

2019 Air Quality Annual Status Report (ASR)

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

June 2019

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Executive Summary: Air Quality in Our Area

Air Quality in Nottingham City Council's administrative area

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].

Nottingham has two DEFRA AURN stations, monitoring a range of pollutants of concern. Monitoring data from the Clinton Street East AURN station over the last 20 years shows that of the 'pollutants of concern' only nitrogen dioxide (NO_2) has exceeded the relevant air quality objectives.

In January 2019 Nottingham City Council varied one of its two air quality management areas (AQMA) declared for nitrogen dioxide (NO_2) so that it encompassed the Council's entire administrative area[4], and revoked the other as it would be within the varied AQMA. This decision was based on air quality monitoring data for nitrogen dioxide for 2015-2017, traffic and air quality modelling predictions for 2020 of the Clean Air Zone feasibility study, and the practicality of varying and describing one of the AQMAs and its interface with the other.

The Council has also determined to enforce the stationary vehicle engine idling powers of the Road Traffic (Vehicle Emissions)(Fixed Penalty)(England) Regulations 2002 in order to further discourage drivers idling vehicle engines when stationary, particularly in sensitive locations e.g. in the vicinity of schools, and at taxi ranks.

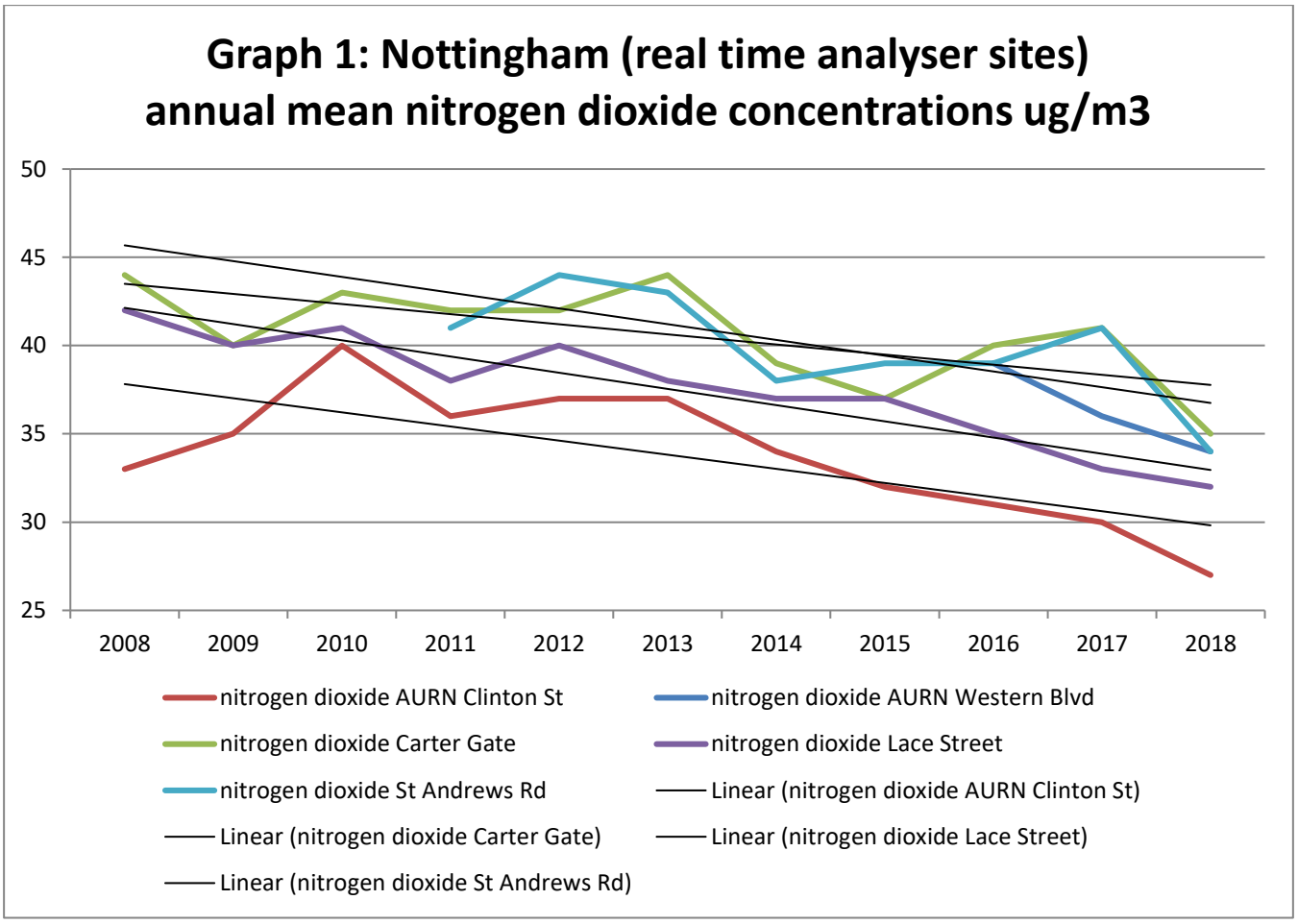
[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013
[4] Nottingham City Council: LAQM revocation of AQMA No3 and variation of AQMA No2 January 2019.

Latest Air Quality Monitoring data

Nottingham has an AQMA for NO_2 and is required to carry out NO_2 monitoring. It uses both real time analysers and nitrogen dioxide diffusion tubes to do this.

The 2018 NO_2 air quality monitoring data from the real time analysers shows lower ambient concentrations than in 2017 (graph 1).

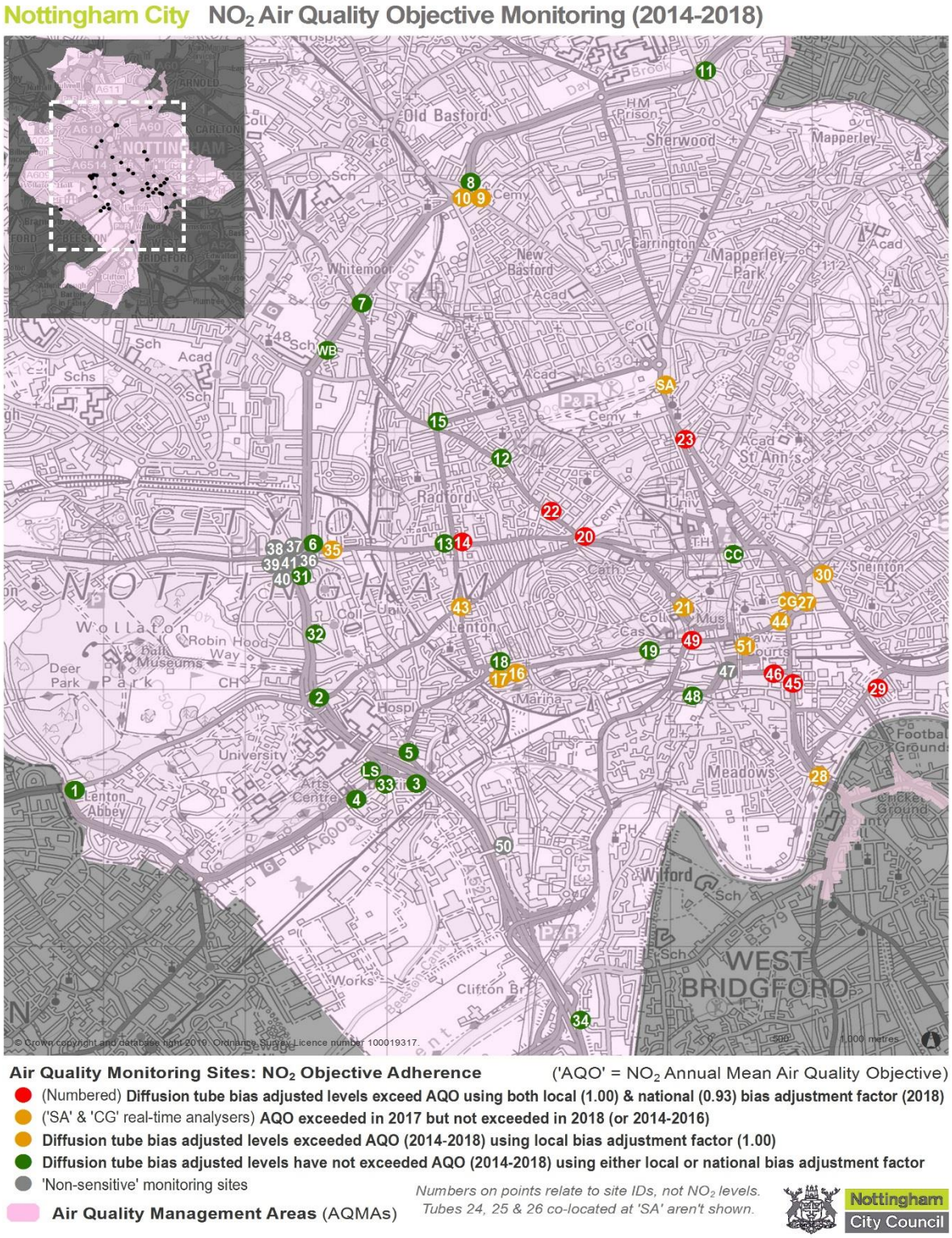
Graph 1. 2008-2018 NO2 monitoring data from Nottingham's 3 real-time analysers and DEFRAs 2 AURN stations.



The diffusion tube data indicates that the annual mean NO_2 concentrations have fallen in a number of locations when compared to 2017. However, the concentrations monitored at a number of roadside and kerbside locations exceeded, or potentially exceeded, the NO_2 annual mean air quality objective. A number of these locations are affected by traffic congestion and from congestion caused by road and lane closures that are necessary for the construction activity associated with redevelopment activity in the City Centre.

To assist the visualisation of the monitoring data Figure 1 combines 2018 real time analyser monitoring results, historical monitoring results (from 2014 to 2018) and an approach that highlights the diffusion tube (DT) monitoring locations where an exceedance of the AQO is likely to have occurred.

Fig. 1 Summary of 2014-2018 monitoring data.



What does this mean for Nottingham?

The Environment Act 1995 Section 83 requires that where there are locations where monitoring demonstrates that air pollution levels exceed, or modelling predicts it will exceed, a relevant Air Quality Objective, local authorities must declare an AQMA and develop and publish Air Quality Action Plans that work towards meeting the AQOs.

2018's detailed air quality modelling work, undertaken as part of the CAZ project, predicted exceedences of the NO2 annual mean AQO in a number of locations both inside and outside the existing AQMAs and, unless additional action was taken, they will continue to exceed the AQO until at least 2020.

The CAZ feasibility project, which used traffic and air quality modelling, concluded that implementing one specific measure: the retrofitting Euro III and V buses operated by Nottingham City Transport with Selective Catalytic Reduction (SCR) equipment, would enable Nottingham to meet the EU annual mean limit value for NO2 of 40 ug/m3, on the roads where the infraction was predicted, negating the need for a charging or non-charging CAZ of any class (A-D).

In August 2018 the Council submitted its 'Local Plan to improve Air Quality in Nottingham'. https://www.nottinghaminsight.org.uk/Document-Library/Document-Library/aBFyzqe The Plan was evaluated, and approved by DEFRA in November 2018. The Council is under ministerial direction to deliver the Plan (Appendix G).

The main part of the plan involves the retrofitting of Nottingham City Transport Euro III, IV and V buses with SCR kits. This project is in progress and on course for completion by October 2019.

Nottingham City Transport has also brought forward the replacement of a large number of its buses with natural-gas/bio-gas buses.

It is also complemented by Nottingham City Council's revised Hackney Carriage and Private Hire Vehicle Strategy 2017-2020 in that only Euro VI compliant taxi's will be licensed from January 2020, and by 2020 a minimum of 40% of the HC and 25% of the Private Hire fleet will be Ultra Low Emission Vehicles.
https://nottinghaminsight.org.uk/d/aBFPtrI

Nottingham City Council is on target to meet the EU annual mean limit value of 40 ug/m3 for those roads where an infraction of the EU annual mean limit value were predicted (City Centre area).

With respect to the National Air Quality Objectives there remains a number of locations where diffusion tube monitoring indicates the Annual Mean Air Quality Objective for NO_2 was potentially exceeded in 2018 therefore Nottingham City Council will:

1. **Continue to promote and support active travel and public transport initiatives in the City and across the Greater Nottingham Conurbation.**
2. **Raise awareness of the air quality impact of idling engines, encourage drivers to switch off engines when parked/waiting, and take enforcement action against drivers committing the stationary vehicle idling offence.**
3. **Continue to work closely with Nottingham's Health and Wellbeing Board partners to reduce emissions from their estate, transport, staff and service users.**
4. **Complete the development of the City Sustainability Strategy that will promote and encourage developments, travel modes and energy generation/storage that will enable Nottingham deliver its goal of a carbon neutral City by 2028.**
5. **Increase activity to encourage and facilitate behavioural change, using events (e.g. World Environment Day, Clean Air Day, World Carfree Day) and social media to raise awareness of issue and health impacts, promote emission reduction through energy efficiency and alternative/sustainable energy generation/storage (by specific projects and as part of normal service delivery where possible).**
6. **Continue to monitor air quality as widely as possible across the City to ensure air quality continues to improve, identify new or developing pollution hotspots, enable and monitor the effectiveness of targeted action.**

Actions to Improve Air Quality

Nottingham Local Plan and Emerging Local Plan

Nottingham City Council has been working to improve air quality by reducing emissions of CO_2, NO_x/NO_2 and particles (PM_{10}, $PM_{2.5}$) by increasing energy efficiency across Nottingham City Council and Nottingham City Homes building stock, and investing in alternative energy generation.

In addition to this NCC has developed and submitted its Land and Planning Policies (LAPP) as required.

https://www.nottinghamcity.gov.uk/information-for-business/planning-and-building-control/planning-policy/the-local-plan-and-planning-policy/

https://www.nottinghamcity.gov.uk/submission

Nottingham City Land and Planning Policies Development (Local Plan Part 2). January 2016. http://documents.nottinghamcity.gov.uk/download/444

It supports the wider Broxtowe Borough, Gedling Borough and Nottingham City Aligned Core Strategy. The Core Strategy details policies and objectives) of which the majority directly address or contribute towards improving air quality e.g.

i) Environmentally responsible development addressing climate change

ii) High quality new housing

v) Regeneration

viii) Health and wellbeing

x) Excellent transport systems and reducing the need to travel

xi) Protecting and improving natural assets

xii) Timely and viable infrastructure

https://www.nottinghamcity.gov.uk/examination

Air Quality Strategy

Nottingham City Council along with all other Nottinghamshire Local Authorities and other agencies (e.g. Environment Agency) are signatories to the Nottinghamshire Air Quality Strategy 2008, which details a range of strategies and actions that, if adopted

by businesses and individuals, reduce individual exposure, emissions and improve air quality.

http://cms.nottinghamshire.gov.uk/nottsairqualityimprovementstrategy2008.pdf

In 2016 Nottingham City Council, in conjunction with partners and stakeholders, carried out a review of the Nottinghamshire Air Quality Strategy 2008 identifying further opportunities and potential synergies of a range of statutory plans to improve air quality, health and wellbeing.

https://nottinghaminsight.org.uk/Document-Library/Document-Library/aAXJ0MT

The revised strategy will be published in autumn 2019, and regularly publicised thereafter via social media to ensure individuals and businesses are aware of it.

