

---

Dublin Airport Air Quality Monitoring  
Q2 2022

Sustainability Department

---

October 2022



## **Dublin Airport Air Quality Monitoring Quarter 2 Report 2022**



## Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>4</b>
1.1	Background.....	4
1.2	Purpose.....	4
<b>2.0</b>	<b>Monitoring Locations .....</b>	<b>6</b>
<b>3.0</b>	<b>Parameters and Sampling Methodology .....</b>	<b>8</b>
3.1	Offsite Passive Sampling: .....	8
3.1.1	Nitrogen Dioxide (NO <sub>2</sub> ) and Benzene (C <sub>6</sub> H <sub>6</sub> ).....	8
3.2	Onsite Sampling.....	8
3.2.1	Equipment Calibration .....	8
3.2.2	Nitrogen Dioxide (NO <sub>2</sub> ).....	8
3.2.3	Particulate Matter (PM <sub>10</sub> ) .....	8
<b>4.0</b>	<b>Monitoring Results.....</b>	<b>9</b>
4.1	Offsite NO <sub>2</sub> Monitoring Results .....	9
4.2	Offsite Benzene Monitoring Results .....	10
<b>5.0</b>	<b>On-site Airport Monitoring Station Results.....</b>	<b>11</b>
5.1	On-site Airport Monitoring Station Results: Daily Average NO <sub>2</sub> .....	11
5.2	On-site Airport Monitoring Station Results: PM <sub>10</sub> .....	12
5.3	Odours .....	14
<b>6.0</b>	<b>Conclusion.....</b>	<b>14</b>

## Figures

Figure 1	Air Quality Monitoring Locations.....	7
Figure 2	Average Monthly NO <sub>2</sub> Concentrations Year to Date 2022.....	9
Figure 3	Average Monthly Benzene (C <sub>6</sub> H <sub>6</sub> ) Concentrations Year to Date 2022 .....	10
Figure 4	Daily Average NO <sub>2</sub> Q2 2022 .....	11

## Tables

Table 1	Community Ambient Air Quality Monitoring Locations.....	6
Table 2	PM <sub>10</sub> Limit Values.....	13

## Glossary

<b>Abbreviation</b>	<b>Definition</b>
EPA	Environmental Protection Agency
NO	Nitrogen Oxide
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Oxides of Nitrogen
PM <sub>10</sub>	Airborne Particulate Matter, particle size less than 10 micron.
AQIH	Air Quality Index for Health
The Regulations	Ambient Air Quality Standards Regulations 2011

## Version Control

<b>Issue No</b>	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Date</b>
DAP Air Quality Monitoring 2022 Q2 Report_V1.0	Environmental Sustainability Officer	Sustainability Department	October 2022

## 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 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 Q2 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 summarises the air quality levels around Dublin Airport during April, May and June 2022. The results of the NO<sub>2</sub> and PM<sub>10</sub> concentrations using the online analyser indicate concentrations are below the relevant annual limit value of 40µg/m<sup>3</sup> and within the allowed criteria of short-term limit values. The diffusion tube results for NO<sub>2</sub> indicate that the highest concentrations detected during this period, were recorded at the Dublin Airport bus depot. This depot location is a hub for mass ground transport activity for the campus. NO<sub>2</sub> concentrations at this location were reduced in Q2 compared to the previous two quarters. It is noted that the Terminal 1 staff shuttle bus stop was suspended temporarily in June 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](http://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 external monitoring locations in the vicinity of the airport in Q2 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 (SO<sub>2</sub>)
- Oxides of nitrogen NO<sub>x</sub> (NO and NO<sub>2</sub>)
- Carbon monoxide (CO)
- Ozone (O<sub>3</sub>)
- Particulate Matter (PM<sub>10</sub>)

