



WORTHING BOROUGH  
COUNCIL



## 2020 Air Quality Annual Status Report (ASR)

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

September 2020

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## Executive Summary: Air Quality in Our Area

### Air Quality in Worthing

#### **This report covers monitoring and action taken during 2019.**

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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

There is one Air Quality Management Area (AQMA) within the Worthing Borough: Worthing AQMA No.2 on the A27/A24 in Worthing, declared for exceeding the annual mean objective for Nitrogen Dioxide (NO<sub>2</sub>) of 40µg/m<sup>3</sup>.

Worthing Borough Council undertook automatic (continuous) monitoring of Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter PM<sub>2.5</sub> at an AURN (Automatic Urban and Rural Network) affiliated site at Grove Lodge Worthing (A27) during 2019. Non-automatic (passive) monitoring of NO<sub>2</sub> also took place at 34 sites across the Borough via the use of 36 diffusion tubes.

Monitoring results show the majority of these 34 sites registered a decrease in measured levels of NO<sub>2</sub> in 2019.

The continuous monitoring site at Grove Lodge recorded a decrease in the ratified annual mean from 36.8µg/m<sup>3</sup> in 2018 to 32.9µg/m<sup>3</sup> in 2019. As with previous years the hourly mean objective of 200µg/m<sup>3</sup> was not exceeded at any time during 2019.

Of the 36 tubes used in 2019, 33 recorded a decrease over 2018 levels. The reductions ranged from 0.8µg/m<sup>3</sup> to 11µg/m<sup>3</sup>. Three sites recorded small increases

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

ranging from  $1\mu\text{g}/\text{m}^3$  to  $6\mu\text{g}/\text{m}^3$ ; First Avenue, Downlands Parade and Steyne Gardens.

Only one monitoring site exceeded the annual mean objective of  $40\mu\text{g}/\text{m}^3$  during 2019; N30A Grove Lodge Cottages.

In addition no sites exceeded  $60\mu\text{g}/\text{m}^3$ , which is used as an indicator of a likely exceedance of the 1-hour mean objective at that site.

Last year we carried out a consultation on declaring the AQMA for an exceedance of the 1-hour mean objective of  $200\mu\text{g}/\text{m}^3$ , based on a single diffusion tube site at Grove Lodge Cottages exceeding an annual mean of  $60\mu\text{g}/\text{m}^3$ . We received just one response from an adjacent local authority, questioning why we were considering declaring exceedance of the 1-hour mean objective based on one single tube site. Defra, in their feedback from on last year's ASR raised the same point. The measured level at the tube site fell again in 2019, taking it below the  $60\mu\text{g}/\text{m}^3$  threshold. Therefore after consideration of these points, it has been decided not to progress with re-designation of the AQMA for exceedance of the 1-hour mean.

Recorded levels of  $\text{PM}_{2.5}$  showed the ratified measured level was  $9.9\mu\text{g}/\text{m}^3$ , again below the EU Limit Value of  $25\mu\text{g}/\text{m}^3$ .

Traffic data obtained from Highways England showed the volume of traffic on the A27 in 2019 increased over 2018 levels, whilst recorded levels of  $\text{NO}_2$  have decreased. As with last year we would hope that the actions listed in Section 2 are assisting the fall in measured levels, alongside the national trend towards a cleaner vehicle fleet.

It will be interesting to see if the downward trend in measured  $\text{NO}_2$  levels continues next year.

More information is available on our website at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/local-air-quality-management/#page-content>

## Actions to Improve Air Quality

The Council took forward a number of measures during 2019 in pursuit of improved air quality. These included commencing delivery of the Sussex-air Defra funded 'Clean Burn Sussex' project, to raise awareness of the health and environmental

impact of burning solid fuels and reduce emissions of particulates; completed delivery of the Sussex-air Defra funded schools intervention programme; continued use of the Sussex Air Quality Emissions Mitigation Planning Guidance and contributed as part of the project team revising and updating the Guidance; West Sussex County Council published their new Parking Standards which included for the first time a target for the provision of active and passive electric vehicle charging points; the Council declared a climate emergency and committed to reduce emissions associated with council services to zero by 2030; published a Staff Travel Action Plan in association with Sustrans; developed & launched 'easitAdur & Worthing' to council staff and local businesses; produced a Draft Local Cycling & Walking Infrastructure Plan (LCWIP); commissioned a Green Fleet Review from the Energy Saving Trust (DfT funded); approved the purchase of the first council electric vehicles; and erected new anti-idling signs at level crossings and traffic hotspots in the Borough. At the time of writing there was still no decision or update from Highways England following their 2017 public consultation on a "proposal to improve the A27 junctions at Worthing and Lancing."

## Conclusions and Priorities

Measured concentrations of NO<sub>2</sub> fell at the majority of monitoring sites and all but one were below the annual mean objective. Levels of PM<sub>2.5</sub> were also measured below the EU limit value.

Specific priority actions for 2020 include:

Commencing updated air quality modelling and source apportionment for the AQMA. This will help inform the revision of the current Air Quality Action Plan which will follow, in partnership with Highways England and West Sussex County Council; conclusion of the Defra grant-funded Clean Burn project through Sussex-air; publication of the final Local Cycling and Walking Infrastructure Plan (LCWIP); seek to further embed the Sussex Air Quality Planning Guidance within the planning regime; continue to work on establishing an Adur & Worthing Car Club; erect additional anti-idling signs at traffic hotspots as and where deemed appropriate, commence work on a further revision of the Sussex Air Quality Planning Guidance. A closer working relationship with Highways England, who are responsible for the A27, remains a priority.

There remains development pressure in the Worthing area. A large number of major developments have either been granted permission or are planned for the Borough, most being in or close to the Town Centre. There are also large developments planned for the adjacent Adur District which could impact upon Worthing. Balancing the demand for development with the need to improve (and certainly not worsen) air quality brings challenges. These developments also bring opportunities to improve infrastructure, especially for walking and cycling, and thus limit the impacts on the existing AQMA and avoid creating new hotspots.

## Local Engagement and How to get Involved

We engage with interested parties in the Borough, including community groups, elected members, transport planners, planning policy and development control. We are active members of the Sussex Air Quality Partnership (Sussex-air). The Partnership provides assistance to members and information to the public via their website with air quality data, news updates, educational resources, links and other services such as air Alert. See <http://www.sussex-air.net/> for more information.

There remain a number of large developments planned for Worthing, particularly in the town centre. There are also large developments planned for the adjacent Adur Borough which could impact upon Worthing. Balancing the demand for development with the need to improve (or not worsen) air quality will bring challenges. It is important to state that these developments also bring opportunities to improve infrastructure, especially for walking, cycling and public transport and thus limit the impacts on the existing AQMA and avoid creating new hotspots. Planned developments are discussed in Section 2 of this report.

The Council is always interested in hearing from residents who may have innovative ideas to reduce traffic congestion/air pollution in and around the Borough. You may contact us using our online form at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/local-air-quality-management/#have-your-say>.

Road vehicles produce over 50 per cent of the emissions of nitrogen oxides in the UK.

Before using your car, ask yourself:

- could I walk or cycle instead of taking the car?
- could I take a bus or train?
- are the levels of air pollution high today? (See our website for forecasts: <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/air-quality-monitoring/#airalert>)
- using quieter streets when you're on a bike or on foot can lower your exposure to air pollution by up to 20%.

If you must drive:

- drive smoothly and don't rev your engine unnecessarily. You'll save fuel, and your engine will also pollute less;
- maintain your car. Keep the engine properly tuned and the tyres at the right pressure; and
- turn off your engine when your car is stationary for prolonged periods, particularly at main junctions and level crossings. By not idling your engine you'll help to make the air cleaner for you, other drivers, pedestrians and cyclists.

At home:

- Buy water-based or low-solvent paints, varnishes, glues and wood preservatives.
- Half of all deliveries to workplaces are personal parcels for staff. By using pick-up points in corner shops or lockers in train stations you can help to reduce pollution from delivery vehicles.
- Open fires and wood-burning stoves have risen in popularity over recent years. This means we now see more smoke from chimneys, which has a negative effect on air quality. This can result in elevated particulate emissions and cause breathing problems, asthma attacks and contribute to other health conditions. Fuels such as wood and coal are permitted as long as the smoke from their combustion does not cause a statutory nuisance to neighbouring properties. However the use of inappropriate fuel can cause problems with local air quality.

The leaflet at the link below provides information for those that use wood burning stoves or open fires to reduce environmental and health impacts. By following its advice you can help to minimise the effect of your burning

<https://www.adur-worthing.gov.uk/media/media,149513,en.pdf>

- Try to avoid lighting bonfires. If you must have a bonfire only burn dry material and never burn household waste, particularly plastic, rubber, foam or paint. Levels of pollution can be quite high on bonfire night and other events/festivals with bonfires, and sensitive people, including people with respiratory conditions, may notice some effects. However exposure can be considerably reduced by remaining indoors and keeping windows closed. Further information is available on our website at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/bonfires-and-smoke/>.

Information on Air Quality, including reports and monitoring results, is available on our website at <https://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/>. Information is also available at <http://www.sussex-air.net/>.



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## 1 Local Air Quality Management

This report provides an overview of air quality in Worthing during 2019. 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 Worthing 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 Table E.1 in Appendix E.

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Worthing 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://www.adur-worthing.gov.uk/environmental-health/pollution/air-quality-and-pollution/local-air-quality-management/#local-aqma>.

There is also a full list of nationally declared AQMA's at <https://uk-air.defra.gov.uk/aqma/list>.

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 AQMA(s).

Last year we carried out a consultation on declaring the AQMA for an exceedance of the 1-hour mean objective of  $200\mu\text{g}/\text{m}^3$ . This was based on a single diffusion tube site at Grove Lodge Cottages exceeding an annual mean of  $60\mu\text{g}/\text{m}^3$ . Guidance states that any site recording levels greater than  $60\mu\text{g}/\text{m}^3$  risks exceeding the 1-hour mean objective of  $200\mu\text{g}/\text{m}^3$ . Defra appraisals of previous ASR's advised the Council to consider amending the existing AQMA to incorporate exceedance of the 1-hour mean objective for  $\text{NO}_2$ ; hence the consultation.

We received just one response from an adjacent local authority, questioning why we were considering declaring exceedance of the 1 hour mean objective based on one single tube site.

Feedback from Defra on last year's ASR raised the same point - *"The Council state that they wish to amend existing AQMA to incorporate exceedance of the 1-hour mean objective for  $\text{NO}_2$ . Though concentrations at N30A are above  $60\mu\text{g}/\text{m}^3$ , they only just exceed the AQOs (at  $60.1\mu\text{g}/\text{m}^3$ ) and concentrations have decreased by over  $8\mu\text{g}/\text{m}^3$  since 2017. Furthermore, concentrations at the continuous monitor opposite N30A show no exceedances of the 1-hour mean*

*objective for NO<sub>2</sub>. This suggests that it is unlikely that the 1-hour mean AQOs are being exceeded at N30A. However, should the Council still wish to amend the AQMA to incorporate the 1-hour mean objective for NO<sub>2</sub> then that is accepted.”*

Once again the continuous analyser on the opposite carriageway has recorded no exceedances of the one hour mean objective.

The measured level at the tube site fell again in 2019, taking it below the 60µg/m<sup>3</sup> threshold.

Therefore after consideration of these points, it has been decided not to progress with re-designation of the AQMA for exceedance of the 1-hour mean.

**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) µg/m3		Action Plan		
						At Declaration	Now	Name	Date of Publication	Link
Worthing Borough Council AQMA No. 2	Declared 13/07/2010, Amended 15/12/2014	NO2 Annual Mean	Worthing	Crockhurst Hill, Offington Corner Roundabout, Warren Road, Grove Lodge Roundabout, Upper Brighton Road up to and including the Downlands Retail Centre and Lyons Way	YES	71.5	55.7	Worthing Air Quality Action Plan	November 2015	<a href="https://www.adur-worthing.gov.uk/media/media,138133,en.pdf">https://www.adur-worthing.gov.uk/media/media,138133,en.pdf</a>

**Worthing 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 Worthing

Defra's appraisal of last year's ASR stated that the conclusions reached are acceptable for all sources and pollutants.

The following comments were made which have been noted and where necessary actioned.

- 1. The Council state that they wish to amend existing AQMA to incorporate exceedance of the 1-hour mean objective for NO<sub>2</sub>. Though concentrations at N30A are above 60µg/m<sup>3</sup>, they only just exceed the AQOs (at 60.1µg/m<sup>3</sup>) and concentrations have decreased by over 8µg/m<sup>3</sup> since 2017. Furthermore, concentrations at the continuous monitor opposite N30A show no exceedances of the 1-hour mean objective for NO<sub>2</sub>. This suggests that it is unlikely that the 1-hour mean AQOs are being exceeded at N30A. However, should the Council still wish to amend the AQMA to incorporate the 1-hour mean objective for NO<sub>2</sub> then that is accepted. This is discussed in more detail within this report.*
- 2. The report provides a link to the AQMA boundary however the monitoring locations are not shown at this link. It would be beneficial for the Council to include a map of the AQMA boundary within the ASR and also have the monitoring locations plotted on the map. Noted.*
- 3. The Council have co-located tubes; therefore, it is not understood to why the Council use the national bias adjustment factor. It is recommended that the Council utilise their co-located tubes and calculate a local bias adjustment factor. If the local factor is lower than that of the national factor then the Council may use the national factor to provide a more conservative assessment. The calculated local factor was lower than the national factor, so we have used the national factor this year.*
- 4. It is strongly recommended that the Council review and publish their new AQAP in 2020 so that they adhere to the 5-year AQAP turnover period recommended by Defra. The AQAP is scheduled to be reviewed in 2021.*
- 5. Overall the report is detailed, concise, satisfies the criteria of relevant standards and can be considered an example of good practice. The Council should continue their good work and submit an Annual Status Report in 2020.*

Worthing Borough Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

1. Commenced delivery of the Sussex-air Defra funded 'Clean Burn Sussex' project. This was designed to raise awareness of the health and environmental impact of burning solid fuels such as wood and coal and encourage people to choose cleaner, more efficient fuels and ultimately reduce emissions of particulates, particularly PM<sub>2.5</sub>. We assisted in the production of new webpages on the Sussex-air website to raise awareness <https://sussex-air.net/Cleanburn/clean-burning.aspx>. We also promoted a clean burn survey to gather information on wood burning in Adur & Worthing - including information on the type of appliances used, the types of fuel used and whether these were used as primary sources of heating or simply recreational use. The results will be reported in the 2021 ASR.
2. Completed delivery of the Sussex-air Defra funded schools intervention programme. The project employed Sustrans to deliver a six week programme in primary schools. The project aimed to raise awareness of air quality issues with small groups of pupils who then presented their findings to the wider school community. A Sustrans Air Quality officer engaged with new schools and those already working with Sustrans to investigate local air quality. Living Streets ran one day anti-idling events outside the schools to tie in with the Sustrans work. Worthing primary schools participating were Bramber Primary School, Thomas A Becket Infant School and Thomas A Becket Junior School. The local business aspect was not completed because of a lack of businesses engaging with the project. As a result, the funding intended for local business was diverted to the schools engagement part of the project.
3. We continued to use the Sussex Air Quality Emissions Mitigation Planning Guidance as part of the planning process. All 'major' planning applications are required to follow the guidance and produce an Emissions Mitigation Assessment, looking at transport emissions from a proposed development and determining the level (cost) of mitigation required to help reduce (offset) the



potential effect on health and/or the local environment. The approach is quite novel and Sussex authorities are attempting to push for this approach as the norm. We have negotiated with developers to ensure appropriate mitigation is provided. The guidance is signposted within the Adur Local Plan. We also continued to work with planning colleagues at both Borough and County level to ensure air quality is highlighted during pre-application discussions with developers, with the aim of incorporating appropriate mitigation into the design of schemes.

