
Dublin Airport Air Quality Monitoring
Q3 2022

Sustainability Department

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Dublin Airport Air Quality Monitoring Quarter 3 Report 2022



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Glossary

| Abbreviation | Definition |
|---------------------|---|
| EPA | Environmental Protection Agency |
| NO | Nitrogen Oxide |
| NO ₂ | Nitrogen Dioxide |
| NO _x | Oxides of Nitrogen |
| PM ₁₀ | Airborne particulate Matter, particle size less than 10 micron. |
| AQIH | Air Quality Index for Health |
| The Regulations | Ambient Air Quality Standards Regulations 2011 |

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Executive Summary

daa undertakes a programme of air quality monitoring at Dublin Airport (DAP) and in surrounding communities. Monitoring is undertaken using a stationary continuous air monitoring station located within the DAP boundary. Air quality is also monitored at 11 locations within and outside the airport boundary using passive diffusion tube sampling.

This report provides an overview of the results of air quality monitoring undertaken by daa at DAP and environs in Q3 2022. Air monitoring locations are listed in Table 1 and presented as Figure 1 of this report.

The Ambient Air Quality Standards Regulations 2011 (the Regulations), S.I. No. 180 of 2011, implement EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe. The Regulations are referred to in this report for comparison purposes only. There is no requirement under the Regulations for individual companies or operators to carry out air monitoring. In Ireland, compliance with the Regulations is the responsibility of the Environmental Protection Agency (EPA), which is deemed to be the competent authority for the purpose of Directive 2008/50/EC. The EPA is required to submit an annual Air Quality report to the Minister of the Environment, Climate and Communications and to the European Commission. The latest EPA Report entitled “Air Quality in Ireland 2021” was published in September 2022 and is available on the [EPA website](#). The 2022 report will be published in 2023.

This report highlights the air quality levels around Dublin Airport during July, August and September 2022. The results of the NO₂ and PM₁₀ concentrations using the online analyser indicate concentrations are below the relevant annual limit value of 40µg/m³ and within the allowed criteria of short-term limit values. The diffusion tube results for NO₂ indicate that the highest concentrations were recorded at the Dublin Airport bus depot which experiences significant vehicular activity. It is noted that the Terminal 1 staff shuttle bus stop was suspended temporarily in June 2022, reopening in October 2022. daa will continue to closely monitor trends in air quality monitoring results at this location.

In collaboration with the EPA, the Dublin Airport continuous air quality monitoring station data is provided to the EPA on a continuous basis. As part of daa’s transparency, daa air quality monitoring station can be viewed on the EPA website: www.airquality.ie.

1.0 Introduction

1.1 Background

Dublin Airport (DAP) is located approximately 10 km north of Dublin city. The areas to the west of the airport are predominantly rural in nature. The airport is surrounded by Swords Village to the north and Santry to the south. The airport is bounded on two sides by the two busiest motorways in the country: the M1 and the M50. The M1 motorway is approximately 1km east of the current location of the airport's onsite air quality monitoring station and the M50 motorway is approximately 2.5 km south of the monitoring location.

1.2 Purpose

The purpose of this report is to present an overview of the results of air quality monitoring conducted onsite at DAP and at 11 monitoring locations in the vicinity of the airport in Q3 2022. The Ambient Air Quality Standards Regulations 2011, S.I. No. 180 of 2011 (the Regulations), implement EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe. This report compares the data collected during the daa monitoring programme with limit values contained in the Regulations to assess air quality at each monitoring location.

The Regulations are referred to in this report for comparison and reference purposes only. There is no requirement under the Regulations that companies or operators shall carry out air quality monitoring. In Ireland, compliance with the Regulations is the responsibility of the Environmental Protection Agency (EPA), which is deemed to be the competent authority.

A range of parameters are recorded at DAP's continuous on-site monitoring station as follows:

- Sulphur dioxide (SO₂)
- Oxides of nitrogen NO_x (NO and NO₂)
- Carbon monoxide (CO)
- Ozone (O₃)
- Particulate Matter (PM₁₀)

Diffusion tube samplers located in communities surrounding the airport monitor the following gases:

- Sulphur dioxide
- Nitrogen dioxide
- Benzene
- Ethylbenzene
- m- and p-Xylene
- o-Xylene
- Toluene
- Ozone

The results of air quality monitoring for all of the above parameters are reviewed by daa on a continuous basis.

