



2017 Air Quality Annual Status Report (ASR)

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

Date June, 2017

Local Authority Officer	Andrew Jameson
Department	Public Protection
Address	Environmental Health Flint Street Depot Flint Street Fartown Huddersfield HD1 6LG
Telephone	01484 221000
E-mail	andrew.jameson@kirklees.gov.uk
Report Reference number	Kirklees_2017_ASR
Date	January 2018

Executive Summary: Air Quality in Our Area

Kirklees is the third largest Metropolitan District in area - it covers 157 square miles or 40,860 hectares and a population of ~404,000. Measured in population terms Kirklees is one of the larger local authorities in England and Wales ranking 11th out of 348 districts. Over one tenth of the district is in the Peak District National Park. The extremes of altitude in Kirklees range from 33m (108 ft) at Thornhill Lees to 582m (1903 ft) at Black Hill.

Manufacturing industry, textiles and engineering still form a proportion of the local economy, the majority of it situated in the Huddersfield and Dewsbury areas and northwards to the M62. The urban areas comprise nine towns including the two larger towns of Huddersfield and Dewsbury.

Air Quality in Kirklees

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.

The air quality issues within Kirklees are focused around the road network connecting the towns, and traffic which passes between the West Yorkshire conurbation along the M62 and Greater Manchester.

Kirklees Council have conducted monitoring across the district where these primary roads are in close proximity to relevant human activity. To date Kirklees has identified 2 primary pollutants of concern. They are Nitrogen Dioxide and Particulate Matter.

Current trends indicate that the levels of these pollutants have fallen over the last 5 years, but health related objectives are still exceeded within the district.

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

Kirklees currently has 9 Air Quality Management Areas (AQMA's) within the district. These are in Bradley in Huddersfield and Scouthill in Dewsbury. Following on from previous assessments in 2016 Kirklees Council is in the process of revoking the Scouthill AQMA, amending the Bradley AQMA and on 01 November 2017 introduced a further 7 AQMA's at the following locations;

- Birchencliffe, Huddersfield
- Birkenshaw, Bradford
- Eastborough, Dewsbury
- Edgerton, Huddersfield
- Liversedge / Heckmondwike
- Huddersfield Town Centre
- Outlane, Huddersfield

Kirklees Council noted exceedance of the annual NO₂ AQO at a further 2 locations, that being Lindley Moor Road in Lindley and Manchester Road in Thornton Lodge. The exceedances are at singular diffusion tube locations and we have therefore followed national guidance, expanding the monitoring network around these areas in order to determine the extent of air quality issue.

Current 5 year trends for NO₂ indicate that the levels fell significantly between 2012 & 2013 within the Kirklees District, but since that time concentrations have stagnated for 3 years around 45 to 40µg/m³, which indicates further work is required in addition to improvements in vehicle engine technology and fleet turnover in order to bring about compliance.

Actions to Improve Air Quality

Kirklees Council has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality.

Key completed measures are:

- Declaration of the 7 AQMA's
- 1st Year of the West Yorkshire ECO-Stars Scheme

- Local Plan Air Quality Impact Study
- Initial implementation of West Yorkshire Low Emission Strategy (WYLES).
- Development of ambitious Local Plan Policies related to AQ.

The Local Plan Air Quality Impact Assessment was completed spring 2017. The assessment was conducted in accordance with national guidance to determine the cumulative impact of the Local Plan and ensure that health related objectives would not be exceeded as a result of the introduction of the Local Plan. The report concluded that “predicted effect of the proposed Local Plan on annual mean NO₂ concentrations in 2020 is anticipated to be moderate adverse at three receptor locations, slight adverse at 29 receptor locations, slight beneficial at one receptor and of negligible significance across the remainder of the study area. In 2030, the predicted effect of the proposed Local Plan is anticipated to be slight adverse at two receptor locations and of negligible significance everywhere else in the Kirklees area.

For particulate matter (both PM₁₀ and PM_{2.5}) negligible effects are predicted at all sensitive receptors.

The effect of the Local Plan on local air quality is therefore overall considered to be not significant for air quality”.

Initial implantation of the WYLES has included the adoption of the strategy by the Council Cabinet and the work to embed the concepts of the strategy in all areas of the Council’s activities. The initial phase of this is the implantation of the WYLES Planning Guidance. This has been successful by the inclusion of a requirement for Electric Vehicle Charging Points included in all planning permissions granted. Conditions are implemented and development control decisions are made based on the requirements of WYLES.

Kirklees is currently in the development of its Local Plan. Through this process ambitious Policies have been drafted in relation to AQ – based on the principals of the WYLES. Implementation of the Policies through the Development Management process will enable Kirklees Council to manage the impact on AQ of all developments regardless of their location and deal with the cumulative impact of development throughout the district.

The majority of the other aforementioned improvement actions are districtwide and policy based action, of which the improvements are difficult to measure.

Conclusions and Priorities

During the 2017/18 reporting year Kirklees Council priorities for air quality are listed below;

- Construct new action plan for the district and AQMAs
- Continue to Integrate the West Yorkshire Low Emission Strategy into Council Policy
- Rationalise UTC management to minimise pollution events
- Work with neighbouring authorities to create a regional public charging network
- Launch the Electric Taxi Scheme

Local Engagement and How to get Involved

If you wish to get information for air quality, please use the following websites:

<http://www.kirklees.gov.uk/community/noisePollution/pollution.aspx>

<http://www.kirklees.gov.uk/involve/entry.aspx?id=821>

<https://uk-air.defra.gov.uk/>

Table of Contents

Executive Summary: Air Quality in Our Area	1
Air Quality in Kirklees.....	1
Actions to Improve Air Quality.....	2
Conclusions and Priorities	4
Local Engagement and How to get Involved	4
1 Local Air Quality Management	7
2 Actions to Improve Air Quality	8
2.1 Air Quality Management Areas.....	8
2.2 Progress and Impact of Measures to address Air Quality in Kirklees Council	12
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations.....	23
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	24
3.1 Summary of Monitoring Undertaken	24
3.1.1 Automatic Monitoring Sites	24
3.1.2 Non-Automatic Monitoring Sites.....	24
3.2 Individual Pollutants	24
3.2.1 Nitrogen Dioxide (NO ₂).....	25
3.2.2 Particulate Matter (PM ₁₀).....	26
3.2.3 Particulate Matter (PM _{2.5})	27
Appendix A: Monitoring Results	28
Appendix B: Full Monthly Diffusion Tube Results for 2016	41
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	44
C.1.1 Factor from Local Co-location Studies	44
C.1.2 Diffusion Tube Bias Adjustment Factors	44
C.1.3 Discussion of Choice of Factor to Use	44
C.3 QA/QC of Automatic Monitoring	44
Appendix D: Map(s) of Monitoring Locations and AQMAs	46
D.1 Continuous Monitor Sites	46
D.2 Passive Monitor Sites	48
D.3 Air Quality Management Areas.....	53
Appendix E: Summary of Air Quality Objectives in England	58
Glossary of Terms	59
References	60

List of Tables

Table 2.1 – Declared Air Quality Management Areas.....	9
Table 2.2 – Progress on Measures to Improve Air Quality	14
Table A.1 – Details of Automatic Monitoring Sites	28
Table A.2 – Details of Non-Automatic Monitoring Sites	29
Table A.3 – Annual Mean NO ₂ Monitoring Results	33
Table A.4 – 1-Hour Mean NO ₂ Monitoring Results	38
Table A.5 – Annual Mean PM ₁₀ Monitoring Results	39
Table A.6 – 24-Hour Mean PM ₁₀ Monitoring Results	40
Table B.1 – NO ₂ Monthly Diffusion Tube Results – 2016	41
Table E.1 – Air Quality Objectives in England	58

List of Figures

Figure A.1 – Trends in Annual Mean NO ₂ Concentrations	37
---	----

List of Maps

D 1.1 - Automatic Monitoring Sites across district	46
D 1.2 - Automatic Monitoring Site New Roadside 3	47
D 1.3 - Automatic Monitoring Site Roadside 6	47
D 2.1 - Non-Automatic Monitoring Sites across district	48
D 2.2 - AQMA 1 Bradley diffusion tubes	49
D 2.3 - Huddersfield town centre diffusion tubes	49
D 2.4 - Dewsbury town centre & Eastborough diffusion tubes	50
D 2.5 - Batley diffusion tubes	50
D 2.6 - Birkenshaw diffusion tubes	51
D 2.7 - Heckmondwike and Liversedge diffusion tubes	51
D 2.8 - Edgerton diffusion tubes	52
D 2.9 - Thornton Lodge diffusion tubes	52
D 3.1 - Ainley Top AQMA	53
D 3.2 - Amended Bradley AQMA	53
D 3.3 - Birkenshaw AQMA	54
D 3.4 - Eastborough AQMA	54
D 3.5 - Edgerton AQMA	55
D 3.6 - Liversedge / Heckmondwike AQMA	55
D 3.7 - Outlane AQMA	56
D 3.8 - Revoked Scouthill AQMA	56
D 3.9 - Huddersfield Town Centre AQMA	57

1 Local Air Quality Management

This report provides an overview of air quality in Kirklees Council during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Kirklees Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Kirklees Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=140 and
<http://www.kirklees.gov.uk/community/noisePollution/pollution.aspx>

Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

01 November 2017 Kirklees Council declared 7 new AQMAs in Huddersfield and Dewsbury

We are in the process of amending AQMA 1.

We are in the process of revoking AQMA 2.

Maps for amendments, revocations and new AQMAs are available in Appendix D: Map(s)

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
AQMA 1 Bradley TO BE AMMENDED	Declared 17/10/08	NO2 Annual Mean	Huddersfield	The designated area incorporates the Leeds Road (A62) - Bradley Road (A6107) junction	NO	73µg/m³	43µg/m³	New Air Quality Action Plan to be Constructed in 2018
AQMA 2 Scouthill TO BE REVOKED	Declared 27/02/09	PM10 24 Hour Mean	Dewsbury	Now revoked, the designated area incorporated part of Huddersfield Road (A644) in Scouthill	NO	43 Days	N/A	N/A
AQMA 3 Ainley Top	Declared 01/11/17	NO2 Annual Mean	Huddersfield	The designated area incorporates Halifax Road (A629), Lindley Moor Road Bradley Road (A643), Warren House Lane and Stirling Wood Close, which is in close proximity to the Ainley Top Roundabout at Birchencliffe	YES	44µg/m³	Real-time data not available	New Air Quality Action Plan to be Constructed in 2018

<p>AQMA 4 Birkenshaw</p>	<p>Declared 01/11/17</p>	<p>NO2 Annual Mean</p>	<p>Bradford</p>	<p>The designated area incorporates Bradford Road (A651), Whitehall Road East (A58), Carlton Court, Grove Terrace, Swincliffe Crescent, Milford Grove, Tetley Drive and Manor Park Gardens, which is in close proximity to the M62 and A651-A58 Roundabout at Birkenshaw</p>	<p>YES</p>	<p>45µg/m³</p>	<p>45µg/m³</p>	<p>New Air Quality Action Plan to be Constructed in 2018</p>
<p>AQMA 5 Eastborough</p>	<p>Declared 01/11/17</p>	<p>NO2 Annual Mean</p>	<p>Dewsbury</p>	<p>The designated area incorporates Leeds Road (A653), Dewsbury Ring Road (A638), Wakefield Road (A638), Highgate Road, Highgate Terrace, Bank Street and Old Bank Road, which is in close proximity to Dewsbury Town Centre</p>	<p>NO</p>	<p>60µg/m³</p>	<p>54µg/m³</p>	<p>New Air Quality Action Plan to be Constructed in 2018</p>
<p>AQMA 6 Edgerton</p>	<p>Declared 01/11/17</p>	<p>NO2 Annual Mean</p>	<p>Huddersfield</p>	<p>The designated area incorporates Edgerton Road (A629) and Blacker Road, which is in close proximity to</p>	<p>NO</p>	<p>54µg/m³</p>	<p>45µg/m³</p>	<p>New Air Quality Action Plan to be Constructed in 2018</p>

				Huddersfield Town Centre				
AQMA 7 Liversedge	Declared 01/11/17	NO2 Annual Mean	Liversedge	The designated area incorporates Huddersfield Road (A62), Bradford Road (A638), Wakefield Road (A638), Wormald Street and Well Street, which is in Liversedge	NO	45µg/m³	65µg/m³	New Air Quality Action Plan to be Constructed in 2018
AQMA 8 Outlane	Declared 01/11/17	NO2 Annual Mean	Huddersfield	The designated area incorporates New Hey Road and Round Ings Road, which is in close proximity to the M62 at Outlane	YES	54µg/m³	36µg/m³	New Air Quality Action Plan to be Constructed in 2018
AQMA 9 Huddersfield Town Centre	Declared 01/11/17	NO2 Annual Mean	Huddersfield	The designated area incorporates Roads bordering and within the Huddersfield Ring Road	NO	55µg/m³	60µg/m³	New Air Quality Action Plan to be Constructed in 2018

Kirklees Council confirm the information on UK-Air regarding their AQMA(s) is up to date

2.2 Progress and Impact of Measures to address Air Quality in Kirklees Council

Defra's appraisal of last year's ASR was as follows:

“The report is well structured, detailed, and provides the information specified in the Guidance. The Council have taken significant steps to clearly document the progress on measures to address local air pollution, and provide details of the most recent developments likely to impact on air quality. They have produced a well-documented report providing clear details of the assessments carried out in areas of proposed AQMA's, which is welcomed.

1. The ASR report highlights there are now only continued exceedances within one of the existing AQMA's, AQMA1 at Bradley. The AQMA2 at Scout Hill Dewsbury no longer exceeds the daily mean objective for particulate matter, and can be considered for revocation.
2. There were seven detailed assessments carried out as follows:
 - Ainley Top AQMA Assessment
 - Birkenshaw AQMA Assessment
 - Eastborough AQMA Assessment
 - Edgerton AQMA Assessment
 - Heckmondwike AQMA Assessment
 - Huddersfield Town Centre AQMA Assessment
 - Outlane AQMA Assessment
3. The Council may wish to consider the fast track procedure for declaration of these AQMA's as detailed within the current Technical Guidance LAQM TG(16)
4. It will be important to ensure that future monitoring and assessment can continue to determine locations of exceedances of air quality objectives at locations of relevant exposure, which will verify which AQMA's need to remain in place, and which can be considered for revocation, where objectives remain below objective levels.
5. The monitoring and assessment results highlight that there is continuing evidence of widespread exceedances of the objectives across the Council area,

suggesting that it may be necessary to re-evaluate the current monitoring programme to assist in the continued review of current and future AQMA's.