4. Contributed as part of the project team to a revision of the Sussex Air Quality & Emissions Mitigation Guidance for Planning. Publication of the revised document, which had a greater emphasis on the provision of appropriate mitigation, was delayed until early 2020.
5. West Sussex County Council published their new Parking Standards - [https://www.westsussex.gov.uk/media/1847/guidance\\_parking\\_res\\_dev.pdf](https://www.westsussex.gov.uk/media/1847/guidance_parking_res_dev.pdf). This includes a target for the provision of active and passive electric vehicle charging points in parking spaces with the percentage allocated to eV's increasing year on year.
6. Worthing Borough Council declared a climate emergency and committed to reduce carbon (and other) emissions associated with council services to zero by 2030.
7. Publication of a Staff Travel Action Plan, working in association with Sustrans, and set up a Travel Action Plan working group to assist in delivering this Plan (improved bike secure parking and cycling facilities, e.g. at Commerce Way, provide Donkey Bikes for staff business travel, have a Cycle Day to promote cycling, promote walking to staff through Well@work).
8. Established a new cycle to work scheme for staff (with SODEXO) to make environmentally travel easier for staff.
9. Developed & launched 'easitAdur & Worthing' to council staff and businesses in March 2019. 17 organisations signed up representing. Businesses signed up to date:
  - AIG Europe Ltd
  - Adur & Worthing Councils

- Colonnade House
  - Emerald Finance Ltd
  - Equiniti Group
  - Greater Brighton Metropolitan College
  - GSK
  - Higgidy Limited
  - Infinity Foods Co-operative Ltd
  - Mosaic Online Systems
  - Paper Round South East
  - Pier 2 Pier Care Services Limited
  - Pitch Publishing Limited
  - Sussex Partnership NHS Foundation Trust
  - The Proto Restaurant Group
  - West Sussex County Council
  - Western Sussex Hospitals NHS Foundation Trust (Worthing and Southlands Hospitals)
10. Produced a Draft Local Cycling & Walking Infrastructure Plan (LCWIP). Sustrans were contracted to deliver this, working with the Council, West Sussex County Council and a stakeholder group 'A&W Walking and Cycling Action Group'. The draft was approved for consultation in November 2019.
11. Commissioned a Green Fleet Review from the Energy Saving Trust (DfT funded)
12. Approved the purchase of the first council electric vehicles (3 electric vans for environmental services)
13. Delivering new salary sacrifice schemes for bicycles (SODEXO) and low emission vehicles (Tusker). This aims to make environmentally travel easier for staff.
14. An Active Travel Day was held to promote active and low carbon travel. Plans were made to decarbonise business travel through switching the current pool car fleet to hybrid vehicles and increase cycling provision at council sites.
15. Two documents were developed from consultancies Energy Saving Trust and CLS - with no charge to the council - to review the business travel from civic buildings, and switching the corporate fleet to ultra-low emission vehicles.

16. At the time of writing there was still no decision or update from Highways England following their 2017 public consultation on a “proposal to improve the A27 junctions at Worthing and Lancing.”
17. An Adur & Worthing Car Club is awaited. Work had been ongoing with a delivery partner, but progress had been slow.
18. New anti-idling signs were erected at level crossings in South Farm Road Worthing and South Street, West Worthing. These were funded by Sussex-air and produced by WSCC. Worthing Borough Council erected smaller anti-idling signs at Lyons Farm, a traffic hotspot within the AQMA, in a bid to try and persuade vehicle drivers to switch off whilst waiting in queuing traffic.

Worthing Borough Council expects the following measures to be completed over the course of the next reporting year:

- Embark on updated air quality modelling and source apportionment for the AQMA. This will help inform a revised Air Quality Action Plan.
- Embark on a revision of the Worthing Air Quality Action Plan in partnership with Highways England and West Sussex County Council.
- Publish the final Local Cycling and Walking Infrastructure Plan (LCWIP).
- Completion of the Sussex-air Defra grant funded ‘Clean Burn’ project in Worthing.
- Further embed the Sussex Air Quality Planning Guidance within the planning regime in Worthing.
- Provision of a Car Club, to reduce single car ownership and facilitate new developments with reduced parking, particularly but not exclusively within Worthing Town Centre.
- Erect additional anti-idling signs at traffic hotspots as and where deemed appropriate, to try and persuade vehicle drivers to switch off whilst waiting;
- Commence work on a further revision of the Sussex Air Quality Planning Guidance.
- A better, closer working relationship with Highways England, who are responsible for the A27, remains a priority.

The principal challenges and barriers to implementation that Worthing Borough Council anticipates facing are

- There remains development pressure in the Worthing area. A large number of major developments have either been granted permission or are planned for the Borough, most being in or close to the Town Centre. Balancing the demand for development with the need to improve (and certainly not worsen) air quality brings challenges. These developments also bring opportunities to improve infrastructure, especially for walking and cycling, and thus limit the impacts on the existing AQMA and avoid creating new hotspots.

The only allocated site of any significant scale in Worthing is the West Durrington Development (700 dwellings) which is nearing completion. Phase 2, for a further 240 dwellings, has been approved subject to the signing of a Legal Agreement.

The draft Worthing Local Plan published for consultation at the end of 2018 included the following allocations:

- Caravan Club - 75 dwellings
- Land West of Fulbeck Ave - 50+ dwellings
- Land at Upper Brighton Rd - 123 dwellings
- Decoy Farm - employment uses
- Teville Gate - 300 dwellings and mixed uses
- Union Place - 128 dwellings and mixed uses
- Grafton - 113 dwellings and commercial uses
- Worthing Civic Centre Car Park - 64 dwellings and a health hub.

It should be noted that the capacity assumptions for a number of the sites listed above are likely to increase when the Submission version of the Worthing Local Plan is published for consultation at the end of 2020.

The site at Upper Brighton Road is in close proximity to the AQMA. In addition, the Draft Plan included three Omission sites which may be included in the

Submission version of the Plan if the identified constraints can be overcome. Two of these (Land north of Beeches Ave (112 dwellings) and Worthing United FC (60 dwellings) are also located in close proximity to the AQMA.

- Development pressures in neighbouring Adur District could also have an effect on traffic volumes in Worthing, particularly on the A27 and within the AQMA.
- Providing sufficient resources (financial and personnel) in order to progress and deliver effective air quality measures.
- Identifying suitable sites for the provision of car club spaces alongside sufficient funding, particularly away from new developments.
- Identifying suitable sites for the installation of electric vehicle charge points remains an issue. Working in partnership with WSCC is vital at certain locations. Identifying sufficient funding is often an issue and sound business cases must be put forward before any commitments are made by elected Members;
- The provision of additional low emission vehicles into the Council's pool car fleet will depend on funding and suitable vehicles being available. At present electric vehicles are not part of the fleet due to the lack of eV charge points at Council sites.
- Engagement with Highways England has continued to be rather intermittent, so we aim to continue to try to work with them in order to deliver the Action Plan. This does however rely on Highways England engaging with us.

Progress on the following measures has been slower than expected due to:

- A27 Highway Improvements have not been forthcoming. These are the responsibility of Highways England and a decision on the way forward has still not been published. Improvements to the A27 present the largest opportunity for traffic emission reduction.
- LEZ/CAZ feasibility – This is linked to the aforementioned highway improvements. As this is a Highways England road such schemes would require Highways England approval/funding; enforcement is also an issue.

There are currently no plans to look into these schemes in the foreseeable future and therefore we plan to review this action when we review the Action Plan commencing 2021.

- The provision of a local car club has been delayed, primarily due to the allocation of appropriate parking space for any car club vehicles. We anticipate this being resolved in 2020.
- The provision of additional low emission vehicles into the Council's pool car fleet was delayed due to the lack of EV charge points at Council sites. We are seeking to address this in 2020.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Worthing Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Worthing Borough Council AQMA No.2. We plan to commence a review of the Air Quality Action Plan in 2021 when existing measures will be reviewed and amended and new measures added where necessary.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	A27 Highway Improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2015	HE	HE	Reduction in levels of NO2	High	Consultation by Highways England on one option ("to improve the A27 junctions at Worthing and Lancing") took place during Summer 2017. A decision about the A27 Worthing-Lancing has still not been announced.	TBC	Still awaiting outcome from Highways England. Estimated completion date now unknown. No AQ assessment included in consultation, so any AQ benefits remain unquantified by HE.
2	Cut Engine, Cut Pollution Signs	Traffic Management	Anti-idling enforcement	2016-18	HE/WSCC	WBC/HE/WSCC	Local AQ monitoring/reduction in NO2	Low/Med	AQMA anti idling signs erected on exit road from Lyons Farm. Additional signs erected at level crossings in Worthing and other known traffic hotspots.	Ongoing	Funded by Worthing BC. Sussex-air funded additional signs at level crossings. For A27 and feeder roads Highway 'clutter' is a concern.
3	LEZ/CAZ Feasibility	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2016	HE/WBC/WSCC	HE	Reduction in older Euro class HGV's/LGV's and buses within the AQMA	High	No progress. Outcome of A27 consultation delaying further discussion	Unknown	As a HE road any CAZ/LEZ is an issue. Issues with displacement of vehicles onto surrounding local roads, Finance, Enforcement - meaning this is not a current priority.
4	Embed Air Quality Emissions Mitigation Planning Guidance for Sussex into the planning process/planning policies	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014	WBC/WSCC	WBC/WSCC	LE mitigation secured in developments	Low	Revised Guidance due for publication January 2020. Guidance signposted within the draft Worthing Local Plan. Discussions to ensure Guidance and appropriate mitigation is flagged as a requirement at an early stage. Emission mitigation assessments being pursued with developers to ensure meaningful mitigation obtained. Walking and cycling initiatives and eV charge points secured at developments.	Ongoing	To consider developing the Guidance into a Supplementary Planning Document.
6	EV vehicles and infrastructure	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2016/18	WBC/WSCC	HE/WSCC/WBC	Number of charge points provided	Low/Med	EV charge points continue to be negotiated for new 'major' developments; new WSCC parking strategy sets minimum targets for ev charge points on new developments; WSCC Electric Vehicle Strategy published Dec 2019: <a href="https://www.westsussex.gov.uk/roads-and-travel/travel-and-public-transport/travelwise-sustainable-transport/electric-vehicles/">https://www.westsussex.gov.uk/roads-and-travel/travel-and-public-transport/travelwise-sustainable-transport/electric-vehicles/</a> Discussions continue with developers as part of AQ mitigation packages. Local authorities are in dialogue with bus operators to consider funding opportunities as and when they arise.	2025	Focus is to increase the number of eV's. Discussions continued successfully with developers as part of AQ mitigation packages.
7	Worthing Car Club	Alternatives to private vehicle use	Car Clubs	2015-19	WBC/ADC	WBC/ Developer contributions	Number of people using the service/Number of vehicles available	Low	Discussions with WSCC and car club providers continued during 2019, looking at both on street and off street spaces. Pool car providers continued discussions with developers.	2020	V. small reduction in AQMA, however larger reductions can be anticipated elsewhere (e.g. town centre). Principle of car clubs embedded in new major/large developments
8	Public transport improvement	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Ongoing	WSCC	WSCC/DfT/OLE V	Journey time and passenger number improvements	Low	Through the current Worthing Town Centre Public Realm Improvements design work, Worthing Road Space Audit and Worthing Area Sustainable Transport Package Feasibility Studies work, it is expected that improvements in access	Ongoing	Subject to appropriate funding being made available.

									to/from public transport gateways will be developed in Worthing. Bus operators in West Sussex are considering low emission fuel technologies in their fleets and local authorities are in dialogue with operators as plans develop, including consideration of any future funding opportunities		
9	WBC AND WSCC Staff Travel Planning	Promoting Travel Alternatives	Workplace Travel Planning	2018/19	WBC/ADC/WSCC	WBC/ADC/WSCC	Staff travel surveys reduced commuting and business travel by car	Low	Adur & Worthing EASIT scheme for staff and local businesses continues. WSCC EASIT scheme already exists. Staff car allowances under review.	Ongoing	Focus on reducing staff car journeys for work and promoting sustainable travel for trips to and from work including alternatives to car travel.
10	Improve Emissions from Council's Vehicle fleet	Promoting Low Emission Transport	Company Vehicle Procurement	2015	WBC/ADC/WSCC	WBC/WSCC	No. of vehicles replaced with better Euro standard models	Low	Programme of fleet replacement with low emission/ev/hybrid vehicles as and when they are due for replacement. All pool cars now hybrids.	Ongoing	Council to demonstrate leadership. Low reduction within AQMA
11	Increase availability of AQ information in relation to impacts on Public Health	Public Information	Via the Internet	2015	WBC	WBC	Reduction in levels of NO2/No. of hits on AQ pages	Low	AQ information updated on WBC and WSCC websites.	Ongoing	Measure success of AQAP/levels in AQMA. Assist with PM2.5 strategy
12	Embedding AQ in Adur & Worthing Public Health Plan	Policy Guidance and Development Control	Other policy	2015	WBC	WBC	Inclusion in each revision of public Health Plan	Low	Air Quality Action Plans included within Adur & Worthing Public Health Plan.	Ongoing	Ensure AQAP is given added weight and priority.
13	Promotion of Air Alert	Public Information	Via the Internet	2014	WBC	WBC/WSCC	Annual increase in subscriber numbers	Low	Liaison with West Sussex County Council Public Health & Sustainability teams who have supported the promotion of air Alert - www.airalert.info - through financial backing and supporting publicity in West Sussex.	Ongoing	Attempt to reduce car journeys/increase walking and cycling particularly through the AQMA, promotion of air Alert service.
14	Re-assess traffic light sequencing in AQMA	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	HE/WSCC	HE/WSCC	Reduction in levels of NO2	Low	Ongoing optimisation by HE/WSCC.	Ongoing	
15	Safe Cycling and Walking Routes	Transport Planning and Infrastructure	Cycle network	Ongoing	WSCC/HE	HE/WSCC	Length of new cycle routes provided	Low	The Draft Adur and Worthing Local Cycling and Walking Infrastructure Plan (LCWIP) was published for consultation in Nov 2019. The Walk To project continued. The Sussex-air schools project promoted walking and cycling working with local primary schools. Design work is taking place on a number of cycle route improvements in and around Worthing under the West Sussex Walking & Cycling Strategy. Additional improvements to walking and cycling routes are being explored through the LCWIP and the development of the Worthing Area Sustainable Transport Package Study during 2019/20.	Ongoing	There already exist cycle paths segregated from pedestrians in and around Grove Lodge.
16	Travel plans for significant/major developments	Promoting Travel Alternatives	Other	2015	WSCC/WBC	Developer contributions	Number of plans delivered	Low	Plans continue to be secured as and when developments come forward. The Draft Local Plan adds weight to the requirement for travel plans.	Ongoing	Forthcoming Worthing Local Plan will add weight to need for travel plans and appropriate mitigation.
17	Car Sharing	Alternatives to private vehicle use	Car & lift sharing schemes	2015	WSCC	WSCC	Website hits/ journeys planned/Number of registrants/ take-up of initiatives	Low	Car share website now <a href="https://liftshare.com/uk/community/westsussexcarshare">https://liftshare.com/uk/community/westsussexcarshare</a>	Ongoing	Focus on promoting sustainable travel/car. Link on Worthing website.