To date and in line with air quality reporting at many airports, daa has focussed reporting on the most important parameters:

- Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀) at the DAP automatic station;
and
- Nitrogen Dioxide (NO₂) and Benzene using diffusion tubes at 11 locations.

2.0 Monitoring Locations

A list of the ambient air quality sampling locations is presented in Table 1. Sampling locations are presented as Figure 1.

| Ref | Location | Method | Parameter |
|----------------|---|---------------------|---|
| On-site | Dublin Airport. | Continuous analyser | NO₂ PM₁₀ |
| A1 | Forrest Little Golf Club. | Passive Tubes | NO₂ Benzene |
| A2 | Kilreesk Lane, St. Margaret's. | Passive Tubes | |
| A3 | Ridgewood Estate West, Swords. | Passive Tubes | |
| A4 | St. Margaret's School and Parish | Passive Tubes | |
| A5 | Fire Station, Huntstown, Dublin Airport. | Passive Tubes | |
| A6 | Southern Boundary Fence, Dublin | Passive Tubes | |
| A7 | Western Boundary Fence, Dublin Airport | Passive Tubes | |
| A8 | St. Nicholas of Myra School, Malahide Road. | Passive Tubes | |
| A9 | Naomh Mearnóg GAA Club, Portmarnock. | Passive Tubes | |
| A10 | Oscar Papa Site, Portmarnock. | Passive Tubes | |
| A11 | Dublin Airport Bus Depot | Passive Tubes | |

