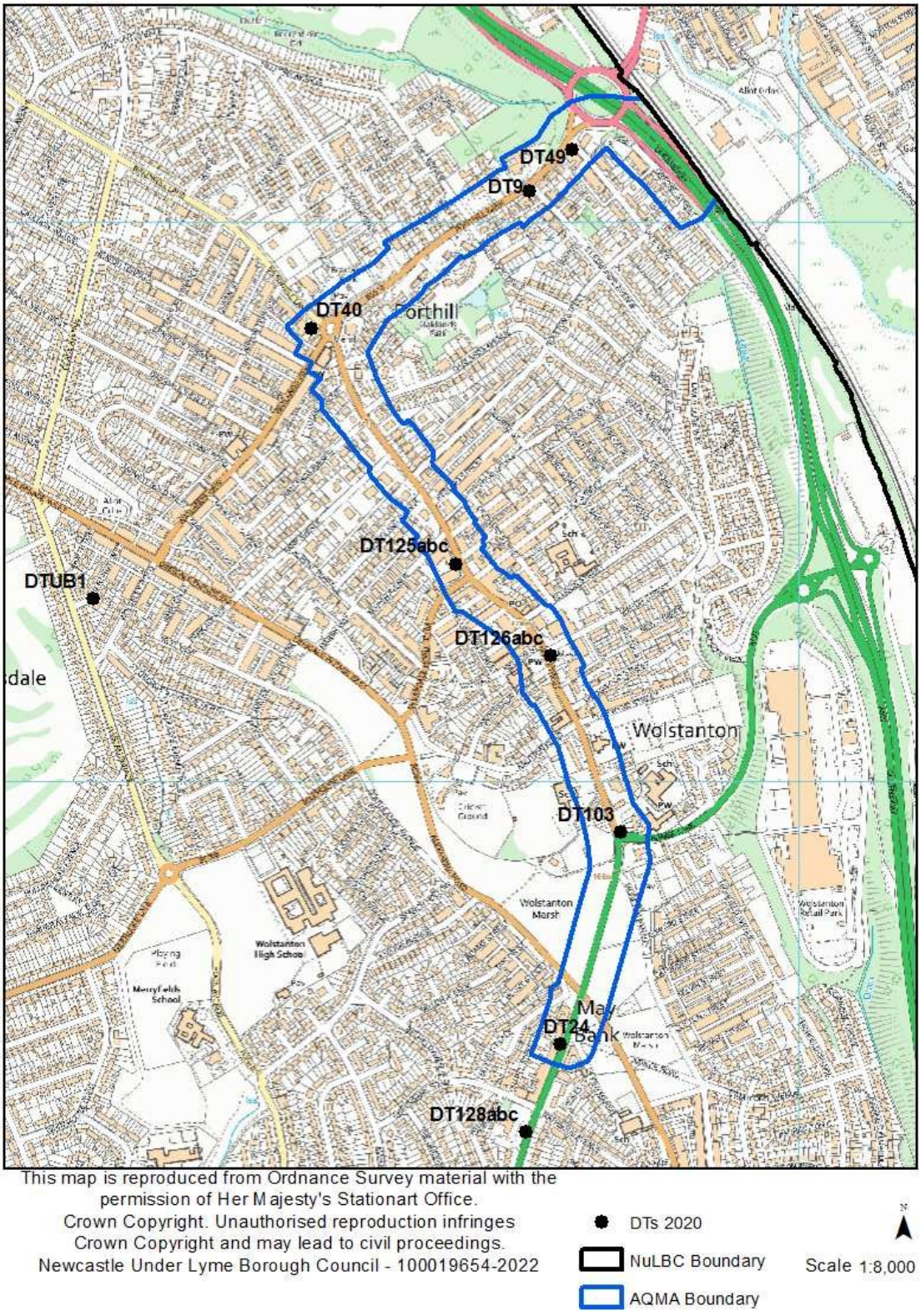


Figure D-12 - Map of monitoring Area 7 – Knutton (not within an AQMA)

