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 Eastleigh Borough

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].

In Eastleigh Borough there are four Air Quality Management Areas (AQMAs), the details of which can be found at http://uk-air.defra.gov.uk/aqma/local-authorities?la_id=95. The declaration of these AQMAs was related to annual averages of nitrogen dioxide (NO_2) which makes this the main pollutant of concern in the borough. Particulate matter (PM) is a related pollutant and PM_{10} is also measured. The main source of these in Eastleigh Borough is transport, and in particular road transport which is a significant contributor to poor air quality in the area. Eastleigh's position at the heart of major transport routes through Hampshire contributes to this problem as many businesses are attracted to the area, including manufacturing and distribution.

Considering long term trends at NO_2 monitoring stations, concentrations are decreasing at the majority of sites, although fluctuations are seen from year to year which are often caused by meteorological conditions. However, this fall in concentrations appears to be slowing in more recent years, particularly at some sites within Eastleigh AQMA No.1 (A335) and Hamble Lane AQMA where over the last three years no clear trend can be seen. Four sites measured an exceedance of the NO_2 annual average objective value in 2018, three of these were within the Eastleigh AQMA No.1 (A335) and one is currently not within an AQMA. Further investigation of

[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

the exceedance which is not within an AQMA is ongoing. We will determine the appropriate course of action to take in respect of this exceedance later this year

A review of Eastleigh Borough Council's Air Quality Action Plans (AQAPs) is underway and these will all be updated and reissued. During this process they will also be consolidated into a single document that will identify both overarching borough wide actions and targeted actions for individual locations. This new AQAP is expected to be finalised at the end of 2019.

Actions to Improve Air Quality

Throughout the time period covered by the previous AQAPs and up to the present, the council has progressed a number of measures in pursuit of improving local air quality. These include:

- Air Quality Monitoring
    - Automatic monitoring for NO_2 and PM_{10}, with all data capture above 90% for 2018. Diffusion tube monitoring for NO_2 including expansion to two new sites in 2018.
    - DEFRA Air Quality Grant funding awarded, which will be used to trial low cost sensors which link air quality and traffic data.
- Cycle network improvements
    - Several schemes to encourage cycling are in progress with the 'Mum and Baby' cycle group and the 'Yo Bike' hire scheme each in the final stages of planning.
    - Funding has been identified for the 'Hut Hill' cycle way between Southampton and Chandler's Ford, alongside the southern section of the B3043 Bournemouth Road/Winchester Road. Delivery of this is planned for the 2019/20 financial year.
    - Addition of a cycle path section along B3037 Bishopstoke Road with work planned to start in summer 2019.
    - A cycle route from Eastleigh to Hedge End along the railway line is at feasibility study stage.
- Eco Engines

- In 2017 Eastleigh Borough Council and Southampton City Council jointly acquired a DEFRA Air Quality Grant for a low emission taxi scheme. To date, 12 grants have been issues for replacement taxis in Eastleigh alongside 60 for Southampton. More recently approval has been gained to expand the scheme to cover EURO 6 diesels as long as the vehicle is able to carry 5-8 passengers or is wheelchair adapted.
- Clean Bus Funding secured by Southampton City Council to retrofit approximately 145 buses will benefit Eastleigh as the depot is located on Chickenhall Lane and these buses will travel through the Eastleigh AQMA No.1 (A335) along Southampton Road daily. All buses should be EURO 6 equivalent by the end of 2019.

- Public Engagement & Information
  - Eastleigh Borough Council's my-air webpage (www.eastleigh.my-air.uk) continues to use data from monitoring stations in the borough to show daily air quality indices, information on monitoring sites, real time visualisation of data and statistics for previous calendar years.
  - The airAlert service (www.airalert.info/hants) is also ongoing, sending an airAlert when pollution levels are elevated with links to relevant health advice and recommended actions.
  - Access Funding granted until March 2020 has benefitted a number of projects including diffusion tube studies and clean air campaigns in schools, and travel planning in both schools and local businesses.

Conclusions and Priorities

At the majority of locations, annual mean NO_2 concentrations are falling in the long term. However, when considering just the last three years, this pattern of decline is slowing in most locations and appears to have stopped in some. Sites where this reduction can no longer be seen have been picked out in the Eastleigh AQMA No.1 (A335) and Hamble Lane AQMA. The Eastleigh AQMA No.1 also included three of the four exceedances which were measured in 2018. The fourth exceedance was recorded on the A27 in Bursledon and is not currently within an AQMA. Further monitoring work in this location is ongoing to determine the extent of the exceedance and we anticipate that we will determine an appropriate course of action before the

next ASR is due. All AQAPs are due for review and reissue and this work has been planned for 2019. It will include consolidating the current three AQAPs into a single document.

Over the coming year, Eastleigh Borough Council's priorities are initially to conduct the review and reissue of AQAPs and to finalise the approach to the exceedance measured on the A27 in Bursledon. As part of the new AQAP, priorities for action moving forward from this will be identified.

Local Engagement and How to get Involved

Everyone can help to improve air quality in the area by activities including walking, cycling and taking public transport. This helps to improve air quality by reducing vehicles on the road, with added health benefits associated with walking and cycling. Reduce your exposure by planning routes to avoid heavily congested areas. Use a journey planner such as https://myjourneyhampshire.com/ to plan your travel.

If you have to use a car, following these steps can improve efficiency and reduce emissions:

- Regularly service your vehicle and maintain the correct tyre pressures.
- Practise eco driving by anticipating the need to stop or slow down, avoiding excessive speeds, shifting up early and removing unnecessary weight from your vehicle.
- Switch off your engine if you expect to be stationary for an extended period.
- Join a car club such as Co-Wheels (www.co-wheels.org.uk.eastleigh) which has options for electric vehicles.

Useful Links:

www.eastleigh.my-air.uk to view and download the borough's monitoring data.

www.airalert.info/hants for free air pollution warnings.

https://myjourneyhampshire.com to plan your travel.

https://uk-air.defra.gov.uk for countrywide data.

http://www.co-wheels.org,uk/eastleigh for the Co-Wheels car club.

https://hants.liftshare.com to arrange liftshares.

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1 Local Air Quality Management

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

The statutory air quality objectives applicable to LAQM in England can be found in **Error! Reference source not found.** in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Eastleigh Borough Council 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=95. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMAs.

We recognise that our monitoring has highlighted an additional area of exceedance which is not currently within an AQMA. This location is undergoing further review and assessment with a decision on determination to be made as soon as we have a robust evidence base. Further information on the information being gathered to inform this declaration can be found in Section 3.2.1.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan	
						At Declaration		Now		Name	Date of Publication
Eastleigh AQMA No. 1 (A335)	Declared 16/02/2005 Amended 03/02/2015	NO_2 Annual Mean	Eastleigh/ Chandlers Ford	Follows the A335 Southampton Road, Romsey Road and Leigh Road. Amended to extend a short way along Woodside Avenue, Twyford Road and Bishopstoke Road. It includes a number of properties on all of these.	YES	> 40 (2004)	µg/m^3	38.3	µg/m^3	Eastleigh AQ Action Plan 2015-2020	2014

Eastleigh AQMA No. 2 (M3)	Declared 03/07/2006	NO_2 Annual Mean	Eastleigh/ Chandlers Ford	An area extending either side of the M3 motorway from junctions 12 to 14.	YES	> 40 (2005)	$\mu g/m^3$	30.5 (not corrected for relevant exposure)	$\mu g/m^3$	Eastleigh AQ Action Plan 2015-2020	2014
Hamble Lane	Declared 03/07/2006 Amended 20/06/2011	NO_2 Annual Mean	Burseldon	An area encompassing a number of properties along Hamble Lane between the junctions with Jurd Way and Portsmouth Road. Amended to extend north to the Windhover roundabout.	NO	> 40 (2005)	$\mu g/m^3$	28.6	$\mu g/m^3$	Hamble Lane AQMA Action Plan 2012-2017	2011
High Street Botley	Declared 20/06/2011	NO_2 Annual Mean	Botley	An area encompassing a number of properties along High Street from Maypole roundabout to the Winchester Street junction.	NO	> 40 (2010)	$\mu g/m^3$	26.8	$\mu g/m^3$	High Street Botley AQMA Action Plan 2012-2017	2011

☒ **Eastleigh Borough 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 Eastleigh Borough Council

Eastleigh Borough Council currently has three AQAPs to cover four AQMAs. As shown in Table 2.1, the AQAPs for Hamble Lane and High Street Botley came to an end in 2017 and have been held pending a review. The Eastleigh AQAP runs until 2020 at which point all AQAPs will be reviewed and reissued. This will bring all AQAPs into line with a consistent timescale and review process. As all AQMAs share a common main pollution source, these AQAPs will be consolidated into a single document that will identify both overarching borough wide actions and targeted actions for individual locations. A review of actions is currently in process and a proposed timetable for producing and consulting on the new plan has been laid out. The new AQAP is expected to be finalised at the end of 2019.

Throughout the time period covered by the previous AQAPs and up to the present, the council has progressed a number of measures in pursuit of improving local air quality. There are challenges and barriers which prevent some measures being implemented or result in slower progress than anticipated. These are detailed in Table 2.2 against the relevant action. Recurring themes in this are availability of funding and complexity of some schemes.

Details on progress of all measures which were part of these AQAPs are set out in Table 2.2 and more detail on key measures which were progressed or completed over 2018/19 are listed below.

- Air Quality Monitoring
    - Automatic monitoring is carried out for NO_2 at two locations and PM_{10} at one location within Eastleigh AQMA No.1, with a further NO_2 continuous monitor close to both Eastleigh AQMAs No.1 and No.2. More than 50 diffusion tubes are deployed across the borough, both within AQMAs and at other locations. See Appendix D for more detail.
    - Eastleigh Borough Council has secured DEFRA Air Quality Grant funding which will be used to trial low cost sensors which link air quality and traffic data. These will complement existing monitoring and provide a further evidence base for traffic related actions.

- Increase use of public transport
    - The 2016 Eastleigh Borough Council Public Transport Review retained the majority of supported services.
    - Two extra Sunday bus service to Eastleigh were running from September 2017, funded by the Bus Service Operators Grant. Other service changes include a new route for the Bluestar 3 which now serves Eastleigh via developments at Horton Heath and Fair Oak.
    - Eastleigh Borough Council responded to the South Western Rail timetable consultation. These changes came into effect from May 2019 and include one additional evening service from Eastleigh to Fareham, calling at Hedge End and Botley.
- Electric hook up points
    - Two publically available electric charging points were installed in the Mitchell Road Multi Story Car Park in 2011.
    - Approximately eight additional EV charging points are planned for installation around Eastleigh town, in locations owned by Eastleigh Borough Council. A supplier has been identified for this and initial investigations are underway.
    - Eastleigh Borough Council's Parking Standards Supplementary Planning Document includes provision of EV charging.
- Cycle network improvements
    - A cycle route from Eastleigh to Hedge End along the railway line is at feasibility study stage. Other cycle network improvements as part of developments could include Chestnut Avenue and Hamble Lane.
    - Addition of a cycle path section along B3037 Bishopstoke Road, with Hampshire County Council planning to deliver this in summer 2019.
    - The 'Hut Hill' cycle way between Southampton and Chandler's Ford is planned for delivery by Hampshire County Council in the 2019/20 financial year, having been funded by 'Transforming Cities'.

  - The Yo Bike hire scheme will be extended to Eastleigh and is expected to be launched in June 2019.
  - The ‘Mum and Baby’ cycle group is in the final stages of planning.
  - Improved signage was implemented on the route from Southampton towards Hedge End/West End/Botley.
  - Cycle path and road crossing improvements were completed along A334 Botley Road.
  - Bus stop cycle parking was implemented at 12 locations on the Bluestar 2 route in summer 2017.
  - Leigh Road cycle way was kerbed in 2016.

- Eco Engines
  - In 2017 Eastleigh Borough Council and Southampton City Council jointly acquired a DEFRA Air Quality Grant for a low emission taxi scheme. To date, 12 grants have been issues for replacement taxis in Eastleigh alongside 60 for Southampton. More recently approval has been gained to expand the scheme to cover EURO 6 diesels as long as the vehicle is able to carry 5-8 passengers or is wheelchair adapted.
  - Clean Bus Funding secured by Southampton City Council to retrofit approximately 145 buses will benefit Eastleigh as the depot is located on Chickenhall Lane and these buses will travel through the AQMA on Southampton Road daily. All buses should be EURO 6 equivalent by end 2019.

- School travel planning
  - Eastleigh Borough Council has been working with the Hampshire County Council school travel planning officers on their projects. Over the last year these have included diffusion tube studies at 5 schools, launch of a park and stride at Wildern School as part of an air quality display day and collaborations with local businesses to produce and display clean air messages.

  - Schools in the borough which currently have ModeShift Stars accreditation are:
    - Gold: Shakespeare Junior School
    - Bronze: Lakeside, Fair Oak Juniors, Shamblehurst, Bursledon Infants, Bursledon Juniors, Kings Copse Primary, Shakespeare Juniors, Wildern and Thornden.
  - In the last year there have been 154 BikeIT schools events.

- Workplace travel planning
  - Alongside Hampshire County Council, Sustrans are working with businesses on travel planning. Up to 79 businesses are signed up to this with 35 currently going through the process, including large businesses in the borough such as Aviva, B&Q, Blake Morgan and Coopervision.

Some existing actions remain ongoing; these will be included in the new AQAP and supplemented with new actions. Those actions which should be prioritised will also be identified. An assessment of expected reductions and when compliance is expected to be achieved for each AQMA will form part of the new AQAP.