Table 1 Community Ambient Air Quality Monitoring Locations

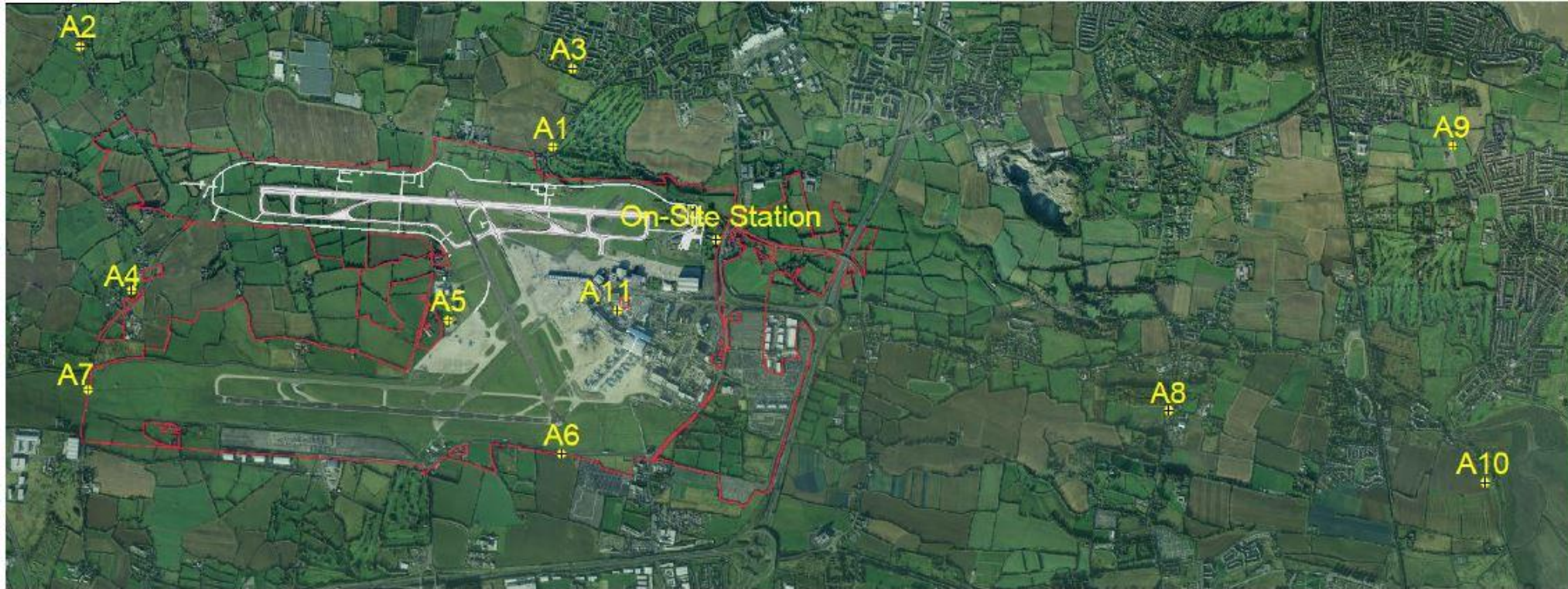


Figure 1 Air Quality Monitoring Locations

3.0 Parameters and Sampling Methodology

3.1 Offsite Passive Sampling:

3.1.1 Nitrogen Dioxide (NO₂) and Benzene (C₆H₆)

daa has installed a network of passive diffusion tube samplers in areas surrounding the airport. Monitoring locations are shown on Figure 1 and listed in Table 1. The diffusion tubes are exposed for approximately 4-week intervals and record monthly mean concentrations. Monthly mean concentrations are averaged to give an annual mean, presented in Figure 2. The tubes are analysed using UV Spectrophotometry at a UKAS (United Kingdom Accreditation Service) accredited laboratory. Results are expressed in µg/m³ (micrograms per cubic metre).

3.2 Onsite Sampling

3.2.1 Equipment Calibration

An external expert service provider undertakes routine servicing of the DAP air quality monitoring equipment. The monitoring station undergoes a full service twice yearly. During routine visits, air filters are replaced, and the instruments are calibrated to EPA gas standards. The technician also inspects the functionality of the station and sampling system. An emergency call out service is also provided by the service provider. The calibration process takes approximately 24 hours, data collection resumes after this 24-hour period. In Q3 2022, due to down times during calibration of our equipment, 98% of NO₂ data and of PM₁₀ data was captured during this period.

3.2.2 Nitrogen Dioxide (NO₂)

Onsite monitoring of NO₂ is carried out on a continuous basis at the stationary airport monitoring station. Measurement of NO₂ is carried out using a Horiba APNA-370 ambient NOx monitor which employs a crossflow modulated chemiluminescence method. The results are expressed in µg/m³.

3.2.3 Particulate Matter (PM₁₀)

PM₁₀ is defined as airborne particulate matter with an aerodynamic diameter equal to or less than 10µm. PM₁₀ is monitored on a continuous basis at the airport monitoring station. This PM₁₀ instrument automatically measures and records airborne particulate concentration levels using the principle of beta ray attenuation. The sampler monitors the PM₁₀ content of air by drawing a measured volume of air through a chamber containing a pre-conditioned and pre-weighed filter in accordance with the internationally accepted US EPA protocol for PM₁₀ sampling. The results are expressed in µg/m³.

4.0 Monitoring Results

4.1 Offsite NO₂ Monitoring Results

Figure 2 presents the annual mean NO₂ concentration for each location based on the monthly passive tube sampling. The Regulations mandate an annual mean limit value of 40 µg/m³ for NO₂. As can be seen from Figure 2, the mean value at all sampling locations in Q3 2022 were below the limit value. The highest average NO₂ concentrations were detected at the bus depot sampling point A11 and are related to the volume of vehicular traffic at this location. It is noted that the Terminal 1 staff shuttle bus stop was suspended from 2nd June 2022 to accommodate the temporary installation of covered areas for passengers outside Terminal 1. This bus stop reopened in Q4 on 10th October 2022.

