Sunderland City Council

2019 Air Quality Annual Status Report (ASR)

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

Date June 2019

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Executive Summary: Air Quality in Our Area

Headlines

We are pleased to be able to report that the Air Quality in Sunderland is good. Health based objectives known as the Air Quality Objectives are being met across the City and we have seen a general decline in some of the pollutants measured. We have not declared any Air Quality Management Areas in our City.

Sunderland City Council is committed to try to reduce levels further and to support initiatives that will improve air quality and well-being in Sunderland. We are continuing to monitor levels of air quality throughout the City; Appendix A of this report contains a summary of air quality data collected in 2018. Our real time monitoring data as well as data from other sites across the region can be accessed by going to http://www.ukairquality.net/

We also look at new sources such as new roads or industrial sites to assess their potential impact on the City's air quality.

Together with our partners in Transport and Public Health we aim to work together to try to improve air quality and there are ways that Sunderland's residents and businesses can get involved too.

Sunderland residents and businesses can get more information by visiting http://gosmarter.co.uk/.

Air Quality Initiatives

Here are a few examples of initiatives taking place in Sunderland that aim to bring improvements in our air quality.

Ultra Low Emissions Vehicles

Sunderland City Council's ambition is to increase the use of electric vehicles as part of its fleet operations and for wider public use. The aim is to future proof Sunderland for the increasing use of zero and ultra-low emission vehicles, in an effort to move away from conventional internal combustion engines and associated tail-pipe emissions which are harmful to local air quality.

Current Developments

Sunderland City Council was part of a regional bid to become one of the Go Ultra Low Cities through a national programme managed by the Office for Low Emission Vehicles (OLEV). The bid was submitted by the North East Combined Authority (NECA) and £1.5m of development funding was awarded to deliver a Go Ultra Low Filling Station located in Sunderland.

The site has now been delivered and officially opened in June 2019, providing a short-stay drive through arrangement under a bespoke photo-voltaic canopy. The station provides the first public access rapid charging units in Sunderland including four 50kW DC units, a Tesla adaptor and also two 175kW units which are the first of this type in the UK.

Next Steps

Sunderland is seeking to secure the replacement and upgrading of the existing network of charging post infrastructure. The intention is to seek a private sector partner to operate and maintain the network, and it is expected that the type and location of charging infrastructure will change reducing in number from those originally installed. The upgrading of the network is being organised on a regional basis again though the NECA to provide a joined up and connected network of chargers across the seven local authority areas.

Funding has also been secured:

- to provide a rapid cluster site in Washington, subject to granting of planning permission,

- to provide a rapid charging unit in Houghton-le-Spring, funded through the OLEV Taxi Fund to incentivise taxi companies to make the switch to electric vehicles,

- to provide work-place charging at three Council sites in Sunderland and Washington,

- and to provide EV infrastructure for the new Parsons Depot and at Jack Crawford House secured through an ERDF programme

Existing Projects

Sunderland City Council is encouraging the use of Ultra Low Emission Vehicles (ULEV). Sunderland's own council fleet now includes electric fleet vehicles like the below.

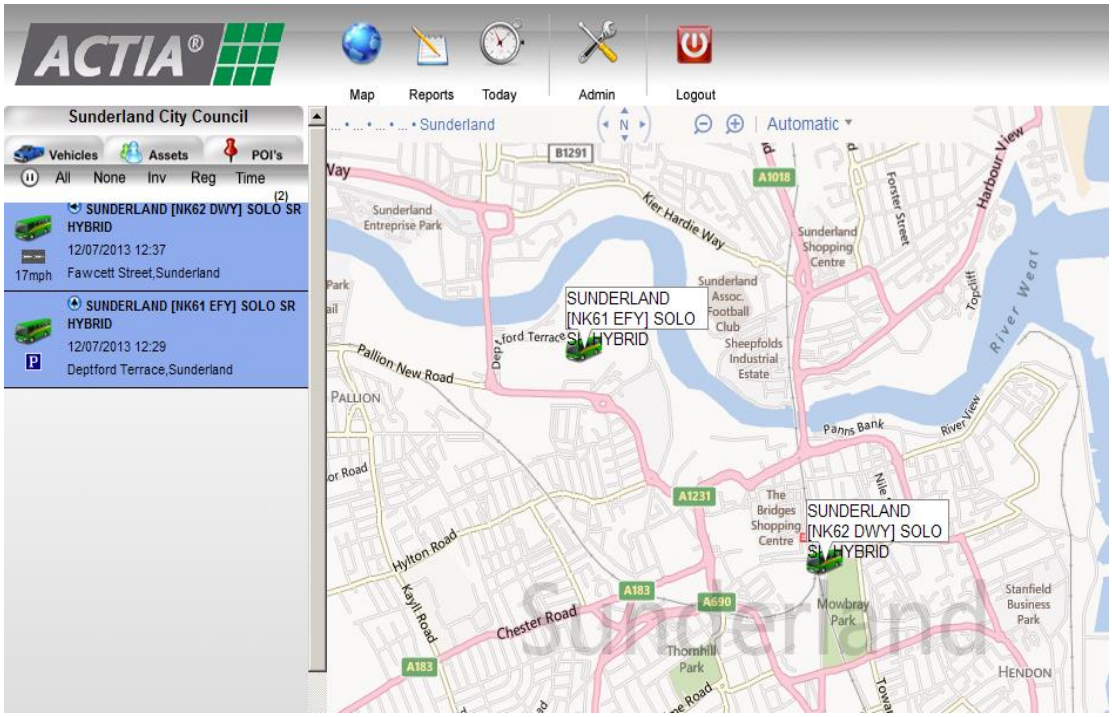
Residents can also try out electric vehicles by using the Co-wheels Car Club which has hybrid and low emission vehicles at 4 locations throughout the city close to public transport links. Staff, community organisations and the public may hire the cars at an hourly rate. Please go to http://www.co-wheels.org.uk/ for more information.

AMAP Project (Automotive and Manufacturing Advanced Practice)

Sunderland City Council, University of Sunderland and Nexus have been working in partnership to carry out a Low Carbon & Electric Vehicle Monitoring Project which involves the Study of Fleet Vehicles operated by partners including Electric Cars and Hybrid Buses. The scope of the project includes

- Remote Vehicle and Driver Performance Monitoring
- Efficiency and Long Term Benefits of EV and Hybrid Vehicles

Live tracking of vehicles to monitor performance.



Low Carbon Bus Service in Sunderland

This project has provided a City Centre Shuttle Bus service to improve connections between the City Centre, University Campuses and main tourist locations in Sunderland. Sunderland Connect 700 low carbon hybrid bus service introduced in Sunderland in 2011 and extended in 2013.

The service promotes the use of public transport, health and wellbeing through sustainable travel. The service meets with the aims and objectives of the Local Transport Plan and Economic master-plan for Sunderland

Gas buses in Sunderland

17 new (CNG) gas buses were initially introduced following an investment from Stagecoach of over £2.5 million in buses. Stagecoach's investment in the buses part-funded by a grant from the Department for Transport's (DfT) Green Bus Fund including a £1 million for the infrastructure at the Sunderland depot, which includes a gas plant for the fuel supply.

The new gas buses are Scania / ADL Enviro 300 single-deckers. The original 17 vehicles entered service in February 2014 on city routes 16 and 20. A further 23 have since being procured and are in service.

Additionally Sunderland recently supported a bid to the Clean Bus Technology Fund led by Gateshead which covered a Go North East cross boundary service travelling between Sunderland, Gateshead and Newcastle. This award is part of the recently announcement where Councils across the country will benefit from a £40 million funding boost as part of a government drive to put more low emission buses on the roads. The 2018/19 funding will enable 16 buses on the 56 service which travels the A1290 and serves the Nissan plant; to be retrofitted with a Selective Catalytic Reduction System. This technology will assist reductions in NO_x and NO_2 emissions and will also reduce harmful particulate matter.

Cycle to work scheme

Sunderland City Council has recently introduced a cycle to work scheme which will help employees to purchase a cycle via salary sacrifice. It is hoped the scheme will increase the number of employees choosing to cycle to work and along with health benefits associated with regular exercise, it is hoped that this will improve air quality within the city.

Pedestrian and Cycling Routes

As part of the Regional Growth Fund 4 programme in the Washington area, 2,865m of new shared surface footway/cycleway was installed and 12,725m of existing footway was upgraded to a shared surface of a minimum 3m width. **Works**

completed March 2015.

