2022 Air Quality Annual Status Report (ASR)

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

Date: September, 2022

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Report Reference Number	DBC_ASR_2022
Date	September 2022

Executive Summary: Air Quality in Our Area

Air Quality in Dacorum

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution 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].

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Since 1997 English local authorities have been charged with the duty of undertaking regular review and assessment of local air quality. This involves comparing local air quality against nationally set objectives for a range of pollutants. These objectives exist to protect health and the environment. As part of their review and assessment local authorities should identify areas of concern where the objective limits are unlikely to be met and, where there is relevant exposure, e.g. housing, schools, health centres / hospitals.

Assessment can be based on prediction techniques such as air quality modelling and / or other methods such as air quality monitoring. Where objectives are unlikely to be met, the local authority must declare an air quality management area and put together a plan to improve local air quality. Collectively this process in known as local air quality management (LAQM).

When comparing air quality in Dacorum just with the nationally set objectives for air pollution, then air quality can be regarded as good. The Council has made declarations in 2012 for 3 Air Quality Management Areas (AQMA) covering 3 distinct areas of the district, that being:

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[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, July 2020

[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

- AQMA 1: Lawn Lane, Hemel Hempstead
- AQMA 2: London Road, Apsley
- AQMA 3: High Street, Northchurch (which is likely to be revoked in 2023)

All AQMAs had been declared due to an exceedance of the annual mean objective of 40µg/m^3 for nitrogen dioxide (NO_2) due to contributions from road transportation sources; furthermore the increase of use of solid fuel burning within residential area is also contributing to this due to the recent popularity of wood burners in the home. Without the onset of the pandemic in 2020, and resultant 'stay at home' and 'stay local' instruction issued by government, air quality in the Lawn Lane and London Road AQMA remained frustratingly above the objective limit in 2020, however this appears to have dropped in the 2021 data. In contrast recent air quality in Northchurch was showing compliance with the relevant objective as it has been for several consecutive years, supporting the prior suggestion for revocation of the AQMA, which it is now considered, should go ahead.

The government instructions to reduce travel during this period gave rise to subsequent reductions in local and regional traffic activity and which translated into substantial improvements in ambient NO_2 levels such that exceedances in Lawn Lane and London Road were just below the objective limit, and well below intervention limits in the Northchurch AQMA

As road traffic activity returned to normal, or close to normal, during the months of Summer 2021, while it was expected that local air quality levels could revert back to their pre-pandemic levels the 2nd half of 2021 shows this may not be the case and have sustained reduce levels or remained below the expected levels of exceedance. The increase in home and remote working as the 'new normal' will naturally have a positive impact on road traffic emissions.

Only one site has shown to exceed the AQ objective levels and this is the Diffusion Tube location DC5, a roadside location at Queensway, near to Old Town High St, Hemel Hempstead (505528 Easting, 207651 Northing). The data from 2022 will clarify if this is indeed the case and revision of the Diffusion tube network to include more monitoring locations in the nearby area will assist in showing if more attention is required at and around this location.

With this in mind the Council feels that revocation of the Northchurch AQMA should now be considered. For its 2020 ASR the Council reported ambient NO_2 levels in the Northchurch AQMA below objective limits and which represented a 2nd consecutive year of

compliance. Where a local authority is considering revocation of an AQMA this may be feasible after three or more years of compliance with the relevant objective. Despite both 2020 and 2021 being atypical, being the 5th year of compliance, given the decreasing ambient NO_2 levels in the Northchurch AQMA pre-pandemic and since the easing of lockdown restrictions in July 2021; it is likely that local air quality in this area will remain below intervention levels. Any steps now needed to revoke this AQMA will be considered in further consultation with DEFRA. This will include consideration by the Senior Leadership Team and Councillors, if approved a Revocation Notice can be produced with the seal of the council and DEFRA will be update, DEFRA are not required to approve revocation if the data supports this, as is the case in Northchurch.

The Council also made a number revisions to its local air quality monitoring network back in 2022. This involved a number of new monitoring sites (passive diffusion tubes for nitrogen dioxide (NO_2)) where it was considered additional information on local air quality was required at locations with sensitive receptors not previously considered and modifying some of the existing network to ensure these are more representative of relevant exposure. Sites regarded as non-productive were also removed from the network. As a result of all these changes the amount of monitoring within the local network decreased slightly to 49 locations (from 54) across the district (a total of 67 diffusion tubes utilising triplicate exposure at some locations).

For the 2021 ASR the diffusion tube network had also been re-ordered noting that in previous years' results were presented out of sequence. This made it difficult to collate and present results and so this has been rearranged. This has been carried over to this years and the data layout remains the same.

In addition to diffusion tube monitoring the Council continues to utilise one real-time analyser in the Northchurch AQMA. This monitors for nitrogen dioxide (NO_2) as well fine particulate matter (both PM_{10} and $PM_{2.5}$). Some data capture for fine particulate matter was lost arising from issues at site due to a defective network connection and the requirement for a replacement data logger. None the less there were no exceedances were measured either of the objectives relevant to Particulate Matter.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[5] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

As reported in the 2021 ASR the function of the AQAP steering group was postponed due to the effect of COVID-19 and redeployment of ECP staff to prioritise the local authority pandemic response in respect of test and trace and regulatory functions. This has now been reinstated, the first assembly of which has taken place on 24th June 2022 and will meet 3 times a year.

Following feedback from the reconvened group, the Council was able to make some updates to its draft AQAP following earlier appraisal from DEFRA. This included revisions to source apportionment work, which detailed the causes of poor air quality (based on breakdown of vehicle by classification), the feasibility appraisal of options and measures, and prioritisation.

The latest appraisal from DEFRA shows a move in the right direction in terms of updating the AQAP, but that the Council should progress towards publishing the AQAP. The most recent appraisal summary is reproduced at section 2.

The Council has also made positive strides in respect of climate change. Along with a number of English local authorities the Council declared a Climate Emergency in 2019. In July 2020 the Council appointed a Climate Emergency and Sustainability Programme Lead Officer to develop and implement a Climate and Ecological Emergency (CEE) Strategy and Action Plan. This CEE action plan has echoed and championed a number of the measures set out within the draft air quality action plan.

As a result the Council has therefore taken forward the proposal for an electric vehicle (EV) charging infrastructure study to determine future EV demand and identity which areas EV charge points would be best served to support wider public adoption of EV.

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[5] Defra. Clean Air Strategy, 2019

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

The Council is working with Herts County Council Public Health Team and Air Strategy Lead in rolling out an Air Quality Alert System focusing on providing a data tool for vulnerable members of the public to identify days and areas of likely poor air quality incidents.

Conclusions and Priorities

Noting the latest appraisal comments from DEFRA in respect of the Council's draft AQAP the priority should be to finalise this work.

Within the region of South West Herts notable growth is still planned in Dacorum as well as neighbouring authorities of Luton, St Albans and Watford and therefore important that new development has a role to play in sustainability and improvement of local air quality. The Council continues to participate in the Herts and Beds air quality group that meets to discuss air quality matters affecting the County as a whole.

The Environmental and Community Protection (ECP) team will also continue to support and input into development of the local plan. Consultation closed in March 2021. As part of its consultation response ECP recommended a sustainability design guide noting that various obligations of national planning policy as regards healthy communities, transport and climate change require similar outcomes and exploiting these obligations to promote the co-benefits. For example travel plans produced under a transport obligation can support cycle schemes and which can promote health, and emissions reduction both in respect of climate and air quality.

The impact of COVID-19 on ambient average NO_2 concentrations in 2020/21 has had a clear benefit in respect of the Council's 3 AQMAs. Which appears to have sustained throughout the last 2 quarters of 2021, post Covid 19 restrictionsrestrictions being lifted. The pandemic appears to have accelerated the shift towards home working meaning some of the positive effectors on air quality may remain to an extent, thus reducing demand on local roads during peak hours of congestion.

The Council will also be communicating further with DEFRA as regards steps required to consider revoking the Northchurch AQMA. Notwithstanding the impact on monitoring data as a result of the pandemic and subsequent lockdowns, the Council considers that ambient air quality levels in this locality are likely to remain below intervention levels to support revocation and this appears to be supported by the data following restrictions being lifted, which should be ratified by the 2022 data, if these trends continue.

The Council also identified a new potential area of exceedance as a result of new monitoring introduced for 2020. This was identified at a single receptor point on Queensway close to the Old Town. This is the only location for the 2021 data reported which has exceeded the Air Quality Objectives and remains a location of interest as a result. Further monitoring and data capture will take place to assess the potential causes of this.

Local Engagement and How to get Involved

As part of the delivery of the AQAP the Council intends to consult when appropriate on individual measures. This will include actively consulting with key partners, the public and businesses.

As part of maintaining contact with the public the Council will continue to ensure that reports and monitoring results are made publically available through the Council's web pages.

Working with Herts County Council, Dacorum are feeding into an Air Quality Alert system which will hope to provide advice and guidance to those vulnerable and at high risk of being physically impaired by the effects of incidents of poor air quality.

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Local Air Quality Management

This report provides an overview of air quality in Dacorum during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Dacorum to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

Actions to Improve Air Quality

The priority focus of the Council during the last 2 years until recently has been responding to the impact of COVID-19. Officers within the Environmental and Community Protection team had been redeployed to prioritise functions linked to local test and trace and ensuring compliance with various iterations of COVID regulation connected to the operation of business and their COVID secure obligations.

Therefore opportunities to progress actions to improve air quality had been limited to addressing the previous commentary provided by DEFRA in respect of the Council's draft Air Quality Action Plan (AQAP), specifically updating source apportionment work and undertaking a feasibility assessment and prioritisation of AQAP measures. This is now back to being a key focus and with the re-initiation of the Air Quality Steering Group in June 2022 will be addressed with more priority.

An overview of the measures proposed as part of the draft AQAP are:

- Maintaining close links with the Local Transport Plan, Local Planning and Public Health
- Influencing emission reduction from new developments
- Potential to relocate bus stops and on-street parking in the Northchurch AQMA
- Clean Air Zone feasibility study
- Workplace parking levy
- Private hire and taxi vehicle emissions policy
- Advanced quality bus partnership
- Reducing council emissions
- Electric vehicle charging infrastructure study / strategy
- Promoting sustainable travel and discouraging the use of single car journeys

Following the Climate Emergency declaration, in 2020, a sixth priority was added to the Council's Corporate Plan - The Climate and Ecological Emergency (CEE) which encompasses four core targets:

- To achieve net zero emissions (scopes 1 and 2) as an organisation by 2030
- To achieve net zero emissions for our council housing stock (approximately 10,500 homes) by 2050 at the latest
- To support the borough in becoming net zero by 2050 at the latest
- To support an increase in biodiversity within the borough as much as possible

A Climate Emergency and Sustainability Programme Lead Officer was appointed in July 2020. The role of this officer is to develop and support the delivery of the CEE strategy and action plan in order to achieve these targets. The four key focuses for this CEE work are sustainable transport, energy use in buildings, sustainable communities and biodiversity. The officer has been invited to, and is actively involved in, the Air Quality Steering Group from June 2022.

Some of the early work of the draft AQAP has been transposed in the CEE Action Plan and through the work of the lead officer progress has begun on the development of an Electric Vehicle Strategy for the borough. Currently we are unable develop this EV strategy further as we are waiting for the Government to release its Transport Decarbonisation Plan and Hertfordshire County Council to release its own Electric Vehicle Strategy as both of these documents from higher governing bodies affect the work that we will be able to do locally. However, we have been able to make progress in some areas. Most notably:

- An internal Sustainable Transport - Climate Emergency group has been established, with an Electric Vehicle sub-group.
- An Electric Vehicle Charging Infrastructure study has been carried out with a sustainability consultant. The key highlights from this work to are:
    - Within Dacorum it is anticipated we will have at least 30,000 EVs by 2030
    - At least one third of households in the district are unable to charge at home
    - Between 600-700 on-street EV charge points will be required to meet demand

- An ongoing Electric Vehicle Residents Survey has been launched on our website which has already had nearly 2000 responses.
- Dacorum have committed to apply to the government's On-Street Residential Chargepoint Scheme (ORCS) this financial year
    - Potential sites for EV chargepoints have been identified
    - Feasibility studies for these sites are in the process of being carried out
    - We have partnered with a supplier to deliver these additional chargepoints
    - Both the resident's survey and consultancy report were designed ready to be used as evidence for this ORCS application.

