The Newbury and Thatcham Air Quality Management Areas

Proposal for Revocation Report

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

Date: February 2024

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1 Introduction

This report was produced on behalf of West Berkshire Council and constitutes the required information under which the Council is to apply for the revocation of two Area Quality Management Areas (AQMAs) known as Newbury AQMA and Thatcham AQMA.

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 two AQMAs subject to consultation.

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 these 2 AQMAs is Nitrogen Dioxide only and the limits are set out in Table 1 below.

Table 1: The National Nitrogen Dioxide 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 West Berkshire is road transport, and the main pollutant of concern is nitrogen dioxide (NO_2). The Newbury AQAM was declared for the exceedances of the Annual Mean and 1-hour NO_2 Objectives, and the Thatcham AQAM declared for the exceedance of the Annual Mean NO_2 Objective. (See Appendix A for the maps).

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

2.3 Current Air Quality Management Area Status

In the comments from the June 2023 Annual Status Report for West Berkshire Council DEFRA has approved the recommendations made for the revocation of both of its AQMA's, as they have both recorded annual levels at or below 36.0 µg/m^3 for 3 continuous years.

[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

2.4 Requirements for the revoking an Air Quality Management Area

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:

"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 West Berkshire Council has robust monitoring data for both the Newbury and the Thatcham AQMAs, that has recorded levels at or below 36.0 µg/m^3 for 3 continuous years they can both be revoked subject to consultation.

3 Thatcham AQMA

3.1 The AQMA

The Thatcham AQMA was declared for the NO_2 annual mean in 2011, which includes part of the A4 in Thatcham from the Harts Hill Road junction to the junction with the Broadway (See Appendix A for Map 2).

3.2 The Nitrogen Dioxide Levels

The nitrogen dioxide levels for the Thatcham AQMA, have been monitored using diffusion tubes since 2001 at 5 locations (see Map 5). These are located within or near the AQMA:

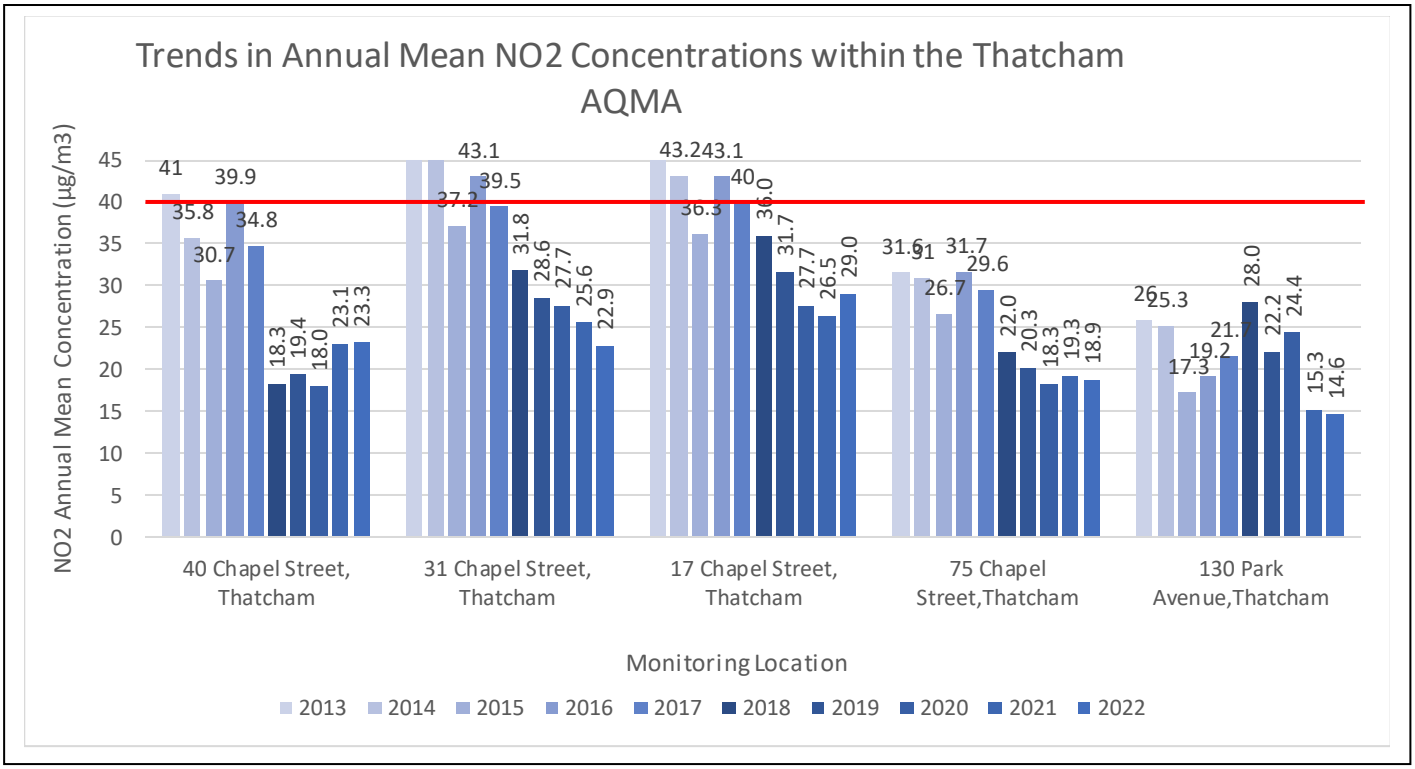
- 40 Chapel Street
- 31 Chapel Street
- 17 Chapel Street
- 75 Chapel Street
- 130 Park Avenue

