



2020 Air Quality Annual Status Report (ASR)

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

June, 2020

Dacorum Borough Council

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Executive Summary: Air Quality in Our Area

This Annual Status Report forms part of the annual review of air quality review and assessment carried out by Dacorum Borough Council. It sets out updated air quality monitoring data and assesses whether any new or proposed developments are likely to have a significant effect on air quality concentrations.

Furthermore, this report fulfils the requirement of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), THE Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedances are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepared an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

Air Quality in Dacorum

For its local air quality monitoring the Council utilises one real-time analyser in the Northchurch AQMA. This monitors for nitrogen dioxide (NO₂) as well fine particulate matter (both PM₁₀ and PM_{2.5}). The Council also has a network of 74 non-automatic (passive) diffusion tubes which monitor for NO₂ at 54 locations across the district.

When comparing monitoring results with the previous year local pollutant concentrations are noted to have decreased in some locations and increased at others. In other words there is no general trend towards improvement or worsening. Longer-term trends of monitoring around the Councils Air Quality Management Areas (AQMA) do typically show a trend of stable or slightly decreasing concentrations for NO₂.

Exceedances of the National Air Quality Objective continue to only be measured in identified areas of poor air quality, that being the AQMAs of Lawn Lane and London Road (Apsley).

For the second consecutive year monitoring in the Northchurch AQMA (Northchurch, Berkhamsted) is demonstrating ambient NO₂ concentrations below intervention limits.

However revocation of an AQMA will typically be feasible after **three or more years** of compliance and thus the status of the AQMA should remain unchanged in the short-term.

Air quality issues in Dacorum are predominantly a result of emissions from road transport, for example, slow moving and congested traffic at busy junctions.

Not all car journeys made will start or end within the borough boundaries and so it is vital to work with other agencies. The Council is part of the Hertfordshire and Bedfordshire Air Quality Network which meets approximately four times and includes officers from the County Council's highways team.

The Council has also produced a draft air quality action plan. A steering group has been formed and which meets on a quarterly basis to support development of the plan.

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Actions to Improve Air Quality

Since early 2019 the Council has been working on a revision to its existing air quality action plan. The previous AQAP was set over a three year period, 2015 – 2018.

The Council has now produced a draft AQAP which replaces the previous plan, and is set to run over 5 years, 2019 – 2024. The AQAP was recently approved at Cabinet, but remains in draft following feedback from DEFRA. The Council has a steering group to guide development of the draft AQAP which meets quarterly. However due to the current situation regarding COVID-19 meetings by the group were temporarily suspended.

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

In order for the action plan to truly remain a live document individual measures will be implemented at varying stages, noting that the evidence burden will be greater to support some measures over others. It will also allow the Council greater flexibility to redefine existing measures or introduce new measures, where appropriate.

Conclusions and Priorities

Noting that the Council has developed a draft revision of its AQAP a clear priority will be to bring forward various measures for implementation. As a district Dacorum is ear-marked for substantial growth both in terms of new housing and business which could impact on air quality locally.

Within the region of South West Herts notable growth is planned also in the neighbouring authorities of Luton, St Albans and Watford and so it will be important that good links are maintained through the Herts and Beds air quality group.

The Council is now working on an update on its local plan. The Environmental and Community Protection Team are engaged with policy planners to provide evidence on air quality for inspection of the local plan.

The 2nd year of compliance within the Northchurch AQMA is also a positive sign for air quality in this locality. Noting guidance issued to local authorities in Policy Guidance (LAQM.PG16) that revocation of an AQMA will typically be feasible after **three or more years** of compliance the status of the AQMA should remain unchanged in the short-term. The Council shall continue to ensure that monitoring continues in this locality.

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 the AQAP delivery a steering group is being set-up which will allow for feedback from the public, visitors and businesses to be reported.

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.

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1 Local Air Quality Management

This report provides an overview of air quality in Dacorum during 2019. 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 can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

As noted in the executive summary the Council is in the process of renewing its air quality action plan (AQAP), having produced a new draft AQAP which is set to run from 2019 – 2024. Cabinet approval was granted for the revised draft AQAP.

The continued development of the AQAP is agreed by a steering group which meets on a quarterly basis and is formed of internal partners and colleagues from Hertfordshire County Council. However due to the current situation regarding COVID-19 the function of this group were temporarily suspended.

The emphasis of the draft AQAP is to promote and achieve a general emissions reduction. Whilst the main focus must be on reducing concentrations of NO₂ in the identified AQMAs, secondary aims are to address other pollutants, such as fine particulate and emissions linked to greenhouse gases.

A current overview of 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
- Emission based parking charges
- Electric vehicle charging infrastructure study / strategy
- Promoting sustainable travel and discouraging the use of single car journeys

Since completing its draft AQAP the Council has sought to pursue and develop some of the draft measures. This has included submitted a bid to DEFRA under the air

quality grant programme for £45k during 2019/20 for support to assess the feasibility of a clean air zone. However, this bid was unsuccessful.

The Council has also produced an internal draft for influencing emissions from new development, noting how different areas of National Planning Policy seek to achieve similar goals. This is also discussed in further detail under action on PM_{2.5}. The Council is also working on an update of its local plan and draft guidance may be used to develop appropriate policy hooks.

The County Council has also completed consultation on its enhanced bus quality partnership which proposes setting of emissions standards for buses operating across the county. The emissions standards proposed will be based on voluntary compliance noting that had this been made a mandatory element of the scheme this may have affected viability of services. A copy of the scheme proposal is available at:

<https://www.hertfordshire.gov.uk/media-library/documents/about-the-council/consultations/intalink-enhanced-partnership-plan-and-scheme-v4.5.pdf>

2.1 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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Dacorum can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <https://uk-air.defra.gov.uk/aqma/list>. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Monitoring of NO₂ in the Northchurch AQMA has identified for a 2nd consecutive year of ambient concentrations below the objective for this pollutant. However to support revocation of the AQMA, Policy Guidance LAQM.PG16 specifies this will typically be feasible after **three or more years** of compliance and thus the status of the AQMA should remain unchanged in the short-term.

Table 2.1 – Declared Air Quality Management Areas

| AQMA Name | Date of Declaration | Pollutants and Air Quality Objectives | City / Town | One Line Description | Is air quality in the AQMA influenced by roads controlled by Highways England? | Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure) | | | | Action Plan | | |
|----------------------------|---------------------------|---------------------------------------|-----------------|--|--|---|-------------------|------|-------------------|-------------|---------------------|------|
| | | | | | | At Declaration | | Now | | Name | Date of Publication | Link |
| Lawn Lane, Hemel Hempstead | 1 st June 2012 | NO ₂ annual mean | Hemel Hempstead | An area encompassing a number of properties overlooking to Lawn Lane, and the boundary declared between Belswains Lane and Seaton Road | NO | 57 | ug/m ³ | 52.1 | ug/m ³ | In draft | In draft | N/A |
| London Road, Apsley | 1 st June 2012 | NO ₂ annual mean | Hemel Hempstead | An area encompassing a number of properties overlooking London Road, and the boundary declared between Featherbed Lane and Weymouth Street | NO | 55.9 | ug/m ³ | 49.9 | ug/m ³ | In draft | In draft | N/A |

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|--------------------------|-----------------------------|-----------------------------|-------------|--|----|------|-------------------|------|-------------------|----------|----------|-----|
| High Street, Northchurch | June 2012, amended Oct 2013 | NO ₂ annual mean | Berkhamsted | An areas encompassing a number of properties overlooking High Street, Northchurch, and the boundary declared between Mandelyns and Bell Lane | NO | 42.2 | ug/m ³ | 37.6 | ug/m ³ | In draft | In draft | N/A |
|--------------------------|-----------------------------|-----------------------------|-------------|--|----|------|-------------------|------|-------------------|----------|----------|-----|

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

2.2 Progress and Impact of Measures to address Air Quality in Dacorum

Defra's appraisal of last year's ASR commentary included the following:

The report is well structured, detailed, and provides all the information specified in the Guidance. The following comments are designed to help inform future reports.

1. The Council are currently in the process of updating their Air Quality Action Plans and intend for implementation to commence by the end of 2019. Despite working to produce a new AQAP, the Council are still required to detail **any progress during 2018** on current AQAP measures. This has not been included within their 2019 ASR and is required in order for the report to be accepted.
2. The Council do not provide detailed discussion of PM_{2.5}, nor detail any specific measures to reduce emissions. The report does not draw links to the fraction of mortality attributable to PM_{2.5} emissions. The Council are encouraged to include this in future reports, in addition to a discussion of historical trends, a comparison between Dacorum Borough and England as a whole, and a comparison to neighbouring authorities. For further guidance, please refer to LAQM Technical Guidance TG16.
3. The Council undertook a review of their monitoring regime and ceased monitoring at three sites, although the reasons for this have not been disclosed. The Council are encouraged to discuss any changes to their monitoring network.
4. Inconsistencies have been noted surrounding the number of passive monitoring sites. The Council state that passive monitoring was undertaken at 63 sites in Section 3.1, and at 57 sites in the Executive Summary, section 3.1.2 and Appendix C. Upon review, there appears to be 77 tubes across 63 monitoring sites, of which three were discontinued for 2018 but have still been included within the report. It is not necessary to include location details of past tubes. The Council are required to clarify this and update their 2019 ASR accordingly.

5. Distance correction has not been carried out. Whilst the decision to not distance-correct may be viewed as conservative, the Council are encouraged to calculate annual mean concentrations at the nearest relevant exposure.
6. QA/QC of monitoring data has been discussed, however evidence to support derivation of the national bias adjustment factor is required in all future reports.
7. The Council are encouraged to provide improved maps of monitoring locations in future reports. A clear, fully labelled map of passive and automatic monitoring locations showing AQMA boundaries is required. Close-up maps showing AQMA boundaries have been included, however it would be extremely beneficial for the Council to depict monitoring locations on these maps, and label these monitoring sites as in the results table (e.g. DC40 etc).
8. Annual mean concentrations of NO₂ within the Northchurch AQMA were below the annual mean objective for NO₂ for the first time in 2018. The Council are commended on this achievement. It is to be noted, however, that consistent compliance is required before revocation of AQMA status can be considered.
9. Annualisation has been carried out correctly, and example calculations provided. In future, the Council could consider reviewing their monitoring regime to include a co-location site. Derivation of a local bias adjustment factor is encouraged, however use of the national factor is appropriate.
10. The Council have not included comments from last year's appraisal, and it is therefore difficult to tell if these have been addressed. The Council are advised to include and respond to comments made during the appraisal process in all future ASRs.
11. The Council has listed a number of priorities for the next year, which includes the publication of their new AQAP. These priorities are appropriate and the council should provide an update on the progress of these in the next reporting year.

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In respect of the commentary above, where appropriate, this has been addressed either through revisions of the ASR 2019 or inclusions into the ASR 2020. Both documents will be submitted together as part of the 2020 ASR submission.

As noted in the preceding chapter, the Council has created a steering group to aid development of its draft AQAP. This has included revisiting the draft AQAP that was submitted to DEFRA. The group has worked to update the draft AQAP, however due to the current challenges presented in response to COVID-19, the work by the steering group has been temporarily suspended.

In advancing work on some of the proposed draft measures the Council has submitted a grant application for £45k in support from the 2019 - 2020 Air Quality Grant to support the feasibility assessment for a clean air zone. However the bid was unsuccessful.

In July 2019 the Council and the County Council also declared a climate change emergency with the overarching aim of working towards all council activities being net carbon neutral by 2030. The Council has progressed towards the development of an action plan.

The draft action plan aims to recognise the mutual benefits that can be achieved from a general emissions and collectively how this can benefit both local air quality and greenhouse emissions. The Council has appointed a new Climate Change and Sustainability Programme Lead Officer to lead on the action plan, and which will incorporate the action plan measure of reducing Council Emissions.

The principal challenges and barriers to implementation that Dacorum anticipates facing are that all AQMAs are declared based on emissions from road transport, and for which it has no administrative control over the road network.

Whilst the measures stated above will help to contribute towards compliance, Dacorum anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Lawn Lane and London Road AQMA. The approach to action planning by the Council is flexible to allow inclusion or removal from its AQAP measures as appropriate.

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

Particulate matter, whether PM₁₀ (aerodynamic diameter <10µm), PM_{2.5} (aerodynamic diameter <2.5µm), or PM_{1.0} (aerodynamic diameter <1µm) is emitted from exhausts as a result of the combustion process within engines and also from tyre and brake wear and other vehicle component wear such as the chassis and clutch (Air Quality Expert Group 2005).

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 25µg/m³ as a limit value to be met by 2020 and the World Health Organisation (WHO) has set an air quality guideline of 10µg/m³ 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 Hertfordshire Local Authorities Report on Particulate Matter (PM_{2.5}) in Ambient Air in 2018 for Hertfordshire County Council Public Health (November 2019) 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 2018.
- 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 for 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/m³ but less than 54µg/m³
- High is defined as being between 54µg/m³ and 70µg/m³
- Very High is defined as being 71µg/m³ 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}, however the Council has proposed through its draft AQAP measures designed at achieving an overall emissions reduction, such as emission reduction from new development or setting of emission standards (e.g. local policy for taxi and private hire, bus emission standards and feasibility assessment for a clean air zone).

Furthermore the Council has declared a Climate Change emergency with a commitment to ensure that all council activities are net carbon neutral by 2030 and the development of an action plan. To fulfil this commitment the Council has recently created and appointed to a new lead officer role for climate change.

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 developing climate change emergency action plan does propose incorporating reductions from Council emissions in the draft AQAP into actions on climate change.

The Council is now also working on the development of the next iteration of its local plan. Influencing emissions reduction from planning has also formed part of the draft AQAP, and internal draft planning guidance was produced to demonstrate how different areas of national policy can be positive for local air quality.