One of our internal high level actions will be to decarbonise the Council's fleet by 2030 (recognising that waste collection vehicles may take longer than this depending on technologies).

We will also be working on a variety of behavioural change initiatives within the borough to encourage more sustainable transport.

Aside from transport, additional studies are also taking place into the current tree stock and external consultant support being provided to shape future tree planting strategies for around the borough.

Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives. Based on the 2021 data, there are no exceedances within the existing AQMA areas, therefore the 'Level of Exceedance, Current Year' is not applicable.

A summary of AQMAs declared by Dacorum can be found in Table 2.1. The table presents a description of the 3 AQMA(s) that are currently designated within Dacorum. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA(s) and also the air quality monitoring locations in relation to the AQMA(s). The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- NO_2 annual mean

As noted in the preceding chapter the Council is now proposing that it should consider revoking the Northchurch AQMA subject to further discussion with DEFRA.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Lawn Lane, Hemel Hempstead	1st June 2012	NO2 Annual Mean	An area encompassing a number of properties overlooking to Lawn Lane, and the boundary declared between Belswains Lane and Seaton Road	NO	57	**n/a**	Under review	Under review
London Road, Apsley	1st June 2012	NO2 annual mean	An area encompassing a number of properties overlooking London Road, and the boundary declared between Featherbed Lane and Weymouth Street	NO	55.9	**n/a**	Under review	Under review
High Street, Northchurch	June 2012, amended Oct 2013	NO2 annual mean	An area encompassing a number of properties overlooking High Street, Northchurch, and the boundary declared between Mandelyns and Bell Lane	NO	42.2	**n/a**	Under review	Under review

☒ **Dacorum Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **Dacorum Borough Council confirm that all current AQAPs have been submitted to Defra.**

Progress and Impact of Measures to address Air Quality in Dacorum

Defra's appraisal of last year's ASR concluded:

1. The Council have submitted a detailed and well written report, and appear to have addressed many of the comments outlined following last year's appraisal, which is commended.
2. QA/QC of monitoring data has been discussed, and the council have opted to apply the local bias factor, which is appropriate. A screen capture of the local bias factor spreadsheet tool showing the derived factor has been provided. Discussion on choice of factor has been included, which adheres to good practice.
3. The Council operate a network of 74 diffusion tubes (DTs) located across 54 sites, which is clearly stated within the report, although the exact distribution of DTs across these sites is difficult to determine. It is possible that there are multiple sites in close proximity, as cross-checks revealed 51 unique sets of coordinates listed in Table A.2, however a review of the location descriptions indicated 54 unique site descriptions. Where sites have duplicate or triplicate tubes, it is beneficial to clearly note this within Tables A.2 and A.3 for ease of interpretation. It would also be appropriate to present the duplicate/triplicate means in Table A.3, and full monthly results for each tube in Table B.1, to prevent miscommunication/misinterpretation of results.
4. The Council are awaiting approval on their draft new AQAP, and have provided an overview of some of the measures proposed as part of the new plan, which is useful. It is expected that next year's ASR contain a full overview of all actions within the AQAP and a detailed assessment of progress is provided within Table 2.2.
5. Detailed discussion of $PM_{2.5}$ has been included, and a discussion of the Public Health Outcomes Framework fraction of mortality has been provided (This indicator is used to determine the fraction of annual all-cause mortality attributable to long-term exposure to current levels of anthropogenic particulate pollution). Due to the significant impact of $PM_{2.5}$ on human health, the inclusion of $PM_{2.5}$-specific measures within the new AQAP is strongly advised.

6. The Council have provided maps of monitoring locations, which is a welcomed addition to the report. Monitoring locations are indicated, and AQMA boundaries depicted, however monitoring locations have not been labelled. It would be extremely beneficial for the Council to label the monitoring sites corresponding with the IDs listed in the results table (e.g. DC40 etc).
7. Annual mean concentrations of NO_2 within the Northchurch AQMA were below the annual mean objective for NO_2 for the second consecutive year. The Council are commended on this achievement, and are aware of the requirement for continued compliance for three or more years before revocation of AQMA status can be considered.
8. The Council has listed a number of priorities for the next year, which includes the adoption of their new AQAP and the implementation of various measures. These priorities are appropriate and the council should provide a detailed update on the progress of these in the next reporting year.

Due to the impact and effect of COVID-19 this has affected the ability of Dacorum to finalise its action plan from the current version which remains in draft. Therefore the key achievements in respect of local air quality during 2020/21 is that the Council was able to keep up with local monitoring as regards exchange of passive diffusion tubes, LSO (local site operator) functions, and making adjustments to the draft action plan to update the source apportionment, undertake a feasibility assessment of AQAP measures, and their prioritisation.

In pursuit of improving local air quality, and as a result of its action on climate change the Council appointed a lead Climate Emergency and Sustainability Programme Lead Officer whose role has been to champion the CEE Strategy and Action Plan as well as developing new work streams. The CEE action plan integrated a number of measures set out in the draft AQAP. As such the Council has begun progress some elements of the draft AQAP under climate change, and which includes work on the electric vehicle charging infrastructure study.

As already noted, the key highlights from work to date on this project has identified:

- Within Dacorum it is anticipated we will have at least 30,000 EVs by 2030
- At least one third of households in the district are unable to charge at home
- Between 600-700 on-street EV chargepoints will be required to meet demand

The principal challenges and barriers to implementation that Dacorum Borough Council anticipates facing are due to the fact that NO_2 emissions arise from transportation sources. Dacorum is situated within a 2-tier authority structure meaning that control over local roads and highways sits with Hertfordshire County Council.

Moreover, and as local lockdowns have demonstrated, a substantial reduction in the amount of road users is required to bring about lasting and exacting improvement to ambient NO_2 concentrations in the Lawn Lane and London Road AQMAs noting the improvements reported in the 2020 dataset. This simply outlines the scale of task at hand for two small areas of the district.

$PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The Air Quality Expert Group (2015) estimate that UK emissions contribute to approximately 50-55% of the total annual average $PM_{2.5}$ in the UK. The European Environment Agency estimates that road transport sources contribute to 13% of European emissions of $PM_{2.5}$ in 2013. Data presented by the Air Quality Expert Group (2015) estimated the contribution from traffic to be 7% in the UK. This emphasises that a large proportion of airborne $PM_{2.5}$ originate from other sources, including sea-salt, inorganic aerosols, organic aerosols and non-traffic generated rural and urban particulates including biomass burning both domestic and commercial.

There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The obligation placed upon local authorities in respect of $PM_{2.5}$ is that they are expected to work towards reducing emissions and concentrations of $PM_{2.5}$ in their local area as practicable and consider action if necessary to address $PM_{2.5}$ issues in their area, and aligning those interests with those public health officers.

However policy guidance LAQM.PG16 does not prescribe what the local authority role should be; it is for the local authority in consultation with its public health officials and others to consider how it wishes to define this role.

Whilst there are no numerical limit values prescribed for $PM_{2.5}$ for England and no statutory obligations on local authorities in respect of monitoring concentrations of $PM_{2.5}$ in the ambient air, the EU Ambient Air Quality Directive has identified 25ug/m^3 as a limit value to be met by 2020 and the World Health Organisation (WHO) has set an air quality guideline of 10ug/m^3 (reducing to 5ug by 2030) as an annual mean for $PM_{2.5}$.

The only specific indicator for $PM_{2.5}$ is included within the Public Health Outcomes Framework (Public Health Outcome Indicator (PHOI) 3.01) which is stated as:

'The fraction of annual all-cause mortality attributable to long-term exposure to current levels of anthropogenic particulate pollution.'

This indicator is based on an estimated amount of $PM_{2.5}$ derived by Defra modelling from local measurement, including one site in Borehamwood, Hertfordshire and another in Bedfordshire. That data has been adjusted by way of population to give a population weighted figure before its use in deriving the PHOI.

The $PM_{2.5}$ focused PHOI reflects the adverse impact that this type of air pollution can have on public health as a result of the fine particles being carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.

Within Hertfordshire joint working on air quality issues between the local authorities and Hertfordshire County Council for $PM_{2.5}$ as part of the Herts and Beds air quality group has included a local monitoring project. The aim has enabled the collection of real-time direct measurements of $PM_{2.5}$ concentrations from multiple locations within Hertfordshire in order to address the paucity of $PM_{2.5}$ data available within the County.

The most recent report remains the Hertfordshire Local Authorities Report on Particulate Matter ($PM_{2.5}$) in Ambient Air in 2018 for Hertfordshire County Council Public Health (November 2019). This identifies that it is important to recognise that the figures published for PHOI 3.01 are estimates and therefore cannot be used for performance monitoring; they can only provide an indication of the scale of the issue. Further information on the use of health related air quality data is available at: https://hertshealthevidence.org/documents/thematic/airqualitydatafaq-briefing-2019-07.pdf.

It is for this reason that the report does not make direct reference to the PHOI figures, but uses the population weighted Defra modelled $PM_{2.5}$ concentrations in their place.

The report makes the following broad observations:

- The number of days on which the levels of $PM_{2.5}$ were measured above a concentration defined by the Daily Air Quality Index for air pollution to be representative of 'moderate', 'high' and 'very high' air pollution typically occur in the winter months in weather conditions that are still and cold. The apparent seasonal trend is as would be expected because it is recognised that cold, still weather conditions typically prevent the dispersal of local air pollution including particulate matter.
- Breaches are likely to be associated with regional or national scale air pollution episodes and only partially associated with locally derived road vehicle pollution

- Breaches may also arise if weather conditions are such that air pollution from the continent (and potentially further afield) is transported across to Britain
- Defra modelled $PM_{2.5}$ concentrations for each local authority area are broadly consistent with the concentrations being measured by the analysers within each local authority
- Where data capture rates have been reliable the mean annual average concentrations of $PM_{2.5}$ recorded have not varied significantly from 2016 to 2021.
- When elevated concentrations of $PM_{2.5}$ were detected they were typically detected at multiple Hertfordshire based analysers. This is suggestive that on the majority of the days where breaches were measured these would have been associated with a non-localised air pollution episode.

The Daily Air Quality Index for air pollution is a UK Air Information resource to inform the public on levels of air pollution and provides recommended actions and health advice. The index is numbered 1-10 and divided into four bands, low (1) to very high (10). Air pollution bandings are defined as:

- Moderate is defined as being above 36µg/m^3 but less than 54µg/m^3
- High is defined as being between 54µg/m^3 and 70µg/m^3
- Very High is defined as being 71µg/m^3 or higher

All are calculated as a 24-hour running mean.

However, beyond its participation in the Herts and Beds Air Quality group the Council currently has no specified measures for emissions reduction for $PM_{2.5}$, and as a result of the pandemic there has been limited progress on the draft AQAP.

As aforementioned within this report the Council is working to various net zero targets for our organisation, our housing stock, as well as the wider borough, and is developing and delivering a CEE Strategy and Action Plan to achieve these. This includes a number of high level actions, including fleet decarbonisation, improvement of energy efficiency in all of our built assets and housing stock, and investigating the role that renewables can play in the borough, with a likely emphasis on solar.

Whilst climate change focuses on greenhouse gas emissions reduction this can play a complimentary role in respect of local air quality management and vice versa. The CEE Action Plan incorporates elements from the draft AQAP as regards reductions from Council emissions.

Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2021 by Dacorum Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

Automatic Monitoring Sites

Dacorum Borough Council undertook automatic (continuous) monitoring at one site during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The Herts and Beds Air Quality Monitoring Service page https://www.airqualityengland.co.uk/local-authority/?la_id=408 presents automatic monitoring results for Dacorum Borough Council, and forms part of the UK-Air website .

