South Tyneside Council

2018 Air Quality Annual Status Report (ASR)

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

June, 2018

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Executive Summary: Air Quality in Our Area

Air Quality in South Tyneside Council

South Tyneside Council adopts a collaborative, corporate-wide approach to air quality led by its Development Services Team. Within Development Services, the Environmental Health Unit is responsible for overseeing local air quality management, including air quality monitoring and reporting results to the Department of Environment, Food and Rural Affairs (Defra). Close working relationships with transport, public health and spatial planning colleagues are important to improve air quality as a consequence of transport and public health initiatives and also through routine planning applications that may impact upon air quality.

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[1,2].

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

There are several principal air pollutants produced by industrial, domestic and traffic sources they include: sulphur dioxide; nitrogen oxide/ nitrogen dioxide (NO_2); PM_{10} and $PM_{2.5}$; ozone and volatile organic compounds; toxic organic micro pollutants; 1-3 butadiene; benzene; carbon monoxide; lead and heavy metals.

Historically, the main air pollutants have been high levels of smoke and sulphur dioxide emitted by combustion of sulphur containing fossil fuels i.e. coal, however currently the main air pollutant threat occurs from traffic emissions.

Nitrogen Dioxide (NO_2) and Nitric Oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NOx). All combustion processes produce NOx emissions, largely in the form of nitric oxides, which is then converted to

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

nitrogen dioxide (NO_2). Nitric oxide (NO) is mainly derived from road transport emissions and other combustion processes such as the electricity supply industry.

The principal source of Nitrogen Dioxide is road transport; combustion processes such as power generation and industrial processes also provide a significant contribution. The main contribution within South Tyneside is from road traffic.

South Tyneside Council ceased monitoring Sulphur Dioxide due to continued compliance during previous rounds of review and assessment.

Together, Environmental Health, Transport and Public Health colleagues are striving to reduce pollutant levels throughout the Borough even further to improve air quality and the health and wellbeing of residents. Various initiatives are discussed within this report and further information can be found in the links provided.

We shall continue to undertake continuous and non-continuous monitoring; all monitoring results can be found within Appendix A.

Air quality is everyone's business and there are various ways that residents and businesses can improve local air quality.

South Tyneside ministerial direction to reduce NO_2 along the A194

In August 2017 Defra released the National Air Quality Plan for nitrogen dioxide concentrations. The plan is targeted to problem areas which national modelling suggests will continue to have air pollution problems in 2021, mostly in cities and towns.

In January 2018, the Council received correspondence from Defra that the A194 carriageway (from the Hedworth Lane junction through to the John Reid Road junction) has defined NO_2 exceedance in 2018, but this reduces to compliant levels by 2019. Following a high court ruling in February, Central Government issued a Ministerial Direction to 33 local authorities, including South Tyneside, to bring forward NO_2 compliance.

Following receipt of the Ministerial Direction on 23rd February 2018, the Council is to complete a targeted feasibility study on the A194 corridor by the end of July 2018 which will define a set of interventions to bring forward compliance.

In terms of Road Census ID 6746 covers the A194 from the junction with A194/A19 Lindisfarne through to the junction between the A194 / A1300 (John Reid Road), the PCM projections show the following NO_2 concentrations:

- 41 µg/m^3 in 2018;
- 39.8 µg/m^3 in 2019;
- 38 µg/m^3 in 2020;
- 35 µg/m^3 in 2021

Defra's PCM modelling is used to determine compliance with nitrogen dioxide limit values and is used in national reporting of air quality data to Europe. There can be disparities between local monitoring data which may not show an exceedance. The Local Authority must demonstrate compliance nationally as well as locally and are completing a feasibility study to identify options to further improve air quality and to verify whether major transport works already completed in this location have already brought nitrogen dioxide levels into compliance, the study will be completed by July 2018.

Actions to Improve Air Quality

Major Schemes

A19/A1300/A194 – Lindisfarne roundabout improvements

This scheme was completed in July 2017. The scheme was funded by the North East Local Enterprise Partnership (NELEP), North East Combined Authority (NECA) and South Tyneside Council.

In brief the scheme comprised of the following enhancements:

- An additional lane on the A194 Newcastle Road Westbound approach to Lindisfarne and an additional lane on the A194 Newcastle Road westbound approach to Lindisfarne roundabout from Edinburgh Road.
- Widening of the A19 northbound on-slip to two lanes and creating designated circulatory lanes to provide additional stacking storage.
- Re-alignment of the A194 Leam Lane westbound exit to provide two through lanes and to remove the blocking back impact of the A19 northbound traffic.
- An additional lane on the A194 Newcastle Road eastbound approach to the John Reid Road.
- An additional right turn lane on John Reid Road roundabout to provide additional stacking capacity for right turn movement into the John Reid Road.
- New cycling and pedestrian links which allow for improve sustainable transport connectivity between the A194 and A1300. Further to this, improved crossing facilities across the A194 carriageway.

- Significantly improved surface water drainage at Lindisfarne roundabout to prevent disruption during periods of heavy rainfall.

Lindisfarne Improvement Scheme

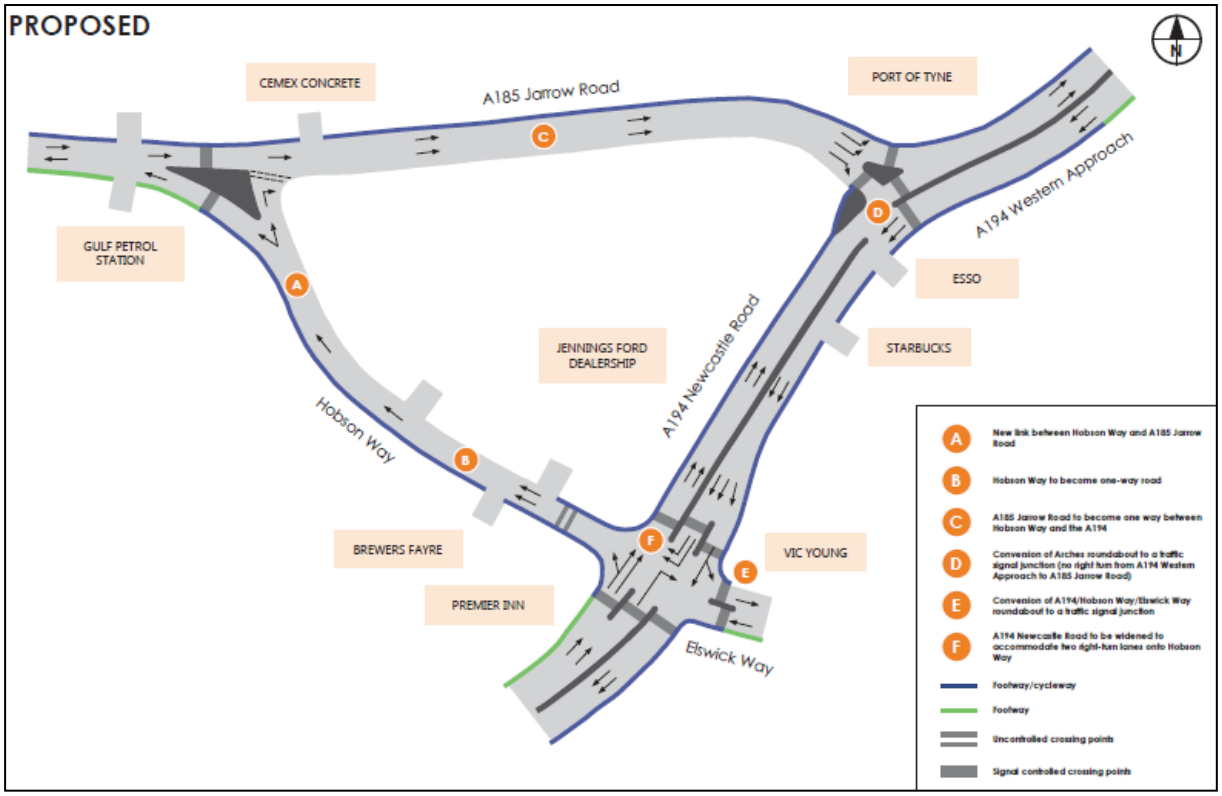
A194 / A185 (The Arches) Major Scheme Proposal

The A19/A184 trunk roads, as well as the A194 / A185 are considered principal transport links into the borough and alongside the Lindisfarne corridor described above, form a Strategic Western Gateway. They are significant links for those individuals accessing employment as well as the movement of goods between businesses. The capacity that these links require has been greatly increased by the new Tyne crossing. Congestion at the junction of the A185 / A194 carriageways has been identified.

The key highway capacity enhancements forming this scheme are as follows:

- Widening the A194 on the westbound approach to the A194 / Elswick Way / Hobson Way roundabout to 3 lanes to accommodate the ahead movement in one lane and the right turn onto the A185 in two lanes;
- Extending Hobson Way to connect with the A185 to the east of the existing filling station;

- Converting the A185 between the Hobson Way Link and the Arches to one way eastbound and using the former westbound lane to create a two-lane eastbound approach to the Arches;
- Adding signals to the A194 / Elswick Way / Hobson Way and Arches roundabouts with traffic and pedestrian phases; and
- Improvements to Non-Motorised User routes and improved crossing facilities;
- Air Quality Improvements.



Arches Improvement Scheme

The scheme commenced onsite in March 2018 with construction likely to take 18 months to complete.

South Shields Town Centre and Public Transport Interchange

The South Shields Transport Interchange scheme will see the consolidation of the Bus and Metro services in the centre of the town centre. Detailed planning permission for this scheme has been obtained and a Compulsory Purchase Order for the acquisition of land has been confirmed. Funding from the NELEP, NECA and Nexus has also been obtained.

The authority has appointed Muse Developments as its strategic development partner for this project and the implementation of the broader town centre regeneration programme (South Shields 365). The scheme started in March 2018. It is expected that the interchange building will be completed in summer

2019, the associated public realm is expected to be completed in Spring 2020.

South Shields Public Transport Interchange

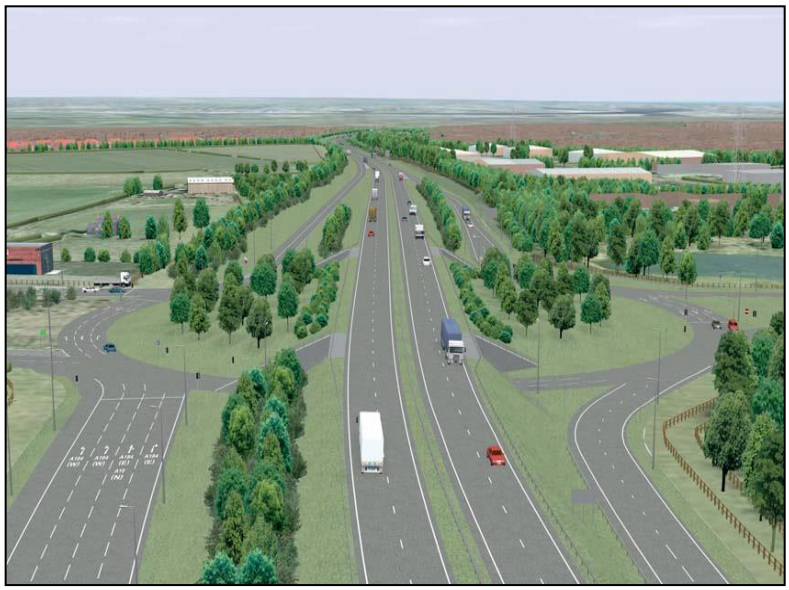
The improvements to local public transport should improve public uptake of the service and have a positive effect on air quality within the borough by reducing car journeys.

In addition to the introduction of the Public Transport Interchange facility, the Council is also spending in excess of £8million in highway junction improvements throughout

South Shields Town Centre including some improvements on the A194. All of the proposed measures will aim to reduce congestion, increase walking and cycling and improve air quality.

Highways England Improvements – Testos and Downhill Lane

The A19 corridor is a key regional economic artery and a fundamental transport link to the Borough. Highways England are proposing to spend £150million on highway infrastructure improvements at the A19 / A184 Testo's junction and at the A19 / A1290 Downhill Lane junction. The Testo's scheme will see the implementation of a fly-over arrangement for the A19 in place of the existing grade separated roundabout. For Downhill Lane junction, there will be the provision of an additional bridge and grade separated roundabout in place of the existing road bridge provision. Both schemes are seen to improve road safety, reduce congestion and improve air quality, with the schemes being constructed from 2019 and completed in 2021.

