Annual Progress Report (APR)

2020 Air Quality Annual Progress Report (APR) for
West Dunbartonshire Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

Date (June, 2020)

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Executive Summary: Air Quality in Our Area

Air Quality in West Dunbartonshire

Local air quality within the West Dunbartonshire Council area remains generally satisfactory.

No Air Quality Management Areas have been declared within the Council Area.

West Dunbartonshire Council has two automatic air quality monitoring stations. The first, West Dunbartonshire Clydebank, is located at Briar Drive in Clydebank and monitors Nitrogen Dioxide (NO_2,) PM_{10} and $PM_{2.5}$. The second, West Dunbartonshire Glasgow Road, is situated at the corner of Glasgow Road and Leven Street, Dumbarton. This unit monitors NO_2 and is part of the Automatic Urban and Rural Network (AURN). Both automatic units have triplicate co-located NO_2 diffusion tubes.

During 2019 we also monitored NO_2 (passive diffusion tubes) at 30 locations throughout the West Dunbartonshire Council area.

Monitoring carried out during 2019 did not identify any exceedances of National Air Quality Objectives for PM_{10} or $PM_{2.5}$. There were 3 exceedances of the NO_2 objective at monitoring locations, however, once these were distance corrected to the nearest relative receptor they no longer exceeded the objective.

No significant changes in emission sources within the Council area were identified during 2019.

There have been no new relevant industrial installations and no new or substantially altered roads within the Council area.

There were no new significant commercial, domestic or fugitive sources of emissions.

Actions to Improve Air Quality

West Dunbartonshire Council has not declared an Air Quality Management Area.

The Council has adopted the provisions of the Road Traffic (Vehicle Emissions) (Fixed Penalty) (Scotland) Regulations 2003.

Following consultation with the Scottish Government West Dunbartonshire Council no longer carries out roadside vehicle emission testing but instead concentrates on regular idling engines patrols with emphasis being placed on schools, taxi ranks and bus termini in addition to responding to complaints.

Local Priorities and Challenges

West Dunbartonshire Council has no specific priorities in respect of local air quality beyond that of statutory monitoring and idling engines enforcement. During 2019 we continued our programme of educational workshops in targeted local primary schools focussing on sustainable travel options and its impact on local air quality.

We also purchased our first electric bike to be used instead of fossil fuel transport and did a promotional exercise in conjunction with clean air day 2019 to promote cycling to work and cycling at work as a sustainable travel option.

How to Get Involved

Further information about air quality and related subjects can be obtained by visiting http://www.west-dunbarton.gov.uk/business/environmental-health/pollution/air-quality/

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1. Local Air Quality Management

This report provides an overview of air quality in during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Running 8-Hour mean	31.12.2003
Lead	0.25 µg/m^3	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

West Dunbartonshire currently does not have any AQMAs.

2.2 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at https://www.gov.scot/Publications/2015/11/5671/17. Progress by West Dunbartonshire against relevant actions within this strategy is demonstrated below.

2.2.1 Transport – Avoiding travel – T1

All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan.

The West Dunbartonshire Travel Plan 'Westbound' aims to tackle the increasing numbers of vehicles on the road by promoting and supporting more sustainable modes of travel to and from work and for business travel. Details of Westbound are below.

Traveline Scotland provides up to date, impartial public transport journey planning and timetables. Click on Plan your Journey to create a journey plan between any two locations in Scotland.

Visit: www.travelinescotland.com Or call: 0871 200 22 33 (open 24 hours every day)

Information on public transport in West Dunbartonshire is available through Council transport web pages.

Reassessing our Travel needs and using more sustainable travel options can have a number of positive economic, social, health and environmental benefits. There are a number of ways we can make travel more sustainable:

Car - Car sharing, Electric or Hybrid vehicles;

Using Public transport;

Cycling more;

The Council provides support and encouragement for sustainable travel specifically relating to commuting, business travel and within the local community including

Journey sharing

Pool bikes

Cycle to work scheme

Bus tokens.

2.2.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered. West Dunbartonshire has recently appointed a Sustainability Officer who is currently developing a Climate Change Strategy Routemap, which will include local air quality as one of its key considerations.

A Climate Change Action Group is being established to ensure that the milestones identified within the routemap are achieved. Again, local air quality will be one of the considerations for this group.

2.3 National Low Emission Framework (NLEF) Stage 1 Screening Appraisal for West Dunbartonshire

The NLEF[1], which is now part of the review and assessment process for LAQM reporting in Scotland, contributes to the Cleaner Air for Scotland strategy by aiming to improve local air quality in areas where air quality objectives are exceeded, or likely to be exceeded, primarily due to emissions from transport.

[1] https://www.gov.scot/publications/national-low-emission-framework/pages/2/

The NLEF is directly linked to Air Quality Action Planning (AQAP) for local authorities with Air Quality Management Areas (AQMAs), and will help to identify actions to improve local air quality within AQMAs. The NLEF appraisal takes the form of a two-stage process, as summarised in Table 2.1:

Table 2.1 – NLEF Appraisal Process

Stage		Outcome	Actions Required
1	Screening	• decision on whether to proceed to stage two assessment	• screening process to identify actions that will benefit air quality within the AQMA • screening evidence should form part of the Annual Progress Report, with the decision agreed by Scottish Government and SEPA
2	Assessment	• decision to proceed with introduction of LEZ or identification of alternative transport-related measures required to improve air quality • Stage two assessment report agreed by Scottish Government and SEPA	• NMF approach to support assessment of sources of pollution and options • quantitative impact assessment (based on predicted change in pollutant concentrations) • consideration of consequential impacts (e.g. congestion, export of pollution)

West Dunbartonshire currently does not have any AQMAs, and therefore a Stage 1 Screening Appraisal has not been undertaken.

3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

West Dunbartonshire undertook automatic (continuous) monitoring at 2 sites during 2019. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.scottishairquality.co.uk

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

3.1.2 Non-Automatic Monitoring Sites

West Dunbartonshire undertook non- automatic (passive) monitoring of NO_2 at 30 sites during 2019, 28 unique sites and 2 sets of triplicate tubes co-located with our automatic monitoring sites for a total of 34 tubes. 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) and bias adjustment for the diffusion tubes are included in Appendix C.

Two of the tubes (Milton 3 & 4) are located within 0.5 metres of the A82 trunk road, the third (Milton 5) is located at Crannog Court which is the nearest residential premises to the junction. Crannog Court is located 14 metres from the A82. Milton 3 and 4 breached the National Air Quality Objectives for NO_2 with bias adjusted results of 46.2µg/m^3 and 49.3µg/m^3 respectively. The bias adjusted result for Milton 5 was 20.2µg/m^3. As a comparison the NO_2 fall off with distance calculator was used and the estimated NO_2 level at Milton 5 was 24.7 µg/m^3 which while marginally higher was still well within the National Air Quality Objective.

Similarly, the level at Milton 1 located 0.5 metres from A82 was 42.2µg/m^3 whereas the calculated fall off level at the nearest receptor 12 metres away was 22.7µg/m^3

Full calculations of these distance corrections are provided in Appendix C.

Individual pollutants

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

3.1.3 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. There were no exceedences of this objective in 2019.

3.1.4 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 18µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year.

There were no exceedences of the objectives in 2019.

3.1.5 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years with the air quality objective of 10µg/m^3.

There were no exceedences of the objectives in 2019.

3.1.6 Sulphur Dioxide (SO_2)

West Dunbartonshire council does not monitor for Sulphur Dioxide

3.1.7 Carbon Monoxide, Lead and 1,3-Butadiene

West Dunbartonshire council does not monitor for Carbon Monoxide, Lead or 1,3-Butadiene.

4. New Local Developments

4.1 Road Traffic Sources

There are no new road traffic sources identified within West Dunbartonshire Council Area. However, see Planning section below.

4.2 Other Transport Sources

There are no new transport sources identified in the West Dunbartonshire Council area.

4.3 Industrial Sources

There are no new industrial sources identified in the West Dunbartonshire Council area.

4.4 Commercial and Domestic Sources

There are no new commercial or domestic sources identified in the West Dunbartonshire Council area.

4.5 New Developments with Fugitive or Uncontrolled Sources

There are no new developments with fugitive or uncontrolled sources identified in the West Dunbartonshire Council area.

5. Planning Applications

There are 2 current planning applications for developments with a potential to have an impact on local air quality.

One is a new bridge over the River Clyde which will be accessed from roads within West Dunbartonshire Council area. This may lead to increased traffic flow in the affected streets.

There is also a proposal for a new link road joining, but partially bypassing, the busy A82 at Bowling. It is unclear what effect this will have on the existing road traffic flow and at the road junctions.

Air quality impact assessments have been requested for both of these developments.

