EARTHSENSE

Case Study

Dowds Group - Belfast Grand Central Train Station

Overview

Dowds Group were asked to provide a monitoring strategy for the proposed air quality monitoring at Belfast Transport Hub (BTH).

The proposed air quality monitoring is being carried out in response to condition 14 of the planning application which requires one year of monitoring to be undertaken at the station to review concentrations.

The Challenge

Dowds Group were tasked with conducting an air quality monitoring survey within the concourse area adjacent to Grosvenor Road entrance to the station in accordance with the government's Local Air Quality Management Technical Guidance LAQM.TG(16) for the period of one year immediately after opening in order to demonstrate compliance with the hourly mean limit value for NO2 concentrations.

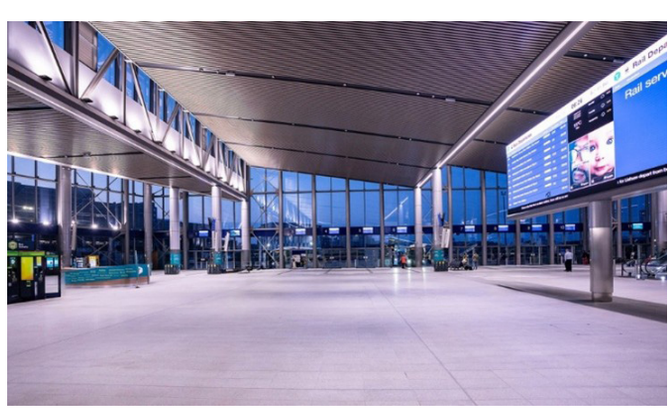
The air quality monitoring will provide automatic continuous data to feed into the Building Management System (BMS) and will then be used to manage the ventilation systems to flush the air in the station as required.

The requirements indicated that the sensors have a range for NO2 of 0-10 parts per million (ppm) at a resolution off <0.02ppm.

Based on the molecular mass of NO2 at 20˚C and 1013 millibars the annual mean standard for NO2 is equal to 0.02ppm and the hourly target, relevant for this study is 0.1ppm.

The value would vary depending on temperature and pressure. There is a risk of data fluctuation due to the low concentrations being monitored which could lead to difficulties when setting BMS parameters.

The issue is that the data at such low concentrations would be variable and subject to variability such as temperature, pressure and drift



The Solution

The accuracy of monitoring to such low concentrations with the GS sensors would be a risk therefore EarthSense was commissioned to provide the Zephyr® NO2 monitor's which provide a range of 0- 10,000ppb with a 5.2ppb (10µg/m3) accuracy.

Location and height locations were proposed to be included throughout the concourse area with five sensors, a sensor at the ticket gate, four sensors located adjacent to each platform dispatch hut and three sensors located at the Grosvenor Road end of the platforms (13 monitoring locations). For the purposes of meeting the planning condition monitoring on the concourse would suffice.

These monitors feature an active sampling mechanism that draws local air into its inlet and releases it back into the atmosphere after measuring air quality. The Zephyr® monitors provided real-time measurements for NO2, offering insights into their impact on air quality levels at the site.

Outcomes

Dowds Group are to provide data validation carried out based on the full year of data collected in the station. The collocated diffusion tube sites should be used to compare the annual averages with the data collected from the continuous sensor monitoring. This approach will provide a review of data accuracy and validation as part of the reporting.

On completion of the air quality monitoring survey, the air quality monitoring results are to be submitted to the Planning Authority for review and the results must be approved in writing.

Quotes

Edwin Bhalla, Business Development Manager at EarthSense, said "Using a Modbus/RS485 connection between the Zephyr monitor® and the BMS system controlling the ventilation system is a hardwired solution to provide accurate control using exceedance threshold levels for NO2.

This solution, provided to Dowds Group, demonstrates a real-world actionable set of events driven by the use of pollution data!"

Long Term Benefits

If the monitored NO2 levels exceed the 1-hour limit value, Dowds shall submit a mitigation plan to the Planning Authority in order to reduce NO2 levels below the limit value.

This Plan must be agreed in writing with the Planning Authority and implemented as agreed.

Get in Touch

info@earthsense.co.uk

www.earthsense.co.uk