Following on from this work a further 8,855m of existing footway was upgraded to shared use, creating a north/south connection in the vicinity of the A182 in order further increase the penetration of the network in this area and link to the national cycling network. These works were funded by Council LTP funding. **Works completed March 2017**.

Both of these schemes included provision of new or upgraded crossing facilities to facilitate safe routes for cyclists and avoid conflict with other road users and compliance with the Equalities Act, and provision of new street lighting where appropriate.

Air Quality in Sunderland

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].

Pollutants can come from a variety of man-made sources such as industry, combustion of fuels, traffic engines and building heating. Some can come from natural sources such as the North Sea which adds to particulate levels. Air Quality in Sunderland is most heavily influenced by traffic emissions. The pollutant of most concern to Sunderland is Nitrogen Dioxide (NO_2) caused by road traffic.

Levels of pollution across Sunderland, indicated by the latest monitoring data, are falling and Sunderland has not had to declare an AQMA within its boundary

Sunderland City Council's Housing Services Team (Environmental Health) is responsible for overseeing the air quality monitoring network and reporting the data to DEFRA. We work together with other Local Authorities in our region as Air

[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

Pollution is trans boundary in nature. Many of the improvements to the road network or fitting buses with pollution reducing technology will have positive benefits in more than one local authority region in our area. The GoSmarter project mentioned earlier operates across all of the Tyne & Wear Authorities and Northumberland.

We also work closely with our partners in Transport, Public Health and Planning as well as partners outside the Local Authority such as the Environment Agency to improve air quality standards.

Actions to Improve Air Quality

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.

Sunderland City Council currently does not have any AQMAs. For reference, a map of Sunderland's monitoring locations is available in Appendix D.

Conclusions and Priorities

We are pleased to report that no exceedences of the Air Quality Objectives were identified during the year 2018. Sunderland City Council does not currently have any AQMA's and because of our good air quality we conclude that we do not need to declare an AQMA for any pollutants.

Looking back over the last 5 years of data it can be seen that there has been a general decrease in NO_2 levels up to 2015. However, during 2016 an increase in NO_2 levels at most of our monitoring sites (apart from 3 diffusion tube sites) has been recorded although levels are still below the National Air Quality Objectives. During 2017 a downward trend was observed across most of our monitoring sites. Interestingly, in 2018 we have seen mixed results in change at our monitoring sites. Both automatic sites reported a small increase in annual mean NO_2, whilst at diffusion tube sites there were 22 sites reporting lower concentrations and the remaining 12 comparable sites showing an increase. According to the UK's Annual report on air pollution for 2017, levels of NO_2 have been decreasing at urban background sites but the same trend has not been repeated at urban roadside sites.

For the purposes of air quality monitoring and assessment of compliance with Directives, the UK is divided into 43 zones. The 2017 results are summarised below:

- The UK met the limit value for hourly mean nitrogen dioxide (NO_2) in all but two zones.
- Six zones were compliant with the limit value for annual mean NO_2. The remaining 37 zones exceeded this limit value. In 36 of these zones the exceedance of the limit value decreased compared to 2016. Modelling done for the 2017 UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations indicated that improvements in zone compliance would begin to be seen only in 2019 once the time necessary to put measures in place was factored in.

In the coming year Sunderland City Council intend to continue to monitor local air quality and to identify any opportunities for projects that will have a positive impact on air quality.

Sunderland Council has strong partnership links with Sunderland University, Nexus, Local businesses and the other Tyne & Wear Local Authorities and intend to build on these partnerships in the future in order to promote the improvement of our City's air.

The new Wear Crossing and associated road network are now completed and opened at the end of August 2019. Further air quality monitoring is scheduled to begin imminently following the opening of the bridge to assess air quality levels in the vicinity for a period of 12 months.

Local Engagement and How to get Involved

There are ways in which we can all make small changes in our daily lives that will benefit the air quality in Sunderland. Things like walking instead of taking your car for short distances, car-sharing to get to work and driving carefully can all make a difference.

Sunderland City Council is part of the Department for Transport funded 'Go Smarter' sustainable transport programme launched four years ago, to promote more environmentally friendly ways of travelling than over-reliance on the car.

The Go Smarter to Work team at Sunderland City Council works with local businesses and employees to provide the practical help, advice and encouragement needed to walk, cycle or use public transport of car share for the journey to work.

Sunderland residents and businesses can get more information by visiting http://gosmarter.co.uk/ where you can:

- Plan your journey using public transport, walking or cycling
- Get advice on smarter ways to travel to work
- Get information for parents and pupils travelling to school.

Businesses can benefit too. Making smarter travel choices in your business can have vast benefits for your employees and your business.

Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

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

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

Sunderland City Council currently does not have any AQMAs. For reference, a map of Sunderland City Council's monitoring locations is available in Appendix D.

2.2 Progress and Impact of Measures to address Air Quality in Sunderland City Council

Defra's appraisal of last year's ASR concluded that *on the basis of the evidence provided by the local authority the conclusions reached area acceptable for all sources and pollutants*. Defra has also provided comments to assist with future reports and this advice has been applied to improve this year's report.

We have continued to review our monitoring sites. The 4 new diffusion tube sites along the A1231 corridor in Washington have now been in place for 10 months and the results were able to be reported within this ASR.

We have also assisted in the commissioning of two new automatic monitoring sites to monitor NO_2 levels as a result of the new Wear crossing (Northern Spire) opening. Monitoring has been delayed allowing traffic patterns to settle and data should begin to be collected in the very near future. Results will be reported in next year's ASR.

Ministerial Directive

In last year's ASR we reported that a stretch of highway in Washington had been identified by DEFRA's Pollution Climate Mapping Model (PCM) as having an exceedance of the NO_2 AQ Objective. The section of road under consideration is the A1231, from its junction with A182 to the A195.

Sunderland Council were included in the third wave of Local Authorities who, following a ministerial directive, carried out a targeted feasibility study to deliver a reduction nitrogen dioxide concentration in the shortest time possible. A local dispersion modelling exercise using ADMS-Roads was undertaken, outputs from which provided updated source apportionment results to be used to better direct possible measures.

The following list of measures have been developed with some delivered since the identified baseline year of 2015 for projected exceedance. Some of these interventions have already been delivered through a range of funding streams which provide improvements designed to increase capacity and reduce congestion to benefit the operation of the highway network. The main benefits will include improvements to journey times, improved capacity and through flow at junctions. In terms of air quality

benefits, these improvements will allow reductions in car idling time and the resultant reductions of NO_x and NO_2 emissions at junctions in this locality. Other measures proposed are longer term and are also described below.

Given the extent of the activities already implemented since 2015, the Council are therefore of the view that improvements in air quality have already been realised relative to the PCM predictions.

New Measures Completed Since 2015

- Highway Scheme - Enterprise Zone at Hillthorn Farm (Completed October 2017)

ERDF funding has enabled the realignment of the A1290 to alter the existing double bend arrangement on the A1290 Washington Road. This revision to the road alignment improves access and journey times to and from the Enterprise Zone with the redistribution of road traffic away from residential properties at Glover Road / Spire Road and Severn Houses. This in turn will assist in improving air quality in this locality and will be beneficial in terms of reducing traffic noise impact on the residential properties at Glover Road / Spire Road and Severn Houses.

- Highway Scheme - A1290 Washington Road Corridor (Completed February 2015)

The Regional Growth Fund Round 4 funding programme enabled the refurbishment and replacement of traffic signal equipment which operated on traditional fixed patterns signal timings. The new signal equipment incorporates MOVA technology, which adapts to queuing demands and is a more reactive to real-life demands at junctions. Based on research MOVA technology provides a minimum 5% improvement on journey times and as such is a benefit to the A1290 corridor by reducing congestion and improving journey times to major employment sites including the Sunderland Nissan plant and key chain suppliers in the automotive sector.

- Highway Scheme - A1231 Sunderland Highway (Completed March 2015)

Highways England secured funding through the Pinch Point Programme to provide improvements to the A19/A1231 junction. These works involved widening the A1231 eastbound approach to the roundabout to three lanes to provide additional capacity

and improving traffic flows northbound onto the A19 as part of the strategic road network in Sunderland. This scheme also included the provision of new signal equipment incorporating MOVA technology, which adapts to queuing demands and is a more reactive to real-life demands at junctions. Based on research MOVA technology provides a minimum 5% improvement on journey times.

