



**2017 Air Quality Annual
Status Report (ASR):
Medway Council**

June 2017



Experts in air quality
management & assessment

Document Control

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Executive Summary: Air Quality in Our Area

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents.

This document is Medway Council's Annual Status Report (ASR). Results from monitoring by the Council are presented and sources of air pollution are identified. The ASR determines those changes since the last assessment that could lead to the risk of an air quality objective being exceeded.

This Annual Status Report confirms that nitrogen dioxide concentrations within Medway continue to exceed the annual mean air quality objective. In 2016, the exceedances mostly occurred within the Central Medway and Rainham Air Quality Management Areas (AQMAs), and therefore it is judged that these AQMAs shall remain.

Following the outcome of the 2016 ASR, an AQMA will soon be declared along Four Elms Hill, where an exceedance continued to be recorded in 2016. A Detailed Assessment confirmed the need to declare a new AQMA in this area, and 24 properties are likely to lie within the exceedance area. Statutory consultation on the AQMA declaration, formal declaration of the AQMA (by legal order) and identification of, and consultation on, Air Quality Action Plan measures are all scheduled to take place in 2017/2018.

All of the monitoring sites within the Pier Road AQMA have recorded concentrations of nitrogen dioxide below the air quality objectives. If the trend continues to show concentrations below the objectives in future years, the Council may revoke the Pier Road AQMA. There is some uncertainty as to when this may occur, as there is considerable new development planned for this area. It will be important to continue monitoring in the AQMA until this development is complete, and to gather sufficient data to be certain of compliance with the objectives. Concentrations of all other pollutants continue to meet the air quality objectives.

There are several new industrial installations which require the Council to issue Part A(2) and Part B licences to regulate emissions to the atmosphere, however no air quality assessments have been undertaken. The new biogas CHP at Kingsnorth Industrial Estate and the extension of the silo capacity at Quinn Cement are not expected to cause any significant air quality impacts. The Annual Status Report has thus not identified any significant changes in emissions sources.

Air Quality in Medway

Air pollution is recognised as having significant impacts on human health, including premature mortality, allergic reactions, and cardiovascular diseases. 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 billion³.

Medway Council is a unitary authority which is situated in Kent in the southeast of England. It is the largest single conurbation in the southeast, outside of London, and serves a population of a quarter of a million. The area is predominately urban and includes the towns of Chatham, Gillingham, Rainham, Rochester and Strood. It also includes industrial areas and port facilities, including Thamesport and the Hoo Peninsula.

Medway is recognised by the government as part of the developing Thames Gateway Region, and is an area of significant regeneration. It is well served by transport links to London by the M2 motorway and the A2 trunk road. A network of subsidiary routes connects with other towns and small centres of population across Kent. The north Kent rail link connects Medway to London and the south coast, and the Channel Tunnel Rail Link passes through the district.

The main source of air pollution in the district is road traffic emissions from major roads, notably the M2, A2, A228, A229, A230, A231, A278 and A289. Medway suffers from significant congestion, particularly in the town centres. Other pollution sources, including commercial, industrial and domestic sources, also contribute to background pollution concentrations.

Medway Council previously declared AQMAs in central Medway, Rainham and Gillingham in 2010. The Council is currently in the process of declaring an additional AQMA, which will extend along Four Elms Hill in Chattenden, covering 24 properties. These urban areas suffer from significant traffic congestion and high levels of traffic, heavy goods vehicles and buses. Further details of these AQMAs are available at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=157. Medway Council recently approved a new Air Quality Action Plan (AQAP)⁴, which includes measures to improve air quality within Medway.

Actions to Improve Air Quality

Overall air quality throughout the region is considered to be acceptable, although concentrations are above the nitrogen dioxide annual mean air quality objective in some areas. The main source of pollution within Medway is road traffic emissions, and the Medway Local Transport Plan (Medway Council, 2011) sets out policies to improve transport corridors and improve local air

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

⁴ Available at:

<http://www.medway.gov.uk/crimenuisanceandsafety/rubbishpollutionnuisance/airandsmells/medwayairqualityaction.aspx>

quality. Medway Council largely protects air quality within its area by using the Medway Local Plan Policy BNE24, to ensure new developments do not make existing air quality conditions worse. The new AQAP sets out a list of measures that the Council will implement to improve air quality within Medway. In April 2016 the Council issued a new technical guidance document 'Medway Air Quality Planning Guidance', which provides technical advice on dealing with planning applications that could impact air quality.

Local Priorities and Challenges

Many challenges still lie ahead for Medway Council in terms of making a positive contribution to improving air quality. Road transport is the dominant source of pollution within Medway's AQMAs, and reducing road traffic emissions is therefore the key air quality priority. Currently, these areas suffer from significant traffic congestion and high levels of traffic, heavy goods vehicles and buses.

Another significant challenge is accommodating the large demand for development in and around the Medway towns. This is likely to put existing areas of poor air quality under additional pressure, and could negate the improvement actions the Council is implementing. For this reason, introducing new planning guidance was a high priority, prior to adoption of a new Local Plan for Medway. Despite the current challenges, and those that still lie ahead, the actions the Council is already taking are beginning to have a positive impact upon air quality.

Whilst local authorities have a key role to play in delivering air quality improvements, further support is needed with regards to national and international policies to effect the necessary behavioural change, and reduce actual vehicle emissions. An example of this is the ever increasing uptake of diesel-fuelled vehicles, which are far more polluting in real world driving conditions than mandated by the Euro emissions standards. Unless diesel emission control systems can be made to work more effectively, and fleet renewal accelerated, stronger action needs to be taken to address this at a national and international level, and to rebalance the UK car fleet as a whole towards cleaner vehicle technologies. The Medway Air Quality Planning Guidance, referred to elsewhere in this report, is taking a positive lead in incentivising the uptake of electric vehicles, as certain developments coming forward through the planning process are now required to install charging points as standard air quality mitigation, providing local charging infrastructure for those living and working in Medway. Additionally, within the new AQAP, Medway Council has set out a list of measures to tackle air quality, with the successes and main challenges described later in this report.

Traffic management

Slow moving vehicles during congestion periods give rise to a high proportion of emissions relative to moving traffic. Congestion is a known issue in the Medway AQMAs. Consequently, measures to reduce traffic queues are likely to reduce emissions.

Medway's Urban Traffic Management and Control system (UTMC) incorporates some advanced features related to bus priority and air quality assessment. Medway Council operates this system proactively to:

- improve the operational efficiency of the highway network;
- provide real time travel and parking information to drivers;
- respond to incidents on the network;
- enable bus services to be more punctual and have improved journey times;
- monitor traffic-related air quality and respond to short term increases in pollution levels where possible; and
- share information with Highways England and neighbouring local authorities.

The UTMC should, over time, lead to a reduction in queue lengths and improve journey times, and will therefore improve air quality within Medway's AQMAs.

Improving movement of freight

The Council plans to consult on, and adopt, a new Freight Action Plan for 2017 - 2021, in collaboration with Kent County Council. The Plan aims to tackle the problems caused by large, mainly foreign lorries, using unsuitable routes in the county. This is noted as a particular problem in Kent and Medway as the region is the gateway to, and from, mainland Europe, and the associated heavy cross-Channel traffic, coupled with the need to service rural businesses. The Freight Action Plan seeks to work with businesses to reduce the pressure on rural communities while maintaining the County's economic vitality. Measures include:

- developing route maps electronically for business to use when planning their deliveries;
- working together with the Freight Transport Association to ensure the impact of freight is minimised;
- review the signing strategy across the county to ensure that the most suitable routes are signed correctly; and
- enabling the public to share their concerns over freight issues.

Medway Council will also encourage freight movements to use rail and river transport, instead of roads.

Encouragement of public transport use

Generally in the UK, 25% of Britain's car journeys are less than 2 miles, it is therefore important to consider the promotion of public transport uptake, car sharing and travel planning within the AQMAs and Medway in general.

Arriva in Medway operates approximately 95% of the local bus network, by mileage, on a commercial basis. A formal bus quality partnership is not currently in place between the Council and Arriva to improve bus journey times and promote patronage increases. There is no commitment at the present time to reduce emissions from the bus fleet by complying with an agreed Euro vehicle emissions standard. Under the new AQAP, Medway Council will increase the proportion of Euro V, and subsequent (equivalent) buses in the fleet, and investigate the feasibility of a Quality Bus Partnership with the local bus operators.

How to Get Involved

Members of the public can help improve air quality in Medway by walking and cycling rather than using cars, especially for local journeys. Medway Council encourages people to car share whenever possible, and the Council has a database for commuter car sharing (www.medwaycarshare.com).

Further information on local air quality can be obtained from the Kent Air website (<http://www.kentair.org.uk/>).

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1 Local Air Quality Management

This report provides an overview of air quality in Medway during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) (HMSO, 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 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 Medway 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 A5.1 in Appendix A5.

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 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Medway Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries is available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=157.

In addition to the existing AQMAs, Medway Council propose to declare a new AQMA covering the Four Elms Hill area in Chattenden following successive years of recorded exceedances of the nitrogen dioxide annual mean objective and a Detailed Assessment of air quality. Once the statutory consultation and formal declaration periods (which are planned to take place in 2017) are complete, the new AQMA will cover approximately 24 properties along Four Elms Hill.

Table 2.1: Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One-Line Description	Action Plan
Central Medway AQMA	NO ₂ annual mean	Rochester	A large central AQMA which includes Frindsbury Road, Cuxton Road, Strood Centre, Rochester Centre, Chatham Centre, Luton Road, High Street, Chatham and Rainham Road.	Air Quality Action Plan 2015 (Medway Council, 2015) Available at: http://www.medway.gov.uk/crimenuisanceandsafety/rubbishpollutionnuisance/airandsmells/medwayairqualityaction.aspx
Rainham AQMA	NO ₂ annual mean	Rainham	An area running along the High Street in Rainham.	
Gillingham AQMA	NO ₂ annual mean	Gillingham	An area along Pier Road in Gillingham.	

2.2. Progress and Impact of Measures to Address Air Quality in Medway

Defra's appraisal of the 2016 ASR identified that the report had not outlined progress arising from the AQAP due to its relative infancy, and requested that future ASRs feature where measures are being progressed, and where measures are not meeting their expected potential. In addition, emphasis should be placed on identifying measures that will impact on air pollution 'hot spots', and track their progress in subsequent years. It was also mentioned

that the 2016 ASR failed to quantify key pollution reductions to facilitate the comparison for effectiveness of different measures to achieve the objectives.

Since the AQAP has now been formally adopted for nearly 18 months, it has been possible to report, assess and quantify the extent to which measures contained within the Plan are helping achieve the objectives. These are outlined in Table 2.2.

The Defra appraisal also makes reference to the exceedance recorded at Four Elms Hill and subsequent changes to AQMA boundaries as a result. Diffusion tubes located along Pier Road in Gillingham did not show exceedances of the objective in 2016; therefore, the Council will continue to consider revoking the AQMA. Nonetheless, there is some uncertainty as to when this may occur owing to a significant amount of development yet to be built in the area. Until this development is complete, it will remain important to monitor and collate data to ensure that compliance is maintained with the objectives.

Following comments from the appraisal, monitoring results have been corrected for distance where required, and have been applied in Table A2.1. In addition, Appendix D includes several maps pertaining to the monitoring locations within each declared AQMA.

2.2.1. Medway Air Quality Action Plan

The Medway Air Quality Action Plan was approved by the Medway Council Cabinet on 15th December 2015, developed in consultation with Integrated Transport, Sustainable Development, Public Health and other departments. Within the Plan, there are 12 measures to improve air quality, which range from transport/highways measures through to public education and advice.

The Action Plan identifies road transport as the significant contributor to local concentrations of nitrogen dioxide, particularly within the AQMAs; it is therefore intended that the Action Plan will be integrated into the Council Local Transport Plan to help reduce traffic emissions further and help to alleviate congestion throughout Medway.

