

# AQ IN SCHOOLS IN WALES A CITIZEN SCIENCE APPROACH

A pilot project run by NRW and Cardiff SVS  
to monitor AQ and initiate behaviour  
change in 20 schools in Wales

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## PROJECT SUMMARY

- **Joint project between Natural Resources Wales and Shared Regulatory Services (Joint venture formed of Bridgend, Cardiff and Vale of Glamorgan Councils)**
- **18 Primary Schools and 1 Secondary School and 1 Further Education College**
- **It is acknowledged that road traffic emissions (particulate matter (PM) and primary/ secondary nitrogen dioxide (NO<sub>2</sub>)) are the primary contributing factor to poor air quality in Wales**
- **20 Schools Targeted for one year of NO<sub>2</sub> Monitoring using non-automated principles (passive diffusion tubes)**

- **Data will be included in three separate reports; Bridgend, Cardiff and Vale of Glamorgan Council's LAQM Annual Air Quality Progress Reports 2020;**
- **Targeting awareness, education and behaviour change in tandem with monitoring;**
- **Following complete 2019 annual ratified data sets data will then be included in the 2020 LAQM progress reports and NRW final report**
- **Involving WG in pilot scheme with a view to rolling out to all schools in Wales if successful**
- **SUSTRANS, Public Health Wales and other Local Authorities are now partners and a national group has been set up to engage in partnership working as AQ has been national news in the UK.**
- **Initial approach to education departments has been made to work on posters and school teacher access and engagement.**
- **Addition of plume labs personal exposure monitors for PM 2.5, PM 10, VOC and NO2**



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## Plume Labs Portable Personal Monitor

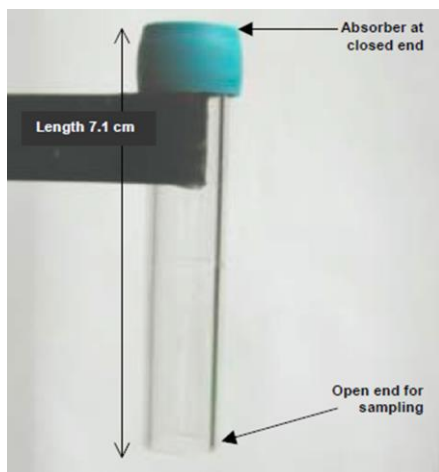


## NO2 Monitoring Strategy and Results

- NO2 concentrations will be recorded by non-automated monitoring techniques in the form of passive diffusion tubes.
- Detailed instructions surrounding the correct use of diffusion tubes to collate representative NO2 datasets is defined in Defra's Local Air Quality Management Technical Guidance 16, February 2018.
- Sampling with diffusion tubes is undertaken in accordance with Defra's diffusion tube recommended exposure dates schedule. The results derived from the sampling sites are individually averaged over a year and subjected to various ratification procedures; Erroneous datasets, annual average, annualisation, bias adjustment
- Bias Adjustment; There are two bias adjustment figures made available to Local Authorities. Firstly there is the Local Authorities' local bias adjustment figure calculated using a co-location study at a local reference automated site and secondly there is the national bias adjustment factor derived by all individual co-location studies undertaken that utilise the same laboratory and analytical techniques for diffusion tube analysis

- Diffusion tubes are supplied and analysed by an accredited analysis laboratory, which in the case of Cardiff Council is Socotec UK Ltd's Didcot office.
- Socotec UK Ltd utilises operating procedure ANU/SOP/1015. The tubes are prepared by spiking acetone:triethanolamine (50:50) on the grids prior to the tubes being assembled. The tubes are desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection. As set out in the practical guidance the results are initially calculated assuming an ambient temperature of 11oC and then adjusted to 20oC to allow direct comparison with EU limits
- Socotec is a UKAS accredited laboratory and currently holds the highest rank of a Satisfactory laboratory in relation to the Workplace Analysis Scheme for Proficiency (WASP) inter-comparison scheme for spiked Nitrogen Dioxide diffusion tubes.
- Monitoring set up 2 diffusion tubes per site

- All sampling procedures for the use of diffusion tubes to record NO<sub>2</sub> concentrations is documented in Defra's LAQM Technical Guidance (TG16), February 2018
- Practical Guidance issued by an Expert Working Group commissioned by Defra and Devolved Administrations.
- Two diffusion sites have been selected for each school location. Both sites are representative of relevant exposure and correspond accordingly to the long term (annual average) and short term (1-hour average) objectives. 1 diffusion tube located at the schools façade and 1 diffusion tube located in the vicinity of the school's playground area.
- The allocation of monitoring sites has been established based upon best practice guidance (LAQM TG 16, February 2018);
- The site should be open to the sky, with no overhanging vegetation or buildings. It is important to place diffusion tubes where there is free circulation of air around the tube, but the opposite extreme should also be avoided, i.e. areas of higher than usual turbulence. For this reason, the tube should not be located on the corner of a building. Care should be taken to avoid any very localised sources, sinks of NO<sub>2</sub>, or disturbances to the airflow.
- 1.5m height- representative of human exposure height



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## Next steps

- As part of the LAQM process if annual average levels are found to be encroaching upon or exceeding the air quality objectives set for NO<sub>2</sub>, SRS and the applicable LA will have a requirement to fulfil the requirements of LAQM and adopt formal procedures to start implementing an Air Quality Management Area (AQMA). 18 months to DRAFT an AQAP (Air Quality Action Plan).
- SRS and the corresponding LA would work with the School to develop strategic measures that could be implemented to alleviate any concerns and improve air quality levels for NO<sub>2</sub>.
- NRW would work with the schools, Sustrans, Local Authorities and other partners to develop a solution