19	Cycling & Walking promotion	Promoting Travel Alternatives	Promotion of cycling	2015	WSCC/WBC	WSCC/ Developer contributions	Automatic cycle counters and travel surveys	Low	The Draft Adur and Worthing Local Cycling and Walking Infrastructure Plan (LCWIP) was published for consultation in Nov 2019. The Walk To project continued. The Sussex-air schools project worked with Sustrans and Living Streets on the walk/cycle to school theme.	Ongoing	Focus on reducing traffic congestion and promoting sustainable travel for trips to and from work. Subject to available funding.
20	WSCC staff travel planning	Promoting Travel Alternatives	Workplace Travel Planning	2014	WSCC	WSCC		Low	Pool cars provided for casual user staff including EV's.	Ongoing	Renault Zoe's added in 2018.
21	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	Ongoing	WSCC	WSCC		Low	Schools are directed to Modeshift Stars for assistance with travel planning, which is a nationally recognised online travel planning tool. Sussex air project working with Primary schools in Worthing influenced travel patterns to/from school, promoting walking and cycling and led to increases of up to 60% in active travel.	Ongoing	Focus on promoting sustainable travel amongst young people and reducing peak time car traffic. WSCC Bikeability has been engaging with primary and secondary schools across Worthing to offer cycle training. The Sussex-air/Defra funded project is hoped to have influenced school travel plans.
22	Business Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	2017	WBC	WBC/WSCC/ Developer contributions	No. of plans devised/revised	Low	Defra AQ grant project via Sussex-air for business fleet advice was unsuccessful. Uptake by businesses in Sussex was v poor, so project was shelved.	Ongoing	Resource issues remain; Questions over whether LGV's should be prioritised over HGV's? A Source Apportionment update will inform this.
23	Worthing College Travel Plan Review	Promoting Travel Alternatives	School Travel Plans	2015/16	WBC/WSCC	Worthing College	Reduction in use of private cars for trips to/from College/ Increase in use of alternative modes of travel	Low/Med	Review completed 2018.	Ongoing	No further updates
24	HGV/LGV assessment	Transport Planning and Infrastructure	Route Mgt plans/Strategic routing for HGV's	2016/17	WBC	WBC/WSCC	Data on Euro Classes	Low	Defra AQ grant project via Sussex-air for business fleet advice was unsuccessful. Uptake by businesses in Sussex was v poor, so project was shelved.	2020/21	The next Source Apportionment Update will identify the proportion of HGV's/LGV's and the weighting to be applied to HGV/LGV actions.
25	Ecostars for Local Fleet Operators	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2016/17	WBC	WBC	Increase in new euro Class vehicles	Low/Med	Defra AQ grant project via Sussex-air for business fleet advice unsuccessful. No further updates.	Revised 2022?	The Ecostars scheme remains an aspiration, but is subject to identification of suitable funding streams.
26	Increase and improve availability of WBC Air Quality Monitoring results	Public Information	Via the Internet	2015	WBC	WBC	Reduction in levels of NO2/No. of hits on AQ pages	Low	Link to UK Air for Grove Lodge AURN monitoring; Diffusion tube results placed on website after Bias correction factors made available.	Ongoing	Revision of webpages planned

## 2.3 PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Worthing Borough Council continues to develop its approach to address PM<sub>2.5</sub> in partnership with West Sussex Public Health and other Sussex local authority officers through Sussex-air. The Clean Burn campaign, funded through the Sussex-air Defra funding, ran through 2019 and into 2020, in an attempt to reduce particulate emissions from domestic burning. The results will be reported in next year's ASR.

We have updated domestic burning guidance on our website linking to the Clean Burn campaign.

The Council has considered the declaration of Smoke Control Areas. However there are considerable barriers to this, most notably associated with non-compliant stoves and fireplaces existing at the time of any declaration. This would also require political and public support.

Adur & Worthing Councils monitor levels of PM<sub>2.5</sub> through an AURN affiliated continuous monitoring station at Grove Lodge, Worthing (A27), which will assist us with assessing any PM<sub>2.5</sub> issue in the area. The annual mean for PM<sub>2.5</sub> in Worthing in 2019 was 9.9µg/m<sup>3</sup>.

Work carried out by Public Health England as part of the Public Health Outcomes Framework (PHOF) shows that the mortality associated with particulate air pollution within Worthing Borough Council is 4.3 %.

Figure 2-1 shows that the mortality calculated for Worthing Borough Council is less than that calculated for south east England (4.9 %) and England (5.1 %) as a whole.

**Figure 2-1 Fraction of mortality attributed to particulate air pollution in Worthing Borough Council**



## 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.

Worthing Borough Council undertook automatic (continuous) monitoring at one site during 2019. The site is AURN affiliated. Table A.1 in Appendix A shows the details of the site. National monitoring results are available at <https://uk-air.defra.gov.uk/>.

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

It is important to note that the national air quality objectives apply to sites where there is 'relevant exposure'. These tend to be the facades of residential premises, schools etc. and do not cover scenarios such as passing pedestrians. Therefore measured levels are often predicted back to represent the nearest relevant exposure using standard prediction methods and tools published by Defra.

#### 3.1.2 Non-Automatic Monitoring Sites

Worthing Borough Council undertook non-automatic (passive) monitoring of NO<sub>2</sub> at 34 sites using 36 diffusion tubes during 2019. Table A.2 in Appendix A shows the details of the sites.

Three new sites were added in 2019:

- N63 New Broadway, Tarring Rd
- N64 South Street, outside Starbucks
- N65 Teville Road (opposite Unleashed)

These replaced three sites removed:

- N55 Varey Road / Fulbeck Avenue – a suburban site where levels measured over 3 years were less than 20µg/m<sup>3</sup> each year.

- N58 Yeoman Road – a kerbside site where levels over three years were consistently around 25µg/m<sup>3</sup>.
- N60 Ham Road / Lyndhurst Road – a roadside site where levels measured last year were below 25µg/m<sup>3</sup>.

Maps showing the location of monitoring sites are provided in Appendix D. Scalable maps are also available at <https://www.adur-worthing.gov.uk/maps/general-map/> (tick the Air Quality Management Areas box to the left side of the map).

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<sup>4</sup>, “annualisation” (where the data capture falls below 75%), and distance correction<sup>5</sup>. Further details on adjustments are provided in Appendix C.

### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

Monitoring results show the majority of monitoring sites registered a decrease in measured levels of NO<sub>2</sub> in 2019.

<sup>4</sup> <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

<sup>5</sup> Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

The continuous monitoring site (WT2) at Grove Lodge recorded a decrease in the ratified annual mean from  $36.8\mu\text{g}/\text{m}^3$  in 2018 to  $32.9\mu\text{g}/\text{m}^3$  in 2019.

Of the 36 tubes used in 2019, 33 recorded a decrease over 2018 levels. The reductions ranged from  $0.8\mu\text{g}/\text{m}^3$  at site N45 11 Hill Barn Lane to  $11\mu\text{g}/\text{m}^3$  at site N24 152 Upper Brighton Road.

Only three sites recorded an increase – N5  $2.7\mu\text{g}/\text{m}^3$ , N29  $6\mu\text{g}/\text{m}^3$  and N62  $1\mu\text{g}/\text{m}^3$ .

Only one monitoring site exceeded the annual mean objective of  $40\mu\text{g}/\text{m}^3$  during 2019 – N30A Grove Lodge Cottages.

In addition no sites exceeded  $60\mu\text{g}/\text{m}^3$ , which is used as an indicator of a likely exceedance of the 1-hour mean objective at that site.

The automatic monitoring site WT2 at Grove Lodge is an AURN affiliated site and is located adjacent to the A27, a strategic trunk route through Worthing where traffic speeds tend to be low for prolonged periods during the day. Annual average  $\text{NO}_2$  peaked at  $51.4\mu\text{g}/\text{m}^3$  in 2014, decreased in 2015 and increased significantly in 2016 to  $48\mu\text{g}/\text{m}^3$ . It decreased again in 2017 and increased slightly in 2018, but was still below the  $40\mu\text{g}/\text{m}^3$  objective. Levels fell in 2019 to just under  $33\mu\text{g}/\text{m}^3$ . The nearest relevant receptor (a residential facade) is 18m away, meaning the level at the facade reduces further still.

As with 2018 the hourly mean objective of  $200\mu\text{g}/\text{m}^3$  was not exceeded at any time during 2019.

It would appear the increased levels recorded in 2016 may have been an anomaly as they have not been repeated since.

Site N30A Grove Lodge Cottages has always recorded the highest levels from any of our monitoring sites. In 2019 measured levels reduced again, this time from  $60.1\mu\text{g}/\text{m}^3$  in 2018 to  $56.6\mu\text{g}/\text{m}^3$ . This is the first time measured levels have been recorded below  $60\mu\text{g}/\text{m}^3$ . This site is adjacent to the westbound carriageway of the A27 and is just over 2m from a residential facade so the level only decreases slightly when predicted back ( $55.7\mu\text{g}/\text{m}^3$ ). However it continues the downward trend of recent years.

The tubes N44A/B/C collocated with the continuous monitor recorded a reduction in levels to bring them below  $40\mu\text{g}/\text{m}^3$ , with the average of the three being  $36.1\mu\text{g}/\text{m}^3$ . Predicted back to the nearest façade levels drop to  $24.7\mu\text{g}/\text{m}^3$ .

All of the monitoring locations within the AQMA measured reductions in the annual mean for 2019 and all were below the national objective, which compares favourably with 2018 when two sites recorded exceedances.

Last year site N24 (within the AQMA, close to Lyons Farm on the A27) recorded the largest increase in recorded levels, jumping by  $8.6\mu\text{g}/\text{m}^3$  to  $34.5\mu\text{g}/\text{m}^3$ . This year it has produced the largest recorded fall,  $11\mu\text{g}/\text{m}^3$  to  $23.5\mu\text{g}/\text{m}^3$ . This is a return to the levels seen prior to 2018. We do not know the reasons for the elevated level in 2018, however the reduction is welcomed and suggests the 2018 figure may have been an anomaly.

Site 6N Gainsborough Avenue showed a reduction again. In 2016 this roadside site exceeded the annual mean objective ( $40.7\mu\text{g}/\text{m}^3$ ). In 2019 it fell by a further  $2\mu\text{g}/\text{m}^3$  to  $33.1\mu\text{g}/\text{m}^3$ . The closest receptor is 11m away, so this level falls further when predicted back.

Levels at site N29 Downlands Parade, close to the Lyons Farm junction of the A27, have been decreasing over recent years. However in 2019 levels increased by  $6.3\mu\text{g}/\text{m}^3$  after a fall of almost  $9\mu\text{g}/\text{m}^3$  in 2018. Despite this increase, the level of  $29.9\mu\text{g}/\text{m}^3$  remains below the annual mean objective, but is a site we will watch with interest.

Site N57 Lyndhurst Road near the former gas holder site was identified in our 2013 Further Assessment as being a potential site of exceedance. However levels continue to fall with the result in 2019 being  $23.4\mu\text{g}/\text{m}^3$ , a drop of  $1.6\mu\text{g}/\text{m}^3$  and well below the annual mean objective. We shall continue to monitor any changes as a number of major developments remain planned for the vicinity.

The other monitoring sites added in 2018 recorded levels below the annual mean objective with site N61 Broadwater Street West falling by  $2\mu\text{g}/\text{m}^3$  to  $34.8\mu\text{g}/\text{m}^3$ . This is a kerbside monitoring location with the closest relevant receptor 4m away, so levels fall further when predicted back.

The monitoring sites added in 2019 all recorded levels below  $30\mu\text{g}/\text{m}^3$ , comfortably below the annual mean objective.



5 year trend graphs are included in Appendix A.

Traffic data has again been obtained from Highways England. The table below shows Annual Average Daily Traffic (AADT) data for 2016 - 2019 for both carriageways of the A27 near Grove Lodge. Interestingly the volume of traffic has increased over 2018 levels, whilst recorded levels of NO<sub>2</sub> have decreased. As with last year we would hope that the actions listed in Section 2 are assisting the fall in measured levels, alongside the national trend towards a cleaner vehicle fleet.

Increased awareness of air quality and the climate change agenda is likely to driving people to change their behaviour – low emission vehicles, cycling and walking, eco-friendly driving, etc. It is also likely that local traffic is avoiding the AQMA as it suffers from severe congestion during large parts of the day, including weekends.

NTIS Link ID	NTIS Link Location Name	AADT 2016	AADT 2017	AADT 2018	AADT 2019	Difference 2018-19
103024103	A27 westbound between A2025 and A24 near Worthing (east)	15,334	14,511	14,994	16,354	+1,360
125021201	A27 eastbound between A24 near Worthing (east) and A2025	18,454	15,849	15,527	16,642	+1,115

### 3.2.2 Particulate Matter (PM<sub>2.5</sub>)

**Table A.5** in Appendix A presents the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past 2 years.

This is our second full year of PM<sub>2.5</sub> monitoring at this location. The recorded and ratified level was 9.9µg/m<sup>3</sup>. This is comfortably within the EU Limit Value of 25µg/m<sup>3</sup>. It also meets the World Health Organisation (WHO) annual mean guideline limit of 10µg/m<sup>3</sup> (which is not a legal limit in the UK).

