

Borough Council of
**King's Lynn &
West Norfolk**



2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995
Local Air Quality Management, as amended by the
Environment Act 2021

Date: June 2023

Information	BCKLWN Details
Local Authority Officer	David Alford, Senior Air Quality Officer
Report Reviewed by	Dave Robson, Environmental Health Manager
Report Appraised by	Jane Locke, Public Health, Norfolk CC
Address	King's Court, Chapel Street, King's Lynn, Norfolk, PE30 1EX
Telephone	01553 616324
E-mail	environmental.quality@west-norfolk.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in the Borough Council of King's Lynn and West Norfolk (BCKLWN)

Air pollution affects us all through a number of adverse health impacts. There is growing evidence that air pollution is a significant contributor to preventable ill health and early death. It can cause and worsen health effects in all individuals particularly society's most vulnerable populations and those with pre-existing health conditions. There is often a strong correlation with equality issues because the areas with poor air quality are often the less affluent areas^{1,2}.

Long-term exposure to air pollution can cause chronic conditions such as cardiovascular and respiratory diseases as well as lung cancer, leading to reduced life expectancy. Short-term increases in levels of air pollution can also cause a range of health impacts including effects on lung function, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality. In addition, there is a growing evidence base which suggests that air pollution may also affect the brain and is linked to dementia and cognitive decline³.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages⁴ with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁵. These health damage costs associated with air pollution demonstrate a need for measures that not just target the areas where air pollution is highest, such as the Air Quality Management Areas (AQMAs) in King's Lynn but with public health interventions also that benefit the wider population.

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017; <https://www.local.gov.uk/publications/air-quality-briefing-directors-public-health>

² Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006; https://uk-air.defra.gov.uk/library/reports?report_id=424

³ Health Matters: Air Pollution, Public Health England 2018 [Health matters: air pollution - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/health-matters-air-pollution)

⁴ Defra. Air quality appraisal: damage cost guidance, March 2023; <https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance>

⁵ Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018;

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/708855/Estimation_of_costs_to_the_NHS_and_social_care_due_to_the_health_impacts_of_air_pollution_-_summary_report.pdf

In terms of the borough it is essentially rural being the tenth largest district council area in England and Wales covering approximately 550 sq. miles with a population of 154,300 (based on 2021 Census). It comprises two market towns of King's Lynn and Downham Market, the Victorian coastal town of Hunstanton and more than one hundred villages of varying sizes. The main source of air pollution in this area is from road traffic emissions. Major roads include the A148 through King's Lynn, the A47, A17 and A10. These roads, amongst others, form the main highway arterial network within the borough.

There are two Air Quality Management Areas (AQMAs) within BCKLWN (Railway Road and Gaywood Clock⁶). They have been declared due to nitrogen dioxide (NO₂) exceeding the annual mean air quality objective (40µg/m³ NO₂). Principal source was traffic emissions. The last exceedance was in 2019 as shown in Table 2. 1. As a result an Air Quality Action Plan (AQAP, 2015) sets out the required measures to reduce the emissions set out in Table 2 2.

The current status of air quality is much improved following the Covid outbreak in 2020 with around a 20% reduction in the NO₂ annual mean being observed when compared to the pre-Covid period. These trends in the NO₂ annual means are shown in Figure A.1. The general reduction in concentrations is considered consistent with trends observed more widely as a result of the pandemic.

Monitoring is also performed for particulate matter within the size fractions of less than 10 and 2.5 microns (PM₁₀ and PM_{2.5}). No exceedances in the objectives were indicated during the 2022 period.

No new sources were identified likely to significantly impact air quality either from new developments, or from changes to sites regulated by environmental permitting either by the Council or Environment Agency.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

⁶ Defra, UK-Air; https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=138

The National Air Quality Strategy (NAQS, 2023⁷) provides the strategic framework for local authorities and other partners to follow in improving air quality. The NAQS has consolidated local air quality management (LAQM) duties with new responsibilities from the Environment Act 2021 including additional powers on smoke controls and the new targets on PM_{2.5}.

In terms of actions specific to PM_{2.5} the NAQS sets out that all local authorities should support the delivery of the national PM_{2.5} targets by taking action to reduce emissions from the sources within their control. This is discussed further in Chapter 2.

The DfT's Road to Zero⁸ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to transport emissions.

Improving air quality is a complex problem and only by working in partnership with key stakeholders to facilitate these improvements can appropriate actions be taken. Examples of this work are set out below:

Actions arising through the AQAP:

King's Lynn and West Norfolk Council have implemented a number of measures that are likely to have reduced concentrations of NO₂ and associated PM_{2.5} in the borough through existing AQAP for example;

- Improvements have been carried out to King's Lynn Transport Interchange (bus-rail) to help incentivise the use of public transport.
- Urban traffic control systems and selective vehicle detection systems have also been implemented in the town centre to help improve traffic flows.
- Securing best practice mitigation wherever possible through our work on planning applications. In the 2022 period we have assessed 142 planning applications. The most significant are set out in Appendix-C (Table C.1).

We are currently in the process of updating the Air Quality Action Plan with relevant stakeholders / partners ahead of adoption and formal submission. It is in draft form

⁷ NAQS, 2023; <https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery>

⁸ DfT, 2018, The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy; <https://www.gov.uk/government/publications/reducing-emissions-from-road-transport-road-to-zero-strategy>

following consultation with key stakeholders. It builds on the existing AQAP and includes a measure to develop an air quality strategy focused on PM_{2.5}. It has been prepared following a literature review of other AQAP's and low emission / local air quality strategies.

Electric Vehicle (EV) Charging Infrastructure:

- The Council had previously installed three Rapid 50kW EV charging points in King's Lynn and one in Hunstanton. It has been agreed however that these units will be replaced with newer units. Working with BP Pulse new Rapid charging points will be installed in Summer 2023.
- The Council successfully applied to OZEV in December 2021 for a grant to install twenty-six double fast EV charging points at council owned car parks across the district. As of June 2023 six sites with eighteen fast (7kW) charging points are currently operational with one further site still to be completed. This additional site is planned to have eight fast charging points installed. They have been installed to give local residents with no off-street parking provision the opportunity to charge their electric vehicle overnight at one of the selected sites. They are available also for daytime use.
- In addition, we have through the normal course of development and ahead of the Approved Document Part S of the Building Regulations secured conditions for EV. This includes future proofing the strategic growth area of the A10 corridor (West Winch ref 13/01615/OM and 18/02289/OM) plus North Wootton (ref 20/01954/RMM) with suitable schemes of around 2,000 EV charging units. This is in addition, to the Council's own housing development (Parkway, 21/01873/FM) of 226 dwellings with respective EV charging units.
- The locations and type of EV charging points district-wide is regularly updated so we recommend the use of zap map^{9,10} to keep up to date on the type and locations of EV infrastructure.

⁹ Zap Map; <https://www.zap-map.com/live/>

¹⁰ BCKLWN; Locations of EV charging infrastructure; https://www.west-norfolk.gov.uk/info/20095/energy_and_climate_change/921/electric_vehicle_charging_points

Traffic Management:

BCKLWN are working with Norfolk County Council on progressing the King's Lynn Area Transport Strategy. The outline business case from the preferred options includes measures to improve the accessibility to cycling and walking and a re-routing of buses that is considered necessary for the town centre. Redesigning the transport infrastructure towards active travel is considered a priority.

Work is also underway on redevelopment of the South Gate entrance into King's Lynn with improved connectivity to more sustainable forms of transport. This area forms the southern extent of the Railway Rd AQMA.

These projects are challenging as the London / Railway Rd (A148) through the town centre is the main arterial route and of importance to the economy of King's Lynn. It requires a careful balance to ensure a vibrant economy but also with measures that improve air quality. An update can be reported in next year's ASR once the business case and transport assessments are further developed.

Local Cycling and Walking Infrastructure Plans:

The council's regeneration dept. is also working with Norfolk County Council on progressing a local cycling and walking infrastructure plan (LCWIP) for the King's Lynn area. It went out initially to public consultation in February 2022¹¹ and is the plan completed¹². A number of the measures have been prioritised and secured with funding (£6.7m) as part of the council's Active and Clean Connectivity Plan¹³. A county-wide LCWIP has also recently been released for further consultation¹⁴.

Measures aimed at PM_{2.5}:

We are working closely with Public Health on the Public Health Outcomes Framework (PHOF) indicator 3.01 on actions in relation to PM_{2.5}. Measures are explained further within Chapter 2. Initial work has reviewed principal primary PM_{2.5} sources with a view to

¹¹ NCC Local Cycling and Walking Infrastructure Plan for King's Lynn, Consultation Feb 2022; <https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-travel-policies/local-cycling-and-walking-infrastructure-plans>

¹² NCC LCWIP; <https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-travel-policies/local-cycling-and-walking-infrastructure-plans>

¹³ BCKLWN ACCP; <https://www.visionkingslynn.co.uk/projects/active-and-clean-connectivity/>

¹⁴ NCC; <https://www.norfolk.gov.uk/news/2023/05/have-your-say-on-the-future-of-cycling-and-walking-in-norfolk>

develop a strategy/project in conjunction with Public Health aimed at reducing exposure to this pollutant borough wide.

Conclusions and Priorities

The key findings for this year are: -

- *No exceedances of the National Air Quality Strategy standards were identified for Nitrogen Dioxide (NO₂) during 2022.*
- *This is the third year running where compliant results have been observed with no exceedances of the NO₂ annual mean objective.*
- *We have assessed 142 planning applications during 2022. The most significant (34) are listed in Appendix C Table C.1. None were identified as likely to significantly impact air quality.*
- *Trends in NO₂ following the first Covid lock-down year of 2020 showed a marked reduction of around 20% in the annual mean NO₂ concentrations.*
- *The concern had been the extent of traffic rebound, but annual mean concentrations have subsequently remained relatively constant with results less than 36µg/m³ i.e. less than 10% of the NO₂ objective (40µg/m³) for the last 3-years.*
- *Revocation of the AQMAs is recognised as potential option if similar trends are observed over the longer-term. In the meantime and to help provide additional confidence we will continue with the current monitoring regime to further assess changes but also implement the updated AQAP on measures to improve air quality within this period of review and assessment.*
- *No exceedances of PM₁₀ objectives level were noted during 2022.*
- *No exceedances of the PM_{2.5} annual mean level were noted during 2022.*
- *Monitoring results are not in excess of the air quality objectives outside of the existing AQMA's and therefore we are not proposing to amend or designate a new AQMA.*

Our priorities noting any anticipated challenges / changes for the forthcoming year are:

- *To continue with the current air quality monitoring programme.*
- *To review and amend the monitoring programme as required.*
- *To continue to implement the current Air Quality Action Plan.*
- *To complete a review and put forward an updated Air Quality Action Plan for adoption during 2023/24.*

- *To continue to work with Norfolk County Council's public health specialists to develop a strategy aimed at reducing exposure to PM_{2.5} by targeting the principal (primary) sources that are within this council's control to support the NAQS. The project may require AQ grant funding.*
- *Continue to collaborate closely with partners to implement King's Lynn Transport Strategy and assess regeneration and traffic management projects which will assist with reducing traffic related emissions.*
- *Continue to review planning applications.*
- *To work jointly with the Norfolk Countywide Air Quality Group. The group meets regularly following the Covid epidemic.*

Local Engagement and How to get Involved

The following section is aimed at providing information on the work we undertake and how it is possible to get involved.

The framework that underpins this work comes under what is termed Local Air Quality Management (LAQM) framework. LAQM provides the tools to assess and monitor the pollution sources as well as means to mitigate and potentially offset these emissions through associated guidance. As the air quality pollutants are common to sources of the greenhouse gases, this framework has the potential to deliver ancillary benefits. Barriers can potentially form but are be minimised through effective policies & partnership working.

To help direct people to the relevant area of interest, we have structured the information on air quality within the Council's website under the following topic-web pages:

- [Air Pollution Levels](#)¹⁵: this includes further information about the pollutants we monitor in the Borough and public access route to view / download [real-time Council air quality monitoring data](#)¹⁶.
- [Air Quality Reports](#)¹⁷: this includes the Annual Status Reports (ASR) on air quality, previous source apportionment studies and the AQAP.

¹⁵ https://www.west-norfolk.gov.uk/info/20137/air_quality/171/air_pollution_levels

¹⁶ <https://www.norfolkairquality.net/>

¹⁷ https://www.west-norfolk.gov.uk/downloads/download/346/air_quality_information_documents

- [Air Quality Information](#)¹⁸: this section provides a summary of the current priorities taken from the Executive summary of the ASR and updated annually.
- [Air Quality Management Areas](#)¹⁹: provides summary of the AQMAs in King's Lynn and current version of the AQAP (v.1).
- [Burning Wood and Coal](#)²⁰: we continue to participate in the Defra Burn Right campaign to help minimise emissions from solid fuel burning. This section provides further information and details on the Smoke Control Areas in King's Lynn.
- [Indoor Air Quality](#)²¹: Indoor air quality is an emerging subject and topical in relation to Covid-19.

Information is also available from Norfolk County Council's website on the Local Transport Plan's strategy for King's Lynn^{22, 23} and also a Local Cycling and Walking Infrastructure Plan (LCWIP¹²) for the area.

Further information on air quality and daily index forecasts is held nationally on Defra's UK Air resource site: <https://uk-air.defra.gov.uk/>.

We also participate in Clean Air Day²⁴ each year and support the initiatives via the Council's communications network.

To obtain further information on these air quality issues or how to get involved with some of the issues / challenges please email the environmental quality team; environmental.quality@west-norfolk.gov.uk.

Local Responsibilities and Commitment

This Annual Status Report on air quality for 2023 has been prepared by the Environmental Quality section of the Borough Council. This report sits within the Directorship of Environment & Planning of the Borough Council of King's Lynn and West Norfolk. Officers involved in preparation and review of this ASR are set out within the preface to this report.

¹⁸ https://www.west-norfolk.gov.uk/info/20137/air_quality/169/air_quality_information

¹⁹ https://www.west-norfolk.gov.uk/info/20137/air_quality/170/air_quality_management_areas

²⁰ https://www.west-norfolk.gov.uk/info/20137/air_quality/633/burning_wood_and_coal

²¹ https://www.west-norfolk.gov.uk/info/20137/air_quality/870/indoor_air_quality

²² Local Transport Plan v.4 Strategy for King's Lynn; <https://www.norfolk.gov.uk/what-we-do-and-how-we-work/policy-performance-and-partnerships/policies-and-strategies/roads-and-travel-policies/local-transport-plan>

²³ NCC, King's Lynn Area Transport Strategy; <https://www.norfolk.gov.uk/roads-and-transport/major-projects-and-improvement-plans/kings-lynn/about-transport-for-kings-lynn>

²⁴ Clean Air Day; <https://www.globalactionplan.org.uk/news/clean-air-day-2022-theme-confirmed?msclkid=6b01288ac7a011ec9e155999491e8315>

Responsibility for the air quality function rests with BCKLWN whereas Norfolk County Council are the highways / public health authority.

This ASR has been approved by the Public Health manager of Norfolk County Council with the following comments:

- *Public Health is pleased that the substantial reductions in air pollution in King's Lynn achieved over the Covid outbreak has, once again, been sustained. It also welcomes the decision to continue air quality monitoring and to only consider revocation of the AQMAs when the decline in air pollution has been maintained over the long term.*
- *In addition Public Health supports the proactive approach taken to PM_{2.5} within the ASR and look forward to supporting this work.*

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1 Local Air Quality Management

This report provides an overview of air quality in the Borough Council of King's Lynn and West Norfolk's (BCKLWN) area during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by the BCKLWN to improve air quality and any progress that has been made.