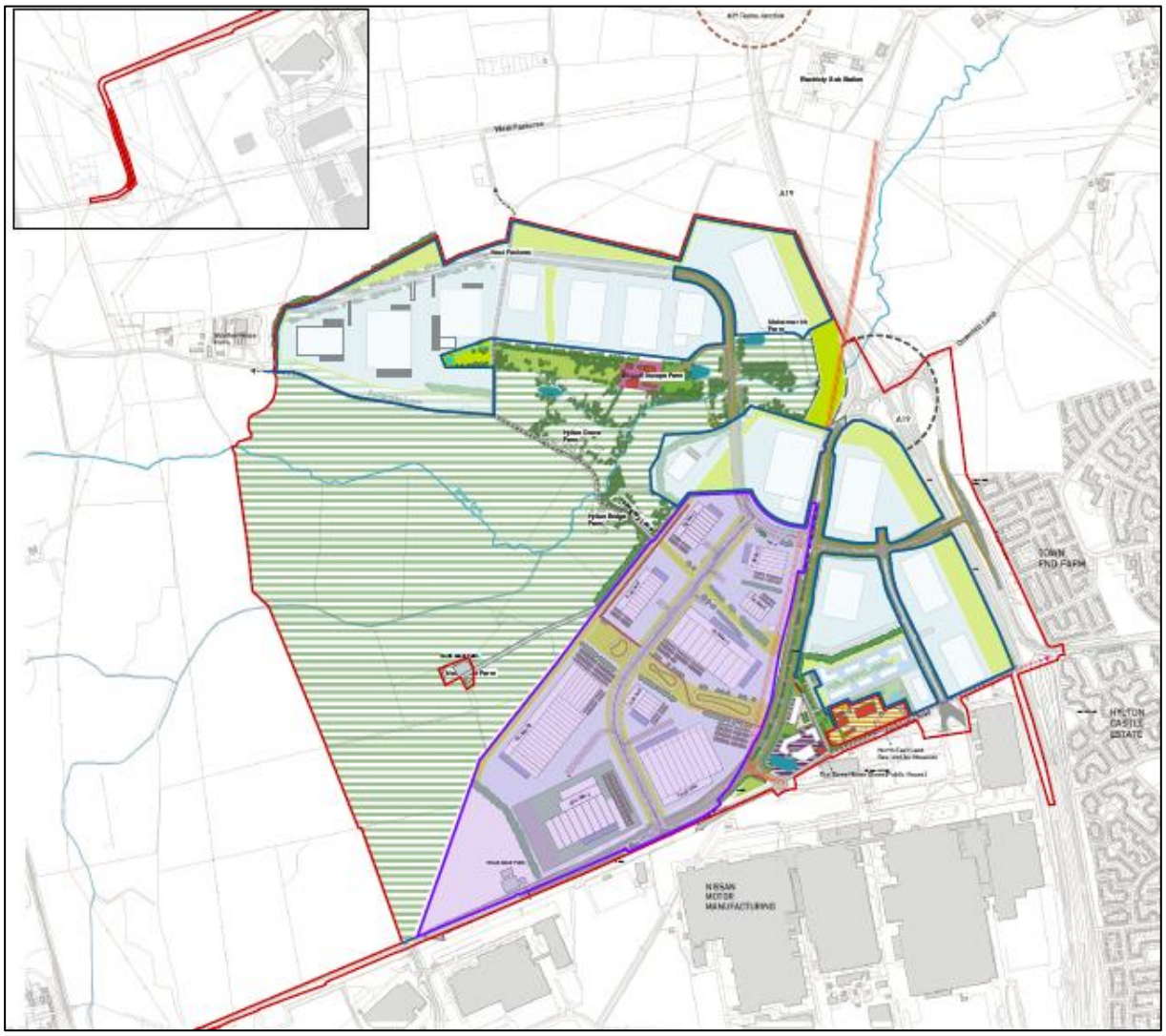


Testo's Major Improvement Scheme

Downhill Lane Major Improvement Scheme

International Advanced Manufacturing Park

Both South Tyneside and Sunderland Councils are investing in the development of an International Advanced Manufacturing Park on land to the North of the Nissan Manufacturing Plant, close to the A19 corridor. This £100m investment will bring over 150ha of development land with over 7,000 jobs by 2024 to the region. In order to facilitate the development, the Councils and NECA are to spend in excess of £45m on highway infrastructure to remove congestion and improve air quality; this will include the dualling of the A1290 road and provision of a new road bridge across the A19.



Map of proposed IAMP Development

A19 Northbound – Lane Gain / Lane Drop

South Tyneside Council has been successful in a National Productivity Investment Fund bid in March 2018 to improve the Northbound A19 congestion. This scheme will see the introduction of an additional carriageway constructed alongside the existing A19 Northbound carriageway. The additional lane will be completed between the Lindisfarne on-slip and the Hebburn / Jarrow off-slip, just prior to the Tyne Tunnel entrance. It is considered that this scheme will reduce congestion, improve air quality and enable the A19 to operate more strategically. The scheme is to be implemented from 2019.

A194 / Mill Lane Corridor

The Council was also successful in National Productivity Funding for a road improvement scheme on the A194 / Mill Lane roundabout, this scheme will see the implementation of traffic signals which will coordinate the traffic flows on the A194 and will reduce congestion and improve air quality. The scheme is to be implemented from 2019.

Clean Bus Technology Fund Bid

In 2018, the Council in working with the local bus operators (Stagecoach and Go North East) was successful in a funding bid to the Clean Bus Technology Fund. This will see 29 buses retrofitted across the fleet of the local bus operators from 2018 through to 2020. This will see the vast improvements in the engine specification of buses operating within South Tyneside, especially in close proximity to the Boldon Lane / Hudson Street Air Quality Management Area.

Active Travel and Physical Activity

We know transportation plays an important role in supporting daily activities; however we also know active travel (cycling, walking and use of public transport) can increase physical activity levels and improve physical and mental wellbeing. Prioritisation of active travel can also reduce over reliance on motorised transport, contributing to improved air quality and a reduction in road injuries. Re-allocation of road space to support walking and cycling; restricting motor vehicle access; introducing road-user charging and traffic calming schemes; and creating create safe routes to schools. Such changes have prompted substantial shifts from car transport to walking and cycling. This is further expanded within the physical activity strategy for the borough, where it is bold in its commitments:

- To develop a traffic free cycle/walkway connecting South Tyneside to the IAMP and over 5000 new jobs
- All of our children will achieve the early learning goal in physical activity
- More children will travel to school by foot, bike, scoot, bus and metro than anywhere else in the region.

- We will ensure that physical activity forms part of quality GP and health professional conversations

This will also contribute to the continued action required to reduce our high obesity rates right across the lifecourse. The latest data for South Tyneside (2016/2017) shows:

- Prevalence rate of obesity, reception children is 11.3% against the England rate of 9.6%
- Prevalence rate of obesity for Year 6 children is 23.3% against the England rate of 20.6%
- Prevalence rate of overweight and obese for adults (aged 18 +) is 71.6% against the England rate of 61.3%.

Conclusions and Priorities

South Tyneside Council is currently meeting local air quality objectives for NO_2 and PM_{10}. No significant exceedances of the national objective levels have been recorded across the borough and we have not declared any new air quality management areas (AQMA's) or had to amend/extend our current AQMA's at Edinburgh Road/ Lindisfarne roundabout and Boldon Lane/ Stanhope Road. Non continuous (diffusion tube) data collected in 2017 has not demonstrated any exceedances of the national annual average for nitrogen dioxide the data collected from continuous monitoring stations has not identified any exceedance of the national objective levels for NO_2 or PM_{10} over the last four years.

Defra's Local Air Quality Management technical guidance (TG16) states that an air quality management area can be revoked following a detailed assessment or if there is a robust evidence base including monitoring over a sufficient period i.e. several years to reflect national trends in emissions; Other factors such as works carried out as part of the action plan associated with the AQMA that may have had an effect on pollutant levels can also be taken into account. Based on guidance the authority considers it appropriate to review the status of both AQMA's following 2018 annual monitoring results as concentrations recorded from monitoring sites within both AQMA's fall below the EU target concentration of 40µg/m^3. As revocation of the AQMA's is subject to internal review and approval via a formal corporate process it is likely revocation will not occur until the submission of the 2019 annual status report. The feasibility study undertaken at Edinburgh Road/ Lindisfarne AQMA should further

inform the decision as to whether revocation is appropriate at this site and can be appended to next year's Annual status report.

We will continue to liaise with Gateshead, Newcastle and North Tyneside to ensure that any plans for clean air zones within their areas do not have an adverse effect upon air quality within South Tyneside by introducing more traffic trying to avoid these clean air zones.

One of the key priorities for the local authority in addressing air quality for the coming year includes combating the cumulative impact of major development within South Tyneside. The Tyneside planning application validation statement currently requires that an air quality assessment is undertaken for developments over a certain size. The concern is that although separately these developments may have a negligible effect on air quality, cumulatively they could have a more detrimental effect. To ensure that this issue is addressed the authority will be amending development plan documents over the next year to embed air quality in the Local Plan and ensure that relevant mitigation is required to be incorporated into scheme design from the outset. South Tyneside is seeking to develop a broader Air Quality Strategy aligned with Council priorities to take a holistic approach to air quality. Progress on the strategy will be reported in next year's ASR.

South Tyneside will work with the Joint Air Quality Unit (JAQU) to develop the Targeted Feasibility Study for the A194 corridor as previously referenced. Further to this, the Council will work with Highways England in terms of constructing the Testo's and Downhill Lane schemes which are expected from January 2019.

Finally, the Council will work with Sunderland City Council to implement the IAMP development, with the 1st phase of the development commencing in June 2018. The wider Development Consent Order is expected to be submitted from early 2019, with the overall development completed by 2024.

Local Engagement and How to get involved

A significant proportion of air pollution is a result of road traffic sources, the two main pollutants of concern being NO_2 and PM_{10}. Making changes to your daily life including walking short journeys, using public transport and car sharing when you can will ultimately reduce levels of NO_2 and PM_{10}.

South Tyneside Council

South Tyneside Council, along with other local authorities within Tyne and Wear are part of the 'Go Smarter' programme introduced by the Department for Transport and the North East Combined Authority to encourage the uptake of sustainable modes of transport. The Go Smarter team within South Tyneside have continued to encourage residents to cycle, walk, and use alternative methods of transport. More information relating to the programme can be found at http://www.gosmarter.co.uk

Other measures that residents can undertake to improve air quality include:

- Purchasing low emission electric/ and or hybrid vehicles
- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NO_x (and carbon) emissions.

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1 Local Air Quality Management

This report provides an overview of air quality in South Tyneside during 2017 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 Tyneside Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by South Tyneside can be found in Table 2.1: Maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=251

There has been continued compliance with national air quality objective levels for nitrogen dioxide at Lindisfarne Roundabout/ Leam Lane and at the Boldon Lane/Stanhope Road AQMA's. Continued compliance has been demonstrated in the last four years of continuous monitoring data along with non-continuous monitoring data for 2016 and 2017. Appendix D: Maps of Monitoring locations and AQMA'S, provides a map of air quality monitoring locations in relation to the AQMA(s).

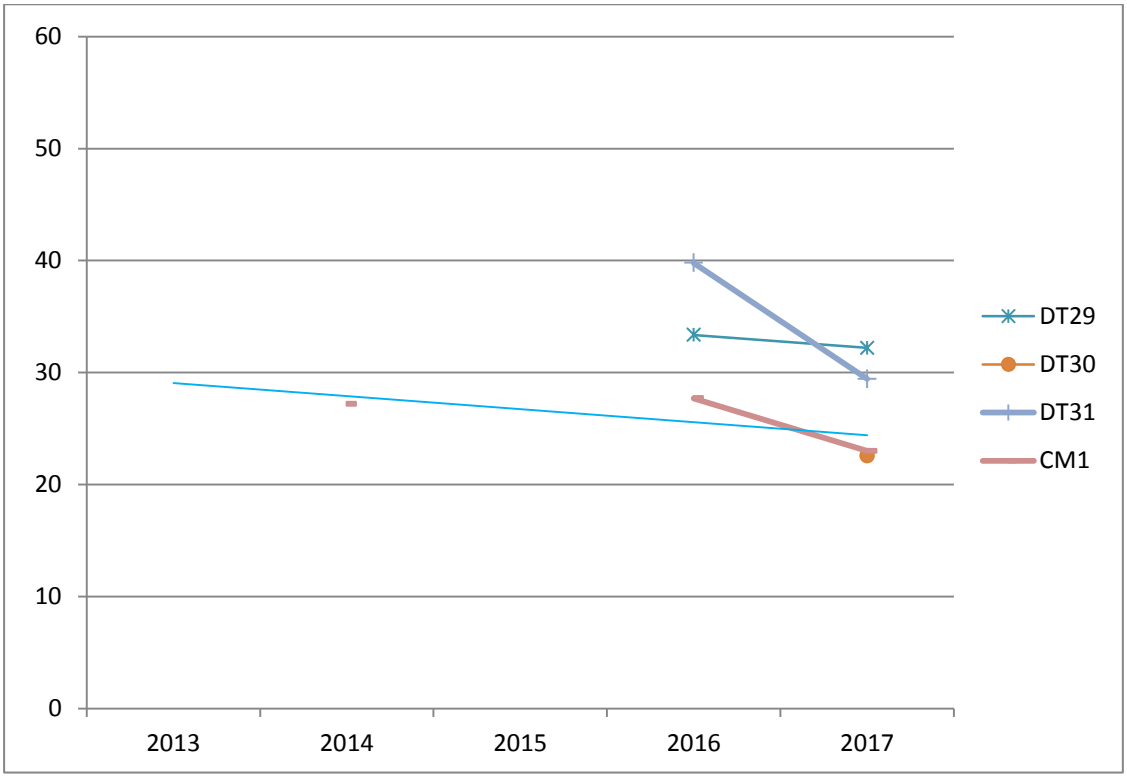
Boldon Lane/ Stanhope Road AQMA

The Council is aware that delays are experienced throughout the Boldon Lane / Stanhope Road area. As a result of this, the Council intends to work collectively with the North East Urban Traffic Management Control team to determine if we can appraise the potential to introduce measures that will improve traffic movements throughout the whole corridor, high level costs and benefit analysis is still to be undertaken and progress shall be updated in the next report.

