



2017 Air Quality Annual Status Report (ASR)

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

June 2017

North Hertfordshire District Council

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Executive Summary: Air Quality in Our Area

Air Quality in North Hertfordshire District Council

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.

Across North Hertfordshire, where monitoring is undertaken, the concentrations of nitrogen dioxide (NO₂) have been declining over the past five years, which means air quality has been improving. Where comparable monitoring from 2012 or 2013 was available, which was the case for thirty-five monitoring locations, an overall reduction in concentrations has been observed at thirty locations, no change at four locations and an increase at one location.

This general trend of decreasing NO₂ over the past 5 years has been observed despite the 2016 data showing that NO₂ concentrations have increased at thirty of the forty NO₂ monitoring locations, were unchanged at two locations and only reduced at six locations.

Air quality is below the health based limits set by Government across the majority of the District, but even with the observed improvement in air quality, as measured by NO₂ concentrations, there remain two areas where the health limits are exceeded.

The two areas are in Hitchin, specifically at Stevenage Road and in the vicinity of Payne's Park. The primary source of the pollution is the exhaust emissions from petrol and diesel engine road vehicles moving through both areas.

NHDC designated the Stevenage Road area as an Air Quality Management Area (AQMA) in 2012 because the levels of NO₂ pollution are too high. As a result of the

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

AQMA NHDC has an Action Plan in place to identify measures that can be taken in an attempt to reduce emissions and improve air quality. The details can be found at <http://www.north-herts.gov.uk/home/environmental-health/pollution/air-quality/air-quality-management-areas-north-hertfordshire>

At the end of 2016 NHDC had almost completed the process of designating an AQMA in the Payne's Park areas of Hitchin. However, the date of final designation occurred in January 2017, which is outside of the reporting period for this report. The 2017 Annual Status Report will contain the details relating to the 2017 designation. It will also include a summary of the measures identified in the Joint Air Quality Action Plan for the Hitchin AQMA and any progress made with the implementation of those measures.

As a result of the relocation of the PM₁₀ particulate matter analyser and the introduction of a PM_{2.5} particulate matter analyser to Stevenage Road, Hitchin during 2015 there is insufficient data with which to make a meaningful assessment of particulate matter pollution levels and trends. However, 2016 was the first full year of monitoring for particulate matter at Stevenage Road and data capture rates for both analysers were good. The air quality objectives for PM₁₀ were not exceeded and the non-statutory guide value for PM_{2.5} was also not exceeded.

There were no new major sources of emissions introduced in North Hertfordshire during 2016.

Due to the major source of air pollution that impacts local air quality originating from road vehicle emissions there is a need to work with other professionals to enhance our management of local air quality for the following reasons:

- many vehicles using North Hertfordshire's roads will not begin or end their journeys within this District.
- commercial expansion or contraction and housing growth in and around North Hertfordshire is likely to impact upon the levels of road traffic.
- the road network within North Hertfordshire is managed either by Hertfordshire County Council (HCC) or Highways England.
- local air pollution has a direct public health impact and Hertfordshire County Council Public Health has a significant public health protection remit in the Hertfordshire.

Therefore, NHDC Environmental Health actively engages with the following partners:

- Other environmental health professionals in Hertfordshire and Bedfordshire via a working group, the Hertfordshire and Bedfordshire Air Quality Network/Forum, which meets 3 or 4 times a year. During 2016 this working group was expanded to include representatives from the planning profession and the public health profession in addition to HCC transport officers that were already routinely represented.
- Public health professionals in Hertfordshire via a task and finish group, which is now activated as and when a specific project is identified either by Public Health or Environmental Health.
- Day to day working relationships with NHDC Transport Planning Officers, Strategic Planning Officers and Development Control Officers to ensure that air quality is considered within the planning regime.

Actions to Improve Air Quality

Measures from the Stevenage Road Action Plan that have been implemented during 2016 have included:

1) Partnership Working within the planning regime:

The Air Quality Policy and reference to the Air Quality and Planning Guidance Document have made it into the Local Plan that is due for Examination in Public in 2017. This represents vital progress in being able to meaningfully influence developers to design and implement their developments in a way that is considerate of local air pollution issues and routinely take actions to mitigate any potential adverse impact on air quality. The scale of housing development in around North Hertfordshire made this a priority.

2) Responding to Planning Consultations:

This is a consequence of (1) and without it the Policy and Guidance is of minimal value. This has ensured that where permissions are granted conditions are in place to hold the developers to account for provision of air pollution mitigation measures

3) Improving infrastructure for Low Emission Vehicles:

A new heads of terms agreement was established for the back-office software and servicing and maintenance of the existing NHDC Electric Vehicle Charging Point Network. This became necessary following the withdrawal of Source East and Evalu8 from the market and was necessary because without it there would have been significant disruption to the availability of that network, or the loss of it altogether.

Conclusions and Priorities

The medium-term (~ 5 years) trend in levels of local air pollution, as measured by NO₂, is still slightly down, representing an improving air quality situation in North Hertfordshire. However, in 2016 levels of air pollution increased across the district in relation to 2015 and air quality objectives are still being exceeded in two locations in Hitchin. Therefore, it is apparent that North Hertfordshire still faces an air pollution problem that needs to be addressed and furthermore is faced with the challenge of addressing that problem against a backdrop of significant development pressures within the district.

To address this current and future challenge and to support the designation of a new AQMA in Hitchin in 2017 the production and publication of a new Air Quality Action Plan and the commencement of implementation of its measures will be a priority for 2017.

Local Engagement and How to get Involved

The potential for the residents and businesses of North Hertfordshire to have a positive impact on air quality is considerable by choosing where practical to travel by:

- public transport
- car sharing / car clubs including e-car clubs
- more sustainable private modes of transport (i.e. not petrol or diesel engine vehicles)
- more modern models of petrol and diesel engine vehicles, which emit lower levels of pollution
- walking or cycling

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Potentially useful sources of further information include:

<https://www.goultralow.com/> = Central Government website about low emission vehicles

<https://www.zap-map.com/live/> = Locations of EV charging points across UK

<http://www.hertsdirect.org/services/transtreets/ltp/live/> = HCC Local Transport Plan

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1 Local Air Quality Management

This report provides an overview of air quality in North Hertfordshire during 2016. 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 North Hertfordshire 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

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 AQMA declared by North Hertfordshire District Council (NHDC) 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://www.north-herts.gov.uk/home/environmental-health/pollution/air-quality/air-quality-management-areas-north-hertfordshire>. A full list of AQMA in England can be found at <https://uk-air.defra.gov.uk/aqma/list>.

Appendix D provides maps of the air quality monitoring locations and where relevant their locations in relation to the AQMA.

All of the preparation work to declare a new AQMA in the Payne's Park area of Hitchin was completed during 2016 (see Section 3). However, the formal declaration was made on the 9th January 2017 so the details and the formal existence of a second AQMA within North Hertfordshire will be reported in the Annual Status Report for 2017, to be published in June 2018.

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 (inc. date of publication) |
|---------------------|----------------------------|---------------------------------------|-------------|---|--|---|-----------------------|--|
| | | | | | | At Declaration | Now | |
| AQMA Stevenage Road | 29 th June 2012 | NO ₂ Annual Mean | Hitchin | An area encompassing a number of residential properties fronting & located on the south side of Stevenage Road (A602) | NO | 41.8µg/m ³ | 40.2µg/m ³ | Stevenage Road Hitchin Action Plan - Sept 2013 - https://www.north-herts.gov.uk/home/environmental-health/pollution/air-quality/air-quality-management-areas-north-hertfordshire |

North Hertfordshire District Council confirms 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 North Hertfordshire

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

- 1) NHDC should proceed to declaration of an AQMA for the Payne's Park, Hitchin area.
- 2) NHDC should review its Action Plan measures and the prioritisation of those measures for the Stevenage Road, Hitchin AQMA.
- 3) Better partnership working between NHDC and the Local Highway Authority should be developed.
- 4) NHDC should include maps of the boundary of the AQMA overlaid with the monitoring locations.

In specific response to the Defra appraisal it is possible to confirm the following:

- 1) Declaration of the AQMA was progressed, with completion of the process in January 2017 falling just outside of the 2016 reporting year.
- 2) In 2017 a Joint Action Plan for the Stevenage Road AQMA and the newly declared Payne's Park AQMA is to be produced and this will include a review of the Action Plan measures for the Stevenage Road AQMA.
- 3) Better partnership working will be addressed in taking forward the Joint Action Plan.
- 4) The map of the AQMA boundary in relation to the monitoring points has been addressed in this report.

North Hertfordshire District Council has taken forward a number of direct measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in the Stevenage Road, Hitchin Action Plan <https://www.north-herts.gov.uk/home/environmental-health/pollution/air-quality/air-quality-management-areas-north-hertfordshire>. Key completed measures are:

- *Measure 1.1. Inclusion of Air Quality in the NHDC developing Local Plan:* Policy D4 is the Air Quality Policy within the Local Plan. An Air Quality

Planning Guidance Document has been produced to support Policy D4. This document emphasises the provision of air quality mitigation by developers rather than screening or more detailed assessments that typically concluded no mitigation measures are required. Work on this Measure has continued in the form of liaison with strategic planning officers and responding to queries arising from the public consultation phase of the Local Plan.

- *Measure 1.2. Responding to Planning Consultations:* 2016 has seen routine consultation on air quality issues between the planning department and the environmental health department. This has led to the majority of granted planning permissions requiring air pollution mitigation measures to be incorporated and the first discharge of condition applications are coming through the system related to the provision of domestic electric vehicle charging infrastructure.
- *Measure 1.3. Liaison on Transport Plans:* A response was provided to the public consultation of Hertfordshire County Council's LTP4 and it is expected that there will be a specific Air Quality Policy incorporated within LTP4. Furthermore, NHDC has made arrangements to actively engage with and provide air quality data to the HCC team that is responsible for developing the future Growth and Transport Plan for the area of the County that incorporates North Hertfordshire.
- *Measure 1.5. Link with the Public Health Agenda:* Successful trial of the Air Quality Notification System in terms of the reliability and robustness of the generated notifications, but more work needed to ensure the notifications reach their intended targets.
- *Measure 2.1. Monitoring Local Air Quality:* District wide diffusion tube network maintained. Real-time monitoring capability at Stevenage Road, Hitchin maintained.
- *Measure 4.3. Support improved pedestrian links and crossing at Stevenage Road:* HCC completed a scheme to introduce an improved pedestrian crossing island for Stevenage Road, which was located within the boundary of the AQMA.

- *Measure 4.4. Installation of Electric Vehicle Charging Point Infrastructure:* Negotiating and drafting, in liaison with colleagues from Legal Services, a new heads of terms agreement for the back-office software and servicing and maintenance of the existing NHDC Electric Vehicle Charging Point Network. This became necessary following the withdrawal of Source East and Evalu8 from the market and was managed such that there was minimal disruption to the availability of that network.

North Hertfordshire District Council expects the following measures to be completed over the course of the next reporting year:

- *Measure 1.2. Responding to Planning Consultations:* Continue to respond to planning application consultations. This will have added significance in 2017 as major scale developments linked to the Local Plan come forward. This has the potential to have a significant impact on minimising the increase in air pollution that may result from the construction and operational phases of major developments. It also has the potential to lead to funding of other measures identified in the Action Plan.
- *Measure 1.5. Link into the Public Health Agenda:* Updated Air Quality section to be written for the revamped JSNA. Roll out of the Air Quality Notification System. This will not have an impact on air pollution levels but will help people to better manage their respiratory health.
- *Measure 1.6. Apply for Defra funding:* A number of possible projects are being developed with a view to bidding, in liaison with HCC, for Defra Funding.
- *Measure 2.1. Monitoring Local Air Quality:* Continuation of existing air quality monitoring network. This will not have an impact on air pollution levels but will enable informed decisions to be made about air quality priorities including what type of measures to prioritise and where to target them.
- *Measure 3.1. Publicity:* NHDC Communications Team to actively participate in National Clean Air Day. Public Consultation for the Joint Action Plan for the Stevenage Road and Payne's Park AQMA. Air Pollution awareness article in the NHDC Magazine to all North Hertfordshire residents. This will hopefully have an indirect impact on air quality by encouraging behaviour change, which itself will result in reduced emissions.

- *Measure 3.3. Engage with Local Business: Working with Eco-Stars, possibly linked with a Defra bid, to engage with businesses operating in the Hitchin industrial areas with the aim of reducing emissions from their vehicles. Provided that there is meaningful engagement with enough business in the area this has the potential to result in measurable reductions in air pollution concentrations.*
- *Measure 6.1. Alternative Route for HGV access to Hitchin Industrial Estates: Continue to provide support to this potential scheme when the opportunity arises, at present the scheme is in its feasibility phase. This has the potential of reducing the levels of air pollution in the Stevenage Road area to a degree that might enable the AQMA to be revoked.*

North Hertfordshire District Council's priority for 2017 is to engage with the local business operating within the Hitchin industrial estates. This reflects the high contribution to local air pollution from diesel HGV emissions and the fact that the Hitchin industrial estates are the source or origin of approximately one third of the HGV utilising the Stevenage Road where it passes through the AQMA.

The principal challenges and barriers to implementation that North Hertfordshire District Council anticipates facing are insufficient resources, in terms of staffing and budget.

Progress on the following measures has been slower than expected due to:

- *Measure 1.4. NHDC Community Services Links (walking & cycling promotion):* Not progressed due to resource constraints.
- *Measure 1.6. Apply for Central Government Funding:* No bid was prepared because priority was on preparation for declaration of Payne's Park AQMA.
- *Measure 2.2. Annual Traffic Count Locations:* Completed so no action required.
- *Measure 3.1. Media/Publicity:* No projects deemed to be of sufficient public interest were progressed during 2016 so publicity opportunities were limited.
- *Measure 3.2. Engage with Schools to Raise Awareness of Air Quality:* Insufficient resourcing to meaningfully promote and support the

education/teaching resource packages that are established and available for junior and senior schools.

- *Measure 3.3. Engage with Local Businesses:* Not progressed due to resource constraints.
- *Measures 4.1. & 4.2. Support Public Transport and Cycling Infrastructure:* No progress due to limited resources.
- *Measure 4.5. Gas or Bio-methane Refuelling Facilities for Industry:* No progress because no opportunities arose to consider their development.
- *Measure 5.1. Emissions Element in Controlled Parking Zone Charges:* No progress due to limited resources.
- *Measure 5.2. Alternatively Fuelled Company Fleets:* No progress because no leases expired in 2016.
- *Measure 6.1. Alternative Route for HGV Access to Hitchin Industrial Estate:* No direct involvement because it is being managed by HCC and no tangible progress yet, although the scheme is currently progressing through the feasibility study phase.
- *Measures 6.2., 6.3. & 6.4. Relocation of Bus-stops, On-Street Parking Review & Stevenage Road Layout Improvements:* No progress due to limited resources.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, North Hertfordshire District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Stevenage Road AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

| Measure No. | Measure | EU Category | EU Classification | Organisations involved and Funding Source | Planning Phase | Implementation Phase | Key Performance Indicator | Reduction in Pollutant / Emission from Measure | Progress to Date | Estimated / Actual Completion Date | Comments / Barriers to implementation |
|-------------|--|---|---|---|----------------|--|---|---|---|--|--|
| 1.1 | Air Quality Policy in Local Plan & supporting Guidance Document | Policy Guidance and Development Control | Air Quality Planning & Policy Guidance | North Hertfordshire District Council | Complete | Policy dependant upon Local Planning Authority (2017) Guidance Document complete | Policy in Local Plan with reference to Air Quality Planning Guidance Document | Addressing demand for car travel and increased proportion of low emission vehicles in general | Policy D4 agreed and in Local Plan. Planning Guidance Document complete. Needs periodic review | Local Plan examination in public in 2017. Planning Guidance Document completed | Hoping to extend the Guidance Document to be Herts and Beds wide |
| 1.2 | Responses to planning consultations | Policy Guidance and Development Control | Air Quality Planning & Policy Guidance | North Hertfordshire District Council | Complete | Ongoing | Utilisation of Planning Obligation Funds & AQ mitigation planning conditions | Addressing demand for car travel and increased proportion of low emission vehicles in general | Ongoing. Planning Conditions being used | Ongoing | None |
| 1.3 | Liaison with Transport Plans | Policy Guidance and Development Control | Air Quality Planning & Policy Guidance | North Hertfordshire District Council | Complete | Ongoing | Inclusion of NHDC issues/needs in local GTP AQ Policy in LTP4 | Some future schemes may impact on road layout in AQMA | No North Herts specific project in LTP4 draft | Ongoing | Will be relying on Growth and Transport Plans in absence of LTP4 projects of relevance |
| 1.4 | Liaison with NHDC Community Services – walking/cycling promotion | Promoting Travel Alternatives | Promotion of cycling & walking | North Hertfordshire District Council | Undefined | Undefined | Implemented initiatives and participation of public | In-directly | None | Undefined | None |
| 1.5 | Links with Public Health Agenda | Policy Guidance and Development Control | Regional Groups, co-ordinating programmes to develop area wide strategies to reduce emissions & improve air quality | North Hertfordshire District Council | Complete | Ongoing | Heightened awareness of air quality among key decision makers in local politics, transport, public health & planning & general public awareness | In-directly | Funded PM _{2.5} monitoring network. Plans for new Air Quality Section of JSNA Air Quality Notification System operating in trial mode | Ongoing | None |

