



DARLINGTON

Borough Council

2022 Air Quality Annual Status Report (ASR)

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

Date: June, 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Darlington Borough Council

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

The mortality burden of air pollution within the UK is equivalent to 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.

The borough of Darlington (population circa 106,000) is located in the north east of England, in the County of Durham. The borough consists of the large market town of Darlington as well as several other smaller villages. Darlington Borough Council is part of the Tees Valley Combined Authority (TVCA), a partnership of five authorities (Darlington, Hartlepool, Middlesbrough, Redcar & Cleveland and Stockton-on-Tees) that work closely together and alongside other partners in making local decisions.

The annual review and assessment process has consistently concluded that air quality across the borough is generally good when compared with Government objectives, and there are currently no Air Quality Management Areas declared within the borough.

In contrast to the other four Tees Valley Combined Authority councils, Darlington Borough Council does not have any large industrial areas within its borders. The main source of air pollution within the borough that gives rise to increased pollutant concentrations is road traffic emissions from the

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

main arterial road network, which connects the relatively densely populated centre of Darlington itself out to its more rural surroundings.

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 Defra 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 emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) across the country are designated due to elevated concentrations heavily influenced by transport emissions.

The air quality across Darlington is generally considered to be good and there are currently no designated AQMAs within the borough, therefore an Air Quality Action Plan (AQAP) is not required. Darlington will continue to monitor and assess the results for the coming year within the NO₂ diffusion tube network.

Local actions to reduce the impact of vehicle emissions within Darlington are principally taken in conjunction with neighbouring councils through the TVCA. In 2020, the TVCA produced a [Strategic Transport Plan](#) (STP) for the period up to 2030. This acts as a Local Transport Plan for all five Tees Valley authorities. The STP concentrates on the following areas, with each local authority producing their own Local Implementation Plan:

- Reducing traffic congestion at peak times through improved network management and road improvements.
- Encouraging local bus companies to review services with particular emphasis on access to new and emerging employment opportunities, and to renew their fleet on an on-going basis.

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

- Encouraging wider transport choices by improving pedestrian, cycling and public transport, including rail.
- Encouraging the provision of a low emission vehicle infrastructure through the planning regime.

The [Darlington Local Plan 2016 – 2036](#) was also adopted in February 2022 and seeks to ensure the borough's need for housing, a thriving economy, community facilities and infrastructure are met, as well as safeguarding the environment, adapting to climate change and securing good design. Policy DC 3(Health and Wellbeing) of the Plan sets out that:

“All new development that may cause groundwater, surface water, air (including odour), noise or light pollution, either individually or cumulatively, will be required to incorporate measures to prevent and reduce their pollution so as not to cause unacceptable impacts on the living conditions of all existing and potential future occupants of land and buildings, the character and appearance of the surrounding area and the landscape”.

The measures discussed above will continue to contribute to further reductions in air pollution within the borough of Darlington.

Conclusions and Priorities

During 2021 no exceedances of the NO₂ annual mean objective were recorded within the borough of Darlington. Pollution concentrations continue to be relatively low and monitoring will continue to ensure that any concentration trends can be identified.

Darlington Borough Council will continue to assess new developments submitted through the planning department to ensure that any proposed developments are not detrimental to local air quality. In addition, any new industrial processes will be regulated in line with The Environmental Permitting (England and Wales) Regulations 2016 (as amended).

Darlington Borough Council will continue to co-operate with the four other Tees Valley Councils in implementing measures to further improve air quality. The councils will also continue trying to identify in more detail the sources of fine particles to see if any additional local action can cost effectively reduce emissions / concentrations.

Local Engagement and How to get Involved

The public can engage with Darlington Borough Council via their website which contains further local information on the following:

- Air quality monitoring;
- Industrial air pollution control;
- Smoke control areas; and
- Garden bonfires.

The [Let's Go Tees Valley website](#) also promotes and provides information on travelling sustainably in the Borough of Darlington, and the wider Tees Valley. It includes information on:

- More sustainable travel options:
 - Local walking routes;
 - Train timetables and maps;
 - Bus timetables and maps;
 - Cycle routes;
 - Smarter driving; and
 - Electric vehicles.
- Getting to school:
 - Walking, cycling and scooting; and
 - Travelling during off-peak hours.
- Inspiring local sustainable travel stories.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Section of Darlington Borough Council with the support and agreement of the following Sections:

- Licensing
- Planning Policy
- Sustainable Transport
- Fleet Management
- Car Parking

This ASR has been approved by Councillor Marshall, Economy Portfolio Holder

This ASR has been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Carol Whelan, Environmental Health Manager (Environmental Protection) at:

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1 Local Air Quality Management

This report provides an overview of air quality in Darlington Borough Council 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 Darlington Borough Council to improve air quality and any progress that has been made.

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

Darlington Borough Council currently does not have any declared AQMAs.

Progress and Impact of Measures to address Air Quality in Darlington Borough Council

Defra's appraisal of last year's ASR concluded the following:

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

- 1. It is commendable that the Council are undertaking measures to improve air quality despite having no exceedances or AQMAs, especially the collaborative approach undertaken in doing so. However, for ease of interpretation and to provide supplementary detail, it would be helpful if in future reports these were included within the standard Table 2.2 from the report template, if possible.*
- 2. The Council continues to provide historic continuous monitoring data, which whilst useful is not essential and could reduce time spent preparing the report in future.*
- 3. The Council may wish to consider additional monitoring around the two new sources identified; either Council run or implemented by the Applicants, to ensure no new exceedances or significant adverse impacts are introduced.*
- 4. Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment and annualisation were outlined in detail and utilised the Data Processing Tool which aids the analysis of the data.*
- 5. Comments from last year's ASR have been mentioned and addressed. This is welcomed, and we encourage this to continue in future ASRs.*
- 6. The Public Health Outcomes Framework and indicator 3.01 were referenced which is encouraged. There is detailed discussion of PM_{2.5} exposure in the borough.*
- 7. The inclusion of trend graphs is welcomed. The maps provided also clearly demonstrate the monitoring network.*
- 8. Overall, the report is detailed, concise and satisfies the criteria of the relevant reporting standards and guidance. It also aligns well with national policy. The Council should continue their good work.*

The comments made within the appraisal report, as shown above, have been taken into account for the completion of the 2022 ASR.