There are a number of traffic signalised junctions along the corridor with additional formalised crossing facilities. The Council is to determine whether the associated traffic lights can be coordinated so that journey time variability is improved and congestion reduced. The corridor is heavily used by buses, so it is important that traffic throughput is improved along the whole corridor.

A replacement diffusion tube was placed at Stanhope Road (DT30) to help to suitably characterise the AQMA to further evidence compliance in order to consider revocation.

Figure A.1.1 – Boldon Lane/ Stanhope Road AQMA



The figure above shows the results of continuous monitoring and non-continuous monitoring data within the Boldon Lane/ Stanhope Road AQMA. It can be seen that NO_2 levels have reduced at the conitnous monitoring from 2014. The non continuous diffusion tube concentrations have also reduced at each site from 2016. The highest concentration in the AQMA is at DT29 The lowest concentration within the AQMA is at DT30

Lindisfarne Roundabout/ Leam Lane AQMA

ADMS-roads is a modelling tool undertaken in relation to air quality assessments associated with planning applications. Modelling located near to the Lindisfarne Roundabout/ Leam Lane AQMA include: Eskdale Drive; Salcombe Avenue and the Arches scheme. Relevant sensitive receptors within the AQMA were identified within all assessments and all were predicted to fall below the national annual objective level for NO_2 for all predicted future years. Further detail regarding the assessments can be found in Appendix C.

Completion of the Lindisfarne roundabout improvements were complete July 2017 and it is predicted that this will have a positive effect on air quality as the additional

lane will reduce congestion, monitoring will continue via non – continuous diffusion tubes and the continuous monitoring station located at Edinburgh Road.

Figure A.1.2 – Lindisfarne Roundabout/ Leam Lane AQMA

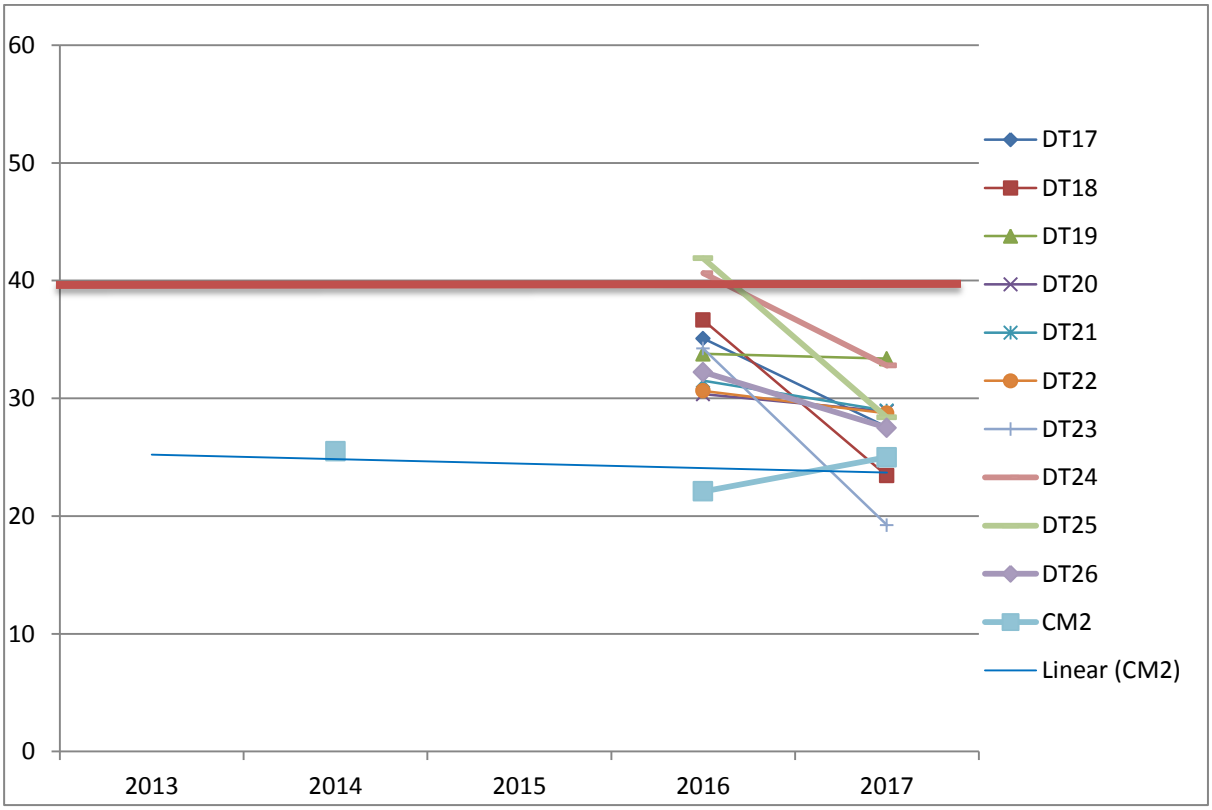


Figure A.1.2 – Lindisfarne roundabout/ Leam Lane AQMA shows all levels remain well below the national annual average objective level for NO_2. There was an overall reduction of around 5 µg/m³ to annual mean NO_2 levels at Edinburgh Road continuous monitoring data from 2012 -2016, reducing the overall annual concentration to 22.1µg/m³ In 2016. Edinburgh Road (CM2) continuous monitoring station annual concentration has increased to 25 µg/m³ in 2017, this may be due to the increase in traffic due to the junction improvement works that were underway until July 2017. Diffusion tube data has been gathered over the past two years, concentrations have remained below the target concentration of 40 µg/m³. There is a downward trend reduction in NO2 concentrations from diffusion tube data. The highest concentration recorded was 33.37 µg/m³ from the Lindisfarne South (DT17).

Based on guidance the authority considers it appropriate to review the status of both AQMA's following 2018 annual monitoring results as concentrations recorded from monitoring sites within both AQMA's fall below the EU target concentration of 40µg/m³. The feasibility study undertaken at Edinburgh Road/ Lindisfarne AQMA in relation to the Governments ministerial direction will further inform the decision as to whether revocation is appropriate at this site and can be appended to next year's Annual status report. As revocation of the AQMA's is subject to internal review and approval via a formal corporate process it is likely revocation will occur during the next 12 months and this will be confirmed in 2019 annual status report.

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
Lindisfarne Roundabout/ Leam Lane	1st March 2006	NO_2	Jarrow	A number of properties around Lindisfarne Roundabout, extending along Leam Lane and the A19.	No	43	µg/m^3	25	µg/m^3	E.g. Action Plan for Lindisfarne AQMA	Currently under review 2018- refer to broad measures in table 2.2	
Boldon Lane/ Stanhope Road	1st March 2006	NO_2	South Shields	Commercial high street with residential properties extending along Boldon Lane and a short distance up Stanhope Road.	No	41	µg/m^3	23	µg/m^3	Action Plan for Boldon Lane AQMA	Currently under review 2018- refer to broad measures in table 2.2	

☒ **South Tyneside 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 Tyneside

Defra's appraisal of last year's ASR concluded that following further monitoring consideration should be given to revocation of the current Air Quality Management Area's located Lindisfarne Roundabout/ Leam Lane and Boldon/ Lane Stanhope Road. Currently there is 4 years' worth of continuous monitoring data from monitoring stations located within both AQMA's and two years' worth of valid non continuous monitoring data.

As discussed earlier in this report following receipt of the Ministerial Direction on 23rd February 2018, the Council is currently completing a targeted feasibility study on the A194 corridor which will define a set of interventions to bring forward compliance. Part of the feasibility study will also be appraising what impact Lindisfarne highway improvements may have had on nitrogen dioxide levels following completion of the scheme, as the Defra PCM modelled concentrations based on data in 2015 would not have taken this into account. Any consideration to revoking the AQMA at Lindisfarne Roundabout/Leam Lane will not be implemented until completion of the study and final to Defra. Including continuous and non-continuous monitoring from the AQMA for 2018 would also ensure there is a full five years' worth of continuous data and three years of non-continuous monitoring data which is in line with LAQM (TG16) guidance in ensuring that there is a robust evidence base including monitoring over a sufficient period i.e. several years to reflect national trends in emissions.

Last year's commentary from Defra advised that screenshots of the distance of diffusion tubes from relevant receptors to justify bias adjustment corrections should be included as part of the ASR. Guidance suggests that the distance correction should be applied to all monitoring locations that record an annual mean concentration that is above either the NO2 annual objective of 40µg/m3 . Consideration may also be given to applying the calculation to monitoring locations that record an annual mean concentration that is within 10% of the NO2 annual objective of 40µg/m3 (i.e. above 36µg/m3), to account for the inherent uncertainty in diffusion tube monitoring concentration data. The only sites above the annual mean concentration are DT27 and DT34. The distance correction calculations can be found in Appendix C.

It was also suggested that all monitoring locations are mapped, we have included a link https://drive.google.com/open?id=1mRyjjoiCBuFuU7S8XqtGZsfKXJUso-q3&usp=sharing to our website that provides all mapped monitoring locations.

It was suggested that further detail regarding planning applications that may have an effect on air quality are discussed in further detail in this year's ASR. Further in depth information can be found in Appendix D.

South Tyneside 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. The measures stated in table 2.2 will help to contribute in an overall reduction in NO_2 levels across the Borough.

In the coming years, the Council will invest in excess of £8million in highway junction improvements throughout South Shields Town Centre including some improvements on the A194. All of the proposed measures will aim to reduce congestion, increase walking and cycling and improve air quality.

South Tyneside will consider using the Healthy Streets approach[4], developed by London Transport; putting people, and their health, at the heart of decision making, resulting in a healthier, more inclusive city where people choose to walk, cycle and use public transport.

The Healthy Streets approach is a long-term plan for improving residents and visitors experiences of London streets, helping everyone to be more active and enjoy the health benefits of being on our streets.

There are 10 Healthy Streets Indicators:

1. **Pedestrians from all walks of life**; Our streets should be welcoming places for everyone to walk, spend time in and engage in community life.
2. ***People choose to walk, cycle and use public transport****; A successful transport system enables more people to walk and cycle more often.*
3. ***Clean air****; Improving air quality delivers benefits for everyone and reduces unfair health inequalities.*
4. **People feel safe;** The whole community should feel comfortable and safe on our streets at all times. People should not feel worried about road danger.

[4] https://tfl.gov.uk/corporate/about-tfl/how-we-work/planning-for-the-future/healthy-streets

5. **Not too noisy**; Reducing the noise impacts of traffic will directly benefit health and improve the ambience of our streets.
6. **Easy to cross;** Making streets easier to cross is important to encourage more walking and to connect communities.
7. **Places to stop and rest;** A lack of resting places can limit mobility for certain groups of people.
8. **Shade and shelter**; Providing shade and shelter enables everybody to use our streets, whatever the weather.
9. **People feel relaxed;** More people will walk or cycle if our streets are not dominated by motor traffic, and if pavements and cycle paths are not overcrowded, dirty or in disrepair.
10. **Things to see and do;** People are more likely to use our streets when their journey is interesting and stimulating, with attractive views, buildings, planting and street art.