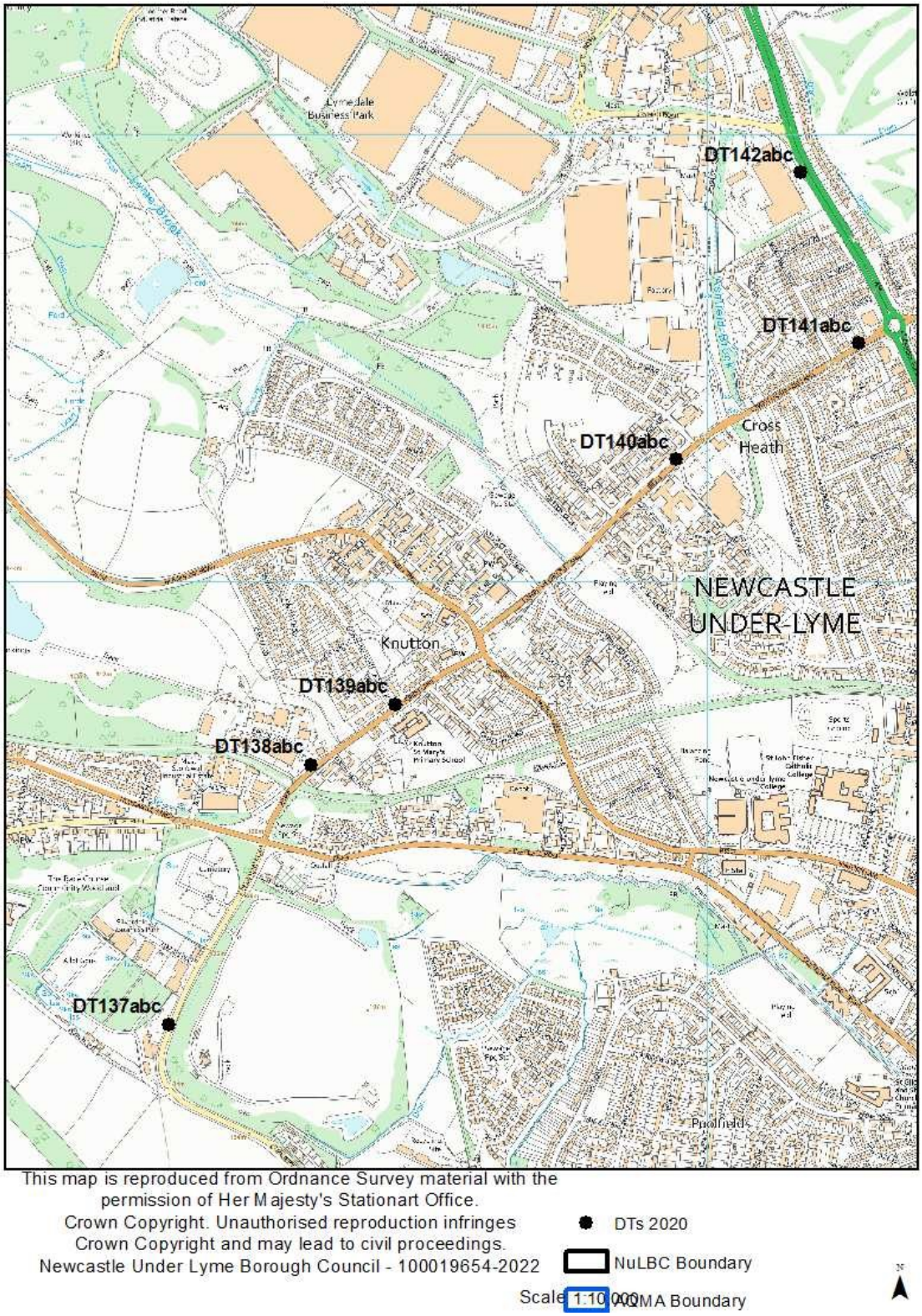


Figure D-13 - Map of monitoring Area 8 - AQMA 2: Newcastle-under-Lyme Town Centre (west)

