

Air quality monitoring results

2020

This document provides the results of air quality monitoring undertaken at and near to Manchester Airport in 2020. It also explains where and how we monitor air quality. Information is also provided about Government's health-based air quality objectives.

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Air quality monitoring at Manchester Airport

Overview

We provide information about air quality and airport-related emissions on our website www.manchesterairport.co.uk/emissionsinfo. Here you can find our Emissions Information Pack which gives information on emissions from activities associated with Manchester Airport and how they contribute to local air quality. More information about air quality is also provided in our Sustainable Development Plan. The Sustainable Development Plan sets the airport's air quality objective which is to "closely monitor local air quality and seek ways to reduce emissions from our operations".

This document summarises the results of air quality monitoring undertaken at and near to Manchester Airport in 2020. It compares measured concentrations of air pollutants against health-based air quality objectives which are set by Government.

Methodology

We have been measuring air quality at the airport since the 1990's. We do this in two ways:

Continuous monitoring

Automatic analysers continuously measure real-time concentrations of air pollutants. These monitors are complex to install and operate, but allow detailed analysis of air quality, where this is required. Analysers are visited by service engineers at least once a month, and are independently calibrated twice a year. We undertake continuous air quality monitoring in partnership with Manchester City Council.

The Clean Air Manchester and UK-Air websites provide near to real-time measurements of the following pollutants:

- nitrogen dioxide (NO₂)
- sulphur dioxide (SO₂)
- ozone (O₃)

We also measure particulate matter (PM₁₀ and PM_{2.5}) using continuous monitoring equipment. The results of this are reported below, and are held by Manchester City Council.

The type of monitoring equipment installed does not currently allow results to be provided in real-time online.

We used continuous monitoring equipment to measure air quality at Styal Road (Site 10) until January 2016, when the equipment moved to Daisy Bank Lane (Site 14) due to redevelopment at the old location.

Diffusion tubes

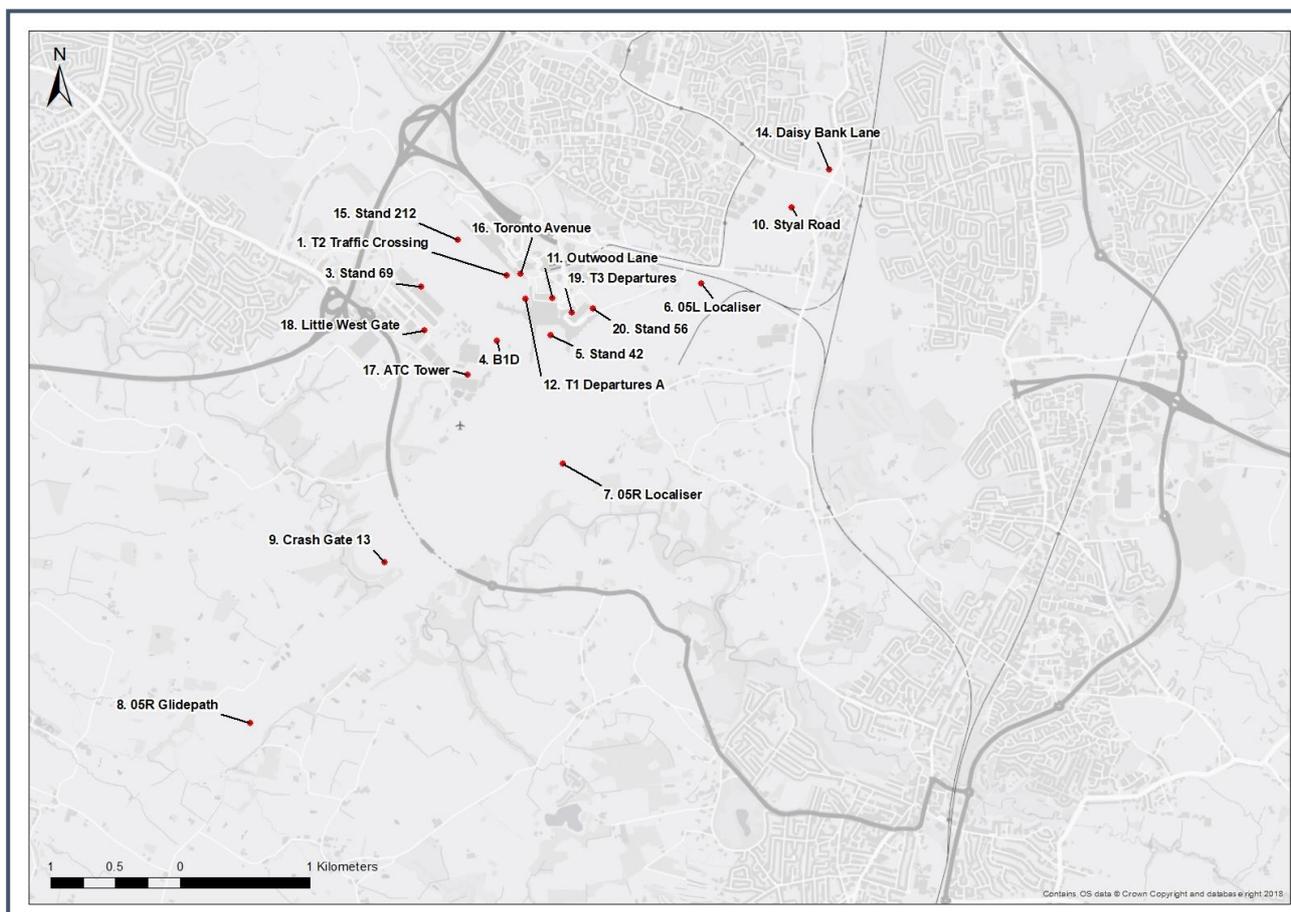
Diffusion tubes measure the average concentration of pollutants over longer periods of time. Pollutants are collected in an absorbent material within diffusion tubes which are chemically analysed at a laboratory to calculate the average concentration during the time that the tube was exposed.