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
E1	Air quality monitoring	Other	Other	EBC, Developer Contibutions, DEFRA AQ Grant 2010/11	n/a	Ongoing	% data capture and survey coverage	n/a	Monitoring ongoing, both with automatic analysers and diffusion tubes. See text in Section 2.2 for more detail.	n/a	Data is available at www.eastleigh.my-air.uk
E2	Consider intern	Other	Other	EBC- Eastleigh Local Area Committee	2015	2016	Implementation of actions, % data capture of monitoring and availability of AQ info	n/a	Internship complete.	Completed January 2017	n/a
E3	Park and ride	Alternatives to private vehicle use	Bus based Park & Ride	n/a	n/a	n/a	% private vehicles in town centre	Reduced vehicle emissions	Possible sites identified at M27 J5 and Stoneham Lane, but these are not currently being progressed.	P&R will be reviewed as part of the Local Plan and proposals will be kept under review.	Solent Transport study found M27 J5 scheme would perform poorly in relation to cost.
E4	Increase use of public transport	Alternatives to private vehicle use	Other	EBC, Transport Operators	2016- EBC Public Transport Review	Ongoing	Number of public transport users	Reduced vehicle emissions	Majority of EBC supported bus services retained. Some service improvements achieved, both commercially driven and through funding. See text in Section 2.2 for more detail.	Council supported bus services in place until 2020, new South Western Rail timetable from May 2019.	Improvements to public transport are most successful when services are commercially viable. DfT rail franchise specifications and local infrastructure are barriers to local rail service improvements.
E5	Overnight deliveries	Freight and Delivery Management	Quiet & out of hours delivery	Local Business	n/a	n/a	Number of overnight deliveries	Reduced emissions from freight vehicles and reduced congestion at rush hour times	n/a	n/a	Lack of funding and operational issues for the businesses.
E6	HGV restriction	Traffic Management	Strategic highway improvements, Re-prioritising road space	n/a	n/a	n/a	% HGVs	Reduced emissions from HGVs	n/a	n/a	EBC has no powers of its own to restrict HGVs. If progressed a viable alternative would be required.

			away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane								
E7	EBC sustainable and CC group	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	n/a	n/a	n/a	Attendance at group	Measures to be discussed will target all local pollutants of concern.	n/a	n/a	Measure no longer active due to council reorganisation. Collaborative working is being achieved through the Hampshire AQ sub group.
E8	Electric hook up points	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	HCC / EBC / Local Business	Ongoing	Ongoing	Number of available charging points, % of electric vehicles in fleet	Reduced vehicle emissions	Further publically available EV charging points are planned, see text in Section 2.2 for more detail.	Ongoing	Funding required, the level of demand for EV charging points is not well understood.
E9	Bus station-turn engines off	Traffic Management	Anti-idling enforcement	EBC / Transport Operators	n/a	n/a	Change in pollutant concentrations attributable to bus idling	Reduced emissions at bus station	Bus operators instruct their drivers to turn off engines when stationary.	n/a	Difficulties in enforcing.
E10	Taxi rank-turn engines off	Traffic Management	Anti-idling enforcement	EBC / Taxi Operators	n/a	n/a	Change in pollutant concentrations attributable to taxi idling	Reduced emissions at taxi ranks	n/a	n/a	Difficulties in enforcing.
E11	Traffic free zones	Traffic Management	Strategic highway improvements, Re-prioritising road space away from	EBC / HCC	n/a	n/a	Measured pollutant concentrations in traffic free zones	Reduced vehicle emissions, increased active travel	Eastleigh town development designed to reduce traffic flow through residential areas. Initial investigations	n/a	Alternative access requirements must be considered. Potential negative effect on local businesses.

			cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane						are being made into temporary pedestrianisation of Market Street.		
E12	Better traffic flow	Traffic Management	UTC, Congestion management, traffic reduction	EBC / HCC / Highways England	n/a	n/a	Pollutant concentrations measured at roadsides	Reduced vehicle emissions	M27 J5 / Leigh Rd / Woodside Ave / Passfield Ave upgrade completed. Other required road improvements identified in the latest Draft Local Plan Transport Study but none currently being progressed.	n/a	Availability of funding and feasibility of some schemes.
E13	Chickenhall Link Road	Transport Planning and Infrastructure	Other	EBC / HCC / Highways England	n/a	n/a	Pollutant concentrations measured on Southampton Road	Reduced vehicle emissions	Design work and discussion in Sustainable Transport Study. Land safeguarded as a saved policy from the Adopted EBC Local Plan (91.T).	Long term aspiration. Possibility for some sections to be delivered as part of the Southampton Airport expansion	High infrastructure costs and complex engineering, due to existing airport runway and rail infrastructure.
E14	Traffic analysis / source apportionment	Transport Planning and Infrastructure	Other	EBC / HCC / Highways England	2017	2017/18	Understanding of traffic numbers, movements and make up	Reduced vehicle emissions	As an extension to the Local Plan work, a model of NO2 and PM10 levels across the borough in 2020 was commissioned.	Completed May 2019	n/a
E15	Better bus routes	Transport Planning and Infrastructure	Bus route improvements	EBC / Transport Operators	2016-EBC Public Transport Review, 2017/18-EBC Draft Local Plan	Ongoing	Number of bus users	Reduced vehicle emissions	Majority of EBC supported bus services retained. Some service improvements achieved, both commercially driven and through funding. See text in Section 2.2 for more detail.	Council supported bus services in place until 2020	Improvements to public transport are most successful when services are commercially viable.

E16	Bus day ticket for Eastleigh	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Transport Operators	n/a	n/a	Number of bus users	Reduced vehicle emissions	Day tickets are available for certain operators. The Solent Go travel card allows customers to use a range of providers.	n/a	n/a
E17	Cycle network improvement	Transport Planning and Infrastructure	Cycle network	EBC / Developer Contributions / SCC / HCC / Access funding	Ongoing	Ongoing	Use of cycle network	Reduced vehicle emissions	Various schemes have been progressed, see text in Section 2.2 for more detail.	Ongoing	Availability of funding
E18	More secure cycle storage	Transport Planning and Infrastructure	Cycle network	EBC	n/a	n/a	Use of cycle storage	Reduced vehicle emissions	Previously implemented at Eastleigh station but unsuccessful as under used, and the space required for other improvements.	n/a	n/a
E19	Increase trees	Other	Other	EBC / Developer Contributions	As part of planning process	On case by case basis	Change in pollutant concentrations	Reduced pollutant concentrations	Implemented on a case by case basis, including planning at Stoneham and Fleming Park as part of development mitigation. The latest iteration of the Local Plan proposes a 2 for 1 replacement policy for trees.	n/a	Evidence of impact of trees / green infrastructure on air quality is mixed.
E20	Improved eco engines	Promoting Low Emission Transport	Other	EBC (DEFRA AQ Grant) / HCC / Transport Operators / Local Business	October 2016-DEFRA AQ Grant bid submission	2017/18	Change in pollutant concentrations	Reduced vehicle emissions	DEFRA AQ Grant bid was successful, see text in Section 2.2 for more detail.	Ongoing	n/a
E21	New improved buses	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Transport Operators / HCC / OLEV bid	n/a	2018/19	Change in pollutant concentrations	Reduced vehicle emissions	EBC's bid for Clean Bus Technology funding was unsuccessful, but SCC did receive funding from the OLEV. See text in Section 2.2 for more detail.	2019	n/a

H1	AQ Monitoring	Other	Other	EBC / Developer Contributions	n/a	Ongoing	% data capture and survey coverage	n/a	Monitoring ongoing with diffusion tubes. See text in Section 2.2 for more detail.	n/a	Data is available at www.eastleigh.my-air.uk
H2	Car park and/or drop off at Hamble railway station	Alternatives to private vehicle use	Rail based Park & Ride	Hamble-Le-Rice Parish Council / EBC / HCC	Design work undertaken	n/a	Railway usage at Hamble railway station	Reduced vehicle emissions	No further progress beyond design work.	n/a	High cost scheme with delivery subject to funding. Also potential access issues due to land ownership.
H3	Improve traffic using the park and ride facility at Bursledon Car Boot	Alternatives to private vehicle use	Bus based Park & Ride	Land owners / HCC / Highways England / SCC	n/a	n/a	Usage of park & ride facility	Reduced vehicle emissions	n/a	n/a	No longer viable as land to be developed for residential use.
H4	Support the HCC car share scheme	Alternatives to private vehicle use	Car & lift sharing schemes	HCC	n/a	Ongoing	% of single occupancy private vehicles	Reduced vehicle emissions	HantsCarShare currently available.	Ongoing	n/a
H5	Work with HCC to better integrate the AQMA with the Local Transport Plan (LTP)	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	HCC / EBC	n/a	Ongoing	Scheme identification and funding in LTP for AQMA	Reduced vehicle emissions	Current LTP in place for 2011-2031.	Ongoing	n/a
H6	Encourage school travel planning	Promoting Travel Alternatives	School Travel Plans	HCC / SCC / EBC through Access Fund	n/a	Ongoing	ModeShift Stars awards & % of private vehicles used for school run	Reduced vehicle emissions	Various schools projects implemented by HCC school travel planning officers. See text in Section 2.2 for more detail.	Access funding secured until 2020	n/a
H7	Develop individual and work place travel plans for local	Promoting Travel Alternatives	Workplace Travel Planning	HCC / SCC / EBC through Access Fund	n/a	Ongoing	Private vehicle use for commuting	Reduced vehicle emissions	Projects implemented through HCC & Sustrans, see text in Section 2.2 for more detail.	Access funding secured until 2020	n/a

	businesses										
H8	Increase use of the local rail network	Promoting Travel Alternatives	Promote use of rail and inland waterways	EBC / Transport Operators	n/a	Ongoing	Use of rail network	Reduced vehicle emissions	SWR timetable changed implemented. See text in Section 2.2 for more detail.	Timetable changes implemented May 2019	n/a
H9	Increase use of public transport	Alternatives to private vehicle use	Other	EBC / Transport Operators	n/a	Ongoing	Use of public transport & % of private vehicles in fleet	Reduced vehicle emissions	Majority of EBC supported bus services retained. Some service improvements achieved, both commercially driven and through funding. See text in Section 2.2 for more detail.	Council supported bus services in place until 2020, new South Western Rail timetable from May 2019.	Improvements to public transport are most successful when services are commercially viable. DfT rail franchise specifications and local infrastructure are barriers to local rail service improvements.
H10	Work with local employers to stagger the times of employees leaving their sites	Promoting Travel Alternatives	Workplace Travel Planning	HCC / SCC / EBC through Access Fund	n/a	Ongoing	Reduced congestion at peak times	Reduced vehicle emissions	Travel planning projects and business engagement by HCC & Sustrans, see text in Section 2.2 for more detail.	Access funding secured until 2020	n/a
H11	Work with Tesco to encourage shoppers to use alternative forms of transport	Alternatives to private vehicle use	Other	Local Business	n/a	n/a	Pollutant concentrations & % of private vehicles close to Tesco	Reduced vehicle emissions	n/a	n/a	Tesco free shopper bus withdrawn.
H12	Publicise, open up and maintain the network of footpaths	Transport Planning and Infrastructure	Other	HCC / SCC Access Fund / EBC	n/a	Ongoing	Private vehicle use	Reduced vehicle emissions	Schemes assessed and implemented as part of development control. Launch of 'Go Jauntly' app by Access fund. This helps people identify walks in their location covers the Eastleigh area.	Access funding secured until 2020	n/a

H13	Work with public transport providers to maintain and improve local services	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	EBC / Transport Operators	2016-EBC Public Transport Review, 2017/18-EBC Draft Local Plan	Ongoing	Number of bus users	Reduced vehicle emissions	Majority of EBC supported bus services retained. Some service improvements achieved, both commercially driven and through funding. See text in Section 2.2 for more detail.	Council supported bus services in place until 2020	Improvements to public transport are most successful when services are commercially viable.
H14	Local commuter education	Public Information	Other	EBC / Local Business	2015 (airAlert) / 2016 (my-air)	Ongoing	# commuters aware of air pollution and impact of road transport	Reduced vehicle emissions	airAlert scheme alerts registered users to poor air quality. The my-air website displays real time monitoring data.	Launch of my-air website in 2016	n/a
H15	Improve awareness of air pollution levels through local publications and EBC website	Public Information	Via the Internet	EBC / HCC	2015 (airAlert) / 2016 (my-air)	Ongoing	Availability of online information	Reduced vehicle emissions	airAlert scheme alerts registered users to poor air quality. The my-air website displays real time monitoring data.	Launch of my-air website in 2016	n/a
H16	Enforce a left turn only out of Portsmouth Road	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	HCC / EBC	n/a	n/a	Pollutant concentrations at Portsmouth Road	Reduced vehicle emissions	Improvements to the Portsmouth Road/Hamble Lane junction form part of HCC's preferred scheme for planned Hamble Lane improvements.	Earliest likely start for improvements implementation is winter 2020/21.	n/a
H17	Traffic study to better understand the	Other	Other	EBC / HCC / Highways England	2017	2017/18	Understanding of traffic numbers, movements and make up	Reduced vehicle emissions	Traffic modelling carried out both to support the Local Plan and as part of HCC's assessment of	Completed	n/a

	movements through the area								planned improvements on Hamble Lane.		
H18	Work with Highways Agency to improve traffic light phasing on Windhover roundabout	Traffic Management	UTC, Congestion management, traffic reduction	Highways England / HCC / SCC / EBC	Ongoing	n/a	Congestion at Windhover roundabout & measured pollutant concentration	Reduced vehicle emissions	Roundabout improvements included in the Highways England M27 Southampton Junctions improvement scheme.	Scheme start in March 2020	n/a
H19	Increase the use and provision of cycle ways to avoid Hamble Lane	Transport Planning and Infrastructure	Cycle network	HCC / EBC	n/a	Ongoing	Use of cycle paths & reduced congestion on Hamble Lane	Reduced vehicle emissions	Implemented through development, see text in Section 2.2 for more detail. Some additions and improvements to the cycle path along Hamble Lane are part of HCC's preferred scheme for planned improvements.	Earliest likely start for improvements implementation is winter 2020/21.	n/a
H20	Improvements to Hamble Lane / Portsmouth Road junction	Transport Planning and Infrastructure	Other	HCC / EBC	n/a	n/a	Pollutant concentrations at Portsmouth Road	Reduced vehicle emissions	Improvements to the Portsmouth Road/Hamble Lane junction form part of HCC's preferred scheme for planned Hamble Lane improvements.	Earliest likely start for improvements implementation is winter 2020/21.	n/a
H21	Improve route signage for Hamble railway station	Promoting Travel Alternatives	Promote use of rail and inland waterways	Network Rail / HCC / Landowners	n/a	n/a	Use of Hamble railway station	Reduced vehicle emissions	n/a	n/a	n/a
H22	Improve cycle network	Transport Planning and Infrastructure	Cycle network	HCC / SCC / EBC through Access Fund	Ongoing	Ongoing	Use of cycle network	Reduced vehicle emissions	Various schemes have been progressed, see text in Section 2.2 for more detail.	Ongoing	Availability of funding

H23	Improve road signage to encourage greater use of Burseldon Road	Public Information	Via other mechanisms	HCC / EBC	n/a	n/a	Road signage provision	Reduced vehicle emissions	n/a	n/a	Could cause deterioration of air quality on Burseldon Road
H24	Reduction of vegetation or replacement with pollution absorbing species	Other	Other	EBC / HCC / Land Owners	As part of planning process	On case by case basis	Change in pollutant concentrations	Reduced pollutant concentrations	Implemented on a case by case basis. The latest iteration of the Local Plan proposes a 2 for 1 replacement policy for trees.	n/a	Evidence for impact of vegetation on air quality is not conclusive.
H25	Work with local HDV businesses to move towards the latest fleet Euro standard	Vehicle Fleet Efficiency	Other	Local Business	n/a	n/a	Age of local business fleet & measured pollutant concentration	Reduced vehicle emissions	n/a	n/a	n/a
H26	Work with VOSA to carry out vehicle emission testing	Vehicle Fleet Efficiency	Testing Vehicle Emissions	DVSA	n/a	n/a	# vehicles tested	Reduced vehicle emissions	n/a	n/a	n/a
H27	Work with local businesses to reduce vehicle movements through effective fleets	Vehicle Fleet Efficiency	Driver training and ECO driving aids	HCC / SCC / EBC through Access Fund & Local Business	n/a	Ongoing	Pollutant concentrations	Reduced vehicle emissions	Some projects with local businesses implemented through HCC & Sustrans, see text in Section 2.2 for more detail.	Access funding secured until 2020	n/a
B1	AQ Monitoring	Other	Other	EBC / Developer Contributions	n/a	Ongoing	% data capture and survey coverage	n/a	Monitoring ongoing with diffusion tubes. See text in Section 2.2 for more detail.	n/a	Data is available at www.eastleigh.my-air.uk

B2	Alternative HGV route or ban	Traffic Management	Other	HCC / EBC	n/a	Following completion of measure B10	Pollutant concentrations	Reduced vehicle emissions	n/a	n/a	Once traffic is re-routed through the Botley bypass (see Measure B10), this will become more feasible.
B3	HGV 'L' training re-routing	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	Local Business / HCC / EBC	n/a	n/a	Pollutant concentrations	Reduced vehicle emissions	n/a	n/a	n/a
B4	Work with local businesses	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	HCC / SCC / EBC through Access Fund & Local Business	n/a	Ongoing	Private vehicle use for commuting	Reduced vehicle emissions	Projects implemented through HCC & Sustrans, see text in Section 2.2 for more detail.	Access funding secured until 2020	n/a
B5	School travel planning	Promoting Travel Alternatives	School Travel Plans	HCC / SCC / EBC through Access Fund	n/a	Ongoing	ModeShift Stars awards & % of private vehicles used for school run	Reduced vehicle emissions	Various schools projects implemented by HCC school travel planning officers. See text in Section 2.2 for more detail.	Access funding secured until 2020	n/a
B6	School travel planning and parking	Promoting Travel Alternatives	School Travel Plans	HCC / SCC / EBC through Access Fund	n/a	Ongoing	ModeShift Stars awards & % of private vehicles used for school run	Reduced vehicle emissions	Various schools projects implemented by HCC school travel planning officers. See text in Section 2.2 for more detail.	Access funding secured until 2020	n/a
B7	Detailed traffic analysis	Other	Other	EBC / HCC	2017	2017/18	Understanding of traffic numbers, movements and make up	Reduced vehicle emissions	Traffic modelling carried out to support the Local Plan.	Completed	n/a
B8	Speed reduction monitor	Traffic Management	Reduction of speed limits, 20mph zones	Local police / EBC	n/a	n/a	Pollutant concentrations	Reduced vehicle emissions	n/a	n/a	EBC has a limited role in traffic management.

