Borough Council of
King's Lynn &
West Norfolk

2025 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 2025

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Local Responsibilities and Commitment

This ASR has been prepared by the Environmental Quality Team, 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 above preface to this report.

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

This ASR has been reviewed by Norfolk County Council Public Health Team.

If you have any comments on this ASR please send them to the Environmental Quality team;

environmental.quality@west-norfolk.gov.uk

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, children, the elderly and those with heart and lung 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 also 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 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 decline[3].

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[4,5] with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[6]. These health damage costs demonstrate the need to take action on pollutants like fine particulate matter ($PM_{2.5}$) as it can affect larger populations than those where the hot spots (Air Quality Management Areas (AQMAs)) are designated. This is discussed further in Section 2.3.

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[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)
[4] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022 https://assets.publishing.service.gov.uk/media/62ab19c4e90e07038e6df074/CHaPR_AQ_Special_Edition_2206116.pdf
[5] 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
[6] 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

Table ES 1 below provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

In terms of the BCKLWN area, 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 a hundred villages of varying sizes.

The main source of air pollution has been from road traffic which emits the pollutants nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$). The main roads include the A10, A47 plus the A148 through King's Lynn. These roads form the main arterial highway network within the borough.

In King's Lynn the A148 (London Road) extends from the South Gate entrance, then northwards into the town centre where a gyratory system forms around the railway station and bus interchange areas. As the traffic becomes congested along this road we have historically observed elevated levels of the pollutant nitrogen dioxide (NO_2). This has previously resulted in the annual mean objective (40µg/m^3) being exceeded and two Air Quality Management Areas (AQMAs) were declared (Railway Rd and Gaywood Clock) with a resultant Air Quality Action Plan (AQAP) to secure and maintain the necessary improvements.

During 2024 we have updated the AQAP with a new version (AQAP 2024-29) that has been adopted through Council (September 2024[7]) following a public consultation on the measures earlier in the year. At the same time as adopting the updated AQAP and given the continued period of compliance at Gaywood Clock with last exceedance in NO_2 annual mean in 2010, this AQMA has been revoked.

In terms of current NO_2 levels, monitoring data for 2024 is shown in Appendix A that shows a further gradual decline in concentrations that has resulted now in five-continuous years of compliance in the NO_2 annual mean within the remaining AQMA (Railway Rd – London Rd). Furthermore, the annual mean levels over this 5-year period have all been at least 10% below the objective.

Figure ES 1 - Reference Southgates Monitor located adjacent to the A148 London Rd

With 5-continuous years of compliance plus a gradual reduction being observed in the NO_2 annual mean and no new developments shown via modelling to significantly impact air quality as described in Appendix-C Table C.1 we will be putting forward for revocation the remaining AQMA (Railway Rd & London Road) through a Cabinet report (expected by the Autumn 2025). This will mean we no longer require an AQAP and instead it will replaced by an Air Quality Strategy in due course. This work will form the main priority going forward that includes the project on particulate matter.

[7] BCKLWN; https://www.west-norfolk.gov.uk/info/20137/air_quality/170/air_quality_management_areas

In general the reduction in traffic related pollution that is being observed is consistent with changes in how we travel since the pandemic with more people working from home but also shopping online which helps to reduce travel movements. There has also been a gradual improvement in vehicle emission standards associated with the uptake of more modern vehicles of better EURO standard engines as well as an increase in the number of electric vehicles. This overall improvement in emission standards is reflected in the Emission Factor Toolkit published by Defra (EFT, 2025[8]). This is in addition with the previously reported highways improvement measures through the AQAP which have helped reduce traffic related emissions.

Air quality monitoring also extends to particulate matter (PM_{10}/$PM_{2.5}$) and NO_2 using indicative sensor type sensor devices. As the monitoring is non-reference results are appended to this report. We have monitors situated around some local industrial point sources such as an animal feed mill in Stoke Ferry and also around the docks in King's Lynn. Within the year we have also installed a new indicative sensor type device (Earthsense Zephyr) where we see highest NO_2 levels along Railway Rd. This Zephyr is useful to show real-time trends in pollution levels especially ahead of any planned changes to the Gyratory road layout. The Zephyr monitors NO_2 and PM_{10}/$PM_{2.5}$ and went live from the start of Aug-2024.

No exceedances in the objectives have been observed.

We also provide additional information to support this ASR in Appendix-C including an update on the following works/studies;

- West Winch Strategic Growth Area (WWGA); Within the year the first development within the WWGA obtained planning permission (ref; 13/01615/OM).
- Medworth EfW Facility: Within the year this Facility obtained its Development Consent Order (DCO) from the Secretary of State and environmental permit from the Environment Agency.
- King's Lynn Port: We have received some complaints of dusts being emitted from loading operations at King's Lynn docks and have been working with the Port to help develop a dust management plan.

[8] EFT, 2025; https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/

- Parkway / Florence Fields Construction Dust Monitoring Scheme (DMS); this construction site is subject to a DMS. We have been working with the developer on the DMS.

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.

The National Air Quality Strategy (NAQS, 2023[9]) provides the strategic framework for local authorities and other partners to follow to improve air quality. The NAQS consolidated local air quality management duties with the new requirements from the Environment Act 2021 including additional powers on smoke control and supporting the national targets on $PM_{2.5}$ reduction by taking action to reduce these emissions from sources within local authority control. This is discussed further in Chapter 2.

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. Some examples of this work are set out below:

Actions arising through the previous AQAP:

King's Lynn and West Norfolk Council have implemented a number of measures that are likely to have reduced concentrations of NO_2 and associated $PM_{2.5}$ in the borough though 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 2024 period we assessed 111 planning applications.
- The most significant (25) are set out in Table C.1 Appendix-C.

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

Electric Vehicle (EV) Charging Infrastructure:

- 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.
- The Council has also replaced the four legacy 50kW Rapid charging points. Three new Rapid EVCP have been installed at St James' multi -storey car park, King's Lynn and one Rapid EVCP at Central car park, Hunstanton.
- 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[10,11] to keep up to date on the type and locations of EV infrastructure.
- The Council is currently developing a car parking strategy which considers future EV charge point provision.

Traffic Management schemes:

BCKLWN are working with Norfolk County Council on progressing the King's Lynn Area Transport Strategy. An outline business case for improvements to the South Gate and Gyratory transport systems is being progressed to improve the accessibility to cycling and walking and a re-routing of buses as considered necessary for the town centre. Redesigning the transport infrastructure towards active travel is considered a priority.

[10] Zap Map; https://www.zap-map.com/live/
[11] BCKLWN; Locations of EV charging infrastructure; https://www.west-norfolk.gov.uk/info/20095/energy_and_climate_change/921/electric_vehicle_charging_points

The 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. A further update can be reported in next year's ASR once the business case progresses, and transport / air quality assessments submitted.

Local Cycling and Walking Infrastructure Plans:

The council is also working with Norfolk County Council on progressing a local cycling and walking infrastructure plan (LCWIP) for the King's Lynn area[12]. A number of the measures have been prioritised and secured with funding (£6.7m) as part of the council's Active and Clean Connectivity Plan[13]. There is also a Norfolk wide LCWIP[14] to enable wider connectivity across the county.

Measures aimed at $PM_{2.5}$:

We are working closely with Public Health on the Public Health Outcomes Framework (PHOF) indicator D01 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 develop a strategy/project supported by Public Health aimed at reducing exposure to this pollutant borough wide. We still plan to take forward the West Norfolk particulate matter project to assess Borough-wide levels.

Conclusions and Priorities

The key findings for this year are: -

- *No exceedances of the National Air Quality Strategy standards were identified for Nitrogen Dioxide (NO_2) during 2024.*
- *This is the fifth continuous year where compliant results have been observed with no exceedances of the NO_2 annual mean objective. The last time an annual mean exceedance occurred was in 2019 (Railway Rd AQMA Site No 2).*
- *Trends in NO_2 following the first Covid lock-down year of 2020 showed a marked reduction of around 20% in the annual mean NO_2 concentrations. The concern had*

[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

*been the extent of traffic rebound, but annual mean NO_2 concentrations have shown a consistent and gradual reduction since, with all results now at least 10% below the NO_2 objective (40*µg/m^3*).*

- *We went out to public consultation on an updated Air Quality Action Plan (AQAP) early in 2024 and after taking into account comments the updated AQAP was adopted through Council (September 2024[15]). At the same time and due to continued period of compliance with Gaywood Clock AQMA this was also agreed to be revoked.*
- *In 2024 we assessed 111 planning applications. The most significant 25 are listed in Appendix C* Table C.1*.*
- *Modelling of the larger/major developments shows they are unlikely to significantly impact overall NO_2 levels. The contributions from these larger developments on annual mean NO2 are described in Appendix C;*
- *Three new NO2 diffusion tube sites were added in 2024 to help monitor any additional traffic from the Florence Fields development on the Gaywood junction.*
- *An Earthsense Zephyr was installed in June 2024 along Railway Road where we observe highest NO_2 levels. It went live from the start of August 2024. The station is useful to observe trends in pollution levels ahead of any road traffic layout changes as a result of the proposed Gyratory and Southgates transport schemes in King's Lynn.*
- *No exceedances of PM_{10} objectives level were noted during 2024.*
- *No exceedances of the $PM_{2.5}$ national annual mean level were noted during 2024.*

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

- *A cabinet report will be put forward by Autumn 2025 to revoke Railway Rd AQMA given its continued compliance with the NO_2 annual mean over the last 5-years, and no developments as likely to significantly impact the levels.*
- *Orders revoking the AQMAs plus final AQAP will be submitted to LAQM portal following the Cabinet report and submission of this ASR.*
- *On revocation of the remaining Railway Rd AQMA the AQAP will be replaced with an Air Quality Strategy (AQS) to improve air quality in due course.*

[15] BCKLWN, Revocation of Gaywood Clock AQMA; https://www.west-norfolk.gov.uk/info/20137/air_quality/170/air_quality_management_areas

- *The AQS will sit under a county-wide AQ Framework that is being commissioned by Norfolk County Council in collaboration with the districts.*
- *We will continue to attend and work jointly with the Norfolk countywide Air Quality Group.*
- *In support of the national population exposure reduction target for $PM_{2.5}$ we will continue to work with Norfolk County Council's public health specialists to develop a health-based West Norfolk air quality project focussing on PM_{10} & $PM_{2.5}$ across the district by targeting the principal sources within this council's control.*
- *We will carry out the annual review and amend the monitoring programme to ensure monitoring locations remain valid, are representative of public exposure and provide suitable level of data acquisition.*
- *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.*
- *Submit an ASR in June next year (2026) including progress on the Air Quality Strategy for the BCKLWN area.*

How 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 the means to mitigate and where necessary offset these emissions through associated guidance.

As the air quality pollutants are common to sources of the greenhouse gases the LAQM framework has the potential to deliver ancillary benefits. Barriers can potentially form but can be minimised through effective policies & partnership working.

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

- Air Pollution Levels[16]; this web page includes further information about the pollutants we monitor in the borough and how to access to view / download automatic air quality monitoring data[17].
- Air Quality Reports[18]: this includes the Annual Status Reports (ASR) on air quality, previous source apportionment studies and former AQAP.
- Air Quality Information[19]: this web page provides a summary of the current priorities taken from the Executive summary of the ASR. This is updated annually.
- Burning Wood and Coal[20]: this is a dedicated web page on burning of wood and coal with practical advice on minimising emissions with link to Defra's Burn Better, Breathe Better campaign. This section provides details on the Smoke Control Areas in King's Lynn.
- Indoor Air Quality[21]: We also have a webpage on indoor air quality with information on some of the in-door pollutant sources and checklist from Asthma and Lung UK to help with conditions like asthma and COPD.
- Smoke Control Areas[22]; this is a webpage on the Smoke Control Areas (SCA) in King's Lynn. The page has been updated to include the new enforcement provisions on smoke from a chimney in an SCA. The webpage includes an online tool to make it easier to report smoke within the SCAs.

Information is also available from Norfolk County Council's website on the Local Transport Plan's strategy for King's Lynn[23, 24] and also a Local Cycling and Walking Infrastructure Plan (LCWIP[12]) 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/.

[16] https://www.west-norfolk.gov.uk/info/20137/air_quality/171/air_pollution_levels
[17] https://www.norfolkairquality.net/
[18] https://www.west-norfolk.gov.uk/downloads/download/346/air_quality_information_documents
[19] https://www.west-norfolk.gov.uk/info/20137/air_quality/169/air_quality_information
[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] https://www.west-norfolk.gov.uk/homepage/309/smoke_control_areas
[23] 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
[24] 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

We participate in Clean Air Day[25] 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.

[25] Clean Air Day; https://www.actionforcleanair.org.uk/files/cad_24_events_guide_final.pdf

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Figures

Tables

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 2024. 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 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.

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 current AQMA declared by BCKLWN can be found Table 2.1 below.

A local Air Quality Strategy will eventually replace the council's AQAP to improve air quality once the Railway Rd AQMA has been revoked.

This will be developed with support from NCC Public Health focussing on PM_{10} & $PM_{2.5}$ across the district by targeting the principal sources that are within this council's control.

Maps showing the air quality monitoring locations are shown in Appendix D.

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
Railway Rd 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	31.2 µg/m^3	5 years	AQAP 2024-29	AQAP 2024-29

☒ **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:

"On the basis of the evidence provided by the local authority the conclusions reached are accepted for all sources and pollutants. Following the completion of this report, King's Lynn and West Norfolk Borough Council should submit an Annual Status Report in 2024".

Defra Commentary:

1. *There is good in-depth discussion about the planning applications that the council have received in 2023.*

   Response: A similar approach to planning applications is taken forward in this ASR.

2. *There is good in-depth discussion about the additional air quality works done by the council in 2023.*

   Response: A similar approach is provided in Appendix-C.

3. *There is good in-depth discussion about $PM_{2.5}$ emissions in the council's administrative area, and the measures being put in place to reduce $PM_{2.5}$ levels.*

   Response: We have carried this approach forward in this ASR.

4. *Monitoring site CM4 SF should be considered for removal from the results tables as this site has been inactive since 2021.*

   Response: CM4 SF is no longer a referenced within this report. It is redundant and not used anymore.

5. *The site ID names included in Table A.3 are not correct. This should be corrected before publication.*

   Response: Site ID names were corrected.

6. *The AQAPs were published in 2015 and are now considered to be out of date. The AQAPs should be updated and published as soon as possible.*

   Response: We went out to public consultation on a new AQAP early in 2024. This was eventually taken forward for adoption through council in Sept. 2024 as well as the

revocation of Gaywood Clock AQMA. The AQAP has been published on the Council's webpage[26].

7. *The column names in Table 2.2 should match the column names in Table 2.2 contained within the excel template.*

   Response: Column names were corrected.

8. *The proposed measures to be progressed, and priorities for the next reporting year have not been clearly identified. This should be corrected in future reports.*

   Response; Conclusions / Priorities section has been made clearer to show key findings within the year but also priorities for next reporting year.

9. *The footer on page 3 (where Table 2.1 is located) refers to the 2023 ASR instead of the 2024 ASR.*

   Response: Reference to 2023 was a typo and has been corrected.

In terms of progressing measures to address air quality in BCKLWN within the year we went to public consultation on a revised AQAP.

Priorities within the AQAP (see Column 1 of Table 2.2 below) generally reflected the views of the public consultation for more sustainable forms of transport (Priority 1) in conjunction with the second priority for improvements to public transport (bus) system including funding for new electric buses which was supported by NCC Sustainable Transport Team. Within each of the priorities there are a number of measures identified.

The larger transport schemes being planning for King's Lynn that we will review in terms of air quality plus the development of a parking strategy were assigned the third priority within the AQAP mainly due to overall higher cost for these schemes.

We have taken forward the updated AQAP in conjunction with key stakeholders through an action tracker to record updates from all of the partners involved. Details of this work is also shown in Table 2.2.