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

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 should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

A summary of AQMAs declared by BCKLWN can be found Table 2. 1. The table presents a description of the two AQMAs that are currently designated within the BCKLWN.

Maps of the AQMAs and also the air quality monitoring locations in relation to the AQMAs are shown in [Appendix D: Map\(s\) of Monitoring Locations and AQMAs](#).

The air quality objective pertinent to the current AQMA designations is the:

- **NO₂ annual mean;**

Table 2. 1– Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Gaywood Clock AQMA	Declared 04/01/2009	NO ₂ Annual Mean	Area encompassing a number of properties around the Gaywood Clock junction of A148 and A1076.	No	45.1 µg/m ³	27.8 µg/m ³	12	AQAP 2015	https://www.west-norfolk.gov.uk/info/20137/air_quality/170/air_quality_management_areas
Railway Road AQMA	Declared 01/11/2003 Amended 01/02/2007	NO ₂ Annual Mean	An area encompassing a number of properties along the A148 within the town centre.	No	55.0 µg/m ³	32.9 µg/m ³	3	AQAP 2015	https://www.west-norfolk.gov.uk/info/20137/air_quality/170/air_quality_management_areas

- BCKLWN confirm the information on UK-Air regarding their AQMA(s) is up to date.
- BCKLWN confirm that all current AQAPs have been submitted to Defra.

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

Defra's appraisal of last year's ASR concluded that the report was well structured, detailed, and provided the information specified in the Guidance. The appraisal added the following commentary;

- 1. The Council have provided a thorough report which contains the required content.*
- 2. As part of the report discussing PM_{2.5}, the Council outline several measures which they have in place/in progress to help reduce PM_{2.5} exposure. This is extremely encouraging to see and demonstrates the Council's pro-active and dedicated approach to tackling air quality within their jurisdiction. This is very much welcomed.*
- 3. QA/QC is thorough and detailed supporting discussion is provided for all procedures applied, including annualisation and bias adjustment. This adheres with good practice and is encouraged for all future reports.*
- 4. Monitoring data has been analysed and reviewed thoroughly. The Council have identified an additional monitoring location for 2022, on the Railway Road section of the A148. This was based on the fact that this area reported the highest annual mean NO₂ concentrations in 2021 and demonstrates the Council's committed approach to reviewing monitoring and thus tackling air quality within their jurisdiction. This is very much welcomed and encouraged.*
- 5. Clear priorities are outlined in the report, including the implementation of the King's Lynn Transport Strategy and the current Air Quality Action Plan.*
- 6. The Council has stated that they will complete a review and put forward an updated Air Quality Action Plan for adoption during 2022/23. The Council is strongly encouraged to progress with the publication of this updated AQAP.*

In terms of the BCKLWN AQAP (2015) it is recognised as more than 5 years old and requires updating including new priorities that align better with national strategies / policies and the emerging challenges associated with fine particulate matter (PM_{2.5}). A draft has been prepared and BCKLWN will consider adopting within this review and assessment period.

Therefore BCKLWN in conjunction with key stakeholders have taken forward measures during the reporting period (2022) that are in pursuit of improving air quality in accordance

with the NAQS. The details of all the AQAP measures are set in out in Table 2. 2 that are either shown as completed, in progress or planned.

In total there are 20 measures included within Table 2. 2 that show the type of measure and the progress made. Barriers restricting implementation of any of the measures are also shown. More detail on the specific measures can be found in their respective plans such as King's Lynn area Transport Strategy^{22, 23} and the Local Cycling and Walking Infrastructure Plan¹².

Key completed measures are:

- Measure 2: *To consider air quality considerations in the Local Plan and adopt development management policy on air quality having regard to the NPPF;*

The emerging Local Plan²⁵ was submitted for examination in March 2022. This includes existing policies that relate to air quality (DM-15 and CS-11). These have been adopted by policies LP-21 and by LP-13 and in conjunction with the national NPPF policies they appear to be sufficient.

- Measure 3 – *Adopt Norfolk Technical Guidance on Air Quality:*

This has been superseded by the updated Institute of Air Quality Management's guidance (IAQM / EP-UK, 2017²⁶) on development control.

- M5 – *Create new access road for buses to Boal Street:*

The bus only route (Hardings Way) has been completed and links to NCN Route 1 removing a number of buses from Railway Rd AQMA.

- M7 and M8 – *Improvements to Urban Traffic Control Systems and installation of Selective Vehicle Detection Systems;*

Traffic management systems to help reduce traffic congestion through King's Lynn have been completed. Systems now incorporate higher SCOOT technology. These technologies are retained / updated where necessary within relevant LTP plans.

- M11 – *Installation of variable message signs;*

Variable message signs have been installed on the approach to King's Lynn town centre to indicate where parking spaces are available.

²⁵ Local Plan Review Pre-Submission Stage 2021; <https://west-norfolk-consult.objective.co.uk/kse/event/36371/section/s1625822757710#s1625822757710>

²⁶ Institute of Air Quality Management, IAQM / EPUK (2017); [Planning for Air Quality](#)

- M18 - *Improved cycling and walking provision;*

Following the public consultation on the local cycling and walking plan for the King's Lynn area specific aspects have been taken forward for implementation.

BCKLWN anticipates that the measures stated above in Table 2. 2 will continue to ensure compliance with the Railway Rd and Gaywood Clock AQMAs.

Table 2. 2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Consideration of Air Quality Impacts when providing comments on planning applications within an AQMA or where an AQMA could be impacted or created.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014	2015	Borough Council (LPA & Env Quality Team)	Borough Council	NO	Funded	< £10k	Implementation	Up to 1	Number of pre application discussions and planning applications responded to	In 2022 there were 142 applications that were commented upon which had potential air quality impacts. They were screened according to Institute of Air Quality Management (IAQM) guidance and air quality assessments required where appropriate. Best practice measures were also recommended.	This will always be an on-going measure as long as relevant planning application are received.
2	With regard to National Planning Policy Framework, include air quality considerations in the Local Plans and adopt an air quality Development Management Policy.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014	2016	Borough Council (LPA & Env Quality Team)	Borough Council	NO	Funded	< £10k	Completed	Up to 1	Production of documents	Completed	The King's Lynn and West Norfolk Local Plan - Site Allocations & Development Management Policies (SADMP) Plan was formally adopted on 29 September 2016. This includes policy DM15 Environment, Design and Amenity, which provides for the assessment of air quality in planning applications. This policy approach is continued in the Local Plan Review (March 2019) as Policy LP18. The July 2011 Adopted Core Strategy's Transport Policy CS11 aimed to achieve improvements where there were air quality issues in the towns of Downham Market, Hunstanton and King's Lynn. The Local Plan Review (March 2019) Policy LP13 continues this approach, particularly with reference to the approved King's Lynn Transport Study and Strategy.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
3	With regard to National Planning Policy Framework, adopt Norfolk Technical Guidance on Air Quality and provide preapplication advice on planning applications.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014	2015	Borough Council (LPA & Env Quality Team)	Borough Council	NO	Funded	< £10k	Completed	Up to 1	Production of documents	Completed	Norfolk Technical Guidance now superseded by IAQM EPUK (2017) Guidance.
4	Develop Parking Management Plan	Transport Planning and Infrastructure	Other	2014	2022	County Council/ Borough Council	Future High Streets Fund	NO	Funded	£10k - 50k	Implementation	Up to 2	Publication of and implementation of plan	A King's Lynn Parking Study is currently underway, which will consider car parking arrangements in the town centre.	
5	New access road from Wisbech Road through Friars to Boal Street.	Traffic Management	UTC, Congestion management, traffic reduction	2010	2022	County Council/ Borough Council	County Council/ Borough Council	NO	Partially Funded	£100k - £500k	Planning	2 to 3	Continued air quality monitoring. Bus flow counts on London Road and new route	The access road has been completed and is well used by buses	Further consideration is being given to the road as part of the King's Lynn Transport Study with the Harding's Way Feasibility Study due to be completed in 2021/2022.
6	Incentivise the use of public transport.	Alternatives to private vehicle use	Other	2014	2017	County Council	County Council	NO	Funded	< £10k	Completed	Up to 1	Continued air quality monitoring. Bus usage figures	The King's Lynn Transport Interchange has been completed making a physically nicer environment for public transport users. New air conditioned and Wi-Fi enabled train carriages were introduced on routes between King's Lynn and London in May 2017.	Consideration is being given to public transport, and encouraging its use, as part of the King's Lynn Transport Study.
7	Implementation of Urban Traffic Control system (UTC) at principal junctions within AQMA and adjacent to AQMA.	Traffic Management	Strategic highway improvements, Re-prioritising Road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2010	2017	County Council	County Council	NO	Funded	£10k - 50k	Completed	2 to 5	Continued air quality monitoring. Queue length at junctions at peak times	Completed	Will be reviewed within the Kings Lynn Transport Study currently underway

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
8	Installation of selective vehicle detection (SVD) system	Traffic Management	Strategic highway improvements, Re-prioritising Road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2011	2017	County Council	County Council	NO	Funded	£10k - 50k	Completed	Up to 1	Number of vehicles fitted with SVD Annual average daily traffic numbers	Completed	
9	Decriminalisation of parking. Review of parking controls and enforcement in AQMAs and King's Lynn Town Centre	Transport Planning and Infrastructure	Other	December 2010 option validation Jan-March 2011	2022	Borough Council/ County Council	Borough Council/ County Council/ Future High Streets Fund	NO	Funded	£10k - 50k	Planning	Up to 1	Implementation of enforcement in AQMAs and Town Centre. Continued air quality monitoring.	Will be considered within the Kings Lynn Transport Study and Parking Strategy currently underway.	
10	Variable car parking rates	Transport Planning and Infrastructure	Other	2014	2022	Borough Council	Future High Streets Fund	NO	Funded	£10k - 50k	Planning	Up to 1	Continued air quality monitoring, car park usage and queue lengths	Parking will be considered within the Car Parking Strategy currently in draft.	
11	Variable message signs	Traffic Management	Other	2014	2019	Borough Council/ County Council	Borough Council/ County Council/ Future High Streets Fund	NO	Funded	£10k - 50k	Completed	Up to 1	Peak hour parking usage, car park usage and continued air quality monitoring queue lengths	Signs have been installed on approach to King's Lynn town centre to indicate where spaces are available.	These will be reviewed as part of the King's Lynn Parking Study currently in draft.
12	Investigate potential for residents only parking in or close to AQMAs	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2014	2022	Borough Council	Borough Council/ Future High Streets Fund	NO	Funded	£10k - 50k	Planning	Up to 1	Peak hour parking usage Car park usage Continued air quality monitoring	Residents parking permits have been introduced in South Quay area, on Portland Road (the link between the railway station and the King's Lynn Transport Interchange), Hiighgate and Archdale Street which are all close to the town centre AQMA. This had made these areas unavailable for commuter parking.	A King's Lynn Parking Study is currently underway, which will consider car parking arrangements in the town centre.
13	Support the use of West Lynn ferry	Promoting Travel Alternatives	Promote use of rail and inland waterways	2012	2022	Borough Council	Borough Council	NO	Not Funded	£100k - £500k	Planning	Up to 1	Number of passengers using ferry	The West Lynn ferry will be considered as part of the King's Lynn Transport and Car Parking Strategy.	
14	Changes to the Road Layout within the King's Lynn Gyratory as proposed by Kings Lynn Transport Study	Traffic Management	UTC, Congestion management, traffic reduction	2011 (Linked to measure 3)	2023	County Council	County Council/ Business Rates Pool	NO	Partially Funded	£100k - £500k	Planning	2 to 10	Continued air quality monitoring. Daily traffic flow data and queue lengths.	King's Lynn Transport Strategy (v.3, 2019) used to inform Feasibility Study including cost estimates, high-level project plan and programme for delivery.	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
15	Traffic Management at London Road and Southgates	Traffic Management	UTC, Congestion management, traffic reduction	2014	2023	County Council	County Council	NO	Not Funded	> £10 million	Planning	1 to 5	Continued air quality monitoring. Queue length at junctions at peak times	The King's Lynn Transport Study includes London Road and the Southgates area. Feasibility work for the Southgates area has now been completed.	Feasibility work was carried out looking at London Road and the Southgates area. This priority area from the Transport Strategy gave rise to the submission of the South Gate Gateway project in the Future High Street Fund (FHSF) bid. Unfortunately, the project was not prioritised, and no other funding sources have been identified yet for the project or the Southgates Roundabout improvements.
16	Traffic Management at Gaywood clock	Traffic Management	UTC, Congestion management, traffic reduction	2014	2026	County Council	County Council	NO	Not Funded	£10k - 50k	Planning	1 to 5	Continued air quality monitoring. Traffic queue lengths.	The King's Lynn Transport Study will include the Gaywood Clock area. Planning permission has also been granted for the Parkway development which includes the bridge over the sandline.	Traffic management at Gaywood Clock will be aided by the construction of the bridge over the sandline as part of the Parkway development. No funding has been obtained for the project yet. Traffic management at Gaywood Clock is also considered within measure STS11 within the King's Lynn Transport Study Implementation Plan.
17	Promotion of travel plans, school travel plans and promotion of car sharing.	Promoting Travel Alternatives	Personalised Travel Planning	2014	2015	County Council/ Borough Council	County Council/ Borough Council	NO	Partially Funded	< £10k	Implementation	Up to 1	Continued air quality monitoring. Number of travel plans	Travel plans are requested by BCKLWN and County Council in response to relevant planning application. Whilst Norfolk County Council no longer provide staff support to help schools create / implement travel plans, they pay for a licence for a school travel plan platform which can be used.	The promotion of travel plans for schools are considered within measure STM17 of the King's Lynn Transport Study Implementation Plan.
18	Improved cycling and walking provision	Promoting Travel Alternatives	Promotion of cycling	2014	2021	County Council/ Borough Council	County Council/ Borough Council	NO	Funded	£10k - 50k	Planning	Up to 1	Cycle usage and walking provision. Number of cycle/foot path improvements.	A Local Cycling and Walking Infrastructure Plan (LCWIP) is being drawn up as part of the transport strategy work. Active transport will be considered in the King's Lynn Transport Study.	Improved cycling and walking provision are considered within measures SAM5, SAM6, SAM7, SAM8, and MAM4 within the King's Lynn Transport Study Implementation Plan.
19	Investigate feasibility and if viable to provide Electric Vehicle (EV) charging points in car parks and in new developments	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote low emission Vehicles, EV recharging, Gas fuel recharging	2014	2022	Borough Council	Borough Council/ Future High Streets Fund	NO	Funded	£10k - 50k	Implementation	Up to 1	Number & use of EV charging points installed	Charging points are recommended on new developments as a mitigation. Options are being considered as part of the Climate Change district carbon emission reduction plan. A number of housing	The introduction of electric charging points within car parks will be considered within the draft Parking Strategy and the King's Lynn Transport Study.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation	
															and commercial developments are being constructed with EV charging in place or are 'EV ready.' The emerging Local Plan includes Policy LP14 – Parking Provision in New Development which specifies one secure electric vehicle charging point wherever possible in new dwellings.	
20	Quality Bus Partnerships and Contracts	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2014	2022	County Council	County Council	NO	Not Funded	£500k - £1 million	Planning	Up to 1	Continued air quality monitoring. % Buses Euro 3 or better. Installation of SVD	A quality bus partnership is in place but there are still a high number of older vehicles used on King's Lynn Town Centre routes. New targets will be set on bus fleets and engines as part of the National Bus Strategy later in the year.	Bus providers have been included within stakeholder engagement as part of the King's Lynn Transport Study.	

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), 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) of sources that are within local authority control.

