Bracknell Air Quality Management Area

Proposal for Revocation Report

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management

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1 Introduction

This report was produced on behalf of Bracknell Forest Council constitutes the required information under which the Council is to apply for the revocation of the Area Quality Management (AQMA) area known as the Bracknell (Area 1).

The AQMA revocation report has been developed in recognition of the legal requirement on the local authority to work towards the Air Quality Strategy (AQS) objectives under Part IV of the Environment Act 1995 and the relevant Regulations made under that part and to meet the requirements of the Local Air Quality Management (LAQM) statutory process.

This report will provide the Council with robust evidence as required under the LAQM guidance, LAQM.TG (22) to enable it to revoke the AQMA.

2 Local Air Quality Management

2.1 Review and Assessment of Air Quality

Under the Environment Act 1995 local authorities are required to review and assess local air quality annually against national air quality objectives. This process sits under the Local Air Quality Management (LAQM) programme which requires local authorities to report annually to the department for Environment, Food and Rural Affairs (DEFRA).

The air quality objectives applicable to LAQM in England are set out in the Air Quality Standard Regulations 2010. The pollutant of concern for this AQMA is for the annual mean objective Nitrogen Dioxide only and the limits are set out in Table 1 below.

Table 1: The National NO_2 Air Quality Objectives

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	Annual mean 40µg/m^3	Annual mean

2.2 Health Impacts

Air pollution is associated with several adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Air Pollution can be harmful to everyone, it mainly affects particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

Poor Air Quality is also a contributory role in mortality. The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

The major source of air quality pollutants in Bracknell Forest is road transport, and the main pollutant of concern is nitrogen dioxide (NO_2). Two Air Quality Management Areas (AQMAs) have been declared for exceedances of the Annual Mean NO_2 Objective (Table 1). The Crowthorne AQMA (area 2) is located in Crowthorne, and includes Part B3348, High Street & part of Sandhurst Road and Bracknell AQMA (Area 1) was designated along the A322 Bagshot Road and Downshire Way from Berkshire Way to junction with B3430. (See Appendix A for the maps).

2.3 Current Air Quality Management Area Status

In the comments from the June 2023 Annual Status Report (ASR) for Bracknell Forest BC DEFRA has approved the recommendation made for the revocation of the Bracknell (Area 1) AQMA as it has recorded annual levels at or below 36.0 µg/m^3 for 3 continuous years.

2.4 Requirements for revoking an Air Quality Management Area (AQMA)

The process for the revoking an AQMA is set out in the DEFRA Local Air Quality Management Policy and Technical Guidance (22). It states that:

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

"*3.57 The revocation of an AQMA should be considered following three consecutive years of compliance with the relevant objective as evidenced through monitoring. Where NO_2 monitoring is completed using diffusion tubes, to account for the inherent uncertainty associated with the monitoring method, it is recommended that revocation of an AQMA should be considered following three consecutive years of annual mean NO_2 concentrations being lower than 36µg/m^3 (i.e. within 10% of the annual mean NO_2 objective). There should not be any declared AQMAs for which compliance with the relevant objective has been achieved for a consecutive five-year period."*

Therefore as Bracknell Forest Council has robust monitoring data for the Bracknell AQMA, that has recorded annual levels at or below 36.0 µg/m^3 for 3 continuous years it can be revoked.

3 AQMA Bracknell

3.1 The AQMA

The original Bracknell AQMA was declared for the NO_2 annual mean in 2011 but was reduced in 2013, following further assessment, and was designated along the A322 Bagshot Road and Downshire Way from Berkshire Way to the junction with B3430 (Map 1).