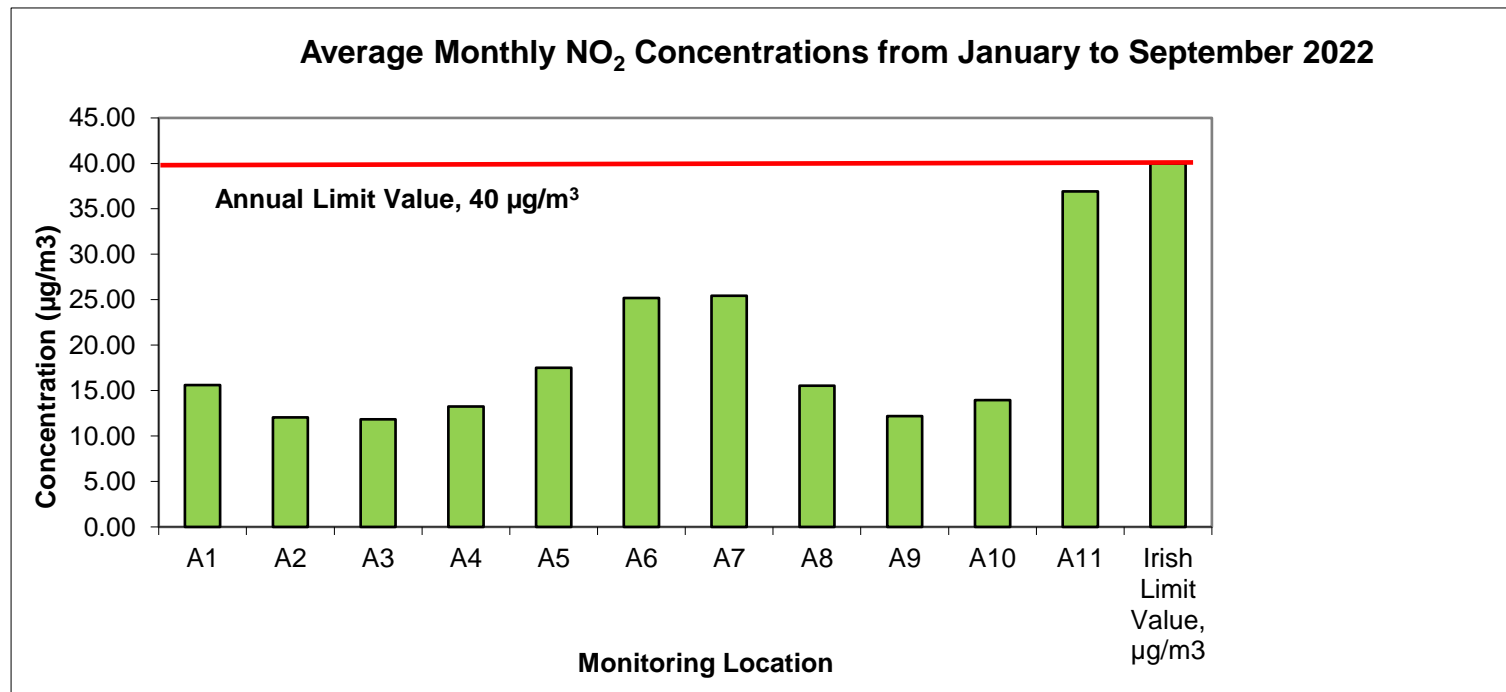


Figure 2 Average Monthly NO₂ Concentrations Year to Date 2022

4.2 Offsite Benzene Monitoring Results

Figure 3 presents the annual mean Benzene concentration for each location based on the monthly passive tube sampling. The Regulations mandate an annual mean limit value of 5 µg/m³ for Benzene. As can be seen from Figure 3, the annual mean values were below the limit value of 5 µg/m³ and less than 1 µg/m³ at all monitoring locations.