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 (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>) at the DAP automatic station;  
and
- Nitrogen Dioxide (NO<sub>2</sub>) and Benzene using diffusion tubes at 11 offsite 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
<b>On-site</b>	Dublin Airport.	Continuous analyser	<b>NO<sub>2</sub></b> <b>PM<sub>10</sub></b>
<b>A1</b>	Forrest Little Golf Club.	Passive Tubes	<b>NO<sub>2</sub></b> <b>Benzene</b>
<b>A2</b>	Kilreesk Lane, St. Margaret's.	Passive Tubes	
<b>A3</b>	Ridgewood Estate West, Swords.	Passive Tubes	
<b>A4</b>	St. Margaret's School and Parish	Passive Tubes	
<b>A5</b>	Fire Station, Huntstown, Dublin Airport.	Passive Tubes	
<b>A6</b>	Southern Boundary Fence, Dublin	Passive Tubes	
<b>A7</b>	Western Boundary Fence, Dublin Airport	Passive Tubes	
<b>A8</b>	St. Nicholas of Myra School, Malahide Road.	Passive Tubes	
<b>A9</b>	Naomh Mearnóg GAA Club, Portmarnock.	Passive Tubes	
<b>A10</b>	Oscar Papa Site, Portmarnock.	Passive Tubes	
<b>A11</b>	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 (NO<sub>2</sub>) and Benzene (C<sub>6</sub>H<sub>6</sub>)**

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/m<sup>3</sup> (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 monthly 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 monthly calibration process takes approximately 24 hours, data collection resumes after this 24-hour period. In Q2 2022, due to down times during calibration of our equipment, 97% of NO<sub>2</sub> data and of PM<sub>10</sub> data was captured during this period.

##### **3.2.2 Nitrogen Dioxide (NO<sub>2</sub>)**

Onsite monitoring of NO<sub>2</sub> is carried out on a continuous basis at the stationary airport monitoring station. Measurement of NO<sub>2</sub> is carried out using a Horiba APNA-370 ambient NOx monitor which employs a crossflow modulated chemiluminescence method. The results are expressed in µg/m<sup>3</sup>.

##### **3.2.3 Particulate Matter (PM<sub>10</sub>)**

PM<sub>10</sub> is defined as airborne particulate matter with an aerodynamic diameter equal to or less than 10µm. PM<sub>10</sub> is monitored on a continuous basis at the airport monitoring station. This PM<sub>10</sub> instrument automatically measures and records airborne particulate concentration levels using the principle of beta ray attenuation. The sampler monitors the PM<sub>10</sub> 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 PM<sub>10</sub> sampling. The results are expressed in µg/m<sup>3</sup>.

#### 4.0 Monitoring Results

#### 4.1 Offsite NO<sub>2</sub> Monitoring Results

Figure 2 presents the annual mean NO<sub>2</sub> concentration for each location based on the monthly passive tube sampling. The Regulations mandate an annual mean limit value of 40 µg/m<sup>3</sup> for NO<sub>2</sub>. As can be seen from Figure 2, the mean value at all sampling locations in Q2 2022 were below the limit value. The highest NO<sub>2</sub> concentrations were detected at the bus depot sampling point A11 and are related to the volume of vehicular traffic and mass ground transit at this location. NO<sub>2</sub> levels at this location which were lower than those recorded in Q1 2022 and Q4 2021. It is noted that the Terminal 1 staff shuttle bus stop was suspended from 2<sup>nd</sup> June 2022 to accommodate the temporary installation of covered areas for passengers outside Terminal 1.