Diffusion tubes are quick and easy to install compared to continuous air quality monitors. They are useful for cost effective monitoring of air quality over a long period of time. We use diffusion tubes to measure concentrations of nitrogen dioxide (NO₂).

We have followed Government guidance and 'bias adjusted' the diffusion tube monitoring results we publish. This means that the results can be compared to other locations. We calculate our 'local bias adjustment factor' by co-locating three diffusion tubes at the independently calibrated Daisy Bank Lane continuous monitor. The bias adjustment factor is then applied to the results of our diffusion tube monitoring. The local bias adjustment has been compared against the 'national bias adjustment factor' released by the Government's Department for Environment, Food and Rural Affairs (Defra) in April 2021. This step compares the laboratory's national diffusion tube performance against diffusion tubes co-located at the Daisy Bank Lane continuous monitoring site. The 'local bias adjustment' resulted in a factor of 0.859 and the 'national bias adjustment' is 0.77. This year we have used the national bias adjustment factor because it is considered more robust than the local bias adjustment. This is due to the local bias adjustment factor relying upon diffusion tube data which was below Government's recommended data capture rate of 75%. Following Government guidance, we also remove monitoring results which are unusually high or low. Removing 'outliers' in this way avoids annual air quality results from being skewed by unrepresentative results.

Where we measure air quality

The locations where we currently monitor air quality are shown below. Diffusion tubes are used to monitor nitrogen dioxide (NO₂) at all locations. Both continuous monitoring and diffusion tubes are used at Site 14, Daisy Bank Lane.



Air quality objectives

The Government has set health-based air quality objectives. Local authorities have a responsibility to monitor air quality and put plans in place to meet health-based objectives in areas where members of the public may spend a significant amount of time. These locations are generally homes or care homes for example. Air quality objectives do not necessarily apply in a work place, or at the airport itself as people only spend short times here.

Air quality objectives are set individually for different air pollutants. They apply to a calendar year, running from January to December. Some types of air pollution have more than one objective, although all must be met, these are often reported individually - for example:

- long-term averages which must be met over a whole year.
- short-term averages, such as hourly or daily averages, which cannot be exceeded more than a certain number of times a year.

What are $\mu\text{g}/\text{m}^3$?

Air quality is measured in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). This is a measure of the weight of a pollutant in a space of air.

There are a thousand micrograms (μg) in a gram, or a billion micrograms in a kilogram.

A cubic meter (m^3) is a thousand liters of air.

One microgram per cubic ($1\mu\text{g}/\text{m}^3$) meter of pollutant is a billionth of a kilogram in a thousand liters of air.

Below are the air quality objectives for the pollutants we monitor.