B9	Improve traffic flow	Traffic Management	UTC, Congestion management, traffic reduction	HCC / EBC	Bypass planning 2013 - 2017	Not identified	Pollutant concentrations	Reduced vehicle emissions	Botley bypass planning permission granted.	On completion of Measure B10.	Primarily achieved by Measure B10
B10	Botley bypass	Transport Planning and Infrastructure	Other	HCC / WCC / EBC	2013 - 2017	Not identified	Pollutant concentrations	Reduced vehicle emissions	Planning permission granted in Nov 2017.	Construction likely in 2020/21	EBC Strategic Transport Study 2015 provides further info on the Bypass.
B11	Traffic calming measures	Traffic Management	UTC, Congestion management, traffic reduction	HCC / EBC	n/a	n/a	Pollutant concentrations	Reduced vehicle emissions	n/a	n/a	Led primarily by HCC. Potential to be delivered on completion of Measure B10.
B12	Improve public transport	Alternatives to private vehicle use	Other	EBC, Transport Operators	2016- EBC Public Transport Review	Ongoing	Number of public transport users	Reduced vehicle emissions	Majority of EBC supported bus services retained. Some service improvements achieved, both commercially driven and through funding. See text in Section 2.2 for more detail.	Council supported bus services in place until 2020, new South Western Rail timetable from May 2019.	Improvements to public transport are most successful when services are commercially viable. DfT rail franchise specifications and local infrastructure are barriers to local rail service improvements.
B13	Improve cycle network	Transport Planning and Infrastructure	Cycle network	EBC / Developer Contributions / SCC / HCC / Access funding	Ongoing	Ongoing	Use of cycle network	Reduced vehicle emissions	Various schemes have been progressed, see text in Section 2.2 for more detail.	Ongoing	Availability of funding
B14	Improve pedestrian routes	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	HCC / EBC	n/a	Ongoing	Use of pedestrian routes & private vehicle use	Reduced vehicle emissions	Schemes assessed and implemented as part of development control. Launch of 'Go Jauntly' app by Access fund. This helps people identify walks in their location covers the Eastleigh area. Road crossing improvements along A334 Botley Road.	Access funding secured until 2020	n/a
B15	HGV weight restriction	Freight and Delivery Management	Other	HCC / EBC	n/a	n/a	% HGVs in AQMA	Reduced vehicle emissions	n/a	n/a	Potential to be delivered on completion of Measure B10.

B16	Re-site vehicle testing	Other	Other	Local business	n/a	n/a	Siting of testing station	Reduced vehicle emissions	n/a	n/a	n/a

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

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

Among the measures that Eastleigh Borough Council is taking to target NO_2 and PM_{10} levels, Table 2.3 lists those which will also contribute towards reducing $PM_{2.5}$. These have been taken from the Technical Guidance LAQM TG16 action toolbox which lists actions that are expected to reduce $PM_{2.5}$ emissions. Other work being undertaken by Eastleigh Borough Council will also have a positive influence on exposure to $PM_{2.5}$, such as the airAlert scheme.

Table 2.3 – Measures which will contribute towards reduction of PM2.5 emissions.

Measure No.	Measure
E8	Electric hook up points
E15	Better bus routes
E17	Cycle network improvement
E20	Improved eco engines
E21	New improved buses
H6	Encourage school travel planning
H7	Develop individual and work place travel plans for local businesses
H10	Work with local employers to stagger the times of employees leaving their sites
H12	Publicise, open up and maintain the network of footpaths
H13	Work with public transport providers to maintain and improve local services
H19	Increase the use and provision of cycle ways to avoid Hamble Lane

H22	Improve cycle network
H27	Work with local businesses to reduce vehicle movements through effective fleets
B5	School travel planning
B6	School travel planning and parking
B12	Improve public transport
B13	Improve cycle network
B14	Improve pedestrian routes

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.

Eastleigh Borough Council undertook automatic (continuous) monitoring at 3 sites during 2018. There were no changes to automatic monitoring in 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/networks/network-info?view=aurn.

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

3.1.2 Non-Automatic Monitoring Sites

Eastleigh Borough Council undertook non- automatic (passive) monitoring of NO_2 at 45 sites during 2018. Table A.2 in Appendix A shows the details of the sites. 3 sites were added or changed during 2018. KCA(18) replaced KCA due to removal of a lamp post and resulted in the site being moved a small distance. 2 new sites were started at SR2, within the Eastleigh No.1 AQMA, and HL3, just to the south of the Hamble Lane AQMA. These were both added in response to concerns expressed by local residents.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

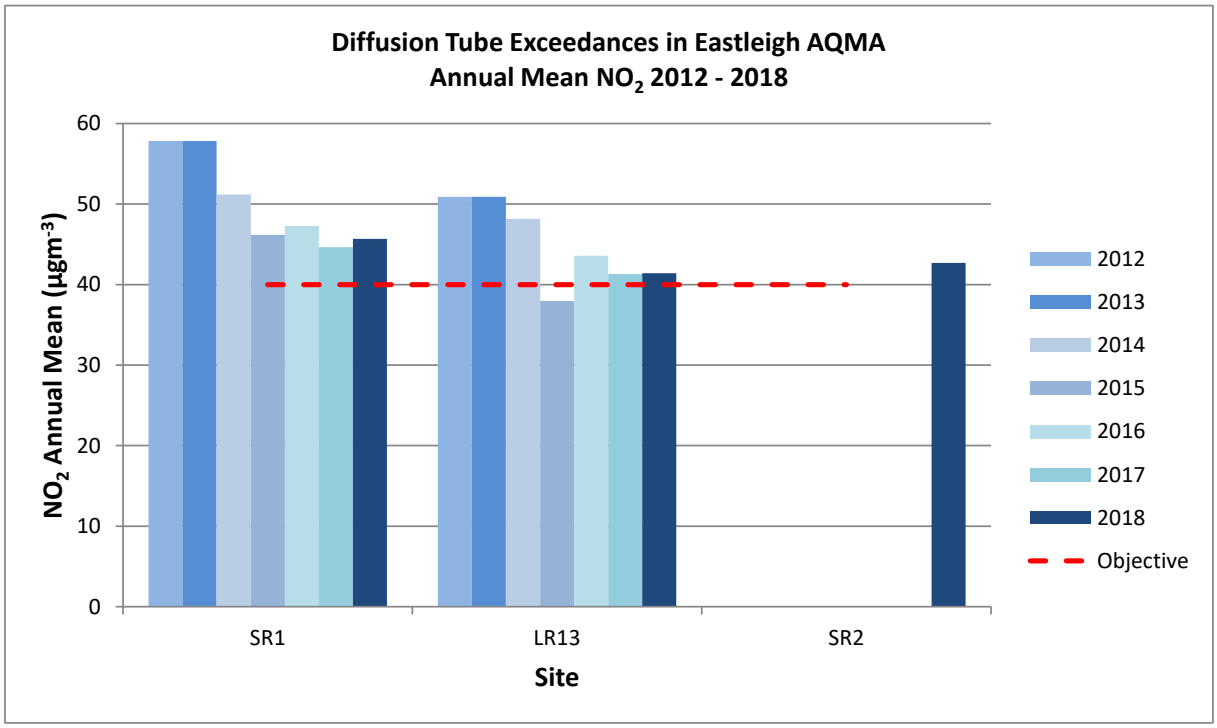
Annual Means

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.

This annual mean objective was exceeded at four diffusion tube monitoring locations in the borough, although these are not at points of relevant exposure. Concentrations have been distance corrected for the nearest exposure where appropriate, the results of this can be seen in Table B.1 in Appendix B and are included in discussion below. Of the exceedances, three are within the Eastleigh AQMA No.1 (A335) and one is currently not within an AQMA.

Those within the Eastleigh AQMA No.1 (A335) are considered first and Figure 1 shows annual trends for 2012 – 2018 for those sites which measured an exceedance of the annual objective in 2018.

Figure 1 – Annual average NO_2 at diffusion tube locations in Eastleigh which exceeded the annual objective in 2018.

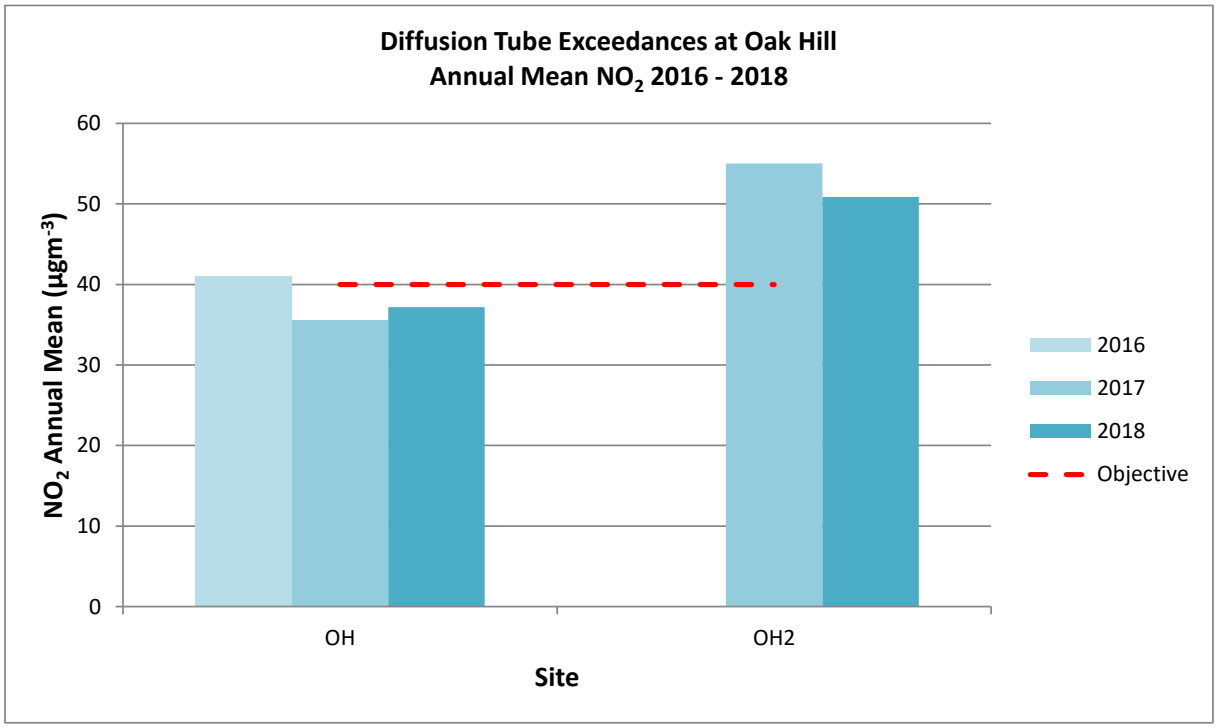


There is enough data available from the sites SR1 and LR13 to assess the long term trend. This shows that overall NO_2 concentrations are falling, but this decrease has noticeably slowed over the last four years and if the time period 2015 – 2018 is considered alone no clear trend is seen. From the data available only one year at

one site shows a result which meets the objective value. As discussed, the diffusion tube locations are not at locations of relevant exposure, and when corrected for this all three sites fall below the objective value, to 38.0 μgm^{-3} (SR1), 33.7 μgm^{-3} (LR13) and 35.1 μgm^{-3} (SR2).

The exceedance not currently in an AQMA is at the site OH2. This is a new site started when an unexpected exceedance was seen at OH in 2016. The new OH2 site has subsequently shown even higher concentrations and was the only one to exceed the objective in 2018. Results for these two sites for 2016 – 2018 are shown in Figure 2.

Figure 2 – Annual average NO_2 at diffusion tube locations in Oak Hill.



There is not yet enough data to assess long term trends, but there is an exceedance conclusively identified in the area. This also extends to a receptor, as when corrected to the nearest house façade the OH2 concentration for 2018 is 44.4 μgm^{-3}. For this reason the area should be included in an AQMA, but the extent of this exceedance is not clear and further work is underway to clarify this. To this end six further diffusion tubes have been deployed, both along the A27 and on two side roads that form key junctions which affect the traffic flow on this road. Results from this will inform the decision around determination. Where it is decided that a

declaration is required this would either be a new AQMA or an extension of the existing Hamble Lane AQMA.

No other exceedances were measured in the borough. Diffusion tube results from selected sites in each AQMA are shown in Figures 3 – 6 in order to assess long term trends.

Figure 3 – Annual average NO_2 at diffusion tube locations in Eastleigh AQMA No.1 (A335).

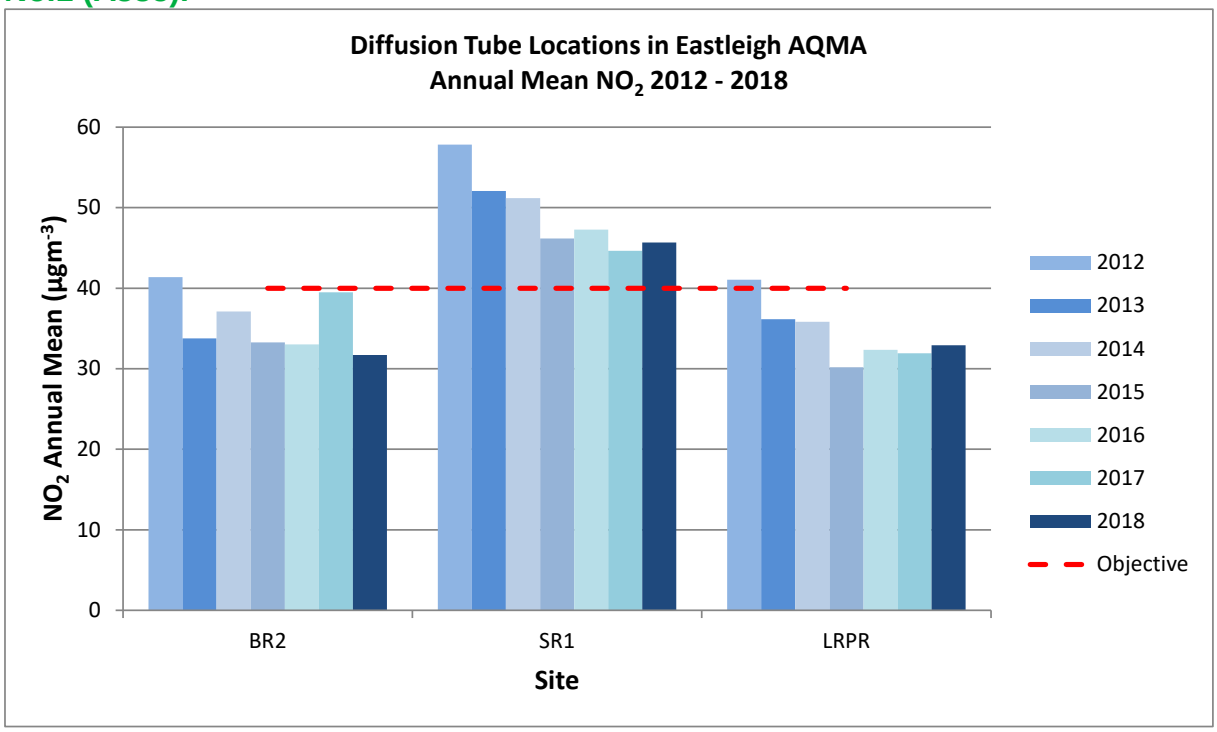


Figure 4 – Annual average NO_2 at diffusion tube locations in Eastleigh AQMA No.2 (M3).