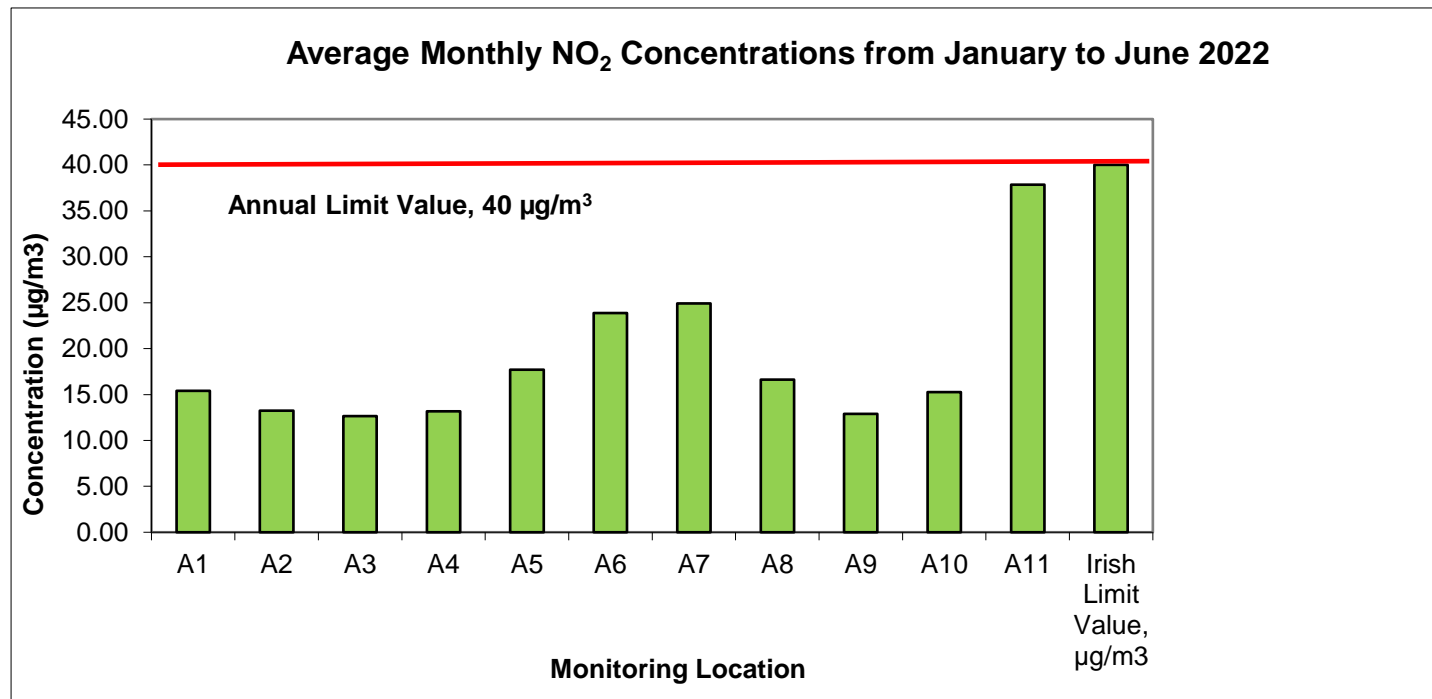