A previously reported planning application for a leisure development in Balloch was refused by the Planning Committee and has not been re-applied for to date.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Monitoring of local air quality during 2019 has shown no exceedance of the National Air Quality Objectives once fall off with distance corrections to the nearest relevant location have been applied.

6.2 Conclusions relating to New Local Developments

There are no new local developments which require consideration in this report.

6.3 Proposed Actions

Monitoring throughout 2019 did not identify any exceedance on the National Air Quality Objective. However proposed developments have been identified which may have a future impact on local air quality. The progress of these developments will be monitored and necessary alterations/additions to the diffusion tube network duly considered.

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)
CM1	West Dunbartonshire Clydebank	Roadside	249723	672044	NO_2; PM_{10} $PM_{2.5}$	N	Chemiluminescent; FIDAS	18	4.5	1.5
CM2	West Dunbartonshire Glasgow Road	Roadside	240238	675193	NO_2	N	Chemiluminescent	2.5	5	1.5

(1) 0 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?
DT1	Clydebank 1	Roadside	248479	671115	NO2	No	2	<1	No
DT2	Clydebank 6	Kerbside	249725	672069	NO2	No	40	<1	No
DT3	Clydebank 7	Kerbside	249913	669865	NO2	No	4	<1	No
DT4	Clydebank 9	Kerbside	248899	670784	NO2	No	3	<1	No
DT5	Clydebank 10	Kerbside	249759	671845	NO2	No	8.5	<1	No
DT6	Clydebank 11	Kerbside	249801	672288	NO2	No	22	<1	No
DT7	Clydebank 12	Kerbside	249747	671665	NO2	No	10	<1	No
DT8	Clydebank 13	Kerbside	249762	671760	NO2	No	3.5	<1	No
DT9	Clydebank 14	Roadside	249872	671854	NO2	No	>25	10	No
DT10	Clydebank 15	Kerbside	249746	671966	NO2	No	8.5	<1	No
DT11	Clydebank 16	Kerbside	249967	672548	NO2	No	10	<1	No
DT12	Clydebank 17	Kerbside	249987	672440	NO2	No	11	<1	No
DT13	Dumbarton 1	Roadside	240322	675177	NO2	No	2.5	2.5	No
DT14	Dumbarton 11	Kerbside	240515	675078	NO2	No	4	<1	No
DT15	Dumbarton 12	Kerbside	239410	675330	NO2	No	7	<1	No
DT16	Glasgow Rd, D'ton 2	Kerbside	240178	675228	NO2	No	8	<1	No
DT17	Glasgow Rd, D'ton 3	Kerbside	240279	675196	NO2	No	4.5	<1	No
DT18	Milton 1	Kerbside	242266	674235	NO2	No	12	<1	No
DT19	Milton 2	Roadside	242160	674299	NO2	No	2	12	No
DT20	Alexandria 1	Kerbside	239024	680206	NO2	No	5	<1	No
DT21	Balloch 1	Kerbside	238584	681562	NO2	No	12	<1	No
DT22	Briar Drive 1	Roadside	249723	672044	NO2	No	2.5	5	Yes

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?
DT23	Briar Drive 2	Roadside	249723	672044	NO2	No	2.5	5	Yes
DT24	Briar Drive 3	Roadside	249723	672044	NO2	No	2.5	5	Yes
DT25	Dumbarton triplicate 1	Roadside	240238	675193	NO2	No	18	4.5	Yes
DT26	Dumbarton triplicate 2	Roadside	240238	675193	NO2	No	18	4.5	Yes
DT27	Dumbarton triplicate 3	Roadside	240238	675193	NO2	No	18	4.5	Yes
DT29	Clydebank 19	Kerbside	249844	669919	NO2	No	6	<1	No
DT30	Clydebank 20	Roadside	250098	669677	NO2	No	9.5	2	No
DT31	Clydebank 21	Kerbside	250531	669269	NO2	No	20	<1	No
DT32	Clydebank 22	Kerbside	250199	669551	NO2	No	4	<1	No
DT33	Milton 3	Kerbside	242378	674258	NO2	No	21	<1	No
DT34	Milton 4	Kerbside	242421	674270	NO2	No	12	<1	No
DT35	Milton 5	Roadside	242413	674288	NO2	No	2	14	No

(1) 0 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 NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2015	2016	2017	2018	2019
CM1	Roadside	Automatic	41.4%	41.4%	18	22	19	22.05(3)	28.2(3)
CM2	Roadside	Automatic	97.3	97.3	17.1	21	20	18	18
DT1	Roadside	Diffusion tube	100.0	100.0	26.82	23.1	23.8	22.5	22.5
DT2	Kerbside	Diffusion tube	91.7	91.7	23.99	26.8	28.4	28.37	30.7
DT3	Kerbside	Diffusion tube	100.0	100.0	21.44	22.7	23.7	20.63	23.9
DT4	Kerbside	Diffusion tube	100.0	100.0	19.96	18.7	19.7	22.00	20.7
DT5	Kerbside	Diffusion tube	91.7	91.7	24.32	22.0	23.4	20.62	25.0
DT6	Kerbside	Diffusion tube	100.0	100.0	19.07	21	18.9	17.25	19.5
DT7	Kerbside	Diffusion tube	91.7	91.7	17.78	21.1	23.1	19.89	19.3
DT8	Kerbside	Diffusion tube	91.7	91.7	21.37	21	21.4	18.68	20.9

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2015	2016	2017	2018	2019
DT9	Roadside	Diffusion tube	83	83	12.28	13.8	13.5	10.97	13.8
DT10	Kerbside	Diffusion tube	100.0	100.0	24.25	18.6	22.0	21.54	21.2
DT11	Kerbside	Diffusion tube	100.0	100.0	23.11	19.6	20.5	21.60	22.1
DT12	Kerbside	Diffusion tube	100.0	100.0	21.09	17.7	21.0	18.04	21.9
DT13	Roadside	Diffusion tube	100.0	100.0	24.56	25.3	23.3	21.94	25.7
DT14	Kerbside	Diffusion tube	100	100	24.07	23.2	22.9	18.81	18.3
DT15	Kerbside	Diffusion tube	100.0	100.0	14.77	17.8	16.6	14.39	17.3
DT16	Kerbside	Diffusion tube	100.0	100.0	25.87	25.5	25.7	24.92	25.9
DT17	Kerbside	Diffusion tube	100.0	100.0	24.34	23.5	21.0	26.63	24.7
DT18	Kerbside	Diffusion tube	100	100	**40**	**44.3**	**47.1**	38.19	**42.2**
DT19	Roadside	Diffusion tube	83	83	15.02	16	18.7	**20.25**[3]	18.9

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2015	2016	2017	2018	2019
DT20	Kerbside	Diffusion tube	100.0	100.0	23.33	23.6	23.5	21.1	22.7
DT21	Kerbside	Diffusion tube	100.0	100.0	16.05	19.6	22.8	18.03	20.1
DT22	Roadside	Diffusion tube	100.0	100.0	17.91	19.1	20.5	19.31	21.6
DT23	Roadside	Diffusion tube	100.0	100.0	18.19	20.6	20.7	17.31	20.9
DT24	Roadside	Diffusion tube	100.0	100.0	19.22	20.2	21.6	19.27	17.0
DT25	Roadside	Diffusion tube	100.0	100.0	15.72	17.4	16.4	18.7	18.2
DT26	Roadside	Diffusion tube	100.0	100.0	17.6	17	20.6	16.6	17.7
DT27	Roadside	Diffusion tube	91.7	91.7	15.47	16.5	18.0	16.3	18.5
DT29	Kerbside	Diffusion tube	100.0	100.0			21.3	19.85	21.7
DT30	Roadside	Diffusion tube	91.7	91.7			27.1	23.8	21.9
DT31	Kerbside	Diffusion tube	100.0	100.0			21.0	20.2	20.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2015	2016	2017	2018	2019
DT32	Kerbside	Diffusion tube	100.0	100.0			19.3	15.5	19.3
DT33	Kerbside	Diffusion tube	100.0	100.0			**49.0**	**43.9**	**46.2**
DT34	Kerbside	Diffusion tube	100.0	100.0			**48.5**	**42.5**	**49.3**
DT35	Roadside	Diffusion tube	100.0	100.0			22.4	21.2	20.2

Notes: Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 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 LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2016	2017	2018	2019	2020
CM1	Roadside	Automatic	41	41	0	0	0	**0(92)**	**0(110)**
CM2	Roadside	Automatic	97	97	0	0(106)	0(101)	0	0

Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 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 PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2016	2017	2018	2019	2020
CM1	Roadside	97	97	10	9	9	10	11

Notes: Exceedances of the PM_{10} annual mean objective of 18µg/m^3 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 LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2016	2017	2018	2019	2020
CM1	Roadside	97	97	0	No data	0	0	4

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 7 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 98.1st percentile of 24-hour means is provided in brackets.