3.2 The Nitrogen Dioxide Levels

The nitrogen dioxide levels for the Bracknell AQMA, have been monitored using diffusion tubes at 5 sites, 1 of which is triplicate, and a reference continuous monitor (see Appendix A Map 2). The diffusion tubes sites are located as follows:

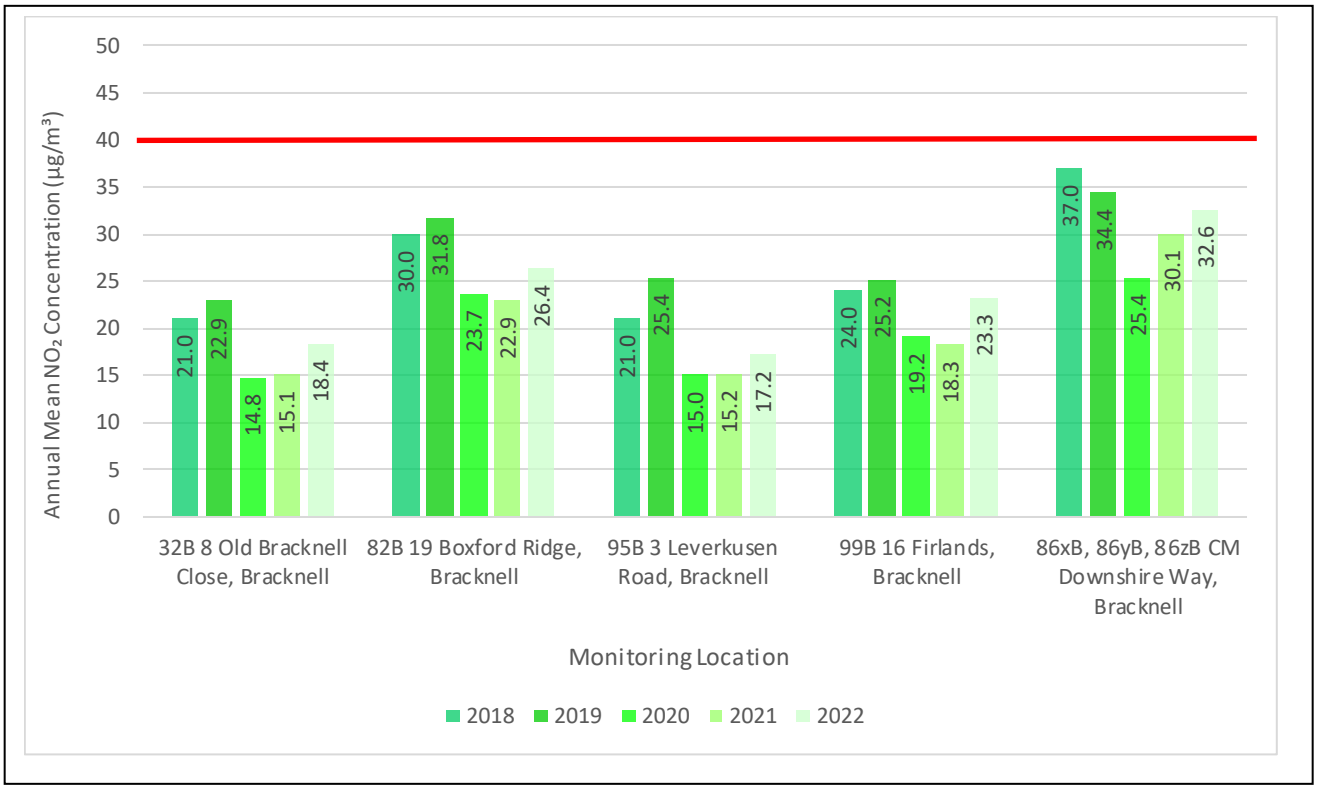
- 32b – 8 Old Bracknell Close, Bracknell
- 82b – 19 Boxford Ridge, Bracknell
- 95b – 3 Leverkusen Road, Bracknell
- 99b – 16 Firlands, Bracknell
- 86xb, 86yb,86zb – Continuous monitor Downshire Way, Bracknell.

