



2018 Air Quality Annual Status Report (ASR)

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

June 2018

Richmondshire District Council

Local Authority Officer	Julia McGrann
Department	Environmental Health
Address	Richmondshire District Council Mercury House Station Road Richmond North Yorkshire DL10 4JX
Telephone	01748 829100
E-mail	environment@richmondshire.gov.uk
Report Reference number	ASR RDC 2018
Date	13 June 2018

Executive Summary: Air Quality in Our Area

Executive Summary

Air pollution is associated with a number of adverse health impacts. Air pollution 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.

Air Quality in Richmondshire

Richmondshire District Council (RDC) is principally a rural district. Very few areas within the district are of concern in relation to air quality. Nitrogen dioxide levels are the principal focus of monitoring in RDC. Concentrations of nitrogen dioxide tend to reflect local road traffic conditions, layout of the roads and the surrounding buildings. An area of narrow congested streets, road junctions and properties close to the kerb in Richmond (around the main approaches to the town centre from the northeast), has been identified as an area of concern in relation to air quality. The results of monitoring in 2017 for this area, together with all of the other sites in Richmondshire, indicate that the concentrations of nitrogen dioxide measured lie below the objective set by legislation (see Appendix E). There is a slight overall downward trend displayed by data gathered at the various monitored locations over the last four-years of the five-year period reported (2013 to 2017).

There are currently no Air Quality Management Areas (AQMAs) in the district. If an AQMA were to be declared in the future then RDC and North Yorkshire County Council (NYCC) would work together to develop an Air Quality Action Plan which would include measures to address air pollution.

Locations of AQMAs in other parts of the country can be found at <https://uk-air.defra.gov.uk/aqma/list> .

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

Previous reports submitted by Richmondshire District Council can be found at www.richmondshire.gov.uk (search 'Air Quality').

Actions to Improve Air Quality

The air quality in Richmondshire is generally good. Monitoring will continue at the same sites as monitored in 2017. If the results of monitoring indicate an upward trend with exceedance(s) of the air-quality objective then Richmondshire District Council will take the steps required by the Local Air Quality Management (LAQM) Policy Guidance.⁴

Conclusions and Priorities

This report provides the results of the monitoring of nitrogen dioxide (NO₂) concentrations over the past 5 years. These NO₂ annual mean concentrations are compared to the air quality objective of 40µg/m³. In Richmondshire the air-quality objective was not exceeded in 2017. Data over that period displays a slight overall downward trend over the last four-year period, ie since 2014.

In Richmondshire the priorities with regard to air quality are therefore to focus on continued monitoring of nitrogen dioxide.

North Yorkshire is a two-tier authority, with North Yorkshire County Council (NYCC) being responsible for highways. NYCC, RDC and the Local Enterprise Partnership have completed major junction improvement works on the A6136 Catterick Road Junction in Catterick Garrison with the aim of reducing congestion (and hence resultant emissions from vehicles) in response to housing and anticipated employment growth in the RDC Local Plan⁵. The plan is under review to accommodate additional military and civilian growth.

The RDC Local Planning Authority and NYCC as the Local Highway Authority will continue to consider planning applications and seek to ensure they do not cause undue traffic congestion on the highway network.

⁴ Defra Local Air Quality Management Policy Guidance (PG16), April 2016

⁵ Richmondshire District Council, Richmondshire Local Plan 2012-2028 Core Strategy, adopted 2014

NYCC undertake the ongoing management of traffic signals by monitoring the condition and operation of traffic signals through a programme of inspection and day-to-day fault reporting and network management with the aim of reducing congestion.

Local Engagement and How to get Involved

Richmondshire District Council currently has no schemes to help improve air quality however North Yorkshire County Council work with schools to improve road safety, promote cycling and travel alternatives and travel awareness and offer cycle training to primary school pupils. Members of the public can help by reducing the number of car-driver trips, car sharing, increasing use of public transport and increasing active travel (cycling and walking).

Table of Contents

Executive Summary: Air Quality in Our Area Executive Summary	i
Air Quality in Richmondshire.....	i
Actions to Improve Air Quality.....	ii
Conclusions and Priorities.....	ii
Local Engagement and How to get Involved.....	iii
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in Richmondshire.....	3
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations.....	7
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	8
3.1 Summary of Monitoring Undertaken.....	8
3.1.1 Automatic Monitoring Sites.....	8
3.1.2 Non-Automatic Monitoring Sites.....	8
3.2 Individual Pollutants.....	8
3.2.1 Nitrogen Dioxide (NO ₂).....	8
Appendix A: Monitoring Results	10
Appendix B: Full Monthly Diffusion Tube Results for 2017	15
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	17
Appendix D: Maps of Monitoring Locations	20
Appendix E: Summary of Air Quality Objectives in England	22
Glossary of Terms	23
References	24

List of Tables

Table 2.1 – Progress on Measures to Improve Air Quality

Table A.1 – Details of Non-Automatic Monitoring Sites

Table A.2 – Annual Mean NO₂ Monitoring Results

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

Table C.1 – National Diffusion Tube Bias Adjustment Factor Spreadsheet Version 03/18

Table E.1 – Air Quality Objectives in England

List of Figures

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

Figure D.1 – Location of Diffusion Tubes in Richmond

Figure D.2 – Location of Diffusion Tubes on the A66 Road

1 Local Air Quality Management

This report provides an overview of air quality in Richmondshire during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy⁶ and Technical Guidance⁷ documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. As a two-tier authority Richmondshire District Council and North Yorkshire County Council would work together to develop an AQAP (which would include measures to address air pollution).