6. It is assumed that the results presented in Table B.2 are for 2015, rather than 2016 as labelled."

It will also be beneficial to review the level of further emissions reductions required at hotspot locations to achieve the air quality objectives, in each AQMA in order to inform the development of the measures within the developing AQAP. The Council should consider the processes described in the Technical Guidance LAQM TG(16) in relation to the further development of effective measures to address the raised pollution levels within the AQMA locations.

Kirklees Council has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality. 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 their respective Action Plans and the West Yorkshire Low Emission Strategy (WYLES). Key completed measures are:

- Declaration of the 7 AQMA's
- 1st Year of the West Yorkshire ECO-Stars Scheme
- Local Plan Air Quality Impact Study

Kirklees Council's priority for the coming year is to construct a new Action Plan for the district, with a focus to improve air quality districtwide and within the AQMAs.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Kirklees anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of our 8 NO₂ AQMA's.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Install Split Cycle Offset Optimisation technique (SCOOT) Traffic Management System within AQMA 1	Traffic Management	Other	LA	2013	2013	Reduction in queuing time	Reduction in emissions	Installed	2013	
2	Alter SCOOT to incorporate actual Air Quality pollution levels	Traffic Management	Other	LA	2015	2016	Reduction in NOx and PM10	Reduction in emissions	Planning stage	2017	
3	Bus priority at lights in AQMA 1	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	LA	2013	2014	Reduction in queuing time for public transport	Reduction in emissions	Implemented scheme	2014	

4	Bradley Junction. Re-model one of the busiest Road Junction in Kirklees in AQMA 1	Transport Planning and Infrastructure	Other	TBC	2014	2019	Reduce congestion levels at AM/PM peaks	Reduction in emissions	Pre-design stage	2021	
5	Ravensthorpe Bypass. Complete by pass of AQMA 2.	Transport Planning and Infrastructure	Other	TBC	2012	2021	Divert traffic away from AQMA 2	Reduction in emissions	Feasibility Study carried out	2026	
6	Cooper Bridge Gyrotory proposed in AQMA 1	Transport Planning and Infrastructure	Other	TBC	2014	2019	Reduction in queuing time	Reduction in emissions	Junction designed. Funding sought	2021	
7	Proposed New Junction 24a on M62	Transport Planning and Infrastructure	Other	TBC	2013	2021	Reduction in traffic volume through AQMA 1	Reduction in emissions	Feasibility Study	2023	
8	Bus Lanes approaching AQMA 1	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	LA	2010	2011	Reduction in delays to buses	Reduction in emissions	Bus lane installed	2012	
9	Resource Smart Resource Corridor	Policy Guidance and Development	Other policy	TBC	2016	TBC	Reduction of NO2 in AQMA	Reduction in emissions			

		ent Control									
10	Internal Travel Plans	Policy Guidance and Development Control	Other policy	LA	2008	2009	Uptake of sustainable options	Reduction in emissions	Adopted and implemented	Ongoing	
11	Transport Plans for Businesses required	Policy Guidance and Development Control	Other policy	LA	Pre 2006	Pre 2006	Uptake of sustainable options	Reduction in emissions	Asking for plans through planning process	Ongoing	
12	School Travel Plan Framework	Policy Guidance and Development Control	Other policy	LA	2005	2006	Uptake of sustainable options	Reduction in emissions	Schools were encouraged to produce travel plans and funding sought to fund infrastructure requirements	Ongoing	
13	Bikeability in schools. Council staff visited schools giving cycling safety training.	Promoting Travel Alternatives	Promotion of cycling	LA	2009	2010	Increase in cycling	Reduction in emissions	Promoted cycling in schools via education programmes on road safety	2014	
14	Spenn Valley Greenway (Traffic Free Cycleway on former railway line)	Transport Planning and Infrastructure	Cycle network	LA	1998	2000	Increase in cycling	Reduction in emissions	Cycleway implemented	2000	
15	Calder Valley Cycleway (Traffic Free Cycleway on former railway line)	Transport Planning and Infrastructure	Cycle network	LA	2004	2008	Increase in cycling	Reduction in emissions	Cycleway implemented	2008	

16	City Cycle Ambition Grant 2	Policy Guidance and Development Control	Other policy	Grant	2015	2015	Increase in cycling	Reduction in emissions	Bid submitted for cycleway improvements	2016	
17	Free Parking for Electric Vehicles and 50% discount on parking for other ULEV	Promoting Low Emission Transport	Priority parking for LEV's	LA	2007	2008	Uptake of low emission and Ultra Low Emission Vehicles	Reduction in emissions	Scheme is operational	On going	
18	City Car Club	Alternatives to private vehicle use	Car Clubs	LA	2008	2009	Use of club cars	Reduction in emissions	Introduced car club to Kirklees District	Ongoing	
19	Car Sharing Scheme	Promoting Travel Alternatives	Other	LA	2006	2007	Use of website	Reduction in emissions	Contribute to license fee for car sharing website and private subsite for council staff	Ongoing	
20	Local Free Bus around Huddersfield Town Centre and Dewsbury Town Centre	Alternatives to private vehicle use	Other	LA	2005	2006	Bus Patronage	Reduction in emissions	Bus runs in both Huddersfield and Dewsbury	Ongoing	
21	Conversion of Fleet to ULEV where appropriate	Vehicle Fleet Efficiency	Other	LA	2008	2009	Number of fleet changed to EV	Reduction in emissions	We have used an electric transit type van for a number of years and have had the Energy Savings trust review our fleet to see if further swithes to Electric vehicles can be made	Ongoing	
22	Air Quality report to Newspaper	Public Information	Via other mechanisms	LA	Pre 2006	Pre 2006	Awareness of Air Quality amongst the public	Reduction in emissions	Daily Reports sent to newspaper	Ongoing	

23	Bike to work scheme within Council, discount cycle purchase scheme	Promoting Travel Alternatives	Promotion of cycling	LA	2008	2009	Uptake of bikes	Reduction in emissions	Implemented scheme and promoted to workforce	Ongoing	
24	Local sustainable transport fund project to promote modal shift in schools. Dedicated officer visiting schools promoting modal shift	Promoting Travel Alternatives	Other	Grant	2011	2012	Monitor transport options at local schools	Reduction in emissions	Funded officer to go into schools and promote modal shift	Ongoing	
25	Air Quality Strategy	Policy Guidance and Development Control	Other policy	LA	2005	2006	Local policy using Air Quality as a decision factor	Reduction in emissions	Document completed and adopted	2006	
26	Deep Clean in AQMA 2	Other	Other	LA	2013	2014	Reduction in PM10 levels	Reduction in emissions	First deep clean conducted. 2014 reduction in exceedances of daily PM10 in AQMA Planning to conduct clean in 2015	Ongoing	
27	Mote sensing real-time emissions	Vehicle Fleet Efficiency	Testing Vehicle Emissions	Grant	2010	2012	Results from research	Reduction in emissions	Analysed emissions of local traffic		
28	Electric Vehicle Charge point Installed	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote	Grant	2013	2014	Number of fleet changed to EV	Reduction in emissions	Charge point installed in council depot	2014	

	in Council Depot		Low Emission Vehicles, EV recharging, Gas fuel recharging								
29	Trial of EV vehicles as pool car	Promoting Low Emission Transport	Other	LA	2014	2014	Uptake of LEVs	Reduction in emissions	Car was used by various staff to conduct daily works	2014	
30	Smokey Vehicle hotline	Public Information	Other	LA	Pre 2000	Pre 2000	Number of calls received	Reduction in emissions	Customers can call and report vehicles with smokey exhausts	Ongoing	
31	Planning conditions on all applications for sustainable transport	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Grant	2014	2014	Number of conditions on approval	Reduction in emissions	Currently request EV charge points on all new developments	Ongoing	
32	Green Procurement Toolkit	Policy Guidance and Development Control	Sustainable Procurement Guidance	LA	2005	2006	use of toolkit in procurement	Reduction in emissions	Green procurement toolkit created for Low carbon	2015	
33	West Yorkshire Low Emission Strategy	Policy Guidance and Development Control	Low Emissions Strategy	Grant	2012	2013	Policy adopted by Kirklees Council	Reduction in emissions	Strategy document completed in draft form. To go out for review	2015	
34	Hotel EV Charge Point Project. Electric Vehicle Charge points installed in a number of accommodation providers	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	LA	2014	2015	use of the charge points	Reduction in emissions	Applications from hotels. Number of sites installed	2015	

35	Install SCOOT within AQMA 2	Traffic Management	UTC, Congestion management, traffic reduction	LA	2012	2013	Reduction in queuing time	Reduction in emissions	Installed	2013	
36	New links to Greenway (Cycle Path) added through planning	Transport Planning and Infrastructure	Cycle network	LA	2000	2000	Increase cycle routes	Reduction in emissions	Recommended conditions to planning	Ongoing	
37	Subsidised Metro Cards for Staff	Promoting Travel Alternatives	Workplace Travel Planning	LA	Pre 2006	Pre 2006	Promote use of public transport	Reduction in emissions	Scheme is operational	Ongoing	
38	Metro Cards introduced for work journeys	Promoting Travel Alternatives	Workplace Travel Planning	LA	2008	2009	Reduce use of cars for shorter journeys	Reduction in emissions	Metro Cards in use for public transport for council staff to undertake their daily work	Ongoing	
39	Installing EV Charge points into private car parks (three sites, 4 units installed)	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	LA	2015	2015	Usage of charge points	Reduction in emissions	Bid successful and sites identified	2015	
40	Congestion performance funding	Traffic Management	UTC, Congestion management, traffic reduction	LA	2011	2012	Number of children going to schools using non private vehicles to access sites	Reduction in emissions	Funded officer to go into schools and promote modal shift	2014	
41	Bus priority at lights in AQMA 1. Gives late buses priority through Air Quality	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management,	LA	2013	2014	Reduction in queuing time for public transport	Reduction in emissions	Implemented scheme	2014	

	Management Area 1		Selective vehicle priority, bus priority, high vehicle occupancy lane								
42	Bluetooth journey monitoring	Traffic Management	Other	LA	2013	2014	Inform smart traffic management	Reduction in emissions	Ran trial of bluetooth data collection system	2016	
43	Retrofitting of School Buses with Pollution abatement equipment	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Grant	2013	2013	All school buses now retrofitted and emissions reduced by 90%	Reduction in emissions	All school buses now retrofitted and emissions reduced by 90%	2014	
44	Installation of Rapid Charge Network across West Yorkshire	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	TBC	2014	2015	Rapid charge network across West Yorkshire being installed	Reduction in emissions	Sites identified and installation due to begin in next few weeks	2015	
45	Ainley Top Junction improvements	Traffic Management	Other	HA	2012	2014	Reduction in traffic congestion	Reduction in emissions	Extra Lanes installed on Roundabout	2015	
46	A629 Corridor Improvement	Transport Planning and Infrastructure	Other	LA	2013	2018	Reduction in traffic congestion	Reduction in emissions	Bid for funding being prepared	2021	
47	A653 Corridor Improvement	Transport Planning and Infrastructure	Other	LA	2013	2018	Reduction in traffic congestion	Reduction in emissions	Bid for funding submitted	2018	
48	Bus priority at lights in AQMA 2	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including	LA	2012	2013	Reduction in queuing time for public transport	Reduction in emissions	Implemented scheme	2013	

			Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane								
49	West Yorkshire ECO-Stars Scheme	Vehicle Fleet Efficiency	Driver training and ECO driving aids	LA	2015/16	2016	Improvement in HGV Fleets	Reduction in emissions	Scheme purchased, Implementation begun	Ongoing	
50	Electric Vehicle Taxi Scheme	Promoting Low Emission Transport	Taxi emission incentives	Grant	2017	2018-2020	Provide taxi charging network across West Yorkshire	Reduction in emissions	Planning stage	2020	
51	Rationalisation of traffic light management system	Traffic Management	UTC, Congestion management, traffic reduction	LA	2017	2018	Determine the best UTC prioritisation to reduce AQ impact	Reduction in emissions	Planning stage	2020	

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

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

Kirklees Council is taking the following measures to address PM_{2.5}:

- Included PM_{2.5} as key indicator for the Health and Wellbeing Board
- Collaborative working between Public Health, Environmental Health, Planning and Highways to conduct a 2015 baseline Air Quality Model for the whole Kirklees District for PM_{2.5} as part of local plan works.
- PM_{2.5} monitors have been installed at 2 locations within the district. Due to a database corruption the 2017 data is not available. If and when the data is available it will be published on the Council's website.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

In January 2016 Kirklees Council reviewed its monitoring budget and decided to suspend 5 real-time monitoring stations. In order to minimise the impact of the loss of a key tool, Kirklees Council has located passive monitoring within these locations.

Kirklees Council undertook automatic (continuous) monitoring at 2 sites during 2016.

Due to a corrupted database Kirklees Council are unable to provide real-time monitoring data for 2016. The council are working with our service provider to restore the data. In the event it is returned, this shall be included in a future Annual Status Report.

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

3.1.2 Non-Automatic Monitoring Sites

Kirklees Council undertook non- automatic (passive) monitoring of NO₂ at 58 sites during 2016. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

Due to a corrupted database Kirklees Council are unable to provide real-time monitoring data for 2016. NO₂ hourly mean concentrations are recorded in Appendix A4. for the past 4 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

In light of the lack of available data for the real-time monitors in 2016, observation made in the 2016 ASR are the most up to date, which at the time indicated falls across the 7 monitoring locations.

In the first half of 2016 Kirklees Council analysed our own diffusion tubes using methods outlined in national guidance and participated in the national laboratory accreditation system WASP. Data collected from spectrophotometer was not complete and the information which was recovered was appeared compromised upon closer inspection. We have therefore omitted the data obtained using our own laboratories.

In the second half of 2016 Kirklees Council began using West Yorkshire Analytical Services to analyse diffusion tubes. Data obtained from this laboratory has been ratified, annualised in accordance with national guidance and presented in Appendix A.

Figure A.1 in Appendix A shows trends over the last 5 years for diffusion tube locations. The data has been divided into 3 areas, Average of all our diffusion tubes, Average of diffusion tubes within our new AQMAs and Average of diffusion tubes within our longstanding AQMAs.

It is noted that between 2012 and 2013 concentrations within the AQMAs and overall fell by roughly 10µg/m³. Since that time concentration levels have stagnated within the AQMA's 1 and 2. Trends within the new AQMA's and at other non AQMA monitoring locations have seen slightly increases by 1 to 2 µg/m³. This indicates that further measures are needed to return to a downward trend and it must also be noted

that the assumptions around the turnover in fleet bringing about required reductions should be treated with caution.