Table 2.2 – Progress on Measures to Improve Air Quality

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	North East Freight Quality Partnership	Freight and Delivery Management	Delivery and Service plans	North East Combined Authority (NECA)	N/A	Complete	Measures to assist freight movements including freight consolidation centres	No direct improvement	Yearly Service Delivery plans	Ongoing	http://www.northeastfreightpartnership.info/
2	North East Freight Maps	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	NECA	N/A	Complete	Limiting freight movements to the strategic routes around the region	No direct improvement	Ongoing	Ongoing	http://www.northeastfreightpartnership.info/
3	North East Air Quality Strategy	Policy Guidance and Development	Air Quality Strategy	NECA	Ongoing	Expected in 2018	Reduced CO_2 emissions	No direct improvement	Ongoing	2018	North East Combined Authority Leading on this
4	North East Combined Authority Sustainable Transport Group	Policy Guidance and Development	Regional Groups to develop Area wide Strategies to reduce emissions	NECA	Ongoing	2018	Air Quality Improvements	No direct improvement	Ongoing	2018	
5	STC promoting electric vehicles through an employer car lease scheme	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	STC	Complete	Ongoing	Reduced emissions	No direct improvement	Ongoing	Ongoing	
6	Investment in Electric Charging Infrastructure	Promoting Low Emission Transport	Priority parking for LEV's	STC	Complete	Ongoing	Reduced emissions, Improved air quality	No direct improvement	Ongoing	Ongoing	10 additional charging points will be implemented following a successful external funding bid.
7	Council Fleet to investigate options for electric fleet including Taxi's	Promoting Low Emission Transport	Prioritising uptake of low emission vehicles	STC	2019	Expected in 2019	Reduced emissions, improved air quality	No direct improvement	Ongoing	2019/2020	

8	Council have installed EV Charging Points	Promoting Low Emission Transport	Prioritising uptake of low emission vehicles,	STC	Complete	Ongoing	Reduced emissions, improved air quality	No direct improvement	Ongoing	Ongoing	
9	Travel Planning through Planning Process	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	NECA & STC	Ongoing	Ongoing	Reduced emissions, Improved air quality,	Limited improvements	Ongoing	Ongoing	
10	New South Shields Public Transport Interchange	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	NEXUS / STC	2019	Ongoing	Reduced emissions, Improved air quality,	No direct improvement	Construction started in 2018	2019	
11	A19 Testos and Downhill lane junction improvements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Highways England	ongoing	2018	Providing a safe and serviceable road network	Improved Air Quality	Construction from 2019	2021	http://www.highways.gov.uk/roads/road-projects/a19-testos-junction-improvements/
12	Go Smarter Work stream	Vehicle Fleet Efficiency	Driver training and ECO driving aids	NECA	Ongoing	Ongoing	Reduced emissions, Improved air quality,	Limited improvements	Ongoing	Ongoing	
13	Travel Information through the UTMC centre	Traffic planning and management	UTC, Congestion management, traffic reduction	NECA / STC	Ongoing	Ongoing	Reduced emissions, Improved air quality,	Yes	Ongoing	Ongoing	
14	Junction Improvements within the borough	Traffic Planning and Management	UTC, Congestion management, traffic reduction	STC	Ongoing	Ongoing	Reduced emissions, Improved air quality,	Yes	Ongoing	Ongoing	
15	Intelligent Transport Solutions at Key Junctions	Traffic Planning and Management	UTC, Congestion management, traffic reduction	STC	Ongoing	Ongoing	Reduced emissions, Improved air quality,	Yes	Ongoing	Ongoing	
16	Successful Clean Bus Fund Bid	Promoting Travel Alternatives	Public transport improvements-interchanges stations and services	STC	Ongoing	Ongoing	Reduced emissions, Improved air quality,	Yes	Ongoing	Ongoing	

2.3 $PM_{2.5}$ – 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 now an extensive body of evidence that long-term exposure to everyday air pollutants over several years contributes to the development of cardiovascular disease (CVD), lung cancer, and respiratory disease. PM is inhaled into the lungs and ultrafine PM0.1 is thought to pass into the blood causing many adverse outcomes including systemic inflammation. Air pollution is strongly associated with all-cause mortality statistics. The all-cause mortality statistic captured in Public Health Outcomes Framework (PHOF) indicator[5] 3.01, ranks air pollution in the top 5-7 causes of mortality in polluted areas, ahead of many other PHOF preventable mortality indicators like road deaths, excess winter deaths or communicable diseases[6].

Impacts on Health Outcomes

Residents of South Tyneside Council generally have a lower life expectancy than the national average Public Health data reports:

	Male	Female
South Tyneside	77.6 years	81.5 years
National Average	79.5 years	83 years

There is evidence to suggest that long term exposure to poor air quality increases the risk of premature mortality from cardiovascular and respiratory diseases. The premature mortality rates for cardiovascular, respiratory diseases and cancer are given below. It is important to note that other lifestyle factors such as smoking, etc. do influence these figures.

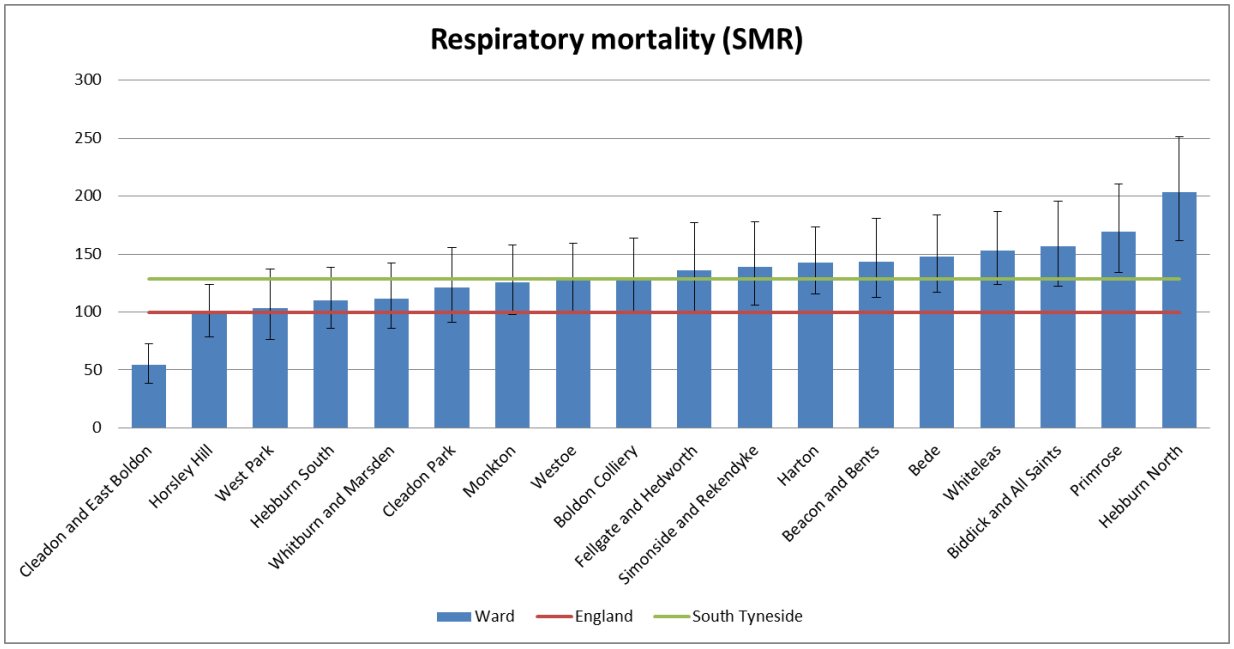
[5] Public Health Outcomes Framework

[6] http://webarchive.nationalarchives.gov.uk/20130123231223/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_132373.pdf

- Premature (under 75 years) mortality rates from all cardiovascular disease of 74.6 per 100,000 as compared to 73.5 per 100,000 for England; of this 47.3 per 100,000 were preventable.
- Premature (under 75 years) mortality rates from respiratory disease of 53.6 per 100,000 as compared to 33.8 per 100,000 for England; of this 36.4 per 100,000 were preventable.
- Premature (under 75 years) mortality rates from cancer of 162.7 per 100,000 as compared to 136.8 per 100,000 for England; of this 95.7 per 100,000 were preventable.

The mortality rates for respiratory disease can be broken down further into South Tyneside Ward areas as shown in the table below, benchmarked against England and South Tyneside as a whole.

Chart 2.3. Deaths from respiratory diseases, all ages, standardised mortality ratio, by Ward 2011-2015:



To note two of these wards (Biddick & All Saints, Bede) include air quality management areas.

Additional data shows:

- Emergency admissions for chronic obstructive pulmonary disease is significantly worse in South Tyneside at 844 per 100,000 population in comparison to England at 417 per 100,000[7].
- Hospital admissions for asthma in children (birth to 9 years) are 403.2 per 100,000 as opposed to the England rate of 259.8 per 100,000.[8]
- The hospital admission rates for young people aged 10 -18 is 264 per 100,000, double that of the England rate. This has seen a continual increase from 2010. We should note however the numbers associated with this rate are fairly low at 38.[9]

It is worth noting that variations that are statistically significant do not in themselves establish a causal relationship and that a wide range of factors affect mortality rates and associated hospital admissions , including rates of smoking, general health, , deprivation and historic industrial exposures.

Nonetheless, diseases that can be worsened by poor air quality emphasises the importance of continued monitoring of air quality to reduce the impact of air pollution on the health of our residents.

South Tyneside Council is undertaking the measures detailed in the executive summary and detailed in table 2.2. These measures will have a positive effect in reducing NO_2 and PM_{10} and would have similar effect upon levels of $PM_{2.5}$.

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.

[7] Emergency hospital admissions for COPD South Tyneside
[8] Admissions for asthma for children aged 0 to 9 South Tyneside
[9] Admissions for asthma for young people aged 10 to 18 South Tyneside

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 Tyneside Council undertook automatic (continuous) monitoring at 3 sites during 2017. Table A.1 in Appendix A shows the details of the sites.

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 Tyneside Council undertook non- automatic (passive) monitoring of NO_2 at 40 sites during 2017. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in

https://drive.google.com/open?id=1mRyjjoiCBuFuU7S8XqtGZsfKXJUso-q3&usp=sharing

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_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

During the reporting year changes to the diffusion tube locations were made,

The following tubes were added:

- Victoria Road West (DT11) - This tube was added to to further assess NO2 levels in Hebburn given the housing developments that are planned/ recently undertaken
- Victoria Road West/ South Drive (DT12) – This tube was added to to further assess NO2 levels in Hebburn given the housing developments that are planned/ recently undertaken
- Alice Street (DT38) - This diffusion tube was added to further assess NO2 levels along the A194.
- Reed Street (D39) - This diffusion tube was added to further assess NO2 levels along the A194.
- Stanhope Road next to Lees Bakery (DT30) – This diffusion tube was added to further assess air quality within the Boldon Lane AQMA to help further evidence whether revocation is necessary.
- Several diffusion tubes within the non continous monitoring regime had less than 75% data they included:

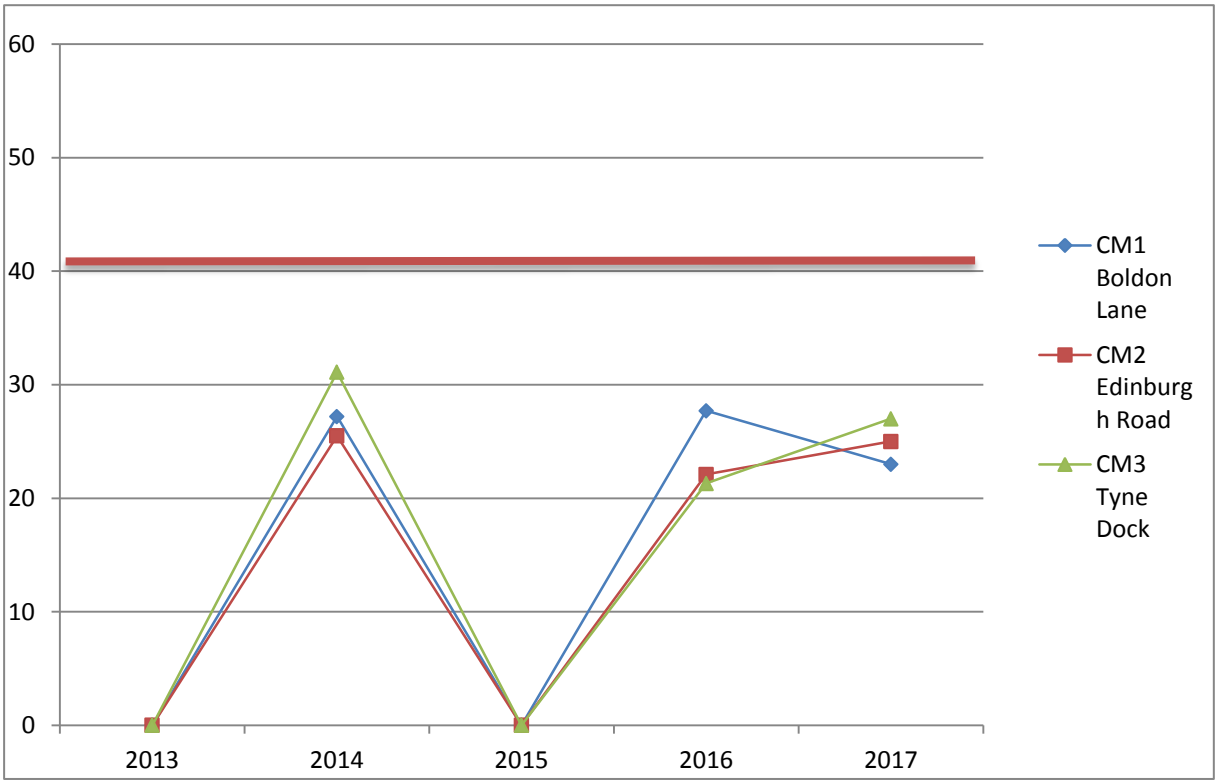
  - Holland Park Drive (DT8)
  - Victoria Road West (DT11)
  - Victoria Road West/ South Drive (DT12)
  - Stanhope Road (DT30)
  - Alice Street (DT38)
  - Reed Street (DT39)
  - Stirling Avenue (DT23)

Annualisation of the tubes has been undertaken in accordance with LAQM (TG16) guidance using Newcastle City Centre and Middlesbrough. These continous stations form part of the AURN network and were the closest available stations.