LAQM Air Quality Action Plan

The current Air Quality Action Plan (AQAP) is within the Local Transport Plan 2010 and focussed solely on reducing emissions from road transport.

The Local Plan to Improve Air Quality in Nottingham (approved by DEFRA in 2018) details a number of existing projects and activity to improve air quality and the 'additional measures' required (with funding) to ensure Nottingham would meet the EU annual mean limit value for NO2 of 40 ug/m3.

Nottingham City Council is developing a wider sustainability strategy that will also help it deliver a 2019 Nottingham Labour Group manifesto pledge to be carbon neutral by 2028. This will consider all significant sources of CO2 emissions, and co-pollutants such as NOx and particles, and promote construction techniques and materials, energy efficiency, and the transition to plant/equipment with lower or zero emissions at point of use.

Fuel cell project

In 2016 Nottingham City Council successfully obtained funding from DEFRA to investigate and trial the feasibility of replacing natural gas fired boiler plant with zero NO2/NOx emission fuel cell technology.

Nottingham City Council Energy Projects Service undertook a successful tender process to appoint a contractor to undertake the design and installation of the fuel cell units. There have been a number of legal and technical issues that have unfortunately delayed the project but these have now been resolved and the units are now due to be installed and should be operational by the end of October 2019.

East Midlands Air Quality Network

Partnership working between professions and local authorities is being strengthened by the establishment of an East Midlands Air Quality Network.

This network brings together a range of professions and organisations: public and environmental health, transport and spatial planning, to develop guidance, identify practical solutions and a consistent approach to improve health by reducing emissions of, and exposure to, air pollution.

A Supplementary Planning Document to enable developers reduce emissions from developments during construction and over the lifetime of the development is about to enter the consultation process for adoption later in 2019.

Nottingham Health and Wellbeing Strategy and Environment Action Plan

Significant work has been undertaken to ensure air quality and its health impacts are recognised and addressed in Nottingham and Nottinghamshire's Joint Strategic Needs Assessments, and improving air quality is prioritised for action within the City's Health and Wellbeing Strategy.

The action plan to deliver the strategy to 2020 can be downloaded.

http://www.healthynottingham.co.uk/health-and-wellbeing-strategy-2016-2020/

In June 2019 Nottingham City Council published its revised JSNA chapter on Air Quality and Health https://nottinghaminsight.org.uk/d/aXx6DuH

and will be developing a revised delivery strategy and framework later in 2019.

Nottingham Local Transport Plan

Nottingham City Council has also reduced CO2, NOx/NO2 and particle emissions through its long term commitment to promoting public transport, the expansion of its tram network, walking and cycling and, more recently as technology has developed, the promotion and facilitation of the transition to Zero and Ultra Low Emission vehicles.

Nottingham's local transport plan outlines the City Council's long-term transport strategy. Please visit

http://www.nottinghamcity.gov.uk/transport-parking-and-streets/transport-strategies-funding-bids-and-current-consultations/

With respect to reducing nitrogen dioxide concentrations from traffic the transport plan and strategy has, and continues to:

- constrain traffic growth in the City area,
- reduce traffic levels and congestion by facilitating and promoting a comprehensive public transport network, with integrated ticketing,
- encourage and facilitate walking and cycling (active travel)
- encourage and facilitate the transition to Zero and Ultra-low Emission Vehicles

Conclusions and Priorities

Air pollution remains a concern to Nottingham City Council, its citizens and businesses. Monitoring results in a number of locations show continuing, new, or renewed exceedances of the NO2 annual mean AQO, and there is greater awareness and individual citizen experiences of localised air pollution problems.

2018 monitoring data indicates that NO2 concentrations measured at real time analyser locations have fallen since 2017.

St Andrews Road and Carter Gate monitoring stations measured a significant decrease in the annual mean NO2 concentration compared to 2017, measuring 34 ug/m3 and 35 ug/m3 respectively. This suggests that the NO2 concentrations measured at these locations in 2017 were probably affected by traffic congestion associated with the road works necessary to commence redevelopment of the Broadmarsh Centre.

Priorities to improve air quality

The local (and conurbation wide) priority to improve air quality continues to be how to reduce levels of nitrogen dioxide, and identify and implement practicable measures to reduce particle emissions and concentrations in the City area.

The local priorities and challenges to improve air quality in Nottingham and reduce emissions are:-

i. Increase activity to raise awareness of air pollution and its health impacts,

ii. Enforce the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002, and issue Fixed Penalty Notices to drivers unnecessarily idling a stationary vehicles' engine.

iii. Go Ultra Low Nottingham - complete the range of initiatives and projects and secure additional funding to facilitate the take-up of Ultra Low Emission Vehicles (ULEV) in Nottingham,

iv. Complete the feasibility study into a low emission zone for the City Centre and identify/secure funding for implementation,

v. Complete the NCT bus retrofit programme and introduction of ULEV buses,

vi. Continue work with Nottingham's taxi companies to introduce low and zero emission vehicles.

vii. Adopt/integrate East Midlands Air Quality Network Air Quality and Emission Mitigation guidance as Supplementary Planning Guidance in the Local Plan.

viii. Further develop plans and secure funding for extension of Nottingham's Tram network (lines 4 and 5),

ix. Continue to work with major private and public sector employers to review vehicle use to reduce emissions,

x. Continue to roll-out/improve energy efficiency in Nottingham City Council's housing stock, as and when funding permits,

xi. Promote energy efficiency and the transition to/installation of alternative technologies that significantly reduce/negate NO2/NOx emissions in the commercial/industrial sector,

xii. Identify opportunities and secure further funding to transition Nottingham City Council commercial vehicle fleet to ULEV,

xiii. Identify and implement practicable local solutions to reduce particle emissions and concentrations.

Local Engagement and How to get Involved

What is the Council doing to reduce emissions?

Nottingham City Council is concerned about air pollution, climate change, and air quality and recognises that these issues are complex and interlinked.

The Council's strategies and action on climate change and public transport have reduced CO2 emissions and air pollution in the City, but the Council recognises it is necessary reduce emissions from the range of sources that generate particles and nitrogen dioxide and impact on health further.

Portfolio Holders Air Quality Steering Group

This group comprises Nottingham City Council's Portfolio Holder for Energy and Environment (including Air Quality), Corporate Director of Development, Director of Transport, Director of Public Health, Head of Environmental Health and Safer Housing, and officers from their teams. It develops strategies, policies and implementation plans to deliver improved air quality in Nottingham.

Health and Wellbeing Board

This group comprises Nottingham City Council and a large number of organisations, including Primary Health Care commissioners and providers, Registered Social Landlords, and third sector organisations.

http://www.healthynottingham.co.uk/

Public health Steering Group

This group comprises officers from Public Health England, Nottingham City Council and Nottinghamshire County Council Public Health teams, the NHS, Nottingham City Council's Environmental Health service, and a representative of Nottinghamshire's district Environmental Health services.

The group identifies current and emerging public/environmental health issues that require joint and concerted action to resolve, and prepares reports and chapters for the Joint Strategic Needs Assessment, used to inform the Health and Wellbeing Board and its formulation of Strategy.

Health and Wellbeing Board Air Quality group

Reporting to the HWb Board, this group comprises Officers from Nottingham City Council, the Health Sector: Clinical Commissioning Group, Nottingham University Hospitals Trust, Circle; East Midlands Ambulance Service, Nottinghamshire Fire and Rescue Service, Nottingham Trent University and University of Nottingham, and co-ordinates action to improve air quality across HWb Board member organisations.

What can I do to improve air quality?

When burned in air, carbon containing fuels e.g. wood and fossil fuels, emit carbon dioxide, nitrogen oxides (NOx) – nitrogen oxide (NO) and nitrogen dioxide (NO_2), and particles (including PM_{10} and $PM_{2.5}$). Although it does not affect local air quality, carbon dioxide is a greenhouse gas and contributes to climate change.

Nitrogen dioxide and particles adversely affect local air quality therefore reducing emissions of these pollutants will improve air quality.

Measures that help to reduce emissions of air pollution and thereby improve air quality:-

Travel choices: walk, cycle, public transport, journey/travel planning

Walking and cycling, also known as ‘active travel’, have mental and physical health benefits in addition to reducing air pollution. Follow the links below for more information:

Walking in Nottingham: https://www.nottinghamcity.gov.uk/information-for-residents/transport-parking-and-streets/rights-of-way-walking-and-cycling/walking-in-nottingham/ and http://walkit.com/

Cycling in Nottingham: http://www.transportnottingham.com/cycling/

Nottingham has a high quality public transport network located within the City, including the NET tram network as well as an established bus network.

Nottingham NET: http://www.thetram.net/

Nottingham City Transport: https://www.nctx.co.uk/

Trent Barton: https://www.trentbarton.co.uk/

Stagecoach: https://stagecoachbus.com

Nottingham Car club

A car club is a membership scheme that offers pay-as-you-go basis car rental, At the end of the journey you return your car to its dedicated on-street car club parking space. Nottingham currently has a network for 14 car club vehicles in 11 locations.

https://www.transportnottingham.com/driving/car-club/

Energy efficiency:

We use energy in the form of electricity or natural gas to heat our homes, cook and power electrical equipment. Insulating our homes and using energy efficient appliances reduces energy consumption and emissions, both at power stations and locally from domestic gas boilers and gas cookers.

Visit http://www.energysavingtrust.org.uk/ for ideas on home to save energy and money.

Clean Air Day

On the 20th June 2019 Nottingham, together with other Cities and organisations across the UK, participated in the third (National) Clean Air Day. The aim of the day was to raise awareness about air pollution, what people can do, and publicise via social media what people did, to reduce emissions and their exposure to air pollution. Please visit https://www.cleanairday.org.uk/

https://www.cleanairday.org.uk/best-practice-in-nottingham

https://www.cleanairday.org.uk/Pages/Category/nottingham for more information.

Although promoted as a single 'Clean Air Day', the event is to highlight the year round issue of air pollution and its effects on health, enable Citizens identify what they can do on Clean Air Day and in the future to reduce personal exposure to air pollution, reduce emissions, and improve air quality.

To demonstrate and promote ongoing activity to improve air quality participants are using the twitter hashtag #cleanaireveryday to maintain awareness and publicise activity to reduce emission and spread information on how to reduce exposure.

For more information, to comment or raise your concerns about air pollution and air quality please visit

https://www.nottinghamcity.gov.uk/information-for-business/environmental-health-and-safer-housing/environmental-health-and-safer-places/

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1 Local Air Quality Management

This report provides an overview of air quality in Nottingham 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 Nottingham 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.

In 2019, as a result of monitoring and detailed air quality modelling undertaken as part of Nottingham City Council's Clean Air Zone feasibility study, and predicted the likely exceedence of the NO2 annual mean AQO of 40 ug/m3 on and in the vicinity of a number of the busiest and congested roads in the City, Nottingham City Council varied one of its two Air Quality Management Areas to encompass its entire administrative area and revoked the other.

Source apportionment, undertaken as part of the modelling, confirmed that the exceedance was primarily due to NOx/NO2 emissions from road traffic.

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 Nottingham City Council for NO_2 can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=188 .

Alternatively, see Figure 1 or Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides a map of air quality monitoring locations in relation to the AQMA.

Further information detailing declared or revoked AQMAs, including maps of AQMA boundaries are available online at

https://uk-air.defra.gov.uk/aqma/details?aqma_ref=112 (AQMA No. 2 - varied 2019).

https://uk-air.defra.gov.uk/aqma/details?aqma_ref=113 gives details of AQMA No.3 which was revoked in January 2019.

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 (inc. date of publication)
						At Declaration	Now (2018)	
AQMA No. 2 (Carter Gate Real Time Analyser)	Declared 2005. Varied 2019	NO2 Annual Mean	City of Nottingham	The AQMA covers the entire administrative area of Nottingham City Council.	NO	44 µg/m3	35 µg/m3	Local Transport Plan Implementation Plan 2015-2017 and 2016-2019 http://www.nottinghaminsight.org.uk/insight/search/unified_search.aspx?q=transport plan]
AQMA No. 2 (St Andrews Road RTA)	Declared 2005. Varied 2019	NO2 Annual Mean	City of Nottingham	A60	NO	41 ug/m3	34 ug/m3	
AQMA No.2 (Lace Street RTA)	Declared 2005. Now within AQMA 2.	NO2 Annual Mean	City of Nottingham	A6005	NO	42 ug/m3	32 ug/m3	

All diffusion tube locations are within AQMA 2 as varied Jan 2019								
Tube 1 Woodside Road (Derby Road)	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A52	YES	-	32 ug/m3 lba 30 ug/m3 nba	
Tube 2 Derby Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6200	NO	-	27 ug/m3 lba 25 ug/m3 nba	
Tube 3 Marlborough Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A52	YES	-	24 ug/m3 lba 22 ug/m3 nba	
AQMA No. 2 (Beeston Road DT 4)	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6005	YES	42 ug/m3	32 ug/m3 lba 30 ug/m3 nba	

Tube 5 87 Abbey Street	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A52	NO	-	30 ug/m3 lba 28 ug/m3 nba	
Tube 6 4 Western Blvd	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	29 ug/m3 lba 27 ug/m3 nba	
Tube 7 197 Wilkinson St	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	29 ug/m3 lba 27 ug/m3 nba	
Tube 8 413 Nottingham Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	35 ug/m3 lba 33 ug/m3 nba	
Tube 9 403 Nottingham Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	B682	NO	-	42 ug/m3 lba 39 ug/m3 nba	

Tube 10 565 Valley Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	39 ug/m3 lba 37 ug/m3 nba	
Tube 11 107 Danethorpe Vale	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	29 ug/m3 lba 27 ug/m3 nba	
Tube 12 Bentinck Road School	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A610	NO	-	33 ug/m3 lba 30 ug/m3 nba	
Tube 13 238 Ilkeston Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A609	NO	-	39 ug/m3 lba 37 ug/m3 nba	
Tube 14 The Gregory Ilkeston Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A609	NO	-	46 ug/m3 lba 43 ug/m3 nba	

Tube 15 161 Gregory Blvd	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6130	NO	-	30 ug/m3 lba 28 ug/m3 nba	
Tube 16 1-6 Castle Gardens	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6005	NO	51 ug/m3	36 ug/m3 lba 34 ug/m3 nba	
Tube 17 215 Castle Boulevard	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6005	NO	-	38 ug/m3 lba 35 ug/m3 nba	
Tube 18 Park Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6005	NO	-	29 ug/m3 lba 27 ug/m3 nba	
Tube 19 87 Castle Boulevard	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6005	NO	42 ug/m3	32 ug/m3 lba 30 ug/m3 nba	