Details of all measures completed, in progress, or planned are set out in Table 2.2. More detail on these measures can be found in the AQAP. Since formal adoption, progress has been made on several measures contained within the Action Plan. In particular, Measure 1 has been completed, with Medway Council working in conjunction with Kent County Council to issue a new Regional Freight Action Plan.

2.2.2. Medway Local Transport Plan

The Local Transport Plan, setting out Medway's transport strategy, was adopted in March 2011. The document provides the long-term policy and strategy for the 15 years between 2011 and 2026, and aims to encourage alternatives to the private car by improving the quality of bus services and encouraging walking and cycling for shorter journeys. The strategy also outlines a series of actions focussing on improving the management of the highway network

as well as congestion and air quality hotspots. In partnership with key stakeholders, the Transport Plan details the development of AQMA traffic management schemes, operational protocols, working with Network Rail to widen Darnley Arch and reviewing transport schemes for air quality impacts as key priorities for the future. The strategy is delivered via shorter-term Implementation Plans, the first of which covered the time period between 2011 and 2015, and within which air quality was addressed.

2.2.3. *Improving Freight Movement*

The Freight Action Plan for Kent was formally adopted in June 2017 following public consultation and Cabinet Committee reviews. The plan identifies five main actions to help mitigate the negative impacts of road freight throughout the county, including managing the routing of HGV traffic, taking steps to address the problems caused by freight traffic, and ensuring that Kent County Council continues to effectively control and reduce the impact of freight traffic. In addition to publishing the new Action Plan, the Council has initiated a review of HGV satellite navigation, although this is principally being delivered through the Freight Action Plan.

Freight movements are also tackled locally through the draft Medway Network Management Plan 2017 – 2020 with the aim of tackling road congestion. Key performance indicators, such as journey times and cycle count data will be used to determine the impact of the plan against a base scenario.

The ability to monitor HGV movements through Medway AQMAs depends on the continuation of monitoring by DfT, who monitor at several locations on the Medway road network within declared AQMAs. Traffic data indicate that there have been significant reductions in the volumes of HGVs not solely through the Medway AQMAs, but through the region as a whole. This is in contrast to the M2 motorway, where the numbers of HGVs have shown a general increase. It is thought that ongoing analysis of HGV traffic flow data could be used to determine the effectiveness of other measures in place to tackle freight movements as well as establish whether further intervention or review is required.

2.2.4. *Encouragement of Public Transport*

Meetings between the Council and local bus operators in 2016 were used as a forum to discuss unnecessary idling at Chatham Bus Station, one of the main gateways in Medway. It has since been noted that incidents of idling have decreased without the need for formal intervention, however further progress relies on cooperation and support between both Medway Council and local bus operators.

Collation of local bus fleet data is to continue in order to determine whether further intervention is required to accelerate the adoption of cleaner vehicle technologies. It is expected that in order for progress to be effective and for vehicle emissions to be successfully reduced, external funding will be required, in particular to support smaller bus operators.

The uptake of bus passengers, despite annual fluctuations, is a useful indicator of performance. Over the last three years there has been a general increase in the total number of bus passengers, reinforced by the introduction of the smart ticketing scheme. Further improvements to patronage could be achieved by improvements to bus infrastructure, such as stop facilities and better provision of information, however budget constraints dictate the extent to which this can be fulfilled. During 2016 improvements included new bus shelter facilities and real-time information screens, along with the implementation of the draft Network Management Plan which is expected to improve bus flows and reliability thereby providing improved journey times.

2.2.5. Improvements in Taxi Emissions

Progressive measures are currently on hold until a detailed analysis of fleet information has occurred. Until the number of ULEVs present in the taxi fleet have been accounted for, it is not possible to advance, such as by introducing a licencing regime, with this measure.

2.2.6. Traffic Management

Although no further action is proposed for several of these measures (such as 11, 12 and 13), the Council intends to introduce a permit scheme to reduce disruption arising from street works in and around the Medway AQMAs. The formulation of the draft Network Management Plan (as described in Section 2.2.3) will help deliver this measure. Progress on Measure 14 relies on continued support and data monitoring by DfT as ANPR data have proved insufficient in classifying vehicle splits. There are already numerous count points administered by DfT throughout the Medway road network; however these may in the future be augmented by dedicated Council surveys.

2.2.7. Promotion of Cycling and Walking

The Council continued to carry out a significant activity supporting delivery of the Action Plan measures relating to walking and cycling during 2016. The work carried out in this area by the Road Safety and Safer Journeys Team (SJT) in Integrated Transport is backed up with complementary walking and cycling initiatives lead by the Public Health Team. In 2016 significant progress was made, including:

Walking Bus/Green Footsteps

At the end of March 2016, there were 628 people participating on the Walking Bus with a total of 50 active Walking Bus Routes operating within Medway. An additional 117 school classes in Medway signed up to the Walk on Wednesday (WOW) and Active Bug initiatives, with approximately 3,500 children from Medway taking part, representing a 19% increase in the number of classes participating in Medway compared to the previous academic year.

By the end of November 2016, the total has risen to 657 participants, with an additional 114 classes signed up to WOW.

Sustrans The Big Pedal 18-19 April 2016

Medway's Safer Journeys Team encouraged Medway schools to register for the event, promoted via email and social media.

National Walk to School Week 16-20 May 2016

The SJT promoted this campaign to Medway schools during May in partnership with Living Streets and the Kent and Medway (KM) Charity Team. Local focus activities included the 'Walk2Count Challenge', encouraging schools to compete for the highest percentage of walks over the duration.

Cars off the Road 1/4/16-30/6/16

Figures generated via the KM Charity Team demonstrated Medway had significantly reduced car journeys compared to the other 13 districts in Kent, with a fifth of the countywide savings (20.6%) having been attributed to Medway school journeys alone (17,054 car journeys saved in Medway out of a total of 82,823 across Kent).

KM Charity Team figures from 1st August 2016 (at the end of the academic year) showed Medway had significantly reduced car journeys (66,199) compared to the other 13 districts in Kent (including Bexley), with close to a quarter of the countywide savings (23%) having been attributed to Medway school journeys alone.

Figures generated via the KM Charity Team data portal from 1/9/16 to 17/11/16 showed Medway demonstrated significantly reduced car journeys compared to any other district in Kent, with over a third of the countywide savings (38%) attributed to Medway school journeys alone.

Bikeability Summer Courses

30 children in Medway participated in a free Bikeability 2-day summer course at Greenacre Academy in Walderslade. The courses were co-ordinated by the SJT and took place between 8-9 and 22-23 August and included a Level 1 assessment followed by Level 2 course delivery involving cycling assessment on nearby roads.

Bikeability Balance

Bikeability delivered approximately 50 courses in Medway between October and December 2016, allowing 400 children to take part in Level 1 and Level 2 training. Bikeability Balance, a new initiative to inspire children in Reception and Year 1 to take to two wheels, launches in January 2017. This is funded by the Department for Transport until 2020, with over 22 schools in Medway wishing to take part to date.

International Walk to School Month

In October 2016, during the International Walk to School Month campaign, the Council's SJT encouraged primary and secondary schools in Medway to compete for the highest percentage of walks over the campaign period. In total 46,510 walked journeys were made by the participating schools.

Parking Enforcement/Road Safety Project

From September 2016, Parking Enforcement and the SJT worked with three Medway schools as part of a partnership project to promote responsible parking and active travel initiatives.

'Mode of Travel' School Census Data

Questions continue to be asked alongside the annual Medway Council school census data collection. Mode of travel data made available during the quarter outlined the following active travel achievements in Medway in 2016:

- 59.9% of pupils aged 5-10 walk to school in Medway, 13.9% higher than the national average
- 35.8% of pupils aged 5-10 are driven to school by car/van/taxi in Medway, 10.2% lower than the national average
- 2.4% reduction in car use (including vans and taxis) for pupils aged 11-15 since records began in 2006/07
- 6.8% increase in walking for pupils aged 11-15 compared to the previous year, the highest since records began in 2006/07

2.2.8. *Eco-driving*

Budget constraints have restricted progress on vehicle fleet efficiency, although there are contracts which Medway Council can award where there is an initiative to deploy ULEVs. Within the procurement strategy (covering the period 2016 – 2021) it is not clear how much budget will be apportioned to ULEVs. At present, there are two vehicle lease schemes available within Medway; Tuskers Salary Sacrifice Lease Scheme and the Green Car Salary Sacrifice Scheme. It is hoped that the release of the Autumn Statement by the Government will enhance the uptake of ULEVs and therefore boost the number of lease schemes available.

2.2.9. *Travel Planning*

The Council continues to support schools across Medway in the development of School Travel Plans (STP), providing each school community with a voice in terms of their concerns or suggestions in relation to the school journey and the opportunity to set targets in addressing these items. Approximately 90% of all schools in Medway have previously developed a STP and there is a continued requirement for schools to produce these in accordance with planning

applications/developments that impact on the travel and transport needs associated with the school journey.

The Education & Inspections Act places a general duty on local authorities to promote the use of sustainable travel and transport. The duty applies to children and young people of compulsory school age who travel to received education or training in a local authority's area. A copy of the Medway Schools Active Travel Strategy (produced by the Safer Journey's Team, under the DfE Home to School Travel & Transport guidance) is available upon request.

Limited resources and restricted budget allocation to travel planning have stalled progress on realigning the Medway Travel Plan to better reflect measures outlined in the Air Quality Action Plan, as well as preventing the development of work place travel plans.

2.2.10. Car Sharing

Medway Council currently has a database managed by Liftshare (www.medwaycarshare.com), with promotion of the scheme proposed to occur in 2017/18 in order to maximise the number of registered users.

2.2.11. Development Planning

In conjunction with a review of the Kent & Medway Air Partnership's (K&MAQP) planning guidance, Medway published new air quality planning guidance in 2016. The guidance was developed in response to changes in national planning policy, brought about by the National Planning Policy Framework. The guidance aims to improve local air quality by:

- Introducing a method for assessing the air quality impacts of developments, which includes the quantification of impacts, calculation of damage costs, and the identification of mitigation measures to be implemented to negate the impact of development on air quality;
- Ensuring cumulative impacts are included in assessments; and
- Providing clarity and consistency of the process for developers, the local planning authority and local communities

The Medway guidance exists as a template for all members of the K&MAQP, and is designed to be used as technical guidance, or for adoption as Supplementary Planning Guidance, and encourages mitigation measures to be implemented where necessary.

The guidance was published in April 2016, and has been used extensively in the consideration of planning applications coming forward in Medway which are likely to have an air quality impact. As a result, significant levels of air quality mitigation are being secured for new developments. A key feature of the Medway guidance is that it requires the implementation of standard air quality mitigation, which includes the installation of electric vehicles charging points, helping to incentivise and accelerate the uptake of electric vehicles.

The guidance can be found at:

<http://www.medway.gov.uk/planningandbuilding/localplansandpolicies/developmentplanpolicies/developmentbriefsguidance.aspx>

Under Medway's lead, a workshop for planners, officers, and councillors is being developed in conjunction with Kent and Medway Air Quality Partnership for delivery in 2017, with the intention of further increasing the uptake of guidance across the whole region.

2.2.12. Promoting Health Awareness and Air Quality Issues

The Environmental Protection Team was invited to deliver a presentation on the health impacts of poor air quality and the Medway AQAP at a Public Health Directors Day in June 2016. Bus and coach drivers at Chatham bus station were educated on the importance of curbing unnecessary idling through a pilot monitoring study in which the Environmental Protection Team used portable monitoring equipment. The key messages raised by this pilot study were reiterated by further engagement at bus operator meetings. The Environmental Protection team, in tandem with the Public Relations team, are planning to issue a draft communications strategy in 2017.