DT32 had a recorded level of 5.53 µg/m^3 during the period 28.04.17 – 02.06.17 this figure has been considered an outlier and removed from the results.

As no diffusion tubes have a concentration of over 60 µg/m^3, this indicates that the hourly objective of 200 µg/m^3 not to be exceeded more than 18 times a year has not been breached.

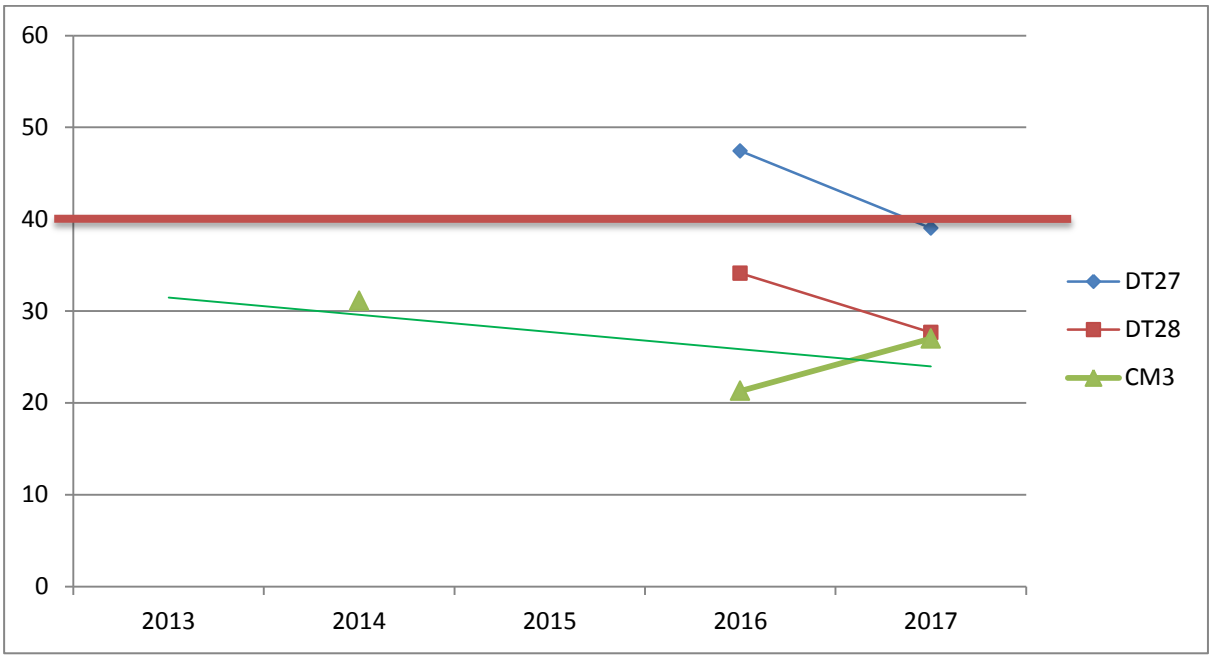
A.1.3- Continuous monitoring station data – 5 years



Continous monitoring data is available 2014, 2016 and 2017; analysis of this data shows that annual mean NO_2 levels have increased slightly in the past year, this may be due to Lindisfarne traffic improvement scheme and also the commencement of the Arches junction improvement scheme.

Trend analysis of the AQMA sites can be found within the AQMA section of the report on pages 2-6

A.1.4 – Port of Tyne concentrations.



There has been a reduction to the annual mean NO_2 level at Tyne Dock continous monitoring station from 2014-2016 with a reduction of 13 µg/m³ to an annual mean figure of 21.25 µg/m³ In 2016. The annual concentration has increased to 27 µg/m³ in 2017. The two nearest diffusion tubes Western Approach near Port of Tyne (DT27) and Commercial Road (DT28) measured 47.43 µg/m³ and 34.11 µg/m³ in 2016 and 39.03 µg/m³ and 27.66 µg/m³ in 2017. It is important to point out that these figures are before a distance correction is undertaken therefore distance correcting (DT27) to the nearest receptor would have brought the 2016 annual average into compliance. The traffic improvement works should improve air quality around Tyne Dock by reducing congestion at the A194/A185 junction, and whilst it is expected that concentrations may worsen whilst works are undertaken, that this will ultimately result in an improvement in NO_2 levels by moving queuing traffic from this area.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

South Tyneside Council have not recorded any exceedances of the air quality annual mean objective for PM_{10}.

At Edinburgh Road (CM2) monitoring station a maximum daily mean of 58µg/m³ was recorded, the daily mean limit value was exceeded on 1 day.

At Tyne Dock (CM3) monitoring station a maximum daily average mean of 69 µg/m³ was recorded, the daily mean was exceeded on 3 days.

There has been a slight increase in PM_{10} concentrations in most recent 2017 data.

It is likely that the increase concentration of PM_{10} at Edinburgh Road (CM2) station is a result of the Lindisfarne junction improvement works which were completed in July 2017, whilst works were undertaken traffic was reduced to one lane and there was an increase in idling traffic/ queuing. It is expected that with the additional lane gain there will be an improvement in traffic flow and speed which should result in an improvement on concentration levels for PM_{10} next year.

It is likely that the slight increase at Tyne Dock is a result of The Arches highway improvement scheme which is located 500m West of the Tyne Dock (CM3) monitoring station. Since works started there has been lane closure both north and southbound which has resulted in increased queing/ congestion. Concentrations will continue to be monitored throughout the duration of the works.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

Local authorities are not legally obliged to monitor $PM_{2.5}$. South Tyneside started to report on $PM_{2.5}$ in 2016. As detailed in Policy Guidance LAQM.PG16 (Chapter 7) $PM_{2.5}$ levels can be estimated from PM_{10} levels by using a nationally derived correction ratio of 0.7. Table A.7 provides $PM_{2.5}$ data converted using the correction ratio with PM_{10} data collected in 2017.

The last two years worth of monitoring shows that the $PM_{2.5}$ has remained fairly constant and below that target value. A slight increase in PM_{10} at both Tyne Dock (CM3) and Edinburgh Road (CM2) means that the $PM_{2.5}$ that has been derived is slightly higher.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Boldon Lane, South Shields	Roadside	435,949	564,456	NO2	Y	Chemiluminescent	Y (15.0m)	3.0m	1.5
CM2	Lindisfarne Roundabout, Jarrow	Roadside	434,068	563,695	NO2 & PM10	Y	Chemiluminescent; TEOM	Y (27.0m)	1.0m	2
CM3	Tyne Dock, South Shields	Roadside	X: 435,565	Y: 565,040	NO2 & PM10	N	Chemiluminescent; TEOM	Y (12.0m)	14.0m	2

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT1	Sunderland Road Jolly Sailor - Whitburn	Roadside	440,820	561,821	NO2	No	9.3	1.7	No	2.3
DT2	Sunderland road - Cleadon	Roadside	438,542	562,321	NO2	No	8.3	1.5	No	2.65
DT3	Front Street Cleadon – Café	Roadside	438,539	562,329	NO2	No	0	2.5	No	2.7
DT4	Station Road East Boldon	Roadside	437,053	561,418	NO2	No	5	1.5	No	2.5
DT5	Front Street / Grange Terrace	Kerbside	436,524	561,275	NO2	No	4	<1	No	2.3
DT6	Front Street / Boker Lane	Roadside	436,021	561,368	NO2	No	11.5	1.5	No	2.5
DT7	Arnold Street	Roadside	434,623	561,746	NO2	No	0	1.5	No	2.5
DT8	Holland Park Drive (A19)	Roadside	433,883	562,644	NO2	No	0	30	No	2
DT9	Southlands (A19)	Roadside	433,739	562,070	NO2	No	19	40	No	2.9
DT10	Mill Lane / A185 Junction	Roadside	430,469	563,040	NO2	No	3	28	No	2.5
DT11	Victoria Road West	Roadside	430,538	563.420	NO2	No	1.6	20	No	2
DT12	Victoria Road West / South Drive	Roadside	430,587	563,671	NO2	No	3	9	No	2

DT13	Station Road Hebburn – on PJ Hairdressers	Roadside	430,976	564,378	NO2	No	0	3.8	No	2.6
DT14	Victoria Road East – Junction with Park Road	Kerbside	432,169	564,962	NO2	No	12.5	<1	No	2.5
DT15	Ellison Street roundabout – Pizza addict	Kerbside	432,676	565,443	NO2	No	16.2	2.2	No	2.5
DT16	Epinay Walk	Roadside	433,093	564,998	NO2	No	8	28	No	2
DT17	Hadrian Road	Roadside	433,658	563,497	NO2	No	2	5	No	2.5
DT18	Lindisfarne Road (55)	Roadside	433,698	563,825	NO2	No	10	8	No	2.5
DT19	Hadrian Road/FInchale Terrace Junction	Roadside	433,780	563,692	NO2	No	3	13.5	No	3
DT20	Edinburgh Road monitoring station	Roadside	434,068	563,695	NO2	Yes	30	<1m	Yes	2.9
DT21	Edinburgh Road monitoring station	Roadside	434,068	563,695	NO2	Yes	30	<1m	Yes	2.9
DT22	Edinburgh Road monitoring station	Roadside	434,068	563,695	NO2	Yes	30	<1m	Yes	2.9
DT23	John Reid Road, Junction with Stirling Avenue	Roadside	433,232	565,006	NO2	No	19.2	1.8m	No	2.85

DT24	Opposite 173 Hadrian Road	Roadside	434,313	563,963	NO2	No	25	3.5	No	2.35
DT25	Opposite 237 Newcastle Road	Roadside	434,402	563,976	NO2	No	32	3.2	No	2.4
DT26	Stanhope Road / Newcastle Road	Roadside	434,303	563,977	NO2	No	18	22	No	2,5
DT27	A194 Arches Roundabout	Kerbside	435,330	564,846	NO2	No	15	<1	No	2.2
DT28	Commercial Road	Roadside	435,565	565,221	NO2	No	3.8	1.5	No	2.6
DT29	Corner of Boldon Lane / Stanhope Road	Kerbside	435, 930	564,600	NO2	Yes	6.5	1	No	2.4
DT30	Stanhope Road	Kerbside	435,980	564,641	NO2	Yes	1	4	No	2.5
DT31	Boldon Lane	Roadside	435,965	564,329	NO2	No	2	1.7	No	2.3
DT32	King George Road	Roadside	437,438	564,391	NO2	No	4	13	No	2.5
DT33	Sunderland Road, next to the Cranny	Roadside	437,816	564,338	NO2	No	7	2	No	2.3
DT34	Westoe Road	Roadside	436,981	565,906	NO2	No	7	2	No	2.35
DT35	Imeary Street/ The Glebe	Roadside	436,729	566,375	NO2	No	14	4	No	2.7
DT36	Chichester Metro	Kerbside	436,483	565,887	NO2	No	18.9	<1	No	2.25
DT37	Western Approach	Roadside	436,220	566,620	NO2	No	11.5	2.5	No	2.5
DT38	Alice Street	Kerbside	436,168	565,875	NO2	No	<1	27	No	2.5
DT39	A194 Reed Street	Roadside	436,102	565,894	NO2	No	3.5	8.5	No	2.5

	Roundabout									
DT40	Anderson Street	Roadside	436,595	567,298	NO2	No	10	2	No	2.5

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2013	2014	2015	2016	2017
CM1 Boldon Lane	Roadside	Automatic	99.8	99.8	-	27.2	-	27.7	23
CM2 Edinburgh Road	Roadside	Automatic	99.8	99.8	-	25.5	-	22.1	25
CM3 Tyne Dock	Roadside	Automatic	99.9	99.9	-	31.1	-	21.3	27
DT1	Roadside	Diffusion Tube	91.86	91.86	-	-	-	30	25.88
DT2	Roadside	Diffusion Tube	91.86	91.86	-	-	-	37.6	31.74
DT3	Roadside	Diffusion Tube	100	100	-	-	-	29.41	21.50
DT4	Roadside	Diffusion Tube	100	100	-	-	-	28.92	20.53
DT5	Roadside	Diffusion Tube	91.86	91.86	-	-	-	31.45	24.06
DT6	Roadside	Diffusion Tube	78.49	78.49	-	-	-	-	31.85
DT7	Roadside	Diffusion Tube	92.15	92.15	-	-	-	35.47	24.61
DT8	Roadside	Diffusion Tube	44.19	44.19	-	-	-	-	18.32[3]
DT9	Roadside	Diffusion Tube	74.42	74.42	-	-	-	-	21.74
DT10	Roadside	Diffusion Tube	81.69	81.69	-	-	-	38.21	27.88
DT11	Roadside	Diffusion Tube	46.22	46.22	-	-	-	-	24.04[3]
DT12	Roadside	Diffusion Tube	36.047	36.047	-	-	-	-	18.89[3]
DT13	Roadside	Diffusion Tube	81.40	81.40	-	-	-	36.64	23.43
DT14	Kerbside	Diffusion Tube	94.48	94.48	-	-	-	34.9	29.95
DT15	Kerbside	Diffusion Tube	92.15	92.15	-	-	-	28.88	22.42