Tube 20 Canning Terrace	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A610	NO	51 ug/m3	50 ug/m3 lba 46 ug/m3 nba	
Tube 21 Sal Inn Maid Marian Way	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6008	NO	-	43 ug/m3 lba 40 ug/m3 nba	
Tube 22 Alfreton Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A610	NO	-	44 ug/m3 lba 41 ug/m3 nba	
Tube 23 180-182 Mansfield Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	-	46 ug/m3 lba 42 ug/m3 nba	
Tube 24 St Andrews Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	41 ug/m3	34 ug/m3 lba 32 ug/m3 nba	Both local (lba) and national (nba) bias adjustments shown

Tube 25 St Andrews Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	41 ug/m3	35 ug/m3 lba 33 ug/m3 nba	
Tube 26 St Andrews Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	41 ug/m3	35 ug/m3 lba 33 ug/m3 nba	
Tube 27 21 Carter Gate	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	41 ug/m3	40 ug/m3 lba 37 ug/m3 nba	Note. Not collocated with Carter Gate real time analyser. DT only 2 meters from A60 and junction.
Tube 28 Trent Bridge	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	41 ug/m3	36 ug/m3 lba 33 ug/m3 nba	
Tube 29 Meadow Lane	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A612	NO	-	45 ug/m3 lba 42 ug/m3 nba	

Tube 30 Manvers Street	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A612	NO	-	43 ug/m3 lba 40 ug/m3 nba	
Tube 31 134 Middleton Blvd	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	27 ug/m3 lba 25 ug/m3 nba	
Tube 32 44 Middleton Blvd	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	27 ug/m3 lba 25 ug/m3 nba	
Tube 33 Lace Street	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6005	YES	42 ug/m3	34 ug/m3 lba 31 ug/m3 nba	
Tube 34 24 Bradbourne Ave	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A52	YES	-	26 ug/m3 lba 24 ug/m3 nba	

Tube 35 70 Wollaton Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A609	NO	-	42 ug/m3 lba 39 ug/m3 nba	
Tube 36 Western Blvd crossing	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	47 ug/m3 lba 43 ug/m3 nba	
Tube 37 Wollaton Rd subway	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	41 ug/m3 lba 38 ug/m3 nba	
Tube 38 180 Wollaton Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A609	NO	-	35 ug/m3 lba 32 ug/m3 nba	
Tube 39 Wollaton Road Crossing	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A609	NO	-	42 ug/m3 lba 39 ug/m3 nba	

Tube 40 Middleton Blvd crossing	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	37 ug/m3 lba 34 ug/m3 nba	
Tube 41 Middleton Blvd crossing	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6514	NO	-	50 ug/m3 lba 46 ug/m3 nba	
Tube 43 328 Derby Rd	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6200	NO	-	28 ug/m3 lba 26 ug/m3 nba	
Tube 44 Cliff Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6008	NO	42 ug/m3	39 ug/m3 lba 36 ug/m3 nba	
Tube 45 London Road	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	42 ug/m3	56 ug/m3 lba 52 ug/m3 nba	

Tube 46 Station St	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	42 ug/m3	48 ug/m3 lba 45 ug/m3 nba	
Tube 47 Sheriffs Way	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	42 ug/m3	45 ug/m3 lba 42 ug/m3 nba	
Tube 48 Kinglake Place	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A6005	NO	42 ug/m3	27 ug/m3 lba 25 ug/m3 nba	
Tube 49 2 Castle Blvd	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A60	NO	42 ug/m3	46 ug/m3 lba 43 ug/m3 nba	
Tube 50 A52 Clifton Boulevard	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham	A52	NO	-	51 ug/m3 lba 47 ug/m3 nba	

Tube 51 Trent Street	Declared 2005, Amended 2010 and 2019	NO2 Annual Mean	City of Nottingham				37 ug/m3 lba 34 ug/m3 nba	

☒ **Nottingham City 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 Nottingham City Council's area

Defra's appraisal of Nottingham City Council's 2018 ASR can be downloaded at https://www.nottinghaminsight.org.uk/d/aAXKdRr

In summary it concluded …'On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants, with the provisos listed in the commentary…'

Nottingham City Council has considered the issues and specific points raised in the appraisal and commentary. With respect to points:-

1- 3; Nottingham completed the process to revoke/vary its AQMAs on the 9th January 2019.

9; there are two action plans: one contained within the LTP 2010 and the more recent Local Plan to Improve Air Quality in Nottingham, focussing on emissions from those transport sources in the City Centre that contribute towards the modelled infraction of the EU NO2 annual average limit value.

Nottingham has recently made a commitment to be carbon neutral by 2028 and is developing a sustainability strategy to enable this by identifying sources and solutions to reduce emissions of carbon dioxide and the co-pollutants NOx and Particles across the wider conurbation.

12: The CAZ additional measures update have been incorporated into Table 2.2

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	DEFRA Air Quality funding	Promoting Low Emission Transport	Other	Led by Nottingham City Council. Joint Air Quality Unit / DEFRA funding	2017/18	2019/20	Project specific outputs	Likely positive impact	Initial works underway	2020	
2	Go Ultra Low Nottingham Programme	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Led by Nottingham City Council. OLEV grant funding (Go Ultra Low Programme)	2015	2016-17 - 2019/20	Project specific outputs	City-wide effect		2020	
3	Nottingham Workplace Parking Levy (WPL)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	Nottingham City Council.	2011	2012 - onwards	WPL liable businesses, WPL compliance	City-wide effect	Ongoing	2037	
4	Midland Mainline Enhancements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Network Rail.	2016/17	2016 - 2023		Positive effect on City Centre area	Electrification to Nottingham cancelled. New rolling stock may deliver improvements to air quality	2023	Electrification cancelled. Uncertainty relating to enhancements on Midland Mainline. New rolling stock may contribute to improving air quality.
5	A52 Nottingham Junctions Improvement	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management,	Highways England	2018/19	2019 - onwards		Localised impact on route		2021	

			Selective vehicle priority, bus priority, high vehicle occupancy lane								
6	M1 Smart Motorway	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Highways England	2017	2018		Impact on AQMA along M1 motorway (Greater Nottingham Area)	Now on site	2020	
7	Southside Transport Strategy (Broadmarsh)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Nottingham City Council. Funding from Local Growth Fund, LTP and prudential borrowing	2014/15 - 2015/16	2016 - 2020		Positive effect on City Centre area	Works to demolish car park finished in 2018. Further road space works planned to take place in future years	2020	Large-scale regeneration project. High number of dependencies for the works
8	Connecting Eastside Phase 2	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Nottingham City Council. Funding to be confirmed.	2017/18	Unknown		Positive effect on City Centre area	Project on hold due to funding constraints	To be determined	Funding a constraint to delivery

9	Smarter Travel Hubs / Access Fund	Promoting Travel Alternatives	Personalised Travel Planning	Nottingham City Council. DfT grant funding (Access Fund)	2015	2015/16 - 2019/20	Specific project outputs / behavioural change	City-wide effect	Project underway	2020	
10	Nottingham Enterprise Zone Sustainable Transport Package	Transport Planning and Infrastructure	Cycle network	Nottingham City Council. Funding from Local Growth Fund and developer contributions.	2016-17	2018 - 2019	Public Transport Usage (Bus) LTP Indicator: Cycle Index	Nil	Works completed	2019	Delay to original scheme due to Network Rail / design refinements
11	CAZ additional measures	Transport Planning and Infrastructure	Taxi strategy	DEFRA grant	2018	2020	% Euro 6 and % ULEV private hire vehicles operating to strategy	City wide effect	Project underway	Jan 2020	
12	CAZ additional measures	Transport Planning and Infrastructure	Bus retrofit project	DEFRA grant	2018	2019		City wide effect. Most pronounced in City Centre due to concentration of routes.	Project underway 50% complete	October 2019	

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

Local authorities are expected to work towards reducing emissions and/or concentrations of PM2.5 (particulate matter with an aerodynamic diameter of 2.5µm or less. Policy Guidance LAQM.PG16 (Chapter 7). There is clear evidence that PM2.5 has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Nottingham City Council is implementing and considering the following measures to address $PM_{2.5}$:

Existing measures are focused on:-

i. reducing emissions from transport by constraining traffic growth and encouraging/facilitating walking, cycling and use of public transport and

ii. on-going regulatory activity re Permitted Processes, ensuring compliance with the City's existing Smoke Control Orders, discouraging bonfires and uncontrolled burning, and ensuring construction/demolition activity implement dust minimisation measures.

Additional measures being considered include:-

i. Reducing emissions from non-vehicle fixed and mobile sources and

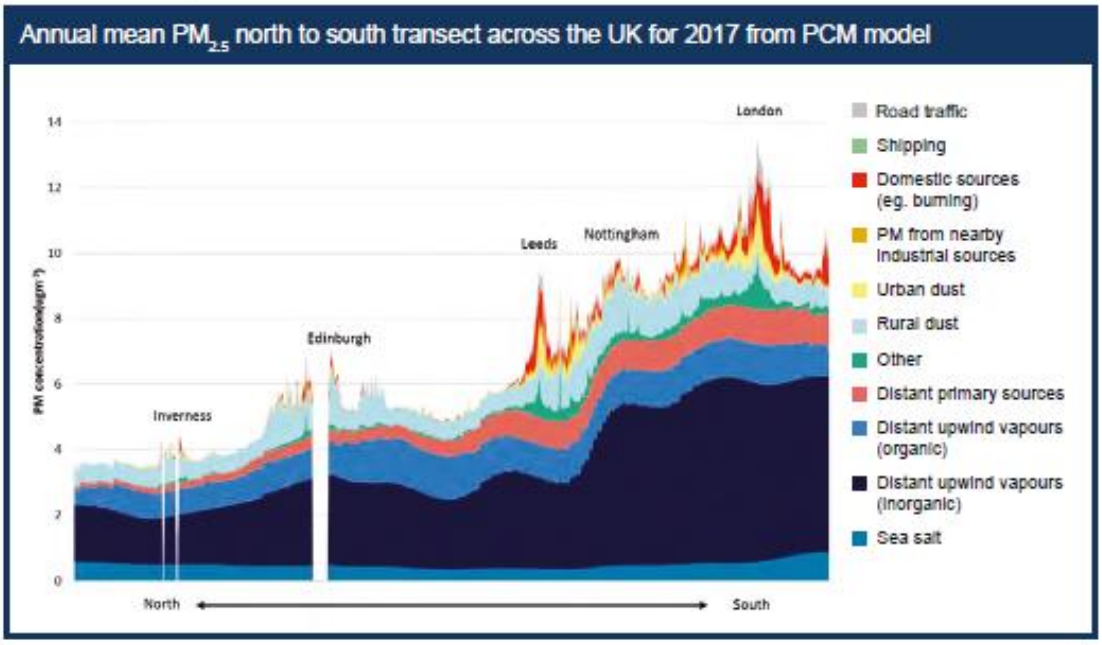
ii. Planting to reduce weathering/entrainment of soil/surface particles and increasing green surface area for adsorption/impingement/entrapment of particles by foliage.

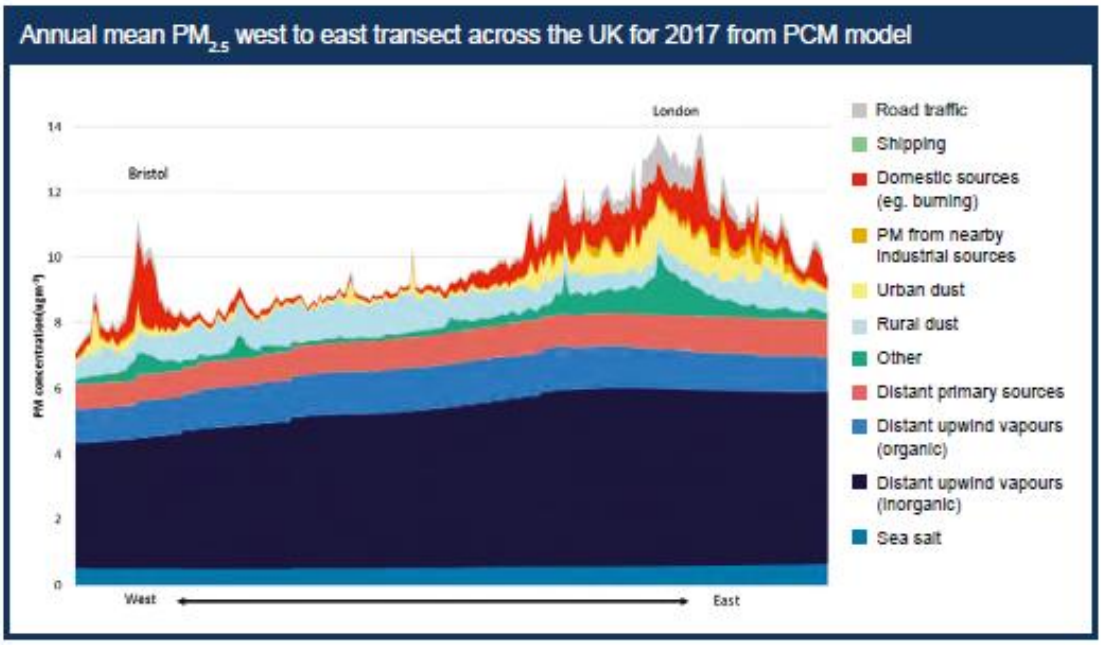
It should be noted that the UK Governments Air Quality Strategy (May 2019) details PM2.5 source contribution to annual mean concentrations across the UK, highlighting a number of cities that fall on the chosen transect line, including Nottingham. Fig 2.

The PCM model indicates that as much as 80% of Nottingham's PM2.5 levels come from distant primary sources and distant upwind vapours e.g. industrial, commercial and agricultural sources outside the City's boundary and therefore any action by Nottingham City Council will only have a small impact on PM2.5 levels.

Figure 2: PM2.5 distribution and source apportionment from Clean Air Strategy May 2019.

These images show how particulate matter from across the country can build up in the atmosphere as 'background pollution' and the role that this can play in combination with local sources in areas with a pollution challenge.







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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.

Nottingham City Council has an air quality monitoring network comprising three NOx/NO2 real time analysers and 50 NO_2 diffusion tubes. There are also two DEFRA AURN air quality monitoring stations located in the City area.

Nottingham City Council undertook automatic (continuous) monitoring at three sites during 2018. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://uk-air.defra.gov.uk/data/data_selector

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

Carter Gate NOx (CG), Carter Gate, City Centre

This unit has been located at Carter Gate monitoring since December 2003. The site is a suburban mixed commercial/residential area of the City adjacent to the A60. It is approximately 10 metres from the A60 which is a major traffic route and, approximately 3 metres from a busy B road. It is classed as a ‘Roadside’ site. There are residential properties approximately 12 metres from the unit and 2 metres away from the A60.

Lace Street NOx (LS), Lace Street, Dunkirk

This is a fixed unit located at Lace Street since March 2007. The site is a suburban, mixed education/commercial/residential area of the City adjacent to the A6005, a busy road traffic route. It is approximately 4 metres from the A6005 and 1 metre from a minor road and is classed a ‘Roadside’ site. The unit is located within an enclosure sited on the pavement at the boundary with a residential property and in-line with the front-facade building line.