The results have been 36.0µg/m^3 or below for the past 5 years, in 4 of the diffusion tube locations (Map 3) and continuous monitor (Map 2). One of the diffusion tube locations (86xb, 86yb, 86zb), co-located with the Continuous monitor has been 36.0µg/m^3 or below since 2019. Whilst the NO_2 has started to rise slightly since 2020 they remain below the 2019 levels (as shown in Figures 1 & 2 below).

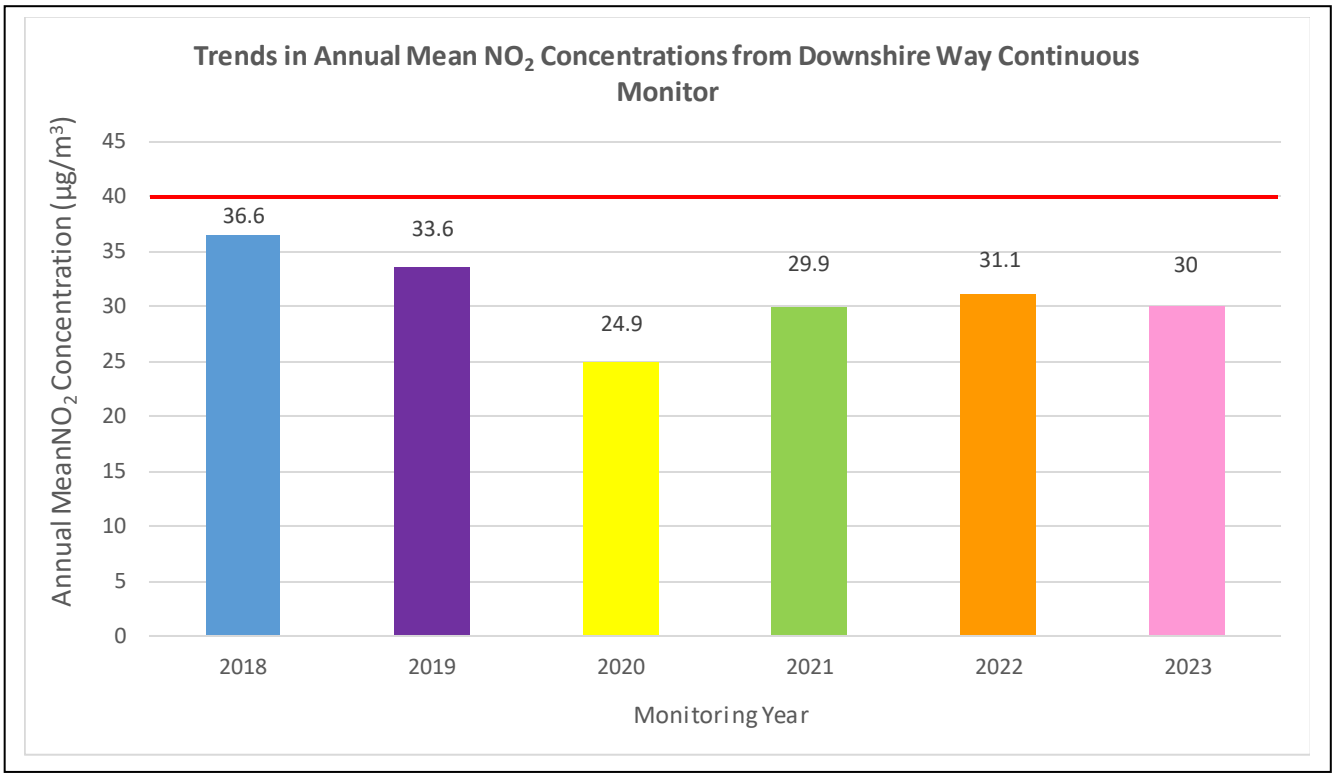
A number of factors may attribute to this reduction in NO2, including significant capacity improvement works carried out to Downshire Way (A322) between the Twin

Bridges and Horse and Groom junctions which have improved traffic flow and movement on what was previously a bottleneck with significant congestion. This has been complemented by wider traffic management improvements at all junctions along the AQMA A322 corridor, with new traffic signals and junction layout changes further improving traffic flow and reducing congestion. There has also been a change in traffic trends during the day, for example peak traffic is typically slightly lower than pre-pandemic, but traffic during the inter-peak hours is higher, consequently there is less congestion and queuing within the AQMA. There has also been an increase in LGVs, making up for a decrease in car traffic. This is likely partly attributable to increased homeworking, but also increased home deliveries.