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## Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
WT2	Grove Lodge	Roadside	514184	104963	NO <sub>2</sub> ; PM <sub>2.5</sub>	YES	Chemiluminescence	18.3	2.9	1.8

**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 (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
4N	Heene Way (UK02)	Urban Background	513609	102556	NO2	NO	5.3	1.7	NO	1.5
5N	Cleveland Road (UK01)	Urban Background	512701	105562	NO2	NO	6.2	2.5	NO	2.0
6N	Gainsborough Avenue (UK06)	Roadside	515190	105122	NO2	NO	11.2	1.8	NO	2.0
N1C	High Street East	Urban Centre	515114	102670	NO2	NO	0.0	3.3	NO	2.0
N5	First Avenue	Roadside	514495	105020	NO2	NO	15.2	2.2	NO	1.5
N8	Littlehampton Road	Roadside	513236	104651	NO2	NO	14.1	1.5	NO	3.5
N11	Dawes Close	Urban Background	515812	103309	NO2	NO	8.4	1.4	NO	1.5
N18A	Kinnall Court, Upper Brighton Road	Suburban	515315	105141	NO2	NO	0.0	12.0	NO	2.0
N21	Greenwood Cottage, A27	Roadside	509777	105696	NO2	NO	7.3	6.5	NO	3.0
N22	Falmer Close, C-Dust monitor	Urban Background	511010	102226	NO2	NO	14.6	2.2	NO	1.5
N24	152 Upper Brighton Road	Roadside	515151	105109	NO2	NO	0.0	8.0	NO	2.0
N25	Warren Court House	Suburban	513845	105191	NO2	NO	0.0	17.3	NO	2.0
N27	Tarring Road, Crossing	Roadside	513380	103352	NO2	NO	0.0	3.2	NO	2.5
N28	Chapel Road/Teville Road	Roadside	514740	103173	NO2	NO	1.6	3.0	NO	2.5
N29	Downlands Parade	Roadside	515014	105099	NO2	NO	0.5	6.5	NO	4.0
N30A	Grove Lodge Cottages	Roadside	514183	104948	NO2	YES	0.2	2.2	NO	2.5
N31	South Farm Road, roundabout	Kerbside	514317	103329	NO2	NO	4.0	0.9	NO	2.5

N35	30 Upper Brighton Road House	Roadside	514266	104961	NO2	YES	0.0	11.2	NO	2.0
N39	SW of roundabout at Grove Lodge	Roadside	514088	104906	NO2	YES	47.8	2.2	NO	4.0
N42	Norfolk House	Roadside	514742	103234	NO2	NO	0.0	3.4	NO	2.0
N43	23 Upper Brighton Road	Suburban	514199	104982	NO2	YES	0.0	19.2	NO	2.0
N44A	NOx Analyser 21 Upper Brighton Road	Roadside	514184	104963	NO2	YES	18.4	2.8	YES	2.0
N44B	NOx Analyser 21 Upper Brighton Road	Roadside	514184	104963	NO2	YES	18.4	2.8	YES	2.0
N44C	NOx Analyser 21 Upper Brighton Road	Roadside	514184	104963	NO2	YES	18.4	2.8	YES	2.0
N45	11 Hill Barn Lane	Suburban	514126	105063	NO2	YES	0.0	13.0	NO	2.0
N48	Shaftesbury Avenue	Roadside	512063	103385	NO2	NO	14.8	2.2	NO	2.0
N52	Newland Road	Kerbside	514973	103335	NO2	NO	4.5	0.4	NO	2.0
N53	Offington Corner	Roadside	513278	105623	NO2	YES	20.5	6.0	NO	2.0
N54	The Aquarena	Roadside	515595	102725	NO2	NO	30.2	3.7	NO	3.0
N56	Titnore Way	Suburban	510318	104506	NO2	NO	11.2	1.2	NO	3.0
N57	Lyndhurst Road	Roadside	515114	102975	NO2	NO	0.0	3.5	NO	2.5
N61	Broadwater Street West	Kerbside	514501	104531	NO2	NO	4.0	1.2	NO	2.0
N62	Steyne Gardens	Kerbside	515201	102500	NO2	NO	4.7	0.8	NO	2.0
N63	New Broadway, Tarring Rd	Roadside	513437	103311	NO2	NO	1.0	3.5	NO	2.0
N64	South Street, outside Starbucks	Urban Centre	514946	102541	NO2	NO	2.8	2.4	NO	2.5
N65	Teville Road (opposite Unleashed)	Kerbside	514543	103220	NO2	NO	4.7	0.8	NO	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.3 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3) (4)</sup>				
							2015	2016	2017	2018	2019
WT2	514184	104963	Roadside	Automatic	97.4	97.4	37.4	<b>48.0</b>	35.8	36.8	32.9
4N	513609	102556	Urban Background	Diffusion Tube	92.0	92.0	11.0	13.8	14.5	14.1	12.7
5N	512701	105562	Urban Background	Diffusion Tube	100.0	100.0	13.4	16.0	15.9	16.9	15.7
6N	515190	105122	Roadside	Diffusion Tube	100.0	100.0	38.0	<b>40.7</b>	38.1	35.1	33.1
N1C	515114	102670	Urban Centre	Diffusion Tube	100.0	100.0	27.5	30.3	26.8	28.5	26.2
N5	514495	105020	Roadside	Diffusion Tube	100.0	100.0	28.8	30.2	31.0	25.6	28.3
N8	513236	104651	Roadside	Diffusion Tube	100.0	100.0	28.2	30.0	30.7	29.6	28.6
N11	515812	103309	Urban Background	Diffusion Tube	100.0	100.0	12.7	15.5	15.6	15.7	13.4
N18A	515315	105141	Suburban	Diffusion Tube	100.0	100.0	21.6	25.3	24.5	23.9	21.7
N21	509777	105696	Roadside	Diffusion Tube	100.0	100.0	28.9	34.1	17.2	13.5	10.8
N22	511010	102226	Urban Background	Diffusion Tube	100.0	100.0	10.4	13.3	13.3	12.8	11.6
N24	515151	105109	Roadside	Diffusion Tube	100.0	100.0	22.4	25.8	25.9	34.5	23.5
N25	513845	105191	Suburban	Diffusion Tube	100.0	100.0	20.7	22.2	20.7	20.3	17.8

N27	513380	103352	Roadside	Diffusion Tube	100.0	100.0	21.6	25.7	24.7	26.2	22.7
N28	514740	103173	Roadside	Diffusion Tube	17.0	17.0	25.7	21.5	36.0	33.4	27.2
N29	515014	105099	Roadside	Diffusion Tube	100.0	100.0	33.5	34.6	32.4	23.6	29.9
N30A	514183	104948	Roadside	Diffusion Tube	100.0	100.0	<b><u>66.1</u></b>	<b><u>64.1</u></b>	<b><u>68.2</u></b>	<b><u>60.1</u></b>	<b>56.6</b>
N31	514317	103329	Kerbside	Diffusion Tube	100.0	100.0	24.3	27.5	26.8	27.1	25.8
N35	514266	104961	Roadside	Diffusion Tube	92.3	92.3	29.9	28.6	28.5	26.2	24.4
N39	514088	104906	Roadside	Diffusion Tube	100.0	100.0	31.1	33.5	32.0	32.7	28.5
N42	514742	103234	Roadside	Diffusion Tube	83.9	83.9	24.2	25.9	25.1	26.6	24.2
N43	514199	104982	Suburban	Diffusion Tube	100.0	100.0	21.2	23.1	23.1	22.3	19.9
N44A	514184	104963	Roadside	Diffusion Tube	100.0	100.0	39.2	<b>42.0</b>	<b>40.5</b>	39.8	36.2
N44B	514184	104963	Roadside	Diffusion Tube	100.0	100.0	<b>40.3</b>	<b>41.5</b>	<b>40.3</b>	<b>41.6</b>	35.7
N44C	514184	104963	Roadside	Diffusion Tube	100.0	100.0	39.8	<b>41.6</b>	<b>41.2</b>	<b>40.8</b>	36.3
N45	514126	105063	Suburban	Diffusion Tube	100.0	100.0	16.0	17.2	17.2	16.2	15.4
N48	512063	103385	Roadside	Diffusion Tube	100.0	100.0	25.6	30.1	27.0	27.7	25.8
N52	514973	103335	Kerbside	Diffusion Tube	100.0	100.0	21.8	24.9	24.8	26.4	22.4
N53	513278	105623	Roadside	Diffusion Tube	100.0	100.0	29.0	32.1	34.9	33.9	30.7
N54	515595	102725	Roadside	Diffusion Tube	100.0	100.0	22.4	26.0	24.6	22.8	19.3
N56	510318	104506	Suburban	Diffusion Tube	100.0	100.0	N/A	25.2	25.6	25.3	20.8

N57	515114	102975	Roadside	Diffusion Tube	100.0	100.0	N/A	27.6	27.6	25.0	23.4
N61	514501	104531	Kerbside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	36.8	34.8
N62	515201	102500	Kerbside	Diffusion Tube	100.0	23.4	N/A	N/A	N/A	23.7	24.6
N63	513437	103311	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	29.2
N64	514946	102541	Urban Centre	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	27.9
N65	514543	103220	Kerbside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	27.5

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance adjustment

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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.

(4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.



**Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations**

**Figure A.1.1 – Site WT2 Automatic Continuous Analyser (Roadside)**

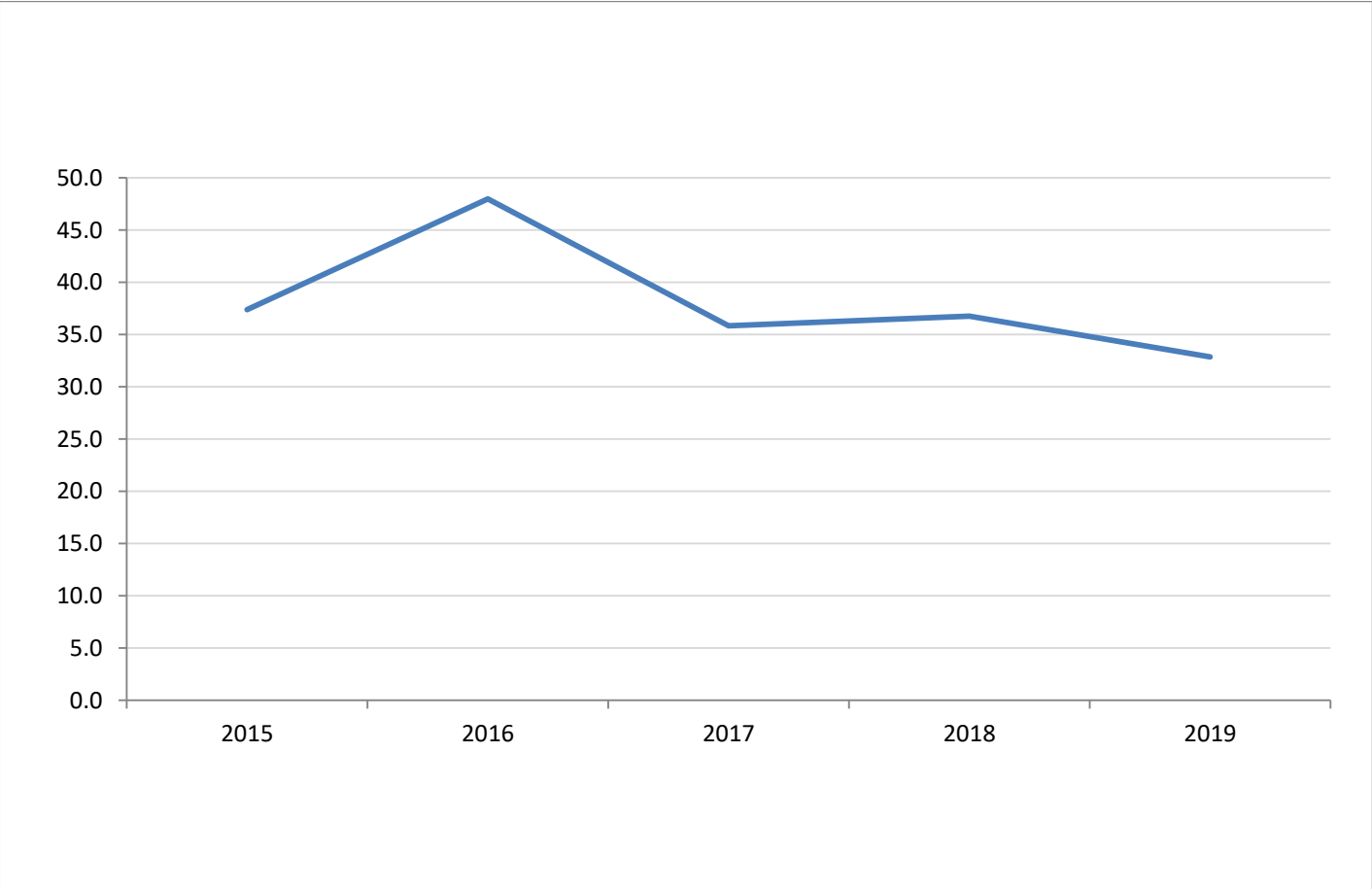
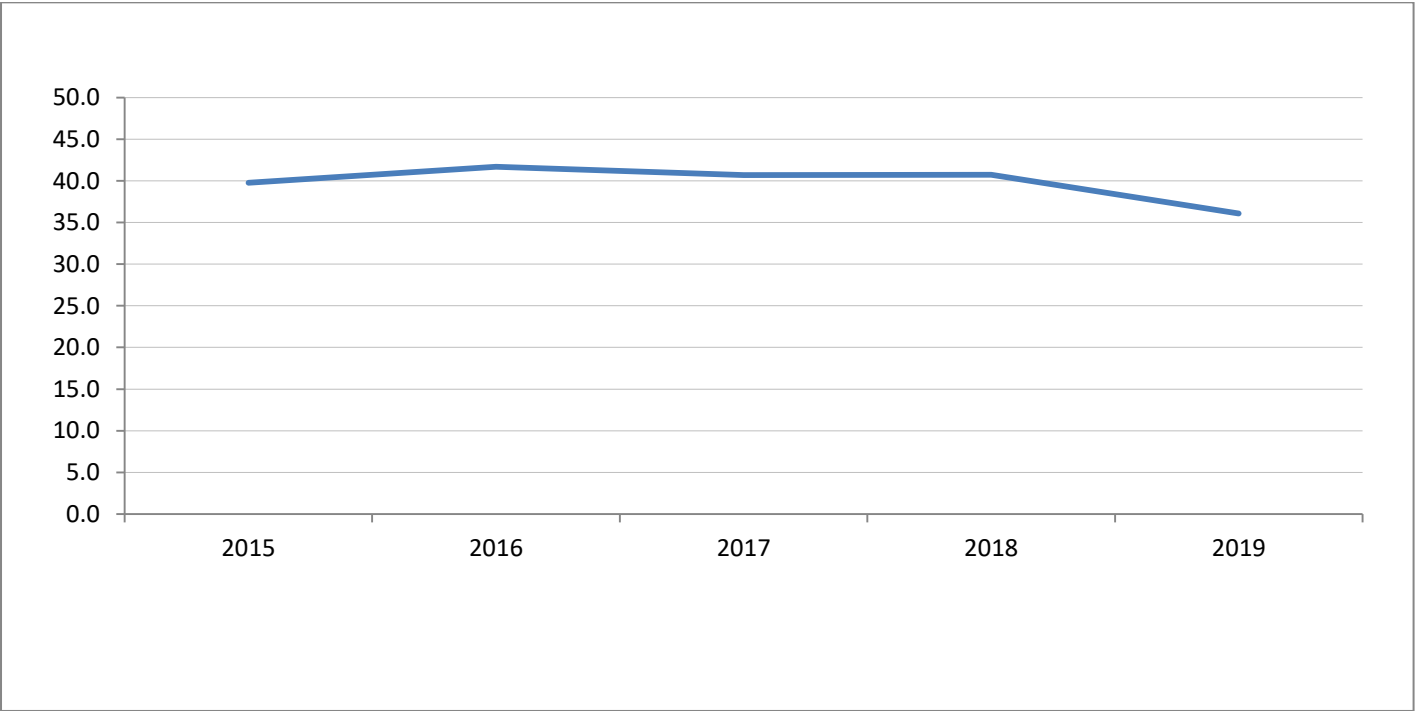
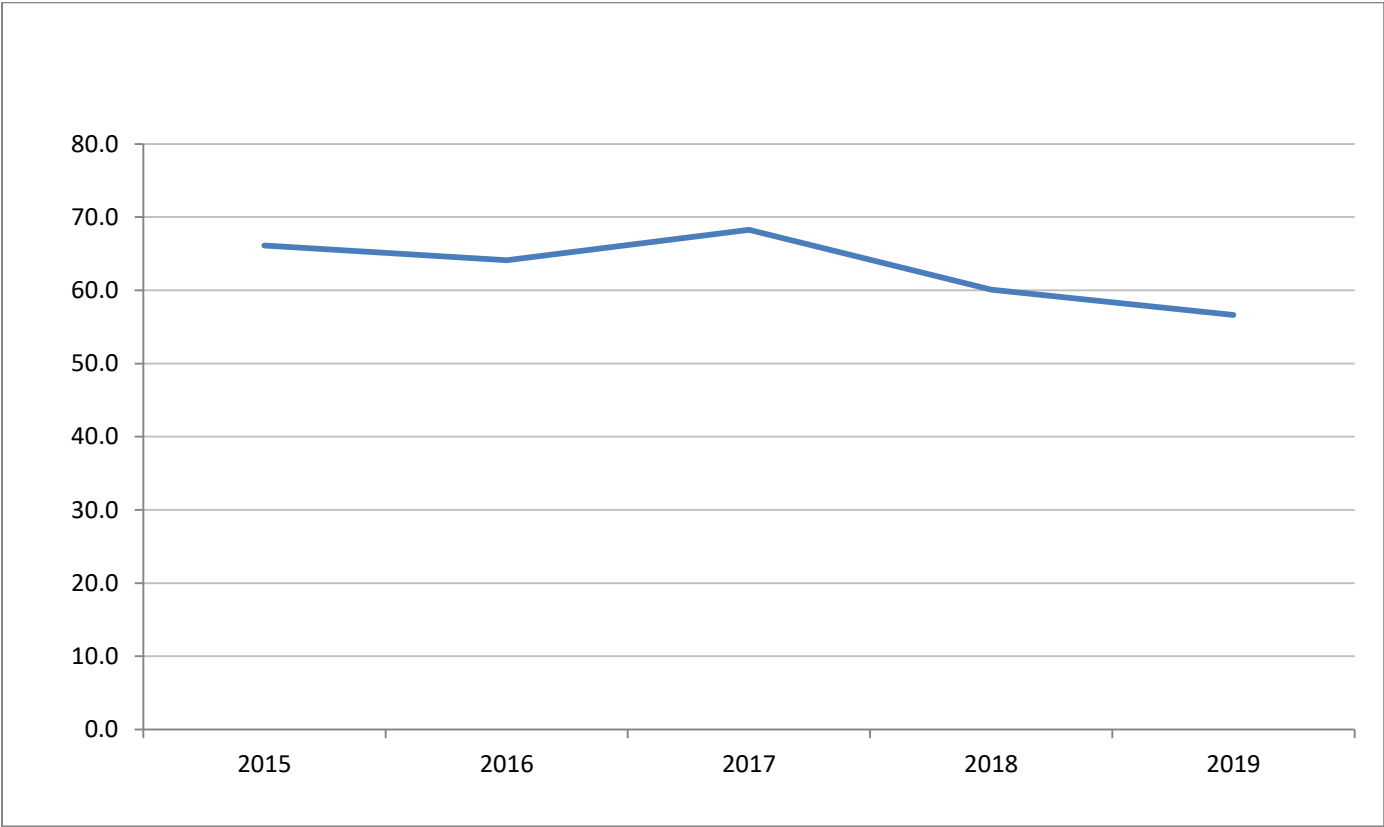