This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Richmondshire District Council to improve air quality and any progress that has been made (as appropriate).

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

⁶ Defra Local Air Quality Management Policy Guidance (PG16), April 2016

⁷ Defra Local Air Quality Management Technical Guidance (PG16), April 2016

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

Richmondshire District Council currently does not have any AQMAs.

For reference, maps of Richmondshire District Council's monitoring locations are available in Appendix D.

2.2 Progress and Impact of Measures to address Air Quality in Richmondshire

Defra's appraisal of last year's ASR indicated that the conclusions reached were acceptable for all sources and pollutants, with the provisos listed below:

- 1. The District Council are continuing to carry out routine monitoring with the use of passive diffusion tubes for nitrogen dioxide at 15 sites across the district, with results below objective levels. Two monitoring sites in Richmond, at Gallowgate and Frenchgate are within 10% of the objective level for annual mean nitrogen dioxide,*
- 2. It is likely these sites are representative of local traffic congestion within the Town centre, and should remain under scrutiny. The extended monitoring programme has now been operating for the last three years, and should continue.*

All of the 15 sites, which were being monitored in 2017, continue to be monitored in 2018 and remain under scrutiny. The two sites referred to in the comments above (R11 on Gallowgate and R19 on Frenchgate) as falling within 10% of the objective level for nitrogen dioxide in 2016, did not fall within 10% of the objective level for annual mean nitrogen dioxide in 2017.

Richmondshire District Council has a Local Plan Core Strategy⁸. Core Policy 3 of that Strategy seeks to align development and provision of services to minimise the need for travel. North Yorkshire County Council, as local highway authority, has objectives which relate to transport as detailed in their Local Transport Plan four⁹. These are summarised in Table 2.1.

Richmondshire District Council's priorities for the coming year are to continue monitoring in the same locations as those monitored during 2017.

⁸ Richmondshire District Council, Richmondshire Local Plan 2012-2028 Core Strategy

⁹ North Yorkshire County Council, Local Transport Plan four, 2016-2045

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Local Plan 2012-2028 Core Strategy (including Core Policy CP3 Achieving Sustainable Development)	Policy Guidance and Development Control	Other policy	Richmondshire District Council (RDC) as Local Planning Authority (LPA) & in consultation with North Yorkshire County Council (NYCC) as Local Highway Authority	N/A	2012-2028	N/A	N/A	On-going & under review to include masterplan for Catterick Garrison to accommodate additional military and civilian growth.	N/A	The strategy seeks to align development and provision of services to minimise the need for travel.
2	Local Transport Plan 4 (LTP4)	Policy Guidance and Development Control	Other policy	North Yorkshire County Council	N/A	2016-2045	N/A	N/A	NYCC are preparing Air Quality and Active Travel strategies. Consultation with stakeholders expected in 2018 - 2019	N/A	Two objectives of the plan are - 'Environment and Climate Change' - managing the adverse impact of transport on the environment, and 'Healthier Travel' - promoting healthier travel opportunities.
3	Management and optimisation of traffic signals	Traffic Management	Congestion Management	North Yorkshire County Council	Ongoing	Ongoing	N/A	N/A	Traffic Engineering monitor the condition / operation of traffic signals through a programme of inspection and day to day fault reporting and network management.	N/A	Aim to reduce congestion
4	Management and optimisation of traffic signals Leyburn	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	North Yorkshire County Council	Ongoing	2018 onwards	N/A	N/A	Pedestrian crossing in the Market Place to be refurbished and converted from a Pelican to a Puffin crossing.		Aim to reduce congestion & improve road safety