With regard to point 3 of the appraisal report, the Crematorium carries out emission monitoring of pollutants in accordance with the requirements of their Part B Permit. The outline planning permission for the erection of up to 58,529 m² of office/industrial development; ancillary development including restaurants/cafe, public house, hotel and petrol filling station has not yet been implemented.

Whilst Darlington Borough Council currently has no requirement to declare an AQMA, the Council is committed to further improving air quality in general and has taken forward a number of measures during the current reporting year of 2021. Details of all measures completed, in progress or planned are set out in Table 2.1.

Seventeen measures are included within Table 2.1, with the type of measure and the progress Darlington Borough Council 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 2.1.

Darlington Borough Council undertakes local action in co-operation with neighbouring councils through the TVCA, as well as through the Tees Valley Environmental Protection Group (TVEPG), which includes the Environment Agency. The Council also encourages standalone measures that may have a beneficial impact on air quality.

Key measures completed during the reporting year are:

- A refuelling station serving hydrogen-powered vehicles based in the Tees Valley at Teesside International Airport. Tees Valley Hydrogen Transport Hub, the airport, along with other key organisations, is testing out commercial and support vehicles fitted with 100% zero-emission hydrogen-fuelled commercial and support. The Tees Valley is aiming to be home to the UK's first Hydrogen Transport Hub;
- Electric Vehicle Charging Points installed at Feethams Multi Storey Car Park on Beaumont Street and at East Street Car Park;
- Shared use path along the spine road at the new Amazon development on Morton Park Way and the funding of additional bus services;
- Idling campaign - leaflets distributed to hackney taxi drivers on idling of engines.
- Policy IN 4 of the Darlington Local Plan 2016-2036 (adopted February 2022) requires every new residential property which has a garage or dedicated marked out residential car parking space within its curtilage should include an electric socket suitable for charging

electric vehicles. Non-residential developments creating over 50 parking spaces are also required to provide at least one double electric vehicle charging point (2 spaces). For each additional 50 parking spaces at least one double charging point will be required;

- A Licensing Policy which offers a 25% reduction in licensing fees for vehicles that are fuelled by liquid petroleum gas (LPG), electric, petrol-electric and compressed natural gas (NGV). At the time of writing 95% of the taxi fleet in Darlington were Euro 5 emission standard compliant or better (217 out of 229 in total). Euro 5 saw the introduction of particulate filters (DPFs) for diesel vehicles and tightening of NOx limits as well as, for the first time, a particulates limit for petrol engines (direct injection engines only). Darlington Borough Council's new taxi licensing policy which was implemented from 1 January 2021 introduced a requirement for all vehicles to be Euro 6 compliant by 1 April 2023, with a maximum vehicle age policy being introduced of 8 years. Euro 6 introduced a further, significant reduction in NOx emissions from diesel engines and established similar standards for petrol and diesel vehicles. Currently 164 of 229 vehicles (72%) already meet the Euro 6 requirement. The taxi licensing policy (and commitment to tougher emission standards) also mentions consideration of longer-term plans aimed at promoting 'cleaner' vehicles, expanding the electric charging infrastructure to encourage uptake of electric vehicles amongst the taxi trade, as well as educational interventions (particularly around vehicle idling at taxi ranks).

Darlington Borough Council worked to implement these measures in partnership with the following stakeholders during 2021:

- TVCA;
- TVEPG;
- Tees Valley bus service operators;
- Local developers.

Darlington Borough Council anticipates that the measures stated above and in Table 2.1 will help maintain compliance with the AQS Objectives across the borough.

The schemes do not all address air quality directly, but all will have a bearing on improving air quality. Darlington Borough Council's Public Health team support the work done in relation to air quality and will continue to work alongside Environmental Health and other colleagues across the Council.

Monitoring of pollutants will also continue to ensure that any increase in concentration trends can be identified, as well as to ensure compliance with AQS objectives.

Table 2.1 – 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	A refuelling station serving hydrogen-powered vehicles based in the Tees Valley at Teesside International Airport. Tees Valley Hydrogen Transport Hub, the airport, along with other key organisations, is testing out commercial and support vehicles fitted with 100% zero-emission hydrogen-fuelled commercial and support vehicles	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2022	Tees Valley Combined Authority and Tees Valley Local Authorities		NO		£1 million - £10 million	Implementation	To provide the infrastructure for use of hydrogen vehicles		Hydrogen refuelling station is operational	The Tees Valley is aiming to be home to the UK's first Hydrogen Transport Hub.
2	Tees Valley Bus Improvement Plan. Zero Emission Bus Regional Areas (ZEBRA) Scheme - hydrogen bus trial.	Policy Guidance and Development Control	Low Emissions Strategy	2022	2027	Tees Valley Combined Authority, Local Authorities and operators of bus Services.		NO		>£10 million	Implementation	To encourage the use of low emission vehicles		A total of £25m has been set aside for the conversion of buses in the region from the TVCA's £310m "sustainable transport settlement". The TVCA missed out on additional £60 million in the first round of Zebra funding but another round of funding bidding is anticipated later in 2022.	Tees Valley aim to be one of the first regions in the UK to have an entirely zero emission local bus fleet.
3	Bus partnership working	Promoting Low Emission Transport	Other			Tees Valley Combined Authority, Local Authorities and operators of bus Services.		NO			Implementation	To encourage use of sustainable transport & low emission vehicles		Arriva who operate the vast majority of bus services in Darlington: Of a total of 68 buses allocated to the Darlington Arriva depot, 13 are Euro 6 compliant with stop start technology, 54 are Euro 5 compliant. All buses are fitted with engine cut off features after 4/5 minutes and there is 1 Euro 3 engine vehicle covering repairs. Also, in 21/22 84% of buses operated on time.	Ongoing work
4	Urban Traffic Management Control - Traffic signalling and use of smart technology including air quality monitors.	Traffic Management	UTC, Congestion management, traffic reduction	2019		Tees Valley Combined Authority and Local Authorities	City Regional Sustainable Transport Settlements fund	NO		£1 million - £10 million	Planning	Smart technology to prevent and control traffic congestion		TVCA are currently exploring options for upgrades to the UTMC system to all for improvements to bus priority, which will be applied to signalised junctions/crossings on priority bus corridors.	

