Air Pollution in Northern Ireland 2022

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1. Report Highlights

This is the twenty-first in a series of annual reports on air quality in Northern Ireland. It has been written and produced by Ricardo, on behalf of the Department of Agriculture, Environment and Rural Affairs (DAERA).

The key purpose of this report is to summarise air quality monitoring results for Northern Ireland in 2022, in order to inform the public, government and wider air quality community in Northern Ireland. This report also contains useful information on air quality policy and legislation as well as on sources of pollution. Figure 1.1 shows the locations of all air quality monitoring sites in Northern Ireland that were in operation during part or all of 2022.

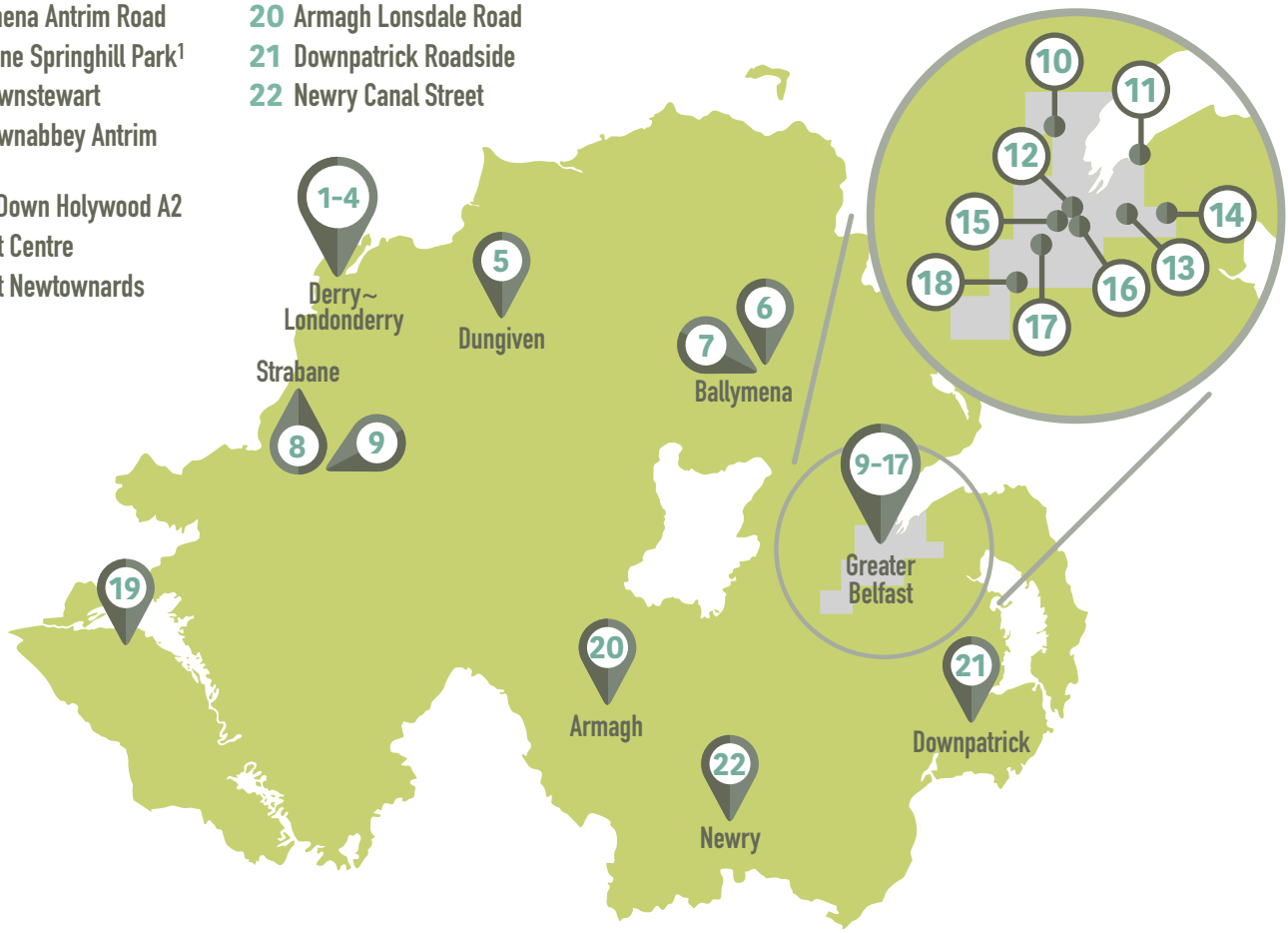
Figure 1.1: Air Quality Monitoring Stations

1 Londonderry Rosemount
2 Londonderry Dale's Corner
3 Strathfoyle Bawnmore Place
4 Derry Brandywell
5 Limavady Dungiven
6 Ballymena Ballykeel
7 Ballymena Antrim Road
8 Strabane Springhill Park[1]
9 Newtownstewart
10 Newtownabbey Antrim Road
11 North Down Holywood A2
12 Belfast Centre
13 Belfast Newtownards Road
14 Castlereagh Dundonald
15 Belfast Westlink Roden Street
16 Belfast Ormeau Road
17 Belfast Stockman's Lane
18 Lisburn Dunmurry Seymour Hill[2]
19 Lough Navar
20 Armagh Lonsdale Road
21 Downpatrick Roadside
22 Newry Canal Street

22 sites operating in 2022. This map has been updated from the previous years to show the location of sites in the UK Black carbon and PAH Networks

[1] Black Carbon is measured at Strabane 2 which is at the same location as Strabane Springhill Park

[2] Black Carbon and PAHs are measured at Kilmakee Leisure Centre which is at the same location as Lisburn Dunmurry Seymour Hill



Belfast city centre, Northern Ireland

This report has been compiled from data supplied by Northern Ireland's network of air quality monitoring stations (Figure 1.1). Some of these are operated on behalf of DAERA, while others are managed by district councils, via the Local Air Quality Management framework, for which DAERA provides funding support. An interactive map of the automatic monitoring stations shown in Figure 1.1 can be found on the Northern Ireland Air Quality Website at www.airqualityni.co.uk. Information on the sites in Northern Ireland within the Black Carbon, Polycyclic Aromatic Hydrocarbons (PAH), Hydrocarbon, Toxic Organic Micro Pollutants (TOMPs) and Heavy Metals Networks, can be found on the UK-AIR website at https://uk-air.defra.gov.uk/interactive-map.

This report reviews the pollutants monitored, and highlights compliance as well as exceedances of air quality objectives. It also highlights emerging trends in air quality over time. Each edition of the report takes an issue to examine in-depth, and this year's focus is on the impact of Climate Change and Net Zero policies on air pollution in Northern Ireland.

There is also growing concern regarding ultra-fine particulate matter in the UK and the impact of this on health.

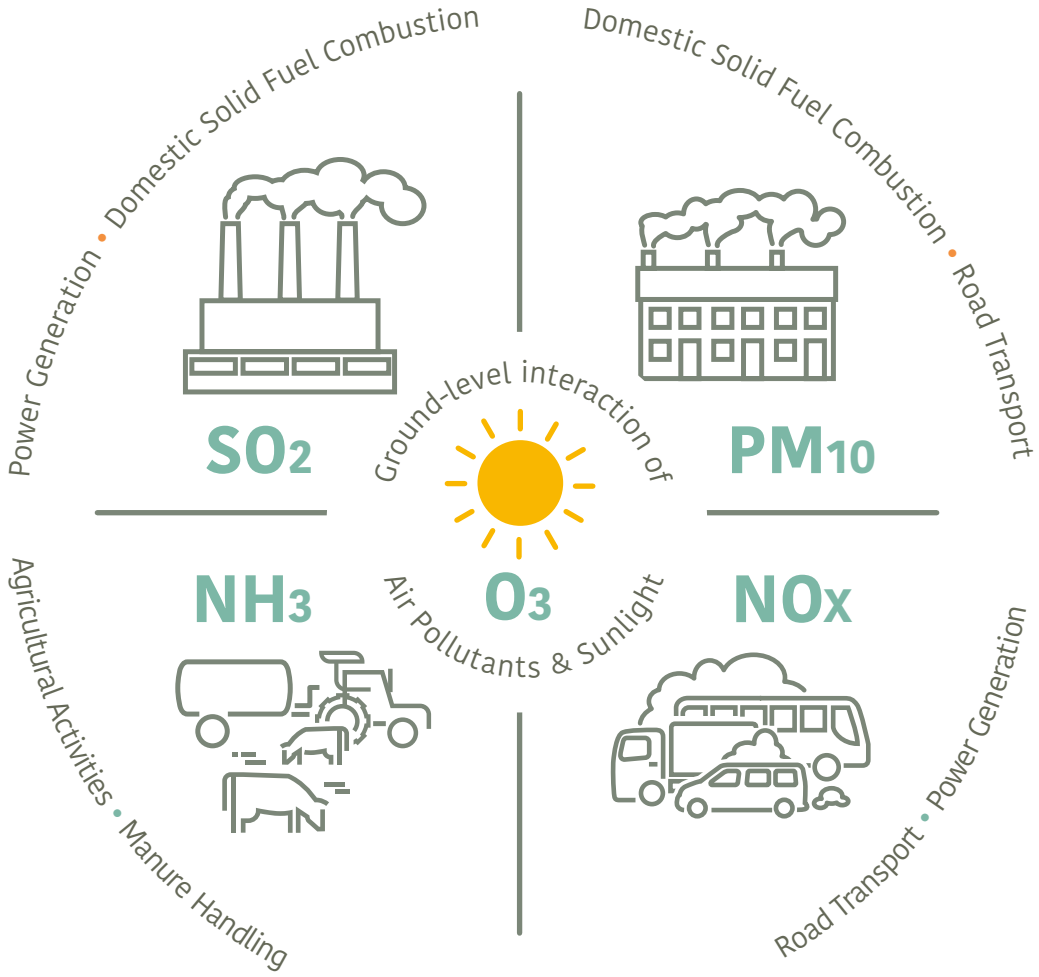
Whilst concentrations of sulphur dioxide, a pollutant associated with coal and oil combustion, have declined significantly since the 1990s, and a decreasing trend in NO_2 concentrations has been observed at some monitoring sites in Northern Ireland, a number of pollutants in some parts of Northern Ireland continue to exceed air quality objectives. There is also growing concern regarding ultra-fine particulate matter in the UK and the impact of this on health. A continued effort to reduce air pollution from all known sources is therefore important, together with monitoring to assess progress and to provide sound, science-based input into policy development.

2. Sources of Air Pollution in Northern Ireland

Figure 2.1 illustrates the most significant air pollutants for our region, and provides information on their sources:

- Nitrogen oxides (NO_x which includes nitrogen monoxide, NO - also called 'nitric oxide' - and nitrogen dioxide, NO_2): from combustion of fuels, most importantly in transport and energy generation. The NO_x emitted by road transport, however, is of particular concern because it leads to increased concentrations of NO_2 at ground level in busy streets where people are present. NO_2 is a respiratory irritant that can worsen the symptoms of people who already have lung problems.
- Sulphur dioxide, SO_2: a pollutant produced during combustion of fuels containing sulphur (such as coal), particularly from power generation, industry, and household heating. SO_2 is a respiratory irritant that can cause the airways to constrict: people with asthma are likely to be particularly sensitive to it.

Figure 2.1: Main Sources of Air Pollution



Portrush Whiterocks Beach, Northern Ireland

- Particulate matter, PM_{10} and $PM_{2.5}$: by-products of burning fuels, in particular use of solid fuels (e.g. domestic wood and coal burning), industrial combustion and road transport. Based on the 2021 NAEI emission estimates, in Northern Ireland, 26% of $PM_{2.5}$ and 16% of the PM_{10} produced from road transport is from fuel combustion, while the remainder comes from tyre and brake wear and road dust[1]. PM_{10} particles can travel into our airways where they can cause inflammation, and a worsening of the condition of people with heart and lung diseases. $PM_{2.5}$ particles are smaller still, and can be carried deep into the lungs: these ultrafine particles may carry surface-absorbed toxic, or carcinogenic, compounds into the body. It is important to note that there are also many natural sources of particulate matter, such as sea salt, pollen or Saharan dust.
- Ground-level ozone, O_3: a secondary pollutant, formed by the interaction of other air pollutants in the presence of sunlight. Ozone irritates the eyes, airways and lungs, increasing the symptoms of those suffering from asthma and lung diseases.
- Ammonia, NH_3: a gas that is emitted from waste and agricultural activities – in particular, manure handling, storage and spreading. Ammonia contributes to air pollution because it can react with other pollutants (such as oxides of nitrogen and sulphur) to produce fine particles of ammonium nitrate and ammonium sulphate.
- Polycyclic Aromatic Hydrocarbons, PAHs: typically formed by incomplete combustion or pyrolysis. Domestic combustion accounts for the majority of PAH emissions to the atmosphere. Several PAHs are toxic or can be carcinogenic, such as benzo[a]pyrene, which is used as a marker compound for PAHs in the UK.

