West Lothian Council

Revocation of The West Lothian Council (Linlithgow) Air Quality Management Area Order 2016

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

January 2024

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1. Introduction

Part IV of the Environment Act 1995 required the UK Government and the devolved administrations, to publish a national Air Quality Strategy (see Ref.1) and establish the system of Local Air Quality Management (LAQM) and Air Quality Objectives for specified pollutants.

The air quality objectives for Scotland are set out in;

- The Air Quality (Scotland) Regulations 2000 (Ref. 2);
- The Air Quality (Scotland) Amendment Regulations 2002 (Ref. 3); and
- The Air Quality (Scotland) Amendment Regulations 2016 (Ref. 4).

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.

West Lothian Council fulfils its LAQM duties by maintaining 3 automatic air quality stations across its area. There is also a network of passive NO_2 diffusion tubes. Results from this monitoring are assessed and an annual progress report is produced each year in line with statutory guidance.

Due to the potential for the air quality objective to be breached, three AQMAs were declared within West Lothian. One of these AQMA's is in Linlithgow town centre – see Map 1 for an outline of the AQMA. Following monitoring, modelling and extensive consultation, this AQMA was declared on 25th April 2016 by issuing **The West Lothian Council (Linlithgow) Air Quality Management Area Order 2016** (see Ref. 6)**.** The AQMA was declared for exceedances of the Scottish annual mean Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}) objectives.

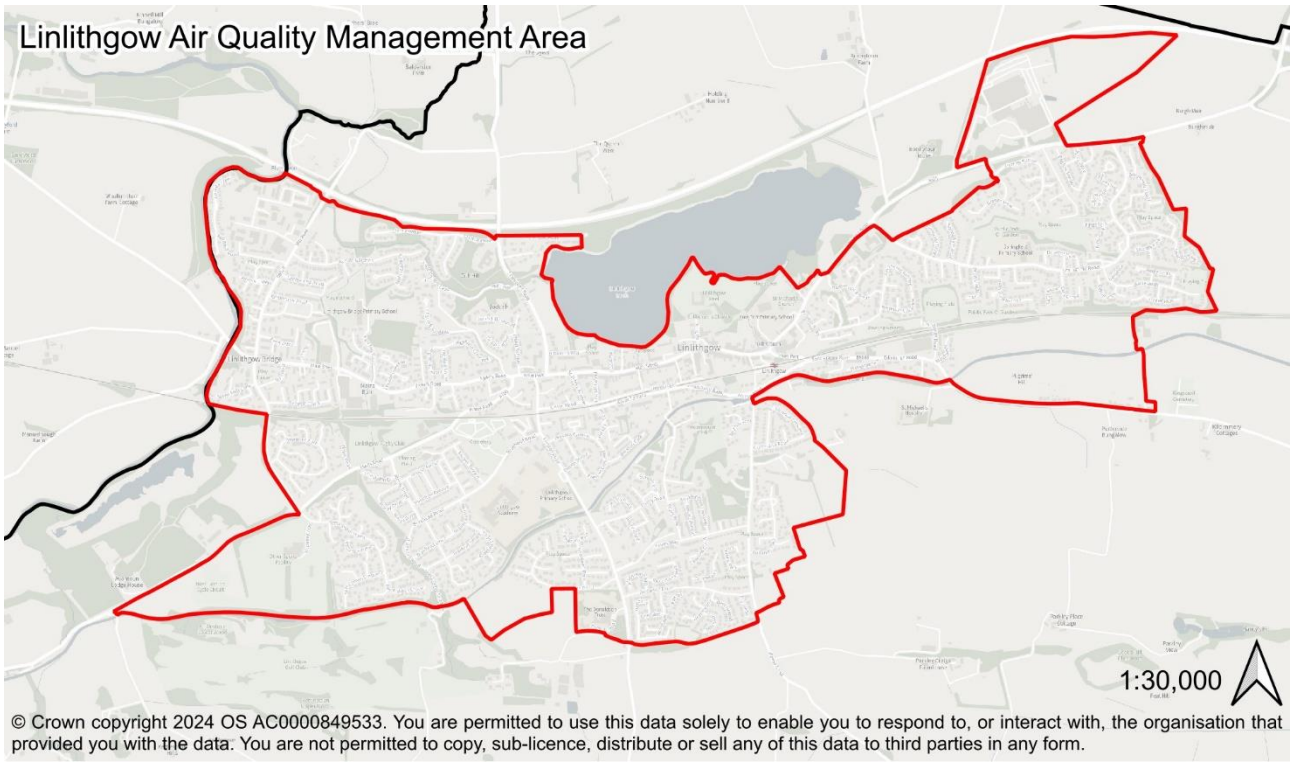
Following completion of the most recent annual progress report (see Ref. 9), and a review of historic monitoring data over previous years, it was noted that the annual mean objectives (see Table 1) for both NO_2 and PM_{10} have been met within the Linlithgow AQMA for several consecutive years as highlighted in Figures 1 and 2.