DT16	Roadside	Diffusion Tube	97.38	97.38	-	-	-	32.64	24.37
DT17	Roadside	Diffusion Tube	100	100	-	-	-	35.08	27.56
DT18	Roadside	Diffusion Tube	100	100	-	-	-	36.65	23.43
DT19	Roadside	Diffusion Tube	100	100	-	-	-	33.78	33.37
DT20	Roadside	Diffusion Tube	100	100	-	-	-	30.35	28.90
DT21	Roadside	Diffusion Tube	100	100	-	-	-	31.5	28.95
DT22	Roadside	Diffusion Tube	100	100	-	-	-	30.64	28.73
DT23	Roadside	Diffusion Tube	45.64	45.64	-	-	-	34.23	24.24[(3)]
DT24	Roadside	Diffusion Tube	100	100	-	-	-	**40.63**	32.79
DT25	Roadside	Diffusion Tube	100	100	-	-	-	**41.9**	28.38
DT26	Roadside	Diffusion Tube	100	100	-	-	-	32.23	28.03
DT27	Kerbside	Diffusion Tube	100	100	-	-	-	**47.43**	39.03
DT28	Roadside	Diffusion Tube	100	100	-	-	-	34.11	27.66
DT29	Kerbside	Diffusion Tube	100	100	-	-	-	33.36	32.21
DT30	Kerbside	Diffusion Tube	45.64	45.64	-	-	-	-	22.55[(3)]
DT31	Roadside	Diffusion Tube	100	100	-	-	-	39.79	29.43
DT32	Roadside	Diffusion Tube	81.69	81.69	-	-	-	28.94	27.01
DT33	Roadside	Diffusion Tube	100	100	-	-	-	32.72	28.28
DT34	Roadside	Diffusion Tube	100	100	-	-	-	37.6	36.57
DT35	Roadside	Diffusion Tube	100	100	-	-	-	27.35	25.91
DT36	Kerbside	Diffusion Tube	82.27	82.27	-	-	-	29.82	29.21
DT37	Roadside	Diffusion Tube	91.86	91.86	-	-	-	**40.24**	32.84
DT38	Kerbside	Diffusion Tube	46.22	46.22	-	-	-	-	22.55[(3)]
DT39	Roadside	Diffusion Tube	46.22	46.22	-	-	-	-	25.70[(3)]
DT40	Roadside	Diffusion Tube	100	100	-	-	-	29.31	27.73

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

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

Notes:

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

Figure A.1.1 – Boldon Lane/ Stanhope Road AQMA

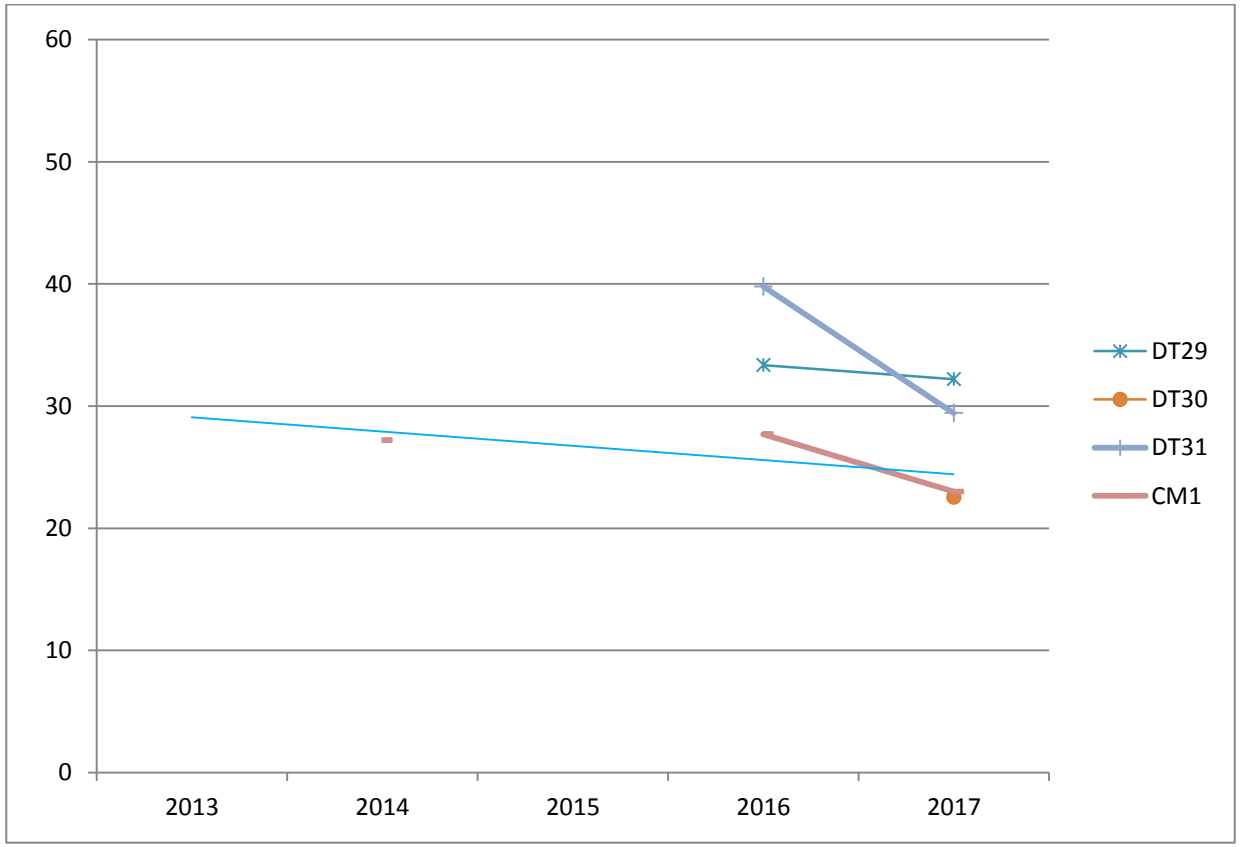
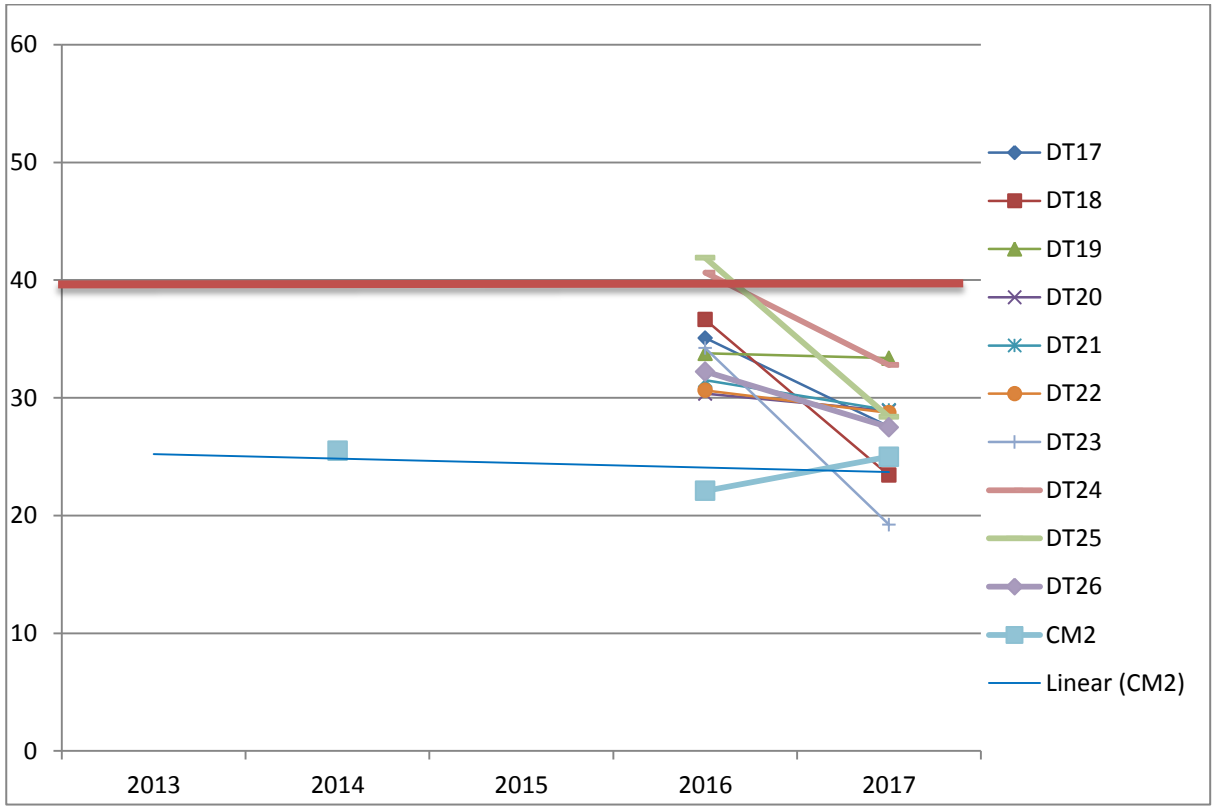
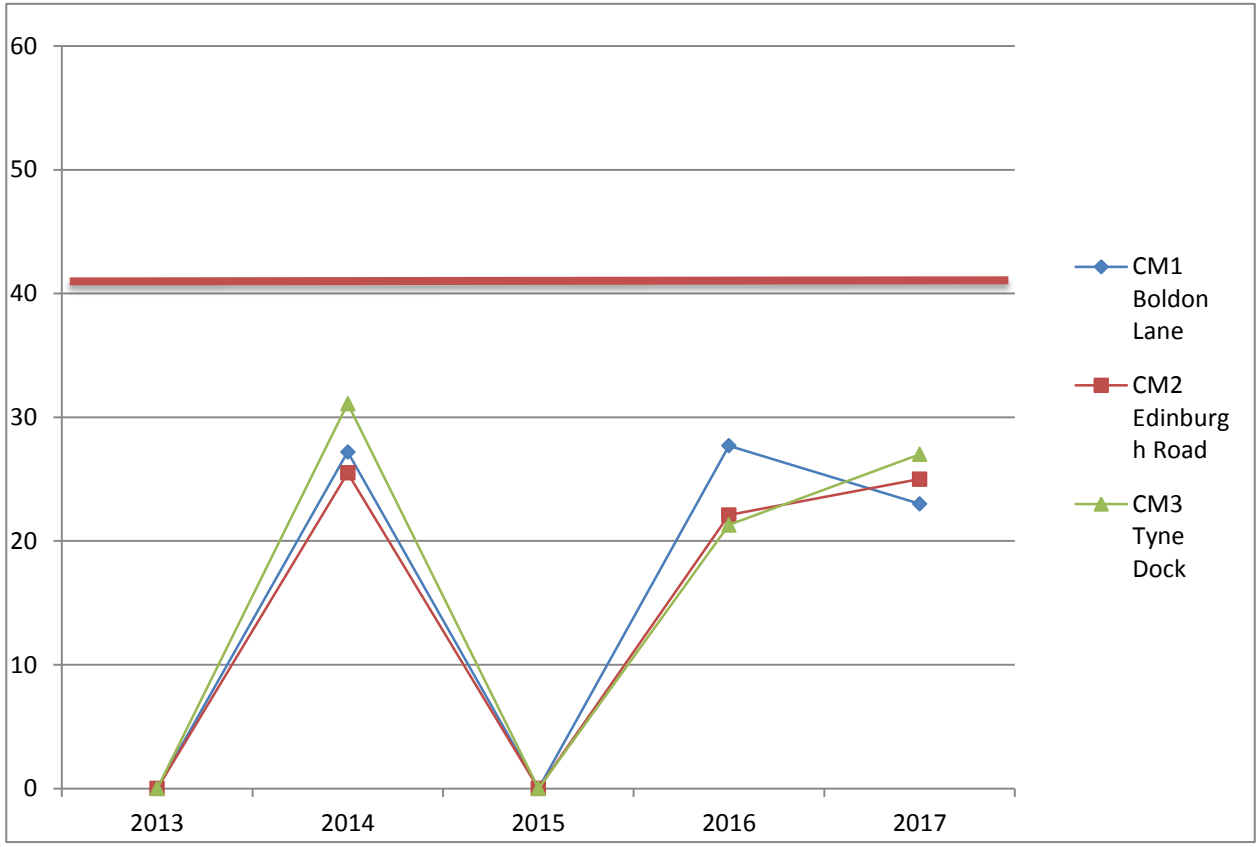


Figure A.1.2 – Lindisfarne Roundabout/ Leam Lane AQMA



A.1.3- Continuous monitoring station data – 5 years



A.1.4 – Port of Tyne concentrations.