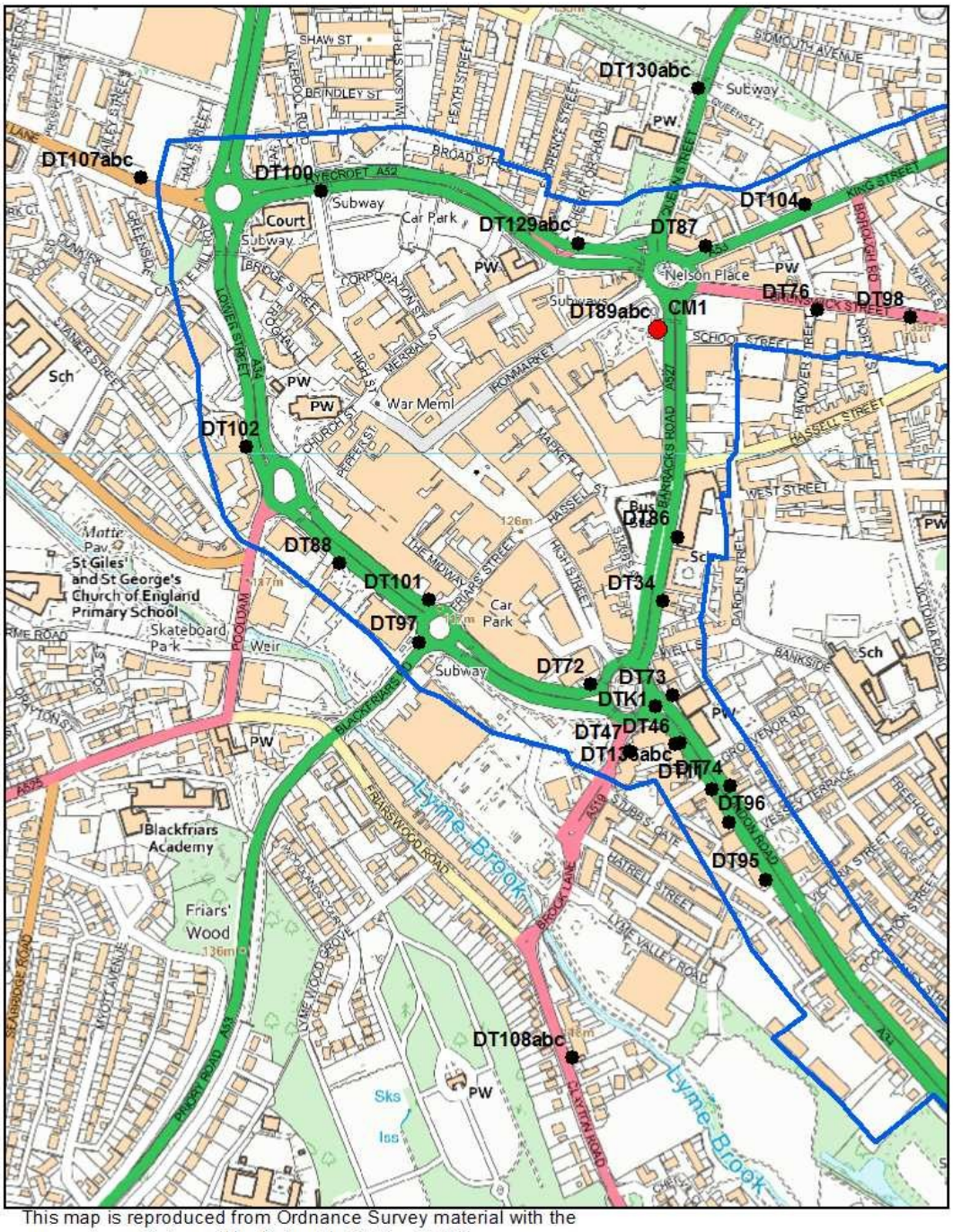


Figure D-14 - Map of monitoring Area 8 - AQMA 2: Newcastle-under-Lyme Town Centre (east)