There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases. There is also a growing body of evidence that PM_{2.5} is linked to dementia. This is of particular interest in Norfolk which has a rapidly ageing population, and where dementia is now one of the leading causes of death²⁷.

The Public Health Outcome Framework (PHOF) indicator 3.01²⁸ gives a local estimate of PM_{2.5} in 2021 (5.7 µgm⁻³)²⁹. The attributable mortality estimate for the BCKLWN area when based on this fraction is 4.6%³⁰. This relative risk is important as it forms the basis of action through all delivery partners to tackle air pollution in the area.

The Borough Council of King's Lynn & West Norfolk is already completing work which will help reduce of PM_{2.5} exposure within the district as follows:

- We carry out monitoring of PM_{2.5} levels using indicative Turnkey Osiris instruments (4) and publish data online and via app to provide local residents information on levels within the district.
- Review planning applications and where required recommend suitable conditions to help mitigate PM_{2.5} emissions.
- Have started to review options for a revised Air Quality Action Plan which will further help reduce PM_{2.5} emissions.
- Implementation of King's Lynn Transport Strategy which will help reduce levels of PM_{2.5} from the vehicle emissions including secondary PM_{2.5} produced from the NO_x

²⁷ Air Pollution and dementia *BMJ* 2023; 381 doi: <https://doi.org/10.1136/bmj.p655> (Published 05 April 2023)

²⁸ Public Health England; Particulate Matter Factsheet
<https://www.pushbikes.org.uk/sites/default/files/Particulate%20Matter.pdf>

²⁹ Defra, <https://uk-air.defra.gov.uk/data/pcm-data>

³⁰ Office of Health and Disparities, Public Health Data;
<https://fingertips.phe.org.uk/search/air%20quality#page/1/gid/1/pat/6/par/E12000006/ati/401/are/E07000146/iid/93867/age/-1/sex/-1/cat/-1/ctp/-1/yr/1/cid/4/tbm/1/page-options/car-do-0>

- Regulation of LAPPC prescribed processes through environmental permits to ensure compliance with best available techniques and where necessary compliance with any emissions limits.
- Held preliminary meetings with Norfolk County Council Public Health regarding how to minimise PM_{2.5} exposure across the district and to work in pursuit of the new national targets for PM_{2.5}. We are looking to develop a strategy/project aimed at reducing exposure to PM_{2.5} by targeting the principal (primary) sources that are within this council's control. The outline of the project is being developed in discussion with Norfolk County Council's public health specialists.
- We have carried out an initial review of the principal primary PM_{2.5} sources using National Atmospheric Emissions Inventory (NAEI). NAEI shows the largest individual source of primary PM_{2.5} as the domestic sector burning wood (14kt in 2020). The domestic sector represents around 27% of total primary PM_{2.5} in UK but is associated with an upward trend (c.250% increase from 1970) when other sectors have declined over the same period.
- NAEI note that the activity data for this source category remains highly uncertain due to the lack of comprehensive fuel sales data³¹, for example the previous estimate was around 40kt or around 38% of UK total as reported in the UK Clean Air Strategy (2019).
- In recognition of the importance of these source categories we have updated the inventory for large (>45kW_{th}) biomass heating systems as shown in Table F.1: Biomass Inventory. A number of installations have been reviewed within this period as set out within Table C.1 including the largest by thermal capacity (c. 3MW; as aggregated max. thermal output).
- For smaller (domestic) installations burning wood there are 8 Smoke Control Areas within King's Lynn²⁰ as a further method of control from PM_{2.5} emissions. Within these areas it means that wood must only be burnt in a Defra exempt appliance to help reduce the risk from smoke emissions. We are updating the enforcement procedure for these areas as introduced in the Environment Act 2021.
- We participate in the national Burn Right campaign (borough wide) and publish advice on the council's website on the types of solid fuel which should be used and how to minimise PM_{2.5} emissions.

³¹ NAEI, UK Informative Inventory Report, https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2303151609_UK_IIR_2023_Submission.pdf

- BCKLWN have adopted a Climate Change Strategy and Action Plan and provided a £1,000,000 budget to help implement the Strategy. This work will help reduce carbon emissions but also PM_{2.5} emissions through the reduction in fossil fuel usage through:
 - vehicles (via EV charging and active travel alternatives);
 - domestic residential properties (Warm Homes, ECO 3 & 4); and,
 - industry and commercial premises (Business Expo 2022).
- Published advice on Council's website about indoor quality and measures to reduce PM_{2.5} and other pollutants.
- We continue to work with colleagues within the Norfolk EP group on PM_{2.5} work

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

This section sets out the monitoring undertaken within 2022 by BCKLWN and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

- BCKLWN undertook automatic (continuous) monitoring at six sites during 2022.
- The Council's automatic monitoring network comprises two NO₂ chemiluminescent analysers and four indicative Osiris dust monitors recording both PM_{2.5} and PM₁₀ concentrations.
- The TEOM at Stoke Ferry (CM4 SF) is no longer operational.
- Table A.1 shows the details of the automatic monitoring sites.
- 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.

- Results are disseminated to the public as real-time via a Norfolk wide portal (www.norfolkairquality.net/). The results are also simultaneously uploaded to Defra's UK-Air website (<https://uk-air.defra.gov.uk>).

3.1.2 Non-Automatic Monitoring Sites

- BCKLWN undertook non- automatic (passive by diffusion tubes) monitoring of NO₂ at 72 sites during 2022.
- Table A.2 presents the details of the non-automatic sites.
- Maps showing the location of the monitoring sites are provided in [Appendix D](#).
- Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction) are included in [Appendix C](#).

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes the full 2022 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.

In terms of bias adjustment, the national factor for the diffusion tubes (Gradko 20% TEA, bias factor 0.83) has been used rather than a local factor derived from the co-location study carried out at the Southgates CM1 station. This was due to poor data capture from

CM1 due to a fault (suspected leak / internal sampling). Diffusion tube data has been annualised for sites 31 and 68 where data acquisition was less than 75%.

In relation to the NO₂ results there were no exceedances of the annual mean objective for NO₂ in 2022 (40µg/m³). Trends in the annual NO₂ mean results are shown in Figures A.1 to A.4. that show the spatial extent of concentrations within the AQMA's and also outside.

Exceedances were last observed in the annual mean NO₂ concentrations from:

- Gaywood Clock AQMA in 2016 (45.0µg/m³) and,
- Railway Rd AQMA in 2019 (42.4µg/m³; see Table A.4).

Railway Rd AQMA

In terms of NO₂ monitoring within Railway Rd AQMA, it benefits from 26 diffusion tubes, a continuous analyser plus the triplicate co-location study at CM1.

Trend data as shown in Figure A.1 and Figure A.3 shows concentrations along the Railway Rd section of the A148 (north and south bound). It can be seen that concentrations progressively increase and peak at monitoring site 2. This is where the highway opens up to multiple lanes (north bound) with stop-start traffic and buildings close to the kerb.

Gaywood Clock AQMA

Within the AQMA at Gaywood Clock there are 6 diffusion tubes and the automatic reference chemiluminescence analyser (CM2). Highest annual mean concentrations within the AQMA were recorded at diffusion tube monitoring site 44 (27.8 µg/m³) and site 75 (27.7 µg/m³) that are located on either arms of the junction. Trend data over the last five years is presented in Figure A.2 showing results as all less than 30% of the annual mean NO₂ objective.

Monitoring outside of AQMAs

Selected NO₂ monitoring trend data outside of the AQMAs is shown in Figure A. 4. Results were all less than the NO₂ annual mean objective, therefore no amendments or variations to any of the AQMAs is therefore proposed. It can also be seen from Figure A. 4;

- Relatively high proportion of NO₂ at site 87 as a result from bus-taxis as Albion St is a bus/taxi only route only.

- Trend associated with NO₂ along the the A-10 at site 79 (close to the strategic growth area of West Winch for up to 4,000 homes).

Monitoring also extends outside the AQMAs in the Wisbech area as shown in Figure D.5. Within this area there is a proposal for an Energy from Waste (EfW) facility as described in Table C.1 with the potential to generate significant traffic in addition to the emissions from chimney. The northern approach to the site occurs within BCKLWN along Elm High Rd where we have monitoring site (101). Traffic flows along this road link according to DfT (survey point 17963³²) were relatively high even during the Covid lock down year of 2020 and therefore with a relatively high NO₂ background concentration. As this road directly links to Churchill Rd in neighbouring Fenland DC where there is an AQMA it makes this a sensitive location.

Short term NO₂ exposure

Short term (1-hour) exposure can be a concern along some high streets or walking / cycle routes that run parallel to busy roads, or at some bus stations / taxi ranks. Relevant potential exposure occurs at King's Lynn Transport Interchange (site 5) and Vancouver car-park where taxi bays (site 86) are located within a covered carpark.

Table A.5 compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year. Trend data is also shown in Figure A. 4 for these sites that show the marked reduction in NO₂ concentrations following the Covid epidemic.

NO₂ annual means were well below the 60µg/m³ and therefore unlikely to represent an exceedance in the short-term objective (200µg/m³ NO₂).

3.2.2 Particulate Matter (PM₁₀)

Table A.6 and Table A.7 in Appendix A compares results for PM₁₀ for the past five years against air quality objectives of:

- Annual Mean (40µg/m³) and,
- Short-term 24-hr Mean (50µg/m³ not to be exceeded more than 35 times per year).

As explained above PM₁₀ is analysed by 4 Turnkey Osiris instruments. As the technique is non-reference (light scattering type) results are indicative only. Two of the monitoring sites

³² DfT Traffic Survey Point; <https://roadtraffic.dft.gov.uk/manualcountpoints/17963>

are located either end of King's Lynn docks (OS1 and OS2) and the other two around an industrial animal feed mill in Stoke Ferry (OS3 and OS4). The feed mill is subject to control through an environmental permit regulated by the Environment Agency.

In summary:

- PM₁₀ results for the 2022 period indicate no exceedances in the annual (40µg/m³) or short-term mean objective with no more than 35 hourly exceedances of 50µg/m³.
- The Page Stair Lane (site OS1) PM₁₀ exceeded the daily mean AQS Objective of 50µg/m³ on 5 days around the end of March 2022. On review there were no nuisance complaints reported around this time (cause unclear). There is an annual allowance of exceedances of 35 days.
- PM₁₀ results for 2022 had to be annualised owing to poor data acquisition (less than 75%) from sites OS2 (Estuary Rd) and OS3 (Wretton Rd). Annualisation is shown Table C.5.
- Stoke Ferry Buckenham Drive (OS4) exceeded on 1 day.
- Wind Direction is currently not working at Page Stair Lane. Wind Speed is currently not working at Estuary Close and Buckenham Drive. The cause is being investigated and replacement anemometers may be required.
- Short term alerts are programmed into the instruments to help investigate the cause of future exceedances.

PM₁₀ monitoring is to continue in its present format as relatively low cost / indicative type to monitor some of the industrial (background) sources.

3.2.3 Particulate Matter (PM_{2.5})

PM_{2.5} is the pollutant with strongest epidemiological links to adverse health impacts and forms the basis for the Public Health Outcomes Framework indicator 3.01. We are not required to carry out monitoring for this pollutant but do so in conjunction with the PM₁₀ analysis through the four Osiris instruments as reported above.

Table A.8 results are indicative of the area they monitor (industrial background) and indicate annual mean concentrations as less than the national (cap) objective (20ug/m³).

Results for 2022 are annualised owing to poor data acquisition (less than 75%) for OS2 and OS3 as shown in Table C.5.

Appendix A: Monitoring Results

Table A.1- Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
CM1 SG	Southgates Park, King's Lynn	Urban Background	562225	319191	NO2	YES Railway Rd AQMA	Chemiluminescent	5	5	1.7
CM2 GW	Gaywood, King's Lynn	Roadside	563437	320472	NO2	YES Gaywood Clock AQMA	Chemiluminescent	5	1	1.7
OS1 PS	Page Stair Lane, King's Lynn	Urban Background	561527	320437	PM10 / PM2.5	No	Indicative, Nephelometer	5	3.3	3.5
OS2 ER	Estuary Road, King's Lynn	Urban Background	561593	321466	PM10 / PM2.5	No	Indicative, Nephelometer	2	1	3.5
OS3 WR	Wretton Road, Stoke Ferry	Urban Background	570438	299905	PM10 / PM2.5	No	Indicative, Nephelometer	24	19	3.5
OS4 BD	Buckenham Drive, King's Lynn	Urban Background	570264	299943	PM10 / PM2.5	No	Indicative, Nephelometer	12	1	3.2
CM4 SF	Lynn Rd Stoke Ferry TEOM	Urban Background	570339	300083	PM10	No	TEOM	5	1	3

Notes:

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

(2) N/A if not applicable

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1	Railway Road 1	Kerbside	562073	320303	NO2	Yes. Railway Rd AQMA	2.0	2.0	No	2.5
2	Railway Road 4	Roadside	562108	320196	NO2	Yes. Railway Rd AQMA	0.0	2.0	No	2.4
3	Railway Road 5	Roadside	562117	320094	NO2	Yes. Railway Rd AQMA	0.0	1.5	No	2.4
5	Bus Station - Shelters, Bay D	Urban Centre	562003	320098	NO2	No	0.0	0.5	No	2.2
6, 7, 8	Southgates Monitoring Station	Roadside	562225	319191	NO2	Yes. Railway Rd AQMA	4.0	5.0	Yes	3.2
9	Mill Fleet	Roadside	561911	319710	NO2	No	0.0	4.0	No	2.5
10	London Road 1	Roadside	562100	319679	NO2	Yes. Railway Rd AQMA	0.0	3.0	No	1.4
11	London Road 2	Roadside	562165	319575	NO2	Yes. Railway Rd AQMA	0.0	3.0	No	2.2
12	London Road 3	Roadside	562242	319452	NO2	Yes. Railway Rd AQMA	1.0	3.0	No	2.1
13	London Road 4	Roadside	562263	319374	NO2	Yes. Railway Rd AQMA	0.0	4.5	No	2.2
14	London Road 5	Roadside	562227	319266	NO2	Yes. Railway Rd AQMA	0.5	4.0	No	2.2
15	HSS Southgates	Roadside	562189	319101	NO2	No	1.0	0.5	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
18	Hardwick Rd	Roadside	562266	319042	NO2	No	0.0	7.0	No	1.9
19	Vancouver Avenue	Roadside	562277	319098	NO2	No	0.0	6.0	No	1.7
20	London Road 10	Roadside	562244	319260	NO2	Yes. Railway Rd AQMA	0.0	3.5	No	2.2
22	London Road 6	Roadside	562284	319385	NO2	Yes. Railway Rd AQMA	0.0	5.0	No	2.1
23	London Road 7	Roadside	562161	319614	NO2	Yes. Railway Rd AQMA	0.0	4.5	No	2.1
24	London Road 8	Roadside	562135	319650	NO2	Yes. Railway Rd AQMA	0.0	5.5	No	2.0
25	The Walks	Roadside	562190	319694	NO2	No	0.0	75.0	No	1.8
26	Railway Road 7	Roadside	562131	319996	NO2	Yes. Railway Rd AQMA	0.0	2.0	No	2.2
27	St John's Terrace	Roadside	562177	319999	NO2	Yes. Railway Rd AQMA	0.0	2.0	No	2.1
28	St John's Terrace/Blackfriar's	Roadside	562253	320015	NO2	Yes. Railway Rd AQMA	0.0	1.5	No	2.6
29	Waterloo Street	Urban Background	562183	320055	NO2	No	1.0	1.0	No	1.6
30	Portland Street	Urban Background	562204	320108	NO2	No	1.0	1.0	No	2.4
31	Railway Road 2	Roadside	562128	320131	NO2	Yes. Railway Rd AQMA	0.0	2.0	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
32	Railway Road 3	Roadside	562119	320216	NO2	Yes. Railway Rd AQMA	0.0	2.0	No	2.4
33	Wellesley Street	Roadside	562202	320158	NO2	No	0.5	0.5	No	2.4
34	Blackfriars 2	Roadside	562244	320128	NO2	Yes. Railway Rd AQMA	0.0	2.5	No	2.4
35	Blackfriars 1	Roadside	562244	320238	NO2	Yes. Railway Rd AQMA	0.0	1.5	No	2.3
36	Norfolk Street	Roadside	562219	320318	NO2	No	0.0	2.0	No	2.2
37	The Shrubberies, Blackfriars 3	Roadside	562253	320258	NO2	Yes. Railway Rd AQMA	0.0	2.0	No	2.2
38	Littleport Street	Roadside	562256	320322	NO2	Yes. Railway Rd AQMA	0.0	2.5	No	2.4
39	Gaywood Road 2	Roadside	562822	320426	NO2	No	0.0	7.0	No	4.0
40	The Swan (1) Gayton Road	Roadside	563490	320469	NO2	Yes, Gaywood Clock	0.0	2.0	No	2.5
41	Wotton Road 2	Roadside	563477	320514	NO2	Yes, Gaywood Clock	0.0	2.0	No	4.0
42	Wootton Road 1	Roadside	563480	320581	NO2	Yes, Gaywood Clock	0.0	3.0	No	1.7
43	Lynn Road 1	Roadside	563411	320476	NO2	Yes, Gaywood Clock	0.0	5.0	No	4.4