However, as explained due to continued 5-years of compliance in the NO_2 annual mean and no development identified through modelling as likely to significantly impact levels, the remaining Railway Rd AQMA is to be put forward for revocation, meaning the AQAP will no longer be required. The priority will be to eventually replace this AQAP with an Air

[26] BCKLWN; Air quality management areas | Air quality management areas | Borough Council of King's Lynn & West Norfolk

Quality Strategy. The AQAP as shown in Table 2.2 is therefore for reference purposes as we are due to put forward for revocation the remaining AQMA at Railway Rd.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1.1	Improve active travel promotion to schools	Promoting Travel Alternatives	School Travel Plans	2024	2029	NCC Schools	NCC	Partially Funded	< £10k	Planning	NO2 / PM2.5 - Low	No. of schools around AQMAs with active travel plans	NCC provide funded access to Modeshift Stars for all schools, so that they can develop active travel plans. No. of schools with active travel plans is not known.	School travel plans have been previously successful, but support has since stopped leaving schools to manage (funding issue).
1.2	To develop a BCKLWN Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	2024	2029	BCKLWN Sustrans	BCKLWN	Partially Funded	< £10k	Planning	NO2 / PM2.5 - Low	Outcome(s) to be agreed from adopted / active TP	A BCKLWN workplace Travel Plan is being developed through a council working group.	No national guidance from DfT / best practice examples limits progress
1.3	Development of other workplace / business travel plans	Promoting Travel Alternatives	Encourage / Facilitate homeworking	2024	2029	BCKLWN Private business	Town Deal and Business Rate Pool	Partially Funded	£50k - £100k	Planning	NO2 / PM2.5 - Low	No. of other workplaces with active travel plans	The Council is working with a number of key employers in King's Lynn (6) to help develop other workplace TPs under the Town Deal ACC programme to help identify any barriers to their wider implementation.	Barriers to implementation are part of the project brief.
1.4	Development of Active Travel Hubs	Transport Planning and Infrastructure	Intensive active travel campaign & infrastructure	2024	2029	BCKLWN NCC	Town Deal & Business Rate Pool	Partially Funded	£1m - £10m	Planning	NO2 / PM2.5 - Low	No. of Active Travel Hubs	Two multi-modal active travel hubs are planned; one on outskirts of King's Lynn (Nar Ouse Enterprise Zone) and other in town centre (Baker Lane). No Hubs delivered as yet.	Hubs are planned, awaiting further development.
1.5	Implement the local cycling and walking infrastructure plan (LCWIP)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2024	2029	NCC BCKLWN	A&CC Town Deal project	Partially Funded	£1m - £10m	Planning	NO2 / PM2.5 - Low	Extent of Infrastructure / No. of LCWIP schemes.	A delivery programme is in progress for the LCWIP schemes with funding in place for 2024-2026 with the exception currently of the Tennyson Rd crossing.	The Tennyson Rd crossing needs to be integrated with a railway crossing.
1.6	Support Use of West Lynn Ferry	Promoting Travel Alternatives	Promote use of rail and inland waterways	2012	2029	BCKLWN NCC	TBC based on successful business case	Not Funded	Unknown - TBC	Planning	NO2 / PM2.5 - Low	Continued operation of Ferry Service with funding where necessary to support	Funding has been agreed between BCKLWN and NCC for repairs and remedial works to both landings to bring the Ferry back into use.	Funding has been agreed for a study to assess longer term more permanent solution(s).
2.1	Work with Norfolk County Council to help deliver their Bus Service Improvement Plan (BSIP)	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2024	2029	NCC Bus Operators	DfT Bus Back Better	Funded	> £10m	Planning	NO2 / PM2.5 Low - Medium	TBC	The 22/25 BSIP programme is in delivery including implementation of bus lanes, subsidised fares and upgrades to bus stations and bus stops.	A consultation has been carried out (Jan 2025) to inform future priorities.
2.2	Zero Emission Buses in King's Lynn	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2024	2029	NCC Bus Operators	DfT ZEBRA funding	Not Funded	Unknown - TBC	Planning	NO2 / PM2.5 - Medium	No. of zero emission buses	Should the opportunity arise NCC will liaise with Bus Operators to develop and submit a bid if appropriate	NCC is awaiting further indications from the Department for Transport regarding whether future opportunities to bid for zero emission bus support will be forthcoming.
3.1	Review changes to the road system within the King's Lynn Town Centre gyratory system (Railway Rd AQMA).	Traffic Management	UTC, Congestion management, traffic reduction	2024	2029	NCC BCKLWN	NCC Levelling Up Fund 2 (£24m)	Partially Funded	< £10k	Planning	Reduction in NO2/PM2.5 is dependent on AQ Modelling against preferred option(s)	Continued NO_2 monitoring, with aim for downward trends	The STARS projects are progressing at NCC towards Outline Business Case. Expected timescale potentially by summer 2025.	AQ review is dependent traffic data being made available.
3.2	Review traffic related changes as part of the Southgates Masterplan	Traffic Management	UTC, Congestion management, traffic reduction	2024	2029	NCC BCKLWN	NCC Levelling Up Fund 2 (£24m)	Partially Funded	< £10k	Planning	Reduction in NO2/PM2.5 is dependent on AQ Modelling against preferred option(s)	Continued NO_2 monitoring, with aim for downward trends	The STARS projects are progressing at NCC towards Outline Business Case. Expected timescale potentially by summer 2025.	AQ review is dependent traffic data being made available.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
3.3	Develop and Implement a comprehensive Car-Parking Strategy for King's Lynn	Traffic Management	UTC, Congestion management, traffic reduction	2024	2029	BCKLWN NCC	BCKLWN	Funded	Unknown - TBC	Planning	NO2 / PM2.5 - Low	TBC	Work ongoing to review and deliver the draft parking strategy.	Parking strategy to review the options.
4.1	To consider air quality from new developments and secure mitigation	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2024	2029	BCKLWN	BCKLWN	Funded	< £10k	Implementation	Minimum amount of pollution from schemes lifetime	No of planning application considered per year	On-going - no. of planning applications reviewed in 2024 (111).	Interim planning guidance only available for $PM_{2.5}$. Await final version.
5.1	Promote behaviour change from individuals and employers	Public Information	Via the Internet	2029	2029	NCC Public Health BCKLWN	NCC	Partially Funded	Unknown - TBC	Implementation	NO2 / PM2.5 - Low	Increased awareness	A number of initiatives are promoted aimed at improving AQ including Clean Air Day, Defra's Burn Better, Breathe Better campaign.	County-wide framework will help to establish priority areas.
5.2	Improve Public Awareness (Air Quality Monitoring and Information)	Public Information	Via the Internet	2024	2029	NCC Public Health BCKLWN	BCKLWN	Partially Funded	Unknown - TBC	Implementation	NO2 / PM2.5 - Low	Increased Awareness of Air Quality	The Norfolk Countywide Air Quality Partnership, with support from Public Health, are in the process of developing a strategic document to highlight air quality issues across the County. This will establish priority areas and actions will follow this, including potential comms and engagement work. Norfolk AQ Summit event held in Aug 2025 setting out the impacts from air pollution with a view for improved collaboration.	There are more intuitive and up to date websites that disseminate AQ results and related information to the public. New website dependent on funding.
6.1	To develop an Air Quality Project to review the impact of PM10 and PM2.5 across the district.	Public Information	Via the Internet	2024	2029	NCC Public Health BCKLWN	DEFRA BCKLWN NCC	Partially Funded	Unknown - TBC	Planning	NO2 / PM2.5 - Low	Completion of project	Draft report prepared with help from public health focussing on PM2.5..	NCC Public Health support the project.

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[27], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$) sources that are within their control. There is clear evidence that this fine particulate matter fraction less than 2.5 micrometres is strongly linked to adverse health impacts, including premature mortality, allergic reactions, and cardiovascular diseases. There is also a growing body of evidence that $PM_{2.5}$ is linked to dementia which is of particular interest in Norfolk which has a rapidly ageing population, and where dementia is now one the leading causes of mortality[28].

The Public Heath Outcome Framework (PHOF) indicator D01 provides an attributable mortality estimate in the area (5.2%[29]) when based on an average or population weighted exposure to the human derived proportion of $PM_{2.5}$[30]. This relative risk indicator does not appear to have been updated and is therefore the same value from last year's ASR. This indicator is considered important as it forms the basis of action through all delivery partners under the county-wide Joint Strategic Needs Assessment to tackle air pollution in the area.

To help drive forward improvements in air quality the Environment Act 2021 set national targets for $PM_{2.5}$ that local authorities are tasked to support as shown below in Table 2.3 below. The national targets include an Annual Mean Concentration Target (AMCT) and also a Population Exposure Reduction Target (PERT) to be achieved by 2040. In summary;

a) **$PM_{2.5}$ annual mean concentration target (AMCT)**; as confirmed in last year's ASR there are no 1km x 1km grid squares in the BCKLWN area that are modelled by Defra background maps as likely to exceed the $10\mu gm^{-3}$ $PM_{2.5}$ annual mean target for the BCKLWN area; and,

[27] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023
[28] Air Pollution and dementia *BMJ* 2023; 381 doi: https://doi.org/10.1136/bmj.p655 (Published 05 April 2023)
[29] Dept of Health and Social Care; Fingertips Data: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000006/ati/301/are/E07000146/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/car-do-0
[30] Defra UK-Air; https://uk-air.defra.gov.uk/data/pcm-data

b) **$PM_{2.5}$ population exposure reduction target (PERT)**; For the BCKLWN area a 35% reduction from 2018 baseline will require annual mean $PM_{2.5}$ concentration to reduce on an average to **6.1 μgm^{-3} by 2040** (see Table 2.3 below).

Table 2.3 – National PM2.5 Targets projected within BCKLWN

National Target	$PM_{2.5}$ National Target measure	BCKLWN Target $\mu g/m^3$	Deadline
Annual Mean Concentration target (AMCT)	10 $\mu g/m^3$ concentration to be achieved nationwide	10 $\mu g/m^3$	By 2040
Interim Annual Mean Concentration Target	12 $\mu g/m^3$ concentration to be achieved nationwide	12 $\mu g/m^3$	By 2028
Population exposure reduction target (PERT)	35% reduction in average population exposure compared to 2018 baseline	6.1 $\mu g/m^3$	By 2040
Interim Population exposure reduction target	22% reduction in average population exposure compared to 2018 baseline	7.33 $\mu g/m^3$	By 2028
Current average $PM_{2.5}$ in BCKLWN (2024)		**5.6 $\mu g/m^3$**	

The current annual average $PM_{2.5}$ concentration for the BCKLWN area when based on the updated Defra background maps (2021 reference year) in 2024 is **5.6μgm^{-3}.**

This highlights that the BCKLWN area is therefore likely to be compliant with the PERT ahead of its 2040 target.

Previously, in last year's ASR we noted a potential challenge with the PERT as levels were noted to be much higher. The change is due to Defra background maps being updated that now show a much lower modelled $PM_{2.5}$ level and therefore a much lower overall average concentration district wide. The reason for the reduction in $PM_{2.5}$ concentrations is explained in UK's Informative Inventory Report (Ricardo, 2025[31]) that provides the background to UK's emission inventory as reflected in these maps. This

[31] Ricardo, 2025, NAEI, UK Informative Inventory Report, 2025, https://naei.energysecurity.gov.uk/sites/default/files/2025-03/GB_IIR_2025_Submission.pdf

explains that the modelling for $PM_{2.5}$ includes updated emission factors for residential wood-burning that takes into account types of stove/fireplace plus also moisture content of wood.

However, to provide further context to the Defra modelled estimates we also carry out monitoring for $PM_{2.5}$ using indicative (iMCERTS) sensor type devices as shown in Appendix C Table C.6. The results are set out in Appendix C.

In terms of measures to further reduce average $PM_{2.5}$ levels we are already carrying out the following;

- We review planning applications and where necessary recommend suitable conditions to help ensure only minimal pollution is emitted in line with the Interim Planning Guidance from Defra on $PM_{2.5}$ and the National Air Quality Strategy (2023).
- Implement the 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 road-NO_x.
- Regulation of LAPPC prescribed processed though environmental permits to ensure compliance with Best Available Techniques (BAT) and where necessary compliance with any emissions limits.
- We 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);
- Published advice on Council's website about indoor quality with links to check lists from Asthma and Lung UK to help reduce exposure to the indoor $PM_{2.5}$ and other pollutants.
- We continue to work with colleagues within the Countywide Air Quality Group on $PM_{2.5}$ work.
- Carry out reviews of National Atmospheric Emissions Inventory (NAEI) submissions as explained above. The latest UK Informative Inventory Report (2025[31]) shows that residential burning of wood accounts for over 40% of the $PM_{2.5}$ emission from combustion sector and about 10% of total UK $PM_{2.5}$ emissions in 2023. National estimates from domestic sources are noted though by NAEI to be prone to uncertainty due to lack of comprehensive wood fuel sales data.

- In terms of PM from traffic, it notes that tail-pipe emissions are no longer the largest source of PM, as brake and tyre wear and road abrasion are now considered the larger source due to the volume of traffic.
- To help improve the understanding of these sources of $PM_{2.5}$ district-wide and to support the national targets we are looking to develop a health-based project focussing on particulate matter. The project will be supported by Norfolk County Council Public Health and other specialists. The project is still being developed. Further details can be reported in next year's ASR.
- Since wood burning from the domestic sector is thought to be responsible for such a large proportion of the total primary $PM_{2.5}$ load we have made it easier for individuals to report smoke from chimneys within any of the 8 Smoke Control Areas (SCAs) in King's Lynn via an online tool[32,33]. This tool went live in December 2023.
- For the 2024 period we received one report of smoke being emitted from a chimney within the Reffley Rd SCA in King's Lynn. This was investigated. It was confirmed that an approved appliance was being used to burn wood after being dried / seasoned and following advice no further reports of smoke being emitted were made. Conversely, outside of the SCAs there were only 6 reports of smoke emitted from a domestic chimney causing a potential nuisance.
- We will keep these instances of smoke emitted from chimneys under review to ensure the Smoke Control Areas remain valid.
- To help promote best practice within the domestic sector burning wood we publicise the national Better Burn, Breathe Better (Defra) campaign through the council's website. This sets out the types of solid fuel which should be used and how to minimise $PM_{2.5}$ emissions.
- We also participate in Global Action Plan's Clean Air Day. There is the potential to take forward these initiatives further through the council's Air Quality Strategy.
- For the larger boilers burning wood (>45kW_{th}) we assess these individually and maintain an inventory of their emission rates. A summary of these installations is shown Table F.1. Within the year we assessed a further 6 biomass boilers that were added to this inventory. None of these larger heating systems were considered likely to cause a significant impact. The largest by thermal capacity in the area remains at around 3MW if based on its aggregated thermal capacity.

[32] SCA reporting tool; https://www.west-norfolk.gov.uk/info/20137/air_quality/633/burning_wood_and_coal
[33] Defra UK-Air; https://uk-air.defra.gov.uk/data/sca/

- New for this year's ASR we have included in Table F.2 an inventory of Anaerobic Digestion (AD) Facilities. Emission inventory from Defra[34] shows ammonia emitted from 'non-manure' digestate spreading such as from AD Facilities increased within the year by 143 per cent. This is useful to note for LAQM purposes especially as ammonia from these activities is source of secondary $PM_{2.5}$ and therefore can be an additional consideration wherever these wastes become aggregated around these AD Facilities.

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

This section sets out the monitoring undertaken within 2024 by BCKLWN and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2020 and 2024 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Reference monitors

BCKLWN undertook automatic (continuous) monitoring at two sites with NO_2 chemiluminescent analysers during 2024. Table A.1 in Appendix A shows the details of the automatic monitoring sites. Monitoring data is available via the Norfolk Air Quality website and also via Defra's UK-Air website.

Indicative / sensor-based monitors

We also carry out indicative continuous monitoring using 4x Turnkey Osiris monitors that analyse both $PM_{2.5}$ and PM_{10} background concentrations around the main industrial areas, including either side of King's Lynn Port and around an animal feed mill in Stoke Ferry. An

[34] Defra, Emissions of air pollutants in the UK – Summary; https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-summary

Earthsense Zephyr analyses for PM_{10}, $PM_{2.5}$ and NO_2 and is deployed along Railway Rd in King's Lynn.

As these are non-reference the results are appended to this report (see Appendix C in Tables C.7 to C.9). Whilst non-reference, they benefit from iMCERTS accreditation for the PM_{10} and $PM_{2.5}$.

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

3.1.2 Non-Automatic Monitoring Sites

BCKLWN undertook non-automatic (i.e. passive) monitoring of NO_2 at 75 sites during 2024. Table A.2 Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D.

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

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 (NO_2)

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

For diffusion tubes, the full 2024 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.