Richmondshire District Council

5	Improvements Spennithorne Bridge	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	North Yorkshire County Council & Department for Transport (DfT)	Ongoing	2018 onwards	N/A	N/A	Traffic controller replaced at Spennithorne Bridge. Bid submitted to the DfT which would fund a full refurbishment and upgrade of this site if successful.	N/A	Aim to improve traffic flow and road safety
6	Improvements Catterick Garrison (A6136)	Traffic Management	Strategic highway improvements	North Yorkshire County Council with RDC and Local Enterprise Partnership	Complete	2016-2017	N/A	N/A	Completed 2018	Completed 2018	Aim to reduce congestion in response to housing and anticipated employment growth in the RDC Local Plan
7	Management and optimisation of traffic signals Whole District	Traffic Management	UTC, Congestion management, traffic reduction	North Yorkshire County Council	Ongoing	Ongoing	N/A	N/A	Traffic Engineering monitor the condition & operation of traffic signals through a programme of inspection (by NYCC engineers and maintenance contractors) and day to day fault reporting and network management.	N/A	Aim to reduce congestion
8	Road safety and travel awareness	Promoting Travel Alternatives	School Travel Plans	North Yorkshire County Council	Ongoing	Ongoing	Number of pupils trained	N/A	On-going as part of LTP4	Ongoing	Cycle training to primary school pupils. Promotion of non-car journeys to/from school via Junior Road Safety Officers (JRSO) and curriculum resources.
9	Countywide Civil Parking Enforcement	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	North Yorkshire County Council	Ongoing	Ongoing	N/A	N/A	On-going as part of LTP4	N/A	To address parking related traffic congestion / disruption
10	Promotion of cycling	Promoting Travel Alternatives	Promotion of Cycling	North Yorkshire County Council (with partners as appropriate)	Ongoing	Ongoing	N/A	N/A	On-going as part of LTP4	N/A	Social media posts. Safety information packs. Engagement with clubs and event organisers. Face-to-face engagement with cyclists. Stands at major events (E.g. Tour De Yorkshire 2018 start at Richmond). Road-side

Richmondshire District Council

											information posters. Bikeability programme.
11	Provision of cycle routes	Transport Planning and Infrastructure	Cycle network	North Yorkshire County Council & Local Planning Authority (LPA)	Ongoing	Ongoing	N/A	N/A	NYCC work with the LPA to ensure that any improvement(s) whether cycle or general Non Motorised Users (NMU) are accommodated. Some locations dictate that no improvements are required with the smaller developments.	N/A	Very limited resources
12	Information about air quality monitoring and reporting	Public Information	Via the Internet	Richmondshire District Council	N/A	N/A	N/A	N/A	N/A	N/A	Available on RDC website

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

As detailed in LAQM Policy Guidance PG16 (Chapter 7)¹⁰, 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.

No specific targets have been issued and no monitoring is currently undertaken by Richmondshire District Council.

Public Health England (PHE) produce figures, as part of the Public Health Outcomes Framework (PHOF), in relation to certain health indicators (found at <http://www.phoutcomes.info/public-health-outcomes-framework#gid/1000049>). The indicator of relevance (within the context of this Annual Status Report report) is 'Fraction of all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, PM_{2.5})'. The values currently available from PHE for this indicator are for 2016. The value for this indicator for Richmondshire is 3.7%. The value for the same indicator for the whole of the Yorkshire and Humber region is 4.8%, with the value for England given as 5.3%.

The Public Health Outcomes Health Profile¹¹ for Richmondshire is found at <http://fingertipsreports.phe.org.uk/health-profiles/2017/e07000166.pdf>.

It is expected that Local authorities review any existing measures already being implemented and assess whether they are already taking positive action to reduce PM_{2.5} emissions. The development of any such measures would form part of an Action Plan to tackle a problem with any Air Quality Management Area (AQMA). As RDC does not have an AQMA no change has been necessary.

¹⁰ Defra Local Air Quality Management Policy Guidance (PG16), April 2016

¹¹ Public Health England, Health Profile 2017 Richmondshire District, 4 July 2017(revised 4 April 2018)

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

Richmondshire District Council does not undertake automatic (continuous) monitoring.

NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

National monitoring results are available at <https://uk-air.defra.gov.uk/>.

3.1.2 Non-Automatic Monitoring Sites

Richmondshire District Council undertook non-automatic (passive) monitoring of nitrogen dioxide (NO₂) at 15 sites during 2017. Table A.1 in Appendix A shows the details for each of those sites.

Maps showing the location of the monitoring sites are provided in Figures D.1 and D.2 in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are all adjusted for bias and, where relevant, distance correction. Annualisation was not required for any of the data. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.1 in Appendix A compares the ratified and bias adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³. Any concentrations above the air-quality objective of 40µg/m³ are shown in bold.

Monitoring sites not representative of public exposure have included a distance correction to the nearest receptor in accordance with LAQM Policy Technical TG16¹². Figure A.1 in Appendix A shows the change in those concentrations over the period 2013 to 2017. The full 2017 dataset of monthly mean values is provided in Appendix B.

Monitoring Results Summary

The air-quality objective of $40\mu\text{g}/\text{m}^3$ was not exceeded in 2017. As there were no annual mean values greater than $60\mu\text{g}/\text{m}^3$, this indicates that the 1-hour mean objective (of $200\mu\text{g}/\text{m}^3$, not to be exceeded more than 18 times per year) is unlikely to be exceeded at these sites.