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

Non-Automatic Monitoring Sites

Dacorum Borough Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 49 sites during 2021.

New sites were introduced in 2020 to consider areas not previously identified under previous rounds of review and assessment and where air quality concerns may be present. Sites were selected based on either local knowledge and / or reports produced by consultants for new development that suggested ambient NO_2 levels approaching the annual average objective.

Monitoring was introduced at the following locations:

- A section along St Albans Road, between Bennetts End and Leverstock Green Way – Hemel Hempstead
- The junction at Maylands Avenue and Wood Lane End – Hemel Hempstead
- The roundabout at Coombe Street and Leighton Buzzard Road – Hemel Hempstead
- The roundabout at Queensway and Marlowes – Hemel Hempstead
- The junction formed by Lower Kings Road, Kings Road and High Street – Berkhamsted
- A section along Brook Street near to the Silk Mill Industrial Estate – Tring

Some tweaks were also made within existing AQMAs by relocating diffusion tubes to locations regarded to be more representative of relevant exposure. Some diffusion tubes were also relocated / removed in line with technical guidance (LAQM.TG16) to ensure free circulation of air around the tube, i.e. to avoid overhanging vegetation.

Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

Nitrogen Dioxide (NO_2)

As a result of the COVID-19 pandemic and its impact on local air quality in the first half of 2021, only 1 exceedance was measured across the district across the year's average, following bias adjustment and distance drop off calculations. Whereas in previous years local monitoring remained well above the objective limit the Lawn Lane and London Road AQMAs, the effect on local air quality, likely arising from 'stay at home' / 'stay local'

instruction resulted in further improvements on previous years, bringing both AQMA areas below the exceedance limits.

Taking the average of the triplicate exposure in the London Road AQMA in 2020 the annual average was 40.7µg/m^3. At the same location in 2021 this was 31.5µg/m^3, an improvement of 8µg/m^3.

Taking the average of the triplicate exposure in the Lawn Lane AQMA in 2020 the annual average was 39.9µg/m^3. At the same location in 2021 this was 27.7µg/m^3, an improvement of 12µg/m^3.

The work of the Herts and Beds Air Quality Group has included commissioning work 'COVID19 lockdown effects on air quality' which examined the impact of lockdown on ambient air quality data.

This page can be found at:
https://www.airqualityengland.co.uk/assets/reports/408/HertfordshireandBedfordshire_report_covid_analysis.html#monthly_change_in_pollutant_concentrations

Noting the estimated reduction in transport use and the corresponding improvement in local air quality it highlights the scale of reduction required to bring about improvement in local air quality. To bring NO_2 levels close to or within objective limits it has taken a national lockdown and thus demonstrates the difficult challenges presented with action planning to reduce activity on local roads and promote modal shift. However, with this continuing to drop post-lockdown in 2021, a further year will be needed to assess whether the changes in culture (increases in remote working, reliance on grocery delivery and so on) will have a lasting impact.

In the Northchurch AQMA measured concentrations for 2021 are well below the objective limit. In its previous ASR the Council reported 3 years of compliance. To support revocation of the AQMA, Policy Guidance LAQM.PG16 specifies this will typically be feasible after three or more years of compliance. Monitoring from 2020 and 2021 would represent a 3rd and 4th year of compliance, although results in 2020/21 clearly arise from an atypical year. Notwithstanding the 2020/21 results, the Council believes that conditions are appropriate to consider revocation of the Northchurch AQMA on the basis that local air quality has been stabilising of generally showing an improvement since 2018. The Council will be consulting with DEFRA on steps required to consider revoking this AQMA.

Aside from AQMA monitoring results the Council also measured an exceedance at one new monitoring location in the Old Town (Queensway and Marlowes). The annual average

at this location was 44.3µg/m^3 in 2020 following distance correction, this has increased to 45.4µg/m^3 in 2021. Noting location (less activity than in existing AQMAs but road narrowing and junction), impact of lockdown, surrounding monitoring and comparisons with month to month data at AQMA receptor points this result is higher than expected. Monitoring through 2022 continues at this receptor point to determine if further action on air quality is necessary.

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

The Council has been monitoring PM_{10} and $PM_{2.5}$ at the automatic monitoring station on the High Street, Northchurch, since August 2015.

In 2021 valid data capture was skewed slightly due to communication and network issues at site. No exceedances were measured for either of the objectives relevant to PM_{10} and a slight reduction on the previous years' data. Noting that road transport appears not to be as significant a contributor to local PM_{10} concentrations as NO_2 concentrations the concentration reduction as a result of the pandemic is not as marked.

Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years. The objective for $PM_{2.5}$ is not a numerical objective, but an expectation that local authorities should work towards reducing emissions/concentrations of fine particulate matter.

The annual average measured for 2021 was 9µg/m^3, which has shown no increase or decrease on the 2020 statistics.

For 2021 the data capture at this station achieved 90%, a significant improvement on the previous year (66%) showing improvements made onsite in regards to the recording technology and logger have worked.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	High Street, Northchurch	Roadside	497295	208901	NO2; PM10; PM2.5	YES	Chemiluminescent; FIDAS	10	3	2

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?
DC1	Cotterrells	Roadside	505355	206504	NO_2	N	5.0	1.0	N
DC2	Southhill Road BG	Background	505251	206960	NO_2	N	4.0	0.5	N
DC3	Leighton Buzzard Road	Roadside	505339	207238	NO_2	N	6.5	2.5	N
DC4	LB Road / Coombe Street	Roadside	505340	207207	NO_2	N	8.0	2.0	N
DC5	Queensway 1	Roadside	505528	207651	NO_2	N	1.0	2.0	N
DC6	Queensway 2	Roadside	505545	207649	NO_2	N	0.0	3.0	N
DC7	Queensway 3	Roadside	505587	207686	NO_2	N	0.0	3.0	N
DC8	Old Town Background	Background	505533	207842	NO_2	N	0.0	15.0	N
DC9	Kylna Court	Roadside	507848	208000	NO_2	N	6.0	2.0	N
DC10	New Park Drive	Urban Background	507774	207313	NO_2	N	6.0	1.0	N
DC11	Green Dell Way	Urban Background	508013	207155	NO_2	N	6.0	2.0	N
DC12	Not yet deployed				NO_2	N			N
DC13	St Albans Rd 2	Roadside	507880	207170	NO_2	N	5.5	2.5	N
DC14	St Albans Rd 3	Roadside	507716	207047	NO_2	N	8.5	1.5	N
DC15	High Street, Markyate 1	Roadside	506227	216317	NO_2	N	0.0	2.0	N
DC16	High Street, Markyate 2	Roadside	506093	216501	NO_2	N	0.0	1.5	N
DC17	Gravel Path, Berkhamsted	Roadside	499703	207838	NO_2	N	0.0	1.0	N
DC18	Chapel Street, Berkhamsted	Roadside	499448	207870	NO_2	N	2.0	2.0	N
DC19	Prince Edward Street, Berkhamsted	Urban Background	499207	207754	NO_2	N	43.0	2.0	N
DC20	High Street 1, Berkhamsted	Roadside	498990	207924	NO_2	N	3.0	3.0	N

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?
DC21	High Street 2, Berkhamsted	Roadside	499095	207874	NO_2	N			N
DC22	High Street 3, Berkhamsted	Roadside	499131	207838	NO_2	N	1.0	4.0	N
DC23	Lower Kings Rd 1	Roadside	499129	207942	NO_2	N	1.5	2.5	N
DC24	Lower Kings Rd 2	Roadside	499125	207900	NO_2	N	1.5	0.8	N
DC25	Kings Rd 1	Roadside	499108	207835	NO_2	N	0.0	2.0	N
DC26	Kings Rd 2	Roadside	499095	207838	NO_2	N	0.0	1.0	N
DC27	BFI 1, Shooters Way	Roadside	498323	206948	NO_2	N	3.0	2.0	N
DC28	BFI 2, Shooters Way	Roadside	498318	206950	NO_2	N	0.0	2.0	N
DC29	Stone Cottages, Kings Road	Roadside	498289	207005	NO_2	N	0.0	7.0	N
DC30	The Meads	Roadside	497472	208730	NO_2	N	8.0	2.0	N
DC31	High Street 1A, Northchurch	Roadside	497346	208835	NO_2	Y – AQMA 3	1.5	1.0	N
DC32	High Street 1B, Northchurch	Roadside	497346	208835	NO_2	Y – AQMA 3	1.5	1.0	N
DC33	High Street 1C, Northchurch	Roadside	497346	208835	NO_2	Y – AQMA 3	1.5	1.0	N
DC34	New Road	Roadside	497355	208852	NO_2	Y – AQMA 3	0.0	1.5	N
DC35	High Street 2A, Northchurch	Roadside	497335	208860	NO_2	Y – AQMA 3	0.0	3.0	N
DC36	High Street 2B, Northchurch	Roadside	497335	208860	NO_2	Y – AQMA 3	0.0	3.0	N
DC37	High Street 2C, Northchurch	Roadside	497335	208860	NO_2	Y – AQMA 3	0.0	3.0	N
DC38	Northchurch Analyser A	Roadside	497295	208901	NO_2	Y – AQMA 3	4.0	3.0	Y
DC39	Northchurch Analyser B	Roadside	497295	208901	NO_2	Y – AQMA 3	4.0	3.0	Y
DC40	Northchurch Analyser C	Roadside	497295	208901	NO_2	Y – AQMA 3	4.0	3.0	Y

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?
DC41	High Street 3, Northchurch	Roadside	497306	208874	NO_2	Y – AQMA 3	0.0	2.0	N
DC42	Brook Street 1, Tring	Roadside	492611	212006	NO_2	N	0.0	2.5	N
DC43	Brook Street 2, Tring	Roadside	492680	212663	NO_2	N	1.0	1.0	N
DC44	Watford Rd, Kings Langley	Roadside	507611	201620	NO_2	N	23.0	2.0	N
DC45	High Street, Kings Langley	Roadside	507168	202802	NO_2	N	1.0	3.0	N
DC46	Belswains Lane, HH	Roadside	507005	204677	NO_2	N	3.0	1.0	N
DC47	London Rd, Aplsey 1A	Roadside	505677	205513	NO_2	Y – AQMA 2	0.0	1.5	N
DC48	London Rd, Aplsey 1B	Roadside	505677	205513	NO_2	Y – AQMA 2	0.0	1.5	N
DC49	London Rd, Aplsey 1C	Roadside	505677	205513	NO_2	Y – AQMA 2	0.0	1.5	N
DC50	London Road, Apsley 2A	Roadside	505737	205443	NO_2	Y – AQMA 2	1.0	2.0	N
DC51	London Road, Aplsey 2B	Roadside	505737	205443	NO_2	Y – AQMA 2	1.0	2.0	N
DC52	London Road, Apsley 2C	Roadside	505737	205443	NO_2	Y – AQMA 2	1.0	2.0	N
DC53	London Road, Aplsey 3	Roadside	505770	205430	NO_2	Y – AQMA 2	1.5	3.5	N
DC54	London Road, Apsley 4	Roadside	505696	205509	NO_2	Y – AQMA 2	0.0	4.0	N
DC55	London Road, Aspley 5	Roadside	505797	205436	NO_2	Y – AQMA 2	0.0	2.0	N
DC56	Durrants Hill 1A	Roadside	505734	205519	NO_2	Y – AQMA 2	1.0	2.0	N
DC57	Durrants Hill 1B	Roadside	505734	205519	NO_2	Y – AQMA 2	1.0	2.0	N
DC58	Durrants Hill 1C	Roadside	505734	205519	NO_2	Y – AQMA 2	1.0	2.0	N
DC59	Lawn Lane, HH 1A	Roadside	505969	205726	NO_2	Y – AQMA 1	1.0	1.0	N