An extract of the internal draft is presented in the table below to note how different areas of national planning policy can be used to promote mitigation from development, but which is not exclusively linked to air quality.

| Promoting health and safe communities | |
|--|--|
| Paragraph 91(c) Planning polices and decisions should aim to achieve healthy, inclusive safe spaces which: <ul style="list-style-type: none">• Enable and support healthy lifestyles, for example | Healthy outcomes that support walking and cycling enabling people to use alternative forms of travel |

| | |
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| <p>through layouts that encourage walking and cycling</p> | |
| <p>Promoting sustainable transport</p> | |
| <p>Paragraph 102(c) & (d)</p> <p>Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:</p> <ul style="list-style-type: none"> • Opportunities to promote walking, cycling and public transport use are identified and pursued • The environmental impacts of traffic and transport infrastructure can be identified, assessed and taking into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains | <p>LTP 4 identifies there is high demand for road travel across Hertfordshire meaning the county’s road network is under great pressure. As a consequence there is regular congestion and network disruption resulting in unreliable journeys and limited resilience, as well as harmful vehicle emissions and other environmental impacts.</p> <p>The current low level of sustainable mode use and the forecast growth in transport demand and pressure underlines the need to rethink the long term transport strategy for the county.</p> |
| <p>Paragraph 103</p> <p>The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need for travel and offering a genuine choice of transport modes. This can help reduce congestion and emissions, and improve air quality and public health. However</p> | |

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| <p>opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.</p> | |
| <p>Paragraph 105 (e)</p> <p>If setting local parking standards for residential and non-residential development, policies should take account:</p> <ul style="list-style-type: none"> • the need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emissions vehicles | |
| <p>Paragraph 110 (a), (e)</p> <p>Within this context, applications for development should:</p> <ul style="list-style-type: none"> • give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas, and second – so far as possible – to facilitating access to high quality public transport • be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations | |
| <p>Paragraph 111</p> | |

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| <p>All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.</p> | |
| <p>Achieving well designed places</p> | |
| <p>Paragraph 131 In determining applications, great weight should be given to outstanding or innovative designs which promote high levels of sustainability.</p> | |
| <p>Meeting the challenge of climate change</p> | |
| <p>Paragraph 150 (b) New development should be planned for in ways that can help reduce greenhouse gas emissions, such as through location, orientation and design.</p> | |

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

3.1 Summary of Monitoring Undertaken

The Council operates one automatic monitoring station which monitors for nitrogen dioxide (NO₂), and fine particles (PM₁₀ and PM_{2.5}) as well as deploying a network of 74 non-automatic (passive) diffusion tubes which monitor for NO₂ across 54 locations across the district.

With the exception of local monitoring in the Lawn Lane and London Road Air Quality Management Areas (AQMA), the objectives for NO₂ and PM₁₀ are being met in all other areas of the district.

Monitoring in the Northchurch AQMA has demonstrated for a 2nd consecutive year that ambient NO₂ concentrations remain below intervention levels at all monitoring locations. However to support revocation of the AQMA, Policy Guidance LAQM.PG16 specifies this will typically be feasible after **three or more years** of compliance.

With respect to the Lawn Lane and London Road AQMAs local monitoring indicates elevated local NO₂ concentrations remain, and an increase in ambient concentrations when compared with the 2018 results. Noting that local NO₂ concentrations remain considerably above the objective for this pollutant in the AQMAs the status of these AQMAs will remain unchanged.

As part of its work on LAQM, for 2020 the Council has revised parts of its air quality network to introduce or increase monitoring at locations where air quality may be a concern. These locations have been identified from local knowledge of the district and / or reports produced by consultants for new development that have suggested ambient NO₂ levels approaching the annual average objective. Monitoring has been revised / 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

Results from these locations will be published as part of the Councils 2021 ASR submission.

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Dacorum undertook automatic (continuous) monitoring at one site during 2019. The automatic monitoring station is located on the High Street, Northchurch and forms part of the local monitoring network of the Northchurch AQMA. The site has been in operation since 2012, but it is not affiliated to the national network.

The site monitors for NO₂, PM₁₀ and PM_{2.5}. In 2018 data capture at the site was above 99% for fine particulate and 94% for NO₂. The monitoring results show that:

- The annual mean objective for all pollutants monitored was achieved at site
- The hourly mean objective for NO₂ was achieved at site, i.e. there were less than 18 separate hourly exceedances of 200µg/m³
- The daily mean for PM₁₀ was achieved at site, i.e. there were less than 35 occasions where the daily mean exceeded 50µg/m³

Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at <https://www.airqualityengland.co.uk/>

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.

3.1.2 Non-Automatic Monitoring Sites

Dacorum undertook non-automatic (passive) monitoring of NO₂ at 54 sites during 2019. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites in AQMAs only 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.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias⁴, “annualisation” (where the data capture falls below 75%), and distance correction⁵. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

With the exception of the Lawn Lane and London Road AQMAs the results for the diffusion tube monitoring from 2019 show compliance with the annual mean objective for NO₂. In comparison with results from 2018 an increase in ambient NO₂ concentrations occurred at 23 monitoring locations, and which represents under half of all sites monitored. At sites exposed as triplicate diffusion tubes, the change in concentration year on year has been based on comparing the triplicate average of 2019 against 2018, as opposed to comparing the individual results.

As stated above, monitoring in the Northchurch AQMA has demonstrated ambient NO₂ concentrations remain below intervention levels at all monitoring locations for a 2nd consecutive year.

Trends in NO₂ concentrations within the Northchurch AQMA are also presented in Figure A.1. At the High Street and Northchurch analyser monitoring locations NO₂ concentrations are noted to be stable or in decline. However at the New Road location the trend suggests a gradually increasing NO₂ concentration across 2015 – 2019, peaking at 37.8µg/m³. Despite results which are below the objective limit, continued monitoring at the location will be required to ensure an exceedance at this location is not recorded.

To support revocation of the AQMA, Policy Guidance LAQM.PG16 specifies this will typically be feasible after three or more years of compliance, and noting compliance has only been measured over 2 years and the reported trend at New Road, it would not be appropriate to suggest revocation of the AQMA in the short-term.

⁴ <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

⁵ Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

Monitoring of NO₂ in the Lawn Lane and London Road AQMA continues to demonstrate elevated local concentrations within both AQMAs, and noticeably above the objective limit at a number of monitoring positions. A comparison of 2019 results with that of 2018 indicate some increases in local NO₂ concentrations.

Trends in NO₂ concentrations within the Lawn Land and London Road AQMA are also presented in Figure A.1. Despite some local increases in 2019 data, the overall picture between 2015 – 2019 is stable or slowly improving local air quality.

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³. Note that the concentration data presented in Table A.3 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 2019 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.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

3.2.2 Particulate Matter (PM₁₀)

The Council has been monitoring PM₁₀ at the automatic monitoring station on the High Street, Northchurch, since August 2015.

In 2019 valid data capture for the monitoring period was 99%. No exceedances were measured for either of the objectives relevant to PM₁₀. However results for 2019 showed a marked increase on previous years both for the annual average and number of 24 hour periods exceeded 50µg/m³.

The reason for this increase can be attributed to the surface re-dressing of the main road that runs parallel to the automatic station. This led to exceptionally high readings between the 14th – 18th April. The activities of surface re-dressing are known to have contributed to 5 of the 8 days in 2019 of 24 hour periods that exceeded 50µg/m³. The highest concentration measured in any single 24 hour period was 399µg/m³. These results have been communicated to Hertfordshire County

Council, as the Highways Authority, noting at its peak the dust caused by surface re-dressing led to local concentrations 8 times that of the objective for a 24 hour period. By removing these events from the dataset, noting the irregularity with which surface re-dressing occurs, 3 exceedances of the 24 hour objective occurred in 2019 and is comparable with the low number of exceedances that have been measured year on year.

Similarly and with respect to the annual average, which although measured at $19\mu\text{g}/\text{m}^3$ and the highest concentration measured to date, if removing contributions from surface re-dressing activities the annual average is $15\mu\text{g}/\text{m}^3$. This is broadly comparable with results of previous years monitoring.

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of $40\mu\text{g}/\text{m}^3$.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of $50\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

3.2.3 Particulate Matter ($\text{PM}_{2.5}$)

The Council has been monitoring $\text{PM}_{2.5}$ at the automatic monitoring station on the High Street, Northchurch, since August 2015. The objective for $\text{PM}_{2.5}$ is not a numerical objective, but an expectation that local authorities should work towards reducing emissions/concentrations of fine particulate matter.

For 2018 data capture at this station achieved 99%. The annual average measured was $10\mu\text{g}/\text{m}^3$. This is a decrease of 2018 monitoring results, but overall represents an increase in previous year's annual averages of $8\mu\text{g}/\text{m}^3$ (2015 – 2017). The results of 2019.

However, when accounting for the activities of surface re-dressing it can be demonstrated that this also impacted local $\text{PM}_{2.5}$ concentrations. Although not as pronounced a reduction when compared with local PM_{10} monitoring, when removing the results between 14th – 18th April this does result in a $0.4\mu\text{g}/\text{m}^3$ reduction, from $10\mu\text{g}/\text{m}^3$ to $9.6\mu\text{g}/\text{m}^3$.

Table A.7 in Appendix A presents the ratified and adjusted monitored $\text{PM}_{2.5}$ annual mean concentrations for the past 5 years.

3.2.4 Sulphur Dioxide (SO₂)

The Council does not monitor for sulphur dioxide as there are no relevant sources for this pollutant identified under previous rounds of review and assessment.

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? | 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 | NO ₂ ; PM ₁₀ ; PM _{2.5} | 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

| Site ID | Site Name | Site Type | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Tube collocated with a Continuous Analyser? |
|---------|----------------------------------|------------------|-------------------------|--------------------------|----------------------|----------|--|---|---|
| DC40 | Sawyers Way HH | Roadside | 506780 | 207180 | NO2 | NO | 5 | 2 | NO |
| DC42 | Wood Lane End HH | Urban Background | 508177 | 207934 | NO2 | NO | N/A | 1 | NO |
| DC46 | High Street Bovington | Roadside | 501541 | 203659 | NO2 | NO | 13 | 1 | NO |
| DC47 | High Street Berkhamsted | Roadside | 499365 | 207724 | NO2 | NO | 20 | 1 | NO |
| DC48 | Prince Edward Street Berkhamsted | Urban Background | 499207 | 207754 | NO2 | NO | N/A | 45 | NO |
| DC50 | High Street Northchurch | Roadside | 497346 | 208835 | NO2 | YES | 1 | 1 | NO |
| DC51 | Brook Street Tring | Roadside | 492552 | 211824 | NO2 | NO | 8 | 2 | NO |
| DC52 | High Street Tring | Roadside | 492335 | 211386 | NO2 | NO | 6 | 2 | NO |
| DC54 | Watford Road Kings Langley | Roadside | 507606 | 201624 | NO2 | NO | 34 | 2 | NO |
| DC55 | High Street Kings Langley | Roadside | 507184 | 202690 | NO2 | NO | 15 | 2 | NO |
| DC57 | Lawn Lane 1 HH | Roadside | 505923 | 205761 | NO2 | YES | 4 | 1 | NO |
| DC58 | Gammon Close HH | Urban Background | 507058 | 206727 | NO2 | NO | N/A | 22 | NO |
| DC59 | Wadley Close HH | Urban Background | 506981 | 206829 | NO2 | NO | N/A | 11 | NO |

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|------|----------------------------|------------------|--------|--------|-----|-----|-----|----|-----|
| DC60 | Field Road HH | Urban Background | 507483 | 206898 | NO2 | NO | N/A | 17 | NO |
| DC61 | St Agnells Lane HH | Roadside | 507121 | 209252 | NO2 | NO | 10 | 1 | NO |
| DC62 | New Road Northchurch | Roadside | 497335 | 208860 | NO2 | YES | 1 | 1 | NO |
| DC63 | Darrs Lane Northchurch | Roadside | 497264 | 208927 | NO2 | YES | 5 | 1 | NO |
| DC64 | Lawn Lane 2 HH | Roadside | 505969 | 205726 | NO2 | YES | 4 | 1 | NO |
| DC65 | Lawn Lane 3 HH | Roadside | 505930 | 205740 | NO2 | YES | 1 | 1 | NO |
| DC66 | London Road Apsley | Roadside | 505674 | 205514 | NO2 | YES | 1 | 1 | NO |
| DC67 | Allandale | Roadside | 505948 | 207814 | NO2 | NO | 16 | 1 | NO |
| DC68 | Belswains Sappi | Roadside | 507005 | 204677 | NO2 | NO | 3 | 1 | NO |
| DC69 | Lawn Lane Belswains | Urban Background | 506053 | 205664 | NO2 | YES | N/A | 25 | NO |
| DC70 | Lawn Lane 4 | Roadside | 505888 | 205801 | NO2 | YES | 6 | 2 | NO |
| DC71 | Orchard Street | Roadside | 505636 | 205504 | NO2 | YES | 3 | 1 | NO |
| DC73 | Durrants Hill Road | Roadside | 505734 | 205519 | NO2 | YES | 1 | 2 | NO |
| DC74 | Avia Close | Roadside | 505841 | 205395 | NO2 | YES | 6 | 1 | NO |
| DC75 | The Meadows | Roadside | 497472 | 208730 | NO2 | NO | 10 | 2 | NO |
| DC76 | The Cotterells | Roadside | 505355 | 206504 | NO2 | NO | 5 | 1 | NO |
| DC81 | Sappi 2 | Roadside | 507122 | 204470 | NO2 | NO | 10 | 1 | NO |
| DC85 | Health Centre, London Road | Roadside | 505754 | 205437 | NO2 | YES | 4 | 1 | NO |
| DC86 | Northchurch Co-location A | Roadside | 497295 | 208901 | NO2 | YES | 10 | 3 | YES |
| DC87 | Northchurch Co-location B | Roadside | 497295 | 208901 | NO2 | YES | 10 | 3 | YES |