- Pedestrian and Cycling Routes (Completed March 2015 / March 2017)

As part of the Regional Growth Fund 4 programme in the Washington area, 2,865m of new shared surface footway/cycleway was installed and 12,725m of existing footway was upgraded to a shared surface of a minimum 3m width.

Following on from this work a further 8,855m of existing footway was upgraded to shared use, creating a north/south connection in the vicinity of the A182 in order further increase the penetration of the network in this area and link to the national cycling network. These works were funded by Council LTP funding.

Both of these schemes included provision of new or upgraded crossing facilities to facilitate safe routes for cyclists and avoid conflict with other road users and compliance with the Equalities Act, and provision of new street lighting where appropriate.

- Adjust Signal Timings on A1231/A182 Junction (Completed March 2018)

The recent implementation of Microprocessor Optimised Vehicle Actuation (MOVA) control to existing traffic signal equipment located approach roads to the grade separated roundabout junction with the A1231 Sunderland Highway and the A182 Washington Highway. The addition of MOVA will allow improved management of flows to maximise capacity on approaches while still achieving road safety benefits.

- HGV Trip Reduction – NMUK (Completed 2017)

Supported the delivery of a link road between Vantec Logistics (automotive components supplier) and NMUK. The link road enables movement of goods and components within the NMUK complex internalising HGV trips and removing trips from the local road network.

- Clean Bus Fund Technology – Bus Retrofit (Completed 2014 and 2016)

Sunderland have previously been successful in securing two rounds of funding to retrofit existing bus fleet service vehicles, and partnered with adjacent Local Authorities

of Durham, Gateshead and Newcastle and bus operator Go North East. The vast majority of buses operated in Sunderland are new fleet vehicles, and meet emission standards. As such, there are few vehicles left which would benefit from a retrofit.

New Measures On-going Since 2015

- Go Smarter to Work (On-going)

The Council has an on-going working relationship with major employers in Washington, with specific focus on the Nissan Manufacturing UK (NMUK) plant and key chain suppliers.

This work builds on travel planning measures and delivered through the Go Smarter to Work programme originally funded through the Local Sustainable Transport Fund.

The Go Smarter to Work team has worked with Nissan since 2013. During this time together achieved a 8% reduction in employees driving a car alone to work, 1% increase in employees cycling to work, 3% increase in employees commuting by bus and a 1% increase in employees car sharing.

These measures are to promote sustainable travel options and reduce single car occupancy. Measures promoted are walking, cycling and use of public transport. The increase in use of car sharing.

- Car Purchase Incentive Scheme (On-going)

Nissan offer employees the option of purchasing the zero emission Nissan LEAF model and also new more efficient Nissan car models, as part of a salary sacrifice staff incentive scheme. Details of current vehicle type petrol / diesel / EV can be identified through staff survey responses, as well as non-motorised user travel.

A similar scheme is available to Council staff, permanent staff of authorised suppliers, MOD/Police/Fire employees and their family members.

- Public Transport (On-going)

The North East Smart Ticketing Initiative (NESTI) for which Nexus acts as programme manager and which has led the delivery of smart ticketing in the region, is offering £50,000 worth of commercial opportunities to develop a new virtual travel ticket system for mobile devices.

NESTI is working alongside ITSO Ltd, the non-profit organisation which sets technical and interoperability standards for UK smart ticketing, to bring host card emulation (HCE) to the UK, allowing mobile devices to replicate a smart card such as the Pop card, used by more than 100,000 people in North East England.

The aim is to replicate the current functionality of the Nexus, Metro and Pop card apps, making it easier for customers to purchase and store tickets, check and top up balances and to receive real time journey updates.

- Traffic Management (On-going)

Review vehicle speeds on A1231 and consider the impacts of a potential speed limit change.

- Urban Traffic Management Control (On-going)

The junction with the A1231 Sunderland Highway and the A182 Washington Highway is also a potential site for Urban Traffic Management Control (UTMC) integration. The UK's first multi-district intelligent traffic management system amalgamates the traffic management operations on behalf of the seven North East Combined Authority districts from one site, controlling traffic signals, bus lanes, CCTV and traffic flow across the region. The UTMC system provides co-ordination between a network of junctions in order to reduce congestion, improve journey times and bring new levels of reliability to the road network across the North East region. The system, which is funded by the Department for Transport and operated on behalf of the North East Combined Authority, is the first in the country to manage and monitor traffic flow across multiple local authority boundaries

The impact of the improvements will generally be to deliver a smoother journey meaning fewer stop starts and delays resulting in a decrease in harmful emissions and an improvement in local air quality.

- Travel Planning – Various (On-going)

Working with SME's in Washington to promote sustainable travel and associated health and wellbeing benefits through walking, cycling / Nordic walking.

Workplace Travel Planning for commercial and retail businesses with follow up event at The Galleries Shopping Centre.

Workshop with public and private sector partners to promote sustainable transport and alternative smarter travel options.

School Travel Plans - Provide travel planning support to target schools of Albany Village Primary, Washington School, Wessington Primary and Barmston Village Primary.

Priority Car Share bays for new developments – 25% proposed with International Advanced Manufacturing Park (IAMP) Area Action Plan.

Priority EV parking bays for new developments within IAMP.

- Freight Consolidation - North East Freight Partnership (On-going)

The North East Freight Partnership was first established in 2005 (as the Tyne and Wear Freight Partnership) and represents a collaboration between freight operators, local authorities, academics, freight user groups, industry associations and anyone with an interest in freight. In 2015, it extended its remit to include Durham and Northumberland, as well as the five Tyne and Wear authorities, so it now covers the same geographical footprint as the North East Combined Authority.

The aim of the Partnership is to promote safe, efficient and sustainable freight movement in the region. Each year, the Partnership offers a programme of activities to help achieve these goals. This includes quarterly meetings, online resources, training, promotion of Best Practice, trials of the latest technology and promotion of fleet accreditation schemes and cycle safety initiatives.

Best practice guidance is supplied in terms of fuel saving, developing skills, equipment and systems and performance management.

New Proposed Measures with Funding Secured

- Clean Bus Fund Technology – Go North East cross boundary service (Scheduled for 2018/2019)

Sunderland recently supported a bid to the Clean Bus Technology Fund led by Gateshead which covered a Go North East cross boundary service travelling between Sunderland, Gateshead and Newcastle. This award is part of the recently announcement where Councils across the country will benefit from a £40 million

funding boost as part of a government drive to put more low emission buses on the roads. The 2018/19 funding will enable 16 buses on the 56 service, which travels the A1290 and serves the Nissan plant, to be retrofitted with a Selective Catalytic Reduction System. This technology will assist reductions in NO_x and NO_2 emissions and will also reduce harmful particulate matter.

- Go Ultra Low Cities - Go Ultra Low Filling Station (Scheduled for September 2018)

Working with the North East Combined Authority, Sunderland City Council has secured £1.5m funding from the Office for Low Emission Vehicles to provide a Go Ultra Low Filling Station in Sunderland. This facility will include 6 number 50Kw rapid charging units and canopies with photo-voltaic units for energy generation. This site is one of two Filling Station sites in the north-east of England with the second located on Science Central at Newcastle University. Additional funding is provided through ERDF and UKCRIC.

Other Proposed Measures

- LGV/HGV Fuelling Station (Proposed)

A proposal has been submitted to seek planning consent for a Compressed Natural Gas (CNG) filling station including fuel dispensers and storage tanks on land at Turbine Business Park which is located to the north of the A1231 Sunderland Highway. This facility, subject to planning, will proved alternative refuelling infrastructure (see also Go Ultra Low Cities heading).

- New EV Fleet Depot - Sunderland Electric Vehicle Hub (Proposed)

This project is intended to create a Regional Electric Vehicle Hub to support the operation and maintenance of both new and electric commercial vehicles for public sector users. The primary site is at Washington to the west of the A19 strategic road network - this is a strategic central location well placed to serve public sector commercial fleet vehicles from across the NELEP area.

An outline application has been made to ERDF seek investment in renewable energy, EV rapid/fast charging infrastructure and new energy storage solutions at this New EV Fleet Depot.