St Andrews Road NOx (SA), St Andrew's Road, Mapperley

This site was established in June 2010 following the expansion of Nottingham City Council's Air Quality Management Area No.2. The monitoring unit is located on a small residential street - St Andrews Road, approximately 13 metres from the A60 Mansfield Road. The A60 is a major traffic route through the City, and south across the River Trent.

The SA NOx is a fixed unit sited on the pavement at the boundary of a residential property. It is classed as a 'Kerbside' site.

To give a complete overview of Automatic Monitoring Sites in the Nottingham City Area it is also necessary to mention the two DEFRA funded Automatic Urban Rural Network (AURN) stations: at Clinton Street East (comprising a suite of air quality monitoring equipment, including NOx/NO2, PM10 and PM2.5 and classed as an Urban Centre), and Western Boulevard (comprising NOx/NO2 and PM10) near its junction with Aspley Lane (NO2 and PM10 and classed as Roadside).

Further information is available at: https://uk-air.defra.gov.uk/ and

https://uk-air.defra.gov.uk/networks/find-sites

3.1.2 Non-Automatic Monitoring Sites

Nottingham City Council undertook non- automatic (passive) monitoring of NO2 at 47 different locations during 2018.

Appendix A Table A.2 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.

Local Air Quality monitoring results

Figure 1 indicates the spatial distribution of all the air quality monitoring sites in Nottingham. Real time analyser monitoring locations are identified by letters, and diffusion tubes by numbers. Note diffusion tubes 24, 25, 26 are collocated with the real time analyser marked SA and used in the national annual diffusion tube bias study.

To assist the visualisation of the monitoring data Figure 1 combines 2018 real time analyser monitoring results, historical monitoring results (from 2014) and an approach that highlights the diffusion tubes monitoring locations where an exceedance of the AQO is likely to have occurred. Nottingham's NO2 diffusion tube monitoring results, adjusted using both the national and local bias adjustment factors, are detailed in Appendix B Table B1.

See Appendix A Tables A1 and A2 for detailed information about the locations, and Table A3 for 2013-2017 monitoring results.

Nottingham's (and the DEFRA AURN station) NO2 real time analysers use the chemiluminescence technique recognised by EU legislation and DEFRA as a reference method for monitoring NO2 concentrations.

In addition to real time analysers, Nottingham uses nitrogen dioxide diffusion tubes to measure NO2 (Appendix B Table B1). Diffusion tubes are not a 'reference method', and only give an average NO2 concentration for the period of exposure. They have low accuracy, and their measurements require a correction, known as bias adjustment. The bias adjustment factor is derived from a collocation study with a local real time analyser (the reference methodology), or by applying a national bias adjustment derived from a large number of national collocation studies (Appendix C). For more information https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html

Advice was obtained from the LAQM helpdesk concerning the use of local and national diffusion tube data in 2018. Nottingham City Council's 2018 collocation study satisfied the range of criteria (LAQM.TG16. Box 7.11) necessary to have confidence in the use of the local bias adjustment factor in preference to the national bias adjustment factor.

For mapping purposes, and to give comparability with the real time analyser results and greater confidence in the likelihood of exceedance of the AQO, only those locations where applying both local and national bias adjustment factors to the diffusion tube measurements resulted in levels higher than 40 ug/m3 are shown as red dots in Fig. 1.

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)

Nottingham City Council conducts nitrogen dioxide monitoring in 47 different locations (4 diffusion tubes are collocated with real time analysers). The majority of tubes are in relevant/sensitive locations with respect to the annual mean objective, 2 tubes are in sensitive locations with respect to the 1-hour objective (200 ug/m3 not to be exceeded 18 times a year), and 6 tubes are not in a relevant/sensitive location) as detailed in Table A.1 and table A.2. (Monitoring at these 6 locations was discontinued from January 2019).

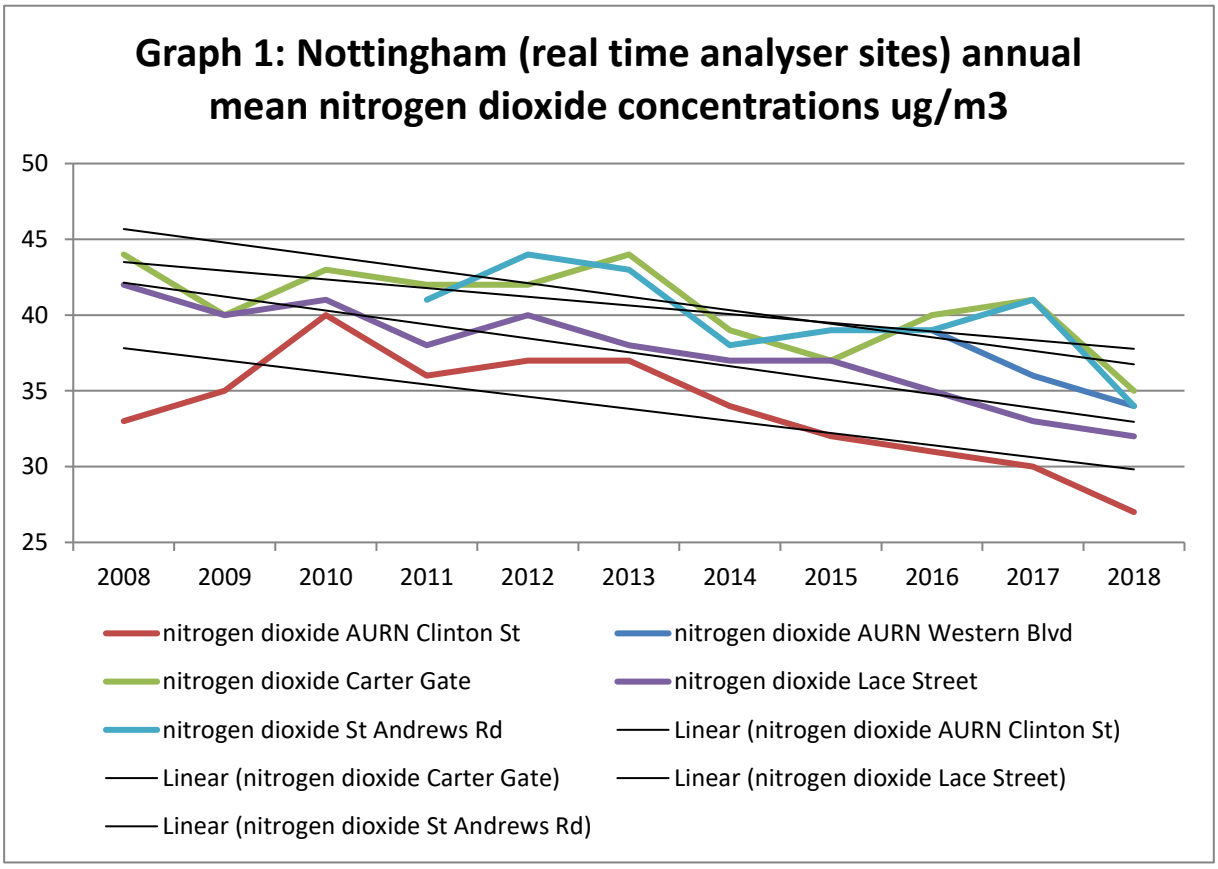


Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

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.

None of the diffusion tubes show a local 'bias adjusted' annual mean greater than 60 ug/m3. It is therefore unlikely that there have been exceedances of the 1-hour air quality objective in any diffusion tube monitoring location.

3.2.2 Particulate Matter (PM_{10})

Nottingham City Council does not undertake its own monitoring for PM_{10}. However, monitoring is undertaken at the DEFRA AURN station located in the City centre and therefore reported here. Monitoring since 2011, when the PM_{10} FDMS, unit was installed, shows levels meet both annual mean and daily mean air quality objectives (Fig. 4).

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.

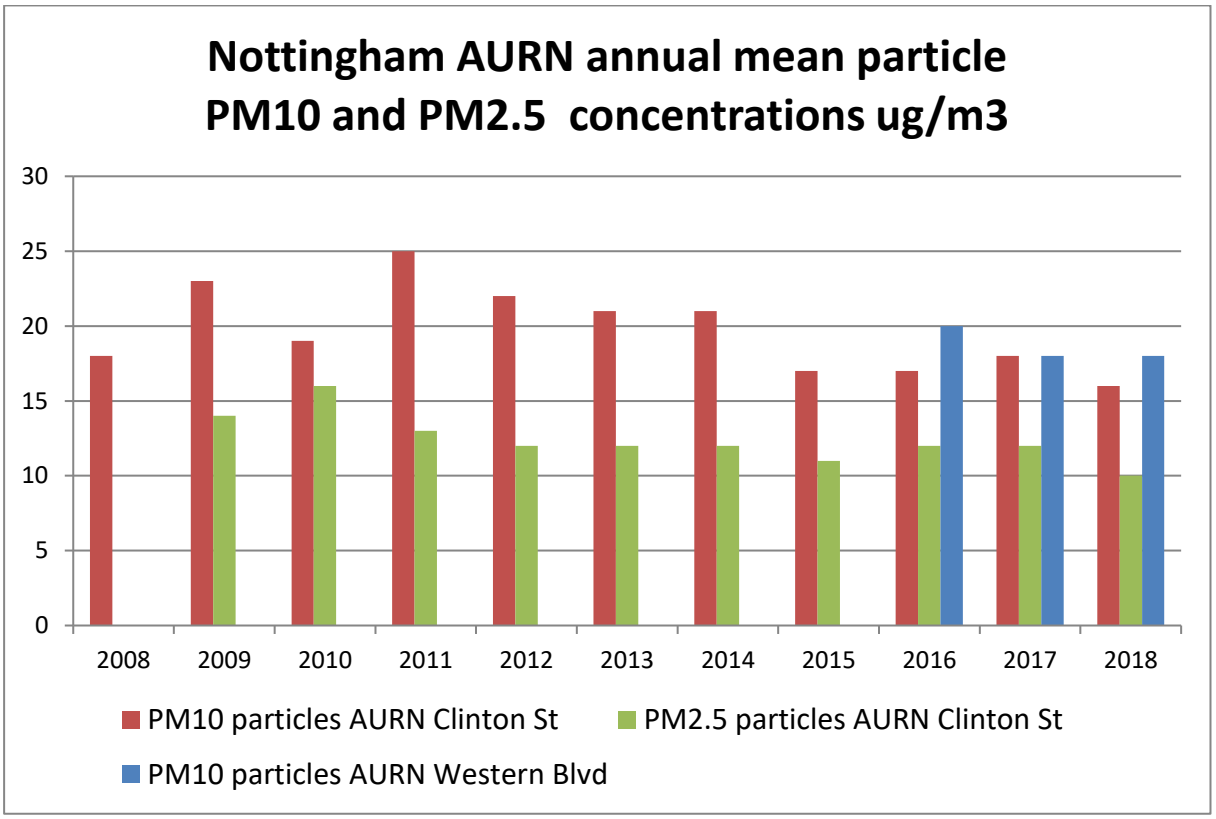
Error! Reference source not found. in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

3.2.3 Particulate Matter ($PM_{2.5}$)

Nottingham City Council does not undertake its own monitoring for PM2.5. However, monitoring is undertaken at the DEFRA AURN station located in the City centre and therefore reported here. There are no air quality objectives for PM2.5 in England.

Table A.7 in Appendix A presents the ratified and adjusted monitored PM2.5 annual mean concentrations for the past 5 years.

Figure 8

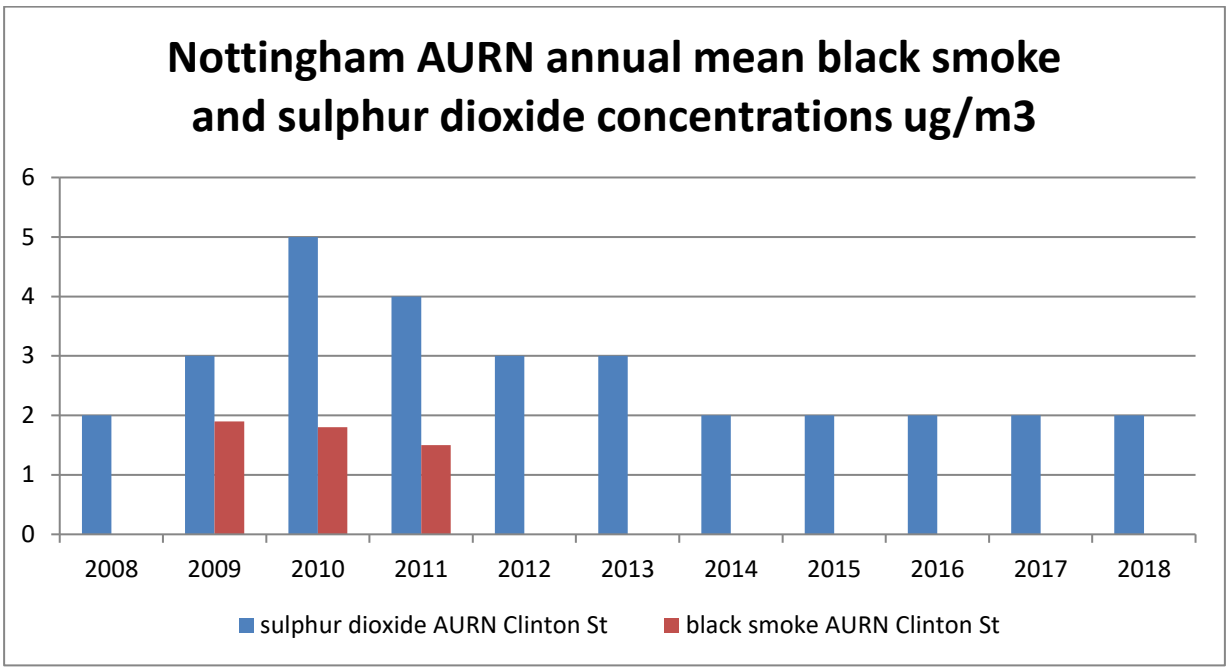


Monitoring shows a gradual decline in particle concentrations since a peak in PM2.5 concentrations of 16 ug/m3 in 2010 and a peak PM10 concentration of 25 ug/m3 in 2011.

3.2.4 Sulphur Dioxide (SO_2)

Nottingham City Council does not undertake its own monitoring for sulphur dioxide. However, monitoring is undertaken at the DEFRA AURN station located in the City centre and therefore reported here. Monitoring shows levels meet all air quality objectives.

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2018 with the air quality objectives for SO_2.