NO_2 Diffusion Tube Bias Adjustment

In terms of bias adjustment a local co-location study was carried out at the Southgates continuous monitoring station against Socotec (50% TEA) diffusion tubes in triplicate. Table C.4 shows the bias adjustment from this local study (0.76) was used in preference to a national factor (bias 0.78, LAQM version 06/25) as data capture and acquisition levels were good. The local study is also preferred as it takes into account local weather conditions than simply an average obtained from studies outside of the area.

Annualisation

Data acquisition was poor (less than 75%) for diffusion tube sites 26, 28, 48, 66 and 110 and therefore results were annualised in accordance with LAQM TG-22 with annualisation results shown in Table C.3 that estimates an annual mean based on short-term monitoring results.

Trends

Trends in the annual mean NO_2 results are shown in Figure A.1 to Figure A.5 that show the spatial extent of concentrations within Railway Rd AQMA and also outside.

Summary

Exceedances were last observed in the annual mean NO_2 concentrations from:

- Former Gaywood Clock AQMA in 2010 (42.4µg/m^3) and,
- Railway Rd AQMA in 2019 (42.4µg/m^3).
- In 2024 there were no exceedances of the annual mean objective for NO_2 (40µg/m^3).

Railway Rd AQMA

In terms of NO_2 monitoring within Railway Rd AQMA it benefits from 25 diffusion tube sites plus the continuous analyser at Southgates with the triplicate co-location study and new for 2024 an Earthsense Zephyr sensor close to where we see highest annual mean.

Trend data is shown in Figures A.1 to A.5. This shows trends in concentrations separately along the north and south bound sections of the A148 that forms Railway Rd AQMA. Figure A.1 shows the annual mean NO_2 concentrations progressively increase and peak along the north bound section at monitoring site 2 which is historically the area where highest NO_2 is observed. This corresponds to an area where the highway opens up to multiple lanes with stop-start traffic plus and with buildings close to the kerb i.e. a street canyon type effect. The annual mean for site 2 in 2024 was 31.2µg/m^3 showing a further gradual reduction in pollutant concentration when compared to previous years. As site 2 is just north of the Albion St / Railway Rd junction it receives an additional contribution of road-NOx from buses as they leave the intechange area.

The trend data even at this area that experiences highest NO_2 annual mean concentration shows gradual and continued reduction in NO_2 pollutant concentrations over the last five years, with all results at least 10% below the annual mean objective.

We had mentioned in last year's ASR of planned changes as a result of the Gyratory and Southgates transport schemes potentially impacting the Railway Rd AQMA, however the basis of these schemes is to improve access to cycle and walking and likely to lead to further separation of traffic from sensitive receptors, and therefore with a further fall-off in NOx concentrations. The Eathsense Zephyr, whilst indicative will help to assess any diurnal changes and short-term impacts in this area.

Monitoring outside of AQMAs

Selected NO_2 monitoring trend data outside of the AQMAs is shown in Figure A. which highlights the following trends at these key sites;

a) **West Winch site 73**; An area that attracts public attention is the A10 as traffic levels are relatively high. The area is also identifed as a strategic growth area with a new housing access road to link the A10 to the A47. We have a monitoring site along the A10 (site 73) at West Winch. Trends from this site show NO_2 to be relatively constant and significantly less than the objective since pre-Covid period.
b) **Site 87 Albion St**: This site is also useful as it is located at the junction with the bus station and Railway Rd. The monitoring site is set back from the junction and therefore shows the proportion of road-NO_2 from vehicles, especially buses leaving the station.

Results were all less than the NO_2 annual mean objective, therefore no new AQMAs are proposed.

Short term NO_2 exposure

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

Trend data is shown for these sites that are located outside of AQMAs but nevertheless where potential short-term exposure can occur. As can be seen in Figure A.5 results are significantly less than the 60µg/m^3 NO_2 at site 86 level that would otherwise indicate an exceedance in the short-term mean objective.

Also presented in Table A.5 are results from the ratified continuous monitored NO_2 hourly mean concentrations for the past five years that are compared to the short term mean objective of 200µg/m^3 that must not to be exceeded more than 18 times per year. This shows no exceedances.

3.2.2 Particulate Matter (PM_{10})

PM_{10} monitoring is carried out using Turnkey Osiris and Earthsense Zephyr indicative sensor type devices, with results reported in Appendix C Tables C.7 and C.8. Osiris benefit from heated air inlets to correct for humidity and both the Zephyr and Osiris benefit from iMCERTS accreditation for PM_{10} and $PM_{2.5}$.

3.2.3 Particulate Matter ($PM_{2.5}$)

We are not required to carry out monitoring for this pollutant but do so in conjunction with the PM_{10} analysis through the Osiris and Zephyr monitors. Results are reported in Appendix C Table C.9

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? (1)	Monitoring Technique	Distance to Relevant Exposure (m) (2)	Distance to kerb of nearest road (m) (1)	Inlet Height (m)
CM_SG	Southgate AQMS	Roadside	562226	319196	NO2	Yes	Railway Rd AQMA	Chemiluminescence	13.4	4.0	1.7
CM_GW	Gaywood AQMS	Roadside	563445	320475	NO2	No	N/a	Chemiluminescence	5.3	1.7	1.7

Notes:

(1) N/A if not applicable

(2) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

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 Rd No. 1	Kerbside	562074	320300	NO2	Yes, Railway Rd AQMA	5.1	1.8	No	2.5
2	Railway Rd No.4	Roadside	562108	320196	NO2	Yes, Railway Rd AQMA	0.0	1.7	No	2.4
3	Railway Rd No.5	Roadside	562116	320094	NO2	Yes, Railway Rd AQMA	0.0	1.5	No	2.4
5	King's Lynn Bus Station	Urban Centre	562003	320098	NO2	No	0.0	0.5	No	2.2
6, 7, 8	Southgates Monitoring Station	Roadside	562225	319196	NO2	Yes, Railway Rd AQMA	13.4	4.0	Yes	1.7
9	Stonegate Street	Roadside	561911	319710	NO2	No	0.0	6.0	No	2.5
10	London Rd No.1	Roadside	562099	319670	NO2	Yes, Railway Rd AQMA	0.0	6.0	No	1.4
11	London Rd No. 2	Roadside	562165	319575	NO2	Yes, Railway Rd AQMA	0.0	6.8	No	2.2
12	London Rd No.3	Roadside	562242	319452	NO2	Yes, Railway Rd AQMA	0.0	4.4	No	2.1
13	London Rd No.4	Roadside	562263	319374	NO2	Yes, Railway Rd AQMA	0.0	5.0	No	2.2
14	London Rd No.5	Roadside	562227	319266	NO2	Yes, Railway Rd AQMA	0.0	4.3	No	2.2
15	Ford Building, South Gate	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, South Gate	Roadside	562266	319042	NO2	No	0.0	9.0	No	2.2
19	Vancouver Av	Roadside	562277	319098	NO2	No	0.0	5.6	No	1.7
20	London Rd No.10	Roadside	562249	319275	NO2	Yes, Railway Rd AQMA	0.0	3.7	No	2.2
22	London Rd No.6	Roadside	562284	319385	NO2	Yes, Railway Rd AQMA	0.0	5.0	No	2.1
23	London Rd No.7	Roadside	562161	319614	NO2	Yes, Railway Rd AQMA	0.0	4.5	No	2.1
24	London Rd No.8	Roadside	562130	319660	NO2	Yes, Railway Rd AQMA	0.0	5.3	No	2.0
25	Framingham's Almhouses	Urban Background	562190	319694	NO2	No	0.0	77.0	No	1.8
26	Railway Rd No.7	Roadside	562131	319996	NO2	Yes, Railway Rd AQMA	0.0	3.0	No	2.2
27	St John's Terrace	Roadside	562177	319999	NO2	Yes, Railway Rd AQMA	0.0	5.1	No	2.1
28	St John's / Blackfriar's	Roadside	562253	320015	NO2	Yes, Railway Rd AQMA	0.0	1.4	No	2.6
29	Waterloo St	Urban Background	562182	320057	NO2	No	0.0	3.0	No	1.6
30	Portland St	Urban Background	562207	320108	NO2	No	2.7	0.8	No	2.4
31	Railway Rd No.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 Rd No.3	Roadside	562119	320216	NO2	Yes, Railway Rd AQMA	0.0	2.0	No	2.4
33	Wellesley St	Roadside	562202	320158	NO2	No	1.8	1.4	No	2.4
34	Blackfriars No.2	Roadside	562244	320128	NO2	Yes, Railway Rd AQMA	0.0	2.3	No	2.4
35	Blackfriars No.1	Roadside	562244	320238	NO2	Yes, Railway Rd AQMA	0.0	4.4	No	2.3
36	Norfolk St	Roadside	562216	320318	NO2	Yes, Railway Rd AQMA	0.0	2.0	No	2.2
37	The Shrubberies, Blackfriars	Roadside	562253	320258	NO2	Yes, Railway Rd AQMA	0.0	4.4	No	2.2
38	Littleport St	Roadside	562256	320322	NO2	Yes, Railway Rd AQMA	0.0	2.6	No	2.4
39	Gaywood Rd No.2	Roadside	562822	320426	NO2	No	0.0	7.0	No	4.0
40	The Swan, Gayton Road	Roadside	563490	320469	NO2	No	0.0	2.8	No	2.5
41	Wootton Rd No.3	Roadside	563477	320514	NO2	No	0.0	2.0	No	4.0
42	Wootton Rd No. 1	Roadside	563480	320581	NO2	No	0.0	3.0	No	1.7
43	Lynn Rd No.1	Roadside	563411	320476	NO2	No	0.0	6.0	No	3.3
44	Lynn Rd No. 2	Roadside	563377	320484	NO2	No	0.0	2.0	No	3.8

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)
45	Gaywood Rd No.3	Roadside	563202	320488	NO2	No	0.0	4.5	No	2.2
46	Gaywood Rd No.1	Roadside	562565	320509	NO2	No	0.0	6.5	No	2.1
47	Austin St No.1	Roadside	562186	320376	NO2	Yes, Railway Rd AQMA	0.0	3.2	No	2.1
48	Austin St No.2	Roadside	562172	320370	NO2	Yes, Railway Rd AQMA	0.0	2.1	No	2.6
51	Wootton Rd No.3	Roadside	563521	320628	NO2	No	0.0	6.9	No	1.8
52	Lynn Rd No.3	Roadside	563288	320504	NO2	No	0.0	6.6	No	1.7
58	Nar Ouse Way, South Gate	Roadside	562171	319018	NO2	No	40.0	2.5	No	2.5
62	Burney Rd, South Lynn	Roadside	561608	318601	NO2	No	0.0	6.8	No	1.8
66	Highgate Infant School	Urban Background	562595	320527	NO2	No	0.0	17.0	No	2.4
67	Greyfriars School, London Road	Urban Background	562235	319578	NO2	No	0.0	19.9	No	2.3
68	St James Nursery London Road	Urban Background	562142	319837	NO2	No	0.0	31.6	No	2.0
69	Whitefriars Primary School No1	Urban Background	561993	319394	NO2	No	0.0	25.1	No	2.2
70	Whitefriars Primary School No2	Urban Background	561929	319354	NO2	No	0.0	N/a	No	2.4

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)
73	West Winch Spar Shop, A10 Main Road	Roadside	563161	315848	NO2	No	0.9	1.6	No	2.0
75	The Swan, Gayton Road	Roadside	563468	320469	NO2	No	0.0	2.1	No	2.9
76	Hardwick Bridge Residential Park	Roadside	562597	318739	NO2	No	0.0	8.5	No	1.7
79	Tennyson Av / Gaywood Rd junction	Roadside	562799	320468	NO2	No	0.0	1.8	No	2.2
86	Taxi Rank at Bus Station	Other	562018	320138	NO2	No	0.0	1.0	No	2.3
87	Albion St / Railway Rd junction	Roadside	562102	320163	NO2	No	0.0	2.5	No	2.1
89	Whitefriars Terrace	Roadside	561887	319466	NO2	No	0.0	1.4	No	2.4
90	Spenser Rd	Roadside	563366	322065	NO2	No	0.0	6.0	No	1.8
91	Reid Way	Roadside	563255	321613	NO2	No	0.0	4.7	No	2.3
92	Garden Court	Roadside	563256	321588	NO2	No	0.0	15.0	No	2.2
94	Wisbech Rd, South Lynn	Roadside	561957	318963	NO2	No	0.0	7.3	No	2.0
95	Harvest House, Wisbech Road	Roadside	562058	319038	NO2	No	0.0	7.2	No	1.9
96	Carp Terrace, King's Lynn	Roadside	562042	319011	NO2	No	0.0	8.4	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)
97	Low Road / Grimston Rd junct.	Roadside	564503	322411	NO2	No	0.0	8.0	No	2.0
98	Greenpark Avenue	Roadside	562821	320964	NO2	No	0.0	4.8	No	1.8
99	West Walton High School	Suburban	547792	313121	NO2	No	27.0	1.0	No	2.3
100	Chapnall Rd, Wisbech	Suburban	547902	310395	NO2	No	0.0	14.0	No	1.8
101	Elm High Rd No.2, Wisbech	Roadside	547094	307850	NO2	No	0.0	5.2	No	1.8
102	Railway Rd No.6	Roadside	562104	320209	NO2	Yes, Railway Rd AQMA	0.0	1.7	No	2.1
103	Railway Rd No.7	Roadside	562116	320128	NO2	Yes, Railway Rd AQMA	0.0	1.7	No	2.1
104	Fenman Pub, Blackfriars Rd	Roadside	562247	320075	NO2	No	1.3	0.7	No	2.1
110	Elm High Rd No.1, Wisbech	Roadside	546884	308315	NO2	No	0.0	6.0	No	2.2
111	Queen Mary Rd NB No.1	Roadside	563370	320416	NO2	No	0.0	8.0	No	2.3
112	Queen Mary Rd SB No.1	Roadside	563402	320381	NO2	No	0.0	17.3	No	2.3
113	Queen Mary Rd NB No.2	Roadside	563344	320176	NO2	No	0.0	10.1	No	2.3

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
CM_SG	562226	319196	Roadside	98.7	98.7	14.2	17.6	14.0	14.8	13.6
CM_GW	563445	320475	Roadside	98.6	98.6	26.7	26.4	24.0	24.8	22.6

☒ **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.**

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2024.**

Notes:

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

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

All means have been "annualised" as per LAQM.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 NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
1	562074	320300	Kerbside	100.0	100.0	25.8	28.7	28.4	27.5	24.9
2	562108	320196	Roadside	100.0	100.0	33.2	33.7	32.9	32.5	31.2
3	562116	320094	Roadside	90.6	90.6	26.4	30.1	29.1	28.5	26.3
5	562003	320098	Urban Centre	90.6	90.6	17.5	20.5	20.3	19.9	18.6
6, 7, 8	562225	319196	Roadside	100.0	100.0	15.7	18.2	17.6	14.3	13.5
9	561911	319710	Roadside	90.6	90.6	13.7	15.2	15.0	12.9	11.4
10	562099	319670	Roadside	92.5	92.5	26.6	29.0	27.8	26.2	27.1
11	562165	319575	Roadside	90.6	90.6	21.2	22.3	22.8	21.1	19.7
12	562242	319452	Roadside	81.1	81.1	22.5	23.5	24.5	23.6	22.2
13	562263	319374	Roadside	100.0	100.0	21.7	22.9	22.2	21.0	19.0
14	562227	319266	Roadside	92.5	92.5	25.9	25.5	24.0	23.5	22.8
15	562189	319101	Roadside	83.0	83.0	27.0	29.6	28.2	26.9	25.6

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 2024 (%) (2)	2020	2021	2022	2023	2024
18	562266	319042	Roadside	83.0	83.0	18.9	19.9	19.7	17.8	15.9
19	562277	319098	Roadside	100.0	100.0	19.9	18.4	18.6	16.5	15.4
20	562249	319275	Roadside	100.0	100.0	21.7	23.8	22.7	23.0	20.0
22	562284	319385	Roadside	100.0	100.0	21.8	25.2	23.7	23.3	20.4
23	562161	319614	Roadside	100.0	100.0	23.1	26.4	25.4	24.2	21.4
24	562130	319660	Roadside	100.0	100.0	21.4	23.8	23.9	23.4	20.6
25	562190	319694	Urban Background	100.0	100.0	11.4	11.5	11.7	11.9	9.1
26	562131	319996	Roadside	67.9	67.9	23.0	26.3	25.4	25.2	24.4
27	562177	319999	Roadside	92.5	92.5	20.0	22.8	22.2	21.2	18.4
28	562253	320015	Roadside	64.2	64.2	19.5	22.4	22.5	21.5	20.7
29	562182	320057	Urban Background	100.0	100.0	12.7	13.3	13.4	12.5	10.8
30	562207	320108	Urban Background	83.0	83.0	13.8	14.9	14.6	13.2	12.0
31	562128	320131	Roadside	75.0	75.0	21.2	24.0	19.8	23.3	20.4

