



# 2019 Air Quality Annual Status Report (ASR)

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

June 2019

## South Lakeland District Council

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## Executive Summary: Air Quality in Our Area

### Air Quality in South Lakeland

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

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 (NO<sub>2</sub>) 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 NO<sub>2</sub> 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](#). Other areas of the district meet the annual mean objective and all areas 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 Group, to ensure measures were in place to bring levels of NO<sub>2</sub> down to below the objective. This Action Plan is reviewed regularly by the Working Group to ensure it is still effective and in 2016 we undertook a full review (see our [Air Quality Action Plan 2016](#)). It is updated annually to show progress and a summary can be found in section 2.2.

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

The good news is that over the years we have been monitoring and working to reduce areas which are above the annual mean/exceedance level, levels of NO<sub>2</sub> have shown a downward trend. Of the 33 sites where we monitor, only one location, on Lowther Street in Kendal (which is within the AQMA), remains above the objective. Even here levels have fallen dramatically over the years and it is now predicted that this site will comply with the annual mean objective by 2020.

### Actions to Improve Air Quality



Over the past year we, along with our partners, have continued to work on the actions in our Action Plan. This document reports on progress.

Projects in the Action Plan include:

- SCOOT in Kendal town centre
  - Cleaner buses
  - Work to reduce engine idling
  - Reduced price parking permits for cleaner vehicles
- Cycle parking provision, new cycle ways and cycling promotion activities
  - Installation of electric vehicle charging points in public car parks
  - On street parking enforcement to reduce congestion





The Council didn't apply for a Clean Air Grant in 2018, but is considering projects to be included in the next round of funding.

## Conclusions and Priorities

This report shows that all locations in the District comply with the Government's 1-hour mean NO<sub>2</sub> objective and all but one (Burgundy's on Lowther Street, within the existing AQMA) comply with the annual mean objective.

Since the declaration of the Air Quality Management Area in 2001, levels of NO<sub>2</sub> at Burgundy's have fallen dramatically, from 82.1µg/m<sup>3</sup> to 42.9 µg/m<sup>3</sup>, through the combination of the measures in the Action Plan and higher emission standards of vehicles on the road.

The potential air quality impact of all proposed significant developments has been assessed and mitigation required as necessary. There have been no new developments which will have a significant impact on air quality and no new pollutant sources have been identified.

A review of monitoring locations took place at the start of 2019, as recommended in Defra's assessment of the 2017 ASR. Monitoring has now been reduced to 21 locations, removing those with annual NO<sub>2</sub> means of less than 20µg/m<sup>3</sup> where levels have been consistently low.

As only one site is currently failing the objective and levels are continuing to fall District-wide, we are planning to reduce the size of the AQMA to cover only Lowther Street.

Our priorities for 2019 are to:

- work more closely with schools on air quality

- authorise Officers to serve fixed penalty notices for vehicle idling
- run an air quality campaign to coincide with Clean Air Day
- install a green living wall on Lowther Street
- progress engagement with Public Health colleagues in Lancashire and Cumbria

This will be a challenge given the pressures that Local Authorities are under from the Government to work differently and do more with less. Many organisations and individuals, including local residents, need to be involved, but we will work to ensure all parties are actively engaged, in particular through the Kendal Traffic Pollution Working Group, so we can ensure our Action Plan is effective. Balancing the economy and public health is key.

Our aim is a continuous improvement in air quality, even once the Government's Objective is met at all locations. It is anticipated that our monitoring regime may change further over the coming years to look at levels at sensitive receptors more generally, for public reassurance, rather than concentrating on roadside hotspots. It is likely Government guidance on monitoring will change in the future too, following publication of their Air Quality Strategy in 2018.

## **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. Our website helps inform the public and any consultation (for example on revisions of the SLDC Air Quality Action Plan) is widely advertised to encourage public engagement.

There has been an increase in interest in air quality nationally recently, with more known about the health effects and several high profile, high pollution days reported in London. Defra's new Action Plan for air quality and subsequent court cases have also caused a lot of public and media interest, particularly given the Plan's reliance on new Clean Air Zones in cities. The 'diesel-gate' scandal has also raised the profile of air quality issues and health.

If you would like more information on air quality locally, or on how you can do your bit to help improve the air you breathe, visit the air quality pages on our [website](#).

There are lots of simple things you can do, for example:

- try to walk or cycle short journeys instead of jumping in the car. Remember air quality can actually be worse in the car than it is outside it
- catch the bus
- lift share to work, school, activities and clubs
- switch off your engine when stationary
- choose a low emission vehicle such as electric or hybrid (there are grants available)
- form a 'walking bus' for the journey to school

If you may be particularly affected by poor air quality (this includes young or older people and those with breathing difficulties) information on current pollution levels can be found on the [Defra Healthy Air website](#). This information helps you plan your day to avoid exposing yourself to higher levels of NO<sub>2</sub>. For example, on bad days stick to pedestrianised areas and don't use heavily congested streets, exercise in areas with lower pollution levels, switch off your engine while stationary and avoid driving in congested areas, as air quality inside cars can be worse than outside.

Please feel free to send us your thoughts on this document and our Action Plan using the contact details at the start of this report.

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## 1 Local Air Quality Management

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

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

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

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

A summary of AQMA declared by South Lakeland District Council can be found in Table 2.1. Further information related to declared or revoked AQMA, including maps of AQMA boundaries, is available [online](#). Alternatively, see Appendix D: Maps) of Monitoring Locations and AQMA, which provides a map of air quality monitoring locations in relation to the AQMA.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan		
						At Declaration	Now	Name	Date of Publication	Link
Kendal AQMA	Declared 05.05.2001; amended 23.11.10	NO <sub>2</sub> Annual Mean	Kendal	An area encompassing properties bordering Lowther Street in Kendal, later extended to also cover properties bordering Kirkland, Highgate, New Road, Blackhall Road, Stramongate, Kent Street, Beeson Road, Wildman Street and Longpool in Kendal.	No	82.1 µg/m <sup>3</sup> *	42.9 µg/m <sup>3</sup>	South Lakeland District Council Air Quality Action Plan	November 2016	<a href="https://www.southlakeland.gov.uk/media/3644/sldc-air-quality-action-plan-2016.pdf">https://www.southlakeland.gov.uk/media/3644/sldc-air-quality-action-plan-2016.pdf</a>

\* NB Result was not bias adjusted in 2001

☒ South Lakeland District Council confirm the information on UK-Air regarding their AQMA(s) is up to date

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

Defra's appraisal of last year's ASR concluded that the conclusions reached were acceptable for all sources and pollutants and recommended that we continue to implement our air quality strategy and continue monitoring, with the provisos below:

1. There are minor inconsistencies between the number of new and decommissioned passive sites between the executive summary and section 3. Please ensure the consistency of what is being reported.

SLDC response: Noted

2. Example calculations have been included which is useful and encouraged for all future reports.

SLDC response: Noted

3. While the Council recently reviewed their monitoring strategy and added / removed some sites, this action is further encouraged as many sites still operating have very low concentrations.

SLDC response: Sites have been further reviewed in 2019 and those with levels below  $20\mu\text{g}/\text{m}^3$  (with the exception of background sites) discontinued.

4. The AQAP is very detailed and has a good discussion of progress and challenges. Continual reflection on the AQAP is encouraged and beneficial for charting progress. The Council have been very successful in implementing measures and this is reflected in their data.

SLDC response: Noted

5. Maps provided are clear and labelled correctly.

SLDC response: Noted

6. In general the report is well written, concise, and presents all of the required information. The Council should continue their hard work improving local air quality in South Lakeland.

SLDC response: Noted

South Lakeland District Council has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in the [South Lakeland Air Quality Action Plan](#).

Key completed measures are:

- Installation of a public cycle hub in the Westmorland Shopping Centre in Kendal town centre, linked to the Council's upgrading of staff facilities and town-wide cycling infrastructure
- An 'Anti-Idling' campaign which ran to coincide with Clean Air Day, targeting motorists who left their engines running while stationary. The event was publicised and Officers from the District and County Councils and the Police handed out leaflets explaining why engines should be switched off
- Publication of the report "Air Quality and Public Health – Reducing Deaths and Ill Health Caused by Poor Air Quality in Lancashire and Cumbria", a collective report of the Lancashire and Cumbria Directors of Public Health, in conjunction with the Local Authorities, highlighting air quality issues across the region and following on from the Lancashire and Cumbria Air Quality Summit held in February 2018. The purpose of the report is to: improve awareness and engagement for action on air quality and understanding of everyone's role in tackling air pollution, building on existing plans and strategies; start a conversation about the ways in which we can work together and hold each other to account for action to improve air quality; and outline potential areas for further action to reduce population exposure to air pollution, as identified at the Summit
- A leadership event involving Public Health and Environmental Health Officers and inaugural meeting of Councillors following publication of the above report
- Inclusion of air quality in Cumbria's Public Health Strategy.

South Lakeland District Council expects the following measures to be completed over the course of the next reporting year:

- Clean Air Day event to run 20 June 2019

- Kendal Master Plan and Kendal Strategic Infrastructure Study to be released for consultation
- 'Charge My Street' project to run in South Lakeland (pending successful funding bid)
- Anti-Idling Protocol to be adopted and Officers authorised to issue fixed penalty tickets

South Lakeland District Council's priority for the coming year is to ensure these measures are completed.

The principal challenges and barriers to implementation that South Lakeland District Council anticipates facing are:

- Major funding will be required for major infrastructure projects (Kendal Master Plan and Kendal Strategic Infrastructure Study, Charge My Street)
- Historically, Clean Bus Fund bids have been unsuccessful, with one reason given being that the air quality problem in Kendal is not big enough. This view is likely to mean other funding will not be easily accessible. In addition there is a contradiction, because while national modelling shows the area is already in compliance (as stated in feedback from the grant application assessment), local monitoring shows there continues to be an exceedance on Lowther Street
- Financial pressures on businesses and bus operators may mean they are reluctant to alter routes or invest in cleaner vehicles
- Ensuring staff resources are available to drive measures forward
- Public resistance to changing their own travel habits.

Progress on the following measures has been slower than expected due to:

- The green wall on Lowther Street has been rejected due to member concerns relating to the effectiveness of green walls in tackling poor air quality. The money may be utilised in future to fund another project.
- Kendal Master Plan and Kendal Strategic Infrastructure Study have been further delayed, with a knock-on effect on 20 MPH zone study – expected 2019

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- Final electric vehicle charging point not yet installed in Kendal, due to low usage of existing points – there is a reluctance to invest unless proof of demand is seen. Charge My Street may address this
- Reducing the number of HGV's entering the AQMA and using Lowther Street – while some businesses responded proactively to the message, some local were resistant, believing it would impact financially and claiming the Council was working against business interests

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, South Lakeland District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance on Lowther Street and enable the revocation of Kendal AQMA.



Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Kendal Master Plan	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	South Lakeland District Council. Internal funding	2016	TBC	Master Plan in place; measures implemented	Improved traffic flow / reduction in traffic in AQMA will reduce emissions	Stakeholder meeting held May 2016. Engagement with consultants to ensure air quality taken into consideration. Master Plan preparation was paused pending completion of EA flood modelling work following Storm Desmond. This has since been completed, but the plan is now delayed pending the outcome of the strategic parking study and the County Councils transport study for Kendal. It is now anticipated that there will be consultation in 2019 on the final draft.	Report to be agreed 2019. Once Plan agreed, implementation could be 3-5 years	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 agreed plan forward, not yet identified. Delays experienced due to linked projects
2	Control of HGVs & on Lowther Street	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	South Lakeland District Council. Internal funding	2016	2016-2017	% HGV on Lowther Street	HGV's emit disproportionate levels of NO <sub>2</sub> . A reduction in numbers will reduce levels	Improved signage installed on by-pass in 2015 to direct vehicles to most appropriate north or south exit to Kendal and avoid AQMA. HGV survey undertaken August 2016 to identify vehicles >18T using Lowther Street. Letter	2017	Reduction in number of HGV's using Lowther Street by re-routing to areas with lower NO <sub>2</sub> . Enforcement of 18T weight limit. Delivery plans for large businesses in town. Potential reduction in weight limit. Has seen some resistance from businesses.