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| Measure No. | Measure | EU Category | EU Classification | Organisations involved and Funding Source | Planning Phase | Implementation Phase | Key Performance Indicator | Reduction in Pollutant / Emission from Measure | Progress to Date | Estimated / Actual Completion Date | Comments / Barriers to implementation |
|-------------|--|--|--|---|----------------|----------------------|--|--|--|------------------------------------|--|
| 1.6 | Applying for Central Government Funding | Multiple depending on nature of bids | Multiple depending on nature of bids | North Hertfordshire District Council | Ongoing | Undefined | Depends on nature of bids | None currently identified, but would be targeted to AQMA | No progress since 2015 | Not applicable | Will continue to pursue funding opportunities |
| 2.1 | Monitoring Air Quality | No Category | No Classification | North Hertfordshire District Council | Complete | Ongoing | Relevant diffusion tube network. Operational real-time analysers | Measurement to inform decision making & effectiveness of measures | NOx, PM10 & PM2.5 analysers established in AQMA | Ongoing | None |
| 2.2 | Annual Traffic Count Established within AQMA | No Category | No Classification | North Hertfordshire District Council | Complete | Complete | Annual data collection | Measurement to inform decision making & effectiveness of measures | DfT annual count location within AQMA | Not applicable | None – Measure fully implemented |
| 3.1 | Utilise NHDC Media to Raise Awareness | Public Information | Via Internet Other | North Hertfordshire District Council | Ongoing | Ongoing | Publications & Online Presence | In-directly | Newspaper Articles, Tweets, Website Presence | Ongoing | None |
| 3.2 | Engage with local schools | Promoting Travel Alternatives / Public Information | School Travel Plans / Via Other Mechanisms | North Hertfordshire District Council | Ongoing | Ongoing | Engagement with School Travel Planning / Education Packs | In-directly | None / Education packs available | Not Known | None |
| 3.3 | Engage with local business to reduce fleet emissions | Freight Delivery Management / Promoting Low Emission Transport | Route Management Plans/Strategic Routing / Company Vehicle Procurement | North Hertfordshire District Council | Undefined | Undefined | Engagement of business & changes in routes and vehicle fleets | A focus on Hitchin Industrial Estate would enable HGV and LGV emissions within AQMA to be targeted | Data on HGV routes from early survey but no success in follow up | Not Known | Identified as a priority in 2017 subject to funding to enable engagement of sub-contractor support |
| 4.1 | Support of Public Transport Initiatives | Promoting Travel Alternatives | Other | Hertfordshire County Council | Undefined | Undefined | Undefined | In-directly | None | Not Known | None |

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| Measure No. | Measure | EU Category | EU Classification | Organisations involved and Funding Source | Planning Phase | Implementation Phase | Key Performance Indicator | Reduction in Pollutant / Emission from Measure | Progress to Date | Estimated / Actual Completion Date | Comments / Barriers to implementation |
|-------------|---|----------------------------------|---|---|----------------|---------------------------------------|--|--|--|------------------------------------|---|
| 4.2 | Improve Cycling Infrastructure | Promoting Travel Alternatives | Promotion of cycling | Hertfordshire County Council | Undefined | Undefined | Increase participation in cycling | In-directly unless LTP includes specific projects in/around Hitchin | None | Not Known | None |
| 4.3 | Improve Walking Infrastructure | Promoting Travel Alternatives | Promotion of walking | Hertfordshire County Council | Undefined | Undefined | Increase participation in walking | In-directly unless LTP includes specific projects in/around Hitchin | None | Not Known | None |
| 4.4 | Installation of Electric Vehicle Infrastructure | Promoting Low Emission Transport | Procuring Alternative Refuelling Infrastructure | North Hertfordshire District Council | Complete | Ongoing – New service provider needed | 5 x publicly available charge points 1 x NHDC charge point transferred to new contractor | Car emissions in AQMA reduced by encouraging uptake of EV. Two charging points specifically located in Hitchin | Complete | Completed 2016 | Next project is implementation of a fee for use of electricity – necessary to be able to afford to retain the network |
| 4.5 | Consider Potential for Gas or Bio-methane refuelling facilities | Promoting Low Emission Transport | Procuring Alternative Refuelling Infrastructure | North Hertfordshire District Council | Undefined | Undefined | Undefined | Potential reduce HGV emissions within AQMA | None | Not Known | None |
| 5.1 | Incorporation of Emission Element to Controlled Parking Charges | Promoting Low Emission Transport | Priority Parking for LEV and Other | North Hertfordshire District Council | Ongoing | Ongoing | Provision of dedicated EV parking and free EV parking | Car emissions reduced in AQMA by incentivising EV uptake | Dedicated & free EV parking/ charging bays | Complete | Annual Review |
| 5.2 | Changing NHDC Fleet | Promoting Low Emission Transport | Company Vehicle Procurement | North Hertfordshire District Council | Complete | Ongoing | Swapping out of diesel fleet vehicles with EV | In-direct | Initial review complete & reported | Ongoing | Follow-up projects planned |

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| Measure No. | Measure | EU Category | EU Classification | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Target Pollution Reduction in the AQMA | Progress to Date | Estimated Completion Date | Comments |
|-------------|--|-------------------------------------|--------------------------------|--------------------------------------|----------------|----------------------|-----------------------------------|---|------------------------------------|---------------------------|---|
| 6.1 | Investigate Alternative Route for HGV access to Hitchin Industrial Area | Freight and Delivery Management | Strategic routing for HGV | Hertfordshire County Council | Complete | Ongoing | HGV re-routed from Stevenage Road | would enable HGV emissions within AQMA to be reduced by diverting %age of HGV from the AQMA | Detailed HGV survey completed 2014 | Not Known | HCC decision, costs, knock on effects & political issues |
| 6.2 | Investigate Changes in Bus-Stop locations at Stevenage Rd | Transport Planning & Infrastructure | Public Transport Improvements | Hertfordshire County Council | Undefined | Undefined | Modelling of proposed changes | Potential to relocate emissions from buses/coaches to less sensitive locations in AQMA | None | Not Known | Was dependant on external grant |
| 6.3 | Review Parking Provision & Restrictions at Stevenage Road | Traffic Management | Parking Enforcement on Highway | North Hertfordshire District Council | Undefined | Undefined | Modelling or possible alterations | Potential to improve flow of traffic along Stevenage Road and so reduce emissions | None | Not Known | Was dependant on external grant |
| 6.4 | Investigate improvement to layout of Stevenage Road to reduce congestion | Traffic Management | Congestion Management | Hertfordshire County Council | Ongoing | Ongoing | Changes in road layout | Potential to improve flow of traffic along Stevenage Road and so reduce emissions | Initial investigation & scoping | Not Known | Is part of HCC medium term plan. May have been expedited if funding bids successful |

2.3 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.

North Hertfordshire District Council is taking the following measures to address PM_{2.5}:

- Establishment of effective partnership working arrangements with Hertfordshire County Council Public Health. This has occurred as a result of three key drivers:
 - Increased evidence and awareness of the harm from exposure to PM_{2.5}
 - The transfer of central government funding from a central public health body to County Councils
 - The existence of the Public Health Outcome Indicator (PHOI) for the fraction of mortality attributable to particulate air pollution measured as fine particulate matter PM_{2.5}.

The outcome of this work has resulted in the formation of an Air Quality (Public Health) Planning Group. The group routinely comprises of the Chair and Vice-Chair of Hertfordshire and Bedfordshire Air Quality (H&B AQ) Working Group, a Public Health Project Manager, a Senior Public Health Analyst, a Planning and Place Health Improvement Officer and a Transport Planning Policy Officer. North Hertfordshire District Council has been particularly active in the establishment and continued activity of this Group because its Environmental Protection Officer is the Chair of the H&B AQ Working Group.

- Access to Public Health Funding for each of the ten Hertfordshire Local Authorities to purchase and establish PM_{2.5} monitoring equipment in their areas. Specific to North Hertfordshire, a Beta Attenuation Measurement

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(BAM) Real-Time Analyser has been installed within the Stevenage Road, Hitchin Air Quality Management Area.

The first full year of PM_{2.5} monitoring is included within this report.

The provision of monitoring equipment was considered a priority because it was identified that there was no actual baseline data available within Hertfordshire. So the validity of the modelled value for the PHOI for Hertfordshire and its Local Authorities could not be judged nor subsequent changes measured.

North Hertfordshire District Council has not yet identified any measures targeted specifically at reducing PM_{2.5} and it is considered unlikely that any such measures will be identified over the coming years. Instead it is anticipated that:

- Measures to reduce emissions of NO_x by encouraging a move away from internal combustion engine vehicles to ultra low emission vehicles (ULEV) will reduce PM_{2.5} emissions from exhausts
- Measures to reduce road travel altogether will reduce PM_{2.5} emissions from brake and tyre wear and dust re-suspension.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

North Hertfordshire District Council undertook automatic (continuous) monitoring at two closely located sites during 2016. Both of the monitoring sites are on Stevenage Road, Hitchin and were operating throughout 2016. One monitors for oxides of nitrogen, including nitrogen dioxide, the other monitors particulate matter (PM₁₀ and PM_{2.5}).

Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at <https://uk-air.defra.gov.uk/networks/network-info?view=aur>.

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

North Hertfordshire District Council undertook non- automatic (passive) monitoring of NO₂ at 39 sites during 2016. Table A.2 in Appendix A shows the details of the 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.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

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 (AQO) of 40µg/m³.

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, which is not to be exceeded more than 18 times per year.

In each of 2013 and 2014 there was only 1 exceedence of the hourly mean recorded and none in 2015. However, in 2016 there were 10 occasions, spread across 7 days, when the hourly mean was exceeded, which represents a significant worsening of short term air quality in the Stevenage Road AQMA.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B. The annual mean values corrected to be representative of the nearest exposure have only been included in Appendix B where the exceedance at the monitoring location exceeded the AQO.

Figure 3.1 displays the NO₂ annual mean concentrations measured along Stevenage Road, Hitchin, in relation to the Air Quality Objective (AQO). All of the monitoring points are within the boundary of the AQMA and in 2016 all of the monitoring locations recorded an increase, or at best a levelling off, in nitrogen dioxide concentrations.

The results from the 2016 monitoring represent a change in the pattern of gradually declining NO₂ concentrations observed at these sites since 2010. However, it should be noted that there have been other years where the gradual decline has been arrested in a given year, for example in 2014.

The NH105 and NH92 annual mean average concentrations measured during 2013 and 2014 were above the 40µg/m³ AQO at the nearest residential properties. This was also the case for NH105 in 2015, but not for NH92. These calculations were undertaken using the methodology approved by Defra and the same method was used for the 2016 data. The outcome of the calculations are summarised below and are detailed in Appendix C.

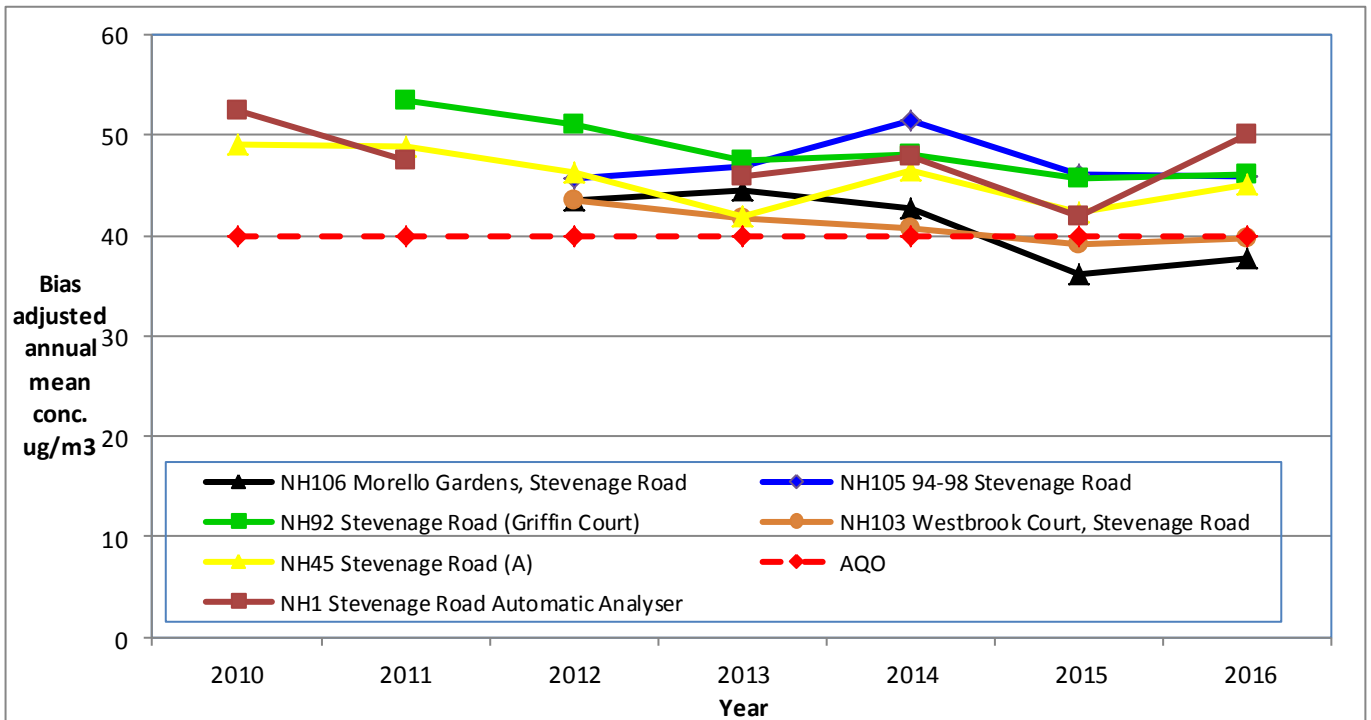


Figure 3.1: Trends in NO₂ concentrations at selected monitoring sites located at Stevenage Road, Hitchin

The mean annual average of 46µg/m³ measured at NH105 in 2016 represents 40.2µg/m³ at the point of public exposure at 94-98 Stevenage Road and hence still represents an exceedance of the AQO. However, the mean annual average of 46.1µg/m³ measured at NH92 in 2016 is representative of 39.4µg/m³ at 22 Stevenage Road, which is below the AQO for the second time since monitoring commenced in 2010.

Therefore, because of the continued exceedance of the AQO at 94-98 Stevenage Road and the slight increase in NO₂ concentrations measured throughout the Stevenage Road AQMA, the AQMA will remain in place.

Figure 3.2 displays the NO₂ annual mean concentrations from the Payne’s Park, Hitchin area, in relation to the Air Quality Objective (AQO). Currently there is no AQMA in the vicinity of Payne’s Park, Hitchin, however, the process of declaring an AQMA was almost complete at the end of 2016.

Figure 3.2 shows that in 2016 the NO₂ concentrations increased in relation to the 2015 arresting the gradual downward trend in NO₂ concentrations that has been since the collection of reliable data from 2010. Despite the increased concentrations

measured at all of the diffusion tube locations, it is only at location NH93 that the AQO is exceeded.