Table A.7 – Annual Mean $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2016	2017	2018	2019	2020
CM1	Roadside	97	97	6	6	5	6	7

Notes: Exceedances of the PM_{10} annual mean objective of 10µg/m^3 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 LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2019

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
DT1	52.1	35.8	26	26.5	21.3	18.3	8.7	21.8	22.4	16.7	33.3	31.3	26.2	22.5
DT2	70.7	29.6	25.6	43.2	24.5	25.6		15	30.6	38.7	58	31.5	35.7	30.7
DT3	85.4	24	26.3	28.3	13.5	11.5	6	16.1	18.3	27.3	44.6	32	27.8	23.9
DT4	43.6	25.8	22.6	32.6	18.6	15.2	11.5	14.7	17.5	23.1	40.3	24	24.1	20.7
DT5	56.9	22.1	20.9	26.5	21.3	18.7		16.3	20.5	21.2	47.2	47.7	29.0	25.0
DT6	52.4	22	12.3	27.4	14.9	16.3	11.5	14.2	18.5	23.1	39.4	20.3	22.7	19.5
DT7	55	23.4	22.5	27.2	13.4	16.2	6.8	15	21.7	20.6		25.5	22.5	19.3
DT8	58.1	20.1	22.7		18.9	16.6	8.9	13.9	21.3	20.5	42.6	23.8	24.3	20.9
DT9	32.4	12.3		23.8	9	11.1	14.3	7.4	12.1	12.3	26.1		16.1	13.8
DT10	56	24.1	22.1	12.9	20.1	13.5	13.7	16.5	23.7	22.8	43.3	27.4	24.7	21.2
DT11	59	23.2	24.9	28.9	15.4	15.8	12.4	18.4	23.8	22.8	40.7	22.8	25.7	22.1
DT12	57.7	24.1	19.7	19.1	20.4	13.5	13.7	51.7	22.1	21.8	17.2	25	25.5	21.9
DT13	50.3	33.1	34	33.9	31.1	12.3	13.1	17.8	20.7	41.2	49.2	21.3	29.8	25.7
DT14	43.8	24.3	21.3	20.6	15.3	7.4	13.7	13.4	19	20.4	40.5	15.8	21.3	18.3

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
DT15	39.3	15.8	17.7	20.7	13.7	14.1	13.6	10.8	17.4	20.1	37.5	20.6	20.1	17.3
DT16	57.7	34.7	25.1	34.8	21.2	10.4	30.4	27.6	20	25.2	38	36.7	30.2	25.9
DT17	43.2	26.7	37.5	22.5	22.6	18.2	16.1	20.4	31.1	30.4	47.6	27.8	28.7	24.7
DT18	73.2	68.1	57.2	59.5	36.4	34.1	6.8	52.1	45.9	49.6	56	50.6	49.1	**42.2**
DT19			11.1	28.6	13	9.3	46.7	11.8	15.8	22.1	39.7	22	22.0	18.9
DT20	44.7	32.2	28.7	25.9	20.7	14	17.7	22.8	20.6	25.1	34.1	30.6	26.4	22.7
DT21	36.4	24.1	20.4	31.3	21.5	10.4	14.2	15.7	19.5	26.4	38.5	22.5	23.4	20.1
DT22	41.8	22.3	16.7	23	20.4	12.9	13.9	11.6	23.1	45.6	43.6	25.9	25.1	21.6
DT23	47	18.5	16.2	29.1	19.1	17.1	16.1	13.9	20.6	26.7	40.1	27.9	24.4	20.9
DT24	45.7	21.4	13.6	8.2	16.3	14.8	16.1	12.6	2.2	23.8	37.7	24.6	19.8	17.0
DT25	36.5	17.8	22	17.5	20.7	10.7	15.5	11.9	19	20.4	41.1	20.2	21.1	18.2
DT26	35	22.6	20.8	2	24.7	11.3	15.9	12.7	22.2	19.9	40.7	19.8	20.6	17.7
DT27	37.4	17.5		19.2	18.1	9.7	14.7	13.3	22.3	21.8	41	21.4	21.5	18.5
DT29	56.1	23	19.9	18	19.2	18.9	14.5	17.5	22.1	26.4	42.9	23.7	25.2	21.7
DT30	56.9	23	20.9	26.9	20.4	16.9	6.5	14	23.5		45.1	26.3	25.5	21.9
DT31	60.7	21.9	22.5	19.2	16.6	15.2	12.6	15.7	20.8	20.9	34.9	24.3	23.8	20.4
DT32	45.1	16	15	21.1	13.9	12.5	35.3	11.3	17.7	19	39.1	22.8	22.4	19.3

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
DT33	74.2	63	53.6	65.1	42.4	56.1	52.8	51.7	36.3	49.1	63.1	37.5	53.7	**46.2**
DT34	80.6	73.4	63	55.7	66	46.2	17.2	63.5	52.4	60.6	59.7	49.3	57.3	**49.3**
DT35	32.8	32.4	23.6	27.5	18.1	15.9	18.3	17.9	19.7	18.6	34.8	22	23.5	20.2

(1) See ApDT33pendix C for details on bias adjustment

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

During 2019 data from West Dunbartonshire Council automatic monitors was downloaded daily by Ricardo Energy. The data was screened, scaled and ratified by Ricardo Energy and an annual report provided. Both of the automatic monitors have a comprehensive service contract and are serviced at six monthly intervals by Air Monitors.

The full Air Pollution Report for 2019 produced by Ricardo Energy and Environment for West Dunbartonshire Glasgow Road (site ID WDB4) and West Dunbartonshire Clydebank (site ID WDB3) can be accessed at http://www.scottishairquality.co.uk.

The HORIBA NOX analyser was offline (not on site) from January 2019, due to a flow fault, until 15th April 2019, when the new Serinus analyser was installed.

The Ricardo Audit on 2nd August 2019 found that there was a sampling fault with the NOX Serinus analyser, in that it was internally sampling (sampling cabinet air rather than ambient air), therefore 15th April 2019 – 2nd August 2019 data was removed from the database.

Therefore, there is only data available for August – December 2019, which resulted in only 41% data capture for the year.

Annualisation of NO_2 data for 2019

Site	% Data Capture	Annual Mean	Period Mean	Ratio
Glasgow High St	97	29.8	30.1	0.99
Glasgow Townhead	99	24.2	23.3	1.04
Glasgow W/millglen	99	9.4	8.5	1.1
Total Ra				1.04

West Dunbartonshire Clydebank = 27x1.04 = 28.2µg/m3

Calculation of Bias

West Dunbartonshire Council use Glasgow Scientific Services (GSS) for NO_2 tube analysis. Tubes are provided and analysed by GSS.

The NO_2 tube preparation method used is 20% triethanolamine (TEA) in water.

Glasgow Scientific Services participate in the AIR NO_2 Proficiency Testing Scheme. In 2019 the results the lab submitted to the scheme were determined to be satisfactory based on a z-score of ≤±2.

A bias of 0.86 has been used to adjust NO_2 tube data. The bias was obtained from the National Diffusion Tube Bias Adjustment Factor spreadsheet, screen shot from website below

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/20

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

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 spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2020

LAQM Helpdesk Website

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: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

Step 2: Select a Preparation Method from the Drop-Down List

Step 3: Select a Year from the Drop-Down List

Step 4: 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[3] shown in blue at the foot of the final column.

