
LOCAL AIR QUALITY MANAGEMENT

1 PURPOSE OF REPORT

- 1.1 To present a summary of local authority responsibilities regarding local air quality management and the Council's progress with the Air Quality Management Area (AQMA) in Rayleigh.

2 INTRODUCTION

- 2.1 Poor air quality contributes to the premature deaths of between 40,000 and 50,000 people each year in the UK.
- 2.2 Local air quality management matters have been reported to Members frequently since the late 1990s and most recently to the Portfolio Holder for Environment in December 2014, prior to the declaration of the AQMA in Rayleigh.
- 2.3 This report serves as an update on the creation of an Air Quality Action Plan (AQAP) for the AQMA in Rayleigh.

3 BACKGROUND

- 3.1 The Environment Act 1995 introduced the requirement for local authorities to monitor their districts for prescribed pollutants, in line with a National Air Quality Strategy, and to try to achieve legally-binding EU limit values.
- 3.2 Over time, officers have found that only two of those pollutants – nitrogen dioxide (NO₂) and PM₁₀ (ultra-fine particulate matter) – are relevant to the Rochford District.
- 3.3 In May 2010 an AQMA was declared for PM₁₀ at Rawreth Industrial Estate and neighbouring roads. This issue was resolved through resurfacing of the spine road serving the estate and without the need to produce an AQAP. The AQMA was duly revoked in March 2013.
- 3.4 The AQMA Order for Rayleigh town centre was made on 30 January 2015 and related to an exceedance of the permissible annual average level of NO₂ at 'relevant receptors'. For the purposes of local air quality management, 'relevant receptors' include the facades of homes, school and hospitals, etc. Excluded are pavements, offices and shops.
- 3.5 A copy of the order is attached as Appendix A.
- 3.6 The primary source of NO₂ in the AQMA is vehicle emissions.
- 3.7 Following the creation of the Air Quality Management Area for Rayleigh officers have been working to arrange the process for creating the mandatory Air Quality Action Plan (AQAP). This has involved scoping the work and participating in traffic analysis with Essex County Council colleagues. During

this time the Department of Environment, Food and Rural Affairs (Defra) has also published revised technical and policy guidance, which has amended the process for carrying out this work.

- 3.8 Rayleigh's air quality problem is caused, principally, by vehicle exhaust emissions; therefore, Rochford's Environmental Health Officers have worked closely with Essex County Council Highway Planners. Officers have worked together through the Essex Framework Agreement to choose a company to project manage the development of the AQAP. Ringway Jacobs were selected in April and are to be supported with technical input provided by Air Quality Consultants, a leading specialist consultancy.
- 3.9 The creation and implementation of the AQAP will include input from relevant stakeholders, such as Development Control and Public Health colleagues and public transport providers, at each stage.
- 3.10 The project will run in two parts. The initial phase will focus on analysing specific aspects of the air quality problem, such as the contribution of particular vehicle types and other contributory factors, current and planned policies and actions, and other pressures, such as development.
- 3.11 The second phase will involve the proposal, evaluation and prioritisation of additional options, followed by a public consultation of the draft AQAP, planned for autumn 2016. Providing no further technical evaluation is required, following this consultation, the final AQAP will be presented to Members early in 2017.

Monitoring

- 3.12 NO₂ monitoring takes place using two methods. An automatic analyser is placed in High Street, Rayleigh for six months each year to provide precise data for that location. This costs in the order of £5000 p.a. once electricity fees are also factored in.
- 3.13 To complement this, diffusion tubes – a passive form of monitoring – are used. They cost approximately £3.80 per tube per month and 10 are currently deployed at 8 locations around the AQMA and in Rochford.
- 3.14 Monitoring data and maps of current and past monitoring locations are available at www.essexair.org
- 3.15 Although officers have recently reduced the period of time the Council has an automatic analyser for each year, options are being explored to remove the analyser and increase diffusion tubes. This should reduce revenue costs and provide a better spread of data.

Reporting and Review

- 3.16 Every local authority is required to report its progress on air quality work to Defra each year. A copy of the Council's 2016 Annual Status Report is attached as Appendix B for reference, and approval is expected in late autumn 2016.

4 EMERGING AIR QUALITY ACTION PLAN

- 4.1 Via Essex County Council (ECC), officers have contracted Ringway Jacobs to develop the AQAP. Options for actions will include planned and proposed highway improvements and policy enhancements as well as public and business engagement. As this work is still ongoing, officers will update Members on the current position at the meeting.
- 4.2 Membership of the AQAP Steering Group reflects the traffic-led nature of the air quality issue in Rayleigh. Aside from Rochford District Council Environmental Health and Planning Policy officers, it consists of a number of ECC representatives from Highways and Public Health.
- 4.3 At the time of writing, public consultation regarding the AQAP remains on course to take place during autumn 2016.
- 4.4 Subject to consultation responses, officers expect to seek Member approval of the final AQAP in early 2017. This can then be submitted to Defra for approval.

5 RISK IMPLICATIONS

- 5.1 Each local authority must produce an AQAP with the aim of reducing pollutant emissions following the declaration of an AQMA. Defra can direct local authorities to carry out works where progress is not made. The UK Government can also pass on fines from the EU through the Localism Act 2011.

6 ENVIRONMENTAL IMPLICATIONS

- 6.1 Achievement of the annual mean value for NO₂ (40µg/m³)

7 RESOURCE IMPLICATIONS

- 7.1 Current work is being met from existing budgets and options are being explored to further reduce direct monitoring costs.
- 7.2 Resources to meet actions for the Council in the emerging AQAP will need to be factored in to future years' budgets.
- 7.3 The full cost estimate of the options will be added as a supplementary paper to the AQAP being submitted for member approval in 2017.

8 LEGAL IMPLICATIONS

- 8.1 The Secretary of State for Environment (Department of Environment, Food and Rural Affairs) is responsible for achieving compliance with EU limit values.
- 8.2 The Localism Act 2011 allows for any fine imposed by the EU for failure to meet EU limit values to be apportioned amongst local authorities. Following the result of the EU Referendum, it is unclear whether EU action may be forthcoming for existing breaches.
- 8.3 The Government has previously been taken to court by Client Earth for lack of progress on air quality matters.

9 PARISH IMPLICATIONS

- 9.1 There are no direct implications for parishes; however, the current AQMA is located entirely within Rayleigh Town Council's area and officers will ensure the Town Council is consulted directly regarding the emerging AQAP.

10 RECOMMENDATION

- 10.1 It is proposed that the Committee **RESOLVES** to note the contents of this report.



Louisa Moss

Assistant Director, Community & Housing Services

Background Papers:-

None

For further information please contact Martin Howlett (Principal Environmental Health Officer) on:-

Phone: 01702 318049

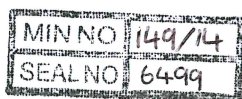
Email: martin.howlett@rochford.gov.uk

If you would like this report in large print, Braille or another language please contact 01702 318111.