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	Electric Vehicle Charging Points to be installed in six town centre car parks. The new charging points will be in Abbott's Yard, Winston Street North, Commercial Street West, Park Place East, Park Place West and Kendrew Street West.	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2022	2022	Tees Valley Combined Authority and Local Authorities	Tees Valley Combined Authority following receiving £720,000 from Government's Office for Zero Emission Vehicles	NO		£500k - £1 million	Implementation	Promote the use of and providing infrastructure for electric vehicles		Funding to deliver chargers in 32 public car parks across the Tees Valley. Electric charging points already installed at Feethams Multi Storey Car Park on Beaumont Street and at East Street Car Park. A legal agreement is being progressed between TVCA and DBC for the installation of EV charging points in Darlington car parks. This will be delivered in the 2022..	
6	DBC Fleet Management and Electric Vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes			Darlington Borough Council		NO			Implementation	Reduce vehicle emissions		The Council has an electric fleet of vehicles currently consisting of (8 Building Services, 3 Highways, 2 Building Cleaning, 2 Street Scene, 1 Cemeteries, 1 Pest Control, 1 South Park Gardener)	
7	Tees Valley Local Cycling and Walking Infrastructure Programme	Transport Planning and Infrastructure	Cycle network	2020		Tees Valley Combined Authority and Local Authorities		NO		£1 million - £10 million	Implementation	Promotion of alternative forms of transport and reduce vehicle use		LCWIP identified 6 routes within Darlington. First route Faverdale/West Park to Town Centre underway see item 11 below. Currently reviewing feasibility of Town Centre to DTVA (via Yarm Road) route.	
8	Improvements to the Stockton and Darlington Railway track bed to ensure this key pedestrian and cycle route is accessible all year round linking the village of Middleton St George to key employment sites to the east of Darlington.	Transport Planning and Infrastructure	Cycle network	2019		Darlington Borough Council - Sustainable Transport & Highways		NO			Implementation	To encourage cycling and walking within the Borough		S&DR line from Teesside Airport to Newton Aycliffe. A DBC Project Manager has been appointed to deliver this scheme as part of a programme of schemes over the next 3 years - in the lead up to 2026. Middleton Lane to DTVA roundabout to be delivered this financial year. Feasibility work on other sections carried out by consultants is ongoing.	
9	New cycling route along Lingfield Way which will connect a further extension of the cycle network along Allington Way.	Transport Planning and Infrastructure	Cycle network	2019		Darlington Borough Council - Sustainable Transport & Highways		NO			Completed	To encourage cycling within the Borough		Completed in 2020.	
10	Shared use path along the spine road at the new Amazon development on Morton Park Way and the funding of additional bus services.	Transport Planning and Infrastructure	Cycle network	2018	2021	Developer	S106 Obligation	NO		£1 million - £10 million	Completed	To encourage cycling and walking within the Borough		S106 bus subsidy funding has been utilised to provide a subsidised bus service (Arriva service 2A) connecting Amazon to	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														the town centre. A segregated path was constructed in 2020.	
11	New cycling and walking route on Woodland Road, Outram Street and Duke Street	Transport Planning and Infrastructure	Cycle network	2020	2022	Darlington Borough Council - Sustainable Transport & Highways	Tees Valley Mayor and Tees valley Combined Authority / Department of Transport	NO		£1 million - £10 million	Implementation	To encourage cycling and walking within the Borough		The first phase from Darlington Memorial Hospital to Town Centre to be completed September 2022. Phase 2 from the Holyhurst junction on Woodland Road to the roundabout on Staindrop Road is due to be completed end 2023 - depending on funding.	
12	Council's Local Plan 2016 -2036. Policy IN4 Darlington Local Plan 2016-2036 adopted February 2022 requires every new residential property which has a garage or dedicated marked out residential car parking space within its curtilage should include an electric socket suitable for charging electric vehicles. Non-residential development creating over 50 parking spaces are required to provide at least one double electric vehicle charging point (2 spaces). For each additional 50 parking spaces at least one double charging point will be required.	Policy Guidance and Development Control	Other Policy	2016		Local Authority	N/A	NO			Completed	To provide the infrastructure for use of electric vehicles			
13	Licensing vehicles age restriction policy introduced a requirement for all vehicles to be Euro 6 compliant by 1 April 2023 with a maximum vehicle age policy being introduced of 8 years.	Policy Guidance and Development Control	Other policy	2021	2023	Darlington Borough Council - Licensing Section	N/A	NO			Completed	To control the age of licenced taxi's and ensure the use of vehicles that produce lower emissions		Currently 95% of the taxi fleet in Darlington are Euro 5 emission standard compliant or better (217 out of 229 in total) and 164 of 229 vehicles (72%) already meet the Euro 6 requirement.	
14	Licensing policy offers 25% reduction in licensing fees for vehicles that are fuelled by liquid petroleum gas, electric, hybrid and compressed natural gas	Policy Guidance and Development Control	Other policy	2021		Darlington Borough Council - Licensing Section	N/A	NO			Completed	To encourage the use of low emission vehicles			
15	Transport related article/poster on air quality One Darlington Magazine and use of social media to raise awareness of idling of engines	Public Information	Via other mechanisms	2019		Darlington Borough Council - Environmental Health	N/A	NO			Completed	To reduce road traffic emissions and idling			
16	Wood burning stoves article on air quality in One Darlington Magazine	Public Information	Via other mechanisms	2018		Darlington Borough Council - Environmental Health	N/A	NO			Completed	To raise awareness of particulates from wood burning stoves			

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
17	Idling campaign hackney taxi drivers	Public Information	Anti-idling enforcement	2022		Local Authority - Environmental Health & Licensing Section	N/A	NO			Implementation	To reduce idling			Leaflet distributed to hackney taxi drivers on idling of engines

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.