A Steering Group, chaired by the Assistant Director of Front Line Services, was established in 2016 to provide oversight, and facilitate further development of measures in the Action Plan. The Steering Group consists of representatives from key council services including, amongst others, Environmental Protection, Public Health, Planning and Integrated Transport, who have agreed to work together with the shared goal of seeking to improve air quality in Medway through behavioural, strategic and infrastructure change.

Although the Action Plan is at the beginning of its expected five year life cycle, good progress was achieved during 2016, with quarterly meetings booked with stakeholders through to June 2017. The fourth meeting will be used to review, amongst others, the frequency, membership and terms of reference of the group.

At present, air quality related actions are included within Environmental Protection and Integrated Service plans, with ongoing work identifying whether there are additional service plans within which the AQAP should be integrated. Input into the new Medway Local Plan is currently ongoing, including the development of a new air quality policy.

2.2.13. Feasibility Studies and Funding

Pilot studies, including measuring the variability in personal exposure to air pollution outside of a local school during term-time and school holidays, and a Council officer's daily commute by car, are being evaluated to decipher what key messages can be extracted and incorporated into future awareness raising initiatives.

Medway has developed a package of schemes as part of a Local Enterprise Partnership (LEP) bid for the Government's Local Growth Fund (LGF). Funding of over £68 million was

granted to the Kent & Medway federated area for projects that commenced in 2015/16. £28.6 million of this funding has been allocated for five schemes In Medway, four of which could have a positive impact in air quality, these include:

- A289 Four Elms Roundabout to Medway Tunnel Journey Time and Network Improvements
- Medway City Estate Connectivity Improvement Measures
- Strood Town Centre Journey Time and Accessibility Enhancements
- Medway Cycling Action Plan

Table 2.2: Progress on Measures to Improve Air Quality

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
1 – Improving Freight Movement	1 -Review Regional Freight Strategy	Freight and Delivery Management	Other	Medway Council - Integrated Transport and Kent County Council	2016	2017 – 2020	Completed or not		Complete. Medway Council worked with Kent County Council on a draft revised regional Freight Action Plan (including Medway). Consultation and adoption to be undertaken during 2017. Link to draft plan: http://consultations.kent.gov.uk/consultationHome . Movement of freight also tackled locally through the Medway draft Network Management Plan for 2017-2020. The draft plan aims to tackle road congestion, and performance indicators, such as journey times, traffic data, cycle count data, air quality monitoring data can be used as a means of measuring the plans impact against a baseline scenario.	2020	
	2 - HGV route optimisation	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	Medway Council - Integrated Transport and Kent County Council	n/a	2017 – 2020. Ongoing for life of plans under 'Review Regional Freight Strategy' above.	Completed or not		Ongoing. Tackled through 'Review Regional Freight Strategy' above.	2020. Ongoing for life of plans under 'Review Regional Freight Strategy' above.	
	3 - HGV Sat Nav review	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	Medway Council - Integrated Transport and Kent County Council	n/a	2017 – 2020. Ongoing for life of plans under 'Review	Completed or not		Ongoing. Tackled through 'Review Regional Freight Strategy' above.	2020. Ongoing for life of plans under 'Review Regional Freight Strategy'	

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
						Regional Freight Strategy' above.				above.	
	4 - Monitor % HGVs through AQMAs	Freight and Delivery Management	Other	Medway Council -Integrated Transport and DfT	n/a	Ongoing	Completed or not		HGV flows are not monitored by Medway Council. However, DfT data are available for a number of locations on the Medway road network, and includes locations within/near to AQMA's. The DfT data shows significant reductions in the % 's of HGV's in many areas of Medway, including in the Medway AQMA's. In contrast, the % of HGV's on the strategic M2 motorway has been increasing. Ongoing analysis of HGV traffic flow data could be used to determine effectiveness of Measures 1-3 above, and whether further intervention/review is required.	Ongoing	Relies on continued monitoring by DfT
2 – Encouragement of Public Transport Use	5 - Investigate the feasibility of a Quality Bus Partnership (or equivalent) with the local bus operator	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	Medway Council -Integrated Transport	Ongoing	Unknown	Completed or not		The Council has regular meetings with all the local bus operators where a wide range of issues are discussed with regards to the efficient running of the local bus services. During 2016 meetings were used as a forum to discuss concerns regarding unnecessary idling at Chatham Bus Station. As a result observed incidents of idling have decreased without the need for formal intervention.	Unknown at this time	Relies on support from local bus operators and Medway Council
	6 -Increase proportion of Euro V, and subsequent (equivalent) buses in	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Medway Council -Integrated Transport	Ongoing	Unknown	Annual fleet status	Reduction in Vehicle Emissions	Bus fleet data for some local bus operators have been obtained for 2015 and 2016. The ongoing trend in bus replacement by the operators is to be monitored further to identify if	Ongoing	Operator investment budgets. External funding is likely to be required to support the smaller bus operators in

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
	fleet								intervention is necessary to accelerate renewal of the fleets. This may require external funding for new buses/retrofitting.		renewal/retrofitting of their vehicle fleets.
	7 - Increase bus patronage	Promoting Travel Alternatives	Other	Medway Council -Integrated Transport	Ongoing	Ongoing	Annual bus patronage figures		Bus patronage figures can fluctuate year to year for a variety of reasons. The last three financial years have shown increases in the total figure: 2014/15 8,676,271; 2015/16 8,709,267; 2016/17 8,902,079. A smart ticketing scheme has been launched and will be expanded in 2017 with pre-loaded cards being issued to residents of a new residential development at Halling in conjunction with Section 106 developer contributions. The smartcard can be used with local bus operators. The complementary Plusbus scheme allows commuters to buy a discount bus pass with a train ticket at any national rail station ticket office, online, and self-service machines selected stations. This allows unlimited bus travel on participating operator's services around the urban area of the Medway towns.	Ongoing	
	8 - Improve bus flow and reliability	Transport Planning and Infrastructure	Bus route improvements	Medway Council - Integrated Transport	Ongoing	Ongoing	Number of bus infrastructure improvements		Bus infrastructure improvements can have a complementary role in improving patronage by providing better stop facilities and improved information for passengers. During 2016 improvements included: new bus shelter facilities on the A2 Corporation Street, and real time information screens. New information screens at Twydall Community Hub. Implementation of the draft Network	Ongoing	

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
									Management Plan could be of benefit to improved bus flows and reliability, by providing improved/consistent journey times.		
3 – Improvements in Taxi Emissions	9 - Review taxi licensing conditions	Promoting Low Emission Transport	Taxi Licensing conditions	Medway Council -Licensing	Unknown	Unknown	Completed or not		No progress has been made during 2016	Unknown at this time	
	10 - Annual Audit of taxi fleet	Promoting Low Emission Transport	Other	Medway Council -Licensing	Ongoing	Unknown	Percent ULEV in Annual audit of taxi fleet		Historic fleet information has been obtained from the Licensing Team. Analysis of the information is needed to identify any trends in the numbers of ULEVs present in the taxi fleet before any interventions are investigated, for example through the licensing regime.	Unknown at this time	Fleet analysis required. External funding may be required to support drivers/companies to renewal/retrofit vehicles, and provide supporting infrastructure (EV charging points).
4 – Traffic Management	11- Carry out maintenance of E-mote system to protect asset for future use	Traffic Management	Other	Medway Council -Integrated Transport	Unknown	Unknown	Completed or not		No action is being proposed at present to progress this measure. The E-motes have not been operative for several years since a pilot project was carried out in Medway. There are currently no plans, or funding available, to carry out maintenance of the system.	Unknown at this time	The E-mote system would also have to be a beneficial traffic management tool for this measure to be progressed.
	12 - Annually report number and location of roadworks in or around AQMAs	Traffic Management	Other	Medway Council -Integrated Transport	2016	2017	Completed or not		No further action is proposed as this is not a SMART indicator. However, a Street Works Permit scheme, due to be introduced by the Council in January 2017 will address the issue of street works in and around the AQMA. The permit scheme is a traffic management tool to reduce the disruption caused by work on the highway. Contractors are required to obtain a permit before work	Ongoing	Ongoing implementation of permit scheme required.

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
									commences, and day of the week/time restrictions are in place for Traffic Sensitive Streets, where permits will only be issued where there is to be compliance with the time restrictions. It may be possible to report the number of permits issued in/around AQMA's.		
	13 - Report AADT annually	Traffic Management	Other	Medway Council – Integrated Transport	2017	2017	Completed or not		No further action is proposed as this is not a SMART indicator. However, performance indicators for the draft Network Management Plan (see no.1 above) are more appropriate going forward (journey times etc.). DfT traffic flow data are also available for many locations/roads in Medway.	Ongoing	Regular reporting of internal indicators required. Relies on continued monitoring by DfT.
	14 - Link ANPR vehicle class data to provide detailed source apportionment to support feasibility study work	Traffic Management	Other	Medway Council – Integrated Transport	2017	2017	Completed or not		ANPR has not worked for several years, and has never been capable of giving vehicle split classifications. Traffic master data and base map software are used to obtain results. This is based on phone signal data, and is not for every vehicle. It provides journey times and volumes only. Dedicated surveys therefore maybe required for future studies or source apportionment work. More detailed DfT data are however available for a number of locations/roads within Medway.	Ongoing	Regular reporting of internal indicators required. Relies on continued monitoring by DfT.
5 – Promotion of Cycling and Walking	15 - Promoting and monitoring cycling and walking	Promoting Travel Alternatives	Promotion of walking and Promotion of cycling	Medway Council – Safer Journeys Team	Ongoing	Ongoing	Medway mode of travel data		See supplementary information in Section 2.2.7	Ongoing	
	16 - Develop and continue	Promoting	School	Medway Council	Ongoing	Ongoing	Number of		See supplementary information in	Ongoing	

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
	walk or cycle to school scheme and events	Travel Alternatives	Travel Plans	- Safer Journeys Team			schools participating		Section 2.2.7		
	17 - Develop and continue healthy walk scheme and cycle scheme	Promoting Travel Alternatives	Promotion of walking and Promotion of cycling	Medway Council - Supporting Healthy Weight Team	Ongoing	Ongoing	Number of individuals involved		See supplementary information in Section 2.2.7	Ongoing	
6 - Eco-Driving	18 - Run internal Eco-driving courses	Vehicle Fleet Efficiency	Driver training and ECO driving aids	Medway Council - Business Development	Unknown	Unknown	Number of drivers on training courses		No progress has been made during 2016	Unknown at this time	
	19 - Engage with businesses to promote Eco-driving	Vehicle Fleet Efficiency	Driver training and ECO driving aids	Medway Council - Business Development Team	2017	2018	Number of businesses engaged		No progress has been made during 2016. However, development of this measure is expected under Measure 29 (below).	Unknown at this time	
7 - Procurement	20 - Increase ULEV component within Medway fleet	Promoting Low Emission Transport	Company Vehicle Procurement -Prioritising uptake of low emission vehicles	Medway Council - Procurement	Ongoing	Unknown	Number of ULEV within Medway fleet		Medway Council currently do not have any ULEVs. The EU class is not currently logged but the fuel type is estimated at over 90% diesel. There are contracts which Medway Council award where there is an initiative within the industry to deploy ULEVs.	Unknown at this time	
	21 - Review of Medway Procurement Policy to ensure positive support for ULEV and third party emission reduction	Promoting Low Emission Transport	Public Vehicle Procurement -Prioritising uptake of low emission vehicles	Medway Council - Procurement	Ongoing	Ongoing	Completed or not		Procurement Strategy covering 2016-2021 has been produced. No obvious support for ULEV and third party emissions reduction. This will need to be explored further. Medway have two vehicle lease schemes in operation: 1) Tusker salary sacrifice lease hire scheme for staff. No data are available on what vehicles are leased through the scheme; however the vast majority	Unknown at this time	