Air Quality Management Area Order

Rochford District Council ("The Council"), in exercise of the powers conferred upon it by Section 83(1) of the Environment Act 1995, hereby makes the following Order:

1. This Order may be cited as the **Air Quality Management Area (Rochford District Council) (No.1) Order 2015** and shall come in to effect on 1st February 2015.
2. The effect of the Order is to designate as an Air Quality Management Area ("the AQMA"), the area as shown outlined in red on the plan in Schedule 1 which incorporates some premises in each of the following streets:
 - a) Brook Road;
 - b) Crown Hill;
 - c) Eastwood Road;
 - d) High Road;
 - e) High Street;
 - f) Hockley Road;
 - g) Southend Arterial Road;
 - h) Webster's Way.
3. Where the AQMA includes any part of a property, it shall be taken to include the whole of that property (buildings and associated open space) within the same curtilage.
4. The AQMA is designated in relation to a likely breach of the nitrogen dioxide (NO₂) annual mean Objective as specified in the Air Quality (England) Regulations 2000, as amended.
5. This Order shall remain in force until it is varied or revoked by a subsequent Order.



The Common seal of ROCHFORD
DISTRICT COUNCIL was hereunto affixed

in the presence of

DATED:



SIGNED:

30 January 2015

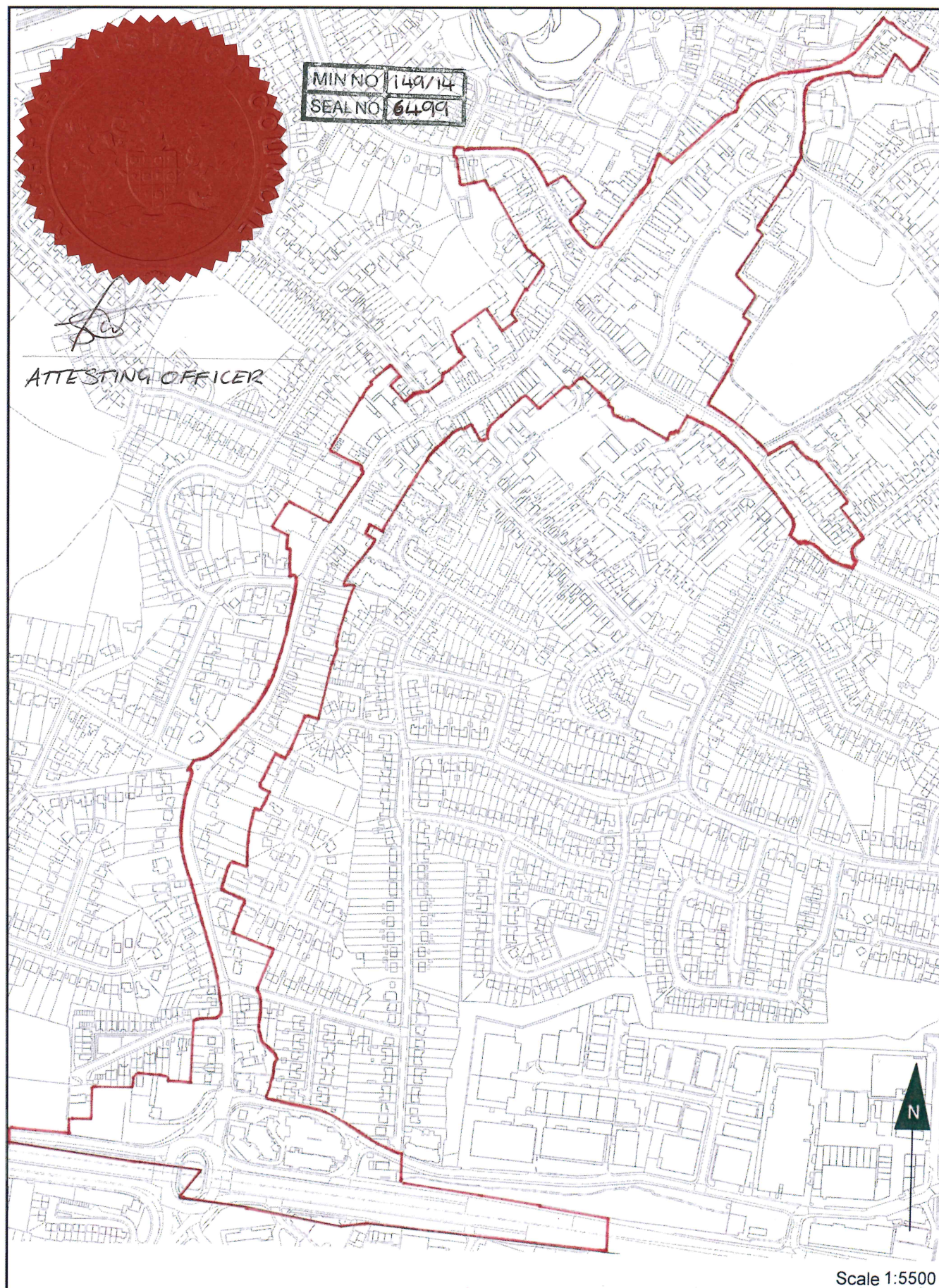
Attesting Officer

Address for all communications:

Rochford District Council, Council Offices
South Street, Rochford, Essex SS4 1BW

Notes: A copy of this Order and associated plan have been deposited and may be seen, free of charge, at the above address during normal working hours and on the Council's website www.rochford.gov.uk/airquality. Enquiries should be directed to Customer Services at the above address, via telephone on (01702) 318111 or else via the website.

Schedule 1 – Air Quality Management Area (Rochford District Council) (No.1) Order 2015




2016 Air Quality Annual Status Report (ASR)



If you would like this information in large print, Braille or another language, please contact 01702 318111.

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Executive Summary – Air Quality in Our Area

The 2016 Annual Status Report is designed to provide the public with information relating to local air quality in the District of Rochford, to fulfil Rochford District Council's statutory duty to review and assess air quality within its area, and to determine whether or not the air quality objectives are likely to be achieved.

Air Quality in Rochford

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

In 2015, Rochford District Council declared an Air Quality Management Area (AQMA) in Rayleigh due to exceedances of Nitrogen Dioxide (NO₂) from road traffic. This area extends from the A127 trunk road to and encompassing the Rayleigh Town Centre one way system.

Rayleigh is Rochford District's principal centre and along with residential development, offers retail and leisure outlets. In addition to normal traffic from commuting, shopping and business, the road network in Rayleigh also acts to transfer traffic between the A127 trunk road and villages such as Hockley, Hawkwell, Ashingdon and Canewdon.

Congestion in the Town Centre and surrounding roads has long been an issue which has been acknowledged in the adopted Rayleigh Centre Area Action Plan which contains aims to make changes to the road network to improve traffic circulation.

The Council is currently working with Essex County Council to produce an Air Quality Action Plan (AQAP) which will contain direct measures to improve the air quality in the AQMA and to meet the Air Quality Objectives as shown in **Appendix F**. These measures are likely to complement improvements that will be delivered by the Rayleigh Centre Area Action Plan.

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.

Actions to Improve Air Quality

The Rochford District adopted Core Strategy policy ENV5 restricts residential development within areas of poor air quality. With the declaration of the Rayleigh Town Centre AQMA, new exposure within this area will be prevented.

New residential development will be restricted in Air Quality Management Areas in order to reduce public exposure to poor air quality.

In areas where poor air quality threatens to undermine public health and quality of life, the Council will seek to reduce the impact of poor air quality on receptors in that area and to address the cause of the poor air quality. Proposed development will be required to include measures to ensure it does not have an adverse impact on air quality.