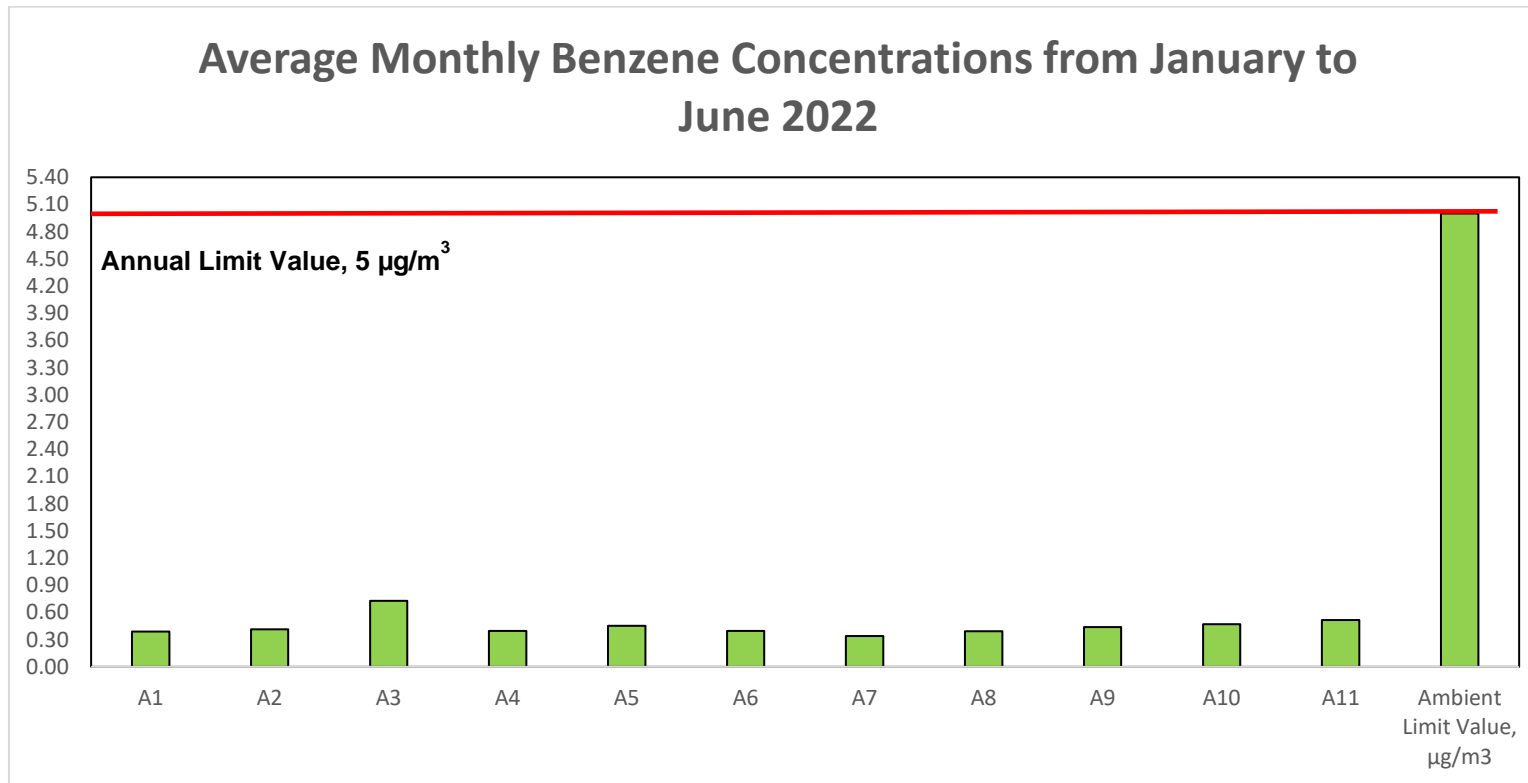