3.2.1 Figure 1: Diffusion Tube NO_2 Levels in the Bracknell AQMA from 2018 to 2022



3.2.2 Figure 2: Continuous monitor NO_2 Levels in the Bracknell AQMA from 2018 to 2023



3.3 Monitoring

Monitoring will continue for NO_2 at the sites using diffusion tubes as advised in LAQM.TG (22) to ensure that the levels remain at 36.0µg/m^3 or below, for the next 3 years.

3.4 2023 Monitoring

Throughout 2023 the 5 diffusion tubes site within the AQMA have remained in place along with the continuous monitor. The 2023 data from the continuous monitor has shown a reduction in and annual average NO_2 to 30µg/m^3 from 2022 (31.1 µg/m^3) and therefore remains below 36.0µg/m^3 (as shown in Figures 2 and 3), The results from the diffusion tubes will not be known until they have been bias corrected at the end of the full monitoring year. However, they are predicted to be below 36µg/m^3 from analysis and comparison with 2022 data and the current data from the continuous monitor.

3.4.1 Figure 3: A table showing the 2023 Continuous monitoring data for the Downshire Road.

Month	Average NO concentration (µg/m³)		Monthly comparison (%)	Quarterly Annual Average		Quarterly comparison (%)
	2022	2023		2022	2023	
January	45.1	53.6	+17	32.4	38.0	+16
February	25.2	35.8	+35			
March	27.6	25.3	-9			
April	23.9	27.1	+12	24.6	24.4	-0.8
May	22.7	25.7	+12			
June	27.5	20.3	-35			
July	34.8	18.8	-85	33.2	23	-36
August	30.4	21.8	-39			
September	34.5	28.6	-21			
October	31.0	30.2	-3	33.8	34.6	+2
November	28.5	39.7	28			
December	41.8	33.9	-23			
Annual Average	**31.1**	**30.0**	**- 3**			

3.5 QA/QC of Monitoring Data

All the monitoring data is presented with a robust quality assurance and quality control refer to Appendix B for full details.

4 Ongoing measure to improve the local Air Quality

In addition to working to reduce and maintain NO_2 concentrations below the annual objective in all areas of the Borough, we will continue to assess planning applications to ensure that future developments and changes to the road networks across the Borough do not lead to an increase in the NO_2 concentration above the annual mean objective of 40µg/m^3. We will also continue to regulate PPC installations to ensure that emission limits are not exceeded and the regulation of smoke control and waste burning to reduce impacts on local air quality. We will continue to provide our Anti-Idling Schools Kit to the local Primary's as well as running Clean Air Day, and other campaigns which help improve our air quality, (air-quality-school-toolkit-final-version-1-003.pdf (publicprotectionpartnership.org.uk) .

4.1 Current Borough Wide Monitoring

In the 2023 Annual Status Report Bracknell Forest confirmed it has 26 diffusion tube sites monitoring NO_2 levels in borough and that they have shown a decreasing trend since the 2018.

No diffusion tube sites located within Bracknell Forest exceeded the Annual Mean Objective. No diffusion tube results were recorded above 60µg/m^3, indicating no exceedances of the 1-hour NO_2 objective.

The continuous monitoring unit in Downshire Way, within the Bracknell AQMA, recorded an Annual Mean NO_2 level of 31.1µg/m^3 in 2022, which meets the Annual Mean NO_2 Objective (40µg/m^3) was not exceeded. The continuous monitoring also met the 1-hour NO_2 objective.