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
44	Lynn Road 2	Roadside	563377	320484	NO2	Yes, Gaywood Clock	0.0	2.0	No	3.4
45	Gaywood Road 3	Roadside	563202	320488	NO2	No	0.0	4.5	No	2.2
46	Gaywood Road 1	Roadside	562565	320509	NO2	No	0.0	6.5	No	2.1
47	Austin Street 1	Roadside	562186	320376	NO2	Yes. Railway Rd AQMA	0.5	1.0	No	2.1
48	Austin Street 2	Roadside	562180	320365	NO2	Yes. Railway Rd AQMA	0.0	2.0	No	2.6
51	Wootton Road 3	Roadside	563521	320628	NO2	No	0.0	1.5	No	1.8
52	Lynn Road 3	Roadside	563288	320504	NO2	No	0.0	1.0	No	1.7
58	Nar Ouse Way Roundabout	Kerbside	562171	319018	NO2	No	18.0	2.0	No	2.5
62	Burney Road	Roadside	561614	318591	NO2	No	0.0	7.0	No	1.8
66	Highgate Primary School, Gaywood Road	Urban Background	562595	320526	NO2	No	0.0	N/a	No	2.4
67	Greyfriars School, London Road	Urban Background	562235	319578	NO2	No	0.0	N/a	No	2.3
68	King's Lynn Nursery School, London Road	Urban Background	562142	319837	NO2	No	0.0	N/a	No	2.0
69	Whitefriars School 1, Whitefriars Road	Urban Background	561993	319394	NO2	No	0.0	N/a	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
70	Whitefriars School 2, Whitefriars Road	Urban Background	561929	319354	NO2	No	0.0	N/a	No	2.4
73	A10 Main Road, West Winch	Roadside	563161	315848	NO2	No	10.0	11.0	No	2.0
75	The Swan (2) Gayton Road	Roadside	563468	320469	NO2	Yes	0.0	2.0	No	2.0
76	Hardwick Road	Roadside	562597	318739	NO2	No	0.0	8.0	No	1.7
79	Tennyson Ave	Roadside	562803	320422	NO2	No	0.0	2.0	No	4.0
86	Bus Station - Taxi Rank	Other	562018	320138	NO2	No	0.0	8.0	No	2.3
87	Albion Street	Roadside	562102	320163	NO2	No	0.0	2.6	No	2.1
89	Whitefriars Terrace	Roadside	561887	319466	NO2	No	0.0	1.0	No	2.4
90	Spenser Road	Roadside	563366	322065	NO2	No	0.0	8.0	No	1.8
91	Reid Way	Roadside	563255	321613	NO2	No	0.0	8.0	No	2.3
92	Garden Court	Roadside	563256	321588	NO2	No	0.0	16.0	No	2.2
94	Wisbech Road	Roadside	561957	318963	NO2	No	0.0	6.5	No	2.0
95	Harvest House, Wisbech Road	Roadside	562058	319038	NO2	No	1.0	7.5	No	1.9

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
96	Carp Terrace, King's Lynn	Roadside	562042	319011	NO2	No	0.0	6.5	No	1.9
97	Low Road, King's Lynn	Roadside	564503	322411	NO2	No	0.0	7.5	No	2.0
98	7 Greenpark Avenue	Roadside	562821	320964	NO2	No	0.0	1.0	No	1.8
99	108 School Road, Wisbech	Suburban	547960	313115	NO2	No	0.0	4.0	No	1.8
100	83 Chapnall Road, Wisbech	Suburban	547902	310395	NO2	No	0.0	3.0	No	1.8
101	62 Elm High Road, Wisbech	Roadside	547094	307850	NO2	No	0.0	1.0	No	1.8
102	6-7 Railway Rd, PE30 1NG	Roadside	562104	320208	NO2	Yes. Railway Rd AQMA	0.0	1.0	No	2.1
103	17-19 Railway Rd, PE30 1NF	Roadside	562116	320128	NO2	Yes. Railway Rd AQMA	0.0	1.0	No	2.1
104	Fenman Pub, Blackfriars Rd	Roadside	562116	320128	NO2	Yes. Fenman Pub AQMA	1.0	0.0	No	2.1

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: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM1 SG	562225	319191	Roadside	100	85	23.9	21	14.2	17.6	14.0
CM2 GW	563437	320472	Roadside	100	96	34.5	37	26.7	26.4	24.0

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

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

Notes:

The annual mean concentrations are presented as µg/m³.

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

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
1	562073	320303	Kerbside	100	90.1	33.8	36.3	25.8	28.7	28.4
2	562108	320196	Roadside	100	92.3	43.2	42.4	33.2	33.7	32.9
3	562117	320094	Roadside	100	100.0	37.4	37.5	26.4	30.1	29.1
5	562003	320098	Urban Centre	100	92.6	28.8	28.8	17.5	20.5	20.3
6, 7, 8	562225	319191	Roadside	100	100.0	23.8	24.3	15.7	18.2	17.6
9	561911	319710	Roadside	100	82.5	19.9	20.5	13.7	15.2	15.0
10	562100	319679	Roadside	100	83.0	36.2	35.5	26.6	29.0	27.8
11	562165	319575	Roadside	100	80.8	28.1	28.4	21.2	22.3	22.8
12	562242	319452	Roadside	100	100.0	29.8	31.4	22.5	23.5	24.5
13	562263	319374	Roadside	100	92.3	28.8	29.0	21.7	22.9	22.2
14	562227	319266	Roadside	100	100.0	33.6	33.2	25.9	25.5	24.0
15	562189	319101	Roadside	100	100.0	35.3	36.7	27.0	29.6	28.2
18	562266	319042	Roadside	100	100.0	24.1	25.1	18.9	19.9	19.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
19	562277	319098	Roadside	100	92.3	21.9	23.9	19.9	18.4	18.6
20	562244	319260	Roadside	100	82.7	30.0	28.2	21.7	23.8	22.7
22	562284	319385	Roadside	100	100.0	34.0	31.0	21.8	25.2	23.7
23	562161	319614	Roadside	100	100.0	32.6	31.2	23.1	26.4	25.4
24	562135	319650	Roadside	100	100.0	30.5	29.7	21.4	23.8	23.9
25	562190	319694	Roadside	100	100.0	15.9	15.3	11.4	11.5	11.7
26	562131	319996	Roadside	100	92.6	32.9	31.5	23.0	26.3	25.4
27	562177	319999	Roadside	100	100.0	28.5	27.6	20.0	22.8	22.2
28	562253	320015	Roadside	100	100.0	28.9	29.8	19.5	22.4	22.5
29	562183	320055	Urban Background	100	100.0	19.0	18.9	12.7	13.3	13.4
30	562204	320108	Urban Background	100	100.0	19.4	20.5	13.8	14.9	14.6
31	562128	320131	Roadside	100	69.0	30.2	29.1	21.2	24.0	19.8
32	562119	320216	Roadside	100	100.0	28.8	27.8	21.3	22.8	21.9
33	562202	320158	Roadside	100	100.0	27.4	28.5	20.3	20.8	21.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
34	562244	320128	Roadside	100	90.1	31.1	28.8	22.9	23.5	24.1
35	562244	320238	Roadside	100	100.0	27.7	27.6	20.7	22.4	22.3
36	562219	320318	Roadside	100	100.0	27.4	27.7	19.4	21.0	21.6
37	562253	320258	Roadside	100	92.1	30.6	29.7	23.3	23.9	22.1
38	562256	320322	Roadside	100	83.0	34.0	34.2	24.9	26.9	27.9
39	562822	320426	Roadside	100	100.0	24.5	24.5	17.7	19.3	18.9
40	563490	320469	Roadside	100	100.0	31.3	32.0	24.6	25.6	26.7
41	563477	320514	Roadside	100	100.0	36.7	34.9	24.5	25.2	26.3
42	563480	320581	Roadside	100	100.0	30.0	29.7	22.9	23.7	23.2
43	563411	320476	Roadside	100	100.0	30.9	29.4	22.0	25.4	24.4
44	563377	320484	Roadside	100	100.0	36.0	34.6	26.3	27.0	27.8
45	563202	320488	Roadside	100	100.0	28.8	26.8	19.5	22.3	21.4
46	562565	320509	Roadside	100	100.0	24.6	24.1	17.6	20.1	19.1
47	562186	320376	Roadside	100	100.0	30.6	29.7	21.5	23.6	24.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
48	562180	320365	Roadside	100	80.8	27.7	27.2	19.1	15.6	21.9
51	563521	320628	Roadside	100	100.0	18.8	18.6	13.6	14.6	14.3
52	563288	320504	Roadside	100	100.0	30.1	28.4	21.7	23.6	23.1
58	562171	319018	Kerbside	100	100.0	28.2	27.4	19.7	20.9	21.0
62	561614	318591	Roadside	100	100.0	13.9	14.1	9.9	10.9	10.4
66	562595	320526	Urban Background	100	92.1	20.6	22.1	16.7	17.5	17.3
67	562235	319578	Urban Background	100	100.0	16.4	16.8	12.1	11.6	12.0
68	562142	319837	Urban Background	100	59.2	20.5	19.1	15.2	14.1	13.2
69	561993	319394	Urban Background	100	84.4	13.7	13.3	9.4	9.8	9.2
70	561929	319354	Urban Background	100	92.1	12.7	13.5	11.8	9.1	8.1
73	563161	315848	Roadside	100	100.0	24.3	22.1	16.2	16.5	16.6
75	563468	320469	Roadside	100	92.3	34.1	35.8	26.5	28.0	27.7
76	562597	318739	Roadside	100	100.0	18.8	19.8	13.9	14.0	14.8
79	562803	320422	Roadside	100	92.3	32.7	33.2	23.8	26.0	25.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
86	562018	320138	Other	100	80.5	27.1	27.7	19.5	20.1	22.1
87	562102	320163	Roadside	100	100.0	32.0	30.0	19.3	24.1	23.0
89	561887	319466	Roadside	100	100.0	13.2	13.5	9.7	9.7	9.7
90	563366	322065	Roadside	100	100.0	15.9	16.1	11.5	11.8	11.8
91	563255	321613	Roadside	100	100.0	14.4	14.5	11.0	11.0	11.1
92	563256	321588	Roadside	100	92.3	12.9	14.0	9.2	9.7	10.1
94	561957	318963	Roadside	100	100.0			15.9	16.4	16.9
95	562058	319038	Roadside	100	100.0			12.0	13.0	12.6
96	562042	319011	Roadside	100	100.0			14.4	15.1	15.7
97	564503	322411	Roadside	100	100.0			14.1	15.1	15.6
98	562821	320964	Roadside	100	100.0				11.2	11.6
99	547960	313115	Suburban	100	100.0				7.8	7.4
100	547902	310395	Suburban	100	100.0				9.5	9.2
101	547094	307850	Roadside	100	100.0				27.8	28.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
102	562104	320208	Roadside	100	74.8					32.1
103	562116	320128	Roadside	100	100.0					30.7
104	562116	320128	Roadside	100	100.0					27.2

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Diffusion tube data has been bias adjusted.

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

Notes:

The annual mean concentrations are presented as µg/m³.

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**.

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Figure A.1 – Trends in Annual Mean NO₂ Concentrations along Railway Rd