| | | | | | | | | | |
|-------|------------------------------|----------|--------|--------|-----|-----|-----|-----|-----|
| DC88 | Northchurch Co-location C | Roadside | 497295 | 208901 | NO2 | YES | 10 | 3 | YES |
| DC89 | High Street, Markyate | Roadside | 506227 | 216317 | NO2 | NO | 0 | 2 | NO |
| DC90 | High Street Northchurch A | Roadside | 497346 | 208835 | NO2 | YES | 1 | N/A | NO |
| DC91 | High Street Northchurch B | Roadside | 497346 | 208835 | NO2 | YES | 1 | N/A | NO |
| DC92 | New Road Northchurch A | Roadside | 497335 | 208860 | NO2 | YES | 1 | N/A | NO |
| DC93 | New Road Northchurch B | Roadside | 497335 | 208860 | NO2 | YES | 1 | N/A | NO |
| DC94 | Health Centre, London Road A | Roadside | 505754 | 205437 | NO2 | YES | 4 | 1 | NO |
| DC95 | Health Centre, London Road B | Roadside | 505754 | 205437 | NO2 | YES | 4 | 1 | NO |
| DC96 | Durrants Hill Road A | Roadside | 505734 | 205519 | NO2 | YES | 1 | 2 | NO |
| DC97 | Durrants Hill Road B | Roadside | 505734 | 205519 | NO2 | YES | 1 | 2 | NO |
| DC98 | London Road Apsley A | Roadside | 505674 | 205514 | NO2 | YES | 1 | 1 | NO |
| DC99 | London Road Apsley B | Roadside | 505674 | 205514 | NO2 | YES | 1 | 1 | NO |
| DC100 | Lawn Lane 1A | Roadside | 505923 | 205761 | NO2 | YES | 4 | 1 | NO |
| DC101 | Lawn Lane 1B | Roadside | 505923 | 205761 | NO2 | YES | 4 | 1 | NO |
| DC102 | Lawn Lane 2A | Roadside | 505969 | 205726 | NO2 | YES | 4 | 1 | NO |
| DC103 | Lawn Lane 2B | Roadside | 505969 | 205726 | NO2 | YES | 4 | 1 | NO |
| DC104 | Lawn Lane 3A | Roadside | 505930 | 205740 | NO2 | YES | 1 | 1 | NO |
| DC105 | Lawn Lane 3B | Roadside | 505930 | 205740 | NO2 | YES | 1 | 1 | NO |
| DC106 | Outside 24 Cotterells | Roadside | 505349 | 206667 | NO2 | YES | 4 | 14 | NO |
| DC107 | Marlowes R/B | Roadside | 505508 | 207613 | NO2 | NO | 0.5 | 3 | NO |

| | | | | | | | | | |
|-------|--|----------|--------|--------|-----|----|------|-----|----|
| DC111 | St Marys 3 | Roadside | 496938 | 209235 | NO2 | NO | 1 | 1.5 | NO |
| DC112 | High Street Markyate 2 | Roadside | 505876 | 216805 | NO2 | NO | 0.5 | 1 | NO |
| DC113 | Chapel Street, Berkhamsted | Roadside | 499448 | 207870 | NO2 | NO | 0.5 | 2 | NO |
| DC114 | Lower Kings Road, Berkhamsted | Roadside | 499127 | 207935 | NO2 | NO | 0.5 | 1 | NO |
| DC115 | Kings Road, Berkhamsted | Roadside | 498887 | 207520 | NO2 | NO | 1 | 1 | NO |
| DC116 | Castle Street, Berkhamsted | Roadside | 499384 | 207722 | NO2 | NO | 0.75 | 2 | NO |
| DC117 | High Street, Berkhamsted 2 | Roadside | 498417 | 208214 | NO2 | NO | 0.25 | 2 | NO |
| DC118 | O/S 158 Marlowes | Roadside | 505508 | 207613 | NO2 | NO | 10 | 7 | NO |
| DC119 | The Point Hemel A | Roadside | 505529 | 206298 | NO2 | NO | 36 | 13 | NO |
| DC120 | The Point Hemel B | Roadside | 505529 | 206298 | NO2 | NO | 36 | 13 | NO |
| DC121 | The Point Hemel C | Roadside | 505529 | 206298 | NO2 | NO | 36 | 13 | NO |
| DC122 | Bridge Street Hemel Hempstead | Roadside | 505551 | 206947 | NO2 | NO | 2 | 1 | NO |
| DC123 | High St/Lower Kings Rd Junct., Berkhamsted | Roadside | 498417 | 208214 | NO2 | NO | 1 | 1.5 | NO |
| DC124 | Waitrose Entrance, Lower Kings Rd, Berkham | Roadside | 499108 | 207860 | NO2 | NO | 5 | 1 | NO |
| DC125 | Canal, Lower Kings Road, Berkhamsted | Roadside | 499108 | 207860 | NO2 | NO | 3 | 3 | NO |

| | | | | | | | | | |
|-------|--|---------------------|--------|--------|-----|----|-----|---|----|
| DC126 | Broadwater, Berkhamsted | Urban Background | 499208 | 208140 | NO2 | NO | N/A | 1 | NO |
| DC127 | BFI, Kings Road, Berkhamsted | Roadside | 498287 | 206978 | NO2 | NO | 5 | 2 | NO |
| DC128 | Shootersway, Berkhamsted | Roadside | 495608 | 208711 | NO2 | NO | 10 | 2 | NO |
| DC129 | Stone Cottage, Kings Road, Berkhamsted | Roadside | 498293 | 207011 | NO2 | NO | 0 | 5 | NO |
| DC130 | 2 The Cottages, Kingshill Way | Roadside | 498313 | 206945 | NO2 | NO | 0 | 2 | NO |
| DC131 | Gravel Path, Berkhamsted | Roadside | 499703 | 207838 | NO2 | NO | 0 | 1 | NO |

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 NO₂ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2019 (%) ⁽²⁾ | NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)} | | | | |
|---------|-------------------------|--------------------------|------------|-----------------|---|--|---|-------------|-------------|-------------|-------------|
| | | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| CM1 | 497295 | 208901 | Roadside | Automatic | 94 | 94 | 26.0 | 29.0 | 29.0 | 29.3 | 24.0 |
| DC40 | 506780 | 207180 | Background | Diffusion Tube | 92 | 92 | 19.0 | 19.4 | 18.2 | 17.3 | 17.8 |
| DC42 | 508177 | 207934 | Background | Diffusion Tube | 92 | 92 | 21.0 | 21.5 | 19.4 | 20.8 | 19.6 |
| DC46 | 501541 | 203659 | Kerbside | Diffusion Tube | 83 | 83 | 19.7 | 19.0 | 19.1 | 17.8 | 18.2 |
| DC47 | 499365 | 207724 | Roadside | Diffusion Tube | 100 | 100 | 31.4 | 32.7 | 32.1 | 29.5 | 30.8 |
| DC48 | 499207 | 207754 | Background | Diffusion Tube | 100 | 100 | 19.0 | 19.6 | 18.1 | 17.9 | 17.5 |
| DC50 | 497346 | 208835 | Roadside | Diffusion Tube | 100 | 100 | 39.4 | 42.4 | 42.3 | 33.0 | 32.7 |
| DC51 | 492552 | 211824 | Kerbside | Diffusion Tube | 100 | 100 | 25.3 | 23.7 | 24.4 | 25.4 | 25.8 |
| DC52 | 492335 | 211386 | Roadside | Diffusion Tube | 100 | 100 | 27.7 | 28.7 | 29.4 | 26.3 | 23.2 |
| DC54 | 507606 | 201624 | Roadside | Diffusion Tube | 100 | 100 | 44.0 | 44.6 | 44.3 | 40.8 | 38.1 |
| DC55 | 507184 | 202690 | Roadside | Diffusion Tube | 100 | 100 | 30.1 | 31.0 | 29.9 | 28.5 | 29.1 |
| DC57 | 505923 | 205761 | Roadside | Diffusion Tube | 100 | 100 | 47.8 | 52.6 | 46.8 | 41.6 | 41.5 |
| DC58 | 507058 | 206727 | Background | Diffusion Tube | 92 | 92 | 24.4 | 33.4 | 23.8 | 24.1 | 22.7 |
| DC59 | 506981 | 206829 | Background | Diffusion Tube | 92 | 92 | 28.9 | 29.2 | 27.8 | 25.7 | 26.7 |

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|------|--------|--------|------------|----------------|-----|-----|-------------|-------------|-------------|-------------|-------------|
| DC60 | 507483 | 206898 | Background | Diffusion Tube | 92 | 92 | 20.9 | 22.4 | 19.2 | 20.3 | 20.8 |
| DC61 | 507121 | 209252 | Roadside | Diffusion Tube | 92 | 92 | 26.3 | 27.0 | 26.0 | 24.5 | 26.1 |
| DC62 | 497335 | 208860 | Roadside | Diffusion Tube | 100 | 100 | 31.8 | 33.3 | 34.2 | 36.2 | 38.6 |
| DC63 | 497264 | 208927 | Roadside | Diffusion Tube | 100 | 100 | 25.2 | 25.8 | 25.3 | 23.5 | 24.2 |
| DC64 | 505969 | 205726 | Roadside | Diffusion Tube | 100 | 100 | 31.2 | 32.5 | 31.2 | 28.5 | 30.6 |
| DC65 | 505930 | 205740 | Roadside | Diffusion Tube | 100 | 100 | 53.3 | 48.3 | 48.9 | 48.7 | 52.1 |
| DC66 | 505674 | 205514 | Roadside | Diffusion Tube | 100 | 100 | 51.6 | 51.1 | 54.0 | 48.6 | 48.6 |
| DC67 | 505948 | 207814 | Roadside | Diffusion Tube | 83 | 83 | 25.0 | 26.9 | 25.0 | 26.0 | 24.9 |
| DC68 | 507005 | 204677 | Roadside | Diffusion Tube | 100 | 100 | 32.9 | 33.3 | 32.2 | 32.9 | 30.4 |
| DC69 | 506053 | 205664 | Roadside | Diffusion Tube | 100 | 100 | 21.0 | 23.6 | 21.1 | 20.6 | 20.2 |
| DC70 | 505888 | 205801 | Roadside | Diffusion Tube | 83 | 83 | 34.2 | 35.1 | 34.1 | 36.4 | 32.2 |
| DC71 | 505636 | 205504 | Kerbside | Diffusion Tube | 92 | 92 | 23.0 | 26.0 | 23.9 | 22.3 | 23.7 |
| DC73 | 505734 | 205519 | Roadside | Diffusion Tube | 100 | 100 | 27.7 | 29.2 | 27.5 | 26.2 | 27.6 |
| DC74 | 505841 | 205395 | Roadside | Diffusion Tube | 100 | 100 | 35.0 | 34.7 | 36.1 | 32.2 | 31.9 |
| DC75 | 497472 | 208730 | Roadside | Diffusion Tube | 92 | 92 | 24.0 | 26.6 | 23.4 | 24.7 | 24.7 |
| DC76 | 505355 | 206504 | Kerbside | Diffusion Tube | 100 | 100 | 31.7 | 32.9 | 32.1 | 31.8 | 31.2 |
| DC81 | 507122 | 204470 | Roadside | Diffusion Tube | 92 | 92 | 33.8 | 35.1 | 35.4 | 32.1 | 33.2 |
| DC85 | 505663 | 205528 | Kerbside | Diffusion Tube | 100 | 100 | 34.0 | 31.3 | 34.6 | 32.0 | 33.3 |

| | | | | | | | | | | | |
|-------|--------|--------|----------|----------------|-----|-----|-------------|-------------|-------------|-------------|-------------|
| DC86 | 497295 | 208901 | Roadside | Diffusion Tube | 100 | 100 | 26.6 | 26.1 | 23.9 | 25.4 | 23.8 |
| DC87 | 497295 | 208901 | Roadside | Diffusion Tube | 92 | 92 | 25.3 | 25.4 | 23.4 | 25.9 | 24.3 |
| DC88 | 497295 | 208901 | Roadside | Diffusion Tube | 100 | 100 | 25.4 | 24.8 | 23.9 | 24.8 | 24.9 |
| DC89 | 506227 | 216317 | Roadside | Diffusion Tube | 100 | 100 | 23.2 | 24.0 | 23.0 | 22.4 | 20.8 |
| DC90 | 497346 | 208835 | Roadside | Diffusion Tube | 100 | 100 | 38.0 | 43.6 | 40.4 | 34.2 | 32.9 |
| DC91 | 497346 | 208835 | Roadside | Diffusion Tube | 100 | 100 | 40.7 | 40.5 | 42.6 | 33.6 | 33.9 |
| DC92 | 497335 | 208860 | Roadside | Diffusion Tube | 100 | 100 | 33.3 | 34.6 | 33.1 | 35.5 | 37.6 |
| DC93 | 497335 | 208860 | Roadside | Diffusion Tube | 100 | 100 | 31.0 | 35.2 | 35.2 | 37.8 | 37.2 |
| DC94 | 505663 | 205528 | Kerbside | Diffusion Tube | 100 | 100 | 35.8 | 35.3 | 35.6 | 35.5 | 33.8 |
| DC95 | 505663 | 205528 | Kerbside | Diffusion Tube | 100 | 100 | 33.5 | 37.1 | 35.2 | 33.8 | 35.1 |
| DC96 | 505734 | 205519 | Roadside | Diffusion Tube | 100 | 100 | 33.1 | 30.2 | 29.1 | 27.5 | 26.6 |
| DC97 | 505734 | 205519 | Roadside | Diffusion Tube | 100 | 100 | 30.7 | 30.9 | 28.6 | 28.0 | 28.8 |
| DC98 | 505674 | 205514 | Roadside | Diffusion Tube | 100 | 100 | 52.0 | 55.2 | 55.8 | 48.3 | 47.1 |
| DC99 | 505674 | 205514 | Roadside | Diffusion Tube | 100 | 100 | 51.6 | 52.4 | 52.9 | 48.3 | 49.9 |
| DC100 | 505923 | 205761 | Roadside | Diffusion Tube | 83 | 83 | 48.1 | 49.9 | 44.6 | 44.6 | 45.3 |
| DC101 | 505923 | 205761 | Roadside | Diffusion Tube | 100 | 100 | 41.8 | 52.6 | 46.6 | 42.9 | 42.4 |
| DC102 | 505969 | 205726 | Roadside | Diffusion Tube | 100 | 100 | 30.8 | 44.5 | 38.5 | 29.2 | 29.8 |
| DC103 | 505969 | 205726 | Roadside | Diffusion Tube | 100 | 100 | 30.6 | 31.8 | 31.7 | 29.4 | 29.4 |