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
									are likely to be either petrol or diesel (not ULEVs). However, ULEVs are available through the scheme. The Green Car Salary Sacrifice Scheme for staff also caps the CO2 emissions limit of cars available through the scheme to 130g/km or lower. This has enabled staff to have a choice of up to 3,800 low emission vehicles. All vehicle tail pipe emissions are off-set and the scheme will be awarded carbon neutral status. 2) There is also a legacy arrangement, which consisted of- 76 personal vehicles, all of which were petrol with a max cc of 1250 and an average cc of 1150; 55 commercial vehicles of which 2 were petrol and 40 diesel, and 13 'unknown', with the max cc of 2500 and average cc of 1500. The Governments autumn budget statement is expected to alter the attractiveness of ULEV's, and could result in more ULEV lease agreements.		
8 - Travel Planning	22 - Develop and improve school travel plans	Promoting Travel Alternatives	School Travel Plans	Medway Council – Safer Journeys Team	Ongoing	Ongoing	Number of schools with active travel plans		90% of all schools in Medway have previously developed a school travel plan, and there is a continued requirement to produce these in accordance with planning applications that impact upon the travel and transport needs associated with school journeys.	Ongoing	Relies on significant changes occurring that required planning permission.
	23 - Review and align Medway Travel Plan with AQAP	Promoting Travel Alternatives	Workplace Travel Planning	Medway Council – Business Development Team	Unknown	Unknown	Completed or not		No progress has been made during 2016. No budget is allocated to travel planning, and no staff availability to promote this.	Unknown at this time	

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
	24 - Develop work place travel plans	Promoting Travel Alternatives	Workplace Travel Planning	Medway Council – Business Development Team	Unknown	Unknown	Number of businesses with a travel plan		No progress has been made during 2016. No budget is allocated to travel planning, and no staff availability to promote this.	Unknown at this time	
9 – Car Sharing	25 - Promote car sharing and reduce the number of trips	Alternatives to private vehicle use	Car & lift sharing schemes	Medway Council – Integrated Transport	2017	2017/18	Number registered on Liftshare scheme		Promotion of Medway Car Share scheme to increase numbers registered planned for 2017/18.	Unknown at this time	
10 – Development Planning	26 - Review and re-write relevant planning policies and develop a supplementary planning document to reflect this action plan and relevant and related corporate strategies	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Medway Council – Planning and Environmental Protection	Ongoing	Ongoing	Number of relevant policies reviewed and re-written that are beneficial to air quality		New air quality planning guidance produced and adopted in April 2016, emphasising mitigation of impacts using damage costs approach. Worked started on drafting a new air quality policy for the local plan to support use of the planning guidance, and increase its scope. The current planning policy, BNE24, was implemented on 4 decision notices in 2016. Under Medway's lead, a workshop for planners, officer and councillors is being developed in conjunction with Kent & Medway Air Quality Partnership for delivery in 2017, to increase uptake of guidance across the region.	Ongoing	Requires implementation and recording of policy on decision notices.

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
11 – Promotion Health Awareness and Air Quality Issues	27 - Improve and then maintain awareness of the health and financial impacts of air pollution to all stakeholder groups; business, schools, public, vulnerable groups, internal members, and internal managers	Public Information	Other	Medway Council	Ongoing	Ongoing	Number of notifications and consultations carried out		Presentation delivered at Public Health Directors Day in June 2016 by Environmental Protection Team on health impacts of poor air quality and the Medway AQAP. In a pilot exercise, portable monitoring equipment was used by the Environmental Protection Team to educate bus/coach drivers at Chatham bus station why it is important not to leave engines idling whilst stationary. Further engagement was carried out at bus operators meetings, which reinforced the need for idling to be minimised.	Ongoing	
	28 - Development of promotional material to support Eco-driving within businesses	Vehicle Fleet Efficiency	Other	Medway Council – Environmental Protection, Public Health and Communications Team	2017	2018	Number of press releases, reports on websites, presentations delivered, workshops delivered and leaflets dropped		No progress has been made during 2016. However, development of this measure is expected under Measure 29 (below).	Unknown at this time	
	29 - Develop an air quality communications strategy with public relations	Public Information	Other	Medway Council – Communications Team and Environmental Protection	2017	2018	Completed or not		A draft communications strategy is to be formulated during 2017/2018 which links to a number of other measures in the Action Plan. The overarching aim of the strategy will be to communicate information to all relevant stakeholders	Unknown at this time	

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
	team								and attempt to induce behavioural change.		
	30 - Set up AQAP steering group and book 6 monthly meetings with stakeholders	Policy Guidance and Development Control	Other Policy	Medway Council – Environmental Protection	2016	2016	Completed or not		Quarterly meetings booked with stakeholders for first year of Steering Group through to June 2017. Frequency of meetings, membership, terms of reference etc. to be reviewed by the group at 4th quarter meeting.	Ongoing	
	31 - Engage with business, internal members and managers as priority	Public Information	Via other mechanisms	Medway Council – Communications Team and Environmental Protection	2017	2018	Number of events and presentations where the AQAP has been represented		No progress has been made during 2016. However, development of this measure is expected under Measure 29 (above).	Unknown at this time	
	32 - Integrate, where appropriate, AQAP target into internal service plans	Policy Guidance and Development Control	Other Policy	Medway Council – Performance Hub and Environmental Protection	Ongoing	Ongoing	Number of internal service plans with AQAP related actions included		AQAP features in Environmental Protection and Integrated Transport service plans. Work required to identify if appropriate to integrate AQAP into other service plans going forward.	Ongoing	
	33 - Identify corporate policies and strategies where consultation of changes is requested and notify	Policy Guidance and Development Control	Other Policy	Medway Council – Environmental Protection	Ongoing	Ongoing	Number identified		Input provided in to ongoing development of the new Local Plan, and development of new air quality policy. Input provided into review of essential car users allowance which financially penalises staff with smaller, more fuel efficient and cleaner vehicles. Comments provided on consultation for Strood town centre	Ongoing	

	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated Completion Date	Comments
	accountable department								improvements.		
12 – Feasibility Studies and Funding	34 - Develop business case for evaluation or quantification studies to take forward to 2016-2017	Other	Other	Medway Council – Environmental Protection	Ongoing	Ongoing	Completed or not		During 2016 the Environmental Protection Team used portable monitoring equipment (particulates and nitrogen dioxide) to measure personal exposure to air pollution outside of a school during and out of term times, and an officer's daily commute by car to and from the Council's main Gun Wharf offices. The data is being evaluated to see what key messages can be taken from the monitoring exercise, and how this fits into future awareness raising initiatives under Measure 29 (above).	Ongoing	

2.3. PM_{2.5}: Local Authority Approach to Reducing Emissions and Concentrations

As detailed in Policy Guidance LAQM.TG16 Chapter 7 (Defra, 2016a), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5 µm 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.

Medway Council is taking the following action plan measures, which will also help to address PM_{2.5}:

- freight movements will be improved, reducing HGV journey times through AQMAs and the proportion of low emission freight vehicles will be increased. This will reduce PM_{2.5} emissions, especially within the AQMAs where human health is of key concern;
- the bus fleet will be improved, leading to lower PM_{2.5} emissions;
- measures to increase the percentage of low emission vehicles in the taxi and council fleet will be explored, potentially reducing PM_{2.5} emissions;
- traffic management measures will be implemented, reducing congestion and queue lengths. This will result in lower PM_{2.5} emissions from vehicles;
- eco-driving information and advice will be provided within the Council and to businesses, which will reduce PM_{2.5} emissions from vehicles;
- sustainable transport options will be promoted, such as walking, cycling and car sharing, which aim to increase modal shift away from private vehicles and thus reduce PM_{2.5} emissions; and
- engagement with stakeholder groups, businesses, schools and members of the public to promote air quality and encourage reductions of PM_{2.5} emissions, through the use of travel plans, sustainable transport options, policies and strategies.

Medway Council is part of the Kent Health and Wellbeing Board, which brings together County and District Councillors, senior officers from the NHS Area Team, Clinical Commissioning Groups, Social Care and Public Health and members of the Local Healthwatch. The Board produced the Kent Joint Health and Wellbeing Strategy, which sets out how the multidisciplinary teams can align their plans to improve public health and tackle key health issues over the coming years.

Medway Council is working with Public Health colleagues to prioritise action on air quality in its area to help reduce the health burden from air pollution. The Public Health Outcomes Framework is a Department of Health data tool for England, intended to focus public health action on increasing healthy life expectancy and reducing differences in life expectancy between

communities. The PHOF includes an indicator, based on the effect of particulate matter (PM_{2.5}) on mortality. The approach used in partnership with Public Health colleagues includes the encouragement of active travel, which will also have wider public health benefits captured in other indicators such as increased physical activity (indicator 2.13) and reducing excess weight at various ages (indicators 2.6 & 2.12).

The Local Transport Plan for Kent sets out a 20 year transport delivery plan for the County. Medway traffic has an impact upon a number of the County's primary highway routes, such as the M2, A228, A26 and A229. With 140,000 new houses and 123,000 new jobs planned for Kent and Medway by 2026, up to 250,000 extra journeys per day could be added onto the County's transport network. The Local Transport Plan sets out a number of strategies to improve the transport infrastructure to support future growth and specifically targets AQMAs and congestion hotspots for improvements. These transport improvements are expected to reduce PM_{2.5} emissions, especially through the AQMAs where health is of key concern, but also on a wider basis.

Medway Council is also part of the Kent and Medway Air Quality Partnership (K&MAQP), which aims to deliver a consistent approach to tackling air pollution across the County, sharing knowledge and information between Kent County Council, district councils, health authorities, Highways England, the Environment Agency, Public Health England and various consultants and research partners. The Kent and Medway Air Quality Monitoring Network (K&MAQMN) coordinates a number of sites monitoring pollution across the County, supported by two AURN monitoring stations in Medway measuring concentrations of PM_{2.5}. Data for the network are reported through its dedicated website, KentAir, which can be found at www.kentair.org.uk.

Planning is also particularly important for reducing concentrations of PM_{2.5} and Medway Council is focussed through its planning policy on preventing particulate matter concentrations being inadvertently increased. Policy BNE24 within the Local Plan states that *“Development likely to result in airborne emissions should provide a full and detailed assessment of the likely impact of these emissions. Development will not be permitted when it is considered that unacceptable effects will be imposed on the health, amenity or natural environment of the surrounding area, taking into account the cumulative effects of other proposed or existing sources of air pollution in the vicinity”*.

In addition, Policy BNE2 within the Local Plan, designed to protect local amenities states that *“All development should secure the amenities of future occupants, and protect those amenities enjoyed by nearby and adjacent properties. The design of the development should have regard to:... ii) noise, vibration, light, heat, smell and airborne emissions consisting of fumes, smoke, soot, ash, dust and grit...”*.

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 the monitoring that has taken place and how the results compare with objectives.

Medway Council undertook automatic (continuous) monitoring at two sites during 2016. Table A1.1 in Appendix A1 shows the details of the sites. National monitoring results are available at <https://uk-air.defra.gov.uk/networks/network-info?view=aurm>.

Maps showing the locations of the monitoring sites are provided in Appendix A4. Further details on how the monitors are calibrated and how the data have been adjusted are included in Appendix A3.

3.1.2. Non-Automatic Monitoring Sites

Medway Council undertook non-automatic (passive) monitoring of NO₂ at 31 sites during 2016, including an additional four sites commissioned since 2015. Table A1.2 in Appendix A1 shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix A4. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustment, annualisation and distance correction are included in Appendix A3.

3.2. Individual Pollutants

The air quality monitoring results presented in this section have, where relevant, been annualised and bias-adjusted. The results shown in Figure 3.1 have not been corrected for distance to allow a comparable analysis with previous years. Further details on adjustments are provided in Appendix A3.

3.2.1. Nitrogen Dioxide (NO₂)

Table A1.3 in Appendix A1 compares the ratified and adjusted annual mean NO₂ concentrations for the past five years with the air quality objective of 40 µg/m³. For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix A2.

Table A1.4 in Appendix A1 compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective (200 µg/m³, not to be exceeded more than 18 times per year).