Nottingham AURN annual mean black smoke and sulphur dioxide concentrations ug/m3
6
5
4
3
2
1
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
sulphur dioxide AURN Clinton St
black smoke AURN Clinton St

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)
CG NOx	Carter Gate	Roadside	457946	339668	NO2 NO NOx	Y	Chemiluminescent	12	4	2.5
LS NOx	Lace Street	Roadside	454941	338315	NO2 NO NOx	Y	Chemiluminescent	3	9	1.5
SA NOx	St. Andrews Road	Roadside	456967	341382	NO2 NO NOx	Y	Chemiluminescent	12	13	1.7
CC AURN	Clinton St East.	Urban background	457437	340049	PM2.5,PM10 NO2, NO, NOx O3 SO2	N	FDMS, FDMS Chemiluminescent Ultra Violet Absorption (UVA) Ultra Violet Fluorescence (UVF)	N/A	35	3
WB AURN	Western Boulevard	Kerbside	454573	341643	PM10 NO2	NO	FDMS Chemiluminescent	15	1	2.5

Notes:

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

(2) N/A if not applicable.

Table A.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)
0	Travel Blank (unexposed)									
1	Woodside Road	Roadside	452795	338219	NO2	Y	0	10	N	2.5
2	Derby Road	Roadside	454520	338931	NO2	N	0	23	N	2.5
3	Marlborough Street	Roadside	455208	338277	NO2	N	0	5	N	2.5
4	Beeston Rd	Roadside	454783	338146	NO2	Y	0	10	N	2.5
5	Abbey Street	Roadside	455146	338512	NO2	N	0	5	N	2.5
6	Western Blvd	Roadside	454466	340111	NO2	N	0	17	N	2.5
7	Wilkinson St	Roadside	454829	342013	NO2	N	0	21	N	2.5
8	413 Nottingham Rd	Roadside	455573	342860	NO2	N	0	13	N	2.5
9	403 Nottingham Road	Roadside	455606	342840	NO2	N	0	4	N	2.5
10	Valley Road	Roadside	455528	342829	NO2	N	0	7	N	2.5
11	Danethorpe Vale	Roadside	457248	343813	NO2	N	0	17	N	2.5
12	Bentinck Rd - Sch	Roadside	455809	340800	NO2	N	0	6	N	2.5
13	Ilkeston Road	Roadside	455439	340131	NO2	N	0	3	N	2.5
14	Ilkeston Road	Roadside	455485	340135	NO2	N	0	4	N	2.5
15	Gregory Blvd	Roadside	455358	341086	NO2	N	0	10	N	2.5
16	Castle Gardens	Roadside	455870	339133	NO2	N	0	3	N	2.5
17	Castle Boulevard	Roadside	455955	339129	NO2	N	0	5	N	2.5

18	LP 3P17 Park Road	Roadside	455809	339178	NO2	N	4	27	N	2.5
19	Castle Blvd	Roadside	456853	339303	NO2	Y	0	4	N	2.5
20	Canning Terrace	Roadside	456399	340191	NO2	Y	0	5	N	2.5
21	Maid Marian Way	Roadside	457083	339637	NO2	N	0	3	N	2.5
22	LP 80A01 Alfreton Rd	Roadside	456156	340383	NO2	N	0	3	N	2.5
23	Mansfield Rd	Roadside	457102	340946	NO2	Y	0	2	N	2.5
24	St Andrew's Rd B	Roadside	456967	341382	NO2	Y	12	16	Y	1.5
25	St Andrew's Rd M	Roadside	456967	341382	NO2	Y	12	16	Y	1.5
26	St Andrew's Rd T	Roadside	456967	341382	NO2	Y	12	16	Y	1.5
27	Cartergate	Roadside	457963	339681	NO2	Y	0	8	N	2.5
28	Trent Bridge	Roadside	458060	338276	NO2	Y	0	2	N	2.5
29	Meadow Lane	Roadside	458459	339011	NO2	N	0	3	N	2.5
30	LP 53890 Manvers Street	Roadside	458078	339891	NO2	N	0	3	N	2.5
31	Middleton Boulevard	Roadside	454399	339886	NO2	N	0	17	N	2.5
32	Middleton Boulevard	Roadside	454493	339402	NO2	N	0	19	N	2.5
33	Lace Street NOx RTA	Roadside	454941	338314	NO2	Y	0	9	Y	1.5
34	24 Bradbourne Avenue	Roadside	456364	336425	NO2	N	0	23	N	2.5
35	Lampost 70 Wollaton Road	Roadside	454587	340097	NO2	N	10	3	N	2.5
36	Western Boulevard Pedestrian Crossing	Roadside	454434	340114	NO2	N	28	1	N	2.5
37	Wollaton Road Subway	Roadside	454327	340056	NO2	N	30	1	N	2.5
38	Lampost 180 Wollaton Road	Roadside	454246	340057	NO2	N	11	1	N	2.5
39	Wollaton Rd/Crown Island Crossing	Roadside	454253	340034	NO2	N	20	1	N	2.5
40	Lampost Middleton Boulevard/Crown Island	Roadside	454321	339931	NO2	N	15	5	N	2.5

41	Crossing Middleton Boulevard/Crown Island	Roadside	454313	339991	NO2	N	37	6	N	2.5
43	Outside 328 Derby Road	Roadside	455453	339595	NO2	N	6	3	N	2.5
44	Parking Post Cliff Road	Roadside	457775	339530	NO2	Y	4	17	N	2.5
45	66 London Road	Roadside	457871	339051	NO2	Y	3	20	N	2.5
46	Hicking Building Queens Road	Roadside	457781	339123	NO2	Y	0	3	N	2.5
47	Sheriffs Way/ Railway Station	Roadside	457398	339183	NO2	Y	23	16	N	2.5
48	Kinglake Place	Roadside	457151	338953	NO2	Y	0	12	N	2.5
49	2 Castle Boulevard	Roadside	457150	339384	NO2	Y	0	4	N	2.5
50	A52 Clifton Boulevard	Roadside	455772	337808	NO2	Y	0	3	N	2.5
51	Trent Street	Roadside	457528	339339	NO2	N	0	2	N	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 2018 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (Tube data bias adjusted)						
					2014	2015	2016	2017 LBA	2017 NBA	2018 LBA	2018 NBA
CG NOx	Roadside	Automatic		99	39	37	40	**41**		35	
LS NOx	Roadside	Automatic		94	37	37	35	33		32	
SA NOx	Roadside	Automatic		99	38	39	39	**41**		34	
AURN	Urban Background	Automatic		97	34	32	31	30		27	
AURN	Roadside	Automatic		94			39	35		34	
1	Roadside	Diffusion Tube		100	38	38	27	37	31	32	30
2	Roadside	Diffusion Tube		100	28	30	23	32	26	27	25
3	Roadside	Diffusion Tube		92	31	25	27	27	22	24	22
4	Roadside	Diffusion Tube		100	37	33	31	35	30	32	30
5	Roadside	Diffusion Tube		100	33	36	31	36	30	30	28
6	Roadside	Diffusion Tube		92	32	31	30	36	30	29	27
7	Roadside	Diffusion Tube		100	31	31	32	36	30	29	27
8	Roadside	Diffusion Tube		100	39	38	38	39	33	35	33
9	Roadside	Diffusion Tube		100	**42**	**42**	37	**46**	39	**42**	39

10	Roadside	Diffusion Tube		92	38	39	31	**41**	34	39	37
11	Roadside	Diffusion Tube		100	30	30	31	34	29	29	27
12	Roadside	Diffusion Tube		100	35	32	31	40	33	33	30
13	Roadside	Diffusion Tube		100	36	36	39	35	29	33	31
14	Roadside	Diffusion Tube		100	**45**	**41**	34	**50**	**41**	**46**	**43**
15	Roadside	Diffusion Tube		92	32	36	33	35	29	30	28
16	Roadside	Diffusion Tube		92	**52**	**48**	32	**41**	34	36	34
17	Roadside	Diffusion Tube		100	**42**	**48**	29	38	32	38	35
18	Roadside	Diffusion Tube		100	32	32	31	32	26	29	27
19	Roadside	Diffusion Tube		100	40	37	40	34	29	32	30
20	Roadside	Diffusion Tube		100	**50**	**48**	**42**	**49**	**41**	**50**	**46**
21	Roadside	Diffusion Tube		100	**44**	**44**	38	**46**	39	**43**	40
22	Roadside	Diffusion Tube		100	**48**	**41**	**44**	**48**	40	**44**	**41**
23	Roadside	Diffusion Tube		83	**45**	**43**	36	**47**	39	**46**	**42**
24	Roadside	Diffusion Tube		100	40	38	35	40	33	34	32
25	Roadside	Diffusion Tube		100	39	38	35	**42**	35	35	33
26	Roadside	Diffusion Tube		100	**41**	39	34	**41**	34	35	33
27	Roadside	Diffusion Tube		100	**41**	**42**	35	**48**	40	40	37

28	Roadside	Diffusion Tube		92	**42**	37	40	**41**	34	36	33
29	Roadside	Diffusion Tube		100	**44**	**42**	40	**46**	38	**45**	**42**
30	Roadside	Diffusion Tube		92	**45**	**41**	35	**46**	39	**44**	40
31	Roadside	Diffusion Tube		92	28	31	28	37	30	27	25
32	Roadside	Diffusion Tube		100	23	26	29	32	27	27	25
33	Roadside	Diffusion Tube		100			29	38	31	34	31
34	Roadside	Diffusion Tube		100			35	31	26	26	24
35	Roadside	Diffusion Tube		92			**41**	**42**	35	**42**	39
36	Roadside	Diffusion Tube		92			39	**54**	**45**	**47**	**43**
37	Roadside	Diffusion Tube		100			36	**45**	37	**41**	38
38	Roadside	Diffusion Tube		92			36	38	32	35	32
39	Roadside	Diffusion Tube		100			40	**46**	38	**42**	39
40	Roadside	Diffusion Tube		83			**37**	36	30	37	34
41	Roadside	Diffusion Tube		92			32	**50**	**42**	**50**	**46**
43	Roadside	Diffusion Tube		100			**44**	35	29	29	26
44	Roadside	Diffusion Tube		100			**41**	**41**	34	39	36
45	Roadside	Diffusion Tube		92			**42**	**61**	**51**	**56**	**52**
46	Roadside	Diffusion Tube		100			37	**53**	**44**	**48**	**45**

47	Roadside	Diffusion Tube		92			**44**	**47**	39	**46**	**42**
48	Roadside	Diffusion Tube		67			36	33	27	27	25
49	Roadside	Diffusion Tube		83			**48**	**53**	**44**	**46**	**43**
50	Roadside	Diffusion Tube		83						**51**	**47**
51	Roadside	Diffusion Tube		58				**49**	**41**	38	34

☒ **Diffusion tube data has been bias corrected – note both local and national bias adjusted results are reported**

☒ **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

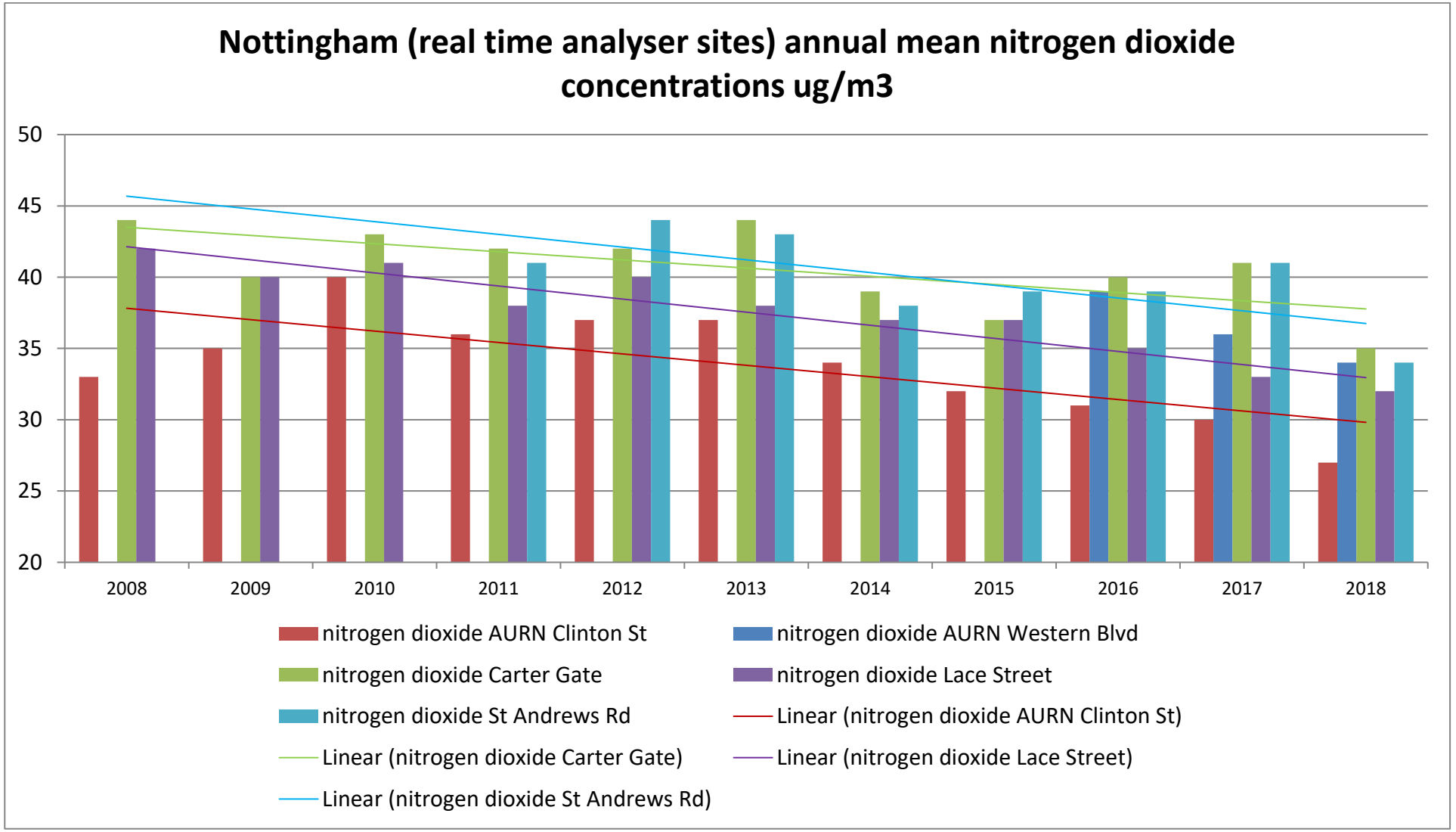


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

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)				
					2014	2015	2016	2017	2018
CG NOx	Roadside	Automatic	99	99	0	0	0	0	0
LS NOx	Roadside	Automatic	90	94	0	0	0	0	0
SA NOx	Roadside	Automatic	99	99	0	0	0	2	0
CC AURN	Urban Background	Automatic	99	99	1	0	0	0	0
WB AURN	Kerbside	Automatic	99	99	-	-	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 (µg/m^3) (3)				
				2014	2015	2016	2017	2018
CC AURN	Urban Background	95	95	21	17	17	18	16
WB AURN	Kerbside	93	93	n/a	20	20	18	18

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.

Table A.6 – 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
CC AURN	Urban Background	95	95	9	6	4	5	2
WB AURN	Kerbside	93	93	-	-	5	8	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.