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									sent to companies identified as using Lowther Street and main businesses in Kendal, reminding of the weight limit and asking for voluntary re-routing in the first instance. No specific action in 2018. HGVs on Lowther Street March 2016 - 12.4% March 2017 - 11.5% March 2018 - 11.8% March 2019 - 13.2%		
3	Reducing bus emissions and increasing usage	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	South Lakeland District Council. Internal funding	2016	2017	Number of buses using Kendal town centre and Lowther Street of Euro Std. 6	Older buses emit disproportionate levels of NO <sub>2</sub> . Cleaner buses will reduce levels	In July 2016 12 new Euro 6 double-deckers were 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. In peak summer 2016, there were 87 bus movements on Lowther Street daily, 23 (26%) were Euro 6. This was unchanged in 2018. Online customer bus tracker introduced 2016. 3 new passenger shelters installed in 2016 by Kendal BID. Clearer signage installed in 2015, linking Kendal town centre to entry points and transport links (ie railway and bus station) to encourage more use of public transport.	Ongoing	Voluntary reduction of emissions and improvement in standard of buses using Kendal town centre. Encouraging bus use. Further bus replacements due summer 2018 (505, 508, 516 services). Funding is an issue. Clean Bus Fund bids in 2015 and 2017 failed as Kendal was not seen to have a big enough pollution problem.

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									Operators have idling policies in place. Anti-idling campaign ran Spring 2017 targeting buses and taxis in Kendal.		
4	Implement ation of Kendal sustainabl e transport measures	Traffic Managem ent	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Cumbria County Council. Local Growth Fund	2014-2016	2016-2017	Number of schemes completed	Improved traffic flow / reduction in traffic in AQMA will reduce emissions	Still 11 schemes out of 14 completed to date. 6 to be completed (some new measures have come online). Includes pedestrian improvements such as crossings and footpaths, cycleways, road widening and junction improvements. Traffic calming through speed humps no longer align with CCC policy. Some works delayed due to flooding in December 2015. Phase one of the cycleway scheme (south Kendal) completed. Phase 2 currently underway. All schemes now due to be completed in 2019/20 financial year.	2019/20	As identified in 'Kendal Transport Improvement Study'. 3 schemes removed in 2018 as undeliverable.
5	Car parking review (including Park and Walk / Park and Cycle)	Traffic Managem ent	Other	South Lakeland District Council. Internal funding	2016	2017	Town Centre AADT's; car park usage figures	Encouraging long term parking in town centre could reduce number of cold starts, reducing emissions. Car parks on outskirts of Kendal could reduce car journeys and emissions	Car Parking Survey ran in 2107 to get users opinions. Results of further car park review going to Committee - includes restructuring permit parking and charges to incentivise parking on outskirts of town. New £1 early bird fee could increase long- term parking. Cars prevented from	2017	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

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									<p>parking on New Road common land in Kendal in early 2018 - impact on other carparks, traffic and air quality to be monitored.</p> <p>Lowther Street AADT:  March 2016 = 10,759;  March 2017 = 11,066;  March 2018 = 11,013;  March 2019 = 11,371</p> <p>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</p>		town. Prioritisation is a political issue. *NB reporting of figures revised in 2018 - multi-storey usage had been omitted
6	Kendal Strategic Transport Infrastructure 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	Cumbria County Council. Funding from CCC, SLDC & KTC	2016	TBC	Strategic Study completed and measures delivered	Improved traffic flow / reduction in traffic in AQMA will reduce emissions	<p>First phase of work commissioned July 2016. Project Officer and Steering Groups appointed. Workshops undertaken with a wider technical group and political stakeholders 2016. Additional study work to pull together several previous pieces of work are now being progressed. Consultation due 2019.</p>	Study now to be completed 2019. Works TBC	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 inked projects. Study is first step and significant additional work and funding will be required prior to any delivery.

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7	Public electric vehicle charging points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	South Lakeland District Council. OLEV funding	2010-2015	2016	Number of EV charging points installed Charging point usage	Electric vehicles have no NO <sub>2</sub> emissions	<p>Further to those installed in Lakes by LDNPA, 8 points installed by SLDC to date (Ambleside, Ulverston, Kirkby Lonsdale, Kendal). Booths supermarkets are installing charging points at their stores. Funding available for one more site in Kendal. Currently 1 fast and 1 rapid charger. Rapid receives more use and an ongoing increase in use is seen.</p> <p>Average no. charges per day at Buser Walk in Kendal 2016 (July - Dec 2016) Fast = 0.17, Rapid = 0.4; 2017 Fast = 0.27, Rapid = 0.99; 2018 Fast = 0.25, Rapid = 1.07.</p> <p>Pay-as-you-go hybrid Co-Wheels car club car now available at Oxenholme train station (part of Go Lakes Gateway project). Bid made by partners for money to run a Charge My Street project in South Lakeland.</p>	2016	Assessing Buser Walk site prior to installation of further points at Blackhall Road. Some resistance as usage figures show low usage to date and charging points involve loss of revenue for that parking space.
8	Reduced price parking / parking permits for cleaner vehicles	Traffic Management	Emission based parking or permit charges	South Lakeland District Council	2010	2011	No. of reduced price parking permits issued	Cleaner vehicles emit less NO <sub>2</sub>	<p>Permits issued: 2011 = 1 2012 = 7 2013 = 11 2014 = 17 2015 = 25 2016 = 33 2017 = 50 2018 = 70</p>	Implemented 2011. Ongoing	Discount on price of annual parking pass for Band A vehicles. Discount increased to £100 April 2017. Investigating options to expand scheme, although there are issues with DVLA and

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									Free parking for Go Lakes electric hire car fleet.		car manufacturer's data.
9	Enforcement of parking / loading restrictions	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	Cumbria County Council	2011	2011 onwards	Number of PCN's served	Reducing congestion improves traffic flow, reducing NO <sub>2</sub>	CCC enforcement team now up to full strength. Shift changes and longer enforcement hours in response to community complaints and feedback. PCN's issued: 2010 = 15 2011 = 273 2012 = 254 2013 = 61 2014 = 127 2015 = 121 2016 = 138 2017 = 582 2018 = 403	Ongoing	Wildman Street and Highgate in particular are areas where illegal parking causes congestion. Number of tickets served should start to reduce as the message gets out.
10	Encouraging walking	Transport Planning and Infrastructure	Other	Kendal Town Council / Kendal Business Improvement District. Internal funding	2016-2017	2017	Number of cars using Park and Walk sites	Walking instead of driving reduces emissions	KTC produced and distributed a Walking Trails leaflet for Kendal in 2017 and reprinted in 2019 - will encourage walking into town from residential areas. Phase 2 of Kendal Castle signage being installed - could also encourage walking. Investment in Canal Towpath Project will open up another safe, off-road walking route into town. SLDC liaising with CCC Public Health team to target travel to school. Kendal Bid project for Kendal Leisure Centre to	2017	Further measures to enhance the walkability of the town to be worked up through the Kendal Town Centre Master Plan. Plan to use Kendal Leisure Centre as park and walk / cycle shelved due to lack of funding as deemed "before it's time".

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									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.		
11	Encouraging cycling, enhanced cycle routes and cycle parking in Kendal	Transport Planning and Infrastructure	Cycle network	Cumbria County Council. Local Growth Fund, Defra AQ grant, Health & Wellbeing Board funding	2014-2015	2016-2017	Length of cycleway; number of cycle stands installed; cycle counts	Cycling instead of driving reduces emissions	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 Westmorland Shopping Centre, Kendal - secure bike parking, changing	2018/19	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 in 2017 or 2018 due to CCC funding cuts.

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									rooms, lockers and maintenance stand. To be publicised following Purdah. Electric Bike Network have 2 hire locations and 3 charging locations in Kendal. 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		
12	Reducing taxi emissions	Promoting Low Emission Transport	Taxi Licensing conditions	South Lakeland District Council	2014	2015	Policy in place. % of licensed taxis of Euro Standard 6	Cleaner vehicles emit less NO <sub>2</sub>	Taxi Licensing Policy with measures to increase cleaner vehicles in fleet and prevent idling adopted January 2016 and interim review being undertaken in 2019. 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. Idling Protocol drafted pending authorisation of Officers to serve fixed penalty notices.	Policy in place January 2016	Policy in place. Reporting system to differentiate between vehicle class currently being developed. Currently record CO2 emissions as detailed on V5 document.



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13	Go Easy campaign & SLDC Active Travel	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	South Lakeland District Council. Internal funding / historic Defra AQ Grant	2016	2016	Number of active travel projects completed.	Behaviour change to reduce car use, reducing emissions	See previous reports for history of Go Easy. Lack of funding has meant campaign has been in hiatus. Potentially to be progressed through SLDC's Active Travel program and Green Team. Website will be used to promote active travel, health and air pollution issues more generally across the District. An Active Travel Action Plan has been approved by Cabinet. Currently 42 actions on the list completed.	Ongoing	Progress restricted as Project Officer not appointed. Now taken on by Health and Wellbeing Officer
14	Planning policy prioritises air quality (Local Plan Policy)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	South Lakeland District Council	2015	2016	CIL liabilities, CIL receipts, CIL spending decisions. Adoption of new policies	New development is air quality neutral and gives rise to no increase in NO <sub>2</sub>	Air quality considerations included in planning policy. Submission of DPD Feb 2018. Development Management Policies being updated. Policies encourage active travel and control pollution to minimise the impact of development on air quality. Development Briefs for specific development sites in Kendal have similar requirements. CIL adopted 1 June 2015. Potential for CIL monies to be spent on projects that support improvement of air quality in Kendal.	CIL ongoing; DM Policies adoption expected by Autumn 2018	Development above thresholds in SLDC Guidance for Developers must be air quality neutral, ie. have positive or no negative impact on air quality. All developments predicting negative impact on air quality, even negligible, are required to agree mitigation, although developers are resistant to this.

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15	20 mile per hour zones in Kendal	Traffic Management	Reduction of speed limits, 20mph zones	Kendal Town Council. Internal funding	2017	Unknown	Number of 20mph zones	Consistent, smooth driving at lower speeds can reduce emissions	Study to be commissioned by KTC into potential for 20mph zones, but on hold pending outcome of Kendal Integrated Transport and Masterplan studies. Funding moved to 2019/20	Unknown	Evidence that measures such as speed bumps can cause increased vehicle emissions, but a consistent lower speed can reduce emissions. Must ensure chosen speed restrictions do not impede smooth flow of traffic. Dependant on CCC support for recommendations
16	Enhanced green infrastructure	Other	Other	South Lakeland District Council / Kendal Town Council. Internal funding / Locally Important Projects Grant	2016	2018	Number of projects completed	Some evidence that certain plants can remove pollutants from the air	The proposed Green Wall on Lowther Street has been rejected by the Town Council due to concerns regarding the effectiveness of them. SLDC & KTC working in partnership on parks and public areas of green space. Making use of the list of species most efficient at removing pollutants. Encouraging planting of 'correct' species through planning process.	Unknown	Any work is subject to permission from owner of wall and structural constraints. Funding other projects is an issue.

## 2.3 PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases. In South Lakeland in 2010 it is estimated there were 44 adult deaths attributable to PM<sub>2.5</sub><sup>4</sup>. Public health indicator 3.01 reports the fraction of mortality attributable to particulate air pollution. In South Lakeland in 2017 this was 3.1%<sup>5</sup>, lower than the regional and English values.

To address PM<sub>2.5</sub>, South Lakeland District Council is working with the Director of Public Health at Cumbria County Council on how air quality can be prioritised in South Lakeland to help reduce the health burden from air pollution.