As such, West Lothian Council consider it appropriate to revoke the Linlithgow AQMA Order 2016 for both NO_2 and PM_{10}. This report brings together all of the relevant monitoring information to support the revocation.

Table 1 – Summary of Air Quality Objectives for NO2 and PM10 in Scotland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO_2)	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
Particulate Matter (PM_{10})	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2021

Map 1 – Linlithgow Air Quality Management Area



2. Monitoring Equipment in Linlithgow

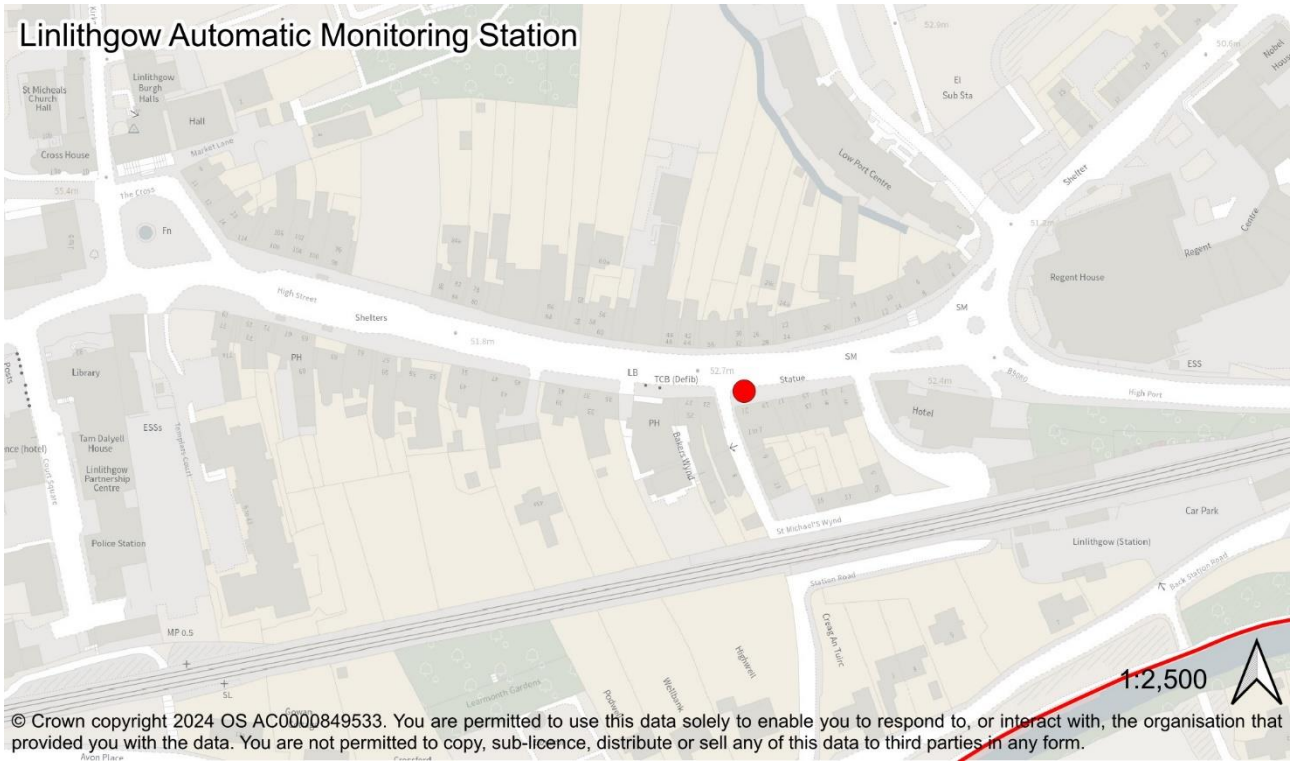
Table 2 provides details of the monitoring equipment which is currently installed at our Linlithgow automatic air quality monitoring site. It also displays details of previous monitoring equipment.