Figure 2 Average Monthly NO<sub>2</sub> Concentrations Year to Date 2022

#### 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/m<sup>3</sup> for Benzene. As can be seen from Figure 3, the annual mean values were below the limit value of 5 µg/m<sup>3</sup> and less than 1 µg/m<sup>3</sup> at all monitoring locations.

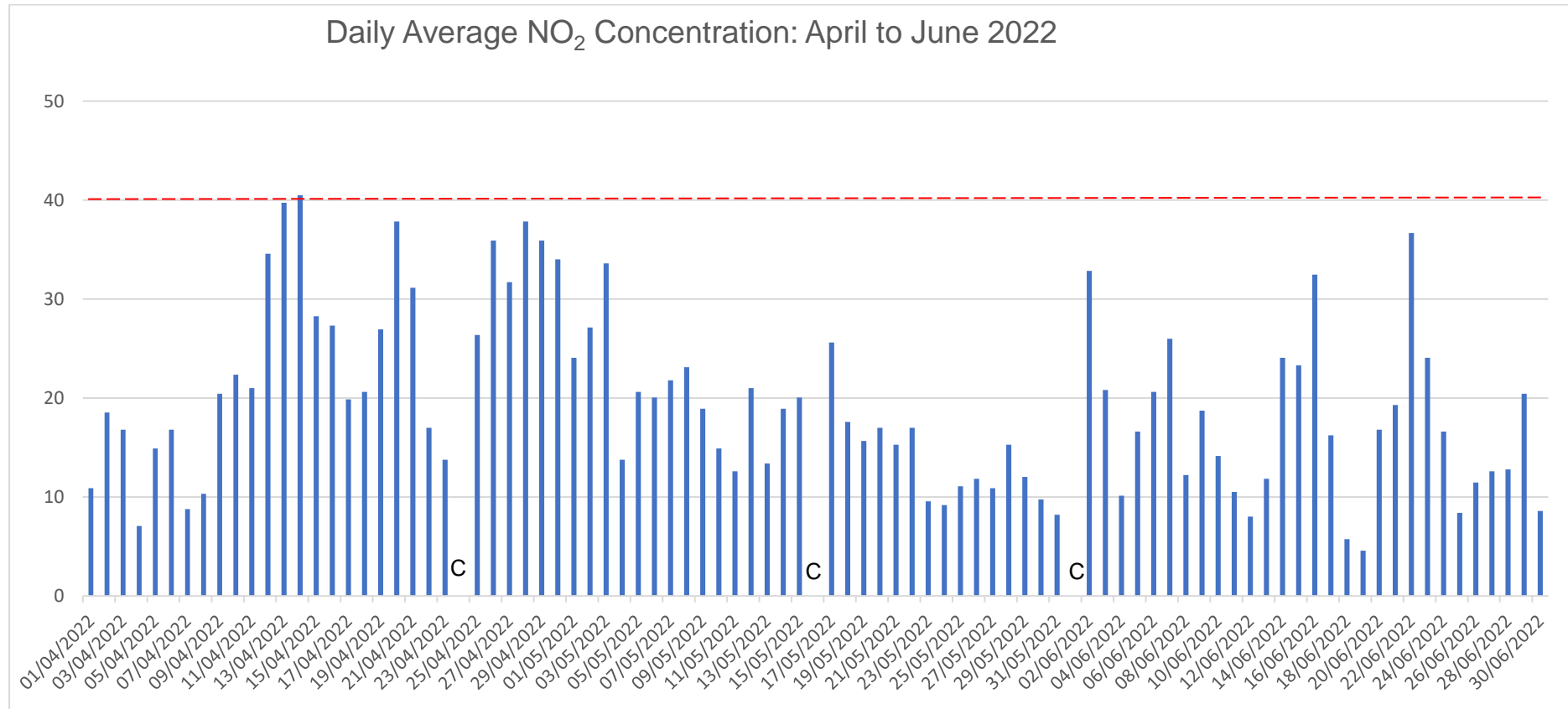


**Figure 3** Average Monthly Benzene (C<sub>6</sub>H<sub>6</sub>) Concentrations Year to Date 2022

**5.0 On-site Airport Monitoring Station Results**

**5.1 On-site Airport Monitoring Station Results: Daily Average NO<sub>2</sub>**

NO<sub>2</sub> concentrations are measured at the automatic station at Dublin Airport. Figure 4 presents the daily average NO<sub>2</sub> concentrations measured during Q2 2022. The equivalent daily average was calculated as 21 µg/m<sup>3</sup>.



**Figure 4** Daily Average NO<sub>2</sub> Q2 2022

C = Calibration

### 5.2 On-site Airport Monitoring Station Results: PM<sub>10</sub>

Daily average PM<sub>10</sub> concentrations recorded at the automatic station in DAP in Q2 2022 are presented in **Error! Reference source not found.**

The average PM<sub>10</sub> was calculated as 13 µg/m<sup>3</sup>.