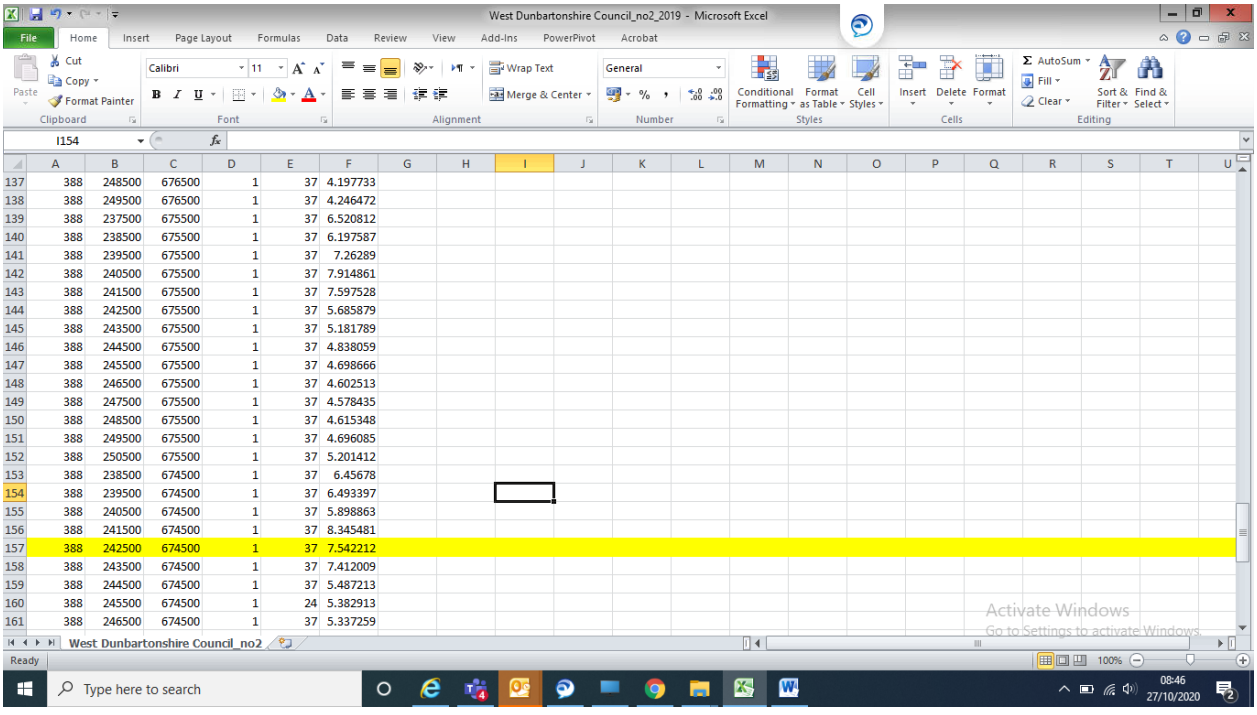
If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

	Analysed By[1]	Method	Year[2]	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
2573	Glasgow Scientific Services	20% TEA in water	2019	R	East Dunbartonshire Council	12	36	32	12.7%	P	**0.89**
2574	Glasgow Scientific Services	20% TEA in water	2019	R	East Dunbartonshire Council	12	23	21	10.6%	P	**0.90**
2575	Glasgow Scientific Services	20% TEA in water	2019	R	East Dunbartonshire Council	12	33	26	23.7%	G	**0.81**
2601	Glasgow Scientific Services	20% TEA in water	2019	KS	Marylebone Road Intercomparison	12	79	65	21.0%	G	**0.83**
2982	Glasgow Scientific Services	20% TEA in water	2019		**Overall Factor[3] (4 studies)**				**Use**		**0.86**
2996											

[1] For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone.
For Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins/ use Environmental Scientific Groups.
From 2011 for Environmental Scientific Groups use ESG Glasgow.
From 2011 for Harwell Scientific Services use ESG Didcot.
For 2017 for SOCOTEC use ESG Didcot, as name changed mid year.
For 2018 SOCOTEC entered as Didcot and Glasgow. Glasgow analysis lab moved to Didcot mid 2018.
For Staffordshire CC SS/Staffordshire County Analyst use Staffordshire Scientific Services.
For Bodycote Health Sciences and Clyde Analytical Laboratories use Exova.
For Rotherham MBC use South Yorkshire Labs.
For Dundee CC use Tayside SS.
For Leicester Scientific Services use Staffordshire Scientific Services.
For South Yorkshire Air Quality Samplers use South Yorkshire Labs. As of January 2010 sampler body changed. As of April 2010 sampler cap

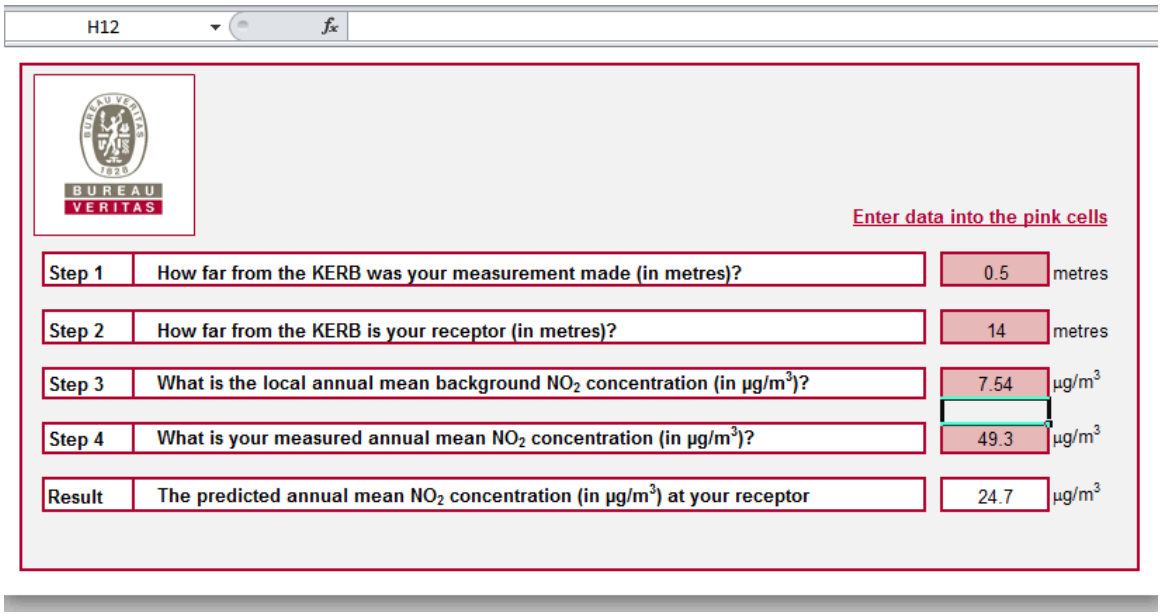
Distance correction calculations

Local annual mean background (from Scottish Air Quality Database) = 7.54

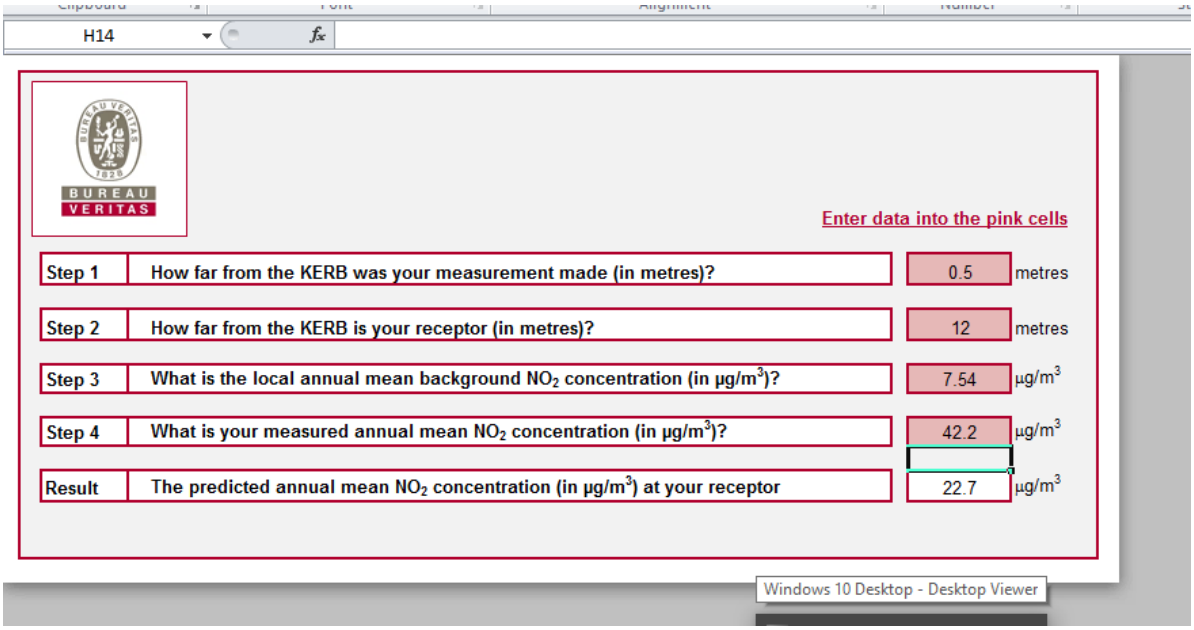


	A	B	C	D	E	F
137	388	248500	676500	1	37	4.197733
138	388	249500	676500	1	37	4.246472
139	388	237500	675500	1	37	6.520812
140	388	238500	675500	1	37	6.197587
141	388	239500	675500	1	37	7.26289
142	388	240500	675500	1	37	7.914861
143	388	241500	675500	1	37	7.597528
144	388	242500	675500	1	37	5.685879
145	388	243500	675500	1	37	5.181789
146	388	244500	675500	1	37	4.838059
147	388	245500	675500	1	37	4.698666
148	388	246500	675500	1	37	4.602513
149	388	247500	675500	1	37	4.578435
150	388	248500	675500	1	37	4.615348
151	388	249500	675500	1	37	4.696085
152	388	250500	675500	1	37	5.201412
153	388	238500	674500	1	37	6.45678
154	388	239500	674500	1	37	6.493397
155	388	240500	674500	1	37	5.898863
156	388	241500	674500	1	37	8.345481
157	388	242500	674500	1	37	7.542212
158	388	243500	674500	1	37	7.412009
159	388	244500	674500	1	37	5.487213
160	388	245500	674500	1	24	5.382913
161	388	246500	674500	1	37	5.337259