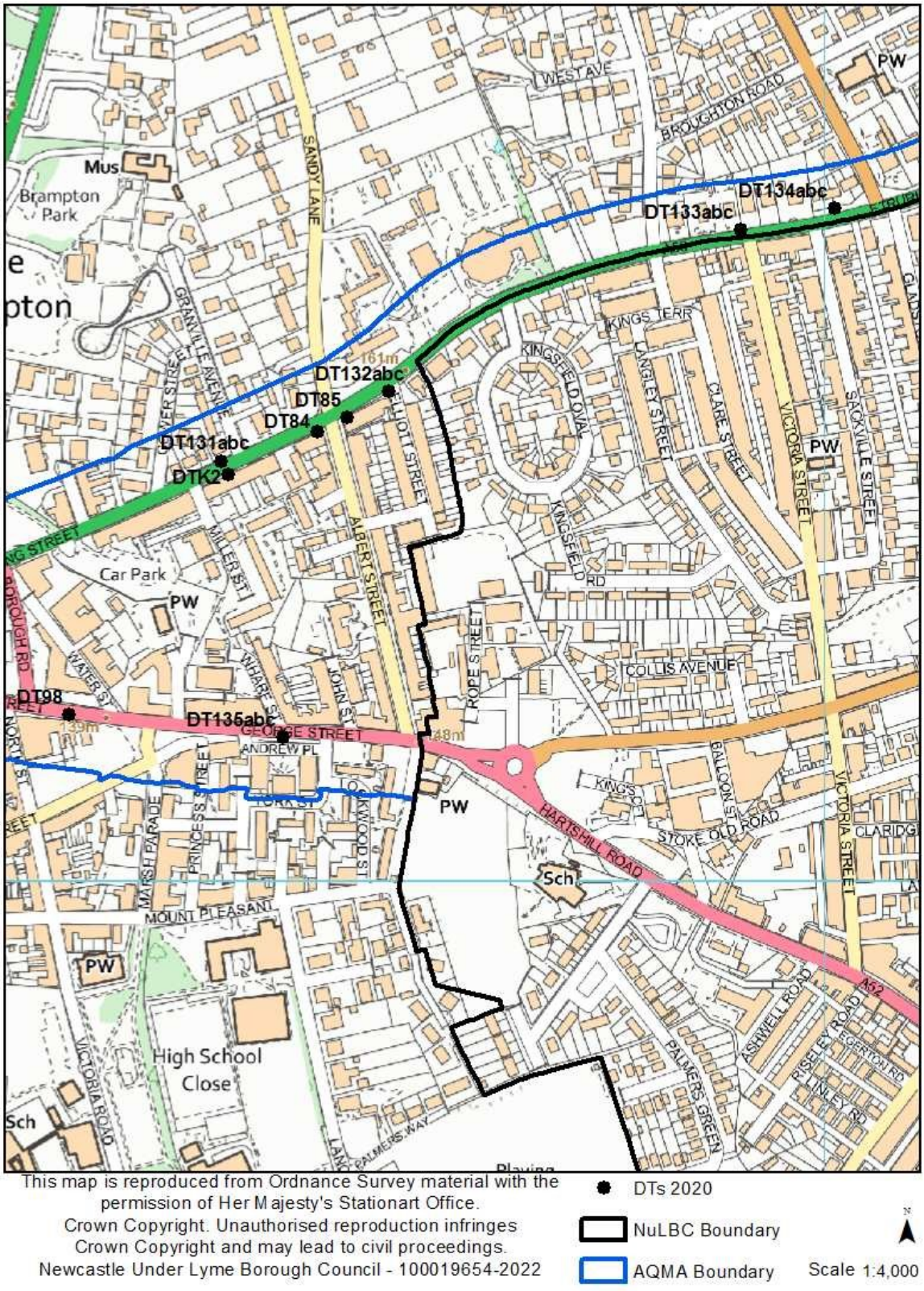


Figure D-15 - Map of monitoring Area 9 - AQMA 4: Little Madeley