This policy was a reason given for the refusal of a planning permission **14/00888/FUL** at 8 Eastwood Road in Rayleigh.

Local Priorities and Challenges

In the coming year, Rochford District Council aims to draft the Air Quality Action Plan, carry out a consultation on the Plan, finalise and to formally adopt.

How to Get Involved

Rochford District Council is a member of the Essex Air Quality consortium. The purpose of the Essex Air is to promote improvements in air quality related issues. The Essex Air **website** provides a daily forecast of air pollution. Also the **@EssexAir** twitter feed provides localised weekly air pollution forecasts.



Moderate [#airpollution](#) forecast for Essex on Thursday and Friday [uk-](#)

[air.defra.gov.uk/forecasting/?d...](#)

For health advice see [uk-air.defra.gov.uk/air-pollution/...](#)

3:33 PM - 4 May 2016



Reply to [@EssexAir](#)

Links to Defra recommended actions and health advice are provided when air pollution is likely to be moderate or higher. This will enable those with heart or lung conditions, or other breathing problems to make informed judgements about their levels of activity or exposure.

Essex County Council has worked closely with **Liftshare** to develop the Essex Car Share scheme. This operates across the Rochford district to provide commuters with a car sharing service which could cut congestion and air pollution whilst saving money.

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1 Local Air Quality Management

- 1.1 This report provides an overview of air quality in Rochford during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.
- 1.2 The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Rochford District Council to improve air quality and any progress that has been made.
- 1.3 The statutory air quality objectives applicable to LAQM in England can be found in **Appendix F, Table F1**.

2 Actions to Improve Air Quality

Air Quality Management Areas

- 2.1 Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.
- 2.2 A summary of the AQMA declared by Rochford District Council can be found in **Table 2.1** and the AQMA declaration order can be found in **Appendix G**.
- 2.3 Further information relating to current and revoked AQMAs declared by Rochford District Council, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=210.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City/Town	One Line Description	Action Plan
AQMA No.1 (2015)	NO ₂ annual mean	Rayleigh	Declared in 2015. Incorporates some premises in the following streets: <ul style="list-style-type: none">• Brook Road• Crown Hill• Eastwood Road• High Road• High Street• Hockley Road• Southend Arterial Road• Webster's Way	The Air Quality Action Plan is currently being prepared

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Progress and Impact of Measures to address Air Quality in Rochford

2.4 Due to Nitrogen Dioxide exceedances, Rochford District Council declared an Air Quality Management Area in Rayleigh Town Centre in 2015. The Council is currently developing an Air Quality Action Plan and associated measures to address air pollution.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Essex Liftshare	Alternatives to private vehicle use	Car and lift sharing schemes	Essex County Council	N/A	2014	Number of Users	Unknown	Ongoing	N/A	
2	Restrict residential development in AQMA	Policy Guidance and Development	Other Policy	Rochford District Council	2014	2015	N/A	N/A	Policy has been adopted		Use of policy to prevent new exposure in areas of poor air quality
3	Developing Air Quality Action Plan	Policy Guidance and Development	Air Quality and Policy Guidance	Rochford District Council	2015	2017	Adoption of Air Quality Action Plan	In development	In Progress	2017	
4	Member of Essex Air	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Essex Air	N/A	N/A	N/A	N/A	Ongoing	N/A	

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

- 2.5 As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.
- 2.6 Rochford District Council does not monitor PM_{2.5} concentrations however notes the Public Health Outcomes Framework indicator 3.01 – Fraction of mortality attributable to particulate (PM_{2.5}) air pollution which for 2013 gave a value of 5.6 broadly similar to other authorities within the region.
- 2.7 Measures that are developed as part of the forthcoming Air Quality Action Plan are likely to reduce emissions and concentrations of PM_{2.5}.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

Summary of Monitoring Undertaken

- 3.1 Due to a number of measured exceedances and after completing a Detailed Assessment, Rochford District Council declared an AQMA in Rayleigh. Monitoring focuses on sites within the Rayleigh AQMA and notable junctions in Rochford.
- 3.2 This section sets out what monitoring has taken place and how it compares with objectives.

Automatic Monitoring Sites

- 3.3 Rochford District Council undertook automatic (continuous) monitoring at one site during 2015. **Appendix A, Table A1** shows the details of this site.
- 3.4 A map showing the location of the monitoring site is provided in **Appendix E**.
- 3.5 Detail of the Quality Assurance/Quality Control (QA/QC) process can be found in **Appendix D**.

Non-Automatic Monitoring Sites

- 3.6 Rochford District Council undertook non- automatic (passive) monitoring of NO₂ at six sites during 2015. **Appendix A, Table A2** shows the details of the sites.
- 3.7 Maps showing the location of the monitoring sites are provided in **Appendix E**.
- 3.8 The diffusion tube monitoring sites in Rayleigh are all within the AQMA.
- 3.9 The diffusion tube monitoring sites in Rochford are not within an AQMA
- 3.10 Detail on Quality Assurance/Quality Control (QA/QC) including annualisation, bias adjustment and nitrogen dioxide fall off calculations for the diffusion tubes are included in **Appendix D**.

Individual Pollutants

Nitrogen Dioxide (NO₂)

- 3.11 The air quality monitoring results presented in this section are, where relevant, adjusted for ‘annualisation’ and bias. Further details on adjustments are provided in **Appendix D**.
- 3.12 It should be noted that due to resourcing issues, automatic monitoring was carried out from January to July and passive diffusion tube monitoring carried out from January to June and not across the calendar year. Although the data has been ‘annualised’, results from data that has been corrected in this manner are only estimations and should be for reference only.
- 3.13 Exceedances of the Air Quality Objectives occurred at the sites of RD1 (Automatic Analyser in Rayleigh Town Centre) and RO016 in 2015. These sites are within the AQMA.

The following table identifies the exceedances.

Table 3.1 – Monitored Exceedances

Site	Annual Mean (Bias Adjusted and Annualised where appropriate)	Estimation of Concentration at the Receptor
RD1 Eastwood Road/High Street (Automatic Analyser)	47.59	41.80
RO016 Eastwood Road (Diffusion Tube)	47.31	41.60

- 3.14 Monitoring site RD1 is at a busy junction (roundabout) of Eastwood Road and Rayleigh High Street. Site RO016 is located in Eastwood Road which is a busy part of the one way system that approaches the junction with the High Street. Both of these locations could be considered to be street canyons.
- 3.15 **Appendix A, Figure A1** shows the RD1 automatic analyser 2015 data graphically.
- 3.16 **Appendix A, Table A4** compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year. This identifies that there have been no exceedances of the NO₂ hourly mean objective in 2015 and that there has been a general trend downwards.
- 3.17 **Appendix C, Figure C1** compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. All locations are showing a general trend downwards from 2012.
- 3.18 For diffusion tubes, the full 2015 dataset of monthly mean values is provided in **Appendix B**.

Appendix A – Monitoring Results

Table A1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
RD1	Eastwood Road/ High Street	Roadside	580536	190629	NO ₂	Y	Chemiluminescent	3.0	2.0	1.5

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

(2) N/A if not applicable.

