



2022 Air Quality Annual Status Report (ASR)

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

Date: December 2022

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Executive Summary: Air Quality in Our Area

Air Quality in South Lakeland District 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 28,000 to 36,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

It is for this reason South Lakeland District Council are charged with the review and assessment of air quality at a local level.

We have monitored nitrogen dioxide (NO₂) levels around the District since 1995. Previous assessments have shown that this is the only pollutant of concern in the district and that the principal source is road traffic.

An Air Quality Management Area (AQMA) was declared in 2001 when levels were found to be above the government's annual mean NO₂ objective on Lowther Street in Kendal. This was then extended in 2010 to cover other roads in the town centre, as shown on Defra's [UK Air website](#). All other areas of the district meet the annual mean objective and all areas, including Lowther Street and the AQMA meet the short-term 1-hour mean.

After the initial AQMA declaration we drew up an Air Quality Action Plan (AQAP). This was done in partnership with other parties who can influence air quality (such as Cumbria County Council, Planners and the Town Council) through the Kendal Traffic Pollution Working

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

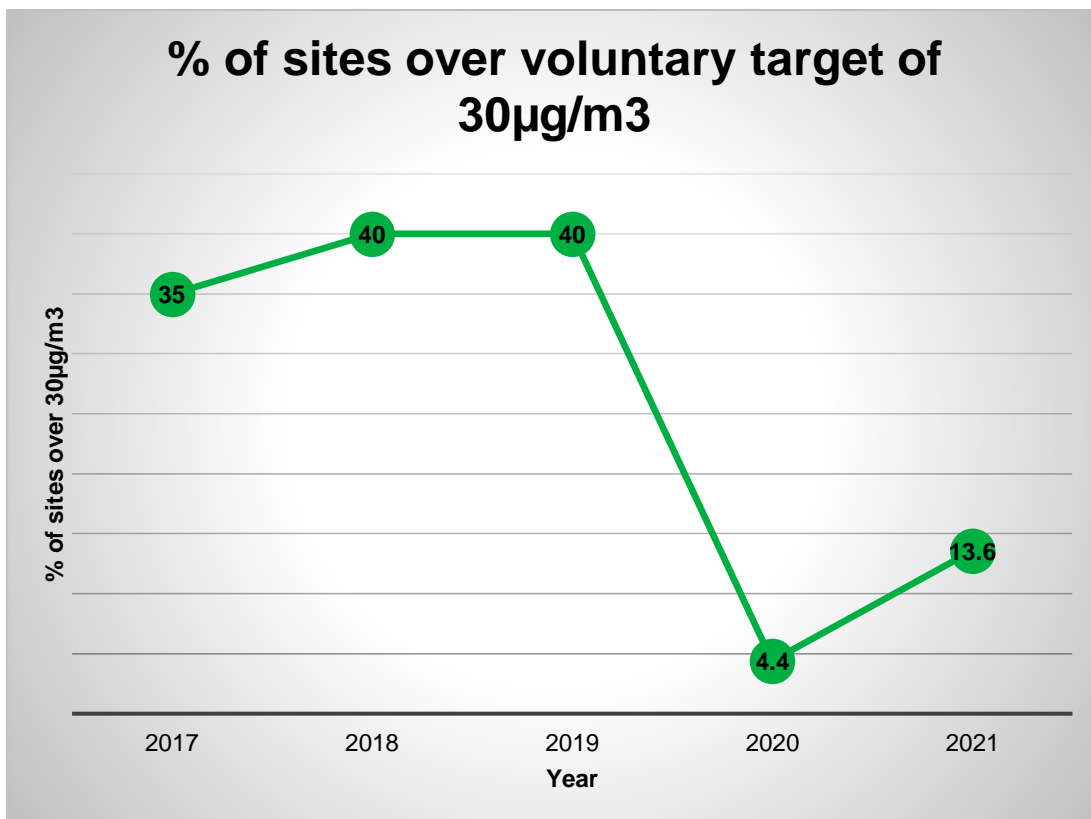
³ Defra. Air quality appraisal: damage cost guidance, July 2021

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

Group, to ensure measures were in place to bring levels of NO₂ down to below the objective. Progress on our action plan has been reported annually, with full reviews of the action plan undertaken on a regular basis, the last full review being in 2016.

Work on air quality in previous years in South Lakeland has involved extensive monitoring and working to reduce areas which are above the annual mean/exceedance level for NO₂. Since the declaration of the AQMA, and implementation of our action plan, levels of NO₂ have shown a downward trend. Of the 22 sites where we monitor, no locations remain above the national objective of 40µg/m³. Whilst we are encouraged by the progress made, we remain cautious, of this, as it is unknown whether traffic levels have returned to normal in the AQMA since the COVID-19 pandemic.

The Council have previously committed to adopting a voluntary target of 30µg/m³, to ensure an ongoing reduction in NO₂, even when the Government objective has been met. Significant and pleasing progress has been made on achieving this target and in 2021 this voluntary target is being met at 19 of the 22 sites.



SLDC is currently in the process of Local Government Reorganisation and will become a Unitary Authority known as Westmorland and Furness Council on 1st April 2023. From this date the new unitary authority will provide all the services currently provided by district councils formerly known as Eden District Council, Barrow Borough Council and South Lakeland District Council and Cumbria county council.

Following the establishment of the new Authority in April 2023, we aim to quickly re-form a new Air Quality Working Group comprising representatives from all interested Stakeholders. The main priority will be to discuss the Air Quality Action Plan, in order to fully review the existing measures and implement new ones.

The intention in 2021 was to review the boundary of the AQMA with a view to potentially reducing its size. Having considered Technical Guidance TG16, it is felt that a fluctuation and uncertainty in results due to COVID-19 and changing traffic flows etc., this detailed assessment would be better carried out in 2024 following the formation of the new Unitary Authority. At this point, there will be 3 years of post COVID pandemic data available and the Authority will be better positioned to progress this work forward.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy⁵ sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero⁶ sets out the approach to reduce exhaust

⁵ Defra. Clean Air Strategy, 2019

⁶ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

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.

Recent progress of our action plan includes:

- A successful bid to the SOSCHI charging infrastructure fund and as a result the installation of 24 x 22kW chargers into our car parks including South Lakeland House, Library Road, Kendal, Redbank Road, Grasmere and Buxton Place, Ulverston. These charge points will go live by March 23 and will be available for public use. They will support a 2-3 hour charge time for your vehicle and our first step in providing EV infrastructure to our residents.
- The Gooseholme Bridge over the river Kent in Kendal was opened on Friday 14th October 2021, replacing an earlier footbridge damaged during Storm Desmond. The District Council has contributed £75,000 from the Community Infrastructure Levy towards the cost of the bridge. The new bridge provides a vital link in the pedestrian and cycle route network in the town centre and will greatly enhance active travel.
- Some small projects have been completed as part of the Climate Change Action Plan. Examples are: a staff cycle morning at Kendal Leisure Centre, grant funding through Climate Change fund for E-bikes, officer support on E-Cargo bike scheme and the Council's greening campaign has led to creation of community actions groups (SENS, Sustainable Duddon) that have been exploring e-bikes projects.
- Inclusion of a minimum Euro 6 standard for new vehicles in our Hackney Carriage & Private Hire Policy (August 2022).

Conclusions and Priorities

The report shows that all locations within the district comply with the 1-hour NO₂ objective and that all sites comply with the annual mean objective.

Levels at Burgundy's have fallen since the declaration of the AQMA and with the progression of the air quality action plan we see that this trend will continue.

1 site is within 10% of the annual average mean objective (Burgundy's on Lowther Street). This is one of the sites that led to the declaration of the AQMA as it was exceeding the limit, so we are pleased to see it is now below the national objective of 40µg/m³.

Following the declaration of a climate emergency, a climate change strategy is now in place and will continue to improve air quality in South Lakeland. It will ensure a strategic approach to climate change and will continue to be a priority for consideration at all levels of the organisation. Some of these actions have begun and we look forward to seeing them progress.

Priorities for the year ahead are:

- The reformation of the Air Quality action group, within the newly formed Westmorland & Furness Council. Followed by a full review of our air quality action plan
- Progress the installation of the EV network in and around the district.

SLDC will continue to respond to local queries regarding air quality and monitoring locations will be continually reviewed in order to accurately reflect the concerns of residents and stakeholders. We strive for continuous improvement in air quality and maintain a local objective of an annual average NO₂ of 30µg/m³.

As previously discussed, the air quality action plan was last reviewed in 2016 and is due to be updated to reflect air quality changes in the district. However, given the major local government reorganisation within SLDC and surrounding districts, not only geographically but financially and in terms of internal structure with the former County Council arrangements etc., it is felt that a more thorough and effective update could be done after the changes take place in April 2023.

If you would like more information on air quality please visit the air quality pages on the Council's website: www.southlakeland.gov.uk .

Local Engagement and How to get Involved

We engage with parties who have an interest in, and are able to influence, air quality through the Kendal Traffic Pollution Working Group. Any consultations on air quality will

be published on the council's website and public engagement is actively advertised and encouraged.