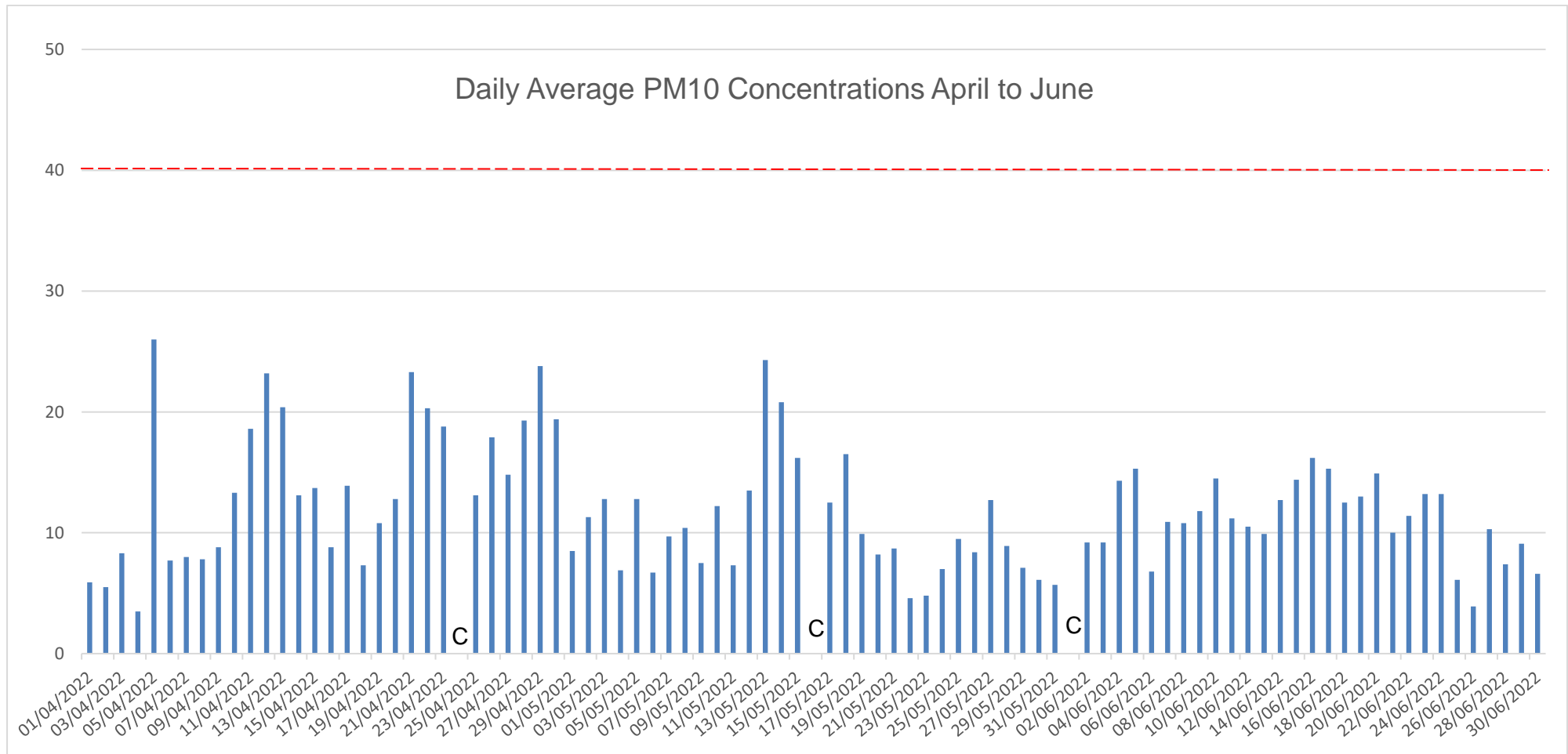


Figure 5 Daily Average PM10 Q2 2022

C = Calibration

The Regulations set a 24-hour PM<sub>10</sub> limit value of 50 µg/m<sup>3</sup>, and an annual mean limit value of 40 µg/m<sup>3</sup> as shown in Table 2.

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

**Table 2** PM<sub>10</sub> 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 NO<sub>2</sub> and PM<sub>10</sub> concentrations using the online analyser indicate concentrations are below the relevant annual limit value of 40µg/m<sup>3</sup> and within the allowed criteria of short-term limit values.

Offsite Monitoring: Diffusion tube results for NO<sub>2</sub> were below the 40 µg/m<sup>3</sup> limit value at all locations in Q2 2022. The highest concentrations 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 which is one of the busiest ground transport hubs in Ireland. NO<sub>2</sub> levels were reduced at this location compared to Q1 results. It is noted that during Q2 there was a temporary suspension of the Terminal 1 staff shuttle bus stop. daa will continue to closely monitor trends in air quality monitoring results at this location.

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