Bracknell Forest Council will be continuing to monitor the Air Quality across the borough (using diffusion tubes), it may move the locations and add new areas to the monitoring schedule as the local environment changes, such as new housing developments, changes to our road networks and the reduction of NO_2 across the borough. Bracknell is committed to continuing our work to reduce levels of pollution throughout the borough.

The Council will continue to monitor the Crowthorne AQMA along with many other areas of the borough working toward reducing the concentration of all air pollutants to achieve the Air Quality Objectives as stated in the Environmental Act 2021.

5 Bracknell Forest Council Consultation

Bracknell Forest Council will consult with statutory consultees as well as interested parties of the intention to revoke the AQMA. It invited The Highways Agency, Environment Agency, neighbouring authorities Planning, Highways and Climate Change for feedback by emailing EQteam@westberks.gov.uk.

6 References and Papers

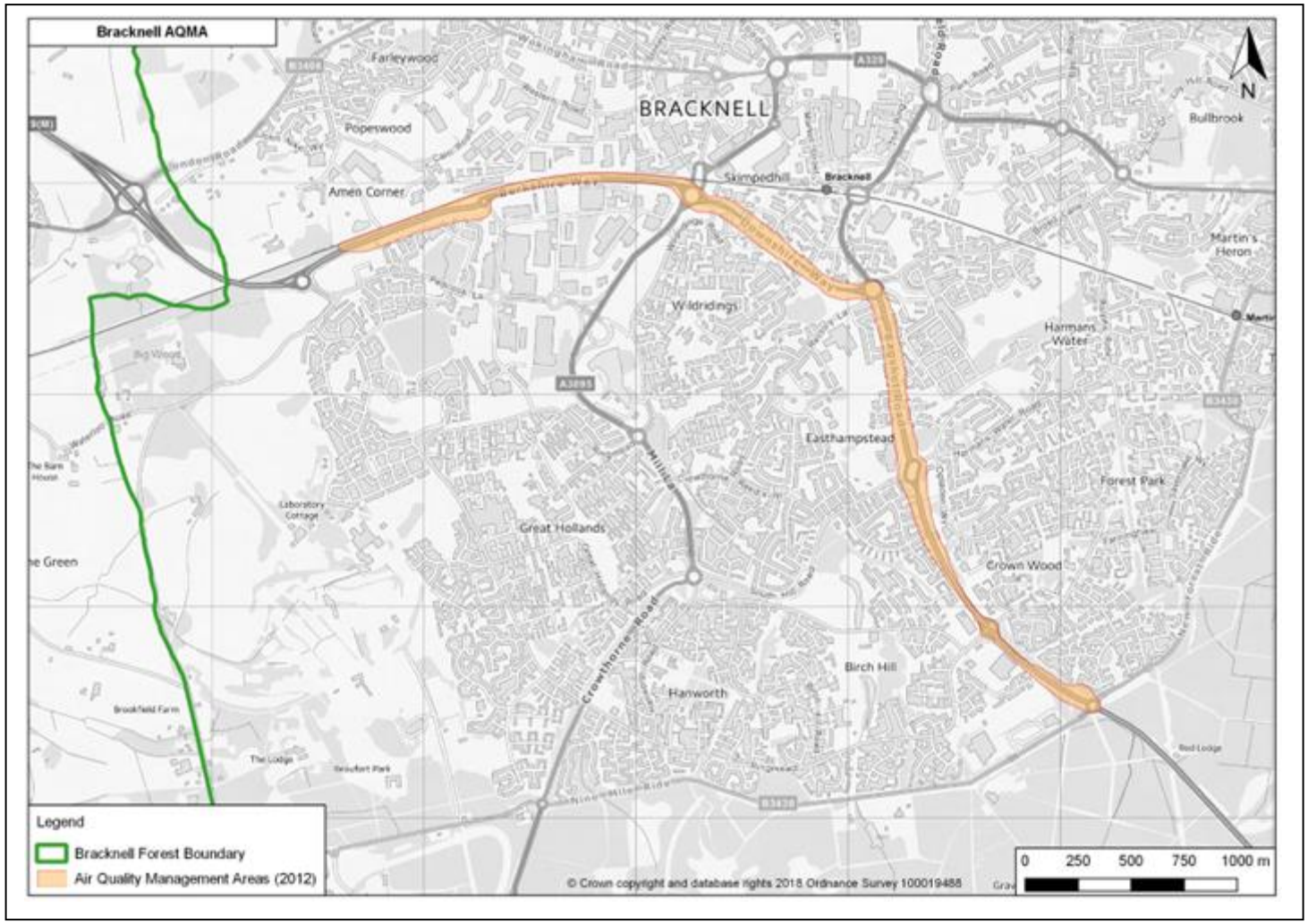
- **Bracknell Forest Council Annual Status Report** (*June 2023*), by Charlie Fielder.
  Air Quality Monitoring - PPP (publicprotectionpartnership.org.uk)