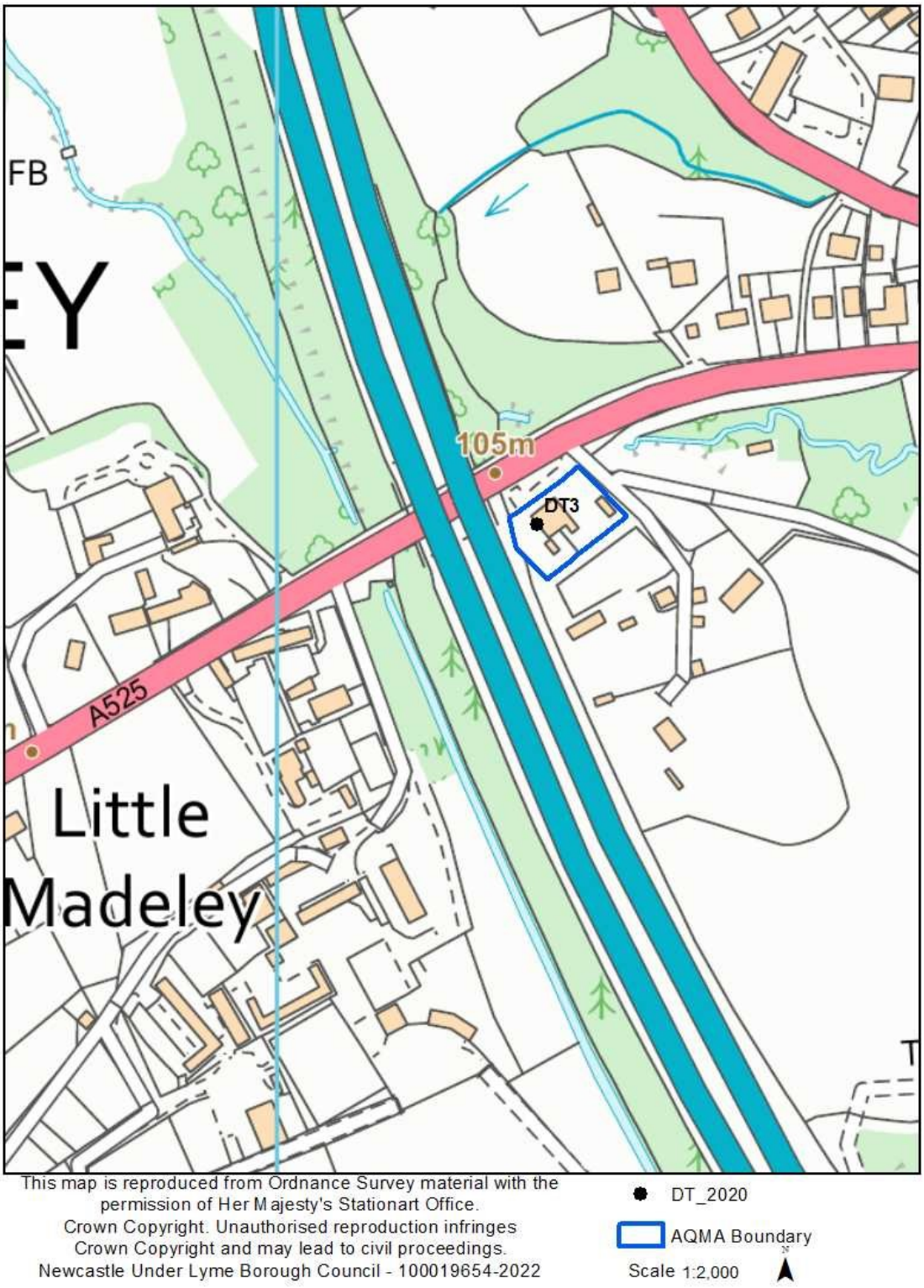


Figure D-16 - Map of monitoring Area 10 – Thistleberry (Not within an AQMA)