This includes including air pollution in Cumbria's Joint Strategic Needs Assessment through the Health and Wellbeing Board, as well as in the Cumbria Public Health Strategy, encouraging closer working and communicating health messages to the public. Work is ongoing with the Directors of Public Health in Cumbria and Lancashire, Councillors and Officers engaging following the joint report, "Air Quality and Public Health – Reducing Deaths and Ill Health Caused by Poor Air Quality in Lancashire and Cumbria"<sup>6</sup>, which came out of the Air Quality Summit held in early 2018.

Measures in the AQAP (Table 2.2) also aim to both reduce the public's exposure to PM<sub>2.5</sub> and reduce other polluting emissions.

Although no national network monitoring of PM<sub>2.5</sub> takes place in South Lakeland, a portable monitor (AQ Mesh) has been purchased by the Council which allows monitoring in response to complaints and of hotspots. Short-term monitoring at residential properties in Kendal and alongside the continuous analyser on Lowther Street has not indicated any problems to date.

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<sup>4</sup> Estimating Local Mortality Burdens Associated with Particulate Air Pollution – Public Health England, 2014

<sup>5</sup> Public Health Outcomes Framework – Public Health England

<sup>6</sup> Air Quality and Public Health – Reducing Deaths and Ill Health Caused by Poor Air Quality in Lancashire and Cumbria – Blackburn with Darwin Borough Council, Cumbria County Council, Lancashire County Council and Blackpool Council, 2018

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

### 3.1 Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

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

South Lakeland District Council undertook automatic (continuous) monitoring of nitrogen dioxide at 1 site during 2018. Table A.1 in Appendix A shows the details of the site. 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

South Lakeland District Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 33 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

At the start of 2018 these sites have been reviewed, as recommended by Defra, and those with NO<sub>2</sub> levels below 20µg/m<sup>3</sup> (with the exception of background sites) have been discontinued. This means the number of monitoring sites in South Lakeland has reduced to 21.

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.

### 3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

For the continuous monitor this is calculated using a full calendar year of 1-hour means. As the analyser reads in parts per billion (ppb) this is converted to micrograms per meter cubed (µg/m<sup>3</sup>) for reporting. The figure is validated by the third party. Diffusion tube annual means are calculated using monitored monthly values.

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

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

Monitoring shows that, after bias adjustment and distance correction (for those sites which are not representative of public exposure), the improvement year on year in air quality across South Lakeland continues, with results at the majority of sites falling between 2017 and 2018. However, there was a slight increase in levels seen at 13 sites around the district (although these were different to those where an increase was seen last year).

With the exception of 1, all sites continued to meet the annual mean objective in 2018. Site N25 (Burgundy's on Lowther Street, where there is relevant exposure on the first floor) saw a result of 42.9µg/m<sup>3</sup>, just above the 40µg/m<sup>3</sup> objective and an increase of 0.36µg/m<sup>3</sup> on 2107. This site is already within the AQMA and is now predicted (using Defra's future year calculator) to meet the objective by 2020.

There were no sites within 10% of the objective in 2018, compared to 1 in 2017.

The Council have adopted a voluntary target of 30µg/m<sup>3</sup>, to ensure an ongoing reduction in NO<sub>2</sub>, even when the Government objective has been met. This was being met at 27 of the 33 sites in 2018 (26 in 2017).

There were no exceedences of the hourly mean objective at the Lowther Street continuous analyser in 2018 (the worst case monitoring location) and no sites at which annual means were greater than 60µg/m<sup>3</sup> (which would indicate an exceedance of the 1-hour mean objective is likely at these sites).

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Pending Defra's response to this report, given the 2018 results and the significant reduction in pollution levels across the AQMA which these confirm, the Council propose to amend the AQMA to reduce it to only cover Lowther Street, where the one Objective exceedence in the District is found.

### **3.2.2 Other Pollutants**

No other pollutants are routinely monitored by South Lakeland District Council.

## Appendix A: Monitoring Results

**Table A.1 – Details of Automatic Monitoring Sites**

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
A1	Lowther Street	Kerbside	351610	492650	NO NO <sub>x</sub> NO <sub>2</sub>	Yes	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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
N1	Stricklandgate, Kendal	Roadside	351500	492710	NO <sub>2</sub>	No	2.03	6.5	No	2.65
N2	Finkle Street, Kendal	Urban Centre	351550	49270	NO <sub>2</sub>	No	1.67	0	No	2.64
N4	St Thomas' School, Kendal	Urban Background	351100	493720	NO <sub>2</sub>	No	6.42	2.9	No	2.62
N6	Cavendish St, Ulverston	Kerbside	328550	478190	NO <sub>2</sub>	No	2	0.2	No	2.47
N7	Millans Park, Ambleside	Roadside	337560	504460	NO <sub>2</sub>	No	12	1.53	No	2.72
N8	Crescent Rd, Windermere	Kerbside	341290	498430	NO <sub>2</sub>	No	1.74	0.68	No	2.56
N9	1 Lowther St, Kendal	Kerbside	351490	492610	NO <sub>2</sub>	Yes	0	0.85	No	2.93
N11, N13, N14	24 Lowther St, Kendal	Kerbside	351605	492640	NO <sub>2</sub>	Yes	0	0.83	Yes	3
N16	Aynam Road, Kendal	Roadside	351710	491940	NO <sub>2</sub>	No	3.1	1.63	No	2.63
N17	Kirkland, Kendal	Roadside	351570	492410	NO <sub>2</sub>	Yes	0.5	4.1	No	2.58
N18	Cooks Corner, Bowness	Roadside	340340	497010	NO <sub>2</sub>	No	0	1.92	No	2.53
N19	Beezon Road, Kendal	Kerbside	351897	493022	NO <sub>2</sub>	Yes	3.2	0.5	No	2.64
N20	29 Wildman Street, Kendal	Roadside	351970	493070	NO <sub>2</sub>	Yes	0.53	1.5	No	2.54
N21	Blackhall Rd, Kendal	Roadside	351680	492840	NO <sub>2</sub>	Yes	0	2.3	No	2.4



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N23	99 Highgate, Kendal	Kerbside	351484	492434	NO <sub>2</sub>	Yes	1.8	0.8	No	3.1
N24	147 Highgate, Kendal	Roadside	351499	492314	NO <sub>2</sub>	Yes	0	2.7	No	2.55
N25	Burgundy's Kendal	Kerbside	351557	492624	NO <sub>2</sub>	Yes	0	0.85	No	2.6
N26	31 Lowther St, Kendal	Kerbside	351619	492637	NO <sub>2</sub>	Yes	0	0.8	No	2.37
N27	Kent Street, Kendal	Roadside	351674	492695	NO <sub>2</sub>	Yes	5.1	2.6	No	2.4
N31	42 Stramongate, Kendal	Roadside	351712	492832	NO <sub>2</sub>	Yes	0.55	2.8	No	2.4
N33	Sandes Ave, Kendal	Roadside	351597	493052	NO <sub>2</sub>	Yes	0.72	2.65	No	2.5
N36	11 Longpool, Kendal	Kerbside	352016	493142	NO <sub>2</sub>	Yes	3.3	0.6	No	2.45
N37	9 Wildman St, Kendal	Roadside	351934	493043	NO <sub>2</sub>	Yes	0	1.5	No	2.5
N38	Windermere Rd, Kendal	Roadside	351499	493022	NO <sub>2</sub>	Yes	12	1.45	No	2.45
N40	Appleby Rd, Kendal	Roadside	352075	493264	NO <sub>2</sub>	No	7.34	1.3	No	2.35
N41	County Road, Ulverston	Roadside	328698	478158	NO <sub>2</sub>	No	5.75	2.2	No	2.6
N43	Casson St, Ulverston	Urban Background	329049	478471	NO <sub>2</sub>	No	0.3	1.12	No	2.5
N46	Canal Street, Ulverston	Kerbside	329316	478554	NO <sub>2</sub>	No	0	1.3	No	2.52
N47	25 Windermere Road, Kendal	Kerbside	351186	493263	NO <sub>2</sub>	No	4.3	1.65	No	2.4
N48	Milnthorpe Road, Kendal	Kerbside	351532	491487	NO <sub>2</sub>	No	6.75	0.53	No	2.54
N49	Stramongate School, Kendal	Roadside	351682	492951	NO <sub>2</sub>	No	0	41.5	No	2.45

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N50	Kirkbie Kendal School, Kendal	Roadside	351872	491574	NO <sub>2</sub>	No	0	14.56	No	2.43
N51	Mintsfeet Road, Kendal	Roadside	352019	493594	NO <sub>2</sub>	No	4.56	1.59	No	2.5

### Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2014	2015	2016	2017	2018
A1 Lowther Street, Kendal	Roadside	Automatic monitor	N/A	100	31.53	32.58	30.36	27.42	21.92
N1 Stricklandgate Kendal	Roadside	Diffusion tube	N/A	100	21.97	20.42	19.32	19.93	19.3
N2 Finkle Street, Kendal	Urban centre	Diffusion tube	N/A	100	15.84	14.19	15.00	13.01	13.6
N4 St Thomas School, Kendal	Urban Background	Diffusion tube	N/A	92	10.55	8.72	9.10	9.04	8.3
N6 Cavendish Street, Ulverston	Kerbside	Diffusion tube	N/A	100	22.89	19.09	20.67	17.96	19.0
N7 Millans Park, Ambleside	Roadside	Diffusion tube	N/A	100	21.85	21.28	18.66	17.26	16.5
N8 Crescent Road, Windermere	Kerbside	Diffusion tube	N/A	100	23.41	22.59	22.98	20.33	19.9
N9 Top Lowther Street, Kendal	Roadside	Diffusion tube	N/A	100	39.63	34.91	32.60	30.27	32.2
N11 Middle Lowther St, Kendal 1	Kerbside	Triplicate diffusion tube	N/A	100	33.57	32.85	30.11	30.55	28.5
N13 Middle Lowther St, Kendal 2	Kerbside	Triplicate diffusion tube	N/A	100	33.24	32.85	29.62	29.31	27.4

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N14 Middle Lowther St, Kendal 3	Kerbside	Triplicate diffusion tube	N/A	100	33.26	32.53	30.96	29.71	28.8
N16 Aynam Road, Kendal	Roadside	Diffusion tube	N/A	100	22.82	22.63	21.08	19.74	18.6
N17 Kirkland, Kendal	Kerbside	Diffusion tube	N/A	100	30.67	28.84	27.04	26.06	25.4
N18 Cooks Corner, Bowness	Roadside	Diffusion tube	N/A	100	31.41	30.44	29.42	27.29	25.7
N19 Beeson Road, Kendal	Kerbside	Diffusion tube	N/A	100	32.31	31.90	32.10	29.7	29.6
N20 29 Wildman St, Kendal	Roadside	Diffusion tube	N/A	100	36.6	29.79	38.33	30.55	35.9
N21 Blackhall Road, Kendal	Roadside	Diffusion tube	N/A	100	31.01	32.47	29.13	31.94	30.9
N23 99 Highgate, Kendal	Kerbside	Diffusion tube	N/A	100	38.50	34.70	35.13	32.45	35.2
N24 147 Highgate, Kendal	Roadside	Diffusion tube	N/A	100	28.07	26.74	27.61	24.02	24.4
N25 Burgundy's, Kendal	Kerbside	Diffusion tube	N/A	100	<b>49.46</b>	<b>46.52</b>	<b>44.45</b>	<b>42.54</b>	<b>42.9</b>
N26 31 Lowther Street, Kendal	Kerbside	Diffusion tube	N/A	100	38.68	38.52	35.98	36.44	34.2
N27 Kent Street, Kendal	Roadside	Diffusion tube	N/A	92	31.30	30.74	32.17	29.34	27.9
N31 42 Stramongate, Kendal	Roadside	Diffusion tube	N/A	100	32.14	29.26	29.61	27.63	28.5