| | | | | | | | | | | | |
|-------|--------|--------|------------|----------------|-----|-----|------|------|------|------|------|
| DC104 | 505930 | 205740 | Roadside | Diffusion Tube | 100 | 100 | 54.8 | 54.7 | 55.6 | 48.6 | 51.0 |
| DC105 | 505930 | 205740 | Roadside | Diffusion Tube | 100 | 100 | 55.3 | 57.3 | 54.6 | 48.3 | 49.3 |
| DC106 | 505349 | 206667 | Roadside | Diffusion Tube | 92 | 92 | 28.3 | 29.3 | 26.9 | 26.6 | 25.8 |
| DC107 | 505508 | 207613 | Roadside | Diffusion Tube | 100 | 100 | 28.0 | 27.4 | 29.5 | 27.2 | 27.9 |
| DC111 | 496938 | 209235 | Background | Diffusion Tube | 100 | 100 | 24.6 | 25.4 | 26.3 | 25.6 | 25.2 |
| DC112 | 505876 | 216805 | Roadside | Diffusion Tube | 100 | 100 | 19.6 | 21.9 | 19.3 | 19.6 | 19.1 |
| DC113 | 499448 | 207870 | Roadside | Diffusion Tube | 100 | 100 | 16.8 | 19.5 | 17.6 | 16.1 | 16.9 |
| DC114 | 499127 | 207935 | Roadside | Diffusion Tube | 100 | 100 | 36.2 | 35.4 | 33.3 | 29.2 | 30.7 |
| DC115 | 498887 | 207520 | Roadside | Diffusion Tube | 92 | 92 | 22.4 | 22.2 | 19.0 | 19.0 | 19.0 |
| DC116 | 499384 | 207722 | Roadside | Diffusion Tube | 92 | 92 | 23.8 | 23.2 | 21.9 | 26.0 | 24.9 |
| DC117 | 498417 | 208214 | Kerbside | Diffusion Tube | 100 | 100 | 27.8 | 28.8 | 27.4 | 27.3 | 26.0 |
| DC118 | 505508 | 207613 | Roadside | Diffusion Tube | 100 | 100 | 27.7 | 30.9 | 30.6 | 26.9 | 28.8 |
| DC119 | 505529 | 206298 | Roadside | Diffusion Tube | 92 | 92 | 36.2 | 37.3 | 34.6 | 33.2 | 32.2 |
| DC120 | 505529 | 206298 | Roadside | Diffusion Tube | 92 | 92 | 35.3 | 37.4 | 34.6 | 34.8 | 31.2 |
| DC121 | 505529 | 206298 | Roadside | Diffusion Tube | 92 | 92 | 35.9 | 38.2 | 36.1 | 34.1 | 31.8 |
| DC122 | 505551 | 206947 | Kerbside | Diffusion Tube | 83 | 83 | 37.2 | 30.9 | 31.3 | 27.7 | 27.3 |
| DC123 | 498417 | 208214 | Kerbside | Diffusion Tube | 92 | 92 | n/a | n/a | 32.9 | 30.9 | 28.8 |
| DC124 | 499108 | 207860 | Kerbside | Diffusion Tube | 100 | 100 | n/a | n/a | 21.1 | 20.0 | 21.7 |

| | | | | | | | | | | | |
|-------|--------|--------|------------|----------------|-----|-----|-----|-----|------|------|------|
| DC125 | 499108 | 207860 | Kerbside | Diffusion Tube | 83 | 83 | n/a | n/a | 19.9 | 20.6 | 19.4 |
| DC126 | 499208 | 208140 | Background | Diffusion Tube | 100 | 100 | n/a | n/a | 14.1 | 15.2 | 16.4 |
| DC127 | 498287 | 206978 | Kerbside | Diffusion Tube | 100 | 100 | n/a | n/a | 35.7 | 33.3 | 29.0 |
| DC128 | 495608 | 208711 | Background | Diffusion Tube | 100 | 100 | n/a | n/a | 29.9 | 31.8 | 28.1 |
| DC129 | 498293 | 207011 | Roadside | Diffusion Tube | 100 | 100 | n/a | n/a | 25.3 | 27.2 | 24.0 |
| DC130 | 498313 | 206945 | Roadside | Diffusion Tube | 100 | 100 | n/a | n/a | 35.0 | 35.5 | 32.5 |
| DC131 | 499703 | 207838 | Kerbside | Diffusion Tube | 100 | 100 | n/a | n/a | 23.6 | 25.1 | 25.3 |

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

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 adjustment

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

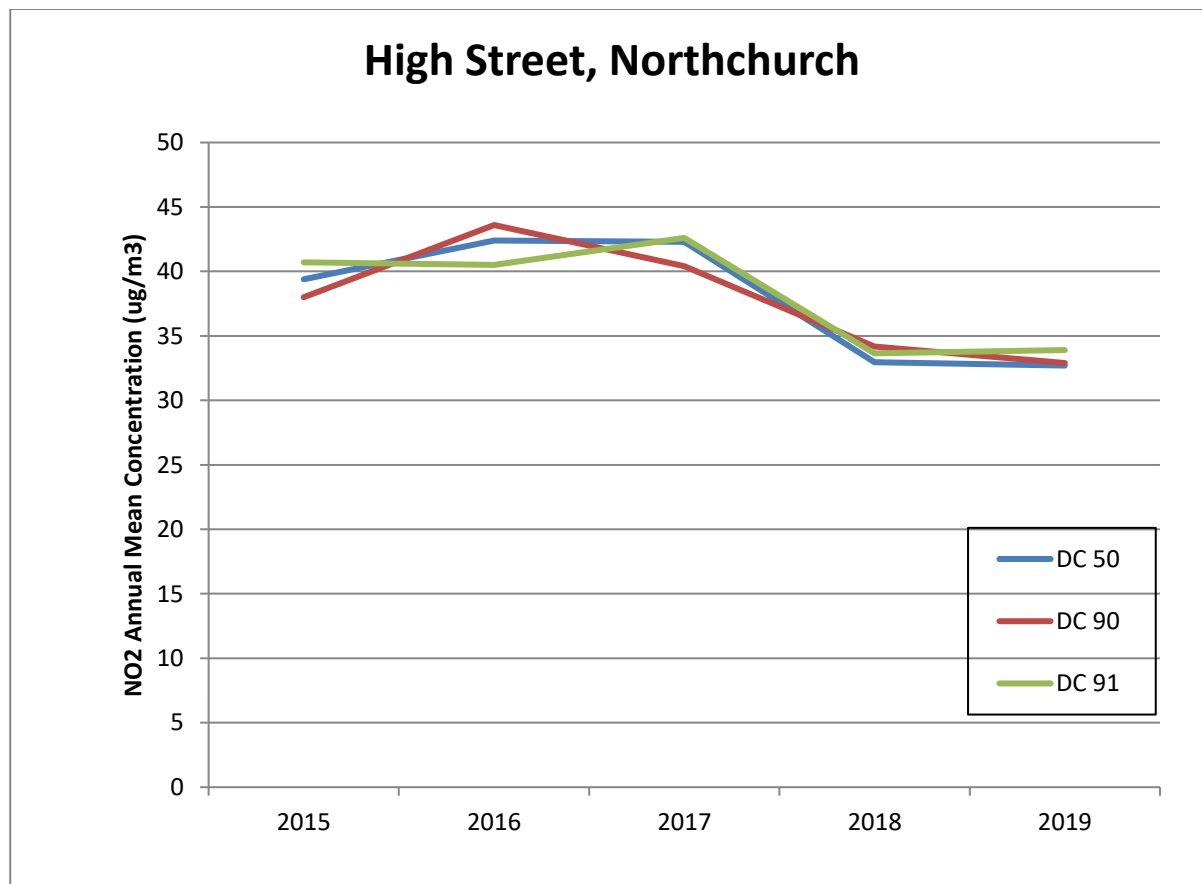
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

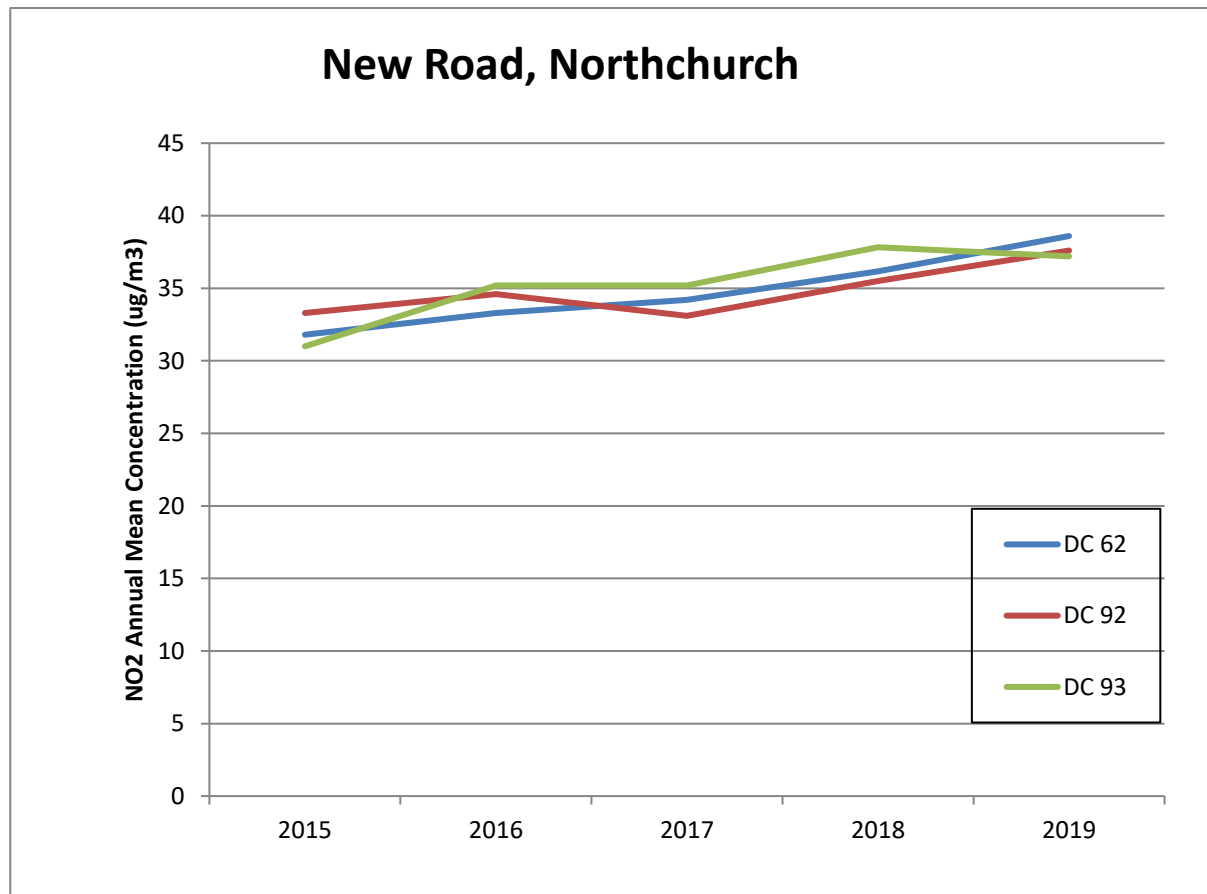
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

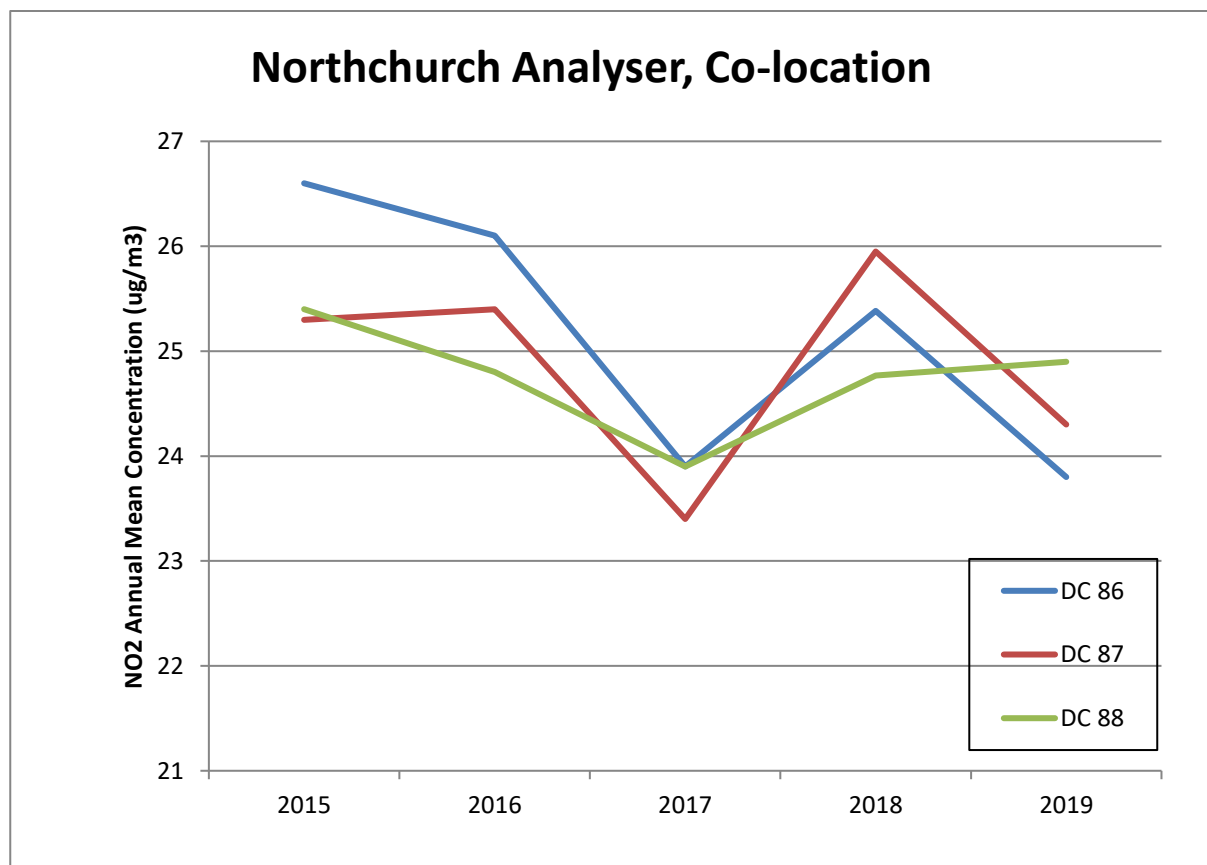
(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