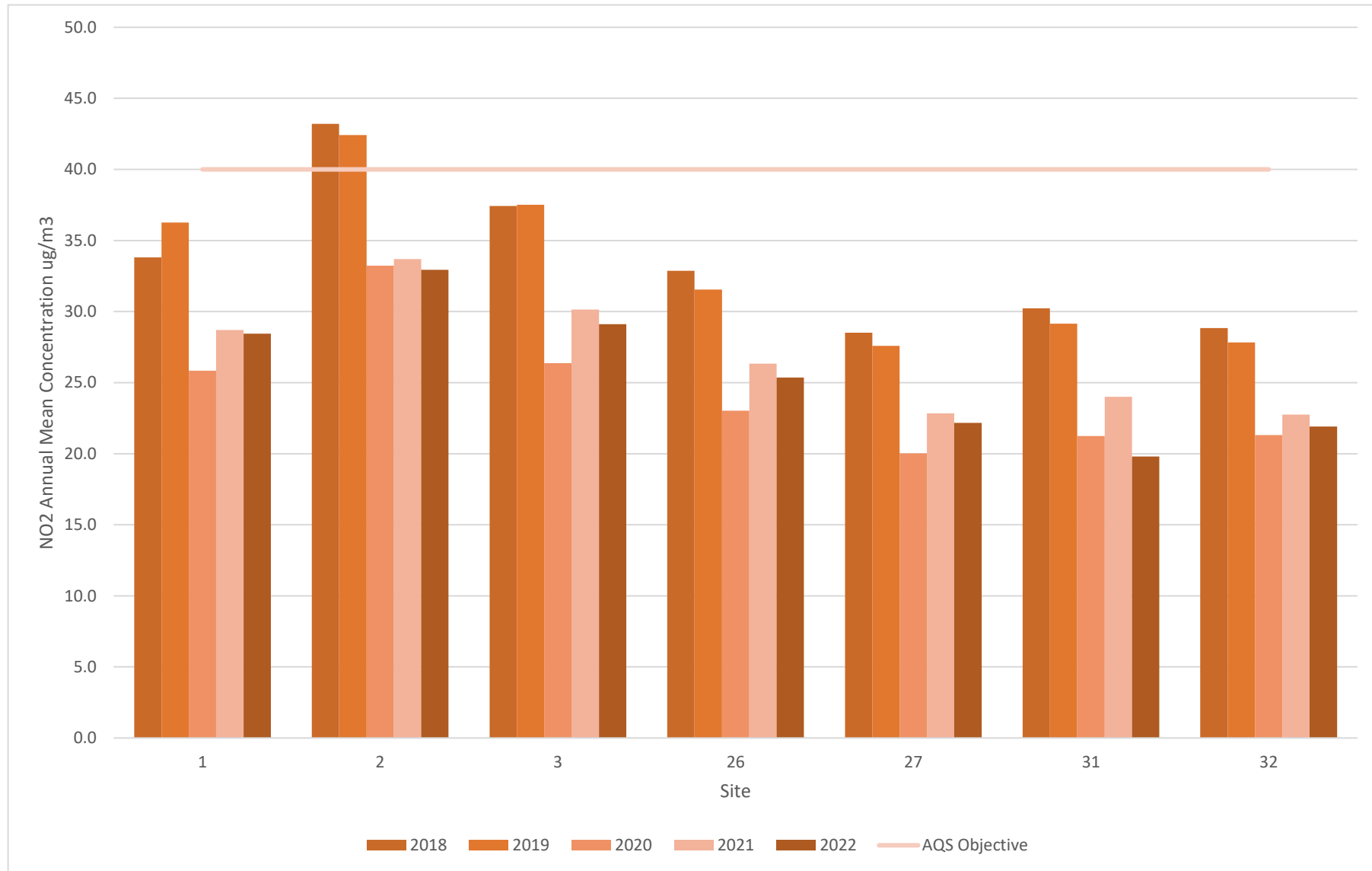


Figure A.2 – Trends in Annual Mean NO₂ concentrations within Gaywood Clock AQMA

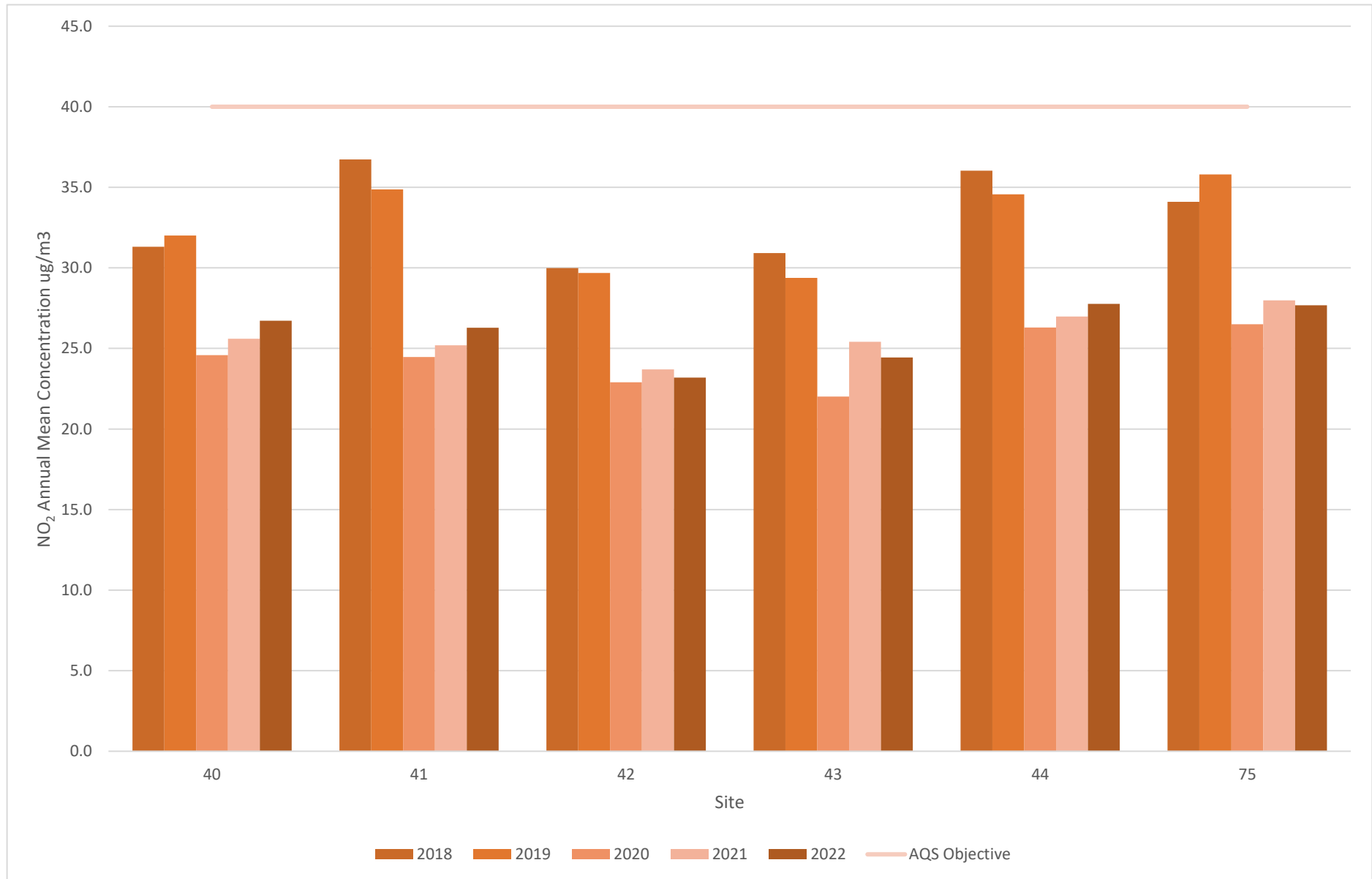


Figure A.3 – Trends in Annual Mean NO₂ concentrations along the South Bound section of Railway Rd AQMA

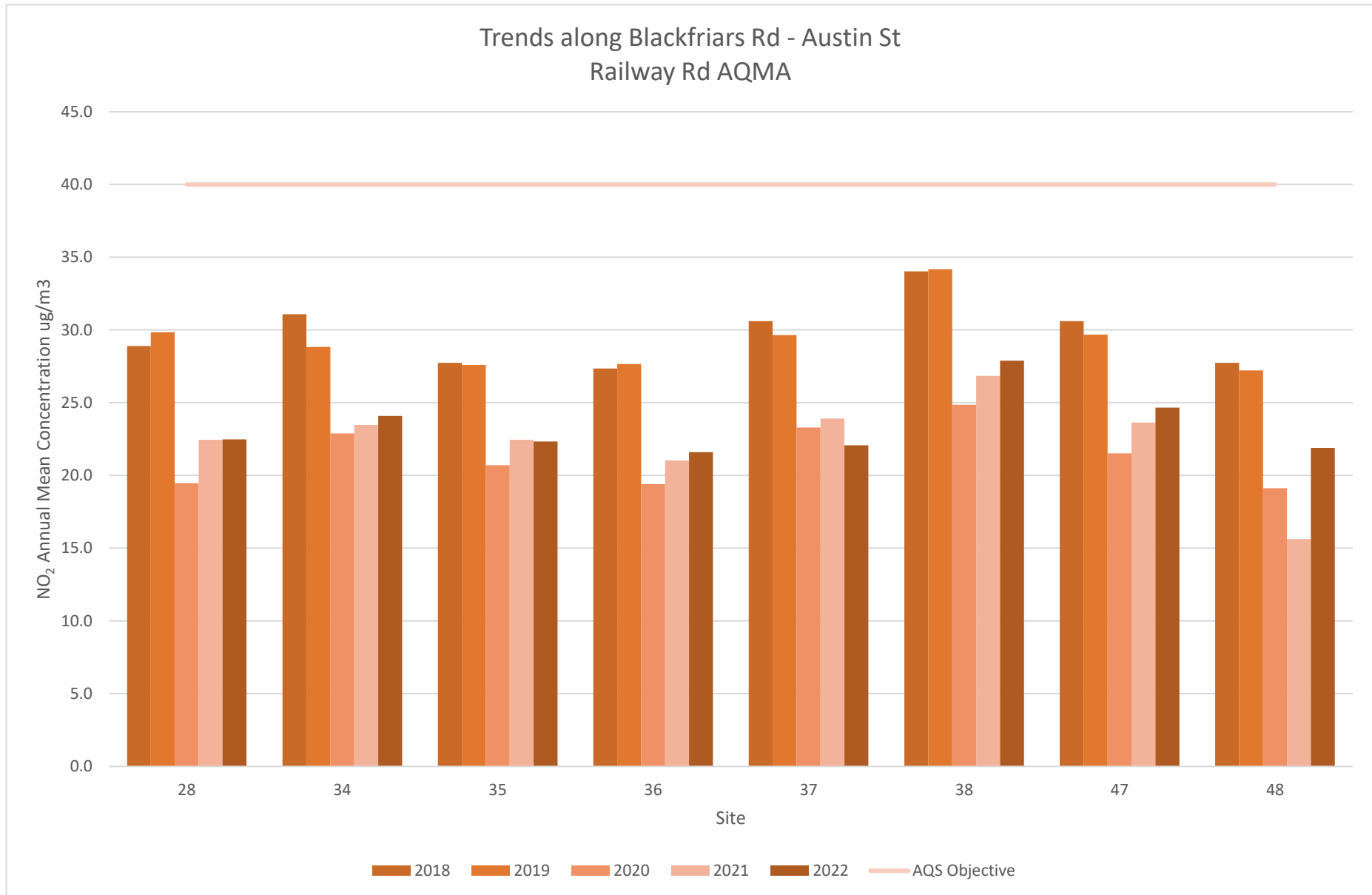


Figure A. 4 – Trends in Annual Mean NO₂ concentrations outside of AQMAs

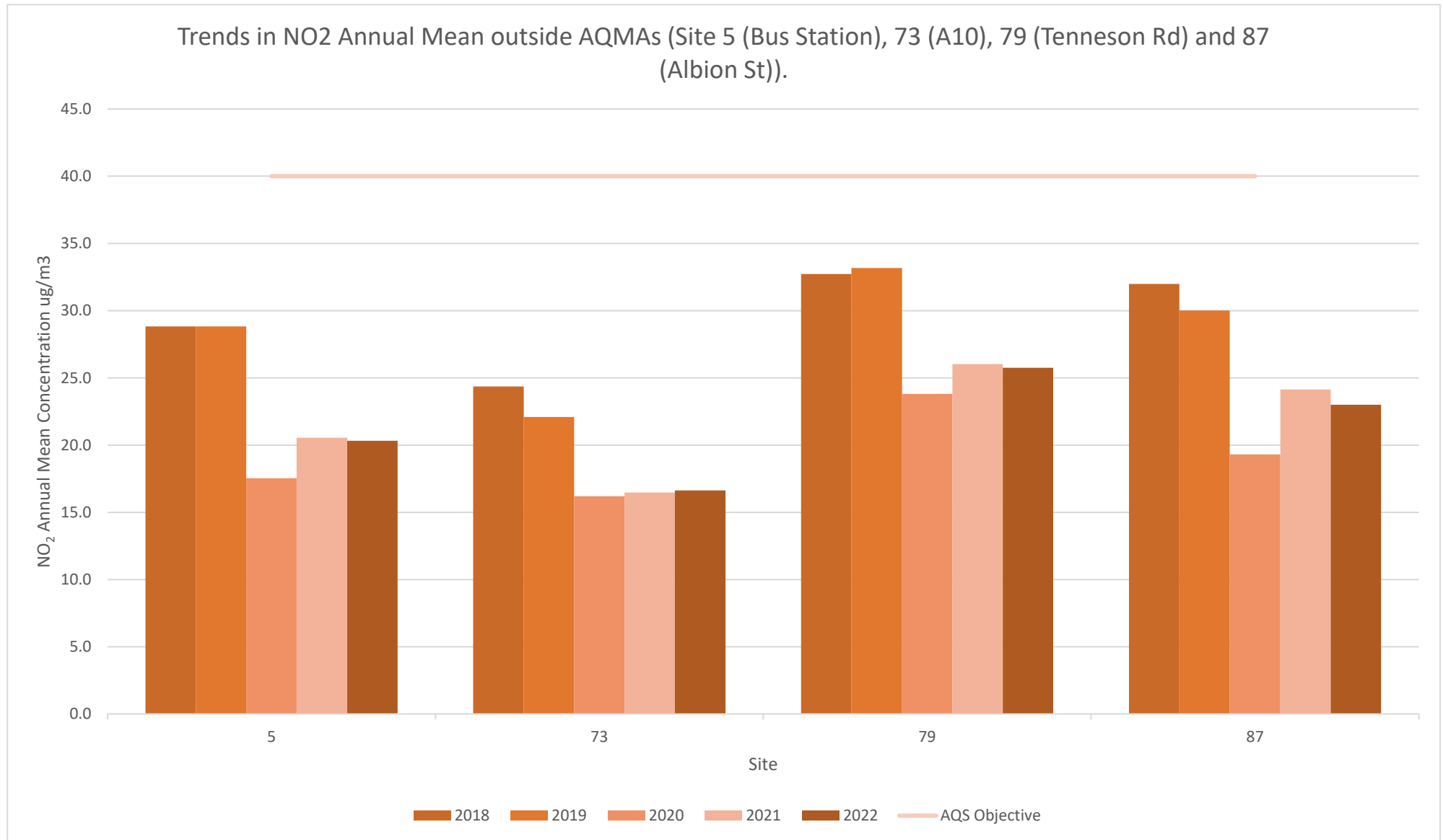


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM1 SG	562225	319191	Roadside	100	85	0	0	0	0	0
CM2 GW	563437	320472	Roadside	100	96	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

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

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

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

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

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM4 SF	570339	300083	Industrial	N/A	N/A	18.4	16.0	14.9	-	-
OS1 PS	561527	320437	Industrial	100	89	16.4	11.0	14.7	8.0	19.0
OS2 ER	561593	321466	Industrial	100	71	14.6	13.0	10.1	16.0	15.1
OS3 WR	570438	299905	Industrial	100	71	13.2	11.0	11.0	12.0	16.1
OS4 BD	570264	299943	Industrial	100	83	12.7	10.0	12.8	12.0	15.0

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Notes:

CM4 SF (Stock Ferry TEOM) is now obsolete.

The annual mean concentrations are presented as µg/m³.