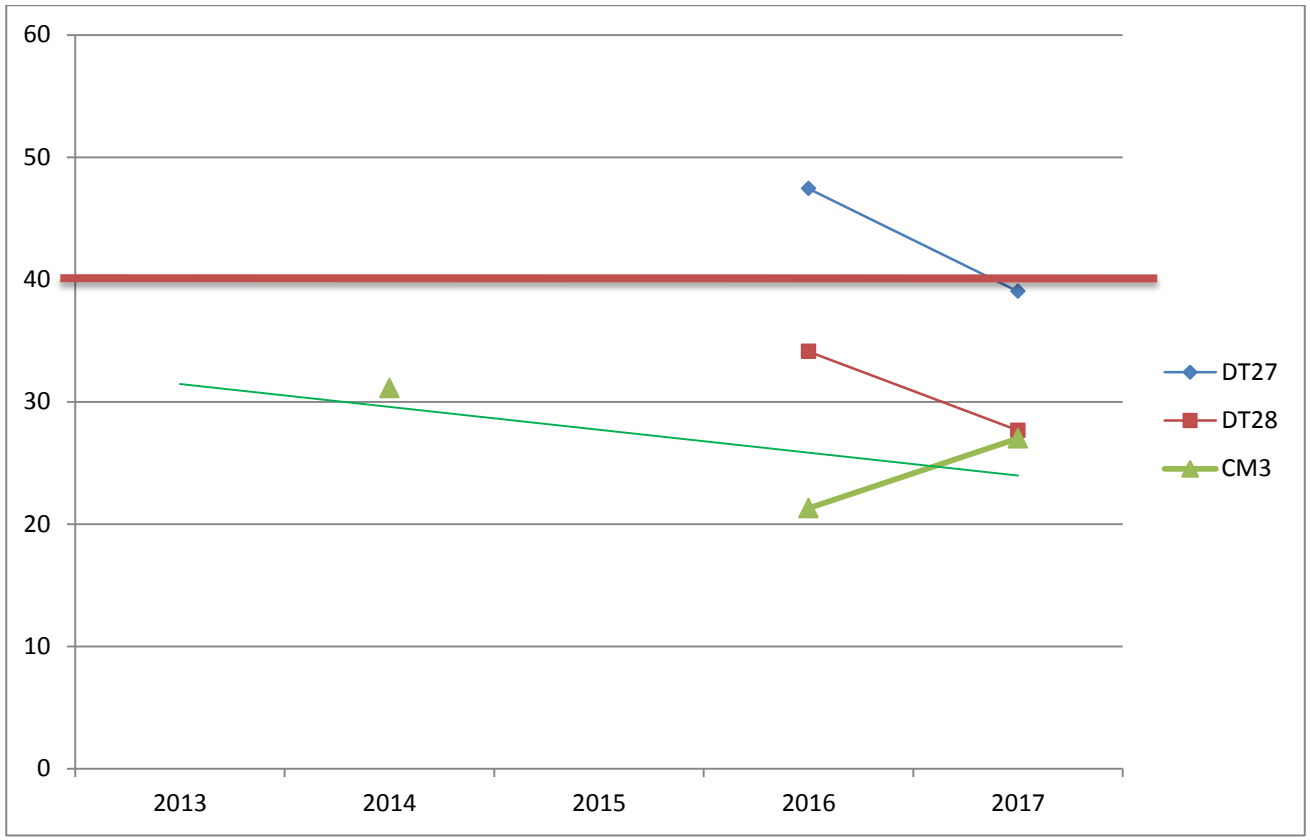


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
CM2 Edinburgh Road	Roadside	Automatic	99.8	99.8	**0**	0	-	0	**0**
CM3 Tyne Dock	Roadside	Automatic	99.8	99.8	**0**	**0**	**-**	3 (268)	**0**

Notes:

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
CM2 Edinburgh Road	Roadside	96.2	96.2	18.9	16.8	-	14.3	15
CM3 Tyne Dock	Roadside	98.4	98.4	19.6	18.9	-	17.3	18

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

Notes:

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

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

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

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

Figure A.1.5 – Trends in Annual Mean PM_{10} Concentrations

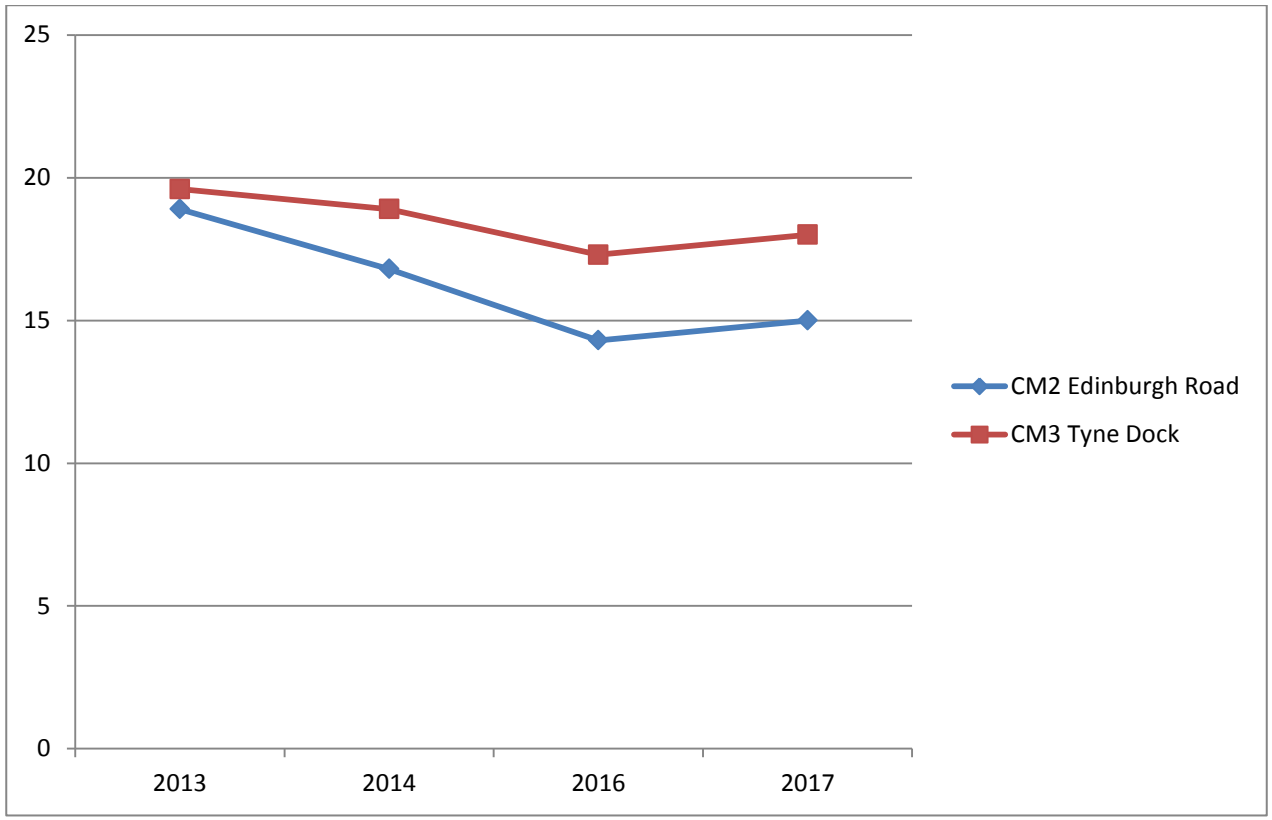


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2013	2014	2015	2016	2017
CM1 Edinburgh Road	Roadside	96.2	96.2	3	2	-	0	1(58)
CM2 Tyne Dock	Roadside	98.4	98.4	3	2	-	2	3(69)

Notes:

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
CM1 Edinburgh Road	Roadside	96.2	96.2	13.23	11.76	-	10.01	10.5
CM2 Tyne Dock	Roadside	98.4	98.4	11.76	13.23	-	12.11	12.6

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

Notes:

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

	11.01.17 - 07.02.17	19.02.17 - 08.03.17	08.03.17 - 30.03.17	30.03.17 - 28.04.17	28.04.17 - 02.06.17	02.06.17 - 30.06.17	30.06.17 – 02.08.17	02.08.17 - 30.08.17	30.08.17 - 28.09.17	28.09.17 - 03.11.17	03.11.17 - 29.11.17	29.11.17 - 03.03.18	Annual Mean		
													Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DT1	**40.83**	29.01	35.46	27.87	25.2	24.98	23.02	-	26.86	27.31	34.2	35.87	29.74	25.88	
DT2	**55.64**	**42.57**	39.22	31.78	24.87	31.46	27.12	-	35.71	33.33	**45.78**	**42.04**	36.49	31.74	
DT3	35.87	25.95	27.36	23.62	25.04	17.89	17.08	17.41	23.53	23.16	29.12	32.34	24.72	21.50	
DT4	36.18	27.49	30.01	19.81	18.94	17.52	15.47	18.21	20.94	21.48	29.91	32.18	23.60	20.53	
DT5	**45.88**	29.71	30.01	24.59	18.93	-	20.7	21.29	26.79	26.15	35.81	30.12	27.66	24.06	
DT6	-	-	**40.78**	-	25.8	36.72	30.21	29.91	36.54	36.58	**49.01**	**47.32**	36.61	31.85	
DT7		28.63	32.85	28.34	25.4	28.03	20.11	21.45	24.58	29.46	35.82	37.88	28.28	24.61	
DT8	-	-	-	-	-	-	-	17.26	22.75	21.72	27.84	30.96	32.04	18.32(1)	
DT9	34.65	27.73	30.65	18.51	20.87	40.15	16.4	-	22.82	19.68	-	-	26.94	21.74	
DT10	46.03	36.84	35.8	25.82	-	34.24	21.61	-	26.78	29.93	37.5	31.65	34.42	27.88	
DT11							17.81	18.45	24.47	29.93	31.76	31.82	24.99	24.04(1)	
DT12									23.05	26.54	30.22	31.35	26.93	18.89(1)	
DT13	39.53	29.77	29.83	24.1	26.41		20.18	18.77	24.81		29.85	29.16	38.36	23.43	
DT14	**46.25**		**73.23**	30.98	25.98	27.45	25.32	24.34	28.91	26.54	42.34	41.13	25.77	29.95	
DT15		**68.75**	35.51	24.4	20.31	28.38	19.87	20.88	16.78	31.28	38.01	40.45	28.01	22.42	
DT16	**41**		35.09	27.49	22.52	30.25	21.84	20.58	25.93	25.24	34.63	37.29	31.68	24.37	

DT17	**48.5**	32.35	39.38	24.49	31.14	35.57	27.71	26.84	30.11	29.54	28.24	30.27	32.48	27.56	
DT18	39.67	38.12	32.14	19.94	26.1	32.34	21.92	20.77	24.77	23.04	23.99	27.47	32.53	23.43	
DT19	**59.55**	44.5	45.42	38.68	29.54	39.9	31.29	29.02	35.73	31.82	**40.71**	**42.93**	32.28	33.37	
DT20	**43.8**	34.39	34.92	32.25	25.2	34.06	23.79	24.22	30.72	30.3	**42.11**	38.87	30.28	28.90	
DT21	**44.95**	34.7	37.39	31.5	25.01	32.75	21.91	25.06	29.63	29.79	**41.39**	**41.69**	37.69	28.95	
DT22	**41.49**	35.73	34.98	30.18	26.59	32.51	22.33	23.24	29.34	32.13	**41.33**	**41.54**	32.62	28.73	
DT23	**-**	-	-	**-**	-	-	23.79	24.22	30.72	30.3	**42.11**	38.87	44.86	24.24[(1)]	
DT24	**42.93**	**42.56**	34.05	34.74	26.54	37.74	31.23	31.21	34.73	39.93	**48.43**	**50.44**	31.79	32.79	
DT25	**43.36**	35.97	32.43	29.28	21.7	35.5	28.01	27.84	29.69	32.89	**41.7**	37.53	37.02	28.38	
DT26	**44.28**	29.38	**43.33**	21.64	31.56	30.48	20.08	24.55	25.89	31.09	36.01	36.04	33.83	28.03	
DT27	**52.52**	**54.63**	**54.41**	**43.65**	37.83	**41.46**	38.57	38.35	**41.1**	**42.42**	**47.25**	**53.53**	32.51	39.03	26.05
DT28	**47.38**	39.35	33.3	**28.56**	29.96	29.96	22.82	24.06	**31.8**	**27.59**	**34.23**	**37.94**	32.82	27.66	
DT29	46.64	39.26	40.64	32.23	29.89	39.79	29.05	29.4	**34.61**	**37.57**	**42.38**	**46.1**	31.17	32.21	
DT30	**-**	**-**	-	-	-	-	25.79	29.37	**-**	**37.03**	**44.97**	**44.38**	29.11	22.55[(1)]	
DT31	**43.22**	**39.98**	42.28	31.19	29.16	39.58	26.3	29.24	**29.72**	**27.77**	**35**	**39.69**	42.03	29.43	
DT32	**43.1**	28.48	33.28	26.14	5.53	26.64	19.18	18.7	-	31.82	39.31	39.53	31.65	27.01	
DT33	**46.97**	32.35	35.95	28.71	29.5	29.72	23.12	26.5	**29.2**	34.28	36.52	39.22	41.64	28.28	
DT34	**58.3**	**38.02**	42.12	**40.9**	29.04	39.24	**31.04**	35.46	**41.5**	38.26	**50.32**	**62.32**	17.99	36.57	30.9
DT35	38.95	**26.32**	29.74	26.97	29.26	25.32	21.15	20.89	26.83	29.28	35.03	38.88	36.21	25.91	
DT36	39.49	**41.96**	**40.28**		26.98	28.71		21.01	29.72	31.4	36.15	38.25	24.20	29.21	
DT37	50.56	**40.4**	42.76	35.07	24.93	38.14	30.9	31.88		**38.55**	**44.14**	**46.58**	30.03	32.84	
DT38	-	**-**	-	-	-	-	14.45	19.93	**23.74**	**23.76**	**30.97**	**33.41**	27.84	22.55[(1)]	
DT39	-	**-**	-	-	-	-	18.78	20.89	**24.75**	**27.74**	**33.41**	**39.44**	28.17	25.70[(1)]	
DT40	**45.69**	30.26	27.43	26.4	26.86	30.24	20.93	25.13	**25.65**	**32.48**	**39.44**	**43.41**	32.11	27.73	