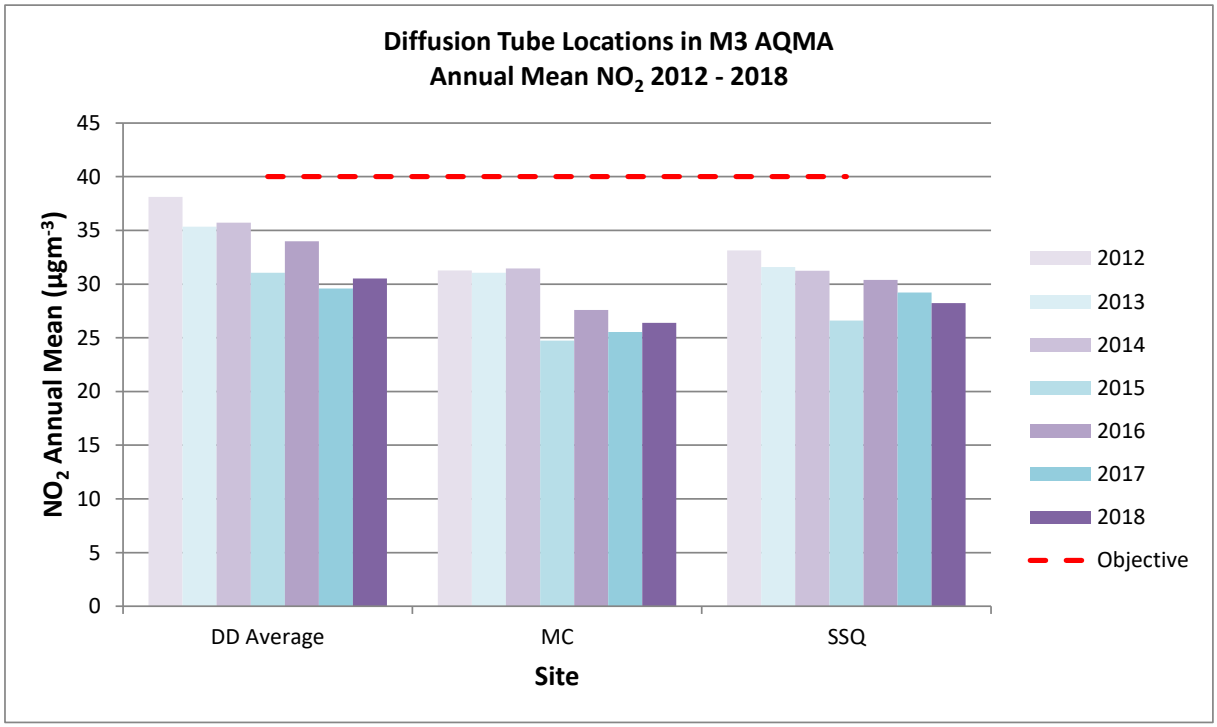


Figure 5 – Annual average NO_2 at diffusion tube locations in Hamble Lane AQMA.

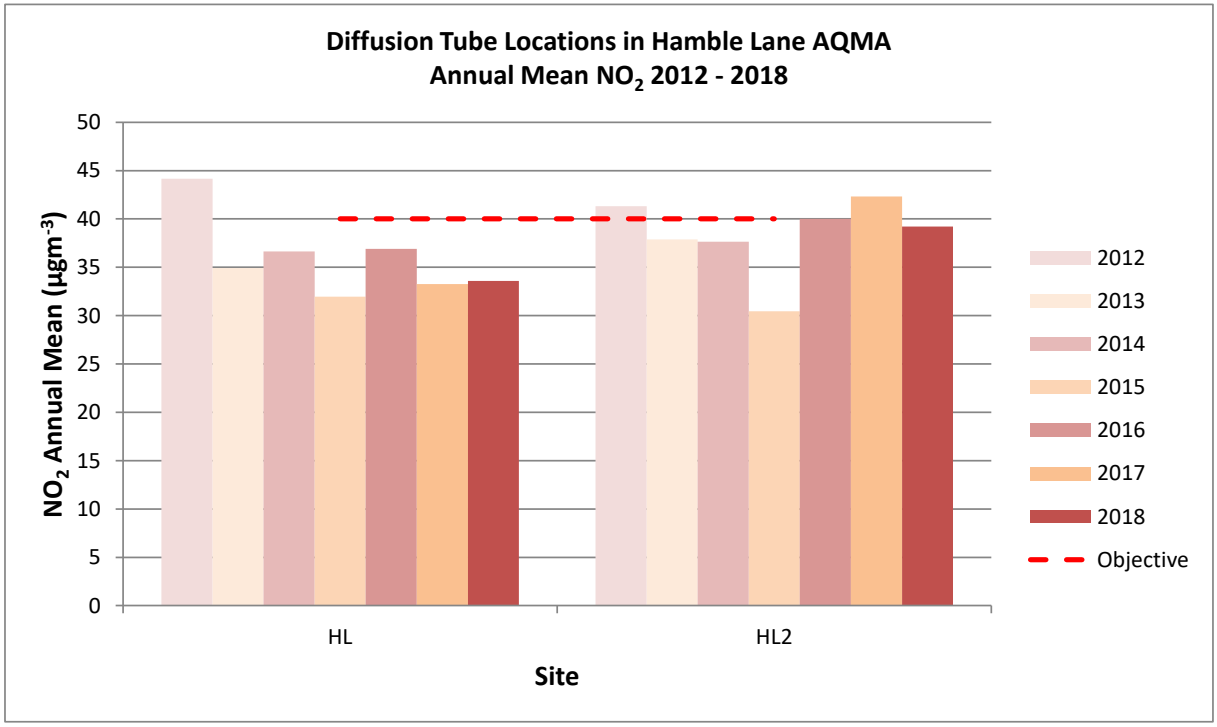
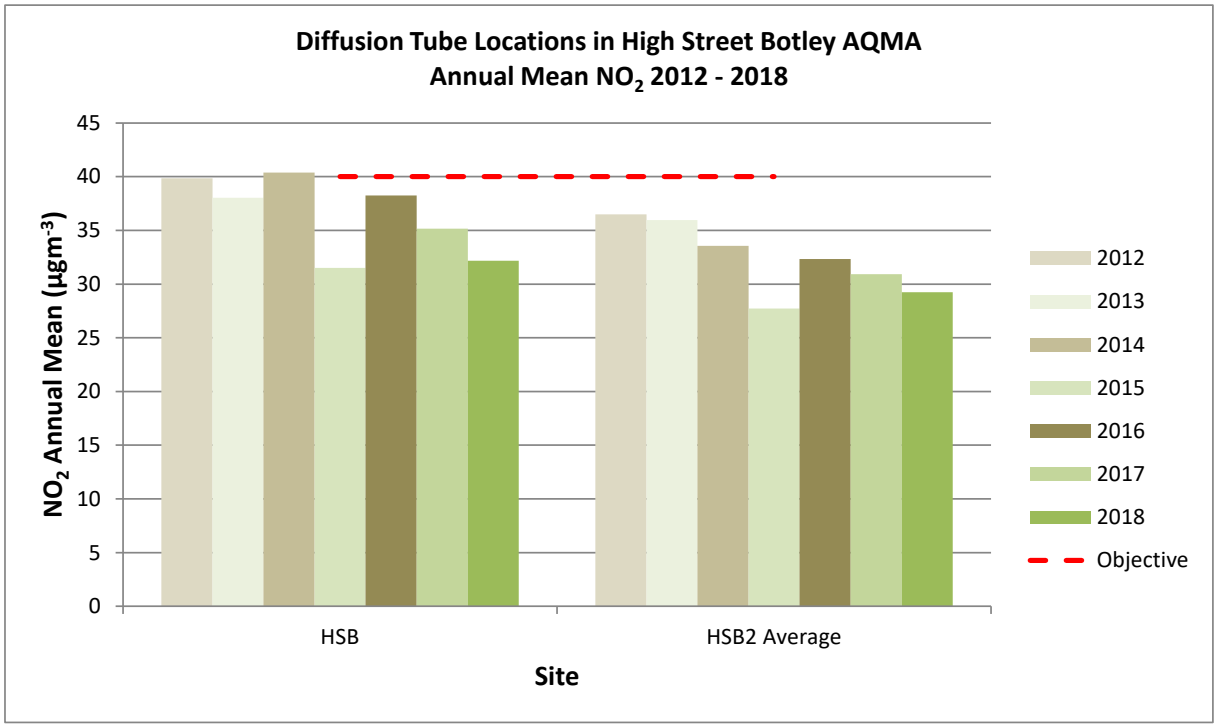


Figure 6 – Annual average NO_2 at diffusion tube locations in High Street Botley AQMA.



Some annual fluctuations are caused by meteorological conditions, but when considering this time period as a whole concentrations have fallen at all AQMAs. This decreasing trend is clear at the Eastleigh AQMA No.2 (M3) and the High Street Botley AQMA. However, in the Eastleigh AQMA No.1 (A335) and Hamble Lane AQMA this drop in concentrations seems to have slowed or stopped. Sites on Hamble Lane in particular do not show any significant trends.

Hourly Means

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.

There were no occasions when the hourly mean NO_2 was above 200µg/m^3 at any of the continuous monitoring stations in Eastleigh Borough, shown in Figures 7 – 9. There were also no annual mean NO_2 concentrations above 60µg/m^3 at any of the diffusion tube sites, indicating that any hourly means above 200µg/m^3 are also unlikely at these locations. Therefore, the 1-hour mean NO_2 objective was not exceeded at monitored locations within the borough.

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

Figure 7 – Hourly average NO_2 at Southampton Road.

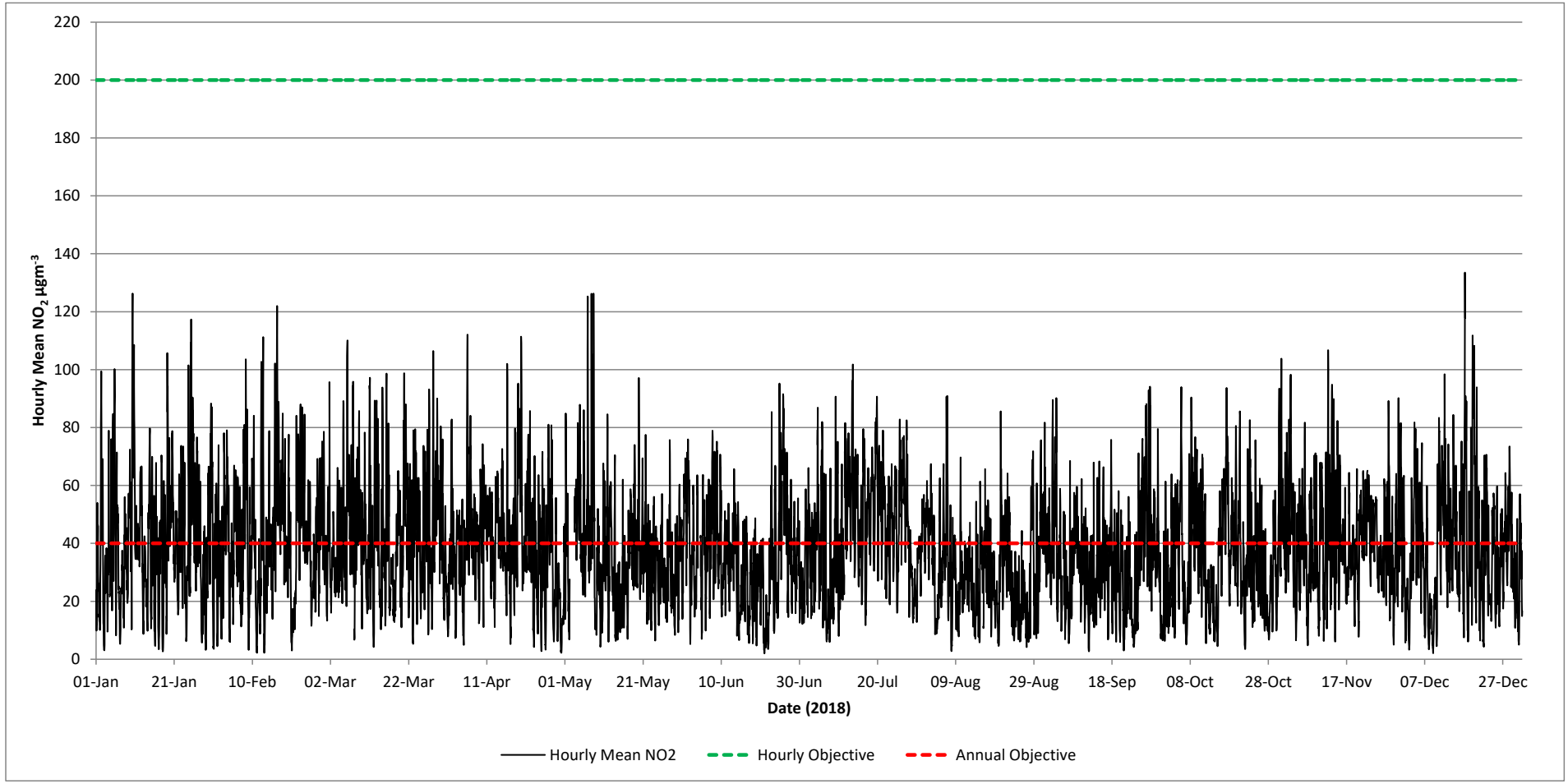


Figure 8 – Hourly average NO_2 at Steele Close.