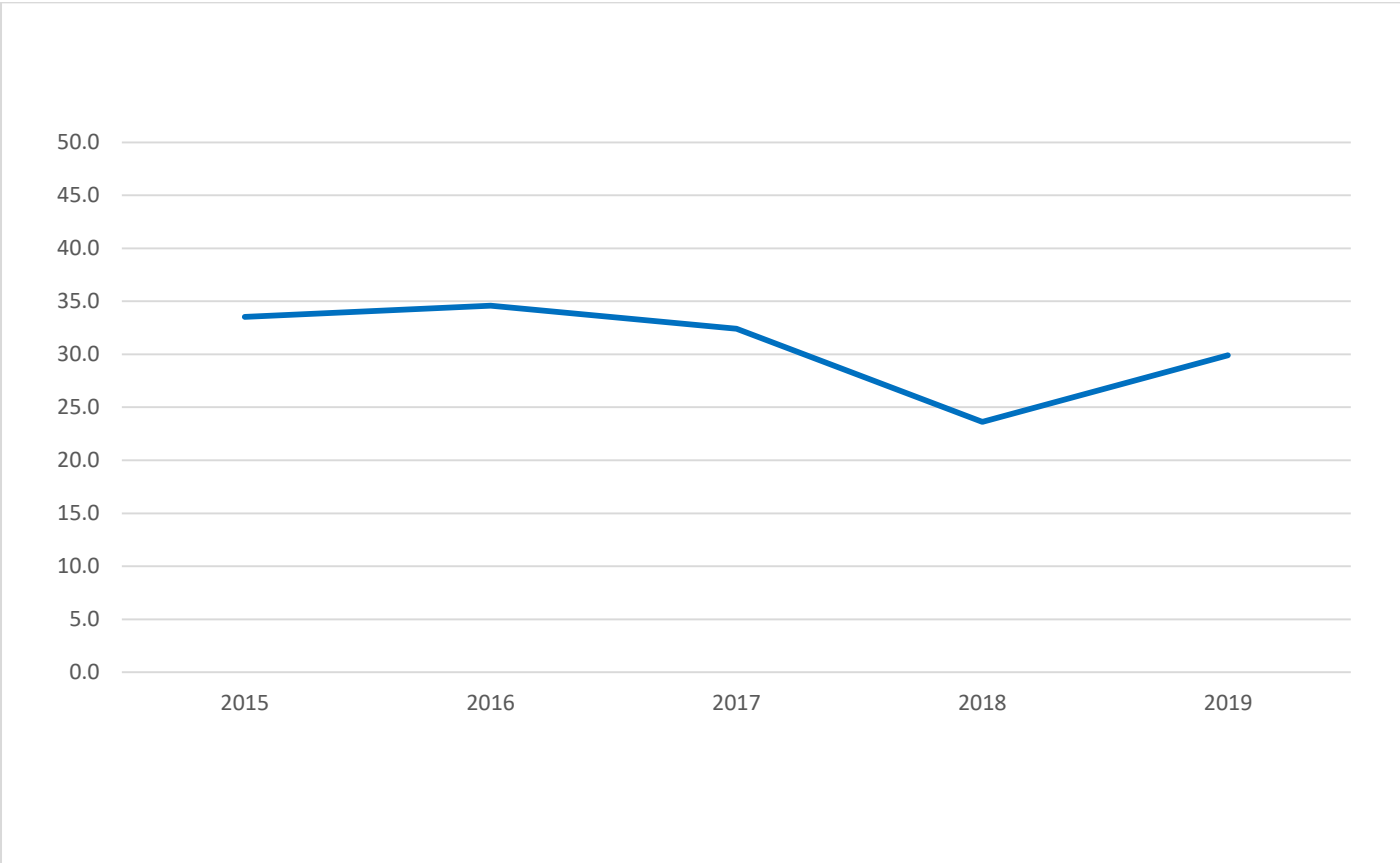
Figure A.1.2 – Site N44 Average of 3 co-located tubes



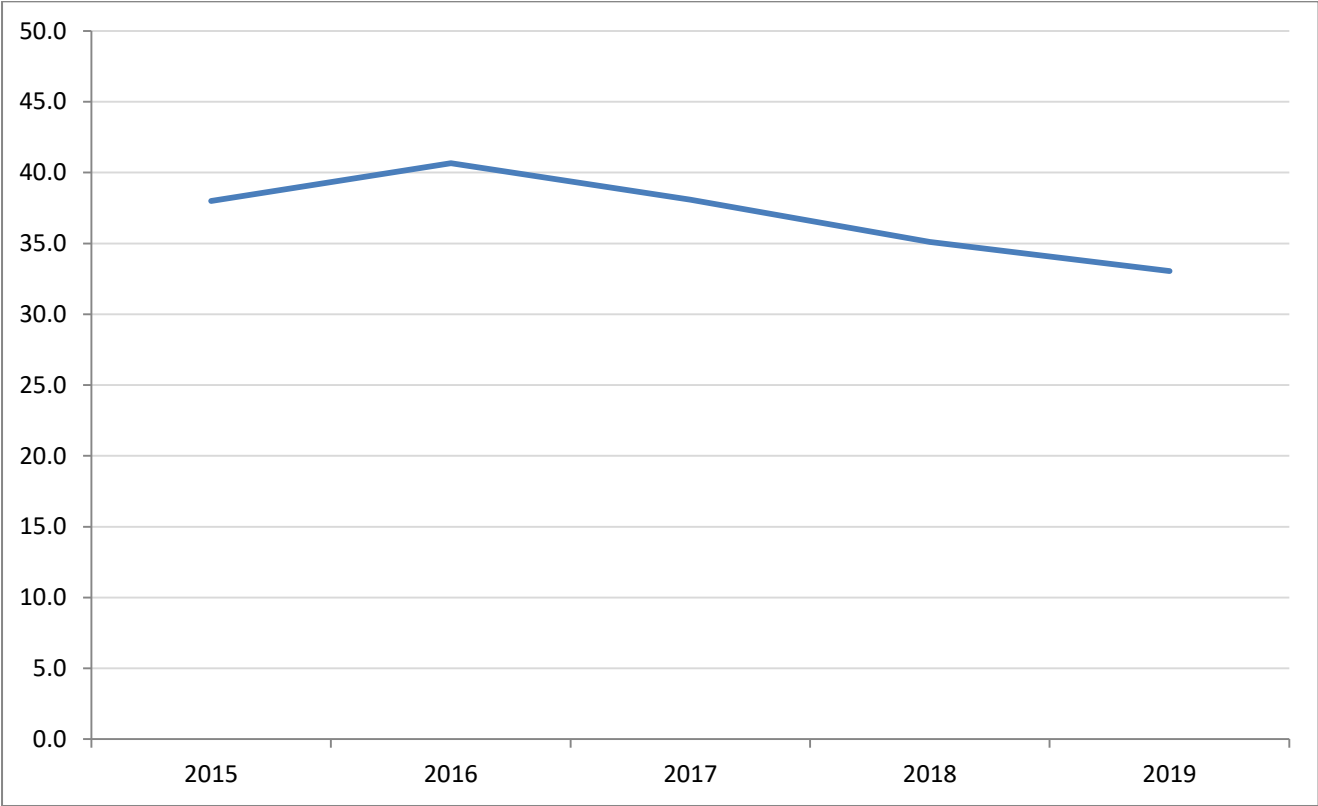
**A.1.3 – Site N30A Grove Lodge Cottages**