The application focuses on the additional low carbon measures and next phase technologies that will be incorporated into the new facilities. The installation of low carbon vehicle infrastructure will support the conversion of up to 20% of operational fleet to LCV/ULEV by 2020. Funding for this proposal will directly support the conversion of diesel / petrol fuelled internal combustion engine vehicles to zero and low carbon alternatives. It is planned that 370 of the Council's fleet vehicles will be converted by 2028.

- IAMP - Committed Highway Improvements (Proposed)

The following mitigation will be delivered as part of this extensive site:

i. A1290 to become dual carriageway and tie into existing single carriageway immediately east of West Moor Farm;

ii. A1290 to become dual carriageway. Interim tie in to existing Downhill Lane, final proposed tie in to HE's Downhill Lane junction scheme;

iii. Construction of new single carriageway road from a new junction on A1290 eastward towards A19;

iv. Construction of new single carriageway bridge over A19 from new road in the west to Washington Road in the east;

v. Washington Road carriageway works, road level to be raised to meet new bridge over A19 with localised widening works and retaining structures;

vi. Construction of a new single carriageway road to run parallel to the west of the A1290;

vii. Construction of new dual carriageway which changes to single carriageway. In the north it will connect to the new bridge being delivered over the River Wear as part of the SSTC works;

viii. Construction of a new single carriageway single span bridge over the River Don;

ix. Construction of new single carriageway from new bridge over the River Don northward;

x. Highway to be stopped up once alternative access to North Moor Farm is provided;

xi. Surface improvements to Follingsby Lane and West Pastures;

xii. Diverted access to North Moor Farm;

xiii. Highways to be stopped up and the Great North Forest Heritage Trail to be diverted;

xiv. Upgrade to non-motorised user facilities;

xv. Construction of a new single carriageway road from Washington Road to connect to new road;

xvi. Diverted access to Elliscope Farm;

xvii. Proposed Nissan car park access; and

xviii. Proposed non-motorised users link to Elliscope Farm.

Other Potential Measures

- Car Club - Targeted provision of additional electric car club vehicles.
- Promotion of Rail complimented by Station Accessibility Audits - Promotional activity through campaigns. Accessibility Audits carried out at main stations.
- Implementation of Public Transport Infrastructure Improvements - Implementation of Public Transport Infrastructure RTI, enhanced shelters, raised kerbs, bus priority etc.
- Workplace Capital Grant Scheme - Capital grants to encourage the use of sustainable travel modes, such as, cycle storage, lockers and showers.
- Getting about campaign and dedicated travel website - Area wide behaviour change campaign, travel website providing journey planning advice, Area Cycle / Bus maps, promotional activity on-going etc.
- Parking enforcement - Decriminalised parking powers secured, parking enforcement officers target hotspots. CCTV camera car enforces at school zig-zags and bus stop clearways.

- Multi modal / operator smartcard - ITSO compliant smartcard. Backed up with promotional campaigns, bus info via Getting about website etc.
- Behaviour change campaigns to reduce single occupancy car trips - Commuter Challenge, Bike Week, Walk to School Month, etc.
- Car Share - Promotion of Sunderland Car Share and Car Share Week.
- Transition Travel Choices Campaign - Campaign to target travel behaviour change for those going through key transition in life, i.e. changing jobs, moving house, etc.
- Promotion of sustainable development - Work with Development Control team to support development designed to minimise reliance on private car.
- No idling campaign - Promote no idling campaign at main junctions.
- Job Seeker Travel Scheme - Working with Job centres to promote cycling through bike voucher scheme and training.
- Apprentice Travel Scheme - Assisting apprentices' access employment and learning through sustainable travel.
- Taxi Licencing - Work towards "greening" taxi fleet through specifying low emission vehicles including EV's.
- Closure and relocation of public access points – re-routing of public footpaths and open spaces to locations away from exceedance area.

Following the submission of the study to DEFRA, the following response was received.

Sunderland City Council

1. Sunderland City Council has one road link with a projected exceedance of the annual mean NO_2 limit value in the national PCM modelling: a section of the A1232 (Census ID 57620).
2. In their feasibility study, Sunderland City Council used local modelling, which demonstrated that Census ID 57620 was compliant with the NO_2 limit value in 2017 based on an NO_2 concentration of 35 µg/m^3.
3. Sunderland City Council's road link is therefore considered compliant with legal limits.

Sunderland will continue to use diffusion tubes to monitor this location for at least the next few years to ensure compliance.

$PM_{2.5}$ – 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.

Background on the impacts on health outcomes and rationale:

The people of Sunderland have lower life expectancy at birth than the England average, with a gap of 2.2 years for males and 2.4 years for females. Data published recently shows that:

- 17.1% of the gap for males and 24.1% of the gap for females is due to deaths from respiratory diseases;
- 13.4% of the gap for males and 16.2% of the gap for females is due to deaths from circulatory diseases;
- 28.1% of the gap for males and 34.3% of the gap for females is due to deaths from cancer.

Evidence shows that long term exposure to poor air quality increases the risk of mortality from cardiovascular and respiratory diseases and also lung cancer. Sunderland has higher than England average rates of death for these causes as follows:

- Premature (under 75 years) mortality rates from cardiovascular disease of 93 per 100,000 compared to 76 per 100,000 for England; of this 62 per 100,000 were preventable.
- Premature (under 75 years) mortality rates from respiratory disease of 44 per 100,000 compared to 33 per 100,000 for England; of this 28 per 100,000 were preventable.

- Premature (under 75 years) mortality rates from lung cancer of 50 per 100,000 compared to 34 per 100,000 for England; around 89% of lung cancers are preventable.

Data from the Public Health Outcomes Framework suggests that man-made small particulate air pollution ($PM_{2.5}$) contributes to deaths in the City and the burden this create on our population is equivalent to 4.5% of all deaths at ages 30 years and over. This places Sunderland is the best performing quartile for this measure.

Levels of $PM_{2.5}$ in Sunderland (as measured by the Silksworth monitoring station) are generally relatively low and in line with the national trend are generally reducing. Data for 2018, at 8µg/m^3 are well below the EU target of 25µg/m^3; however it should be noted that there is no completely safe level of exposure.

Actions already being taken by Sunderland City Council to reduce pollutants such as PM_{10} and NO_x as reported in the executive summary will also reduce levels of $PM_{2.5}$ emissions.

Examples of measures to tackle $PM_{2.5}$ can be categorised into Mobile Sources, Stationary Sources and Area Sources.

Mobile Sources

Sunderland Council has recently secured funding for the retrofitting of diesel buses which will help to reduce primary and secondary sources of PM2.5.

Stationary Sources

Stationary sources of $PM_{2.5}$ can originate from industrial processes that use dusty raw materials and equipment such as electrostatic precipitators. The Environmental Health Team of Sunderland Council closely monitors dusty emissions from permitted processes and respond to any complaints regarding dust emissions from demolition and/or construction sites. We also control dust through the planning process by ensuring construction sites have a Construction Environmental Management Plan in place.

Area Source Measures

The whole of Sunderland City Council's boundary is a smoke control area and domestic coal is not permitted to be used as fuel. The Environmental Team

investigates complaints of dark smoke or the use of unapproved appliances to minimise the emissions of $PM_{2.5}$ from these sources.

Sunderland City Council's Public Health Team are happy to support Environmental Health in promoting the importance of air quality in contributing to key priorities for the city and recommend that any actions that can reduce levels of $PM_{2.5}$ should be considered as part of the broad strategy to protect and promote the health of the Sunderland population.

Further discussions between our partners in Public Health and Transport are required to improve our understanding. Sunderland City Council will work towards reducing emissions and concentrations of $PM_{2.5}$ in their area as practicable.

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.

Sunderland City Council undertook automatic (continuous) monitoring at 2 sites during 2018. Table A.1 in Appendix A shows the details of the sites. Sunderland's monitoring results are available at http://www.ukairquality.net/home/map . National monitoring results are available at https://uk-air.defra.gov.uk/ .

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

Sunderland undertook non- automatic (passive) monitoring of NO_2 at 34 sites during 2018. Table A.2 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 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 2018 dataset of monthly mean values is provided in Appendix B. The diffusion tubes have been annualised, bias corrected, and distance corrected to the nearest receptor where appropriate.

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 2018 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.

3.2.2 Particulate Matter (PM_{10})

Error! Reference source not found. 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.5 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.

None of the Air Quality Objectives for PM_{10} were exceeded.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.6 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

The annual mean for 2018 was 8µg/m^3 which is well below the target of 25 µg/m^3.