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N33 Sandes Avenue, Kendal	Roadside	Diffusion tube	N/A	100	35.40	34.74	32.95	26.48	27.2
N36 11 Longpool, Kendal	Kerbside	Diffusion tube	N/A	100	35.10	29.33	28.53	25.15	25.7
N37 9 Wildman Street, Kendal	Roadside	Diffusion tube	N/A	100	37.36	35.35	33.81	31.39	33.7
N38 Windermere Road, Kendal	Roadside	Diffusion tube	N/A	100	37.40	33.57	34.95	27.50	29.3
N40 Appleby Road, Kendal	Roadside	Diffusion tube	N/A	100	25.21	24.60	23.80	22.80	22.0
N41 County Road, Ulverston	Roadside	Diffusion tube	N/A	100	32.94	30.34	30.19	26.56	27.3
N43 Casson Street, Ulverston	Urban Background	Diffusion tube	N/A	100	17.29	11.1	10.33	11.92	10.7
N46 Canal Street, Ulverston	Roadside	Diffusion tube	N/A	83.3					30.3
N47 25 Windermere Road, Kendal	Roadside	Diffusion tube	N/A	83.3					23.6
N48 Milnthorpe Road, Kendal	Roadside	Diffusion tube	N/A	83.3					29.3
N49 Stramongate School, Kendal	Roadside	Diffusion tube	N/A	75					11.5
N50 Kirkbie Kendal School, Kendal	Roadside	Diffusion tube	N/A	75					11.5

N51 Mintsfeet Road, Kendal	Roadside	Diffusion tube	N/A	75					18.4
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☒ **Diffusion tube data has been bias corrected**

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

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

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

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

Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Outside Kendal

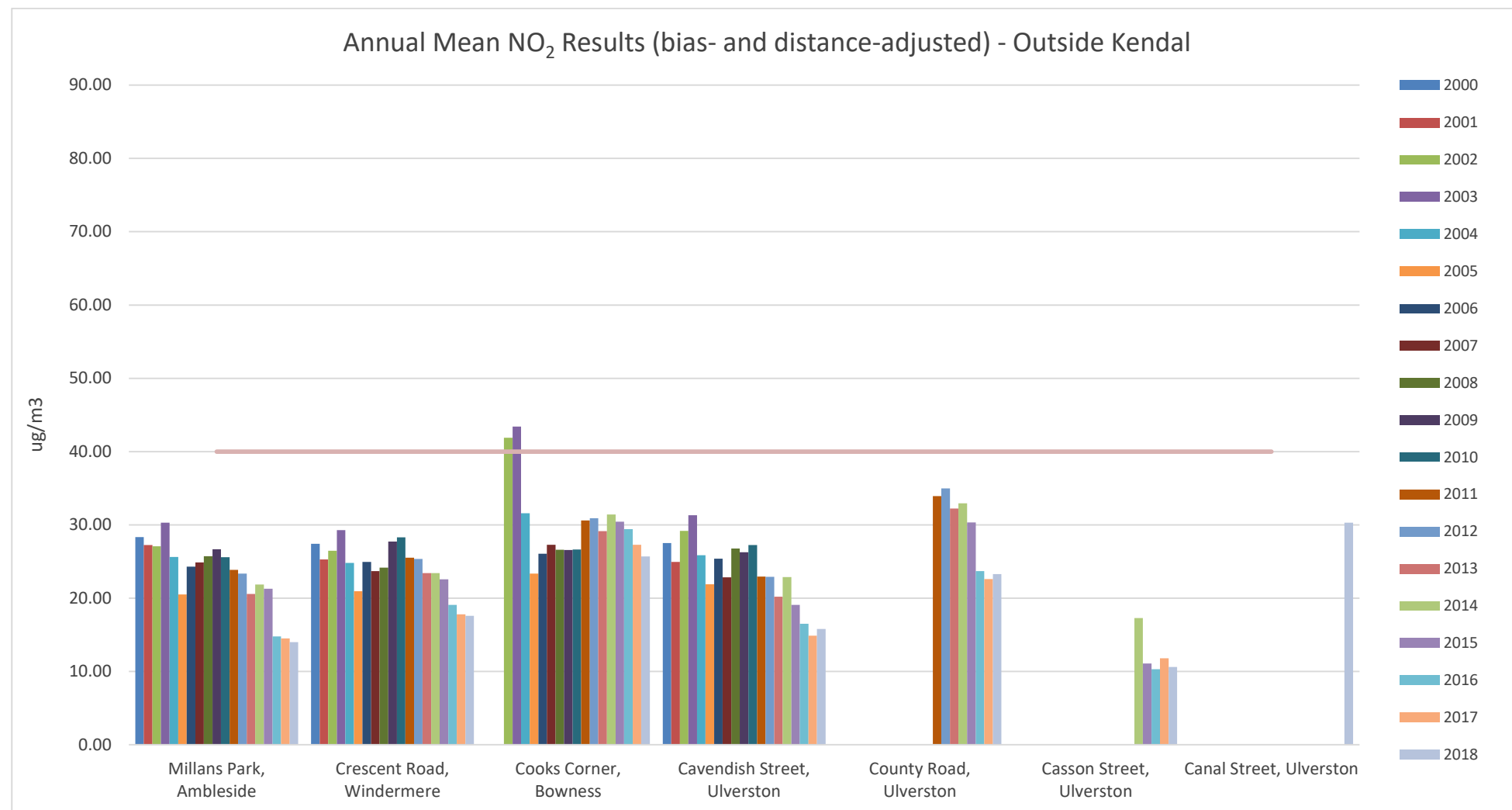


Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Kendal

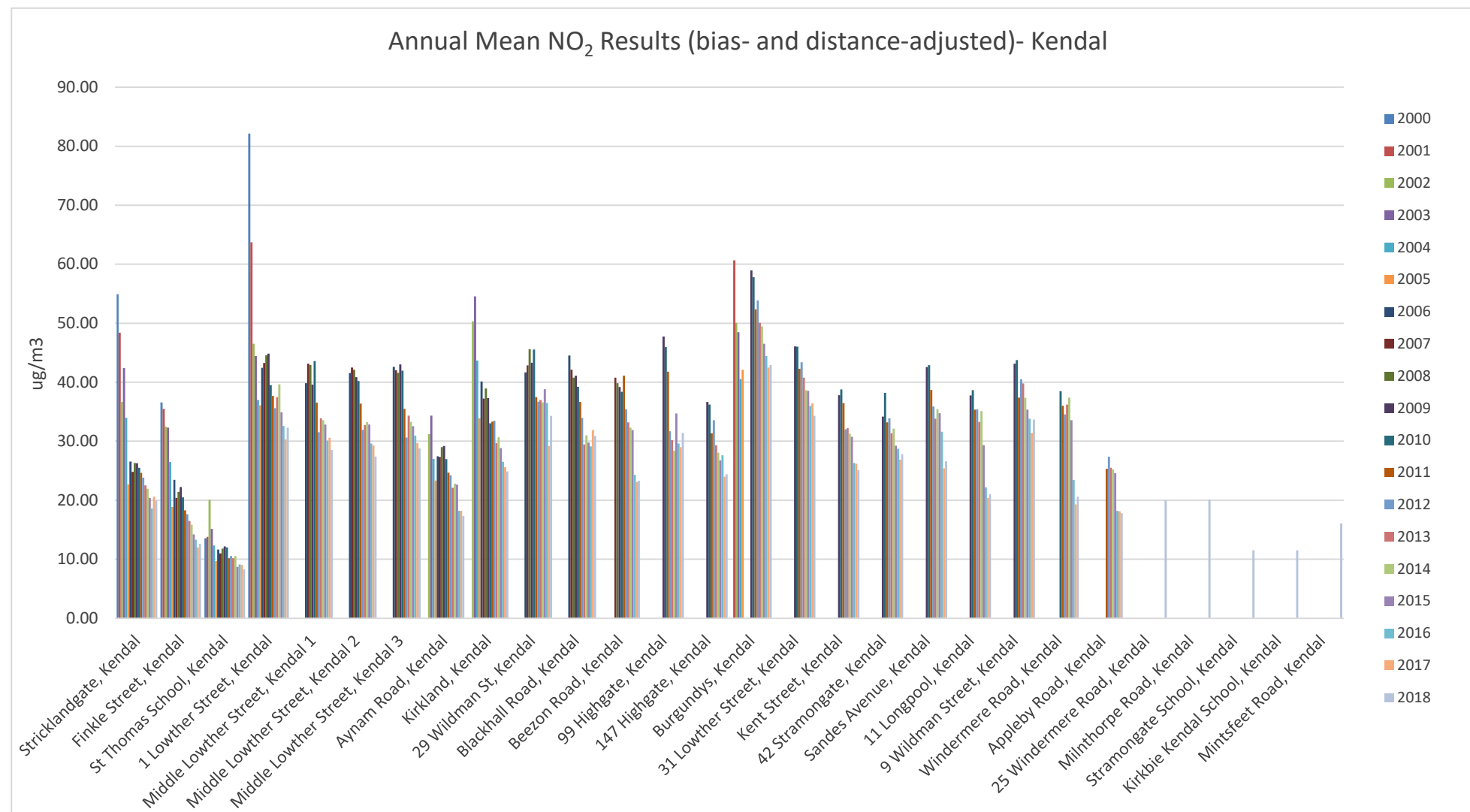




Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
					2014	2015	2016	2017	2018
A1	Roadside	Automatic monitor	N/A	97.6	<b>0</b> <b>(104.2)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Figure A.3 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Continuous Analyser