- **Air Quality Management Areas** (AQMAs) (*DEFRA October 2023*)
  AQMA Details - Defra, UK

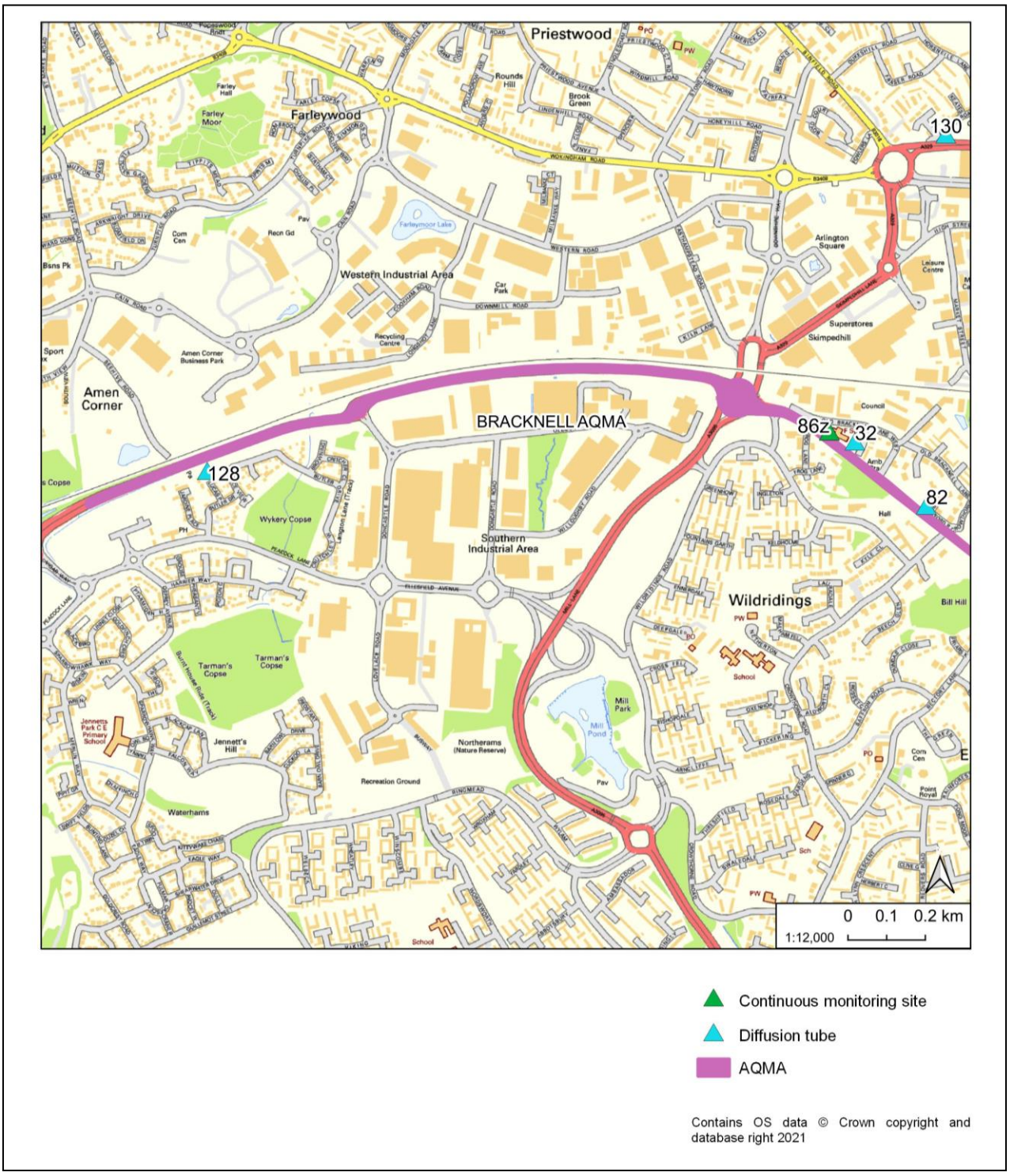
- **Local Air Quality Management Technical Guidance LAQM.TG (22)** (*August 2022).* Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
  LAQM-TG22-August-22-v1.0.pdf (defra.gov.uk)