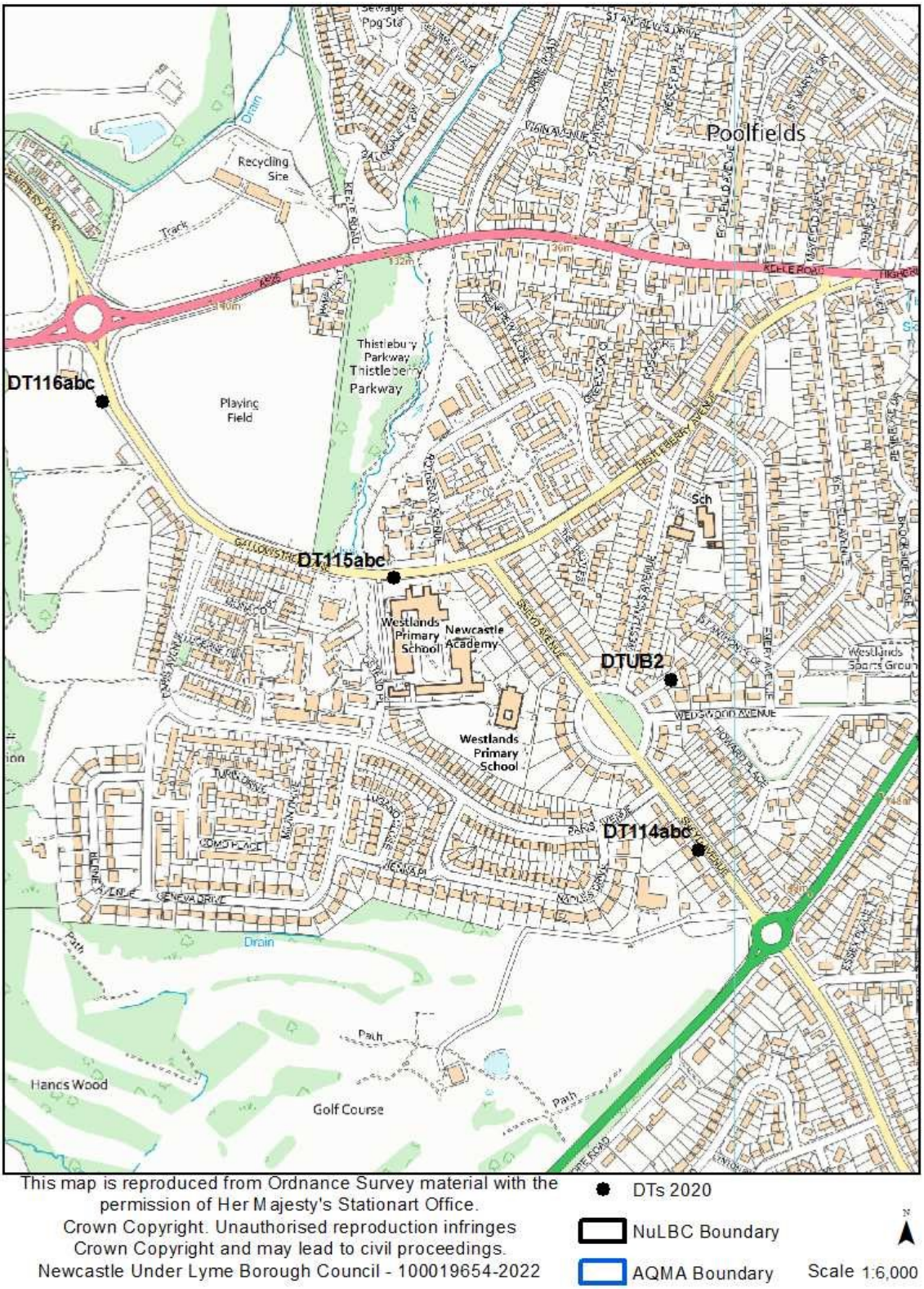