Table 2 – Linlithgow Air Quality Station - Automatic Monitoring Equipment (Current and Historical)

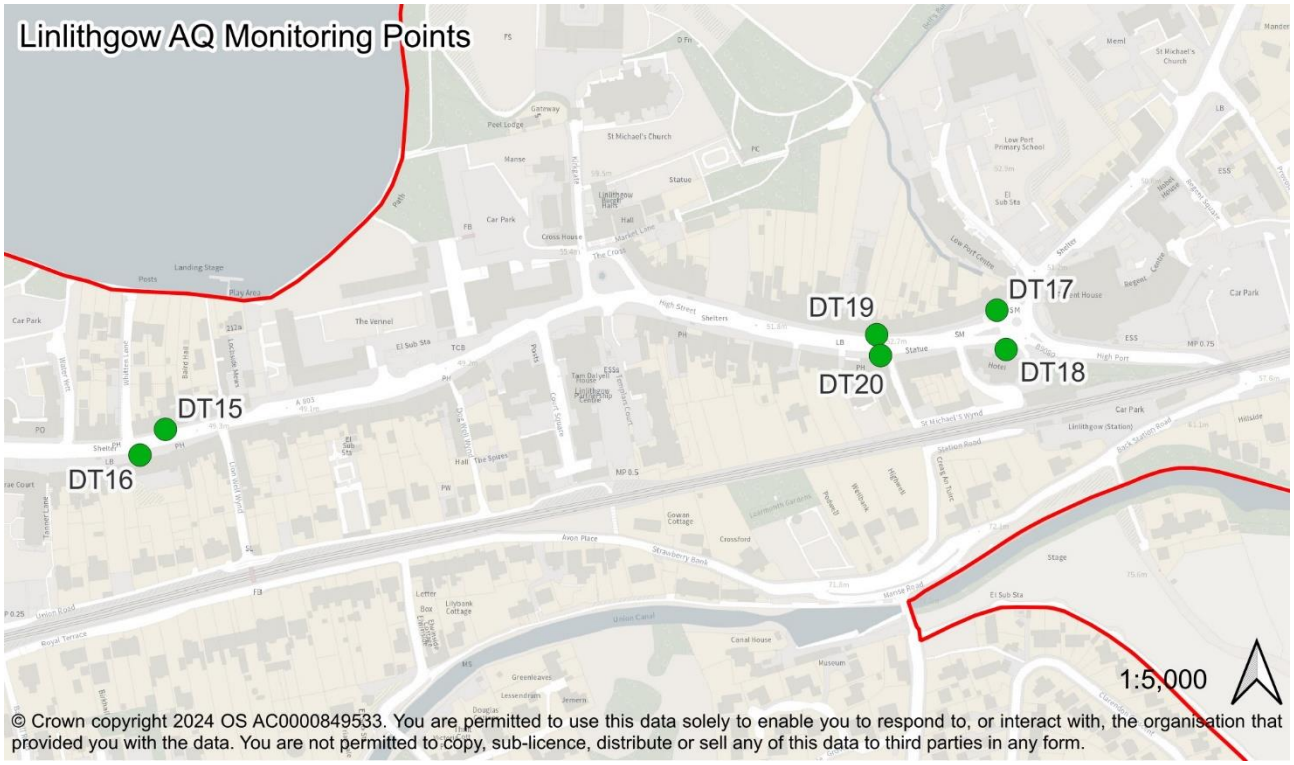
Site ID	Site Type	Grid Ref	Pollutants Measured	Equipment	Distance to relative exposure (m)	Distance to kerb of nearest road (m)	Inlet height (m)	Date of Installation
CM1 Linlithgow High Street	Roadside	300426, 677172	NO_2, PM_{10}; $PM_{2.5}$,	FIDAS 200; T200 API NO_X Analyser (Current)	4	1.36	2.32	2016
CM1 Linlithgow High Street	Roadside	300426,677172	NO_2, PM_{10}	TEOM/FDMS	4	1.36	2.32	30.10.2013 (relocated)
CM1 Linlithgow High Street	Roadside	299992, 677091	NO_2, PM_{10}	TEOM/FDMS	5.5	7	2.4	2008
CM1 Linlithgow High Street	Roadside	299992, 677091	NO_2, PM_{10}	TEOM analyser	5.5	7	2.4	Installed in December 2005