In addition to the current 9 Air Quality Management Areas, Kirklees Council have identified a further 2 areas where singular passive monitoring sites have returned results in breach of health related objectives. These are along Lindley Moor Road in Lindley and Manchester Road in Thornton Lodge, both of which are within the Huddersfield area. Diffusion tubes located at a singular location are good as an indicator that failure may be occurring in an area, but does not give a clear picture of the conditions, which is why Kirklees Council officers expanded the monitoring network in February 2017 to determine the extent of these issues within these areas. Results of this study will be available in the 2018 ASR.

Kirklees Council is currently in the development of its Local Plan. In order to safeguard air quality conditions for the future, in 2018 officers plan to expand the network within the district, positioning monitoring locations within areas anticipated to experience greatest impact from the local plan developments. This has been determined using professional experience and the AECOM support document, created to determine the impact of the local plan.

3.2.2 Particulate Matter (PM₁₀)

Due to a corrupted database Kirklees Council are unable to provide real-time monitoring data for 2016. PM₁₀ annual mean concentrations are recorded in Appendix A5. for the past 4 years with the air quality objective of 40µg/m³.

PM₁₀ daily mean concentrations are recorded in Appendix A5. for the past 4 years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

In light of the lack of available data for the real-time monitors in 2016, observation made in the 2016 ASR are the most up to date, which at the time indicated falls across the 7 monitoring locations

3.2.3 Particulate Matter (PM_{2.5})

Due to a corrupted database Kirklees Council are unable to provide real-time PM_{2.5} monitoring data for 2016. The council are working with our service provider to restore the data. In the event it is returned, this shall be included in a future Annual Status Report.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
Roadside 3	RS3 - Bradley	Roadside	417255	420761	NO2; PM10	YES	Chemiluminescent; Met-One BAM	3	3	1.5
Roadside 6	RS6 - Ainley Top	Roadside	411739	419007	NO2; PM10	YES	Chemiluminescent; Met-One BAM	8	5	1.5

Notes:

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

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
1	Dewsbury Bus Station	Other	424506	421535	NO ₂	NO	N	0.8	NO	2
2	Bus Station - Huddersfield	Other	414214	416504	NO ₂	YES	N	4.1	NO	2
3	Edgerton Road	Roadside	413504	417439	NO ₂	YES	Y (2.0)	2.4	NO	2
4	Princess Street, Batley	Roadside	424464	424395	NO ₂	NO	Y (4.3)	1.8	NO	2
5	Huddersfield Road Ravenshorpe	Roadside	422443	420380	NO ₂	NO	Y (1.6)	1.9	NO	2
6	Leeds Road - Cooper Bridge	Roadside	417872	421050	NO ₂	YES	Y (5.2)	6	NO	2
7	Westgate Huddersfield	Urban Centre	414434	416744	NO ₂	YES	Y (0.5)	0.5	NO	2
8	Bradford Road Fartown 1	Roadside	414496	417795	NO ₂	NO	Y (2.5)	2.5	NO	2
9	Bradley Road	Kerbside	417280	420482	NO ₂	NO	Y (13.4)	0.7	NO	2
10	Leeds Road Bradley 1	Roadside	417227	420337	NO ₂	NO	Y (3.2)	2	NO	2
11	Chapel Hill Huddersfield	Roadside	414389	416262	NO ₂	YES	Y (0.1)	5.5	NO	2
12	Leeds Road Bradley 2	Roadside	417335	420412	NO ₂	NO	Y (3.7)	1.8	NO	2
13	Whitehall Road East	Roadside	420377	427871	NO ₂	YES	Y (2.1)	2.6	NO	2
14	Oastler Avenue	Urban Background	413669	416463	NO ₂	NO	N	1.7	NO	2
15	Ainley Top 1	Other	420441	427353	NO ₂	YES	N	3	YES	2

16	Ainley Top 2	Other	420441	427353	NO ₂	YES	N	3	YES	2
17	Ainley Top 3	Other	420441	427353	NO ₂	YES	N	3	YES	2
18	Huddersfield Road Birstall	Roadside	422686	426229	NO ₂	NO	Y (4.2)	1.9	NO	2
19	Huddersfield Road Scouthil	Roadside	423563	421014	NO ₂	NO	Y (6.5)	2.7	NO	2
20	Rockley Street Dewsbury	Roadside	424853	421828	NO ₂	YES	Y (9.5)	1.5	NO	2
21	Castlegate Huddersfield	Roadside	414149	416686	NO ₂	YES	Y (6.9)	2.1	NO	2
22	Leeds Road Bradley 3	Roadside	417418	420479	NO ₂	YES	Y (3.2)	1.5	NO	2
23	Leeds Road Mirfield 2	Roadside	418483	420978	NO ₂	NO	Y (14.1)	1.6	NO	2
24	Lindley Moor Road	Roadside	409941	418471	NO ₂	NO	Y (15.4)	2	NO	2
25	Leeds Road - RS3 - 1	Other	423185	420612	NO ₂	NO	N	6	YES	2
26	Leeds Road - RS3 - 2	Other	423185	420612	NO ₂	NO	N	6	YES	2
27	Leeds Road - RS3 - 3	Other	423185	420612	NO ₂	NO	N	6	YES	2
28	Ring Road Huddersfield	Roadside	414745	416710	NO ₂	YES	Y (0.1)	3.3	NO	2
31	Blacker Road 1	Roadside	413400	417495	NO ₂	YES	Y (8.3)	2.7	NO	2
32	Blacker Road 2	Roadside	413513	417481	NO ₂	YES	Y (5.0)	2.6	NO	2
33	Wakefield Rd / Huddersfield Road	Roadside	420727	423668	NO ₂	YES	Y (4.3)	2.4	NO	2
34	Frost Hill Liversedge	Roadside	420845	423770	NO ₂	YES	Y (0.3)	1.9	NO	2
35	Leeds Road Liversedge	Roadside	420853	423866	NO ₂	YES	Y (9.4)	1.9	NO	2

36	Huddersfield Road Mirfield 1	Kerbside	420304	419766	NO ₂	NO	Y (2.9)	0.9	NO	2
37	Bradford Road, Birkenshaw	Roadside	420356	427810	NO ₂	YES	Y (2.5)	2.2	NO	2
38	Whitehall Road West	Roadside	420222	427764	NO ₂	YES	Y (18.3)	1	NO	2
39	Bradford Road, Batley	Roadside	424526	424326	NO ₂	NO	Y (1.7)	2.1	NO	2
40	Leeds Road Dewsbury	Roadside	424871	421921	NO ₂	YES	Y (1.2)	1.6	NO	2
41	Chain Bar Roundabout	Roadside	418285	426630	NO ₂	NO	Y (12.5)	3.4	NO	2
42	Leeds Road Dewsbury - 2	Roadside	424969	422002	NO ₂	YES	Y (5.6)	1.9	NO	2
43	John Street Dewsbury	Roadside	425083	422022	NO ₂	YES	Y (6.0)	1.9	NO	2
44	Calmswood Road Eastborough	Roadside	425179	422114	NO ₂	NO	Y (-7.2)	1.7	NO	2
45	Bradford Road Fartown 2	Roadside	414480	417720	NO ₂	NO	Y (0.5)	7.2	NO	2
46	Willow Lane East Fartown	Roadside	414546	417759	NO ₂	NO	Y (0)	2.2	NO	2
47	Roundings Road Outlane	Other	407942	417261	NO ₂	YES	Y (0)	14.4	NO	2
48	Flush Liversedge	Roadside	421039	423673	NO ₂	YES	Y (0)	2.6	NO	2
49	Manchester Road Thornton Lodge 2	Roadside	413659	416182	NO ₂	NO	Y (3.5)	3.7	NO	2
50	Manchester Road Thornton Lodge 1	Roadside	413414	415981	NO ₂	NO	Y (1.6)	2.5	NO	2
51	High Street Heckmondwike	Roadside	421904	423580	NO ₂	YES	Y (4.9)	1	NO	2
52	Penistone Road Waterloo	Roadside	417627	416472	NO ₂	NO	Y (7.8)	2.4	NO	2

53	Yates Lane Milnsbridge	Roadside	411564	415902	NO ₂	NO	Y (1.6)	1.7	NO	2
54	Wakefield Road Dewsbury	Roadside	425196	421566	NO ₂	YES	Y (2.7)	3.2	NO	2
55	Huddersfield Road Holmfirth	Roadside	414187	408264	NO ₂	NO	Y (3.2)	1.7	NO	2
56	Wakefield Road Huddersfield	Roadside	415009	416420	NO ₂	YES	N	2.8	NO	2
57	Cambridge Road 1	Roadside	414291	417281	NO ₂	YES	N	2.2	NO	2
58	Cambridge Road 2	Roadside	414350	417270	NO ₂	YES	N	2.6	NO	2

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
Roadside 3	Roadside	Automatic	0	0	<u>35.00</u>	33.20	36.00	39.80	N/A
Roadside 6	Roadside	Automatic	0	0	<u>N/A</u>	42.30	41.70	44.40	N/A
1	Other	Diffusion Tube	75	25	<u>50.11</u>	47.67	46.64	45.34	47.42
2	Other	Diffusion Tube	100	33	<u>50.44</u>	43.39	44.97	46.74	41.58
3	Roadside	Diffusion Tube	100	33	<u>50.44</u>	49.24	47.85	53.70	41.43
4	Roadside	Diffusion Tube	50	17	<u>35.11</u>	38.79	39.95	35.16	32.68
5	Roadside	Diffusion Tube	75	25	<u>N/A</u>	40.22	40.08	41.50	35.60
6	Roadside	Diffusion Tube	100	33	<u>44.61</u>	36.88	38.64	38.94	40.46
7	Urban Centre	Diffusion Tube	100	33	<u>48.61</u>	46.33	42.82	44.81	38.78
8	Roadside	Diffusion Tube	100	33	<u>42.97</u>	37.84	39.99	38.30	33.33
9	Kerbside	Diffusion Tube	100	33	<u>42.66</u>	34.98	41.19	39.21	36.63
10	Roadside	Diffusion Tube	100	33	<u>51.40</u>	39.89	41.25	42.11	43.73
11	Roadside	Diffusion Tube	100	33	<u>57.69</u>	41.23	41.61	42.40	37.79
12	Roadside	Diffusion Tube	100	33	<u>48.17</u>	39.31	40.17	42.57	43.40
13	Roadside	Diffusion Tube	75	25	<u>39.60</u>	35.37	36.86	40.38	36.20

14	Urban Background	Diffusion Tube	100	33	<u>19.00</u>	17.95	18.62	16.34	20.96
15	Other	Diffusion Tube	0	0	<u>N/A</u>	N/A	N/A	38.47	N/A
16	Other	Diffusion Tube	0	0	<u>N/A</u>	N/A	N/A	40.09	N/A
17	Other	Diffusion Tube	0	0	<u>N/A</u>	N/A	N/A	38.51	N/A
18	Roadside	Diffusion Tube	75	25	<u>48.60</u>	47.89	44.77	45.40	41.00
19	Roadside	Diffusion Tube	75	25	<u>44.47</u>	46.35	42.58	39.84	45.20
20	Roadside	Diffusion Tube	75	25	<u>39.05</u>	40.82	39.73	40.68	36.20
21	Roadside	Diffusion Tube	100	33	<u>50.97</u>	45.17	43.94	44.92	45.05
22	Roadside	Diffusion Tube	100	33	<u>63.90</u>	52.50	47.85	43.36	43.88
23	Roadside	Diffusion Tube	75	25	<u>43.31</u>	46.83	42.90	42.63	40.00
24	Roadside	Diffusion Tube	100	33	<u>N/A</u>	48.91	49.01	50.48	49.01
25	Other	Diffusion Tube	0	0	<u>27.05</u>	22.10	22.20	20.39	N/A
26	Other	Diffusion Tube	0	0	<u>27.05</u>	23.64	23.50	20.61	N/A
27	Other	Diffusion Tube	0	0	<u>29.07</u>	23.63	25.06	19.97	N/A
28	Roadside	Diffusion Tube	100	33	<u>63.06</u>	51.83	49.03	54.68	53.13
31	Roadside	Diffusion Tube	100	33	<u>37.58</u>	34.70	32.68	34.96	41.75
32	Roadside	Diffusion Tube	100	33	<u>50.65</u>	42.14	41.83	47.42	45.38
33	Roadside	Diffusion Tube	75	25	<u>41.40</u>	35.88	35.78	33.75	54.80

34	Roadside	Diffusion Tube	75	25	<u>42.79</u>	34.94	35.35	33.21	54.20
35	Roadside	Diffusion Tube	75	25	<u>58.44</u>	45.92	44.02	38.86	72.40
36	Kerbside	Diffusion Tube	75	25	<u>47.49</u>	43.91	40.71	42.49	38.80
37	Roadside	Diffusion Tube	75	25	<u>42.60</u>	36.63	36.18	36.36	30.00
38	Roadside	Diffusion Tube	75	25	<u>50.62</u>	42.63	40.68	38.66	36.00
39	Roadside	Diffusion Tube	50	17	<u>40.94</u>	42.79	42.52	40.40	39.30
40	Roadside	Diffusion Tube	75	25	<u>63.49</u>	51.08	45.24	60.39	54.40
41	Roadside	Diffusion Tube	50	17	<u>44.08</u>	42.13	43.03	45.25	43.50
42	Roadside	Diffusion Tube	75	25	<u>N/A</u>	48.03	47.37	42.99	43.60
43	Roadside	Diffusion Tube	75	25	<u>N/A</u>	46.53	42.82	43.97	43.00
44	Roadside	Diffusion Tube	75	25	<u>N/A</u>	38.43	35.78	36.68	32.20
45	Roadside	Diffusion Tube	100	33	<u>N/A</u>	35.99	36.84	37.45	36.70
46	Roadside	Diffusion Tube	75	25	<u>N/A</u>	36.87	32.08	37.87	39.53
47	Other	Diffusion Tube	100	33	<u>N/A</u>	44.45	42.17	54.16	35.52
48	Roadside	Diffusion Tube	100	33	<u>N/A</u>	44.15	44.62	43.82	64.68
49	Roadside	Diffusion Tube	75	25	<u>N/A</u>	44.06	38.69	42.71	37.1875
50	Roadside	Diffusion Tube	100	33	<u>N/A</u>	42.94	43.72	45.49	42.075
51	Roadside	Diffusion Tube	75	25	<u>N/A</u>	37.88	43.65	40.04	55.4

52	Roadside	Diffusion Tube	100	33	<u>N/A</u>	48.34	35.24	36.23	36.465
53	Roadside	Diffusion Tube	100	33	<u>N/A</u>	36.13	32.27	35.07	33.495
54	Roadside	Diffusion Tube	75	25	<u>N/A</u>	40.55	38.57	39.60	39
55	Roadside	Diffusion Tube	100	33	<u>N/A</u>	36.82	31.76	39.05	33.495
56	Roadside	Diffusion Tube	75	25	<u>N/A</u>	41.20	39.50	39.93	40
57	Roadside	Diffusion Tube	100	33	<u>N/A</u>	25.87	28.81	41.56	46.86
58	Roadside	Diffusion Tube	100	33	<u>N/A</u>	45.74	39.17	32.35	30.36

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

If applicable, all 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.