Trend

There is a slight overall downward trend displayed by data gathered at the monitored locations over the last four-years (2014 to 2017) of the five-year (2013 to 2017) period reported.

¹² Defra Local Air Quality Management Technical Guidance (PG16), April 2016

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
R2	Queens Road	Roadside	417180	501125	NO ₂	NO	8	2	NO	3
R3	Darlington Road	Roadside	418066	501490	NO ₂	NO	22	1	NO	3
R4	White Rose Crescent	Urban Background	418504	501455	NO ₂	NO	11	2	NO	3
R6	Gatherley Moor Farm	Roadside	419207	506509	NO ₂	NO	0	8	NO	2
R7	Scotch Corner Hotel	Roadside	421366	505261	NO ₂	NO	0	22	NO	3
R8	15 Queens Road	Roadside	417179	501127	NO ₂	NO	7	2.5	NO	3
R10	Oglethorpe	Roadside	417381	501281	NO ₂	NO	1.7	1.7	NO	3
R11	17 Gallowgate	Roadside	417377	501317	NO ₂	NO	0	3.3	NO	3
R12	1 Anchorage Hill	Roadside	417542	501275	NO ₂	NO	3.5	1.8	NO	3
R13	3 Maison Dieu	Roadside	417536	501258	NO ₂	NO	0	1.4	NO	3
R15	2 Maison Dieu	Roadside	417500	501263	NO ₂	NO	0	1.7	NO	3
R16	74 Frenchgate	Roadside	417451	501269	NO ₂	NO	0	1.5	NO	3
R17	95 Frenchgate	Roadside	417370	501262	NO ₂	NO	2	1.5	NO	3

R18	26 Darlington Road	Roadside	417661	501297	NO ₂	NO	3.5	1.7	NO	3
R19	43 Frenchgate	Roadside	417312	501037	NO ₂	NO	0	2	NO	3

Notes:

- (1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
- (2) N/A if not applicable.

Table A.1 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
R2	Roadside	Diffusion Tube	100	100	19	22.3	19.2	21.1	18.8
R3	Roadside	Diffusion Tube	100	100	12.1	13	11.5	12.3	10.9
R4	Urban Background	Diffusion Tube	100	100	9.1	9.4	7.8	8.8	7.6
R6	Roadside	Diffusion Tube	100	100	24.5	26.5	23.8	22.9	21.3
R7	Roadside	Diffusion Tube	100	100	19.7	20.3	18.1	18.1	15.7
R8	Roadside	Diffusion Tube	100	100		25.5	24.5	24.1	22.5
R10	Roadside	Diffusion Tube	100	100		32.9	31.3	32	30.5
R11	Roadside	Diffusion Tube	100	100		38	37.1	36.7	35.4
R12	Roadside	Diffusion Tube	100	100		22.7	22.2	22.1	19.6
R13	Roadside	Diffusion Tube	100	100		28.2	25.9	27.4	24.4
R15	Roadside	Diffusion Tube	100	100		28.7	28.6	27.6	25.1
R16	Roadside	Diffusion Tube	100	100		40.2	38.9	37.8	35.2
R17	Roadside	Diffusion Tube	100	100		28.4	24.3	26	22.3
R18	Roadside	Diffusion Tube	100	100		22.9	23.5	24.1	20.1
R19	Roadside	Diffusion Tube	100	100			25.9	29.3	27.9

- Diffusion tube data has been bias corrected
- Annualisation has been conducted where data capture is <75%
- Where applicable, data has been distance corrected for relevant exposure

Notes:

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

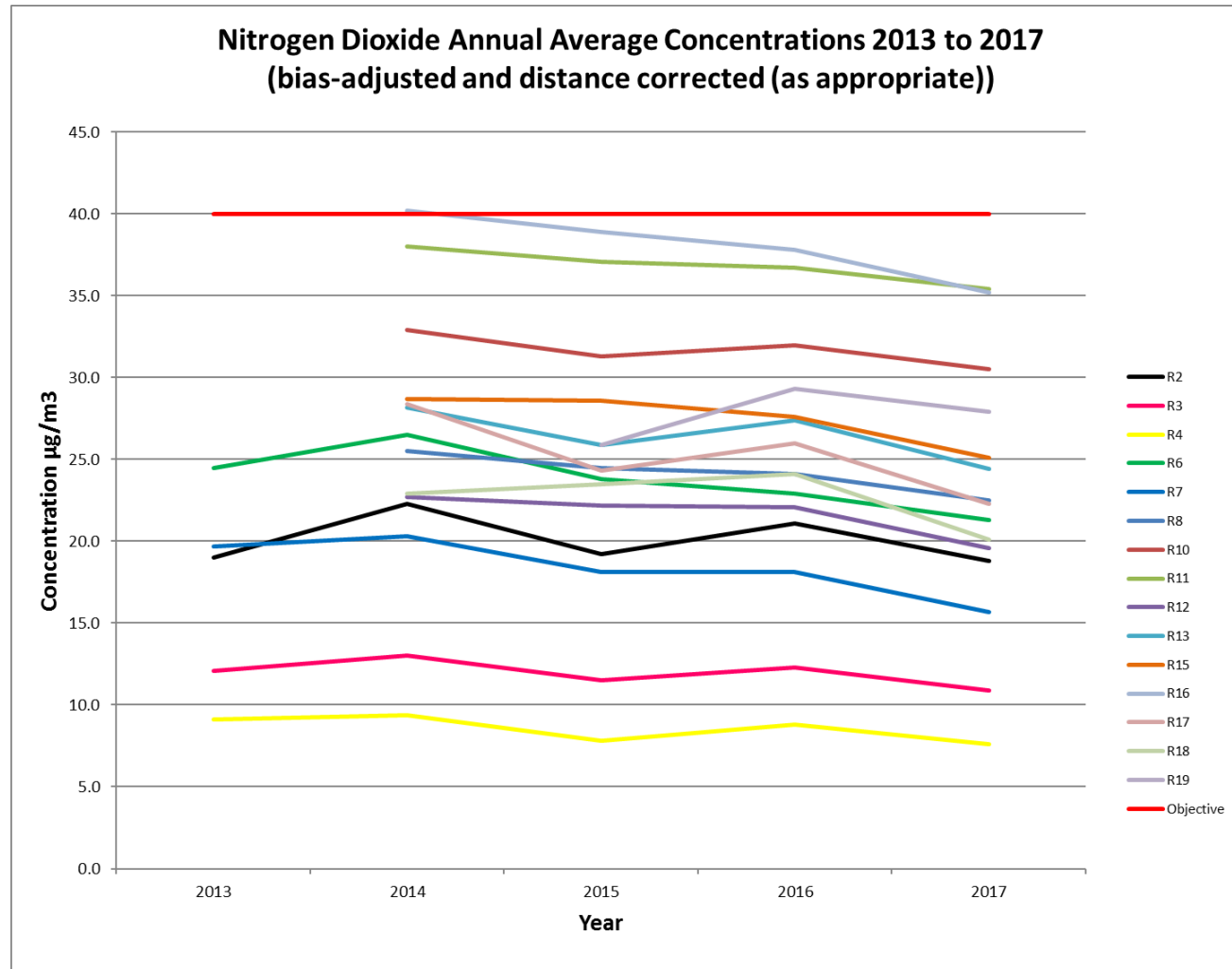
NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(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 6 months, the maximum data capture for the full calendar year is 50%).

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

Figure A.1 – Trends in Annual Mean NO₂ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

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 ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
R2	49	45.3	31.4	29.3	21.4	27.7	31.2	28.9	38.3	33.2	34.4	27.2	33.1	25.5	18.8
R3	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	34.8	21.7	16.7	10.9
R4	23	16.6	10.7	7.4	6.7	6.7	5.3	5.3	7.5	9.6	10.4	10	9.9	7.6	7.6
R6	38.2	33.7	33.2	33.1	24.4	21	22.4	18.5	25.4	26	28.9	26.5	27.1	20.9	21.3
R7	32.4	24	24.5	19.8	31.2	13.8	15.3	14	19.2	14.8	16	18.9	20.3	15.7	15.7
R8	45	45	47.4	36.3	38	32.3	34.6	26.8	40.2	35.7	46.9	37.5	38.8	29.9	22.5
R10	49.6	45.7	50.7	51	40.7	38.7	40.3	35.1	43.6	40.5	52	52.9	45.1	34.7	30.5
R11	58.2	48.2	49.8	45	41.6	40.2	41.7	37.7	48.3	38.5	53.3	48.5	45.9	35.4	35.4
R12	28.5	41	37.7	32.4	27.4	27.7	24.5	22.9	31.3	30	31.3	31.5	30.5	23.5	19.6
R13	45.5	42.1	40.7	30.6	31.5	22.7	25.9	21.3	29.6	28.4	32.8	29.2	31.7	24.4	24.4
R15	54.3	47.3	38.1	27.3	26.4	25.8	24.5	23.1	33.2	28.9	34.3	27.4	33.0	25.4	25.1
R16	68.6	44.3	51.4	46.9	48.6	42.4	35.3	35.9	50.5	42.1	46.6	36.6	45.8	35.2	35.2
R17	51	47.5	42.8	34.3	36.7	27.3	27.3	23	30.6	25.9	28.6	25.6	33.4	25.7	22.3
R18	52.3	51.8	31.4	30.6	18.8	29.3	22.8	25.8	33.3	31.1	27.1	24.4	31.6	24.3	20.1
R19	55.4	42	40.4	35.4	29.3	33.6	29.4	29.2	32.1	37.8	35.4	34.8	36.2	27.9	27.9

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75%

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) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube Bias Adjustment Factor

Richmondshire has made use of the National bias adjustment factor. The factor used takes into account the following aspects:

(i) Supplier

The diffusion tubes used in Richmondshire are supplied and analysed by Environmental Scientifics Group (ESG) (latterly known as Socotec), Didcot, Oxfordshire.