Pollutant	Long-term annual objective (limit as an annual average)	Short term objective(s)
Nitrogen dioxide (NO ₂)	40 $\mu\text{g}/\text{m}^3$	No more than 18 cases of an hourly average > 200 $\mu\text{g}/\text{m}^3$ each year
Particulate matter (PM ₁₀)	40 $\mu\text{g}/\text{m}^3$	No more than 35 cases of a daily average > 50 $\mu\text{g}/\text{m}^3$ each year
Particulate matter (PM _{2.5})	25 $\mu\text{g}/\text{m}^3$	-
Sulphur dioxide (SO ₂)	-	No more than 35 cases of a 15-minute average > 266 $\mu\text{g}/\text{m}^3$ each year No more than 24 cases of an hourly mean > 350 $\mu\text{g}/\text{m}^3$ each year No more than 3 cases of a daily mean > 125 $\mu\text{g}/\text{m}^3$ each year

Ozone (O ₃)	-	No more than 10 cases of an 8hr mean > 100 µg/m ³ each year
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Air quality monitoring results

Impact of the COVID-19 pandemic

The COVID-19 pandemic has decreased activity levels across the UK. These reductions include reduced road traffic and fewer flights. Combined, they will lower concentrations of pollutants such as nitrogen dioxide (NO₂). The pandemic has also disrupted our ability to monitor air quality. Due to COVID-19, it was not always possible for us to change diffusion tubes. As a result, data capture for our diffusion tube monitoring in 2020 ranges from 50-58% and does not meet Defra's recommended data capture requirements of 75%. However, automatic equipment has continued to monitor air quality at Daisy Bank Lane and achieved data capture of 99%.

As a result of lower levels of data capture, the uncertainty of annual average NO₂ concentrations measured by diffusion tubes in 2020 is larger than prior years. To account for seasonal variation, our monitoring results have been annualised. This process compares diffusion tubes with automatic continuous monitoring to remove any seasonal bias due to partial data collection of diffusion tubes.

We have compared the results of our air quality monitoring in 2020 to previous years. Our comparison shows that concentrations of air pollutants decreased at all monitoring locations. The decreases ranged from 27-58%. These changes are consistent with air quality observations at other locations across the UK and likely associated with reduced activity during the COVID-19 pandemic.

Air quality recorded this year

The results of our air quality monitoring during 2020 are outlined below. The results also show whether health-based air quality objectives apply at that location, and if they are met.

Results of nitrogen dioxide (NO₂) monitoring using diffusion tubes:

Monitoring location	Recorded annual average (µg/m ³)	Air quality objectives apply?	Air quality objectives met?
1. T2 Traffic Crossing	23.6	No	-
3. Stand 69	19.9	No	-
4. B1D	22.9	No	-
5. Stand 42	19.9	No	-
6. 05L Localiser	14.0	No	-
7. 05R Localiser	9.2	No	-
8. 05R Glidepath	6.7	No	-
9. Crash Gate 13	9.2	No	-
10. Styal Road	13.0	No	-
11. Outwood Lane	26.6	No	-
12. T1 Departures A	35.3	No	-
14. Daisy Bank Lane	16.2	Yes	Yes
15. Stand 212	21.2	No	-
16. Toronto Avenue	24.7	No	-
17. ATC Tower	15.2	No	-
18. Little West Gate	22.1	No	-
19. T3 Departures	22.6	No	-
20. Stand 56	22.0	No	-

Results of continuous air quality monitoring:

	Recorded annual average (µg/m ³)	Air quality objectives apply?	Short term objective exceedances	Air quality objectives met?
Nitrogen dioxide (NO ₂)	14.4	Yes	Hourly Means > 200 µg/m ³ = 0	Yes
Particulate matter (PM ₁₀)	11.9	Yes	Daily Means > 50 µg/m ³ = 0	Yes
Particulate matter (PM _{2.5})	N/A	N/A	N/A	N/A
Sulphur dioxide (SO ₂)	1.2	Yes	15min Means > 266 µg/m ³ = 0	Yes
Ozone (O ₃)	46.6	Yes	8hr Means > 100 µg/m ³ =11	No

Long term air quality monitoring results

Previous years monitoring data can be downloaded from our website. Using this information, you can see how air quality has changed over time.

Our website also provides links to websites where you can see detailed results of continuous air quality monitoring in Manchester and the rest of the UK. Please be aware that these websites use different names to describe our monitoring sites: Styal Road (our monitoring site 10) is called 'Manchester South'; and, Daisy Bank Lane (our monitoring site 14) is called 'Manchester Sharston'.

Want to know more?

Our website (www.manchesterairport.co.uk/emissionsinfo) provides more information in a range of formats. These include information sheets, progress reports and useful internet links.

If you would like to talk to us you could:

- phone our Freephone number (08000 967 967);
- send an email to community.relations@manairport.co.uk; or
- come to an outreach session (details are on our website).