Measured concentrations at the automatic monitoring sites were below the annual mean air quality objective in 2016. Concentrations were also below the objective at 21 diffusion tube monitoring sites. Exceedances were observed at 10 sites, nine of which also measured an exceedance in 2015. Concentrations at several monitoring sites were lower than in 2015; however, there are several sites that show increases in nitrogen dioxide concentrations compared to previous years, although levels remain below the objective.

Eight of the sites that measured exceedances of the annual mean objective are located within AQMAs (Central Medway and Rainham) where concentrations have previously been measured above the objective. Only two of the monitoring sites that measured exceedances are located outside the AQMAs (at 33 London Road and Four Elms Hill); further analysis is provided below.

The bias-adjusted annual mean concentration at 33 London Road was 48.5 µg/m³ in 2016. The nearest relevant exposure to this monitoring site is a residential property located 6.7 m away from the kerb. The 'distance from roads' calculator has been used to determine whether concentrations would be above the objective at the residential property; details of the calculation are provided in Appendix A3. The annual mean concentration at the residential property is predicted to be 37.5 µg/m³, which is below the objective. It is therefore recommended that the Central Medway AQMA remains unchanged.

The bias-adjusted annual mean concentration at Wainscott, Four Elms Hill (NAS17) was 50.9 µg/m³ in 2016, a slight decrease from 2015 (52.0 µg/m³). The monitoring site is located 2.2 m away from a residential property. The 'distance corrected' concentration is above the objective (40.8 µg/m³). The Council is currently preparing for the declaration of the Four Elms AQMA, which will include this location, and it is recommended that monitoring continues within the area. Modelling of pollution concentrations (within the Detailed Assessment) at this location will provide a more accurate representation of concentrations at sites of relevant exposure.

Concentrations were not measured above the objective at any monitoring site within the Pier Road AQMA in 2016, although levels at some sites were higher in 2016, and at other sites were lower. Concentrations should continue to be monitored within this AQMA; if levels remain consistently below the objective, consideration may be given to revoking the AQMA.

In 2016, the Council commissioned four additional sites, three of which are located within the Central Medway AQMA. Site NA1S19, located 1.1 metres from a tuition centre, measured an exceedance of the annual mean nitrogen objective, of 41.7 µg/m³. The distance-corrected concentration at the façade of the tuition centre is 39.9 µg/m³, reinforcing that the Central Medway

AQMA should remain. The other three sites measured concentrations below the annual mean objective.

There were no measured exceedances of the 1-hour objective at the automatic monitoring sites. The annual mean concentrations at the diffusion tube monitoring sites were all below 60 µg/m³, indicating that an exceedance of the 1-hour mean objective is unlikely.

Measured annual mean concentrations for the past six years (bias adjusted and annualised) are presented in Figure 3.1. For comparison with previous years, 2016 monitoring data have not been distance-corrected. There is no clear trend in measured concentrations over this period, with some sites demonstrating downward concentrations, notably NAS31, whilst others, in particular sites NAS30 and NA1S2, show increasing levels (of at least 4 µg/m³).

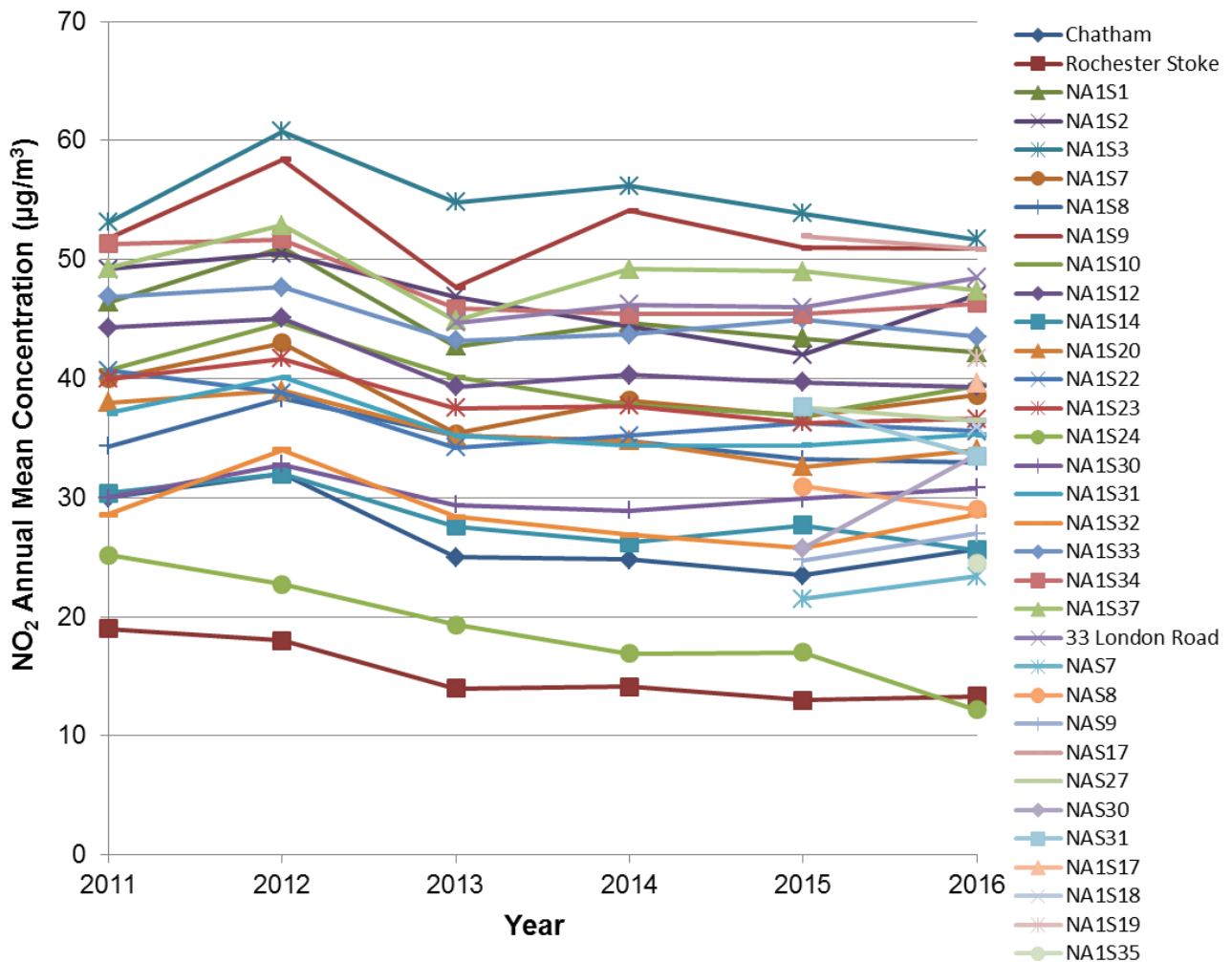


Figure 3.1: Trends in Measured Annual Mean Nitrogen Dioxide Concentrations

3.2.2. Particulate Matter (PM₁₀)

Table A1.5 in Appendix A1 compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40 µg/m³.

Table A1.6 in Appendix A1 compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past six years with the air quality objective (50 µg/m³, not to be exceeded more than 35 times per year).

The measured concentrations were well below the annual and daily mean air quality objectives at both automatic monitoring sites in 2016.

Measured annual mean concentrations for the past six years are presented in Figure 3.2. Between 2013 and 2015 there is a slight downwards trend in measured concentrations.

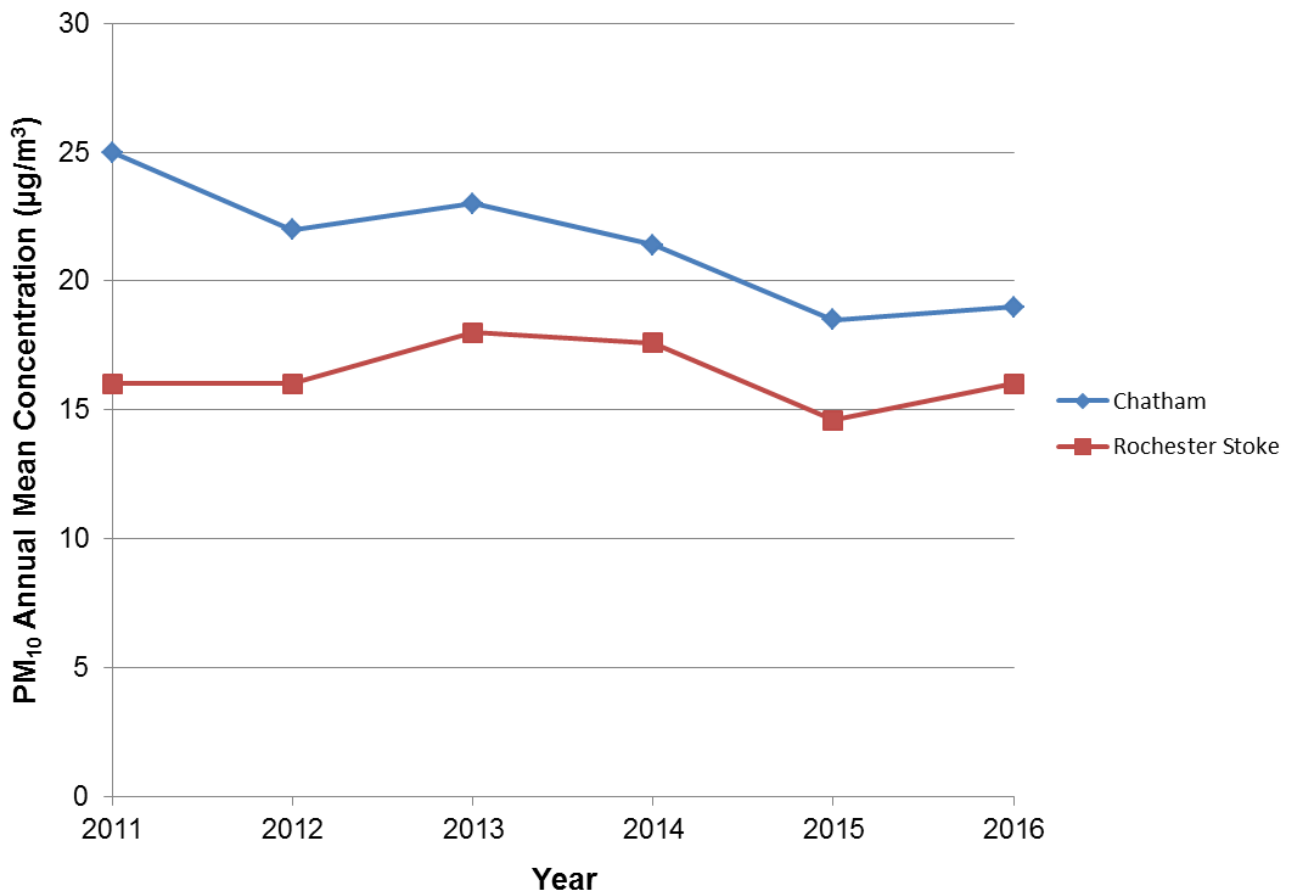


Figure 3.2: Trends in Measured Annual Mean PM₁₀ Concentrations

3.2.3. Particulate Matter (PM_{2.5})

Table A1.7 in Appendix A1 presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years at the Chatham Roadside and Rochester Stoke AURN sites.

The measured concentrations were below the PM_{2.5} UK objective for 2020 (25 µg/m³ as an annual mean) at both automatic monitoring sites in 2016.

Measured annual mean concentrations for the past six years are presented in Figure 3.3. There is a downward trend in measured concentrations over this period for the Chatham Roadside AURN site. There also appears to be a general trend of decreasing concentrations over the past four years at the Rochester Stoke site.