[1] Air Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2021 https://naei.beis.gov.uk/reports/reports?report_id=1131

3. Legislation and Policy: What Can Be Done

During 2022 the management of air quality in Northern Ireland was based on the requirements of the Air Quality Standards Regulations (Northern Ireland) 2010, the 2007 UK Air Quality Strategy, the Environment Order (NI) 2002, and the Air Quality Regulations (Northern Ireland) 2003.

The Environment (Northern Ireland) Order 2002

DAERA has a duty under these Regulations to prepare and publish a statement or Air Quality Strategy, containing policies with respect to the assessment or management of the quality of air. This Strategy is in development. District councils have a duty to review and assess air quality within their districts, under Part III of The Environment Order (NI) 2002. These Regulations also make provision for DAERA to provide financial support to the district councils in carrying out an air quality assessment, review, prepare and implement an action plan, or management of the quality of air. DAERA supports the district councils financially through the Local Air Quality Management Grant.

The Air Quality Regulations (Northern Ireland) 2003

These Regulations set out the air quality objectives to be achieved. The Regulations require district councils to review the quality of air within their area. The reviews have to consider the current and likely future air quality and assess whether the air quality objectives are being met or are likely to be achieved within the relevant period.

The Air Quality Standards Regulations (Northern Ireland) 2010

Ambient air quality in Northern Ireland is regulated by the Air Quality Standards Regulations (Northern Ireland) 2010 and their subsequent 2016 amendment[2]. These Regulations transposed the following European Commission Directives:

- Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (the Air Quality Directive), which relates to sulphur dioxide, oxides of nitrogen, particulate matter, lead, carbon monoxide, benzene and ozone in ambient air; and
- Directive 2004/107/EC (the Fourth Daughter Directive) relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons (PAH) in ambient air.

These Directives came into operation while the UK was a member state of the European Union (EU). The provisions of the Directives were required to be incorporated (or 'transposed') into Northern Ireland's own legislation, and the Regulations were the means by which this was done. The full provisions of the above Directives therefore remain part of Northern Ireland's own legislation, even after the UK's departure from the EU in early 2020.

[2] Available at: https://www.legislation.gov.uk/nisr/2010/188/contents/made

As well as limit values and non-mandatory target values for ambient concentrations of pollutants, the Regulations set out requirements for ambient air quality monitoring, including the number of monitoring sites required, siting criteria and acceptable methodology. They also identify the duties of Northern Ireland's Government Departments in relation to achieving limit and target values. It is the responsibility of DAERA to inform the public about air quality in the region, particularly with regard to warning the public when air quality is poor.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, first published in 1997 and updated in 2007, provides a comprehensive framework for tackling air pollution. It was established on the basis of strong scientific evidence and a science-based understanding of the effects of air pollutants on health and the environment. The Strategy sets objectives to be met within the UK for a suite of pollutants. The scientific basis, the objectives set, and provisions contained within the Strategy are closely associated with the corresponding standards set within the European Air Quality Directives, as listed above. All the Air Quality Strategy objectives are at least as stringent as the corresponding limit values in the Air Quality Directive or 4th Daughter Directive and the Regulations. The full Air Quality Strategy and its technical annexes are available online and can be downloaded from https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1.

The Environment Act 2021 requires the Secretary of State to undertake regular five-yearly reviews of the Air Quality Strategy. Defra published an updated Air Quality Strategy in 2023. In a significant change, the updated Air Quality Strategy does not include the Devolved Administrations. However, the 2007 Air Quality Strategy remains in place for Northern Ireland until the Clean Air Strategy for Northern Ireland is published.

Carrick-a-Rede, Causeway Coast Route, Northern Ireland

The Air Quality Provisional Common Framework

In February 2022, the UK Government published the Air Quality Common Framework (UK Government, 2022). This policy paper, which is available online at https://www.gov.uk/government/publications/air-quality-provisional-common-framework, explains how the UK Government and the Devolved Administrations propose to work together to develop air quality policy, following the UK's exit from the European Union.

World Health Organization (WHO) Guidelines

The World Health Organization publishes guidelines for key pollutants based on the scientific evidence on the health effects of the pollutants available at the time. The latest update was issued in 2021[3], with revised guidelines published for these pollutants. It also provides interim targets to guide reduction efforts towards the ultimate and timely achievement of the Air Quality Guideline levels. Table 3.1 shows the 2021 WHO Air Quality Guideline levels and interim targets for NO_2, PM_{10} and $PM_{2.5}$. The WHO guidelines are not legally binding but are valuable for providing guidance for future UK legislations.

Table 3.1: WHO 2021 air quality guidelines for NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Averaging Period	2021 WHO Interim Targets				2021 WHO Air Quality Guideline Level
		1	2	3	4	
NO_2 (µg m^{-3})	Annual	40	30	20	-	10
	24 hour*	120	50	-	-	25
PM_{10} (µg m^{-3})	Annual	70	50	30	20	15
	24 hour*	150	100	75	50	45
$PM_{2.5}$ (µg m^{-3})	Annual	35	25	15	10	5
	24 hour*	75	50	37.5	25	15

* measured as the 99th percentile of 24 hour means in a year (equivalent to 3 - 4 exceedances)

[3] World Health Organization. (2021). WHO global air quality guidelines: particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. World Health Organization. https://apps.who.int/iris/handle/10665/345329. License: CC BY-NC-SA 3.0 IGO

Local Air Quality Management

Local Air Quality Management (LAQM) provides the framework under the Environment Order (NI) 2002, within which air quality is managed by the 11 district councils in Northern Ireland. LAQM requires district councils to review and assess a range of air pollutants against the objectives set by the Air Quality Regulations (Northern Ireland) 2003 and the UK Air Quality Strategy, using a range of monitoring, modelling, observations and corresponding analyses. For locations where objectives are not expected to be met by the relevant target date, district councils are required to declare an Air Quality Management Area (AQMA), and (along with relevant authorities), to develop an Action Plan addressing the problem. In 2022 there were 19 AQMAs in Northern Ireland, as shown in Table 3.2.

Nine councils have AQMAs: of these, seven have AQMAs for NO_2 only, and two have AQMAs for PM_{10} and NO_2. There are no AQMAs in place for any other pollutants, in Northern Ireland.

District Council reports on air quality can be accessed through the following webpage: https://www.airqualityni.co.uk/laqm/district-council-reports.

Table 3.2: Air Quality Management Areas in Northern Ireland

District Council	Number of AQMAs	Pollutant that triggered designation	Sources
Antrim and Newtownabbey Borough Council	1	Nitrogen Dioxide	Road traffic
Ards and North Down Borough Council	0	-	-
Armagh City, Banbridge and Craigavon Borough Council	1	Nitrogen Dioxide	Road traffic
Belfast City Council	4	Nitrogen Dioxide	Road traffic
Causeway Coast and Glens Borough Council	1	Nitrogen Dioxide	Road traffic
Derry City and Strabane District Council	4	Nitrogen Dioxide	Road traffic
Fermanagh and Omagh District Council	0	-	-
Lisburn and Castlereagh City Council	1	Nitrogen Dioxide	Road traffic
Mid and East Antrim Borough Council	2	Nitrogen Dioxide (1) and PM_{10} (1)	NO_2: Road traffic PM_{10}: Domestic Heating
Mid Ulster District Council	3	Nitrogen Dioxide	Road traffic
Newry, Mourne and Down District Council	2	Nitrogen Dioxide (1) and PM_{10} (1)	Road traffic

4. Air Quality Monitoring Results for 2022

Monitoring in Northern Ireland

A wide range of air quality monitoring is carried out in Northern Ireland. Some monitoring sites are run as part of UK-wide monitoring networks; others are operated by district councils in order to meet local objectives.

The Air Quality Standards Regulations divide Northern Ireland into 'zones' for reporting purposes. Northern Ireland comprises two reporting zones – the 'Belfast Metropolitan Urban Area' agglomeration (the conurbation of Greater Belfast), and the 'Northern Ireland' zone (the rest of the region). The Regulations then specify how many monitoring sites (or 'stations') are needed in each zone (based on its size and population). Only sites which meet the stringent siting criteria of the Regulations may be used for reporting compliance. The Regulations' siting criteria are different from those used for LAQM: for example, sites located close to major road junctions are used in LAQM but must not be used for compliance monitoring purposes. There are also different criteria regarding relevant public exposure.

The following pollutants were monitored in Northern Ireland during 2022:

- Carbon monoxide (CO);
- Oxides of nitrogen (NO_x), comprising nitric oxide (NO) and nitrogen dioxide (NO_2);
- Sulphur dioxide (SO_2);
- Particles (as PM_{10}, $PM_{2.5}$, and black carbon);
- Ozone (O_3);
- Benzene;
- Polluting elements – including lead, arsenic, cadmium, nickel and mercury;
- Polycyclic Aromatic Hydrocarbons (PAH); and
- Toxic Organic Micro Pollutants (TOMPs)

There were 22 automatic air quality monitoring stations that operated for all or part of 2022 in Northern Ireland. Each was equipped with continuous monitoring equipment for one or more of the pollutants for which automatic methods are used: CO, NO_x, SO_2, PM_{10}, $PM_{2.5}$, O_3, and black carbon, and/or a non-automatic sampler for PAH. These sites (shown previously in Figure 1.1) provide information on a wide range of pollutants. Data from the continuous monitoring sites are communicated rapidly to the public via the website www.airqualityni.co.uk and the Northern Ireland Air app, which can be downloaded free of charge from https://www.airqualityni.co.uk/stay-informed. Public health warnings are issued when forecast or actual pollutant concentrations reach levels defined as 'High' by the Daily Air Quality Index (see https://uk-air.defra.gov.uk/air-pollution/daqi for an explanation of this Index).

Seven of the automatic monitoring sites (Armagh Lonsdale Road, Ballymena Antrim Road, Ballymena Ballykeel, Belfast Centre, Belfast Stockman's Lane, Derry/Londonderry Rosemount and Lough Navar) were part of the UK's national monitoring network and were used to assess compliance with the Air Quality Standards Regulations. Non-automatic monitoring techniques are used for benzene, metallic pollutants, and PAHs. Some of these measurements are used to assess compliance with the Air Quality Standards Regulations and the Air Quality Strategy.

Correction of TEOM Data

Two of Northern Ireland's twelve PM_{10} monitoring sites used a type of instrument called a Tapered Element Oscillating Microbalance (TEOM) to measure PM_{10} during part of 2022: these sites were Strathfoyle Bawnmore Place and Newtownstewart. The TEOM continuously measures particle mass concentration by measuring the change in the oscillation frequency of a tapered element, which is connected to a filter. Particles collected on the filter change the weight, and in turn the frequency of the tapered element. The relatively high operating temperature of the TEOM (necessary to prevent condensation on the filter) can result in the loss of volatile components of the particulate matter sampled, causing under-estimation of the PM_{10} concentration.

Historically, the data have been corrected for this using the Volatile Correction Model (VCM) developed by King's College, London and now administered by Imperial College, London. The VCM uses data from Filter Dynamic Measurement Systems (FDMS) PM_{10} analysers in the region, which measure both the volatile and non-volatile fractions, to calculate an appropriate correction based on the location of the instrument and the period of the measurements. The resulting corrected measurements have been demonstrated as equivalent to the European reference method. For more information, visit the Volatile Correction Model page[4]. This issue only arises for PM_{10}: there is at present no requirement to correct TEOM measurements of $PM_{2.5}$.