(4) Concentrations have not been distance corrected in table A.3. For distance corrected results see Table B.1

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

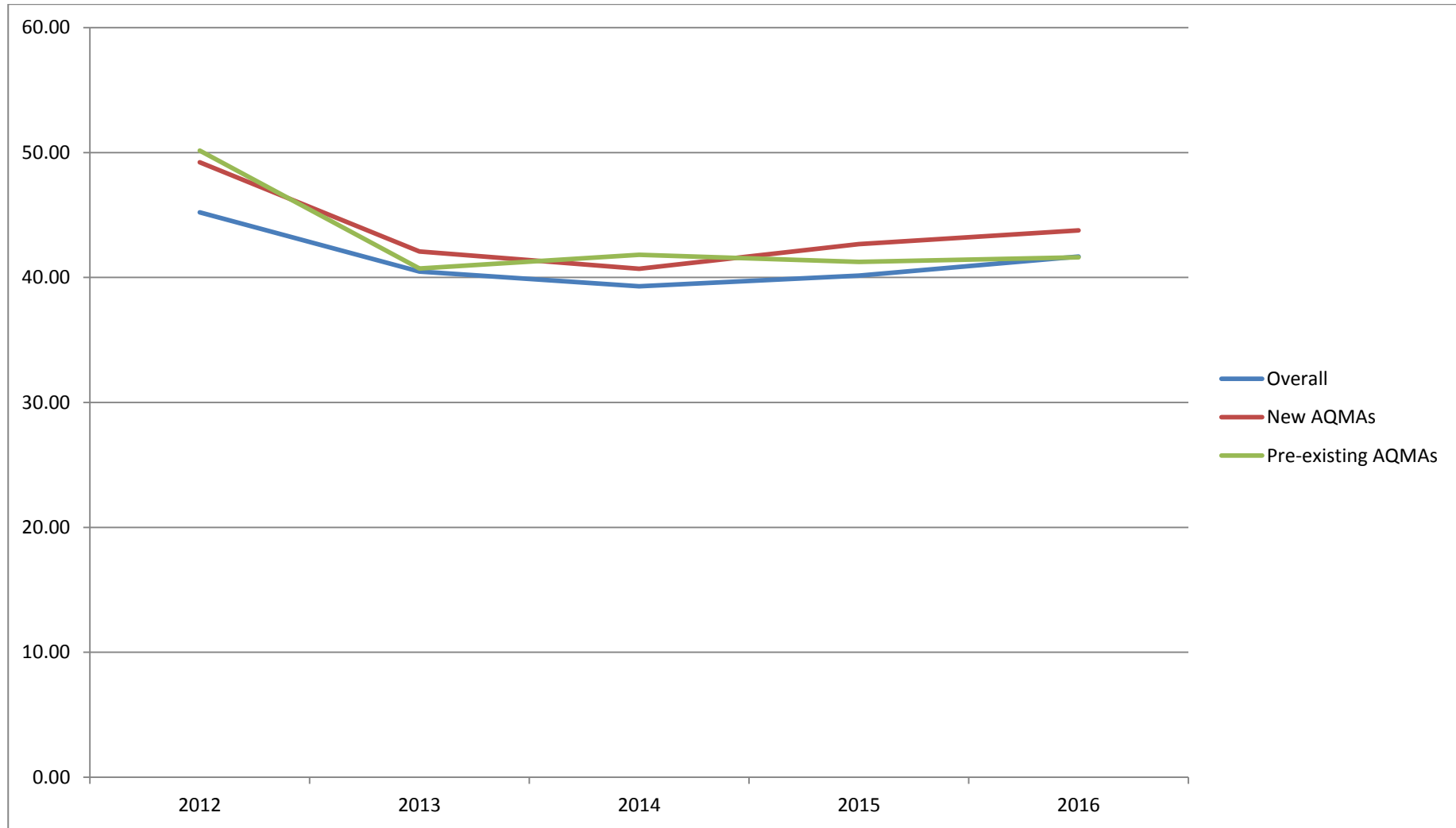


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2012	2013	2014	2015	2016
Roadside 3	Roadside	Automatic	0	0	0	0	2 (139.91)	7 (171.37)	N/A
Roadside 6	Roadside	Automatic	0	0	N/A	0 (102.04)	2 (128.0)	0	N/A

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 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
Roadside 3	Roadside	0	0	19.21	22.08	20.12	18.72	N/A
Roadside 6	Roadside	0	0	N/A	N/A	17.13	25.95	N/A

Annualisation has been conducted where data capture is <75%

Notes:

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

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

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

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

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2012	2013	2014	2015	2016
Roadside 3	Roadside	0	0	19.21	22.08	20.12	18.72	N/A
Roadside 6	Roadside	0	0	N/A	N/A	17.13	25.95	N/A

Notes:

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

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.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 (0.75) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		65	75	78	72.67	47.42	
2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50	60	71	71	63.00	41.58	
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	45	44	77	88	63.50	41.43	38.07
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		50	55		52.50	32.68	28.62
5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		58	68	52	59.33	35.60	33.53
6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53	48	69	78	62.00	40.46	36.16
7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	43	61	62	69	58.75	38.78	35.70
8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53	45	52	52	50.50	33.33	30.00
9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53	39	53	77	55.50	36.63	24.10
10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	60	46	71	88	66.25	43.73	38.40
11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	57	49	64	59	57.25	37.79	37.70
12	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	62	52	79	70	65.75	43.40	37.40
13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		55	60	66	60.33	36.20	34.50
14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	34	20	32	41	31.75	20.96	
15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A							
16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A							

17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A							
18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		75	61	69	68.33	41.00	20.90
19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		165	49	12	75.33	45.20	34.30
20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		45	66	70	60.33	36.20	32.20
21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	55	76	62	80	68.25	45.05	33.80
22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	63	57	68	81	67.25	43.88	37.90
23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		62	62	76	66.67	40.00	28.90
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	65	52	94	86	74.25	49.01	33.90
25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A						#DIV/0!	
26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A						#DIV/0!	
27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A						#DIV/0!	
28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	71	70	82	99	80.50	53.13	52.90
31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	59	70	58	66	63.25	41.75	33.60
32	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	65	64	66	80	68.75	45.38	38.30
33	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		151	56	67	91.33	54.80	46.10
34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		163	44	64	90.33	54.20	53.00
35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		208	63	91	120.67	72.40	50.80
36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		71	50	73	64.67	38.80	32.80
37	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		50	27	73	50.00	30.00	29.00
38	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		58	55	67	60.00	36.00	29.10
39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		56		75	65.50	39.30	36.80
40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		97	78	97	90.67	54.40	51.00
41	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		69	76		72.50	43.50	31.80
42	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		75	55	88	72.67	43.60	36.60
43	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		71	63	81	71.67	43.00	36.10
44	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		59	56	46	53.67	32.20	37.60
45	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	54	49	55	67	56.25	36.70	36.40

46	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53		58	75	62.00	39.53	39.53
47	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	55	52	80	69	64.00	35.52	35.52
48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	53	185	62	92	98.00	64.68	64.68
49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	43		57	75	58.33	37.19	34.00
50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	55	47	68	85	63.75	42.08	38.40
51	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		141	62	74	92.33	55.40	43.20
52	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	55	41	56	69	55.25	36.47	29.80
53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	51	41	49	62	50.75	33.50	30.90
54	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		52	65	78	65.00	39.00	36.20
55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	43	44	58	58	50.75	33.50	30.70
56	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		59	72	69	66.67	40.00	
57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	56	97	79	52	71.00	46.86	
58	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	37	30	41	76	46.00	30.36	

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

Kirklees has previously operated its own laboratory for the analysis of Palmes NO₂ diffusion tubes. This has been suspended and Kirklees Council now get their tubes from West Yorkshire Analytical Services. The tubes are prepared using 50% tea: 50% acetone mix.

C.1.1 Factor from Local Co-location Studies

Kirklees Council currently have 2 Co-location studies conducted at our monitoring stations, but due to station failures, non of our studies had >75% and are therefore not valid.

C.1.2 Diffusion Tube Bias Adjustment Factors

In addition to our own scheme, West Yorkshire Analytical Services participate in co-location studies and derive bias adjustment factors for their tubes. The bias adjustment factor for West Yorkshire Analytical Service is 0.75

C.1.3 Discussion of Choice of Factor to Use

In 2016, Kirklees Council did not generate a bias adjustment factor from their own studies. Therefore, the national figure for West Yorkshire Analytical Service has been used

C.3 QA/QC of Automatic Monitoring

Data ratification is carried out internally by one person (Senior Technical Officer) periodically, normally at monthly intervals. After ratification it is stored on an Excel files in the Kirklees air quality archive.

Data verification is carried out by two staff who have had their competency verified after internal training. Verification takes place twice per day on weekdays, and the of Friday p.m. to Monday a.m. on Monday morning.

Station	Roadside 3 – Hunsworth Lane
Analyser Model	Horiba: APNA-360CE, FH 62 I-R
Logging system	Each analyser has a data distribution board and communicates directly via modem for data download twice per day
Calibration Gas	NO, zero air.
Routine Calibration	Automatic calibration carried out every 72 hours
Daily zero and span Check	No
Air Conditioning	Yes
Service Contract	Horiba: 2 x 6 monthly service and breakdown/repair call out.

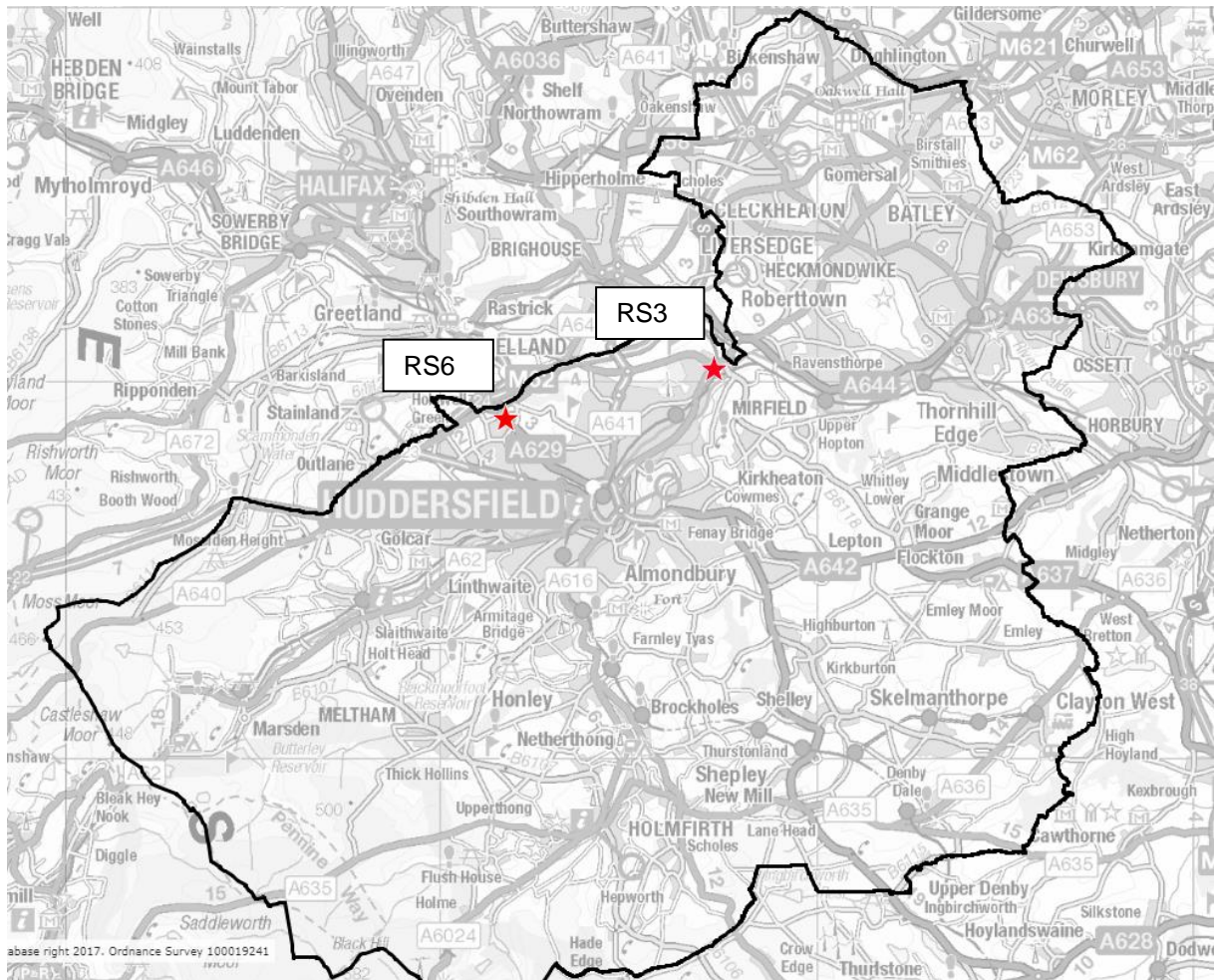
Roadside 6– Ainley Top

Station	Roadside 6 – Ainley Top
Analyser Model	Horiba: APNA-360CE, MET-One BAM
Logging system	Each analyser has a data distribution board and communicates directly via modem for data download twice per day
Calibration Gas	NO,
Routine Calibration	Automatic calibration carried out every 72 hours
Daily zero and span Check	No
Air Conditioning	Yes
Service Contract	Horiba: 2 x 6 monthly service and breakdown/repair call out.