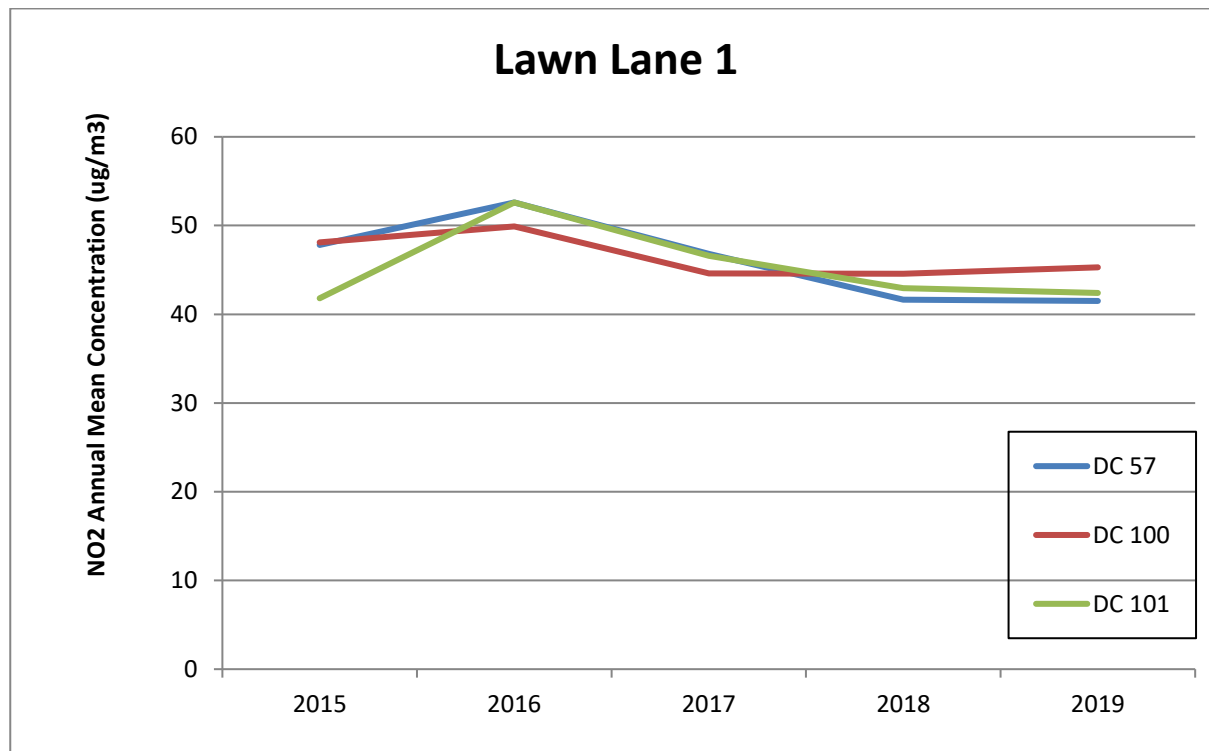
Figure A.1 – Trends in Annual Mean NO₂ Concentrations
Northchurch AQMA