However, the ability of the VCM to calculate a reliable volatile correction depends on there being an FDMS within a specified distance. In recent years, the number of FDMS instruments in the UK has declined substantially: they have been replaced with other instrument types, as they have reached the end of their functional lifetime and are no longer supported by the manufacturer.

As of 11 September 2021, it has no longer been possible to use the VCM method to correct TEOM data from sites in Northern Ireland because there are no longer any FDMS within the prescribed distance. As such, to estimate the gravimetric equivalent PM_{10} concentrations from the TEOMs, it has been necessary to return to a method that was historically used to correct TEOM data before the implementation of the VCM method in 2004. This consists of applying a factor of 1.3 to the TEOM PM_{10} data, to approximately correct for the lost volatile component. This correction factor cannot take account of local or day-to-day variation in the volatile component of PM_{10}. Therefore, TEOM PM_{10} data corrected in this way are classified as indicative gravimetric equivalent (rather than gravimetric equivalent like VCM-corrected TEOM data, FDMS, BAM or Fidas 200™ data).

The last two TEOMs in Northern Ireland were replaced during 2022: Strathfoyle Bawnmore Place on 25 February 2022, and Newtownstewart on 10 March 2022. Both sites now use the Fidas 200™ to measure particulate matter.

The Belfast City Hall at Donegall Square, Belfast, Northern Ireland

[4] http://www.volatile-correction-model.info/

Carrick-A-Rede rope bridge, Northern Ireland

Key Results for 2022

This section summarises key monitoring results from 2022, including compliance with Air Quality Standards Regulations limit values and the corresponding Air Quality Strategy (AQS) objectives. Further information is provided on the Northern Ireland Air website.

Carbon Monoxide was monitored using an automatic instrument at one site – Belfast Centre. The results were well within the Regulations limit value and AQS objective for this pollutant and have been for many years.

Benzene was monitored at one site, Belfast Centre, which met the annual mean limit value and AQS objective (for the running annual mean) in 2022, as it has for many years.

Metallic and Other Polluting Elements including lead, arsenic, cadmium and nickel – were monitored using non-automatic techniques at Belfast Centre, as part of the UK Heavy Metals Network. The results for 2022 were within the annual mean limit value and AQS objective for lead, and within the Regulations annual mean target values for arsenic, cadmium and nickel.

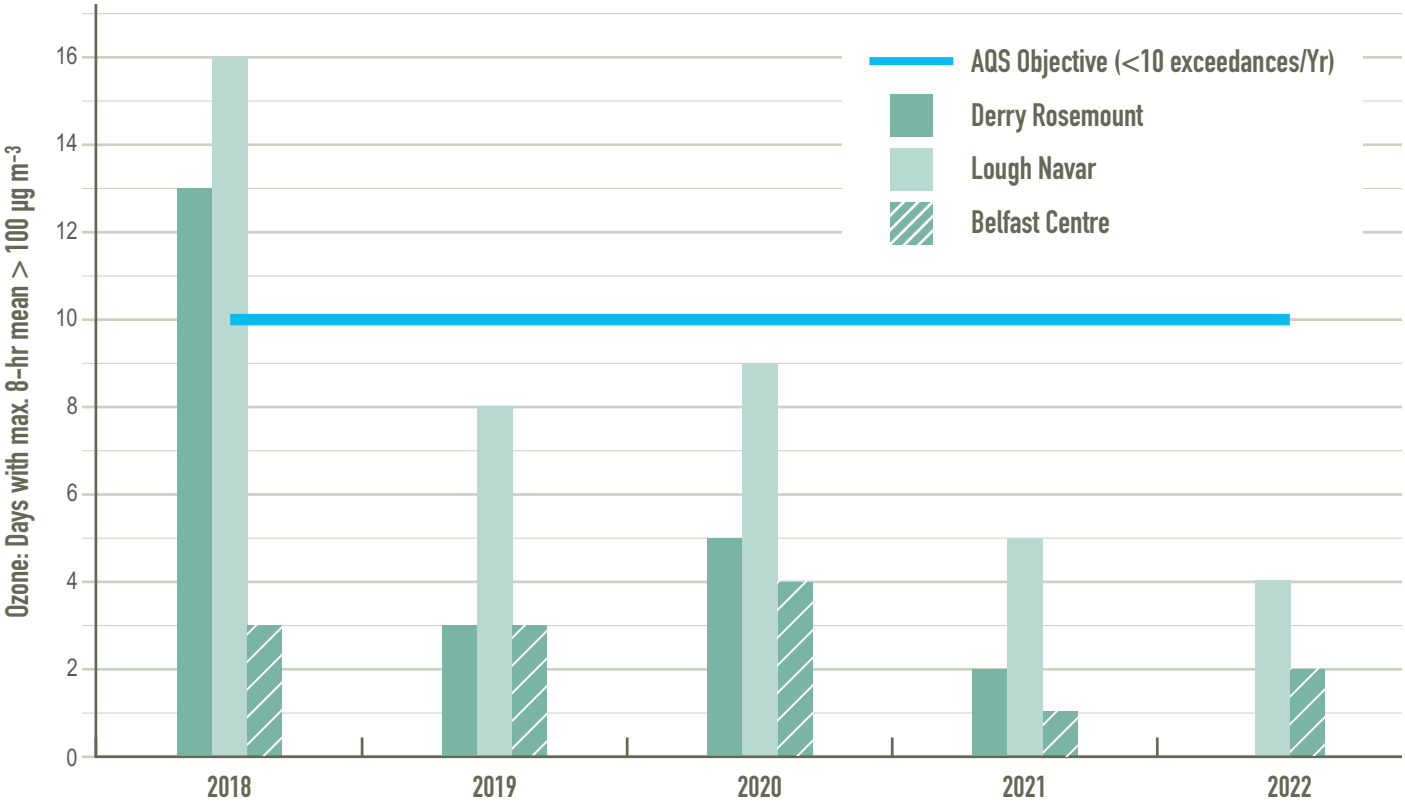
Sulphur Dioxide was monitored at five automatic sites during 2022. All sites met the limit values for SO_2 (1-hour and 24-hour mean), and the AQS objective for the 15-minute mean.

Ozone was monitored at Belfast Centre, Derry Rosemount, and the rural Lough Navar site. A maximum daily 8-hour mean above 100 µg m^{-3} was measured on two days at Belfast Centre and on four days at Lough Navar, in 2022. Derry Rosemount did not measure any days with a maximum daily 8-hour mean above 100 µg m^{-3} (Figure 4.1). Therefore, no sites exceeded the target value for human health of 120 µg m^{-3} (for the maximum daily 8-hour mean) on more than the permitted 25 days or exceeded the more stringent AQS objective of 100 µg m^{-3} on more than the permitted 10 days in 2022.

Unlike some other pollutants, levels of ozone (O_3) in Northern Ireland do not appear to be decreasing but remain variable from year to year. Ozone exceedances happen in some years but not others. The reasons for this relate to how ozone is formed: it is a 'secondary' pollutant – that is, it is formed by reactions involving other pollutants, in the presence of sunlight, and over several hours. This means that the number of ozone exceedances in any given year depends substantially on weather conditions.

Section 5 of this report investigates the long-term trend in ozone concentrations in Northern Ireland.

Figure 4.1: Days with Maximum 8-hour mean Ozone Concentrations > 100 µg m^{-3} for Five Years 2018-2022



Particulate Matter PM_{10}. Particulate matter as PM_{10} was monitored at twelve locations in 2022. Figure 4.2 shows the annual mean PM_{10} concentrations (shown by the darker coloured bars), and the number of exceedances of the daily mean limit value and objective (shown by the lighter coloured bars). As explained above, Fidas 200™ instruments were used to replace the TEOM at Strathfoyle Bawnmore Place on 25 February 2022 and the TEOM at Newtownstewart on 10 March 2022. The data before the replacements were made have been corrected to indicative gravimetric equivalent using the agreed correction factor of 1.3 as explained previously in this section.

For sites with less than 75% data capture, annualisation has been undertaken to estimate the annual mean, as per the procedure laid out in LAQM.TG(22) (Box 7.9)[5]. For PM_{10}, Strathfoyle Bawnmore Place and Strabane Springhill Park both had a data capture below 75% in 2022.

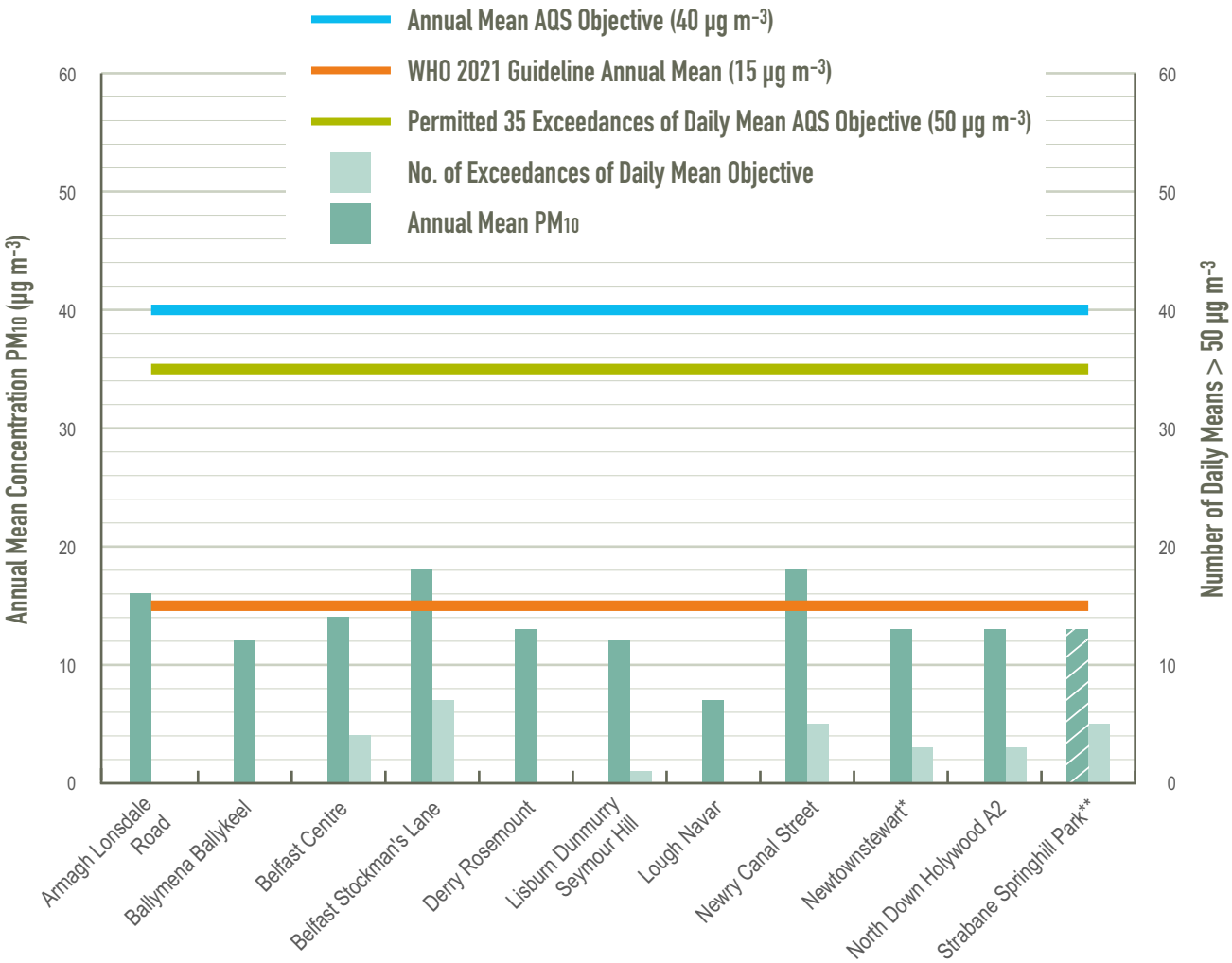
[5] Local Air Quality Management - New Technical Guidance TG(22): Available at https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf

A minimum of three months of data is required for annualisation and Strathfoyle Bawnmore Place had only two months of complete data, therefore annualisation was not undertaken for this site.