The results have been 36.0 µg/m^3 or below for the past 5 years at 4 locations and 36.0 µg/m^3 or below for 4 years at site 17 Chapel Street, within the highest level reaching 36.0 µg/m^3 in 2018. Whilst the levels have started to rise slightly since 2020-2021 in two locations, 40 Chapel

Street and 17 Chapel Street, they are still below 30.0 µg/m^3 (See Figure 1). From Figure 1 it can be seen that 75 Chapel Street and 130 Park Avenue's NO_2 levels have been below 36µg/m^3 since 2013. 40 Chapel Street has been below since 2017, and 31 Chapel Street, and 17 Chapel Street since 2018. Therefore, the NO_2 started to reduce before the impact from the COVID lock downs (2020 and 2021) and changing traffic volumes and working patterns.

Several factors may attribute to these reduced levels including an increased use of electric vehicles, more people working from home "hybrid working", increase in public transport use and reduction in vehicle idling.

Figure 1: Diffusion tube Nitrogen Dioxide Levels in the Thatcham from 2018 to 2022



3.3 Future Monitoring

Monitoring will continue at the 5 sites using diffusion tubes as advised in LAQM.TG (22) to ensure that the levels remain at 36.0 µg/m^3 or below, unless direct otherwise from DEFRA.

3.4 Air Quality considerations in the Local Plan (2022 to 2023)

The *Human and Public Health Modelling Results and Interpretation section* (8) of the Local

Plan looks at the future impact on the air quality on our residents, and it concluded that the NO_2 will not exceed any of the current objectives in 2037. Air Quality Assessment.pdf (westberks.gov.uk)

The *Sub-Section on Human Health and Local Air Quality Management*, Page 101 (8.1.14) states that the;

"The AQS objective for annual mean NO_2 concentrations (40µg/m^3) is predicted to be met at all modelled receptors, both without and with the 2037 Pre-Submission Local Plan. Concentrations are reduced from the 2017 baseline scenario due to improvement in vehicle emissions and background concentrations forecast in the years up to 2037, which more than offsets the forecast traffic growth."

For *the 1-hour Mean NO_2 Concentrations* (section 8.1.18) page 101 states that;

"As all predicted annual mean NO_2 concentrations are all well below 60µg/m^3 , it is very likely that there is compliance with the 1-hour mean AQS objective. Therefore, all impacts on 1-hour mean NO_2 concentrations can be described as negligible."

Future Occupants of the Pre-Submission Site Allocations, page 118 states that the;

"Annual Mean NO_2 Concentrations In 2037, with the Pre-Submission Local Plan, Table 8-13 shows that annual mean NO_2 concentrations within all of the proposed site allocations are predicted to be below 20.0µg/m^3. The maximum annual mean NO_2 concentration across all site allocations is predicted to be 19.0µg/m^3 and is predicted within," Land at Siege Cross Farm, Thatcham'. Therefore, when compared to current air quality standard objectives, none of the sites are predicted to exceed any current objective".

The impact on annual mean NO_2 concentrations experienced at all receptors can be described as negligible. At all receptors the predicted concentrations are reduced from the 2017 baseline due to future improvements in vehicle emissions which more than offset the forecast growth between 2017 and 2037 (the end of the assessed Pre-Submission Local Plan period).