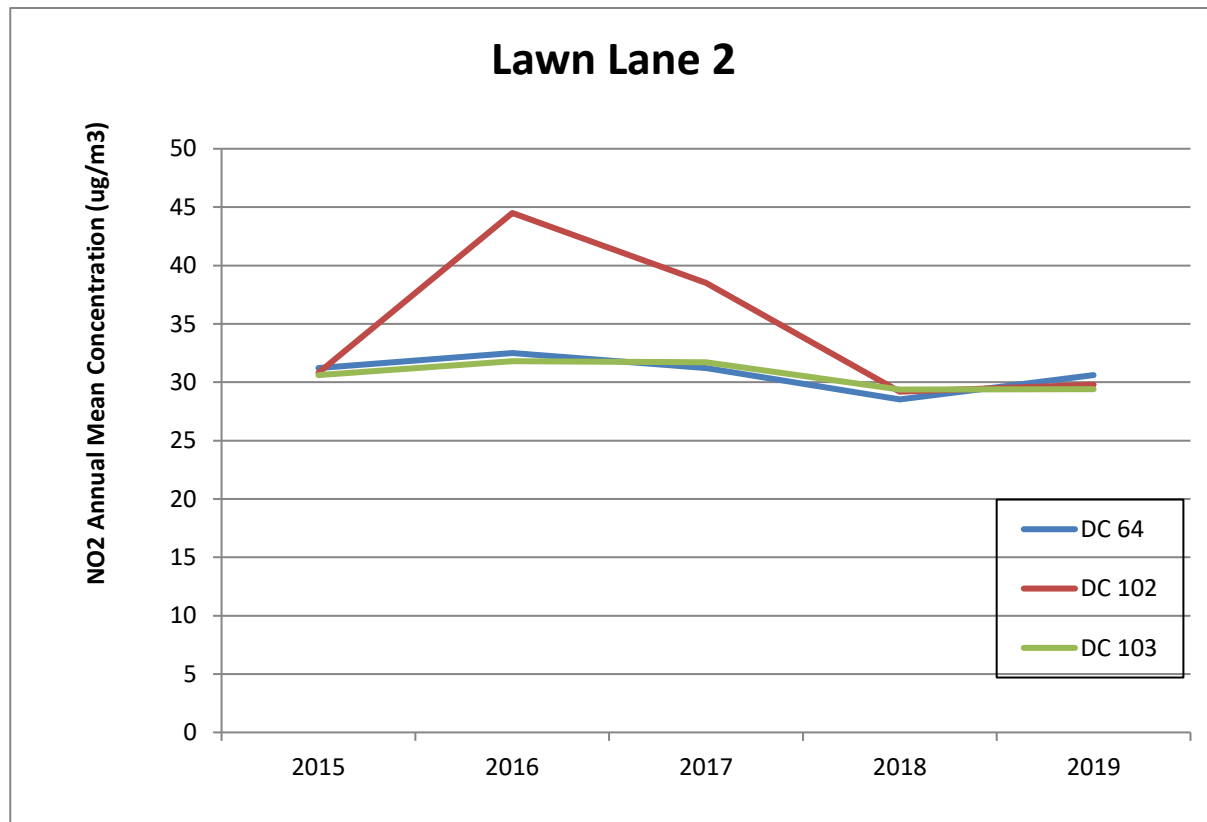


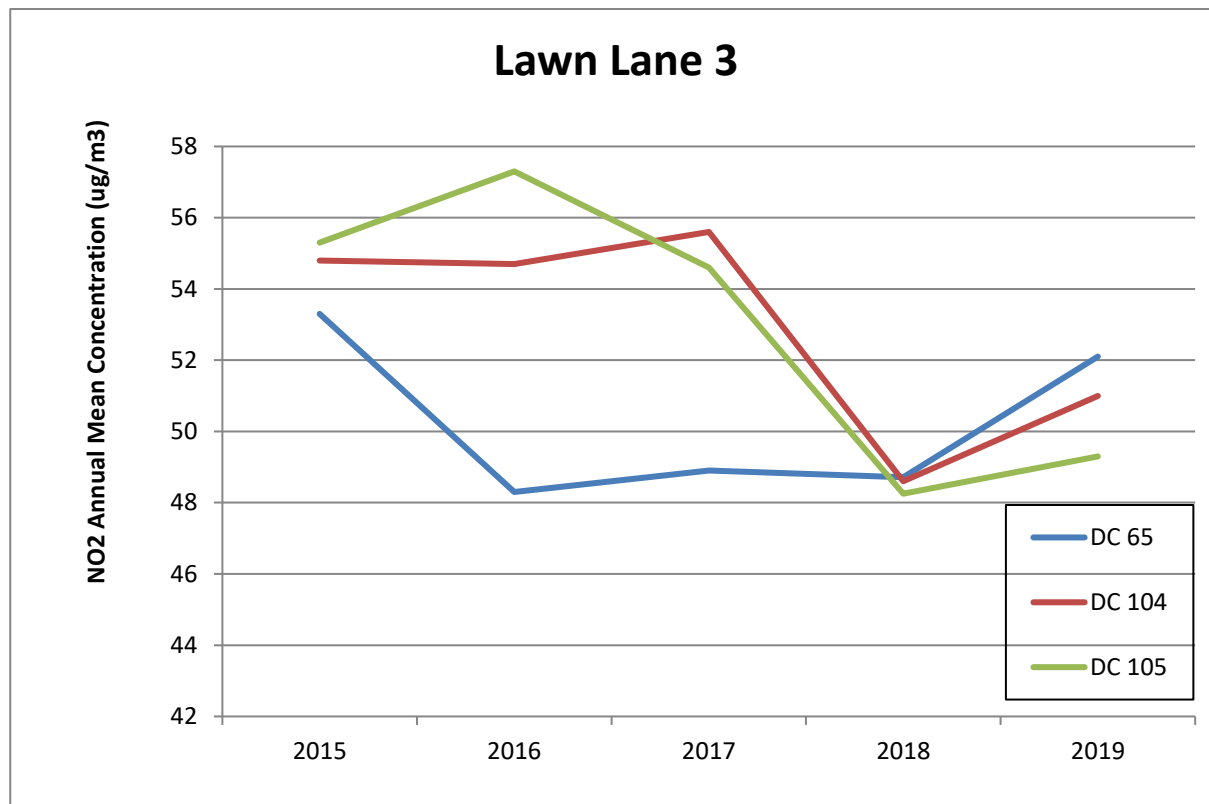




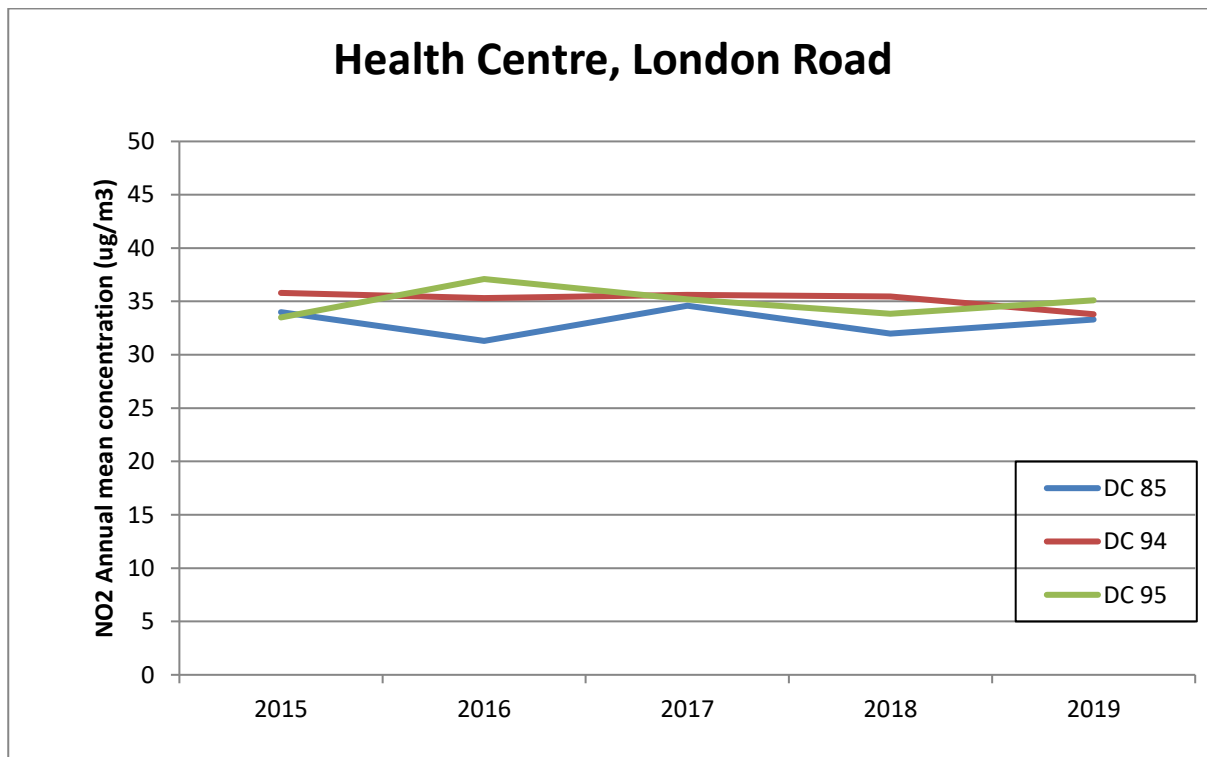
Lawn Lane AQMA

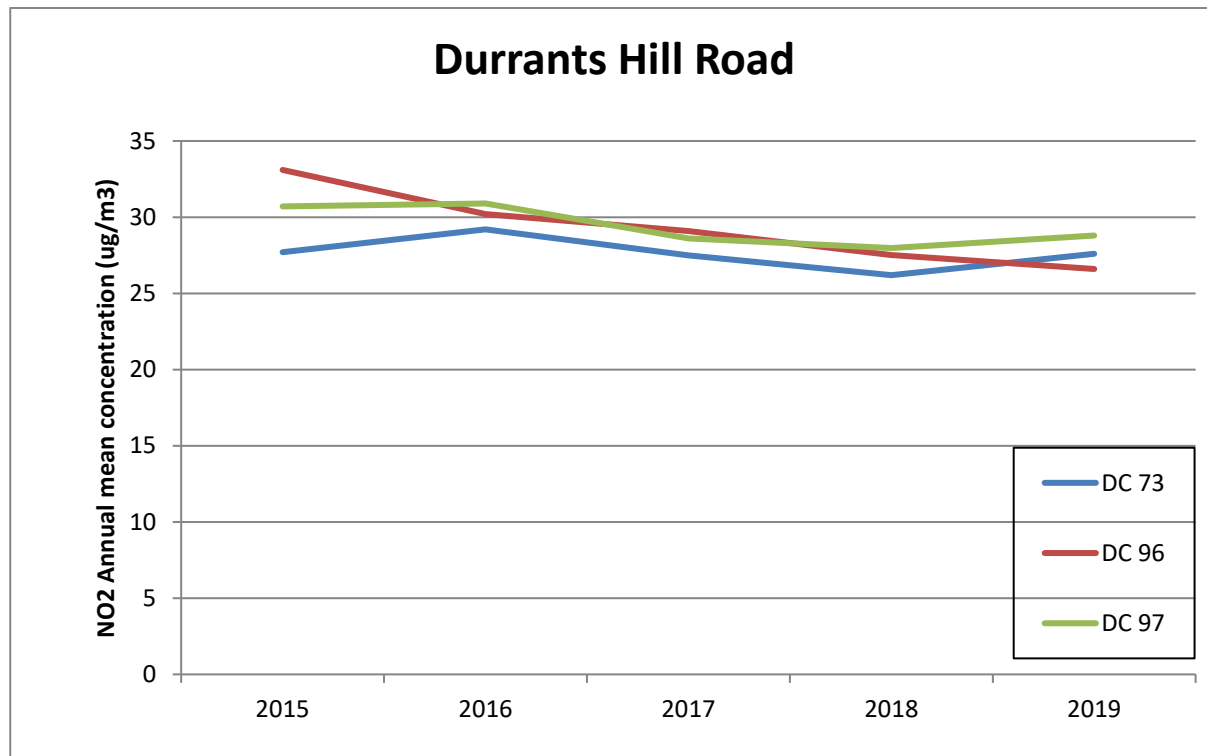






London Road AQMA





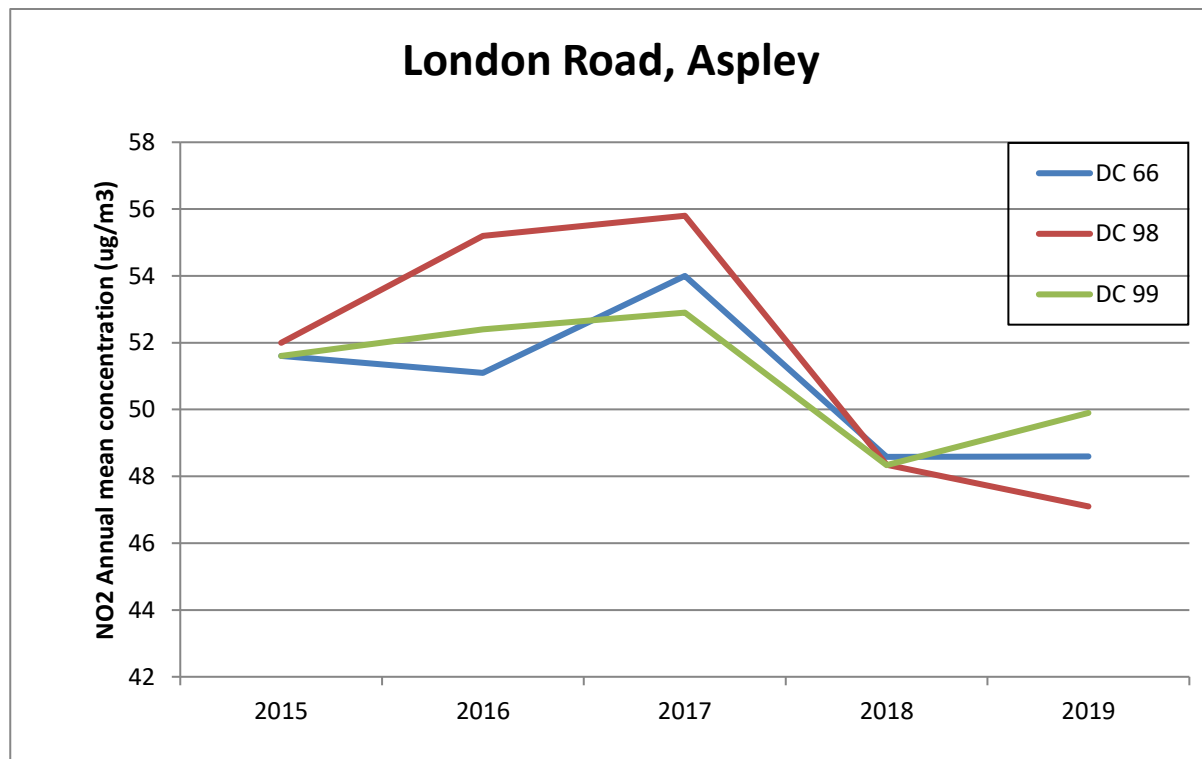


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2019 (%) ⁽²⁾ | NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾ | | | | |
|---------|-------------------------|--------------------------|-----------|-----------------|---|--|--|------|------|------|------|
| | | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| CM1 | 497295 | 208901 | Roadside | Automatic | 94 | 94 | 0 | 0 | 0 | 0 | 0 |

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

Table A.5 – Annual Mean PM₁₀ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2019 (%) ⁽²⁾ | PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|---------|-------------------------|--------------------------|-----------|---|--|--|------|------|------|------|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| CM1 | 497295 | 208901 | Roadside | 99 | 99 | 13 | 12 | 12 | 17 | 18 |

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

(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) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2019 (%) ⁽²⁾ | PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾ | | | | |
|---------|-------------------------|--------------------------|-----------|---|--|---|----------|----------|----------|----------|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| CM1 | 497295 | 208901 | Roadside | 99 | 99 | 1 | 1 | 0 | 3 | 8 |

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

Table A.7 – PM_{2.5} Monitoring Results

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2019 (%) ⁽²⁾ | PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|---------|-------------------------|--------------------------|-----------|---|--|---|------|------|------|------|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| CM1 | 497295 | 208901 | Roadside | 99 | 99 | 8 | 8 | 8 | 11 | 10 |

Annualisation has been conducted where data capture is <75%

Notes:

(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) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO₂ Monthly Diffusion Tube Results - 2019

| Site ID | X OS Grid Ref (Easting) | Y OS Grid Ref (Northing) | NO ₂ Mean Concentrations (µg/m ³) | | | | | | | | | | | | | | |
|---------|-------------------------|--------------------------|--|------|------|------|------|------|------|------|------|------|------|------|-------------|--|---|
| | | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual Mean | | |
| | | | | | | | | | | | | | | | Raw Data | Bias Adjusted (0.77) and Annualised ⁽¹⁾ | Distance Corrected to Nearest Exposure ⁽²⁾ |
| DC40 | 506780 | 207180 | 28.5 | 34.4 | 30.9 | 20.8 | 15.2 | 15.8 | 14.3 | 14.7 | 19.0 | 25.5 | 35.7 | - | 23.2 | 17.8 | |
| DC42 | 508177 | 207934 | 28.3 | 35.6 | 20.6 | 29.2 | 21.2 | 21.2 | 19.3 | 17.7 | 22.7 | 27.5 | 36.5 | - | 25.4 | 19.6 | |
| DC46 | 501541 | 203659 | 33.7 | 34.9 | 17.4 | 20.6 | 18.2 | - | 17.4 | 3.7 | 22.2 | 28.1 | 40 | - | 23.6 | 18.2 | |
| DC47 | 499365 | 207724 | 41.6 | 49.3 | 34.8 | 45.9 | 34.7 | 33.4 | 32.9 | 32.6 | 39.3 | 40.4 | 54.2 | 41.3 | 40.0 | 30.8 | |
| DC48 | 499207 | 207754 | 35.7 | 29.2 | 18.7 | 31.3 | 16.3 | 19 | 12.1 | 12.6 | 20.6 | 19.3 | 35.9 | 22.8 | 22.8 | 17.5 | |
| DC50 | 497346 | 208835 | 50.1 | 49 | 35.6 | 50.3 | 39.7 | 40 | 36.4 | 28.5 | 41.2 | 42.7 | 58 | 37.5 | 42.4 | 32.7 | |
| DC51 | 492552 | 211824 | 41.8 | 38 | 27.3 | 41.3 | 27 | 28.3 | 28.9 | 24.6 | 35 | 35.5 | 47.6 | 27.5 | 33.6 | 25.8 | |
| DC52 | 492335 | 211386 | 44.8 | 39.7 | 33.1 | 30.2 | 24.8 | 24.2 | 23.7 | 18 | 21.1 | 27.2 | 41.7 | 33.7 | 30.2 | 23.2 | |
| DC54 | 507606 | 201624 | 65 | 31.1 | 42 | 49.6 | 42.6 | 41.3 | 44.6 | 49.6 | 50.8 | 55.1 | 65.7 | 56.3 | 49.5 | 38.1 | |
| DC55 | 507184 | 202690 | 45 | 46.6 | 35.8 | 41.9 | 31.3 | 32.3 | 32.5 | 29 | 31.8 | 37.9 | 49.1 | 40.4 | 37.8 | 29.1 | |
| DC57 | 505923 | 205761 | 67 | 59.3 | 49.7 | 63.3 | 47.1 | 51.4 | 47.6 | 43.2 | 50.5 | 51.1 | 70.6 | 46.4 | 53.9 | 41.5 | 33.2 |
| DC58 | 507058 | 206727 | 41.1 | 33.2 | 27.2 | 31.8 | 25.5 | 23.7 | 21.7 | 20.5 | 25 | 30.1 | 44.7 | - | 29.5 | 22.7 | |
| DC59 | 506981 | 206829 | 44.2 | 54.1 | 31.7 | 32.5 | 25 | 25.7 | 28.1 | 28.8 | 30.5 | 33.6 | 46.8 | - | 34.6 | 26.7 | |
| DC60 | 507483 | 206898 | 33.2 | 36.6 | 22.5 | 31.2 | 20.3 | 21.6 | 21 | 20.3 | 22.6 | 28.7 | 39.4 | - | 27.0 | 20.8 | |
| DC61 | 507121 | 209252 | 43 | 52.3 | 27.4 | 29.6 | 24.9 | 25 | 26.6 | 25 | 31.9 | 37.2 | 50 | - | 33.9 | 26.1 | |

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|------|--------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|------|
| DC62 | 497335 | 208860 | 54.8 | 63.3 | 39.2 | 51.1 | 42.6 | 42.6 | 46.1 | 43.9 | 50.1 | 51.4 | 59.4 | 57 | 50.1 | 38.6 | |
| DC63 | 497264 | 208927 | 42.5 | 40.4 | 25.6 | 33.8 | 24.6 | 24.7 | 25.5 | 24.6 | 29.2 | 30.3 | 44.7 | 30.7 | 31.4 | 24.2 | |
| DC64 | 505969 | 205726 | 51.8 | 51.5 | 35.1 | 38.3 | 33 | 30.4 | 31.3 | 30.2 | 36.9 | 43.9 | 54.3 | 40.5 | 39.8 | 30.6 | 26.5 |
| DC65 | 505930 | 205740 | 82.5 | 81.8 | 67.6 | 65.7 | 58.5 | 51 | 61.8 | 65.9 | 64.1 | 68.7 | 79 | 65.3 | 67.7 | 52.1 | |
| DC66 | 505674 | 205514 | 78.6 | 72.3 | 64.3 | 58.6 | 57.2 | 51.4 | 64.3 | 57.4 | 62.3 | 62.4 | 66.7 | 62.1 | 63.1 | 48.6 | |
| DC67 | 505948 | 207814 | 36.4 | 43 | - | 30.9 | 24.5 | 25.9 | 24.4 | 24 | 31.7 | 35.6 | 46.5 | - | 32.3 | 24.9 | |
| DC68 | 507005 | 204677 | 51.8 | 50.4 | 34.8 | 33.5 | 32.4 | 31.4 | 32.4 | 32.3 | 39.4 | 43 | 51.7 | 41.2 | 39.5 | 30.4 | |
| DC69 | 506053 | 205664 | 39.6 | 33.4 | 24 | 26 | 18.7 | 18.7 | 18.1 | 18.6 | 24.2 | 26.9 | 38 | 28.8 | 26.3 | 20.2 | |
| DC70 | 505888 | 205801 | 54.3 | 50.7 | 35.6 | - | 35 | - | 31.1 | 31.8 | 37 | 43 | 59 | 40.1 | 41.8 | 32.2 | |
| DC71 | 505636 | 205504 | 44.6 | 39.5 | 26.4 | 35.5 | 25.2 | 21.4 | 21.7 | 21.6 | 27.3 | - | 45.2 | 29.6 | 30.7 | 23.7 | |
| DC73 | 505734 | 205519 | 40.1 | 43.6 | 29.2 | 45.3 | 30.9 | 31.4 | 30.3 | 28.4 | 33.9 | 36.5 | 45.3 | 34.8 | 35.8 | 27.6 | 24.6 |
| DC74 | 505841 | 205395 | 54.7 | 54.5 | 34.3 | 41.1 | 35.5 | 30.1 | 33 | 37.4 | 39.4 | 44.4 | 50.6 | 41.4 | 41.4 | 31.9 | |
| DC75 | 497472 | 208730 | 44.3 | 38.3 | 29.8 | - | 24.9 | 25.2 | 25.4 | 23.6 | 28 | 33.3 | 45.8 | 34 | 32.1 | 24.7 | |
| DC76 | 505355 | 206504 | 45.6 | 57 | 33.3 | 45.5 | 32.2 | 33.4 | 32.3 | 35.7 | 38.2 | 45 | 48.3 | 40.4 | 40.6 | 31.2 | |
| DC81 | 507122 | 204470 | 56.9 | 45.4 | 37.6 | 32.1 | - | 41.7 | 40.6 | 38.9 | 38 | 48.1 | 52.2 | 42.4 | 43.1 | 33.2 | |
| DC85 | 505663 | 205528 | 57.4 | 55.1 | 35.4 | 47.4 | 37 | 32.6 | 39.5 | 34.5 | 40.7 | 41.6 | 57 | 40.4 | 43.2 | 33.3 | 29.6 |
| DC86 | 497295 | 208901 | 41.3 | 30.8 | 27.3 | 35.1 | 26.3 | 24.2 | 26.5 | 24.7 | 28.9 | 31.8 | 39.4 | 34.3 | 30.9 | 23.8 | |
| DC87 | 497295 | 208901 | 43.1 | 38.2 | 26.8 | 33.8 | 25.3 | - | 26.3 | 24.7 | 29.9 | 32.1 | 34.8 | 32.2 | 31.6 | 24.3 | |
| DC88 | 497295 | 208901 | 42.1 | 44.5 | 23.9 | 38.7 | 25.4 | 23.9 | 25 | 24.4 | 28.8 | 34.9 | 44.2 | 32.7 | 32.4 | 24.9 | |
| DC89 | 506227 | 216317 | 42.4 | 39.4 | 26.4 | 26.1 | 22.8 | 3.6 | 20.8 | 19 | 24.5 | 27.2 | 43.3 | 29.3 | 27.1 | 20.8 | |
| DC90 | 497346 | 208835 | 54.8 | 49 | 37.6 | 49.1 | 36.2 | 33.3 | 34.7 | 28.7 | 42.6 | 45.2 | 62.2 | 38.7 | 42.7 | 32.9 | |
| DC91 | 497346 | 208835 | 55.8 | 49.7 | 36 | 50.1 | 40.4 | 38.4 | 35.7 | 29.7 | 42.9 | 45.2 | 63.1 | 40.9 | 44.0 | 33.9 | |
| DC92 | 497335 | 208860 | 39.4 | 68.4 | 45.5 | 48 | 43.5 | 43.2 | 44.9 | 42.1 | 44 | 50.7 | 63.2 | 52.9 | 48.8 | 37.6 | |
| DC93 | 497335 | 208860 | 55.2 | 46.2 | 45.2 | 46.3 | 39.3 | 44.1 | 46 | 41.3 | 50.4 | 49.5 | 62.9 | 53.4 | 48.3 | 37.2 | |
| DC94 | 505663 | 205528 | 55.6 | 49.6 | 39.6 | 53.4 | 34.8 | 34.7 | 33.8 | 36.8 | 42.8 | 45.5 | 58.5 | 40.9 | 43.8 | 33.8 | 30.0 |
| DC95 | 505663 | 205528 | 58.8 | 53.5 | 34.7 | 51 | 37.7 | 35.6 | 36.1 | 37.6 | 42.2 | 47.1 | 65.7 | 46.9 | 45.6 | 35.1 | 31.0 |