There are also 3 diffusion tubes co-located at the current automatic monitoring site. The location of the Linlithgow automatic monitoring station is shown in Map 2 below;

Map 2 – Location of Linlithgow Automatic Monitoring Station



Map 3 - Map of Diffusion Tube Locations in Linlithgow



3. Air Quality Management Area – NO_2 (annual mean objective)

In 2016, a Detailed Assessment of NO_2 in Linlithgow (Ref. 5) was completed. It used available monitoring data from 2014 and found exceedances of the annual mean objective of 40 μgm^{-3} at four of the diffusion tube monitoring sites within Linlithgow. NO_2 diffusion tube monitoring results from 2012 and 2013 are shown in Table 3 below.

Table 3 – NO_2 diffusion tube monitoring results during 2012 and 2013

Site	Site Type	2012 Annual Mean (μgm^{-3})	2013 Annual Mean (μgm^{-3})
Diffusion Tube (DT14)	R	NA	**44**
Diffusion Tube (DT15)	R	**43**	**40**
Diffusion Tube (DT16)	R	**42**	**45**
Diffusion Tube (DT17)	R	35	33
Diffusion Tube (DT18)	R	31	**41**
Diffusion Tube (DT19)	R	**41**	**40**
Diffusion Tube (DT20)	R	**45**	**42**
R = Roadside site (1-5m from the kerb).			

Annual Mean NO_2 values for the year were then modelled for the Linlithgow study area and the findings compared to the results of NO_2 monitoring. The modelling exercise found that NO_2 concentrations at various residential receptors within the study area, had been estimated to exceed the annual mean objective of 40 μgm^{-3} for the 2016 calendar year. As such, West Lothian Council declared an AQMA for NO_2 in the Linlithgow study area.

3.1 More Recent NO_2 monitoring results

Over a number of years, it has been noted in the Councils Annual Progress report, that NO_2 levels have been consistently below the Air Quality Objective annual mean level of 40 μgm^{-3} at both the automatic monitoring site and diffusion tube sites within Linlithgow. The results of previous years monitoring are shown in Table 4 below.

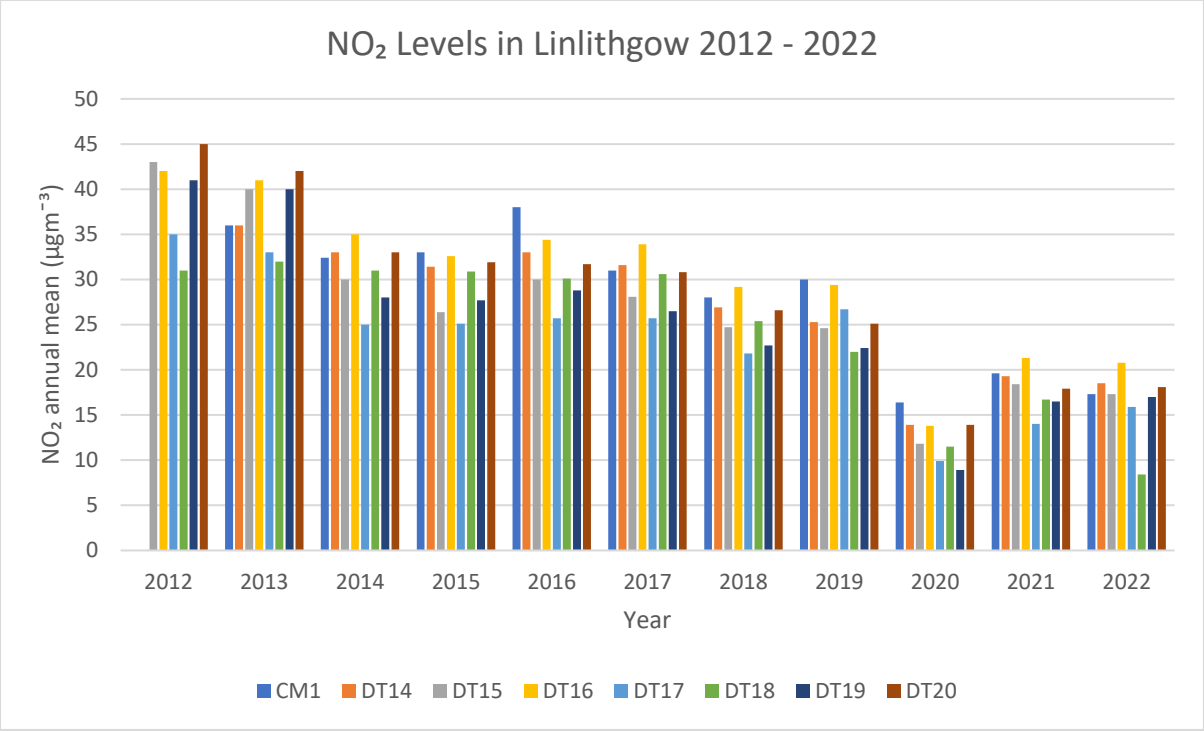
Table 4 – NO_2 monitoring results since 2012 in Linlithgow (annual mean μgm^{-3})