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	Trimdon Street	Kerbside	438928	557151	NO2; PM10	NO	Chemiluminescent; TEOM	3	0.5	2
CM2	Silksworth	Urban Background	438116	554462	NO2; PM10; PM2.5	NO	Chemiluminescent, TEOM, FDMS	230	0.5	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)
38	17 Parkside South	Roadside	435714	552473	NO2	NO	0	18	NO	2
53	166 Chester Road	Roadside	438568	556566	NO2	NO	0	4	NO	2
55	25 Eden Vale	Roadside	438690	556135	NO2	NO	0	3	NO	2
56	101 Southwick Road	Roadside	439101	558282	NO2	NO	0	2	NO	2
57	5/6 Nbridge St	Kerbside	439664	557829	NO2	NO	0	2	NO	2
58	6 Beatrice Tce	Kerbside	432634	552616	NO2	NO	0	3	NO	2
86	2 Alice St	Roadside	439466	553484	NO2	NO	0	4	NO	2
88	Hind Street	Kerbside	439160	556995	NO2	NO	165	0	NO	4
94	Chaplin's PH	Kerbside	439423	556738	NO2	NO	0	2	NO	4
100	Air Quality Trailer, Trimdon Street	Kerbside	438927	557151	NO2	NO	3	4	YES	2
101	Puma Centre, Silksworth Lane	Urban Background	438927	557151	NO2	NO	130	3	YES	2
103	Air Quality Trailer, Trimdon Street	Kerbside	438927	557151	NO2	NO	3	4	YES	2
104	Air Quality Trailer, Trimdon Street	Kerbside	438116	554462	NO2	NO	3	4	YES	2
105	Puma Centre, Silksworth Lane	Urban Background	438116	554462	NO2	NO	130	3	YES	2

106	Puma Centre, Silksworth Lane	Urban Background	438116	554462	NO2	NO	130	3	YES	2
109	23 Newcastle Road	Roadside	435278	547463	NO2	NO	0	3	NO	2
111	237 Queen Alexandra Rd	Roadside	428269	553809	NO2	NO	0	9	NO	2
113	181 Durham Road..	Urban Centre	429555	558545	NO2	NO	20	4	NO	4
116	9 Derwent Street	Roadside	439648	558120	NO2	NO	0	2	NO	4
117	3, Holmside (Baker's Oven)	Roadside	439901	558514	NO2	NO	97	4	NO	4
118	27 Bridge Street	Roadside	438453	555507	NO2	YES	0	2	NO	4
119	4 Athaneum Street	Roadside	439792	556921	NO2	NO	88	2	NO	4
120	Gillespies	Roadside	439806	557063	NO2	NO	100	5	NO	4
121	16 Windsor Terrace	Roadside	440702	554722	NO2	NO	0	2	NO	4
123	263 Chester Road	Roadside	437943	556341	NO2	NO	10	4	NO	2
125	45 Station Road	Roadside	435417	547025	NO2	NO	0	2	NO	2
128	Echo Building	Roadside	439707	557312	NO2	NO	20	2	NO	4
129	West Sunniside	Roadside	439938	557089	NO2	NO	2	1	NO	4
130	St Mary's Car Park	Roadside	439538	557292	NO2	NO	177	3	NO	4
132	Dunn House Nth Bridge St	Roadside	439661	557901	NO2	NO	0.5	3	NO	4
133	Northern Way	Roadside	438123	558344	NO2	NO	0	3	NO	4
134	Southwick Rd/ Thompson Rd	Roadside	438563	558517	NO2	NO	0	2	NO	4
135	Merle Terrace	Roadside	437561	557538	NO2	NO	0	4	NO	2

136	1, Morningside	Roadside	428269	553809	NO2	NO	0	9	NO	2
137	11,Esthwaite	Roadside	429935	556631	NO2	NO	0	26	NO	2
138	Galleries Service Yard	Roadside	429984	556576	NO2	NO	56	1	NO	2
139	Rear 79 Spout Ln	Roadside	430989	556961	NO2	NO	8	0	NO	4
140	Musgrove Tce	Roadside	430877	556851	NO2	NO	3	0	NO	4

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 2018 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3]				
					2014	2015	2016	2017	2018
CM1	Kerbside	Automatic		97.1	38.9	34.2	37	30	32
CM2	Urban Background	Automatic		94.6	16	14	16	13	14
38	Roadside	Diffusion Tube		100	28.9	28.9	35.6	34.4	**33.5**
53	Roadside	Diffusion Tube		100	27.1	28.1	29.8	25.9	25.3
55	Roadside	Diffusion Tube		100	30.6	30.1	33.5	31.0	25.8
56	Roadside	Diffusion Tube		92	25.8	22.1	22.4	24.1	22.2
57	Kerbside	Diffusion Tube		83	35.4	29	32.4	26.9	27.1
58	Kerbside	Diffusion Tube		83	32.7	32.4	33.9	32.1	32.2
86	Roadside	Diffusion Tube		83	20.7	18	21.9	17.5	16.9
88	Kerbside	Diffusion Tube		92					26.4
94	Kerbside	Diffusion Tube		58	35.1	31.7	31.2	29.9	29.6
100	Kerbside	Diffusion Tube		92	36.9	33.4	33.7	34.9	30.2
101	Urban Background	Diffusion Tube		92	37.1	34	33.7	33.8	15.2
103	Kerbside	Diffusion Tube		92	37.2	34.2	33.7	36.8	29.9
104	Kerbside	Diffusion Tube		58	16.7	15	17.1	14.3	30.2

105	Urban Background	Diffusion Tube		75	16.2	14.7	16.4	14.8	15.4
106	Urban Background	Diffusion Tube		67	15.3	14.5	16.3	13.7	14.3
109	Roadside	Diffusion Tube		75	32.3	31.7	34.5	30.5	29.9
111	Roadside	Diffusion Tube		92	19.3	18.1	21	18.0	18.3
113	Urban Centre	Diffusion Tube		83	27	26.3	21.6	29.1	18.8
117	Roadside	Diffusion Tube		100	35.7	33.9	33.8	29.2	29.1
118	Roadside	Diffusion Tube		100	24	24.2	25.3	28.6	28.3
119	Roadside	Diffusion Tube		92	26.1	26.6	27.1	23.0	23.7
120	Roadside	Diffusion Tube		50	29.9	22.1	27	27.0	23
121	Roadside	Diffusion Tube		92	26.2	25.3	30.9	23.1	21.8
123	Roadside	Diffusion Tube		92	35.6	34	37.7	31.3	30.5
125	Roadside	Diffusion Tube		83	25.8	22.5	31.4	24.0	25.6
128	Roadside	Diffusion Tube		100	30.8	28.3	21.3	29.9	22.3
129	Roadside	Diffusion Tube		100	20.2	21.1	23.5	19.6	19.4
130	Roadside	Diffusion Tube		92	24	21.4	32.3	23.3	25
131	Roadside	Diffusion Tube		67	33	31.5	31.2	28.7	27.7
132	Roadside	Diffusion Tube		75	39.1	36.2	**40.3**	40.0	34.2
133	Roadside	Diffusion Tube		92	31.3	28.9	31.3	27.1	28.2

134	Roadside	Diffusion Tube		75	30.3	28.3	31.2	28.7	29.9
135	Roadside	Diffusion Tube		100	24.1	20.7	24.3	19.1	19.6
136	Roadside	Diffusion Tube		100	21.9	21	24.3	21.8	21.3
137	Roadside	Diffusion Tube	89	67					18.2
138	Roadside	Diffusion Tube	100	75					37.9
139	Roadside	Diffusion Tube	100	75					23.9
140	Roadside	Diffusion Tube	100	75					21.7

☒ **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 (Automatic Monitoring Sites)