Overview

PM_{2.5} are very fine particulates which are now considered to be a more significant health risk than the larger particulates PM₁₀, as they penetrate further into the respiratory system and are less easily dislodged. Recognising this, the UK [Public Health Outcomes Framework](#) includes an indicator relating to fine particulate matter (PM_{2.5}). In May 2022 the definition and method of calculating the indicator D01 ‘Fraction of mortality attributed to particulate air pollution’ was revised. The latest factors nationally and for the Tees Valley (2017, 2018, 2019 and 2020 (new method used)) are as follows:

Fraction (%)	England	North East	Darlington	Hartlepool	Middlesbrough	Redcar & Cleveland	Stockton-on-Tees
2017	5.1	3.7	3.7	3.8	4.2	4.0	4.0
2018	5.2	3.8	3.9	4.0	4.4	4.0	4.1
2019	5.1	3.6	3.7	3.9	4.4	4.1	4.0
2020	5.6	4.0	4.1	4.1	4.4	4.0	4.2

Particulate PM_{2.5} is not yet incorporated into LAQM regulation within England and as such there is no statutory requirement on local authorities to review and assess PM_{2.5} for LAQM purposes. The Environment Act 2021 introduces a duty under the environmental frameworks targets on the government to bring forward at least two air quality targets by October 2022 that will be set in secondary legislation. The first target will aim to reduce the annual average level of fine particulate matter (PM_{2.5}) in ambient air. The second will be a long-term target (set a minimum of 15 years in the future). The Government recently launched a consultation on proposed national air quality targets, alongside other environmental targets. Whilst PM_{2.5} monitoring across the UK is desirable given the links to the Public Health Outcomes Framework, it is recognised that monitoring costs can be prohibitive on local authorities.

The latest Technical Guidance (TG16, updated April 2021) suggests local authorities use results from the national network of PM_{2.5} monitors to assess levels, and also provides a nationally derived factor of 0.7 that can be used to estimate PM_{2.5} levels from any particulate PM₁₀ monitors that local authorities may have installed.

There is not currently any monitoring of PM_{2.5} or PM₁₀ completed within the borough, therefore no concentration values can be reported or estimated using the method as described in Box 7.7 of LAQM.TG(16), which provides a method for estimating PM_{2.5} concentrations from PM₁₀ measurements. However, within the Tees Valley, there are three PM_{2.5} monitors as part of the national network, Middlesbrough Breckon Hill (urban background); Stockton Eaglescliffe (urban background); and Stockton A1035 Nelson Terrace (roadside), all giving direct PM_{2.5} annual means. These sites are located approximately 22km, 12 km and 15.5 km from Darlington, respectively. The Breckon Hill and Eaglescliffe stations have PM₁₀ monitors alongside them so that a locally derived factor of PM_{2.5} to PM₁₀ can be calculated and compared with the national factor and used at local PM₁₀ monitors with a similar location.

Annual means for PM_{2.5} within the Tees Valley (Middlesbrough Breckon Hill and Stockton Eaglescliffe, Stockton A1305 Nelson Terrace) for the last five years have ranged between 7.5 and 10.3 µg/m³, with variations year on year likely to be due to weather variations. The UK target objective for PM_{2.5} was first introduced in 2008 as an annual mean of 25µg/m³ (gravimetric) which has been consistently met across the Tees Valley.

Technical Guidance recognises that due to its extremely small size, PM_{2.5} can travel for long distances in the air and it is estimated that as much as 40% to 50% of the levels found in any given area can be from sources outside a local authority's direct boundary. Around a quarter of concentrations are thought to be secondary sourced, i.e. reactions between other pollutants in the atmosphere. In addition, coastal and rural areas can have higher proportions of natural sources such as salt, fine sand and pollens, the extent of which will be weather dependent. This means that locally emitted PM_{2.5} will tend to be significantly less than 50% of the total burden, with road traffic, industry and domestic solid fuel burning (wood and coal) being the principal sources.

Darlington PM_{2.5}

Darlington Borough Council is one of five unitary Councils forming the general area known as the Tees Valley. As shown below, it is the most westerly of these Councils and third largest in area, at 198.4 km².



Darlington Borough has a densely populated central area but is otherwise largely rural. It is a major shopping and commercial centre and is the main railway centre for the Tees Valley. There is very little heavy industry compared with other Tees Valley Councils, and although some quarrying and other industrial processes lie just outside its boundary, they do not significantly impact on Darlington air quality.

The main A1 motorway (North – South), and the A66 trunk route (East – West) run through the Borough, but are mainly in rural areas, with no areas of relevant exposure. Within the urban area, there are some congested commuter routes, and in the absence of a northern by-pass, some heavy through traffic on the northern outskirts of the town.

The majority of the Darlington urban area is within a [smoke control area](#), subject to Smoke Control Orders, and natural gas is the main source of heating in all but a few rural villages. As highlighted in the 2019 ASR, Environmental Health did some work in 2018 to raise awareness and educate people more on the use of wood burning stoves and remind them of the Smoke Control Area requirements. Work has started and will continue in 2022 to carry out visits to check on compliance at premises with the Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020, relating to the sale/certification of domestic solid fuels and the phasing out of certain solid fuels (bituminous coal and wet wood) for use in domestic properties.

The Environment Act 2021 from the 1st May 2022 enables local authorities including Darlington Borough Council to issue financial penalties for a chimney releasing a substantial amount of smoke in a smoke control area.