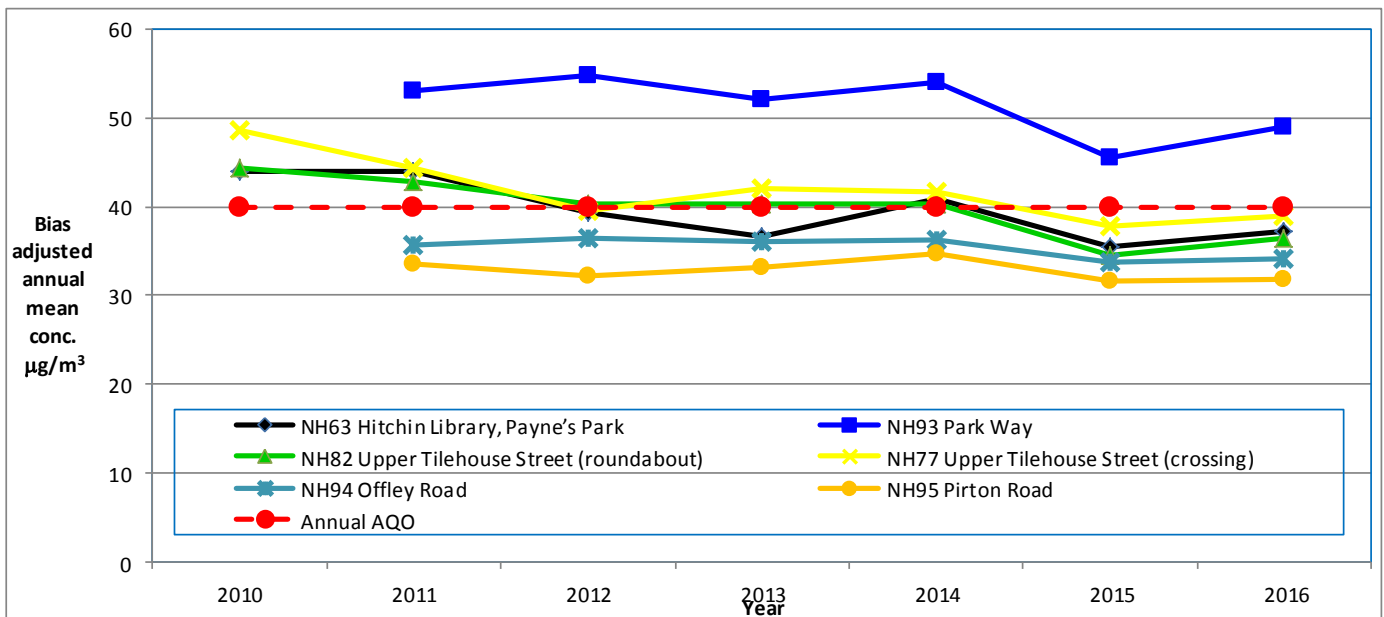


Figure 3.2: Trends in NO₂ concentrations at selected monitoring sites at Payne's Park, Hitchin

The NH93 annual mean average concentrations measured during 2011 to 2015 were above the 40µg/m³ AQO at the nearest residential receptor (41 Upper Tilehouse Street). The same assessment was undertaken for NH93 in 2016 and because of the higher annual mean average the exceedance of the AQO at 41 Upper Tilehouse Street was greater than it was in 2015.

The mean annual average of 49µg/m³ measured at NH93 in 2016 represents 44.5µg/m³ at the point of public exposure at 41 Upper Tilehouse Street. The decision to declare an AQMA in this area during 2016 remains valid based on the last six years of data being indicative of public exposure to elevated concentrations of NO₂ at 41 Upper Tilehouse Street.

Traffic counts are the only readily available measure of a change in the local sources of NO₂. As such the road traffic data covering the 2005 to 2016 period are illustrated in Figure 3.3.

Reductions in the volume of traffic at Stevenage Road had been recorded between 2005 and 2013, however 2014, 2015 and 2016 saw an increase in the volume of road traffic passing through the AQMA. This increase coincided with an increase in

NO₂ recorded in the AQMA in 2014 and 2016, but did not correlate to the reduction in NO₂ recorded in 2015.

At the Payne’s Park/Park Way count location traffic volumes have remained steady since a decline in 2012 and 2016 indicated no change in this trend. At the Upper Tilehouse Street count location traffic volumes had been relatively unchanged for a longer period than at Payne’s Park/Park Way location. However, the 2016 data show a notable increase in road traffic compared to the preceding period.

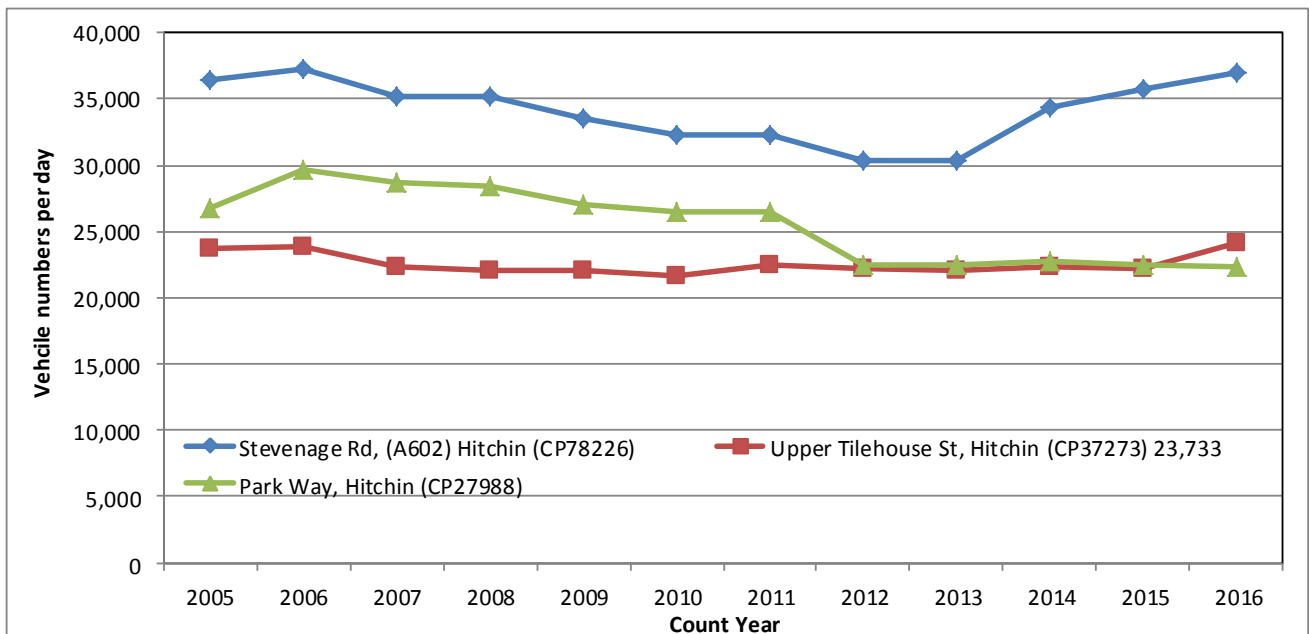


Figure 3.3: Trends in road traffic counts at the three DfT count points closest to the Stevenage Road AQMA and Payne’s Park area of Hitchin

The split of vehicles comprising the traffic counted at the three sites since 2010 are illustrated by Figures 3.4, 3.5 and 3.6. This is of interest because heavy goods vehicles (HGV) and to a lesser extent light goods vehicles (LGV) contribute more emissions of NO₂ per vehicle compared to cars and motor-cycles. Buses (Public Transport Vehicles) share this characteristic with HGV, but it should be noted that HGV a much more prevalent than buses in these areas of Hitchin.

There is no apparent relationship between the measured NO₂ concentrations and total vehicle numbers, or the numbers of particular groups of vehicle for any of the locations considered. Such a simplistic relationship would not really be expected, in particular when considering such proportionately low changes in vehicle numbers and the influence that meteorological conditions can have on the dispersion of air pollutants emitted from vehicle exhausts.

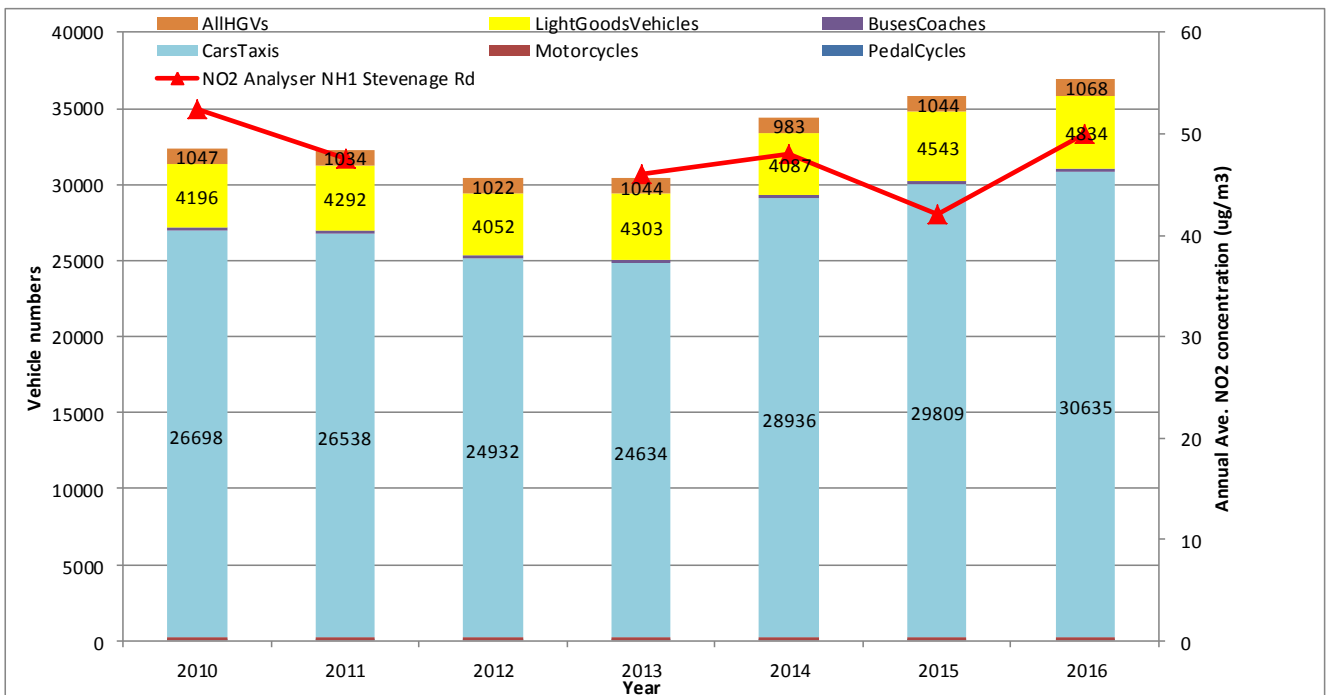


Figure 3.4: Road traffic counts at DfT count point 78226 within the Stevenage Road AQMA Hitchin compared to mean annual average NO₂ measured by the automatic analyser.

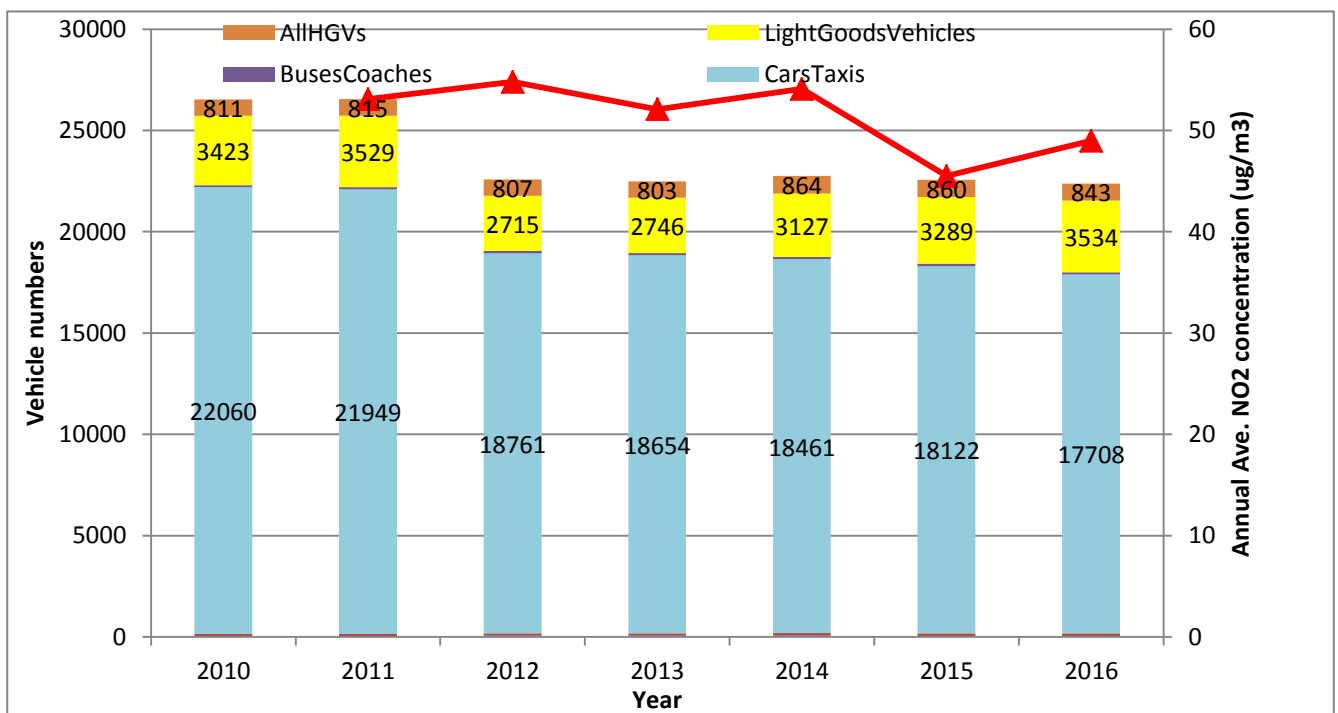


Figure 3.5: Road traffic counts at DfT count point 27988 at Park Way, Hitchin compared to the mean annual average NO₂ measured by diffusion tube NH93

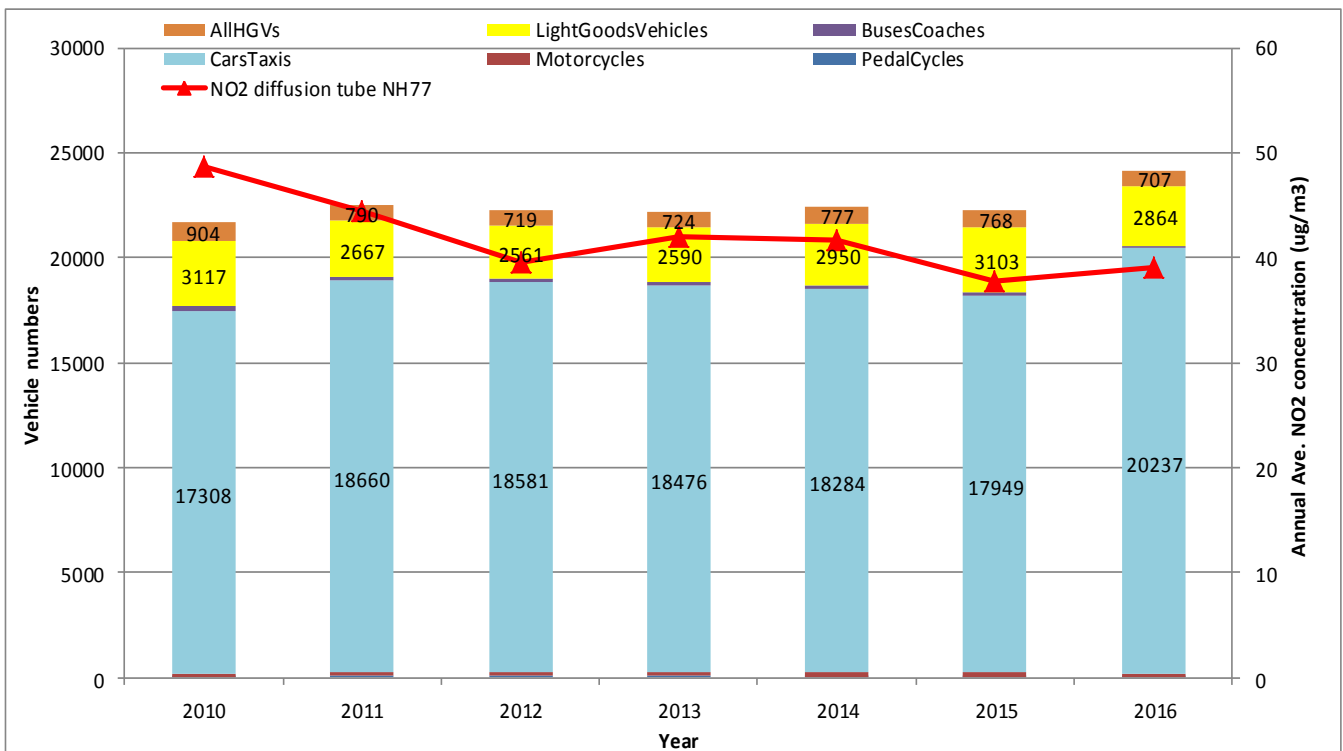


Figure 3.6: Road traffic counts at DfT count point 37273 at Upper Tilehouse Street, Hitchin compared to the mean annual average NO₂ measured by diffusion tube NH77

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

Table A.6 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

2016 was the first full year of PM₁₀ monitoring at the Stevenage Road location. In 2015 data capture from the same monitoring location was only 39.7% because the monitoring site was only established part way through 2015.