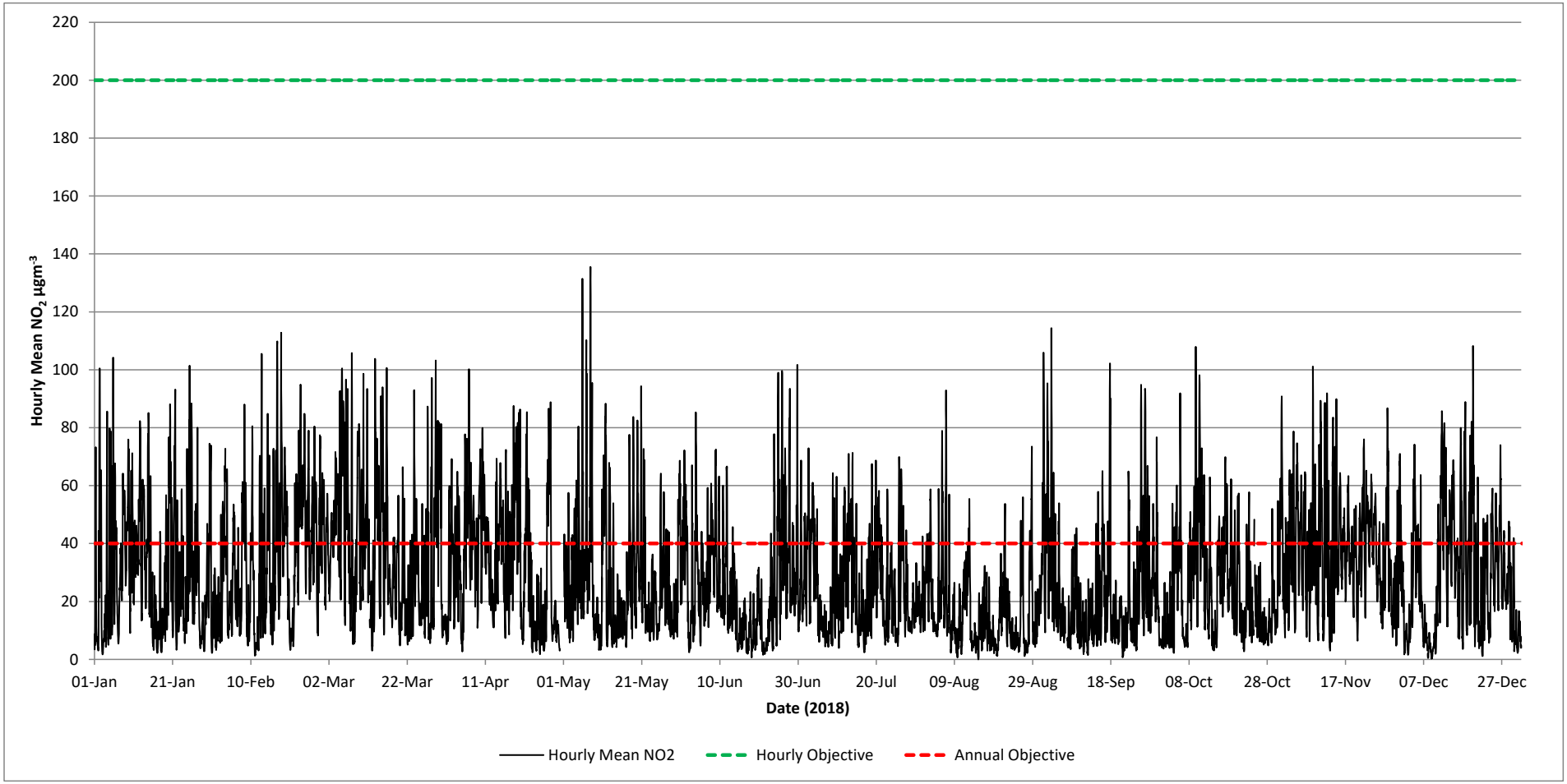
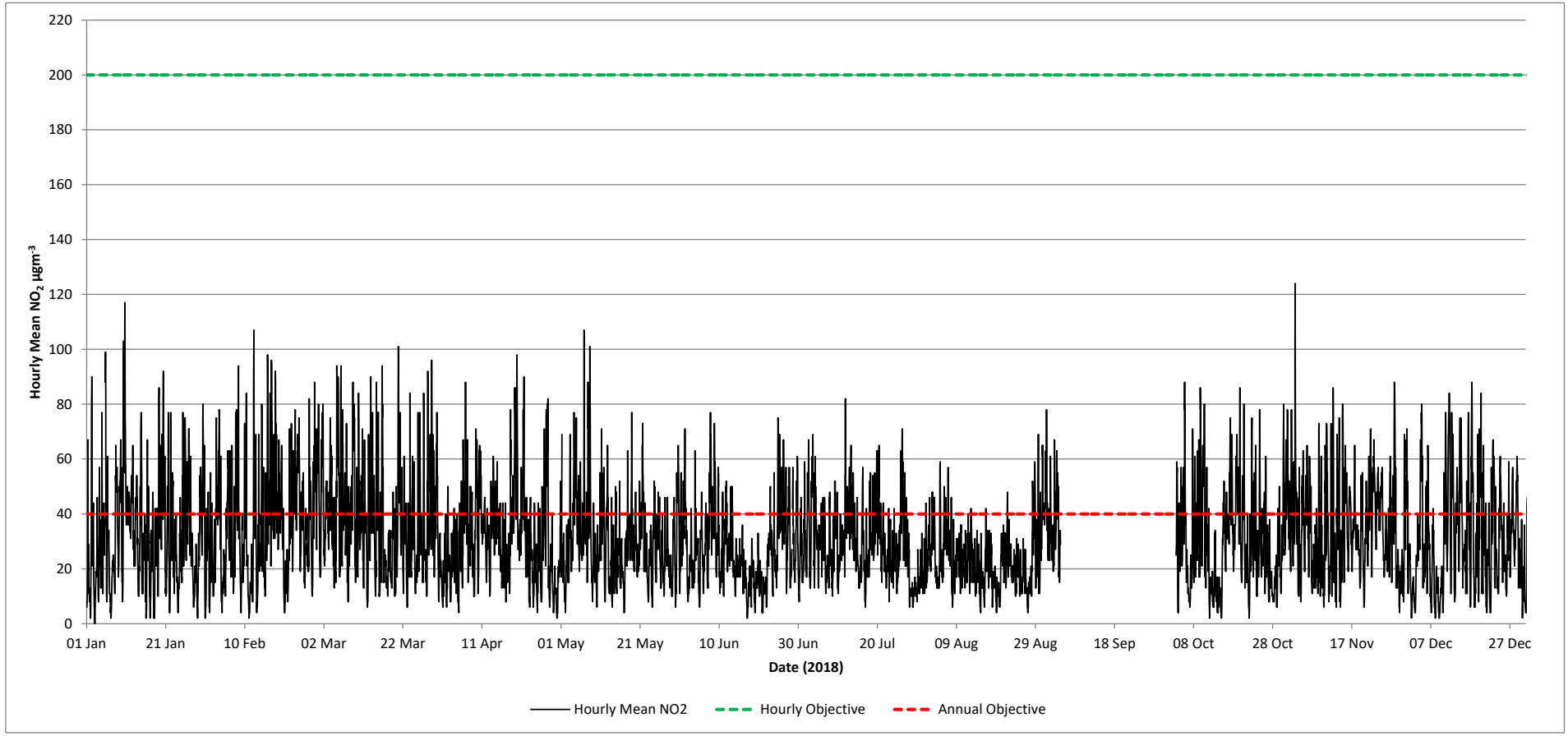


Figure 9 – Hourly average NO_2 at The Point.



3.2.2 Particulate Matter (PM_{10})

Annual Mean

Error! Reference source not found. in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

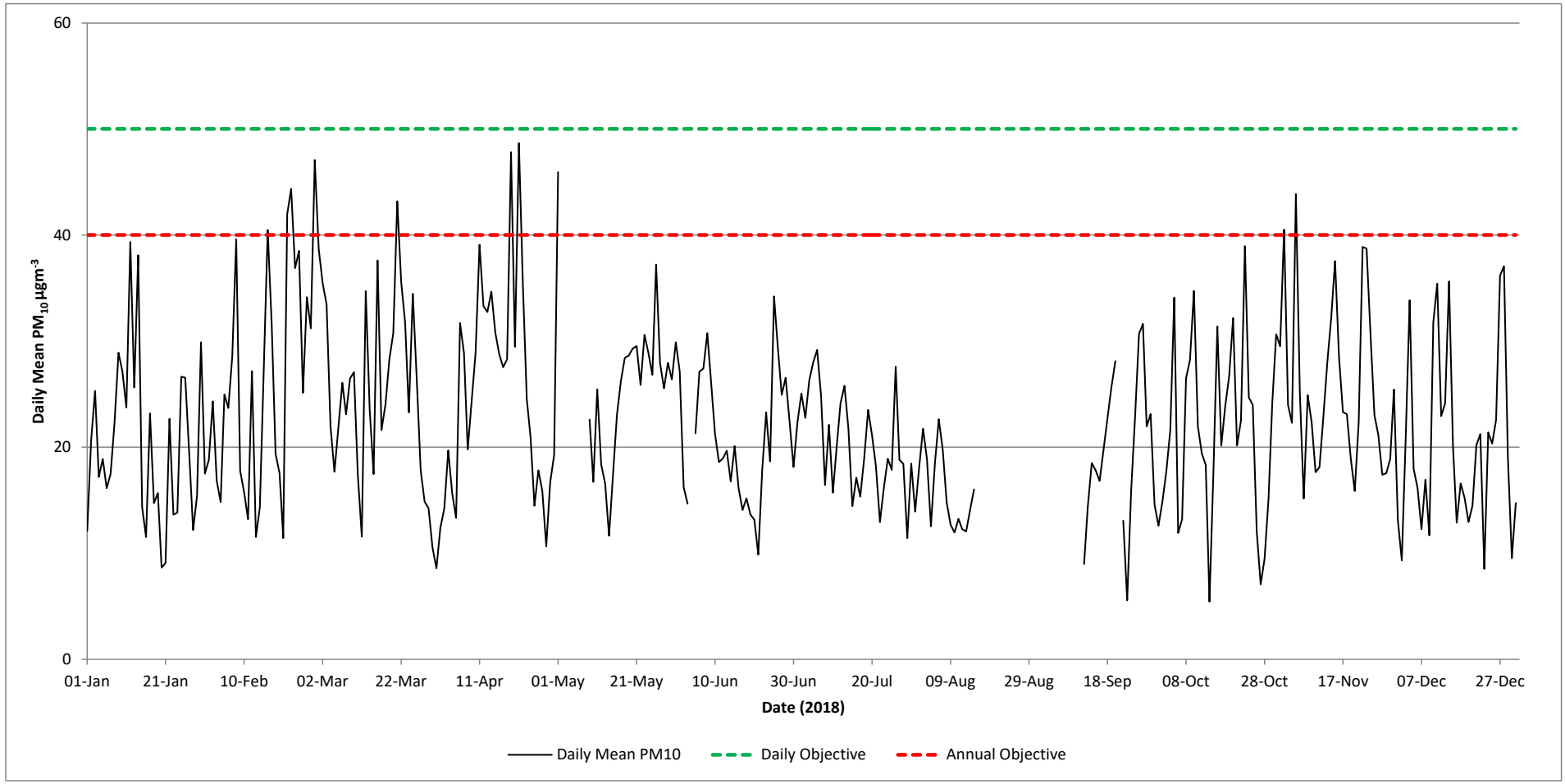
The annual mean objective was not exceeded in 2018.

Daily Mean

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

In 2018 there were not exceedances of the daily mean objective.

Figure 10 – Daily average PM_{10} at Southampton Road.



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)
ES1	Southampton Road	Roadside	445495	118237	NO_2; PM_{10}	YES	Chemiluminescent; TEOM	17.6	2.0	1.9
ES2	Steele Close	Urban Background	443959	119673	NO_2	NO	Chemiluminescent	16	2.4	2.2
ES3	The Point	Roadside	445310	119148	NO_2	YES	Chemiluminescent	42.8	8.2	3.6

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)
HL	Hamble Lane	Roadside	447717	110359	NO2	YES	38	1.7	NO	2.3
HL2	Hamble Lane 2	Roadside	447745	110478	NO2	YES	9.9	1.4	NO	2.3
HL3	Hamble Lane 3	Roadside	447638	110071	NO2	NO	0	6	NO	2.3
OH	Oak Hill	Roadside	448653	110280	NO2	NO	9.4	1.9	NO	2.3
OH2	Oak Hill 2	Roadside	448736	110213	NO2	NO	4.6	1.2	NO	2.3
BDG	Bridge Road	Roadside	449099	109864	NO2	NO	2.2	1.7	NO	2.5
HSB	High Street Botley	Roadside	451431	113025	NO2	YES	4.8	2.1	NO	2.3
HSB2 (A,B)	High Street Botley 2	Roadside	451184	113030	NO2	YES	5.7	1.3	NO	2.5
KCA	Kings Copse Avenue (to May 2018)	Roadside	449937	113137	NO2	NO	3.5	1.9	NO	1.5
KCA(18)	Kings Copse Avenue (from June 2018)	Roadside	449935	113146	NO2	NO	0.5	1.6	NO	2.4
GR	Grange Road	Roadside	449867	113250	NO2	NO	10	1.7	NO	2.5
UNC	Upper Northam Close	Urban Background	448090	112635	NO2	NO	12.9	2.5	NO	2.2
JW	Jukes Walk	Urban Background	447690	114912	NO2	NO	19	1.6	NO	1.5
SWA	Swaythling Road	Roadside	446170	114603	NO2	NO	4.1	2.7	NO	2.4

AL	Allington Lane	Roadside	445908	115544	NO2	NO	55.7	2.6	NO	2.4
BOT	Botley Road	Roadside	449634	117382	NO2	NO	4.5	1.9	NO	2.4
WYV	Wyvern School	Roadside	449577	118165	NO2	NO	4.5	1.9	NO	2.3
FORSL	Fair Oak Road / Sandy Lane	Roadside	448788	118553	NO2	NO	33	1	NO	1.5
FOR	Fair Oak Road	Roadside	447427	118780	NO2	NO	5.8	5.6	NO	2.5
BR	Bishopstoke Road	Roadside	446604	119149	NO2	NO	11.5	1.8	NO	2.4
BR2	Bishopstoke Road 2	Roadside	446051	119171	NO2	NO	0.3	2.2	NO	2.1
TW	Twyford Road	Roadside	445739	119856	NO2	NO	3.6	1.5	NO	2.1
MS	Mill Street	Roadside	445707	119619	NO2	NO	2.8	1.5	NO	2.1
SRAN(17) (A,B,C)	Southampton Road Analyser (from July 2017)	Roadside	445495	118237	NO2	YES	17.6	1.6	YES	1.9
SR1	Southampton Road 1	Roadside	445450	118144	NO2	YES	4.3	2	NO	2.4
SR2	Southampton Road 2	Roadside	445651	118634	NO2	YES	5.2	1.7	NO	2.5
CA(15)	Chestnut Avenue (from November 2014)	Roadside	445339	118111	NO2	NO	3.8	2.7	NO	2.4
TP (A,B,C)	The Point	Roadside	445310	119148	NO2	YES	42.8	8.1	YES	2.3
LRPR	Leigh Road / Pluto Road	Roadside	444864	119174	NO2	YES	7.3	1.7	NO	2
OX	Oxburgh	Urban	444543	120187	NO2	NO	11.4	1.9	NO	2.3

	Close	Background								
HG	Hadleigh Gardens	Urban Background	445347	120367	NO2	NO	5.9	1.9	NO	2.7
WA	Woodside Avenue	Roadside	444483	119443	NO2	NO	7.2	1.9	NO	2.2
SC (A,B,C)	Steele Close	Urban Background	443959	119673	NO2	NO	16	2.1	YES	1.95
BEL	Belmont Road	Urban Background	443778	119303	NO2	YES	10.7	2.1	NO	2.2
LR13	Leigh Road / Junction 13	Roadside	443842	119526	NO2	YES	7.5	1.7	NO	2.5
MC	Medina Close	Urban Background	444239	120060	NO2	YES	7.6	1.5	NO	1.5
PC (A,B)	Porteous Crescent	Urban Background	444656	120775	NO2	YES	13.8	1	NO	2.5
NH	Nuffield Hospital	Urban Background	445121	122183	NO2	NO	10.1	1	NO	2.2
AR	Ashdown Road	Urban Background	443291	122842	NO2	NO	9.6	1.3	NO	1.5
CC	Chestnut Close	Roadside	443054	118962	NO2	NO	9.9	1.5	NO	2.1
SSQ	Sparrow Square	Urban Background	443483	118612	NO2	YES	9	1.7	NO	2.6
DD (A,B)	Dove Dale	Urban Background	443559	118751	NO2	YES	7.7	2.9	NO	2.7
CR	Campbell Road	Industrial	445750	118111	NO2	NO	12.9	2.2	NO	2.1
PA	Passfield Avenue	Roadside	444340	118696	NO2	NO	24.7	1.4	NO	1.5
WHL	Woodhouse Lane	Roadside	450422	113751	NO2	NO	30.7	0.8	NO	2