The *Public Health Change in Exposure and Relative Risk Across the District* section (page 103, section 8.2.1) states that;

"The locations within the district that are affected by annual mean NO_2 concentrations in the high (28.5 to 40 µg/m^3) and very high (>40 µg/m^3) exposure bands are expected to be substantially smaller in 2037, with no locations within the high and very high band in 2037. These improvements are due to the changes to zero/ultra-low emissions technologies in transport, industrial, commercial and residential sectors that are forecast by Defra."

4 Newbury AQMA

4.1 The AQMA

The Newbury AQMA was declared for the NO_2 in 2009. An area encompassing the roundabout junction of the A339, A343 and Greenham Road in Newbury (See Appendix A Map 2).

4.2 The Nitrogen Dioxide Levels

The nitrogen dioxide levels for the Newbury AQMA, have been monitored using diffusion tubes (7 sites, 1 of which is triplicate) and a reference continuous monitor (see Map 3). The tubes are located at:

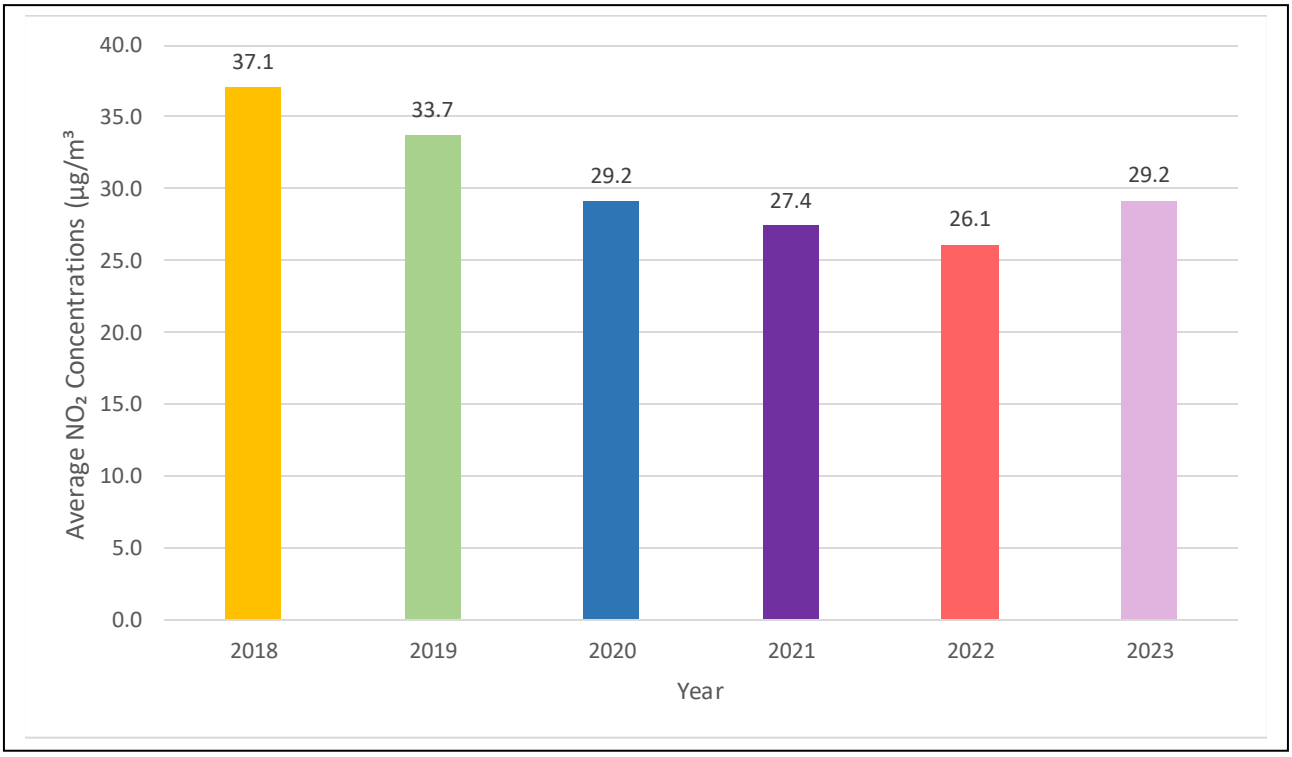
- 64 Greenham Road
- 1 Winchester Court
- Newbury Gardens Day Nursery
- 3 Howard Road
- 63 St Johns Road
- 1 St Johns Road
- Newbury Continuous Monitor

The Annual Mean results for NO_2 have been 36.0 µg/m^3 or below for the past 5 years, at all the diffusion tube locations (Figure 2). The continuous monitor has remained below 36.0 µg/m^3 since 2019, and the NO_2 has continued to decrease (Figure 3). There have not been any exceedances of the 1-hour objective in the last 5 years, where 18 are permitted. See Figure 4.