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 2024 (%) (2)	2020	2021	2022	2023	2024
32	562119	320216	Roadside	100.0	100.0	21.3	22.8	21.9	20.5	19.1
33	562202	320158	Roadside	100.0	100.0	20.3	20.8	21.9	20.9	17.8
34	562244	320128	Roadside	100.0	100.0	22.9	23.5	24.1	23.1	19.3
35	562244	320238	Roadside	100.0	100.0	20.7	22.4	22.3	21.7	19.4
36	562216	320318	Roadside	100.0	100.0	19.4	21.0	21.6	19.9	17.3
37	562253	320258	Roadside	100.0	100.0	23.3	23.9	22.1	19.8	18.6
38	562256	320322	Roadside	100.0	100.0	24.9	26.9	27.9	25.2	23.0
39	562822	320426	Roadside	100.0	100.0	17.7	19.3	18.9	16.9	14.5
40	563490	320469	Roadside	100.0	100.0	24.6	25.6	26.7	26.0	23.0
41	563477	320514	Roadside	100.0	100.0	24.5	25.2	26.3	25.1	23.8
42	563480	320581	Roadside	100.0	100.0	22.9	23.7	23.2	21.6	19.8
43	563411	320476	Roadside	100.0	100.0	22.0	25.4	24.4	23.5	21.4
44	563377	320484	Roadside	100.0	100.0	26.3	27.0	27.8	27.4	25.2

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 2024 (%) (2)	2020	2021	2022	2023	2024
45	563202	320488	Roadside	100.0	100.0	19.5	22.3	21.4	20.5	17.4
46	562565	320509	Roadside	100.0	100.0	17.6	20.1	19.1	17.8	17.0
47	562186	320376	Roadside	100.0	100.0	21.5	23.6	24.7	22.0	20.6
48	562172	320370	Roadside	66.0	66.0	19.1	15.6	21.9	18.6	20.3
51	563521	320628	Roadside	92.5	92.5	13.6	14.6	14.3	13.2	11.0
52	563288	320504	Roadside	100.0	100.0	21.7	23.6	23.1	22.4	19.9
58	562171	319018	Roadside	100.0	100.0	19.7	20.9	21.0	18.7	17.3
62	561608	318601	Roadside	100.0	100.0	9.9	10.9	10.4	10.0	7.9
66	562595	320527	Urban Background	66.0	66.0	16.7	17.5	17.3	16.4	13.8
67	562235	319578	Urban Background	92.5	92.5	12.1	11.6	12.0	10.6	9.2
68	562142	319837	Urban Background	75.0	75.0	15.2	14.1	13.2	11.3	11.2
69	561993	319394	Urban Background	75.0	75.0	9.4	9.8	9.2	9.0	7.0
70	561929	319354	Urban Background	92.5	92.5	11.8	9.1	8.1	8.1	6.6

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 2024 (%) (2)	2020	2021	2022	2023	2024
73	563161	315848	Roadside	100.0	100.0	16.2	16.5	16.6	15.5	15.9
75	563468	320469	Roadside	100.0	100.0	26.5	28.0	27.7	25.4	24.1
76	562597	318739	Roadside	100.0	100.0	13.9	14.0	14.8	13.0	11.6
79	562799	320468	Roadside	84.9	84.9	23.8	26.0	25.8	24.7	22.4
86	562018	320138	Other	92.5	92.5	19.5	20.1	22.1	19.9	19.3
87	562102	320163	Roadside	100.0	100.0	19.3	24.1	23.0	21.3	19.5
89	561887	319466	Roadside	100.0	100.0	9.7	9.7	9.7	8.5	9.2
90	563366	322065	Roadside	100.0	100.0	11.5	11.8	11.8	10.4	9.6
91	563255	321613	Roadside	100.0	100.0	11.0	11.0	11.1	9.8	8.4
92	563256	321588	Roadside	92.5	92.5	9.2	9.7	10.1	8.3	7.7
94	561957	318963	Roadside	90.6	90.6	15.9	16.4	16.9	15.5	13.3
95	562058	319038	Roadside	100.0	100.0	12.0	13.0	12.6	13.0	10.3
96	562042	319011	Roadside	100.0	100.0	14.4	15.1	15.7	13.7	11.4

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 2024 (%) (2)	2020	2021	2022	2023	2024
97	564503	322411	Roadside	100.0	100.0	14.1	15.1	15.6	14.2	12.3
98	562821	320964	Roadside	100.0	100.0	From 2021	11.2	11.6	9.9	8.9
99	547792	313121	Suburban	100.0	100.0	From 2021	7.8	7.4	6.5	5.6
100	547902	310395	Suburban	92.5	92.5	From 2021	9.5	9.2	8.3	6.7
101	547094	307850	Roadside	100.0	100.0	From 2021	27.8	28.3	26.5	26.4
102	562104	320209	Roadside	100.0	100.0	From 2022	From 2022	32.1	29.7	29.2
103	562116	320128	Roadside	90.6	90.6	From 2022	From 2022	30.7	29.3	26.9
104	562247	320075	Roadside	100.0	100.0	From 2022	From 2022	27.2	24.8	23.2
110	546884	308315	Roadside	66.0	66.0	From 2023	From 2023	From 2023	14.6	14.3
111	563370	320416	Roadside	92.5	92.5	From 2024	From 2024	From 2024	From 2024	10.0
112	563402	320381	Roadside	92.5	92.5	From 2024	From 2024	From 2024	From 2024	8.0
113	563344	320176	Roadside	92.5	92.5	From 2024	From 2024	From 2024	From 2024	7.8

☒ **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/m^3.

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.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 NO_2 Concentrations along the A148 Railway Rd (Gyratory North Bound)

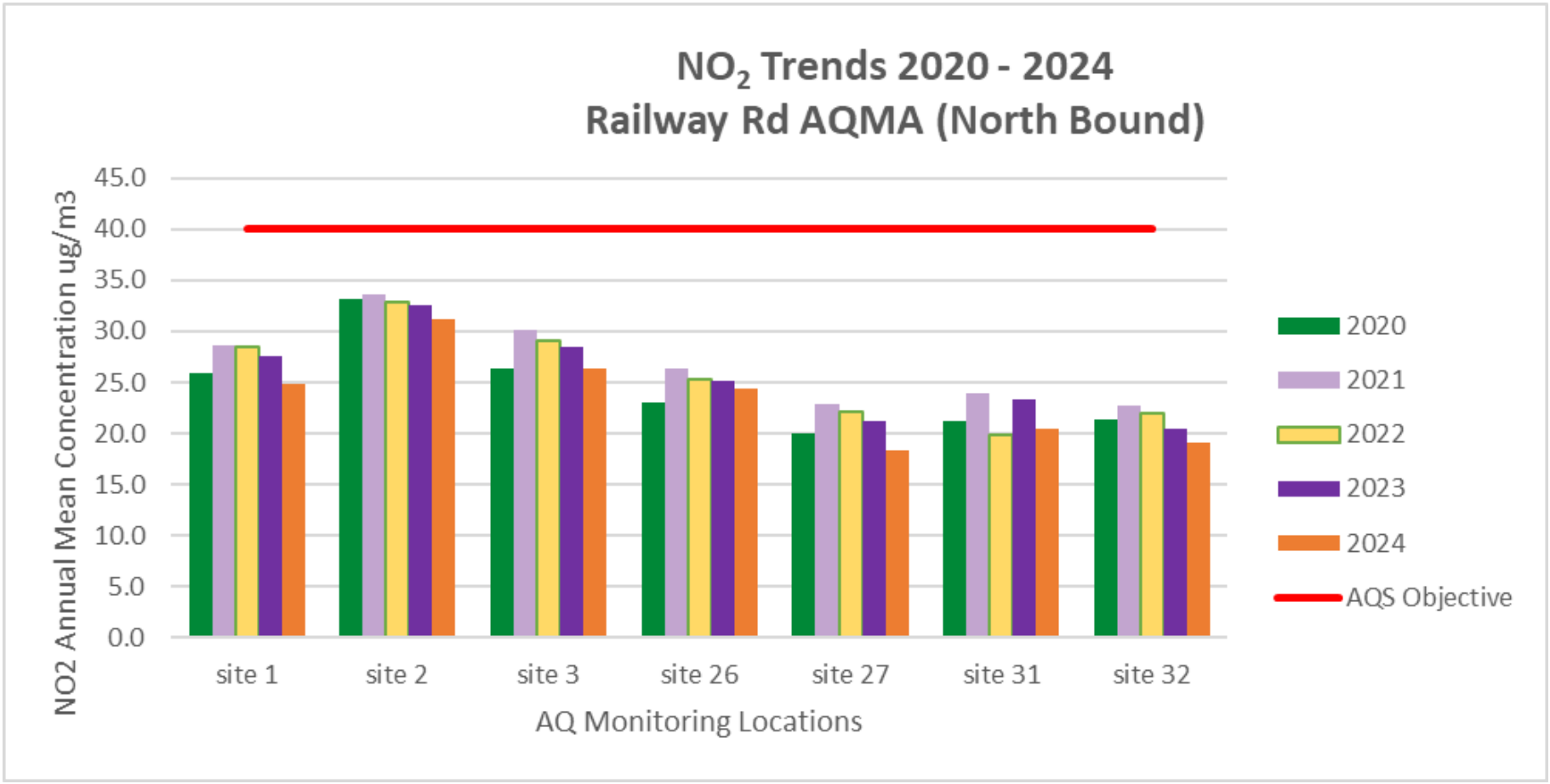

Figure A.2 – Trends in Annual Mean NO_2 Concentrations along the A148 Blackfriars Rd (Gyratory South Bound)

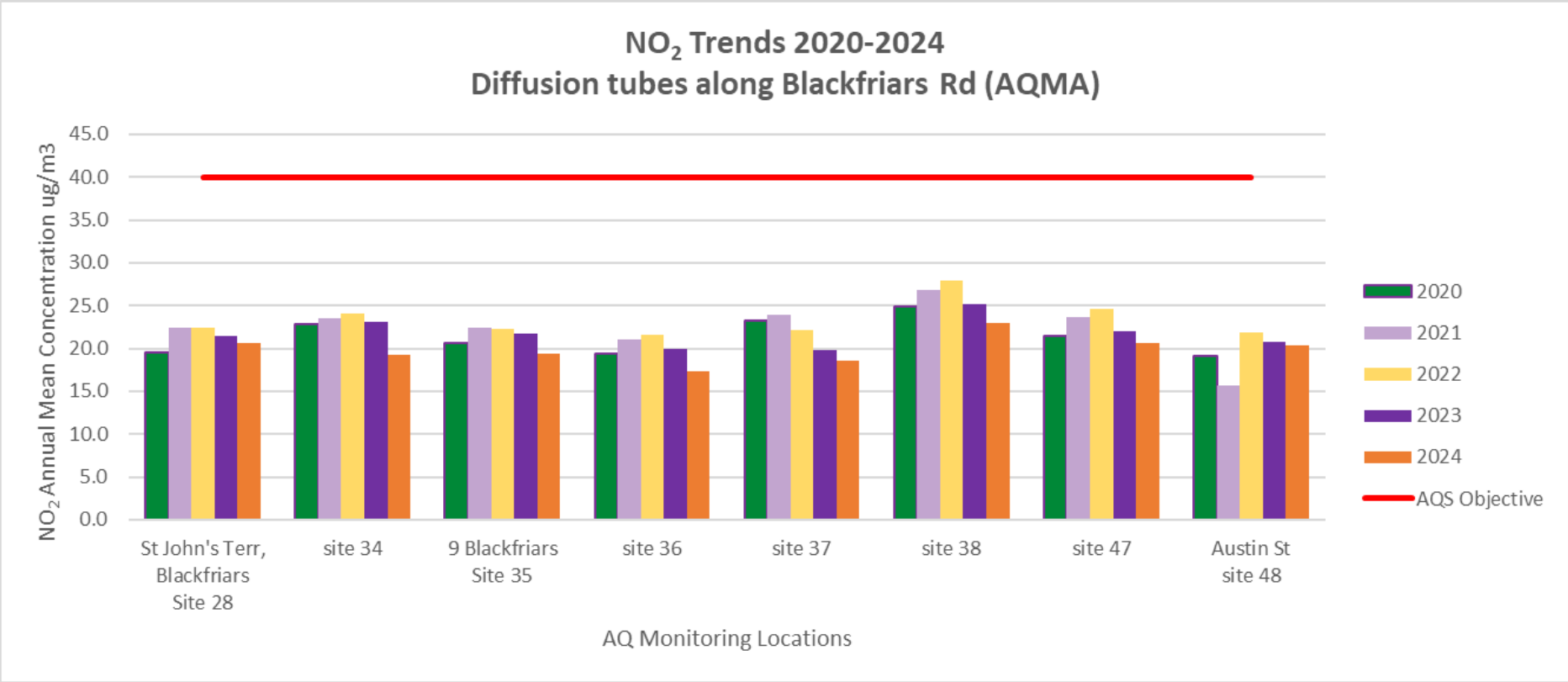

Figure A.3 – Trends in Annual Mean NO_2 Concentrations within AQMA

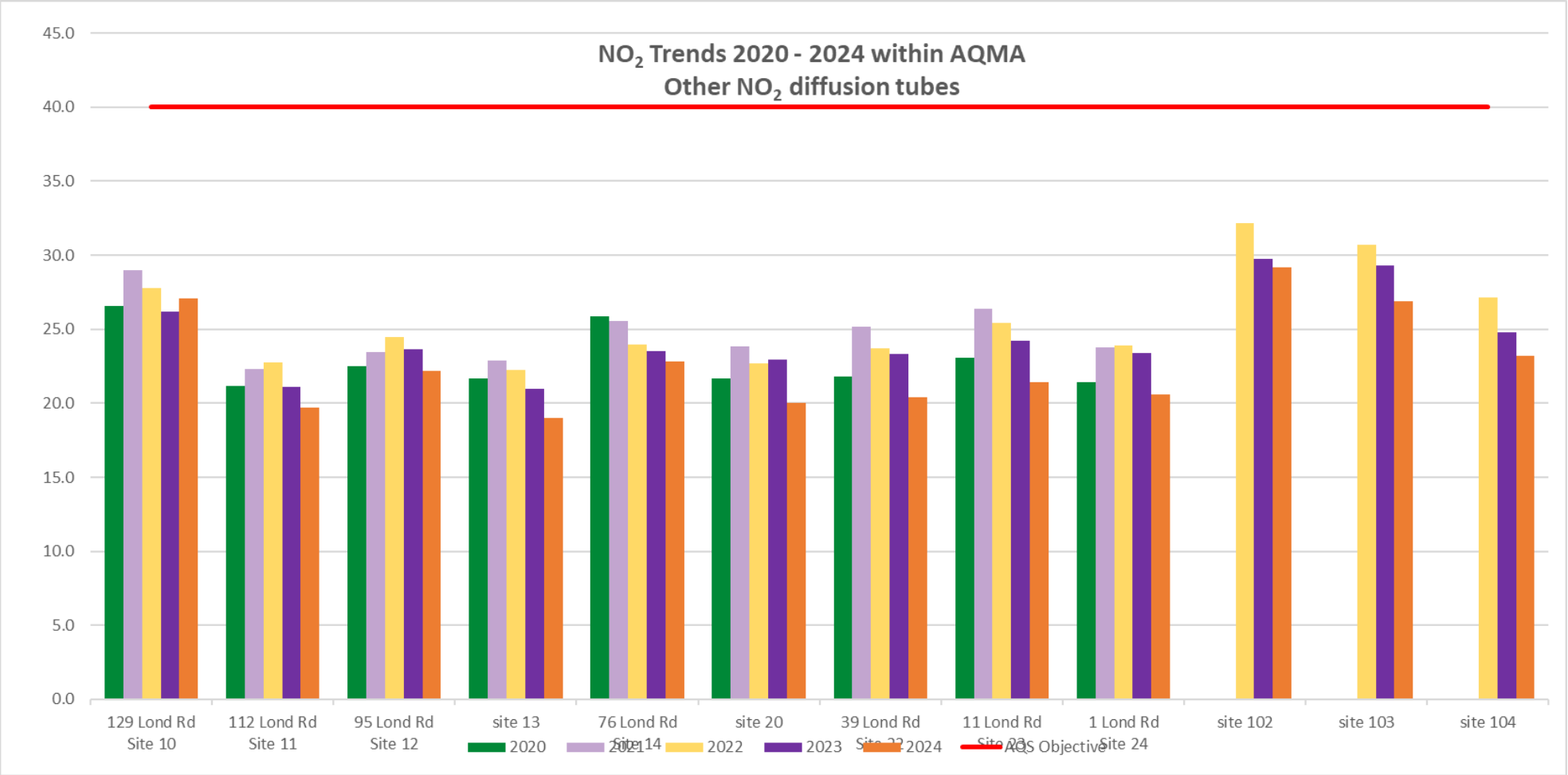

Figure A.4 – Trends in Annual Mean NO_2 Concentrations Around Gaywood Clock Junction 2020-2024