The mean average concentration recorded in 2015 was 20µg/m³ and there was one exceedence of the 24hr mean concentration of 50µg/m³, but because of the low data capture no meaningful comparison could be made with the AQO.

In 2016 data capture from the monitoring location was 98.88% and so the mean annual average of $20\mu\text{g}/\text{m}^3$ is comparable to the AQO of $40\mu\text{g}/\text{m}^3$. As is the fact that the 24hr mean concentration AQO of $50\mu\text{g}/\text{m}^3$ was exceeded on four occasions.

2016 represented the first complete year of particulate matter monitoring within the AQMA at Stevenage Road, Hitchin so there has been no opportunity for analysing trends. Although, it is of interest that the annual mean average recorded in both 2015 and 2016 was $20\mu\text{g}/\text{m}^3$.

3.2.3 Particulate Matter (PM_{2.5})

Table A.7 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past 5 years.

2016 was the first full year of PM_{2.5} monitoring at the Stevenage Road location. In 2015 data capture from the same monitoring location was only 39.7% because the monitoring site was only established part way through 2015.

The mean average concentration recorded during 2015 was $11\mu\text{g}/\text{m}^3$. However, because of the low data capture no meaningful comparison can be made with the non-statutory target value of $25\mu\text{g}/\text{m}^3$.

In 2016 data capture from the monitoring location was 91.31% and so the mean annual average of $13\mu\text{g}/\text{m}^3$ is comparable to the non-statutory target value of $25\mu\text{g}/\text{m}^3$. In the absence of a short-term AQO for PM_{2.5} the Defra Daily Air Quality Index has been used to assess the number of days during which moderate or high PM_{2.5} concentrations were detected. During 2016 moderate concentrations were measured on six days and a high concentration was measured on one day.

2016 represented the first complete year of particulate matter monitoring within the AQMA at Stevenage Road, Hitchin so there has been no opportunity for analysing trends.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Monitoring Technique | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Inlet Height (m) |
|---------|--------------------|-----------|---------------|---------------|----------------------|----------|----------------------|--|---|------------------|
| NH1 | Stevenage Road NOx | Roadside | 518740 | 228348 | NO2 | YES | Chemiluminescent | 11 | 2 | 1.5 |
| NH2 | Stevenage Road PM | Roadside | 518713 | 228349 | PM10, PM2.5 | YES | TEOM, BAM | 19 | 2 | 1.5 |

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 | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|---|-----------|---------------|---------------|----------------------|----------|--|---|---|------------|
| NH06 | Melbourn Rd, Op. Town Hall, Royston | Roadside | 535906 | 240794 | NO ₂ | NO | 7 | 1.1 | NO | 2.1 |
| NH45 | Stevenage Rd A, Hitchin | Roadside | 518708 | 228347 | NO ₂ | YES | 19 | 2 | NO | 2 |
| NH59 | (NH04a) Clothall Rd, Baldock | Roadside | 524649 | 234061 | NO ₂ | NO | 11 | 3 | NO | 2 |
| NH60 | (NH13a) Willian Rd, Hitchin | Roadside | 519916 | 230099 | NO ₂ | NO | 29 | 1.1 | NO | 2 |
| NH61 | (NH53a) Whitehorse St, Baldock (nr town hall) | Roadside | 524428 | 233882 | NO ₂ | NO | 35 | 2 | NO | 2.1 |
| NH63 | (NH02a) Library Hitchin | Roadside | 518160 | 229092 | NO ₂ | NO | 30 | 3.5 | NO | 2 |
| NH67 | Cadwell Court, Hitchin | Roadside | 519225 | 230553 | NO ₂ | NO | 12 | 2 | NO | 2.1 |
| NH69 | 64 Grove Rd, Hitchin | Roadside | 518821 | 229993 | NO ₂ | NO | 5 | 2 | NO | 2 |
| NH70 | Nr Bus Stop Hitchin St Baldock | Roadside | 524298 | 233784 | NO ₂ | NO | 1 | 3.5 | NO | 2.1 |

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| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|--|-----------|---------------|---------------|----------------------|----------|--|---|---|------------|
| NH72 | Op. Rose Crown, Whitehorse St, Baldock | Roadside | 524502 | 233948 | NO ₂ | NO | 27 | 2 | NO | 2 |
| NH103 | Westbrook Court, Hitchin | Roadside | 518773 | 228342 | NO ₂ | YES | 10 | 2.4 | NO | 2 |
| NH77 | Upper Tilehouse Street, Hitchin (traffic lights) | Roadside | 518006 | 229032 | NO ₂ | NO | 5 | 1.5 | NO | 2 |
| NH78 | West Hill, Hitchin | Roadside | 518099 | 229229 | NO ₂ | NO | 4 | 2 | NO | 2 |
| NH82 | Upper Tilehouse St, Nr Roundabout | Roadside | 518129 | 229065 | NO ₂ | YES | 7 | 1.5 | NO | 2 |
| NH83 | Hitchin Station, Roundabout A | Roadside | 519366 | 229806 | NO ₂ | NO | 20 | 1 | NO | 2 |
| NH87 | 11 Stevenage Rd, Hitchin | Roadside | 518731 | 228362 | NO ₂ | NO | 0 | 15 | NO | 1.9 |
| NH88 | Church St, Baldock (Opp. Town Hall) | Kerbside | 524448 | 233898 | NO ₂ | NO | 45 | 0.5 | NO | 2 |
| NH89 | London Rd, Hitchin | Roadside | 518706 | 228293 | NO ₂ | NO | 20 | 1.9 | NO | 2 |
| NH90 | Gosmore Rd, Hitchin | Roadside | 518593 | 228304 | NO ₂ | NO | 20 | 2.2 | NO | 2 |

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| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|--|-----------|---------------|---------------|----------------------|----------|--|---|---|------------|
| NH91 | St John's Road, Hitchin | Roadside | 518656 | 228406 | NO ₂ | NO | 5 | 7.9 | NO | 2.1 |
| NH92 | Stevenage Road (Griffin), Hitchin | Roadside | 518872 | 228305 | NO ₂ | YES | 5 | 2 | NO | 2 |
| NH93 | Park Way, Hitchin | Roadside | 518130 | 229036 | NO ₂ | YES | 3 | 1.6 | NO | 1.8 |
| NH94 | Offley Road, Hitchin | Roadside | 517915 | 228967 | NO ₂ | NO | 7 | 2.3 | NO | 2 |
| NH95 | Pirton Road, Hitchin | Roadside | 517886 | 228975 | NO ₂ | NO | 22 | 1.3 | NO | 2 |
| NH96 | Park Street, Hitchin | Roadside | 518417 | 228624 | NO ₂ | NO | 1 | 1.8 | NO | 1.8 |
| NH97 | Queen Street, Hitchin | Roadside | 518666 | 229786 | NO ₂ | NO | 4 | 1.7 | NO | 2 |
| NH98 | Walsworth/Radcliffe Rd, Hitchin | Roadside | 519080 | 229510 | NO ₂ | NO | 4 | 1.5 | NO | 2 |
| NH99 | Nightingale Road, Hitchin | Roadside | 518953 | 229786 | NO ₂ | NO | 5 | 1.7 | NO | 2 |
| NH108 | Hitchin - (97) Hermitage Rd | Roadside | 518534 | 229302 | NO ₂ | NO | 3 | 0.8 | NO | 2 |
| NH109 | Hitchin - (26) Hermitage Rd | Roadside | 518631 | 223279 | NO ₂ | NO | 0 | 3 | NO | 2 |
| NH104 | Dower Court (A), Stevenage Rd, Hitchin | Roadside | 518757 | 228334 | NO ₂ | YES | 0 | 3.3 | NO | 1.8 |
| NH105 | 94-98 Stevnage Rd, Hitchin | Roadside | 519067 | 228255 | NO ₂ | YES | 7 | 3.5 | NO | 2.1 |

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Distance to Relevant Exposure (m) ⁽¹⁾ | Distance to kerb of nearest road (m) ⁽²⁾ | Tube collocated with a Continuous Analyser? | Height (m) |
|---------|--------------------------------------|-----------|---------------|---------------|----------------------|----------|--|---|---|------------|
| NH106 | Morello Grdns, Stevenage Rd, Hitchin | Roadside | 519250 | 228218 | NO ₂ | NO | 5 | 1.4 | NO | 2 |
| NH107 | Whitehill Rd, Hitchin | Roadside | 518720 | 228335 | NO ₂ | NO | 26 | 2.3 | NO | 2 |
| NH110 | Stevenage Rd, AQ Analyser 1, Hitchin | Roadside | 518740 | 228348 | NO ₂ | YES | 11 | 2 | YES | 1.2 |
| NH111 | Stevenage Rd, AQ Analyser 2, Hitchin | Roadside | 518740 | 228348 | NO ₂ | YES | 11 | 2 | YES | 1.2 |
| NH112 | Stevenage Rd, AQ Analyser 3, Hitchin | Roadside | 518740 | 228348 | NO ₂ | YES | 11 | 2 | YES | 1.2 |
| NH114 | Old Park Rd, Hitchin (no. 20) | Roadside | 518150 | 229160 | NO ₂ | NO | 0 | 2.45 | NO | 2.1 |
| NH115 | Old North Rd, Royston | Roadside | 535373 | 241466 | NO ₂ | NO | 9 | 1 | NO | 1.9 |

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2016 (%) ⁽²⁾ | NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|---------|-----------|-----------------|---|--|---|-------------|-------------|-------------|--------------|
| | | | | | 2012 | 2013 | 2014 | 2015 | 2016 |
| NH1 | Roadside | Automatic | 97.38 | 97.38 | | 46 | 48 | 42 | 50 |
| NH06 | Roadside | Diffusion Tube | 92 | 92 | 27.9 | 29.7 | 29.3 | 26.8 | 25.94 |
| NH45 | Roadside | Diffusion Tube | 83 | 83 | 46.3 | 42 | 46.6 | 42.3 | 45.16 |
| NH59 | Roadside | Diffusion Tube | 100 | 100 | 31.1 | 30.6 | 29.1 | 26.4 | 27.75 |
| NH60 | Roadside | Diffusion Tube | 100 | 100 | 30 | 31.5 | 29 | 29.5 | 29.89 |
| NH61 | Roadside | Diffusion Tube | 100 | 100 | 36.3 | 35.1 | 33.5 | 29.2 | 30.35 |
| NH63 | Roadside | Diffusion Tube | 100 | 100 | 39.4 | 36.6 | 40.8 | 35.5 | 37.20 |
| NH67 | Roadside | Diffusion Tube | 92 | 92 | 29.8 | 28.9 | 26.6 | 25.3 | 27.15 |
| NH69 | Roadside | Diffusion Tube | 75 | 75 | 31.9 | 32.2 | 28.8 | 26.9 | 28.33 |
| NH70 | Roadside | Diffusion Tube | 75 | 75 | 28.2 | 27.4 | 28.2 | 25.3 | 27.30 |
| NH72 | Roadside | Diffusion Tube | 92 | 92 | 36.9 | 31.8 | 23.7 | 30.4 | 32.05 |
| NH103 | Roadside | Diffusion Tube | 100 | 100 | 43.6 | 41.7 | 40.8 | 39.1 | 39.83 |
| NH77 | Roadside | Diffusion Tube | 100 | 100 | 39.5 | 42 | 41.6 | 37.8 | 38.99 |
| NH78 | Roadside | Diffusion Tube | 100 | 100 | 28.6 | 29 | 29.3 | 25.9 | 26.90 |
| NH82 | Roadside | Diffusion Tube | 100 | 100 | 40.4 | 40.3 | 40.3 | 34.5 | 36.53 |
| NH83 | Roadside | Diffusion Tube | 100 | 100 | 32.7 | 32.9 | 34.1 | 30.4 | 32.35 |
| NH87 | Roadside | Diffusion Tube | 100 | 100 | 29.2 | 27.9 | 27.4 | 26.3 | 26.93 |
| NH88 | Kerbside | Diffusion Tube | 100 | 100 | 44.4 | 38.4 | 42.4 | 39 | 39.89 |
| NH89 | Roadside | Diffusion Tube | 100 | 100 | 29.5 | 28.4 | 28.7 | 26.3 | 29.70 |
| NH90 | Roadside | Diffusion Tube | 100 | 100 | 27.6 | 27.7 | 25.8 | 24.2 | 26.24 |
| NH91 | Roadside | Diffusion Tube | 100 | 100 | 34.6 | 32 | 29.9 | 31.2 | 31.85 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2016 (%) ⁽²⁾ | NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|---------|-----------|-----------------|---|--|---|------|------|------|-------|
| NH92 | Roadside | Diffusion Tube | 100 | 100 | 51.1 | 47.6 | 48.1 | 45.8 | 46.05 |
| NH93 | Roadside | Diffusion Tube | 92 | 92 | 54.8 | 52.1 | 54.1 | 45.5 | 48.99 |
| NH94 | Roadside | Diffusion Tube | 100 | 100 | 36.5 | 36 | 36.3 | 33.8 | 34.06 |
| NH95 | Roadside | Diffusion Tube | 100 | 100 | 32.2 | 33.2 | 34.7 | 31.7 | 31.81 |
| NH96 | Roadside | Diffusion Tube | 100 | 100 | 32.1 | 34.5 | 32.6 | 29.2 | 30.55 |
| NH97 | Roadside | Diffusion Tube | 100 | 100 | 32 | 30.8 | 32.4 | 29.7 | 29.43 |
| NH98 | Roadside | Diffusion Tube | 100 | 100 | 33.6 | 32.7 | 31.9 | 30.3 | 30.44 |
| NH99 | Roadside | Diffusion Tube | 75 | 75 | 33.4 | 32.2 | 29.1 | 28.2 | 30.71 |
| NH108 | Roadside | Diffusion Tube | 100 | 100 | | 36.5 | 40.2 | 36.1 | 34.04 |
| NH109 | Roadside | Diffusion Tube | 92 | 92 | | 28 | 27.9 | 28.4 | 27.62 |
| NH104 | Roadside | Diffusion Tube | 100 | 100 | 33.9 | 31.5 | 30.4 | 27.9 | 30.80 |
| NH105 | Roadside | Diffusion Tube | 100 | 100 | 45.8 | 47 | 51.4 | 46.2 | 45.96 |
| NH106 | Roadside | Diffusion Tube | 100 | 100 | 43.5 | 44.6 | 42.7 | 36.1 | 37.68 |
| NH107 | Roadside | Diffusion Tube | 100 | 100 | 30.8 | 29.4 | 29.6 | 28.4 | 29.01 |
| NH110 | Roadside | Diffusion Tube | 75 | 75 | | | | 49.6 | 50.16 |
| NH111 | Roadside | Diffusion Tube | 92 | 92 | | | | 58.6 | 56.38 |
| NH112 | Roadside | Diffusion Tube | 66 | 66 | | | | 48.7 | 54.21 |
| NH114 | Roadside | Diffusion Tube | 92 | 92 | | | | | 30.52 |
| NH115 | Roadside | Diffusion Tube | 100 | 100 | | | | | 26.46 |

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

If applicable, all data has been distance corrected for relevant exposure. Data corrected for distance to relevant exposure is available in Table B.1 of Appendix B, where the directly measured concentrations exceed the AQO.

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.

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

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2016 (%) ⁽²⁾ | NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾ | | | | |
|---------|-----------|-----------------|---|--|--|------|------|------|-----------|
| | | | | | 2012 | 2013 | 2014 | 2015 | 2016 |
| NH1 | Roadside | Automatic | 97.38 | 97.38 | | 1 | 1 | 0 | 10 |

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 | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2016 (%) ⁽²⁾ | PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|---------|-----------|---|--|--|------|------|-----------|-----------|
| | | | | 2012 | 2013 | 2014 | 2015 | 2016 |
| NH2 | Roadside | 98.88 | 98.88 | | | | 20 | 20 |

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 | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2016 (%) ⁽²⁾ | PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾ | | | | |
|---------|-----------|---|--|---|------|------|------|------|
| | | | | 2012 | 2013 | 2014 | 2015 | 2016 |
| NH2 | Roadside | 98.88 | 98.88 | | | | 1 | 4 |

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 | Site Type | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2016 (%) ⁽²⁾ | PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|---------|-----------|---|--|---|------|------|------|------|
| | | | | 2012 | 2013 | 2014 | 2015 | 2016 |
| NH2 | Roadside | 91.31 | 91.31 | | | | 11 | 13 |

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.