Site	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Linlithgow Automatic Monitor (CM1)	n/a	36(44.5)	32.4	33	38	31	28	30	16.4	19.6	17.3
Linlithgow CNC (3 co-located tubes) (DT14)	n/a	36	33	31.4	33	31.6	26.9	25.3	13.9	19.3	18.5
Linlithgow NW High St (DT15)	**43**	**40**	30	26.4	30	28.1	24.7	24.6	11.8	18.4	17.3

Linlithgow SW High Street (DT16)	**42**	**41**	35	32.6	34.4	33.9	29.2	29.4	13.8	21.3	20.8
Linlithgow High Street NE (DT17)	35	33	25	25.1	25.7	25.7	21.8	26.7	9.9	14	-
Linlithgow High Street SE (DT18)	31	**41**	31	30.9	30.1	30.6	25.4	22	11.5	16.7	-
Linlithgow High Street N (DT19)	**41**	**40**	28	27.7	28.8	26.5	22.7	22.4	8.9	16.5	-
Linlithgow High Street S (Old Post Office pub) (DT20)	**45**	**42**	33	31.9	31.7	30.8	26.6	25.1	13.9	17.9	18.1

It is evident that measured levels have been significantly below the Annual Air Quality Objective for many years. Measured results for 2020 are lower due to the Coronavirus pandemic, however, several years of data before this have remained below the objective level. As the pandemic eased and traffic levels increased in 2021, it is notable that the measured NO_2 level, started to increase again.

Figure 1 – NO_2 levels since 2012 in Linlithgow



4. Air Quality Management Area – PM_{10} (Annual Mean)

Following exceedances of the air quality objective noted in the 2014 annual progress report (see Table 5), the updated 2016 detailed assessment considered whether an air quality management area should be declared for PM_{10} as well as NO_2. The detailed assessment utilised modelling to determine PM_{10} levels at different receptors throughout the Linlithgow study area. The modelling exercise found that PM_{10} concentrations at various residential receptors within the study area, had been estimated to exceed the annual mean objective of 18 μgm^{-3} for the 2016 calendar year. The detailed assessment concluded that an AQMA should be declared an AQMA for PM_{10} in High Street, Linlithgow. As a result, WLC declared an AQMA for PM_{10} in 2016.

Table 5 – PM_{10} monitoring results in 2014

Site	Site Type	Data Capture (%)	2014 Annual Mean (μgm^{-3})
High Street (Automatic Monitor)	R	95	18.1

4.1 More recent PM_{10} monitoring results

Over a number of years, within the Councils Annual Progress reports, it has been noted that PM_{10} levels have been consistently below the Scottish Air Quality Objective annual mean level of 18 µgm-3 at the Linlithgow automatic monitoring site. An annual mean concentration equal to the Scottish 18µgm^{-3} objective was last measured in Linlithgow in 2014 which was just prior to the declaration of the AQMA. The results of previous years monitoring are shown in Table 6 below.

Table 6 – PM_{10} monitoring results since 2011 (annual mean µgm^{-3})

Site	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Linlithgow Automatic Monitor (CM1)	13	12	18	**18**	15	14	9.9	12.1	13.2	8.4	9.6	13.1
Numbers in bold indicate an exceedance of the Air Quality Objective (18µgm^{-3})												

It is clear that measured levels over a number of recent years have been significantly below the Annual Air Quality Objective. Measured results for 2020 are lower due to the Coronavirus pandemic. As the pandemic eased and traffic levels increased in 2021, it is notable that the measured PM_{10} started to increase.