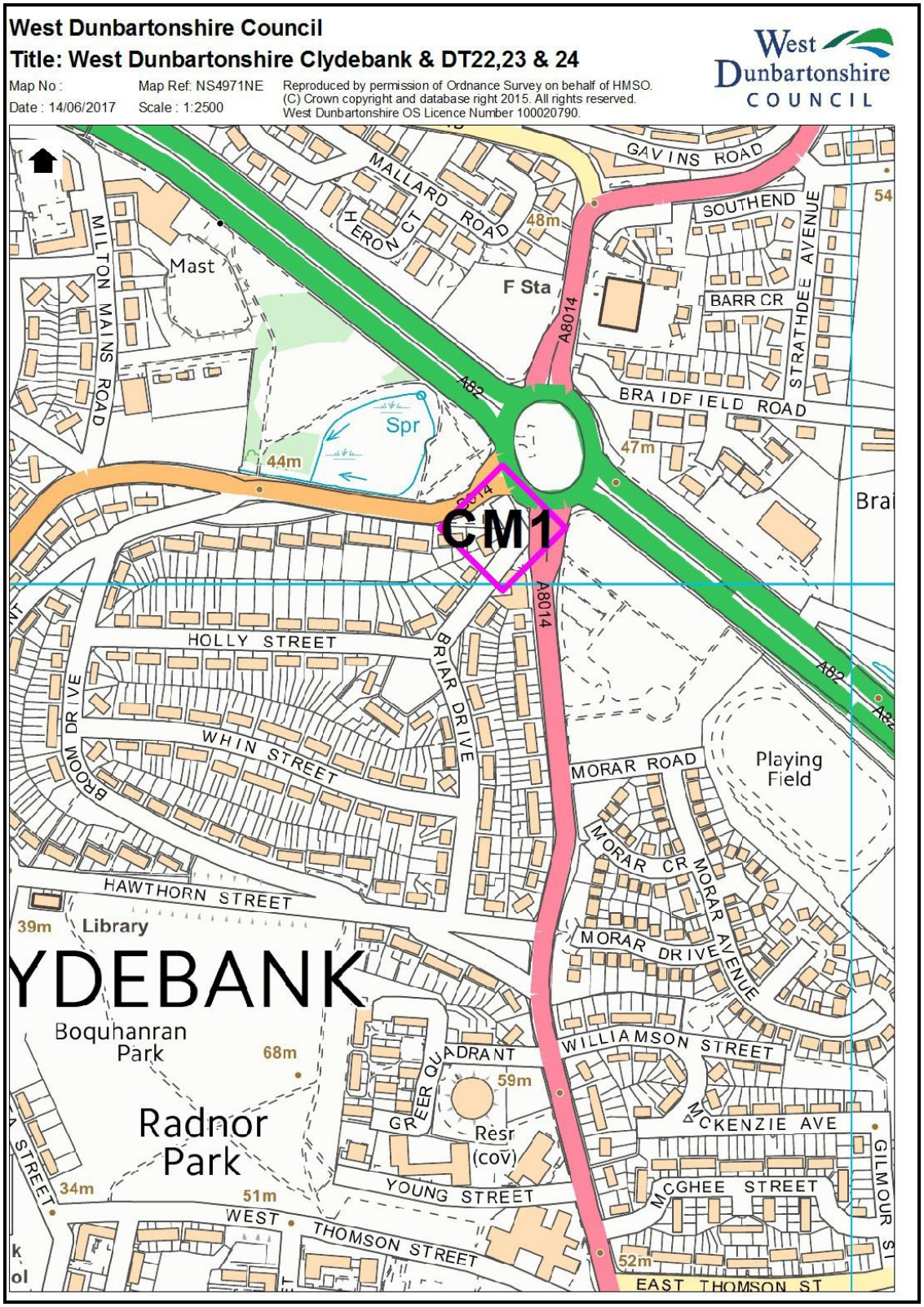
Milton 4: nearest receptor 14 metres away (Milton 5)