The principal source of fine particulate pollution is likely to be from road transport, but even this is limited. Other than along the main commuter routes into the town centre, road traffic is generally light as the significant through routes are in their own transport corridors. This general view of sources is reflected in the national 1 km² sector model [background maps](#) for Darlington, produced by Defra and the Devolved Administrations, based on 2018 emission source estimates (Projections in the 2018 reference year background maps are based on assumptions which were current before the Covid-19 outbreak in the UK). Typical background levels (PM_{2.5}) are shown as 6.2 – 7.9µg/m³ per km². The average PM_{2.5} loading per km² in 2018 is shown as 6.9µg/m³, which is projected to reduce to 6.1µg/m³ in 2030.

Therefore, at this stage of understanding of local fine particulate emissions, it is difficult to see what positive action can be economically taken by Darlington Borough Council to reduce PM_{2.5} levels over the coming years, other than those actions already identified in Section 2.2 of this report. The Government recently consulted on the review of Local Air Quality Management Policy Guidance, seeking the views on actions that can be taken by local authorities to reduce PM_{2.5} concentrations, and the Council awaits further guidance.

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

This section sets out the monitoring undertaken within 2021 by Darlington Borough 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

Darlington Borough Council did not undertake any automatic (continuous) monitoring during 2021.

3.1.2 Non-Automatic Monitoring Sites

Darlington Borough Council undertook non-automatic (i.e. passive) monitoring of NO₂ at 15 locations during 2021. These included two duplicate sites (D7/D12) and (D6/D15). [Table A. 1](#) in Appendix A presents the details of the non-automatic sites.

It was brought to the Council's attention that the OS grid reference coordinates for sites D7/D12 and D11 were inaccurate in the 2021 ASR. These have therefore been updated in the relevant tables of this year's report.

A map showing the location of the monitoring sites is 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. 2 and Figure A. 1 in Appendix A compares 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.

All monitoring locations within Darlington continue to report annual mean NO₂ concentrations well below the AQS objective. Fall-off with distance correction was not required due to the low monitored concentrations. Following bias adjustment and annualisation where required, the maximum reported concentration in 2021 is 32.1µg/m³ at diffusion tube monitoring location D1, located along the A167 near Northgate roundabout in Darlington. This monitoring location also reported the maximum concentration (30.0µg/m³) in the 2020 report.

Figure A. 1 presents the 2021 annual mean NO₂ concentrations at Darlington Borough Council's monitoring sites. Concentrations at sites D3, D4, D10, and D16 all decreased slightly during 2021 in comparison to 2020. Concentrations at all other locations increased during 2021 in comparison to 2020. This is most likely due to a return to business as usual following the COVID-19 pandemic, whereby the UK Government issued advice to stay at home where possible, alongside strict lockdowns. This resulted in decreased levels of traffic observed across the UK, and therefore significantly reduced NO_x and NO₂ emissions during 2020.

It is possible to infer the risk of exceedances of the 1-hour mean NO₂ AQS objective at diffusion tube monitoring sites. LAQM.TG(16) provides an empirical relationship that states exceedances of the 1-hour objective are unlikely when the annual mean concentration is below 60µg/m³. Given that the highest recorded annual mean concentration at any of the diffusion tube monitoring sites is 32.1 µg/m³, it is possible to conclude that there have been no exceedances of the hourly mean NO₂ objective in the last five years at all monitoring locations.

Appendix A: Monitoring Results

Table A. 1 – 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)
D1	Northgate	Kerbside	429026	514898	NO ₂	No	N/A	1.0	No	2.5
D2	Houghton Road	Roadside	429351	514819	NO ₂	No	1.7	2.3	No	2.5
D3	Platform 1 (Middleton St George)	Roadside	434205	514165	NO ₂	No	4.6	1.5	No	2.5
D4	Salters Lane	Roadside	429478	517375	NO ₂	No	4.5	1.4	No	2.5
D5	Woodland Rd	Roadside	428152	514966	NO ₂	No	20.0	1.6	No	2.6
D8	Houghton Green	Kerbside	430905	515918	NO ₂	No	19.0	0.6	No	2.6
D9	Yarm Road / McMullen Rd	Roadside	431299	514137	NO ₂	No	9.0	2.0	No	2.4
D10	St Cuthbert's	Kerbside	429170	514534	NO ₂	No	N/A	0.8	No	2.4
D11	Whinfield Road	Roadside	431107	516524	NO ₂	No	7.6	1.9	No	2.4
D7, D12	North Road	Roadside	429016	515546	NO ₂	No	4.0	1.5	No	2.3

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)
D13	106 High Northgate	Kerbside	429028	515523	NO ₂	No	2.7	0.4	No	2.4
D14	Eldon Street Corner	Kerbside	429183	516223	NO ₂	No	8.5	0.6	No	2.8
D6, D15	Blackwell Bridge	Roadside	427734	512591	NO ₂	No	10.0	2.0	No	2.6
D16	Hill House Lane	Kerbside	434227	516944	NO ₂	No	4.8	0.7	No	2.4
D17	West Auckland Road	Roadside	427201	516597	NO ₂	No	11.0	1.8	No	2.4

Notes:

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

(2) N/A if not applicable.

Table A. 2 – 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
D1	429026	514898	Kerbside	92.3	92.3	27.9	38.7	35.8	30.0	32.1
D2	429351	514819	Roadside	92.3	92.3	29.9	30.9	27.8	21.5	22.5
D3	434205	514165	Roadside	92.3	92.3	12.1	15.3	14.2	11.1	10.1
D4	429478	517375	Roadside	92.3	92.3	29.4	34.0	31.4	26.0	23.5
D5	428152	514966	Roadside	75.0	75.0	25.1	23.9	24.9	16.9	19.7
D8	430905	515918	Kerbside	84.6	84.6	33.2	33.8	31.1	26.3	26.4
D9	431299	514137	Roadside	75.0	75.0	27.7	28.6	25.0	19.9	21.6
D10	429170	514534	Kerbside	84.6	84.6	31.0	34.1	31.6	27.4	26.1
D11	431107	516524	Roadside	55.8	55.8		24.0	18.8	18.9	20.4
D7, D12	429016	515546	Roadside	82.7	82.7	41.9	40.8	34.8	28.3	28.8
D13	429028	515523	Kerbside	92.3	92.3		32.5	28.8	23.2	25.5
D14	429183	516223	Kerbside	84.6	84.6		29.4	24.8	19.0	21.1
D6, D15	427734	512591	Roadside	92.3	92.3	34.8	35.5	31.5	26.0	26.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
D16	434227	516944	Kerbside	92.3	92.3				17.3	15.2
D17	427201	516597	Roadside	75.0	75.0				15.6	15.8