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?
DC60	Lawn Lane, HH 1B	Roadside	505969	205726	NO_2	Y – AQMA 1	1.0	1.0	N
DC61	Lawn Lane, HH 1C	Roadside	505969	205726	NO_2	Y – AQMA 1	1.0	1.0	N
DC62	Lawn Lane, HH 2A	Roadside	505930	205740	NO_2	Y – AQMA 1	0.0	1.0	N
DC63	Lawn Lane, HH 2B	Roadside	505930	205740	NO_2	Y – AQMA 1	0.0	1.0	N
DC64	Lawn Lane, HH 2C	Roadside	505930	205740	NO_2	Y – AQMA 1	0.0	1.0	N
DC65	Lawn Lane, HH 3A	Roadside	505901	205788	NO_2	Y – AQMA 1	5.5	1.5	N
DC66	Lawn Lane, HH 3B	Roadside	505901	205788	NO_2	Y – AQMA 1	5.5	1.5	N
DC67	Lawn Lane, HH 3C	Roadside	505901	205788	NO_2	Y – AQMA 1	5.5	1.5	N
DC68	Lawn Lane, HH 4	Urban Background	506053	205664	NO_2	Y – AQMA 1	0.0	29.0	N

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2017	2018	2019	2020	2021
CM1	497295	208901	Roadside	Automatic	99	29.0	29.3	24.0	19.0	18.0

- **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**
- **Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction.**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2017	2018	2019	2020	2021
DC1	505355	206504	Roadside	85	84.4	32.1	31.8	31.2	28.0	27.1
DC2	505251	206960	Background	85	84.4				12.9	12.7
DC3	505339	207238	Roadside	85	84.4				39.0	34.8
DC4	505340	207207	Roadside	85	84.4				37.8	36.5
DC5	505528	207651	Roadside	85	84.4				**47.8**	**49.4**
DC6	505545	207649	Roadside	85	84.4				26.2	24.9
DC7	505587	207686	Roadside	85	84.4				30.3	28.7
DC8	505533	207842	Background	85	84.4				14.9	12.9
DC9	507848	208000	Roadside	85	84.4				25.7	27.3
DC10	507774	207313	Urban Background	85	84.4				15.5	15.4
DC11	508013	207155	Urban Background	78	77.0				16.8	17.3
DC13	507880	207170	Roadside	85	84.4				28.5	29.2
DC14	507716	207047	Roadside	85	84.4				26.5	25.7
DC15	506227	216317	Roadside	85	84.4	23.0	22.4	20.8	17.6	15.6
DC16	506093	216501	Roadside	85	84.4	19.3	19.6	19.1	14.2	14.7
DC17	499703	207838	Roadside	85	84.4	23.6	25.1	25.3	18.6	19.4
DC18	499448	207870	Roadside	68	67.1	17.6	16.1	16.9	13.8	12.9
DC19	499207	207754	Urban Background	68	84.4	18.1	17.9	17.5	12.9	13.6
DC20	498990	207924	Roadside	85	84.4				20.0	21.3
DC21	499095	207874	Roadside	85	84.4				24.4	24.9
DC22	499131	207838	Roadside	85	84.4				24.8	24.4
DC23	499129	207942	Roadside	70	69.0	33.3	29.2	30.7	22.6	21.6
DC24	499125	207900	Roadside	85	84.4				21.9	20.8
DC25	499108	207835	Roadside	77	76.7				20.7	21.2
DC26	499095	207838	Roadside	85	84.4				28.3	26.6
DC27	498323	206948	Roadside	85	84.4	35.7	33.3	29.0	21.6	22.1
DC28	498318	206950	Roadside	76	74.8	35.0	35.5	32.5	24.3	23.5
DC29	498289	207005	Roadside	85	84.4	25.3	27.2	24.0	17.0	17.1
DC30	497472	208730	Roadside	85	84.4	23.4	24.7	24.7	20.5	20.5
DC31	497346	208835	Roadside	85	84.4	**42.3**	33.0	32.7	32.0	30.1
DC32	497346	208835	Roadside	85	84.4	**40.4**	34.2	32.9	33.2	31.2
DC33	497346	208835	Roadside	85	84.4	**42.6**	33.6	33.9	32.6	31.2
DC34	497355	208852	Roadside	85	84.4				20.4	19.5
DC35	497335	208860	Roadside	85	84.4	34.2	36.2	38.6	26.7	27.1
DC36	497335	208860	Roadside	85	84.4	33.1	35.5	37.6	27.1	26.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2017	2018	2019	2020	2021
DC37	497335	208860	Roadside	85	84.4	35.2	37.8	37.2	27.4	27.9
DC38	497295	208901	Roadside	85	84.4	23.9	25.4	23.8	19.0	18.1
DC39	497295	208901	Roadside	85	84.4	23.4	25.9	24.3	19.2	18.9
DC40	497295	208901	Roadside	85	84.4	23.9	24.8	24.9	18.9	18.7
DC41	497306	208874	Roadside	85	84.4				24.3	22.8
DC42	492611	212006	Roadside	60	59.5				20.5	20.3
DC43	492680	212663	Roadside	77	76.7				19.0	17.5
DC44	507611	201620	Roadside	85	84.4				32.7	31.9
DC45	507168	202802	Roadside	85	84.4				21.2	20.8
DC46	507005	204677	Roadside	85	84.4	32.2	32.9	30.4	25.0	23.2
DC47	505677	205513	Roadside	85	84.4	**54.0**	**48.6**	**48.6**	**40.2**	37.6
DC48	505677	205513	Roadside	85	84.4	**55.8**	**48.3**	**47.1**	**40.2**	38.5
DC49	505677	205513	Roadside	85	84.4	**52.9**	**48.3**	**49.9**	**41.5**	36.1
DC50	505737	205443	Roadside	85	84.4				32.5	30.0
DC51	505737	205443	Roadside	77	76.7				31.8	30.7
DC52	505737	205443	Roadside	85	84.4				32.5	30.1
DC53	505770	205430	Roadside	77	76.7				27.6	26.1
DC54	505696	205509	Roadside	85	84.4				28.0	28.7
DC55	505797	205436	Roadside	85	84.4				31.2	29.6
DC56	505734	205519	Roadside	85	84.4	27.5	26.2	27.6	22.4	22.3
DC57	505734	205519	Roadside	77	76.7	29.1	27.5	26.6	21.8	22.0
DC58	505734	205519	Roadside	85	84.4	28.6	28.0	28.8	21.0	22.9
DC59	505969	205726	Roadside	85	84.4	31.2	28.5	30.6	23.9	24.1
DC60	505969	205726	Roadside	85	84.4	38.5	29.2	29.8	25.3	24.9
DC61	505969	205726	Roadside	85	84.4	31.7	29.4	29.4	24.4	26.5
DC62	505930	205740	Roadside	85	84.4	**48.9**	**48.7**	**52.1**	**40.4**	35.8
DC63	505930	205740	Roadside	85	84.4	**55.6**	**48.6**	**51.0**	39.8	36.0
DC64	505930	205740	Roadside	85	84.4	**54.6**	**48.3**	**49.3**	39.5	35.1
DC65	505901	205788	Roadside	85	84.4				26.7	28.2
DC66	505901	205788	Roadside	85	84.4				26.7	27.3
DC67	505901	205788	Roadside	85	84.4				27.6	27.1
DC68	506053	205664	Urban Background	85	84.4	21.1	20.6	20.2	15.9	15.3

- **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**
- **Diffusion tube data has been bias adjusted**

- **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

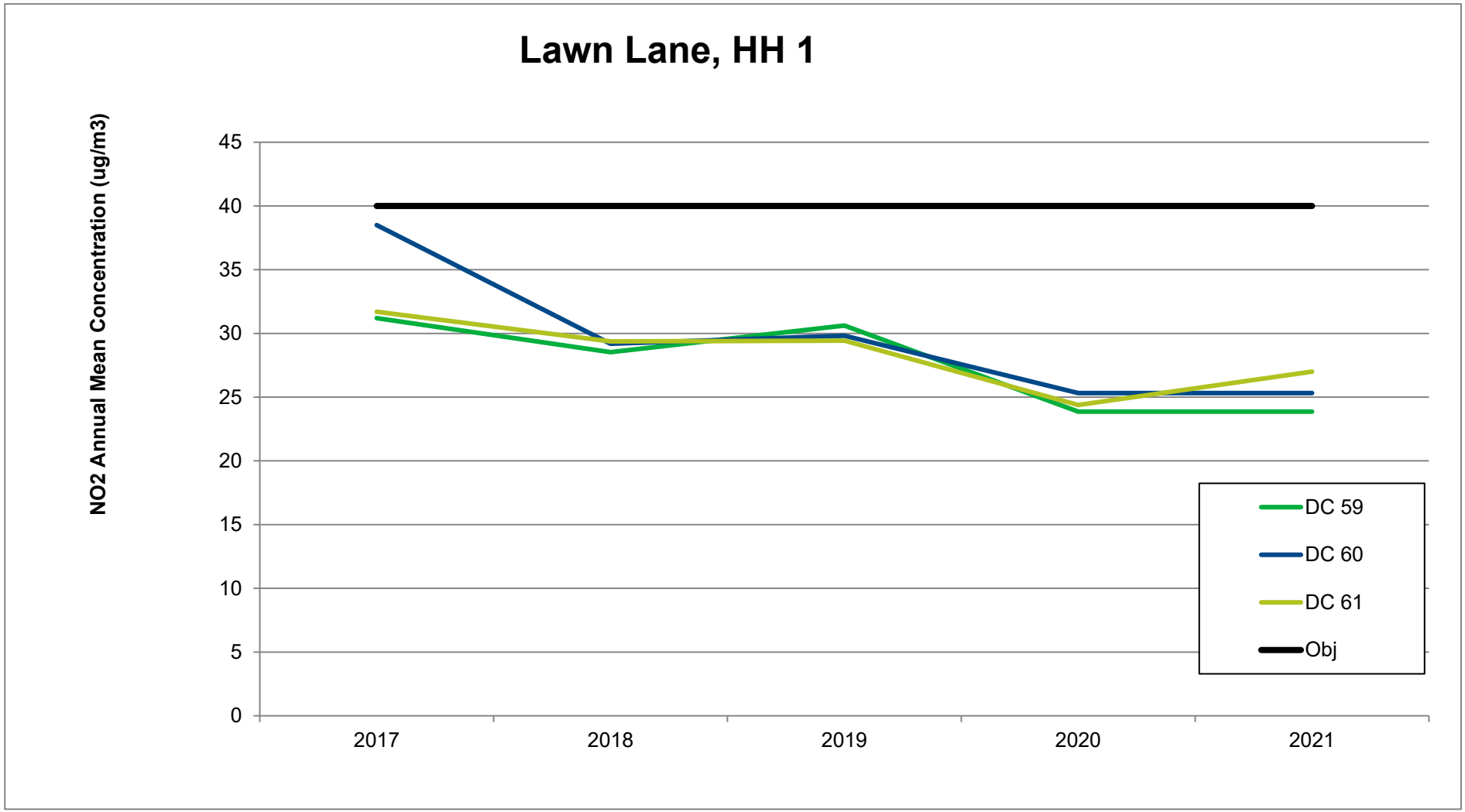
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