There are lots of simple things you can do to improve air quality including:

- Walk or cycle short journeys instead of using the car
- Use public transport
- Car share to work, school or activities
- Switch off your engine when stationary
- Choose a low emission vehicle such as an electric or hybrid. The network of charging points is continually growing across the district and across the country and these vehicles are becoming more popular and affordable
- Form a 'walking bus' for the journey to school

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Protection Team , South Lakeland District Council with the support and agreement of the following officers and departments:

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Damian Law – Specialist (Strategy), South Lakeland District Council

Helen Watson Moriarty – Development and Delivery Manager, Kendal Town Council

This ASR has been approved by: Councillor Dyan Jones

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Jackie Dickinson at:

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1 Local Air Quality Management

This report provides an overview of air quality within South Lakeland during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by South Lakeland District 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 E.1.

2 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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by SLDC can be found in Table 2.1. The table presents a description of the one AQMA that is currently designated within South Lakeland. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation is as follows:

- NO₂ annual mean;

Table 2.1 – 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 National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Kendal AQMA	Declared 05.5.2001, amended 23.11.10	NO2 Annual Mean	An area encompassing properties bordering Lowther Street in Kendal, later extended to also cover properties bordering Kirkland.	NO	82.1	39	South Lakeland Action Plan Nov-16	https://www.southlakeland.gov.uk/media/3644/sldc-air-quality-action-plan-2016.pdf

☒ SLDC confirm the information on UK-Air regarding their AQMA(s) is up to date.

☒ SLDC confirm that all current AQAPs have been submitted to Defra.

Progress and Impact of Measures to address Air Quality in South Lakeland

Defra's appraisal of last year's ASR concluded

1. It is encouraging to see that the Council have reviewed their monitoring programme and have introduced new monitoring locations. The Council should continue to review the monitoring programme on a regular basis, to ensure that monitoring takes place at any sites of potential exceedance with relevant exposure.
2. The Council's presentation of trend graphs is very useful as they clearly identify trends in and out of the AQMA. However, the formatting could be improved by subscribing pollutants, for example. The Council do also provide a good discussion of NO₂ trends within the district.
3. The formatting of the report could in general also be improved, for example Table 2.2 column spacing.
4. The Council could provide clearer maps showing the locations of study sites and the AQMA. To improve the maps, labels should be clearly legible and the boundary of the AQMA should be given.
5. The Council's latest AQAP was published in 2016, therefore is greater than five years old. It is therefore recommended that the AQAP is updated to reflect the current air quality in the area.

In response to this, SLDC has committed to review the AQAP following LGR.

6. Ideally screenshots of the national bias factor sheets used should be provided in the report to ensure consistency with the downloadable files.
7. The Council have proposed an amendment of the current AQMA boundary, which was also mentioned in the previous ASR. It is recommended that the Council refer to Section 3.48 'Amendment and revocation of AQMAs' in the LAQM TG16 guidance document to assess whether a detailed study or screening assessment is required to support the amendment of the AQMA boundary and provide an update of this in the next ASR.

This will be addressed once LGR has been completed.

8. The adoption of voluntary NO₂ target of 30µg/m³ is encouraging and commendable. This could be given greater focus in future reporting.

South Lakeland District Council has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Sixteen measures are included within Table 2.2, with the type of measure and the progress SLDC have made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

Key completed measures are:

- Kendal Strategic Infrastructure Study/ Kendal Highways and Transport improvements Study has been completed. This is the first step in various linked projects and will help to secure funding for this to be carried out.
- Public electric charging points - SLDC are part of a Cumbria wide EV infrastructure group, which aims to significantly expand Cumbria's EV charging infrastructure. Supported by EV charging infrastructure specialists, the partnership formed in Autumn 2020 and has since been mapping potential locations for the installation of EV charge points across Cumbria, including multiple identified locations in Kendal.

SLDC worked to implement these measures in partnership with the following stakeholders during 2021:

- Cumbria County Council
- Kendal Town Council

The principal challenges and barriers to implementation that SLDC anticipates facing is local government reorganisation. SLDC is currently in the process of Local Government Reorganisation and will become a Unitary Authority known as Westmorland and Furness Council on 1st April 2023. From this date the new unitary authority will provide all the services currently provided by district councils formerly known as Eden District Council, Barrow Borough Council and South Lakeland District Council and Cumbria county council. Whilst this may provide potential barriers to implementation, once complete it should assist with implementation due to closer links with the highways authority.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, SLDC anticipates that further additional measures not yet prescribed will be

required in subsequent years to achieve continued compliance and improvement and enable the revocation of Kendal AQMA.

Table 2.2 – 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
1	Town Centre Strategy	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2019	2024	SLDC; Cumbria County Council	SLDC internal funding	NO	Not Funded	£1m	Implementation	Unknown	Strategy in place; measures implemented	Masterplan now referred to as Kendal Town Centre Strategy published 2019	Flexible framework for future development and investment in Kendal including car parking, the road, walking and cycling networks and the public realm. Funding required to take strategy forward, delivery mechanism established, money to be made available for projects and further feasibility studies to deliver strategy.
2	Control of HGV's on Lowther Street	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2016	2024	SLDC; Cumbria County Council	SLDC internal funding	NO	Not Funded		Aborted	Unknown	% HGV on Lowther Street	Action point now incorporated with the Town Centre Strategy and therefore this will be removed going forward.	THIS ACTION TO BE REMOVED

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
3	Reducing bus emissions and increasing useage	Promoting Low Emission Plant	Public Procurement of stationary combustion sources	2016	2026	SLDC, bus companies	SLDC internal funding	NO	Not Funded	£100K	Implementation	Unknown	Number of buses using Kendal town centre and Lowther Street of Euro Std. 6	In July 2016 - 12 new Euro 6 double-deckers introduced on the 555 Lancaster to Keswick route, which includes Lowther Street. In July 2017, 7 new Euro 6 Volvo B5 TL double deck (open top) vehicles added on the on 599 service. Operators have idling policies in place. Anti-idling campaign ran Spring 2017 targeting buses and taxis in Kendal. Stagecoach are planning introduction of nine new Low Floor double deck buses in Kendal in 2023, which will have significantly lowered emissions.	Bids for funding to return buses to Stricklandgate in Kendal; improve the waiting environment in Kendal bus station; and traffic changes to reduced mileage in Ambleside in Bus Service Improvement Plan 2022 were not successful.
4	Implementation of Kendal Transport Measures	Traffic Management	Strategic highway improvements , Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2016	2020	CCC	Cumbria County Council Local Growth Fund	NO	Not Funded	£1m	Completed		Number of schemes completed	13 schemes out of 16 completed to date. Includes pedestrian improvements such as crossings and footpaths, cycleways, road widening and junction improvements. The remaining 3 will not be undertaken due to other restrictions. Traffic calming through speed humps no longer align with CCC policy. The final scheme A5284 Sandylands/ Appleby Road is not deliverable.	As identified in 'Kendal Transport Improvement Study'. 3 schemes removed as undeliverable.

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
5	Car Parking Review (including park and walk and park and cycle)	Traffic Management	Other	2016	2021	SLDC	SLDC internal funding	NO	Not Funded		Implementation	Unknown	Town Centre AADT's; car park usage figures	Car park on County Hall – that may now serve to reduce car journeys of visitors who access Kendal down Windermere Road or Burneside Road as they may be diverted to find parking at the North end of Kendal before accessing the Town centre. Lowther Street AADT: March 2016 = 10,759; March 2017 = 11,066; March 2018 = 11,013; March 2019 = 11,371 Car park tickets sold in Kendal: 1 Jan – 31 Aug 2015 = 577,665; 1 Jan – 31 Aug 2016 = 534,629; 1 Jan - 31 Aug 2017 = 539,588; 1 Jan - 31 Aug 2018 = 564,740 1 Jan - 31 Aug 2019 = 553,889 1 Jan - 31 Aug 2020 = 607586	Plan to use Kendal Leisure Centre as park and walk / cycle shelved due to lack of funding as deemed "before it's time". Proving difficult as a Council to balance economy (bringing shoppers in by providing town centre parking) against the air quality benefits of keeping cars out of town. Prioritisation is a political issue. *NB reporting of figures revised in 2018 - multi-storey usage had been omitted
6	Kendal Strategic Infrastructure Study/ Kendal Highways and Transport improvements Study	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2016	2019	CCC, SLDC	CCC, SLDC, KTC	NO	Not Funded		Completed	Unknown	Strategic Study completed and measures delivered	This study considers longer term infrastructure requirements of Kendal, taking into account recent flooding events, air quality and proposed future development (including one way system, north / south travel and 'Northern Development Route').	Delays due to linked projects but this study is the first step and significant additional work and funding will be required prior to any delivery.

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
7	Public electric charging points	Promoting Low Emission Transport		2015	2023	SLDC	SLDC OLEV funding	NO	Not Funded	200K	Implementation	Unknown	Number and usage of EV charging points		SLDC are part of a Cumbria wide EV infrastructure group, which aims to significantly expand Cumbria's EV charging infrastructure. Supported by EV charging infrastructure specialists, the partnership formed in Autumn 2020 and has since been mapping potential locations for the installation of EV charge points across Cumbria, including multiple identified locations in Kendal. The project has overrun due to the slow pace of capacity upgrades by ENW and issue with the supplier.
8	Reduced price parking/parking permits for cleaner vehicles	Traffic Management	Emission based parking or permit charges	2016	2025	SLDC	SLDC	NO	Not Funded		Implementation	Unknown	No. of reduced price parking permits issued	Permits issued: 2011 = 1 2012 = 7 2013 = 11 2014 = 17 2015 = 25 2016 = 33 2017 = 50 2018 = 70 2019 = 54 2020 = 44	Discount on price of annual parking pass for Band A vehicles. Discount increased to £100 April 2017.
9	Enforcement of parking/loading restrictions	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2016	2025	Cumbria County Council	Cumbria County Council	NO	Not Funded		Implementation	Unknown	Number of PCN's served	2010 = 15 2011 = 273 2012 = 254 2013 = 61 2014 = 127 2015 = 121 2016 = 138 2017 = 582 2018 = 403 2019 = 134 2020 = 170 2021=793	Staffing issues within the parking services team hindered performance.