Several factors may attribute to these reduced levels including an increased use of electric vehicles, more people working from home “hybrid working”, increase in public transport use and reduction in vehicle idling.

Figure 2: Diffusion tube Annual NO_2 concentrations at Newbury AQMA from 2018 to 2022

Figure 3: Continuous Monitor Annual NO_2 concentrations at Newbury AQMA from 2018 to 2022



4.3 Monitoring

Monitoring will continue at the 7 diffusion tubes sites in Newbury as advised in LAQM.TG (22) to ensure that the levels remain at 36.0 µg/m^3 or below, unless direct otherwise from DEFRA.

4.4 Future Monitoring

Throughout 2023 the 7 diffusion tubes site within the AQMA have remained in place along with the Continuous monitor. The continuous monitoring has shown that the 2023 annual NO_2 results of 29.2µg/m^3 still remains well below 36.0µg/m^3 in 2023, see Table 2. There has only been a slight rise from the 2022 data (26.2µg/m^3). The 2023 data shows the same NO_2 annual average results as the COVID year of 2020. The results from the diffusion tubes will not be known until the raw data has been bias corrected, however they are predicted to be below 36µg/m^3 from analysing the previous year's data and the current data from the continuous monitoring.

Table 2: A table showing the 2023 Continuous monitoring data for the Newbury.

Month	Average NO_2 concentration (µg/m^3)		Monthly comparison (%)	Quarterly Annual Average NO_2		Quarterly comparison (%)
	2022	2023		2022	2023	
January	38.8	32.9	-15	32.3	31.8	-1.6
February	23.9	35.5	48			
March	33.3	27.4	-18			
April	22.3	25.3	12	20.2	29	+36
May	17.0	43.4	61			
June	21.7	18.1	-20			
July	24.7	35.5	+30	25.1	27	+7
August	25.7	20.3	-25.7			
September	Offline	24.8	n/a			
October	23.4	32.2	+32	26.6	29.1	+9
November	26.9	33.2	+21			
December	29.4	21.8	-30			
Annual Average NO_2 (µg/m^3)	**26.2**	**29.2**	**+11**			

5 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 air quality objective of 40µg/m^3. We will also continue to regulate installations to ensure that emission limits are not exceeded and continue the regulation of smoke control and waste burning to reduce impacts on local air quality. We will continue to provide our Anti-Idling Schools Toolkit 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)).

5.1 Air Quality Strategy

Up until now West Berkshire Council has not been required to have an Air Quality Strategy, as it has two declared AQMA's and had published a working Air Quality Action Plan. Once the AQMA's have been revoked, an Air Quality Strategy will then be developed in consultation with the Director of Public Health, in order to set out and progress the steps the local authority will take to continue to improve air quality in their area. This will include the continuation of air quality monitoring. Whilst the strategy is being prepared the air quality will continue to be monitored, and the Annual Status Reports submitted as it is a statutory duty which is required under the Environment Act 1995.

5.2 Current District Wide Monitoring

In the 2023 Annual Status Report West Berkshire Council confirmed it has 36 diffusion tube sites monitoring NO_2 levels in district and that they have shown a decreasing trend since the 2018. No diffusion tube sites located within West Berkshire 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 Newbury, within the Newbury AQMA, recorded an Annual Mean NO_2 level of 26.1µg/m^3, 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 and recorded no exceedances.

Furthermore, there were no exceedances of the Annual Mean NO_2 Objective from the monitoring sites within both the Newbury and Thatcham AQMAs.

West Berkshire Council will be continuing to monitor the Air Quality across the borough (using diffusion tubes and continuous monitors), it may move the locations and add new areas to 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 district. West Berkshire is committed to continuing our work to reduce levels of pollution throughout the borough.