7 Appendix A

Map 1: The Bracknell AQMA



7.1 Map 2: The Bracknell AQMA (North) diffusion tube and continuous monitoring locations



7.2 Map 3: The Bracknell AQMA (South) diffusion tube and continuous monitoring locations

Appendix B:

QA/QC for the Diffusion Tubes and Continuous Monitor

QA/QC Diffusion Tubes

Bracknell Forest Council uses GRADKO as the supplier used for diffusion tubes and the method of preparation, e.g. 20% TEA in water. The monitoring that has been completed for the past 5 years+ is in adherence with the 2022 DEFRA Diffusion Tube Monitoring Calendar (NO2 Diffusion Tube Monitoring Calendar | LAQM (defra.gov.uk)).

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO_2 Network's QA/QC and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management. The laboratory participants analyse four spiked tubes and report the results to HSL. HSL assign a performance score to each laboratory's result, based on their deviation from the known mass of nitrite in the analyte. The Performance criteria are due to be changed, at present the criteria are based on the z-score method, and equates to the following:

GOOD: Results obtained by the participating laboratory are on average within 13% of the assigned value. This equates to a Rolling Performance Index (RPI) of 169 or less.

ACCEPTABLE: Results obtained by the participating laboratory are on average within 13-26% of the assigned value. This equates to an RPI of 169 - 676.

WARNING: Results obtained by the participating laboratory are on average within 26 – 39% of the assigned value. This equates to an RPI of 676 - 1521.

FAILURE: Results obtained by the participating laboratory differ by more than 39% of the assigned value. This equates to an RPI of greater than 1521.

However, from April 2009, the criteria has been based upon the Rolling Performance Index (RPI) statistic and will be tightened to the following:

GOOD: Results obtained by the participating laboratory are on average within 7.5% of the assigned value. This equates to an RPI of 56.25 or less.

ACCEPTABLE: Results obtained by the participating laboratory are on average within 15% of the assigned value. This equates to an RPI of 225 or less.

UNACCEPTABLE: Results obtained by the participating laboratory differ by more than 15% of the assigned value. This equates to an RPI of greater than 225.

Bracknell Forest Council use Gradko International for the supply and analysis of the nitrogen dioxide diffusion tubes for their non-automatic monitoring programme. Gradko's performance for AIR PT please see Table C.2. Nitrogen Dioxide AIR PT 2019.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

A summary of bias adjustment factors used by Bracknell Forest Council over the past five years is presented in Table B.. The site which was used was Downshire Way (Bracknell AQMA). Gradko International Ltd of St Martin's House 77 Wales Street Winchester Hampshire is the supplier and analyst of the nitrogen dioxide diffusion tubes. The tubes are analysed by U.V. spectrophotometry. The limit of detection is 20% TEA/Water.