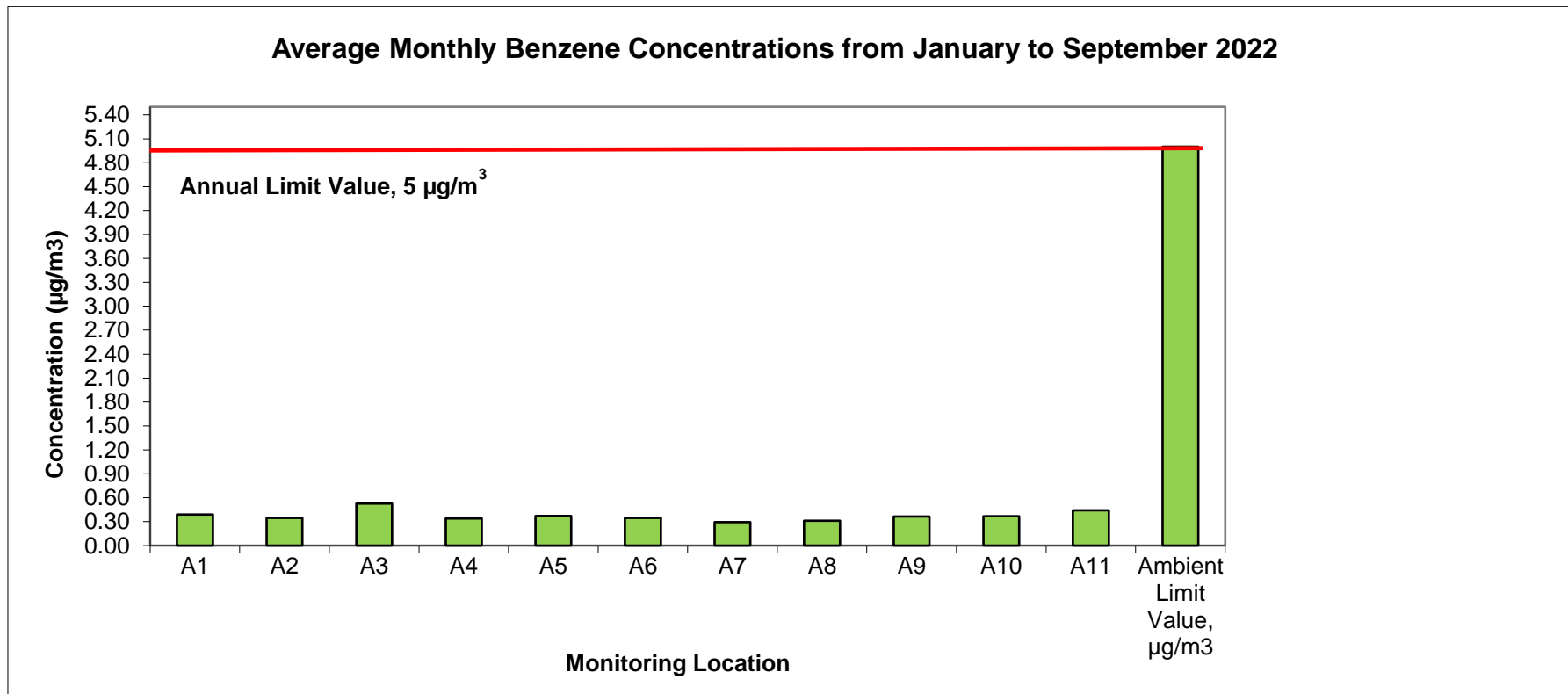


Figure 3 Average Monthly Benzene (C₆H₆) Concentrations Year to Date 2022

5.0 On-site Airport Monitoring Station Results

5.1 On-site Airport Monitoring Station Results: Daily Average NO₂

NO₂ concentrations are measured at the automatic station at Dublin Airport. Figure 4 presents the daily average NO₂ concentrations measured during Q3 2022. The equivalent daily average was calculated as 13 µg/m³ during this period.