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

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM4 SF	570339	300083	Urban Background	N/A	N/A	0	5	0	-	-
OS1 PS	561527	320437	Urban Background	100	89	4	0	4(29.4)	0	5
OS2 ER	561593	321466	Urban Background	100	71	0	0	0	2	0
OS3 WR	570438	299905	Urban Background	100	71	0	0	0	0	0
OS4 BD	570264	299943	Urban Background	100	83	0	0	0	0	1

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

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

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

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

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

Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
OS1 PS	561527	320437	Industrial	100	89	7.0	5.0	7.9	4.0	7.0
OS2 ER	561593	321466	Industrial	100	71	6.9	7.0	6.7	6.0	6.5
OS3 WR	570438	299905	Industrial	100	71	6.2	7.0	6.4	5.0	7.5
OS4 BD	570264	299943	Industrial	100	83	5.9	5.0	5.4	6.0	6.0

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Notes:

The annual mean concentrations are presented as µg/m³.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1– NO2 2022 Diffusion Tube Results (µg/m3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83, v03/23)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	562073	320303	43.5	29.3	37.1		27.6	31.3	27.0	30.7	32.9	35.9	41.3	40.3	34.3	28.4	-	
2	562108	320196	52.6		37.5	33.1	35.2	35.1	39.8	39.5	40.7	41.5	44.5	37.1	39.7	32.9	-	
3	562117	320094	42.8	25.1	35.3	29.8	32.3	32.5	33.8	36.6	35.8	35.6	41.1	40.3	35.1	29.1	-	
5	562003	320098	28.7	22.8		24.4	18.7	20.6	22.3	25.0	25.0	25.2	28.9	27.6	24.5	20.3	-	
6	562225	319191	30.8	20.8	23.8	18.4	17.8	16.8	17.1	21.2	20.6	21.5	24.3	24.5	-	-	-	Triplicate Site with 6, 7 and 8 - Annual data provided for 8 only
7	562225	319191	29.0	20.4	24.9	17.8	15.4	17.2	16.6	21.5	20.5	21.6	24.2	24.4	-	-	-	Triplicate Site with 6, 7 and 8 - Annual data provided for 8 only
8	562225	319191	28.8	19.8	22.9	16.4	17.1	16.2	17.1	21.5	19.9	22.3	24.3	25.8	21.2	17.6	-	Triplicate Site with 6, 7 and 8 - Annual data provided for 8 only
9	561911	319710	24.8	15.6	24.7	16.7	13.4		12.7	16.9	16.7	18.3	20.5		18.0	15.0	-	
10	562100	319679	43.5	34.3	37.8	29.1		29.0	31.8	36.4		10.4	41.2	41.6	33.5	27.8	-	
11	562165	319575	30.8	25.8	29.3			24.7	24.6	24.7	26.4	26.6	31.7	29.6	27.4	22.8	-	
12	562242	319452	39.6	29.0	29.9	22.2	27.4	28.3	27.1	25.3	26.4	29.6	36.1	33.1	29.5	24.5	-	
13	562263	319374	35.0	28.1	25.5	22.0	22.4	25.0	22.9	24.6		28.0	29.7	31.6	26.8	22.2	-	
14	562227	319266	38.6	25.0	28.5	25.0	26.4	28.4	24.9	28.8	26.2	28.3	33.1	33.2	28.9	24.0	-	
15	562189	319101	37.8	30.8	38.7	32.9	26.8	29.3	33.8	39.2	35.9	30.9	34.7	37.2	34.0	28.2	-	
18	562266	319042	30.0	22.9	26.2	21.9	21.2	20.2	19.4	22.5	20.4	22.6	28.2	28.9	23.7	19.7	-	
19	562277	319098	29.2		25.1	17.0	19.8	19.0	18.6	20.8	20.0	23.3	26.3	27.4	22.4	18.6	-	
20	562244	319260	29.3	22.5	33.2	27.2	21.5	22.4	23.6	30.7	29.5			33.5	27.3	22.7	-	
22	562284	319385	33.8	24.7	34.4	27.3	22.8	23.1	25.0	30.6	29.6	26.4	32.7	32.3	28.5	23.7	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83, v03/23)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
23	562161	319614	27.6	22.0	41.7	34.1	23.2	21.8	31.6	38.2	36.2	27.1	30.9	33.5	30.7	25.4	-	
24	562135	319650	27.6	19.0	41.1	33.6	23.0	22.1	29.2	35.4	33.7	23.9	27.6	28.9	28.8	23.9	-	
25	562190	319694	23.6	14.9	16.8	9.9	11.8	9.5	9.6	10.0	12.6	14.7	18.0	18.6	14.2	11.7	-	
26	562131	319996	33.4	25.6		32.0	23.0	26.7	29.9	36.6	31.7	30.8	32.8	33.4	30.6	25.4	-	
27	562177	319999	32.0	22.1	28.4	25.8	24.0	22.1	24.6	31.5	29.0	24.9	27.0	29.1	26.7	22.2	-	
28	562253	320015	34.2	25.3	26.8	20.4	24.1	25.3	25.3	27.9	28.3	22.7	31.1	33.5	27.1	22.5	-	
29	562183	320055	23.6	15.1	19.2	12.6	12.0	11.1	11.3	13.5	15.5	18.9	19.0	22.0	16.2	13.4	-	
30	562204	320108	25.5	15.6	21.8	15.0	13.0	10.6	13.5	17.2	17.8	17.4	19.6	23.7	17.6	14.6	-	
31	562128	320131	32.9	21.9	33.9	25.8	22.1					27.3	22.1	33.5	27.4	19.8	-	
32	562119	320216	31.5	20.5	32.8	23.7	21.0	21.9	24.3	25.5	27.7	24.9	31.3	31.6	26.4	21.9	-	
33	562202	320158	35.1	26.4	30.9	21.7	23.1	23.5	23.6	26.8	21.3	25.0	29.7	30.1	26.4	21.9	-	
34	562244	320128	36.3	30.7	27.3		23.0	25.8	25.3	26.9	27.0	30.2	33.3	33.7	29.0	24.1	-	
35	562244	320238	36.8	25.7	23.3	23.7	24.5	24.3	23.2	27.9	28.2	24.4	29.5	31.3	26.9	22.3	-	
36	562219	320318	33.1	24.1	31.4	21.1	22.0	21.5	23.1	27.6	26.2	24.9	29.9	27.3	26.0	21.6	-	
37	562253	320258	30.3	22.0	32.0	28.5	21.6		23.0	31.2	28.4	23.1	26.5	25.9	26.6	22.1	-	
38	562256	320322	39.3	34.0	40.8	27.2		23.2	29.3		34.8	32.4	40.9	34.4	33.6	27.9	-	
39	562822	320426	31.3	24.7	27.1	19.5	19.4	19.3	11.0	19.7	23.0	23.6	28.4	26.1	22.8	18.9	-	
40	563490	320469	42.7	34.2	32.6	25.3	28.1	30.4	29.1	26.1	35.4	29.1	38.9	34.4	32.2	26.7	-	
41	563477	320514	38.6	25.7	35.5	31.3	27.5	26.8	29.1	32.2	29.4	29.0	37.5	37.4	31.7	26.3	-	
42	563480	320581	35.8	28.9	26.5	23.1	25.0	25.9	24.5	24.2	26.9	26.2	33.3	35.0	27.9	23.2	-	
43	563411	320476	36.7	26.7	30.9	28.2	26.1	24.1	33.3	29.6	32.6	24.5	28.3	32.2	29.4	24.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83, v03/23)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
44	563377	320484	40.6	27.7	42.8	34.3	24.4	27.5	30.8	38.7	35.6	28.3	33.9	36.8	33.5	27.8	-	
45	563202	320488	32.4	21.0	32.4	31.1	20.0	17.4	21.0	28.2	28.8	21.3	26.5	30.1	25.8	21.4	-	
46	562565	320509	30.2	19.5	28.7	23.4	20.4	15.0	20.1	24.0	24.1	19.1	26.4	25.8	23.1	19.1	-	
47	562186	320376	38.2	24.6	34.5	28.6	23.7	24.0	27.3	29.6	28.9	29.3	34.7	33.5	29.7	24.7	-	
48	562180	320365	33.2	27.7	31.4	18.4	22.8	22.1	24.5	22.2	24.5		37.0		26.4	21.9	-	
51	563521	320628	26.1	18.9	20.5	14.6	12.8	12.2	12.3	12.8	14.6	17.4	22.5	21.7	17.2	14.3	-	
52	563288	320504	37.8	23.8	30.7	28.6	23.3	23.0	26.1	27.9	29.0	24.6	28.8	30.9	27.9	23.1	-	
58	562171	319018	29.8	20.2	36.5	23.8	18.0	17.7	20.0	27.2	25.5	25.8	29.4	29.7	25.3	21.0	-	
62	561614	318591	23.1	12.4	8.5	9.9	9.8	8.6	8.1	9.2	12.1	13.7	16.7	18.2	12.5	10.4	-	
66	562595	320526	31.4	19.6	24.8	17.1	15.4		14.8	16.4	18.6	20.5	24.9	26.4	20.9	17.3	-	
67	562235	319578	24.0	14.4	17.9	9.5	10.8	10.8	9.5	10.1	12.2	16.1	18.0	20.1	14.5	12.0	-	
68	562142	319837		16.0	18.0		13.7	12.8				17.0	19.1	20.8	16.8	13.2	-	
69	561993	319394			17.2	9.2	7.9	6.9	7.3	8.4	10.6	11.7	14.9	16.4	11.0	9.2	-	
70	561929	319354		10.5	17.9	8.5	7.2	6.6	6.7	7.8	9.0	13.1	15.0	5.5	9.8	8.1	-	
73	563161	315848	26.4	11.5	29.2	22.9	15.0	12.4	16.8	22.4	22.7	16.6	19.7	24.6	20.0	16.6	-	
75	563468	320469	43.7		39.8	30.4	27.2	27.4	30.4	31.5	33.3	29.0	34.7	39.3	33.3	27.7	-	
76	562597	318739	22.4	18.1	23.1	12.1	14.0	15.6	15.2	12.5	18.1	19.2	21.7	21.6	17.8	14.8	-	
79	562803	320422	41.7		32.0	26.5	26.9	25.4	28.7	29.1	32.9	27.2	34.2	36.5	31.0	25.8	-	
86	562018	320138	32.1	25.9	28.2		22.1	22.7	24.5	24.6	22.7		30.3	33.0	26.6	22.1	-	
87	562102	320163	31.5	21.7	37.6	29.0	23.8	21.4	25.2	33.0	28.8	25.0	28.0	27.5	27.7	23.0	-	
89	561887	319466	18.9	10.8	16.6	9.0	7.6	7.1	7.5	8.9	10.4	12.6	14.7	16.7	11.7	9.7	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83, v03/23)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
90	563366	322065	20.9	14.0	17.3	11.0	10.7	9.5	10.0	10.7	13.9	15.2	18.5	19.6	14.3	11.8	-	
91	563255	321613	22.7	13.2	14.9	9.8	9.7	8.2	9.4	9.6	13.0	14.2	17.2	19.0	13.4	11.1	-	
92	563256	321588	19.3	11.7	15.8	8.2	8.0	6.9		7.9	10.4	13.2	15.9	16.7	12.2	10.1	-	
94	561957	318963	30.4	20.6	22.4	17.3	18.3	17.4	16.8	18.8	17.1	19.6	21.3	24.3	20.4	16.9	-	
95	562058	319038	22.1	13.6	21.9	12.3	11.4	9.7	11.2	13.4	12.8	16.3	18.2	19.5	15.2	12.6	-	
96	562042	319011	27.7	18.3	24.9	16.1	14.5	14.0	14.0	16.2	16.2	20.0	22.7	22.6	18.9	15.7	-	
97	564503	322411	27.1	15.7	24.5	17.7	14.7	13.5	15.3	16.1	15.5	19.3	23.5	22.6	18.8	15.6	-	
98	562821	320964	24.3	14.5	17.7	11.3	9.3	7.5	7.8	8.6	12.5	15.4	19.0	19.6	14.0	11.6	-	
99	547960	313115	16.9	9.2	6.3	7.1	6.8	5.3	5.7	5.9	8.1	10.1	12.3	13.4	8.9	7.4	-	
100	547902	310395	23.1	12.1	7.1	8.1	7.9	6.6	6.8	6.9	9.4	12.4	14.6	17.9	11.1	9.2	-	
101	547094	307850	41.9	34.3	17.4	33.2	34.0	37.0	33.3	32.3	34.5	40.1	37.8	33.5	34.1	28.3	-	
102	562104	320208			37.4	30.5	35.5	40.5	38.2	41.1	41.3		43.2	40.8	38.7	32.1	-	
103	562116	320128	45.5	33.5	34.9	29.4	34.3	34.4	36.1	37.7	37.0	39.1	40.6	41.4	37.0	30.7	-	
104	562116	320128	38.9	28.9	35.3	28.9	29.7	27.6	31.7	35.3	34.2	31.5	34.2	36.5	32.7	27.2	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Local bias adjustment factor used.

National bias adjustment factor used.

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

BCKLWN confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

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**.

See Appendix C for details on bias adjustment and annualisation.

Appendix C: Supporting Technical Information / AQ Monitoring Data QA/QC

New or Changed Sources Identified Within BCKLWN During 2022

There were 142 developments that were appraised for air quality in 2022. The following 34 developments were considered as most significant:

Table C.1: Most Significant Planning Applications in 2022

Planning Ref.	Address	Proposal	Response
13/01615/OM 18/02289/OM	West Winch Strategic Growth Area	Up to 1110 dwellings plus primary school and local centre. Up to 500 dwellings plus neighbourhood centre.	Both applications are still pending.
EN010110	Land On Algores Way Industrial Estate Wisbech Cambridgeshire	DCO application for Energy from Waste Facility (EfW) combined heat and power plant with a maximum gross capacity of 58MW	Development Consent Order is still pending. BCKLWN Relevant Representation and Local Impact Report submitted.
22/01405/CON	Wisbech East Fringe Norfolk	Hybrid application off Sandy Lane, Wisbech for 320 dwellings plus community centre.	Screened based on traffic impacts. Daily flows up to 1523 AADT along Broadend Rd based on a trip rate (4.7). EV condition plus CMP (HGV route) recommended.
22/00479/F	Queen Elizabeth Hospital King's Lynn	New diagnostics centre (MRI, CT etc.) proposed in the front of the QEH Hospital to replace existing	New diagnostics centre within existing hospital for staff (18) and patient referrals. Recommended EV charging scheme and CEMP as conditions. Travel Plan forms

Planning Ref.	Address	Proposal	Response
		52-space staff carpark. Additional carparking spaces (66) provided.	part of wider hospital plan but made as a condition (7). No objection
22/01947/FM	Queen Elizabeth Hospital King's Lynn	Demolition of existing with construction of a new Multi-Storey Car Park (MSCP) and associated works	Proposal seeks to aggregate existing into new MSCP with 383 car spaces. Construction dusts managed via CEMP. Travel demands to be managed through TP with 4% year on year reduction in single occupancy use. No objection
22/00929/FM	Land S of Hunstanton Commercial Park And E Kings Lynn Road Hunstanton Norfolk	Development for a 61-care apartment building, 42 care ready bungalows and 60 residential dwellings and associated works	Additional daily traffic predicted as potentially significant (580 AADT). Assessed as a negligible impact on air quality (up to a 4% change in NO ₂). Recommended condition for EV charging scheme, CEMP and informative on communal block heating and EV car club for the apartment building.
22/01648/FM 22/01650/FM	Ken Hill Farms & Estate Heacham Bottom Farm Lynn Road Heacham	Change of use of existing to provide a new visitor centre, cafe, glamping units, 20 touring caravan pitches plus utility building including additional car parking spaces (320 plus spaces for tourers).	AQA (Dustscan, Dec 2022) carried out a screening type assessment. Additional 408 AADT. Unlikely to exceed a negligible AQ impact. Recommended conditions for EV charging and wood burning.
22/00493/OM	Vong Lane Grimston Norfolk	Outline application for 19 dwellings, including 5 affordable dwellings and 6 self-build dwellings	Screened based on transport statement showing traffic as 54 vehicles per day (vpd) at peak periods. No objection. Recommended condition for EV charging and informative on travel plan. Not

Planning Ref.	Address	Proposal	Response
			allocated for housing within current Local Plan (cumulative).
22/01756/FM	Land S of Sandy Lane Walsoken Norfolk	Hybrid application for 325 dwellings and an outline planning permission for a Community Hub/local centre, 60-bedroom care home/extra care accommodation and C3 residential development with all matters reserved apart from access.	Additional information requested (traffic information not submitted).
22/01134/OM	Frogs Hall Barwick Road Stanhoe King's Lynn	Proposed site for holiday accommodation (46 park home type)	Screened based on daily traffic (134vpd). Informative on smoke controls / PM _{2.5} as design incorporate chimneys.
22/01443/FM	Croylands 157 Bexwell Road Downham Market	Demolition of existing and re-development to provide a 72-bedroom care home (Use Class C2) together with associated works	Screened based on traffic flows (134 vpd as weekday) as less than IAQM criteria. Background likely to be raised due to cumulative effects. Recommended conditions for suitable and secure cycle parking scheme, TP and CEMP.
22/01228/F 22/01235/FM	Holiday Flats and Former Holiday Chalet Site Manor Road Hunstanton Norfolk	72 no. bed care home and Apartment Building with 8 Flats	Screened based on additional cumulative daily traffic (c.200vpd). Condition recommended for EV charging, TP and CMP.