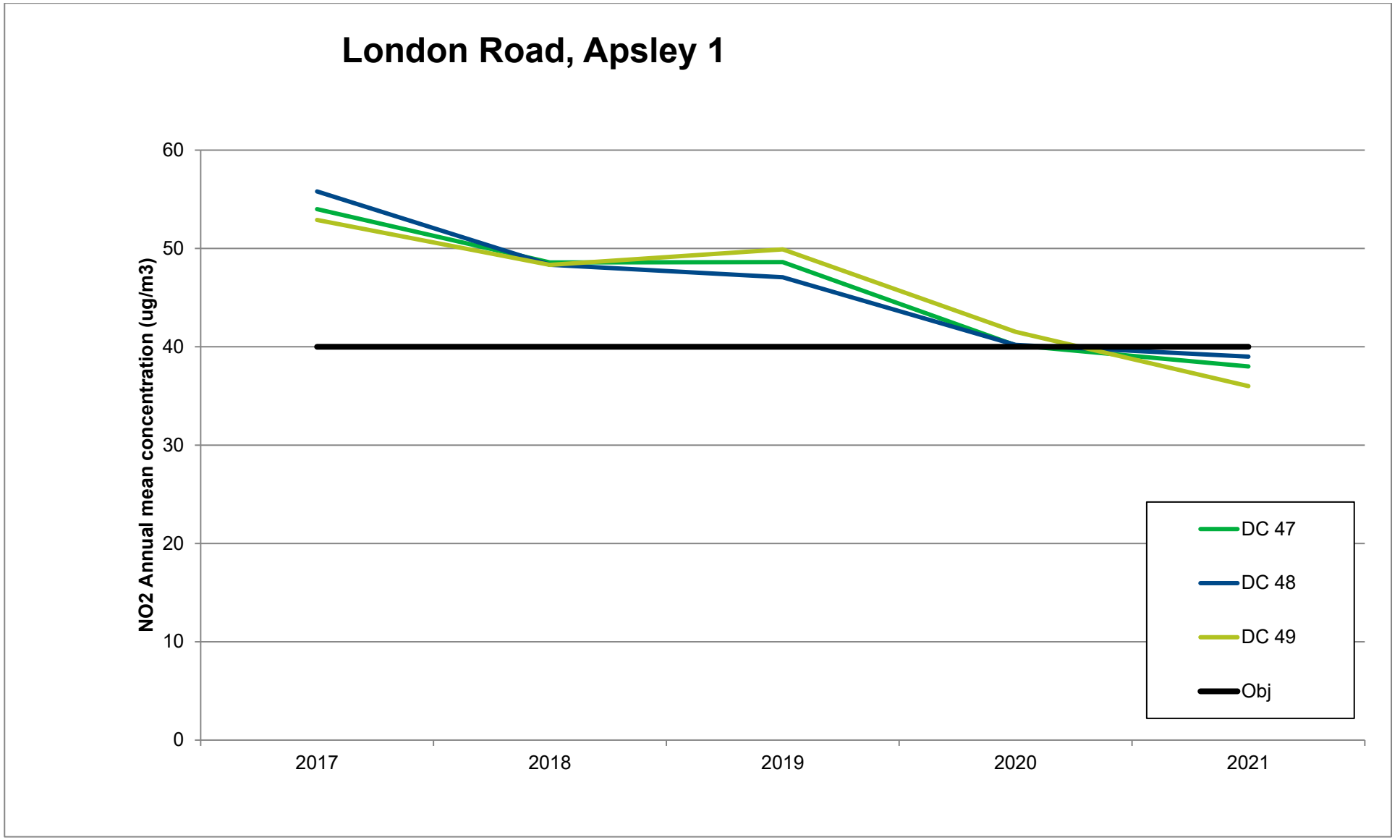
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

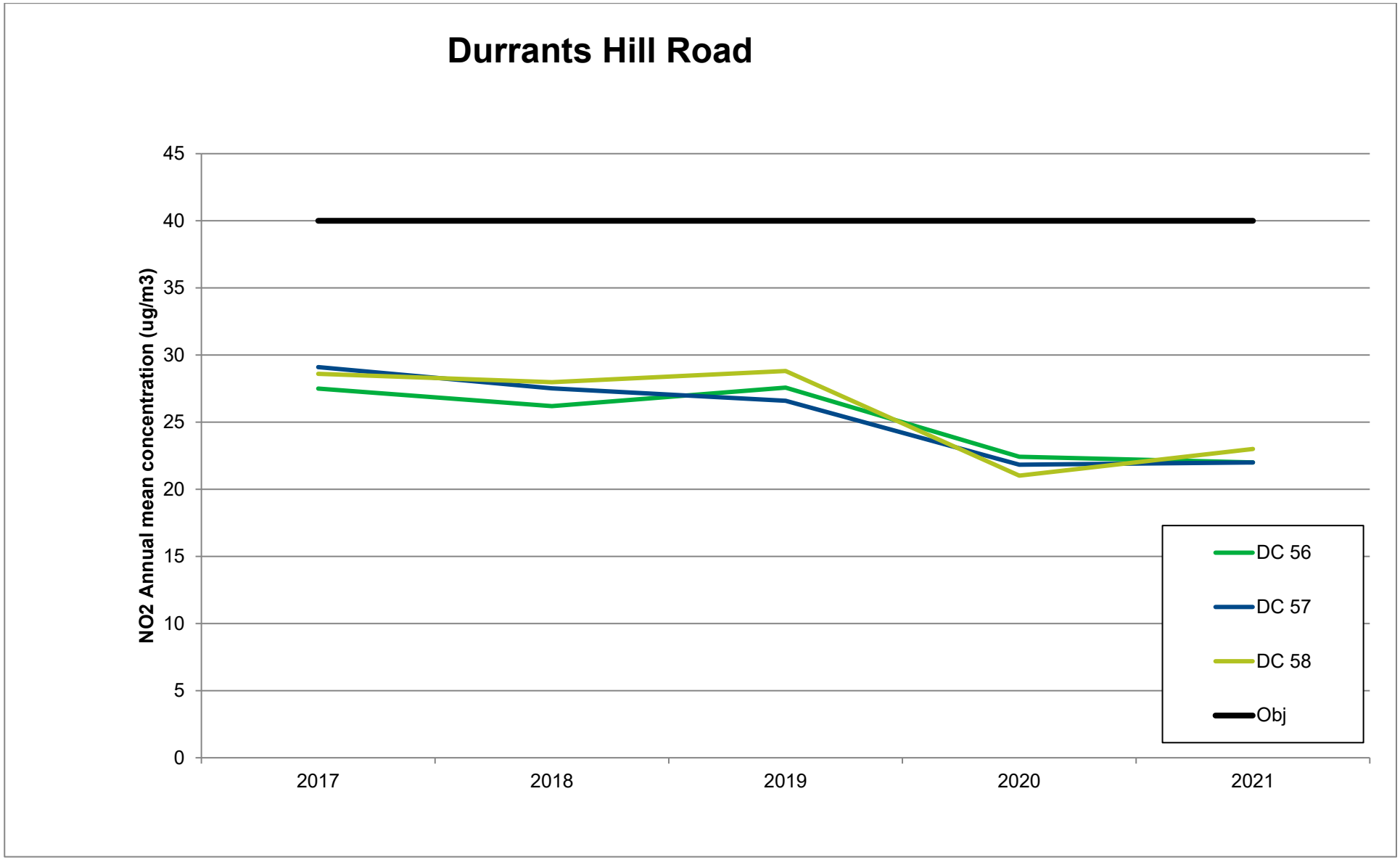
(3) Sites presenting data for 2020 & 2021 only represent new monitoring locations introduced following revisions to the local monitoring network.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