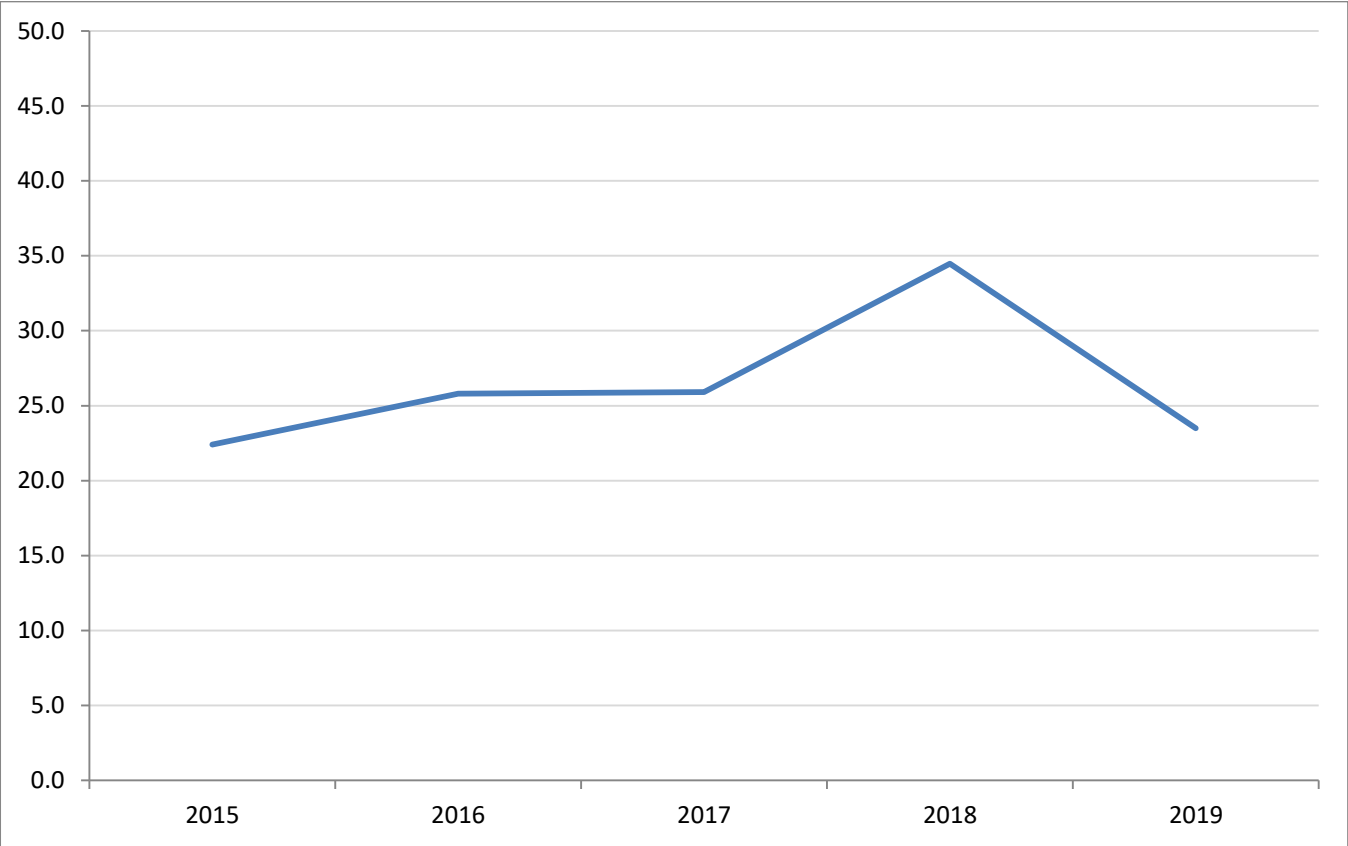
A.1.4 – Site N29 Downlands Parade



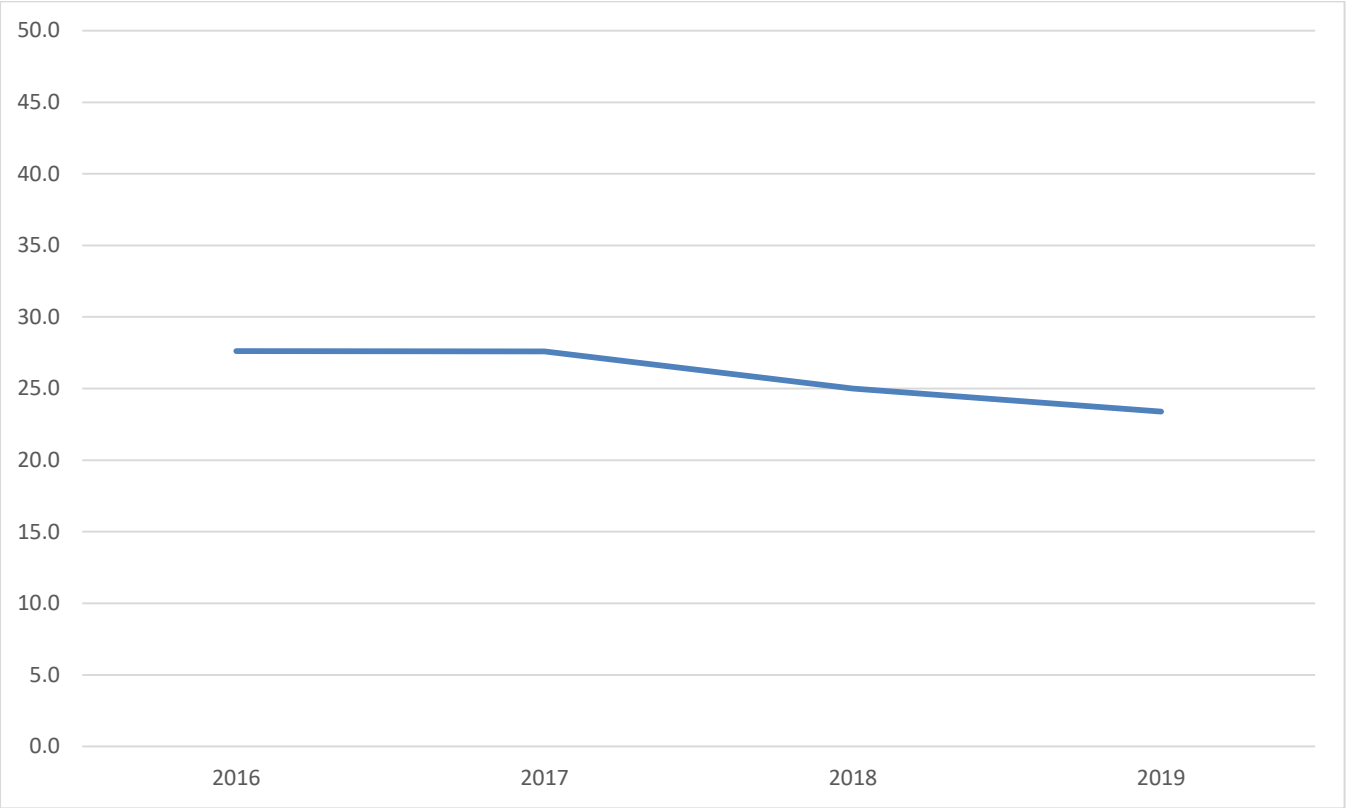
**A.1.5 – Site 6N Gainsborough Avenue**



**A.1.6 – Site N24 152 Upper Brighton Road**



**A.1.7 – Site N57 Lyndhurst Road**



**Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
							2015	2016	2017	2018	2019
WT2	514184	104963	Roadside	Automatic	97.4	97.4	<b>2</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

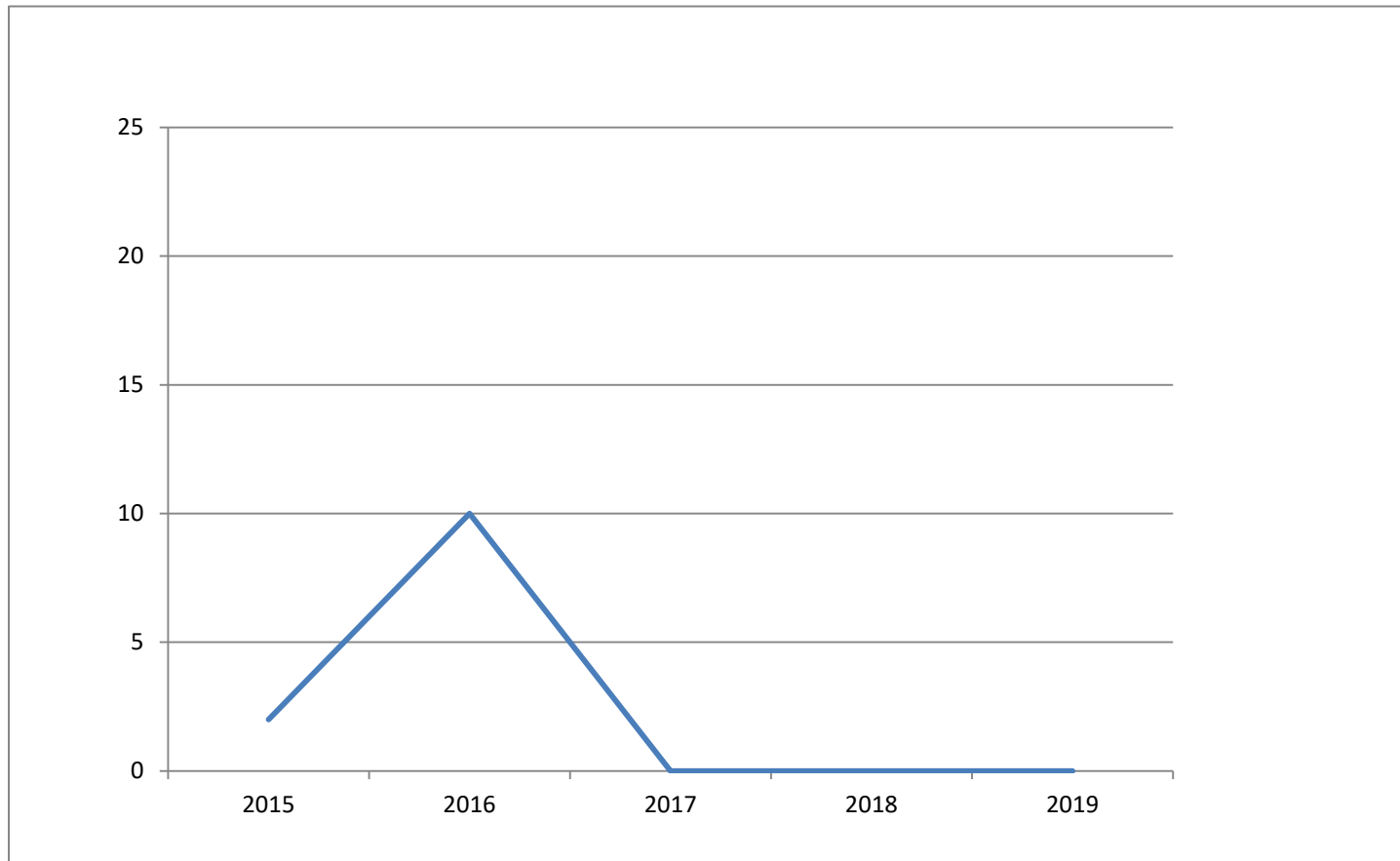
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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 99.8<sup>th</sup> percentile of 1-hour means is provided in brackets.



Figure A.2 – Trends in Number of NO<sub>2</sub> 1-Hour Means > 200µg/m<sup>3</sup> for site WT2



**Table A.5 – PM<sub>2.5</sub> Monitoring Results**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2019 (%) <sup>(2)</sup>	PM <sub>2.5</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
						2015	2016	2017	2018	2019
WT2	514184	104963	Roadside	Automatic	97.4	N/A	N/A	N/A	10.6	9.9

Annualisation has been conducted where data capture is <75%

**Notes:**

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

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

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

## Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO<sub>2</sub> Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.87) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
4N	513609	102556	22.9	22.4	13.8	15.0	11.6	8.3	10.6	9.3	10.6	20.0	-	16.0	14.6	12.7	
5N	512701	105562	23.6	23.6	16.1	16.5	13.4	22.6	11.8	11.3	12.7	19.2	24.6	21.8	18.1	15.7	
6N	515190	105122	53.8	48.7	42.4	40.0	31.5	35.9	30.1	29.8	34.3	23.8	45.7	40.0	38.0	33.1	
N1C	515114	102670	33.8	36.9	31.3	35.6	27.4	25.5	28.5	25.9	27.6	26.6	36.1	26.6	30.1	26.2	
N5	514495	105020	45.3	42.9	33.7	27.4	24.8	26.6	28.5	32.2	25.4	33.2	37.5	32.7	32.5	28.3	
N8	513236	104651	38.1	46.2	34.7	32.2	29.6	28.6	26.9	26.7	28.9	31.6	39.4	31.5	32.9	28.6	
N11	515812	103309	22.1	19.4	17.6	13.1	12.1	11.6	12.3	10.4	11.7	17.1	21.8	15.1	15.4	13.4	
N18A	515315	105141	35.4	28.7	26.4	24.5	24.2	20.6	19.9	20.1	18.8	24.3	31.2	24.9	24.9	21.7	
N21	509777	105696	19.3	18.5	14.1	13.8	9.8	4.0	8.9	9.5	9.5	11.8	16.3	12.9	12.4	10.8	
N22	511010	102226	19.4	18.4	13.5	13.7	10.8	8.5	10.7	8.4	9.3	13.9	21.2	12.5	13.4	11.6	
N24	515151	105109	40.9	45.3	25.6	25.9	21.9	22.8	20.3	18.9	20.7	25.5	29.6	26.5	27.0	23.5	
N25	513845	105191	14.6	29.6	24.7	20.1	18.4	17.2	18.4	17.3	15.7	21.2	26.0	22.0	20.4	17.8	
N27	513380	103352	35.7	30.8	28.8	32.5	26.2	11.5	22.8	16.7	22.5	26.0	32.4	26.9	26.1	22.7	
N28	514740	103173	-	-	-	-	-	-	-	-	30.3	32.3	-	-	31.3	27.2	
N29	515014	105099	31.4	30.6	33.9	33.9	31.6	33.2	36.2	32.8	31.8	36.3	40.0	40.6	34.4	29.9	

N30A	514183	104948	66.5	89.3	69.7	58.7	60.2	60.6	64.1	66.7	56.8	62.6	63.0	63.1	65.1	56.6	55.7
N31	514317	103329	35.5	41.3	31.1	23.8	27.2	24.2	27.3	24.8	23.3	36.2	30.4	30.9	29.7	25.8	
N35	514266	104961	-	39.7	29.6	22.7	23.8	25.4	24.8	27.8	24.4	27.8	32.0	30.4	28.0	24.4	
N39	514088	104906	45.8	41.0	32.0	36.3	32.9	26.7	19.9	27.1	30.3	30.3	40.0	31.4	32.8	28.5	
N42	514742	103234	35.1	34.6	26.0	31.2	24.9	22.7	24.4	-	21.0	26.6	32.9	26.0	27.8	24.2	
N43	514199	104982	30.0	30.6	23.7	21.7	21.8	19.5	21.3	17.7	18.9	23.0	22.9	23.8	22.9	19.9	
N44A	514184	104963	51.6	47.5	46.2	38.7	40.4	38.3	39.9	37.0	38.7	39.0	42.9	39.7	41.7	36.2	24.7
N44B	514184	104963	47.2	48.6	45.9	36.4	36.1	37.2	41.0	40.0	38.6	39.1	42.0	39.8	41.0	35.7	
N44C	514184	104963	52.1	56.6	47.3	38.7	37.7	37.8	36.6	37.3	37.3	39.8	41.9	37.8	41.7	36.3	24.7
N45	514126	105063	24.6	25.1	17.6	14.3	14.7	13.5	15.7	14.7	14.2	16.1	21.6	20.5	17.7	15.4	
N48	512063	103385	31.7	42.1	30.2	30.6	26.0	24.1	27.8	21.4	24.3	31.2	35.1	31.2	29.6	25.8	
N52	514973	103335	32.4	35.2	32.1	21.6	21.2	20.4	20.0	21.0	22.4	26.9	29.9	26.3	25.8	22.4	
N53	513278	105623	39.9	48.8	38.0	31.1	32.6	30.6	38.2	36.4	28.2	34.1	28.5	37.6	35.3	30.7	
N54	515595	102725	29.6	29.9	24.5	18.7	20.4	17.9	20.3	19.2	17.5	20.4	28.7	18.8	22.2	19.3	
N56	510318	104506	30.2	37.6	8.8	5.7	23.3	24.0	27.9	25.3	23.6	25.3	28.0	26.9	23.9	20.8	
N57	515114	102975	37.0	37.6	33.8	27.2	23.3	26.1	10.8	23.6	20.9	27.5	31.9	23.3	26.9	23.4	
N61	514501	104531	48.9	51.6	42.2	35.0	35.8	34.6	37.9	36.1	29.9	36.9	44.3	47.6	40.1	34.8	
N62	515201	102500	27.1	31.9	25.9	-	-	-	-	-	-	-	-	-	28.3	24.6	
N63	513437	103311	37.5	48.5	35.6	-	29.4	-	33.0	-	28.4	30.9	21.9	36.5	33.5	29.2	
N64	514946	102541	31.9	35.3	31.7	65.5	28.2	26.4	28.7	23.8	25.1	30.0	33.2	24.7	32.0	27.9	
N65	514543	103220	41.0	-	37.4	30.7	29.4	26.9	-	22.2	25.4	30.9	40.2	32.3	31.6	27.5	

- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75%
- Where applicable, data has been distance corrected for relevant exposure in the final column

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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. Distance correction is not necessary for sites below 36 ug/m<sup>3</sup> - see LAQM TG16 paragraph 7.78.

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

### Automatic Monitoring Site

The automatic continuous monitoring site at Grove Lodge is part of the national Automatic Urban and Rural Network (AURN) and complies with the EU Directive on ambient air quality (2008/50/EC). The site is audited and serviced every 6 months and Local Site Operator (LSO) routine calibrations are completed by Worthing Borough Council every 2 weeks.

### Diffusion Tube Bias Adjustment Factors

NO<sub>2</sub> diffusion tubes are provided and analysed by Gradko laboratory. The NO<sub>2</sub> tube preparation method used is 50% triethanolamine (TEA) in Acetone.