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
10	Encouraging walking	Transport Planning and Infrastructure	Other	2016	2025	SLDC/KTC/CCC	KTC/SLDC	NO	Not Funded		Implementation	Unknown	Number of cars using Park and Walk sites	KTC continue to distribute a Walking Trails leaflet for Kendal - will encourage walking into town from residential areas. Improvements made. SLDC liaising with CCC Public Health team to target travel to school. Kendal Bid project for Kendal Leisure Centre to become a Park and Walk / Cycle, including improved links to town centre, did not receive funding. No Park & Walk yet in operation, so no usage figures available.	Further measures to enhance the walkability of the town to be worked up through the Kendal Town Centre Strategy.
11	Encouraging cycling, enhanced cycle routes and cycle parking in Kendal	Transport Planning and Infrastructure	Cycle network	2015	2020	CCC/KTC/SLDC	Cumbria County Council, Local Growth Fund, Defra AQ grant, Health and well being funding	NO	Not Funded		Implementation	Unknown	Length of cycleway. Number of cycle stands installed	850m of cycleway installed in Phase 1 of Burton Rd Cycleway and 1.41km now completed in Phase 2. Shap Road section to follow. Lancaster Canal Partnership implementing the Kendal to Lancaster canal cycleway to encourage cycling from Natland to Kendal. Work now started on completing missing sections of 'Kendal X', linking 4 corners of Kendal. Also potential for cycle routes to be combined in flood defence works which received planning approval early 2019. Cycle parking now installed in most SLDC car parks. 46 Defra-funded cycle stands installed in Kendal, with net increase of 25 stands, alongside 20 bike boxes installed by Kendal BID. Bike Hub installed in	Cycle routes funded by Local Growth Fund. Funding was reprofiled to 2018/19 which has delayed implementation of the schemes. Cycle parking funded by Defra AQ Grant. Cycling Hub in Westmorland Shopping Centre delayed pending investigation of other options. Further measures to encourage cycling to be worked up through the Kendal Town Centre Master Plan. No cycle count since 2017 or 2018 due to CCC funding cuts.

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															<p>Westmorland Shopping Centre, Kendal - secure bike parking, changing rooms, lockers and maintenance stand. To be publicised following Purdah.</p> <p>Electric Bike Network have 2 hire locations and 3 charging locations in Kendal.</p> <p>The Gooseholme Bridge over the river Kent in Kendal was opened on Friday 14th October 2021, replacing an earlier footbridge damaged during Storm Desmond. The District Council has contributed £75,000 from the Community Infrastructure Levy towards the cost of the bridge. The new bridge provides a vital link in the pedestrian and cycle route network in the town centre and will greatly enhance active travel.</p> <p>1619 cyclists in Kendal in October 2015 traffic count (8.8% growth on previous year). 2016 = 1715 (5.8% growth). 2017 = no figures available 2018 = no figures available 2019 = no figures available</p>

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
12	Reducing taxi emissions	Promoting Low Emission Transport		2015	2023	SLDC	SLDC	NO	Not Funded	N/A	Implementation	Unknown	Policy in place. % of licensed taxis of Euro Standard 6	Taxi Licensing Policy review delayed until 2022. Anti-idling campaign ran Spring 2017 targeting buses and taxis in Kendal. Another campaign ran on Clean Air Day, with Officers from South Lakeland and Cumbria County Council and the Police handing out leaflets to drivers found idling. Internal reorganisation has led to the employment of locality officers who will be authorised to serve Fixed Penalty Notices and carry out education/enforcement role.	
13	Councils climate change action plan	Promoting Travel Alternatives		2016	2025	SLDC	SLDC internal funding/historic AQ grant	YES	Partially Funded		Implementation	Unknown	Number of active travel projects completed.	Some small projects completed-staff cycle morning at the Leisure Centre, grant funding through Climate Change fund for E-bikes, officer support on E-Cargo bike scheme and the Council's greening campaign has led to creation of community actions groups (SENS, Sustainable Duddon) that have been exploring e-bikes projects.	Lack of resources funding and expertise (active travel officer).
14	Planning policy prioritise air quality (Local Plan Policy)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2015	2032	SLDC	SLDC	NO	Not Funded	N/A	Implementation	Unknown	CIL liabilities, CIL receipts, CIL spending decisions. Adoption of new policies	Local Plan under review, Issues and Options Consultation 2021. Existing policies being reviewed include those relating to pollution and transport.	

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
15	20mph zones in Kendal	Traffic Management	Reduction of speed limits, 20mph zones	2017	2024	Kendal Town Council Internal Funding	KTC/SLDC	NO	Not Funded		Implementation	Unknown	Number of 20mph zones	Zone boundary agreed with CCC.	There was a delay due to controversy re whether zones reduced emissions and would also reduce the flow of traffic. This is no longer relevant as agreed boundary creates a signage only scheme.
16	Enhanced green infrastructure	Other	Other	2016	2025	SLDC/KTC internal funding/ locally important projects grant	SLDC/ KTC	NO	Not Funded		Implementation	Unknown	Number of projects completed	KTC installed two 'Ivy Screens'. Funding secured to deliver more in 2023, potentially on Windermere Road following railing improvements.	

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

SLDC will commit to undergoing an assessment of the extent (if any) of the issues with PM_{2.5} using the available and suggested resources in the technical guidance document during 2022 and this will be reported in the 2023 ASR. Alongside this, we are currently in possession of an AQMesh which can monitor various pollutants including particulates at varying locations across the district as it is a mobile unit. This equipment is currently undergoing repair but once returned, we intend to use the equipment to investigate complaints and also to carry out a pro-active monitoring programme across the district. This information will form the basis of future actions to reduce particulate levels across the District.

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

This section sets out the monitoring undertaken within 2021 by South Lakeland District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

South Lakeland District Council undertook automatic (continuous) monitoring of NO₂ at 1 site during 2021. **Error! Reference source not found.** in Appendix A shows the details of the sites. National monitoring results are available at <https://uk-air.defra.gov.uk/data/>

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

3.1.2 Non-Automatic Monitoring Sites

SLDC undertook non- automatic (i.e. passive) monitoring of NO₂ at 22 sites during 2021. 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.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. 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 2021 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 NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

Monitoring has shown that in 2021, after bias adjustment and distance correction (for those sites which are not representative of public exposure) there were no sites in the District that were above the annual mean objective of 40µg/m³.

There was 1 site within 10% of the objective and this is site ref N25, Burgundys on Lowther St, Kendal, where there is relevant exposure on the first floor. This site is within the AQMA. We are pleased to see this level fall below the objective as this is the first time, except for 2020 when the COVID-19 pandemic significantly affected the results downwards.

There were no other sites within 10% of the objective in 2021.

The Council have adopted a voluntary target of 30µg/m³, to ensure an ongoing reduction in NO₂, even when the Government objective has been met. This was being met at 19 of the 22 sites in 2021, which is very encouraging.

There were no exceedences of the hourly mean objective at the Lowther Street continuous analyser in 2021 (the worst case monitoring location) and no sites at which annual means were greater than 60µg/m³, (which would indicate an exceedance is likely at these sites).

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)
A1	Lowther Street	Kerbside	351610	492650	NO Nox NO2	YES 'Kendal AQMA	Chemiluminescence	0	0.83	3

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)
N4	St Thomas' School, Kendal	Urban Background	351100	493720	NO2	No	6.4	2.9	No	2.6
N9	1 Lowther St, Kendal	Kerbside	351490	492610	NO2	No	0.0	0.9	No	2.9
N11, N13, N14	24 Lowther St, Kendal	Kerbside	351605	492640	NO2	Yes	0.0	0.8	Yes	2.5
N17	Kirkland, Kendal	Roadside	351570	492410	NO2	Yes	0.5	4.1	No	3.0
N18	Cooks Corner, Bowness	Roadside	340340	497010	NO2	No	0.0	1.9	No	2.6
N19	Beezon Road, Kendal	Kerbside	351897	493022	NO2	Yes	3.2	0.5	No	2.5
N20	29 Wildman Street, Kendal	Roadside	351970	493070	NO2	Yes	0.5	1.5	No	2.6
N21	Blackhall Rd, Kendal	Roadside	351680	492840	NO2	Yes	0.0	2.3	No	2.5
N23	99 Highgate, Kendal	Kerbside	351484	492434	NO2	Yes	1.8	0.8	No	2.4
N24	147 Highgate, Kendal	Roadside	351499	492314	NO2	Yes	0.0	2.7	No	3.1
N25	Burgundy's Kendal	Kerbside	351557	492624	NO2	Yes	0.0	0.9	No	2.6
N26	31 Lowther St, Kendal	Kerbside	351619	492637	NO2	Yes	0.0	0.8	No	2.6