To perform annualisation, data from two to four nearby continuous background monitors with capture rates greater than 85% should be used to calculate an annualisation factor. Data from Ballymena Ballykeel and Derry Rosemount were used to calculate an annualisation factor for PM_{10} at Strabane Springhill Park.

All sites met the limit value and objective of 40 µg m^{-3} for annual mean PM_{10}, and no sites exceeded the daily mean limit value and objective of 50 µg m^{-3} on more than the maximum permitted 35 occasions during the year (after correction for lost volatile component in the case of TEOM data). Where data capture is less than 85%, the daily mean objective is judged on whether the 90.4th percentile of 24 hour mean PM_{10} concentrations has exceeded 50 µg m^{-3}, rather than the number of exceedances. For Strabane Springhill Park the 90.4th percentile was below 50 µg m^{-3}. Three of the twelve sites (Armagh Lonsdale Road, Belfast Stockman's Lane and Newry Canal Street) exceeded the WHO 2021 guideline of 15 µg m^{-3} for annual mean PM_{10} concentrations, in 2022.

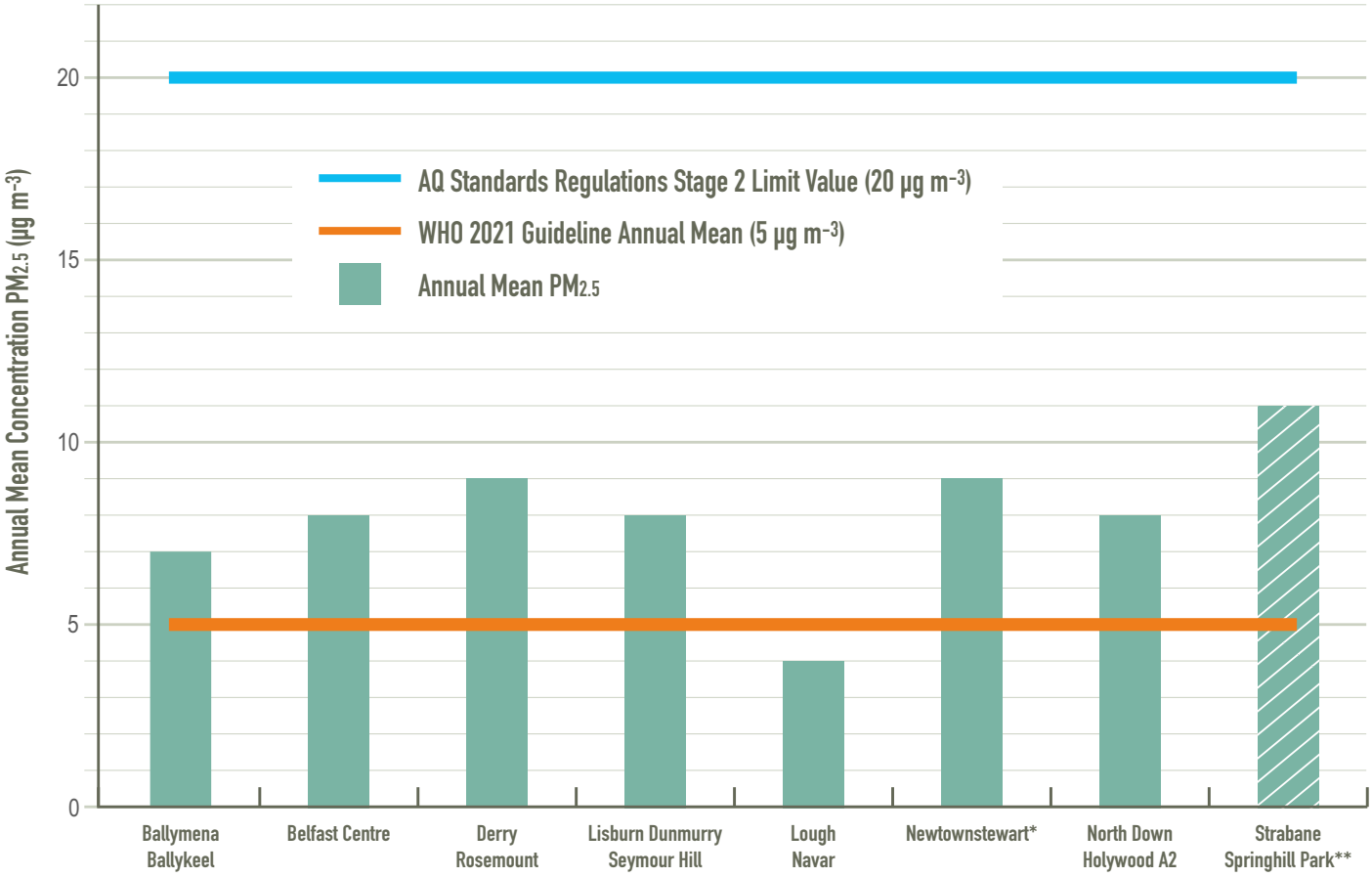
Figure 4.2: Annual Mean PM_{10} Concentrations and Exceedances of Daily Mean Objective, 2022



* Asterisk indicates sites with < 85% data capture
** Where the valid data capture is less than 75%, the means have been "annualised" and shown as a striped bar

Particulate Matter $PM_{2.5}$. Fine particulate matter as $PM_{2.5}$ was continuously monitored at nine sites in 2022. Figure 4.3 shows the annual mean $PM_{2.5}$ concentrations for 2022 at all sites except Strathfoyle Bawnmore Place. The data capture rate for this site was 22% in 2022, which is too low for annualisation to be performed, as this requires a minimum of three months' data. It should also be noted that Strabane Springhill Park has just enough data for annualisation; however, with a data capture rate of 39%, the annualised annual mean should be treated with caution. All sites reported annual mean $PM_{2.5}$ concentrations well below the Air Quality Regulations Stage 2 limit value of 20 µg m^{-3} (which had to be achieved by 1 January 2020). All sites, with the exception of the rural site at Lough Navar, exceeded the new WHO guideline for annual mean $PM_{2.5}$ concentrations (5 µg m^{-3}), in 2022.

Figure 4.3: Annual Mean $PM_{2.5}$ Concentrations for 2022

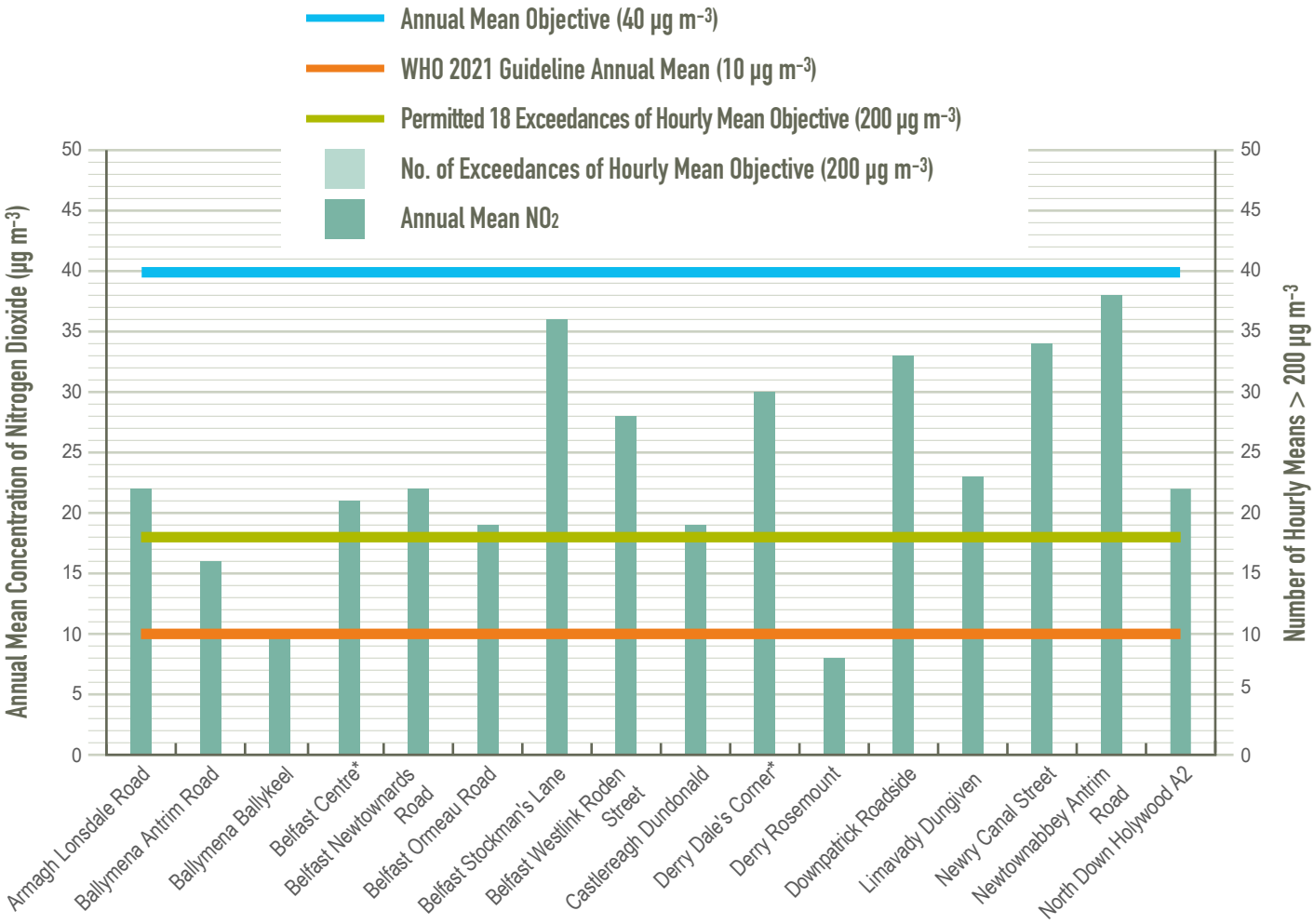


* Asterisk indicates sites with < 85% data capture
** Where the valid data capture is less than 75%, the means have been "annualised" and shown as a striped bar

Nitrogen Dioxide was monitored using automatic analysers at 16 sites during 2022. Figure 4.4 shows the annual mean NO_2 concentrations for all sites. No sites exceeded the AQS objective for annual mean NO_2 concentration (40 µg m^{-3}). However, annual mean NO_2 concentrations were above the WHO 2021 guideline (10 µg m^{-3}) at all sites except one (Derry Rosemount), in 2022.

For the hourly mean limit, a concentration of 200 µg m^{-3} must not be exceeded on more than the permitted 18 occasions in a year. For Belfast Centre and Derry Dale's Corner, the data capture was less than 85%, therefore the exceedance of the hourly mean objective is judged on whether the 99.8th percentile of hourly values has exceeded 200 µg m^{-3} rather than the number of hourly means above the objective. There were no exceedances of the hourly mean limit value of 200 µg m^{-3} at any site in 2022.