Data from the NO<sub>2</sub> diffusion tubes has been compared and bias corrected to the factors produced from the UK co-location data-base available from Defra, <http://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

The bias adjustment factor used for 2019, obtained via tools at the aforementioned website, was **0.87**.

### QA/QC of diffusion tube monitoring

All diffusion monitoring data has been ratified following the methods described in LAQM.TG(16). A quality assurance / quality control (QA/QC) programme including field duplicates and blanks, and instrument calibration with standard gases has been followed (AEAT, 2000).

### Fall off with Distance Calculations

Screen shots of the falloff of NO<sub>2</sub> concentration with distance from kerb calculator spreadsheet (downloaded from the LAQM website) are shown below, with the calculations for sites N30A, N44A and N44C.

### N30A Grove Lodge Cottages



Enter data into the pink cells

<b>Step 1</b>	How far from the KERB was your measurement made (in metres)?	2.2	metres
<b>Step 2</b>	How far from the KERB is your receptor (in metres)?	2.4	metres
<b>Step 3</b>	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	13.78	µg/m <sup>3</sup>
<b>Step 4</b>	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	56.6	µg/m <sup>3</sup>
<b>Result</b>	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	55.7	µg/m <sup>3</sup>

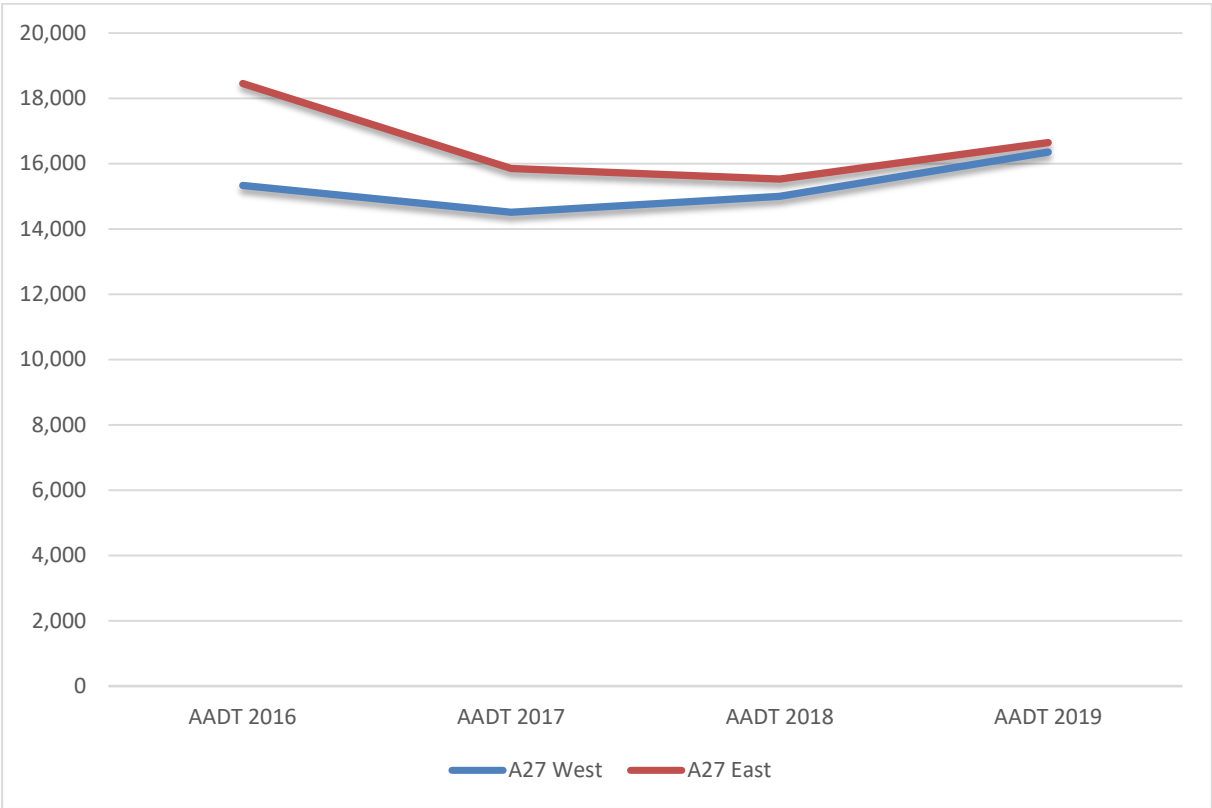
### N44A & N44C NOx Analyser 21 Upper Brighton Road



Enter data into the pink cells

Site Name/ID	Distance (m)		NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
N44A	2.8	21.2	13.8	36.2	24.7	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
N44B	2.8	21.2	13.8	35.7	24.4	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.
N44C	2.8	21.2	13.8	36.3	24.7	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.

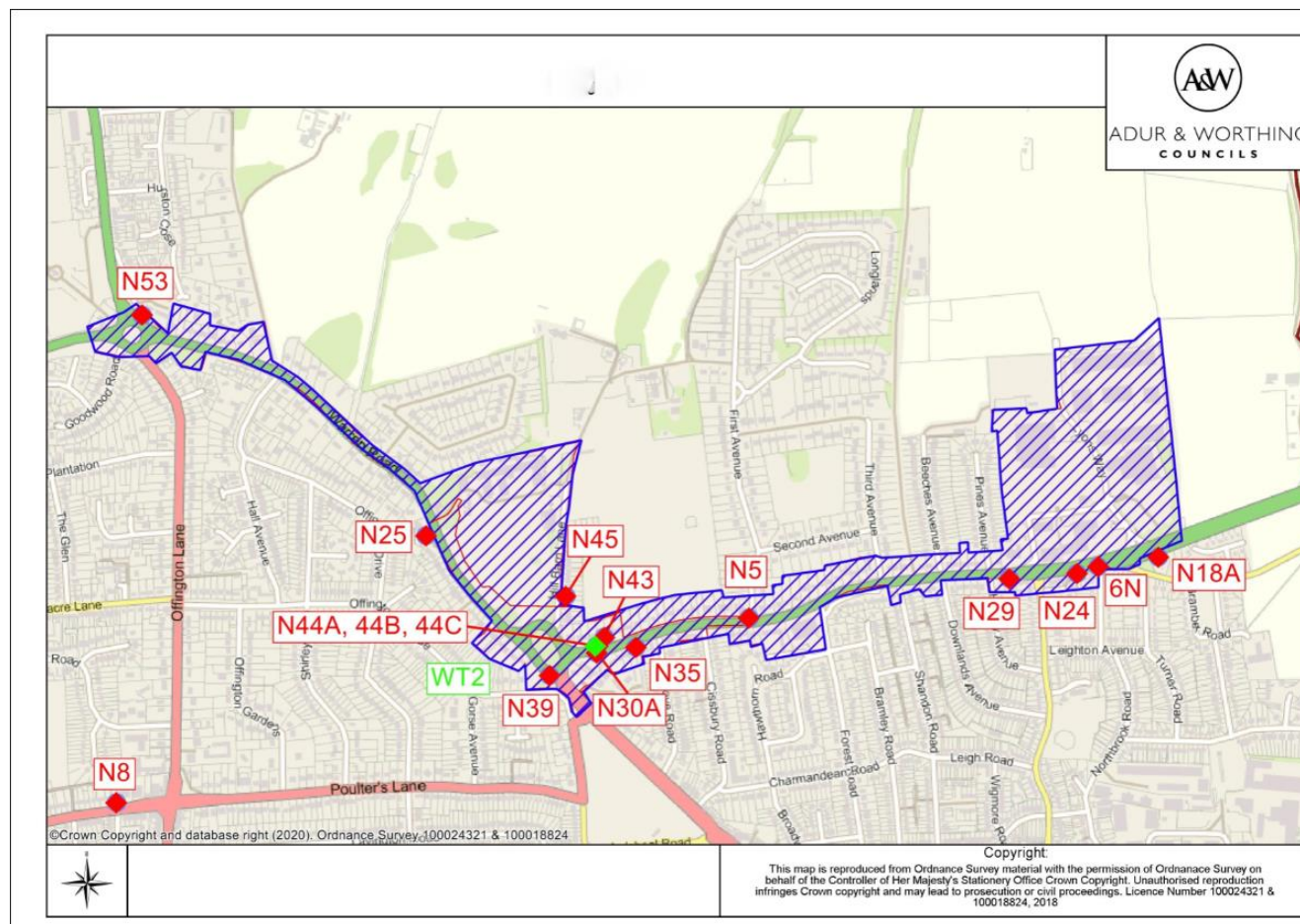
**AADT data for Worthing A27 2016-2019**



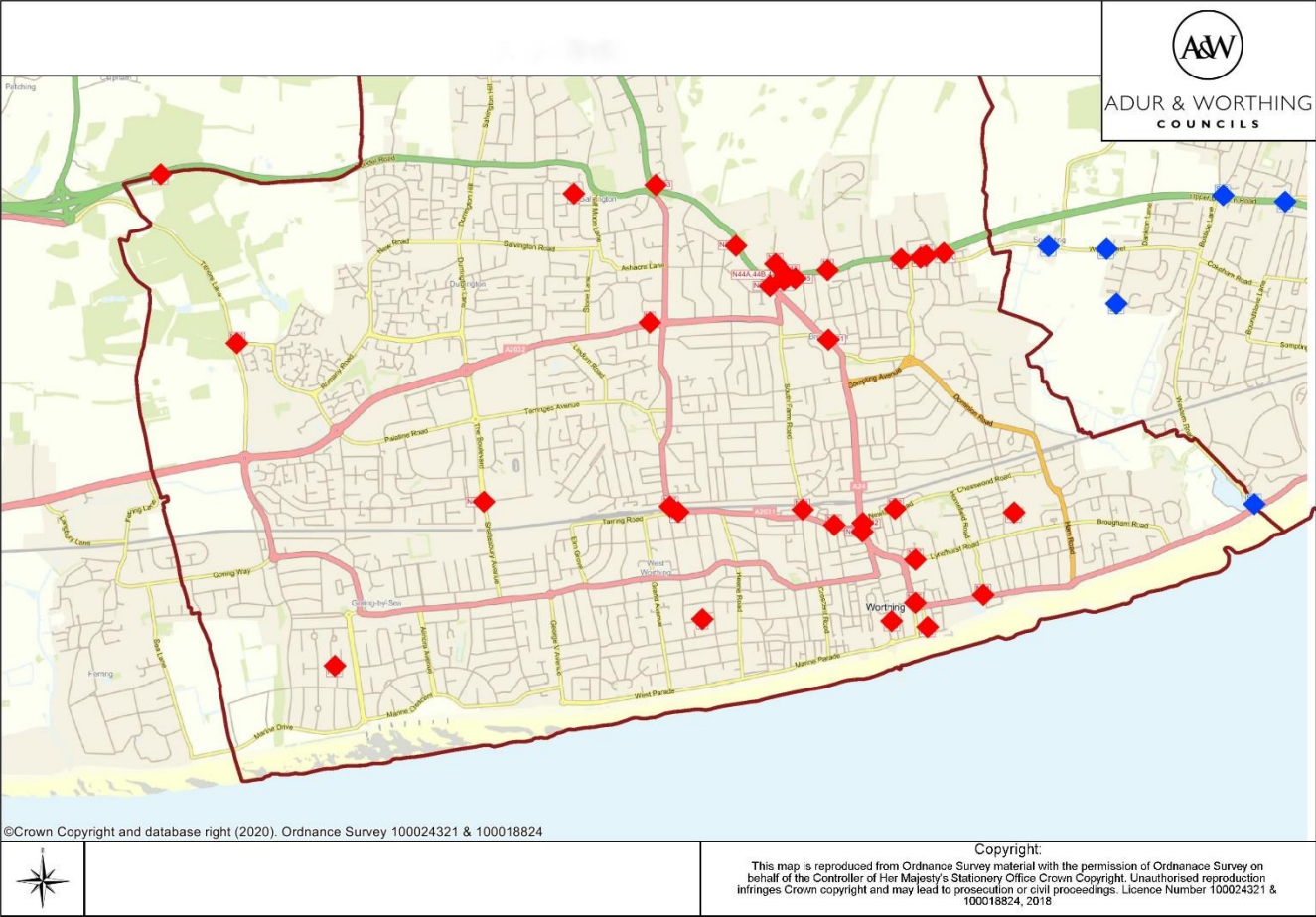


## Appendix D: Map(s) of Monitoring Locations and AQMAs

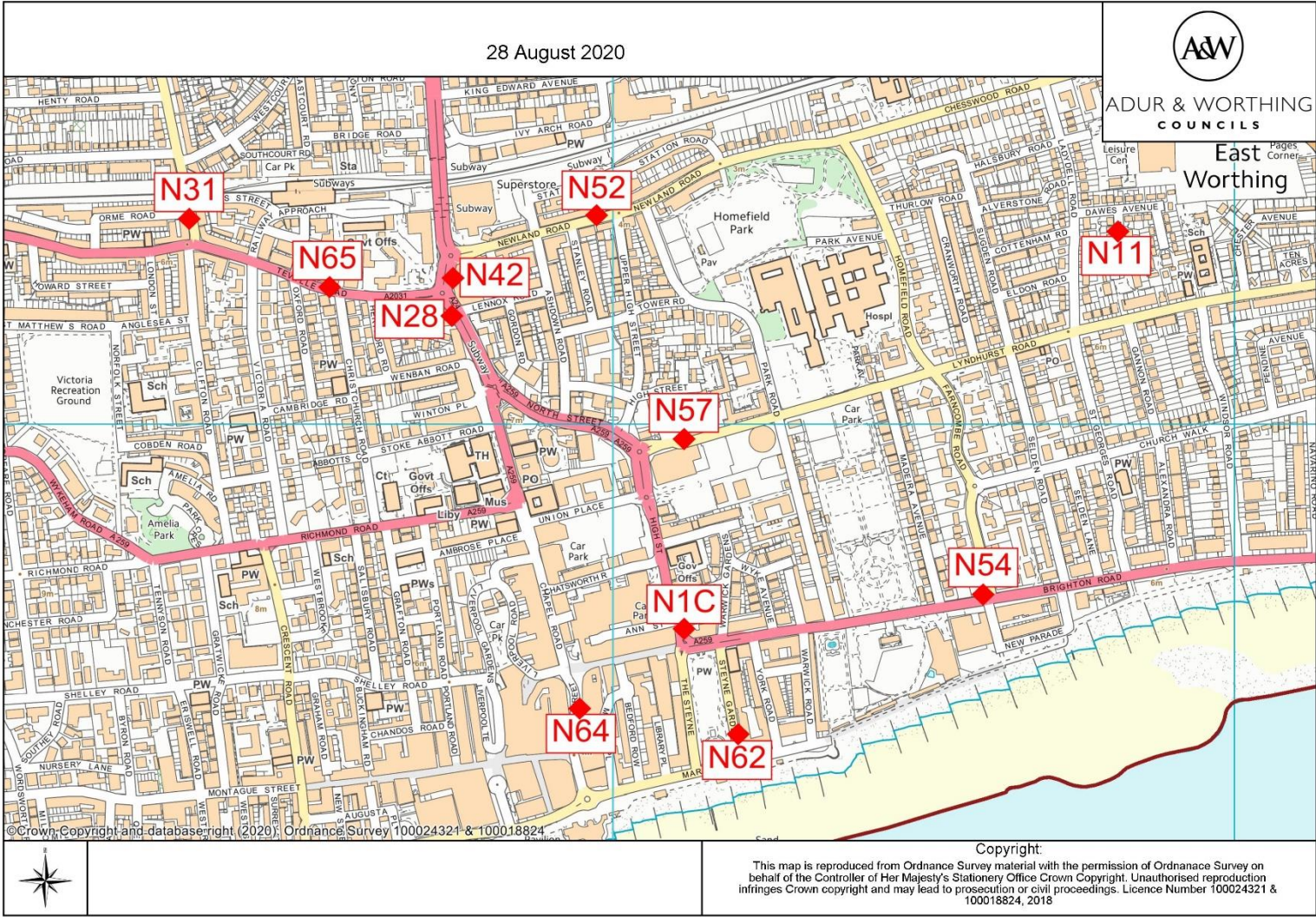
### D.1 Worthing AQMA and Sampling Locations