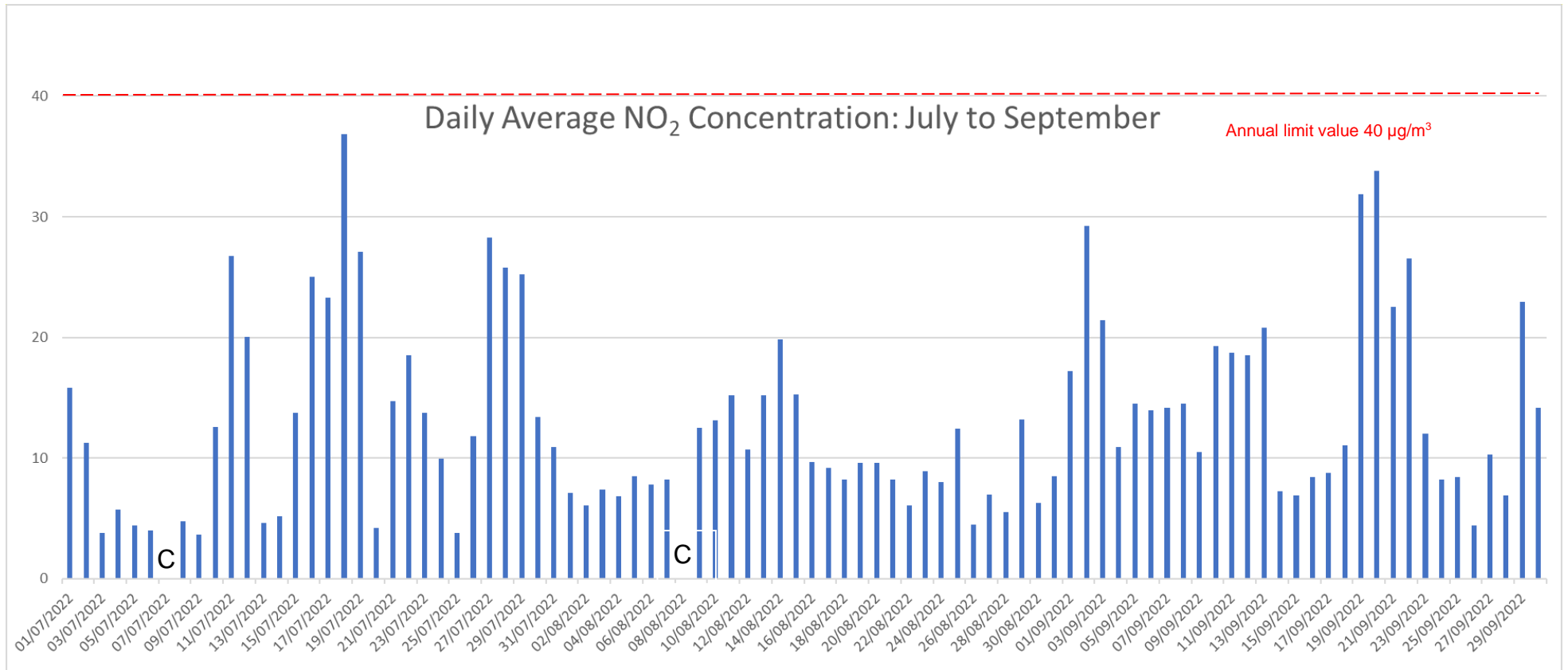


Figure 4 Daily Average NO₂ Q3 2022

C = Calibration

5.2 On-site Airport Monitoring Station Results: PM₁₀

Daily average PM₁₀ concentrations recorded at the automatic station in DAP in Q3 2022 are presented in Figure 5. The average PM₁₀ was calculated as 11 µg/m³ during this period. There were no exceedances of the daily mean limit value of 50 µg/m³ during Q3.