The Council will continue working toward reducing the concentration of all air pollutants to achieve the Air Quality Objectives as stated in the Environmental Act 2021.

6 Report Consultation

West Berkshire Council has consulted with statutory consultees a well as interested parties of the intention to revoke the two AQMAs. The comments were noted, and further additions have been made to the report, for clarification.

7 References and Papers

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

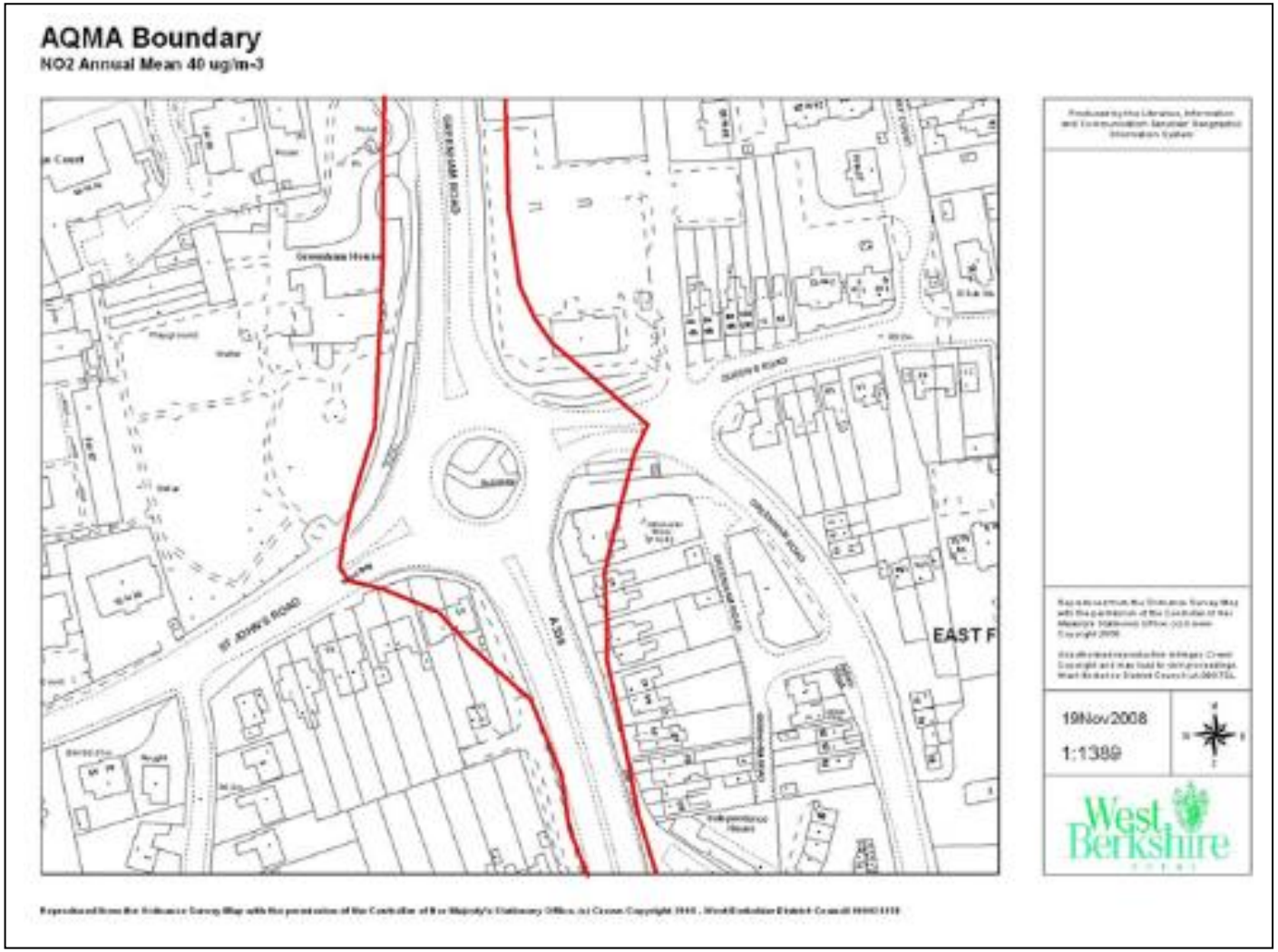
- **Air Quality Management Areas** (AQMAs) (*DEFRA October 2023*)
  Local Authority Details - Defra, UK

- **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)