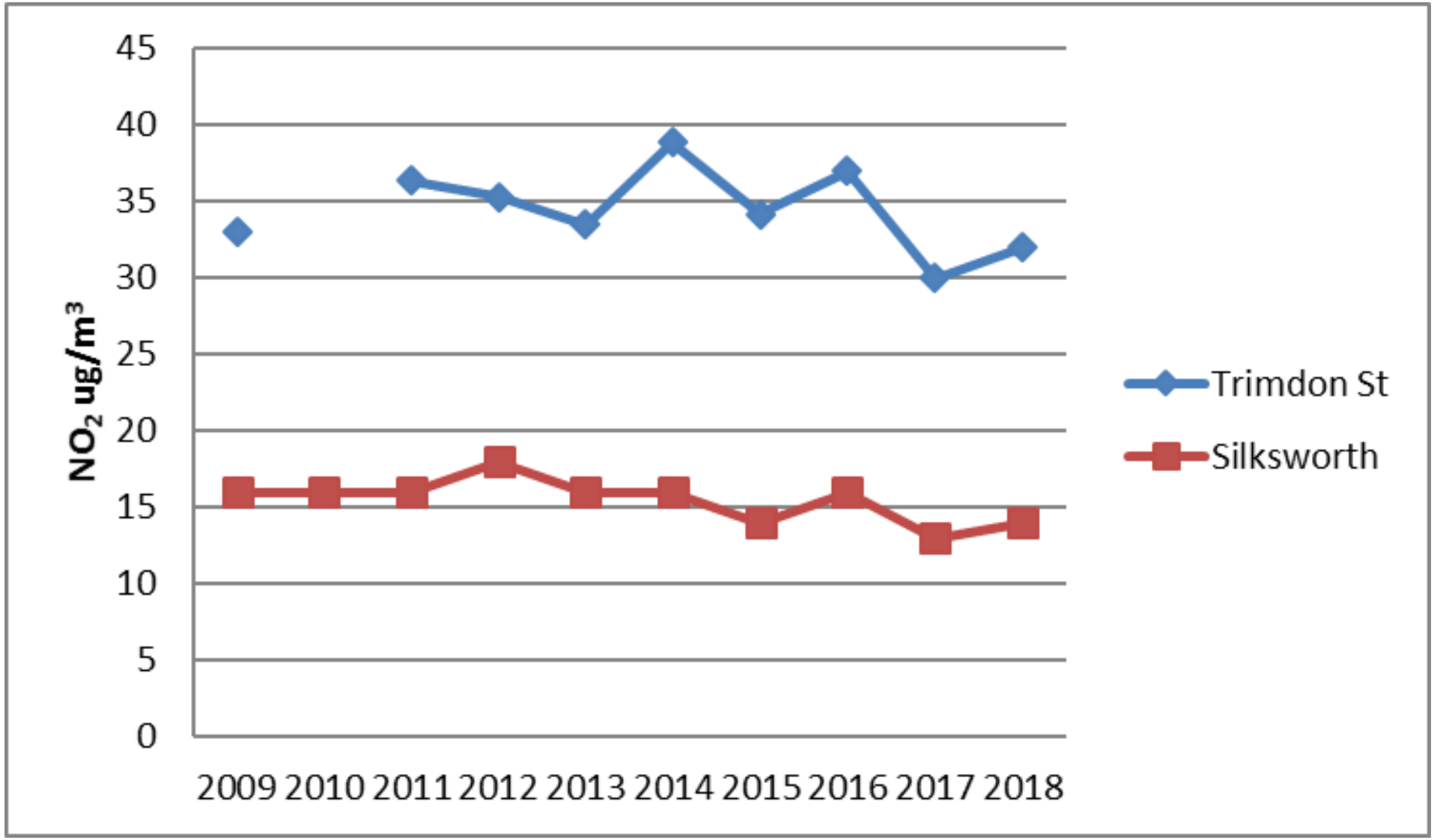


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2014	2015	2016	2017	2018
CM1	Kerbside	Automatic		97.4	**0**	**0(92)**	7	6	**0**
CM2	Urban Background	Automatic		94.6	**0(76)**	**0(67)**	0	0	**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 2018 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
CM1	Kerbside		84.5	21.3	20.9	18	16	**19**
CM2	Urban Background		96.4	13.9	14.6	13	12	15

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

Notes:

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ 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.

Table A.5 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
CM1	Kerbside		92	3	6	1	2	2
CM2	Urban Background		99	3	2	1	0	2

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.6 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2014	2015	2016	2017	2018
CM2	Urban Background		90	10	7	6	7	8

☒ **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 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2018

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.9) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
38	43.8	33.8	33.5	31.1	24.9		33.2	30.8	33.0	39.9	44.7	47.9	36.0	33.5	
53	29.6	27.0	28.4	18.9	21.2		22.6	21.0	25.3	29.5	36.1	39.8	27.2	25.3	
55	38.7	16.26	29.65	19.81	22.45		25.23	27.62	17.65	32.02	38.81	37.54	27.8	25.8	
56	31.88	23.92	30.73	18.54	13.37			18.2	20.22	26.65	29.25	25.55	23.8	22.2	
57	32.17	32.49	37.3	24.6	24.16			22.56		17.39	35.85	35.31	29.1	27.1	
58			37.47	29.68	20.78		31.86	31.21	31.85	38.5	38.8	51.38	34.6	32.2	
86		22.13	20.12	19.27	14.24		16.57	13.57	11.77		22.19	23.69	18.2	16.9	
88	23.7		28.14	30.98	19.46		30.25	25	22.18	30.96	37.98	35.73	28.4	26.4	
94	37.19	29.42							25.93	33.87	36.2	36.08	33.1	29.6	25.0
100	45.62		38.57	34.24	23.18		35.89	26.48	30.51	34.79	46.86	43.92	36.0	33.5	30.2
101	46.5		36.13	32.24	26		35.45	31.67	28.85	37.9	37.28	43.81	35.6	33.1	29.9
103	46.06		37.86	32.99	27.57		37.56	27.47	30.88	35.59	45.33	39.42	36.1	33.5	30.2
104	21.69			9.75				11.34		16.47	22.8	20.27	17.1	15.2	
105	23.41			10.72	9.88		14.13	12.36		16.12	24.58	21.36	16.6	15.4	
106	20.89			12.5	10.7			12.22	12.6		24.28	18.67	16.0	14.3	

109	40.52	28.49	41.47	30.16	22.63			28.44	31.02	33.36	33.09		32.1	29.9	
111	23.4	20.58	21.75		16.02		17.52	14.56	14.19	20.69	23.78	24.25	19.7	18.3	
113		28.12	27.64	17.41	17.6		24	23.61	26.2	31.65	32.83		25.5	23.7	18.8
116	37.07	29.79	34.76	28.23	24.23		30.74	28.92	28.04	30.6	35.17	36.47	31.3	29.1	
117	39.62	27.91	30.12	26.06	21.15		25.89	29.43	27.94	32.78	34.57	39.45	30.4	28.3	
118	31.8	25.9	25.8	25.69	15.92		21.25	21.79	24.53	25.83	29.4	32.59	25.5	23.7	
119	34.56	23.86			19.65		23.67				26.98		25.7	23.0	
120		28.3	24.66	17.16	19.8		21.98	17.61	20.81	24.03	29.88	30.02	23.4	21.8	
121	40.33	34.84	36.41	25.07	20.45			29.72	27.74	33.36	40.09	39.44	32.7	30.5	
123			32.4	29.24	24.65		28.48	20.69	18.44	22.1	37.05	34.51	27.5	25.6	
125	40.46	29.19	30.78	26.15	15.99		22.34	27.6	27.1	35.44	32.08	38.28	29.6	27.5	22.3
128	28.8	14.79	23.17	18.44	14.24		16.88	16.84	17.93	20.43	29.29	28.37	20.8	19.4	
129	32.15	23.88	33.05		15.82		20.02	19.53	20.11	28.38	38.43	37.53	26.9	25.0	
130	39.19	31.15	33.22	29.93	23.82		32.68	26.96					31.0	27.7	26.1
132	52.28	31.7		35.79				30.83	42.3	35.35	38.57	27.12	36.7	34.2	
133	38.22	32.64	41.99	25.65	25.2			22.99	21.54	29.71	31.89	33.29	30.3	28.2	
134	39.28	30.25	41.48		22.62			25.41	25.04	28.44	37.95	38.58	32.1	29.9	
135	27.83	21.73	22.51	12.67	15.29		18.08	15.87	16.53	21.57	33.38	25.82	21.0	19.6	
136	32.26	23.74	20.83	20.56	16.07		17.8	18.83	22.81	25.38	25.39	28.43	22.9	21.3	
137			22.34	19.47	12.05		19.71	18.75	18.31		30.75	21.83	20.4	18.2	
138			31.72	35.48	44.16		46.8	39.11	31.9	45.1	53.95	38.25	40.7	37.9	
139			26.44	20.79	14.81		19.55	17.64	25.43	29.42	37.23	40.14	25.7	23.9	
140			23.52	18.46	24.41		19.81	22.52	15.8	24.52	31.86	29.14	23.3	21.7	

☐ **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**

Please note that diffusion tubes were exposed for different exposure periods to those recommended. Tubes were left out for longer periods and as a result only 11 monitoring periods were completed although tubes were exposed all year round.