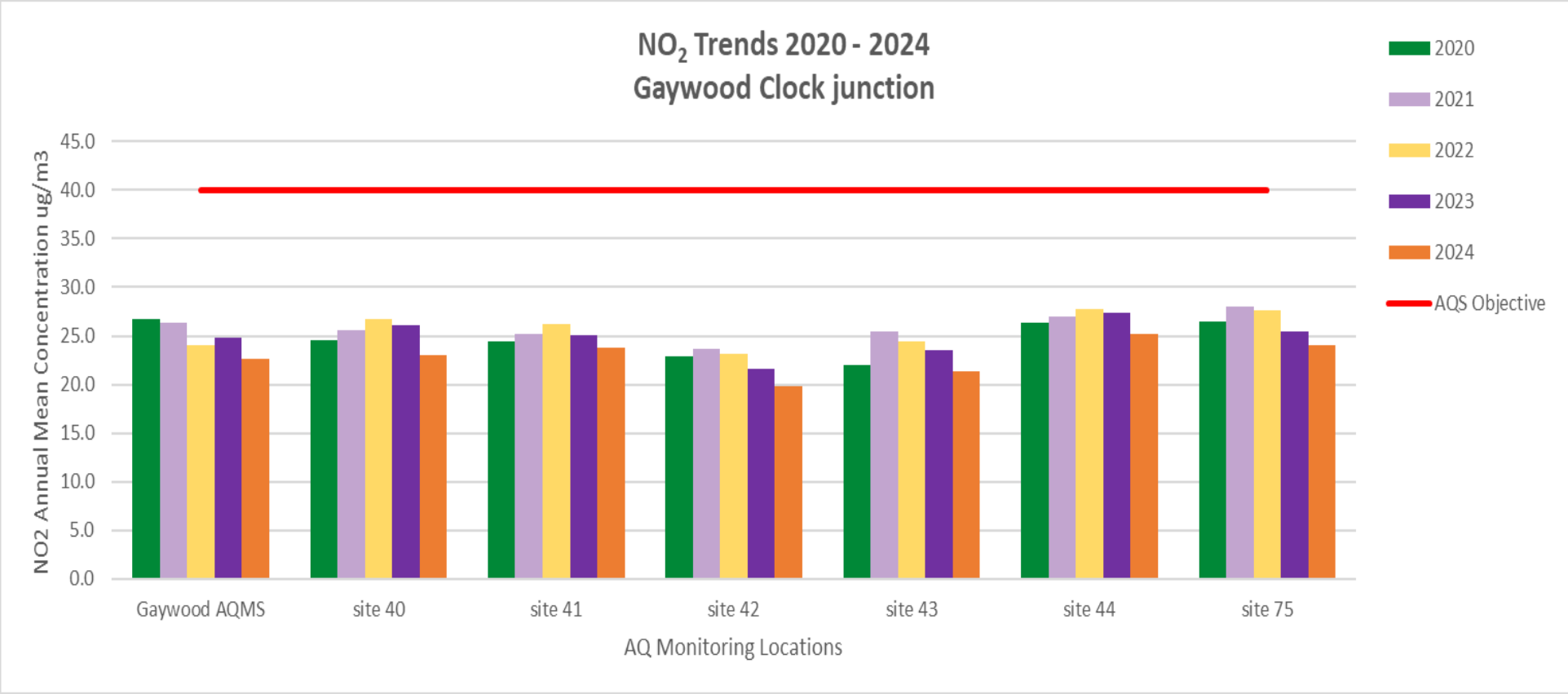

Figure A.5 – Key Trends in Annual Mean NO_2 Concentrations outside AQMA

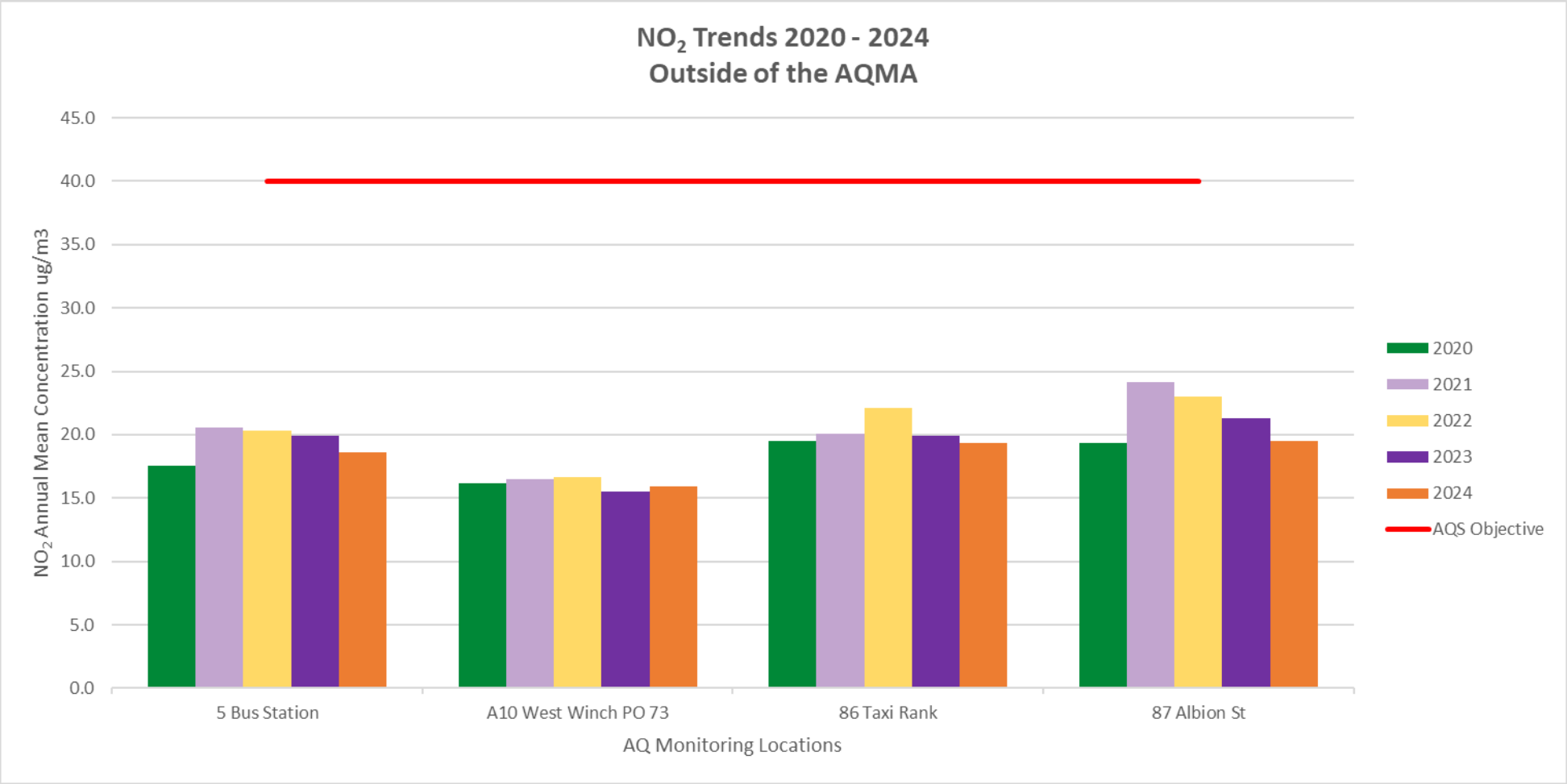

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
CM_SG	562226	319196	Roadside	98.7	98.7	0	0	0	0	0
CM_GW	563445	320475	Roadside	98.6	98.6	0	0	0	0	0

Notes:

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

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2024

Table B.1 – NO_2 2024 Diffusion Tube Results (µg/m^3)

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 (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	562074	320300	32.7	40.6	32.8	29.0	30.7	30.5	31.6	28.6	25.3	36.8	39.9	33.3	32.7	24.9	-	
2	562108	320196	40.7	50.9	41.4	40.0	37.3	44.2	45.8	42.3	35.2	41.9	41.5	29.7	40.9	31.2	-	
3	562116	320094	38.3	40.1	31.8	34.1	33.1	35.9	33.2	30.6	29.9	34.3	37.4		34.4	26.3	-	
5	562003	320098	31.9		25.7	25.9	27.0	22.4	20.4	22.3	22.8	24.0	23.2	21.8	24.3	18.6	-	
6	562225	319196	24.3	23.2	17.5	14.8	14.1	15.5	14.8	15.3	12.3	19.8	21.1	7.4	-	-	-	Triplicate Site with 6, 7 and 8 - Annual data provided for 8 only
7	562225	319196	26.2	22.2	17.9	17.3	15.5	15.1	14.4	15.4	11.0	19.7	23.0	22.2	-	-	-	Triplicate Site with 6, 7 and 8 - Annual data provided for 8 only
8	562225	319196	23.9	21.2	18.0	17.3	14.1	14.7	14.6	15.8	11.6	19.1	25.3	22.8	17.7	13.5	-	Triplicate Site with 6, 7 and 8 - Annual data provided for 8 only
9	561911	319710	22.1	15.6	9.6	14.3	14.1	12.3	11.4	12.0	15.1	17.3	20.8		15.0	11.4	-	
10	562099	319670	42.9	44.5	37.6	31.8	31.1	33.1	32.5	31.9		38.9	29.7	35.9	35.4	27.1	-	
11	562165	319575	26.3	29.4	26.2	20.5	22.2	22.6	23.2	24.5	33.8	27.9	27.1		25.8	19.7	-	
12	562242	319452	33.1	35.4	27.5	22.9	23.8	30.0	28.6		24.5	32.2	32.9		29.1	22.2	-	
13	562263	319374	29.5	26.5	24.9	25.0	20.6	26.7	23.2	22.8	21.0	26.3	31.0	20.4	24.8	19.0	-	
14	562227	319266	34.2	39.3	27.3	24.7	25.1	30.3	23.3	27.7		29.8	35.1	31.3	29.8	22.8	-	
15	562189	319101	40.4	37.5	30.7	30.5	37.7	36.6	31.7	33.3			28.3	29.3	33.6	25.6	-	
18	562266	319042			23.9	19.6	17.2	19.6	18.6	20.7	17.0	23.6	26.4	21.7	20.8	15.9	-	
19	562277	319098	19.5	27.5	21.2	16.6	18.1	16.6	19.3	21.1	18.2	23.6	18.5	21.9	20.2	15.4	-	
20	562249	319275	25.5	31.5	24.7	21.1	27.5	21.5	25.8	25.4	27.6	33.8	23.0	27.2	26.2	20.0	-	
22	562284	319385	31.2	31.7	27.1	24.0	25.6	22.2	24.5	23.4	24.9	30.3	31.4	24.5	26.7	20.4	-	

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 (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
23	562161	319614	33.1	30.0	27.3	26.9	32.1	26.1	24.3	23.8	28.4	31.3	29.2	23.5	28.0	21.4	-	
24	562130	319660	31.6	30.9	27.3	24.7	29.9	22.5	25.1	21.1	29.0	30.8	28.7	22.7	27.0	20.6	-	
25	562190	319694	16.0	17.1	9.3	10.6	9.0	10.7	9.2	10.2	8.8	14.4	18.2	9.6	11.9	9.1	-	
26	562131	319996		33.6	28.5		32.1	27.6	27.6	27.8	31.8	27.3			29.5	24.4	-	
27	562177	319999	29.4	24.7	21.6		24.0	25.3	21.8	18.9	21.8	26.1	29.1	23.1	24.2	18.4	-	
28	562253	320015	29.7	29.8	22.2	25.6		26.1	25.6	25.6			29.6		26.8	20.7	-	
29	562182	320057	16.6	18.6	12.8	12.7	11.2	11.3	10.7	11.0	15.4	16.5	18.8	14.1	14.1	10.8	-	
30	562207	320108	21.4	19.2	14.9	13.1	13.9	13.3	11.0	12.2		17.7	21.0		15.8	12.0	-	
31	562128	320131	36.1	33.5	25.6	27.0	30.1	24.0	23.7	23.6				17.5	26.8	20.4	-	
32	562119	320216	31.3	28.5	23.1	22.8	25.4	23.9	22.5	21.4	22.9	29.1	29.9	18.8	25.0	19.1	-	
33	562202	320158	28.1	31.6	24.4	20.1	20.3	20.9	21.3	19.8	18.0	27.5	24.7	23.5	23.4	17.8	-	
34	562244	320128	30.6	33.6	26.8	25.6	22.8	29.5	24.1	25.9	18.4	27.6	32.4	6.5	25.3	19.3	-	
35	562244	320238	28.2	30.2	20.6	23.3	22.8	28.5	23.4	21.7	22.2	26.9	30.5	27.4	25.5	19.4	-	
36	562216	320318	26.3	30.8	23.4	19.0	21.0	20.8	18.9	20.4	22.0	26.2	27.5	16.0	22.7	17.3	-	
37	562253	320258	33.8	25.4	23.2	24.4	25.1	23.1	21.7	19.3	25.9	25.1	24.2	21.3	24.4	18.6	-	
38	562256	320322	35.9	38.9	30.0	24.4	26.4	27.2	30.7	28.8	20.1	36.2	32.7	30.1	30.1	23.0	-	
39	562822	320426	22.4	25.9	17.8	18.6	19.0	17.8	15.3	18.1	15.4	22.6	22.3	12.3	19.0	14.5	-	
40	563490	320469	37.2	41.0	32.4	28.2	25.2	30.7	28.3	27.0	21.9	30.6	32.1	27.7	30.2	23.0	-	
41	563477	320514	33.2	37.8	32.9	23.0	31.5	28.6	28.1	28.2	29.7	34.6	37.2	28.7	31.1	23.8	-	
42	563480	320581	33.1	31.3	26.4	25.2	23.2	28.0	23.1	25.2	24.8	24.8	24.1	21.4	25.9	19.8	-	
43	563411	320476	37.1	30.3	26.7	33.0	30.8	30.6	22.0	23.3	29.5	25.8	33.7	14.3	28.1	21.4	-	