Table A.8 – SO₂ Monitoring Results

| Site ID | Site Type | Valid Data Capture for monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2016 (%) ⁽²⁾ | Number of Exceedances 2016 (percentile in bracket) ⁽³⁾ | | |
|---------|-----------|---|--|--|--|---|
| | | | | 15-minute Objective (266 µg/m ³) | 1-hour Objective (350 µg/m ³) | 24-hour Objective (125 µg/m ³) |

No monitoring undertaken within North Hertfordshire

Notes:

Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

(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 relevant percentiles are provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

| Site ID | NO ₂ Mean Concentrations (µg/m ³) | | | | | | | | | | | | | Annual Mean | | |
|---------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|--|---|--|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Raw Data | Bias Adjusted (factor) and Annualised ⁽¹⁾ | Distance Corrected to Nearest Exposure ⁽²⁾ | |
| | | | | | | | | | | | | | | | | |
| NH06 | 27.96 | 25.66 | 26.32 | 23.65 | 20.37 | 23.46 | 23.54 | 19.46 | 26.5 | 24.64 | | 35.49 | 25.19 | 25.94 | | |
| NH45 | 46.88 | 41.26 | 34.72 | 45.59 | 42.54 | | 37.32 | 32.24 | 50.75 | | 48.56 | 58.57 | 43.84 | 45.16 | 29.2 | |
| NH59 | 26.63 | 25.34 | 24.35 | 26.6 | 24.18 | 23.29 | 24.95 | 22.21 | 28.11 | 29.51 | 29.66 | 38.49 | 26.94 | 27.75 | | |
| NH60 | 26.55 | 27.06 | 23.21 | 23.43 | 25.51 | 29.38 | 27.11 | 24.65 | 32.5 | 36.61 | 34.85 | 37.39 | 29.02 | 29.89 | | |
| NH61 | 33.04 | 27.58 | 17.15 | 28.61 | 30.19 | 27.59 | 24.17 | 23.65 | 34.85 | 28.04 | 35.38 | 43.34 | 29.47 | 30.35 | | |
| NH63 | 41.04 | 28.38 | 30.08 | 29.6 | 35.72 | 31.03 | 35.57 | 32.35 | 41.13 | 34 | 41.77 | 52.73 | 36.12 | 37.20 | | |
| NH67 | 30.23 | 23.88 | 18.59 | | 20.63 | 22.65 | 20.82 | 21.62 | 30.59 | 25.51 | 34.01 | 41.39 | 26.36 | 27.15 | | |
| NH69 | 30.83 | 31.81 | 24.79 | 25.59 | 24.35 | | 19.06 | 20.05 | 32.46 | | | 38.62 | 27.51 | 28.33 | | |
| NH70 | 31.6 | 26.87 | | 23.21 | 21.82 | 18.64 | | 17.89 | 27.52 | | 33.5 | 37.48 | 26.50 | 27.30 | | |
| NH72 | 36.87 | 30.99 | 27.3 | 27.36 | | 24.92 | 29.58 | 24.47 | 31.61 | 28.48 | 36.99 | 43.72 | 31.12 | 32.05 | | |
| NH103 | 42.38 | 37.21 | 34.83 | 35.15 | 33.78 | 32.99 | 32.85 | 31.31 | 40.58 | 39.74 | 47.8 | 55.38 | 38.67 | 39.83 | | |
| NH77 | 39.14 | 34.4 | 33.68 | 33.55 | 37.97 | 36.82 | 32.86 | 32.23 | 36.16 | 37.1 | 45.67 | 54.7 | 37.86 | 38.99 | | |
| NH78 | 26.67 | 24.34 | 25.37 | 23.83 | 26.76 | 24.96 | 15.99 | 16.41 | 28.88 | 28.93 | 32.09 | 39.19 | 26.12 | 26.90 | | |
| NH82 | 41.1 | 31.05 | 30.98 | 31.93 | 32.44 | 30.23 | 33.07 | 29.2 | 39.09 | 39.81 | 40.51 | 46.23 | 35.47 | 36.53 | | |
| NH83 | 33.78 | 31.28 | 28.47 | 30.23 | 26.86 | 30 | 27.97 | 25.1 | 26.36 | 33.85 | 39.37 | 43.65 | 31.41 | 32.35 | | |

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| Site ID | 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 (factor) and Annualised ⁽¹⁾ | Distance Corrected to Nearest Exposure ⁽²⁾ |
| NH87 | 31.58 | 25.31 | 23.45 | 21.94 | 22.18 | 21.12 | 22.67 | 21.62 | 27.43 | 23.85 | 32.8 | 39.76 | 26.14 | 26.93 | |
| NH88 | 49.62 | 37.02 | 32.16 | 34.37 | 30.42 | 31.23 | 38.5 | 33.94 | 40.77 | 33.86 | 48.06 | 54.82 | 38.73 | 39.89 | |
| NH89 | 35.92 | 29.29 | 25.59 | 25.09 | 23.65 | 22.31 | 22.63 | 20.49 | 29.01 | 28.84 | 37.4 | 45.84 | 28.84 | 29.70 | |
| NH90 | 25.21 | 23.36 | 15.46 | 23.38 | 26.49 | 21.37 | 21.29 | 20.75 | 28.52 | 30.26 | 31.42 | 38.2 | 25.48 | 26.24 | |
| NH91 | 41.73 | 28.95 | 26.81 | 25.01 | 24.76 | 23.51 | 28.59 | 26.12 | 34.16 | 27.14 | 39.12 | 45.11 | 30.92 | 31.85 | |
| NH92 | 49.2 | 43.38 | 37.14 | 41.58 | 38.75 | 38.61 | 40.24 | 40.87 | 45.19 | 45.78 | 52.79 | 63.03 | 44.71 | 46.05 | 39.4 |
| NH93 | 43.59 | 38.97 | 42.18 | 46.25 | 47.33 | 48.25 | | 44.02 | 52.08 | 48.73 | 55.99 | 55.83 | 47.57 | 48.99 | 44.5 |
| NH94 | 36.02 | 29.87 | 30.16 | 31.67 | 27.5 | 27.99 | 31.81 | 30.8 | 34.37 | 33.58 | 39.87 | 43.22 | 33.07 | 34.06 | |
| NH95 | 33.19 | 30.39 | 28.77 | 27.12 | 27.8 | 24.94 | 30.13 | 25.45 | 33.36 | 30.84 | 36.23 | 42.4 | 30.89 | 31.81 | |
| NH96 | 24.89 | 29.1 | 27.84 | 29.64 | 33.13 | 27.1 | 27.55 | 25.62 | 33.8 | 34.46 | 27.1 | 35.68 | 29.66 | 30.55 | |
| NH97 | 30.76 | 26.13 | 25.51 | 25.91 | 27.61 | 24.97 | 22.24 | 21.69 | 32.87 | 32.03 | 33.52 | 39.62 | 28.57 | 29.43 | |
| NH98 | 34.34 | 27.81 | 27.33 | 26.77 | 23.1 | 23.65 | 25.88 | 18.2 | 36.59 | 29.97 | 36.51 | 44.52 | 29.56 | 30.44 | |
| NH99 | 31.97 | 25.34 | 26.51 | 29.63 | | 24.48 | 28.24 | | 27.33 | 31.85 | | 43.03 | 29.82 | 30.71 | |
| NH108 | 39.03 | 33.82 | 28.68 | 27.87 | | 25.46 | 32.39 | 26.96 | 37.36 | 29.42 | 37.21 | 45.36 | 33.05 | 34.04 | |
| NH109 | 26.09 | 27.11 | 25.82 | 21.92 | 25.74 | 23.64 | 21.1 | 20.55 | 27.9 | 32.06 | 32.94 | 36.96 | 26.82 | 27.62 | |
| NH104 | 31.92 | 29.9 | 28.89 | 25.9 | 25.88 | 27.3 | 26.33 | 24.1 | 32.14 | 32.13 | 35.35 | 38.98 | 29.90 | 30.80 | |
| NH105 | 49.74 | 38.07 | 40.11 | 46.97 | 46.04 | 35.83 | 42.65 | 40.07 | 46.51 | 44.52 | 46.98 | 57.93 | 44.62 | 45.96 | 40.2 |
| NH106 | 31.81 | 34.62 | 33.17 | 34.71 | 37.47 | 35.1 | 27.21 | 28.87 | 41.08 | 38.49 | 44.52 | 51.99 | 36.59 | 37.68 | |
| NH107 | 31.39 | 24.24 | 24.15 | 24.47 | 23.87 | 25.44 | 24.56 | 21.75 | 31.93 | 27.66 | 35.16 | 43.41 | 28.17 | 29.01 | |

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| Site ID | NO ₂ Mean Concentrations (µg/m ³) | | | | | | | | | | | | | Annual Mean | | |
|---------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|--|---|--|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Raw Data | Bias Adjusted (factor) and Annualised ⁽¹⁾ | Distance Corrected to Nearest Exposure ⁽²⁾ | |
| | | | | | | | | | | | | | | | | |
| NH110 | 47.8 | | | 41.47 | 44.75 | 47.24 | 47.09 | 39.46 | 56.56 | 43.2 | | 70.76 | 48.70 | 50.16 | 36.1 | |
| NH111 | 56.8 | 52.59 | 43.82 | 44.92 | 54.77 | 61.18 | | 42.2 | 57.36 | 50.27 | 65.54 | 72.62 | 54.73 | 56.38 | 39.8 | |
| NH112 | 50.42 | | | 41.04 | 38.29 | 41.57 | | 42.57 | 48.78 | | 60.24 | 63.36 | 48.28 | 49.73 | 38.5 | |
| NH114 | 31.25 | 29.38 | 28.16 | 24.73 | 25.68 | | 26.86 | 24.94 | 32.43 | 29.28 | 33.44 | 39.83 | 29.63 | 30.52 | | |
| NH115 | 29.74 | 26.25 | 22.84 | 22.8 | 20.69 | 21.29 | 20.87 | 19.77 | 26.13 | 26.66 | 32.69 | 38.53 | 25.69 | 26.46 | | |

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

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

Automatic Monitoring:

The R&P 1400a Tapered Element Oscillating Measurement (TEOM) monitor at Stevenage Road, Hitchin is subject to calibration visits and filter checks and changes on a monthly basis by NHDC staff. In addition, Enviro-Technology is employed to undertake two service/maintenance visits (one minor and one major service) and to respond in the event of any maintenance issues encountered during daily operation. The calibration readings were reported to AQDM and subsequently Ricardo Energy and Environment (due to a routine change in service provider) which were retained by NHDC to verify and ratify the data generated by the monitor. This process includes the application of the volatile correction model (VCM) and the results of the data reported have had this applied and have been demonstrated as equal to the gravimetric equivalent.

The Met-One Smart Heated BAM 1020 PM_{2.5} monitor at Stevenage Road requires no periodic calibration checks, only a tape change approximately once every six weeks which is undertaken by NHDC staff. In addition Enviro-Technology is employed to undertake two service/maintenance visits (one minor and one major service) and to respond in the event of any maintenance issues encountered during daily operation. The outcome of the servicing and the associated performance of the monitor are reported to AQDM and subsequently Ricardo Energy and Environment (due to a routine change in service provider) which is retained by NHDC to verify and ratify the data generated by the monitor.

The Teledyne-API T200A chemiluminescence monitor at Stevenage Road is subject to calibration checks and filter checks and changes on a monthly basis by NHDC staff. In addition Enviro-Technology is employed to undertake two service/maintenance visits (one minor and one major service) and to respond in the event of any maintenance issues encountered during daily operation. The calibration readings were reported to AQDM and subsequently Ricardo Energy and Environment (due to a routine change in service provider) which were retained by NHDC, as part of the larger Hertfordshire and Bedfordshire Air Quality Network, to verify and ratify the data generated by the monitor.

Short-term to Long-term Data adjustment (Annualisation):

Where it has only been possible to carry out monitoring at a location, whether automatic or non-automatic, at a site for less than 75% of the 12 months the results need to be adjusted to enable an estimate of the annual mean for that location to be calculated.

It should be noted that a minimum 6 month period is necessary for this process to be valid. There were no monitoring locations where less than 6 months data were collected during 2015.

The annualisation process is described in Box 7.9 of TG(16) and NHDC’s application of it for each of the relevant monitoring locations is summarised below.

Annualisation Factor Calculation for Stevenage Road, Hitchin Nitrogen Dioxide

Monitor (NH112). (Monitoring Period – Jan, Apr-Jun, Aug-Sept and Dec 2016)

| Site | Site Type | Annual Mean (µg/m ³) | Period Mean (µg/m ³) | Ratio |
|-----------------------|-----------|----------------------------------|----------------------------------|-------------|
| Sandy | Roadside | 31.6 | 33.1 | 1.05 |
| Stevenage Rd, Hitchin | Roadside | 50.0 | 44.4 | 1.13 |
| | | | Average of ratios R(a) | 1.09 |

Therefore: NH112 annual mean (8months) of 49.7µg/m³ multiplied by 1.09 produces an annualised mean of **54.2µg/m³**.

Non-Automatic Monitoring:

The diffusion tubes are 50% triethanolamine (TEA) in acetone and are supplied and analysed by Gradko Limited. Gradko follows the procedures set out in the Harmonisation Practical Guidance. ESG/HSS also participates in the Workplace Analysis Scheme for Proficiency (WASP) and is currently ranked as a Category Satisfactory laboratory. This information was used in selecting the below bias adjustment factor.

Data from the diffusion tubes has been compared and bias corrected to the factors produced from the UK co-location database. The bias adjustment factor has been taken from the March 2017 version of the Diffusion Tube Bias Adjustment Factors spreadsheet available from the Defra Review and Assessment website (<http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>).

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According to the above database the bias adjustment factor for Gradko in 2016 was 1.03.

Calculations for Reduction of Nitrogen Dioxide with Distance from Kerb

The calculation of the reduction of nitrogen dioxide with distance from the kerb was undertaken in line with the methodology that is downloadable from <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html> and which is referred to by TG(16). In all cases local background concentrations were derived from 2013 mapping (the most current available at the time of completion of the report) sourced from <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>.

Real Time Analyser (NH1) Stevenage Road, Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 2 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 11 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 14.91 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 50 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 36.0 | µg/m ³ |

Diffusion Tube (NH45) Stevenage Road, Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 2 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 19 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 14.91 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 45.16 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 29.2 | µg/m ³ |

Diffusion Tube (NH92) Stevenage Road (Griffin Court) Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 2 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 5 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 14.91 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 46.05 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 39.4 | µg/m ³ |

Diffusion Tube (NH105) Stevenage Road (94-98) Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 3.5 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 7 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 14.91 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 46 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 40.2 | µg/m ³ |

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Diffusion Tube (NH110) Stevenage Road (at location of NH1) Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 2 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 11 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 14.91 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 50.16 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 36.1 | µg/m ³ |

Diffusion Tube (NH111) Stevenage Road (at location of NH1) Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 2 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 11 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 14.91 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 56.38 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 39.8 | µg/m ³ |

Diffusion Tube (NH112) Stevenage Road (at location of NH1) Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 2 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 11 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 14.91 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 54.21 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 38.5 | µg/m ³ |

Diffusion Tube (NH93) Park Way (Payne's Park Area) Hitchin

| | | | | |
|--------|--|----------|--------------|-------------------|
| Step 1 | Distance from the KERB was your measurement made (in metres)? | (Note 1) | 1.6 | metres |
| Step 2 | Distance from the KERB is your receptor (in metres)? | (Note 1) | 3 | metres |
| Step 3 | The local annual mean background NO ₂ concentration (in µg/m ³)? | (Note 2) | 16.89 | µg/m ³ |
| Step 4 | Measured annual mean NO ₂ concentration (in µg/m ³)? | (Note 2) | 48.99 | µg/m ³ |
| Result | Predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor | (Note 3) | 44.5 | µg/m ³ |