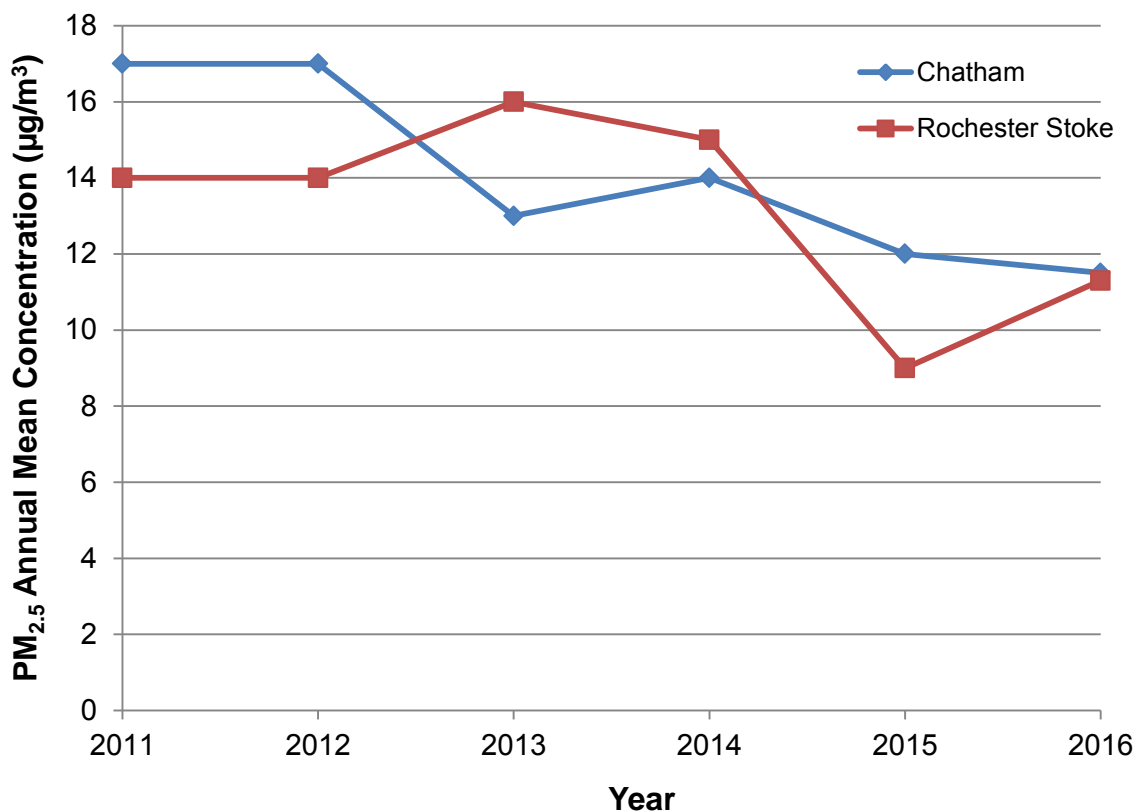


Figure 3.3: Trends in Measured Annual Mean PM_{2.5} Concentrations

3.2.4. Sulphur Dioxide (SO₂)

Table A1.8 in Appendix A1 compares the ratified continuous monitored SO₂ concentrations for year 2016 with the air quality objectives for SO₂.

In 2016, there were no measured exceedances of the air quality objectives for SO₂.

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A1 Appendix A: Monitoring Results

Table A1.1: 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) ^a	Distance to kerb of nearest road (m) ^b	Inlet Height (m)
Chatham	Chatham (AURN)	Roadside	577434	166993	NO ₂ PM ₁₀ PM _{2.5}	Y	Chemiluminescent analyser FDMS (until November 2016 then BAM) FDMS (until November 2016 then BAM)	0	4	2.5
Rochester Stoke	Rochester Stoke (AURN)	Rural Background	583164	176313	NO ₂ PM ₁₀ PM _{2.5} SO ₂ O ₃	N	Chemiluminescent analyser FDMS FDMS UV fluorescent analyser UV absorption analyser	0	N/A	2.5

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

^b N/A if not applicable.

Table A1.2: 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) ^a	Distance to kerb of nearest road (m) ^b	Tube Collocated with a Continuous Analyser	Height (m)
NA1S1	60 High Street, Rainham	Roadside	581565	165955	NO ₂	Y	0.0	2.5	N	2.3
NA1S2	High Street, Strood (Tanning Shop)	Roadside	573470	169283	NO ₂	Y	0.0	2.5	N	2.5
NA1S3	High Street, Strood	Roadside	573793	169164	NO ₂	Y	0.0	2.1	N	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ^a	Distance to kerb of nearest road (m) ^b	Tube Collocated with a Continuous Analyser	Height (m)
	(Southern Heating)									
NA1S7	Luton Road (Funeral Directors)	Roadside	576565	167336	NO ₂	Y	0.0	2.9	N	2.5
NA1S8	27 Luton High Street	Roadside	577419	166501	NO ₂	Y	0.0	2.0	N	2.5
NA1S9	18 Star Hill, Rochester	Roadside	574592	168087	NO ₂	Y	0.0	3.3	N	2.5
NA1S10	92 Cuxton Road, Strood	Roadside	573078	168908	NO ₂	Y	0.0	4.2	N	2.2
NA1S12	Railway Street, Chatham	Roadside	575642	167779	NO ₂	Y	0.0	5.5	N	3.0
NA1S14	Chatham AQ Station	Roadside	577434	166993	NO ₂	Y	0.0	3.3	Y	3.0
NA1S20	Flat 4 New Road, Chatham	Roadside	575683	167691	NO ₂	Y	0.0	8.2	N	4.0
NA1S22	Chatham High Street (Orbit Housing)	Roadside	576395	167497	NO ₂	Y	0.0	3.1	N	2.5
NA1S23	28 Frindsbury Road, Strood	Roadside	573866	169647	NO ₂	Y	0.0	3.1	N	2.1
NA1S24	Stoke AQ Station	Rural Background	583164	176313	NO ₂	N	0.0	N/A	Y	3.0
NA1S30	Corporation Street, Rochester	Roadside	574492	168510	NO ₂	Y	1.4	4.3	N	2.5
NA1S31	White Horse Pub, High Street, Rainham	Roadside	581709	165922	NO ₂	Y	1.0	2.4	N	2.5
NA1S32	Care Home, High	Roadside	581842	165886	NO ₂	Y	0.0	4.9	N	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ^a	Distance to kerb of nearest road (m) ^b	Tube Collocated with a Continuous Analyser	Height (m)
	Street, Rainham									
NA1S33	Canterbury Street/Chatham Hill Junction, Gillingham	Roadside	577763	166924	NO ₂	Y	2.8	1.9	N	2.5
NA1S34	Luton Arches Junction	Roadside	576504	167411	NO ₂	Y	1.0	1.8	N	2.5
NA1S37	London Road, Strood	Roadside	573329	169294	NO ₂	Y	0.0	2.5	N	2.5
33 London Rd	33 London Road, Strood	Roadside	573168	169305	NO ₂	N	6.7	1.7	N	2.0
NAS7	86 Spire Way, Wainscott	Roadside	574999	170882	NO ₂	N	0.0	29.0	N	2.2
NAS8	Joy Lodge, Four Elms Hill	Roadside	575489	171616	NO ₂	N	0.0	12.0	N	1.2
NAS9	1 Omaha Place, Wainscott	Roadside	575044	171351	NO ₂	N	0.0	34.0	N	2.1
NAS17	Lamp post Wainscott, Four Elms Hill	Kerbside	575946	171847	NO ₂	N	2.2	0.5	N	2.6
NAS27	Lamp post PAS23, Pier Road	Roadside	577908	169285	NO ₂	Y	0.4	3.3	N	2.3
NAS30	Lamp post PAS12 Pier Road	Roadside	578007	169262	NO ₂	Y	6.8	2.6	N	2.4
NAS31	Lamp post PAS22, Pier Road	Roadside	577880	169319	NO ₂	Y	4.6	3.8	N	2.4
NA1S17	9 New Road, Chatham	Roadside	575737	167670	NO ₂	Y	6.4	1.0	N	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ^a	Distance to kerb of nearest road (m) ^b	Tube Collocated with a Continuous Analyser	Height (m)
NA1S18	Trinity College, Chatham	Roadside	574758	167892	NO ₂	Y	6.1	2.9	N	2.5
NA1S19	Tuition Centre, Chatham	Roadside	575475	167839	NO ₂	Y	1.1	3.1	N	2.5
NA1S35	7 Highview Drive, Chatham	Roadside	574789	164568	NO ₂	N	0.0	8.4	N	2.5

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

^b N/A if not applicable.

Table A1.3: Annual Mean NO₂ Monitoring Results

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ^a	Valid Data Capture 2016 (%) ^b	NO ₂ Annual Mean Concentration (µg/m ³) ^c				
						2012	2013	2014	2015	2016
Chatham	Chatham (AURN)	Roadside	Automatic	99.1	99.1	32	25	24.8	23.5	25.7
Rochester Stoke	Rochester Stoke (AURN)	Rural Background	Automatic	92.2	92.2	18	14	14.1	13.0	13.3
NA1S1	60 High Street, Rainham	Roadside	Diffusion Tube	100.0	100.0	51.0	42.7	44.7	43.4	42.2
NA1S2	High Street, Strood (Tanning Shop)	Roadside	Diffusion Tube	83.3	83.3	50.5	46.9	44.4	42.0	47.0
NA1S3	High Street, Strood (Southern Heating)	Roadside	Diffusion Tube	100.0	100	60.8	54.8	56.2	53.9	51.7
NA1S7	Luton Road (Funeral Directors)	Roadside	Diffusion Tube	91.7	91.7	43.0	35.4	38.2	36.8	38.6
NA1S8	27 Luton High Street	Roadside	Diffusion Tube	100.0	100.0	38.3	35.2	34.8	33.2	33.0
NA1S9	18 Star Hill, Rochester	Roadside	Diffusion Tube	100.0	100.0	58.4	47.7	54.1	51.0	50.9
NA1S10	92 Cuxton Road, Strood	Roadside	Diffusion Tube	100.0	100.0	44.7	40.1	37.8	36.9	39.4
NA1S12	Railway Street, Chatham	Roadside	Diffusion Tube	100.0	100.0	45.1	39.3	40.3	39.7	39.3
NA1S14	Chatham AQ Station	Roadside	Diffusion Tube	100.0	100.0	32.0	27.6	26.2	27.7	25.6
NA1S20	Flat 4 New Road, Chatham	Roadside	Diffusion Tube	91.7	91.7	39.0	35.2	34.8	32.6	34.0
NA1S22	Chatham High Street (Orbit Housing)	Roadside	Diffusion Tube	100.0	100.0	38.8	34.2	35.2	36.3	35.6
NA1S23	28 Frindsbury Road, Strood	Roadside	Diffusion Tube	100.0	100.0	41.7	37.5	37.7	36.3	36.6
NA1S24	Stoke AQ Station	Rural Background	Diffusion Tube	83.3	83.3	22.7	19.3	16.9	17.0	12.2
NA1S30	Corporation Street, Rochester	Roadside	Diffusion Tube	100.0	100.0	32.8	29.4	28.9	29.9	30.8

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ^a	Valid Data Capture 2016 (%) ^b	NO ₂ Annual Mean Concentration (µg/m ³) ^c				
						2012	2013	2014	2015	2016
NA1S31	White Horse Pub, High Street, Rainham	Roadside	Diffusion Tube	100.0	100.0	40.1	35.2	34.4	34.4	35.3
NA1S32	Care Home, High Street, Rainham	Roadside	Diffusion Tube	100.0	100.0	34.0	28.4	26.9	25.8	28.6
NA1S33	Canterbury Street/Chatham Hill Junction, Gillingham	Roadside	Diffusion Tube	100.0	100.0	47.7	43.2	43.7	45.0	43.5
NA1S34	Luton Arches Junction	Roadside	Diffusion Tube	100.0	100.0	51.7	45.9	45.4	45.4	46.3
NA1S37	London Road, Strood	Roadside	Diffusion Tube	75.0	75.0	52.9	44.9	49.2	49.0	47.4
33 London Road	33 London Road, Strood	Roadside	Diffusion Tube	100.0	100.0	N/A	44.7	46.2	46.0	48.5
NAS7	86 Spire Way, Wainscott	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	21.5	23.4
NAS8	Joy Lodge, Four Elms Hill	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	31.0	29.0
NAS9	1 Omaha Place, Wainscott	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	24.7	27.0
NAS17	Lamp post Wainscott, Four Elms Hill	Kerbside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	52.0	50.9
NAS27	Lamp post PAS23, Pier Road	Roadside	Diffusion Tube	83.3	83.3	N/A	N/A	N/A	37.6	36.5
NAS30	Lamp post PAS512 Pier Road	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	25.8	33.6
NAS31	Lamp post PAS22, Pier Road	Roadside	Diffusion Tube	91.7	91.7	N/A	N/A	N/A	37.6	33.5
NA1S17	9 New Road, Chatham	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	39.6
NA1S18	Trinity College, Chatham	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	35.9
NA1S19	Tuition Centre, Chatham	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	41.7
NA1S35	7 Highview Drive, Chatham	Roadside	Diffusion Tube	100.0	100.0	N/A	N/A	N/A	N/A	24.5

Notes: Exceedances of the NO₂ annual mean objective of 40 µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60 µg/m³, indicating a potential exceedance of the NO₂ 1-hour objective, are shown in **bold and underlined**.