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Table A2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
RO011	Rayleigh Weir	Roadside	580233	189766	NO ₂	Yes	2.0	6.0	No	2.0
RO012	Eastwood Road/ High Street	Roadside Urban Centre	580536	190629	NO ₂	Yes	3.0	2.0	No	2.0
RO013	Eastwood Road/ High Street	Roadside Urban Centre	580536	190629	NO ₂	Yes	3.0	2.0	No	2.0
RO014	Eastwood Road/ High Street	Roadside Urban Centre	580536	190629	NO ₂	Yes	3.0	2.0	No	2.0
RO015	Crown Hill	Roadside Urban Centre	580542	190755	NO ₂	Yes	5.0	1.0	No	2.0
RO016	Eastwood Road	Roadside Urban Centre	580603	190546	NO ₂	Yes	3.0	2.0	No	2.0
RO020	South Street	Kerbside	587670	190352	NO ₂	No	2.0	1.0	No	2.0
RO022	Anne Boleyn Sutton Road	Roadside	587733	189667	NO ₂	No	13.0	1.0	No	2.0

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

(2) N/A if not applicable.

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Table A3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2015 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2011	2012	2013	2014	2015
RD1	Roadside	Automatic	99.9	51.46	35.80	52.10	52.50	50.10	47.59~41.80
RO011	Roadside/Urban Centre	Diffusion Tube	100	45.45	39.60	42.26	41.33	37.10	34.57
RO012 RO013 RO014	Roadside/Urban Centre	Diffusion Tube	93.33	42.42	45.10	50.48	53.00	45.00	37.98
RO015	Roadside/Urban Centre	Diffusion Tube	100	45.45	43.30	53.01	48.62	47.00	39.61
RO016	Kerbside	Diffusion Tube	40	18.18	50.30	54.57	53.87	49.55	47.31~41.6
RO020	Roadside	Diffusion Tube	60	27.27	33.30	38.69	40.80	35.70	34.08
RO022	Roadside	Diffusion Tube	100	45.45	44.40	48.50	49.82	39.70	39.74

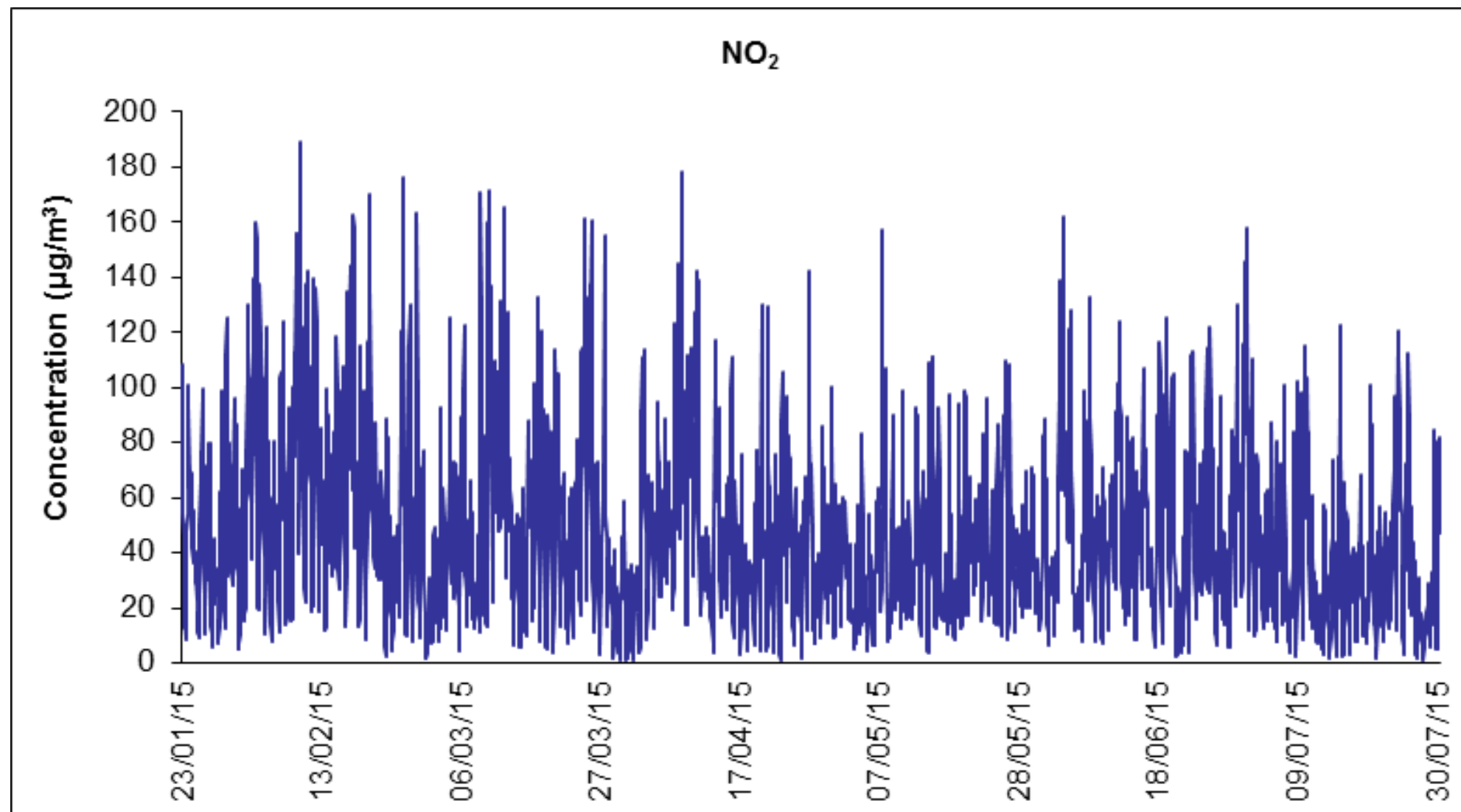
Notes: Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

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

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for six months, the maximum data capture for the full calendar year is 50%).
- (3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See **Appendix D** for details.

~ Estimated NO₂ concentration at the receptor. See **Appendix D** for details.

Figure A1 – 2015 Automatic Monitoring Data Chart



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Table A4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2015 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2011	2012	2013	2014	2015
RD1	Roadside	Automatic	99.9	51.46	0	4	12	8	0

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

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

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

(3) If the period of valid data is less than 90%, the 99.8th percentile of 1-hour means is provided in brackets.