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)				
					2014	2015	2016	2017	2018
ES1	Roadside	Automatic	99	99	-	-	**40.8**	37.4	37.8
ES2	Urban Background	Automatic	99	99	-	-	29.3	27.0	28.5
ES3	Roadside	Automatic	92	92	-	-	37.0	33.0	31.0
HL	Roadside	Diffusion Tube	92	92	36.7	32.0	36.9	33.3	33.6
HL2	Roadside	Diffusion Tube	92	92	37.7	30.5	**40.0**	**42.3**	39.2
OH	Roadside	Diffusion Tube	100	100	-	-	**41.0**	35.6	37.2
OH2	Roadside	Diffusion Tube	100	100	-	-	-	**55.0**	**50.9**
BDG	Roadside	Diffusion Tube	100	100	-	-	30.6	26.7	27.8
HSB	Roadside	Diffusion Tube	100	100	**40.4**	31.5	38.3	35.2	32.2
HSB (average of duplicate)	Roadside	Diffusion Tube	-	-	33.6	27.7	-	-	-
HSB2(A)	Roadside	Diffusion Tube	100	100	-	-	31.5	31.3	29.7
HSB2(B)	Roadside	Diffusion Tube	89	67	-	-	33.1	30.5	28.8
KCA	Roadside	Diffusion Tube	60	25	-	-	32.9	30.9	25.9
KCA(18)	Roadside	Diffusion Tube	100	58	-	-	-	-	30.7
GR	Roadside	Diffusion Tube	100	100	-	-	30.2	31.3	28.7

UNC	Urban Background	Diffusion Tube	100	100	29.3	28.3	34.6	29.5	27.7
JW	Urban Background	Diffusion Tube	100	100	-	-	27.9	24.8	24.7
SWA	Roadside	Diffusion Tube	100	100	-	-	31.7	29.5	27.7
AL	Urban Background	Diffusion Tube	100	100	29.4	26.1	28.0	25.2	25.1
BOT	Roadside	Diffusion Tube	100	100	-	-	36.5	34.4	32.5
WYV	Roadside	Diffusion Tube	100	100	-	-	32.2	25.0	29.5
FORSL	Roadside	Diffusion Tube	92	92	-	-	33.2	30.2	28.0
FOR	Roadside	Diffusion Tube	100	100	25.9	21.7	23.5	22.9	21.9
BR	Roadside	Diffusion Tube	92	92	38.1	33.0	34.5	33.0	33.4
BR2	Roadside	Diffusion Tube	58	58	37.1	33.3	33.0	39.5	31.7
TW	Roadside	Diffusion Tube	83	83	35.7	25.2	28.3	26.5	27.5
MS	Roadside	Diffusion Tube	100	100	36.1	28.6	31.2	28.9	32.1
SRAN (average of triplicate)	Roadside	Diffusion Tube	-	-	**42.5**	34.0	-	-	-
SRAN(A)	Roadside	Diffusion Tube	-	-	-	-	39.4	34.2	-
SRAN(B)	Roadside	Diffusion Tube	-	-	-	-	**41.4**	34.4	-
SRAN(C)	Roadside	Diffusion Tube	-	-	-	-	39.6	34.3	-
SRAN(17)(A)	Roadside	Diffusion Tube	100	100	-	-	-	**43.4**	38.3
SRAN(17)(B)	Roadside	Diffusion	100	100	-	-	-	**41.8**	38.5

		Tube							
SRAN(17)(C)	Roadside	Diffusion Tube	100	100	-	-	-	**43.7**	39.7
SR1	Roadside	Diffusion Tube	83	83	**51.2**	**46.2**	**47.3**	**44.7**	**45.7**
CA	Roadside	Diffusion Tube	-	-	28.5	-	-	-	-
CA(15)	Roadside	Diffusion Tube	92	92		24.7	28.6	24.5	25.8
TP (average of triplicate)	Roadside	Diffusion Tube	-	-	28.3	23.5	-	-	-
TP(A)	Roadside	Diffusion Tube	100	100	-	-	27.9	25.6	26.0
TP(B)	Roadside	Diffusion Tube	92	92	-	-	26.7	24.8	25.1
TP(C)	Roadside	Diffusion Tube	100	100	-	-	26.7	24.5	25.4
LRPR	Roadside	Diffusion Tube	83	83	35.8	30.2	32.4	31.9	32.9
OX	Urban Background	Diffusion Tube	92	92	23.5	19.9	22.0	20.8	20.1
HG	Urban Background	Diffusion Tube	100	100	21.1	18.8	20.6	19.2	19.0
WA	Roadside	Diffusion Tube	100	100	39.2	34.1	35.9	34.0	35.0
SC (average of triplicate)	Urban Background	Diffusion Tube	-	-	31.0	26.6	-	-	-
SC(A)	Urban Background	Diffusion Tube	92	92	-	-	25.8	23.3	24.1
SC(B)	Urban Background	Diffusion Tube	100	100	-	-	25.2	23.4	25.7
SC(C)	Urban Background	Diffusion Tube	100	100	-	-	26.0	22.9	25.4
BEL	Urban Background	Diffusion Tube	100	100	30.3	24.7	26.5	23.5	26.0

LR13	Roadside	Diffusion Tube	100	100	**48.2**	38.0	**43.6**	**41.3**	**41.4**
MC	Urban Background	Diffusion Tube	100	100	31.5	24.7	27.6	25.5	26.4
PC (average of duplicate)	Urban Background	Diffusion Tube	-	-	32.0	25.5	-	-	-
PC(A)	Urban Background	Diffusion Tube	100	100	-	-	27.5	25.7	27.7
PC(B)	Urban Background	Diffusion Tube	100	75	-	-	30.1	24.9	27.7
NH	Urban Background	Diffusion Tube	75	75	33.7	23.7	28.4	22.3	26.0
AR	Urban Background	Diffusion Tube	92	92	12.6	10.5	11.6	10.7	11.6
CC	Roadside	Diffusion Tube	92	92	32.6	26.5	29.9	29.4	28.2
SSQ	Urban Background	Diffusion Tube	100	100	31.2	26.6	30.4	29.2	28.2
DD (average of duplicate)	Urban Background	Diffusion Tube	-	-	35.7	31.0	-	-	-
DD(A)	Urban Background	Diffusion Tube	100	100	-	-	33.9	31.5	31.2
DD(B)	Urban Background	Diffusion Tube	100	100	-	-	33.3	31.0	29.8
DD(C)	Urban Background	Diffusion Tube	-	-	-	-	34.8	26.3	-
CR	Industrial	Diffusion Tube	83	83	-	34.7	33.0	35.0	35.1
PA	Roadside	Diffusion Tube	100	100	-	-	31.5	27.5	30.0
WHL	Roadside	Diffusion Tube	100	100	-	-	-	19.1	20.3
SR2	Roadside	Diffusion Tube	100	25	-	-	-	-	**42.7**
HL3	Roadside	Diffusion Tube	100	25	-	-	-	-	22.1

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

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

Notes:

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

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

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

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

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

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2014	2015	2016	2017	2018
ES1	Roadside	Automatic	99	99	-	-	4	0	0
ES2	Urban Background	Automatic	99	99	-	-	0	0	0
ES3	Roadside	Automatic	92	92	-	-	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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
ES1	Roadside	90	90	-	-	22.2	20.9	22.5

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

Notes:

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
ES1	Roadside	90	90	-	-	7	7	0

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.

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		
													Raw Data	Bias Adjusted (0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
HL	**45.3**	33.8	Error	31.1	34.6	31.7	**41.0**	32.4	36.9	**47.9**	28.8	33.6	36.1	33.6	-
HL2	**43.8**	**40.3**	**47.3**	**46.8**	**48.2**	**44.1**	Missing	38.4	**42.1**	34.3	38.0	**40.6**	**42.2**	39.2	28.7
OH	**41.2**	38.5	**49.2**	38.6	35.5	**40.3**	**46.1**	33.0	32.4	**40.3**	**41.8**	**43.1**	**40.0**	37.2	30.3
OH2	**56.6**	46.0	**69.0**	**53.7**	**52.8**	**54.2**	**58.4**	**46.4**	**46.0**	**54.1**	**60.4**	**58.6**	**54.7**	**50.9**	**44.2**
BDG	33.2	29.0	36.6	30.6	26.0	26.9	29.9	23.3	27.4	30.9	31.7	32.7	29.9	27.8	25.6
HSB	36.6	28.7	**43.8**	38.1	32.7	38.3	31.9	31.6	29.4	33.7	35.9	34.7	34.6	32.2	33.9
HSB2(A)	36.9	31.3	33.9	34.7	30.0	32.0	29.2	24.8	27.3	31.3	35.7	35.9	31.9	29.7	27.3
HSB2(B)	33.7	33.6	32.7	32.4	28.6	28.0	29.6	24.9	Error	Closed	-	-	30.4	28.8	26.6
KCA	37.5	Missing	27.0	28.7	Missing	Closed	-	-	-	-	-	-	31.1	25.9	24.2
KCA(18)	-	-	-	-	-	22.8	28.9	24.5	28.5	34.4	34.2	33.2	29.5	30.7	30.1
GR	34.6	38.4	**41.1**	31.3	28.6	28.0	25.2	24.1	24.5	30.8	28.2	35.5	30.9	28.7	24.4
UNC	**44.9**	30.7	32.2	31.0	24.4	24.1	29.7	24.3	28.8	28.5	28.1	30.6	29.8	27.7	24.6
JW	26.9	27.1	30.5	22.4	28.1	30.2	24.9	19.9	24.6	28.4	28.4	27.5	26.6	24.7	-
SWA	33.9	30.5	36.5	28.4	28.7	26.5	26.0	24.8	21.8	30.8	34.5	34.3	29.7	27.7	25.5
AL	33.5	25.9	27.6	18.1	22.9	25.5	29.9	25.2	26.5	28.4	30.1	30.2	27.0	25.1	-

BOT	36.5	34.9	38.6	37.9	31.7	34.7	38.4	27.0	36.2	32.2	32.7	38.9	35.0	32.5	27.7
WYV	33.8	37.2	35.5	29.5	27.3	31.3	32.6	22.9	28.4	35.2	32.5	34.6	31.8	29.5	25.6
FORSL	32.3	29.2	34.6	31.8	23.6	27.6	31.7	27.9	28.5	31.5	32.6	Missing	30.1	28.0	-
FOR	29.9	25.0	25.5	23.4	21.2	19.1	25.4	18.2	21.4	23.0	23.8	26.2	23.5	21.9	20.5
BR	39.7	36.1	37.3	37.9	31.6	Missing	**45.9**	31.1	30.8	37.2	30.4	37.6	36.0	33.4	25.9
BR2	39.6	**41.6**	36.9	33.5	29.7	31.8	Missing	29.9	Missing	Missing	Missing	Missing	34.7	31.7	31.2
TW	35.1	30.2	29.0	24.9	21.6	Missing	27.5	Error	33.5	33.5	25.7	34.8	29.6	27.5	25.3
MS	35.1	39.8	37.1	37.8	37.5	37.9	31.5	25.0	29.3	34.6	34.7	33.9	34.5	32.1	32.3
SR (A)	**47.9**	**40.7**	**44.6**	**45.1**	37.3	**40.7**	**40.0**	35.5	36.5	38.4	**44.1**	**43.9**	**41.2**	38.3	27.4
SR (B)	**48.0**	**45.2**	**45.7**	**49.0**	37.4	39.1	35.6	30.8	36.8	**40.1**	**42.8**	**45.9**	**41.4**	38.5	27.5
SR (C)	**49.8**	**40.8**	**43.3**	**48.0**	**40.8**	**41.1**	**44.5**	33.6	37.0	**40.5**	**47.8**	**45.6**	**42.7**	39.7	28.0
SR1	**56.8**	**52.9**	Missing	**46.0**	**46.5**	**49.7**	**51.8**	**42.8**	**50.5**	**44.5**	Error	**49.7**	**49.1**	**45.7**	37.8
CA	35.1	32.5	32.0	29.5	24.2	23.5	23.9	22.1	25.9	29.2	Error	27.2	27.7	25.8	24.2
TP(A)	31.6	31.5	34.2	27.9	25.1	25.6	26.5	20.4	24.1	29.8	29.7	29.1	28.0	26.0	-
TP(B)	29.5	32.2	28.9	28.2	23.9	26.7	26.3	22.1	23.0	26.6	29.1	Error	26.9	25.1	-
TP(C)	30.8	33.1	30.9	28.6	23.0	25.9	23.9	21.3	24.0	28.6	29.9	28.2	27.3	25.4	-
LRPR	33.1	**41.1**	38.4	**41.2**	36.4	32.9	Missing	26.1	29.8	Missing	**41.4**	33.6	35.4	32.9	28.5
OX	Missing	28.3	16.7	22.5	18.9	17.9	21.5	18.9	20.7	23.9	22.0	26.2	21.6	20.1	-
HG	22.9	27.4	21.5	20.3	17.1	15.8	16.0	17.2	18.3	22.3	23.0	23.8	20.5	19.0	-
WA	**42.4**	**44.0**	36.1	**41.1**	32.9	34.5	37.6	31.8	35.1	39.5	36.2	**40.1**	37.6	35.0	30.0
SC(A)	29.9	30.4	Error	30.5	23.2	26.7	20.0	18.4	19.7	27.3	30.8	28.5	25.9	24.1	-
SC(B)	29.1	32.5	31.3	34.1	22.8	27.8	23.5	19.3	21.7	26.4	35.1	27.6	27.6	25.7	-
SC(C)	27.2	26.8	30.5	34.1	24.4	26.8	25.7	20.3	20.2	27.6	36.0	28.2	27.3	25.4	-
BEL	28.8	34.0	28.5	28.3	29.6	29.3	24.2	19.4	21.5	32.4	34.1	25.4	28.0	26.0	-
LR13	**48.5**	**47.8**	**44.5**	**50.8**	39.4	**44.3**	**50.4**	32.8	36.8	**44.0**	**51.8**	**43.2**	**44.5**	**41.4**	32.5
MC	33.0	35.5	31.9	18.0	25.6	30.6	26.9	19.1	20.8	30.0	**41.7**	27.4	28.4	26.4	-
PC(A)	30.3	29.3	32.2	36.6	29.1	34.1	29.7	23.4	23.3	30.3	38.1	20.5	29.7	27.7	-

PC(B)	29.0	32.5	32.9	36.2	30.7	34.1	29.2	21.8	21.7	Closed	-	-	29.8	27.7	-
NH	29.6	36.2	Missing	Missing	Missing	33.1	22.2	22.6	18.7	31.3	32.5	25.6	28.0	26.0	-
AR	14.5	17.1	13.3	13.2	Missing	10.0	10.1	8.9	8.0	13.4	16.2	12.8	12.5	11.6	-
CC	36.8	31.8	31.6	Missing	27.6	25.6	23.9	26.7	31.7	32.5	32.6	32.7	30.3	28.2	25.5
SSQ	**41.1**	34.3	27.7	30.4	29.1	25.2	25.4	26.2	31.4	31.1	27.4	35.2	30.4	28.2	-
DD(A)	**44.8**	39.4	30.5	34.3	33.4	28.5	30.2	27.3	32.3	34.0	32.3	36.0	33.6	31.2	-
DD(B)	**45.1**	35.7	32.8	21.6	34.3	28.6	31.5	22.0	33.1	35.8	29.2	34.9	32.1	29.8	-
CR	**50.0**	**41.0**	30.9	37.4	27.9	26.7	34.0	Missing	**43.3**	Missing	**40.6**	**45.9**	37.8	35.1	-
PA	35.8	**41.0**	31.7	33.6	32.8	32.8	32.3	17.8	25.6	33.2	38.2	32.2	32.3	30.0	-
WHL	28.5	27.1	22.2	20.3	18.1	18.6	22.0	18.0	19.9	20.6	23.3	23.5	21.8	20.3	-
SR2	-	-	-	-	-	-	-	-	-	**51.5**	**51.3**	**48.8**	**50.5**	**42.7**	34.3
HL3	-	-	-	-	-	-	-	-	-	27.1	26.7	24.6	26.1	22.1	22.1

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

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

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

Notes:

Exceedances of the NO_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

Bias Adjustment

From consultation with Box 7.11 of the LAQM.TG16, Eastleigh Borough Council has chosen the national bias adjustment factor of 0.93[4] to apply to the annual mean NO_2 diffusion survey results. This is appropriate as it has been derived from 30 co-location studies, and tubes across Eastleigh Borough are deployed at a range of locations but are not affected by specific, local non-traffic sources. The tubes were also exposed in accordance with the DEFRA timetable over the full calendar year. Diffusion tubes are analysed by Gradko using the 20% TEA in water method.