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 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

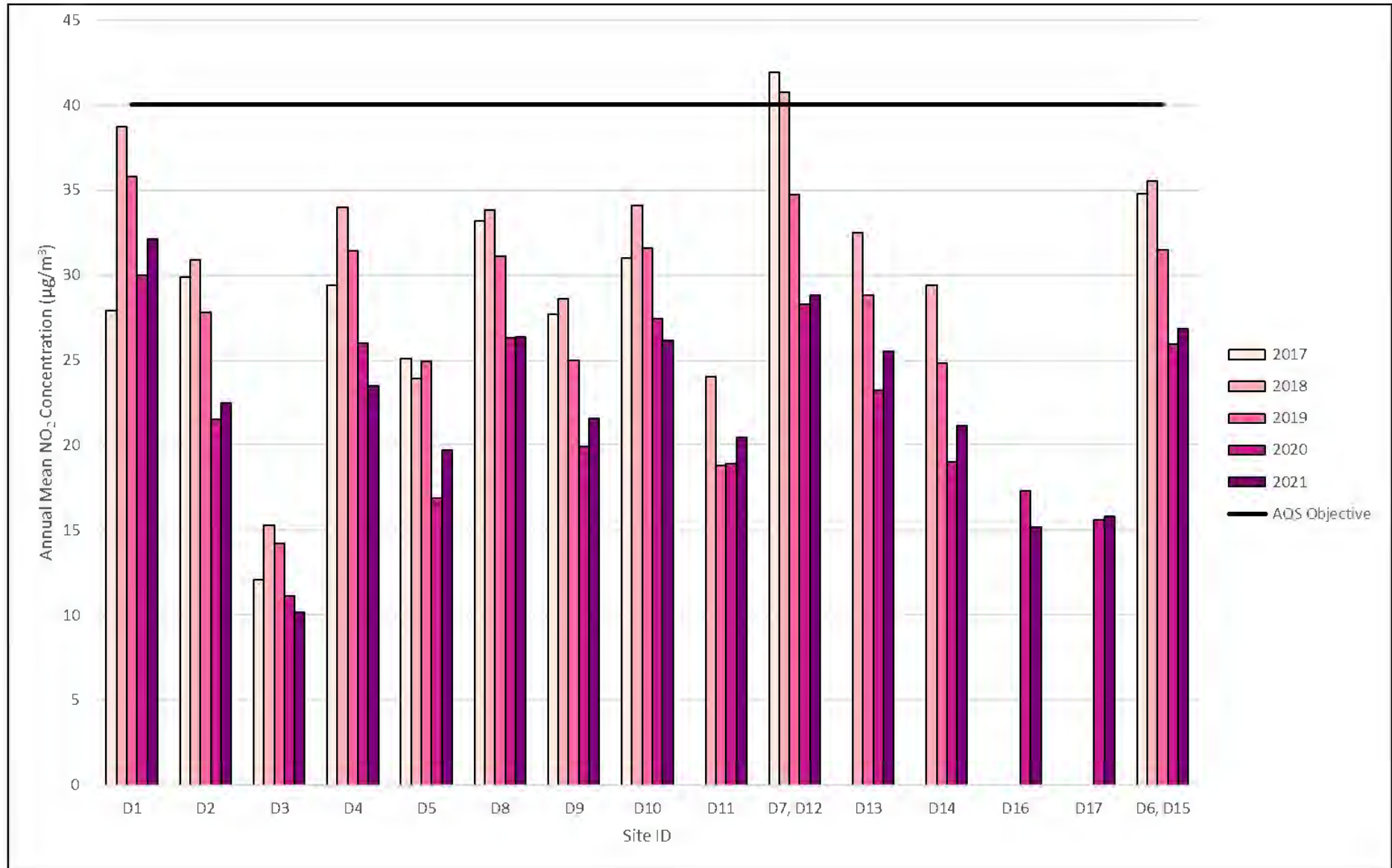
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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 A. 1 – Trends in Annual Mean NO₂ Concentrations



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 (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
D1	429026	514898		40.2	34.7	35.8	44.5	32.8	40.7	33.1	44.5	40.5	37.8	41.4	38.7	32.1	-	
D2	429351	514819		28.2	22.5	24.6	29.6	21.2	24.3	23.4	33.6	26.0	30.4	34.0	27.1	22.5	-	
D3	434205	514165		14.9	9.4	12.2	11.5	8.6	11.1	10.5	11.6	13.7	15.8	15.1	12.2	10.1	-	
D4	429478	517375		28.6	35.5	23.6	26.6	20.1	22.1	25.0	30.6	30.2	35.5	33.2	28.3	23.5	-	
D5	428152	514966		27.3	23.8	19.2	20.3	14.2			21.4	22.3	33.7	31.8	23.8	19.7	-	
D6	427734	512591		43.1	19.3	27.8	35.6	28.1	32.3	28.5	36.9	30.4	48.6	32.7	-	-	-	Duplicate Site with D6 and D15 - Annual data provided for D15 only
D7	429016	515546		28.1	34.4	23.2	30.4	25.3			41.7		46.3	41.2	-	-	-	Duplicate Site with D7 and D12 - Annual data provided for D12 only
D8	430905	515918		33.8		27.8	34.4	23.6	28.7	26.5	36.6	30.7	40.4	35.1	31.7	26.4	-	
D9	431299	514137		35.5	24.9	25.5	27.3	18.6	23.2	20.5	29.3			29.0	26.0	21.6	-	
D10	429170	514534		33.7	27.2	30.0	36.1	26.7	34.1	30.9	39.2	26.7		30.3	31.5	26.1	-	
D11	431107	516524		29.3	21.8	22.1	25.0	17.7			24.6		27.5		24.0	20.4	-	
D12	429016	515546		32.5	32.2	30.5	37.8	25.1		34.7	37.8	39.3	42.2	38.0	34.7	28.8	-	Duplicate Site with D7 and D12 - Annual data provided for D12 only
D13	429028	515523		31.6	27.1	34.7	32.8	23.5	33.4	31.4	37.1	27.7	27.5	31.4	30.8	25.5	-	
D14	429183	516223		31.5		24.1	23.6	18.0	20.2	21.4	28.1	30.4	28.6	28.6	25.4	21.1	-	
D15	427734	512591		31.3	25.4	24.7	34.7	29.0	34.5	28.9	39.1	33.5	36.6	30.7	32.3	26.8	-	Duplicate Site with D6 and D15 - Annual data provided for D15 only
D16	434227	516944		21.8	16.6	16.1	20.2	15.6	15.8	15.5	17.7	18.4	19.4	24.1	18.3	15.2	-	
D17	427201	516597		24.5	14.2	15.7	18.2	12.0			19.0	20.3	22.2	25.2	19.0	15.8	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG1.

- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Darlington Borough Council 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 Darlington Borough Council During 2021

Darlington Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

New cremators with mercury abatement have been installed at the Crematorium in the Darlington, which will improve emissions and air quality. The process is covered by a Part B environmental permit relating to the control of emissions to air which is regulated by the Council. The permit has been varied to take account of the new cremators and the more stringent emission limits. Emission monitoring will be carried out in accordance with the requirements of the Part B environmental permit.

The boiler at Nobia UK has also been replaced with two new boilers, again resulting in improvement to emissions, which are covered by an environmental permit regulated by the Environment Agency.

In addition, to ensure that any new development would not adversely impact upon air pollution within the borough, an air quality assessment was received for the following planning applications that were granted permission in 2021:

- 21/00987/DC - Ingenium Park, Salters Lane, Darlington. Hybrid application for outline permission with all matters reserved for the erection of 100,000m² of employment land.
- 21/00688/DC - Darlington Station Gateway East, Darlington. Demolition of existing buildings and erection of station building with concourse, multi-storey car park, transport interchange, public realm and highways works.
- 18/00694/FUL - Former Vantage Point site Faverdale Industrial Estate, Darlington. Erection of a 1,900m² supermarket, 1,900m² retail store and a 167m² drive-thru unit with associated parking for 263 cars, ancillary service and delivery areas, landscaping and new access.

Additional Air Quality Works Undertaken by Darlington Borough Council During 2021

Whilst Darlington Borough Council does not currently have any declared AQMAs, work will continue in conjunction with neighbouring councils, through the TVCA, to implement local actions (as set out in Table 2.1) to reduce the impact of vehicle emissions within the borough.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2021 were supplied and analysed by Gradko International Ltd, the tubes were prepared using the 50% TEA in water preparation method.

Gradko is a UKAS accredited laboratory and participates in the AIR-PT Scheme for NO₂ tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high calibre. The latest available AIR-PT result is AIR-PT AR042 (January – March 2021), in which Gradko scored 25%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$. Data from April 2021 onwards has not yet been made available.

The precision of the current 14 local authority co-location studies in 2021 detailed within the national bias adjustment factor spreadsheet (version 03/22) was rated as 'good' (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%). Further information on the precision summary results can be found on the [LAQM website](#).

Diffusion tube monitoring during 2021 was largely undertaken in line with the Diffusion Tube Monitoring Calendar and recommended exposure period (4 or 5 whole weeks (+/- 2 days)), with the exception of January during which tubes were not collected or analysed due to adverse weather conditions.

Diffusion Tube Annualisation

As per LAQM.TG(16), annualisation is required for any site which has a data capture of less than 75%, but greater than 25%. Annualisation was therefore required to be completed for one site, D11, due to there being a 55.8% data capture for 2021. This was completed by using version 2 (March 2022) of the [Diffusion Tube Data Processing Tool](#).

The data has been annualised using the results at three Tees Valley continuous monitoring sites, all of which are classified by their corresponding local councils as background sites:

- Stockton Eaglescliffe (urban background);
- Redcar and Cleveland Dormanstown (suburban); and
- Middlesbrough Breckon Hill (urban background).

All of these sites have a data capture of >85% and therefore could be used for annualisation. Table C. 1 presents the annualisation summary and is taken directly from the Diffusion Tube Data Processing Tool.

Table C. 1 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Stockton-on-Tees Eaglescliffe	Annualisation Factor Middlesbrough Breckon Hill	Annualisation Factor Redcar and Cleveland Dormanstown	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
D11	1.0088	1.0460	1.0234	1.0260	24.0	24.6

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 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/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Diffusion tubes for Darlington Borough Council are supplied and analysed by Gradko International Ltd. The tubes were prepared using the 50% TEA in water preparation method. The national bias adjustment factor for Gradko 50% TEA in water is 0.83 for the year 2021 (based on 14 studies) as derived from the [National Bias Adjustment Factor Spreadsheet](#) (version 03/22).