Appendix B – Full Monthly Diffusion Tube Results for 2015

Table B1 – NO₂ Monthly Diffusion Tube Results – 2015

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Annualisation Factor (1)	Bias Adjusted (1)
RO011	60.20	64.30	34.90		32.60	28.00	No Measurement						44.00	0.97	34.57
RO012	66.60	56.30	50.50		32.80	37.50	No Measurement						48.74	0.97	38.30
RO013	49.10	58.60	32.90		40.50	Missing	No Measurement						45.28	0.97	35.57
RO014	68.70	61.10	48.40		37.60	43.70	No Measurement						51.90	0.97	40.78
RO015	62.90	62.80	49.20		39.80	37.40	No Measurement						50.42	0.97	39.61
RO016	68.20	Missing	Missing		Missing	51.00	No Measurement						59.60	0.98	47.31
RO020	49.50	Missing	44.70		Missing	34.60	No Measurement						42.93	0.98	34.08
RO022	70.00	56.10	41.30		37.60	47.90	No Measurement						50.58	0.97	39.74

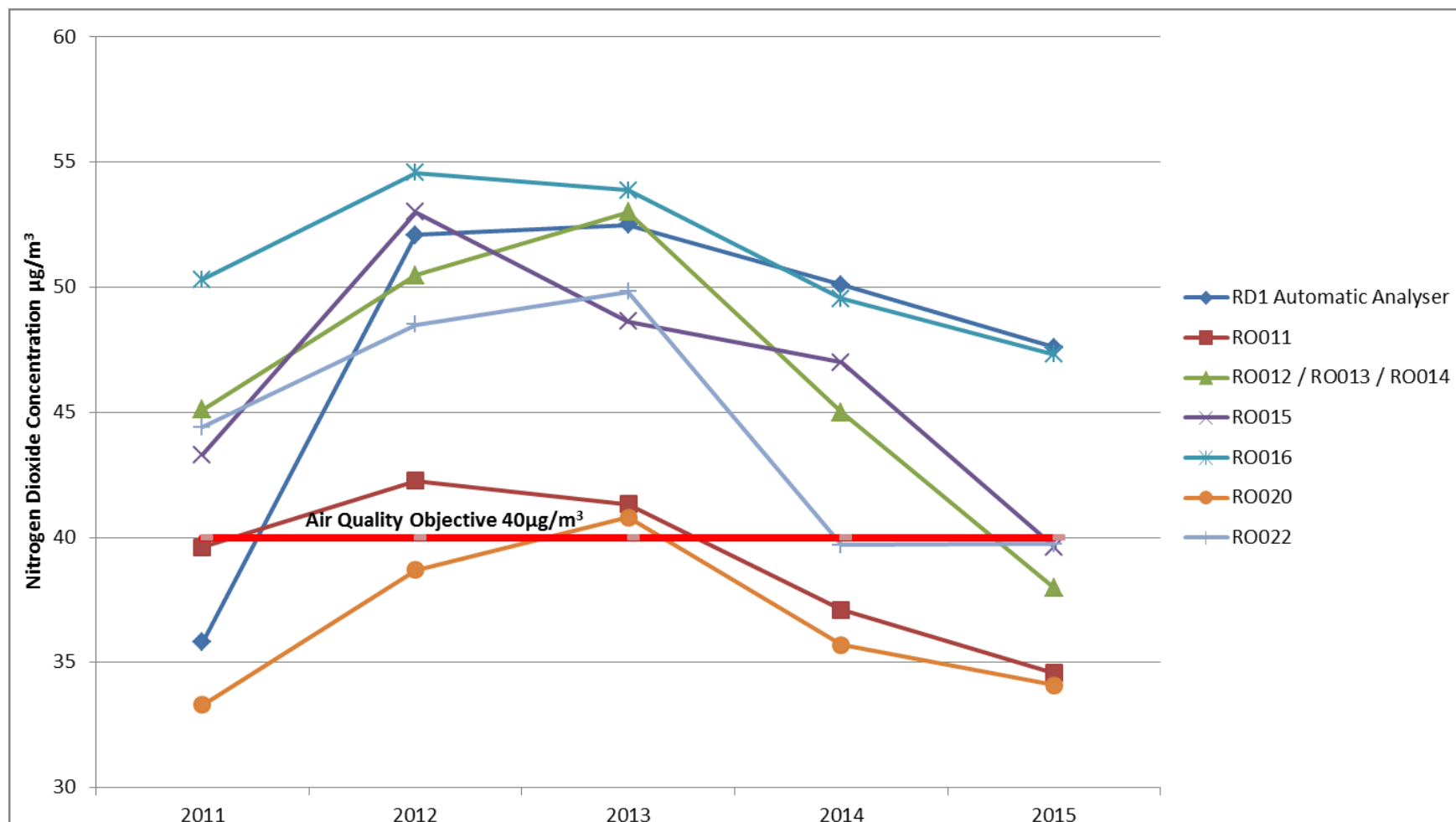
(1) See **Appendix C** for details on bias adjustment and annualisation factor.

March Diffusion Tubes exposed 4 March to 22 April.

A lack of resources prevented deployment of diffusion tubes during the second half of 2015.

Appendix C – Nitrogen Dioxide Trend Data

Figure C1 – Nitrogen Dioxide Trend Data 2011-2015



Appendix D – Supporting Technical Information/Air Quality Monitoring Data QA/QC

Automatic Monitoring QA/QC

Rochford District Council operates an API 200a TRL ID 6008 nitrogen oxide monitor in Rayleigh High Street at the roundabout junction with Eastwood Road. The analyser was serviced and tested in line with manufacturer guidelines prior to deployment. Upon installation the unit was checked against the certified calibration gas bottle. The 2015 monitoring campaign was of six months duration during which LSO duties were carried out monthly.

Data has been ratified according to AURN recommended procedures. The calibration and ratification process corrected the raw dataset for any drift in the zero baseline and upper range of the instrument. This was carried out using a spreadsheet based process that incorporates zero and span check information from the calibration visits.

The zero reading recorded during the calibration visits is used to adjust any offset of the baseline of the data. The difference between the span value obtained between one calibration visit and the next visit is used to calculate a factor. This change is assumed to occur at the same rate over the period between calibrations and as such, the factor is used as a linear data scalar. This effectively results in the start of the period having no factor applied and the end of the period being scaled with the full factor with a sliding scale of the factor in-between.

After applying the calibration factors the data was screened by visual examination for erroneous measurements or outliers. For the 2015 dataset no data was removed and the data capture rate was excellent.

Table D1 – Automatic Data Annualisation

Background Site	Annual Mean 2015 (Am)	Period Mean 2015 (Pm)	Ratio (Am/Pm)
Chignal	12.76	11.64	1.10
St Osyth	10.68	10.97	0.97
Average (Ra)			1.03
Rayleigh High Street Monitored Average			46.2
Rayleigh High Street Annualised Average Concentration			47.59

Diffusion Tubes QA/QC

Rochford District Council undertook monitoring at 6 nitrogen dioxide diffusion tubes sites in 2015.

The diffusion tubes were supplied by Environmental Scientifics Group (ESG Didcot) (UKAS Testing Laboratory number 1015) with a preparation method of 50% triethanolamine (TEA) in Acetone.

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The AIR NO₂ proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2015:

Table D2 – AIR PT Results 2015

AIR PT Round	AIR PT AR006	AIR PT AR007	AIR PT AR009	AIR PT AR010
Round conducted in the period	January – February 2015	April – May 2015	July – August 2015	October – November 2015
ESG Didcot	87.5%	100%	100%	100%

Diffusion Tube Bias Adjustment Factors

Rochford District Council uses the national bias adjustment figure for calculating diffusion tubes results.

The Diffusion Tube Bias Adjustment Factors Spreadsheet for March 2016 identified that for ESG (Didcot) 50% TEA in acetone diffusion tubes in 2015, a bias adjustment factor of 0.81 should be used. This was derived from orthogonal regression analysis of 21 studies.