Planning Ref.	Address	Proposal	Response
21/02421/FM	West of Kiln House Thieves Bridge Road Watlington Norfolk	Proposed development of 40 dwellings and associated external works and access	Screened based on changes to traffic movements from 40 dwellings. Recommended conditions on EV and CEMP to control dusts. No objection
21/02247/FM	Land Opposite Flint Farm Oxborough Road Stoke Ferry Norfolk	7 shepherd's huts for holiday use with a reception hut and associated works.	Informative on PM _{2.5} / wood burning plus condition for EV charging scheme. Applicant confirmed that wood burning appliances are to be to Ecodesign and to supply dry wood fuel to guests. No more than 7 units to be occupied.
22/00782/F	5 - 9 Chapel Street King's Lynn Norfolk PE30 1EG	Change of use from existing offices into 6 residential flats	Access to the proposed development via Railway Rd AQMA. No allocated carpark spaces proposed but insufficient secure cycle spaces. Referred to LHA. Amended plans submitted with 23/00781/F showing 15 cycle spaces.
22/00871/FM	Lark Road Stoke Ferry Norfolk	Proposed residential development of 13 dwellings	Potential cumulative traffic impacts on air quality in Stoke Ferry. Recommended condition on CEMP and EV scheme.
22/00772/OM	Land S of 22 Lynn Road Hillington Norfolk	Outline application for erection of 37 affordable dwellings and 10 self-build plots	Recommended refusal based on high trip rates per dwelling and without clear details to effectively mitigate.
22/01163/CU	Land W of Brambles Main Road Brancaster Staithe	Change of use from agricultural land to 250 space car park	Screened based on daily changes in traffic flows as less than IAQM significant criteria. TA / TS requested setting out mitigation.

Planning Ref.	Address	Proposal	Response
22/01333/FM	Alfred G Pearce Wormegay King's Lynn	Alterations and extension to existing cold store building to form new packing shed and erection of new cold store building	Screened; development does not propose significant change in existing HGV movements (currently around 117 weekly) plus staff (50 employed; 100 weekday movements).
22/01796/FM	Brancaster Staithe Norfolk	Construction of 12 affordable dwellings with associated external works	No objection. Recommended conditions on EV charging scheme and 10% reduction in building emissions to mitigate additional transport as per policy CS08.
22/01752/FM	Downham Country Garden Store Bexwell Downham Market	Garden centre extension and associated works plus extension of existing carpark.	Following a holding objection additional information submitted on EV charging for additional car parking spaces, secure cycle parking and low carbon / NOx building emissions as secured through condition.
22/01969/F	The Ridings 94 School Road Terrington St John	Construction of 2no. Dwellings and Extension/Alterations to Existing Dwelling	Low flue as similar height to neighbouring window (PM _{2.5}). Objection. Planning refused.
FUL/2020/0107 SC/2022/0002	Pentney Quarry Abbey Road Pentney	Extraction of sand and gravel (c.550,000 tonnes) Middleton Aggregates Ltd	Proposal to vary (extend) operation of the quarry to 2036 and extract additional sands / gravel. Impacts not considered as significant. No objection.
22/01037/F	Reeve Flooring Hardwick Industrial Estate King's Lynn	Biomass: Retrospective Application for a workshop biomass heating system (50kW)	Emission factor of appliance unknown (assumed to be similar to domestic stove). Emission rates for principal pollutants assessed as potential significant increase in PM but impacts limited through use (as back-up) and working day. No objection

Planning Ref.	Address	Proposal	Response
21/02506/F	The Piggeries 49 Methwold Road Whittington King's Lynn	Biomass: Additional storage buildings for the drying and storage of wood fuel and charcoal products.	Existing biomass boiler (600 kW) screened based on biomass tool. Emission rates calculated as less than respective targets (<5% long-term means) for principal pollutants. No objection. Biomass inventory updated.
22/01103/F	Whitegate Nurseries Terrington St John	Biomass: Retrospective application for a biomass heating system (240kW)	Biomass boiler assessed using biomass tool. Emission rates calculated as less than respective targets (<5%) for principal pollutants. No objection. Biomass inventory updated.
14/00974/DISC_A	Reeve Flooring Rollesby Road Hardwick Industrial Estate King's Lynn	Biomass: DISCHARGE OF CONDITION 3 OF PLANNING PERMISSION 14/00974/F: relating to a biomass heating system (199kW).	Condition 3 concerned stack height calculation. Screened based on biomass tool. Change in emissions not considered significant.
22/00860/FM 22/00866/FM	Woodlark Farming Ltd Breckland and Feltwell Farms Methwold Norfolk	Demolition of existing with construction of 20 new poultry sheds to house up to 870,000 birds, new piggery to house 14,000 pigs over 30kg and workers dwellings	Environmental Statement submitted for both applications that included air quality and odour assessments. No significant impacts noted. EA permitted site. Condition recommended for CEMP
22/01408/EIASC 22/01409/EIASC 22/01406/EIASC	Abbey Field Farm and The Bungalow (Cherryridge Poultry Ltd), Pentney / East Winch	SCOPING OPINION: Broiler Unit including replace dwellings with 6 purpose-built buildings	Recommended that within scope is particulate matter emissions and on-site (farm) receptors. Spoil from SUDS (3x1725m3) recommended to be re-used on-site than transported by HGV off-site.

Planning Ref.	Address	Proposal	Response
22/01310/RMM	Land West of Knights Hill Village Grimston Road South Wootton King's Lynn	RMM for up to 576 dwellings together with local centre and associated infrastructure	Conditions recommended for EV charging scheme and low carbon energy design systems.
22/00475/RMM	Limagrain UK Ltd Station Road Docking	RMM for residential development consisting of 30 dwellings	Recommended EV charging scheme that was conditioned. Some of the designs showing chimneys and informative added. No objection.
22/01657/OM	Whetstone Way Outwell Norfolk	RMM for 26 affordable dwellings with associated infrastructure	Recommended conditions for EV charging scheme and suitable low carbon energy scheme in accordance with policy CS08. No objection.
21/01121/RMM	Land NE of 7 To 11 Bridle Lane Downham Market	RMM for erection of 226 dwellings and associated works and infrastructure	Outline application showed around 1000 AADT. Recommended mitigation through building designs under Policy CS08 and informative on solid fuel burning. Visitor parking spaces proposed (26) with condition recommended on EV charging.
21/01873/FM	Parkway Gaywood King's Lynn	DISCHARGE OF CONDITIONS of Planning Permission 21/01873/FM for the construction of 226 new homes and associated infrastructure	Agreed that the dust monitoring scheme submitted for TSP, PM ₁₀ and PM _{2.5} over 15-min average periods with remote access to data. PM alerts if greater than 190ug/m ³ 1-hr period.

Additional Air Quality Works Undertaken by BCKLWN During 2022

There were no additional source apportionment studies or air dispersion modelling work conducted by BCKLWN during the 2022 review and assessment period.

As explained in Table C.1 above we have however, carried out a number of biomass screening assessments and updated the inventory on these sources. This includes an update to the largest capacity system in the area in Upwell rated at an aggregated maximum capacity of around 3MW_{th}.

QA/QC of Diffusion Tube Monitoring

The choice of passive sampling methods by diffusion tubes and correcting bias against reference analysers is considered a relatively simple and cost-effective method of monitoring air quality in the borough.

Diffusion Tube Annualisation

There were two diffusion tube monitoring locations that recorded data capture was less than 75% (sites 31 and 68) but greater than 25%. In such instances it is necessary to annualise the data. Results are presented in Table C.2 below.

Table C.2: Annualisation Summary (concentrations presented in µg/m³)

Site ID	Annualisation Factor Site 1 Wicken Fen	Annualisation Factor Norwich Lakenfield	Annualisation Factor Northampton Spring	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
31	0.8698	0.8757	0.8639	0.8698	27.4	23.9
68	0.9465	0.9463	0.9439	0.9456	16.8	15.9

Diffusion Tube Bias Adjustment Factors

The Council used diffusion tubes supplied by Gradko International using the 20% TEA preparation method during the 2022 period.

The diffusion tube data presented within the 2022 ASR have been corrected for bias using a national bias adjustment factor as shown in Table C. 3. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring.

A triplicate co-location study was used to determine a local bias factor based on the comparison of diffusion tube results to the CM1 Southgates NO_x/NO₂ continuous analyser. Using a local factor is considered preferable as diffusion tube results can be affected by

local meteorological conditions. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method. BCKLWN have applied a national bias adjustment factor of 0.83 to the 2022 monitoring data. This was due to poor data acquisition from the CM1 Southgates analyser.

A summary of bias adjustment factors used by BCKLWN over the past five years is presented in below Table C. 3. Results of the co-location study to derive a local bias correction factor is shown in Table C.4 below but was not used due to poor data capture from CM1.

Table C. 3: Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23 (27 studies)	-
2021	National	03/22 (32 studies)	-
2020	National	03/21	-
2019	National	03/20	-
2018	Local	-	0.93

Table C.4: Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	10	-	-	-	-
Bias Factor A	0.69 (0.64 – 0.75)	-	-	-	-
Bias Factor B	45% (34% – 55%)	-	-	-	-
Diffusion Tube Mean (µg/m ³)	20.5	-	-	-	-
Mean CV (Precision)	3.3%	-	-	-	-
Automatic Mean (µg/m ³)	14.2	-	-	-	-
Data Capture	100%				
Adjusted Tube Mean (µg/m ³)	14 (13 – 15)				

Note: A single local bias adjustment factor study was carried out in 2022 using CM1 but gave poor data acquisition due to internal sampling / possible leak during November / December 2022.

NO₂ Fall-off with Distance from the Road

The NO₂ diffusion tube monitoring locations did not require any distance correction during 2022 period.

QA/QC of Automatic Monitoring

- Data management for the six automatic monitors was carried out by Air Quality Data Management (AQDM) services and Envitech Europe who host the results via a county wide web portal (www.norfolkairquality.net). The NO₂ results are also uploaded simultaneously to Defra's UK-Air network (<https://uk-air.defra.gov.uk/>).
- Servicing of the 2x chemiluminescent NO_x/NO₂ analysers was carried out by Matts Monitors that comprises a 6-monthly routine maintenance program plus 24-hr call outs to help ensure continuity of data. Air conditioning is serviced under contract by JD Cooling Services.
- LSO drift calibrations of the 2x chemiluminescent NO_x/NO₂ analysers was carried out by BCKLWN monthly, with frequency increased depending on performance of the NO₂ analysers.
- The National Physics Laboratory carry out annual external QC of CM1 and CM2 against a certified standard of the NO span gas. This was carried out in February 2022.
- The Osiris PM monitors are serviced under contract by supplier (Turnkey). The enhanced contract extends to serviceable parts (battery, pump, and photometer plus consumables such as filters). These analysers are also subject to quarterly filter change and flow rate check by BCKLWN. The data is supplied by Turnkey but as explained above is managed by AQDM and uploaded by Envitech Europe to the Norfolk web portal for public dissemination.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The PM₁₀ and PM_{2.5} Osiris analysers are co-located yearly by Turnkey against their reference gravimetric analyser. There was no adjustment factor necessary for the 2022 period (factor 1.0).

Automatic Monitoring Annualisation

Annualisation was required for two automatic monitoring sites (OS2 and OS3) which recorded data capture less than 75% but greater than 25%. A summary of annualisation is presented in Table C.4.

Table C.5: Annualisation Summary (concentrations presented in µg/m³)

Background Site	PM10 AM	PM10 Period Mean	Ratio AM/PM
Norwich Lakenfields Background Urban	13.7	13.9	0.99
Leicester University Background Urban	12.9	13.1	0.98
		Average Ratios	0.985
Estuary Rd OS2		Raw PM	15.3
		PM10 Annualised Mean	15.1
Norwich Lakenfields Background Urban	13.7	12.2	1.12
Leicester University Background Urban	12.9	12.2	1.06
		Average Ratios	1.09
Wretton Rd OS3		Raw PM	14.8
		PM10 Annualised Mean	16.1

Background Site	PM2.5 AM	PM2.5 Period Mean	Ratio AM/PM
Norwich Lakenfields Background Urban	8.89	9.75	0.912
Leicester University Background Urban	7.93	8.37	0.947
		Average Ratios	0.930
Estuary Rd OS2		Raw PM 2.5	6.94
		PM2.5 Annualised Mean	6.45
Norwich Lakenfields Background Urban	8.89	7.54	1.18
Leicester University Background Urban	7.93	7.27	1.091
		Average Ratios	1.13
Wretton Rd OS3		Raw PM2.5	6.6
		PM2.5 Annualised Mean	7.54

NO₂ Fall-off with Distance from the Road for automatic monitoring results

No automatic NO₂ monitoring locations within BCKLWN required distance correction during 2022.

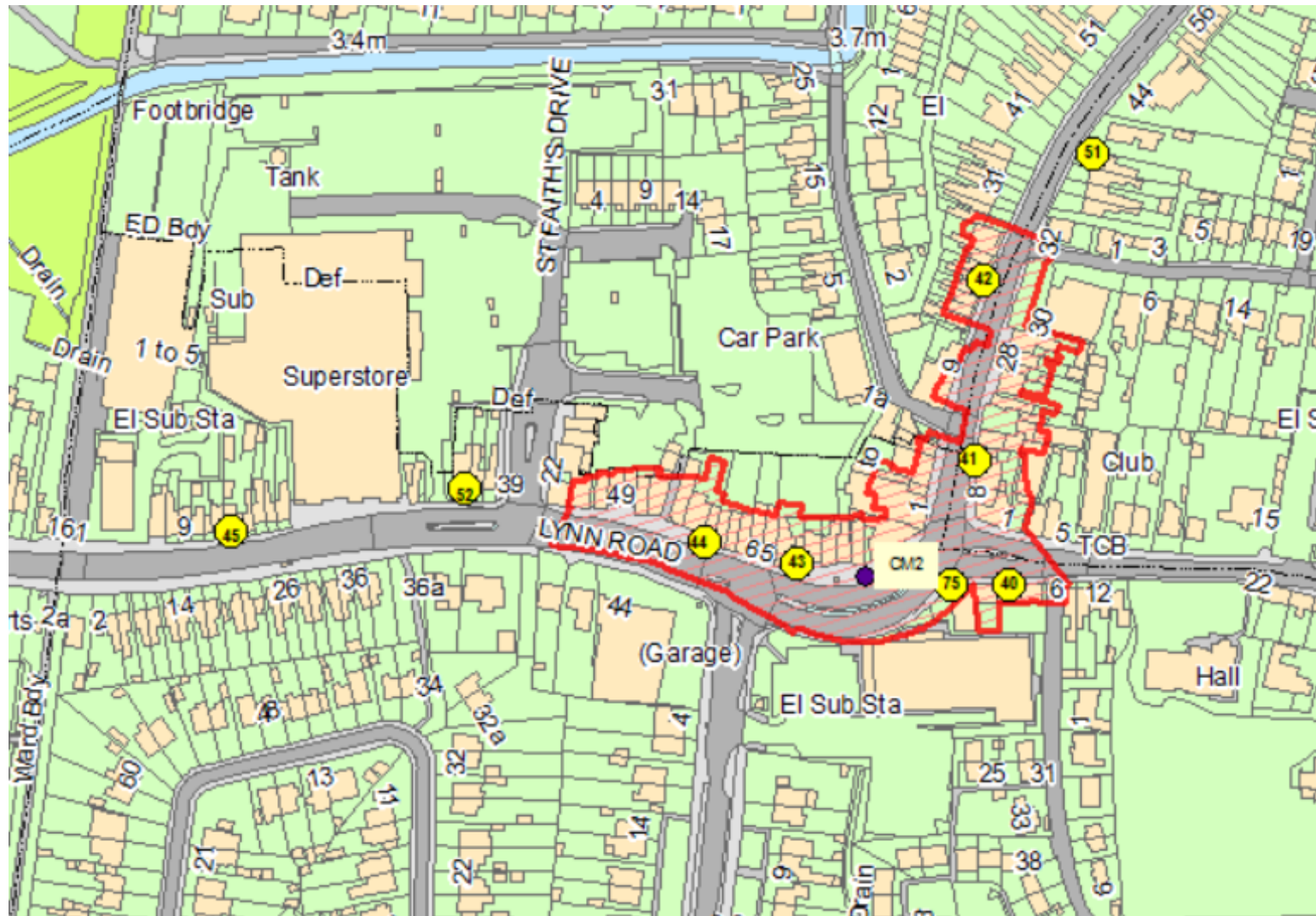
Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1– Map of the Monitoring Sites around Railway Rd AQMA