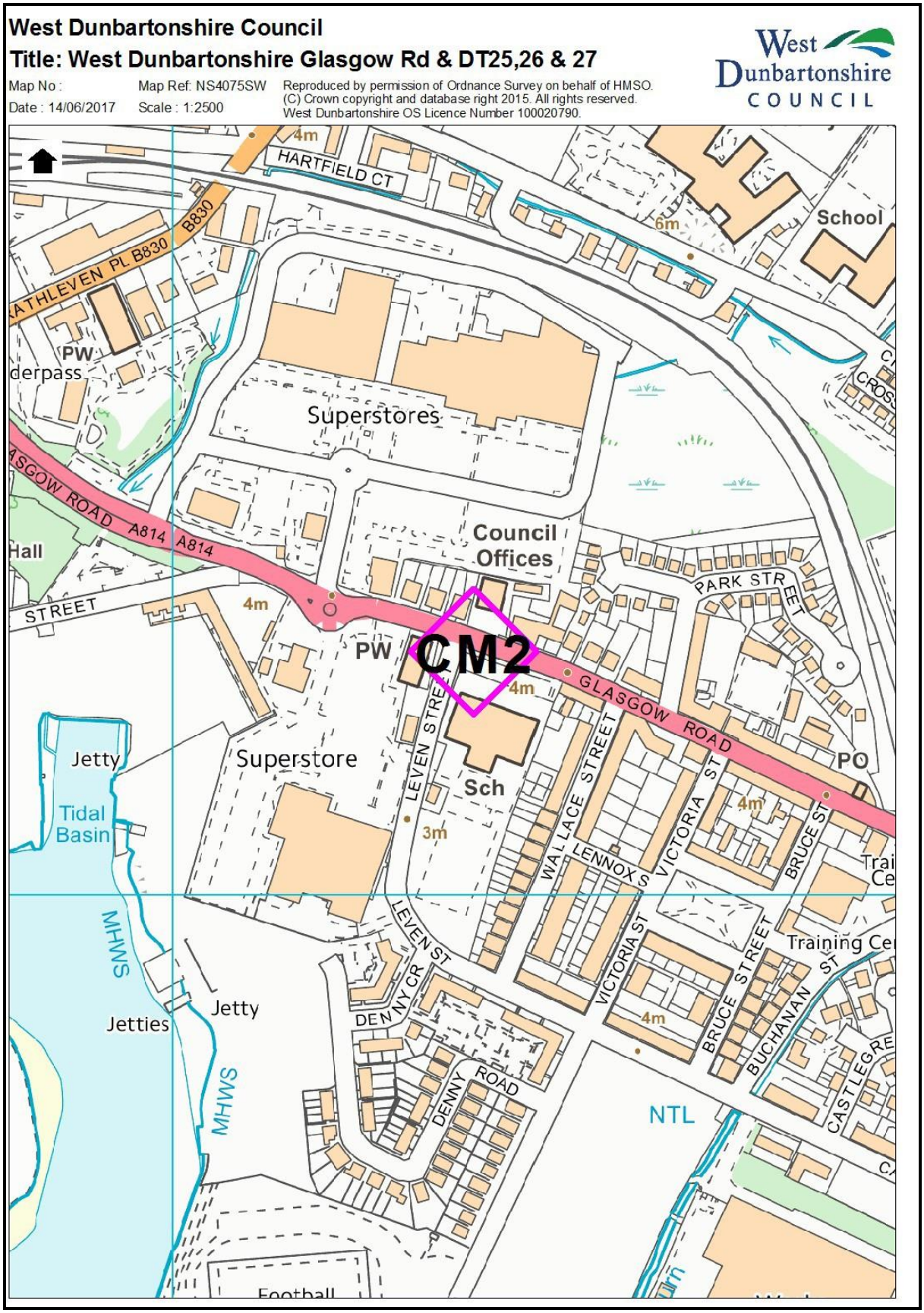


Milton 1 nearest receptor 12 metres away



Appendix D: Automatic Monitoring Site Location Maps co-located NO_2 tubes

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CM2
HARTFIELD CT
B830
PW
Superstores
GLASGOW ROAD A814
Council Offices
PARK STREET
Hall
STREET
PW
GLASGOW ROAD
Jetty
Tidal Basin
Superstore
LEVEN STREET
Sch
WALLACE STREET
VICTORIA ST
LENNOX ST
BRUCE ST
PO
MHWS
Jetty
Jetties
LEVEN ST
DENNY CR
DENNY ROAD
BUCHANAN ST
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School
Training Ce
Football
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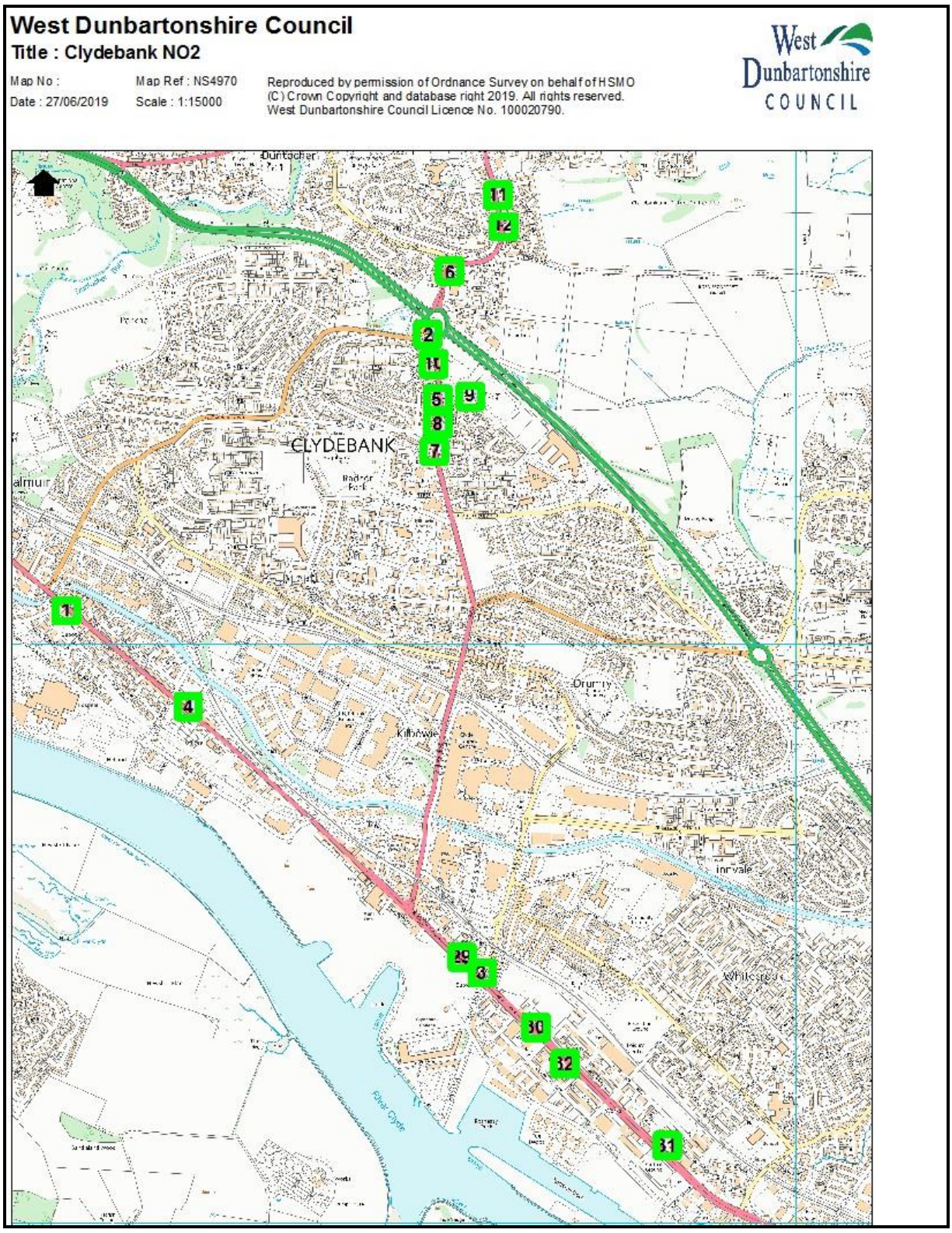
6m
3m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Duntocher
CLYDEBANK
Drumry
Kilbowie
Whitecrook
1
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4
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11
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31