^a Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year (e.g. if monitoring was carried out for 3 months and results were available for all three monthly tubes then the data capture is 100%).

^b 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%).

^c Annual means for diffusion tubes have been corrected for bias. All means have been annualised as per Technical Guidance LAQM.TG16 (Defra, 2016c) if valid data capture for the full calendar year is less than 75%. At applicable sites, annual means have not been corrected for distance to allow comparison with previous years. Distance corrected values for relevant sites are available in Appendix A2, with details available in Appendix A3.

Table A1.4: 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ^a	Valid Data Capture 2016 (%) ^b	NO ₂ 1-Hour Means > 200 µg/m ³ ^c				
					2012	2013	2014	2015	2016
Chatham	Roadside	Automatic	99.1	99.1	3	0	0	0	0
Rochester Stoke	Rural Background	Automatic	92.2	92.2	0	0	0	0	0

Notes: Exceedances of the NO₂ 1-hour mean objective (200 µg/m³, not to be exceeded more than 18 times/year) are shown in **bold**.

^a Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b 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%).

^c If the period of valid data capture is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A1.5: Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ^a	Valid Data Capture 2016 (%) ^b	PM ₁₀ Annual Mean Concentration (µg/m ³) ^c				
				2012	2013	2014	2015	2016
Chatham	Roadside	90.4	90.4	22	23	21.4	18.5	19.1
Rochester Stoke	Rural Background	85.0	85.0	16	18	17.6	14.6	15.8

Notes: Exceedances of the PM₁₀ annual mean objective of 40 µg/m³ are shown in **bold**.

^a Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b 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%).

^c All means have been annualised as per Technical Guidance LAQM.TG16 (Defra, 2016c) if valid data capture for the full calendar year is less than 75%. See Appendix A3 for details.

Table A1.6: 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ^a	Valid Data Capture 2016 (%) ^b	PM ₁₀ Annual Mean Concentration (µg/m ³) ^c				
				2012	2013	2014	2015	2016
Chatham	Roadside	90.4	90.4	14	10	15	4	3
Rochester Stoke	Rural Background	85.0	85.0	4	3	8	2 (24)	4 (32)

Notes: Exceedances of the PM₁₀ 24-hour mean objective (50 µg/m³, not to be exceeded more than 35 times/year) are shown in **bold**.

^a Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b 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%).

^c If the period of valid data capture is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A1.7: PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ^a	Valid Data Capture 2016 (%) ^b	PM _{2.5} Annual Mean Concentration (µg/m ³) ^c				
				2012	2013	2014	2015	2016
Chatham	Roadside	75.4	75.4	17	13	14	11.8	11.5
Rochester Stoke	Rural Background	86.1	86.1	14	16	15	8.9	11.3

^a Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b 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%).

^c All means have been annualised as per Technical Guidance LAQM.TG16 (Defra, 2016c) if valid data capture for the full calendar year is less than 75%. See Appendix A3 for details.

Table A1.8: SO₂ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ^a	Valid Data Capture 2016 (%) ^b	Number of Exceedances (percentile in brackets) ^c		
				15-minute Objective (266 µg/m ³)	1-hour Objective (350 µg/m ³)	24-hour Objective (125 µg/m ³)
Rochester Stoke	Rural Background	95.7	95.7	0	0	0

Notes: Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

^a Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b 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%).

^c If the period of valid data capture is less than 85%, the relevant percentiles are provided in brackets.

A2 Appendix B: Full Monthly Diffusion Tube Results for 2016

Table A2.1: NO₂ Monthly Diffusion Tube Results 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.77) and Annualised ^a	Distance Corrected to Nearest Exposure ^b
NA1S1	67.2	52.8	40.0	58.5	52.9	44.8	53.9	52.5	59.7	51.5	63.9	59.4	54.8	42.2	42.2
NA1S2	56.5	68.2	64.5	67.5	68.3	57.7	39.8	-	-	59.6	66.8	61.9	<u>61.1</u>	47.0	47.0
NA1S3	50.8	66.5	71.8	76.7	78.7	52.6	62.3	56.4	73.5	73.2	72.5	70.5	<u>67.1</u>	51.7	51.7
NA1S7	56.2	55.9	52.1	53.7	47.0	-	37.8	39.0	44.0	47.6	58.4	59.4	50.1	38.6	38.6
NA1S8	45.9	50.6	45.2	44.8	43.1	40.7	32.5	34.2	40.9	42.4	46.2	47.9	42.9	33.0	33.0
NA1S9	72.2	71.2	62.8	62.8	67.7	58.1	59.3	59.1	72.8	67.7	69.7	69.3	<u>66.1</u>	50.9	50.9
NA1S10	47.4	53.3	46.0	52.2	59.6	49.4	45.6	42.9	54.5	54.6	55.6	52.3	51.1	39.4	39.4
NA1S12	56.2	56.5	52.6	57.1	55.9	40.4	39.9	41.4	53.8	51.6	52.7	53.7	51.0	39.3	39.3
NA1S14	42.6	32.9	37.9	33.0	34.0	27.9	33.6	30.2	32.2	34.1	43.0	38.7	35.0	25.6	25.6
NA1S20	51.5	54.1	-	45.8	46.3	35.6	33.6	34.0	45.8	43.3	49.9	46.5	44.2	34.0	34.0
NA1S22	57.7	55.9	38.3	51.3	51.2	36.2	39.0	39.1	43.6	43.3	53.9	46.0	46.3	35.6	35.6
NA1S23	50.9	48.9	49.3	49.7	51.3	40.1	37.4	38.4	46.4	48.1	52.4	57.7	47.6	36.6	36.6
NA1S24	32.5	28.3	21.5	20.1	21.1	12.9	14.4	15.6	21.6	-	-	42.8	23.1	12.2	12.2
NA1S30	39.4	46.7	45.5	39.7	41.1	34.5	28.6	30.7	42.5	42.7	47.0	42.0	40.0	30.8	29.8
NA1S31	35.2	51.8	46.7	47.6	50.0	43.1	38.2	38.0	46.8	47.3	50.7	54.0	45.8	35.3	33.6
NA1S32	33.1	43.8	49.8	38.1	36.5	28.3	27.2	30.2	33.4	35.9	43.0	46.5	37.2	28.6	28.6
NA1S33	56.3	65.5	55.7	61.1	62.8	29.1	52.8	51.0	59.1	54.2	68.4	62.0	56.5	43.5	37.9

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.77) and Annualised ^a	Distance Corrected to Nearest Exposure ^b
NA1S34	56.7	69.7	51.3	66.3	65.7	46.5	55.6	52.4	61.8	58.8	69.7	66.4	60.1	46.3	43.4
NA1S37	70.2	-	55.1	53.3	63.4	-	-	56.1	67.9	59.0	72.2	56.4	61.5	47.4	47.4
33 London Road	66.0	70.5	64.5	58.3	65.2	59.6	52.9	49.4	59.5	62.0	74.5	72.9	62.9	48.5	37.5
NAS7	33.9	-	30.3	32.4	39.9	21.6	21.0	22.8	30.1	24.4	34.7	43.6	30.4	23.4	23.4
NAS8	46.1	40.7	35.4	42.7	38.0	33.5	36.6	30.7	35.0	32.8	39.7	40.9	37.7	29.0	29.0
NAS9	38.6	39.8	32.0	34.8	42.3	29.9	25.3	25.6	33.3	34.7	37.2	47.8	35.1	27.0	27.0
NAS17	78.8	74.7	60.9	69.8	59.1	57.9	55.3	54.6	67.8	68.2	73.0	73.2	66.1	50.9	40.8
NAS27	-	43.4	44.0	-	53.2	44.3	43.8	41.0	54.0	44.5	63.1	43.3	47.5	36.5	35.9
NAS30	49.8	59.1	49.3	45.3	52.2	41.7	34.3	26.0	35.3	35.9	47.8	47.4	43.7	33.6	28.7
NAS31	66.2	66.0	37.0	35.2	38.1	30.1	26.0	34.4	44.7	46.7	54.3	-	43.5	33.5	30.2
NA1S17	27.4	59.1	62.0	48.9	62.7	56.8	40.8	39.3	53.6	53.0	59.5	54.2	51.4	39.6	31.3
NA1S18	45.3	56.2	54.2	51.6	45.8	39.0	36.7	35.3	40.5	42.3	53.8	58.6	46.6	35.9	30.5
NA1S19	59.4	60.0	55.9	54.2	58.9	45.6	43.0	41.1	52.4	47.6	63.3	68.2	54.1	41.7	39.9
NA1S35	27.3	38.5	32.2	35.6	26.7	22.3	23.6	24.6	32.7	30.4	42.7	44.6	31.8	24.5	24.5

Exceedances of the NO₂ annual mean objective of 40 µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60 µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**

^a See Appendix A3 for details on annualisation, bias adjustment and distance correction.

^b Distance corrected to nearest relevant public exposure.

A3 Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Supporting Technical Information

Changed and new sources of pollution have been investigated and any changes to existing sources or new sources are listed below:

New or Existing Source	Screening Assessment Required?
Narrow Congested Streets with residential properties close to the kerb	No
Busy Streets where people may spend 1-hour or more close to traffic	Restaurant seating area for the Hollywood Bowl on the A231 Brompton Road, Gillingham. This road carried in excess of 10,000 vehicles and the seating is within 5 m of the kerb.
Roads with a high flow of buses and/or HGV	No
Junctions	No
New roads constructed since the last round of Review and Assessment	No
New roads constructed since the last round of Review and Assessment	No
Bus and coach stations	No
Railway (diesel and steam trains)	No
Industrial installations (new installations and those with significantly increased emissions)	There are a number of new industrial installations, see below for details.
Major petrol storage depots	No
Petrol Stations	No
Poultry farms	No
Biomass combustion (including domestic solid-fuel burning for PM ₁₀)	No
CHP installations	Kingsnorth Industrial Estate, Hoo St Werburgh, Rochester, see below for details.
Domestic solid-fuel burning (SO ₂)	No
Quarries, landfill sites, opencast coal mining, waste transfer sites, materials handling (i.e. ports, major construction sites)	No

New or Existing Source	Screening Assessment Required?
New Developments	<p>There have been a number of commercial and residential developments in the area in 2016. For several developments, mitigation has been secured by condition. At New Road, Chatham (MC/16/1212 and MC/16/1471) potential air quality impacts have been identified, but the Council has been unable to address them through prior approval/notification. Following consultation from Swale Borough Council, objections have been raised by Medway Council, including on air quality impacts, for the development on London Road, Newington (MC/16/0368)</p>

New Industrial Sources

In order to control emissions to the atmosphere, several industrial processes which required Part A(2) and Part B permits were given by the Council in 2016. These included:

Timberstore Preservation Ltd, Shed 8, Chatham Docks ME4 4SW (Timber Treatment, Part A(2) - P/A2/004)

WJ Timber Treatment Ltd, Scotline Terminal, Crown Wharf, Whitehall Way, Medway City Estate, Rochester, ME2 4EN (Timber Treatment, Part A(2) - P/A2/005)

Colas Ltd, Thamesport, Grain Road, Isle of Grain, ME3 0EP (Mobile Roadstone Coating, Part B - P/B/070)

OCL Regeneration Ltd, Systems House, Beluncle Halt, Stoke Road, Hoo, Rochester, ME3 9NT (Mobile Roadstone Coating and Mobile Concrete Crushing, P/B/CP/069/P1)

Asda Petrol Filling Station, Pier Road, Chatham, ME7 1RZ (P/B/PVR/029)

Asda Petrol Filling Station, 381 Maidstone Road, Chatham, ME5 9SE (P/B/PVR/030)

OCL Regeneration Ltd appears to be relatively small, and located more than 250 m away from the nearest relevant receptors on Stoke Road. As such the air quality impacts from this facility are likely to be insignificant, and there is no need for a detailed assessment to be carried out. The other new industrial sources are unlikely to affect local air quality.