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

Sunderland City Council continues to assess new sources of pollution and during 2018 there have not been any new industrial processes that have required an Environmental Permit

New Roads Constructed or Proposed since the last round of review and assessment.

Sunderland Strategic Transport Corridor (SSTC)

Phase 2 of the Sunderland Strategic Transport Corridor linking the A19 to the City is now open imminently. Phase 2 includes the new River Wear crossing which has been named Northern Spire. As part of the planning conditions the bridge contractors will need to carry out 12 months of monitoring at two locations (one North and one South of the Wear) that were identified by the AQ assessment as having increased NO_2 concentrations. This monitoring has recently begun, and results will be reported in next year's ASR.

Phase 3 of SSTC is the critical 2km link between the New Wear Crossing and the city centre and is due for completion in 2020. This phase has now been given consent through the planning process. Sunderland City Council reported on the assessment in 2018's ASR. Utility diversions and preliminary works have started, including earthworks at the western section of the scheme. Any relevant updates will continue through this reporting process.

New Major Development

Renewable Energy Centre Update

In last year's ASR, we reported plans for a new Renewable Energy Centre have been submitted to Sunderland City Council (LPA) for consideration. The development will be designed for the recovery of energy from non-hazardous waste using an Advanced Conversion Technology (gasification). The Air Quality and Greenhouse

Gas Assessments submitted for the site have been considered by SCC but also peer reviewed by Consultant's Bureau Veritas (BV) to provide a robust review.

Further clarification was sought and provided from the developer and in conclusion Bureau Veritas consider that the results of the assessment demonstrate that the potential exposure to poor air quality on all assessed sensitive receptors is likely to be insignificant with the development in place. The development has not as yet been granted planning permission.

IAMP Update

The International Advanced Manufacturing Park (IAMP) is one the most important development sites in the north of England.

With up to 150 hectares of development land to the north of Nissan UK and adjacent to the A19 trunk road, IAMP is designated a 'Nationally Significant Infrastructure Project' (NSIP) by the UK Government, and is a partnership between Sunderland and South Tyneside.

IAMP is a hub for automotive, advanced manufacturing and technology businesses, accelerating economic growth and generating the conditions for private sector investment of more than £300 million. It is predicted to deliver 260,000m2 of developable floor space and 5,200 new jobs by 2027.

Work is now underway on the construction of IAMP one.

Nationally Significant Infrastructure Projects in Sunderland

The Government has introduced the Nationally Significant Infrastructure Projects (NSIP) process to deal with the granting of development consent for large-scale projects such as major new transport, utilities and energy infrastructure, as well as large-scale business and commercial developments.

NSIP development consent orders (DCO) are a form of planning permission that can integrate other types of approval, such as highways/infrastructure works and compulsory purchase orders (CPO).

NSIP applications are determined by The Planning Inspectorate (PINS) through independent examination, a form of public inquiry, rather than by the council as the Local Planning Authority. The project developers are nevertheless required to carry

out extensive pre-application public consultation prior to submitting their application direct to PINS.

Consultants working for the second phase, IAMP Two, have submitted Preliminary Environmental Information Report (PEIR) which includes a chapter on Air Quality including Dispersion Modelling. Sunderland City Council have responded to this first consultation by providing comments on the information provided.

Sunderland City Council will continue to consult with the process and further updates will be provided in next year's ASR.

QA/QC Data

Diffusion Tube Bias Adjustment Factors

Sunderland City Council diffusion tubes are supplied and analysed by Gradko International Ltd, Winchester, Hampshire. The preparation method used is 20% TEA/ Water.

The bias adjustment factor of 0.9 was obtained from the National Diffusion Tube Bias Adjustment Factor Spread sheet version 03/19. This bias adjustment factor was chosen as being representative of a wide range of studies and therefore providing a better factor rather than one derived solely from our roadside station or urban background site which may be more heavily influenced by the location.

Tubes have also been annualised where data capture has fallen below 75% using data from our local urban background continuous site (CM2) using the method given in Boxes 7.9 and 7.10 of LAQM.TG16. The tables C1 and C2 below shows the data used.

Table C1

Start Date	End Date	B1	94	101	106	137	B1 when 94 avail	B1 when 101 avail	B1 when 106 avail	B1 when 137 avail
4/1/18	9/2/18	17.8	37.2	21.7	20.9		17.8	17.8	17.8	
9/2/18	16/3/18	15.4	29.4				15.4			
16/3/18	24/4/18	13.1				22.3				13.1
24/4/18	23/5/18	12.7		9.8	12.5	19.5		12.7	12.7	12.7
23/5/18	27/6/18	10.7			10.7	12.1			10.7	10.7
27/6/18	2/8/18	12.6				19.7				12.6
2/8/18	4/9/18	9.9		11.3	12.2	18.8		9.9	9.9	9.9
4/9/18	2/10/18	10.2	25.9		12.6	18.3	10.2		10.2	10.2
2/10/18	30/10/18	14.1	33.87	16.47			14.1	14.1		
30/10/18	6/12/18	19.7	36.2	22.8	24.3	30.8	19.7	19.7	19.7	19.7
6/12/18	8/1/19	17.8	36.1	20.3	18.7	21.8	17.8	17.8	17.8	17.8
Average		**14.0**	**33.1**	**17.1**	**16.0**	**20.4**	**15.8**	**15.3**	**14.1**	**13.3**

Table C2

AM/PM	0.88	0.91	0.99	1.05
Ra	**0.96**			

Sites that are not representative of a receptor have been distance corrected and the results presented in Table B1. The calculations were made using NO_2 fall-off with distance calculator (version4.2) It was noted that the tool is affected by several limitations particularly where the receptor is further than 20m further from the kerb

than your monitor. The calculator could not be used for distance greater than 50m so in some cases e.g. DM 138 the tubes were unable to be distance corrected.

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 Automatic Monitoring

The QA/QC procedures of Sunderland are based on the AURN Site Operator's manual along with training received from our original equipment suppliers, Casella Measurement.

The fundamental aims of a quality assurance/ control programme are:

- The data obtained from measurement systems should be representative of ambient concentrations existing in each area.
- Measurements must be accurate, precise and traceable.
- Data must be comparable and reproducible.
- Results must be consistent over time.

An appropriate level of data capture is required throughout the year.

Equipment Maintenance

- Automatic analysers are serviced every 6 months by a qualified engineer under a contract with Matts Monitors

- Local Authority staff visits the air quality sites at least once every 4 weeks during which a check of the equipment is made to ensure it is all working within normal parameters. Filters are also changed during this visit.
- If a problem occurs then a call-out is instigated to the service centre and an engineer will normally visit site within 48-hours to correct the fault.

Calibration

- Each day a calibration response check is undertaken by the logger, this check does not re-calibrate the instrument. The calibration system uses certified gas cylinders of a known concentration, to produce an expected response from the analyser.
- Calibration reports stored in the logger will retain expected zero and span gas responses and the actual measured zero and span gas responses.
- Computer software collects and stores these calibration reports and also calculates a zero correction and span response scaling factor which can be applied to the data if required.
- At the 6-month service the instruments are re-calibrated to the site cylinder certificated value.
- Gas cylinder pressures are regularly checked at routine visits to ensure they are replaced before they run out completely.

When a cylinder is replaced the new certified values are entered into the logger.

Data Validation

Data from all of Sunderland City Council's automatic monitoring sites are collected via modem by AQDM who are under contract with Sunderland City Council to validate and ratify the data. Monthly reports of the data are produced by AQDM and

e-mailed to Sunderland City Council. The data is also displayed on a website that members of the public can freely access. The website address is

http://www.ukairquality.net/home/map

AQDM review data daily to ensure that

- Telecommunications to the station are operational
- The air quality station is operational
- Individual analysers are operational
- Air quality exceedences 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 in order to provide a final ratified data set.

The software that collects the data is used to rescale the data using the factor calculated from the monthly calibration check. Data is then reviewed for erroneous data such as:

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

When data is satisfactory, it is compared to other local sites. This provides a check to ensure data is realistic.