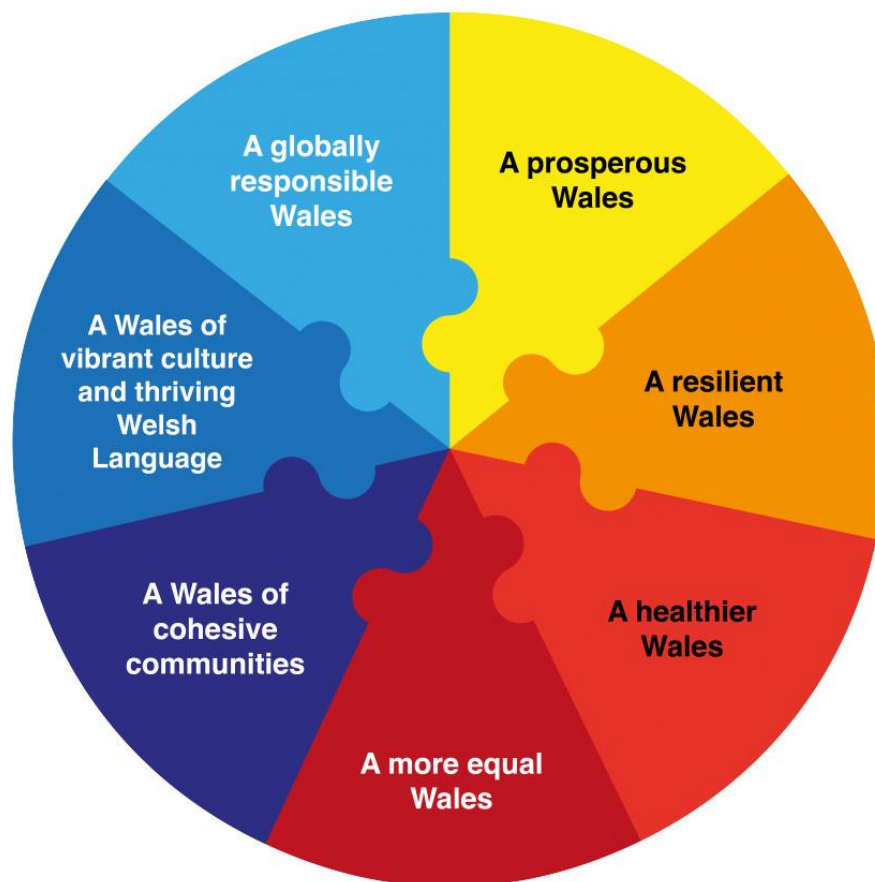
## NRW OBJECTIVES

- Establish a pilot programme of NO<sub>2</sub> monitoring in 20 schools
- Establish partnerships with other authorities to develop a shared goal.
- Establish a Wales wide Citizens Science subgroup of the WAQF with all partners. (Now established)
- Rationalise actions between partners and produce a shared goals programme moving forward
- Aspirations to expand the monitoring remit to include Particulate Matter, incorporating the WHO guidelines as a long term non-statutory target for PM which are more stringent.
- Embed the latest health and education strategies and guidance into schools curriculum or via other routes
- Work with Welsh Government to embed a commitment to Citizen Science in the new Clean Air Plan for Wales.

# WELLBEING AND FUTURE GENERATIONS ACT

- This Act is about improving the social, economic, environmental and cultural well-being of Wales.
- The Act will make the public bodies listed in the Act think more about the long term, work better with people and communities and each other, look to prevent problems and take a more joined-up approach.
- This new law will mean that, for the first time, public bodies listed in the Act must do what they do in a sustainable way.
- The Act also establishes Public Services Boards (PSBs) for each local authority area in Wales. Each PSB must improve the economic, social, environmental and cultural well-being of its area by working to achieve the well-being goals.

## Seven Wellbeing Goals:



- **As the Well-being of Future Generations Act becomes embedded into strategic plans, the Future Generations Commissioner for Wales may wish to remind Public Service Boards to consider explicitly the role of AQ improvement in achieving their well-being goals.**
- **Public Bodies and Public Service Boards have a duty to improve the economic, social, environmental and cultural well-being of Wales (through setting well-being objectives that maximise contribution to the seven national well-being goals) and report on progress.**
- **We believe that AQ and behaviour change should be an explicit element of improving well-being in Wales**
- **A multi-sectoral approach is needed to develop and effectively implement long term policies and strategies that reduce risks of air pollution to health. This approach is supported across Wales through the Well-being of Future Generations (Wales) Act 2015.**
- **Includes goals to achieve a healthier Wales, that is more globally responsible and equal, through thinking more about the long-term, looking to prevent problems and taking a more joined-up approach. Many of the actions required to address air quality will have additional benefits to health and well-being by increasing levels of physical activity, improving mental well-being, and decreasing social isolation.**

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- **Five Ways of Working**

provides multiple benefits that satisfy NRW and Cardiff Council's Well-being Objectives and the seven national Well-Being Goals.

- **Long term** – ensure long term continued improvement in air quality, not only within the specified AQMAs but also Wales wide.
- **Prevention** – Take relevant preventative measure and aim to achieve annual average levels below the set annual average air quality objective for NO<sub>2</sub> (40µg/m<sup>3</sup>), which will have a requisite impact on air quality in schools in Wales.
- **Integration** – Integrated policy with all actors working together through Public Service Boards
- **Collaboration** – The efforts needed to attain the targeted levels will involve all public service bodies. The implementation of strategies to meet targeted levels for air quality will compliment public health policy to lessen disproportionate disease burdens between and within regions.
- **Involvement** – The involvement of multiple third sector and schools as well as private sector and the public will ensure involvement of the whole community.