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|-------|--------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|------|
| DC96 | 505734 | 205519 | 39 | 49.6 | 31.6 | 40.1 | 26.3 | 5.6 | 28.7 | 29.8 | 35.5 | 38.8 | 49.9 | 39.6 | 34.5 | 26.6 | 25.0 |
| DC97 | 505734 | 205519 | 44.9 | 45.6 | 31.2 | 46.1 | 30.7 | 31.1 | 29.6 | 29.8 | 33.3 | 39.5 | 49.4 | 37.8 | 37.4 | 28.8 | 26.9 |
| DC98 | 505674 | 205514 | 75.7 | 78.2 | 58.3 | 54.4 | 56.9 | 48.3 | 61.9 | 60.7 | 54.7 | 58.5 | 62 | 64 | 61.1 | 47.1 | |
| DC99 | 505674 | 205514 | 69.5 | 83.9 | 61.2 | 61.2 | 55.7 | 50.7 | 60.5 | 64.6 | 62.6 | 64.6 | 76.3 | 67 | 64.8 | 49.9 | |
| DC100 | 505923 | 205761 | 64.9 | - | - | 60.9 | 48.2 | 95.5 | 49.4 | 43.8 | 55.5 | 48.1 | 72.2 | 49.2 | 58.8 | 45.3 | 35.8 |
| DC101 | 505923 | 205761 | 63.6 | 59.4 | 50 | 64.8 | 48.1 | 57 | 50.1 | 44.5 | 53.7 | 51.4 | 68 | 50.8 | 55.1 | 42.4 | 33.8 |
| DC102 | 505969 | 205726 | 51.8 | 50.1 | 39.8 | 37 | 32 | 30 | 31.2 | 30.2 | 35.3 | 38.8 | 49.9 | 38.7 | 38.7 | 29.8 | 25.9 |
| DC103 | 505969 | 205726 | 51.3 | 49.3 | 36.2 | 36.6 | 32.2 | 29.4 | 31.4 | 31.1 | 35.2 | 38.4 | 49.7 | 37.9 | 38.2 | 29.4 | 25.7 |
| DC104 | 505930 | 205740 | 87.2 | 76.4 | 62.5 | 61.5 | 61.7 | 52.4 | 60.9 | 63.3 | 62 | 66.8 | 75.1 | 64.6 | 66.2 | 51.0 | |
| DC105 | 505930 | 205740 | 73.2 | 80.6 | 58.2 | 58.6 | 58.3 | 47.5 | 60.5 | 66.5 | 59.8 | 64.1 | 75 | 65.6 | 64.0 | 49.3 | |
| DC106 | 505349 | 206667 | 49.3 | 45.5 | 30 | 37 | 26.2 | 23.6 | 22.2 | 22.1 | 33 | 33.7 | 46.3 | - | 33.5 | 25.8 | |
| DC107 | 505508 | 207613 | 45.2 | 44.3 | 32.6 | 33.6 | 30.2 | 30 | 31.2 | 29.4 | 32.8 | 37.6 | 46.6 | 41.5 | 36.3 | 27.9 | |
| DC111 | 496938 | 209235 | 47.7 | 38.2 | 31.4 | 35.7 | 25.7 | 24 | 26.7 | 24.4 | 28.7 | 32 | 44 | 34.5 | 32.8 | 25.2 | |
| DC112 | 505876 | 216805 | 32.8 | 29.7 | 19.8 | 32.1 | 19.3 | 19.2 | 17.1 | 14 | 20.8 | 26.7 | 41.7 | 24.1 | 24.8 | 19.1 | |
| DC113 | 499448 | 207870 | 30.2 | 31 | 19 | 21.8 | 14.8 | 14.9 | 16.7 | 15.9 | 19.1 | 21.9 | 33.2 | 24.5 | 21.9 | 16.9 | |
| DC114 | 498417 | 208214 | 47.7 | 51 | 36.4 | 36.6 | 30.1 | 32.7 | 32.9 | 33.4 | 38.8 | 44 | 50.5 | 44.2 | 39.9 | 30.7 | |
| DC115 | 498287 | 206978 | 36.8 | 31.4 | 21.9 | 26.6 | 16.8 | 16.4 | 16 | 16.4 | 23.3 | 25.4 | 39.8 | - | 24.6 | 19.0 | |
| DC116 | 499384 | 207722 | 30.6 | 38.7 | 22.8 | - | 43.8 | 50.9 | 21.3 | 20 | 26.2 | 28.9 | 43.3 | 29.4 | 32.4 | 24.9 | |
| DC117 | 498417 | 208214 | 47.4 | 40.8 | 28.1 | 32.5 | 30.4 | 26.7 | 25.9 | 21.6 | 31.6 | 34.8 | 52.2 | 32.9 | 33.7 | 26.0 | |
| DC118 | 505508 | 207613 | 42.8 | 48 | 34.5 | 33.7 | 28.5 | 30.1 | - | 32.1 | 35.1 | 40.3 | 47.8 | 39 | 37.4 | 28.8 | |
| DC119 | 505529 | 206298 | 52.5 | 48.7 | 40.4 | 41.4 | 35.1 | 36.6 | 36.9 | 26.7 | 39.9 | 45.1 | 57.1 | - | 41.9 | 32.2 | |
| DC120 | 505529 | 206298 | 48.6 | 48.2 | 35 | 41.7 | 36.1 | 36.7 | 34.7 | 32.3 | 39.2 | 39.9 | 53.4 | - | 40.5 | 31.2 | |
| DC121 | 505529 | 206298 | 35 | 49.5 | 38.5 | 46.8 | 34 | 35.4 | 35 | 36 | 42.4 | 45.9 | 55.8 | - | 41.3 | 31.8 | |
| DC122 | 505551 | 206947 | 46.3 | 43.2 | 33.9 | 37.8 | 26.5 | 28.6 | - | 29.9 | 29.5 | 34.8 | 44.1 | - | 35.5 | 27.3 | |
| DC123 | 498417 | 208214 | 39.5 | 48.2 | 36.6 | 41.4 | 35.6 | 31.4 | 31 | 31 | 39.3 | 40 | - | 37.5 | 37.4 | 28.8 | |
| DC124 | 499108 | 207860 | 35.1 | 37.2 | 22.8 | 24.9 | 21.2 | 22.9 | 20.3 | 22.5 | 28.4 | 32.4 | 34.3 | 35.6 | 28.1 | 21.7 | |

| | | | | | | | | | | | | | | | | | |
|-------|--------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| DC125 | 499108 | 207860 | 32.8 | - | 20.4 | 32 | 20.9 | 23.4 | 20.4 | 19.1 | 24 | - | 32.1 | 26.8 | 25.2 | 19.4 | |
| DC126 | 499208 | 208140 | 28.3 | 30.1 | 16.8 | 23.3 | 15.7 | 15 | 15.8 | 14.1 | 19.5 | 22 | 32.2 | 23.2 | 21.3 | 16.4 | |
| DC127 | 498287 | 206978 | 51.4 | 44 | 32.2 | 44.9 | 34.1 | 34.8 | 28.9 | 26 | 31.7 | 37.6 | 52.3 | 33.3 | 37.6 | 29.0 | |
| DC128 | 495608 | 208711 | 40.5 | 42.1 | 33.9 | 40.3 | 29.3 | 32.2 | 30.8 | 29.7 | 38 | 39.4 | 50.8 | 30.4 | 36.5 | 28.1 | |
| DC129 | 498293 | 207011 | 39.6 | 39.6 | 30.4 | 31.7 | 27.3 | 25 | 23.5 | 23.9 | 29.8 | 30.8 | 42.3 | 30.6 | 31.2 | 24.0 | |
| DC130 | 498313 | 206945 | 53.9 | 43.2 | 42.6 | 42.5 | 37.9 | 39.9 | 33.7 | 30.6 | 39.7 | 43 | 56.1 | 42.7 | 42.2 | 32.5 | |
| DC131 | 499703 | 207838 | 38.8 | 40.7 | 27.5 | 40.2 | 28.3 | 29.9 | 29.4 | 24.8 | 32.7 | 29.9 | 40.1 | 31.4 | 32.8 | 25.3 | |

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Where applicable, data has been distance corrected for relevant exposure in the final column

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC of Automatic Monitoring

The High Street, Northchurch automatic monitoring station has been operating a NO₂ chemiluminescent analyser since November 2012 and FIDAS for particulate matter since August 2015. The 2019 data validation and ratification was carried out by Ricardo – AEA.

The Local Site Operative (LSO) duties and bi – annual services of the NO_x analyser were undertaken by Enviro Technology Services; with the routine calibrations carried out once a month.

The particulate matter analyser bi-annual service in 2018 was completed by air monitors in accordance with the manufacturers' instructions. Quality control audits are undertaken twice yearly and supplied by the National Physics Laboratory (NPL).

QA/QC of Diffusion Tube Monitoring

During 2019, NO₂ monitoring was undertaken at 54 sites within the borough using passive diffusion tubes. The Northchurch diffusion tubes at location DC86, 87 and 88 were used as a co-location site with triplicate tubes co-located with the continuous monitor.

The tubes were supplied and analysed by SOCOTEC (a UKAS accredited laboratory). The tubes were prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection.

The exposure periods for the diffusion tubes are those of the UK Nitrogen Dioxide Diffusion Tube Network run by NETCEN which effectively is a four or five week duration. QA/QC procedures are as detailed in the UK NO₂ Diffusion Tube Network Instruction Manual which can be found in the link below:

<https://uk-air.defra.gov.uk/assets/documents/reports/cat06/no2instr.pdf>

All diffusion tube results have been corrected for bias by applying the local bias adjustment factor of 0.77 using the Local Bias Adjustment Factor Tool. A local bias adjustment factor has been applied, since at the time of writing, the national bias

adjustment factor dataset is incomplete and therefore provisional. For completeness a screenshot of the local bias adjustment tool calculator is presented below.

However the provisional national bias adjustment factor for results analysed by SOCOTEC (Didcot) provides an adjustment factor of 0.75. If applying the provisional national adjustment factor of 0.75 (compared with a local bias of 0.77), this would only result in a slight downward revision of 2019 results, and thus no correction is considered necessary.

The National Diffusion Tube Bias Adjustment Factors for 2019 diffusion tube monitoring data can be found here:

<https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

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".

Checking Precision and Accuracy of Triplicate Tubes



| Diffusion Tubes Measurements | | | | | | | | | |
|------------------------------|--------------------------|------------------------|-------------------------------|-------------------------------|-------------------------------|-----------------|--------------------|-------------------------------|----------------|
| Period | Start Date dd/mm/yyyy | End Date dd/mm/yyyy | Tube 1 μgm^{-3} | Tube 2 μgm^{-3} | Tube 3 μgm^{-3} | Triplicate Mean | Standard Deviation | Coefficient of Variation (CV) | 95% CI of mean |
| 1 | 09/01/2019 | 06/02/2019 | 41.3 | 43.1 | 42.1 | 42 | 0.9 | 2 | 2.2 |
| 2 | 06/02/2009 | 06/03/2019 | 30.8 | 38.2 | 44.5 | 38 | 6.9 | 18 | 17.0 |
| 3 | 06/03/2019 | 03/04/2019 | 27.3 | 26.8 | 23.9 | 26 | 1.8 | 7 | 4.6 |
| 4 | 03/04/2019 | 02/05/2019 | 35.1 | 33.8 | 38.7 | 36 | 2.5 | 7 | 6.3 |
| 5 | 02/05/2019 | 06/06/2019 | 26.3 | 25.3 | 25.4 | 26 | 0.6 | 2 | 1.4 |
| 6 | 06/06/2019 | 03/07/2019 | 24.2 | 4.0 | 23.9 | 17 | 11.6 | 67 | 28.8 |
| 7 | 03/07/2019 | 08/08/2019 | 26.5 | 26.3 | 25.0 | 26 | 0.8 | 3 | 2.0 |
| 8 | 08/08/2019 | 05/09/2019 | 24.7 | 24.7 | 24.4 | 25 | 0.2 | 1 | 0.4 |
| 9 | 05/09/2019 | 02/10/2019 | 28.9 | 29.9 | 28.8 | 29 | 0.6 | 2 | 1.5 |
| 10 | 02/10/2019 | 06/11/2019 | 31.8 | 32.1 | 34.9 | 33 | 1.7 | 5 | 4.2 |
| 11 | 06/11/2019 | 05/12/2019 | 39.4 | 34.8 | 44.2 | 39 | 4.7 | 12 | 11.7 |
| 12 | 05/12/2019 | 09/01/2020 | 34.3 | 32.2 | 32.7 | 33 | 1.1 | 3 | 2.7 |
| 13 | | | | | | | | | |