Figure 11 – National Diffusion Tube Bias Adjustment Factor Spreadsheet 03/19.

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:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.								
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	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/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2018		Overall Factor[3] (30 studies)				Use		0.93

Distance Correction for Relevant Public Exposure

All 2018 results have, where appropriate, undergone correction for distance to the nearest relevant receptor in accordance with the LAQM TG16 and results of this are shown in Table B.1. Calculations were carried out using the NO_2 fall-off with distance calculator[5].

Annualisation

Sites with below the required 75% data capture in 2018 were annualised in accordance with Box 7.9/7.10 of the LAQM TG16. This process is outlined below and in Tables C.1 – C.3.

[4] https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html (Spreadsheet Version Number: 03/19)
[5] https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html (Version 4.2)

Measurements were obtained from the AURN network sites Bournemouth, Portsmouth and Chilbolton. These concentrations were averaged in time periods to coincide with the DEFRA diffusion tube calendar.

Table 4 – AURN sites averaged for each DEFRA diffusion tube period.

Start Date	End Date	Bournemouth (B1) µgm^{-3}	Portsmouth (B2) µgm^{-3}	Chilbolton (B3) µgm^{-3}
03/01/2018	31/01/2018	13.75	20.79	10.99
31/01/2018	28/02/2018	14.43	25.45	13.84
28/02/2018	28/03/2018	12.30	21.91	12.19
28/03/2018	02/05/2018	10.83	18.96	11.95
02/05/2018	06/06/2018	10.80	18.08	11.17
06/06/2018	04/07/2018	9.51	14.60	7.29
04/07/2018	01/08/2018	8.94	13.91	6.40
01/08/2018	05/09/2018	7.11	13.75	5.68
05/09/2018	03/10/2018	9.81	16.54	6.65
03/10/2018	31/10/2018	14.26	21.70	8.60
31/10/2018	05/12/2018	14.39	21.08	11.76
05/12/2018	09/01/2019	13.60	20.64	8.30
Annual Mean (AM) µgm^{-3}		11.65	18.95	9.57

A period mean was calculated for each AURN site, corresponding to each diffusion tube site which requires adjustment.

Table 5 – AURN period means corresponding to each diffusion tube site.

Diffusion Tube	Unadjusted Mean	B1 Period Mean	B2 Period Mean	B3 Period Mean
HSB2(B)	30.44	10.96	18.43	9.94
KCA	31.05	12.30	20.55	11.71
KCA(18)	29.49	11.09	17.46	7.81
BR2	34.72	11.25	19.08	10.44
SR2	50.51	14.09	21.14	9.55
HL3	26.12	14.09	21.14	9.55

Three AURN annualisation ratios were calculated for each diffusion tube site, and an average of these calculated. This ratio was applied to the diffusion tube data and then bias adjusted.

Table 6 – Annualisation ratios and final results.

	Ratio (Annual Mean / Period Mean)			Average Ratio	Diffusion Tube x Average Ratio	Bias Adjusted
	B1	B2	B3			
HSB2(B)	1.06	1.03	0.96	1.02	30.99	28.82
KCA	0.95	0.92	0.82	0.90	27.80	25.85
KCA(18)	1.05	1.09	1.23	1.12	33.03	30.72
BR2	1.04	0.99	0.92	0.98	34.08	31.69
SR2	0.83	0.90	1.00	0.91	45.88	42.67
HL3	0.83	0.90	1.00	0.91	23.72	22.06

Diffusion Tube Laboratory Proficiency Scheme Results

Gradko International participated in four rounds of the AIR-PT laboratory proficiency testing scheme during 2018 and 100% of their results in this time were determined to be satisfactory[6].

Automatic Monitoring QA/QC

Air quality measurements from automatic instruments are validated and ratified to the standards described in the LAQM TG16. Automatic monitoring sites are visited fortnightly by a trained officer to calibrate instrument reading against gas standards of a known concentration obtained from a certified supplier. A comprehensive service and maintenance contract is maintained with an external organisation. Data from the analysers at Southampton Road and Steele Close are validated and ratified by King's College London's Environmental Research Group as part of a data management contract. This also includes annual audits of these sites by the National Physical Laboratory. Data validation and ratification for The Point was undertaken by Air Quality Data Management, the QA/QC report from this Figures 12 and 13.

[6] https://laqm.defra.gov.uk/assets/laqmno2performancedatauptofebruary2019v1.pdf

Figure 12 – AQDM QA/QC Report Page 1/2

QA/QC of Automatic Air Quality Instruments

Air quality measurements from the automatic instruments are validated and ratified by Air Quality Data Management (AQDM) http://www.aqdm.co.uk to the standards described in the Local Air Quality Management – Technical Guidance LAQM (TG16) https://laqm.defra.gov.uk/technical-guidance.

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NO_x, O_3, SO_2 and CO) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM_{10} and $PM_{2.5}$) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Generally this operates at three, six or twelve month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three and six monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include

- the correct scaling of data
- ignoring calibrations that were poor e.g. a spent zero scrubber
- closely tracking rapid drifts or eliminating the data
- comparing the measurements with other pollutants and nearby sites
- corrections due to span cylinder drift
- corrections due to flow drifts for the particulate instruments
- corrections for ozone instrument sensitivity drifts
- eliminating measurements for NO_2 conversion inefficiencies
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods were instruments are warming-up after a powercut
- identification of anomalies due to mains power spikes

Figure 13 – AQDM QA/QC Report Page 2/2

- correcting problems with the date and time stamp
- observations made during the sites visits and services

The identification of data anomalies, the proper understanding of the effects and the application of appropriate corrections requires expertise gained over many years of operational experience. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. There are rarely simple faults that can be discovered by computer algorithms or can be understood without previous experience.

The PM_{10} and $PM_{2.5}$ concentrations may require scaling into Gravimetric Equivalent concentration units by use of the Volatile Correction Model (VCM) http://www.volatile-correction-model.info or by corrections published by Defra https://uk-air.defra.gov.uk/networks/monitoring-methods?view=mcerts-scheme depending on the measurement technique.

Further information about air quality data management, expert data ratification and examples of bad practices are given on the Air Quality Data Management (AQDM) website http://www.aqdm.co.uk.

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

Maps of monitoring locations and AQMAs in Eastleigh Borough are shown in Figures 14 to 19. The letters correspond to the site I.D. codes in Table A.2. AQMAs are shown as shaded areas.

Figure 14 – Eastleigh and Chandlers Ford diffusion tube locations, Eastleigh AQMA No.1 (A335) in purple shading and Eastleigh AQMA No.2 (M3) in blue shading.

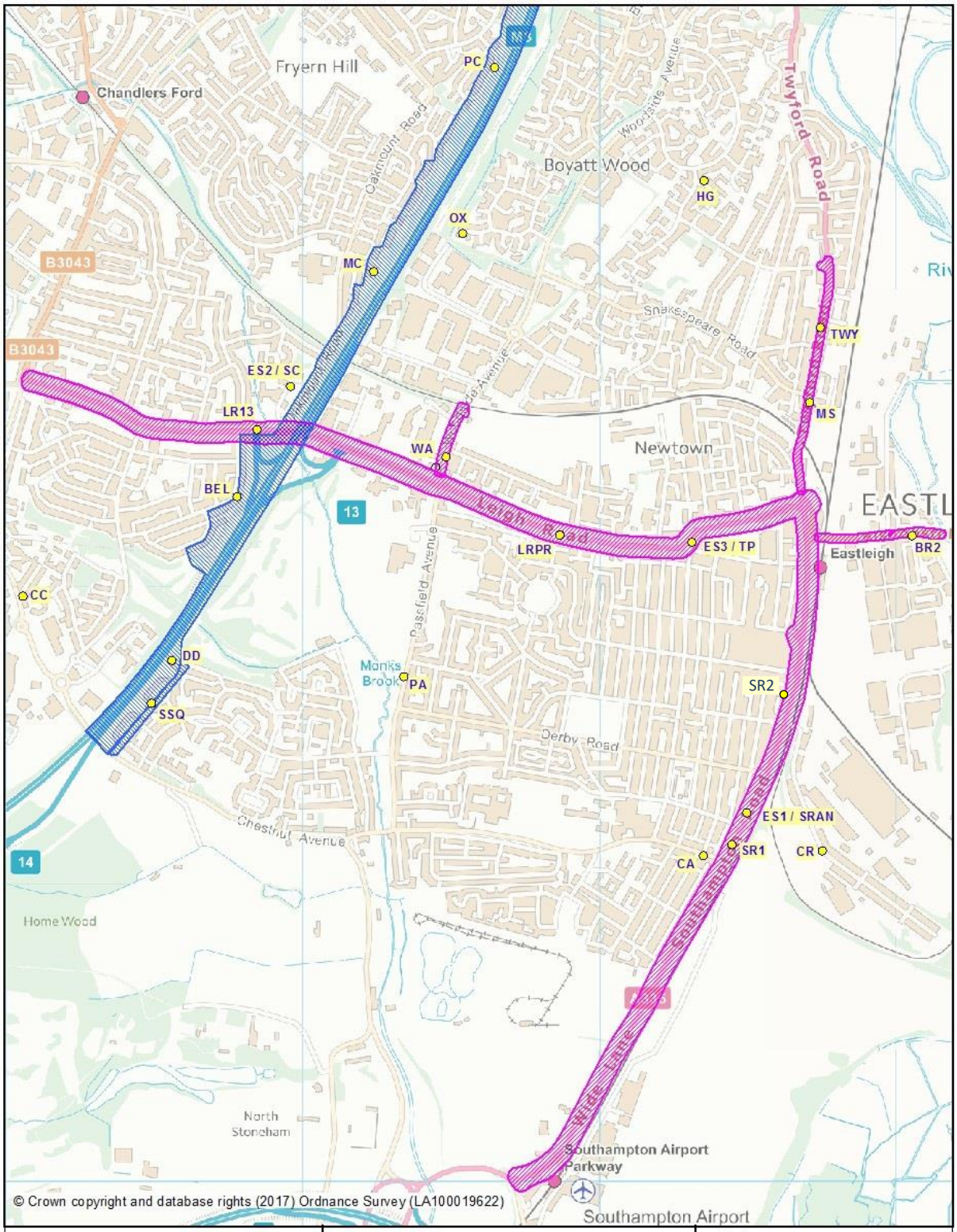


Figure 15 – Chandlers Ford and Hiltingbury diffusion tube locations and Eastleigh AQMA No.2 (M3) in blue shading.

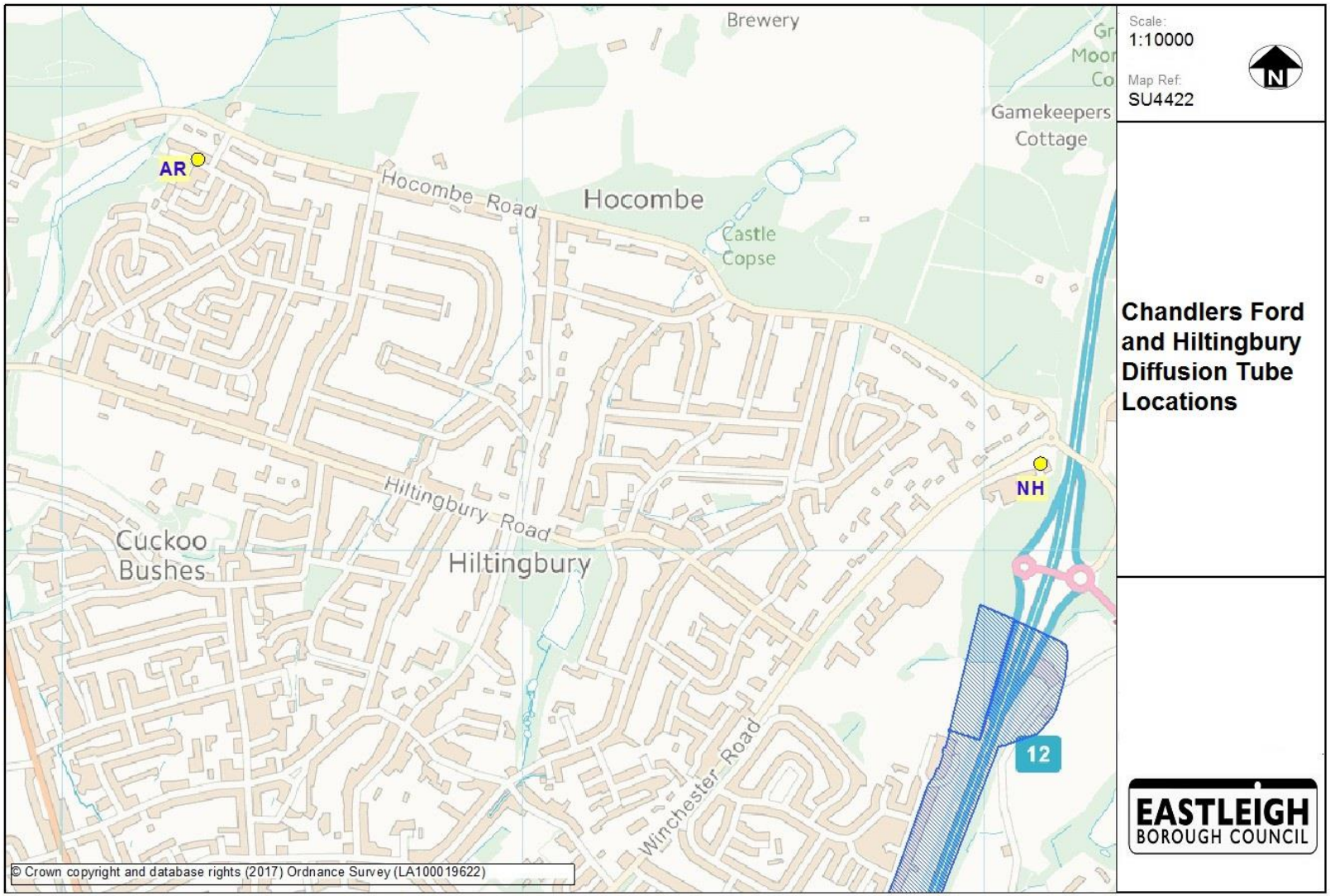


Figure 16 – Bishopstoke, Fair Oak and Horton Heath diffusion tube locations.