Figure D1 – RD012/013/014 Triplicate Adjustment

Adjustment of DUPLICATE or TRIPLICATE Tubes AEA Energy & Environment From the AEA group

Diffusion Tubes Measurements										Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm ⁻³	Tube 2 µgm ⁻³	Tube 3 µgm ⁻³	Triplicate Average	Standard Deviation	CV	95% CI mean	Diffusion Tubes Precision Check	
1	07/01/2015	04/02/2015	66.6	49.1	68.7	61.5	10.76	17.51	26.73	Good	
2	04/02/2015	04/03/2015	56.3	58.6	61.1	58.7	2.40	4.09	5.96	Good	
3	04/03/2015	22/04/2015	50.5	32.9	48.4	43.9	9.61	21.88	23.88	Poor Precision	
4	22/04/2015	27/05/2015	32.8	40.5	37.6	37.0	3.89	10.52	9.66	Good	
5	27/05/2015	02/07/2015	37.5	-	43.7	40.6	4.38	10.80	39.39	Good	
6											
7											
8											
9											
10											
11											
12											
13											

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

Site Name/ ID: **Rayleigh High Street**

Jaume Targa, for AEA
Version 04 - February 2011

Adjusted measurement (95% confidence level) Without periods with CV larger than 20%
Bias calculated using 0 periods of data
Tube Precision:
Bias factor A:
Bias B:
Information about tubes to be adjusted
Diffusion Tube average: 49 µgm ⁻³
Average Precision (CV): 11
Adjusted Tube average: µgm ⁻³

Adjusted measurement (95% confidence level) with all data
Bias calculated using 0 periods of data
Tube Precision:
Bias factor A:
Bias B:
Information about tubes to be adjusted
Diffusion Tube average: 48 µgm ⁻³
Average Precision (CV): 13
Adjusted Tube average: µgm ⁻³

Diffusion Tube Data Annualisation

All 8 sites had less than 8 months' worth of data so it was necessary to annualise. Rochford District Council does not operate a continuous monitor at a background site so data from the rural background site at Chignal in Chelmsford was used.

Table D3 – Diffusion Tube Annualisation

Start Date	End Date	B1 (Chignal, Chelmsford Rural Background AQMS)	D1 – RO011	B1 when D1
7 January 2015	4 February 2015	17.42	60.20	17.42
4 February 2015	4 March 2015	16.54	64.30	16.54
4 March 2015	22 April 2015	13.09	34.90	13.09
22 April 2015	27 May 2015	9.93	32.60	9.93
27 May 2015	2 July 2015	8.74	28.00	8.74
2 July 2015	8 August 2015	9.06		
8 August 2015	26 August 2015	9.42		
26 August 2015	30 September 2015	11.03		
30 September 2015	28 October 2015	13.55		
28 October 2015	2 December 2015	14.97		
2 December 2015	6 January 2016	17.08		
Average		12.80	44.00	13.14
Annualisation Factor		0.97		
RO011 Annualised Concentration		42.86		
Start Date	End Date	B1 (Chignal, Chelmsford Rural Background AQMS)	D1 – R 012 RO013 RO014	B1 when D1
7 January 2015	4 February 2015	17.36	61.50	17.42
4 February 2015	4 March 2015	16.68	58.70	16.54
4 March 2015	22 April 2015	12.95	43.90	13.09
22 April 2015	27 May 2015	10.07	37.00	9.93
27 May 2015	2 July 2015	8.76	40.60	8.74
2 July 2015	8 August 2015	8.98		
8 August 2015	26 August 2015	9.46		
26 August 2015	30 September 2015	10.95		
30 September 2015	28 October 2015	14.03		
28 October 2015	2 December 2015	14.92		
2 December 2015	6 January 2016	16.78		
Average		12.81	48.34	13.14
Annualisation Factor		0.97		
RO012/013/014 Annualised Concentration		47.12		

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Start Date	End Date	B1 (Chignal, Chelmsford Rural Background AQMS)	D1 – RO015	B1 when D1
7 January 2015	4 February 2015	17.42	62.90	17.42
4 February 2015	4 March 2015	16.54	62.80	16.54
4 March 2015	22 April 2015	13.09	49.20	13.09
22 April 2015	27 May 2015	9.93	39.80	9.93
27 May 2015	2 July 2015	8.74	37.40	8.74
2 July 2015	8 August 2015	9.06		
8 August 2015	26 August 2015	9.42		
26 August 2015	30 September 2015	11.03		
30 September 2015	28 October 2015	13.55		
28 October 2015	2 December 2015	14.97		
2 December 2015	6 January 2016	17.08		
Average		12.80	50.42	13.14
Annualisation Factor		0.97		
RO015 Annualised Concentration		49.11		
Start Date	End Date	B1 (Chignal, Chelmsford Rural Background AQMS)	D1 – RO016	B1 when D1
7 January 2015	4 February 2015	17.42	68.20	17.42
4 February 2015	4 March 2015	16.54		
4 March 2015	22 April 2015	13.09		
22 April 2015	27 May 2015	9.93		
27 May 2015	2 July 2015	8.74	51.00	8.74
2 July 2015	8 August 2015	9.06		
8 August 2015	26 August 2015	9.42		
26 August 2015	30 September 2015	11.03		
30 September 2015	28 October 2015	13.55		
28 October 2015	2 December 2015	14.97		
2 December 2015	6 January 2016	17.08		
Average		12.80	59.60	13.08
Annualisation Factor		0.98		
RO016 Annualised Concentration		58.34		

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Start Date	End Date	B1 (Chignal, Chelmsford Rural Background AQMS)	D1 – (RO020)	B1 when D1
7 January 2015	4 February 2015	17.42	49.50	17.42
4 February 2015	4 March 2015	16.54		
4 March 2015	22 April 2015	13.09	44.70	13.09
22 April 2015	27 May 2015	9.93		
27 May 2015	2 July 2015	8.74	34.60	8.74
2 July 2015	8 August 2015	9.06		
8 August 2015	26 August 2015	9.42		
26 August 2015	30 September 2015	11.03		
30 September 2015	28 October 2015	13.55		
28 October 2015	2 December 2015	14.97		
2 December 2015	6 January 2016	17.08		
Average		12.80	42.93	13.08
Annualisation Factor		0.98		
RO020 Annualised Concentration		42.01		
Start Date	End Date	B1 (Chignal, Chelmsford Rural Background AQMS)	D1 – RO022	B1 when D1
7 January 2015	4 February 2015	17.42	70.00	17.42
4 February 2015	4 March 2015	16.54	56.10	16.54
4 March 2015	22 April 2015	13.09	41.30	13.09
22 April 2015	27 May 2015	9.93	37.60	9.93
27 May 2015	2 July 2015	8.74	47.90	8.74
2 July 2015	8 August 2015	9.06		
8 August 2015	26 August 2015	9.42		
26 August 2015	30 September 2015	11.03		
30 September 2015	28 October 2015	13.55		
28 October 2015	2 December 2015	14.97		
2 December 2015	6 January 2016	17.08		
Average		12.80	50.58	13.14
Annualisation Factor		0.97		
RO022 Annualised Concentration		49.27		

Nitrogen Dioxide Fall Off with Distance Calculations

Figure D2 – RD1 Automatic Analyser Fall Off with Distance Calculation

This calculator allows you to predict the annual mean NO₂ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	(Note 2)	20.55	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	(Note 2)	47.59	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	(Note 3)	41.8	µg/m ³

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Figure D3 – RO016 Eastwood Road Fall Off with Distance Calculation