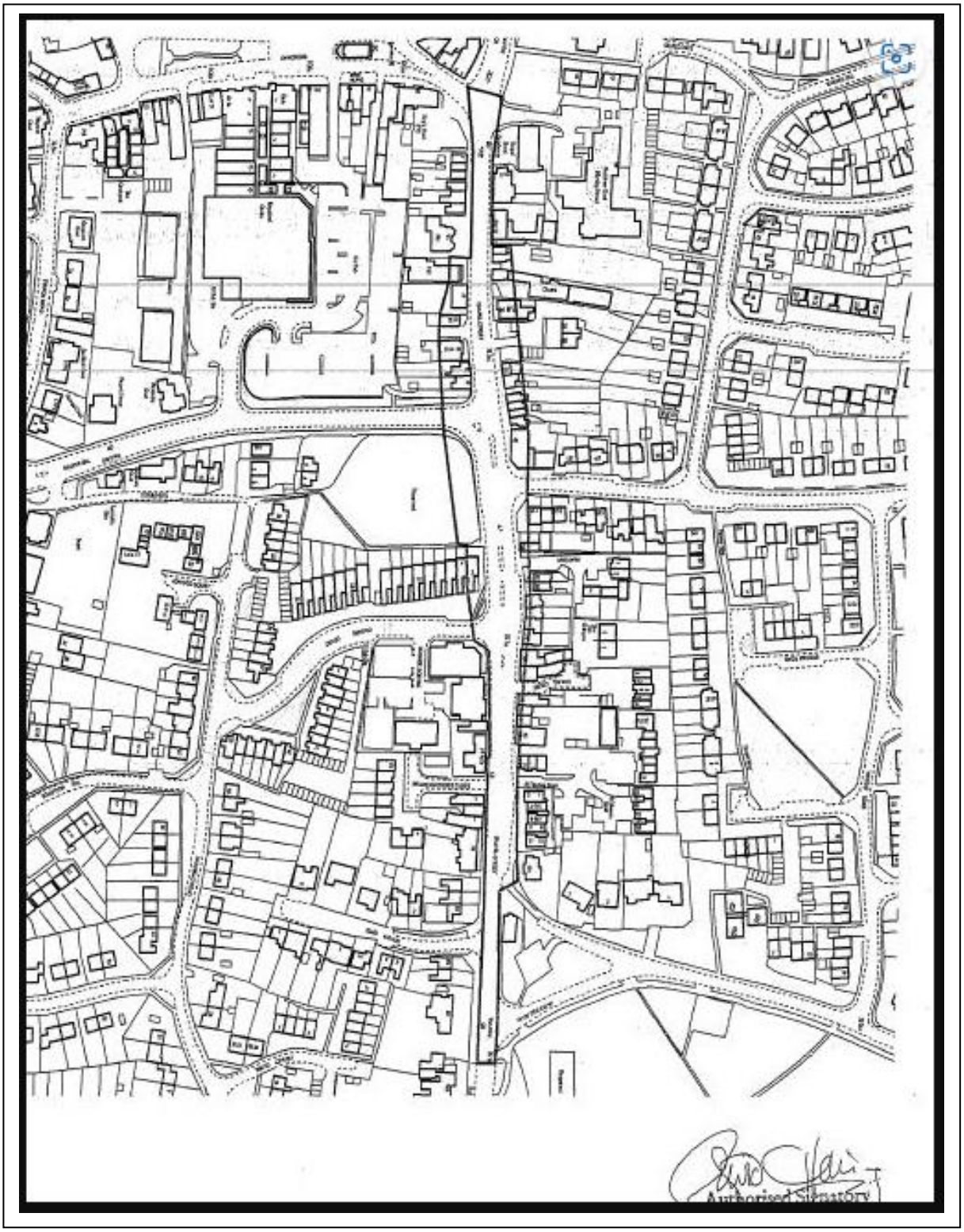
- **West Berkshire Pre-Submission Local Plan – Air Quality Assessment**, *West Berkshire Council*, (January 2023). Air Quality Assessment.pdf (westberks.gov.uk)