Figure 4.4: Annual Mean NO_2 Concentrations and Exceedances of Hourly Objective, 2022

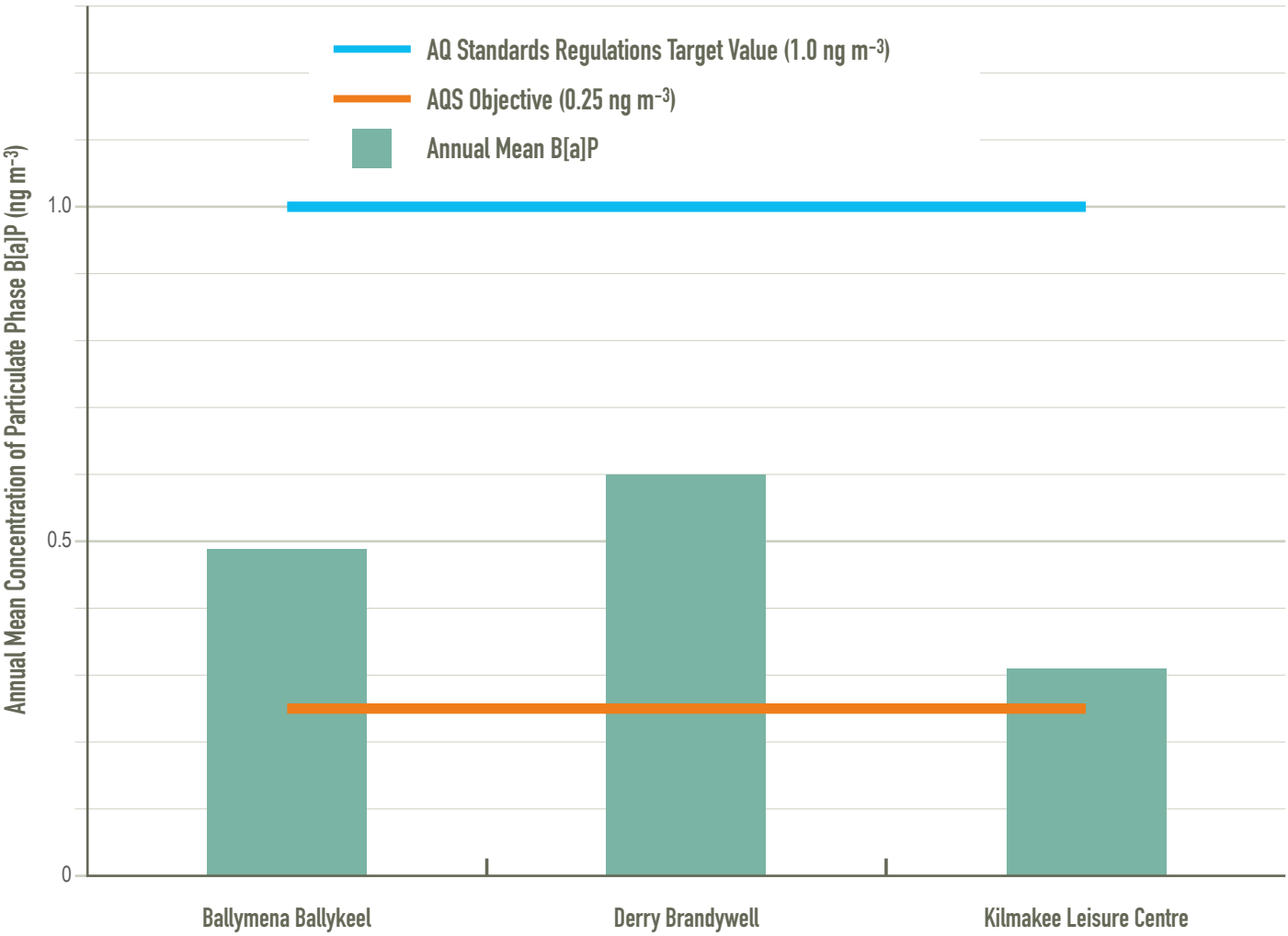


* Asterisk indicates sites with < 85% data capture

Polycyclic Aromatic Hydrocarbons (PAHs) were monitored at three sites in 2022; Ballymena Ballykeel, Derry Brandywell and Kilmakee Leisure Centre in Dunmurry. In October 2022 measurements of PAHs also began at a fourth site, Armagh Roadside. All are part of the UK PAH Monitoring Network. The network measures a range of PAH compounds, but one species in particular, benzo[a]pyrene (B[a]P), is used as a 'marker' for PAH compounds and is the subject of an AQS objective and Air Quality Standards Regulations target value. Figure 4.5 shows the annual mean concentrations for 2022, at the three sites which were operating for the full year. No site exceeded the target value of 1 ng m^{-3} for annual mean B[a]P concentration during 2022 (which was to be met by 31 December 2012). All three sites exceeded the more stringent AQS annual mean objective of 0.25 ng m^{-3} for this PAH species, which was to have been achieved by 31 December 2010.

Armagh Roadside did not have sufficient data for a valid annual mean, having only started measuring PAH in October 2022. However, the individual measurements of B[a]P concentration at this site in 2022 were all less than the annual mean target value, but greater than the AQS annual mean objective.

Figure 4.5: Annual Mean Concentrations of Benzo[a]pyrene in 2022



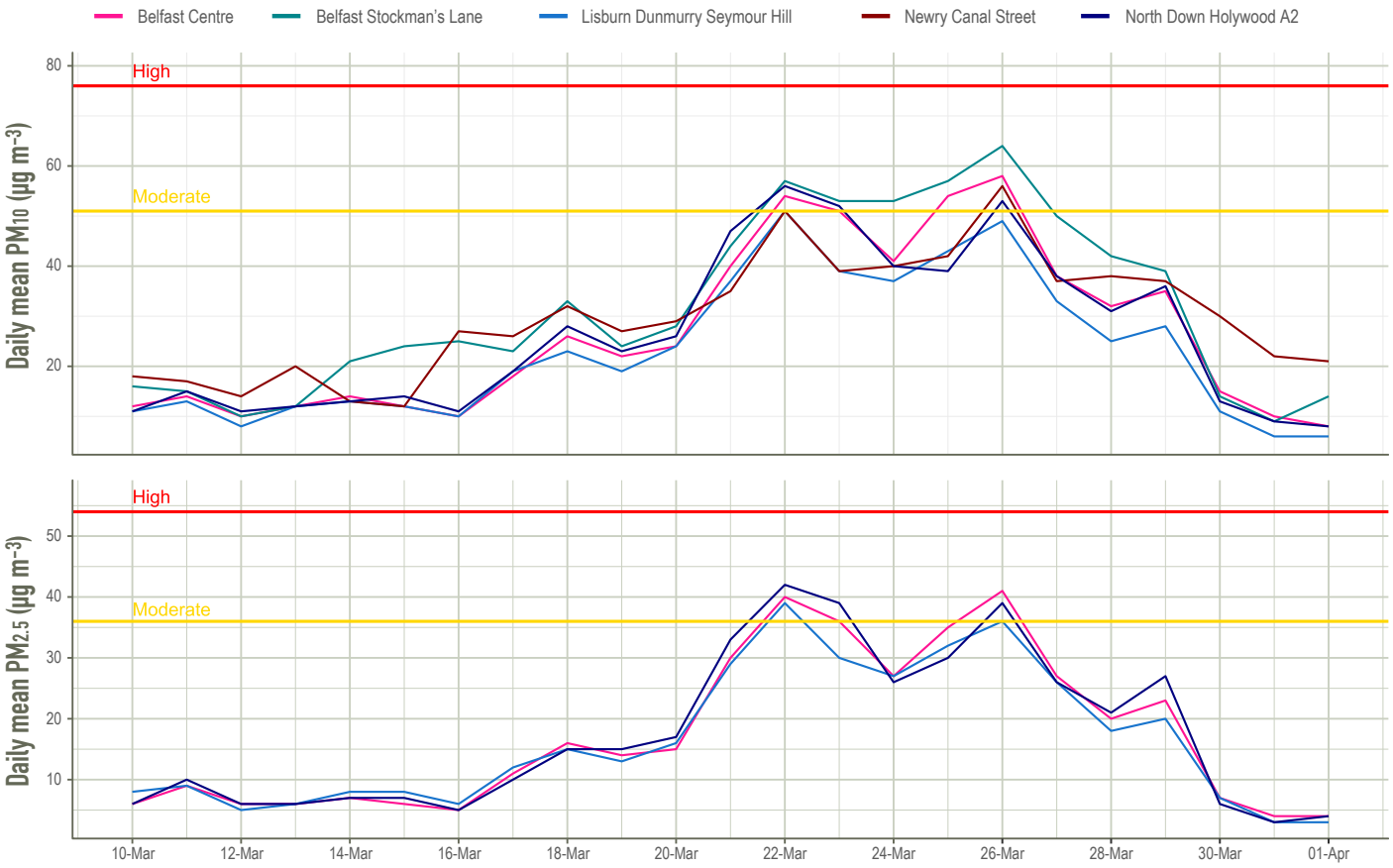
Pollution Events

In this section some Moderate and High pollution events, as defined by the Daily Air Quality Index (DAQI)[6] are investigated.

Between 22 and 26 March 2022, Moderate PM_{10}, and $PM_{2.5}$ concentrations were recorded at several sites in Northern Ireland, as shown in Figure 4.6. Moderate ozone was also observed at Lough Navar on 26 March. This period of Moderate particulate pollution coincided with air coming from the continent, likely transporting pollution from Europe, which then mixed with local pollution. This was a widespread pollution event with Moderate/High/Very High particulate pollution occurring across the UK.

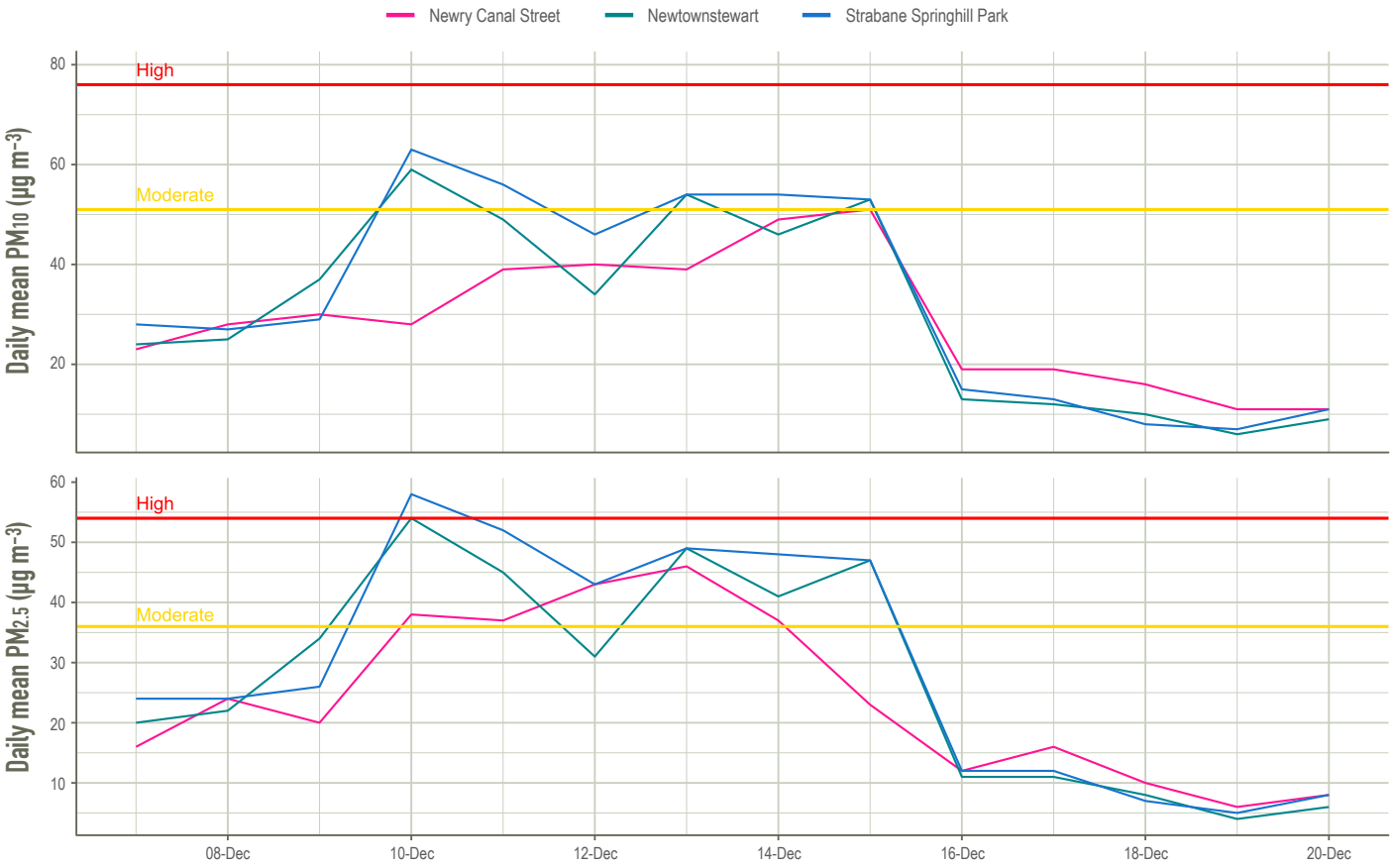
A particulate pollution episode was also observed from 10 to 14 December 2022. Figure 4.7 shows 24-hour mean $PM_{2.5}$ concentrations measured at Strabane Springhill Park and Newtownstewart reaching the High band of the DAQI on 10 December. Moderate PM_{10} was also recorded at Newry Canal Street, Newtownstewart and Strabane Springhill Park. This pollution episode coincided with a drop in temperatures, which may have resulted in an increase in the burning of wood, other solid fuels and oil to heat homes, potentially contributing to the elevated PM concentrations observed.