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)
N27	Kent Street, Kendal	Roadside	351674	492695	NO2	Yes	5.1	2.6	No	2.4
N31	42 Stramongate, Kendal	Roadside	351712	492832	NO2	Yes	0.6	2.8	No	2.4
N33	Sandes Ave, Kendal	Roadside	351597	493052	NO2	Yes	0.7	2.7	No	2.4
N36	11 Longpool, Kendal	Kerbside	352016	493142	NO2	Yes	3.3	0.6	No	2.5
N37	9 Wildman St, Kendal	Roadside	351934	493043	NO2	Yes	0.0	1.5	No	2.5
N38	Windermere Rd, Kendal	Roadside	351499	493022	NO2	Yes	12.0	1.5	No	2.5
N41	County Road, Ulverston	Roadside	328698	478158	NO2	No	5.8	2.2	No	2.5
N43	Casson St, Ulverston	Urban Background	329049	478471	NO2	No	0.3	1.1	No	2.6
N46	46 Canal Street, Ulverston	Kerbside	329316	478554	NO2	No	0.0	1.3	No	2.5
SLAKE/20A/NWB3S 1	22 Canal Street, Ulverston	Kerbside	329356	478604	NO2	No	0.0	1.3	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 NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
A1	Lowther Street	Kerbside	351610	98.7	94.5	27.42	21.92	25.72	21	24

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

☒ **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/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

All means have been “annualised” as per LAQM.TG16 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 NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
N4	351100	493720	Urban Background	100	100.0	9.0	8.3	11.0	5.6	7.1
N9	351490	492610	Kerbside	100	100.0	30.3	32.2	29.6	22.1	28.0
N11, N13, N14	351605	492640	Kerbside	100	100.0	29.9	28.2	28.8	22.5	24.6
N17	351570	492410	Roadside	100	100.0	26.0	25.4	25.0	18.5	21.1
N18	340340	497010	Roadside	100	100.0	29.0	25.7	25.8	15.9	20.5
N19	351897	493022	Kerbside	100	100.0	29.7	29.6	35.6	20.9	28.1
N20	351970	493070	Roadside	100	100.0	30.6	35.9	32.7	26.1	31.9
N21	351680	492840	Roadside	100	100.0	31.9	30.9	32.3	25.1	28.6
N23	351484	492434	Kerbside	100	100.0	32.5	35.2	34.0	24.6	26.8
N24	351499	492314	Roadside	100	100.0	24.0	24.4	24.8	19.7	20.8
N25	351557	492624	Kerbside	100	100.0	42.5	42.9	40.2	30.5	39.4
N26	351619	492637	Kerbside	100	100.0	36.4	34.2	33.9	23.3	29.6
N27	351674	492695	Roadside	100	100.0	29.3	27.9	29.9	20.4	26.1

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
N31	351712	492832	Roadside	100	100.0	27.6	28.5	29.3	22.1	27.4
N33	351597	493052	Roadside	100	100.0	26.5	27.2	27.4	19.8	25.9
N36	352016	493142	Kerbside	100	100.0	25.2	25.7	25.7	20.0	23.8
N37	351934	493043	Roadside	100	100.0	31.4	33.7	33.3	29.5	31.9
N38	351499	493022	Roadside	100	100.0	27.5	29.3	29.3	21.2	26.8
N41	328698	478158	Roadside	100	83.0	26.6	27.3	29.0	20.0	24.5
N43	329049	478471	Urban Background	100	100.0	11.9	10.7	11.7	7.8	8.9
N46	329316	478554	Kerbside	100	100.0	-	30.3	33.3	22.7	29.1
SLAKE/20A/NWB3S1	329356	478604	Kerbside	100	90.4	-	-	-	20.5	20.6

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

☒ 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 $\mu\text{g}/\text{m}^3$.

Exceedances of the NO₂ annual mean objective of $40\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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.TG16 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 A1 – Trends in Annual Mean NO2 concentrations (bias and distance adjusted)

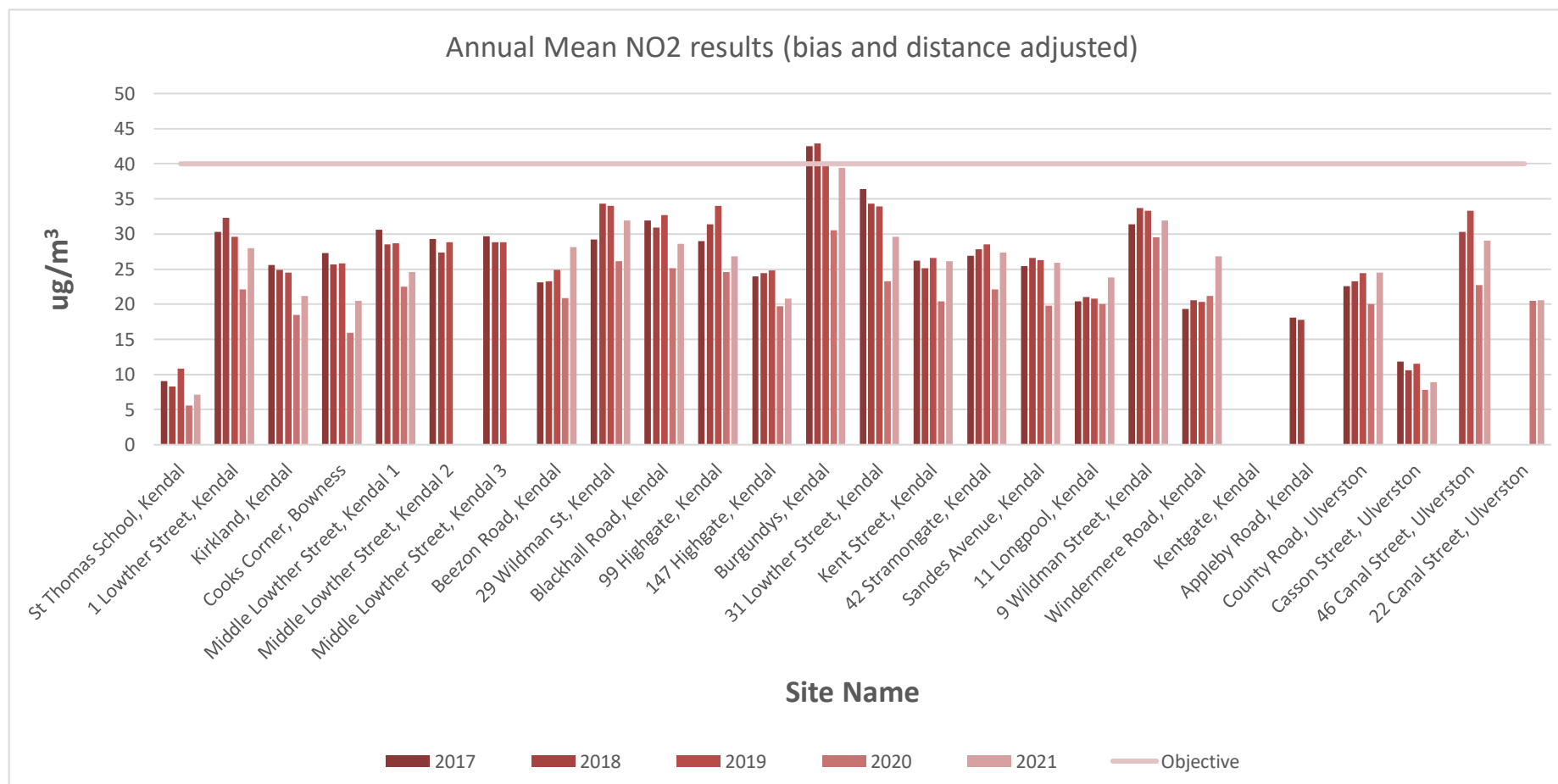


Figure A2 – Trends in Annual Mean NO2 concentrations (bias and distance adjusted) – outside Kendal