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

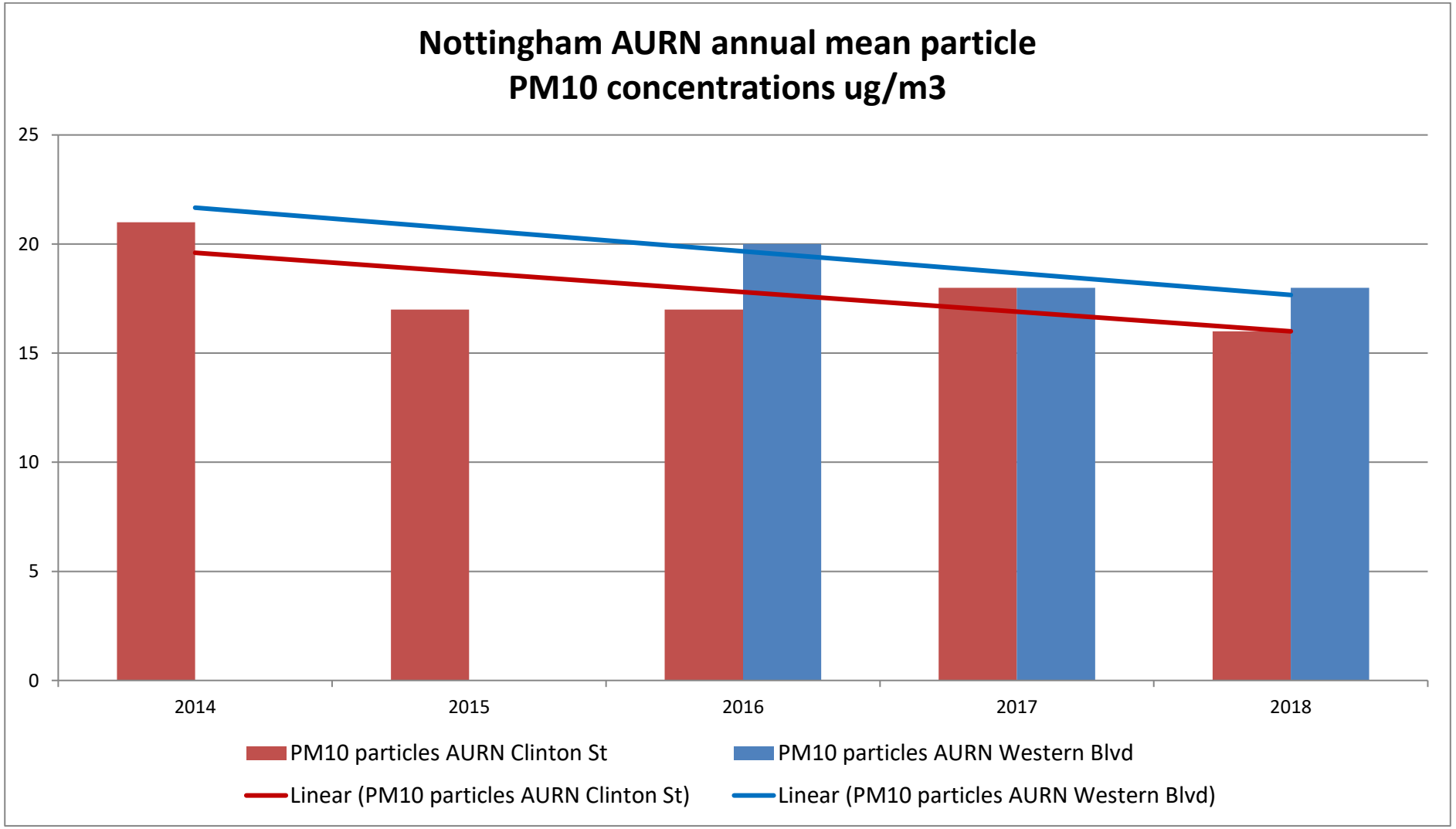


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
CC AURN	Urban Background	95	95	12	11	12	12	10

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.

Figure A.3 – Trends in Annual Mean $PM_{2.5}$ Concentrations

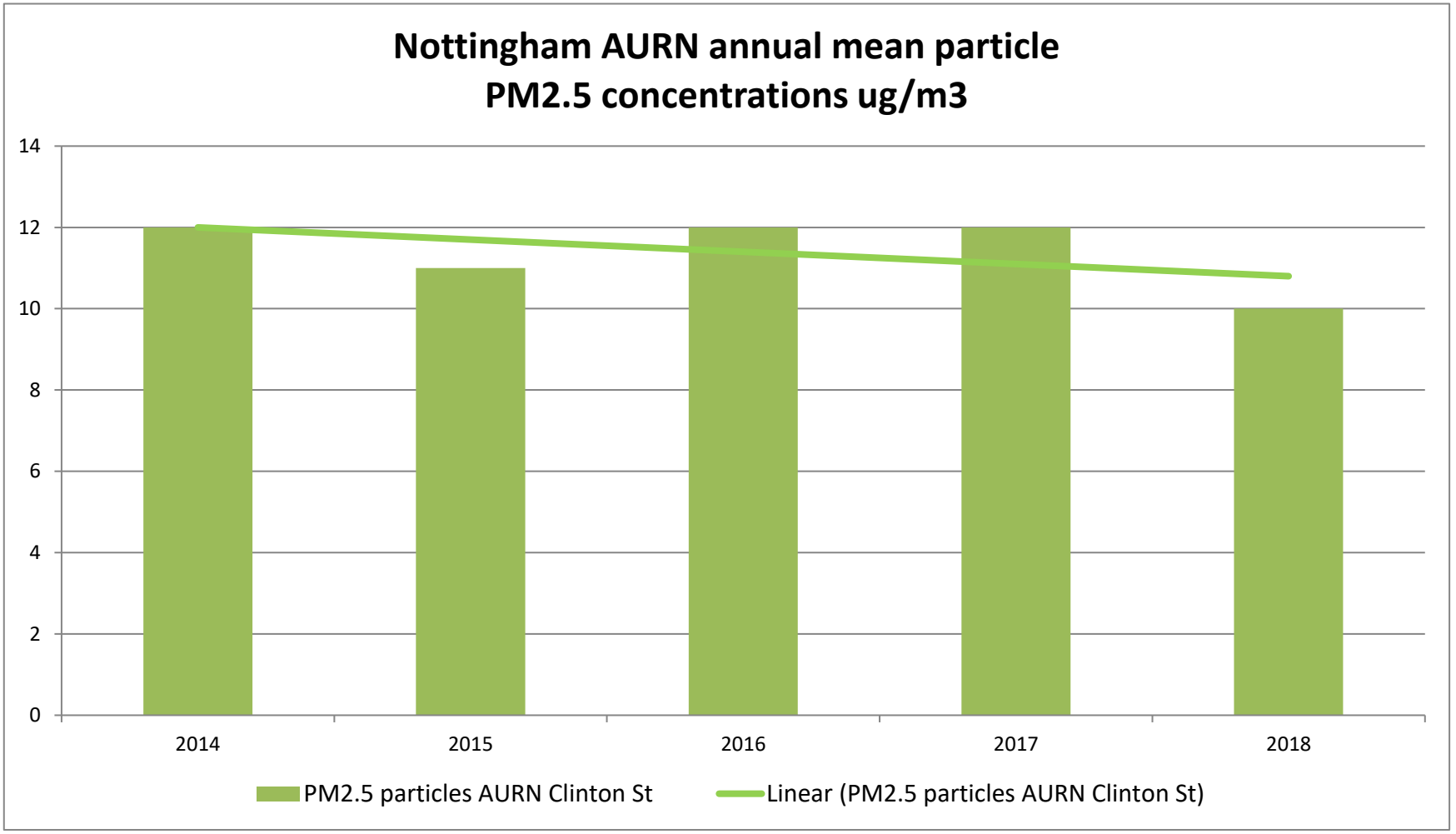


Table A.8 – SO_2 Monitoring Results

Site ID	Site Type	Valid Data Capture for monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	Number of Exceedances 2018 (percentile in bracket) (3)		
				15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
CC AURN	Urban Background	95	95	0	0	0

Notes:

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

(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 relevant percentiles are provided in brackets.

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 ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean 2018		
													Raw Data	Bias Adjusted (1)	Distance Corrected to Nearest Exposure
1	31.40	36.60	33.40	19.85	30.48	30.68	32.27	30.80	33.26	31.67	35.78	34.58	31.73	31.7	32
2	33.49	25.56	26.98	25.03	22.76	17.21	21.81	23.97	25.74	28.93	34.38	34.60	26.70	26.7	27
3	28.74	27.59	24.73	24.31	21.49	19.71	20.32	16.95	22.89	27.65	-	26.94	23.76	23.8	24
4	31.41	33.16	30.01	31.04	28.81	22.16	30.62	33.10	32.38	35.25	36.79	43.69	32.37	32.4	32
5	36.31	35.60	32.78	34.29	15.03	23.79	30.23	24.77	29.84	30.47	33.16	34.57	30.07	30.1	30
6	32.40	33.22	31.59	27.99	12.31	20.25	26.96	30.77	34.46	34.67	-	35.98	29.15	29.1	29
7	30.93	32.91	25.74	25.29	13.38	20.92	28.41	29.55	33.20	34.97	33.46	33.86	28.55	28.6	29
8	48.01	41.28	33.92	34.71	18.58	29.48	36.42	36.05	36.01	34.30	36.81	38.91	35.37	35.4	35
9	48.34	41.64	35.06	44.05	44.10	35.58	47.65	43.13	51.88	23.56	46.26	42.33	41.96	42.0	**42**
10	44.12	44.99	36.93	38.34	41.02	-	40.96	33.79	36.77	39.52	37.99	39.25	39.43	39.4	39
11	32.38	32.83	22.99	28.05	21.57	21.52	28.83	27.48	32.21	32.26	30.00	36.57	28.89	28.9	29
12	31.79	30.66	28.75	33.45	33.05	28.08	37.85	29.99	34.43	35.20	33.88	35.66	32.73	32.7	33
13	30.97	36.06	28.56	35.65	35.71	35.20	33.37	26.65	29.03	33.51	40.58	33.31	33.22	33.2	33

14	45.37	53.73	39.63	47.60	49.07	40.78	49.89	43.38	43.55	47.85	45.22	45.14	45.93	45.9	**46**
15	32.39	32.31	26.88	28.91	25,65	21.54	26.32	27.60	31.81	31.90	33.25	35.82	29.88	29.9	30
16	38.76	48.30	34.16	36.49	31.98	-	33.20	31.65	30.35	33.56	39.39	41.30	36.29	36.3	36
17	39.65	38.59	31.48	32.63	30.60	39.52	56.60	34.87	37.97	38.10	34.64	37.87	37.71	37.7	38
18	31.21	30.52	27.03	22.46	22.52	26.08	38.18	25.57	29.74	30.14	30.64	30.52	28.72	28.7	29
19	33.05	37.41	29.17	34.49	28.78	33.70	28.06	26.70	29.70	32.72	34.52	35.54	31.99	32.0	32
20	46.97	54.79	48.51	51.06	63.10	50.87	54.70	40.85	41.58	50.34	49.79	43.15	49.64	49.6	**50**
21	41.90	44.65	40.39	44.46	48.58	40.51	45.39	39.19	40.51	45.22	44.08	40.21	42.93	42.9	**43**
22	46.99	42.97	50.67	42.00	53.20	41.51	37.39	29.03	32.94	48.73	45.56	53.81	43.73	43.7	**44**
23	43.92	34.34	47.66	45.11	52.43	47.82	45.05	-	-	48.40	55.99	35.92	45.66	45.7	**46**
24	39.95	35.32	27.20	32.91	23.25	23.75	33.00	37.57	38.69	39.61	39.12	37.05	33.95	34.0	34
25	36.86	41.98	25.69	33.07	28.04	22.90	34.11	35.41	39.82	39.86	39.49	37.38	34.55	34.6	35
26	38.10	36.79	29.77	32.66	28.92	22.66	34.62	35.67	41.19	42.61	40.47	40.06	35.29	35.3	35
27	46.13	41.13	34.27	48.03	36.07	35.45	35.75	36.66	41.75	45.49	40.78	38.70	40.02	40.0	40
28	-	47.17	34.13	32.80	33.24	28.50	35.09	34.83	33.98	36.69	37.50	36.67	35.51	35.5	36
29	45.74	46.27	44.12	44.52	47.64	37.79	48.03	40.63	40.04	45.86	50.98	43.89	44.63	44.6	**45**
30	47.67	40.28	41.11	39.86	46.38	44.54	39.60	-	42.88	46.45	49.45	40.17	43.49	43.5	**44**
31	30.97	29.43	23.71	29.80	24.83	23.02	24.43	27.04	-	28.11	30.82	28.98	27.38	27.4	27
32	30.96	29.80	27.21	22.56	21.52	17.72	23.61	25.81	29.97	35.05	30.98	30.99	27.18	27.2	27
33	39.06	35.71	37.87	31.68	33.43	28.35	31.16	27.32	32.92	33.56	38.48	34.41	33.66	33.7	34
34	33.87	31.33	24.61	26.04	20.80	18.07	23.52	26.61	28.75	15.76	28.29	29.22	25.57	25.6	26
35	45.25	39.92	40.11	32.98	35.62	34.02	35.86	-	77.52	43.71	43.42	36.21	42.24	42.2	**42**
36	49.93	49.81	41.15	51.59	45.95	39.99	44.47	47.41	46.39	46.52	52.82-	49.83	46.64	47.2	47
37	45.20	43.21	40.70	47.01	36.45	29.05	36.94	37.00	37.14	39.44	52.02	43.17	40.61	40.6	41
38	35.00	38.02	34.58	35.80	28.02	30.47	31.30	29.49	29.95	-	45.89	41.63	34.56	34.6	35
39	49.41	43.40	45.38	37.27	44.07	41.84	40.22	34.89	35.38	36.78	54.52	41.96	42.09	42.1	42

40	41.27	39.79	38.18	37.17	39.82	-	34.39	25.46	0.00	36.17	46.14	31.06	36.94	36.9	37
41	51.39	57.25	50.75	50.15	56.73	48.35	54.02	44.89	45.29	51.95	-	39.01	49.98	50.0	50
43	33.48	31.53	31.53	25.78	24.85	22.68	24.65	25.41	25.44	29.26	35.95	28.72	28.27	28.3	29
44	45.79	38.82	38.82	44.48	34.92	29.44	34.28	32.25	39.01	41.62	45.98	37.83	38.60	38.6	39
45	59.09	48.49	48.49	51.49	45.34	-	87.17	51.56	57.01	57.73	56.37	47.79	55.50	55.5	**56**
46	47.35	46.50	46.50	48.18	45.06	43.10	50.68	46.35	47.53	51.79	59.42	47.05	48.29	48.3	**48**
47	43.53	58.20	58.20	43.69	48.84	39.44	31.03	-	39.44	43.45	49.04	40.82	45.06	45.1	**46**
48	31.70	-	-	25.06	24.99	29.27	20.71	22.03	-	-	30.64	30.43	26.85	26.9	27
49	48.09	-	-	46.80	45.84	48.89	40.76	42.70	48.89	46.95	47.23	42.92	45.91	45.9	**46**
50	58.58	45.77	45.77	39.64	50.75	47.52	55.12	-	-	55.21	59.41	51.60	50.94	50.9	**51**
51	44.76	44.38	33.17	35.74	31.55	-	38.23	35.60	-	-	-	-	37.63	37.6	38

☒ **Local 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

QA/QC for Diffusion Tube Monitoring

Gradko International supply and analyse Nottingham City Council's diffusion tubes. The organisation is UKAS accredited and is assessed annually for compliance to ISO 17025 and participates in other proficiency schemes.