(ii) Tube Type

The tubes used contain a mesh which is doped with 50% v/v triethanolamine (TEA) and acetone.

(iii) Results from other local authorities using the same supplier and tube type

There are systematic differences in the performance of different laboratories and preparation methods of diffusion tubes. A spreadsheet provided by the LAQM Helpdesk (viewed at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>) shows those figures for different local authorities using the same supplier and tube type and where diffusion tubes are co-located with automatic (continuous) monitors.

A copy of the relevant section of the table used to obtain the bias adjustment figure for this report provided by the LAQM Helpdesk is shown in Table C.1 below.

**Table C.1 – National Diffusion Tube Bias Adjustment Factor Spreadsheet
Version 03/18**

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/18			
Follow the steps below in the correct order to show the results of relevant co-location studies.							This spreadsheet will be updated at the end of June 2018			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods. Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet. This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.			
Step 1:		Step 2:		Step 3:		Step 4:				
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor* shown in blue at the foot of the final column.				
If a Laboratory is not shown, we have no data for this Laboratory.		If a preparation method is not shown, we have no data for that method at this Laboratory.		If a year is not shown, we have no data.		If you have your own co-location study then see footnote*. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327953				
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu\text{g}/\text{m}^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu\text{g}/\text{m}^3$)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
ESG Didcot	50% TEA in acetone	2017	R	Suffolk Coastal DC	12	45	37	21.7%	G	0.82
ESG Didcot	50% TEA in acetone	2017	R	Dumfries and Galloway Council	12	36	29	23.3%	G	0.81
ESG Didcot	50% TEA in acetone	2017	KS	Marylebone Road Intercomparison	12	106	75	34.3%	G	0.74
ESG Didcot	50% TEA in acetone	2017	R	Vale of White Horse District Council	11	31	25	26.0%	G	0.73
ESG Didcot	50% TEA in acetone	2017	UB	Cardiff City Council	10	29	21	35.5%	G	0.74
ESG Didcot	50% TEA in acetone	2017	R	Cambridge City Council	12	45	33	37.7%	G	0.73
ESG Didcot	50% TEA in acetone	2017	R	Wrexham County Borough Council	12	20	17	14.5%	G	0.87
ESG Didcot	50% TEA in acetone	2017	LI	North Lincolnshire Council	12	22	16	40.7%	G	0.71
ESG Didcot	50% TEA in acetone	2017	KS	Caerphilly CBC	12	37	32	15.0%	G	0.86
ESG Didcot	50% TEA in acetone	2017	R	Caerphilly CBC	11	44	29	51.2%	G	0.66
ESG Didcot	50% TEA in acetone	2017	UB	City of York Council	12	23	15	53.4%	G	0.65
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	10	37	28	30.8%	G	0.76
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	11	32	23	41.0%	G	0.71
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	12	40	25	58.6%	G	0.63
ESG Didcot	50% TEA in acetone	2017	R	Hambleton District Council	10	21	20	4.0%	G	0.96
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	11	35	29	18.1%	G	0.85
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	12	31	28	21.3%	G	0.82
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	11	33	23	41.5%	G	0.71
ESG Didcot	50% TEA in acetone	2017	UC	Leeds City Council 1	12	41	32	28.5%	G	0.78
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 10	11	48	38	25.7%	S	0.80
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 2	12	47	35	34.4%	S	0.74
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 4	11	56	43	29.1%	S	0.77
ESG Didcot	50% TEA in acetone	2017	R	Leeds City Council 7	11	38	27	39.8%	S	0.72
ESG Didcot	50% TEA in acetone	2017	UB	Slough Borough Council	12	45	35	26.4%	G	0.73
ESG Didcot	50% TEA in acetone	2017	UB	Slough Borough Council	12	32	25	28.8%	G	0.78
ESG Didcot	50% TEA in acetone	2017	UB	Slough Borough Council	11	39	33	19.2%	G	0.84
ESG Didcot	50% TEA in acetone	2017	R	Tunbridge Wells	12	56	40	38.2%	G	0.72
Overall Factor* (27 studies)								Use		0.77

Distance Correction

Distance correction is undertaken where monitoring sites are not representative of public exposure (e.g. if monitoring sites are located at roadside or kerbside, but the façades of the nearest properties are set further back from the road).

Data for such sites can be distance corrected using an NO₂ fall-off with distance calculator available on the LAQM website (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>), following guidance in LAQM TG(16).

The data presented in this report has been corrected to nearest exposure (as appropriate).