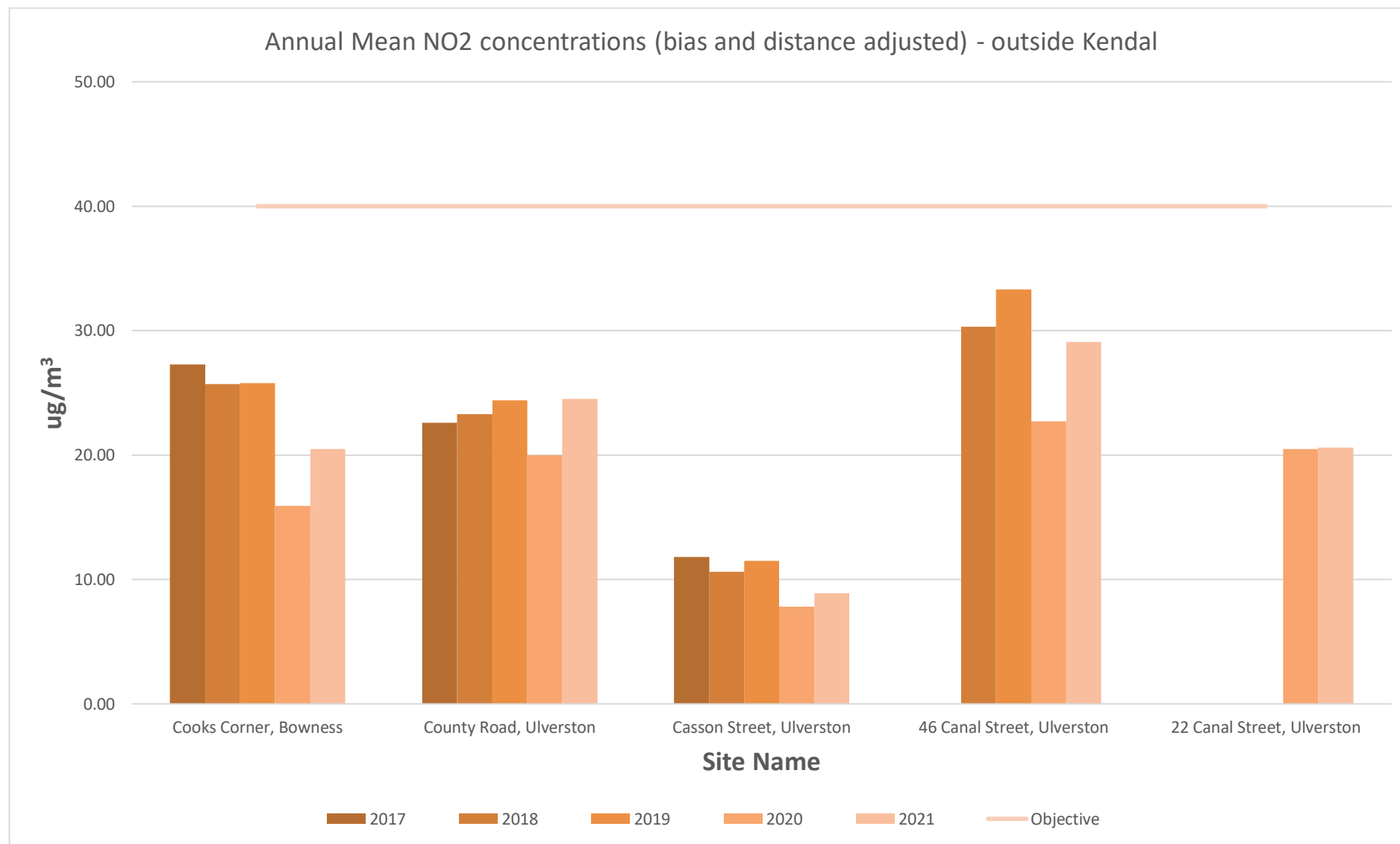


Figure A3 – Trends in Annual Mean NO2 concentrations (bias and distance adjusted) - Kendal

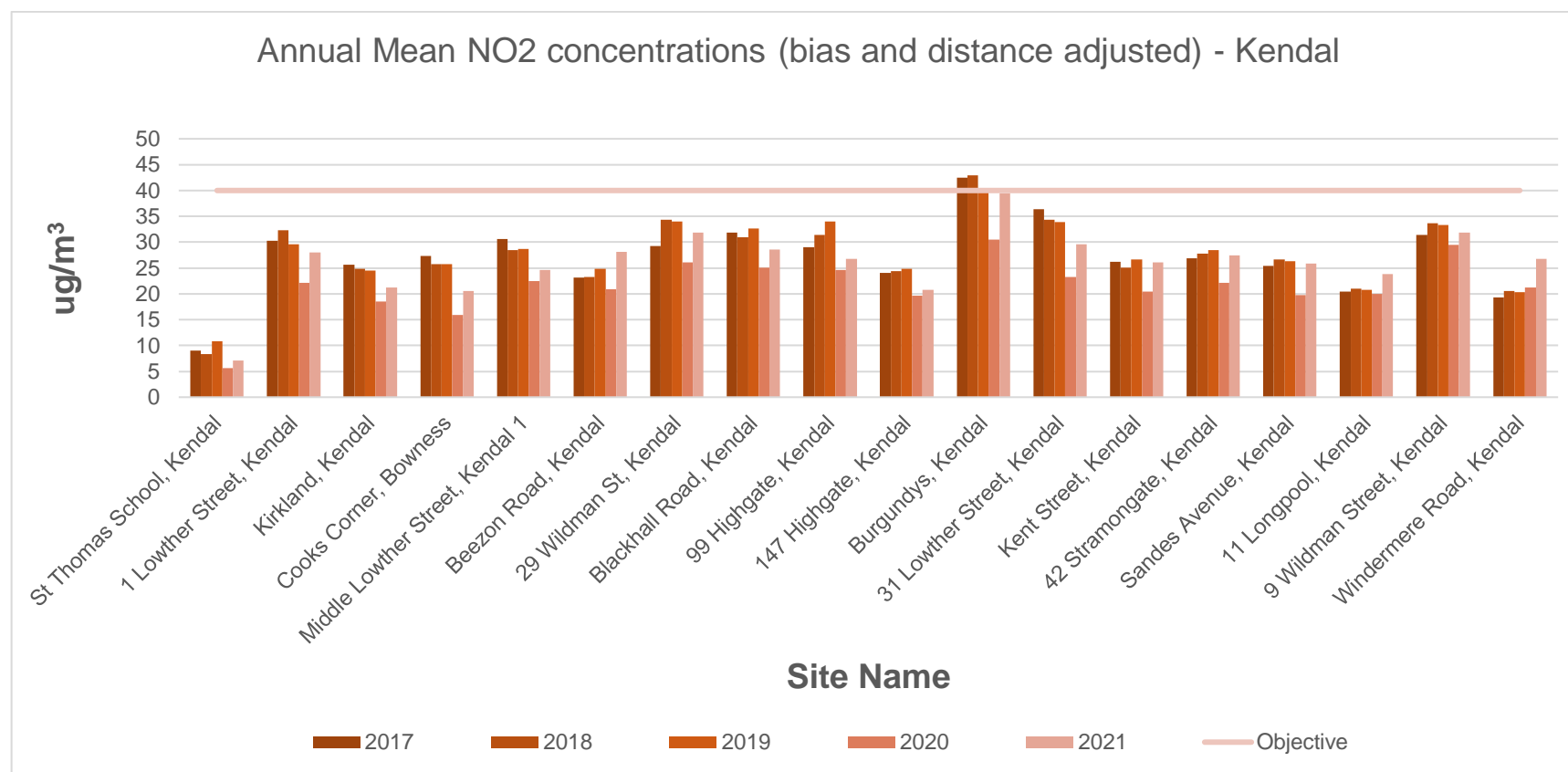


Figure A4 – Trends in Annual Mean NO₂ Concentrations Analyser Results – Lowther Street, Kendal

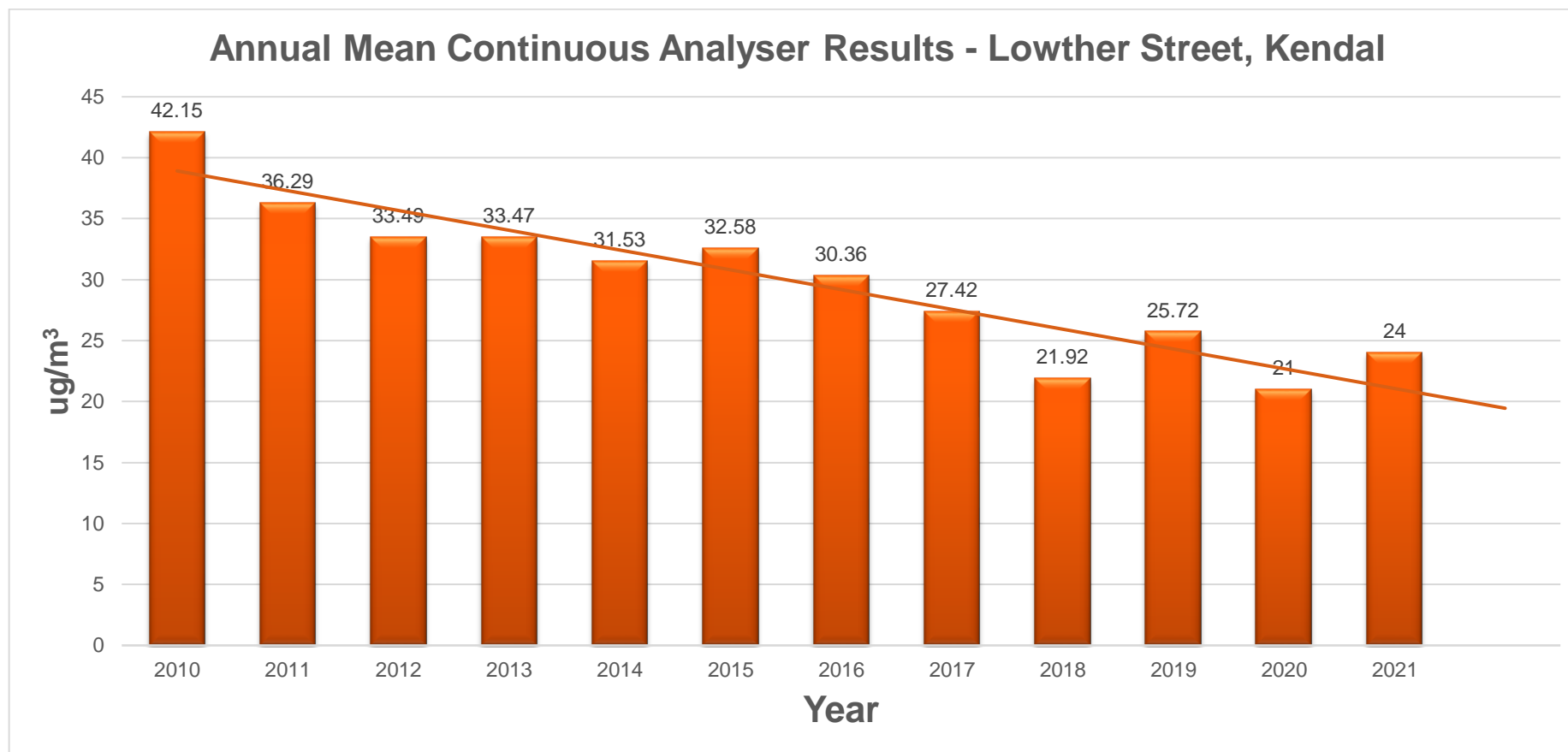


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
A1	351610	492650	Roadside	98.7	98.7	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ 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 2021