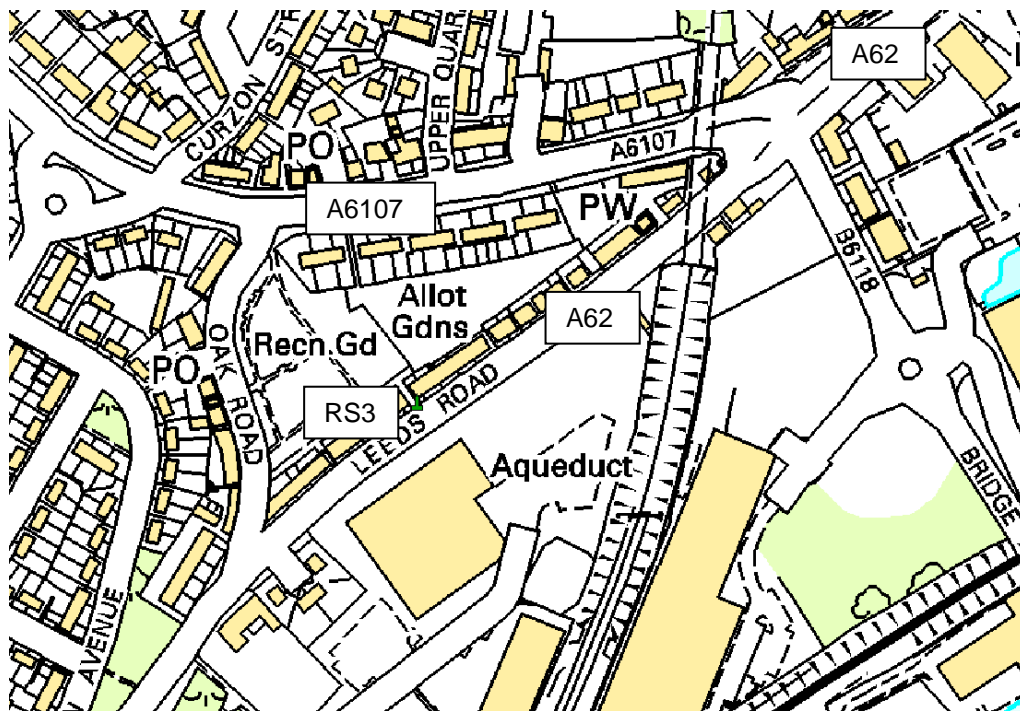
Appendix D: Map(s) of Monitoring Locations and AQMAs

D.1 Continuous Monitor Sites

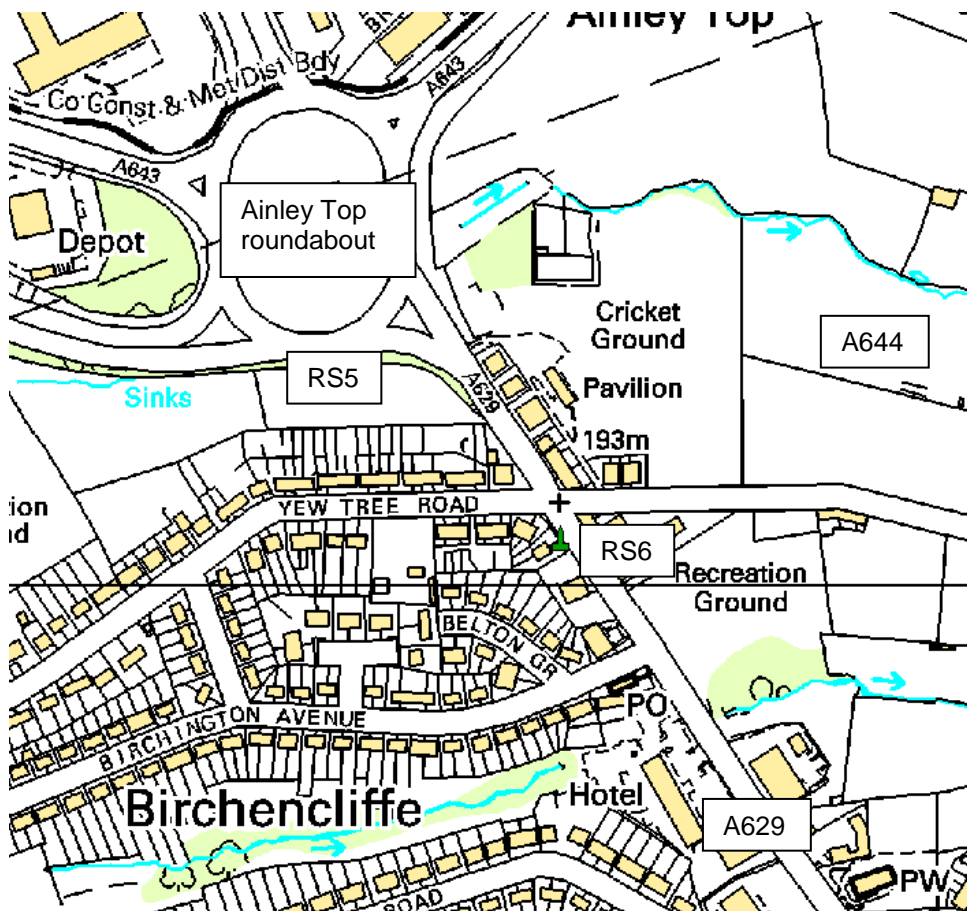
D 1.1 Automatic Monitoring Sites across district



D 1.2 Automatic Monitoring Site New Roadside 3

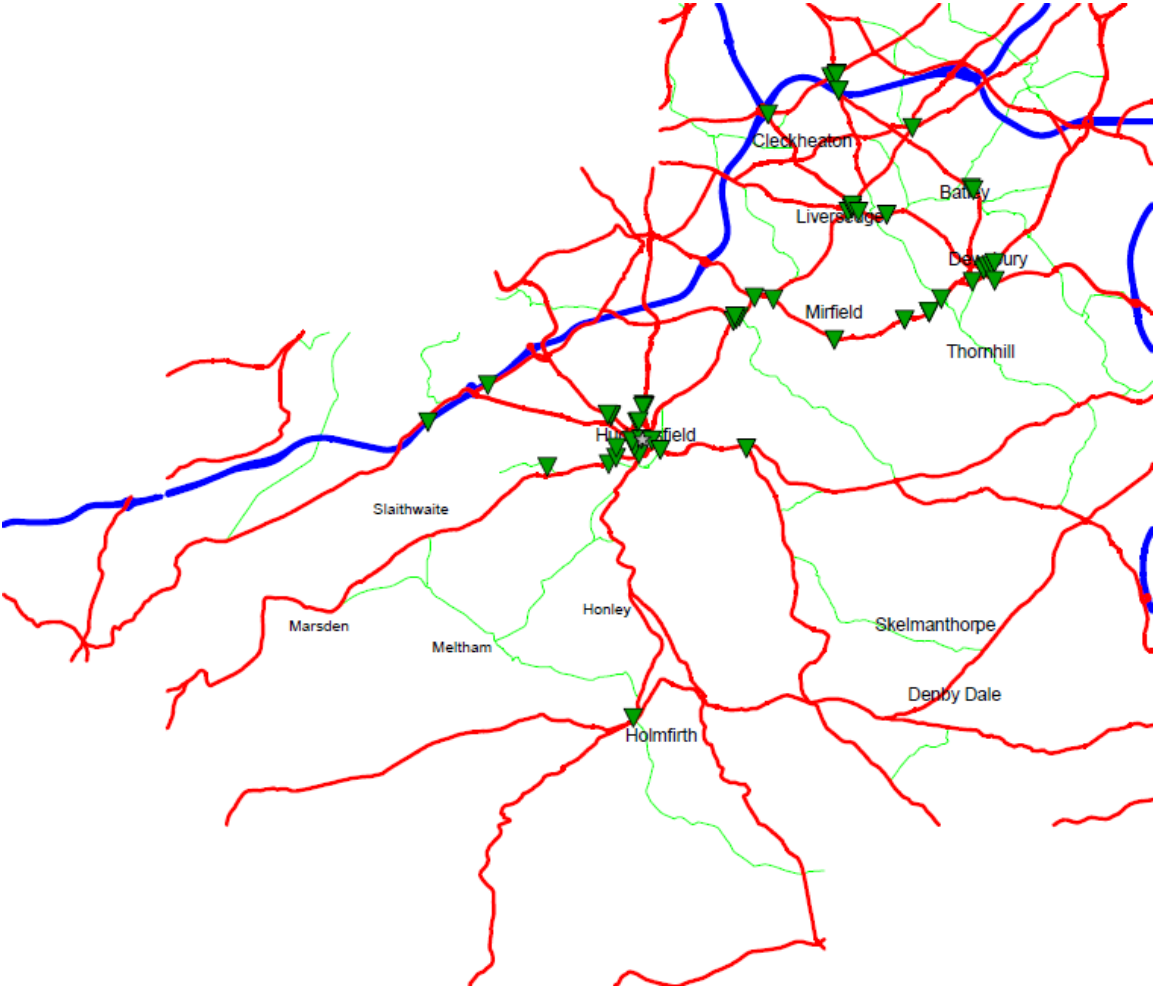


D 1.3 Automatic Monitoring Site Roadside 6

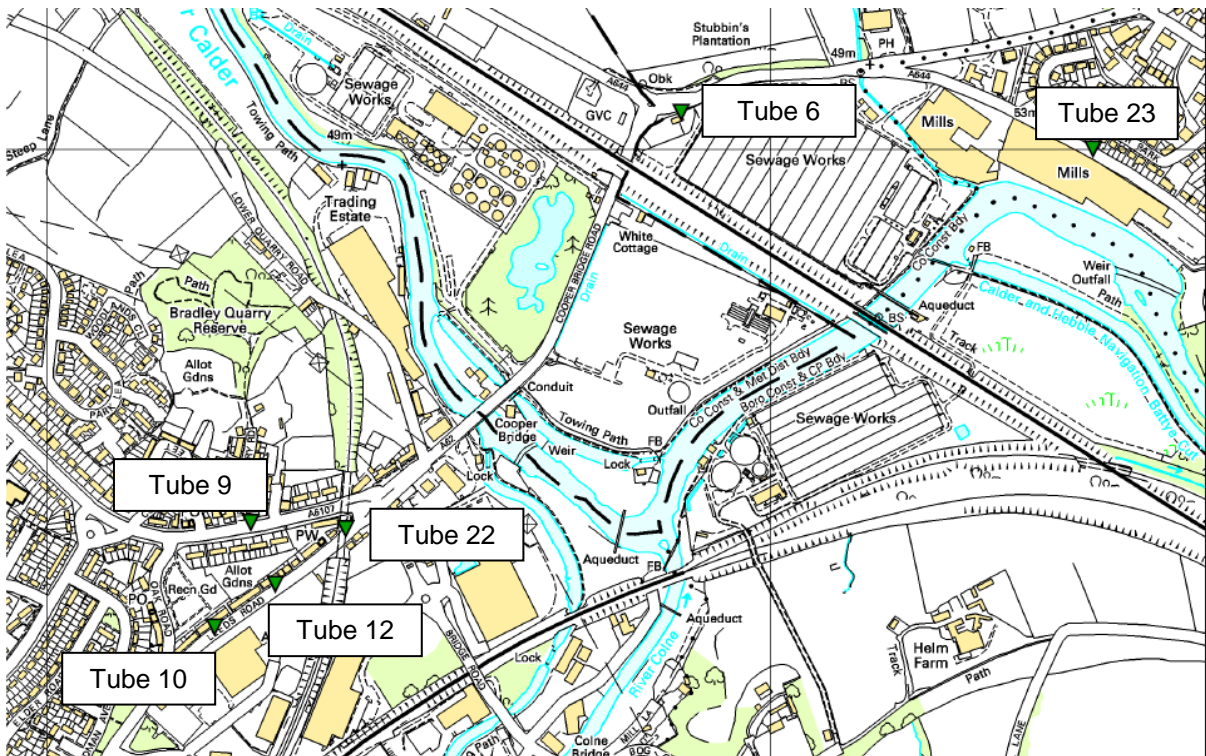


D.2 Passive Monitor Sites

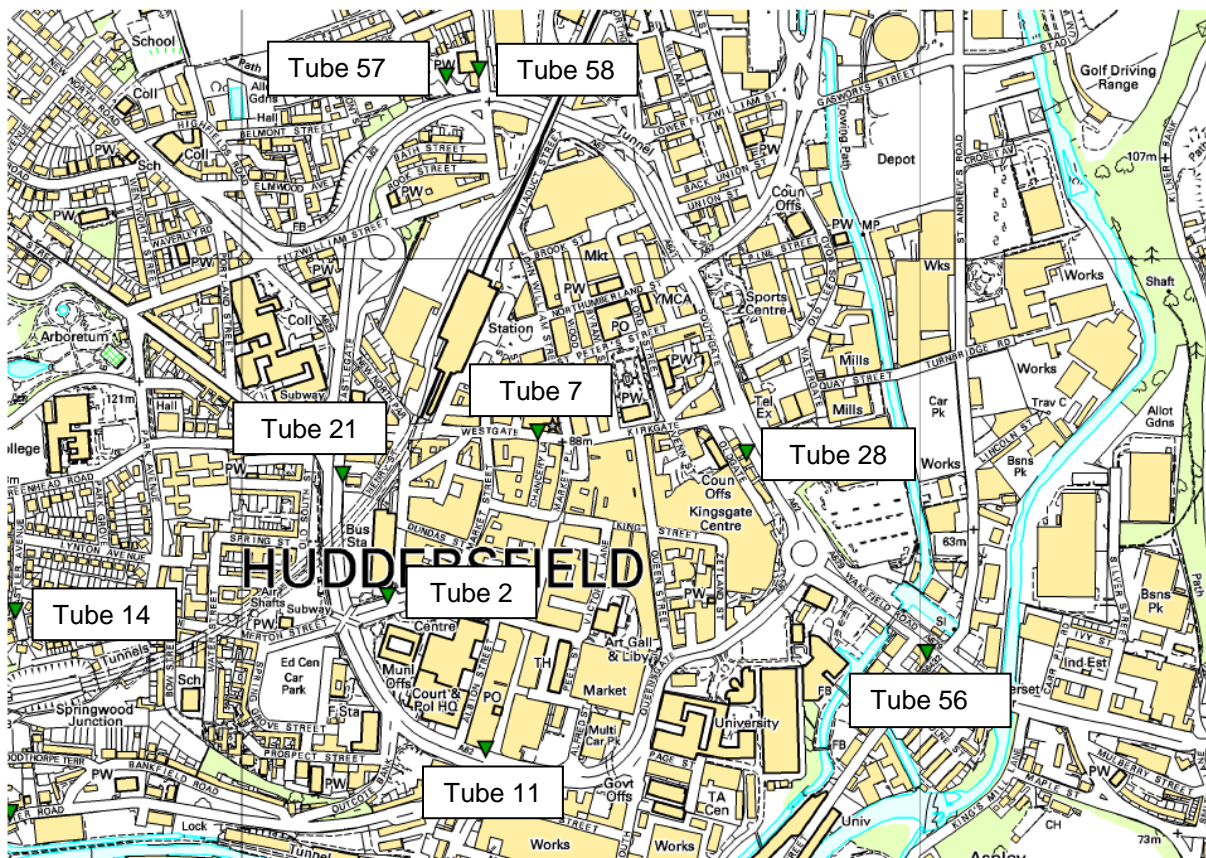
D 2.1 Non-Automatic Monitoring Sites across district