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

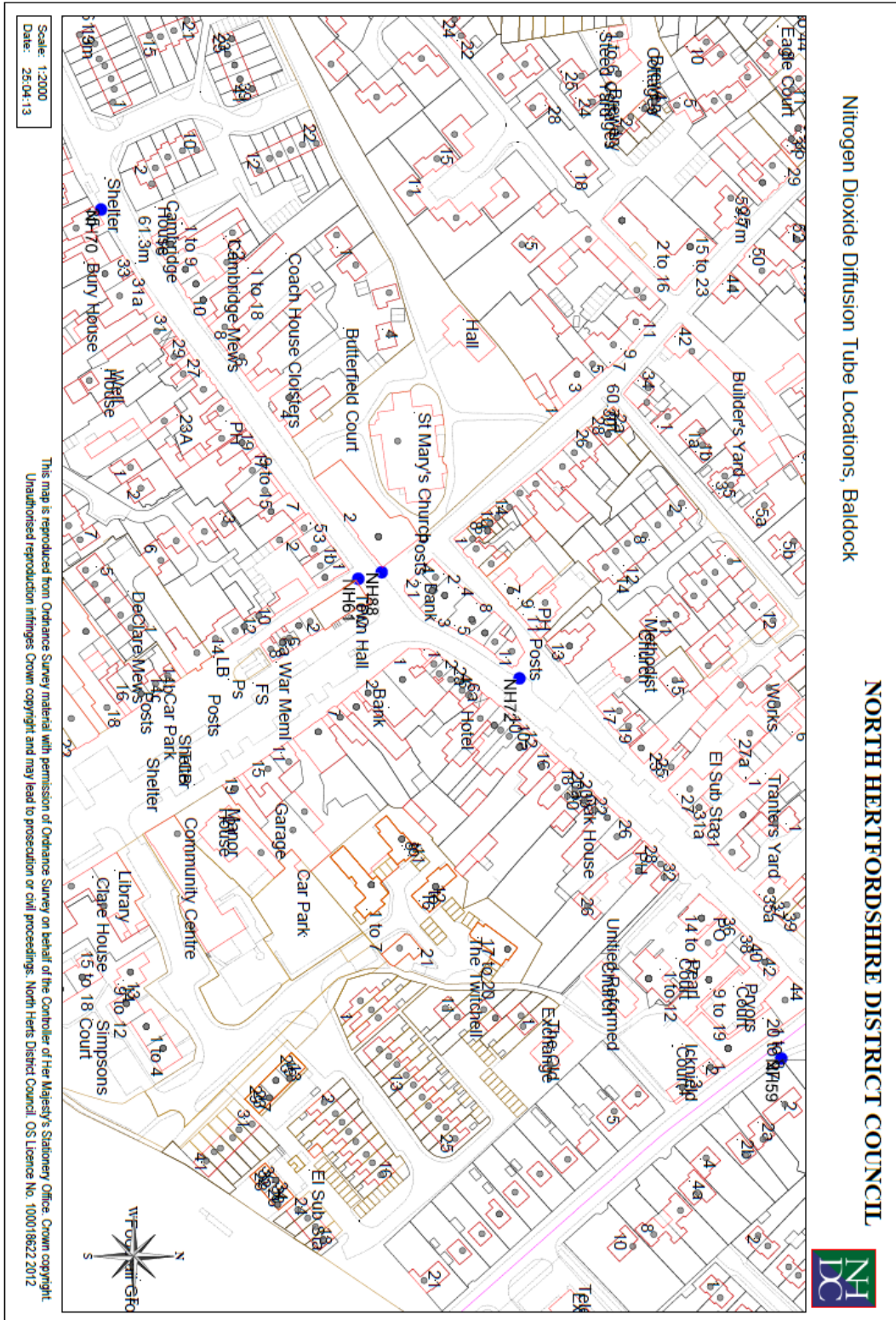


Figure D1: Diffusion Tube Monitoring Locations (NH72, NH88, NH70, NH59 & NH61) in Baldock - 2016

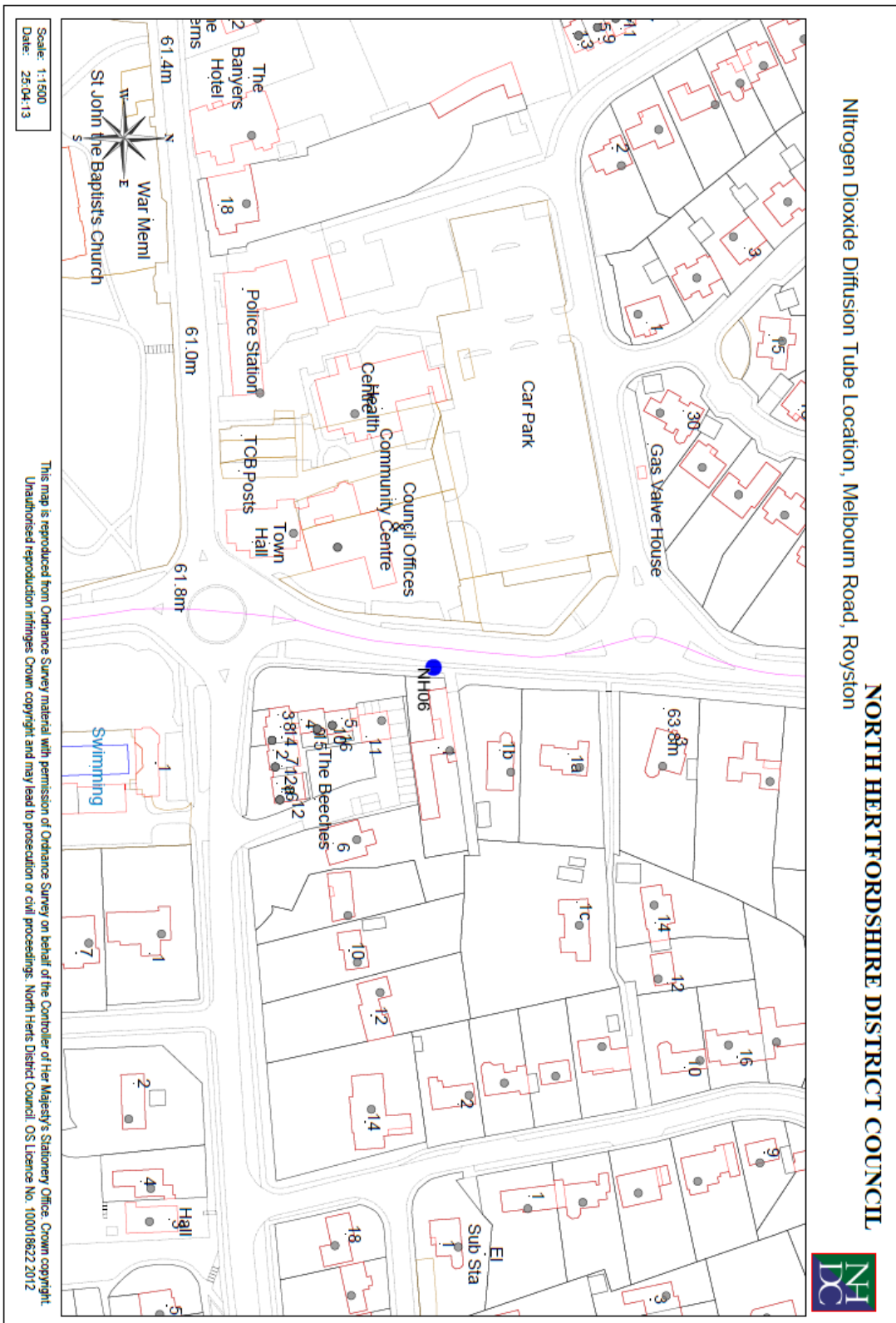


Figure D2: Diffusion Tube Monitoring Location (NH06) at Melbourn Road, Royston - 2016

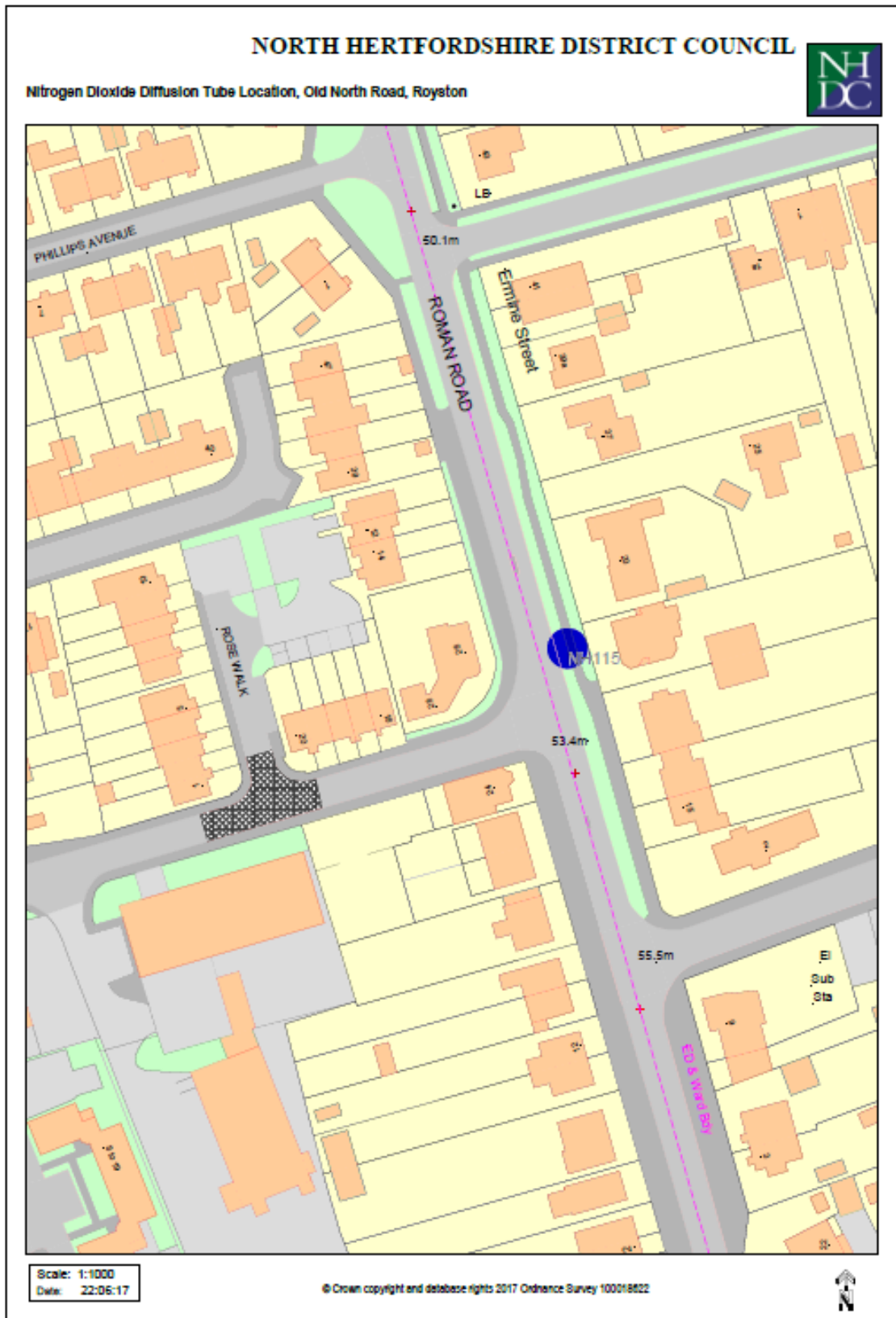


Figure D3: Diffusion Tube (NH115) Monitoring Location at Old North Road, Royston - 2016

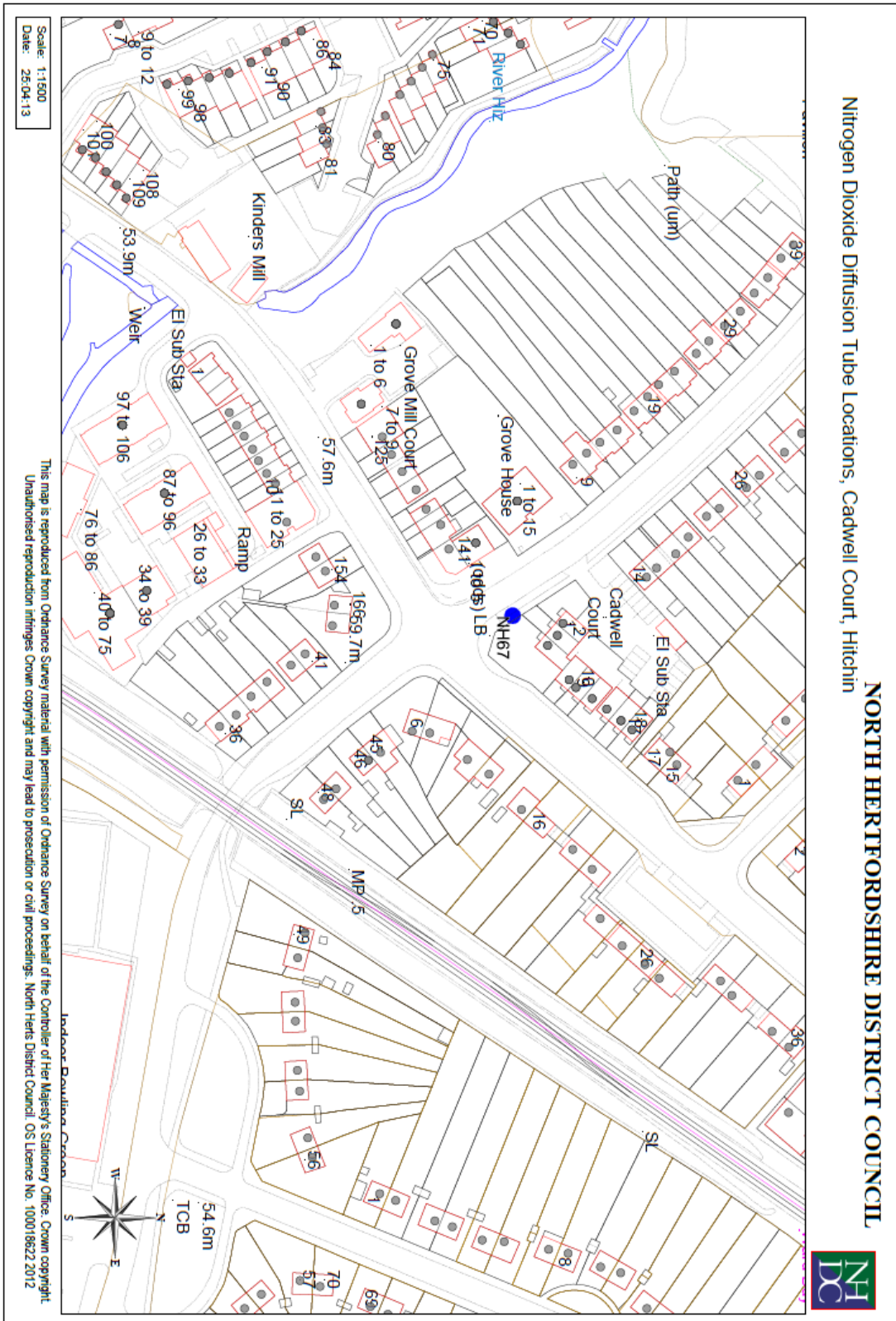


Figure D4: Diffusion Tube (NH67) Monitoring Location at Cadwell Court, Hitchin - 2016

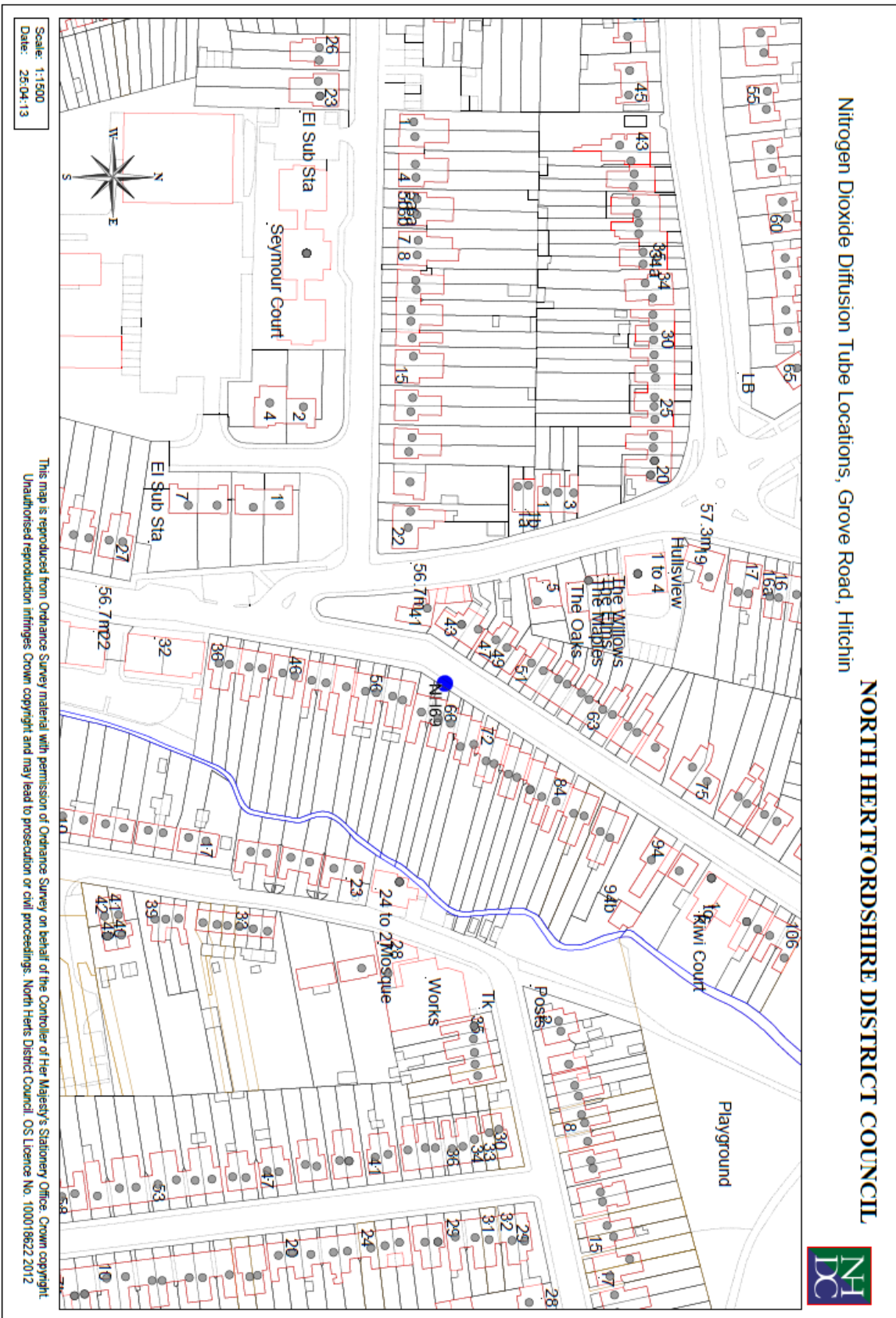


Figure D5: Diffusion Tube (NH69) Monitoring Location at Grove Road, Hitchin - 2016