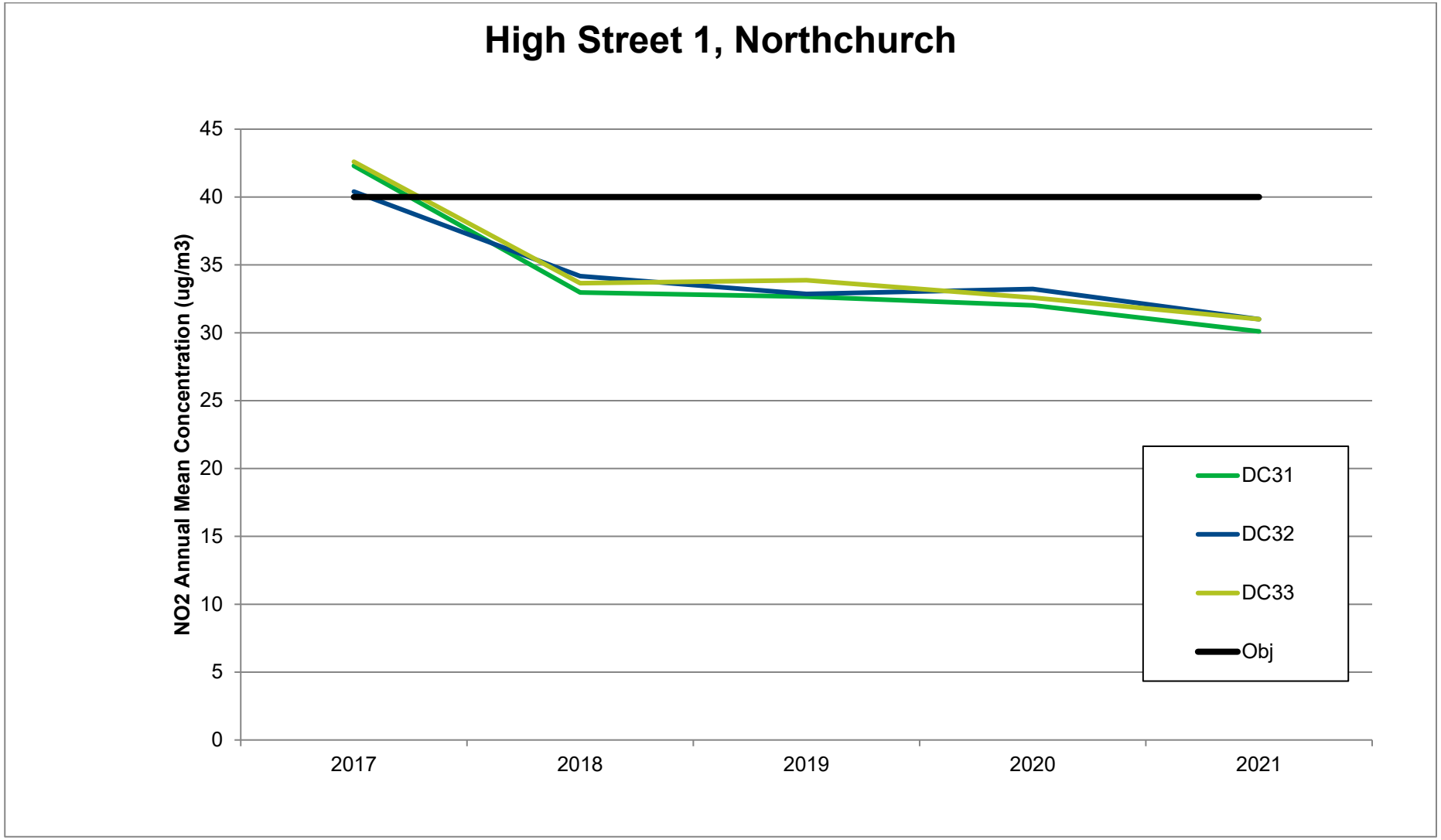
AQMA 1 – Lawn Lane, Hemel Hempstead

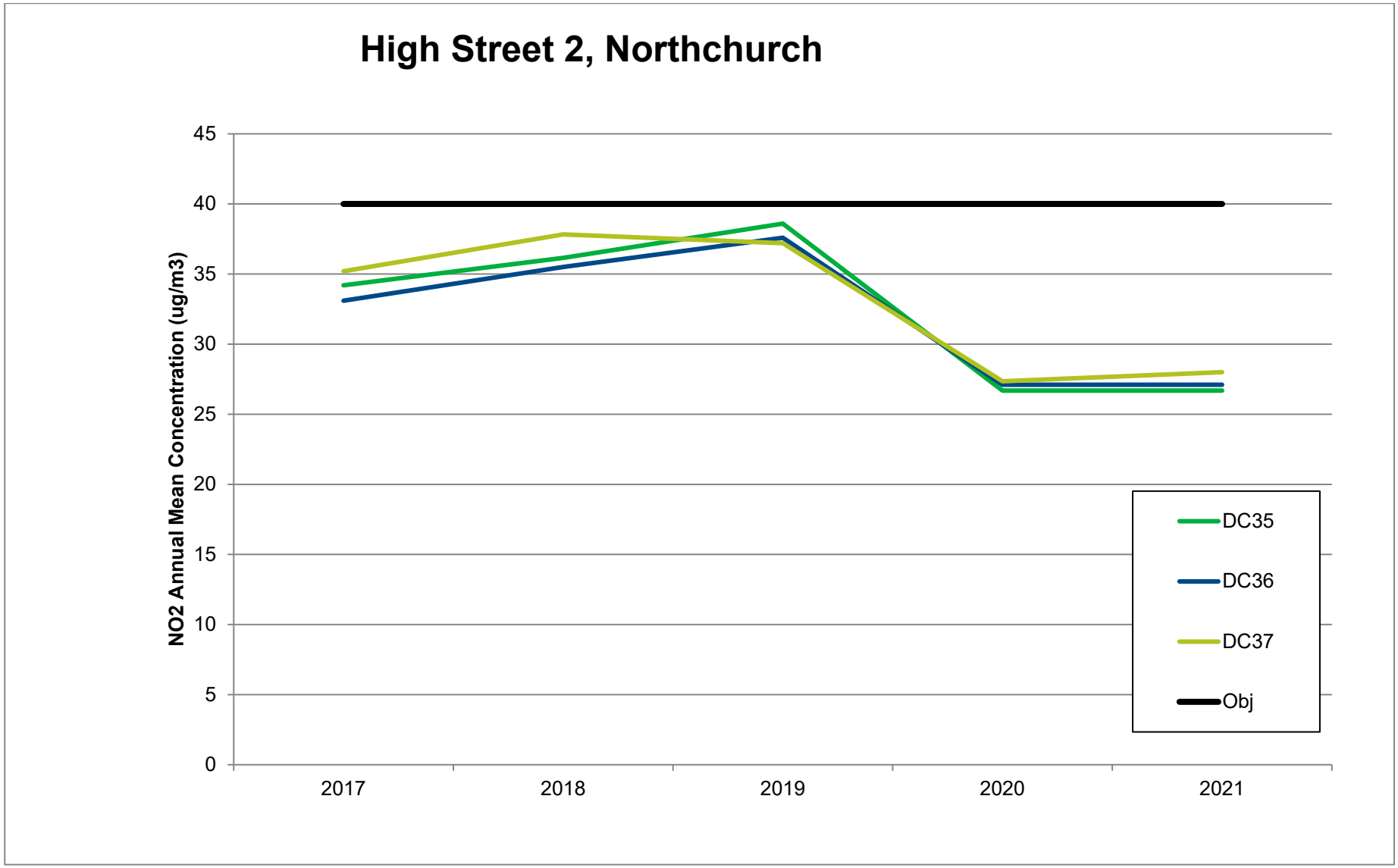



London Road, Apsley 1
NO2 Annual mean concentration (ug/m3)
60
50
40
30
20
10
0
2017
2018
2019
2020
2021
DC 47
DC 48
DC 49
Obj


Durrants Hill Road
NO2 Annual mean concentration (ug/m3)
45
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DC 56
DC 57
DC 58
Obj

AQMA 3 – Northchurch




High Street 2, Northchurch
NO2 Annual Mean Concentration (ug/m3)
45
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DC35
DC36
DC37
Obj

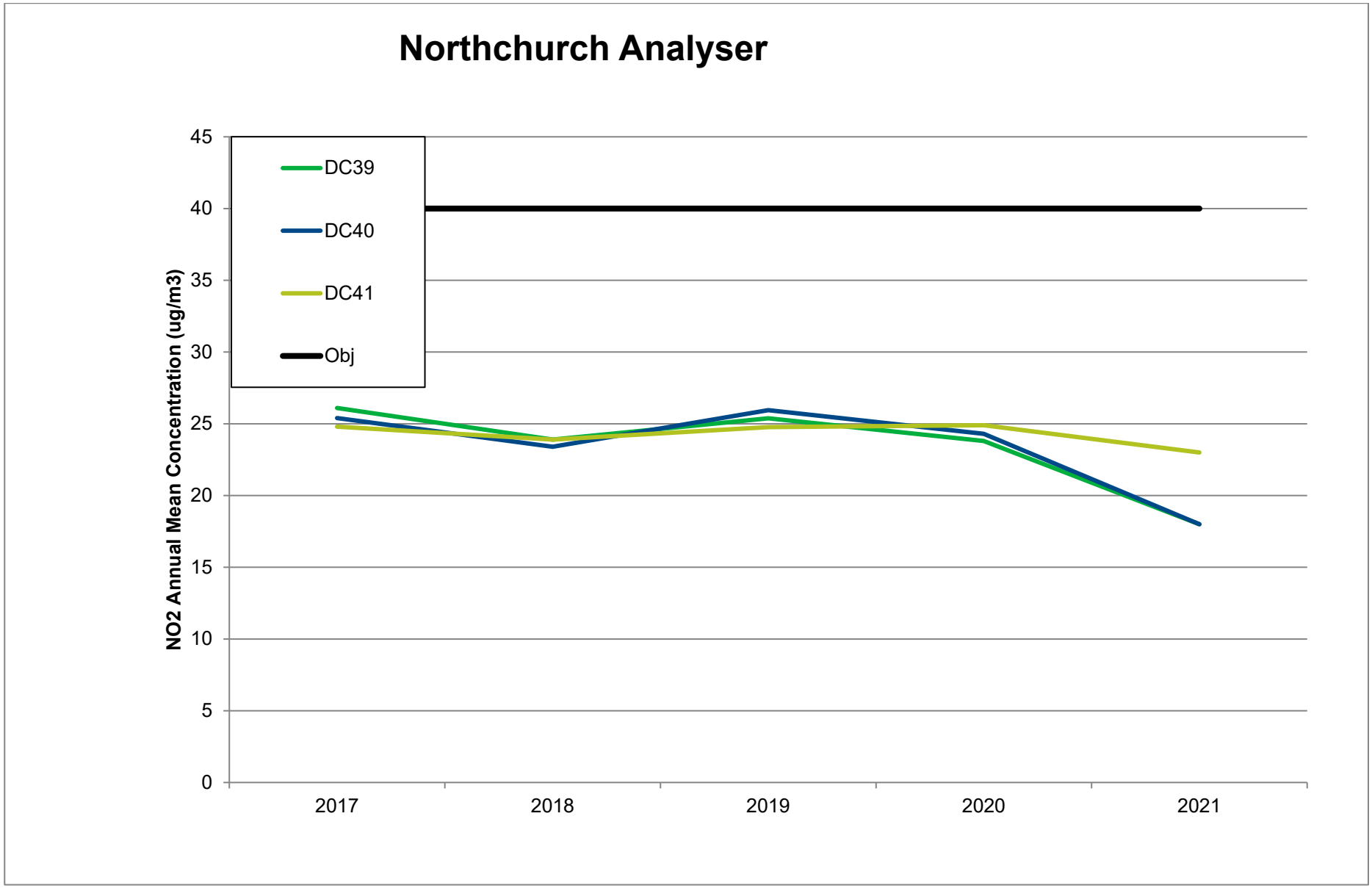

Northchurch Analyser
NO2 Annual Mean Concentration (ug/m3)
45
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DC39
DC40
DC41
Obj

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM1	497295	208901	Roadside	92	92	0	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.6 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020	2021
CM1	497295	208901	Roadside	91	91	**12**	**12**	**17**	**18**	**15**	**15**

- **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM1	497295	208901	Roadside	91	91	1	0	3	8	1	1

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2016	2017	2018	2019	2020	2021
CM1	497295	208901	Roadside	91	91	8	8	11	10	9	9

- **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

Notes:

The annual mean concentrations are presented as µg/m^3.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)			Comments
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.77)	Distance Corrected to Nearest Exposure	
DC1	505355	206504	42.9	35.7	34.2	32.5	35.3	30.6	28.8	24.1	35.1	39.8	40.7	42.5	35.2	27.1	-	
DC2	505251	206960	25.5	20.0	17.0	13.5	10.4	11.0	12.3	9.3	17.1	19.3	20.0	23.3	16.6	12.7	-	
DC3	505339	207238	51.7	45.8	45.7	41.2	48.3	39.0	37.9	31.2	48.8	50.0	45.9	56.9	45.2	34.8	-	
DC4	505340	207207	52.3	50.1	47.7	44.1	51.6	42.9	42.0	32.4	47.7	50.1	55.6	52.4	47.4	36.5	27.7	
DC5	505528	207651	70.6	49.6	69.2	84.4	56.8	68.0	60.9	63.6	65.0	54.3	73.8	54.0	64.2	**49.4**	**46.0**	**Exceedance**
DC6	505545	207649	39.1	36.3	30.5	29.0	30.7	24.6	26.9	24.2	41.1	36.3	34.3	35.7	32.4	24.9	-	
DC7	505587	207686	49.6	38.5	35.4	40.5	9.2	37.5	35.4	31.3	45.1	39.9	46.1	38.8	37.3	28.7	-	
DC8	505533	207842	19.2	22.5	17.1	13.9	13.5	11.2	13.2	11.4	16.9	21.1	22.4	18.7	16.8	12.9	-	
DC9	507848	208000	42.2	35.3	35.7	35.3	29.3		31.1	26.2	38.2	32.8	44.0	39.7	35.4	27.3	-	
DC10	507774	207313	29.0	26.2	20.8	19.1	13.5	12.9	14.6	10.7	21.9	20.9	24.7	25.4	20.0	15.4	-	
DC11	508013	207155	30.3	25.5	26.3	22.0	17.7	19.4	16.4	15.9	22.3	21.9	25.5	26.6	22.5	17.3	-	
DC12																	-	Not Deployed
DC13	507880	207170	36.7	38.7	34.8	33.0	35.2	30.8	38.2	29.8	49.0	45.6	42.4	41.0	37.9	29.2	-	
DC14	507716	207047	41.3	33.7	31.6	36.0	30.1	23.9	28.2	21.9	41.4	35.7	38.4	37.6	33.3	25.7	-	
DC15	506227	216317	30.9	22.2	20.1	19.8	16.9	15.3	14.3	13.0	21.5	21.2	27.8	20.8	20.3	15.6	-	
DC16	506093	216501	24.6	26.0	20.4	22.9	16.9	15.3	12.9	8.8	19.7	18.5	23.7		19.1	14.7	-	
DC17	499703	207838	28.2	27.6	23.7	26.2	23.5	22.2	23.1	16.5	30.3	27.2	26.7	26.6	25.2	19.4	-	
DC18	499448	207870	25.2	18.8	17.5	14.2	13.4	10.6	11.7	9.5	17.8	18.0	23.1	21.6	16.8	12.9	-	
DC19	499207	207754	20.3	21.5	16.4	19.9	13.4		13.4	10.1	17.3	18.3	23.3	20.8	17.7	13.6	-	
DC20	498990	207924	34.1	32.8	26.8	29.9	26.5	23.4	23.5	15.8	31.6	24.7	30.9	31.6	27.6	21.3	-	
DC21	499095	207874	34.7	32.6	34.5	33.5	31.4	30.6	28.7	23.6	31.9	31.4	39.8	34.7	32.3	24.9	-	
DC22	499131	207838	36.7	28.0	31.0	24.7	28.0	24.2	23.4	<0.6	54.2	33.4	36.3	28.3	31.7	24.4	-	
DC23	499129	207942	30.5	23.9	26.8	23.7	24.1	24.3	23.3	21.3	32.7	34.2	40.6	31.9	28.1	21.6	-	
DC24	499125	207900	29.1	28.6	23.8	23.8	28.2	24.3	23.6	19.2	32.4	30.6	29.6	31.0	27.0	20.8	-	
DC25	499108	207835	28.3	33.3	27.4	27.3	27.1	21.1	23.5	14.3	34.2	30.8	30.7	32.4	27.5	21.2	-	
DC26	499095	207838	42.1	31.4	34.9	33.3	32.1	33.3	28.2	24.4	37.1	37.2	46.4		34.6	26.6	-	
DC27	498323	206948	33.4	30.2	30.1	26.0	27.2	27.4	24.0	20.9	31.9	27.9	36.4	29.6	28.8	22.1	-	
DC28	498318	206950	36.3	29.6	33.6	26.1	29.8	30.2	24.3	21.3	31.4	32.0	35.7	35.2	30.5	23.5	-	
DC29	498289	207005	24.5	21.9	22.9	22.6	20.4	19.1	16.9	14.7	26.5	22.7	30.8	23.1	22.2	17.1	-	
DC30	497472	208730	33.4	27.4	25.8	27.6	24.8	22.7	20.7	17.8	26.9	28.0	36.5	28.2	26.7	20.5	-	
DC31	497346	208835	45.8	38.4	40.4	37.0	36.7	34.0	34.8	26.1	46.7	38.4	47.8	43.3	39.1	30.1	-	
DC32	497346	208835	50.3	39.8	40.8	37.5	37.3	33.0	34.7	29.0	44.4	43.9	49.4	45.9	40.5	31.2	-	
DC33	497346	208835	48.1	40.5	42.2	39.8	35.8	36.2	37.6	29.3	46.0	42.8	48.7	38.6	40.5	31.2	-	
DC34	497355	208852	32.2	26.8	28.4	27.9	20.7	23.1	20.3	17.2	24.8	25.8	31.4	24.7	25.3	19.5	-	
DC35	497335	208860	41.6	36.8	38.5	35.0	33.8	30.7	31.5	24.8	37.0	34.7	42.2	36.2	35.2	27.1	-	
DC36	497335	208860	40.1	39.8	36.5	44.7	25.6	31.9	31.8	20.8	40.4	31.5	41.7	35.0	35.0	26.9	-	
DC37	497335	208860	42.3	38.3	36.7	41.8	34.0	35.0	30.3	25.3	41.8	33.6	39.0	36.3	36.2	27.9	-	
DC38	497295	208901	32.1	28.9	25.4	23.4	18.9	16.8	19.6	14.4	24.4	24.1	28.8	25.0	23.5	18.1	-	
DC39	497295	208901	32.6	23.5	26.7	26.0	24.6	19.5	18.9	16.1	26.0	25.0	28.6	27.2	24.6	18.9	-	
DC40	497295	208901	39.1	26.6	27.3	25.4	16.8	18.9	18.6	16.4	25.8	25.2	28.3	23.3	24.3	18.7	-	
DC41	497306	208874	32.4	29.6	30.9	19.7	30.3	28.1	23.9	17.7	35.7	37.9	34.7	34.4	29.6	22.8	-	
DC42	492611	212006	30.1	31.7	29.1	22.6	23.4	21.2	20.9	20.0	30.7	23.6	34.9	27.8	26.3	20.3	-	
DC43	492680	212663	31.3	22.5	24.2	21.1	19.7	16.9	19.9	15.6	26.0	23.4	29.1		22.7	17.5	-	
DC44	507611	201620	54.1	42.9	42.3	54.1	36.3	33.7	33.0	28.4	43.7	41.1	47.0	40.3	41.4	31.9	-	
DC45	507168	202802	33.5	28.8	27.0	25.4	24.4	21.0	19.3	16.6	30.9	28.7		29.8	27.1	20.8	-	
DC46	507005	204677		28.9	28.7	25.6	19.9	26.2	25.1	20.9	35.1	33.6	39.5	30.3	30.2	23.2	-	
DC47	505677	205513	61.1	40.6	49.9	41.7	50.7	44.2	44.3	35.9	56.6	49.1	57.5	51.9	48.8	37.6	-	
DC48	505677	205513	60.5	47.6	52.5	42.5	49.1	44.3	43.9	35.6	57.9	51.9	59.3	52.5	50.0	38.5	-	