Table B.1 – NO₂ 2021 Diffusion Tube Results (µg/m³)

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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N4	351100	493720	16.3	11.7	7.9	6.6	6.4	5.9	4.5	5.2	9.5	10.5	13.0	13.8	9.3	7.1	-	
N9	351490	492610	42.0	41.8	31.1	33.9	36.1	32.1	28.0	28.2	39.0	46.0	40.8	37.4	36.4	28.0	-	
N11	351605	492640	37.7	27.2	27.1	33.9	34.0	26.0	26.6	24.8	31.7	31.1	60.1	38.5	-	-	-	Triplicate Site with N11, N13 and N14 - Annual data provided for N14 only
N13	351605	492640	40.0	26.4	25.3	33.9	32.1	26.2	24.4	25.4	34.2	29.2	38.6	35.3	-	-	-	Triplicate Site with N11, N13 and N14 - Annual data provided for N14 only
N14	351605	492640	37.8	28.1	26.6	33.1	30.3	26.2	27.3	26.0	36.0	33.2	39.3	38.1	32.0	24.6	-	Triplicate Site with N11, N13 and N14 - Annual data provided for N14 only
N17	351570	492410	32.7	27.4	29.0	24.7	27.9	21.4	18.8	18.5	29.4	31.0	31.9	36.2	27.4	21.1	-	
N18	340340	497010	25.4	23.2	19.2	22.0	28.3	25.5	24.5	27.4	31.6	29.1	30.5	32.4	26.6	20.5	-	
N19	351897	493022	49.8	34.3	33.2	37.0	33.2	27.0	31.6	26.3	38.7	36.1	42.1	47.9	36.4	28.1	-	
N20	351970	493070	45.7	44.8	46.0	41.0	40.3	38.6	34.2	30.1	41.4	43.2	44.3	48.3	41.5	31.9	-	
N21	351680	492840	34.1	35.1	32.4	33.1	36.0	29.2	29.7	28.8	41.1	49.4	55.3	42.1	37.2	28.6	-	
N23	351484	492434	45.9	36.0	33.4	33.0	36.3	26.4	25.3	22.9	39.4	35.8	40.0	43.7	34.8	26.8	-	
N24	351499	492314	36.1	25.2	24.0	32.4	29.6	19.1	19.7	16.9	31.0	24.6	31.0	34.6	27.0	20.8	-	
N25	351557	492624	56.5	46.3	50.8	55.7	51.4	40.0	44.2	41.3	55.0	64.6	52.7	56.2	51.2	39.4	-	
N26	351619	492637	51.2	36.2	39.8	33.8	39.6	32.1	33.5	21.8	44.5	37.2	47.4	43.5	38.4	29.6	-	
N27	351674	492695	38.8	32.9	29.8	32.9	32.5	28.1	29.9	26.1	38.0	32.2	44.3	40.9	33.9	26.1	-	
N31	351712	492832	41.8	33.3	34.6	36.5	35.2	25.3	25.1	26.0	36.9	42.7	43.1	46.8	35.6	27.4	-	
N33	351597	493052	40.3	31.8	30.5	40.2	31.0	27.9	23.5	25.6	36.3	32.9	46.8	36.8	33.6	25.9	-	
N36	352016	493142	34.1	31.9	29.9	32.4	32.1	25.0	25.3	22.9	33.4	33.2	33.7	36.8	30.9	23.8	-	

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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N37	351934	493043	51.5	46.1	39.4	40.1	40.1	36.2	36.8	28.3	47.0	39.5	46.8	45.0	41.4	31.9	-	
N38	351499	493022	42.1	34.5	33.2	42.6	31.2	31.7	26.6	21.5	35.1	35.0	43.6	40.1	34.8	26.8	-	
N41	328698	478158	39.7	28.1	28.6	32.9	31.4			24.8	29.1	29.5	37.4	36.2	31.8	24.5	-	
N43	329049	478471	18.4	14.8	10.7	10.2	8.5	6.4	6.5	7.1	11.3	11.6	15.8	17.4	11.6	8.9	-	
N46	329316	478554	40.8	33.2	38.6	36.5	33.0	34.6	33.6	34.7	37.1	40.4	47.1	43.2	37.7	29.1	-	
SLAKE/20A/NWB3S1	329356	478604	33.0	26.3	26.0	24.4	21.3	24.7	21.8	23.5	28.6		31.9	32.3	26.7	20.6	-	

- ☒ All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.
- ☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.
- ☒ National bias adjustment factor used.
- ☒ Where applicable, data has been distance corrected for relevant exposure in the final column.
- ☒ SLDC confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 South Lakeland District Council During 2021

South Lakeland District Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by South Lakeland District Council During 2021

South Lakeland District Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

South Lakeland District Council's diffusion tubes are supplied and analysed by Environmental Scientifics Group (ESG) using 20% triethylamine (TEA) in water by UKAS accredited SOCOTEC.

The samples have been analysed in accordance with SOCOTEC's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance.'

The tubes were prepared by spiking water:triethanolamine (80:20) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection. All samples were received in good condition, unless otherwise stated in the comments field of results table. Please note:

(i) As set out in the practical guidance, the results were initially calculated assuming an ambient temperature of 11°C, the reported values **have** been adjusted to 20°C to allow for direct comparison with EU limits.

In the AIR NO₂ PT proficiency testing scheme, 100% of results submitted in 2019 and 2020 by SOCOTEC (formerly ESG), who supply and analyse the Council's diffusion tubes, were subsequently determined to be satisfactory. Their test method for NO₂ tubes meets the guidelines in Defra's guidance for diffusion tube monitoring and they are UKAS accredited.

Diffusion tubes are installed and changed each month by the Council according to the Council's document "Procedure for Air Quality Monitoring" and in accordance with Defra's documents "Diffusion Tubes for Ambient Monitoring: Practical Guidance" and TG(16). Spurious or unusual diffusion tube results are removed from the data set.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within SLDC recorded data capture 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 2021 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.TG16 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.

SLDC have applied a national bias adjustment factor of 0.77 to the 2021 monitoring data. Version 09/22 of the spreadsheet has been used and a screenshot of the result is shown below:

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 09/22							
Follow the steps below in the correct order to show the results of relevant co-location studies								This spreadsheet will be updated at the end of March 2023 LAQM Helpdesk Website					
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods													
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet													
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.													
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.							
Step 1:		Step 2:		Step 3:		Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ³ shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data ²		If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
Analysed By ¹		Method ² <small>To undo your selection, choose (All) from the pop-up list</small>		Year ³ <small>To undo your selection, choose (All)</small>		Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)
Socotec Didcot		20% TEA in water		2021		KS	Marleybone Road Intercomparison	10	57	42	35.7%	P	0.74
Socotec Didcot		20% TEA in water		2021		KS	New Forest District Council	12	37	25	50.0%	G	0.67
Socotec Didcot		20% TEA in water		2021		R	New Forest District Council	12	29	23	27.2%	G	0.79
Socotec Didcot		20% TEA in water		2021		R	South Oxfordshire District Council	11	25	18	38.5%	G	0.72
Socotec Didcot		20% TEA in water		2021		R	South Oxfordshire District Council	11	37	33	12.9%	G	0.89
Socotec Didcot		20% TEA in water		2021		KS	Fife Council	11	24	19	25.5%	G	0.80
Socotec Didcot		20% TEA in water		2021		R	Fife Council	11	21	16	36.0%	G	0.74
Socotec Didcot		20% TEA in water		2021		R	Fife Council	12	21	14	51.9%	G	0.66
Socotec Didcot		20% TEA in water		2021		R	Fife Council	12	23	19	20.4%	G	0.83
Socotec Didcot		20% TEA in water		2021		R	London Borough of Ealing	12	63	50	27.1%	G	0.79
Socotec Didcot		20% TEA in water		2021		R	London Borough of Ealing	12	41	32	28.6%	G	0.78
Socotec Didcot		20% TEA in water		2021		R	London Borough of Ealing	11	47	35	33.9%	G	0.75
Socotec Didcot		20% TEA in water		2021		R	Vale of White Horse DC	11	22	17	29.7%	G	0.77
Socotec Didcot		20% TEA in water		2021		R	Rhondda Cynon Taf CBC	12	24	22	11.8%	G	0.89
Socotec Didcot		20% TEA in water		2021		R	Mid and East Antrim Borough Council	12	22	17	34.4%	G	0.74
SOCOTEC Didcot		20% TEA in water		2021		Overall Factor ³ (15 studies)					Use	0.77	

A summary of bias adjustment factors used by SLDC over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor used	Local factor for comparison purposes (not used)
2021	National	09/22	0.77	0.75
2020	National	09/21	0.74	0.72
2019	National	09/20	0.76	0.64
2018	National	06/19	0.74	0.57
2017	National	09/18	0.71	0.65

It is recognised that local results are more representative of local circumstances. However, as the national and locally derived figures are very similar it was felt that the national figure should be used in order to achieve consistency.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with

distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within SLDC required distance correction during 2021

QA/QC of Automatic Monitoring

South Lakeland District Council has, since 1999, used a US-EPA, TÜV and Netcen-accredited Horiba APN 360 ambient air quality analyser. This is situated in the basement of the Council Offices on Lowther Street, within the AQMA. The analyser self-calibrates and is also calibrated and the results checked weekly by the Local Authority, with a 6-monthly service and calibration visit by the supplier. The calibration factor is automatically applied to the raw data. Access is available to an engineer at short notice if required.