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 (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
44	563377	320484	39.7	35.7	29.1	29.4	34.6	32.0	30.6	27.8	39.0	34.0	37.7	26.7	33.0	25.2	-	
45	563202	320488	28.5	28.1	22.2	21.9	22.4	20.0	24.0	14.9	25.8	22.0	27.9	16.6	22.9	17.4	-	
46	562565	320509	29.2	24.7	23.0	22.5	23.6	21.3	19.9	16.1	19.2	21.5	26.7	20.1	22.3	17.0	-	
47	562186	320376	27.7	33.6	27.6	22.9	25.8	24.8	24.5	24.5	22.5	29.4	33.9	26.5	27.0	20.6	-	
48	562172	320370	29.6			20.1	18.2	25.3	25.8	28.1			27.3	27.2	25.2	20.3	-	
51	563521	320628	17.7	17.3	14.8	12.2	11.2	11.6		11.7	10.5	15.5	20.0	16.5	14.5	11.0	-	
52	563288	320504	33.1	29.9	24.4	27.7	28.0	26.3	23.5	19.9	19.3	25.8	32.4	21.8	26.0	19.9	-	
58	562171	319018	28.9	28.0	23.4	20.2	21.6	16.1	20.4	18.4	25.5	23.9	22.4	23.8	22.7	17.3	-	
62	561608	318601	14.8	15.8	9.8	9.6	8.1	9.2	8.6	8.2	6.6	9.7	12.9	11.0	10.4	7.9	-	
66	562595	320527	23.6	22.5		11.6	13.4	16.0	15.2	13.8			24.2		17.5	13.8	-	
67	562235	319578	16.5	18.2		10.9	9.5	9.8	9.9	9.6	7.6	12.4	16.8	11.9	12.1	9.2	-	
68	562142	319837	17.1	17.8		13.9	12.1	13.6			6.9	15.8	18.8	15.5	14.6	11.2	-	
69	561993	319394	15.2			7.3	7.7	7.1	6.8	7.3	4.7	12.1	14.8		9.2	7.0	-	
70	561929	319354	13.1	11.7		8.3	6.7	6.5	6.4	6.5	5.1	9.2	12.3	9.6	8.7	6.6	-	
73	563161	315848	28.5	18.9	19.7	21.3	22.7	18.6	19.3	15.7	25.0	21.7	20.2	18.1	20.8	15.9	-	
75	563468	320469	39.2	36.6	37.3	28.9	30.4	31.8	31.9	30.1	27.0	28.8	38.2	18.8	31.6	24.1	-	
76	562597	318739	19.1	20.4	14.1	12.1	12.4	13.7	14.4	14.0	11.5	18.2	17.4	15.4	15.2	11.6	-	
79	562799	320468		33.7	28.3	27.7	27.7	32.8	28.9	26.4	29.7	30.1		28.7	29.4	22.4	-	
86	562018	320138	32.1	35.4	22.6	22.0	19.6	27.0		20.9	18.8	26.3	26.7	26.0	25.2	19.3	-	
87	562102	320163	31.8	24.7	25.3	26.5	27.1	23.9	20.9	20.4	28.2	26.8	27.4	23.3	25.5	19.5	-	
89	561887	319466	13.2	15.4	10.0	6.5	7.5	6.8	6.8	7.4	32.9	12.6	13.8	11.0	12.0	9.2	-	

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 (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
90	563366	322065	16.9	16.9	14.0	12.0	9.8	9.5	9.9	9.3	8.7	14.0	16.6	13.0	12.6	9.6	-	
91	563255	321613	16.1	16.8	8.4	10.0	7.1	9.2	8.8	8.8	5.9	13.1	14.0	13.1	10.9	8.4	-	
92	563256	321588	14.0	10.9	10.5		7.0	7.5	8.4	7.9	6.2	11.3	15.1	11.7	10.0	7.7	-	
94	561957	318963	21.8	20.7	14.8	15.1		17.5	16.0	16.3	13.5	18.0	18.1	19.6	17.4	13.3	-	
95	562058	319038	16.0	21.3	13.6	8.8	10.7	9.6	10.8	10.6	13.3	16.2	16.9	14.3	13.5	10.3	-	
96	562042	319011	21.4	16.2	17.3	12.7	9.2	12.4	12.8	13.9	14.3	17.4	20.9	10.2	14.9	11.4	-	
97	564503	322411	23.3	20.3	17.5	12.2	13.1	12.6	13.6	13.0	15.9	17.9	19.9	14.4	16.1	12.3	-	
98	562821	320964	16.6	16.1	10.4	8.8	8.6	8.4	7.1	8.2	11.4	13.0	17.6	13.9	11.7	8.9	-	
99	547792	313121	11.0	6.1	6.2	4.2	6.4	5.5	5.7	6.0	7.5	9.1	10.5	9.2	7.3	5.6	-	
100	547902	310395	14.5	10.4	9.4	7.4	7.1	7.5	5.8	8.1	8.0	11.4		6.5	8.7	6.7	-	
101	547094	307850	32.5	42.8	37.2	36.6	30.8	34.8	36.0	37.0	26.5	32.6	36.0	32.0	34.6	26.4	-	
102	562104	320209	40.1	40.9	34.4	32.9	35.6	39.8	36.4	39.8	33.3	39.9	44.7	40.5	38.2	29.2	-	
103	562116	320128	37.5	33.8	36.4	31.6	31.3	38.9	37.6	34.2	26.5		41.5	38.1	35.2	26.9	-	
104	562247	320075	31.6	34.1	27.7	26.5	30.0	32.5	30.3	27.2	36.0	29.7	37.6	21.5	30.4	23.2	-	
110	546884	308315	21.7	23.2		12.6	16.2	15.4	16.2		18.1	19.7			17.9	14.3	-	
111	563370	320416		14.9	13.8	9.9	12.3	11.2	9.9	9.0	14.8	13.9	19.4	14.5	13.1	10.0	-	
112	563402	320381		11.3	10.4	9.6	10.0	9.3	7.4	8.7	6.0	13.0	16.4	13.0	10.5	8.0	-	
113	563344	320176		15.6	11.0	7.9	8.1	9.2	6.9	8.5	12.0	12.7	8.1	11.7	10.2	7.8	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.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 2024 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within BCKLWN During 2024

For the 2024 review period Table C.1 below highlights some of the most significant new developments considered for air quality. Overall there were *111 planning applications* considered in 2024 with the following *25 applications* listed in Table C.1 as being considered the most significant. A summary of the potential changes are noted against each development.

None of these potential new sources were considered to significantly impact air quality.

Table C.1 - Most Significant Planning Applications in 2024

Planning Ref.	Address	Proposal	Comments
13/01615/OM 18/02289/OM FUL/2024/0001	West Winch Strategic Growth Area (WWGA)	Currently – the following 3 developments in WWGA: a) Up to 1110 dwellings plus primary school and local centre. b) Up to 500 dwellings plus neighbourhood centre. c) County Matters: West Winch Housing Access Road (WWHAR).	These developments form part of the wider West Winch Strategic Growth Area (WWGA) for up to 4,000 dwellings in an area located south of King's Lynn that includes a new housing access road. The new road will link the A10 to A47 and is designed to relieve congestion from the A10. We have reviewed air quality assessments that included air dispersion modelling for all three developments, that showed no significant impact on air quality. The initial outline Application for up to 1,100 homes plus local centre and school (13/01615/OM has now been approved (Aug 2024) but other two applications are still pending. Further

Planning Ref.	Address	Proposal	Comments
			details are explained below (see Additional AQ Works).
Nationally Significant Infrastructure Project (NSIP) 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 to operate this EfW Facility was granted within the year by the Secretary of State (Feb 2024). Emissions will be controlled through an environmental permit EPR/HP3441QA (issued May 2024) that ensures they are to BAT and with any necessary ELVs at source. Further information on this DCO is set out below (see Additional AQ Works).
Nationally Significant Infrastructure Project (NSIP) Scoping Opinion 24/01456/EAISCO Preliminary Environmental Impact Assessment (PEIR)	Development extends into the Walpole area as part of Eastern Green Link 3-4 (EGL3-4)	The EGL3-4 NSIP consists of construction of below ground high voltage cables and associated converter and substations to supply up to 4GW of offshore wind electricity into the National Grid.	Development has the potential to create significant construction traffic plus emissions from associated diesel backup generators. Scoping Opinion identified that the pollutants from the above sources are within scope. A PEIR is further refining any significant impact ahead of submission of the ES.
Nationally Significant Infrastructure Project (NSIP) 24/01932/EAISCO	Anglia Water, Fens Reservoir near to Chatteris in Cambs.	The Fens Reservoir NSIP is subject currently to a Scoping Opinion for new reservoir in neighbouring Cambs area but with associated pipeline to connect to new service reservoirs including one at Bexwell,	Air quality matters set out in Chapter 15 of the ES which focussed on controlling fugitive dust emissions through a suitable Construction Environmental Management Plan (CEMP). Given the magnitude of earthworks, we recommended for some boundary particulate matter monitoring as a precautionary basis. Scheme is to include additional NO_2 diffusion tube monitoring by Anglia

Planning Ref.	Address	Proposal	Comments
		Downham Market in BCKLWN area	Water to help establish background in areas affected.
22/00860/FM 22/00866/FM Permit consultation EPR/XP3632QE/V003	Breckland and Feltwell Farms Methwold Norfolk	Demolition of existing buildings and construction of 20 new poultry sheds to house up to 714,000 chickens (from 870,000) and new piggery to house 14,000 pigs over 30kg plus 4 workers dwellings	ES was re-submitted for both applications within the year that included within Chapter 6 an assessment of air quality that we reviewed. We were also consulted on a variation to the environmental permit application. Environmental Quality Team made responses to these applications. Application has been refused.
SCR/2024/003 SCR/2024/0004 FUL/2024/0010 23/01201/F Permit: EPR/YP3403MG/A001	Riverside Business Centre, King's Lynn	County Matters (CM) application to increase feedstock quantities and change types to 80,000 tpa to an approved Anaerobic Digestion (AD) Facility with an associated change in transport movements	Application concerns an increase in feedstocks to the AD facility to take total capacity from 55,000 to 80,000 tpa. Air quality assessment modelled NO_2 from stack and flare based on reduced capacity CHP (235kW) with negligible impact shown. HGV (42 per day) screened out but subject to HGV routing condition away from town centre. The variation to increase feedstocks has been refused by the County Planning Authority based on insufficient information.
SCR/2024/0002 SCO/2024/0003	Estuary Farm / Greenworld, King's Lynn	Screening Opinion for AD Facility to process up to 60,000 tpa feedstocks with resultant biogas to supply 2x 1.35MWth (input) CHP	Proposal is to use heat from AD Facility's CHP (2x 1.35MW) to dry wastes at an existing (permitted) composting facility. Principal pollutants from stack and flare (NO_2 and SO_2) screened using SCAIL with negligible impact shown. HGV (22 HDV per day) scoped out but digestate movements excluded. Existing composting facility

Planning Ref.	Address	Proposal	Comments
			dried by 3x 370kW biomass boilers. Pending full application if EIA does not apply.
24/01488/F	Reeve Flooring, Rollesby Rd, Kings Lynn	Proposal to relocate the existing ETA Hack biomass boiler 199kW to heat a warehouse building located at the rear.	Pollutants emitted from relocated boiler assessed through biomass screening tool which showed a negligible impact for PM_{10} and NO_2 but a change of around 9% for $PM_{2.5}$ when compared to the AMCT (10ug/m^3). No objection to proposed change.
24/01263/F	Lodge Farm, Hunstanton	Biomass boiler (100kW) proposed to replace existing heating system to Farm.	Carried out biomass screening assessment. Moisture content of woodchip to be controlled by method statement. When based on chimney height the emission rates (ER) of principal pollutants calculated as less than targets. No significant impact.
24/00920/AG	Church Farm, Fring Estate	To replace LPG heating system with 3x biomass boilers (aggregated 220kW) to dry grain.	Carried out biomass screening assessment. When based on chimney height the emission rates (ER) of principal pollutants calculated as less than targets. No significant impact.
24/01384/LDE	Westacre Estate	Certificate of Lawfulness with installation of replacement biomass boiler (200kW) used for district heating scheme	Carried out biomass screening assessment. When based on chimney height the emission rates (ER) of principal pollutants calculated as less than targets. No significant impact.
Retrospective 21/01087	Greenworld, King's Lynn	Review of existing biomass heating system (3x 370kW) boilers	Carried out review of biomass screening assessment. When based on chimney height the emission rates (ER) of principal pollutants calculated as less than targets. No significant impact.

Planning Ref.	Address	Proposal	Comments
Retrospective	Anglia Wood Fuel, Fring Estate	Existing biomass boiler used to dry wood chip (990kW)	Carried out review of biomass screening assessment. When based on chimney height the emission rates (ER) of principal pollutants calculated as less than targets. No significant impact.
FUL/2024/0004, FUL/2024/0005 FUL/2024/0006	Blackborough End Quarry	Application to vary (extend) operation of quarry.	Site is a former quarry being infilled as part of restoration plan. HGVs are not increasing in rate (numbers per day), therefore screened out as change less than IAQM criteria (100 HGV).
24/01540/FM	Queen Elizabeth Hospital King's Lynn	Erection of a new Central Sterile Services building and associated works.	Air quality assessment submitted by SLR Consulting Ltd. Dusts to be controlled as part of CEMP. Building emissions were to exceed core policy CS08, but later revised with high efficiency gas-fired steam boilers necessary for sterilisation process.
23/02066/FM	Sandringham Estate, Caravan And Motorhome Club Site	Extension to existing campsite with additional pitches (55), new amenity blocks and refurbishment of main reception building and associated works	Screened based on additional traffic of around additional 80 cars / caravans / motor homes per day i.e. less than IAQM criteria for AQ assessment. Requested further information in terms of best practice building emissions. To include PV and ASHP plus MVHR on the new amenity blocks, plus a further PV on the main reception building and 4 parking spaces for EV vehicles to help improve air quality.
24/01186/OM	Frogs Hall, Stanhoe	Proposed site for holiday accommodation	Development of 46 statics will create a new junction onto the B1454 with around 3800vpd as existing. Screened based on Defra criteria for new junctions. Sum of all arms plus additional (134vpd) less than criteria, so no objection. Designs to be high

Planning Ref.	Address	Proposal	Comments
			quality and sustainable to be secured at reserved matters.
24/00173/FM	Amber's Bell Tent Camping, Church Lane, Little Massingham	Retrospective Change of Use from Agricultural Building to Flexible Use (Hospitality Events) with Camping, Barn and Associated Camp Site	Development including Barn to house events (weddings etc.), 7 bell tents and 2 former railway carriages to be based predominantly on space heating using wood-burners. Concern that (non-domestic) solid fuel regulations will not apply therefore requested further information on how pollutants ($PM_{2.5}$) will be kept to a minimum in accordance with national policy (Defra AQS Strategy). Provided guidance to assist.
FUL/2024/0021	King's Lynn Academy, 60 Queen Mary Road, Gaywood	New Design and Technology Block plus Expansion of Dining Hall and associated works	Additional traffic as a result of expansion of school screened using IAQM criteria. Development to provide new cycle spaces, 7 bus parking spaces, 2x EV charging spaces and building to be heated by ASHP, plus LED lights and a PV array (237 panels) generating estimated annual yield of c. 80MW. No objection.
24/00253/FM	The Ffolkes Arms Hotel, Hillington	New spa facilities / treatment rooms with changes to carpark	Changes to existing carpark to relocate of staff parking area plus the provision of EV charging infrastructure. As the new facilities will only be able for guests staying at the Hotel no significant change in traffic movements. Chalets onsite have hot tubs heated by wood, with informal comments made to ensure minimal pollution.

Planning Ref.	Address	Proposal	Comments
24/01689/FM	British Sugar Plc, Wissington	New water storage reservoir	Risk of significant dust emissions as new reservoir relatively large (surface area 105,000m^2) but proximity to receptors not sufficient to warrant air quality monitoring. Dusts to be controlled through DMP.
24/01844/F	British Sugar Plc, Wissington	Installation of 2 x Steam Drying Installation Units.	The new steam drying process for drying spent beet pulp to include a heat recovery phase to help reduce emissions from the British Sugar factory. Application supported / no objection in terms of air quality.
24/01188/F	Guildhall of St George in King's Lynn	Guild Hall of St. George to provide public events following restoration / refurbishment.	Recommended condition to include sensors on proposed MVHR system to help ensure in-door AQ meets best practice and suitable ventilation rates.
24/01996/FM	Land next to James Medical Centre, Edward Benefer Way, King's Lynn	New apartment building of 77 units for over 55's.	AQ assessment modelled predicted traffic once operational and assessed construction dusts. Modelled impacts from traffic not significant. Dusts subject DMP measures to protect amenity.
24/00622/FM	Former St James Medical Practice, County Court Road, King's Lynn	Conversion of building into 11 Flats	Access to the former medical centre off Railway Rd AQMA. Best practice measures to minimise NOx emissions and secure cycle parking secured through condition.

Additional Air Quality Works Undertaken by BCKLWN During 2024

West Winch Strategic Growth Area – AQ Study and New Housing Access Road

In last year's ASR we reported on an additional study (Bureau Veritas, 2023[35]) that was commissioned as part of the examination of new local plan of air quality impacts from traffic generated by the West Winch Growth Area (WWGA).The study showed nitrogen dioxide levels potentially increasing. The study was based on initial transport data.