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)			
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.77)	Distance Corrected to Nearest Exposure	Comments
DC49	505677	205513	54.5	48.9	46.1	40.5	44.1	44.3	44.6	34.8	57.6	47.1	61.2	53.9	46.9	36.1	-	
DC50	505737	205443	46.5	41.3	41.2	36.5	33.9	32.0	32.6	26.2	41.6	40.6	46.2	44.0	39.0	30.0	-	
DC51	505737	205443	48.7	40.3	41.0	36.3	43.1	34.5	33.4	26.2	41.3	44.6	51.9	44.2	39.9	30.7	-	
DC52	505737	205443	50.3	42.3	37.2	33.9	44.2	32.6	34.7	26.2	43.6	40.1	45.4	45.0	39.0	30.1	-	
DC53	505770	205430	46.3	35.3	38.2	29.7	36.5	18.8	27.8	22.3	38.9	35.3	38.3	33.9	33.9	26.1	-	
DC54	505696	205509	41.3	41.7	38.0	38.6	31.5	35.3	32.9	25.7	40.5	35.5	44.3	40.5	37.3	28.7	-	
DC55	505797	205436	43.3	43.3	42.5	41.9	40.1	32.3	31.8	29.2	44.8	40.6	46.4	39.7	38.5	29.6	-	
DC56	505734	205519	36.2	34.9	28.2	25.5	24.3	19.9	26.2	19.5	33.8	33.0	32.2	33.7	29.0	22.3	-	
DC57	505734	205519	32.9	35.6	27.7	28.8	28.6	22.4	23.6	14.3	32.4	30.6	32.4	34.7	28.6	22.0	-	
DC58	505734	205519	25.9	35.2	27.7	29.1	30.7	22.5	25.2	18.1	36.4	31.2	31.4	33.7	29.8	22.9	-	
DC59	505969	205726	34.5	30.5	31.4	31.3	28.7	28.8	27.8		34.3	33.0	41.8	31.8	31.3	24.1	-	
DC60	505969	205726	38.7	30.9	34.2	32.2	29.6	23.0	27.6		33.5	33.5	32.3	34.8	32.3	24.9	-	
DC61	505969	205726	36.1	32.1	32.8	31.7	26.5	31.6	28.5		36.2	33.4	37.6	31.9	34.4	26.5	-	
DC62	505930	205740	48.5	36.4	50.8	44.7	46.8	49.2	41.2	34.4	54.0	50.2	58.1	46.4	46.5	35.8	-	
DC63	505930	205740	56.4	39.6	46.1	43.8	47.7	46.3	41.3	34.3	51.3	52.2	55.7	46.5	46.8	36.0	-	
DC64	505930	205740	53.1	41.1	44.1	24.0	50.7	49.5	44.6	35.8	57.3	55.9	56.2	49.7	45.6	35.1	-	
DC65	505901	205788	39.6	41.2	36.3	25.2	37.9	38.1	33.9	29.6	43.0	38.2	40.8	37.2	36.7	28.2	-	
DC66	505901	205788	38.4	40.7	36.2	23.3	38.2	35.6	31.9	27.6	41.5	36.5	40.0	35.5	35.5	27.3	-	
DC67	505901	205788	36.3	43.8	38.7	24.4	37.5	36.1	33.3	27.4	43.1	36.9	40.3	37.1	35.1	27.1	-	
DC68	506053	205664	28.6	25.8	23.3	10.7	14.0	17.2	16.3	14.4	21.0	21.2	27.1	25.8	19.8	15.3	-	

- **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**
- **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**
- **Local bias adjustment factor used.**
- **National bias adjustment factor used.**
- **Where applicable, data has been distance corrected for relevant exposure in the final column.**
- **Dacorum Borough Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

March and April data missing due to COVID-19 national lockdown. Other gaps in data occur due to missing diffusions tubes during exchange, e.g. theft of sampler.

DC12 Not yet deployed.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New or Changed Sources Identified Within Dacorum During 2021

Dacorum Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Dacorum Borough Council During 2021

Dacorum Borough Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

Details relating to the following aspects of non-automatic (i.e. passive) monitoring using diffusion tubes:

- The supplier used for diffusion tubes within 2020 was SOCOTEC and the method of preparation was 50:50 acetone:triethanolamine. The tubes were desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection.
- SOCOTOEC confirms that the methods and procedures they follow meet the guidelines set out in Defra's "Diffusion Tubes for Ambient Monitoring: Practical Guidance". SOCOTEC also takes part in the WASP Proficiency Scheme and the laboratory performance is rated at the highest level of "good".
- Monitoring has been completed in adherence with the 2020 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

Annualisation was required for a small number of non-automatic monitoring sites, the sites requiring annualisation clearly defined along with details of the calculation method undertaken provided in Table C.2. Annualisation was required for any site with data capture less than 75% but greater than 25%.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR 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.TG16 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.

Dacorum Borough Council have applied a national bias adjustment factor of 0.77 to the 2021 monitoring data. A summary of bias adjustment factors used by Dacorum Borough Council over the past five years is presented in Table C.1. Over the last 5 years the local bias adjustment has been equal or nearly equal to the National factor and therefore the national factor was used in 2021 due to time and resource constraints.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	July 2021	0.77
2020	Local	-	0.80
2019	Local	-	0.77
2018	Local	-	0.76
2017	National	Unknown	0.77

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

Fall-off-with-distance calculations were required at 2 non-automatic monitoring sites, DC4 & DC5 (Queensway, Old Town). The output from the Diffusion Tube Data Processing Tool is presented in Table C.4. Distance correction has been considered at any monitoring site where the annual mean concentration is greater than 36µg/m^3 and the monitoring site is not located at a point of relevant exposure.

QA/QC of Automatic Monitoring

This section provides details in relation to the following:

- Data management is completed by Ricardo on behalf of the Council with Local Site Operator (LSO) duties for the automatic monitoring sites undertaken by the Council.
- Calibration is undertaken once a month, with audit/servicing undertaken bi-annually
- Monitoring data presented within the ASR is ratified;
- Live/historic data is available as part of the Herts and Beds Air Quality Network. This is available from: https://www.airqualityengland.co.uk/local-authority/?la_id=408

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The type of PM_{10}/$PM_{2.5}$ monitor(s) utilised within Dacorum do not require the application of a correction factor.

Automatic Monitoring Annualisation

Annualisation was required for to correct automatic monitoring data for PM_{10}/$PM_{2.5}$. The annualisation data is be presented in Table C.2. Annualisation is required for any site with data capture less than 75% but greater than 25%.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Dacorum required distance correction during 2021.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Site 1	Annualisation Factor Site 2	Annualisation Factor Site 3	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DC18	0.9808	0.9995	0.9264	-	0.9689	17.8	17.3	NO_2 correction
DC23	0.9144	0.9522	0.8955	-	0.9207	30.7	28.3	NO_2 correction
DC42	0.8964	0.9601	0.8844	-	0.9136	28.1	25.7	NO_2 correction
CM1	1.03	1.05	-	-	1.04	14.4	14.9	PM10 correction
CM1	0.95	1.03	-	-	0.99	9.1	9	PM 2.5 correction

Notes:

Automatic monitoring stations used to annualise NO_2 were Oxford St Ebbes, Reading & Northampton.

Automatic monitoring stations used to annualise PM10 and PM2.5 were Reading and Richmond upon Thames.