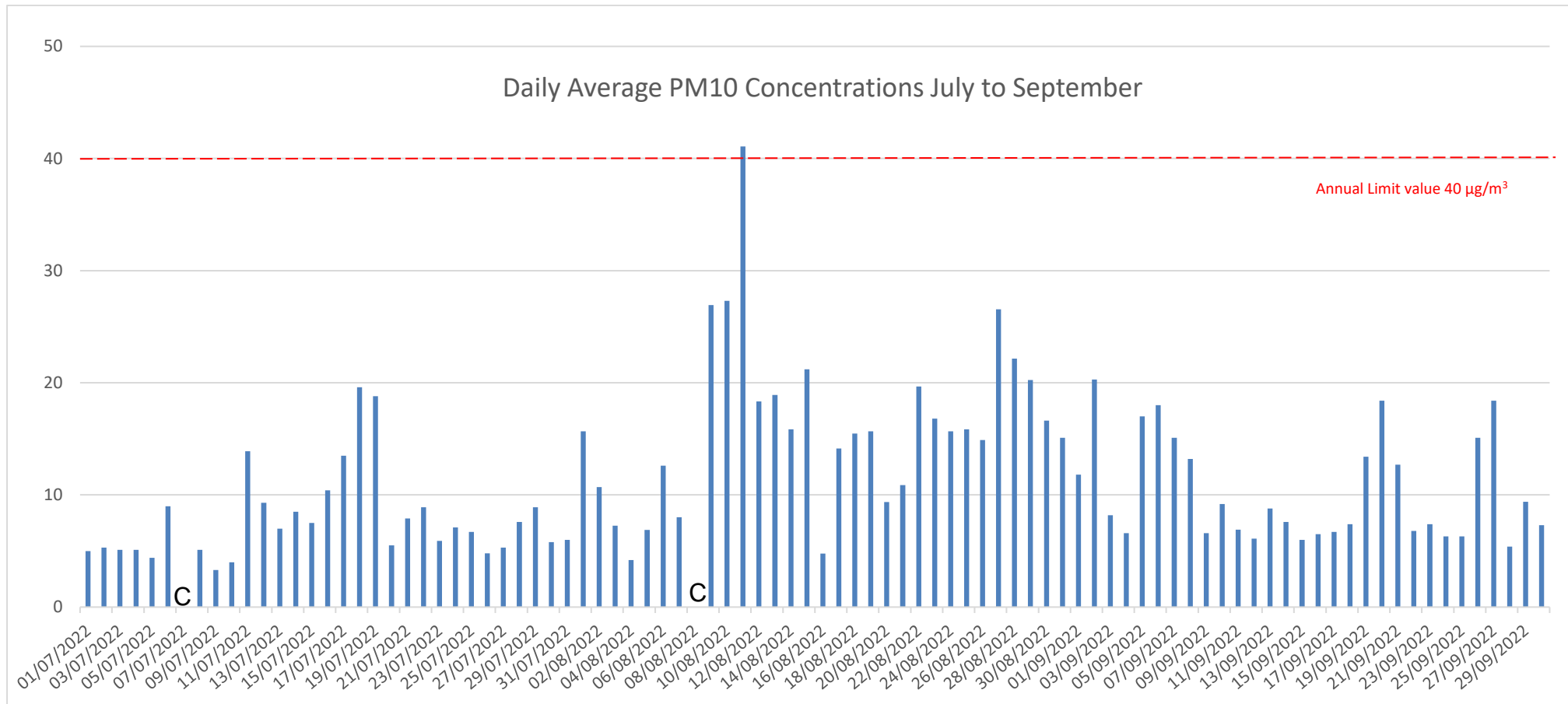


Figure 5 Daily Average PM₁₀ Q3 2022

C = Calibration

The Regulations set a 24-hour PM₁₀ limit value of 50 µg/m³, and an annual mean limit value of 40 µg/m³ as shown in Table 2.

| Objective | Averaging Period | Limit or Threshold Value (µg/m ³) | No. of Allowed Exceedances | No. of Exceedances (Year to date) |
|------------------------------|------------------|---|--|-----------------------------------|
| PM ₁₀ Limit Value | 24 hour | 50 | Not to be exceeded on more than 35 days per year | 1 |
| PM ₁₀ Limit Value | Calendar Year | 40 | NA | NA |

Table 2 PM₁₀ Limit Values

5.3 Odours

Fuel odours may arise from many sources including road traffic, ground handling equipment as well as aircraft on the ground. Depending on weather conditions odours from fuel (hydrocarbons) may be detected at locations close to the airport. As discussed in section 4.2 of this report, diffusion tubes results for benzene indicate that the average concentrations are well below the national limit value at all locations.

The human nose is extremely sensitive and can detect very low concentrations of hydrocarbons in the air. Weather also impacts the dispersion of odour and affects the strength of odour and locations affected.

6.0 Conclusion

Onsite Monitoring: The results of the NO₂ and PM₁₀ concentrations using the online analyser indicate concentrations are below the relevant annual mean limit value of 40µg/m³ and within the allowed criteria of short-term limit values.

Offsite Monitoring: Diffusion tube results for NO₂ are below the 40 µg/m³ limit value at all locations in Q3 2022. The highest average NO₂ concentrations in Q3 were recorded at the bus depot at the airport. The elevated readings are related to the volume of vehicular activity that occurs in the area.

Diffusion tube results for benzene indicate that concentrations at all locations are well below the annual average limit value.