Figure D6: Diffusion Tube Monitoring Locations (NH99, NH83 & NH98) in the Nightingale Road Area of Hitchin - 2016

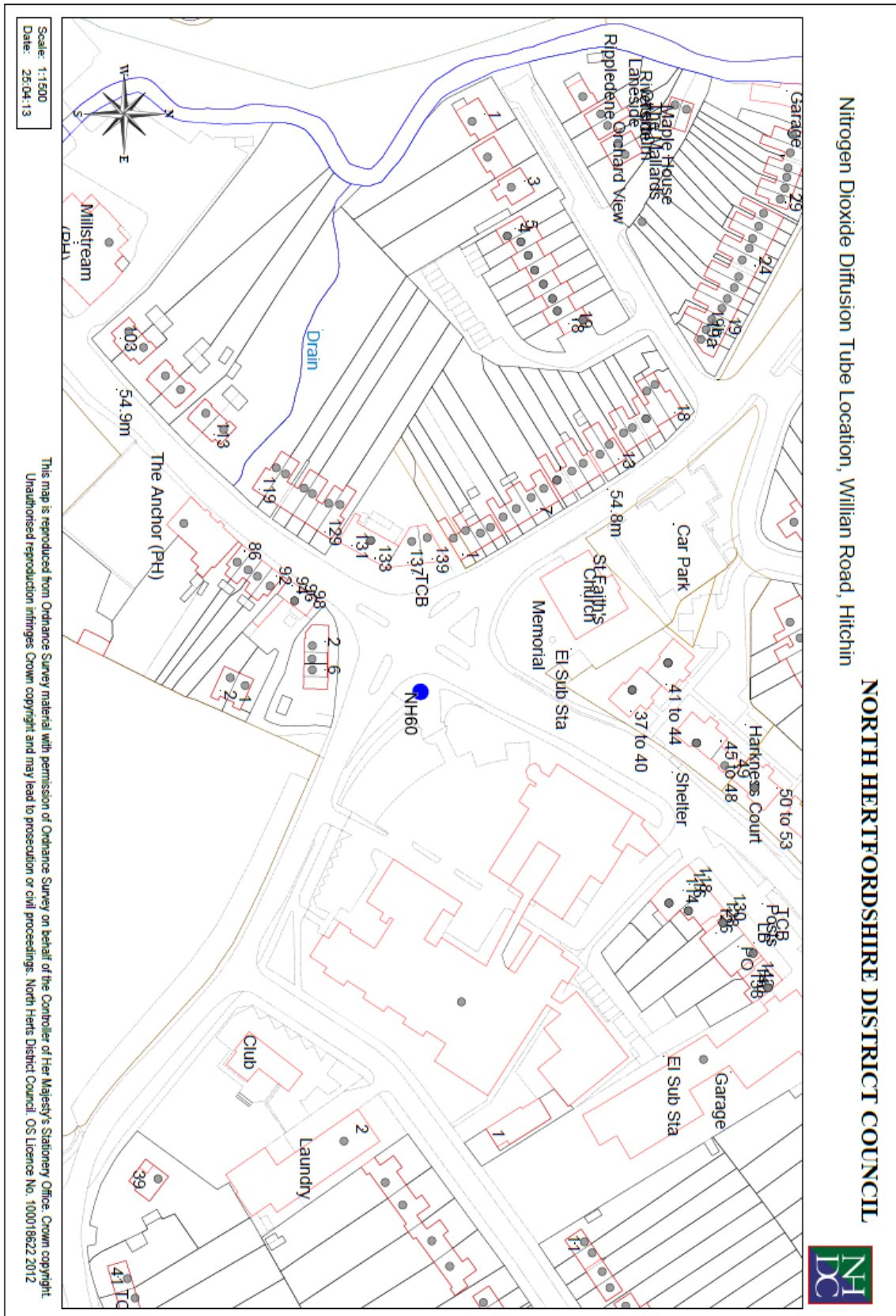


Figure D7: Diffusion Tube Monitoring Location (NH60) at Willian Road, Hitchin - 2016

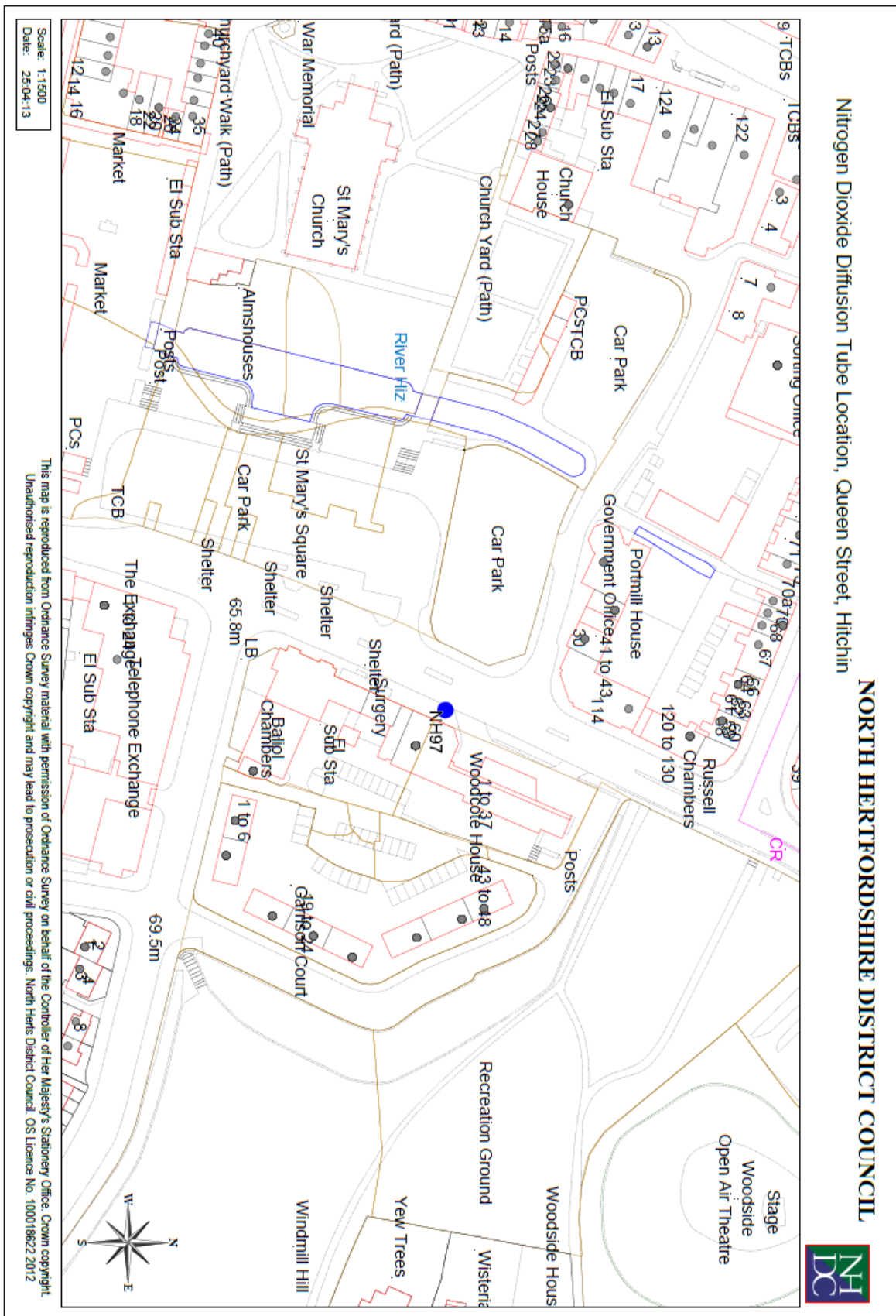


Figure D8: Diffusion Tube Monitoring Location (NH97) at Queen Street, Hitchin - 2016

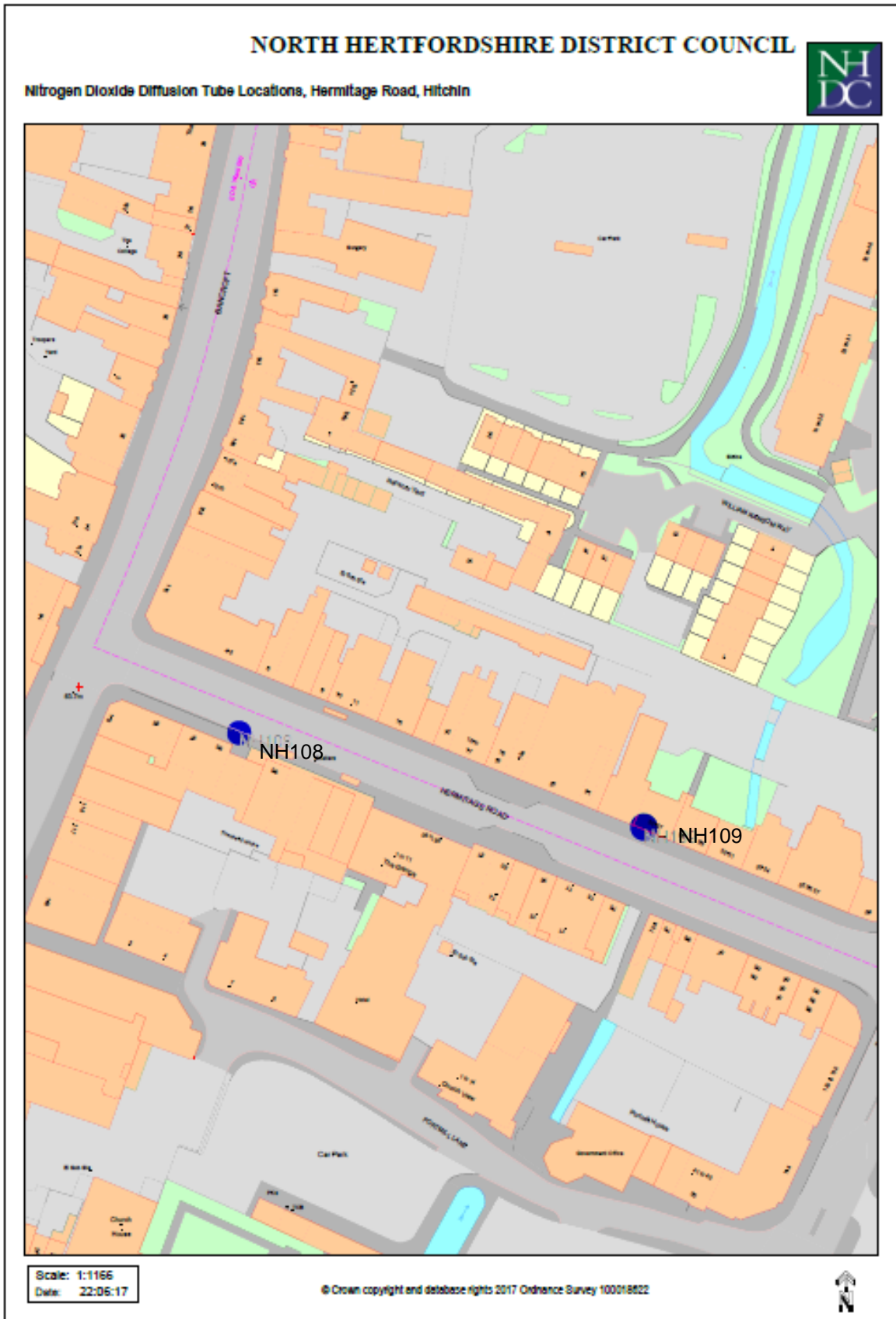


Figure D9: Diffusion Tube Monitoring Locations (NH108 & NH109) at Hermitage Road, Hitchin – 2016

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Title :- Nitrogen Dioxide Diffusion Tube Location, Park Street, Hitchin

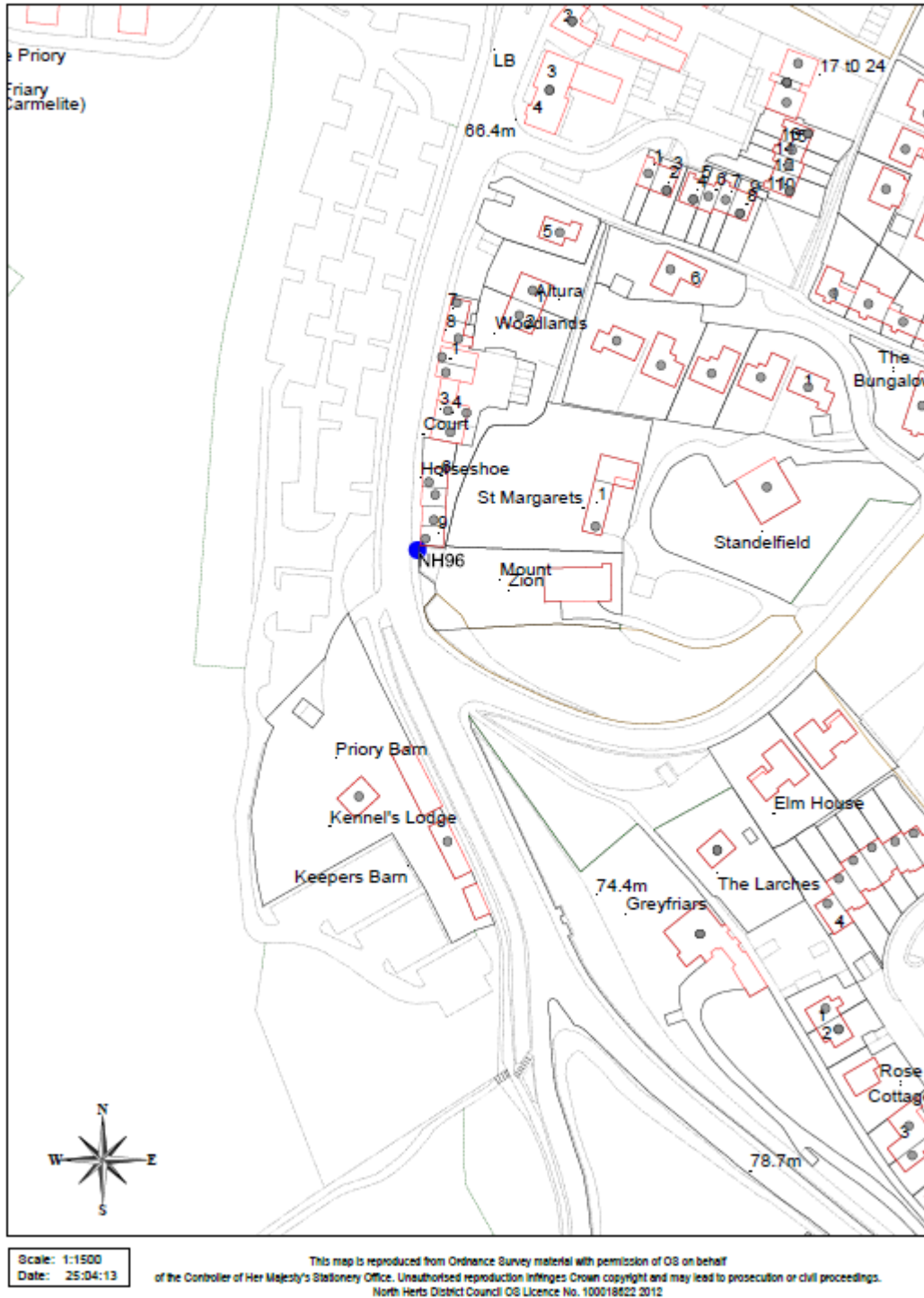


Figure D10: Diffusion Tube Monitoring Location (NH96) at Park Street, Hitchin - 2016