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

| Automatic Method | | Data Quality Check | |
|------------------|---------------------|-----------------------|------------------------|
| Period Mean | Data Capture (% DC) | Tubes Precision Check | Automatic Monitor Data |
| 37.7 | 99 | Good | Good |
| 32 | 99 | Good | Good |
| 21.6 | 99 | Good | Good |
| 25.5 | 99 | Good | Good |
| 21 | 95 | Good | Good |
| 17 | 100 | Poor Precision | Good |
| 18 | 78 | Good | Good |
| 18 | 99 | Good | Good |
| 20 | 99 | Good | Good |
| 22 | 99 | Good | Good |
| 31.6 | 99 | Good | Good |
| 23 | 69 | Good | or Data Capture |
| | | Good precision | Good Overall DC |

Overall survey -->

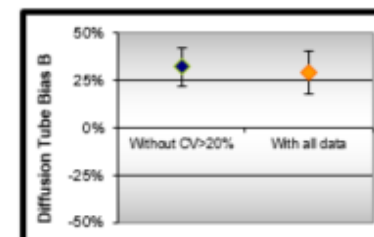
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 11 out of 12 periods have a CV smaller than 20%

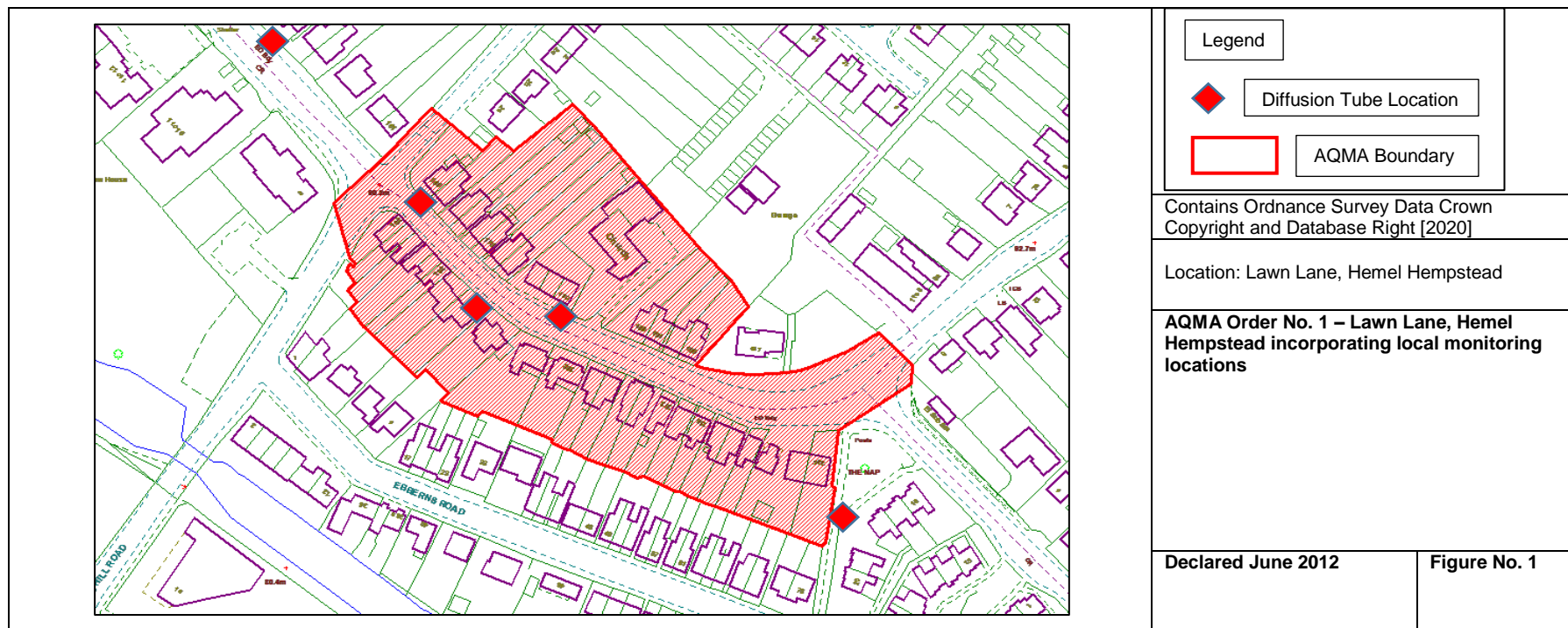
| Accuracy (with 95% confidence interval) | |
|--|----------------------------------|
| without periods with CV larger than 20% | |
| Bias calculated using 10 periods of data | |
| Bias factor A | 0.77 (0.72 - 0.83) |
| Bias B | 30% (20% - 39%) |
| Diffusion Tubes Mean: | 32 μgm^{-3} |
| Mean CV (Precision): | 6 |
| Automatic Mean: | 25 μgm^{-3} |
| Data Capture for periods used: | 97% |
| Adjusted Tubes Mean: | 25 (23 - 27) μgm^{-3} |

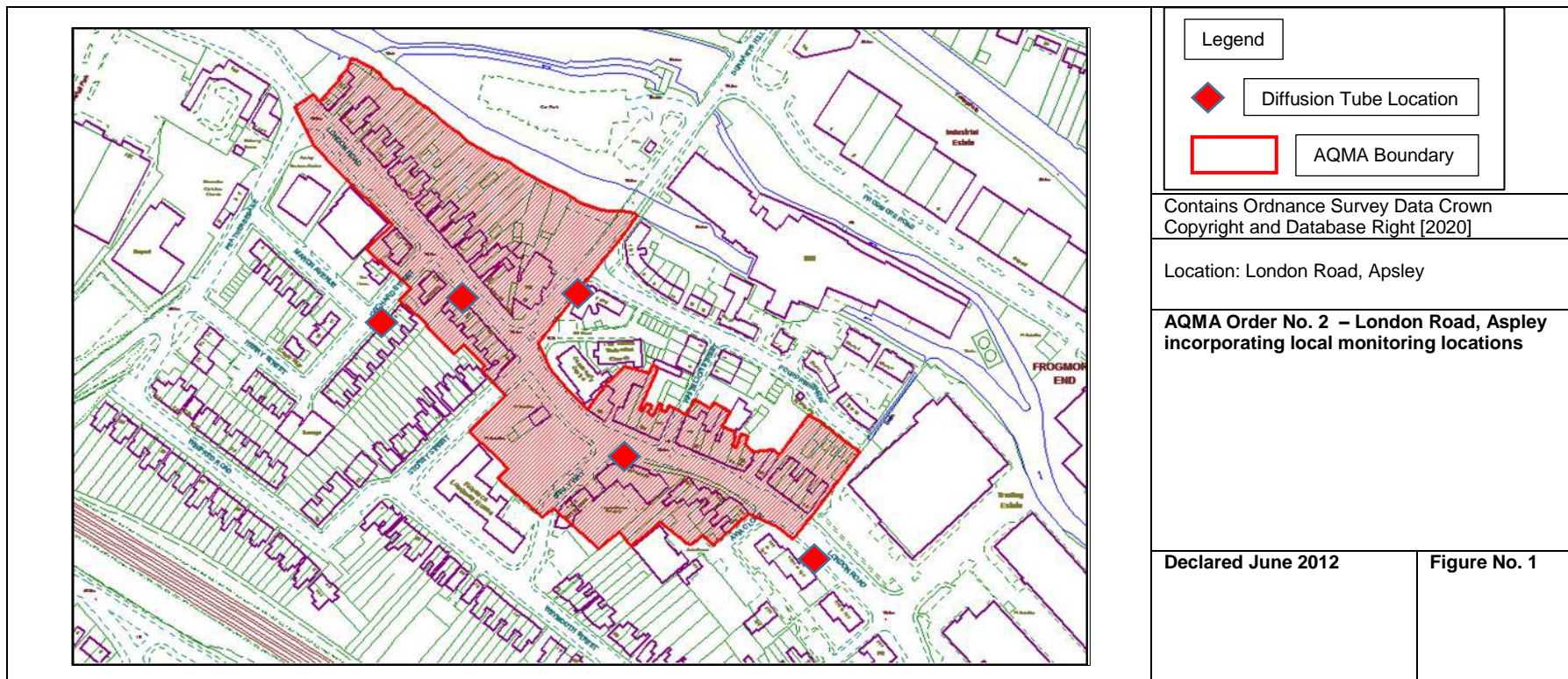
| Accuracy (with 95% confidence interval) | |
|--|----------------------------------|
| WITH ALL DATA | |
| Bias calculated using 11 periods of data | |
| Bias factor A | 0.78 (0.72 - 0.86) |
| Bias B | 28% (17% - 39%) |
| Diffusion Tubes Mean: | 31 μgm^{-3} |
| Mean CV (Precision): | 11 caution |
| Automatic Mean: | 24 μgm^{-3} |
| Data Capture for periods used: | 97% |
| Adjusted Tubes Mean: | 24 (22 - 26) μgm^{-3} |

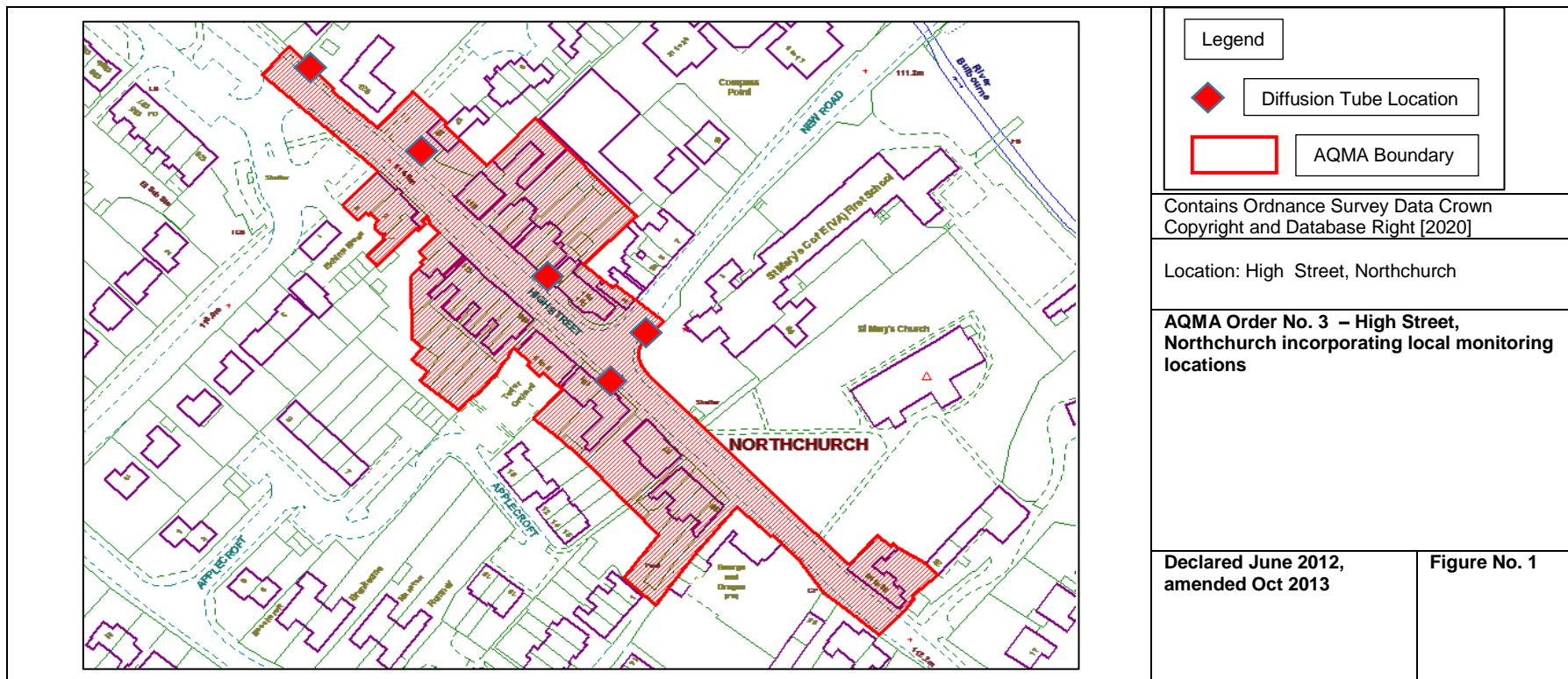


Jaume Targa, for AEA
Version 04 - February 2011

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







Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective ⁶ | |
|--|--|----------------|
| | Concentration | Measured as |
| Nitrogen Dioxide (NO ₂) | 200 µg/m ³ not to be exceeded more than 18 times a year | 1-hour mean |
| | 40 µg/m ³ | Annual mean |
| Particulate Matter (PM ₁₀) | 50 µg/m ³ , not to be exceeded more than 35 times a year | 24-hour mean |
| | 40 µg/m ³ | Annual mean |
| Sulphur Dioxide (SO ₂) | 350 µg/m ³ , not to be exceeded more than 24 times a year | 1-hour mean |
| | 125 µg/m ³ , not to be exceeded more than 3 times a year | 24-hour mean |
| | 266 µg/m ³ , not to be exceeded more than 35 times a year | 15-minute mean |

⁶ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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 | Air quality Annual Status Report |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England |
| 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 (micrometres or microns) 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

1. DEFRA (2009). Part IV of the Environment Act 1995 Environment (Northern Ireland) Order 2002 Part III Local Air Quality Management Technical Guidance LAQM.TG(09)
2. DEFRA UK Air Information Resource website: <http://uk-air.defra.gov.uk>
3. Hertfordshire and Bedfordshire Air Quality Network: www.hertsandbedsair.net
4. Local Air Quality Management, Policy Guidance LAQM. PG (09) (2009)
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6. The Environment Act 1995, HMSO The Environmental Permitting (England and Wales) Regulations 2010 (as amended)
7. <https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>
8. Hertfordshire Local Authorities Report on Particulate Matter (PM2.5) in Ambient Air in 2018 for Hertfordshire County Council Public Health [November 2019]: www.hertsandbedsair.net