Since the study there is a new local plan adopted through Council (March 2025) that includes specific Policy E2.1 for the WWGA with a range of sustainable transport measures plus a 'masterplan' to co-ordinate overall development provisions. There are also planned transport improvements as part of the Southgates Masterplan and the Town Centre's Gyratory system to further improve air quality with measures designed to improve access to local cycling and walking infrastructure in these areas.

Furthermore, the first large housing scheme (Hopkins Homes) within the WWGA for up to 1,100 homes plus local centre and school under 13/01615/OM has now been approved (Aug 2024) within the year that we can provide an update on. Air quality was presented with Chapter 10 of the ES (Updated ES Volume-1[36]) that assessed traffic once operational by air dispersion modelling. The largest change in annual mean NO_2 was predicted as up to 0.7µg/m^3 within Railway Rd AQMA. Other developments coming forward as shown in Table C.1 are smaller in scale and shown via modelling to contribute less to the NO_2 annual mean. Therefore when compared to current NO_2 levels this change would not be considered as significant and alter the decision to revoke Railway Rd AQMA.

In addition, we have also been consulted within the year on the West Winch Housing Access Road (WWHAR) for this area which will link the A10 to A47 and provide access to developments in this area. The application is still pending but includes a number of additional sustainable transport measures that are designed to further promote modal shift and relieve congestion / improve air quality along the A10. Modelling of traffic showed an

[35] Bureau Veritas, AQ Technical Note, May 2023; https://www.west-norfolk.gov.uk/info/20216/local_plan_review_2016_-_2036/1070/consultation_on_additional_evidence_base_documents

[36] BCKLWN; 13/01615/OM | Outline application: change of use from agricultural/undeveloped land to a new development of housing and associated facilities; comprising a mix of up to 1110 residential units (Class C3); primary school (Class F1), local centre (Class E, F2); public open space, landscaping and highway access on the A47 and A10. | Land West of Constitution Hill Constitution Hill North Runcton Norfolk PE33 0QP

improvement in air quality along the A10 once the traffic becomes reassigned onto the A47 and a negligible impact elsewhere.

Future impacts from subsequent developments in the WWGA will still need to be considered by this team and can be reported within next year's ASR.

ABP King's Lynn Port – Dust Management Plan

Within the year we have received some complaints of dusts being emitted from loading operations at King's Lynn docks and provide an update of the work with ABP to help develop a dust management plan for the Port to minimise particulate matter emissions.

The operation consists of loading food grade products (grain, barley, malt etc.) into ships berthed at the port using conveyors that are supplied by HGV.

This work has included a review of the operations, including air quality monitoring carried out by ABP and this council to ensure the monitoring makes best use of resources (minimises any duplication) and is still relevant of public exposure around the Port. The Port have two continuous / indicative Earthsense Zephyrs that are in addition to the two BCKLWN Osiris monitors as set out in Table C.6 below. No exceedances have been observed from these stations (see results in Table C.7 to C.9) however as a result of this review we are now planning to relocate OS1PS to West Lynn to give better overall coverage.

We have worked with ABP to draft the DMP that sets out the measures to control dusts including pre-screening analysis of the grain to ensure it meets required standards plus use of covered conveyors and chutes to minimise dust creation. It also includes details of monitoring undertaken plus a record of particulate matter results following any complaints. Once the OS1PS monitor has been relocated to the preferred West Lynn site we will be meeting with ABP to finalise the DMP.

Medworth EfW Facility

As explained within Table C.1 above this Energy from Waste (EfW) Facility obtained its Development Consent Order within the year (Feb 2024) from the Secretary of State for a combined heat and power plant with a maximum gross capacity of 58MW. Given the potential impact we summarise this additional work in reviewing this project and provide an update on the Local Air Quality Monitoring Strategy (LAQMS) that has been agreed. It will be delivered jointly across Fenland DC and BCKLWN areas.

The emissions from the Facility will be controlled through an environmental permit (EPR/HP3441QA) regulated by the Environment Agency. The permit was issued within the year (May 2024) that ensures operation is to Best Available Techniques and the setting of Emission Limits Values at source.

Air quality was covered under Chapter 8 of the ES that consisted of air dispersion modelling as worse case for the in-combination effects of emissions from the stacks and traffic once operational. Results are summarised in Table C.2 below that compares the modelled process contributions to the objectives that we consider under LAQM. No exceedances were noted as a result of the process contributions once combined with background/local levels.

Table C.2 – Summary of Modelled Process Contributions – Medworth EfW

Pollutant	Process Contribution - Stack (µg/m^3)	Process Contribution - Traffic (µg/m^3)	Process Contribution - Combined (µg/m^3)	Objective (µg/m^3)
NO_2 – annual mean	0.78	0.04	1.2	40
NO_2 – 1hr	29.79	0.02	29.81	200
PM_{10} – annual mean	0.05	0.02	0.07	40
PM_{10} – daily mean	0.16	0.05	0.21	50
$PM_{2.5}$ – annual mean	0.05	0.01	0.06	20
SO_2 -1hr	42.17	-	-	350
SO_2 -24hr	20.23	-	-	125
SO_2 -15min	47.29	-	-	266

Whilst the emissions will be controlled through the environmental permit the facility will also be subject to Requirement 27 to ensure a Local Air Quality Monitoring Strategy (LAQMS). The LAQMS will deploy air quality monitors from the EfW Facility within Fenland DC (FDC) but also into this council's area. The scheme is to include a reference analyser in FDC and an indicative monitor in this council's area (an Earthsense Zephyr). Access will be provided to the continuous / real-time monitoring data, plus also passive NO_2 diffusion tubes that extend out into the outlying villages away from the Facility.

We can provide further update on this scheme for next year's ASR once the monitors are installed and data is generated.

Parkway / Florence Fields Construction Dust Monitoring Scheme (DMS);

This is a development of 226 residential dwellings as approved under planning ref 21/01873/FM. The site is located in Gaywood, King's Lynn. Due to the proximity of the construction site to nearby sensitive receptors including schools to the immediate west (King's Lynn Academy) and to the east (Howard Junior School) the development was made conditional on a dust monitoring scheme in accordance with IAQM guidance (IAQM, 2018[37]). Two Dustsens DM30 monitors were installed on the boundary fence lines. The scheme was to provide alerts of the short-term 1-hr PM_{10} (190ug/m^3) concentration to allow the construction site to take action to minimise it's dust emissions.

Owing to some concerns with the quality of the data generated we have agreed to relocate the OS3WR Osiris to provide a comparison study to the construction site monitors. We can provide an update on this in next year's ASR.

QA/QC of Diffusion Tube Monitoring

Using passive sampling methods by diffusion tubes and correcting for bias against reference analysers is considered a relatively simple and cost-effective method of monitoring pollutant concentrations in the borough. However, the diffusion tubes only give an indication of the longer-term average NO_2 concentrations than real-time data as generated from the continuous analysers at Southgates and Gaywood Clock.

During the 2024 period we continued to use diffusion tubes supplied by Socotec (Didcot) using the 50% TEA in acetone preparation method. The analysis by Socotec benefits from UKAS accreditation and the laboratory also participate in an external QC (AIR PT) scheme of spiked samples that test the laboratory's analytical performance on a quarterly basis. Socotec achieved the relevant satisfactory z-score (< +/-2) for all rounds apart from most recent between Jan-Feb 2025[38] when it achieved the score for only 87.5% of spiked samples. The variance is noted and something to consider when reviewing contract supplier.

[37] IAQM, 2018 Air Quality Monitoring in the Vicinity of Demolition and Construction Sites https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf
[38] Defra, Diffusion tube QA/QC Framework; https://laqm.defra.gov.uk/air-quality/air-quality-assessment/qa-qc-framework/

During the 2024 period the deployment dates of diffusion tubes were in accordance with the exposure periods (+/- 2 days) given by Defra's LAQM calendar. As a result, we have reported results without the need to adjust dates within the data processing tool.

Diffusion Tube Annualisation

Where data collection is poor for diffusion tube sites then it is necessary to estimate an annual average from the part-year average in accordance with para 7.140 of LAQM TG-22 by correcting results to other continuous background monitoring sites.

Diffusion tube sites 26, 28, 48, 66 and 110 all gave less than the TG-22 criteria i.e. less than 75% but greater than 25% and therefore results were annualised and presented in Table C.3 below. The poor collection rate at these sites has been noted and can be taken forward within the next annual review of tube locations / heights to help improve overall tube collection rates.

The urban background sites chosen for the annualisation were based on good data capture (as >85%) and relatively local namely Wicken Fen, St Osyth and Northampton Spring.

Diffusion Tube Bias Adjustment Factor

The diffusion tube data presented within the 2025 ASR have been corrected for bias using a local adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring.

A single triplicate co-location study was used to determine the local bias factor for the Socotec diffusion tubes as data capture and acquisition levels as shown by the Diffusion Tube Data Processing Tool were considered good.

BCKLWN have applied a **local bias adjustment factor of 0.76** to the 2024 monitoring data. A summary of bias adjustment factors used by BCKLWN over the past five years is presented in Table C.4.

Within the year the triplicate tubes have benefitted from being placed within the locked cage to the Southgates reference NO_x/NO_2 monitor and nearer to its inlet to help improve accuracy to the reference. Similarly, using a local factor is considered preferable as this takes into account local meteorological conditions than an average factor derived from

studies outside of the area. The single bias factor was also considered as representative for the area.

The local bias adjustment calculation obtained from the Data Processing Tool is also shown in Table C.5.

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

Site ID	Annualisation Factor Wicken Fen	Annualisation Factor St Osyth	Annualisation Factor Northampton Spring	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
26	1.1177	1.0533	1.0775	1.0828	29.5	32.0
28	1.0185	1.0224	0.9999	1.0136	26.8	27.1
48	1.0344	1.0268	1.0974	1.0529	25.2	26.5
66	1.0280	1.0378	1.0351	1.0336	17.5	18.1
110	1.0572	1.0619	1.0233	1.0475	17.9	18.7

Table C.4 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2024	Local	-	0.76
2023	Local	-	0.78
2022	National	03/23 (27 studies)	0.83
2021	National	03/22 (32 studies)	0.84
2020	National	06/21	0.81

Table C.5 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3
Periods used to calculate bias	11		
Bias Factor A	0.76 (0.7 – 0.84)		
Bias Factor B	31% (19 – 43%)		
Diffusion Tube Mean (µg/m^3)	17.8		
Mean CV (Precision)	4.3%		
Automatic Mean (µg/m^3)	13.6%		
Data Capture	99%		
Adjusted Tube Mean (µg/m^3)	13 (12 – 15)		

NO_2 Fall-off with Distance from the Road

The NO_2 diffusion tube monitoring locations did not require any distance correction during 2024 period.

QA/QC of Automatic Monitoring

To ensure data is of sufficient quality from the two continuous / reference NO_2/NOx monitors located at Southgates and Gaywood Clock to satisfy LAQM TG-22 the following procedures were implemented;

- Data ratification; Automatic monitoring data presented in this ASR is ratified by Air Quality Data Management (AQDM) services. Envitech Europe host the results via a county-wide web portal (www.norfolkairquality.net) and simultaneously export results also to Defra's UK-Air network (https://uk-air.defra.gov.uk/) for public dissemination of data.
- LSO type visits; 4-weekly LSO type visits carried out by a member of the Environmental Quality team which can be increased in frequency depending on findings. Within the year the air conditioning unit at Gaywood Clock was found to be inadequate causing the unit to overheat. The air conditioning unit was replaced in January 2025. The A/C is serviced under contract by Progen Ltd.
- Annual audits; Annual external audits are carried out by Ricardo AEA Ltd including calibration against certified external source of NO gas; Audit was carried out on 13th November 2024 with satisfactory findings.

- 6-monthly servicing; Servicing was carried out by Matts Monitors which comprises a 6-monthly routine maintenance program plus 24-hr call outs to help ensure continuity of data.

Whilst the following units are non-reference they are still subject to the following;

- Osiris PM monitors are serviced and calibrated under a 24-month contract by the supplier (Turnkey). The contract includes a calibration against Turnkey's reference analyser. No correction factor was applied to the Osiris units. The service covers parts such as battery, pump, and photometer plus consumables such as filters. Turnkey Osiris analysers benefit from heated inlet to correct for high moisture content. They are 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.
- Earthsense Zephyr; the unit is covered by a two-year service contract that covers all parts including sensor cartridge;

Automatic Monitoring Annualisation

There was no annualisation carried out of the automatic monitoring data as data acquisition was considered good (>75%) in line with TG-22.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website.

There was no automatic annual mean NO_2 concentrations corrected for distance as concentrations were sufficiently low (less than 10% of the objective) not to warrant this correction for distance.

Indicative monitoring of PM_{10} and $PM_{2.5}$

BCKLWN undertook automatic / indicative monitoring at five locations using sensor type devices during 2024. Table C.6 shows the details of these indicative automatic monitoring sites. This continuous monitoring data is made available via the Norfolk Air Quality website. An Earthsense Zephyr went live in Aug 2024.

Monitoring results are indicative only of the industrial background concentrations in the area they monitor and shown in Table C.7 to C.9 and locations shown in Maps (Figure D.3 and Figure D.4) but in summary;

- Turnkey Osiris OS1PS (Page Stair Lane) and OS2ER (Estuary Road) are positioned either side of King's Lynn Docks;
- Turnkey Osiris OS3WR (Wretton Rd) and OS4BD (Buckenham Drive) are positioned either side of an animal feed mill in Stoke Ferry;
- Earthsense Zephyr (EZ1) is located along Railway Rd, King's Lynn close to diffusion tube site-2 where we historically see highest levels of traffic pollutant (NO_2).

Data collection for 2024 was considered good for the year (>75% data acquistion).

Monitoring of PM_{10}

PM_{10} results in summary:

- *Results are indicative that in the areas being monitored the annual mean objective (40µg/m^3), or short-term 24-hr mean (50µg/m^3) that must not be exceeded more than 35 times per year was not being exceeded.*

Short term alerts are programmed into the instruments to help identify the cause of the daily mean exceedances wherever possible, and when compared to Defra's Daily AQ Index the following daily mean (50µg/m^3 PM_{10}) exceedances were identified e.g.;

- **Estuary Rd Osiris (OS2ER)** PM_{10} was moderate and over the 50µg/m^3 daily mean objective on the 11$^{th\ of}$ March 2024, 2nd May 2024 and 6th Sept 2024 with highest daily mean 65.2µg/m^3. Construction of a new building at the Port and adjacent to OS2ER occurred during the early part of 2024 and likely cause of the spike.
- **Page Stair Lane Osiris (OS1PS)** was moderate and over the 50µg/m^3 daily mean objective on 6th Sept 2024 with a daily mean reaching 53.6 µg/m^3.

- **Wretton Rd Osiris (OS3WR)** was moderate and over the 50µg/m^3 daily mean objective on 11th March 2024, 2nd May 2024, 6th Sept 2024, 3rd Oct 2024 and 24th Nov 2024 with a daily mean reaching 70.5 µg/m^3.
- **Buckenham Drive Osiris (OS4BD)** was moderate and over the 50µg/m^3 daily mean objective on 9th Jan 2024, 10th-11th March, 2nd May 2024 with a daily mean reaching high Daily AQ Index 86.5µg/m^3 on 6th Sept 2024.
- **Earthsense Zephyr (EZ1)**; no daily PM_{10} exceedances recorded.

Monitoring of $PM_{2.5}$

$PM_{2.5}$ results as shown in Table C.9 in summary;

- *Results are indicative that in the areas being monitored the annual mean national objective (20 µg/m3) was not being exceeded.*
- *Results were all less than Environment Act 2021 AMCT for $PM_{2.5}$ (10.0µg/m^3 as shown in Table 2.3) apart from OS2ER with concentration of 10.0µg/m^3.*
- *The reason for raised $PM_{2.5}$ level in this area was likely due to a new warehouse building being constructed at the Port during 2024 and situated close to the OS2ER monitor.*

Earthsense Zephyr PM10 / PM2.5 / NO_2 results

This monitor was installed in 2024 along Railway Rd with monitoring data from 01st of Aug 2024. For the 2024 review period this gave good data capture (99.8 %) with the following indicative results;

- NO_2 period mean (Aug-Dec) was 24.4µg m^3 therefore lower than AQS Objective of 40µg m^3.
- There were no NO_2 short-term (1-hour) concentrations where the 200ug/m3 objective was exceeded.
- PM_{10} period mean (Aug-Dec) was 12.6 µg m^3 therefore lower than the AQS Objective of 40µg m^3.
- There were no high short-term PM_{10} (daily means) over 50µg m^3 AQS Objective
- $PM_{2.5}$ period mean (Aug-Dec) was 8.3 µg/m^3 therefore lower than the national standard (20µg/m^3) and National AMCT (10µg/m^3).
- No annualisation to correct for short-term data was carried out as the results are considered non-reference / indicative only.