Figure 4.6: 24 hour mean PM_{10} and $PM_{2.5}$ concentrations measured at sites in Northern Ireland between 10 March and 1 April 2022. The yellow and red lines represent the concentration thresholds for the moderate and high index bands of the DAQI.



[6] https://www.airqualityni.co.uk/air-quality/daily-air-quality-index

Figure 4.7: 24 hour mean PM_{10} and $PM_{2.5}$ concentrations measured at sites in Northern Ireland between 7 December and 20 December 2022. The yellow and red lines represent the concentration thresholds for the moderate and high index bands of the DAQI.



Ballintoy Harbour, Northern Ireland

Mussenden Temple, Castlerock, County Londonderry

Summary

Air Quality Standards Regulations limit values, target values and corresponding AQS objectives have been met for the following pollutants in Northern Ireland –

- Particulate matter as PM_{10}
- Particulate matter as $PM_{2.5}$
- Nitrogen dioxide
- Ozone
- Carbon monoxide
- Benzene
- Sulphur dioxide
- The elements lead, arsenic, cadmium and nickel

All three sites where benzo[a]pyrene is monitored in 2022 exceeded the AQS objective of 0.25 ng m^{-3}.

A summary of compliances for the pollutants measured in Northern Ireland with the Air Quality Standards Regulations Limits/Targets, the UK Air Quality Strategy Objectives and the WHO Air Quality Guidelines 2021, is shown in Table 4.1.

Table 4.1: Summary of compliances for pollutants measured in Northern Ireland

Pollutant	Monitoring sites	Averaging time	Air Quality Standards Regulations (Northern Ireland) Limits/ Targets	Compliance	UK Air Quality Strategy Objective	Compliance	WHO Air Quality Guidelines 2021	Compliance
$PM_{2.5}$ µg m^{-3}	Belfast Centre Derry Rosemount Lisburn Dunmurry Seymour Hill Lough Navar North Down Holywood A2 Newtownstewart Strabane Springhill Park* Strathfoyle Bawnmore Place*	Annual Mean	25	Compliant	20	Compliant	5	Non-compliant at all sites except Lough Navar
		24 hour	–	–	–	–	15	Non-compliant at all sites except Lough Navar
PM_{10} µg m^{-3}	Armagh Lonsdale Road Ballymena Ballykeel Belfast Centre Belfast Stockman's Lane Derry Rosemount Lisburn Dunmurry Seymour Hill Lough Navar Newry Canal Street Newtownstewart North Down Holywood A2 Strabane Springhill Park* Strathfoyle Bawnmore Place*	Annual Mean	40	Compliant	40	Compliant	15	Non-compliant at the following sites: Armagh Lonsdale road Belfast Stockman's Lane Newry Canal Street
		24 hour	50 (not to be exceeded more than 35 times a year)	Compliant	50 (not to be exceeded more than 35 times a year)	Compliant	45	Non-compliant at the following sites: Belfast Centre Belfast Stockman's Lane Newry Canal Street North Down Holywood A2 Strabane Springhill Park
O_3 µg m^{-3}	Derry Rosemount Lough Navar Belfast Centre	8-hour	120 (not to be exceeded more than 25 times a year, averaged over 3 years)	Compliant	100 (not to be exceeded more than 10 times a year)	Compliant	100	Non-compliant at all sites
NO_2 µg m^{-3}	Armagh Lonsdale Road Ballymena Antrim Road Ballymena Ballykeel Belfast Centre Belfast Newtownards Road Belfast Ormeau Road Belfast Stockman's Lane Belfast Westlink Roden Street Castlereagh Dundonald Derry Dale's Corner Derry Rosemount Downpatrick Roadside Limavady Dungiven Newry Canal Street Newtownabbey Antrim Road North Down Holywood A2	Annual Mean	40	Compliant	40	Compliant	10	Non-compliant at all sites except Derry Rosemount.
		24 hour	–	–	–	–	25	Non-compliant at all sites
		1 hour	200 (not to be exceeded more than 18 times a calendar year)	Compliant	200 (not to be exceeded more than 18 times a calendar year)	Compliant	200	Compliant
SO_2 µg m^{-3}	Ballymena Ballykeel Belfast Centre Derry Rosemount Strabane Springhill Park	24 hour	125 (not to be exceeded more than 3 times a year)	Compliant	125 (not to be exceeded more than 3 times a year)	Compliant	40	Compliant
CO mg m^{-3}	Belfast Centre	24 hour	–	–	–	–	4	Compliant
		8 hour	10	Compliant	10	Compliant	10	Compliant
		1-hour	–	–	–	–	35	Compliant
		15-minute	–	–	–	–	100	Compliant

*sites with data capture < 75% in 2022

5. Air Quality Changes Over Time

The Air Pollution in Northern Ireland report for 2021 showed how particulate matter (PM_{10} and $PM_{2.5}$) concentrations in Northern Ireland have changed over the past decade. For this report the trends in ozone concentrations have been compared with UK average trends provided by Defra.

It can be seen that rural ozone concentrations are generally higher than those measured at urban background sites.

As mentioned in Section 4, ozone is a secondary pollutant, formed primarily from reactions between volatile organic compounds (VOCs) and NO_x, in the presence of heat and sunlight. The highest concentrations of ozone, therefore, typically occur during the summer months. Ozone, once formed, may also remain in the atmosphere for several days and can be transported over long distances. This means that much of the ozone measured in a particular area may have been generated elsewhere, therefore it is challenging to reduce concentrations through local actions.

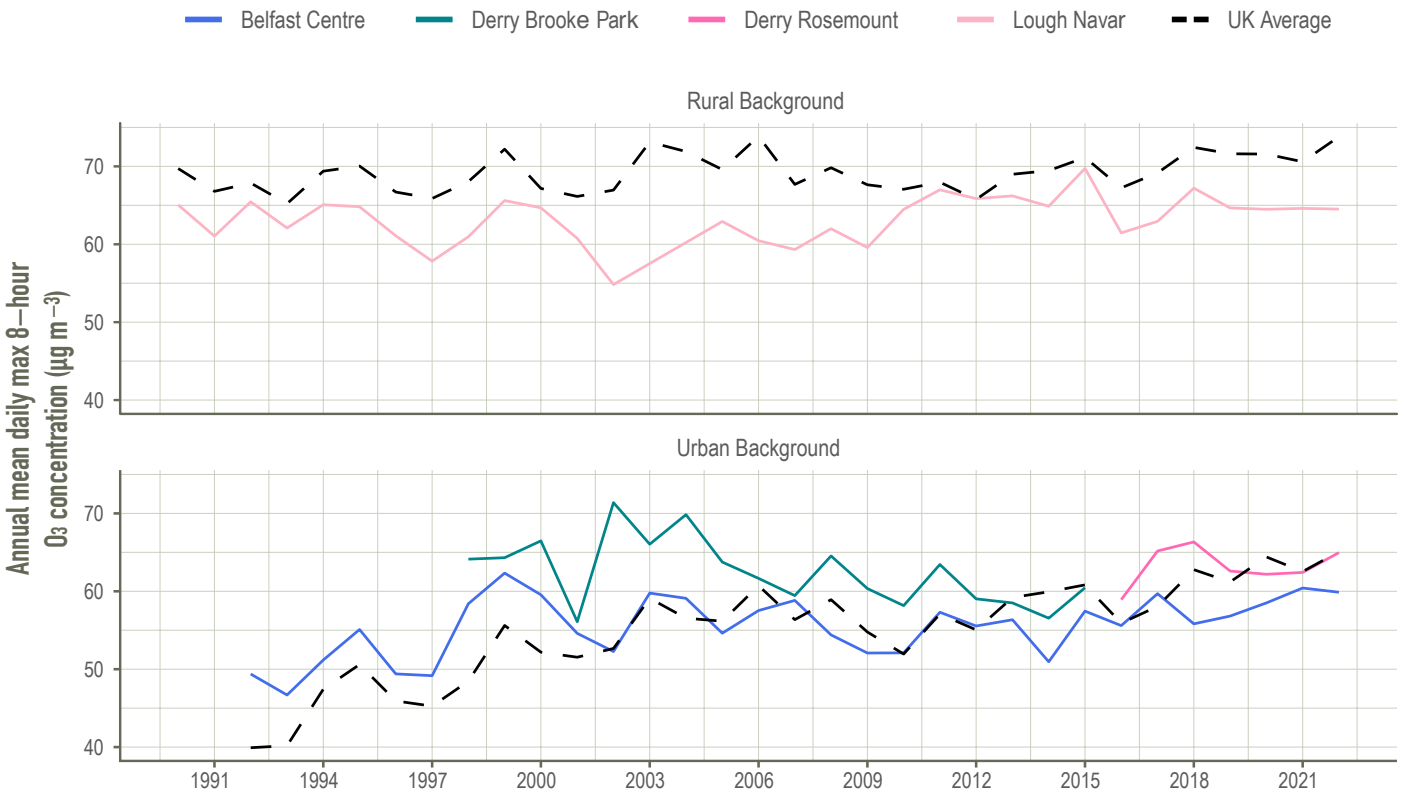
Figure 5.1 shows the annual average of the daily maximum 8-hour mean concentrations of ozone, measured at rural and urban background sites in Northern Ireland since 1990, alongside the UK average concentrations. Concentrations of ozone vary considerably each year as the formation of ozone is partly dependant on weather conditions.

It can be seen that rural ozone concentrations are generally higher than those measured at urban background sites. In urban areas, nitric oxide (NO), which is emitted from combustion activities, 'scavenges' ozone – i.e. removes it from the ambient air by reacting with it. In rural locations concentrations of NO_x are lower, therefore there is less NO available to react and remove ozone, thus ozone concentrations can be higher.

A comparison of annual mean NO_x concentrations at Belfast Centre and the two Derry/Londonderry sites (not shown here), show that NO_x concentrations at Derry Brooke Park and Derry Rosemount are much lower than at Belfast Centre. This may explain, in some part, why ozone concentrations at these two sites are generally higher than at Belfast Centre, and the UK average.

Ozone concentrations at the rural site in Lough Navar are slightly lower than the UK rural average. This may be due to its location in the north-west of the UK, as higher ozone is typically observed in the south-east as this region is close to sources of pollution from the continent. The site is also surrounded by forest which may encourage overnight deposition of ozone.

Figure 5.1: Comparison of annual mean daily 8 hour max ozone concentrations at urban background and rural background sites (with a data capture > 75% for each year) in Northern Ireland (solid lines) to the UK average (dashed line), from 1990 to 2022.



To assess long-term changes in ozone in Northern Ireland, trend analysis has been undertaken on measurements from the two sites that have monitored ozone the longest in Northern Ireland: Lough Navar and Belfast Centre. The trend analysis has been performed using the 'TheilSen' tool from the Openair R package[7]. This tool is based on the Theil-Sen statistical method and has been used here to determine trends in ozone concentrations. The trend analysis is based on monthly mean pollutant concentrations, calculated here from the daily maximum 8-hour mean ozone concentration data.

The analysis tool includes an option to 'de-seasonalise' the data – i.e. to make statistical modifications the plotted data to remove the influence of seasonal cycles, thus providing a clearer indication of the overall trend over the relevant time. The 'de-seasonalise' option has been used here. When this option is used gaps in the dataset are also filled by a linear interpolation method; therefore, the datasets shown in these plots appear uninterrupted, though this is not necessarily the case.