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

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

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

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

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

New roads constructed or proposed since the last round of review and assessment.

The Arches

An Air Quality Assessment was submitted as part of the planning application for this scheme, due to the substantial change to the road layout. The assessment submitted provided ADMS – Roads dispersion modelling to predict local air quality impact and looked at a 2018 and 2033 'do nothing' and 'do something' scenario, modelled using 2014 and 2018 emissions parameters, respectively, as a cautious approach.

Modelled receptor locations were manually selected to comprise of residential properties near to affected roads including:

- A194 Newcastle Road 'West of Arches'
- A194 Leam Lane, 'West of Arches'
- A194 Jarrow Road 'East of Arches'
- A19
- A185 Howard Street
- Priory Road

Air quality effects of the proposed scheme were determined by magnitude of change and absolute concentration according to IAQM/ EPUK guidance. To verify the modelled results monitored diffusion data from nearby sites was used to compare, an adjustment factor of 2.4 was applied.

The local air quality effects of the proposed scheme were predicted at 72 sensitive receptors locations near affected roads. The model was verified for the 2014 baseline year by comparison with local authority monitoring undertaken on roads within the study area.

The future 2018 and 2033 model years were also modelled using 2014 and 2018 emissions parameters, respectively, as a cautious approach to consider the effects of the fleet improving less than expected in the future. The modelling concluded that the annual mean objectives for both and NO_2 and PM_{10} would not be exceeded, either with, or without, the proposed scheme going ahead.

The largest impact was described as moderate adverse at one location near the junction in 2014, although in the 2033 scenario it was described as slight adverse.
The effects at receptors to the west of the AQMA were described as slight beneficial.
The effects at the majority of locations were described as negligible.

The annual mean concentration of PM_{10} was not predicted to exceed the objective values in any year or scenario. The impacts in all scenarios and years were predicted to be negligible. Overall, the impact of the proposed scheme is not considered to constitute a significant effect on local air quality.

The scheme started on site in July 2018, with a scheduled 12 construction period.

Major Development

IAMP

The International Advanced Manufacturing Park (IAMP) is one the most important development sites in the North of England, with the North East seen as an exemplar in this industry. Both Sunderland and South Tyneside Councils have allocated 150 hectares of development land to the north of Nissan UK and adjacent to the A19 trunk road. The IAMP was designated a 'Nationally Significant Infrastructure Project' (NSIP) by the UK Government, with a Development Consent Order expected from 2019.

In order to facilitate the first phase of development, both Councils adopted the International Advanced Manufacturing Park Area Action Plan on 30 November 2017. A planning application for IAMP ONE was approved by Sunderland City Council in May 2018 and the construction is expected to commence during 2018, with the first site occupiers expected in early 2019.

Victoria Road West housing development

A proposed residential development consisting of 334 residential dwellings, on land to the west of Victoria Road West, Hebburn, was received by the planning department. Due to the size of the development an air quality assessment with regard to NO_2 and PM_{10} was required.

A DMRB (Design Manual for Roads and Bridges) assessment was carried out based upon three scenarios verification and base year, 2026 open future year 'without development' and 2026 open future year 'with development'.
The following roads were examined in the assessment:

- Victoria Road West (A1085);
- Victoria Road East (A1085);
- Hall Road;
- Station Road;
- South Drive;
- Parkside;
- Hebburn Sports Social Club car park (north of Parkside);
- Mill Lane (B1036);
- Site Access.

5 sensitive receptors were identified (ESR1-5) along with 3 potential receptors (PR1-3) in the 'with development' scenario.

Model verification was based upon 2014 data from automatic analyser at Hall Road Hebburn and a passive diffusion tube. The air quality assessment predicted that there will be a negligible impact on concentrations of NO_2 and PM_{10} at all of the existing sensitive receptors considered, in 2026 with the development in place. Exceedance of the NO_2 and PM_{10} annual mean air quality objectives of 40µg/m^3 is not predicted to occur, for all of the existing sensitive receptors considered, for the 'without development' and 'with development' scenarios.

Transport colleagues have indicated that in terms of the traffic impacts on the localised network, there will be a high degree of saturation at the Station Road / A185 and Mill Lane / A185 junctions which could lead to detrimental air quality impacts.

Given the resultant congestion and air quality implications arising from the development, the Council secured a significant developer contribution to improve the junctions around the vicinity of the development. Work has commenced on site with the development and the Council is currently assessing the highway improvements that can be delivered.

Development adjacent to AQMA

Eskdale Drive housing development

This application proposes a housing development of 36 units in an area adjacent to the existing Lindisfarne, Jarrow air quality management area. A full air quality assessment was requested in line with the Council's validation check list for planning applications, to fully characterise the site in terms of current and future air quality compliance with current statutory European Union limit values for Nitrogen Dioxide (NO_2) and PM_{10}.

ADMS Roads model has been used to investigate levels of NO_2 and PM_{10} in relation to the following road networks: Eskdale Dr; Hedworth Lane; A194; A19; A1300 John Reid Rd;. The report uses 2015 as a base year and investigates compliance with EU limit values for NO_2 and PM_{10} in 2018 'with' and 'without' development.Relevant sensitive receptors and potential new receptors were identified within the assessment.

The report concluded that there will be a negligible impact on both NO_2 and PM_{10} levels for 2018. 'With development' are assessed to be below the EU limit values, all receptors are expected to have an increase of less than 0.08µg/m³ for NO_2 and PM_{10}.

Salcombe Avenue housing development

This application proposes a housing development of 20 properties in an area adjacent to the existing Lindisfarne air quality management area. As part of the application a full air quality assessment was requested to fully characterise the site in terms of current and future air quality compliance with current statutory European Union limit values for Nitrogen Dioxide (NO_2) and PM_{10}.

ADMS Roads model has been used to investigate levels of NO_2 and PM_{10} in relation to the following road networks: A194 Newcastle Rd; A19; A194 Leam Lane; and A1300 John Reid Road. The report uses 2015 as a base year and investigates compliance with EU limit values for NO_2 and PM_{10} in 2018 'with' and 'without' development. Relevant sensitive receptors and potential new receptors were identified within the assessment.

The report concluded that there will be a negligible impact on both NO_2 and PM_{10} levels for 2018 'with development' are assessed to be below the EU limit values.

Diffusion Tube Bias Adjustment Factors

Diffusion tubes are supplied and analysed by Gradko International Ltd, Winchester, Hampshire. The preparation method used is 20% TEA (Triethanolamine) and acetone. The bias adjustment factor of 0.87 was obtained from the Spread sheet version 03/18 v2.

PM Monitoring Adjustment

PM_{10} is monitored at two locations using TEOM instruments. The data has been adjusted using the volatile correction model (VCM) accessed at http://www.volatile-correction-model.info/ .

QA/QC of continuous monitoring stations

The QA/QC procedures of South Tyneside Council are based on the AUN Site Operator's manual along with training received from our original equipment suppliers, Casella Group.

Maintenance / Calibration of equipment:

- A qualified engineer services automatic analysers every 6 months under a contracted service agreement. The analysers are calibrated during service visits.
- Matt's Monitors Ltd are under contract to maintain the stations, staff visit each monitoring station at least once every 4 weeks to ensure all of the equipment is working within normal parameters and to conduct zero and span checks of the equipment. The filters at each site are changed during these visits.
- If a problem is noted with any of the stations, a call-out is initiated and a service engineer will visit the site within 2 days to correct the fault.

Data Validation

AQDM are now under contract with South Tyneside Council to validate and ratify continuous monitoring data. Monthly reports of the data are produced and e-mailed to South Tyneside Council. They review the data daily to ensure that:

- Telecommunications to the station are operational
- The air quality station is operational
- Individual analysers are operational
- Air quality exceedances are identified
- Operational information such as TEOM filter loading, does not invalidate data
- Obvious data errors are identified

Data Ratification

In addition to the initial data screening process (validation), data are further scrutinised in monthly blocks by AQDM in order to provide a final ratified data set.

Data is reviewed for erroneous data such as:

- Daily calibration spikes
- Routine or service visit errors
- Analyser faults
- Site faults, such as power outages

QA/QC Diffusion Tubes

Gradko has full U.K.A.S. accreditation for compliance with ISO-IEC 17025 for laboratory management system. The accuracy and consistency of analytical methods is regularly monitored using external proficiency schemes such as

- Workplace analysis scheme for proficiency (W.A.S.P.)
- Laboratory Environmental Analysis Proficiency (L.E.A.P.)

Distance correction for diffusion tubes

Where diffusions tubes are not located immediately next to a desired receptor, DEFRA have provided an Excel spreadsheet to help predict levels using required data.
This Excel tool has been developed to help local authorities derive the NO_2 concentration at locations relevant for exposure as it is not always possible to measure concentrations at precisely the desired location. The calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site. The monitoring can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be.

The methodology consists of comparing the monitored annual mean NO_2 concentrations at a given point against known relationships between NO_2 concentrations and the distance from a road source.

Any further information with regards to the use of this tool is provided within LAQM.TG(16).
DT27 – A194 Arches Roundabout.

Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	0.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	15	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	18.18	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	39.03	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	26.5	µg/m^3

DT34 – Westoe Road

Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	7	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	17.21	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	36.57	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	30.9	µg/m^3

Annualisation

Middlesbrough	January	Feb	March	April	May	June	July	August	September	October	November	December	C1 average	Ra
	25.57	15.18	15.6	11.66	11.3	6.89	7.44	5.5	9.26	10.59	17.92	19.38	13.01	
Stirling Ave							7.44	5.5	9.26	10.59	17.92	19.38	11.68	1.11387
vic road west							7.44	5.5	9.26	10.59	17.92	19.38	11.68	1.11387
vic road west south drive									9.26	10.59	17.92	19.38	14.28	0.911064
alice street							7.44	5.5	9.26	10.59	17.92	19.38	11.68	1.11387
reed street							7.44	5.5	9.26	10.59	17.92	19.38	11.68	1.11387
Stanhope Road next to bakery							7.44	5.5		10.59	17.92	19.38	12.16	1.069901
holland park drive								5.5	9.26	10.59	17.92	19.38	12.53	1.038308

Newcastle City Centre	January	Feb	March	April	May	June	July	August	September	October	November	December	C1	Ra
	41.64	32.68	35.65	25.26	26.22	22.41	22	20.83	24.82	29.24	34.66	33.31	20.06	
Stirling Ave							22	20.83	24.82	29.24	34.66	33.31	27.48	0.729985
vic road west							22	20.83	24.82	29.24	34.66	33.31	27.48	0.729985
vic road west south drive									24.82	29.24	34.66	33.31	30.51	0.657489
alice street							22	20.83	24.82	29.24	34.66	33.31	27.48	0.729985
reed street							22	20.83	24.82	29.24	34.66	33.31	27.48	0.729985
Stanhope Road next to bakery							22	20.83		29.24	34.66	33.31	28.008	0.716224
holland park drive								20.83	24.82	29.24	34.66	33.31	28.572	0.702086

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

Boldon Lane AQMA

Lindisfarne AQMA

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

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

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

Glossary of Terms

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

Add references here.