The distance correction data, for 2017 for relevant public exposure of the bias adjusted figures, is given in the last column of data presented in Table B.1 of this ASR. The data shows that the predicted relevant public exposure is lower than the measured (and bias adjusted) figure where the relevant public exposure is further from the source of pollutant than the actual location of the monitoring site.

The NO₂ fall-off with distance calculation requires the use of a 'local mean background NO₂ concentration'. The figure used in the calculation in Richmondshire is that obtained from monitoring data from the R4 'Urban Background' site in Richmond.

Annualisation

Data capture for all monitoring sites in this report was greater than 75%, therefore annualisation of the data was not necessary.

Appendix D: Maps of Monitoring Locations

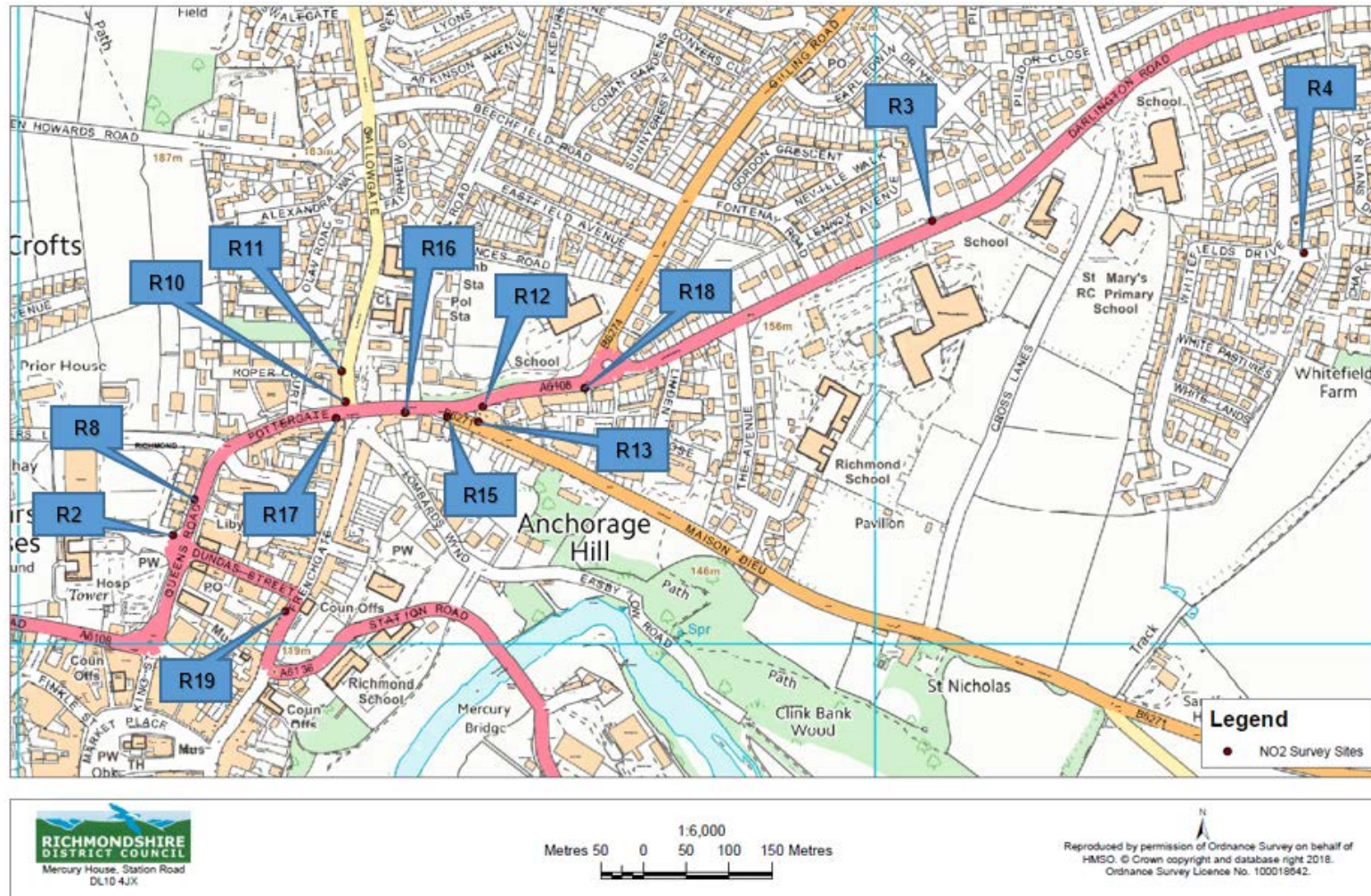


Figure D.1 Location of Diffusion Tubes in Richmond

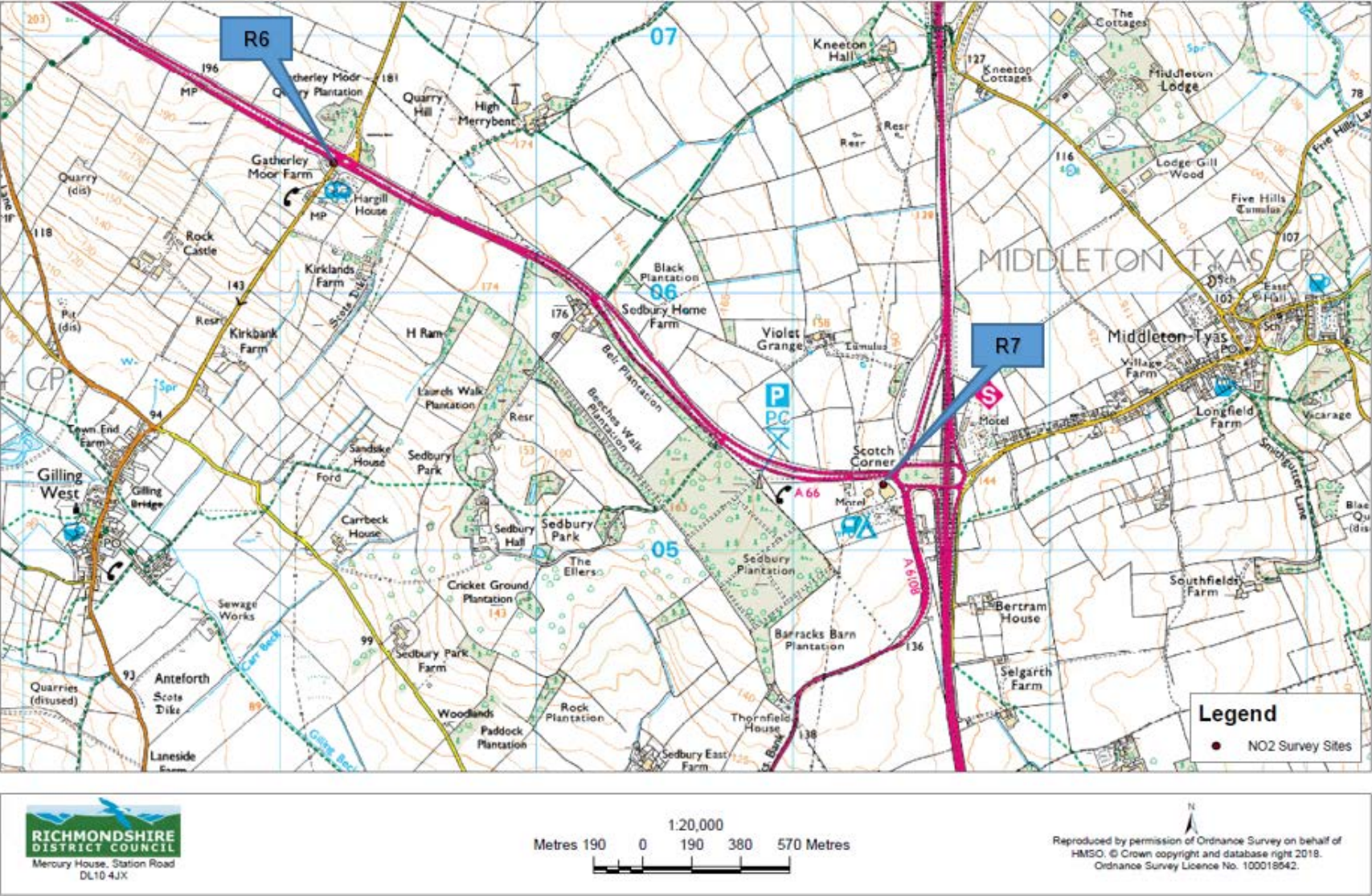


Figure D.1 Location of Diffusion Tubes on the A66 Road

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ¹³	
	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

¹³ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
ESG	Environmental Scientifics Group
EU	European Union
FDMS	Filter Dynamics Measurement System
JRSO	Junior Road Safety Officer
LAQM	Local Air Quality Management
NMU	Non Motorised User E.g. Cycles, horses, pedestrians
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NYCC	North Yorkshire County Council
PHOF	Public Health Outcomes Framework
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RDC	Richmondshire District Council
TEA	Triethanolamine

References

- AEA Energy and Environment, Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users, February 2008
- Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
- Defra. Abatement cost guidance for valuing changes in air quality, May 2013
- Defra Local Air Quality Management Policy Guidance (PG16), April 2016
- Defra Local Air Quality Management Technical Guidance (TG16), April 2016
- Environmental equity, air quality, socioeconomic status and respiratory health, 2010
- North Yorkshire County Council, Local Transport Plan four, 2016-2045
- Public Health England, Health Profile 2017 Richmondshire District, 4 July 2017 (revised 4 April 2018)
- Richmondshire District Council, Richmondshire Local Plan 2012-2028 Core Strategy, adopted 9 December 2014