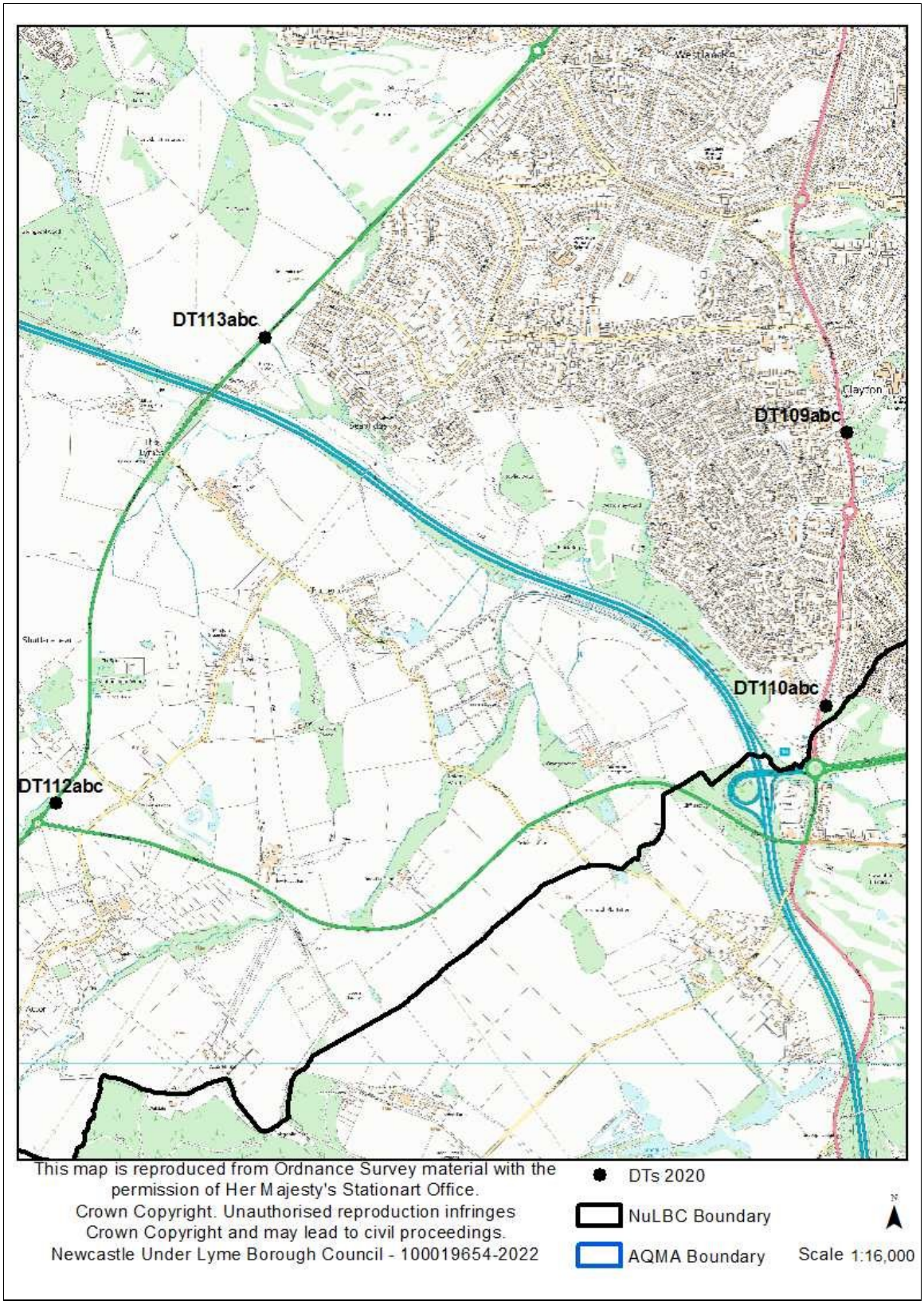