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 03/22					
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 June 2022					
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.						LQ303 Helpdesk @ Webpage					
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 shown in blue at the foot of the final column.								
If a laboratory is not chosen, 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.	If you have your own co-location study then see footnote. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953								
Analysed By	Method	Year	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	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	50% TEA in acetone	2021	UC	Falkirk Council	12	35	34	3.5%	G	0.97	
Gradko	50% TEA in acetone	2021	UB	Falkirk Council	12	16	13	22.5%	G	0.82	
Gradko	50% TEA in acetone	2021	SU	Redcar & Cleveland Borough Council	11	14	11	23.2%	G	0.77	
Gradko	50% TEA in acetone	2021	R	Royal Borough of Windsor and Maidenhead	12	23	26	9.3%	G	0.91	
Gradko	50% TEA in acetone	2021	R	Royal Borough of Windsor and Maidenhead	11	26	25	7.2%	G	0.93	
Gradko	50% TEA in acetone	2021	R	Sandwell MBC	12	37	28	31.4%	G	0.76	
Gradko	50% TEA in Acetone	2021	UB	Sandwell Metropolitan Borough Council	11	23	19	22.2%	G	0.82	
Gradko	50% TEA in acetone	2021	UB	Middlesbrough	12	18	14	32.6%	G	0.75	
Gradko	50% TEA in acetone	2021	R	London Borough of Richmond upon Thames	12	24	21	15.1%	G	0.87	
Gradko	50% TEA in acetone	2021	B	London Borough of Richmond upon Thames	9	16	13	21.5%	G	0.82	
Gradko	50% TEA in acetone	2021	KS	Marblebone Road Intercomparison	10	52	41	24.2%	G	0.81	
Gradko	50% TEA in acetone	2021	R	Reading Borough Council	12	30	26	15.3%	G	0.86	
Gradko	50% TEA in acetone	2021	R	Merton Council	9	50	32	55.4%	G	0.64	
Gradko	50% TEA in acetone	2021	UB	Wandsworth Council	11	29	26	9.8%	G	0.91	
Gradko	50% TEA in acetone	2021	Overall Factor^a (14 studies)							Use	0.83

As there is currently no local co-location study within Darlington Borough Council the national factor has been applied to the 2021 monitoring data.

A summary of bias adjustment factors used by Darlington Borough Council over the past five years is presented in Table C. 2.

Table C. 2 – Bias Adjustment Factor

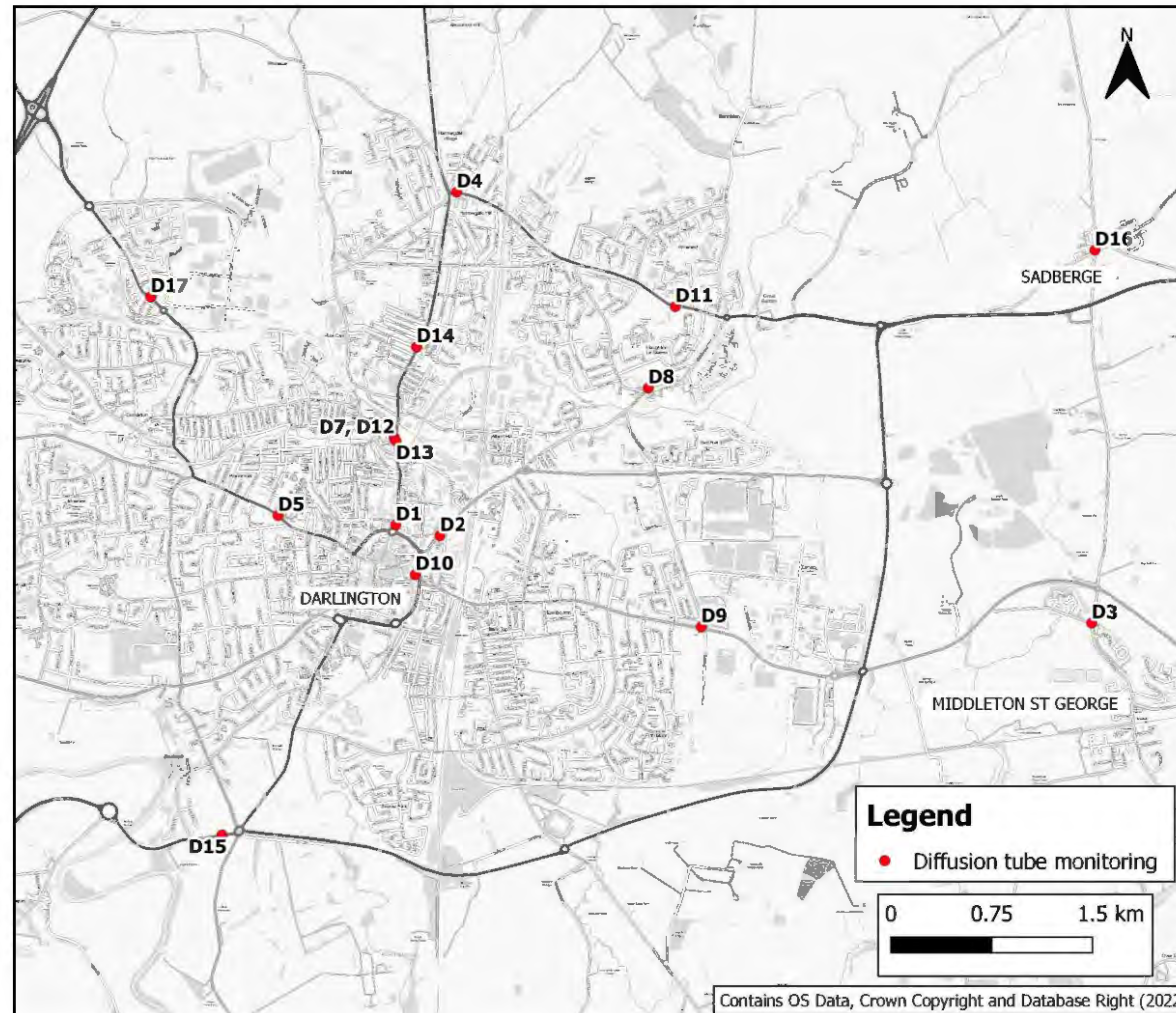
Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.83
2020	National	03/21	0.82
2019	National	03/20	0.87
2018	National	03/19	0.92
2017	National	03/18	0.97

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. No diffusion tube NO₂ monitoring locations within Darlington Borough Council required distance correction during 2021.

Appendix D: Map of Monitoring Locations

Figure D. 1 – Map of Non-Automatic Monitoring Site



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
TVCA	Tees Valley Combined Authority
TVEPG	Tees Valley Environmental Protection Group

References

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