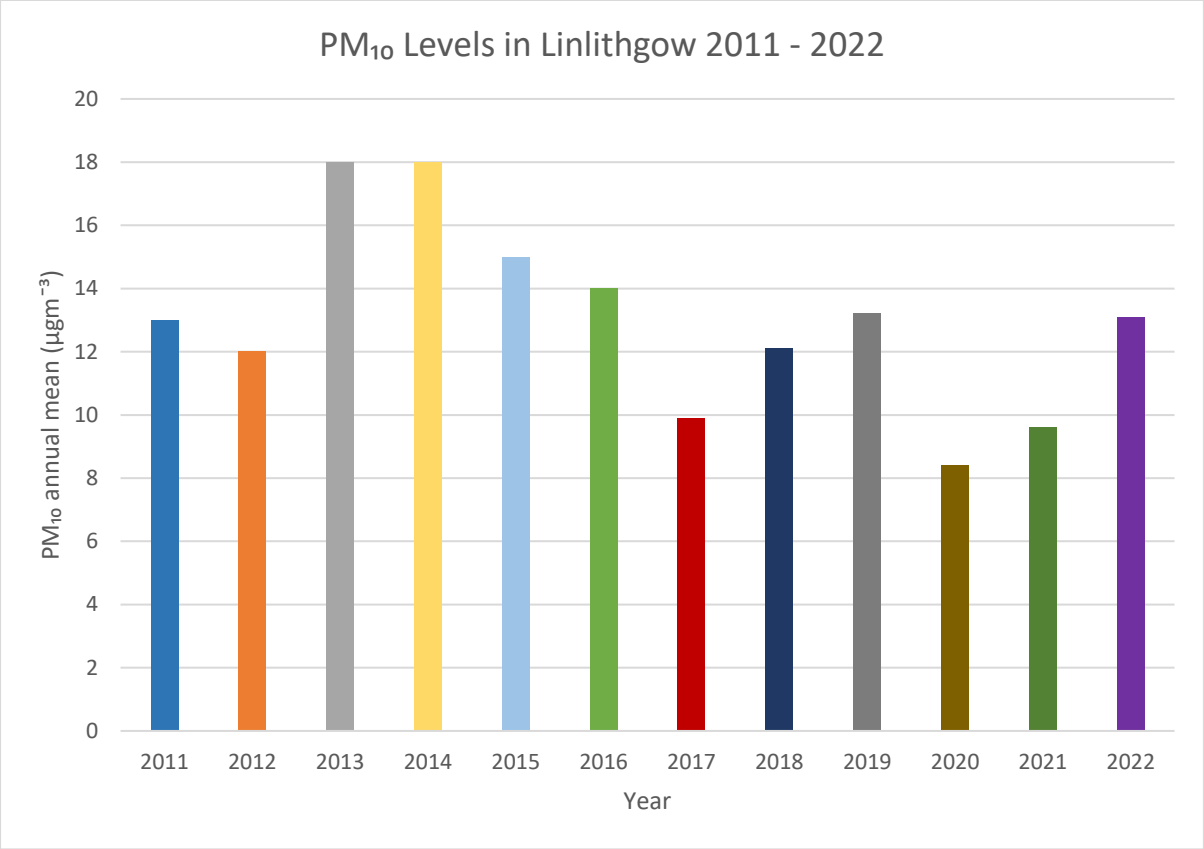
4.2 Particulate Matter Monitoring

The accurate measurement of particulate matter (PM) represents a significant challenge particularly where concentrations can generally be considered to be low. Ambient concentrations of PM_{10} and PM2.5 reported by different MCERT equivalent instruments in the same environments can vary by several micrograms (as an annual mean). Such differences represent a particular problem when considering compliance with air quality standards, especially in situations where a change in instrumentation results in a step-change reduction in reported concentrations. This prompted the Scottish Government to conduct a Pilot Research Study.

The aim of the study was to help identify whether measurement techniques used in Scotland were providing accurate measurements that government could rely on when making policy decisions. The study was carried out between July 2021 and June 2022 and the focus was on the main method for monitoring PM_{10} measurements - the FIDAS 200 which the council utilises.