Theil-Sen trend graphs for Lough Navar and Belfast Centre are presented in Figure 5.2. The trend is shown as a solid red line, with its 95% confidence intervals as dotted red lines. The trend is given at the top of each graph in green, with confidence intervals shown in square brackets. The trend is given as units (i.e. µg m^{-3}) per year, over the period shown. This may be followed by a symbol, with '+' indicating that the trend is statistically significant at the 0.1 level, '*' indicating significance at the 0.05 level, '**' indicating significance at the 0.01 level, and '***' indicating significance at the 0.001 level.

7 https://bookdown.org/david_carslaw/openair/

Figure 5.2: De-seasonalised trend plots for O_3 measured at Lough Navar from 1990 to 2022 and Belfast Centre from 1992 to 2022.

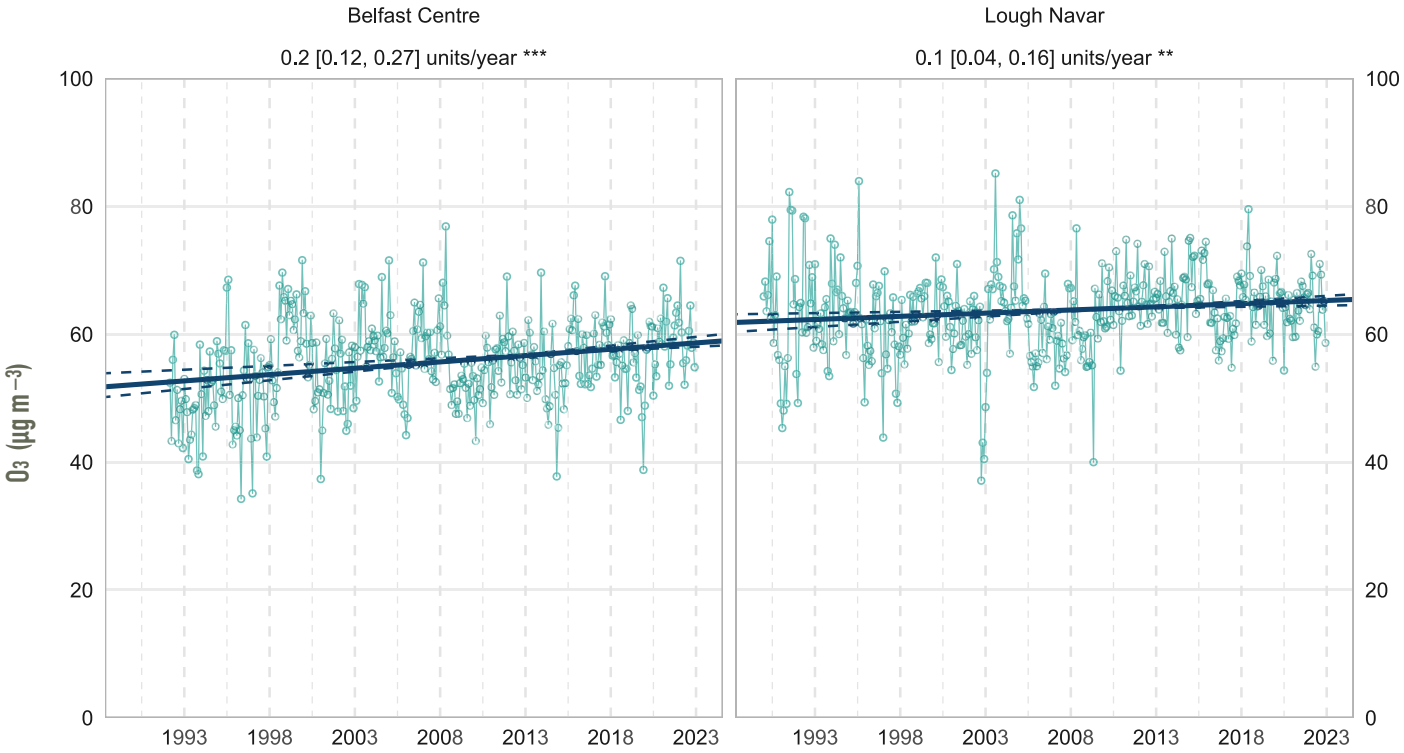


Figure 5.2 shows an increase in ozone concentrations of 0.2 µg m^{-3} per year between 1992 and 2022, significant at the 0.001 level. The increase in ozone concentrations observed at Belfast Centre is likely due to the reduction in NO_x concentrations over the same period, which limits the amount of NO available to remove ozone.

An increasing trend between 1990 and 2022 is also observed at Lough Navar, however the increase is smaller at 0.1 µg m^{-3} per year (significant at the 0.01 level). With further reductions in NO_x in urban areas, O_3 exceedances remain possible in future.

6. Impact of Climate Change and Net Zero Policies on Air Pollution in Northern Ireland

With regards to climate change, "net zero" refers to the balance between the emissions and removal of greenhouse gases in the atmosphere[8]. Net zero policies designed to mitigate climate change can also have a positive impact on air pollution, as greenhouse gases and air pollutants often have similar sources, for example CO_2 and NO_x/PM from burning fossil fuels. In addition, ongoing climate change may also impact air quality in future years, for example increases in pollution episodes due to warmer temperatures, so implementing net zero polices can also have a secondary impact on improving air quality. On the other hand, some net zero policies may also have a negative impact on air pollution, therefore careful consideration needs to be given when implementing any of these policies or mitigation measures.

The Royal Society published a report on the effects of policies for net zero and the effects of climate change on air quality in November 2021[9]. Here we detail some of the impacts net zero policies and climate change may have on key air pollutants in Northern Ireland.

Flagstaff View Point, County Armagh

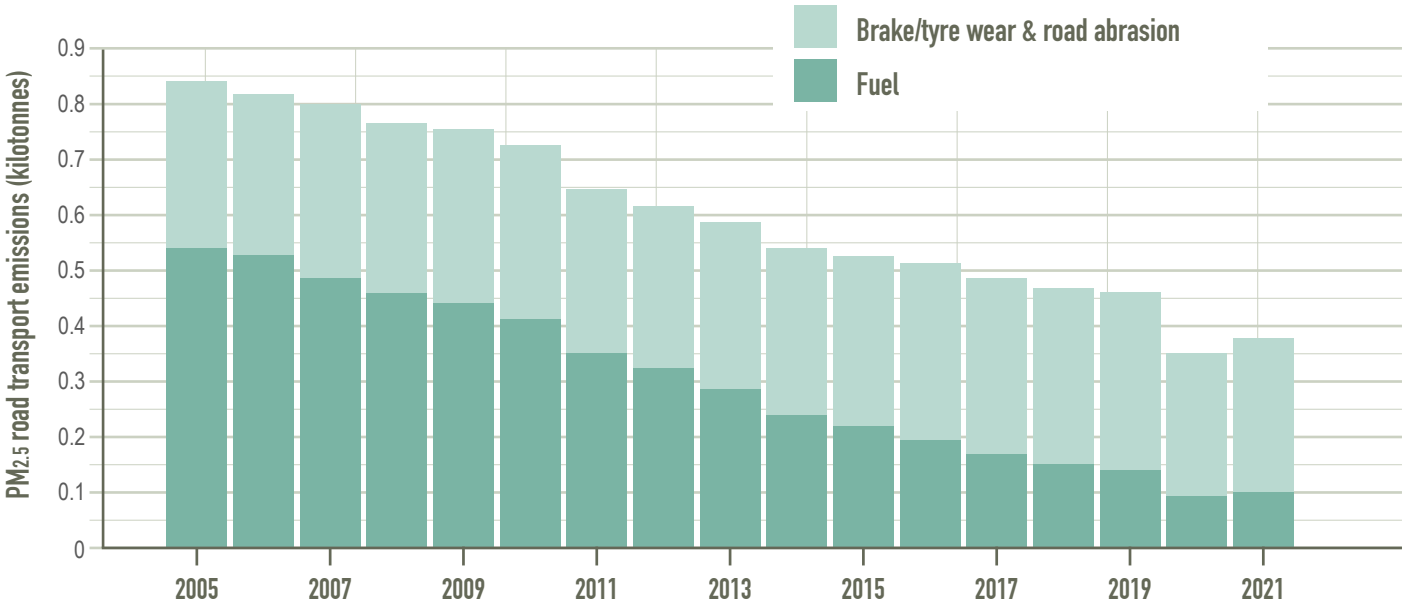
[8] https://commonslibrary.parliament.uk/net-zero-emissions-a-new-uk-climate-change-target/
[9] https://royalsociety.org/topics-policy/projects/air-quality-climate-change/

Ammonia: Ammonia emissions are dominated by agricultural sources, with this sector accounting for 97% of the ammonia emissions in Northern Ireland in 2021. The main sources are the release from manure and slurry (either stored or spread on land), grazing animals, and the use of inorganic fertilisers. As temperatures increase, ammonia emission rates can also increase, potentially resulting in higher concentrations in the atmosphere. Ammonia in the atmosphere also plays a role in the formation of secondary particulate matter, emphasising the importance of policies directed to mitigate ammonia emissions. DAERA has published a consultation on the draft Ammonia Strategy, which outlines measures to reduce ammonia emissions in Northern Ireland.

Nitrogen Oxides: Policies aimed at reducing carbon emissions, such as the ban on the sale of new petrol and diesel light-duty vehicles by 2035 in the UK and switching from fossil fuels to renewable sources will also have a positive impact on reducing NO_x emissions. In Northern Ireland's publication Energy Strategy - The Path to Net Zero Energy[10], reducing the distance people travel in private vehicles is a key objective, through the promotion of alternatives, such as active travel and public transport. Further information on these strategies is given in the document Planning for the Future of Transport – Time for Change[11].

Particulate Matter: As for NO_x, the transition towards electric vehicles will help reduce exhaust emissions of particulate matter in urban areas. However, non-exhaust emissions (brake and tyre wear, road wear, resuspension of road dust) will remain, and likely increase if the number of vehicles on the roads also increases. Figure 6.1 shows the contribution of fuel emissions, and non-exhaust emissions to the total $PM_{2.5}$ emissions from road transport, based on the NAEI emission estimates for Northern Ireland. In 2021 brake wear, tyre wear and road abrasion combined contributed to 74% of the total $PM_{2.5}$ emissions from road transport in Northern Ireland.

Figure 6.1: Road transport emissions from fuel emissions and non-exhaust emissions (brake wear, tyre wear and road abrasion) in Northern Ireland from 2005-2021, based on the NAEI estimates[12].



[10] https://www.economy-ni.gov.uk/publications/energy-strategy-path-net-zero-energy
[11] https://www.infrastructure-ni.gov.uk/publications/planning-future-transport-time-change
[12] Air Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2021 https://naei.beis.gov.uk/reports/reports?report_id=1131

Domestic burning of solid fuels is a large source of particulate matter in Northern Ireland. Smoke Control Areas (SCAs) have been declared in many areas by district councils in Northern Ireland.

SCAs were introduced under the Clean Air Order (1981) to reduce the emissions of smoke and particles from premises through the restriction of certain fuels which can be burnt within an SCA. A key policy in the Energy Strategy - The Path to Net Zero Energy is to transition from fossil fuels to renewable energy. Alternative fuels such as biomass are a potential low carbon alternative to fossil fuels, which can help with the net zero goals. However, biomass burning releases particulate matter (along with other pollutants), which needs to be considered in any net zero policies which propose to implement the use of biomass fuels. Switching to energy sources such as wind, solar, and heat pumps on a wide scale will have a benefit on both net carbon and air quality.

In a warming climate, there is the potential for an increase in emissions of secondary $PM_{2.5}$ precursors, such as ammonia and biogenic VOCs, resulting in higher concentrations of $PM_{2.5}$ downwind. Higher temperatures may also result in a greater number of wildfires, thereby emitting more PM. On the other hand, a changing climate may also result in an increase in rainfall, which can remove PM from the atmosphere.

Ozone: As a secondary pollutant, ozone formation is sensitive to the availability of its precursors (NO_x and VOCs). Therefore, any policies that focus on reductions in these precursors, can also have an impact on ozone concentrations. For example, as shown in Section 5, a reduction in NO_x in Belfast has had an impact on ozone concentrations at the roadside, as there is less NO available to remove ozone. As a result, policies aimed at further reducing NO_x, i.e. moving towards cleaner vehicles and fuel, could potentially result in further increases in ozone concentrations in urban areas. However on a regional scale reductions in NO_x are likely to limit ozone formation.