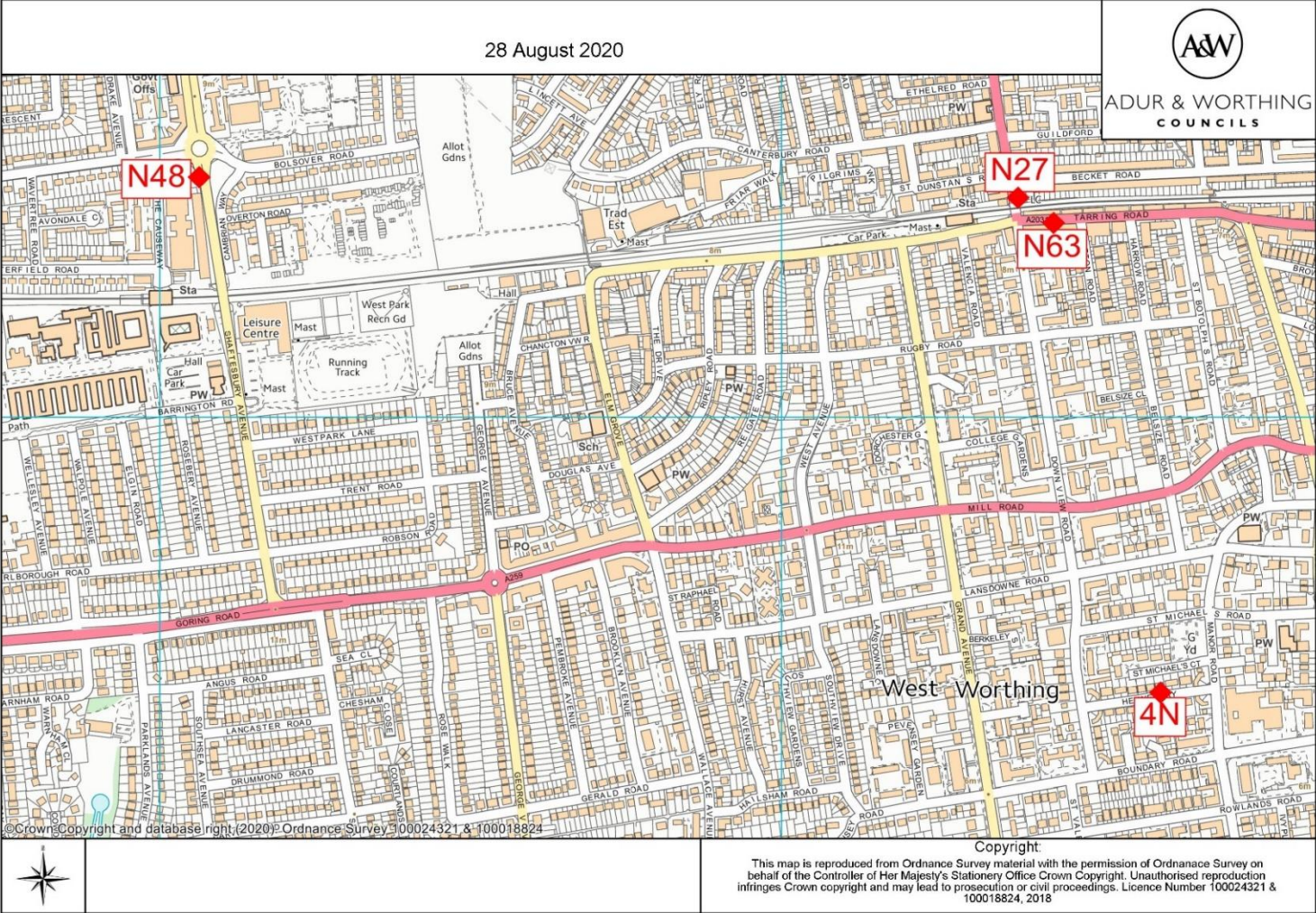
D.2 Worthing Monitoring Sites (showing spatial spread)



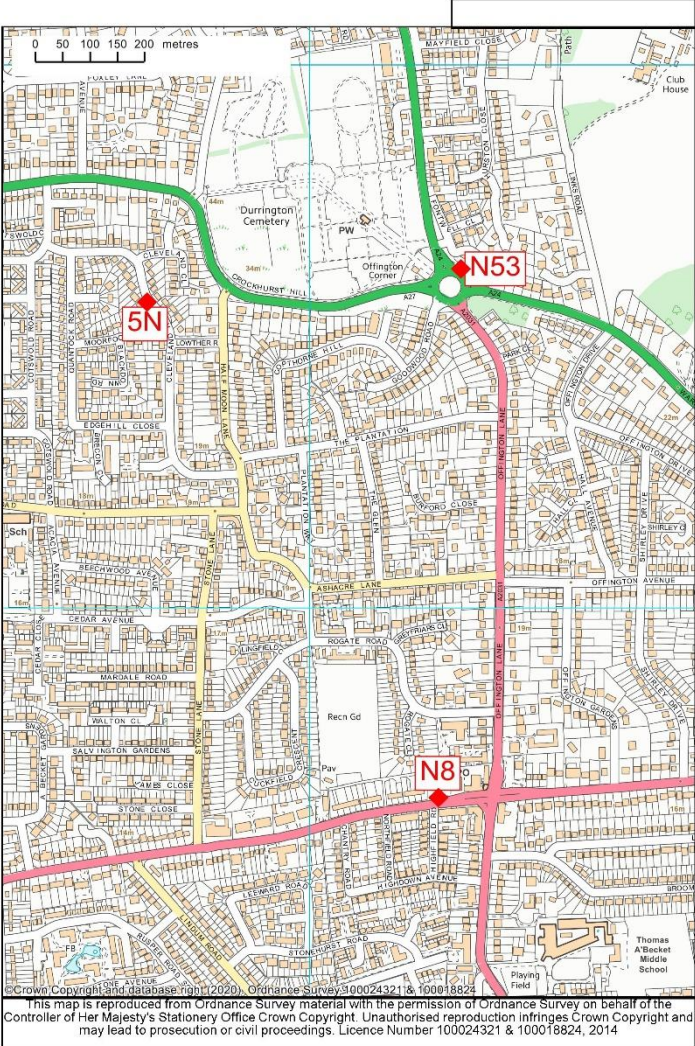
D.3 Worthing Central Monitoring Sites



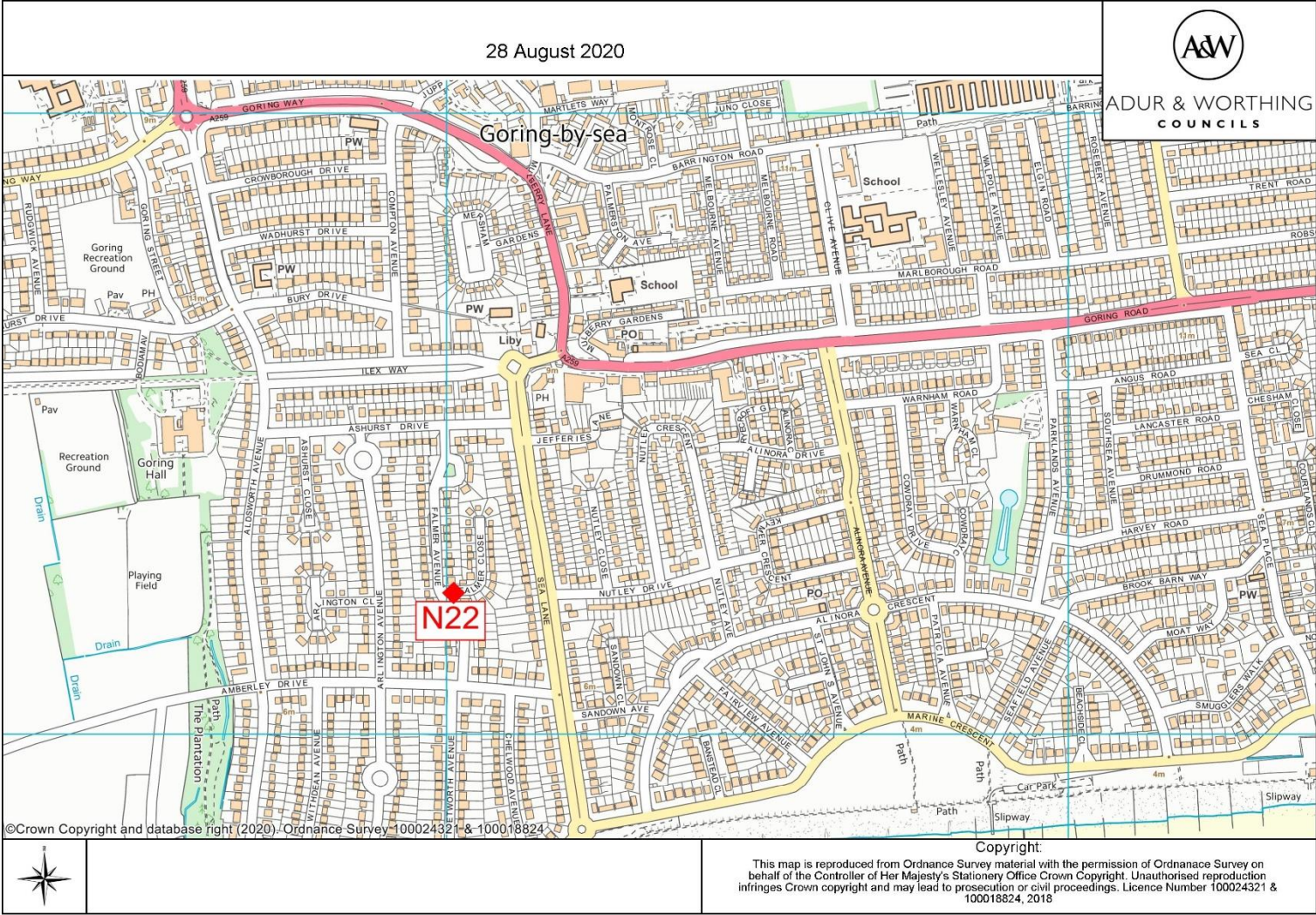
D.4 West Worthing Monitoring Sites



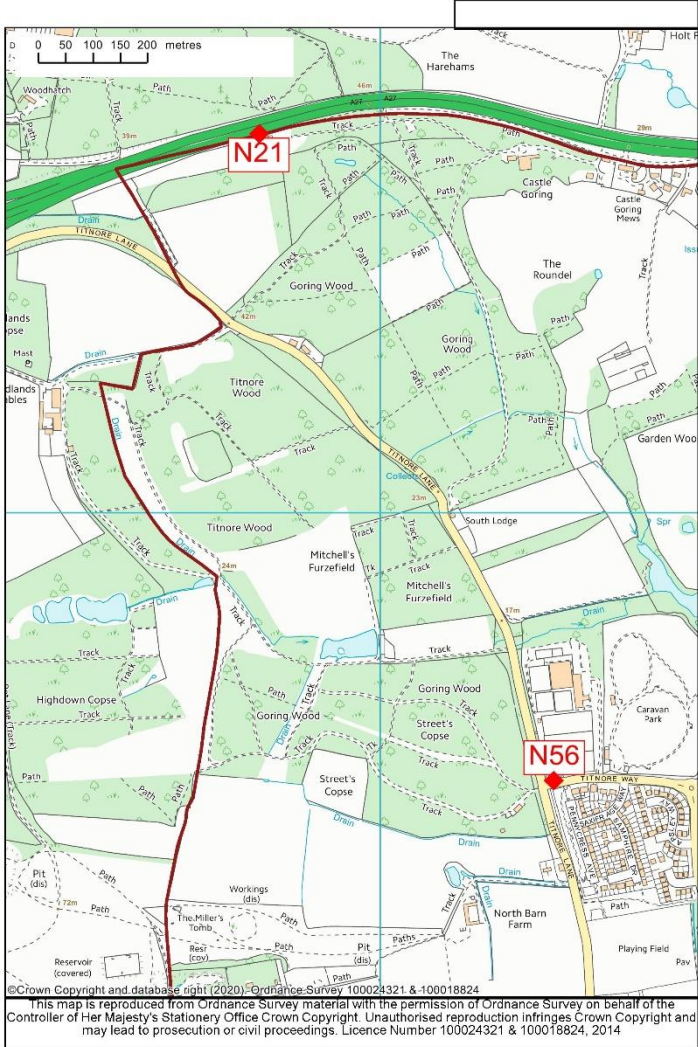
D.5 Salvington Monitoring Sites



D.6 Goring Monitoring Sites



D.7 Durrington Monitoring Sites



## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>6</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>6</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).



## 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
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HE	Highways England
HGV	Heavy Goods Vehicle
LAQM	Local Air Quality Management
LGV	Light Goods Vehicle
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide
ULEV	Ultra-Low Emission Vehicles
WSCC	West Sussex County Council

## References

Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006, Defra, Report Number AEAT/ENV/R/2170. Available from UK-AIR [https://uk-air.defra.gov.uk/assets/documents/reports/cat09/0701110944\\_AQinequalitiesFNL\\_AEAT\\_0506.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat09/0701110944_AQinequalitiesFNL_AEAT_0506.pdf)

Local Air Quality Management Technical Guidance (TG16), Defra  
Available from <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf>

Local Air Quality Management Policy Guidance (PG16), Defra  
Available from  
[https://consult.defra.gov.uk/communications/laqm\\_changes/supporting\\_documents/LAQM%20Policy%20Guidance%202016.pdf](https://consult.defra.gov.uk/communications/laqm_changes/supporting_documents/LAQM%20Policy%20Guidance%202016.pdf)

Air Quality and Emission Mitigation Guidance for Sussex (2019)  
Available from <https://www.sussex-air.net/>

NO<sub>2</sub> Fall-Off with Distance Calculator available from:  
<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Defra Background Maps for Worthing  
<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2017>