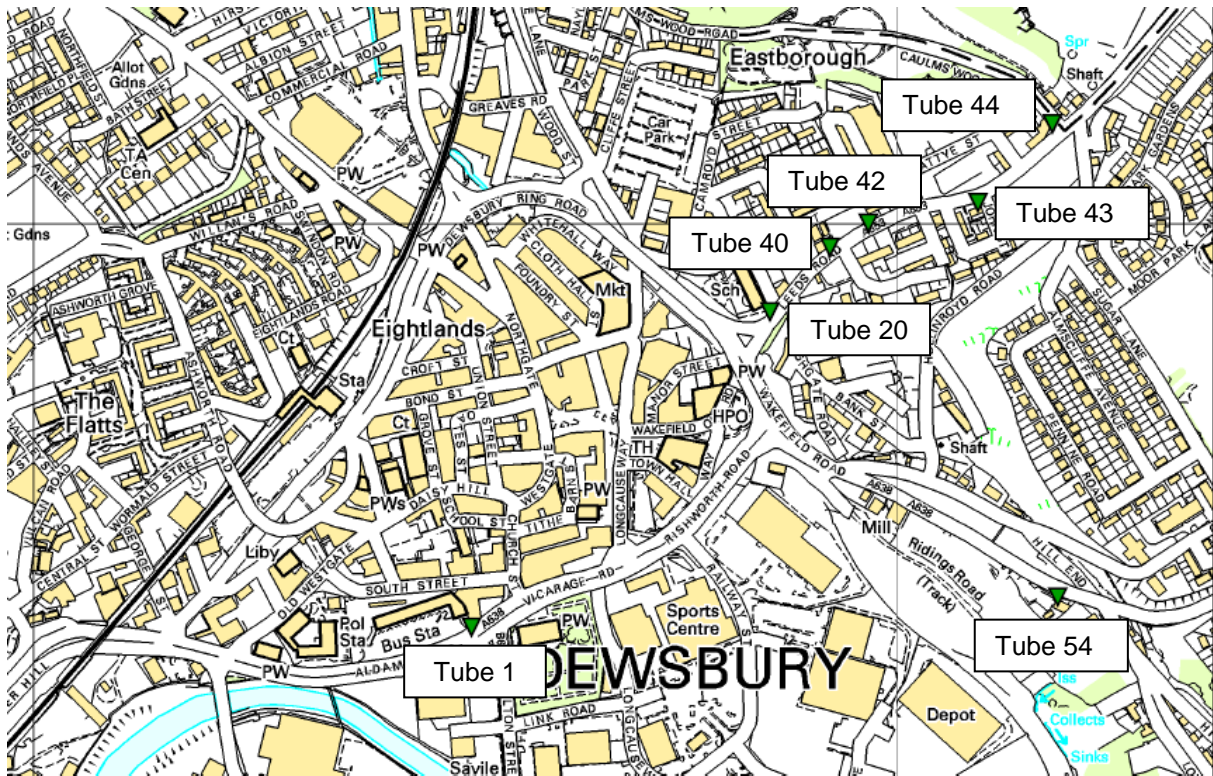
D 2.2 AQMA 1 Bradley diffusion tubes



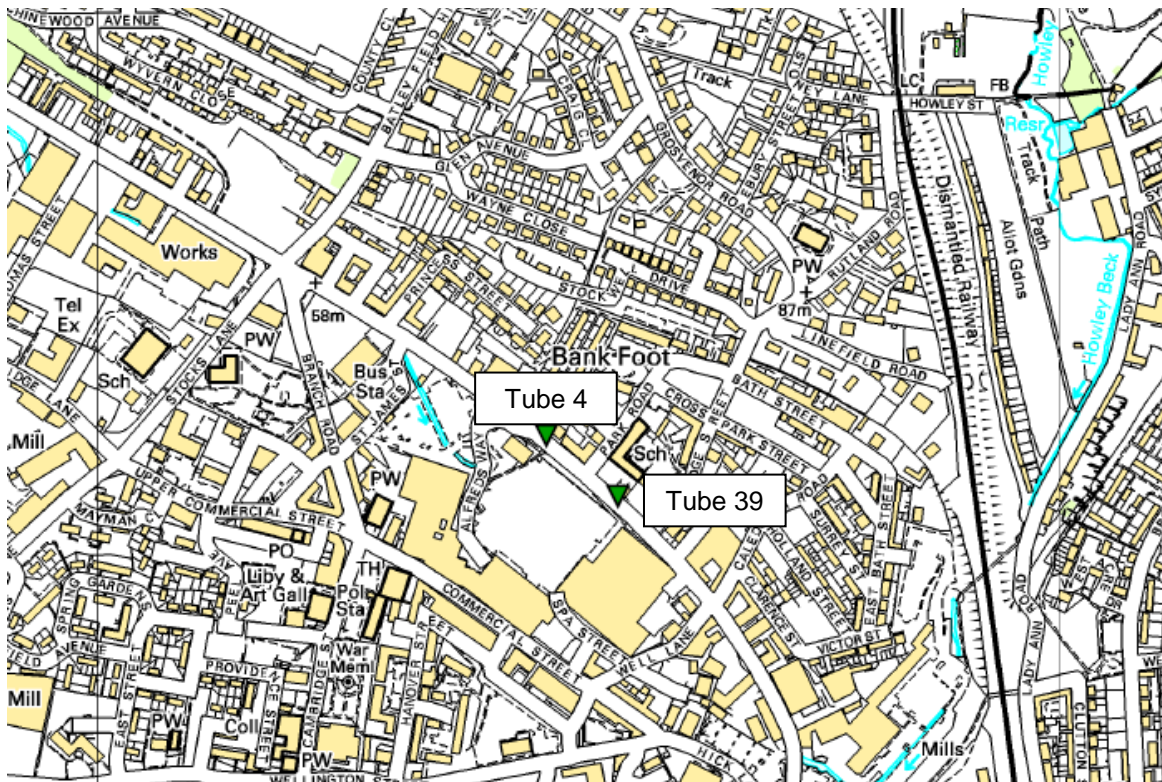
D 2.3 Huddersfield town centre diffusion tubes



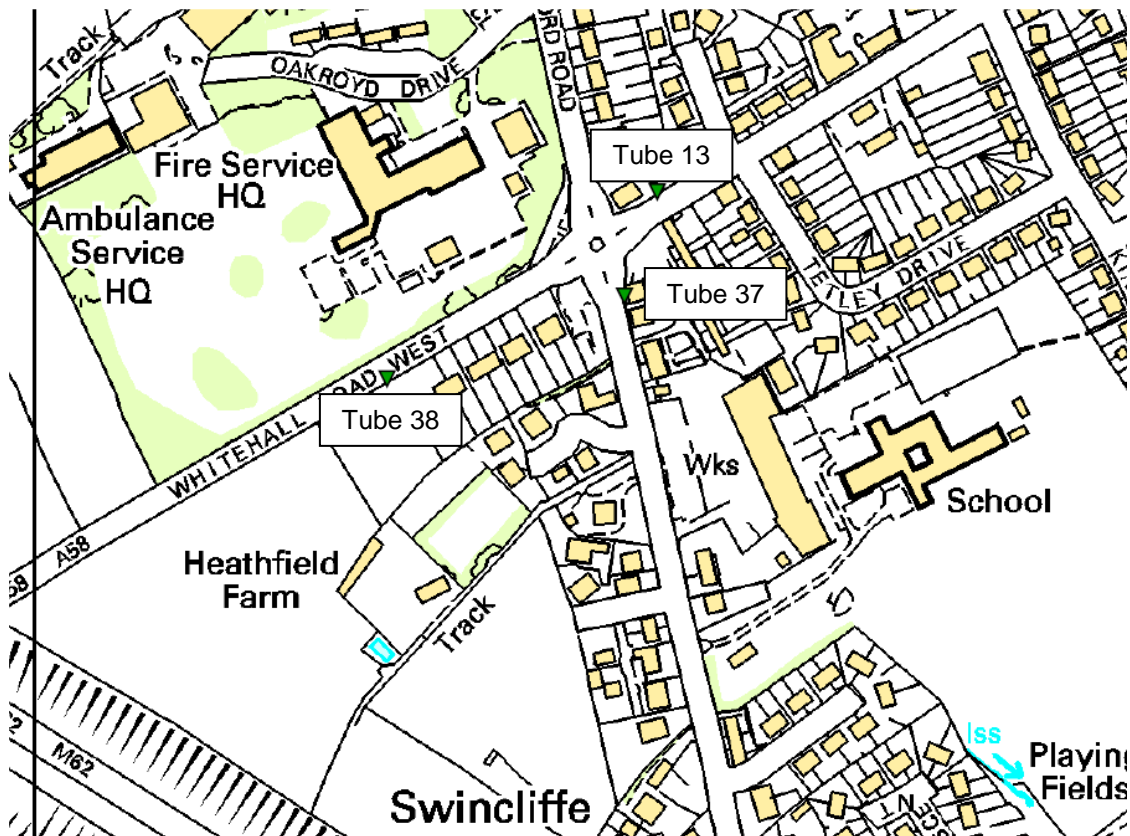
D 2.4 Dewsbury town centre & Eastborough diffusion tubes



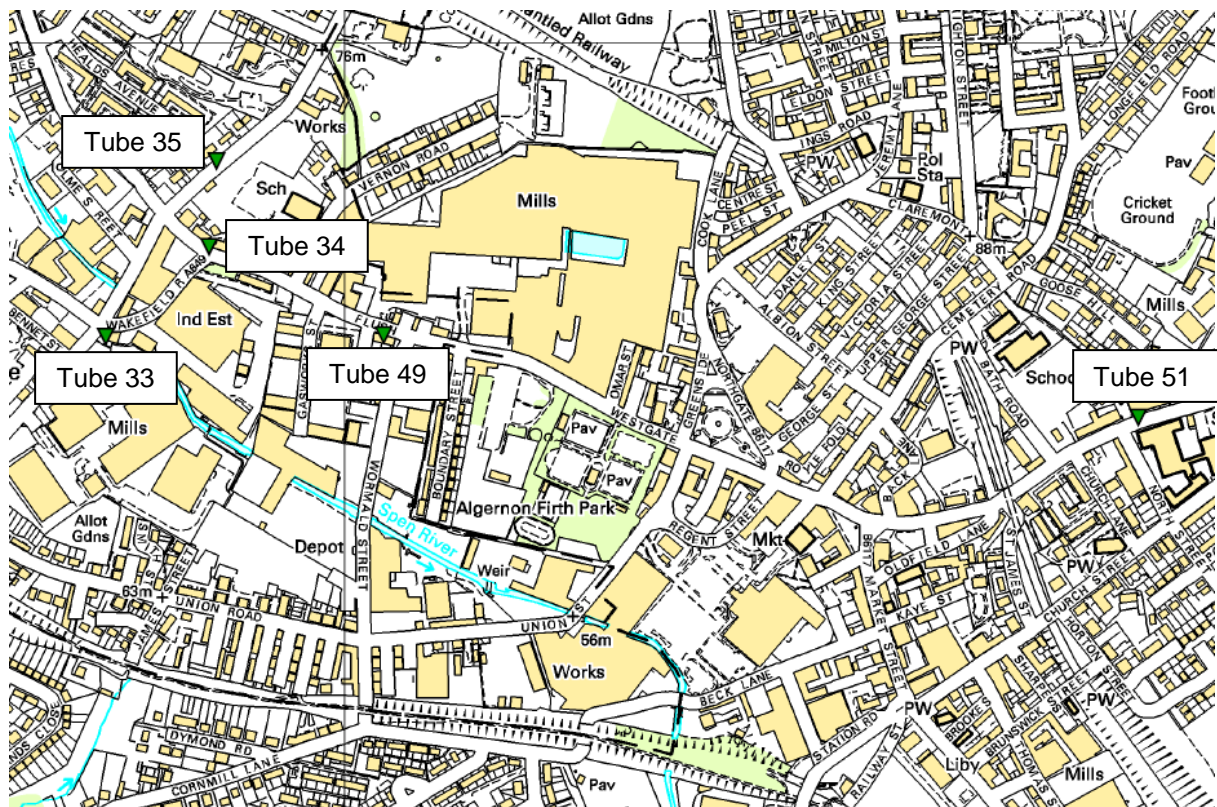
D 2.5 Batley diffusion tubes



D 2.6 Birkenshaw diffusion tubes



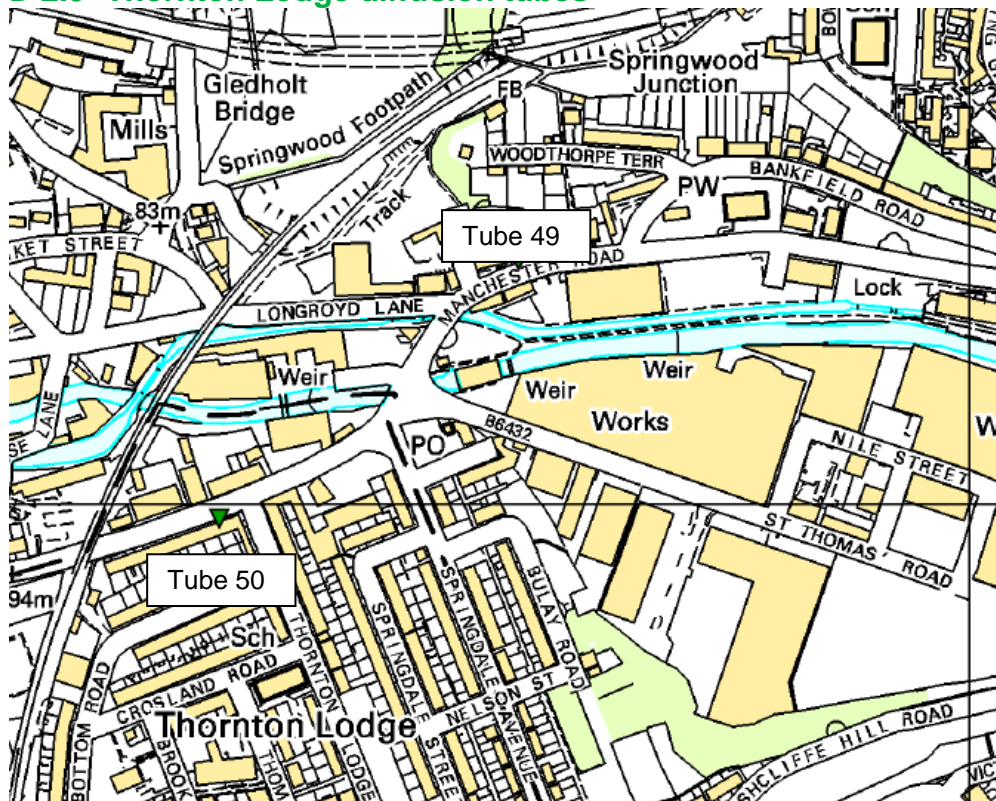
D 2.7 Heckmondwike and Liversedge diffusion tubes