This calculator allows you to predict the annual mean NO₂ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	(Note 2)	20.55	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	(Note 2)	47.31	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	(Note 3)	41.6	µg/m ³

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Appendix E – Map(s) of Monitoring Locations

Figure E1 – Location of RD1 Automatic Analyser

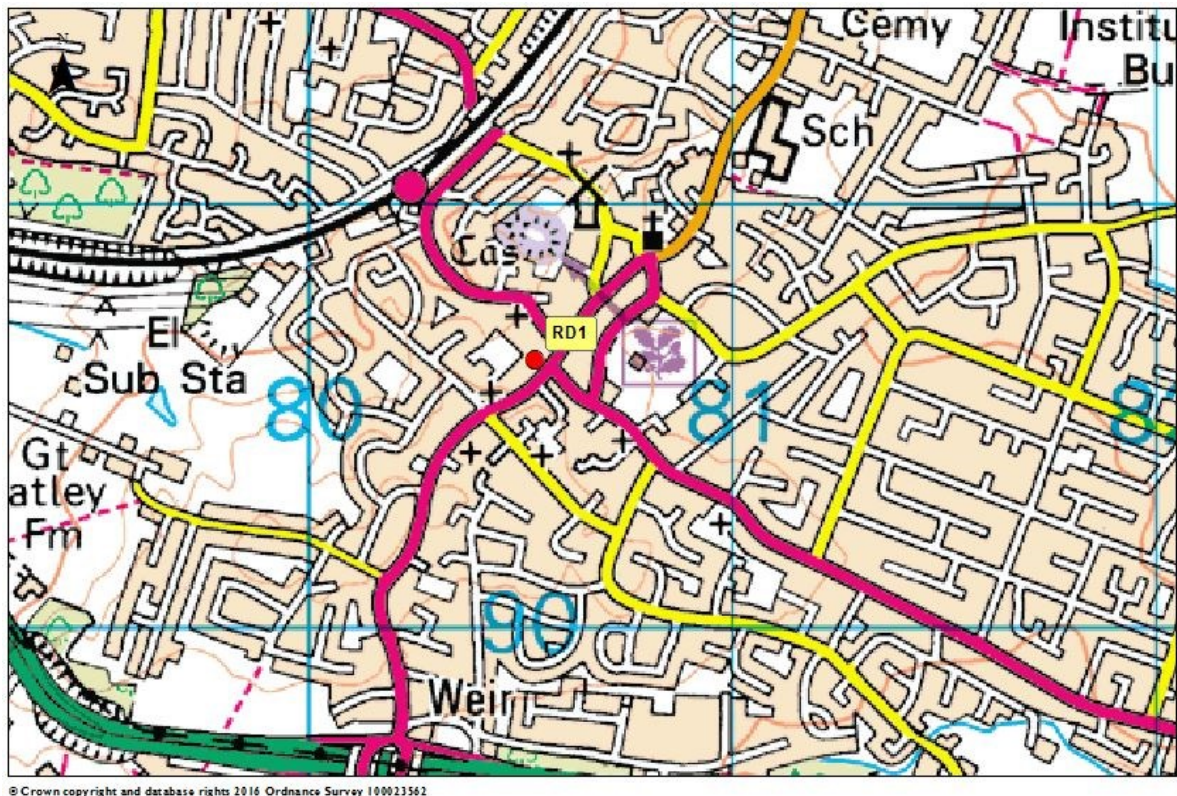


Figure E2 – Location of Rayleigh Diffusion Tubes

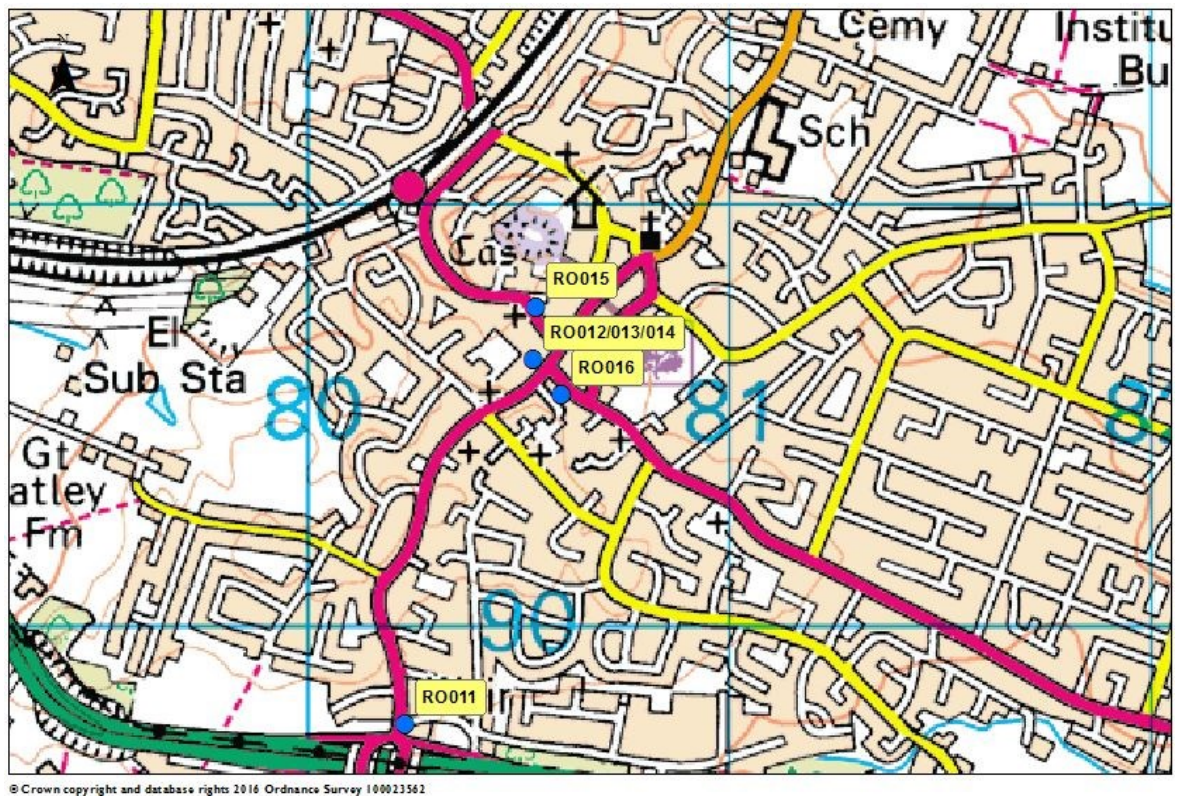


Figure E3 – Location of Rochford Diffusion Tubes



Appendix F: Summary of Air Quality Objectives in England

Table F1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁴	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix G: Air Quality Management Area

**Figure G1 – Air Quality Management Area (Rochford District Council)
(No. 1) Order 2015**

Rochford District Council

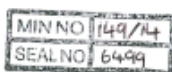


ENVIRONMENT ACT 1995, SECTION 83

Air Quality Management Area Order

Rochford District Council ("The Council"), in exercise of the powers conferred upon it by Section 83(1) of the Environment Act 1995, hereby makes the following Order:

1. This Order may be cited as the **Air Quality Management Area (Rochford District Council) (No.1) Order 2015** and shall come in to effect on 1st February 2015.
2. The effect of the Order is to designate as an Air Quality Management Area ("the AQMA"), the area as shown outlined in red on the plan in Schedule 1 which incorporates some premises in each of the following streets:
 - a) Brook Road;
 - b) Crown Hill;
 - c) Eastwood Road;
 - d) High Road;
 - e) High Street;
 - f) Hockley Road;
 - g) Southend Arterial Road;
 - h) Webster's Way.
3. Where the AQMA includes any part of a property, it shall be taken to include the whole of that property (buildings and associated open space) within the same curtilage.
4. The AQMA is designated in relation to a likely breach of the nitrogen dioxide (NO₂) annual mean Objective as specified in the Air Quality (England) Regulations 2000, as amended.
5. This Order shall remain in force until it is varied or revoked by a subsequent Order.