Data is validated and ratified to the LAQM (TG16) standards using the AURN methodology by a third party (Air Quality Data Management) prior to publishing. As part of this contract, all data, diagnostics and any alarms are downloaded automatically at least twice a day, seven days a week. Performance is checked daily looking for the first sign of a fault.

The analyser however, is now over 20 years old and a decision will be made as to whether to keep it.

Automatic Monitoring Annualisation

All automatic monitoring locations within SLDC 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.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No automatic NO₂ monitoring locations within SLDC required distance correction during 2021.

Table C.2 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	11				
Bias Adjustment Factor A	0.75 (0.72 - 0.78)				
Diffusion Tube Bias B	33% (27% - 39%)				
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	30.7				
Mean CV (Precision)	3.9%				
Automatic Mean ($\mu\text{g}/\text{m}^3$)	23.1				
Data Capture	98%				
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	23 (22 - 24)				

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

Figure D.1 – Automatic Monitoring Site

Automatic Monitor location



Figure D2 – Ulverston Monitoring locations

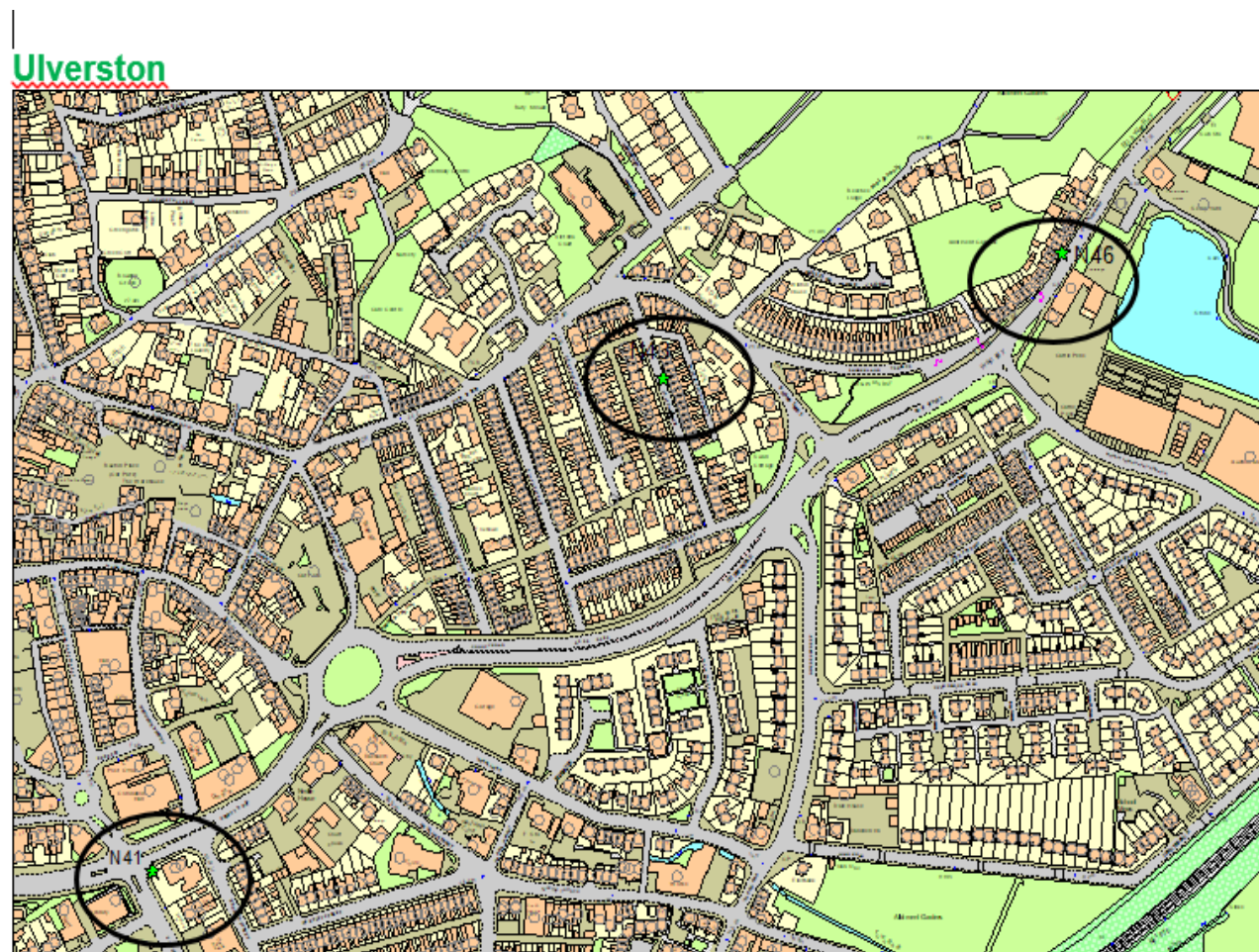


Figure D3 – Bowness Monitoring Location

Bowness

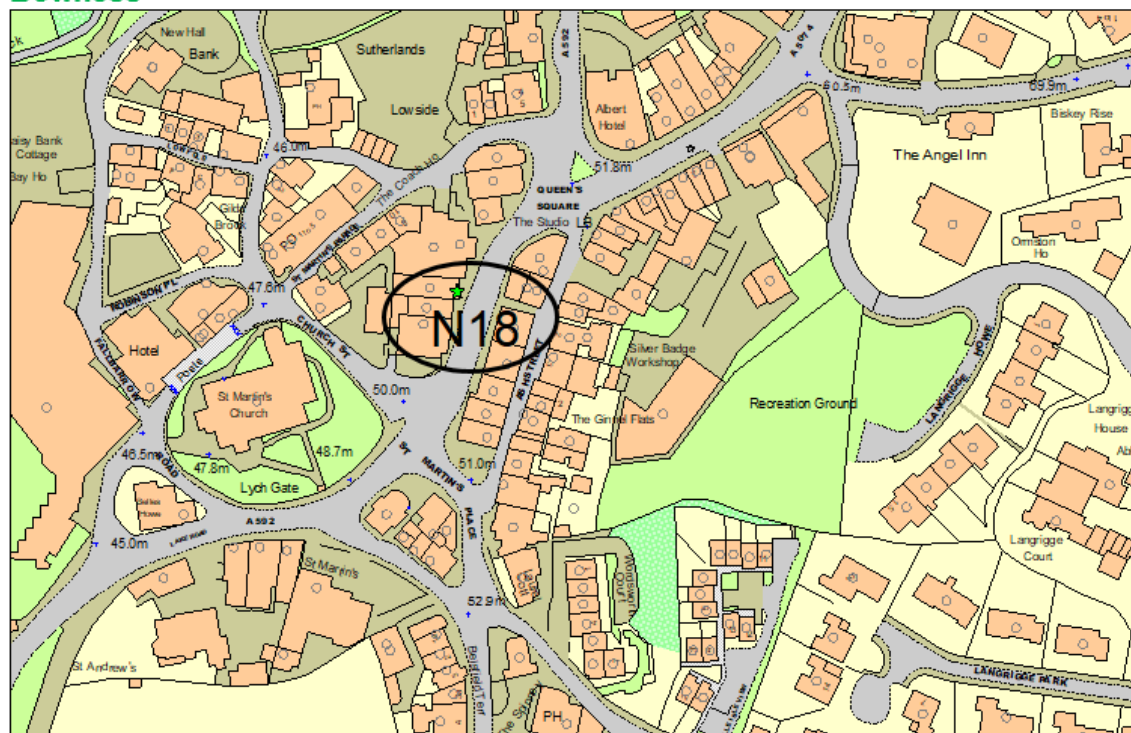


Figure D4 – Kendal Monitoring Location (outside AQMA)