Gradko have confirmed that their procedures follow the guidance issued on behalf of Defra (AEA Energy & Environment, Feb 2008) relating to the preparation, extraction, analysis and calculation procedures for passive NO_2 diffusion tubes

Gradko participate in a number of QA/QC monitoring systems to demonstrate satisfactory performance including the Workplace Analysis Scheme for Proficiency (WASP) programme to ensure uniformity in data throughout the year.

Precision vs Accuracy (Bias)

A further aspect of QA/QC for a laboratory is the reproducibility of results i.e. precision. Precision should not be confused with accuracy. Diffusion tube precision can be described as the ability of a measurement to be consistently reproduced, i.e. how similar the results of duplicate or triplicate tubes are to each other.

Accuracy represents the ability of the measurement to represent the 'true' value, which for the monitoring results, is defined as the results from the automatic analysers. When averaged over a number of sets of results bias can be evident. This represents the overall tendency of the diffusion tubes to depart from the 'true' value, i.e. to systematically over-or under-read when compared against the reference method.

Once identified, bias can be adjusted for to improve the accuracy of diffusion tube results. This is done using bias adjustment factors which have been found to be specific to a laboratory and tube preparation method. See Appendix A subsection A-1 above.

Unlike bias, poor precision cannot be adjusted for. It can only be improved by careful handling of the tubes in both the laboratory and the field.

The LAQM website provides a link to the summary of precision results for individual laboratories - **Summary of Diffusion Tube Precision 2008-2018 (updated March 2019)**. It can be downloaded as a PDF from http://laqm.defra.gov.uk/diffusion-tubes/precision.html.

The 2018 precision rating for Gradko supplied/analyzed diffusion tubes was 'good'. This precision reflects the laboratory's performance/consistency in preparing and analyzing the tubes, as well as the subsequent handling of the tubes in the field.

Nottingham City Council's collocation study data contributes to the rating. The data spreadsheet also allows NCC to determine whether its collocation study's bias adjustment factor should be used in preference to the national bias adjustment factor derived from collocation studies conducted by other local authorities.

Nottingham City Council's 2018 collocation study results.

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	03/01/2018	30/01/2018	39.95	36.86	38.1	38	1.6	4	3.9
2	30/01/2018	27/02/2018	35.32	41.98	36.79	38	3.5	9	8.7
3	27/02/2018	27/03/2018	27.2	25.69	29.77	28	2.1	7	5.1
4	27/03/2018	01/05/2018	32.91	33.07	32.66	33	0.2	1	0.5
5	01/05/2018	05/06/2018	23.25	28.04	28.92	27	3.1	11	7.6
6	05/06/2018	03/07/2018	23.75	22.9	22.66	23	0.6	2	1.4
7	03/07/2018	31/07/2018	33	34.11	34.62	34	0.8	2	2.1
8	31/07/2018	04/09/2018	37.57	35.41	35.67	36	1.2	3	2.9
9	04/09/2018	02/10/2018	38.69	39.82	41.19	40	1.3	3	3.1
10	02/10/2018	30/10/2018	39.61	39.86	42.61	41	1.7	4	4.1
11	30/10/2018	04/12/2018	39.12	39.49	40.47	40	0.7	2	1.7
12	04/12/2018	08/01/2019	37.05	37.38	40.06	38	1.7	4	4.1
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
38.1	99.8	Good	Good
37.6	99	Good	Good
32.1	99.6	Good	Good
32.2	99.6	Good	Good
26.7	99.5	Good	Good
22.5	99.9	Good	Good
33.4	99.6	Good	Good
33.6	99.8	Good	Good
37.9	99.9	Good	Good
39.5	99.7	Good	Good
36.9	99.8	Good	Good
43.4	99.6	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: St Andrews Road

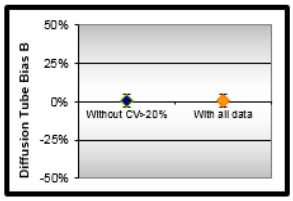
Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 12 periods of data
Bias factor A: 1 (0.95 - 1.04)
Bias B: 0% (-4% - 5%)
Diffusion Tubes Mean: 35 μgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 34 μgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 35 (33 - 36) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data
Bias factor A: 1 (0.95 - 1.04)
Bias B: 0% (-4% - 5%)
Diffusion Tubes Mean: 35 μgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 34 μgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 35 (33 - 36) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Adjustment of DUPLICATE or TRIPLICATE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Average	Standard Deviation	CV	95% CI mean
1	03/01/2018	30/01/2018	39.95	36.86	38.1	38.3	1.56	4.06	3.86
2	30/01/2018	27/02/2018	35.32	41.98	36.79	38.0	3.50	9.20	8.69
3	27/02/2018	27/03/2018	27.2	25.69	29.77	27.6	2.06	7.49	5.12
4	27/03/2018	01/05/2018	32.91	33.07	32.66	32.9	0.21	0.63	0.51
5	01/05/2018	05/06/2018	23.25	28.04	28.92	26.7	3.05	11.41	7.58
6	05/06/2018	03/07/2018	23.75	22.9	22.66	23.1	0.57	2.48	1.42
7	03/07/2018	31/07/2018	33	34.11	34.62	33.9	0.83	2.44	2.06
8	31/07/2018	04/09/2018	37.57	35.41	35.67	36.2	1.18	3.26	2.93
9	04/09/2018	02/10/2018	38.69	39.82	41.19	39.9	1.25	3.14	3.11
10	02/10/2018	30/10/2018	39.61	39.86	42.61	40.7	1.66	4.09	4.14
11	30/10/2018	04/12/2018	39.12	39.49	40.47	39.7	0.70	1.76	1.73
12	04/12/2018	08/01/2019	37.05	37.38	40.06	38.2	1.65	4.33	4.10
13									

Data Quality Check
Diffusion Tubes Precision Check
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good
Good

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Jaume Targa, for AEA

Version 04 - February 2011

Site Name/ ID: St Andrews Road

Adjusted measurement (95% confidence level)
Without periods with CV larger than 20%

Bias calculated using 12 periods of data
Tube Precision: 5 Automatic DC: 100%
Bias factor A: 1 (0.95 - 1.04)
Bias B: 0% (-4% - 5%)

Information about tubes to be adjusted
Diffusion Tube average: 35 µgm^{-3}
Average Precision (CV): 5
Adjusted Tube average: 35 +/- 2 µgm^{-3}

Adjusted measurement (95% confidence level)
with all data

Bias calculated using 12 periods of data
Tube Precision: 5 Automatic DC: 100%
Bias factor A: 1 (0.95 - 1.04)
Bias B: 0% (-4% - 5%)

Information about tubes to be adjusted
Diffusion Tube average: 35 µgm^{-3}
Average Precision (CV): 5
Adjusted Tube average: 35 +/- 2 µgm^{-3}

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/19

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2019
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List
If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List
If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List
If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method To undo your selection, choose (All) from the pop-up list	Year[2] To undo your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (ug/m^3)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2018	R	Ards and North Down Borough Council	11	36	29	27.4%	G	**0.78**
Gradko	20% TEA in water	2018	R	Gedling Borough Council	12	33	32	5.6%	G	**0.95**
Gradko	20% TEA in water	2018	R	Lisburn & Castlereagh City Council	12	32	24	32.1%	G	**0.76**
Gradko	20% TEA in water	2018	R	Monmouthshire County Council	12	38	36	4.7%	G	**0.96**
Gradko	20% TEA in water	2018	UB	Northampton Borough Council	12	16	13	26.8%	G	**0.79**
Gradko	20% TEA in water	2018	R	Bedford Borough Council	11	32	29	9.2%	G	**0.92**
Gradko	20% TEA in water	2018	R	Borough Council of King's Lynn and West Nor	12	26	24	6.0%	G	**0.94**
Gradko	20% TEA in water	2018	R	Cheshire West and Chester	12	36	37	-2.5%	G	**1.03**
Gradko	20% TEA in water	2018	R	Cheshire West and Chester	12	43	40	6.1%	G	**0.94**
Gradko	20% TEA in water	2018	R	Fareham Borough Council	12	28	34	-17.5%	G	**1.21**
Gradko	20% TEA in water	2018	R	Fareham Borough Council	12	37	34	8.9%	G	**0.92**
Gradko	20% TEA in water	2018	R	Fareham Borough Council	12	32	28	12.6%	G	**0.89**
Gradko	20% TEA in water	2018	R	NOTTINGHAM CITY COUNCIL	12	35	34	0.3%	G	**1.00**
Gradko	20% TEA in water	2018	R	Bracknell Forest Borough Council	12	44	37	19.4%	G	**0.84**
Gradko	20% TEA in water	2018	R	Brighton & Hove City Council	9	48	50	-3.7%	G	**1.04**
Gradko	20% TEA in water	2018	R	Eastleigh Borough Council	11	28	32	-12.0%	G	**1.14**
Gradko	20% TEA in water	2018	R	Eastleigh Borough Council	12	42	38	10.2%	G	**0.91**
Gradko	20% TEA in water	2018	UB	Eastleigh Borough Council	12	27	28	-4.4%	G	**1.05**
Gradko	20% TEA in water	2018	R	Gateshead Council	12	29	25	13.9%	G	**0.88**
Gradko	20% TEA in water	2018	R	Gateshead Council	12	32	29	10.8%	G	**0.90**
Gradko	20% TEA in water	2018	R	Gateshead Council	9	40	41	-1.8%	G	**1.02**
Gradko	20% TEA in water	2018	R	Wokingham Borough Council	12	38	33	13.2%	G	**0.88**
Gradko	20% TEA in water	2018	R	Bath & North East Somerset	12	40	39	4.0%	G	**0.96**
Gradko	20% TEA in water	2018	R	Bedford Borough Council	10	30	27	8.8%	G	**0.92**
Gradko	20% TEA in water	2018	KS	Marylebone Road Intercomparison	11	93	85	9.3%	G	**0.91**
Gradko	20% TEA in water	2018	R	South Gloucestershire Council	12	21	20	6.3%	G	**0.94**
Gradko	20% TEA in water	2018	R	Thurrock Borough Council	12	53	52	2.3%	S	**0.98**
Gradko	20% TEA in water	2018	R	Thurrock Borough Council	12	34	30	15.1%	G	**0.87**
Gradko	20% TEA in water	2018	R	Thurrock Borough Council	12	31	24	28.8%	G	**0.78**
Gradko	20% TEA in water	2018	UB	Thurrock Borough Council	12	27	25	9.2%	S	**0.92**
Gradko	20% TEA in water	2018		**Overall Factor[3] (30 studies)**				**Use**		**0.93**

QA/QC Information for Automatic Monitoring

Quality Control, Maintenance, Calibration

AURN Site

The analysers at the AURN site are subject to a four weekly calibration regime. The calibrations are undertaken by a trained local site operator (LSO) and conducted in accordance with the Local Site Operators' Manual.

CG NOx, LS NOx and SA NOx Sites

At Nottingham City Council's CG NOx, LS NOx and SA NOx sites calibrations are carried out fortnightly. The calibrations, using zero air and span gases, are undertaken by the LSOs that prior to 2016 were also the LSOs for the City Centre AURN site. Calibrations are conducted using the same principles and procedures as given in the AURN LSO Manual.

The equipment is fully serviced every six months by Matts Monitors Ltd, Stroud.

Calibration Gas Traceability

AURN Site

Please visit the DEFRA site https://uk-air.defra.gov.uk/networks/ for more information.

CG NOx, LS NOx and SA NOx Sites

Calibration gases used in the CG NOx, LS NOx and SA NOx monitoring sites are supplied by Matts Monitors Ltd. The gases are supplied with a certificate of analysis.

Data Collection and Processing

AURN Site

Please visit https://uk-air.defra.gov.uk/data/ for more information.

CG NOx, LS NOx and SA NOx Sites

During 2018 data collection, validation and ratification was carried out by Air Quality Data Management Ltd http://www.aqdm.co.uk/

Throughout 2018, data from the CG NOx, LS NOx and SA NOx sites was polled remotely directly from the analysers and collected as 15 minute averages using Envista ARM data collection software. The data has been scaled and converted into hourly (or other values) using the Envista ARM data management system.

The software allows users to remotely view, analyse, report and distribute environmental quality data. Manipulation of raw data to verified data can be conducted in a structured approach.

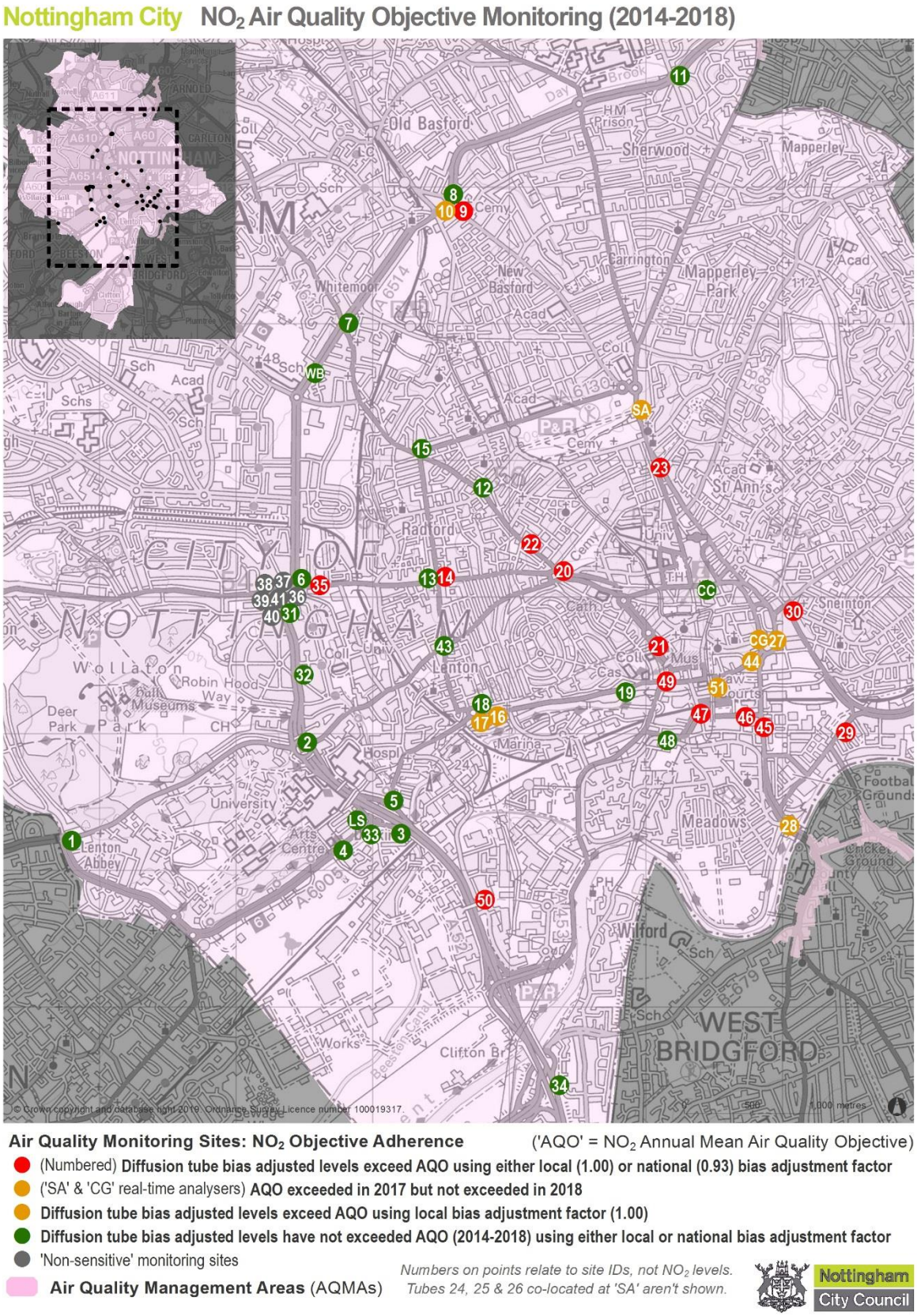
Data validation is carried out and involves screening the scaled values to identify unusual measurements, errors due to equipment failure etc. and flagging them for further investigation.