Appendix A

Map 1: The Newbury AQMA

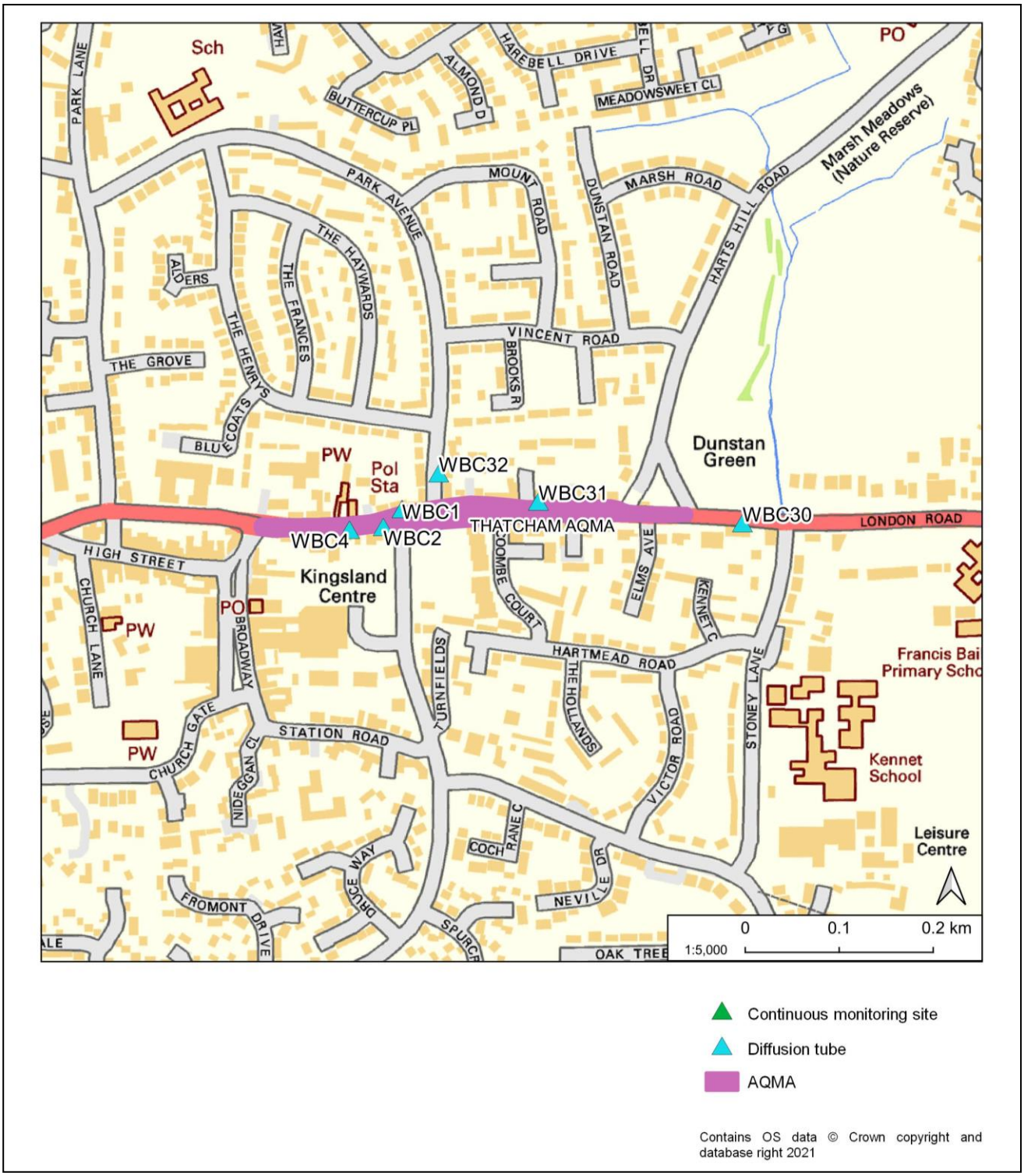


Map 2: The Thatcham AQMA



Map 3: The Newbury AQMA diffusion tube and continuous monitoring locations

Map 5: The Thatcham AQMA diffusion tube monitoring locations



Appendix B:

QA/QC for the Diffusion Tubes and Continuous Monitor

QA/QC Diffusion Tubes

West Berkshire 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.

West Berkshire 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 West Berkshire Council over the past five years is presented in Table . The site which was used was Newbury in the 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 3 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National		0.82
2021	Local	-	0.84
2020	Local	-	0.99
2019	Local	09/20	0.91
2018	Local	-	1.0

QA/QC of Automatic Monitoring

TRL carry out the QA/QC on behalf of West Berkshire 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 are 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 West Berkshire 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.