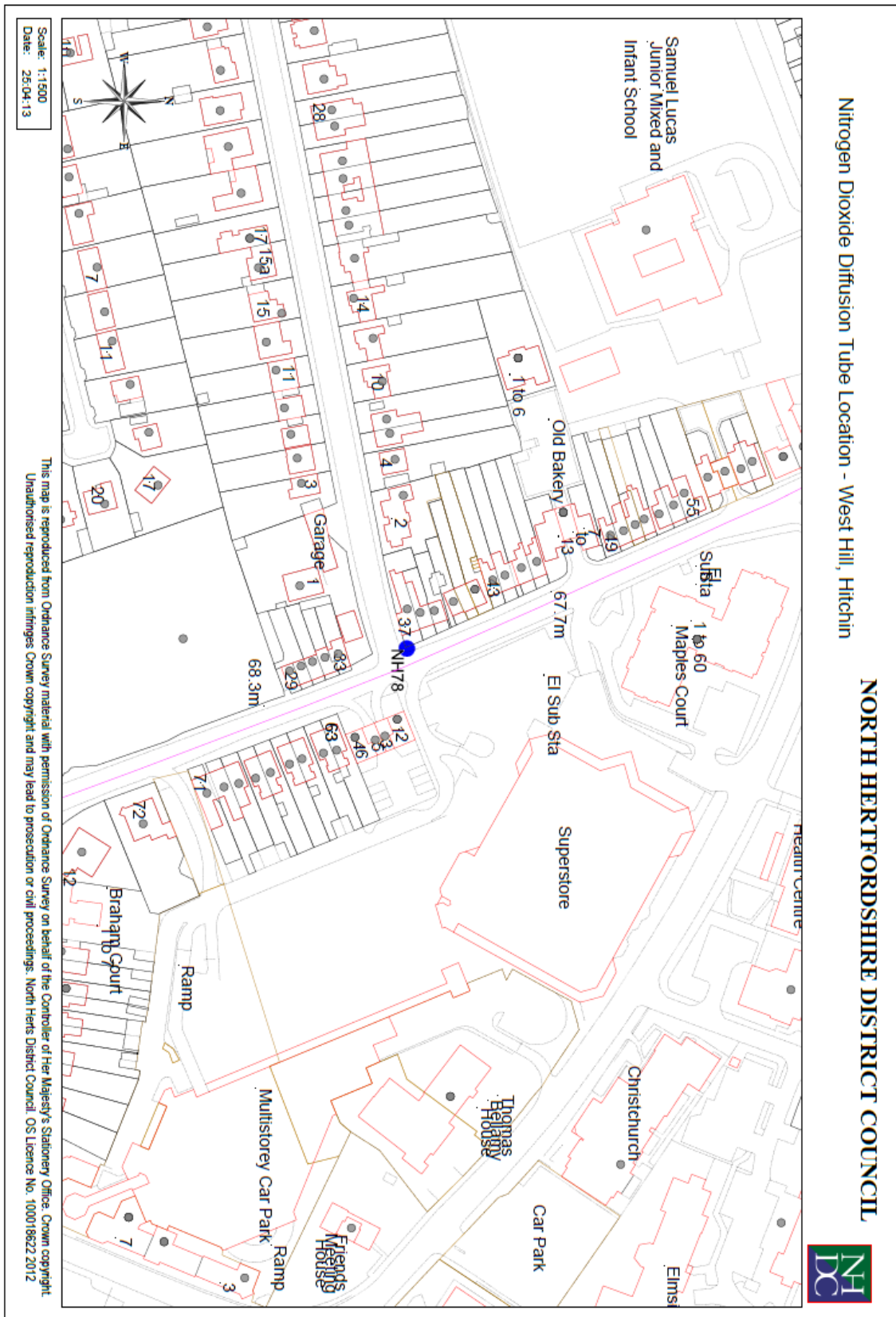


Figure D11: Diffusion Tube Monitoring Location (NH78) at West Hill Hitchin - 2016

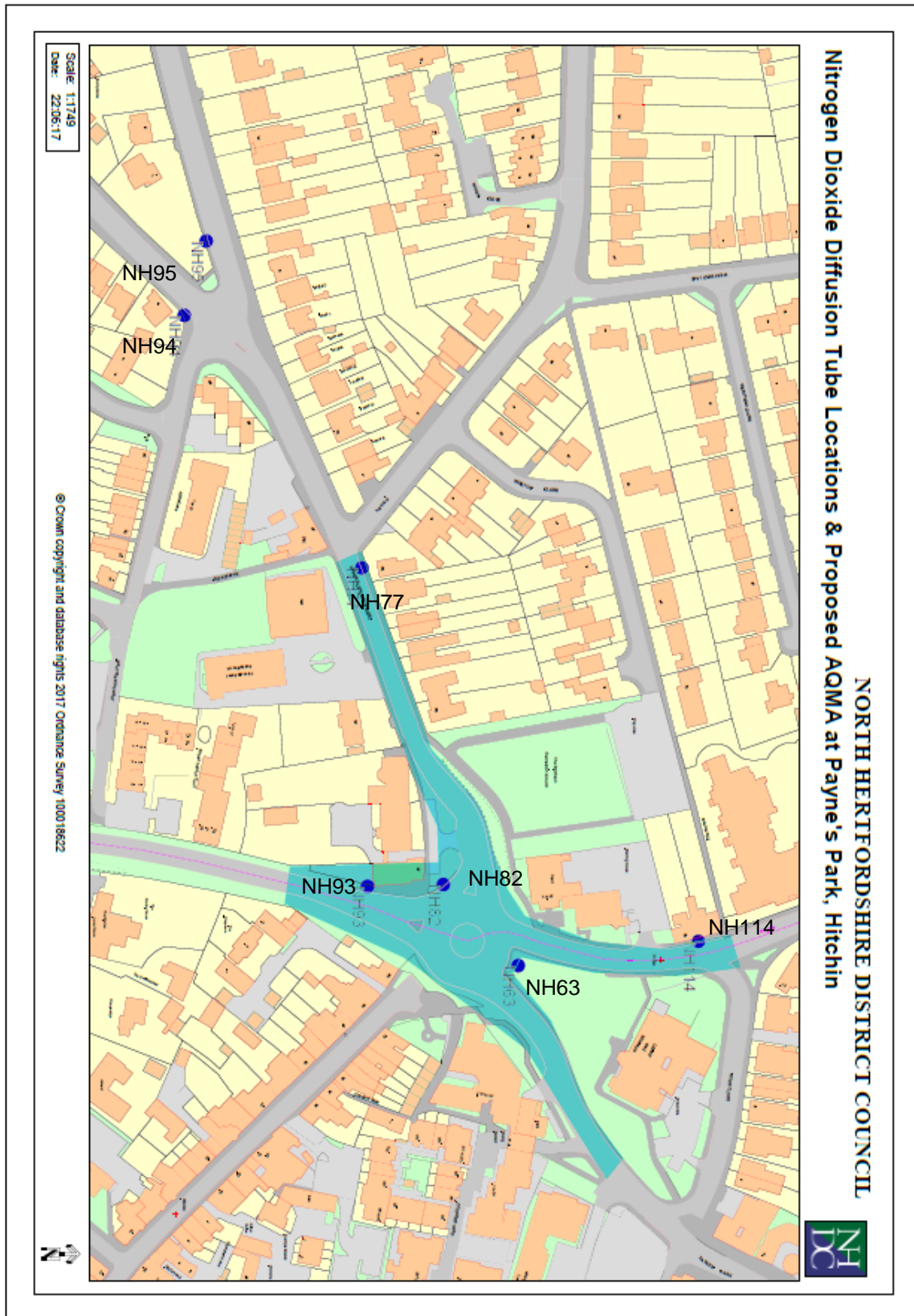


Figure D12: Diffusion Tube Monitoring Locations (NH108 & NH109) & Proposed Extent of AQMA at Payne's Park, Hitchin – 2016

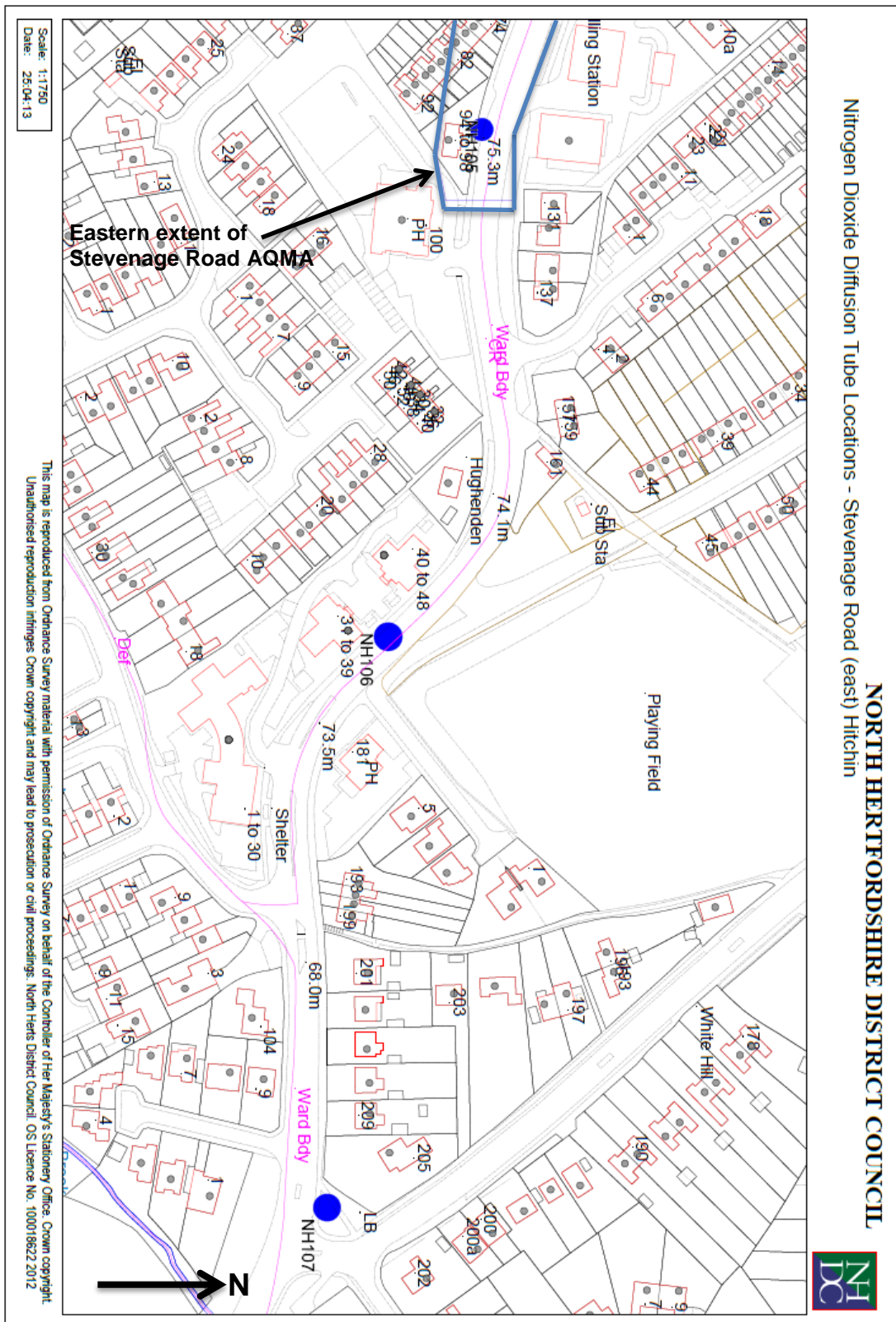


Figure D13: Diffusion Tube Monitoring Locations (NH105, NH106 & NH107) & Eastern Extent of the Stevenage Road AQMA at Stevenage Road, Hitchin – 2016

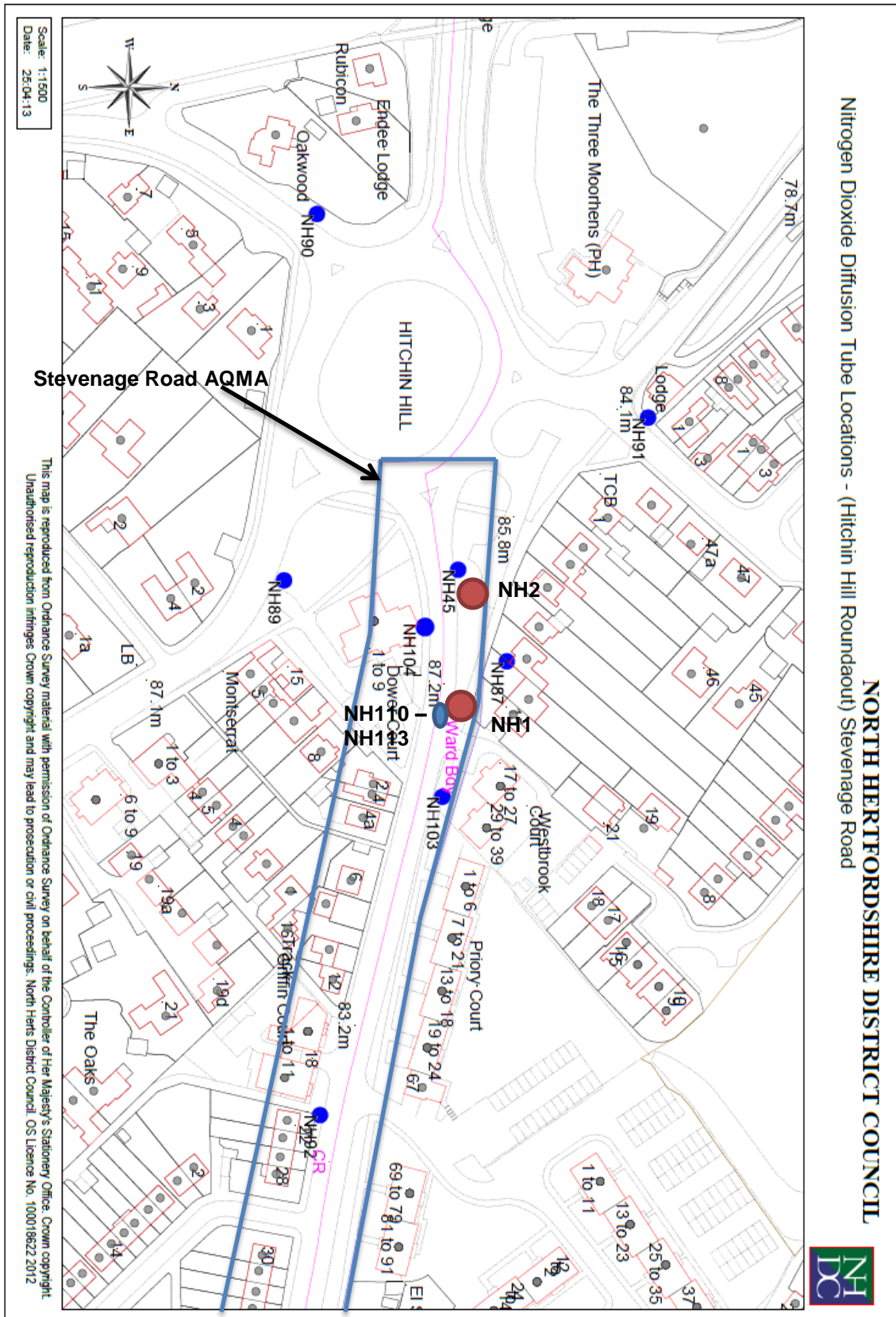


Figure D14: Diffusion Tube Monitoring Locations (NH45, NH87, NH89, NH90, NH91, NH92, NH91 & NH110-112), Real-Time Analyser Locations (NH1 and NH2) & the Stevenage Road AQMA at Stevenage Road, Hitchin – 2016

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

| Pollutant | Air Quality Objective ⁴ | |
|--|--|----------------|
| | 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 |

⁴ 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

No additional references