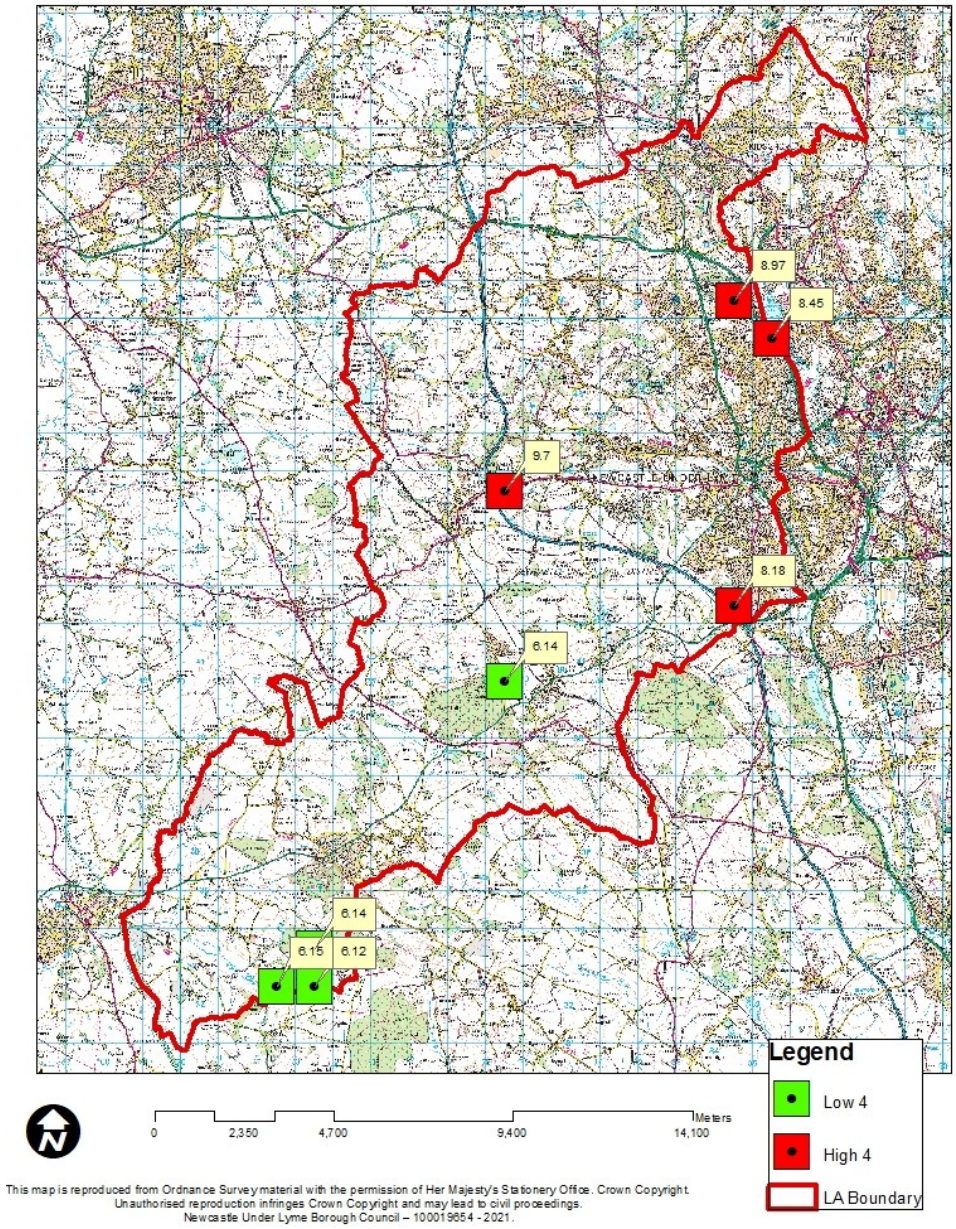
Figure D-17 - Map of monitoring Area 11 – Clayton / Seabridge (Not within an AQMA)



Appendix E: The four highest and lowest areas of $PM_{2.5}$ in $\mu g/m^3$ within Newcastle under Lyme

Figure E-1 - Background concentrations of $PM_{2.5}$ in $\mu g/m^3$ for 2022 – Showing the four highest and lowest areas based on a 1km grid square.

(Source data: DEFRA https://uk-air.defra.gov.uk/data/laqm-background-home)



Appendix F: Summary of Air Quality Objectives in England

Table F.1 – Air Quality Objectives in England[20]

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

[20] 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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
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 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

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.