The Common seal of ROCHFORD
DISTRICT COUNCIL was hereunto affixed

in the presence of

DATED:  _____

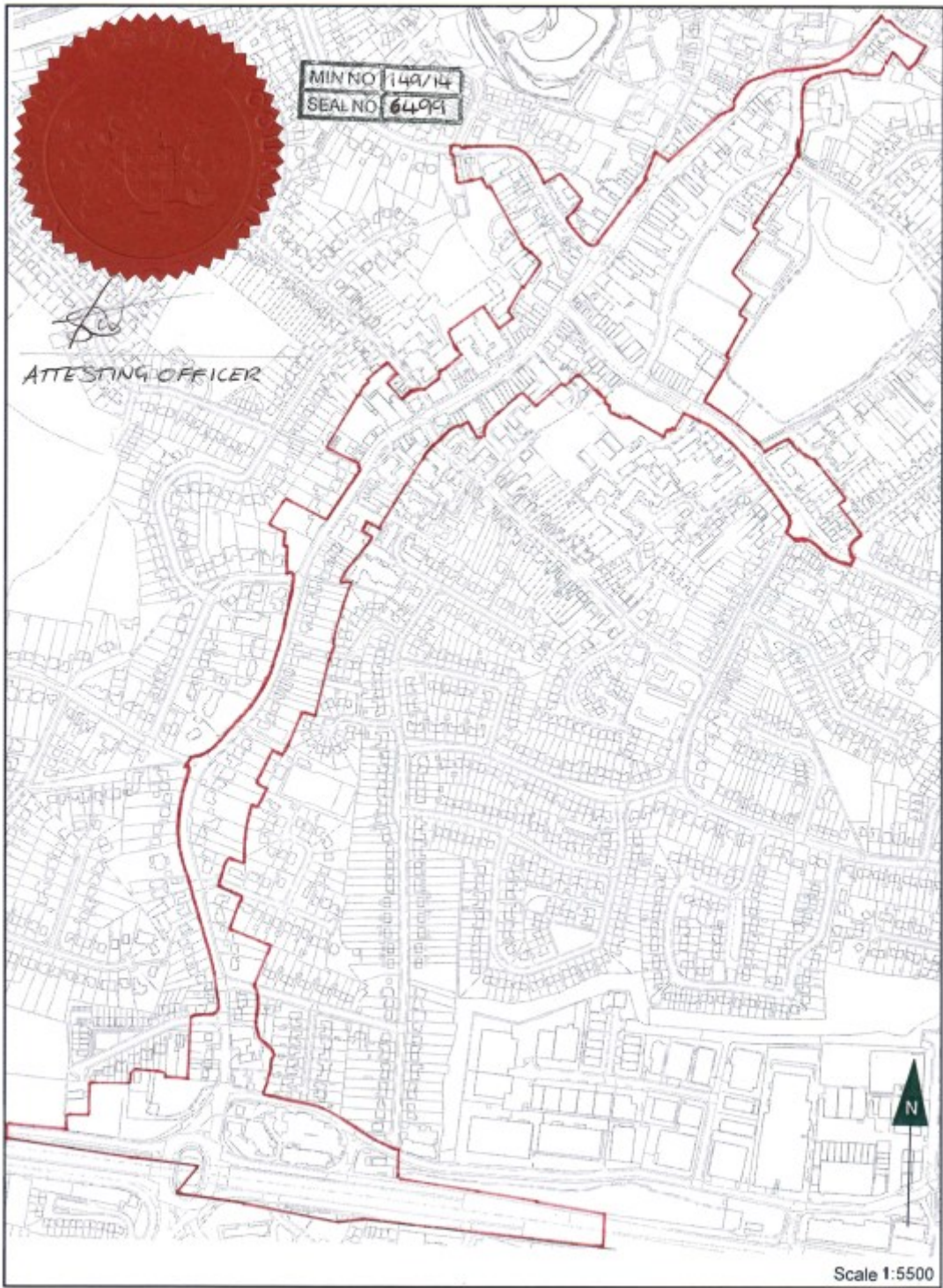
SIGNED: 30 January 2015

Attesting Officer

Address for all communications:
Rochford District Council, Council Offices
South Street, Rochford, Essex SS4 1BW

Notes: A copy of this Order and associated plan have been deposited and may be seen, free of charge, at the above address during normal working hours and on the Council's website www.rochford.gov.uk/airquality. Enquiries should be directed to Customer Services at the above address, via telephone on (01702) 318111 or else via the website.

Schedule 1 – Air Quality Management Area (Rochford District Council) (No.1) Order 2015



Glossary of Terms

Abbreviation	Description
AURN	Automatic Urban and Rural Network – The AURN is the UK's largest automatic monitoring network and is the main network used for compliance reporting against the Ambient Air Quality Directives.
AQAP	Air Quality Action Plan – A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
LAQM	Local Air Quality Management
NO₂	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM_{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
TEA	Triethanolamine – substance used in diffusion tubes for absorbing nitrogen dioxide
UKAS	United Kingdom Accreditation Service

Rochford District Council – 2016 Air Quality Annual Status Report (ASR)

References

Defra Diffusion Tube Bias Adjustment Factors Spreadsheet available at:	http://laqm.defra.gov.uk/documents/Database_Diffusion_Tube_Bias_Factors_v03_16_Final_v2.xls
Defra LAQM Summary of Laboratory Performance in AIR NO ₂ PT Scheme available at:	http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-(April-2014-February-2016)-NO2-report.pdf
Defra LAQM Policy Guidance LAQM.PG16 available at:	http://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf
Defra LAQM Technical Guidance LAQM.TG16 available at:	http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf
Defra Nitrogen Dioxide Fall-Off with Distance Calculator available at	http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
Essex Air Quality Consortium available at:	http://www.essexair.org.uk/AQInEssex/LA/Chelmsford.aspx
EssexCarShare.com available at:	https://essex.liftshare.com/
Essex Air Twitter Feed available at	https://twitter.com/essexair
Public Health Outcomes Framework Indicator 3.01 available at:	http://www.phoutcomes.info/public-health-outcomes-framework#page/1/gid/1000043/pat/6/par/E12000006/ati/101/are/E07000075/iid/30101/age/230/sex/4
Rochford District Council Core Strategy available at:	http://www.rochford.gov.uk/planning/policy/local_development_framework/core_strategy_dpd1
Rochford District Council Rayleigh Town Centre Action Plan available at:	http://www.rochford.gov.uk/planning/policy/local_development_framework/rayleigh_area_action_plan



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