D 2.8 Edgerton diffusion tubes

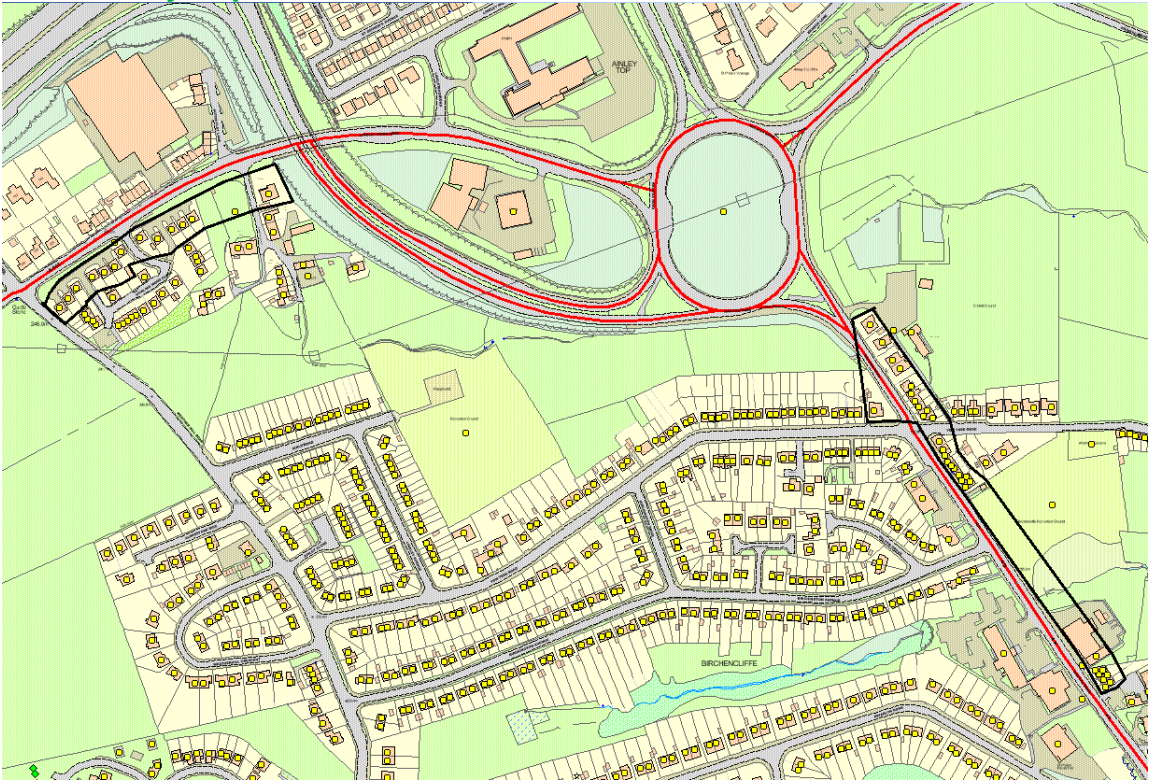


D 2.9 Thornton Lodge diffusion tubes

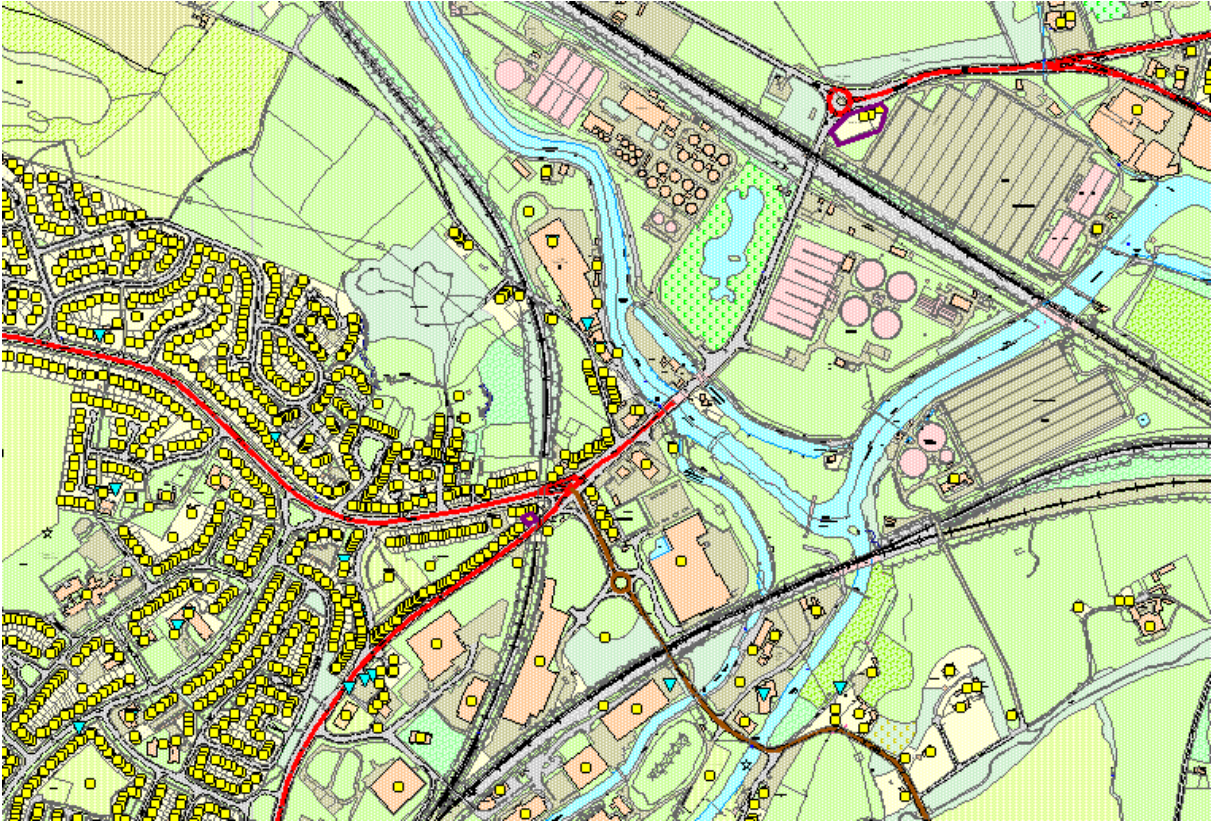


D.3 Air Quality Management Areas

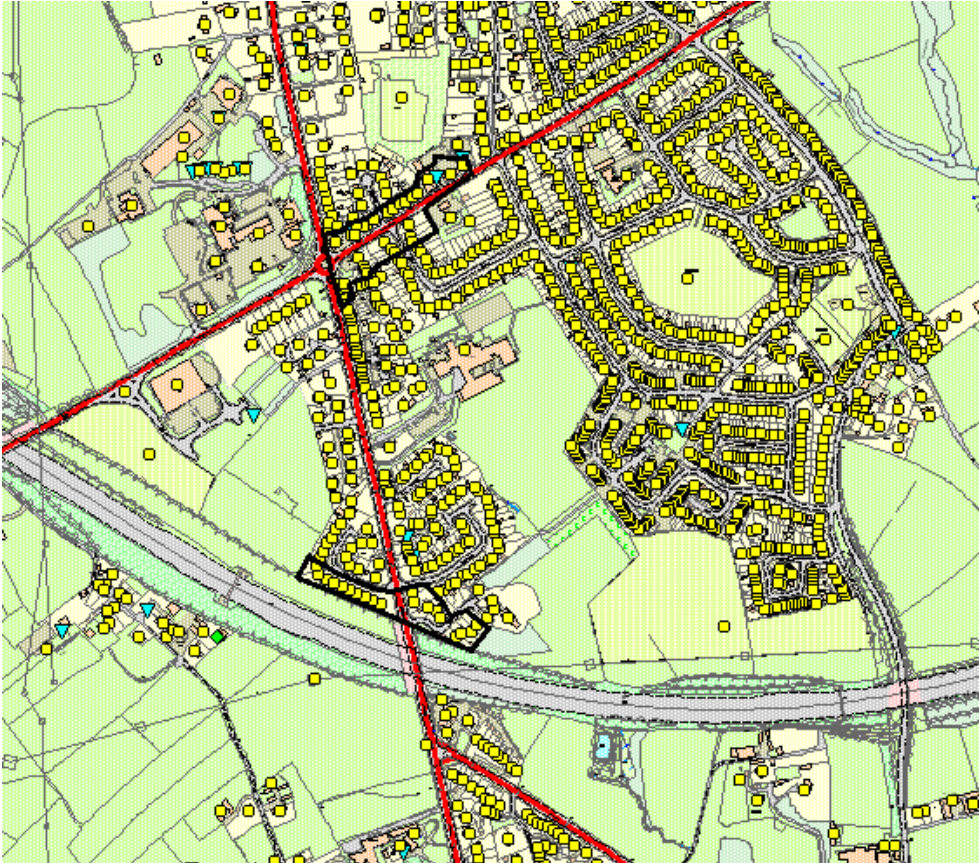
D 3.1 Ainley Top AQMA



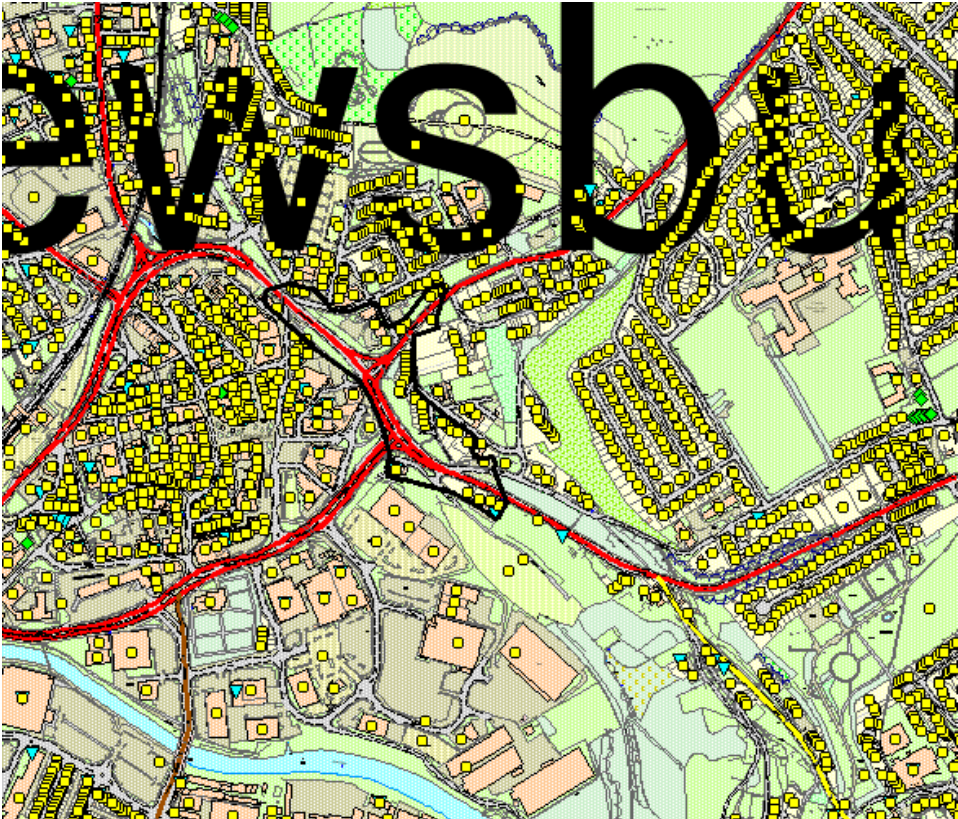
D 3.2 Amended Bradley AQMA



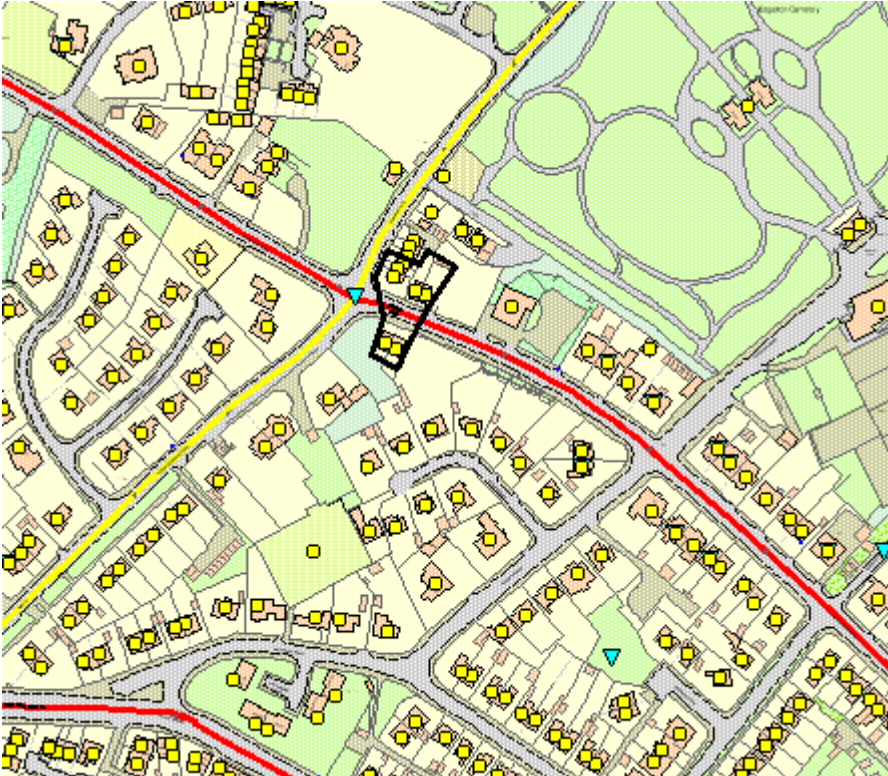
D 3.3 Birkenshaw AQMA



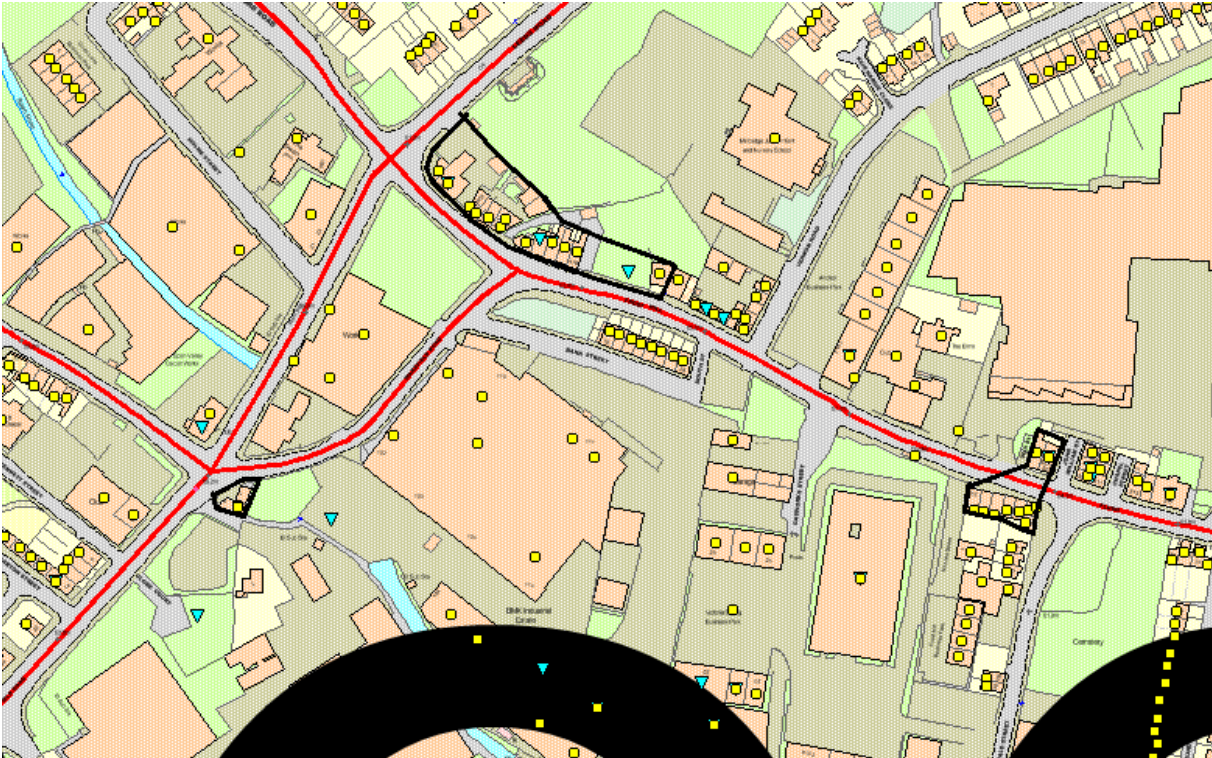
D 3.4 Eastborough AQMA



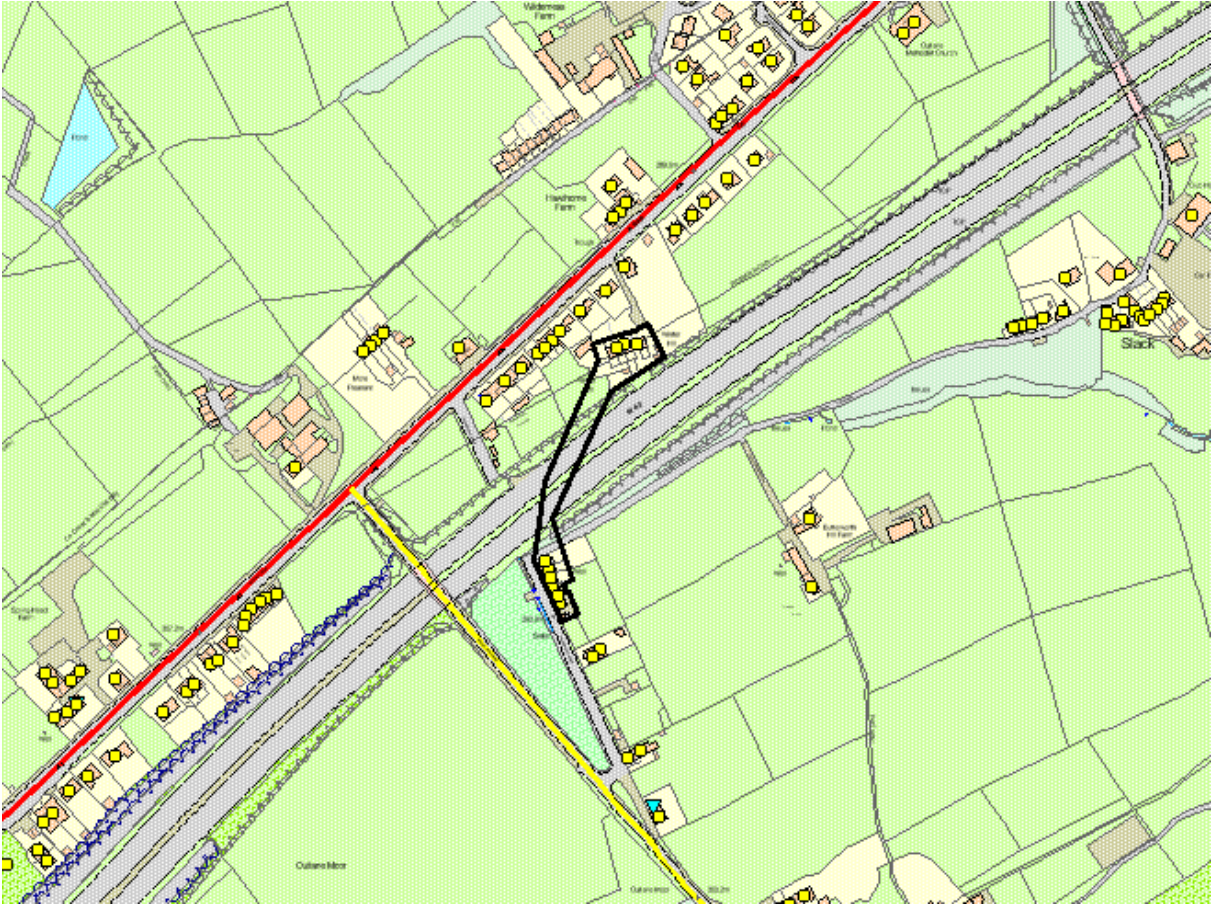
D 3.5 Edgerton AQMA



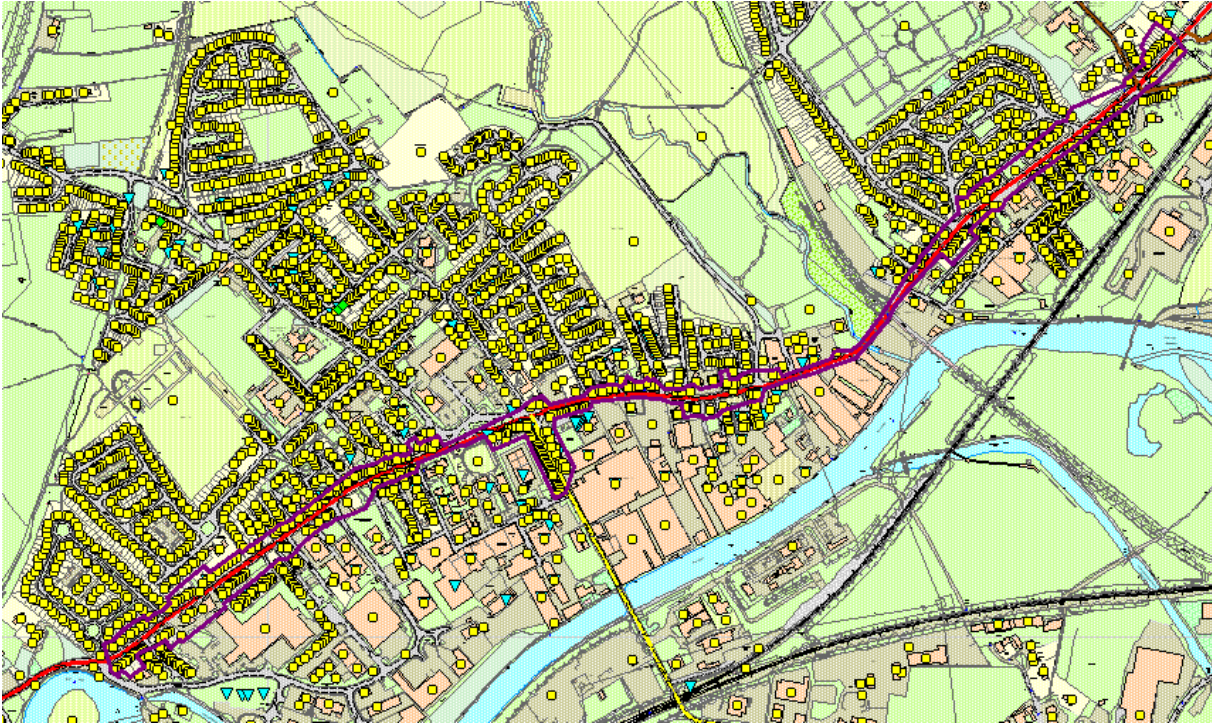
D 3.6 Liversedge / Heckmondwike AQMA



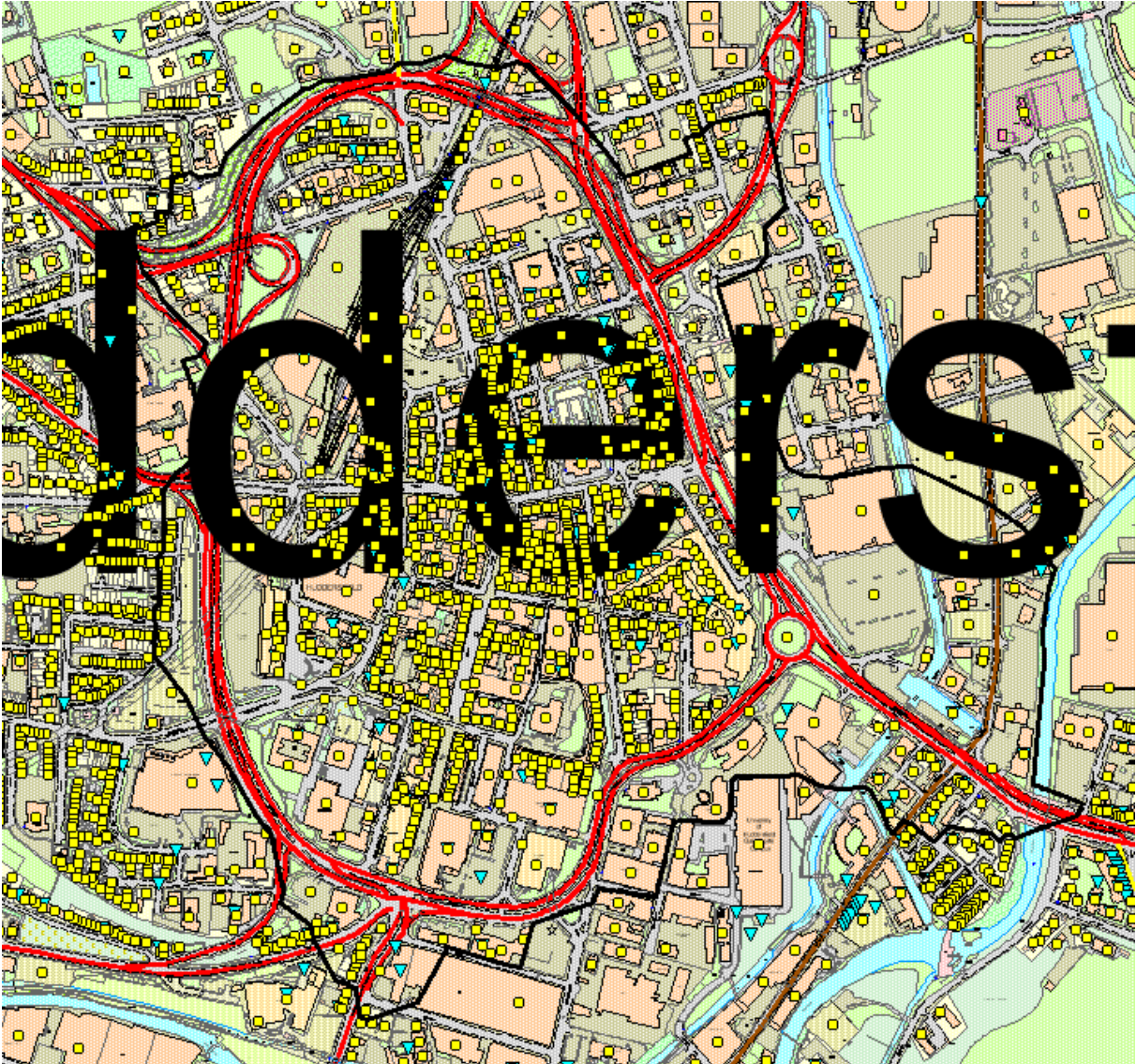
D 3.7 Outlane AQMA



D 3.8 Revoked Scouthill AQMA



D 3.9 Huddersfield Town Centre AQMA



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – 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).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
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
SO ₂	Sulphur Dioxide
WYLES	West Yorkshire Low Emission Strategy

References

Part IV Environment Act 1995. (c.25) London: HMSO

Local Air Quality Management Technical Guidance LAQM TG (16) DEFRA 2016

Air Quality (England) Regulations 2000. SI 2000/928, London: HMSO

Air Quality (England) (Amendment) Regulations 2002. SI 2002/3043, London: HMSO