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias					
Bias Factor A					
Bias Factor B					
Diffusion Tube Mean (µg/m^3)					
Mean CV (Precision)					
Automatic Mean (µg/m^3)					
Data Capture					
Adjusted Tube Mean (µg/m^3)					

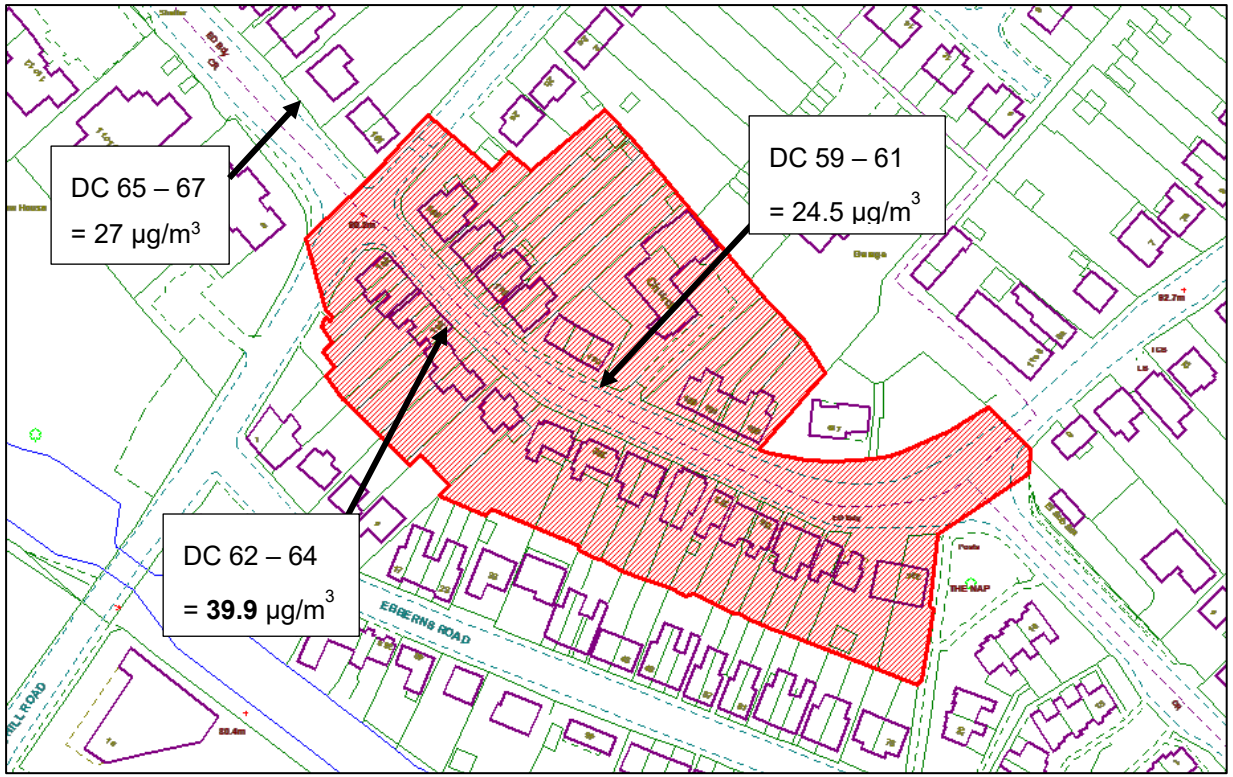
Notes:

The national bias adjustment factor has been used to bias adjust the 2021 diffusion tube results.

Table C.4 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
DC4	2.0	10.0	36.5	13.2	27.7	
DC5	2.0	3.0	49.4	13.2	**46.0**	*Predicted concentration at Receptor above AQS objective.*

Appendix D: Map(s) of Monitoring Locations and AQMAs



Legend

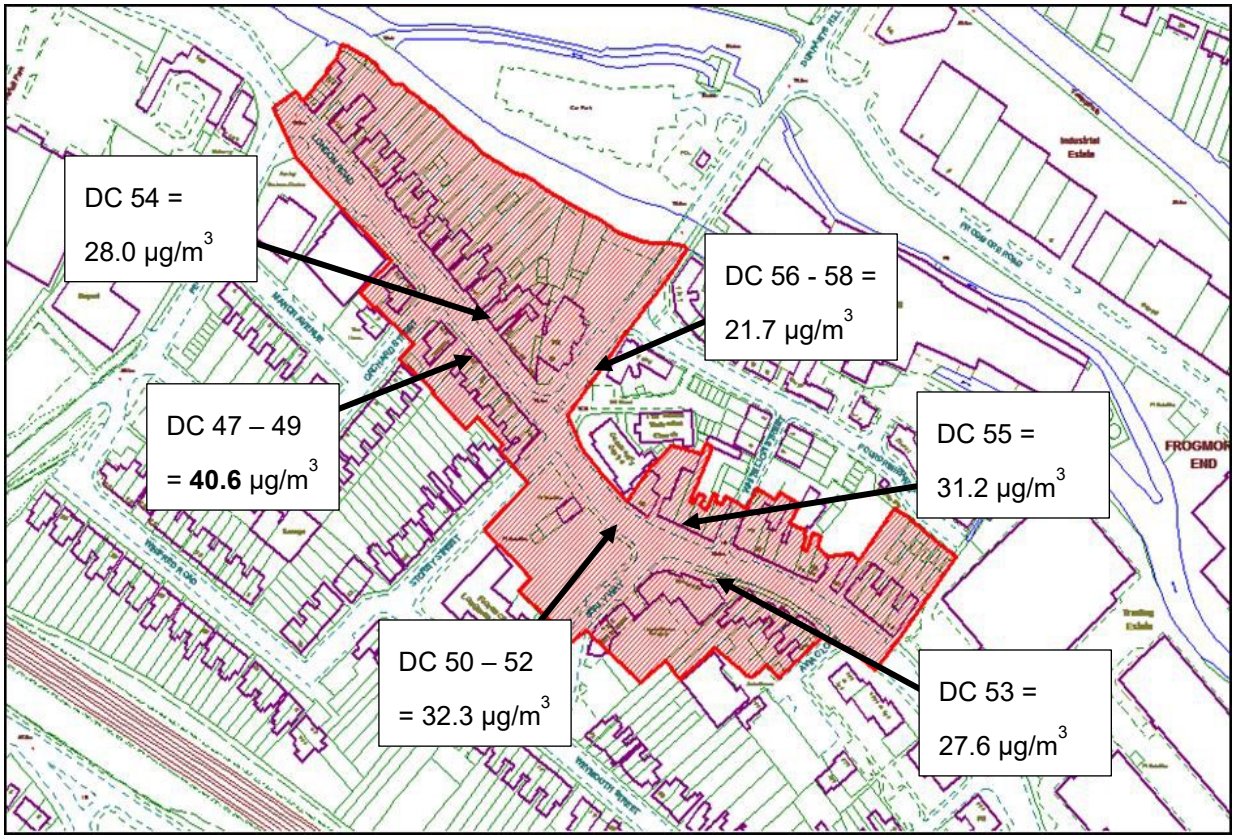
AQMA Boundary

Location: Lawn Lane, Hemel Hempstead

AQMA Order No. 1 – Lawn Lane, Hemel Hempstead incorporating local monitoring locations

Declared June 2012

Figure No. 1



Legend

AQMA Boundary

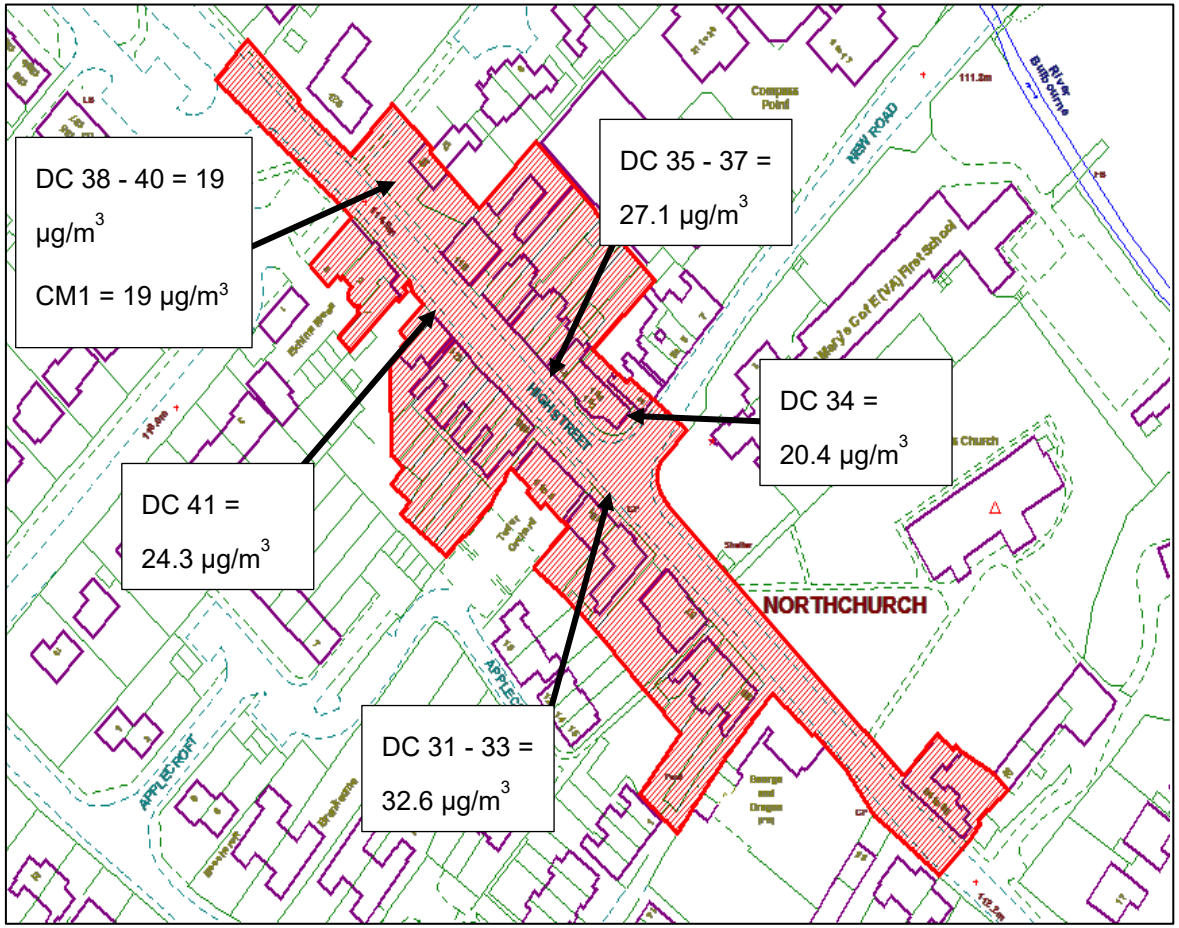
Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location: London Road, Apsley

AQMA Order No. 2 – London Road, Aspley incorporating local monitoring locations

Declared June 2012

Figure No. 1



Legend

AQMA Boundary

Location: High Street, Northchurch

AQMA Order No. 3 – High Street, Northchurch incorporating local monitoring locations

Declared June 2012, amended Oct 2013

Figure No. 1

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Appendix F: Impact of COVID-19 upon 2021 LAQM

COVID-19 had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[8] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[9] has estimated that during the initial lockdown period in 2020/2021, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

[8] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[9] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20μg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5μg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Dacorum

It is acknowledged within this ASR that COVID-19 impacted upon some of the LAQM functions of the Council. The pandemic affected the day to day operations of the Council due to a shift in the priorities of the ECP team to focus on matters related to the pandemic response such as the enforcement responsibilities through the introduction of emergency regulation made in response to the serious and imminent threat to public health posed by the incidence and spread of COVID-19 and obligations toward local test and trace. This led to a large impact rating having resulted in stalled progress with the Council's draft air quality action plan, and which remains on hold.

Various lockdowns imposed through 2020 and 2021, and those corresponding reductions in road traffic activity has however had a positive effect on local air quality especially with regard to the Lawn Lane and London Road AQMAs.

As noted within the main body of the ASR air quality improved substantially in both AQMAs.

However this also demonstrates the scale of the task at hand in terms of improving local air quality noting that it has taken something as drastic as nationally imposed restrictions upon movement to bring about these substantial improvements, noting that areas of exceedance are confined to two small distinct areas of Dacorum.

None the less the Council is taking positive action in light of the impact of the pandemic and consulting with its staff on future arrangements for office working. This is seeking views of employees on the need to return to the office Monday or Friday or whether the Council can deliver its functions based on a hybrid arrangement combining a mix of home and office working.

Assuming that the main Council Office has desk space for 500, if all employees worked from home a minimum of 2 days a week this would, in very simple terms, save 1,000 car journeys per week. The Council is not alone in reviewing how it can best use office space.

Opportunities Presented by COVID-19 upon LAQM within Dacorum

Please refer to the above commentary.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Dacorum

Please refer to the above commentary.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
CEE	Climate and Ecological Emergency
Defra	Department for Environment, Food and Rural Affairs
DT	Diffusion Tube
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
ECP	Environmental and Community Protection
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.