Proposed Industrial Sources

Picado UK Ltd, Thamesport, Grain Road, Isle of Grain, ME3 0AG (Cement Batching)

Sicame UK Ltd, Medway Commercial Park, Plot 49, ME3 9ND (Di-isocyanate Use)

Sources with >30% Increase in Emissions

Quinn Cement (Crown Wharf, Whitewall Road, Rochester) has increased its silo capacity by >30%, although BAT should minimise emissions below this level. Despite the expansion, the original Part B permit issued by Medway Council in October 2015 details a set of criteria that must be adhered to in order for the installation to operate. This includes monitoring of dust and fumes, measures to minimise dust emissions, and procedures to ensure the permit is followed. It is expected that, despite the expansion, the operational impact of the installation on local air quality will remain insignificant.

Kingsnorth Industrial Estate, Hoo St. Werburgh, Rochester

The development plans include the replacement of existing structures (B8 use) with the construction of two new buildings (floor area circa 5,060 m²) incorporating a 1.8 MW biogas combined heat and power plant (sui generis) and associated storage and car parking.

The applicant submitted an air quality assessment, with the proposal dated December 2015. The assessment demonstrated that the proposal will not have a significant effect on the surrounding air quality and that the concentrations of all pollutants, at the nearest sensitive receptors, will be below the objectives.

Notwithstanding the air quality assessment, a condition was added to the planning application regarding a further air quality assessment and restrictions on emissions concentrations (condition 8).

Diffusion Tube Bias Adjustment Factors

Measurements from co-located diffusion tubes and the automatic monitors at the Chatham (AURN) and Rochester Stoke (AURN) monitoring sites have been compared to determine a local bias adjustment factor. The bias adjustment factor has been calculated as presented in Table A3.1.

Table A3.1: Local Bias Adjustment Factor Calculation

Monitoring Site	Diffusion Tube Annual Mean Concentration (µg/m ³)	Automatic Annual Mean Concentration (µg/m ³)	Adjustment Factor
Chatham	35.0	25.7	0.73
Rochester Stoke	23.1	13.3	0.58
Local Bias Adjustment Factor			0.66

A database of bias adjustment factors determined from Local Authority co-location studies throughout the UK has been collated by the LAQM Helpdesk. The National Diffusion Tube Bias Adjustment Factor Spreadsheet (Version 03/16) was used to obtain an overall adjustment factor of

0.77 for 2016. This overall factor is based on 30 co-location studies where the tube preparation method and analysis laboratory used, were the same as those used by Medway Council.

The national bias adjustment factor is higher than the local adjustment factor and has therefore been used to provide a worst-case approach. The bias adjustment factors for previous years were 0.84 in 2012, 0.77 in 2013 and 0.81 in 2014 and 0.79 in 2015.

The national bias adjustment factor has been applied to all sites, with the exception of the collocated tubes which used the respective site bias factors from the national spreadsheet. For reference, these were taken as 0.73 for Chatham and 0.53 for Rochester Stoke.

QA/QC of Automatic Monitoring

The Chatham (AURN) site is calibrated every two weeks and the Rochester Stoke (AURN) site every month. An external specialist company is contracted to service the stations every 6 months. The quality assurance/quality control (QA/QC) procedures are equivalent to the UK AURN procedures. Kent and Medway Air Quality Monitoring Network have a contract with Ricardo-AEA to ratify the data for these sites.

QA/QC of Diffusion Tube Monitoring

Nitrogen dioxide analysis procedures are compliant with the Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for users and laboratories (February 2008). The diffusion tubes are supplied and analysed by ESG Didcot utilising the 50% Triethanolamine (TEA) in acetone preparation method. ESG Didcot is a UKAS accredited laboratory which participates in the AEA inter-comparison and the WASP scheme.

Distance from Road Calculation

Concentrations at the nearest relevant exposure to the monitoring have been predicted following the guidance set out in paragraph 7.78 of LAQM.TG16 (Defra, 2016a), which states that the NO₂ with distance from roads calculator should be used (available at <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>). The parameters used in the calculator are presented in Table A3.2 for each of the monitoring sites that required distance correction. The background concentration has been determined for 2016 using Defra's background maps (Defra, 2016b).

Table A3.2: Calculation of predicted concentrations at distance from a road

Diffusion Tube ID	Distance of the monitoring site to the kerb (m)	Distance of the relevant exposure to the kerb (m)	Annual mean background NO ₂ concentration (µg/m ³)	Measured annual mean NO ₂ concentration at the monitoring site (µg/m ³)	Predicted annual mean NO ₂ concentration at the relevant exposure (µg/m ³)
NA1S30	4.3	5.7	18.2	30.8	29.8
NA1S31	2.4	3.4	15.0	35.3	33.6
NA1S33	1.9	4.7	16.6	43.5	37.9
NA1S34	1.8	2.8	17.8	46.3	43.4
33 London Rd	1.7	8.4	17.9	48.5	37.5
NAS17	0.5	2.7	17.0	50.9	40.8
NAS27	3.3	3.7	18.2	36.5	35.9
NAS30	2.6	9.4	18.4	33.6	28.7
NAS31	3.8	8.4	18.2	33.5	30.2
NA1S17	1.0	7.4	19.1	39.6	31.3
NA1S18	2.9	9.0	17.4	35.9	30.5
NA1S19	3.1	4.2	19.1	41.7	39.9

A4 Appendix D: Map of Monitoring Locations

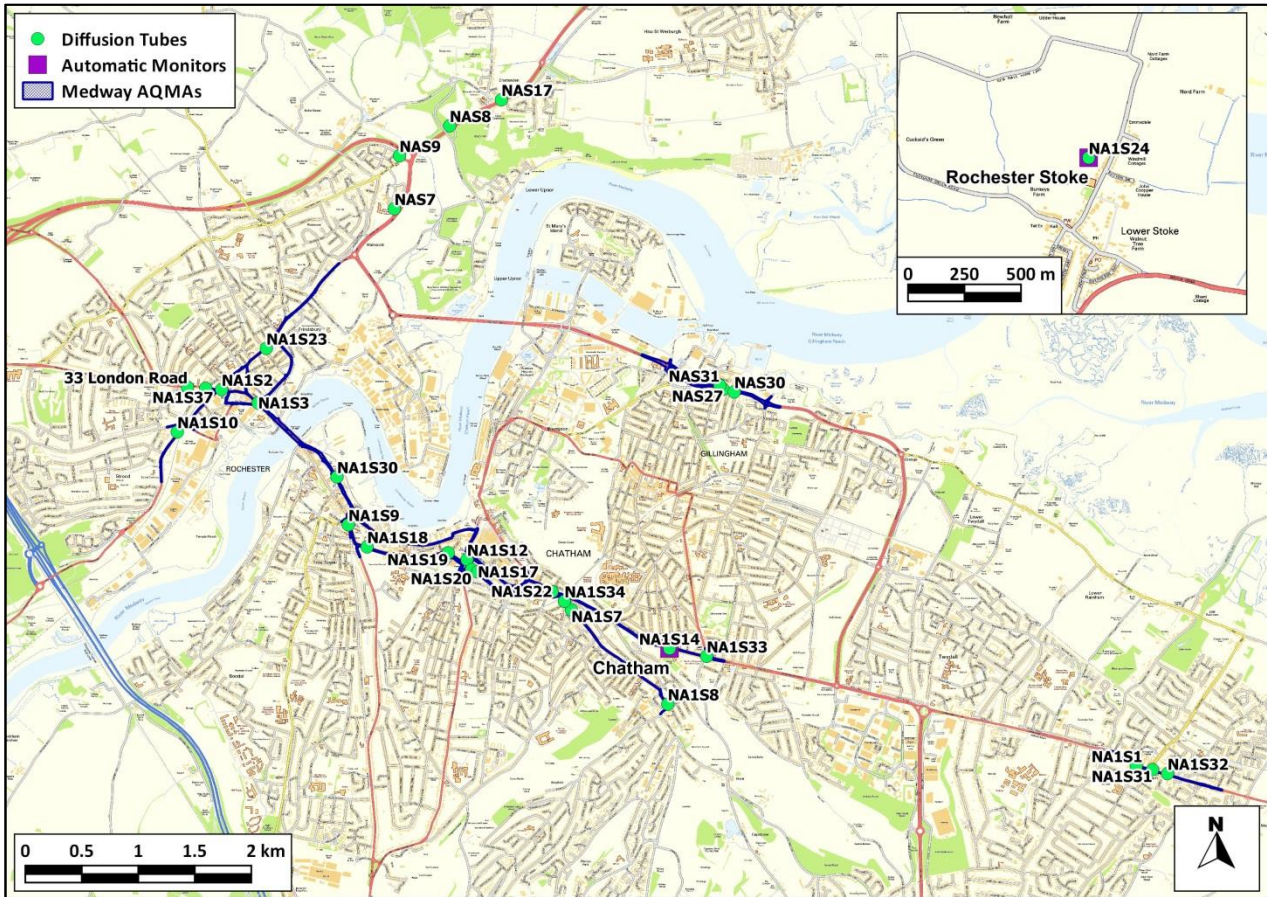


Figure A4.1: Map of Monitoring Sites and Locations of AQMAs within Medway



Figure A4.2: Location of Monitoring Sites within Central Medway AQMA



Figure A4.3: Location of Monitoring Sites within Gillingham AQMA



Figure A4.4: Location of Monitoring within Rainham AQMA

A5 Appendix E: Summary of Air Quality Objectives in England

Table A5.1: Air Quality Objectives in England

Pollutant	Air Quality Objective ^a	
	Objective	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
Fine Particles (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

^a The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
BAM	Beta Attenuation Monitoring
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
$\mu\text{g}/\text{m}^3$	Microgrammes per cubic metre
NO	Nitric oxide
NO₂	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO ₂ + NO)
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM₁₀	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
PM_{2.5}	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

References

Defra (2016a) *Local Air Quality Management Policy Guidance (PG16)*.

Defra (2016a) *Review & Assessment: Technical Guidance LAQM.TG16*, Defra.

Defra (2016b) *Defra Air Quality Website*, [Online], Available: <http://laqm.defra.gov.uk/>.

Defra (2016c) *Local Air Quality Management Technical Guidance (TG16)*.

HMSO (1995) *Environment Act*.

Medway Council (2011) *Medway Local Transport Plan 2011-2026*.

Medway Council (2015) *Air Quality Action Plan 2015*.