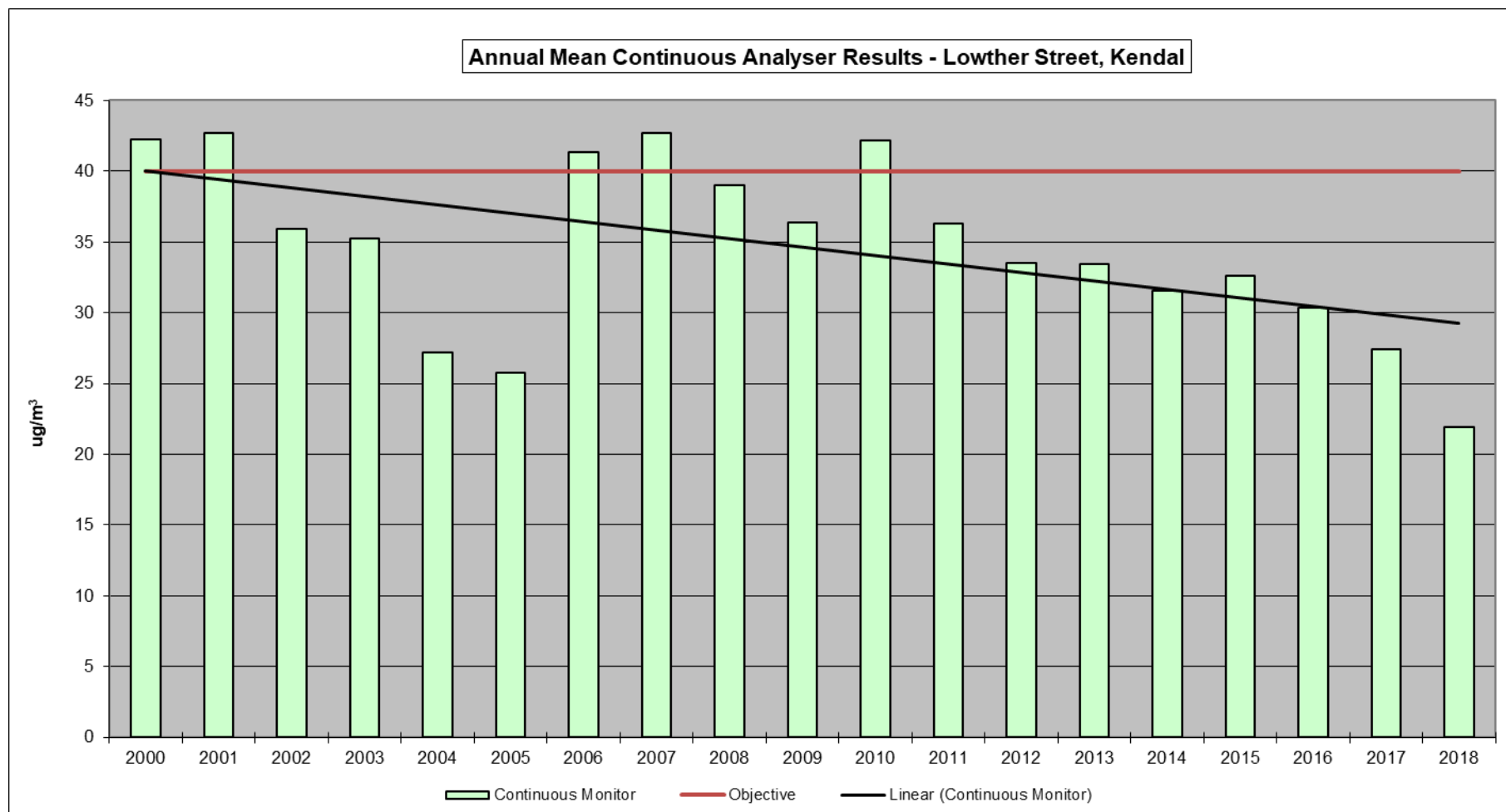
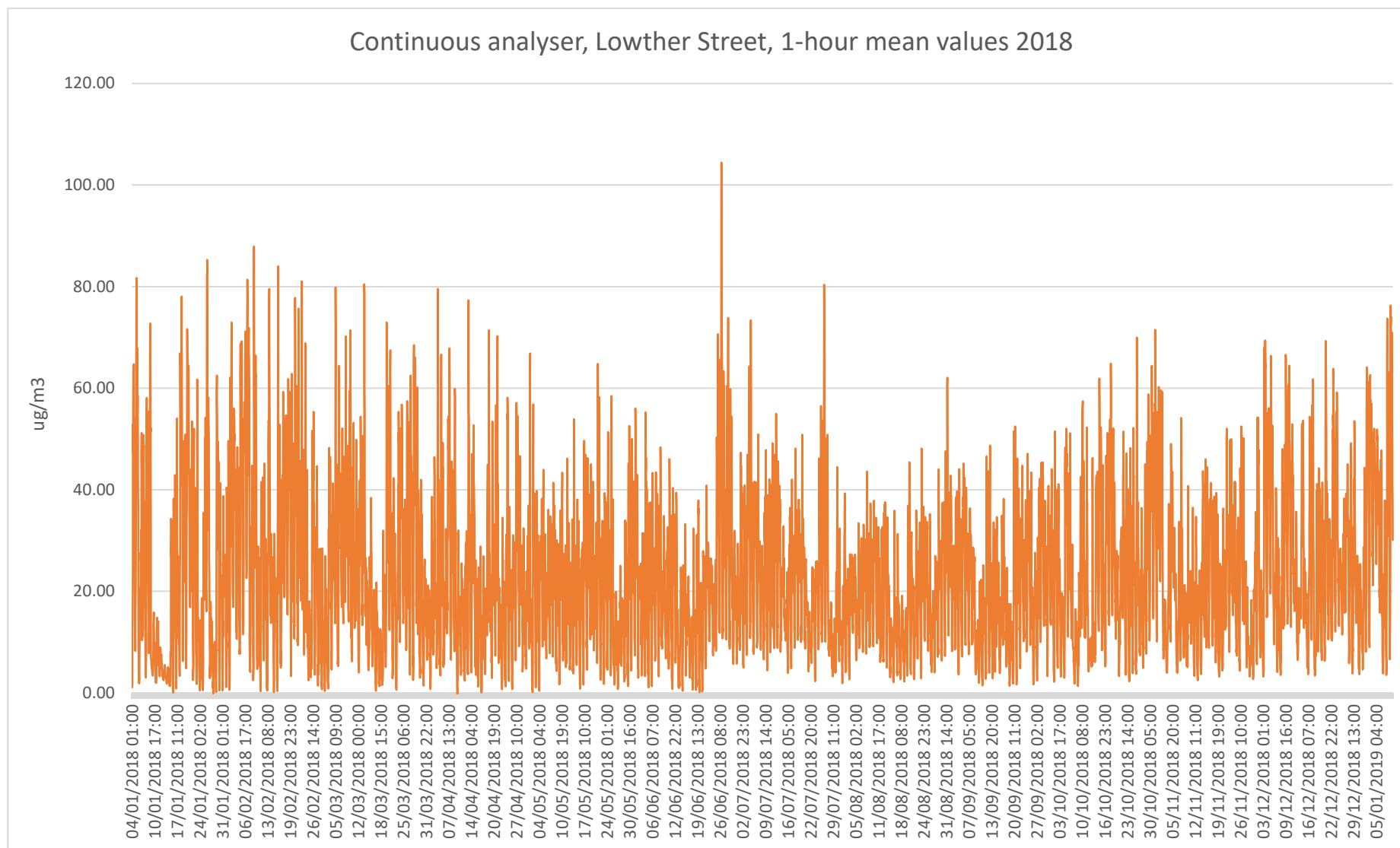


Figure A.4 – Trends in Number of NO<sub>2</sub> 1-Hour Means > 200µg/m<sup>3</sup>



## Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2018

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.74) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
N1	30.20	33.00	31.70	25.00	18.00	17.30	21.00	17.50	21.80	26.50	32.90	37.40	26.0	19.26	19.9
N2	19.90	24.70	26.60	17.00	13.10	12.50	13.10	11.90	13.70	16.90	23.00	28.40	18.4	13.6	12.6
N4	15.1	15.8	14.9		5.1	6.8	6.1	6.8	7.2	8.8	17.7	19.7	11.3	8.3	8.3
N6	29.3	31.2	34.5	26.7	20.6	22.1	20.7	14.7	17.3	22.2	32.7	36.3	25.7	19.0	15.8
N7	24.7	26.8	27.8	22.1	17.8	19.4	16.9	13.7	19.4	21.6	28.8	27.8	22.2	16.5	14.0
N8	28.9	33.8	36.2	29	19.5	24.2	27.3	19.5	19.4	25.6	31.3	28.2	26.9	19.9	17.6
N9	49.7	49.9	53.5	43.1	40.4	44.2	39.8	33.3	36.6	40.5	45.5	46.5	43.6	32.3	32.3
N11	41.3	46.6	48.3	37.8	32.6	37.1	32.4	30.3	31.9	39.9	40	44.5	38.6	28.5	28.5
N13	37.9	42.2	44.2	33.8	33.5	37.5	33.7	30.2	31.9	34.7	38.9	45	37.0	27.4	27.4
N14	39.3	47.2	46.2	35.2	34.7	35.1	35.3	28.8	31.1	33.2	37.9	63.4	39.0	28.8	28.8
N16	31.9	34.2	30.4	21.9	17.2	20.6	20	17.2	20.1	22.8	31.1	33.9	25.1	18.6	17.3
N17	39.6	45.7	34.1	33	21.6	24.9	30	27.2	30.4	40.7	39.3	44.7	34.3	25.4	24.9
N18	34.1	37.3	35.7	43.98	32.8	33.3	36.2	35.4	30.1	32.9	32.5	32.6	34.7	25.7	25.7
N19	47.6	50.4	46.6	40	31.6	36.7	32.1	27	32.1	42.5	43.9	49.3	40.0	29.6	23.3
N20	54.6	54.9	55.7	46.7	44.6	43.5	43.2	38.5	41.5	45	49.8	64.6	48.6	35.9	34.3
N21	44.1	46.9	47.1	41.3	31.2	34.8	38	38.4	41.2	40.4	43.8	53.6	41.7	30.9	30.9

## South Lakeland District Council

N23	55.1	57.9	52.6	47.8	40	36	39	34.9	37.6	49.3	56.5	64.5	47.6	35.2	31.4
N24	35.4	42.8	44.1	34.4	30	29.5	25.7	22.7	23	31.3	37.9	39.4	33.0	24.4	24.4
N25	65.9	68.7	67.4	58.1	56.2	56.5	52.9	44.3	46.9	58.9	56.9	63.7	58.0	<b>42.9</b>	<b>42.9</b>
N26	53.1	50.69	56.8	45.2	40.4	41	41.3	42.5	42.4	45	46.2	50.6	46.3	34.3	34.3
N27	43.3	41.7	44	35.6	34.1	39.2	35.2	25.8	29	39.2		47.6	37.7	27.9	25.1
N31	38	52	53.2	38.4	34.3	36.7	30	24.3	28.1	37.6	42.2	48	38.6	28.5	27.8
N33	39.4	44.2	47.5	35.2	34.1	40	31.8	25.2	29.7	37.8	40.2	43	37.3	27.6	26.6
N36	38.6	43.5	43.2	33.7	30.4	32.7	31	25.5	28.3	31.9	37	41.1	34.7	25.7	21.0
N37	46.6	50.5	51	60.7	43.6	45.2	39.9	30.3	35.6	42.9	46.1	54.8	45.6	33.7	33.7
N38	46.7	46.6	50	41.6	36.7	37.7	29.5	26	30.4	39	43.1	417.4	39.6	29.3	20.6
N40	35.2	38.6	34.2	27.3	22.9	25	22.8	22.3	255	30.3	35.3	37.9	29.8	22.0	17.8
N41	35.4	48.3	46.7	31.3	30.5	34.5	30.7	28.3	30.9	35.6	43	47.1	36.9	27.3	23.3
N43	19.2	17.9	21.2	14.1	9.6	11.5	10	7.6	9.6	13.5	20.2	19.2	14.5	10.7	10.6
N46			49.7	41.6	35.8	38.2	41.8	36.2	40.2	46.4	40.5	39.1	41.0	30.3	30.3
N47			39.4	33.1	27.5	29.8	26.5	20.8	28.9	36.1	33.7	43.2	31.9	23.6	20.0
N48			44.9	42	32.7	35.5	38.1	31.9	36.3	39.8	46.2	48.5	39.6	29.3	20.1
N49				15.3	9.3	11.5	11.8	11.4	14.5	17.3	22	27.2	15.6	11.5	11.5
N50				15.8	10.7	12.3	12.4	10.3	13.6	16.5	23.6	25.2	15.6	11.5	11.5
N51				21.6	15.4	21.5	23.9	20.7	23.9	29.3	34.1	33.1	24.8	18.4	16.1

☐ Local bias adjustment factor used

☒ National bias adjustment factor used

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

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

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

(2) Distance corrected to nearest relevant public exposure.

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

### Screening of New and Modified Sources

It is now recognised that Local Authorities will have assessed all known sources in their District through previous rounds of review and assessment. Any new or modified sources will be assessed for their impact on air quality through the planning application process.

South Lakeland District Council Environmental Protection Group is consulted on all applications which may impact on air quality and requires that all development is air quality neutral. This means developments are not affected by poor air quality and they either improve, or have no negative impact on air quality themselves.

Any new or modified source identified will be assessed using the tools in [LAQM \(TG16\)](#) (updated in February 2018). Sources which will be assessed include new developments which lead to an increase in traffic (including the proportion of HGV's), biomass boilers and Combined Heat and Power (CHP) plant, new industrial sites or changes to existing industrial sources, new or altered roads or junctions, bus stations, airports and railways and any uncontrolled or fugitive sources (such as construction sites).

South Lakeland District Council will continue to review developments to ensure sources are assessed if they meet the criteria in TG16.

Work to strengthen local planning policy when looking at requirements for air quality is ongoing.

### Diffusion Tube Bias Adjustment Factors

Diffusion tubes may systematically under- or over-read NO<sub>2</sub> concentrations when compared to the reference automatic monitor. This is described as 'bias' and can be corrected using a bias adjustment factor to improve the accuracy of the diffusion tube results. This is calculated using the results of 3 diffusion tubes co-located alongside an automatic monitor, all sampling the same air. The annual average result for the monitor is divided by the annual average of the 3 diffusion tubes results to give the bias

factor. This factor is then applied to all the diffusion tube results for that year. A bias factor can vary from year to year due to variables such as the weather at the site or changes in laboratory procedures.

Even after bias adjustment a diffusion tube may have an uncertainty of +/-20%, compared to 10-15% for automatic monitors.