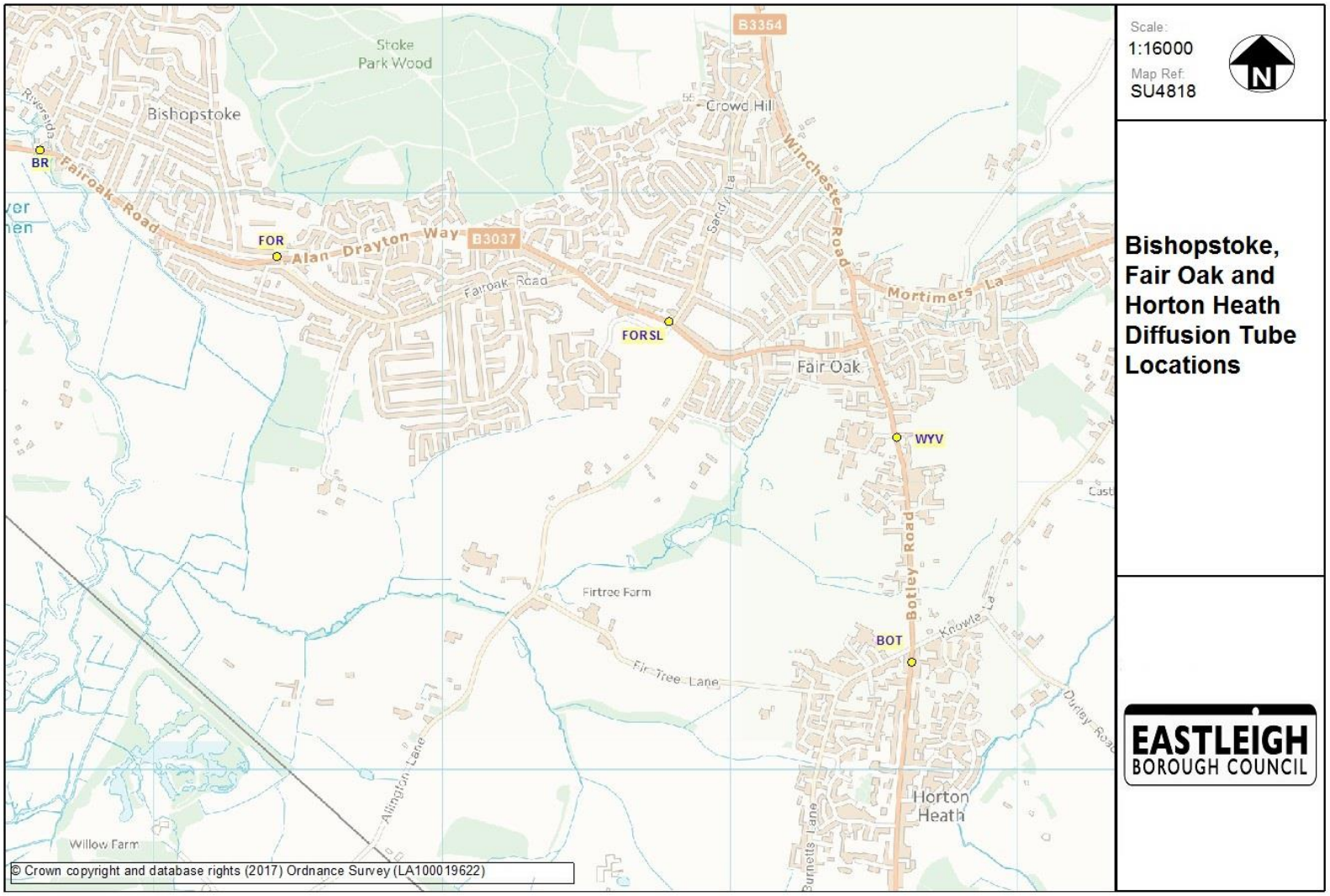


Figure 17 – Hedge End and West End diffusion tube locations

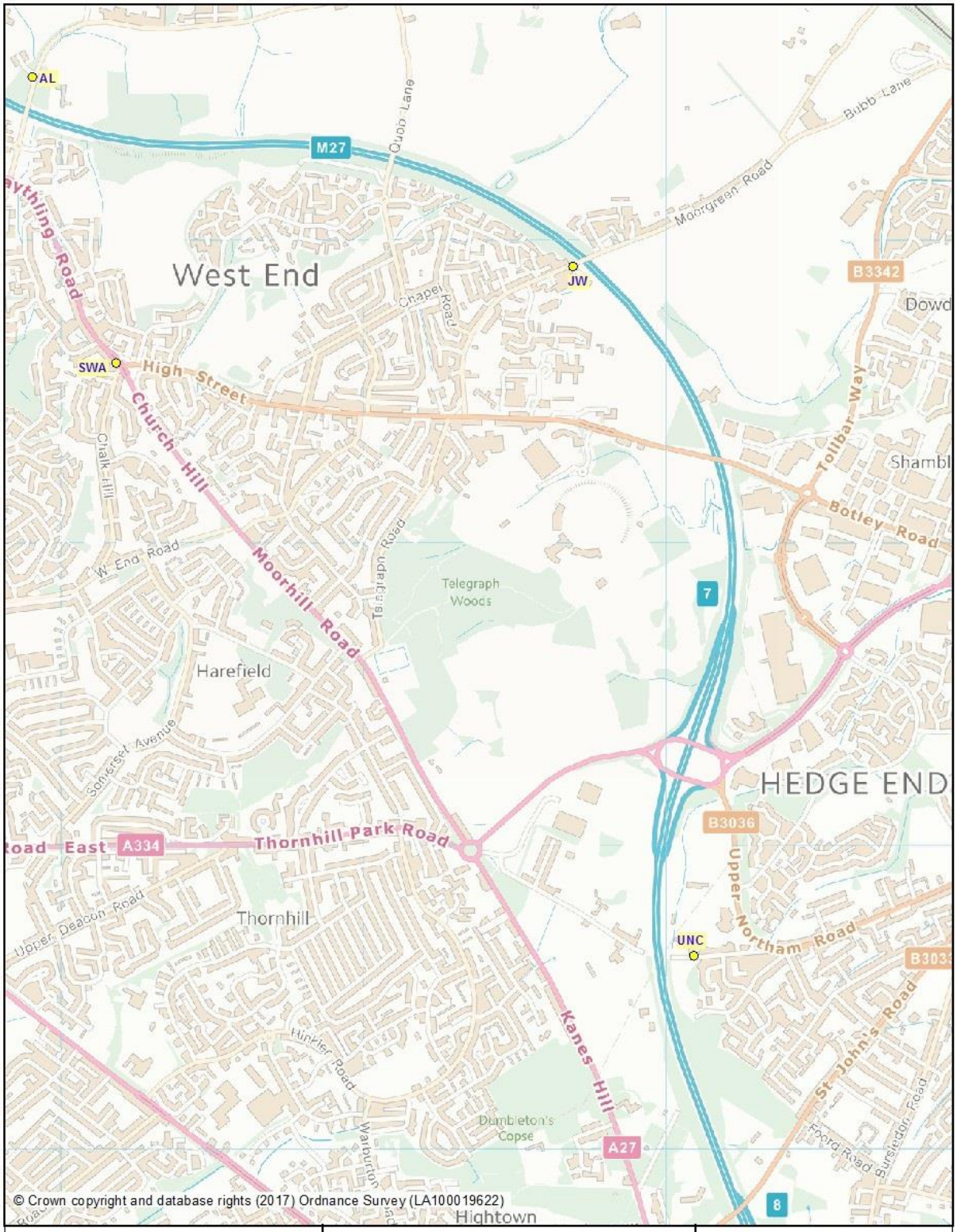


Figure 18 – Botley diffusion tube locations, High Street Botley AQMA in purple shading.

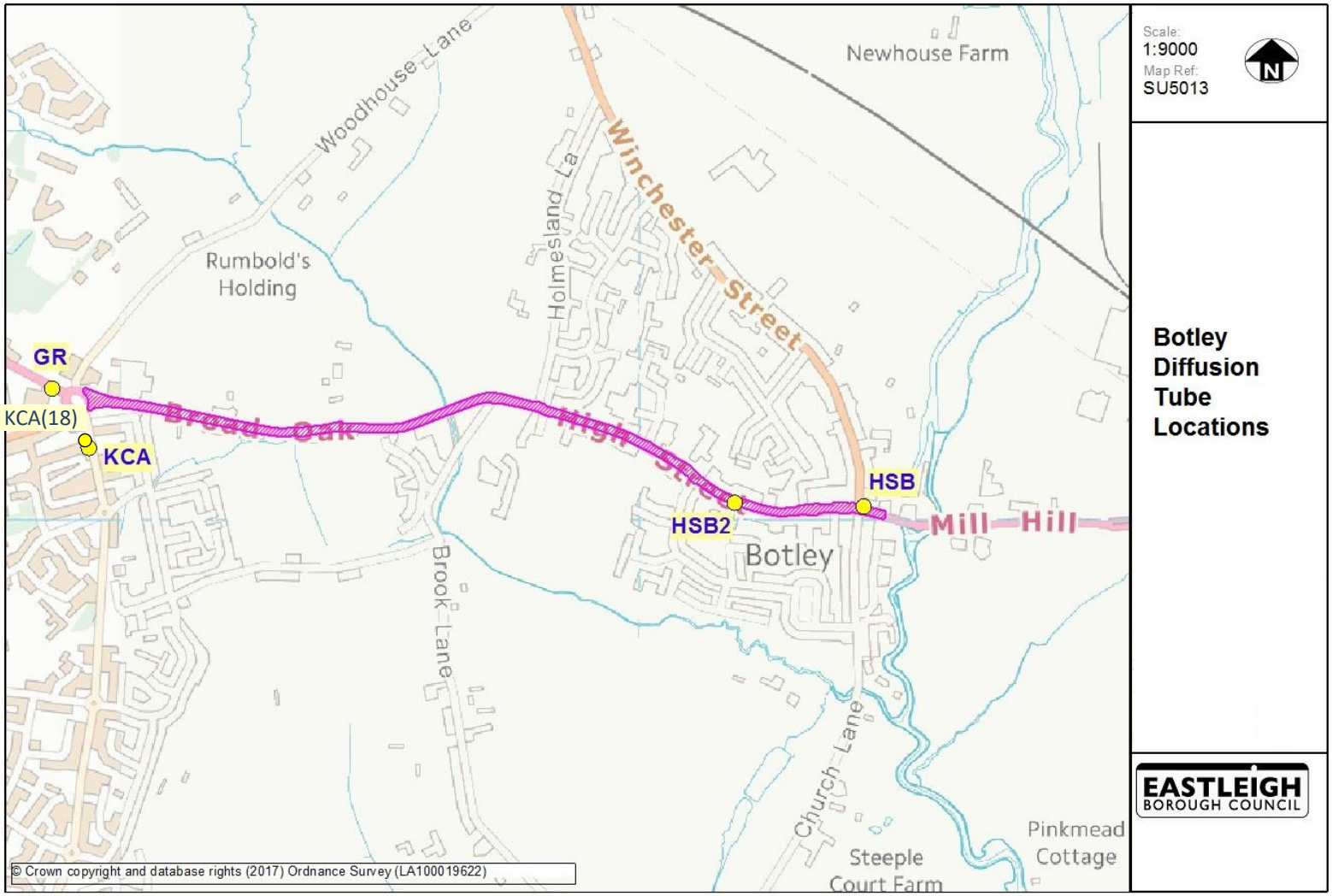
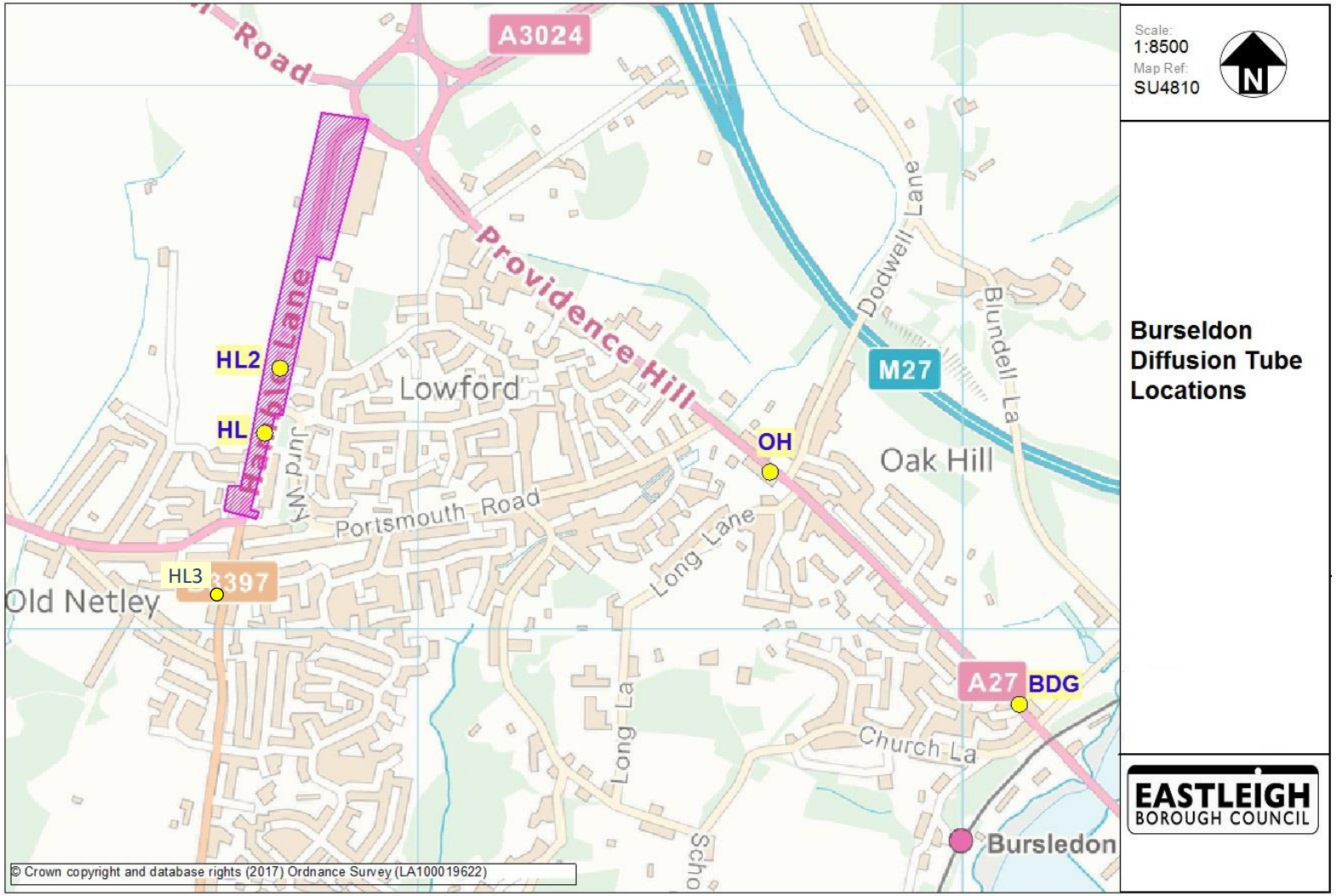


Figure 19 – Burseldon diffusion tube locations, Hamble Lane AQMA in purple shading.



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
EBC	Eastleigh Borough Council
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HCC	Hampshire County Council
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management
LAQM PG16	Local Air Quality Management Policy Guidance 2016
LAQM TG16	Local Air Quality Management Technical Guidance 2016
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
OLEV	Office for Low Emission Vehicles
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
SCC	Southampton City Council
SO_2	Sulphur Dioxide
SWR	South Western Rail