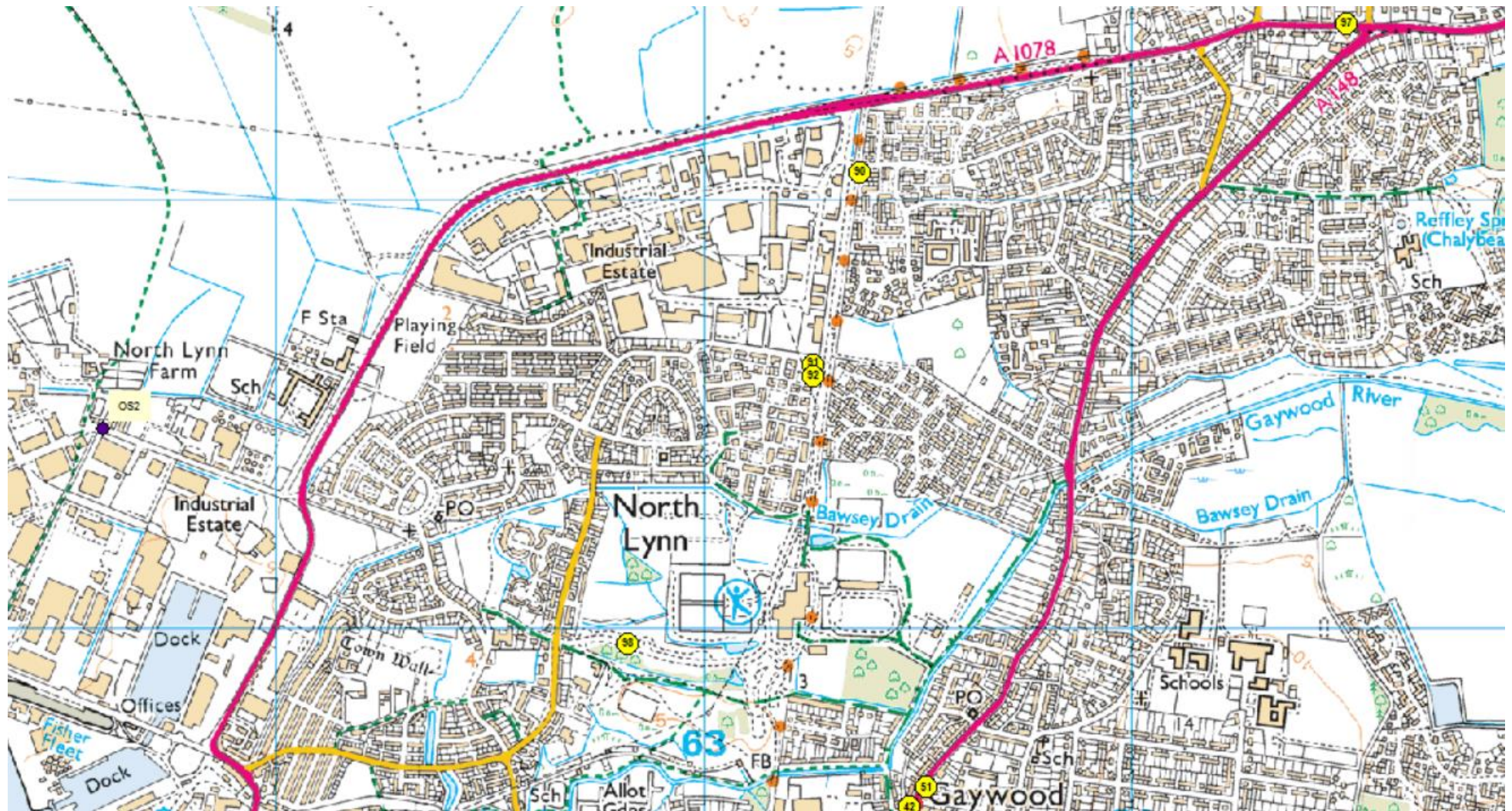
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Figure D.2 – Map of the Monitoring Sites around Gaywood Clock AQMA



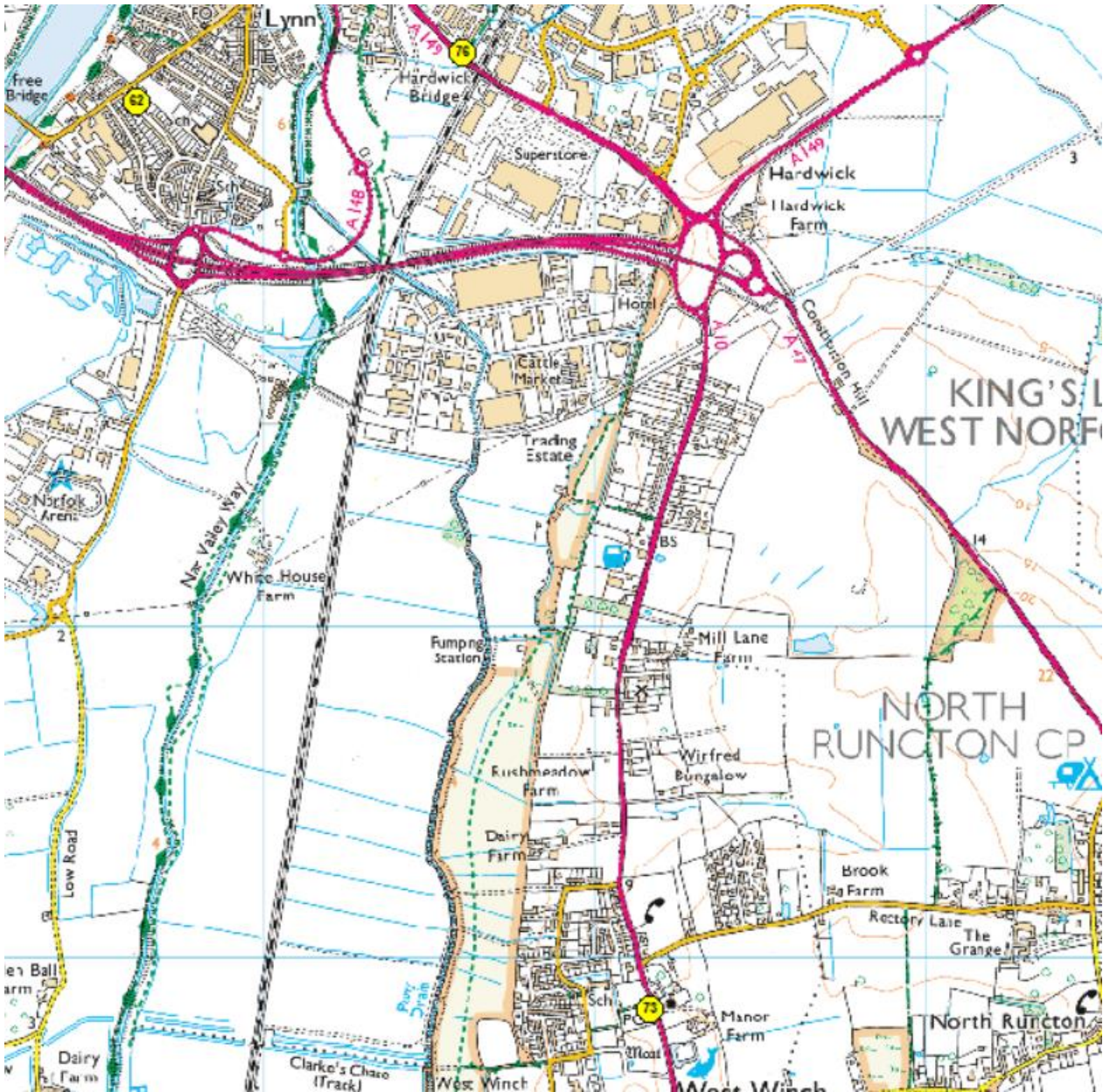
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Figure D.3 – Map of the Monitoring Sites around the northern approach to King's Lynn and the Docks area



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Figure D.4 – Map of the monitoring sites around the southern approach to King's Lynn including A10 corridor



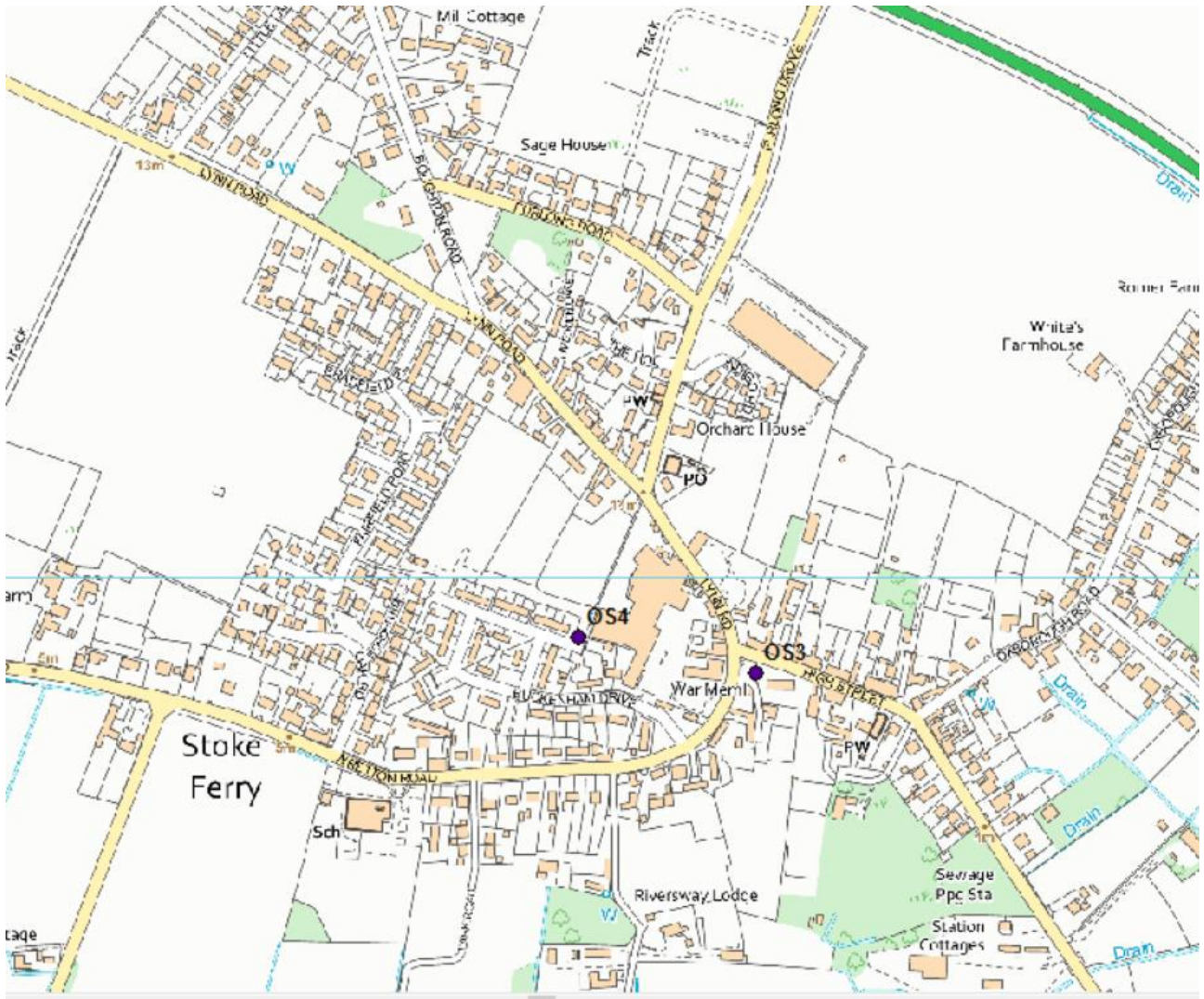
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Figure D.5 – Map of the monitoring sites around Wisbech area



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Figure D.6 – Map of the monitoring sites around Stoke Ferry



Appendix E: Summary of Air Quality Objectives in England

Table E.1: Air Quality Objectives in England³³

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

³³ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix F: Biomass Heating Systems >45kW_{th}

Table F.1: Biomass Inventory

Name	Planning / Permit reference	therm_output (kW)	make appliance	fuel type
Kevley, Upwell	12/00356/F 13/00292/F	3x 995kW	Linka	Straw bales
Hillgate Nurseries, Terrington St Clement	12/00349/F	990	Uniconfort	Woodchip
Belmont nursery, Terrington St Clement PE34 4JL	LAPPC066	990	Uniconfort	Waste wood
Houghton Hall	12/01975/F 12/01976/LB	700	Gilles HPKI-K 700 multi-cyclone	
Construction Industry Training Centre CITB	11/01819/F	600	Herz BioFire 600	Wood chip pellets
Big K Ltd, Whittingham	21/00794/FM	600	Talbotts MWE 600	Wood chip
Iceni Academy, Methwold	15/01767/F	500	ETA Hack VRBG3	Wood Pellet
Rokewood Nursery, Walsoken	14/00417/F	390	FARM 2000 HT80R	logs
Whitegate Nurseries, Terrington St John	22/01103/F	240	Remeha Gilles HPKI-240	Woodchip
Reeve Flooring, King's Lynn	14/00974/F	199	ETA Hack 199	chips
Dersingham St George's Church of England Junior School	14/01483/F	199	ETA Hack 199	pellets
Roydon Hall Farm	15/00103/F	150	HDG Compact 150	
Eastgate Farm, Marham	20/00181/F	150	HDG 150 Hackgut	
College of West Anglia (COWA)	12/00696/F 11/00609/FM	130	Hertz Firematic Biocontrol	pellets
Barwick Hall Farm, Stanhoe	19/01224/LDE	120	GILLES HPK-RA 120	Wood Chip
Ken Hill Farms Estate, Snettisham	21/00601/F	88	E Classic 3200	Logs

Newcome-Baker Farms Limited, Wethered Manor, Sedgeford	17/01685/F	Thermal capacity not known		Straw
Wiggenhall St Germans Primary School, Wiggenhall	Y/7/2010/2021	Thermal capacity not known		

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'
AQA	Air Quality Assessment
AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
BCKLWN	The Borough Council of King’s Lynn and West Norfolk
CMP / CEMP	Construction Management Plan / Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EfW	Energy from Waste Facility
EV	Electric Vehicle Charging
EU	European Union
FDMS	Filter Dynamics Measurement System
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LHA / HA	Local Highways Authority / Highways Authority
LAPPC	Local Air Pollution Prevention and Control
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control

Abbreviation	Description
RMM	Reserved Matters planning application
SO ₂	Sulphur Dioxide
TP / TA / TS	Travel Plan / Transport Assessment / Transport Statement
TSP	Total Suspended Particulates
vpd	Vehicles per day