Data ratification is carried out monthly. This involves looking at the data more closely and includes:

- examination of calibration records to ensure correct application of calibration factors;
- examination of data for other pollutants and monitoring sites to highlight any anomalies;
- deletion of data shown from chart or other records to be spurious, for example, spikes generated by the analyser;
- correction of any baseline drift as indicated by examination of daily automatic calibration records.

Once this process has been carried out and data has been verified, amended or rejected as appropriate, the data is ratified. This final data set is used for the R & A process.

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



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[5]	
	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

Table E.2 – Examples of Where the Air Quality Objectives Should Apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties[9].	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes	

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

Appendix F

Background – Nottingham's geography and weather.

A location's air quality is affected by both local and distant emissions, from a wide range of sources, seasonal and day-to-day weather conditions, and the prevailing wind direction.

Nottingham's location in England means it does not experience daily coastal sea-breeze effects and is subject to the wind direction associated with air masses moving across the UK. The wind rose (Figure 9 is typical of data measured at Watnall meteorological station on the western edge of the Nottingham conurbation) shows the wind direction with the greatest frequency as the large lobe at 220^0. This 'prevailing wind' direction is roughly from the southwest. Thus, Nottingham's air quality is significantly influenced by sources ranged in an arc from the west-south-west to the south-south-west.

Fig 9: Nottingham City Council's geographic location in England and example Windrose (Watnall)

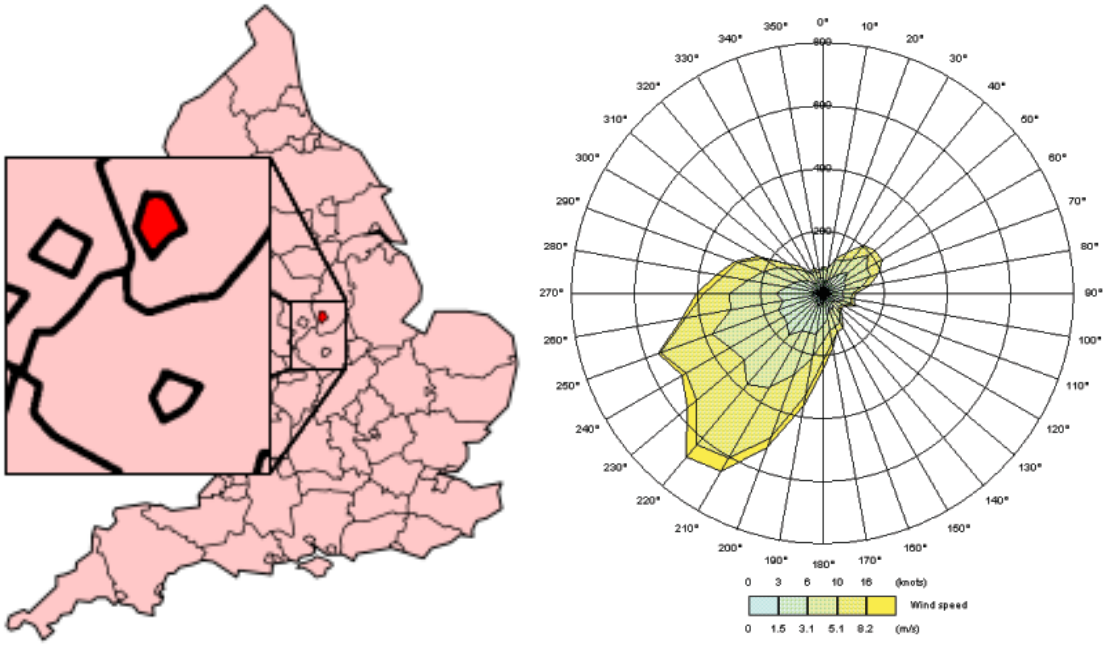
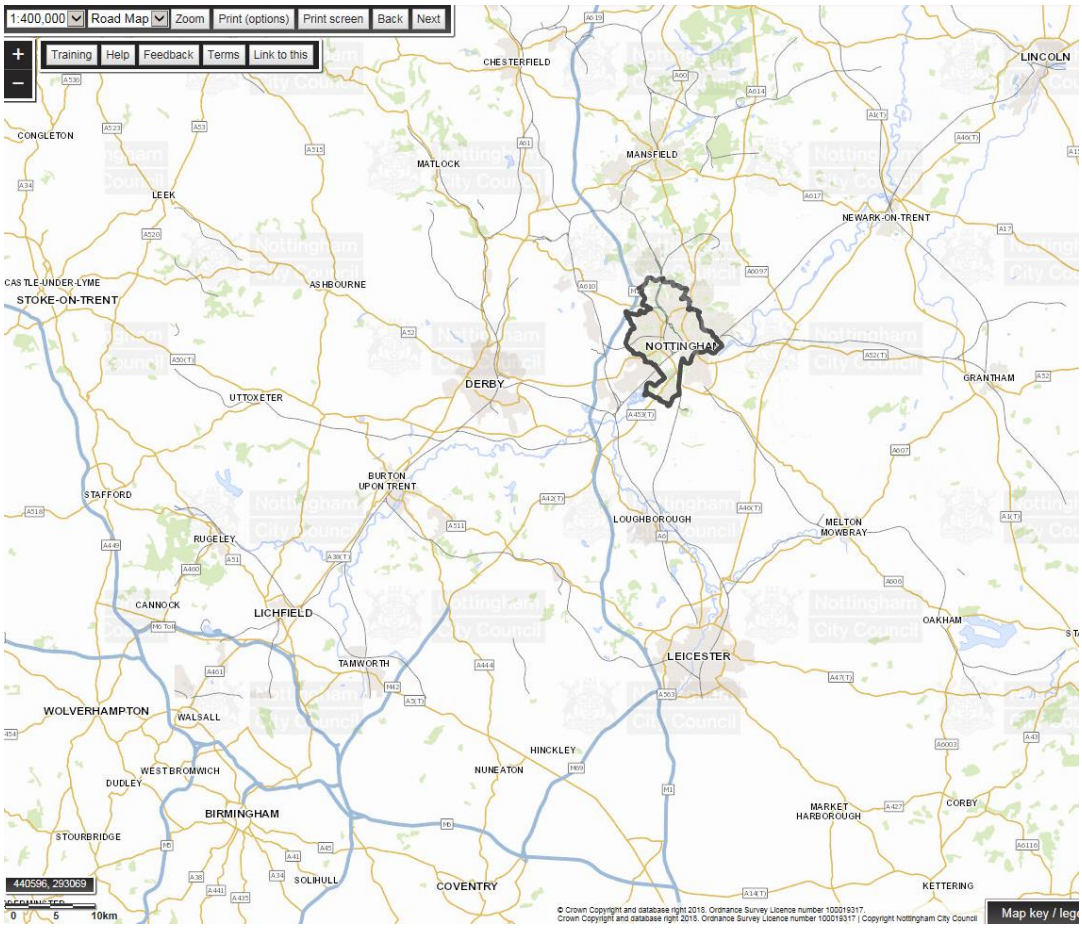


Fig 10: Nottingham City Council's geographic location (detailed)



Nottingham is surrounded by agricultural land, the M1 motorway bounds Nottingham to the west, and the very large urban industrial conurbation of the West Midlands is approximately 40 miles to its southwest (Fig. 10). Emissions from agricultural activity outside the conurbation as well as those from closer and more distant domestic, commercial, industrial and transport sources outside Nottingham contribute to the levels of NO2 and particles measured in Nottingham.

When carrying out air quality modelling it is necessary to quantify and include the contribution these distant and local sources make to modelled concentrations.

Appendix G

Department for Environment Food & Rural Affairs

Dr Thérèse Coffey MP
Parliamentary Under Secretary of State
for the Environment

Seacole Building
2 Marsham Street
London SW1P 4DF

T 03459 335577
defra.helpline@defra.gsi.gov.uk
www.gov.uk/defra

Cllr Jon Collins
Leader, Nottingham City Council
LH Box 28 Loxley House
Station Street
Nottingham
NG2 3NG

20th November 2018

Dear Cllr Collins

Thank you for your continued hard work on Nottingham City Council's plan to deliver compliance with air quality legal limits in the shortest possible time. Following my letter of 29 August 2018 I am pleased to write with approval of your local plan which will see you delivering compliance in 2019 by:

- Retrofitting 171 buses to Euro VI standard with support from the Government's Clean Bus Technology Fund; and
- Introducing the taxi licensing changes set out in your Age and Emissions Policy, which will require all hackney carriages licenced in Nottingham to be at least Euro 6 in 2020.

Please find attached to this letter a Ministerial Direction requiring Nottingham City Council to deliver the above measures according to the timelines set out in your business case.

Your business case also included a bid for support from the Clean Air Fund of £997,000. I am pleased to confirm that I agree with your proposals. My officials will shortly be issuing a grant letter for the funding and feedback on the bid.

I trust that delivering your local plan for air quality will be a priority for the Council and look forward to seeing your work progress.

Yours sincerely,

DR THERESE COFFEY MP

MINISTERIAL DIRECTION

ENVIRONMENT ACT 1995

Environment Act 1995 (Nottingham City Council) Air Quality Direction 2018

The Secretary of State, in exercise of the power conferred by section 85(5) of the Environment Act 1995(1), gives the following direction.

In accordance with section 85(6) a copy of this direction will be published in the London Gazette.

The Secretary of State makes this direction having determined that it is necessary in order to meet obligations placed upon the UK under the EU Ambient Air Quality Directive(2).

Citation, commencement and application

1.—(1) This direction may be cited as the Environment Act 1995 (Nottingham City Council) Air Quality Direction 2018 and comes into force on 21 November 2018.

(2) This direction applies to Nottingham City Council.

Interpretation

2. In this direction—

"local plan for NO_2 compliance" means the detailed scheme (excluding any associated mitigation measures) which Nottingham City Council identified as part of the AQP to deliver compliance with the legal limit value for nitrogen dioxide in the shortest possible time that was approved by the Secretary of State on 20 November 2018 and is summarised in Schedule 1;

"the authority" means Nottingham City Council;

"AQP" means the UK plan for tackling roadside nitrogen dioxide concentrations 2017, drawn up by the Secretary of State in accordance with regulation 26(1) of the Air Quality Standards Regulations 2010(3);

Duty to implement the approved local plan for NO_2 compliance

3.—(1) The authority must take steps to implement the local plan for NO_2 compliance for the area for which it is responsible.

(2) The authority must ensure that the local plan for NO_2 compliance is implemented so that—

(a) compliance with the legal limit value for nitrogen dioxide is achieved in the shortest possible time, and by 2019 at the latest;

(b) exposure to levels above the legal limit for nitrogen dioxide are reduced as quickly as possible.

(1) 1995 c25.
(2) 2008/50/EC OJ No. L 152, 11.06.08, p.1.
(3) S.I. 2010/1001. A copy of the plan is available at: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017.

Variation, revocation or suspension

4. The authority must not vary, revoke or suspend its implementation of the local plan for NO_2 compliance pursuant to paragraph 3, without the prior written consent of the Secretary of State.

Guidance

5. The authority, in taking steps under this direction, must have regard to relevant guidance issued by the Secretary of State.

Thérèse Coffey MP
Parliamentary Under Secretary of State for the Environment
Department for the Environment Food & Rural Affairs

20 November 2018

SCHEDULE 1

Paragraph 2

Summary of local plan for NO_2 compliance measures

Measures description	*Deadlines*
Clean Bus Technology Fund bus retrofit programme	To be implemented as soon as possible and at least in time to bring forward compliance to 2019
Updating the taxi licensing policy (as set out in the Age and Emissions Policy)	To be implemented as soon as possible and at least in time to bring forward compliance to 2019

EXPLANATORY NOTE

(This note is not part of the direction)

This direction directs Nottingham City Council to implement its local plan for NO2 compliance, in connection with duties in respect of air quality under Part 4 of the Environment Act 1995 and as part of the UK plan for tackling roadside nitrogen dioxide concentrations 2017. The local plan for NO_2 compliance was approved by the Secretary of State on 20 November 2018, and it must now be implementation to ensure compliance with the legal limit value for nitrogen dioxide is achieved in Nottingham in the shortest possible time. Under section 85(7) of the Environment Act it is the duty of a local authority to comply with a direction given to it. A copy of this direction is available at for inspection at Seacole Building, 2 Marsham Street, London, SW1P 4DF.

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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Harrison D., (June 2006) **UK Equivalence Programme for Monitoring of Particulate Matter Bureau Veritas Report No. Bureau Veritas/AQ/AD202209/DH/2396,**

Nottingham City Council (April 2009) **Key Facts for Nottingham and Greater Nottingham - Last updated: 6th April 2009**

The Air Quality (England) (Amendment) Regulations 2002 (SI 3043)

The Pollution Prevention and Control Act 1999

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http://www.nottinghaminsight.org.uk/f/63682/Library/Environment/Air-Quality/

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Air Quality Review & Assessment First & Second Stage April 2000

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Local Air Quality Management: Stage Four Review & Assessment of Nottingham's Air Quality Management Areas July 2003

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Nottingham City Council
Local Air Quality Management: Annual Status Report June 2018

Nottingham City Council Website **http://www.nottinghamcity.gov.uk**