Similar to PM, climate warming can have an impact on downwind concentrations due to the increase in emissions of its precursors and the increase in the number and intensity of wildfires. Ozone exceedances may also increase in the future due to the potential for longer, hotter summers.

Belfast neighbourhood

7. Measures, Initiatives and Reports

The Clean Air Strategy

DAERA continues to develop Northern Ireland's first Clean Air Strategy. In autumn 2020, a Discussion Document was issued to public consultation. It invited views on a range of matters relating to air quality and was an opportunity for stakeholders to put ideas to the Department. The consultation closed in spring 2021 and responses were analysed in detail. A synopsis of the responses is available to view at https://www.daera-ni.gov.uk/clean_air_strategy_discussion_document. Preliminary findings were discussed with the then Minister and an inter-departmental working group was established to further develop proposals and identify policies for cross-departmental consideration. A further public consultation is planned for 2024, to seek views on the proposed draft strategy.

Ammonia Reduction: Northern Ireland is a relatively high contributor to ammonia emissions. Agriculture is the main source of ammonia emissions in Northern Ireland, accounting for 97% of the total ammonia emissions in 2021. In 2021, Northern Ireland accounted for 12% of the UK's total ammonia emissions despite having only 3% of the UK's population and 6% of the UK's land mass. Estimated ammonia emissions in Northern Ireland decreased from over 32 kilotonnes (kt) in the mid-1990s to 27.9 kt in 2010. However, from 2010 to 2017 they then increased by 14.5% to 31.9 kt. This increase was primarily due to a trend of increasing livestock numbers, greater use of indoor housing systems, and insufficient uptake of ammonia reduction measures. Total ammonia emissions from agriculture in Northern Ireland continued to rise, reaching 33 kt in 2021[13].

DAERA held a public consultation on a draft Ammonia Strategy from January to March 2023. The draft Ammonia Strategy is available to view at: https://www.daera-ni.gov.uk/sites/default/files/consultations/daera/Draft%20Ammonia%20Strategy%2003%2001%2023.PDF. Responses to the consultation are being used to inform a reworked draft Ammonia Strategy for an incoming Minister and new Executive to consider. DAERA has also launched a Call for Evidence on the Future Operational Protocol to assess the impacts of air pollution on the natural environment. The Call for Evidence is available at: https://www.daera-ni.gov.uk/future-operational-protocol-a-call-for-evidence. Following this Call for Evidence, DAERA will review all available evidence relating to the assessment of air quality impacts on designated sites and protected habitats. A new Operational Protocol will be developed by DAERA to inform planning advice and decision-making processes in the assessment of plans and projects, for an incoming Minister and new Executive to consider.

Climate Action: The Climate Change Act (Northern Ireland) 2022 ("the Act") came into operation on 7 June 2022. The Act sets out the Northern Ireland-specific legal framework for tackling climate change and reducing emissions. It sets a Northern Ireland net zero greenhouse gas emissions target by 2050, along with a requirement to set interim targets for 2040 and 2030, with a level for the reduction of methane emissions for the year 2050 not required to be more than 46% lower than the baseline. The 2030 target must be at least 48% lower than the 1990 baseline. DAERA is also required to set five-yearly carbon budgets in line with a pathway to Net Zero.

[13] Air Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005-2021 https://naei.beis.gov.uk/reports/reports?report_id=1131

These carbon budgets set maximum emissions levels over the five-year period with the first carbon budget running from 2023 to 2027. In June 2023, DAERA published a formal consultation on the Climate Change Committee's advice for the first three carbon budgets and the 2030 and 2040 targets. Each carbon budget will be delivered through the policies and proposals for emissions reduction within the corresponding Climate Action Plans, which cover the five years of each carbon budget. The Act also requires annual air quality targets to be set in Climate Action Plans, the first of which is currently in development.

Transport: The Department for Infrastructure has been supporting Translink, the public transport body for Northern Ireland, to reduce their greenhouse gas emissions. This has included replacing around 100 diesel buses with zero emission vehicles by December 2022 and a commitment to remove all diesel buses in Belfast Metro service by 2030. In addition, Translink has officially launched its all-new Foyle Metro electric bus service, making Derry/Londonderry one of the first cities in the UK and Ireland to operate a fully zero emission urban bus service. The new 38-bus Foyle Metro fleet features a mix of single and double deck all-electric vehicles.

In partnership, Translink and the Department for Infrastructure have already delivered Phase 1 of the Belfast Rapid Transport project (BRT Glider) and the development of Phase 2 of the project is under consideration following conclusion of a public consultation on route options. In addition, Belfast Grand Central Station is under construction. This new, fully integrated Transport Hub will enhance local and international connectivity with bus, coach and rail links across Northern Ireland and beyond, as well as providing enhanced walking and cycling connectivity, greater comfort and accessibility encouraging greener active travel for a healthier, smarter city. Further strategic projects are also being advanced.

The Department for Infrastructure continues to work with partners across all sectors to deliver improvements to our active travel infrastructure. A range of measures are currently being implemented to increase the delivery of high quality active travel infrastructure, which includes working closely with councils to better understand their five-year Greenway programme, and to develop an appropriate grant and support framework for the effective delivery of Greenways.

The Department for Infrastructure has recently commenced work on an Active Travel Network Delivery Plan for Northern Ireland, including a full update of our design guidance. The Department plans to consult on draft proposals for the Northern Ireland Active Travel Network Plan early in 2024. When complete, this plan will provide our teams throughout Northern Ireland with a firm basis for the prioritisation of active travel infrastructure delivery within and connecting our towns and cities. The plan and associated design guidance will also complement the Belfast Cycle Network Delivery Plan and the 'Exercise, Enjoy, Explore' strategic plan for Greenways. Achievements in the past year include the opening of Strathfoyle Greenway and a major upgrade to Jane's Shore in Downpatrick that were co-funded by the Department; engagement on the development of the West Belfast Greenway and other schemes included in the Belfast Cycling Network, as well as the opening of the Coleraine Ring Road enhanced provisions for active travel.

Council Awareness Campaigns: The district councils in Northern Ireland collectively have a number of measures in place under the Local Air Quality Management (LAQM) regime and associated action plans. A number of councils have used awareness campaigns to achieve positive comes for air quality. Ards and North Down Council is working alongside Lisburn and Castlereagh City Council to tackle air pollution through a campaign that focuses on the dangers of engine idling. The 'Prevent the Cough' campaign began in the two councils in 2019. It aims to educate students, parents and the general public on the dangers of keeping their engines running while waiting in and around schools.

Schools in both council areas are already taking part in the initiative while more are being invited to sign up. All schools are provided with educational materials and resource packs to help them develop their own 'no idling' projects, including signs to showcase their work around the schools. The campaign aims to raise everyone's awareness of the issue and help to limit air pollution during school runs.

Belfast City Council are also running their own separate 'No Idling Campaign' where banners have been distributed for display outside primary schools through the Eco-School programme.

Both of these campaigns are part-funded by DAERA through the Local Air Quality Monitoring (LAQM) grant.

Where to find out more about air quality

The Northern Ireland Air Quality Website at www.airqualityni.co.uk provides information covering all aspects of air pollution in Northern Ireland.

DAERA's website at https://www.daera-ni.gov.uk provides links to information on a range of environmental issues including biodiversity, waste and pollution. DAERA's 'Protect the Environment' web page at https://www.daera-ni.gov.uk/topics/protect-environment covers air quality, climate change and local environmental issues including noise.

National and local air quality forecasts are available from:

- The Defra UK Air Information Resource (UK-AIR) - http://uk-air.defra.gov.uk/
- The Northern Ireland Air Quality website - https://www.airqualityni.co.uk/
- The Environmental Protection Agency (Ireland) Air Quality website - https://www.airquality.ie/

Download the Northern Ireland Air app for iPhone and Android, keeping you updated about air pollution in Northern Ireland.

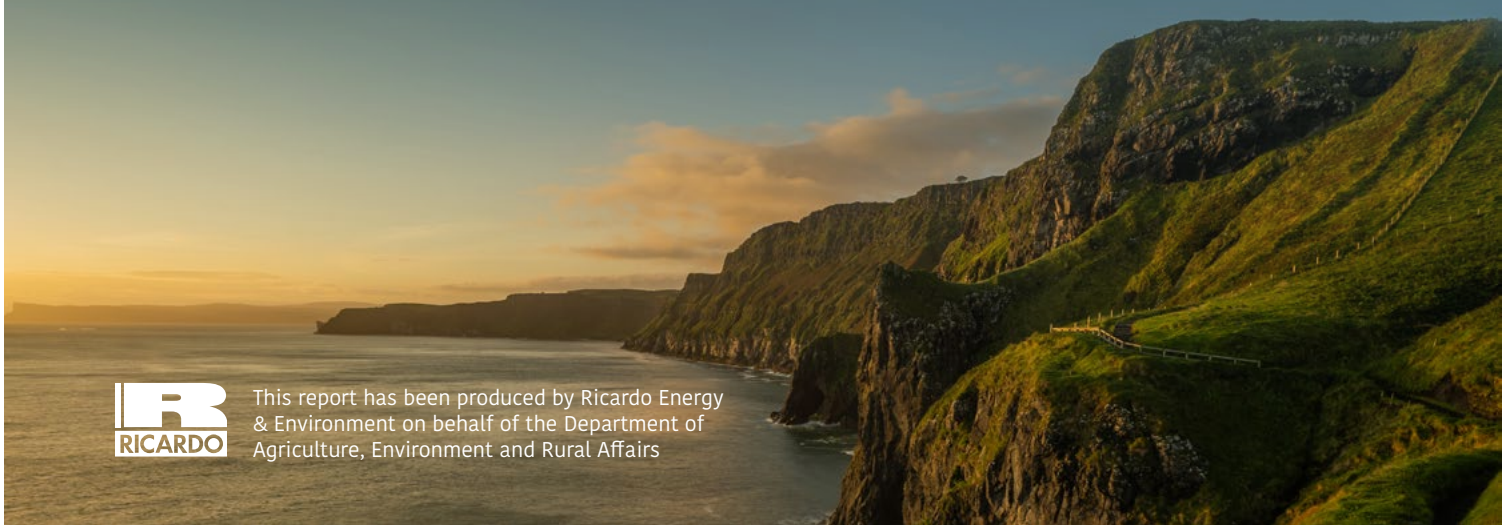
The app provides:

- Easy access to the latest pollution levels from the monitoring sites
- Colour-coded map showing the pollution forecasts
- Approved health advice based on the pollution levels
- Subscribe to free alerts when moderate, high and very high pollution is forecast.

DAERA, in conjunction with Department of Health, launched the updated "Air Aware" SMS subscription service on 16 June 2022. The service allows members of the public to receive SMS text alerts when periods of high air pollution are forecast or being experienced in Northern Ireland. The service is targeted at those with chronic health conditions such as heart disease and lung disease and can be initiated by texting **'AIR'** to **07984405722.**

For information on air quality issues in your local area please contact the Environmental Health Department of your district council: https://www.nidirect.gov.uk/contacts/local-councils-in-northern-ireland

Department of
Agriculture, Environment and Rural Affairs
www.daera-ni.gov.uk



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Air Aware

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You can receive alerts FREE to your mobile phone to let you know when air pollution levels are high.

Just text Air to 079 8440 5722 or download the Northern Ireland Air App

If you use regular treatment for respiratory problems and think your breathing may be affected by air pollution levels, consider adjusting your treatment as you would do for a normal increase in symptoms. If this is not effective, consult your doctor.

You may wish to consider avoiding busy, congested streets and not participating in strenuous outdoor activity on days when air pollution levels are high.

If you suffer from a heart condition and notice a change in your symptoms, you should seek medical advice as you normally would.

Northern Ireland Air
Air Quality in Northern Ireland

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Text messages to the service will be charged at your normal standard rate. Alerts are received free of charge. To opt out, text STOPAIR to 079 8440 5722

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