### **Factor from Diffusion Tube Supplier**

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

A national bias adjustment factor is calculated using results from all Authorities supplied by ESG who also use 20% TEA in water and who upload their results to the collation website (<http://laqm.Defra.gov.uk/bias-adjustment-factors/national-bias.html>). The March 2019 version was used for the 2018 calculation. The results from 5 Authorities (including South Lakeland) were included in this calculation.

<b>Year</b>	<b>ESG Bias</b>
2016	0.75
2017	0.71
2018	0.74

### **Factor from Local Co-location Studies**

The local bias adjustment factor was calculated using triplicate tubes (N11, N13 & N14) located alongside the automatic monitor (A1) on Lowther Street in Kendal.

<b>Year</b>	<b>Automatic Monitor Annual Mean</b>	<b>Diffusion Tube Annual Mean of 3 Tubes</b>	<b>Bias</b>
2016	30.36	40.85	0.74
2017	27.42	42.05	0.65
2018	21.92	38.16	0.57



### Discussion of Choice of Factor to Use

It is recognised that local results are more representative of local circumstances. However, the locally derived figure was very low in 2018 and its use would reduce diffusion tube results massively.

It has therefore been decided that the national factor of 0.74, which is more similar to previous years factors, will be used to bias adjust the 2018 data, to give worst case results.

### Diffusion Tube Distance Adjustment

Some passive monitoring locations are not representative of relevant exposure (due to a lack of secure mounting locations at the property facade). In these cases results are adjusted for distance to the nearest relevant receptor (residential property) using Defra's NO<sub>2</sub> fall-off with distance calculator. Table B1 shows which sites these are.

### Diffusion Tube Bias Annualisation

No annualisation of diffusion tube results has been necessary as more than 9 months data was available for each site in 2018.

### 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 is now 20 years old and spare parts hard to obtain. A decision will be taken in 2019 on whether to retain it.

## **QA/QC of Diffusion Tube Monitoring**

In the AIR NO<sub>2</sub> PT proficiency testing scheme, 100% of results submitted in 2018 by SOCOTEC (formerly ESG), who supply and analyse the Council's diffusion tubes, were subsequently determined to be satisfactory. Their test method for NO<sub>2</sub> 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.

The precision and accuracy of all results can be checked using the tool available on Defra's website. With the exception of one month, this shows good precision and good overall data capture in 2018.

# Checking Precision and Accuracy of Triplicate Tubes



Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{gm}^{-3}$	Tube 2 $\mu\text{gm}^{-3}$	Tube 3 $\mu\text{gm}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	03/01/2018	30/01/2018	41.3	37.9	39.3	40	1.7	4	4.2	26.3	78.1	Good	Good
2	30/01/2018	01/03/2018	46.6	42.2	47.2	45	2.7	6	6.8	27.6	99.6	Good	Good
3	01/03/2018	29/03/2018	48.3	44.2	46.2	46	2.1	4	5.1	24.9	99.6	Good	Good
4	29/03/2018	02/05/2018	37.8	33.8	35.2	36	2.0	6	5.0	20.9	99.6	Good	Good
5	02/05/2018	06/06/2018	32.6	33.5	34.7	34	1.1	3	2.6	20	99.4	Good	Good
6	06/06/2018	04/07/2018	37.1	37.5	35.1	37	1.3	4	3.2	21	99.4	Good	Good
7	04/07/2018	02/08/2018	32.4	33.7	35.3	34	1.5	4	3.6	21	99.6	Good	Good
8	02/08/2018	05/09/2018	30.3	30.2	28.8	30	0.8	3	2.1	18	99.8	Good	Good
9	05/09/2018	02/10/2018	31.9	31.9	31.1	32	0.5	1	1.1	18	99.5	Good	Good
10	02/10/2018	30/10/2018	39.9	34.7	33.2	36	3.5	10	8.7	22	99.1	Good	Good
11	30/10/2018	04/12/2018	40.0	38.9	37.9	39	1.1	3	2.6	22	97.6	Good	Good
12	04/12/2018	09/01/2019	44.5	45.0	63.4	51	10.8	21	26.8	26.9	99.7	Poor Precision	Good
13												Good	Good
It is necessary to have results for at least two tubes in order to calculate the precision of the measurements										Overall survey -->		Good	Good
Site Name/ ID: Lowther Street										Precision 11 out of 12 periods have a CV smaller than 20%		(Check average CV & DC from Accuracy calculations)	
<b>Accuracy (with 95% confidence interval)</b> <b>without periods with CV larger than 20%</b> Bias calculated using 11 periods of data Bias factor A 0.6 (0.57 - 0.62) Bias B 68% (61% - 74%) Diffusion Tubes Mean: 37 $\mu\text{gm}^{-3}$ Mean CV (Precision): 4 Automatic Mean: 22 $\mu\text{gm}^{-3}$ Data Capture for periods used: 97% Adjusted Tubes Mean: 22 (21 - 23) $\mu\text{gm}^{-3}$										<b>Accuracy (with 95% confidence interval)</b> <b>WITH ALL DATA</b> Bias calculated using 12 periods of data Bias factor A 0.59 (0.56 - 0.61) Bias B 70% (63% - 77%) Diffusion Tubes Mean: 38 $\mu\text{gm}^{-3}$ Mean CV (Precision): 6 Automatic Mean: 22 $\mu\text{gm}^{-3}$ Data Capture for periods used: 98% Adjusted Tubes Mean: 23 (21 - 23) $\mu\text{gm}^{-3}$			

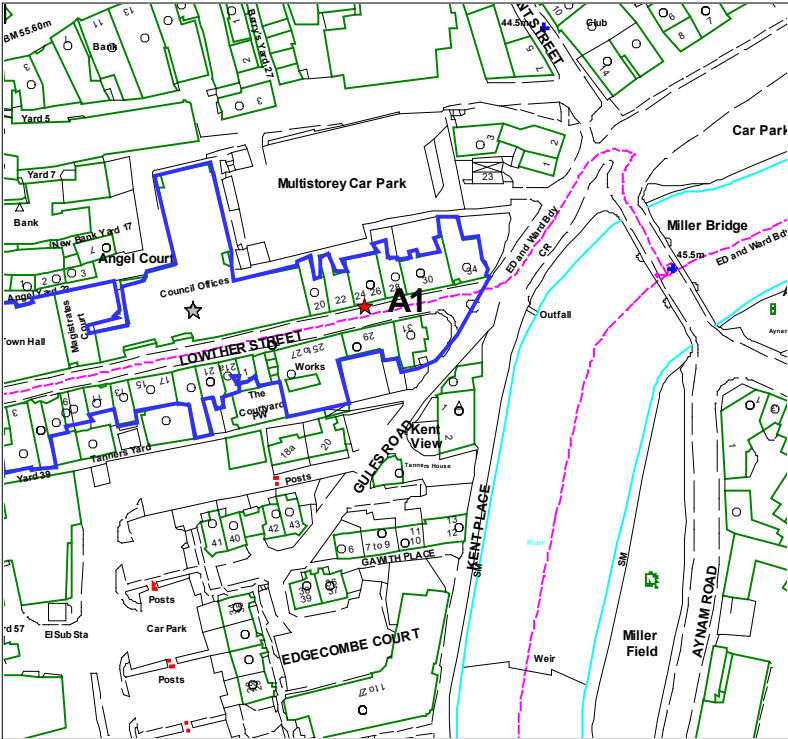
Jaume Targa, for AEA  
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at:

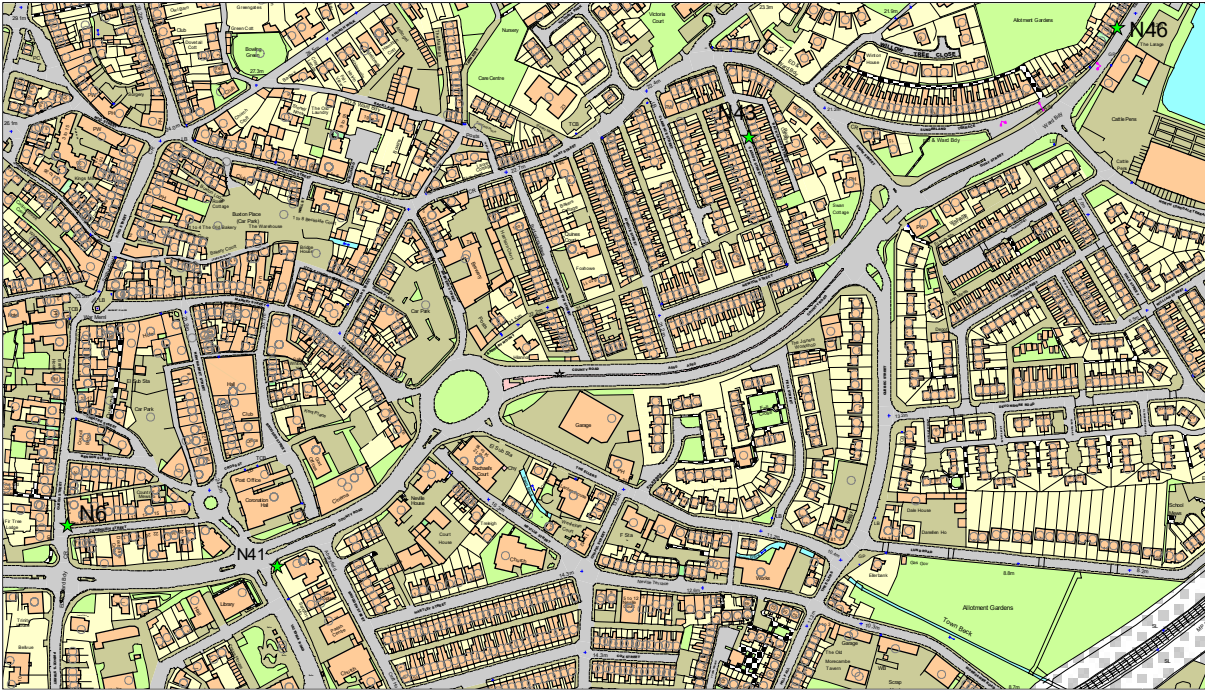
[LAQMHelpdesk@uk.bureauveritas.com](mailto:LAQMHelpdesk@uk.bureauveritas.com)