Table B.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.82
2021	National	03/21	0.81
2020	National	09/20	0.84
2019	Local	-	0.82
2018	National	03/21	0.81

QA/QC of Automatic Monitoring

TRL carry out the QA/QC on behalf of Bracknell Forest Council, below is their QA/QC procedure.

Site operation

Routine instrument calibrations are conducted approximately once a month, which involve zero and span checks, a written record of the gas analyser diagnostics and a general visual inspection of all equipment is undertaken. There is a written operating procedure, and a calibration record sheet is completed at every site visit.

Data retrieval and daily data checking

Data from the monitoring station is retrieved and processed on a Campbell CR10x data logger as 15-minute mean data. The logger was interrogated via a Siemens TC35i GSM modem at 8-hourly intervals by the ENVIEW 2000 software hosted at TRL. This was used to retrieve, check and archive data. TRL's internal QA/QC procedures require all data to be backed up on a secure server and all documentation associated with each site to be uniquely identified and securely stored to provide an audit trail. Daily data inspections are undertaken during office hours using the facilities of the Data Management System. Initial observations of the Management System indicate whether the site has been contacted during its nominated 'poll time' overnight. If this has not been successful a manual poll of the site may be required. If this is not successful further investigation of the communications integrity will be required to establish contact with the site modem and data logger. Three-day plots of recorded data are viewed for the requested site, and these are inspected and assessed for continuity, validity, minimum and maximum values, date and time, power failures and general integrity. All anomalies are recorded on the Daily Check sheet, as required. Any anomalies or queries arising from daily inspection of data, or system operation, are brought to the attention of the Project Manager who will evaluate the situation and initialise any necessary action. In the event that the PM is not available, contact will be made with the next available senior person within the monitoring team. Any issues identified with equipment operation will be referred to the client for attention within 24 hours (excluding weekends). On a weekly basis, data is examined using summary statistics and outlier analysis to establish data validity. If unusual data episodes are recorded, these would be routinely examined over longer data periods to establish their impact on trends but would also be cross referenced with data peaks and troughs recorded at other national monitoring stations. In addition, integrity and validity of data logger clock times are checked, and any significant errors recorded in the Data Management System logbook. All site data recorded through the Data Management System is archived on TRL's Network. The data is backed up daily, and the TRL IT Department maintains these data within their long-term and secure archives. This secures all data in the event of any system failure.

Data calibration and ratification

Data is ratified as per AURN recommended procedures. The calibration and ratification process for automatic gas analysers corrects the raw dataset for any drift in the zero baseline and the upper range of the instrument. This is done using Evista software-based calibration and ratification process which incorporates the zero and span check information from the calibration visits. The zero reading recorded during the calibration visits is used to adjust any offset of the baseline of the data. The difference between the span value obtained between one calibration visit and the next visit is used to calculate a factor. This change is assumed to occur at the same rate over the period between calibrations and as such the factor is used as a linear data scaler. This effectively results in the start of the period having no factor applied and the end of the period being scaled with the full factor with a sliding scale of the factor in-between. After applying the calibration factors, it is essential to screen the data, by visual examination, to see if they contain any unusual measurements or outliers. Errors in the data may occur as a result of equipment failure, human error, power failures, interference or other disturbances. Data validation and ratification is an important step in the monitoring process. Ratification involves considerable knowledge of pollutant behaviour and dispersion, instrumentation characteristics, field experience and judgement. On completion of this data correction procedure, the data set is converted to hourly means and a summary of the data is provided to Bracknell Forest Council at quarterly intervals and a calendar year annual report is prepared.

Independent Site Audits

In addition to these checks an independent site audit is carried out every 12 months to ensure the monitoring equipment is operating correctly. The audits that are carried out utilise procedures that are applied within DEFRA's National Automatic Air Monitoring Networks Quality Control Programme. The efficiency of the analyser's convertor is checked, and the analyser is also flow and leak tested. The gas bottle used for calibrations on site is also checked against the auditor's gas bottle to ensure the stability of the gas concentration.