Kendal 1

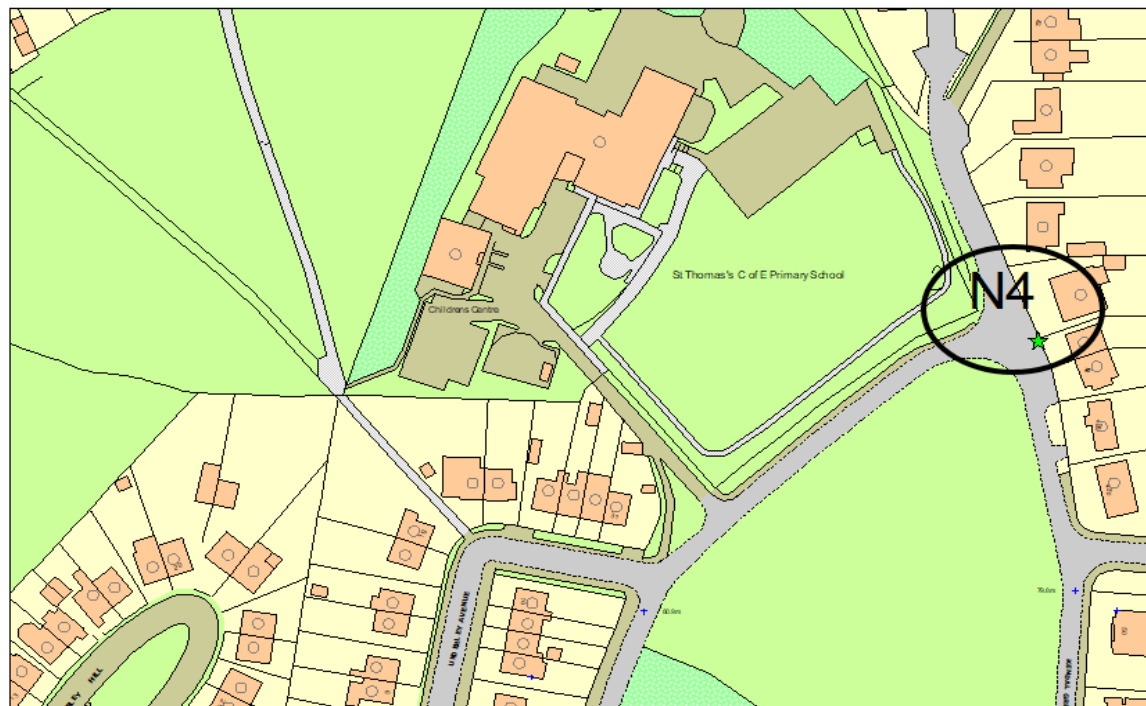


Figure D5a – Kendal Monitoring Locations (inside AQMA)

Kendal 2

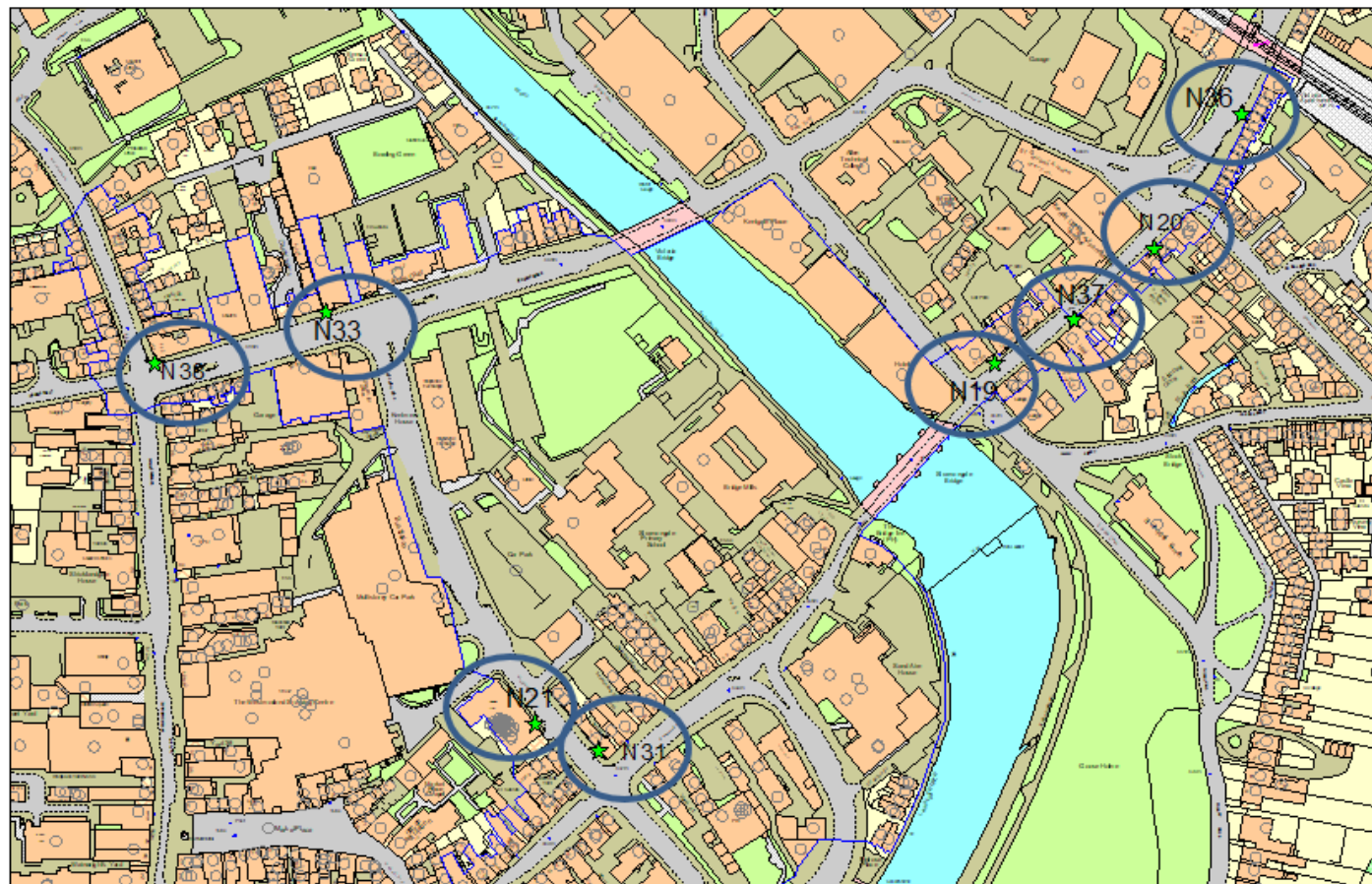
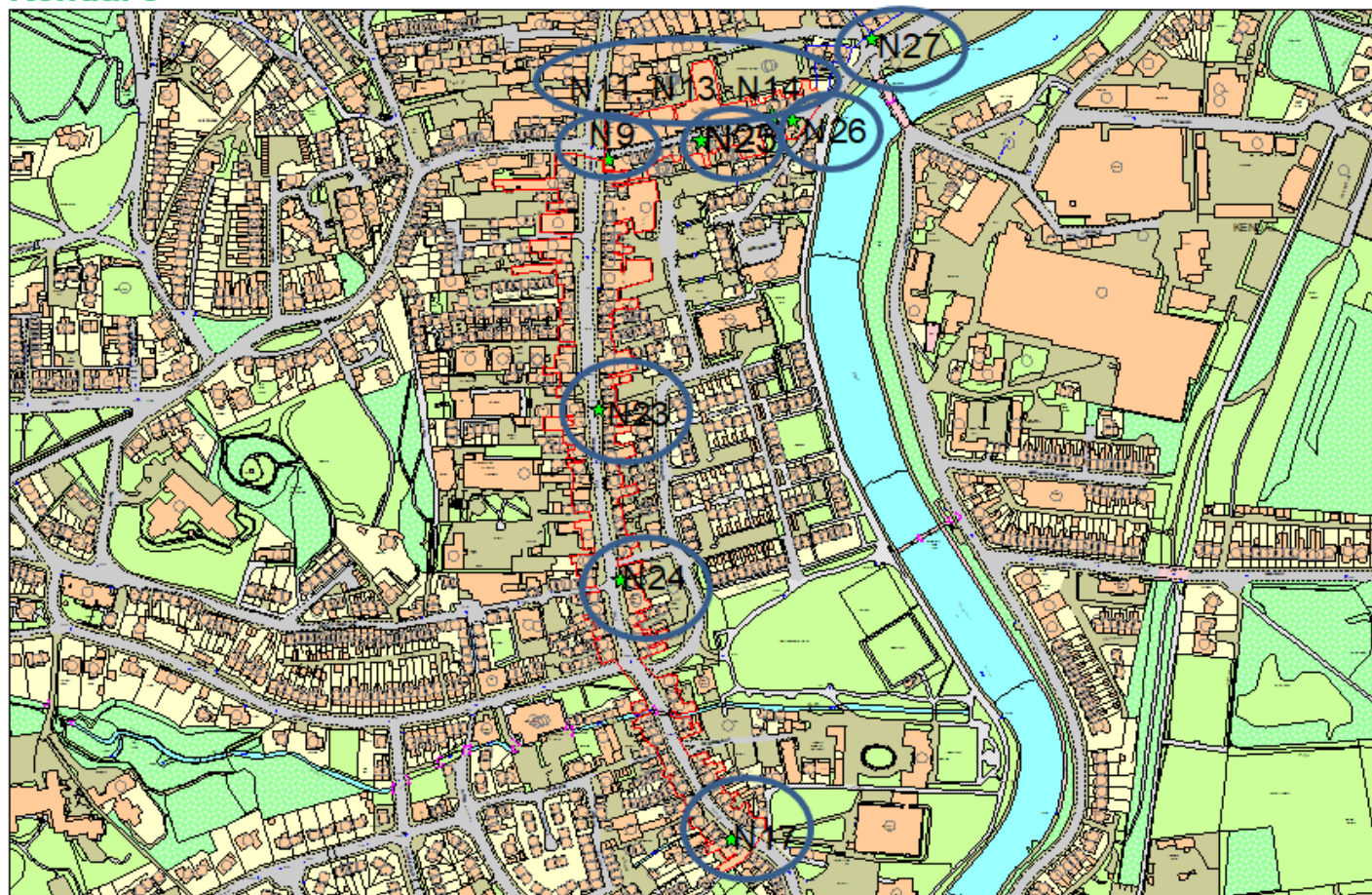


Figure D5b – Kendal Monitoring Locations (inside AQMA)

Kendal 3



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

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

⁷ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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.TG16. April 2021. 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.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.