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

## Automatic monitor A1

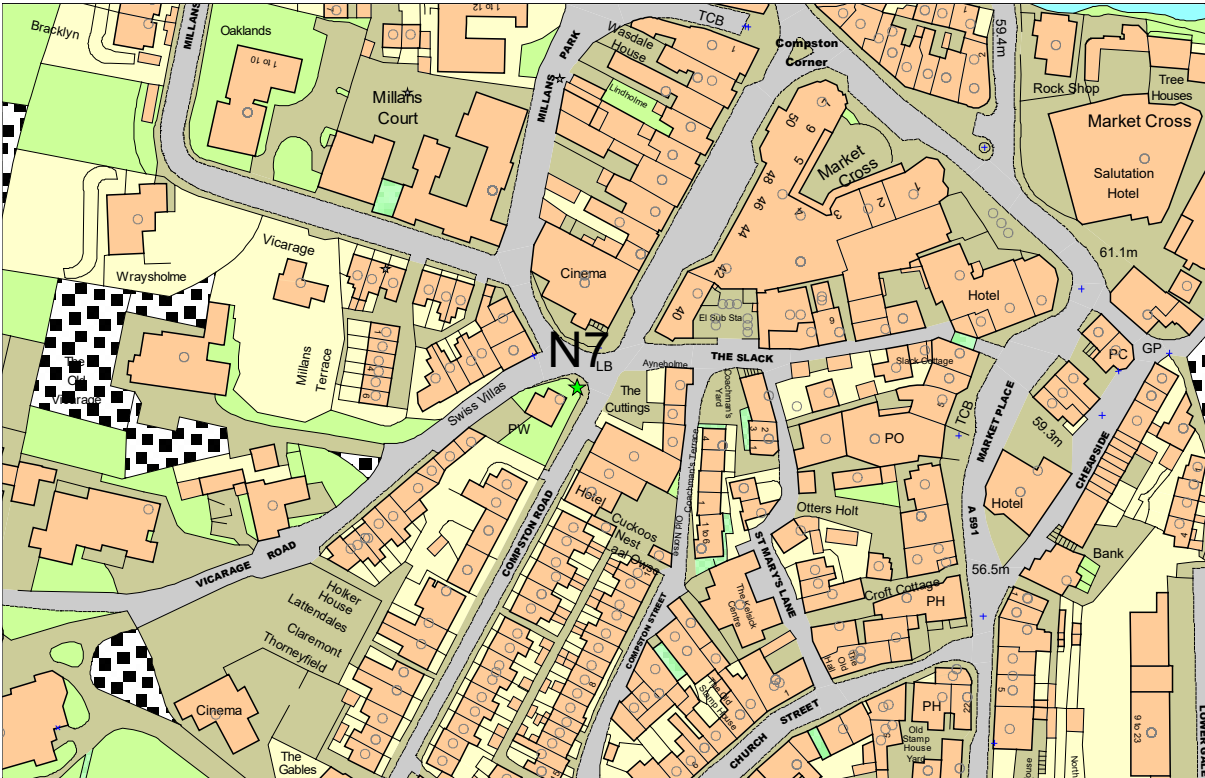


## Ulverston

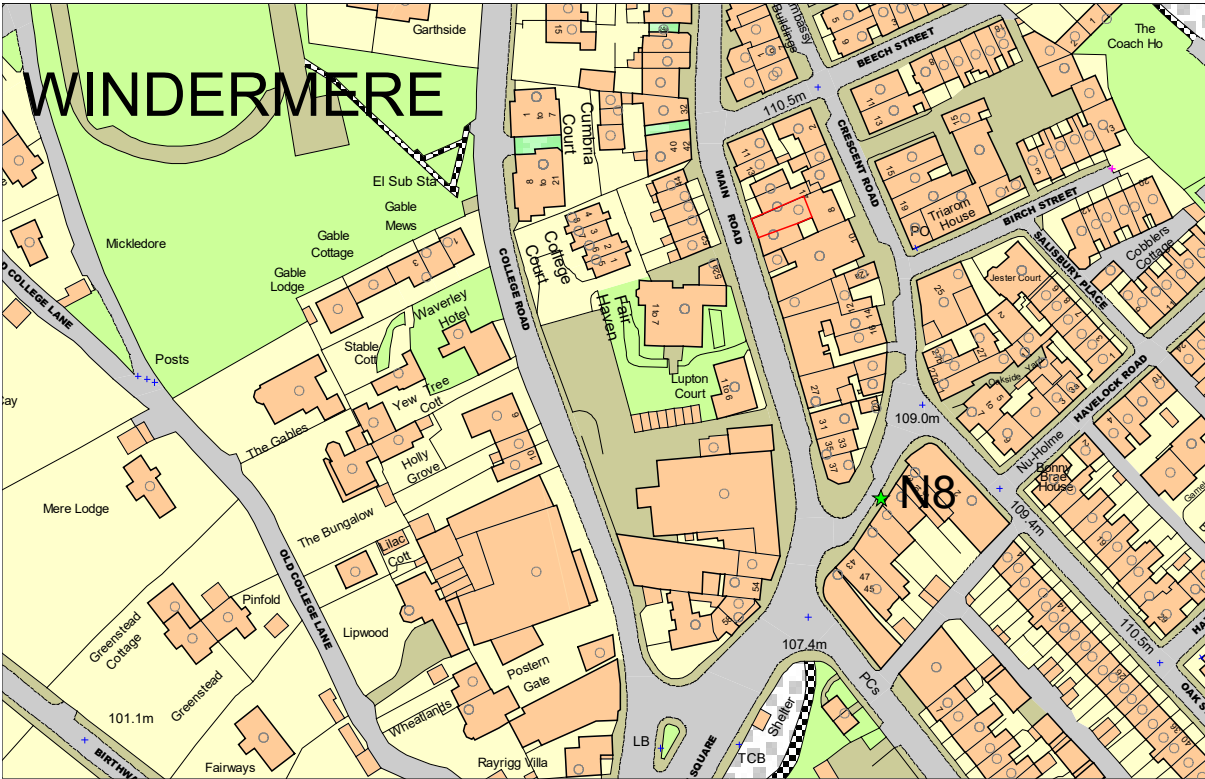




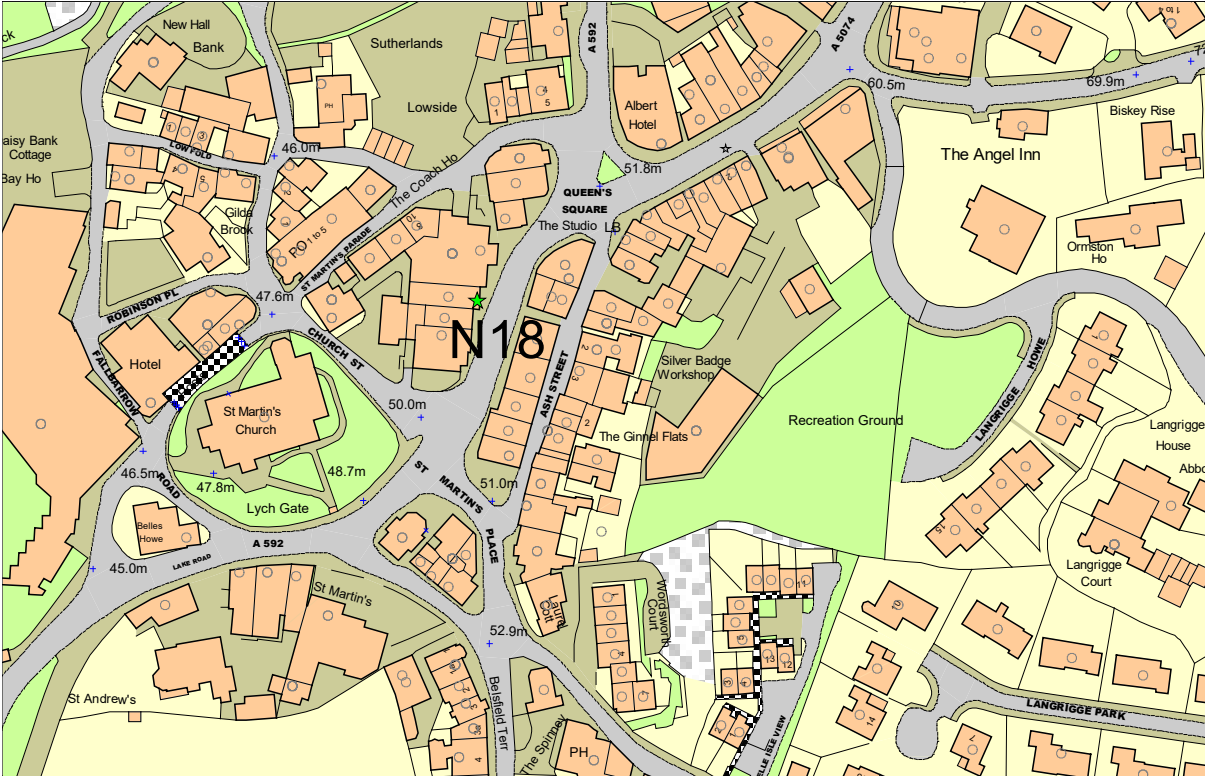
Ambleside



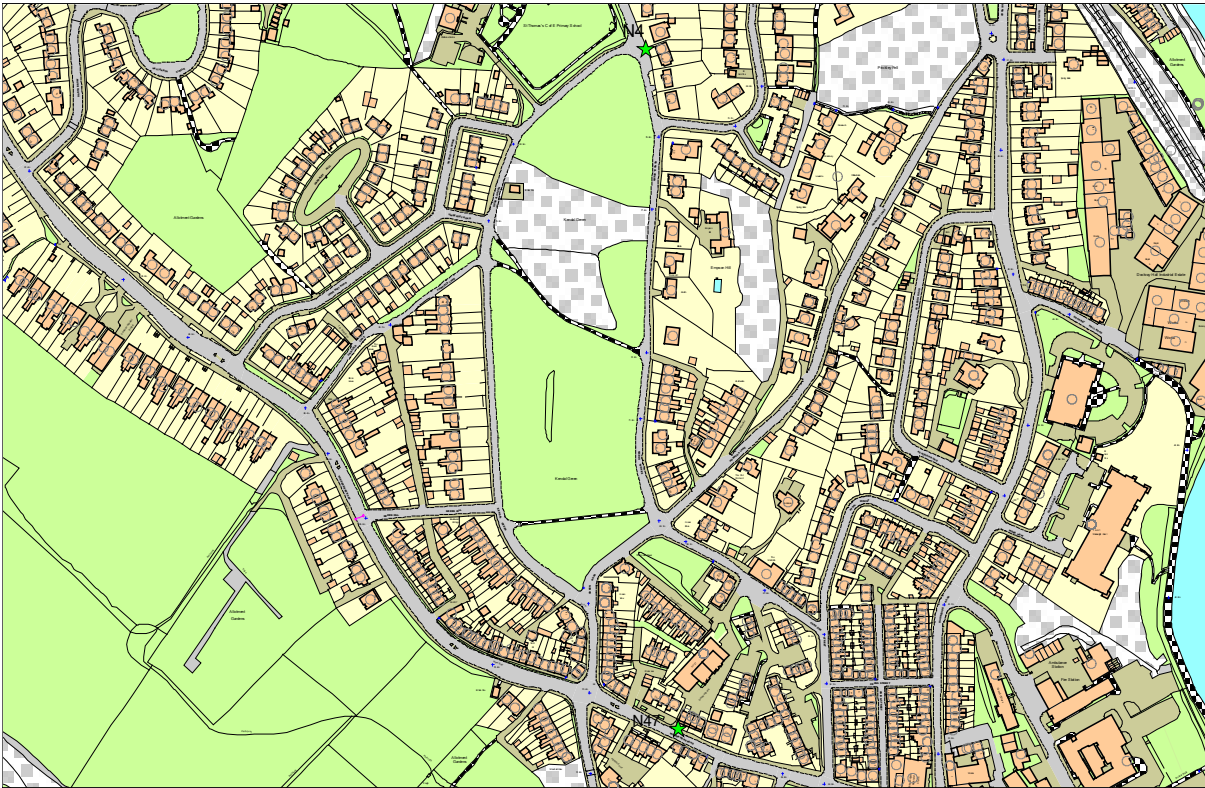
Windermere



Bowness

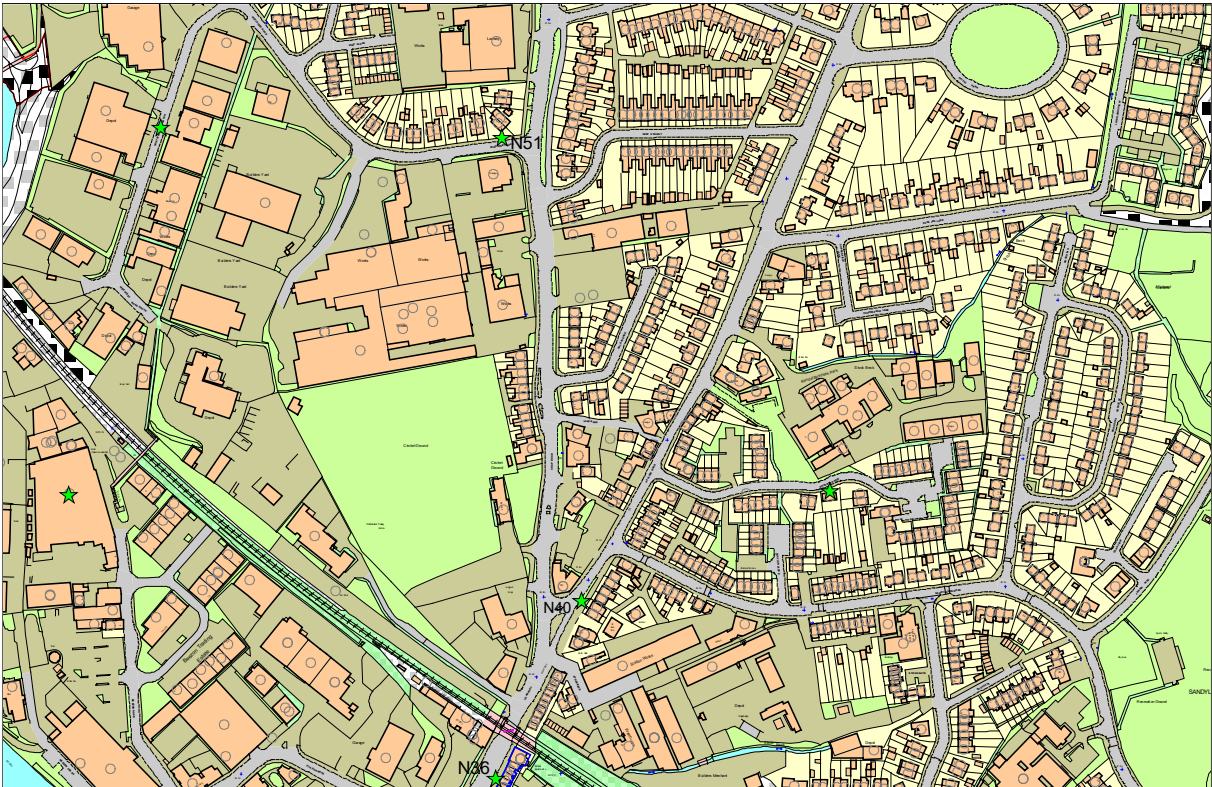


Kendal 1

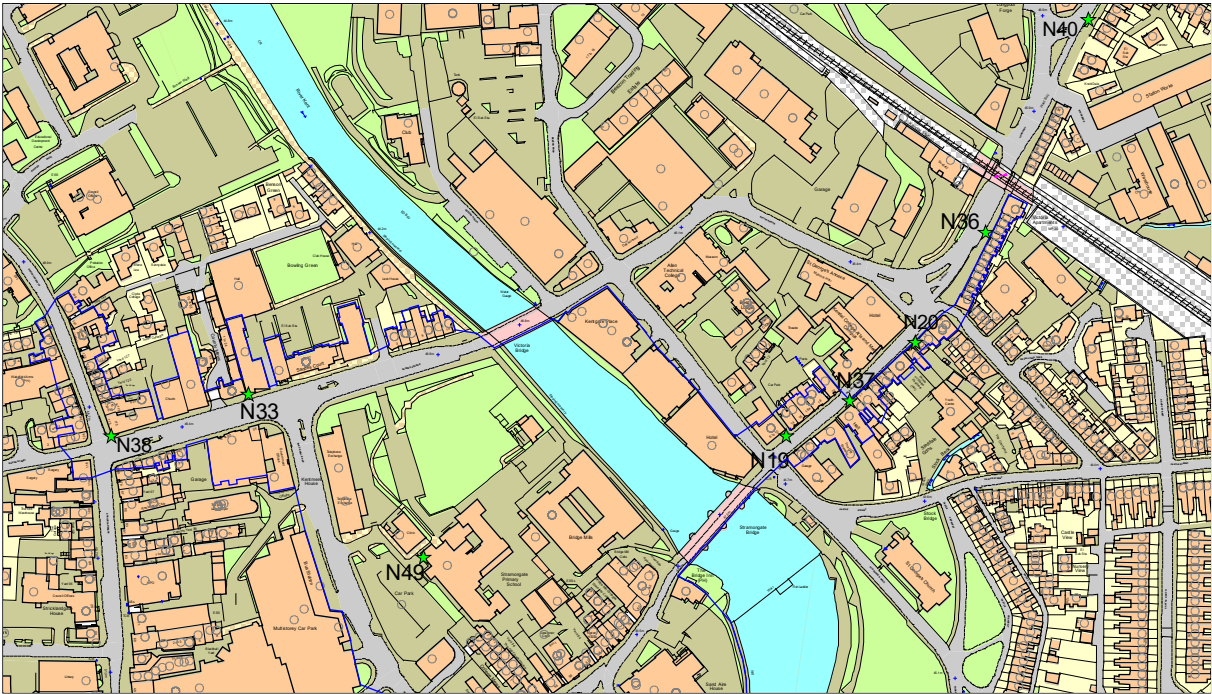




Kendal 2

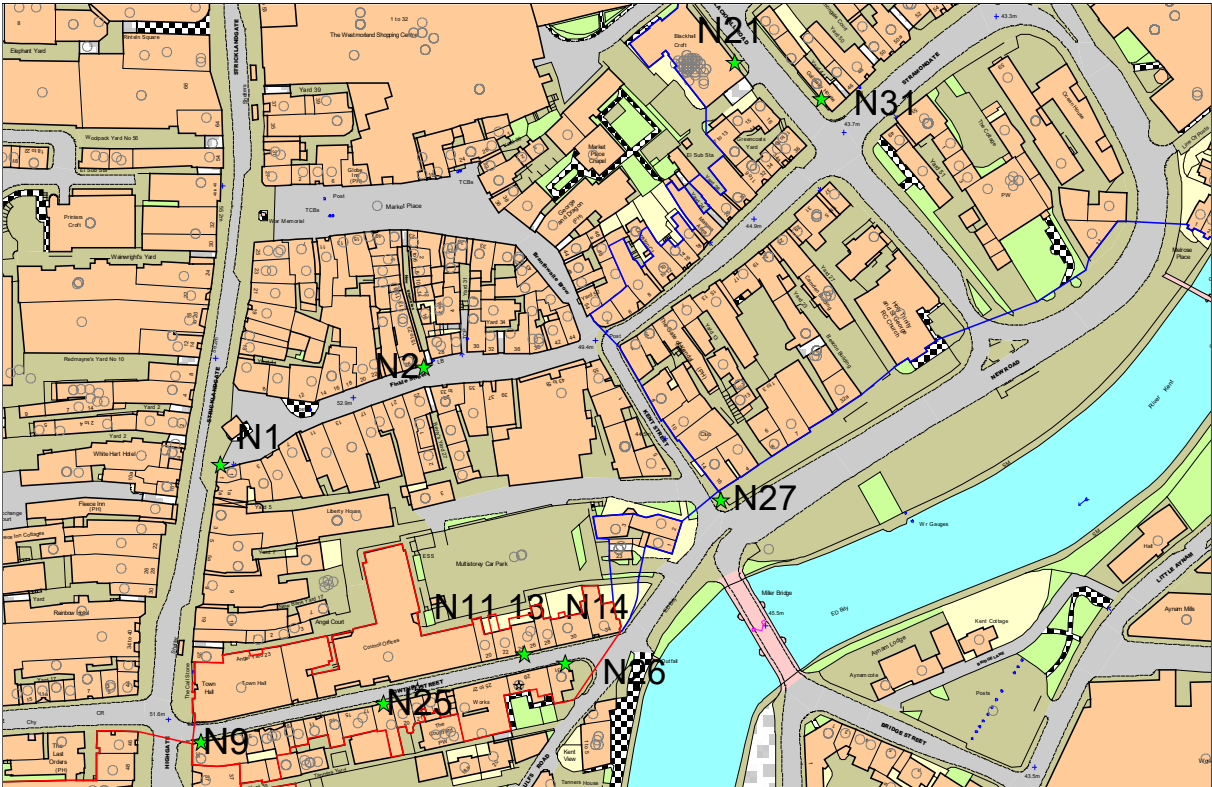


Kendal 3

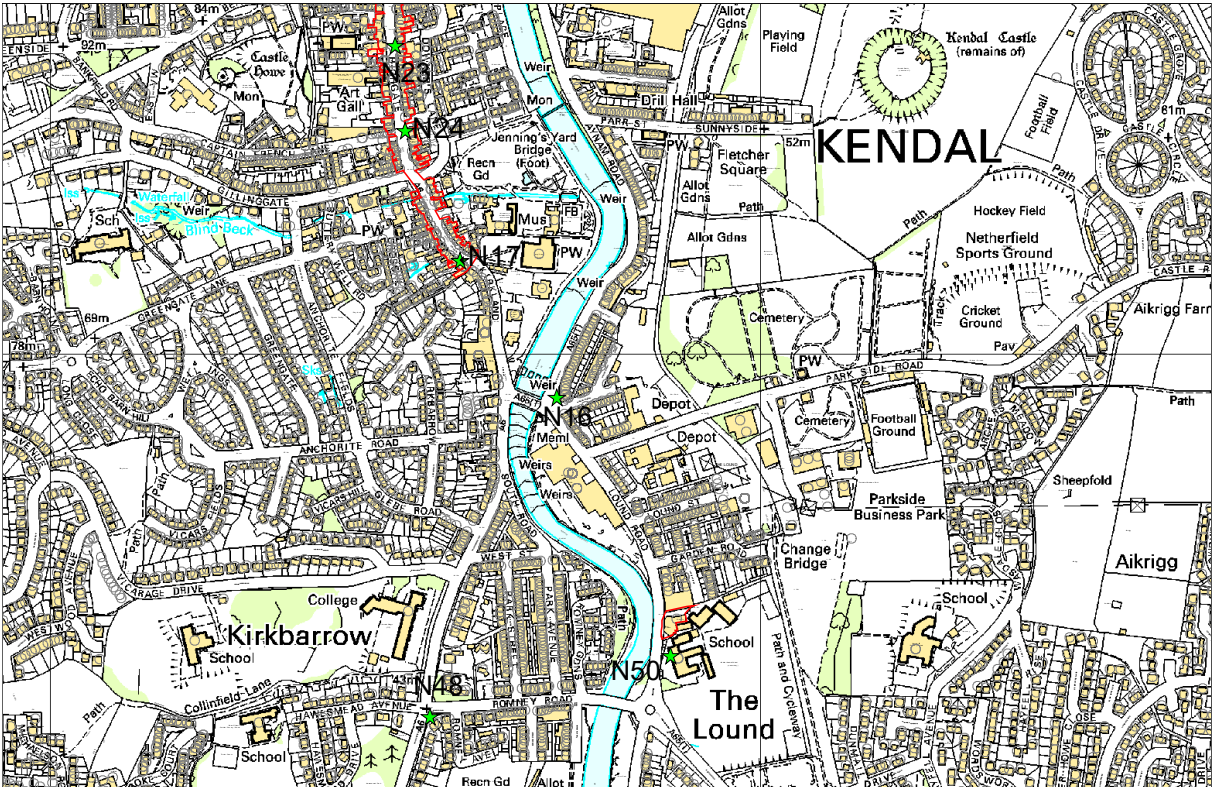




Kendal 4



Kendal 5





## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Glossary of Terms

Abbreviation	Description
AADT	Annual Average Daily Traffic
AQ	Air quality
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
BID	Business Improvement District
CCC	Cumbria County Council
CHP	Combined heat and power
CIL	Community Infrastructure Levy
CO <sub>2</sub>	Carbon Dioxide
Defra	Department for Environment, Food and Rural Affairs
ESG	Environmental Scientifics Group
EU	European Union
EV	Electric vehicle
HGV	Heavy Goods Vehicle
KTC	Kendal Town Council
LAQM	Local Air Quality Management
LDNPA	Lake District National Park Authority
MPH	Miles per hour
NO <sub>2</sub>	Nitrogen Dioxide

NO <sub>x</sub>	Nitrogen Oxides
OLEV	Office for Low Emission Vehicles
PCN	Parking Contravention Notice
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
ppb	Parts per billion
QA/QC	Quality Assurance and Quality Control
SLDC	South Lakeland District Council
SCOOT	Split Cycle Offset Optimisation Technique
TEA	Triethylamine
ULEV	Ultra-low emission vehicle
µg/m <sup>3</sup>	Microgrammes per cubic meter
µm	Micrometres

## References

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