The research report was published in May 2023 with the Scottish Government issuing guidance for local authorities. There were a number of points including the requirement to apply a correction factor to data obtained by the FIDAS particulate monitors. FIDAS 200 PM_{10} data collected within the Scottish Air Quality Database (SAQD) should be corrected by dividing ratified data by 0.909. The data in Table 6 has had this correction factor applied to measurements taken since 2017.

Figure 2 – PM_{10} Levels Since 2011 in Linlithgow



5. Air Quality Action Plan 2017

During 2017, a draft air quality action plan was developed for Linlithgow (see Ref. 4). The development of an action plan is a statutory requirement, following the declaration of an AQMA. A steering group across West Lothian Council was established and a number of strategic measures were outlined. These measures were also the subject of a public consultation exercise. Some of the measures set out in the action plan have been actioned since 2017. For example;

- Supplementary guidance on air quality and planning has been produced (see Ref. 8);
- The ECO stars scheme has expanded its membership across West Lothian;
- Electric vehicle charging points have continued to be installed, both by the Council and via planning conditions for residential and commercial developments;
- Developers have been encouraged to include active travel measures into their plans – included in air quality and planning guidance and general planning condition requirements;
- Environmental Health have continued to deal with environmental nuisance (including dust and smoke) complaints across the Councils area.

6. Detailed Assessment 2022

In considering whether the revocation of the Linlithgow AQMA was appropriate, a detailed assessment of air quality in Linlithgow was also undertaken and subsequently published in October 2022 (see Ref. 7). The detailed assessment considered;

- A review of measured NO_2 and PM_{10} concentrations within the AQMA over recent years;
- Detailed dispersion modelling of NO_2, PM_{10} and $PM_{2.5}$ concentrations for a baseline year of 2017;
- A sensitivity analysis of potential fluctuations in annual mean pollutant concentrations attributable to meteorological conditions;
- Detailed dispersion modelling of NO_2, PM_{10} and $PM_{2.5}$ concentrations in a future year of 2024 reflecting anticipated changes in traffic levels associated with projected growth or planned local developments.

The detailed assessment concluded that West Lothian Council may wish to:

1. Consider revocation of the Linlithgow Air Quality Management Area for exceedances of the NO_2 annual mean objective;
2. Delay revoking the AQMA for exceedances of the PM_{10} annual mean objective until Scottish Government guidance regarding AQMA revocation and the use of FIDAS analysers for particulate measurements is updated.

   This study has now been completed and a report has been published. PM_{10} data presented in this report has had the appropriate correction factor applied in line with the research recommendations.

7. Conclusion

The Linlithgow AQMA was declared in April 2016 after monitoring and modelling found exceedances of NO_2 and PM_{10} air quality objective levels at various residential receptors in the Linlithgow study area. Since the AQMA was declared, measured concentrations of both NO_2 and PM_{10} have consistently been below the air quality objectives for several consecutive years; 8 years for NO_2 and 7 years for PM_{10}.

As stated within the Air Quality in Scotland (LAQM) website in relation to AQMA Revocation: ‘Where a local authority feels that it has sufficient evidence to justify the need to amend/revoke an AQMA at any time, it should submit that evidence to the Scottish Government for appraisal.

The Scottish Governments Policy Guidance PG(S) 23 states that there are no set criteria on which an amendment or revocation decision will be based, but each request will be considered on a case-by-case basis. A minimum requirement however will normally be at least three consecutive years where the objectives of concern are being achieved and where monitoring data demonstrates that further exceedances of the objectives are unlikely to occur. For those authorities that have continuous monitoring, the Scottish Government would expect them to keep the AQMA under regular review, and to act where necessary, rather than await the next round of reviews and assessments.'

In considering all the information available from several years of monitoring and from modelling carried out in the most recent 2022 detailed assessment, West Lothian Council intend to revoke the AQMA for both NO_2 and PM_{10}. The Council will, however, continue to monitor NO_2 and PM_{10} within Linlithgow. If measured levels remain below the objective levels, West Lothian Council may utilise the monitoring equipment at other potential areas of poorer air quality within the Council area.

As previously mentioned pilot research by RICARDO (Scottish Government air quality consultants), which investigated particulate matter monitoring techniques in Scotland has now been completed.

The research report was published in May 2023. This required a correction factor to be applied to data obtained by the FIDAS particulate monitors which the council utilises.

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