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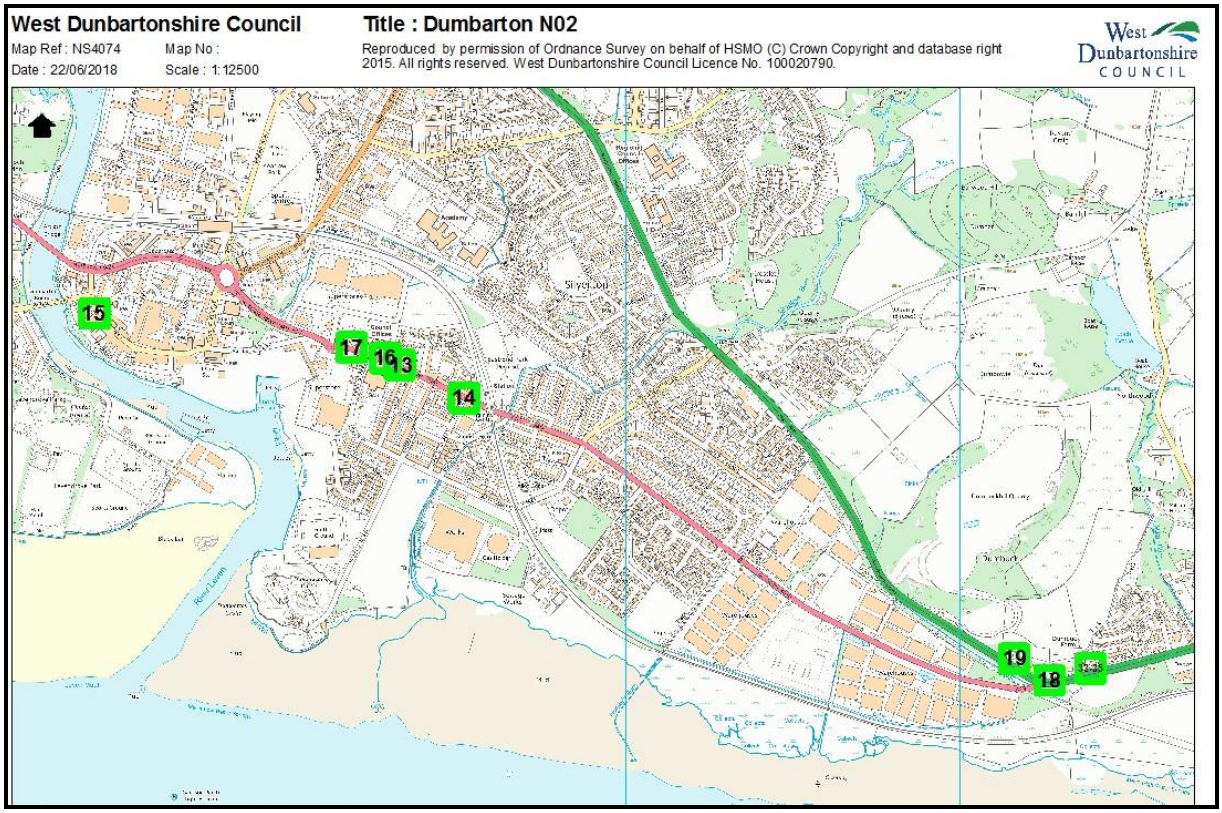
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West Dunbartonshire COUNCIL
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17
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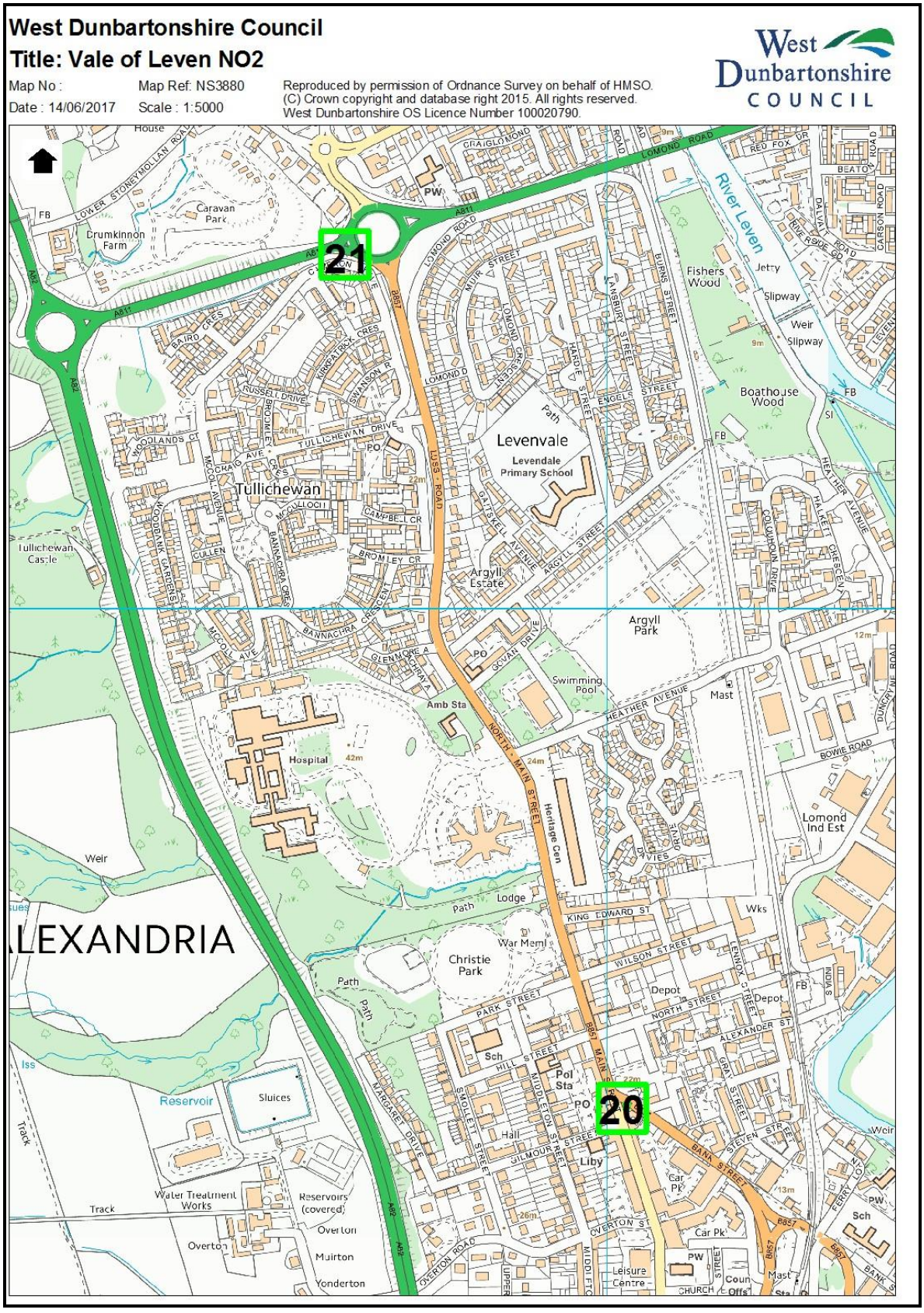
18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Map Ref: NS3880
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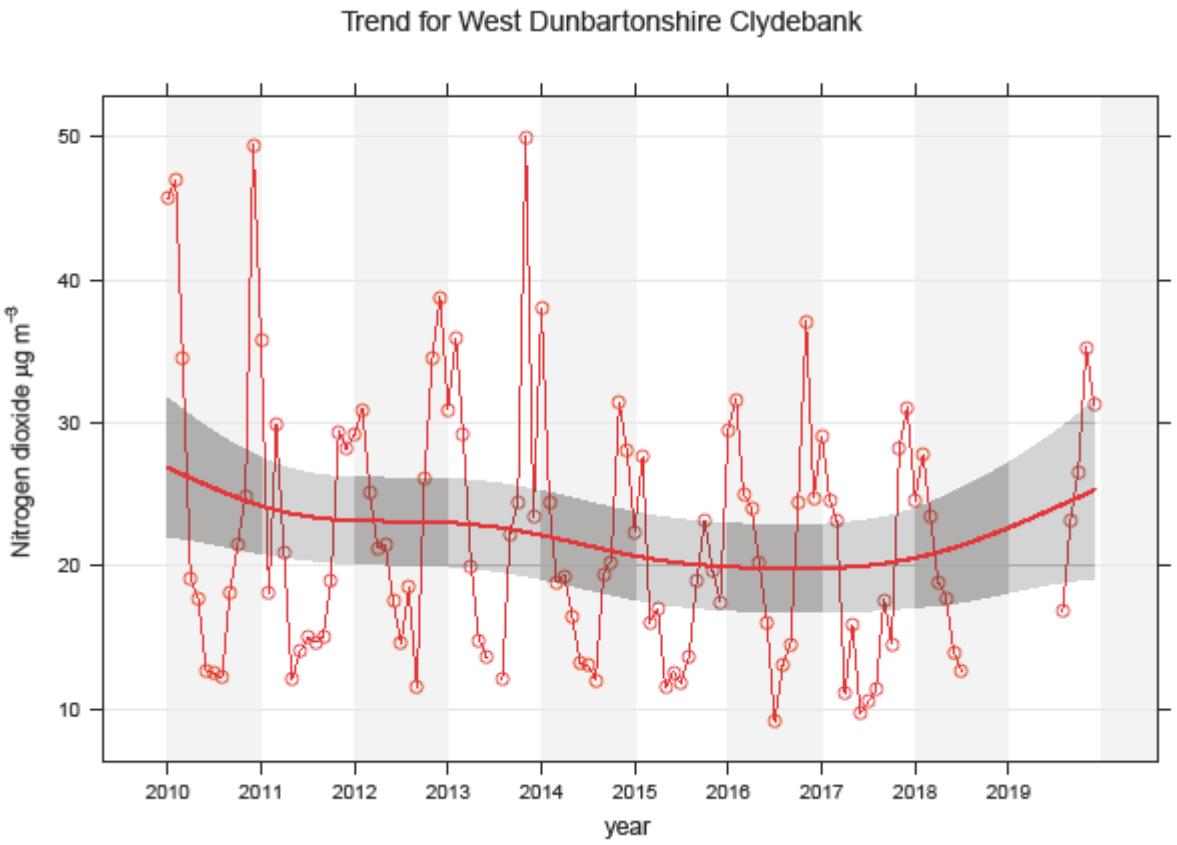
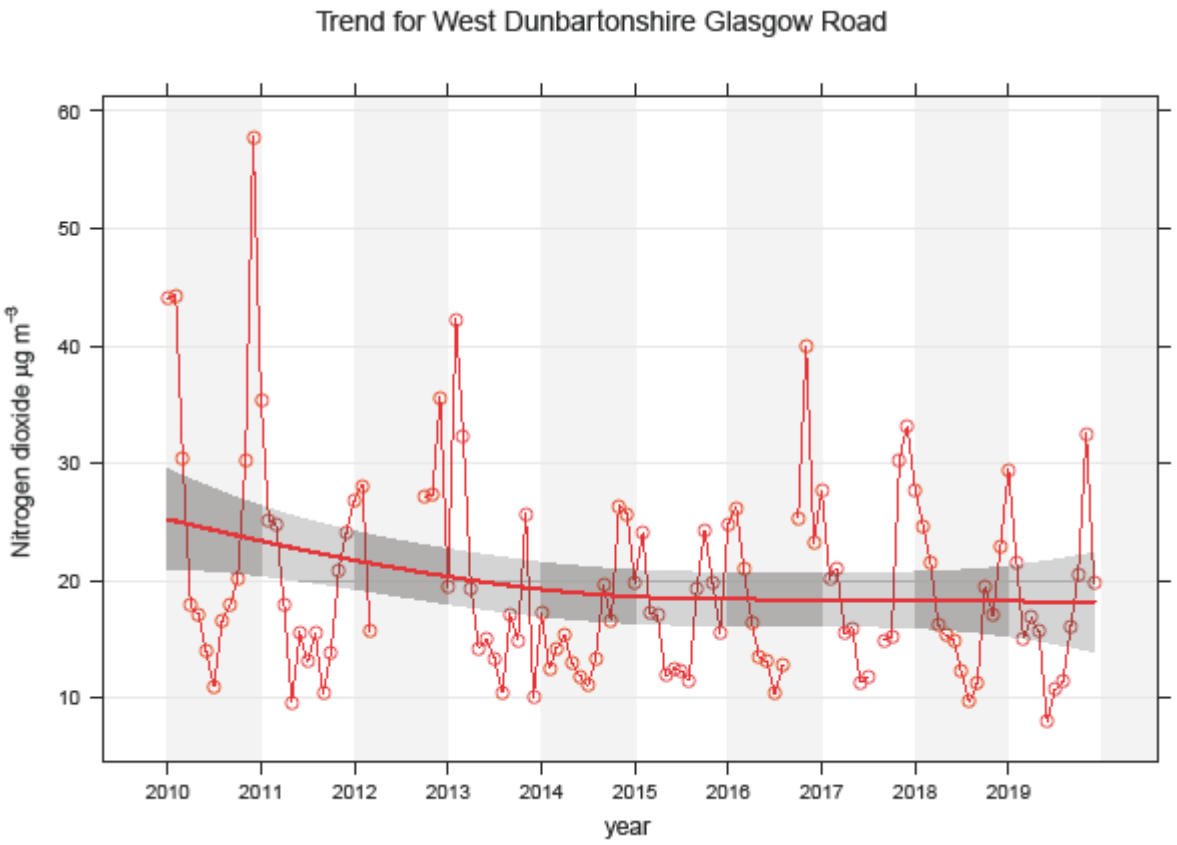
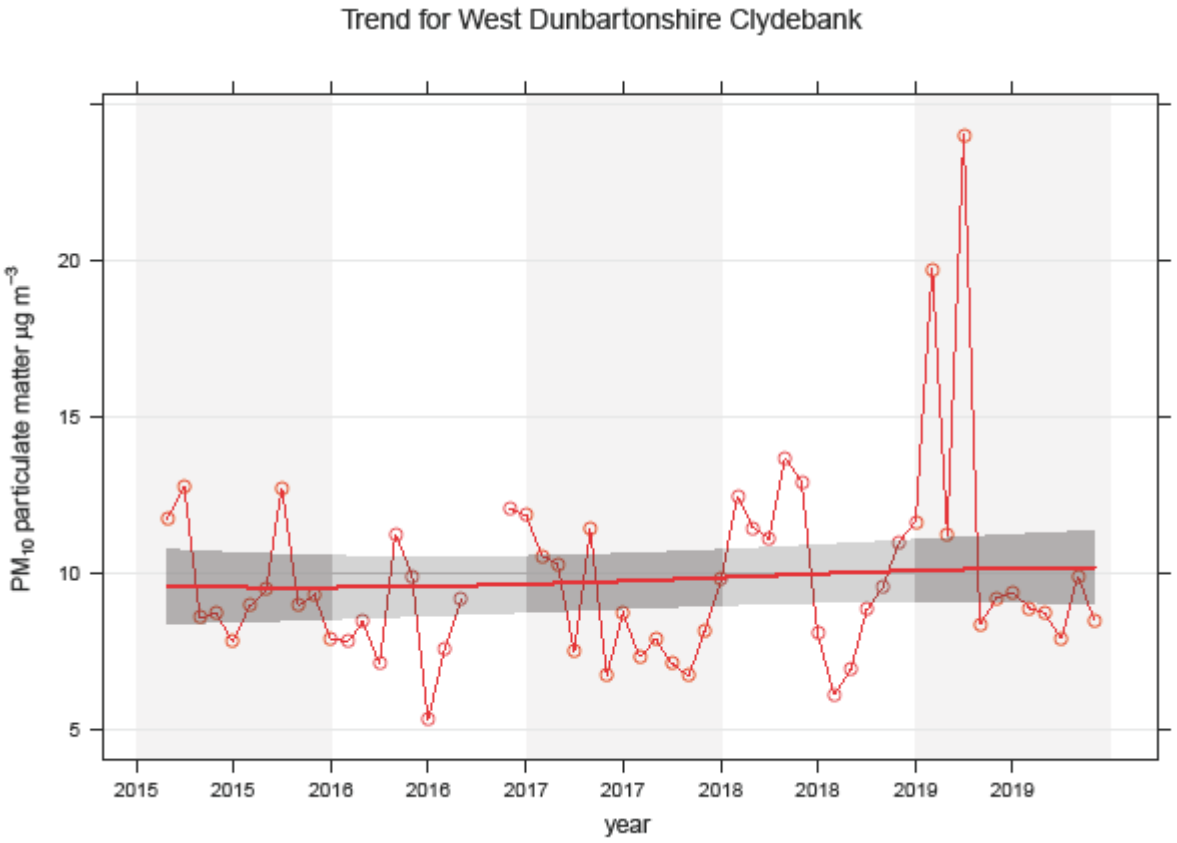
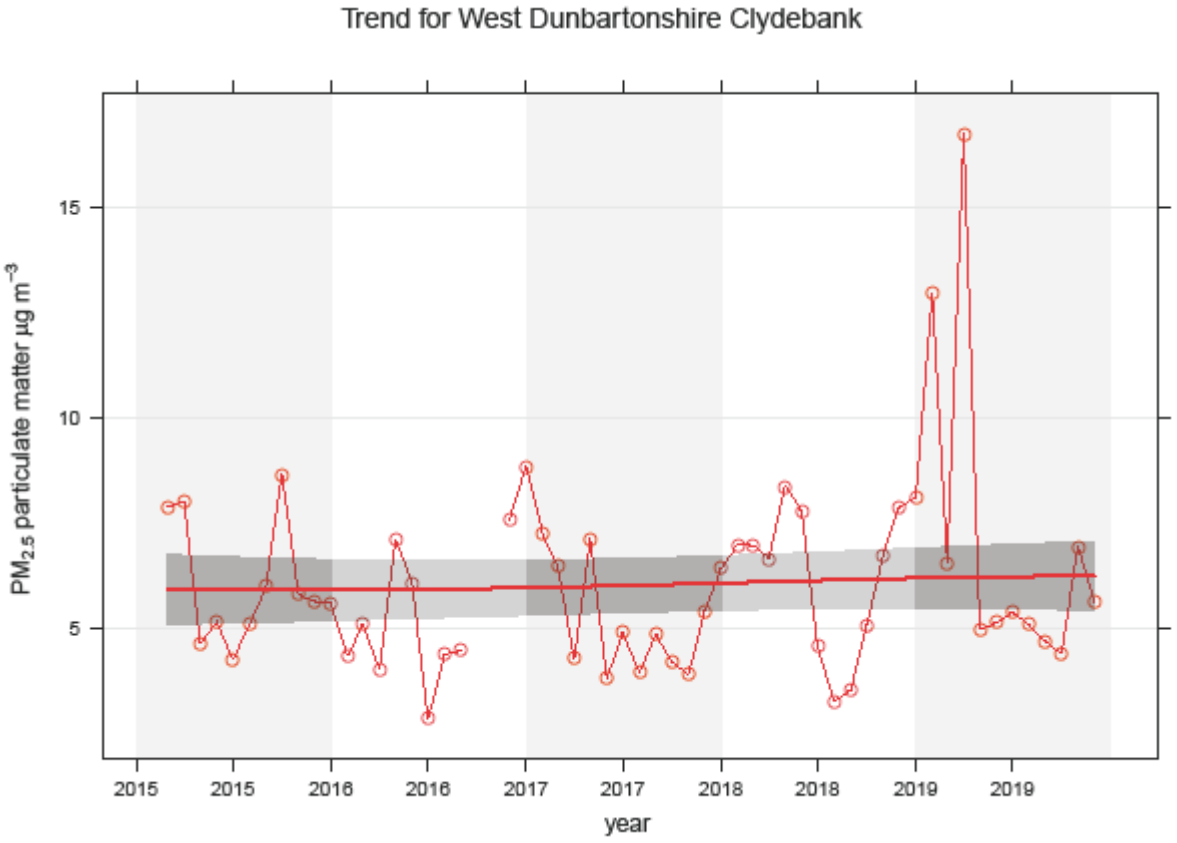
21
20
Levenvale
Tullichewan
Argyll Estate
Argyll Park
Christie Park
Hospital
Swimming Pool
Leisure Centre
Lomond Ind Est
Fishers Wood
Boathouse Wood
River Leven
Reservoir
Sluices
Water Treatment Works
Reservoirs (covered)
Overton
Muirton
Yonderton
Caravan Park
Drumkinnon Farm
Tullichewan Castle
Levendale Primary School
Heritage Cen
Amb Sta
Pol Sta
Liby
Mast
Weir
Jetty
Slipway
Lodge
Path
Track
Sch
Hall
Depot
Wks
Car Pk
Coun Offs
LOMOND ROAD
MAIN STREET
NORTH MAIN STREET
A82
A811
B857

Appendix E: Automatic Monitor trends 2010 -2018




Trend for West Dunbartonshire Glasgow Road
Nitrogen dioxide µg m-3
60
50
40
30
20
10
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
year


Trend for West Dunbartonshire Clydebank
PM10 particulate matter µg m-3
20
15
10
5
2015
2015
2016
2016
2017
2017
2018
2018
2019
2019
year


Trend for West Dunbartonshire Clydebank
PM2.5 particulate matter µg m-3
15
10
5
2015
2015
2016
2016
2017
2017
2018
2018
2019
2019
year

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA 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
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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