QA/QC of diffusion tube monitoring

Gradko has full U.K.A.S. accreditation for compliance with ISO-IEC 17025 for laboratory management system. Its 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.)

Although these have now been replaced with the Air PT scheme.

In addition regular cross-checks are carried out with other U.K.A.S. accredited labs using certified standard solution.

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

Figure 1: City of Sunderland Monitoring Locations.

Key: Red = non automatic sites, Black = Automatic sites

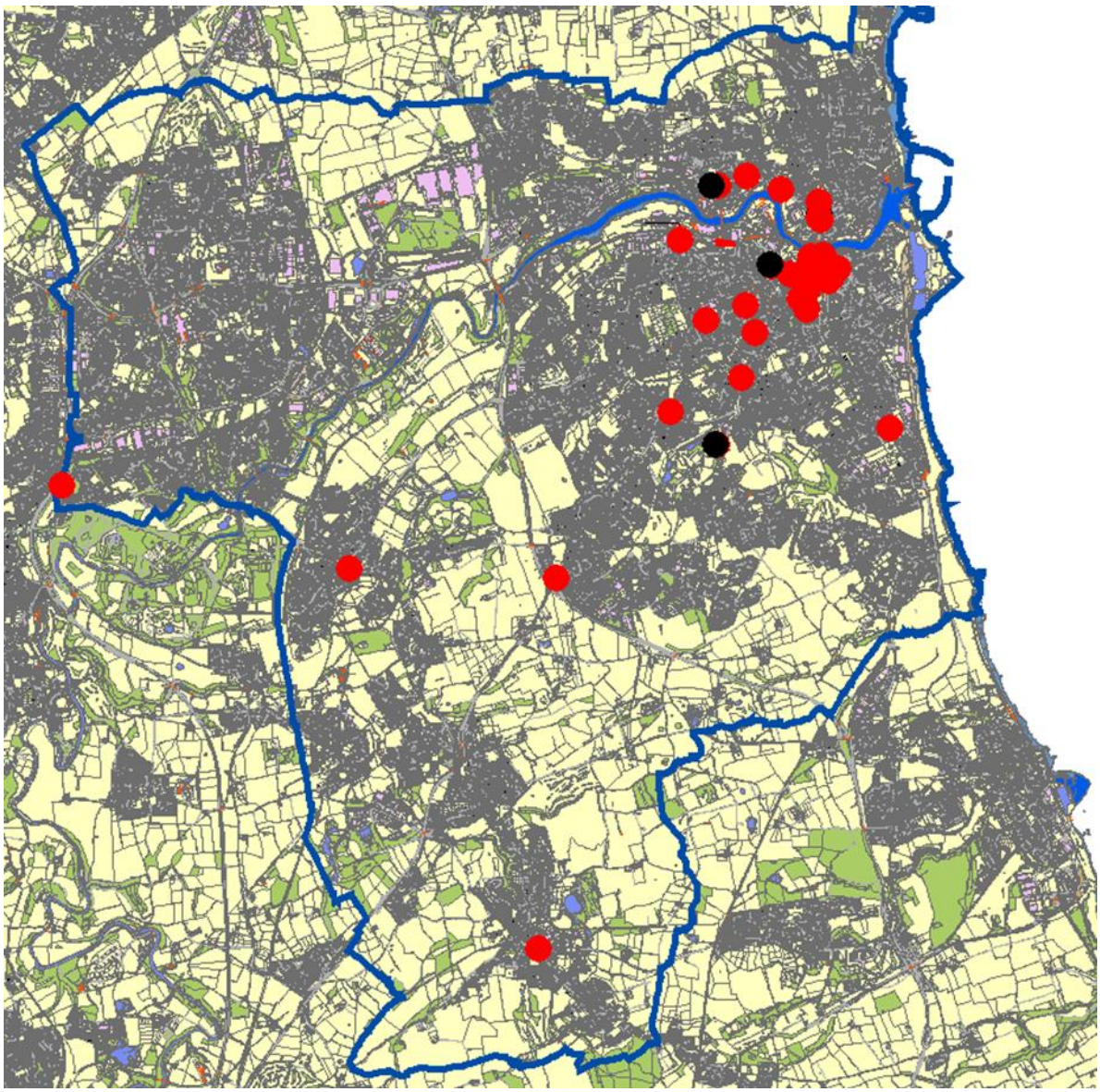


Figure 2: Sunderland Central Area

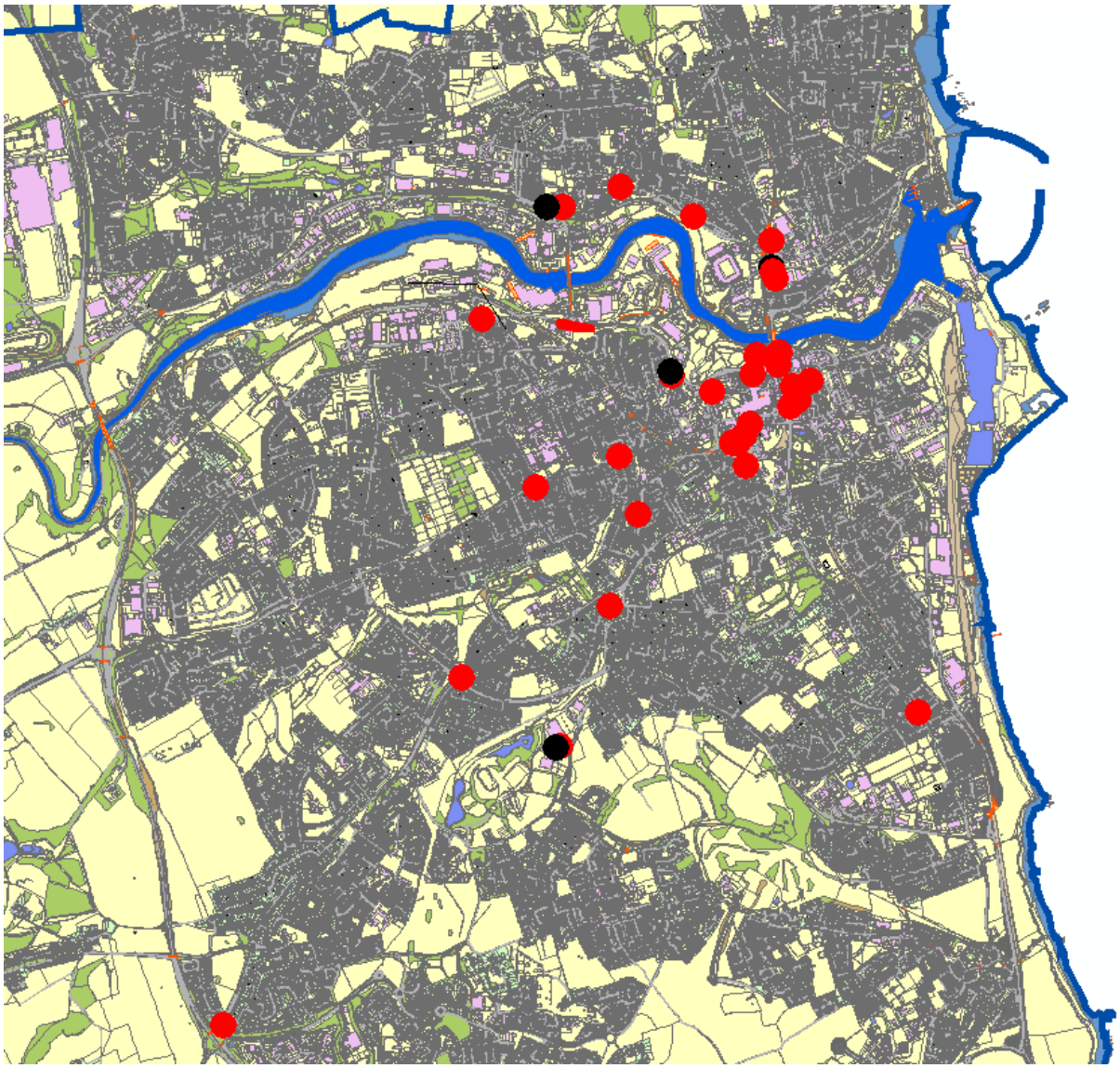


Figure 3: Houghton & Washington Areas

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	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

[4] The units are in micrograms 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