Summary of Indicative Monitoring and Plans next year

- *No exceedances indicated from sensor type devices.*
- Monitoring for $PM_{2.5}$ whilst indicative (non-reference) helps to provide additional context to the modelled Defra $PM_{2.5}$ background maps i.e. where the AMCT (10.0µg/m^3) may be raised. Estuary Rd (OS2ER) gave the highest $PM_{2.5}$ (10.0µg/m^3) which appeared to be a result from temporary construction works at the Port; something to note for 2025.
- The monitoring sites around the Mill at Stoke Ferry are to reduce in number with OS3WR to be moved off site leaving only OS4BD. The OS4BD is to be re-located to Indigo Drive, Stoke Ferry as this is considered more representative of the prevailing wind direction from the Mill but also close to a planned construction site.
- OS3WR is to be re-located to Parkway / Florence Fields, King's Lynn construction site;
- Monitoring for PM_{10}/$PM_{2.5}$ will be reviewed as part health-based project focussed on $PM_{2.5}$. which can be reported in next year's ASR.

Table C.6: Details of Non-reference 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)
OS1PS	Page Stair Lane, King's Lynn	Urban Background	561527	320437	PM_{10} $PM_{2.5}$	No	Indicative, Nephelometer with heated inlet and filter	5	3.3	3.5
OS2ER	Estuary Road, King's Lynn	Urban Background	561593	321466	PM_{10} $PM_{2.5}$	No	Indicative, Nephelometer with heated inlet and filter	2	1	3.5
OS3WR	Wretton Road, Stoke Ferry	Urban Background	570438	299905	PM_{10} $PM_{2.5}$	No	Indicative, Nephelometer with heated inlet and filter	24	19	3.5
OS4BD	Buckenham Drive, King's Lynn	Urban Background	570264	299943	PM_{10} $PM_{2.5}$	No	Indicative, Nephelometer with heated inlet and filter	12	1	3.2
EZ1	Railway Road, King's Lynn	Roadside	562116	320109	PM_{10} $PM_{2.5}$ NO_2	No	Indicative Cartridge type sensor with fan	0.0	1.6	2.4

Table C.7 – Annual mean PM_{10} Monitoring Results (µg/m^3) from indicative Osiris (OS) and Zephyr (EZ) monitors.

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2020	2021	2022	2023	2024
OS1PS	561527	320437	Industrial	82.5	82.5	14.7	8.0	19.0	11.3	12.6
OS2ER	561593	321466	Industrial	100	100	10.1	16.0	15.1	13.1	19.2
OS3WR	570438	299905	Industrial	95.3	95.3	11.0	12.0	16.1	15.8	19.4
OS4BD	570264	299943	Industrial	100	100	12.8	12.0	15	16.3	16.8
EZ1	562116	320109	Roadside	99.8	41.6	-	-	-	-	12.6

No annualisation has been conducted for data capture <75% and >25% as the monitors are only indicative.

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

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

(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 C.8 – Indicative 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)	2020	2021	2022	2023	2024
OS1PS	561527	320437	Industrial	82.5	82.5	4 (29)	0	5	1 (20.5)	1
OS2ER	561593	321466	Industrial	100	100	0	2	0	0	3
OS3WR	570438	299905	Industrial	95.3	95.3	0	0	0	3	6
OS4BD	570264	299943	Industrial	100	100	0	0	1	0	5
EZ1	562116	320109	Roadside	99.8	41.6	-	-	-	-	0

Notes:

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

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

(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 C.9 – Indicative Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2020	2021	2022	2023	2024
OS1PS	561527	320437	Industrial	82.3	82.3	7.9	4	7	6.6	6.7
OS2ER	561593	321466	Industrial	97.8	97.8	6.7	6	6.5	6.1	10.0
OS3WR	570438	299905	Industrial	95.0	95.0	6.4	5	7.5	7.0	9.2
OS4BD	570264	299943	Industrial	99.3	99.3	5.4	6	6	7.5	6.9
EZ1	562116	320109	Roadside	99.8	41.6	-	-	-	-	8.3

No annualisation has been conducted for data capture <75% and >25% as the monitors are indicative / non-reference.

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

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

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

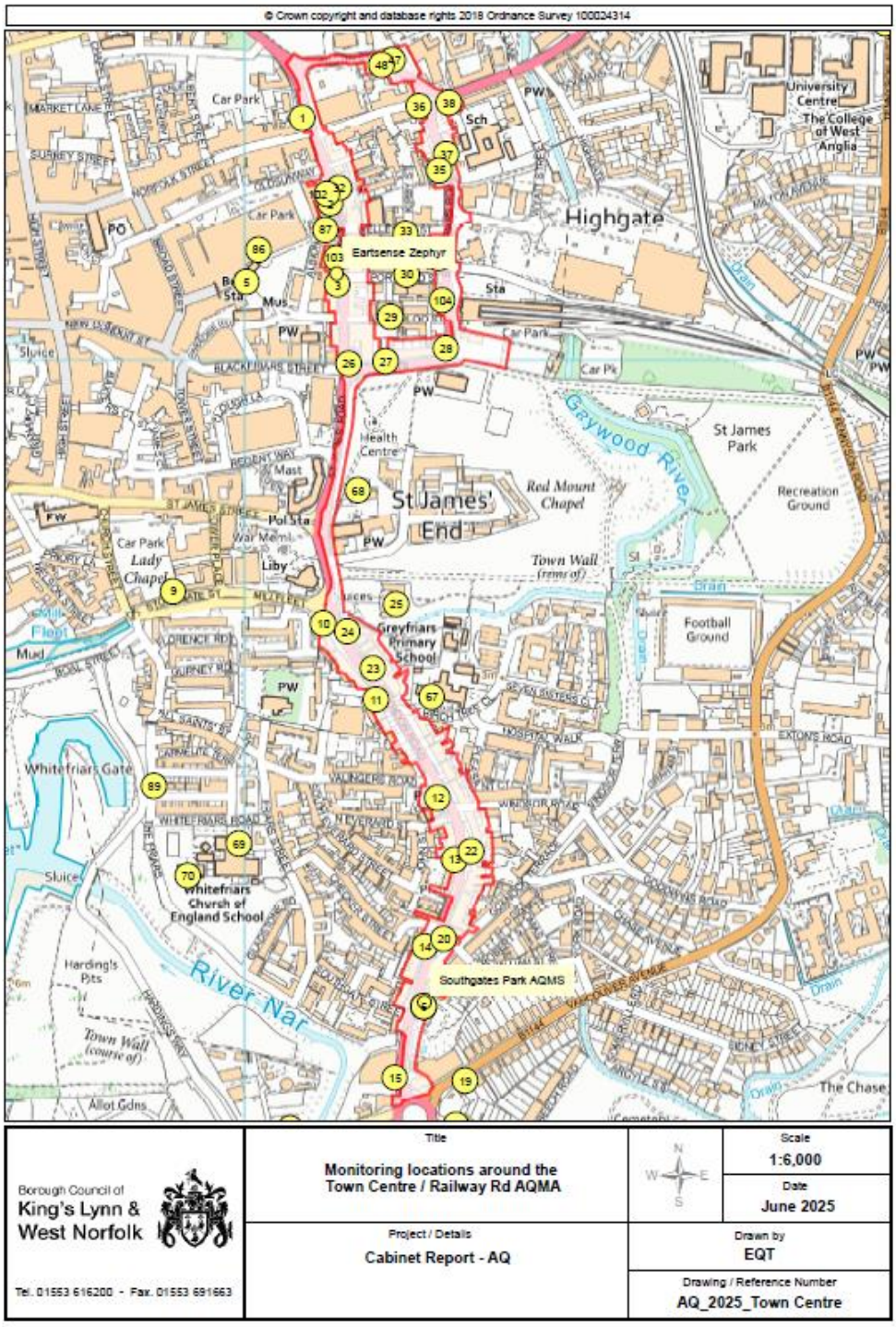

Figure D.2 – Map of the Monitoring Sites around Gaywood Clock

Figure D.3 – Map of the Monitoring Sites around King's Lynn Docks

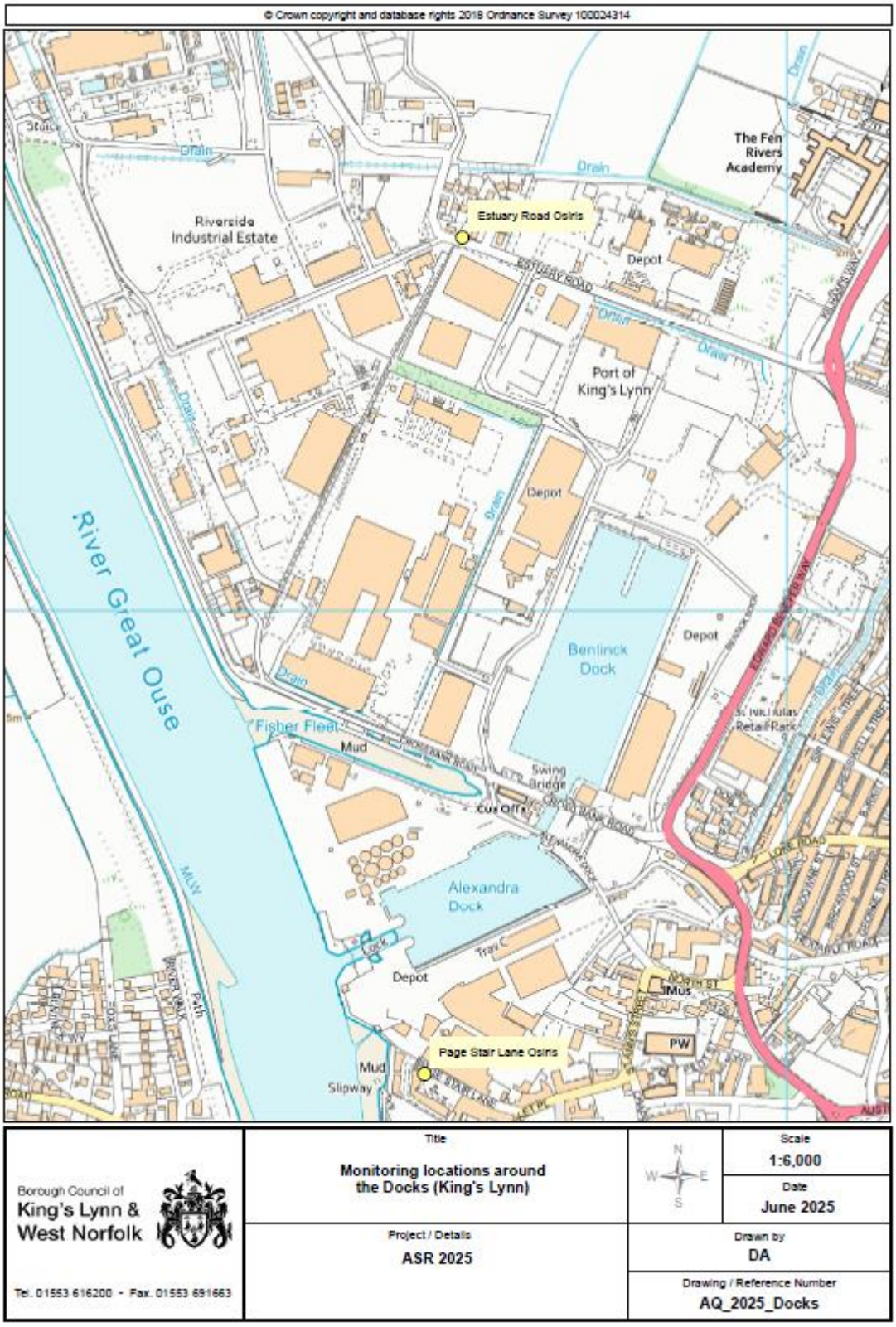

Figure D.4 – Map of the Monitoring Sites around the Mill in Stoke Ferry

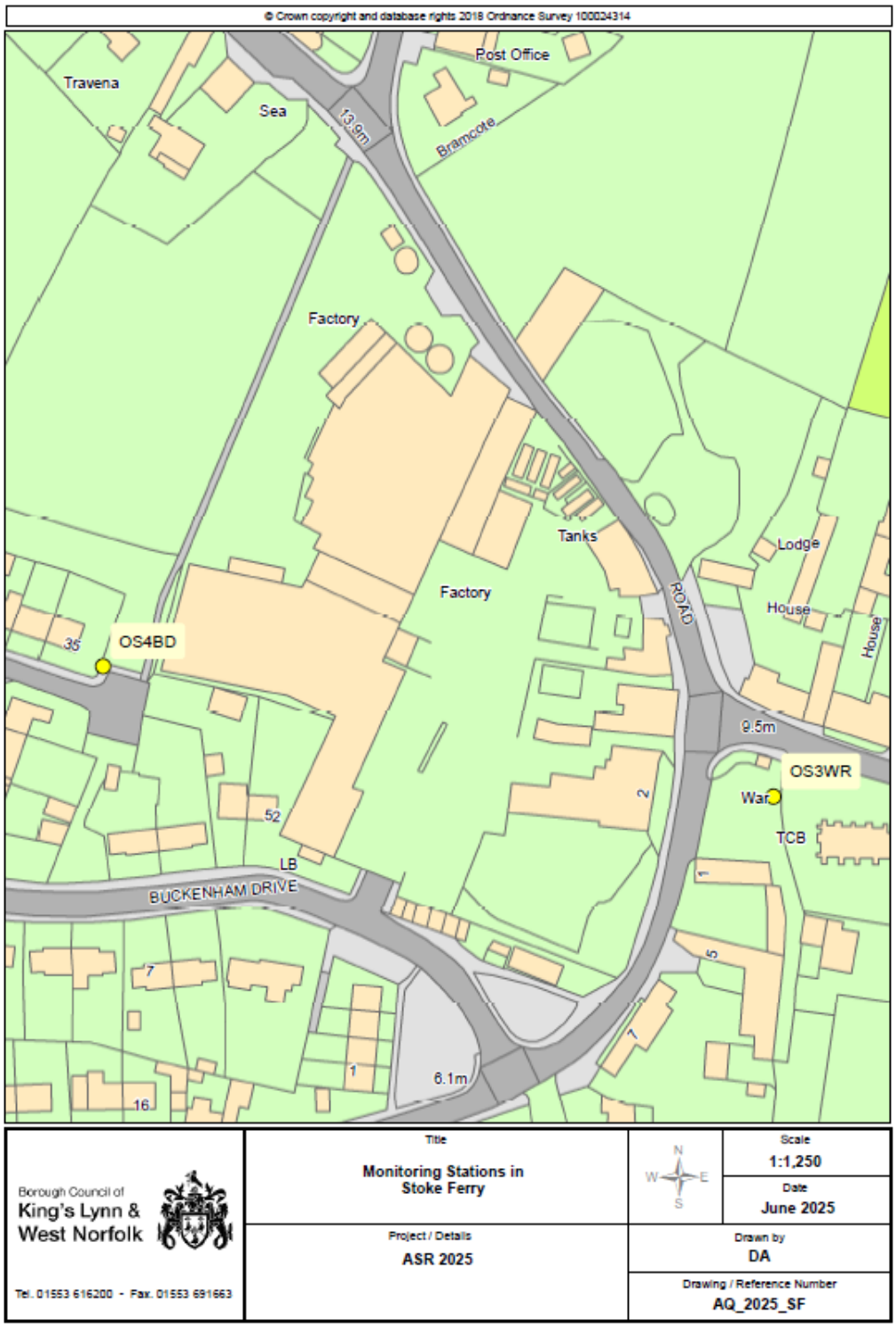

Figure D.5 – Map of the Diffusion Tube sites around North Lynn Approach

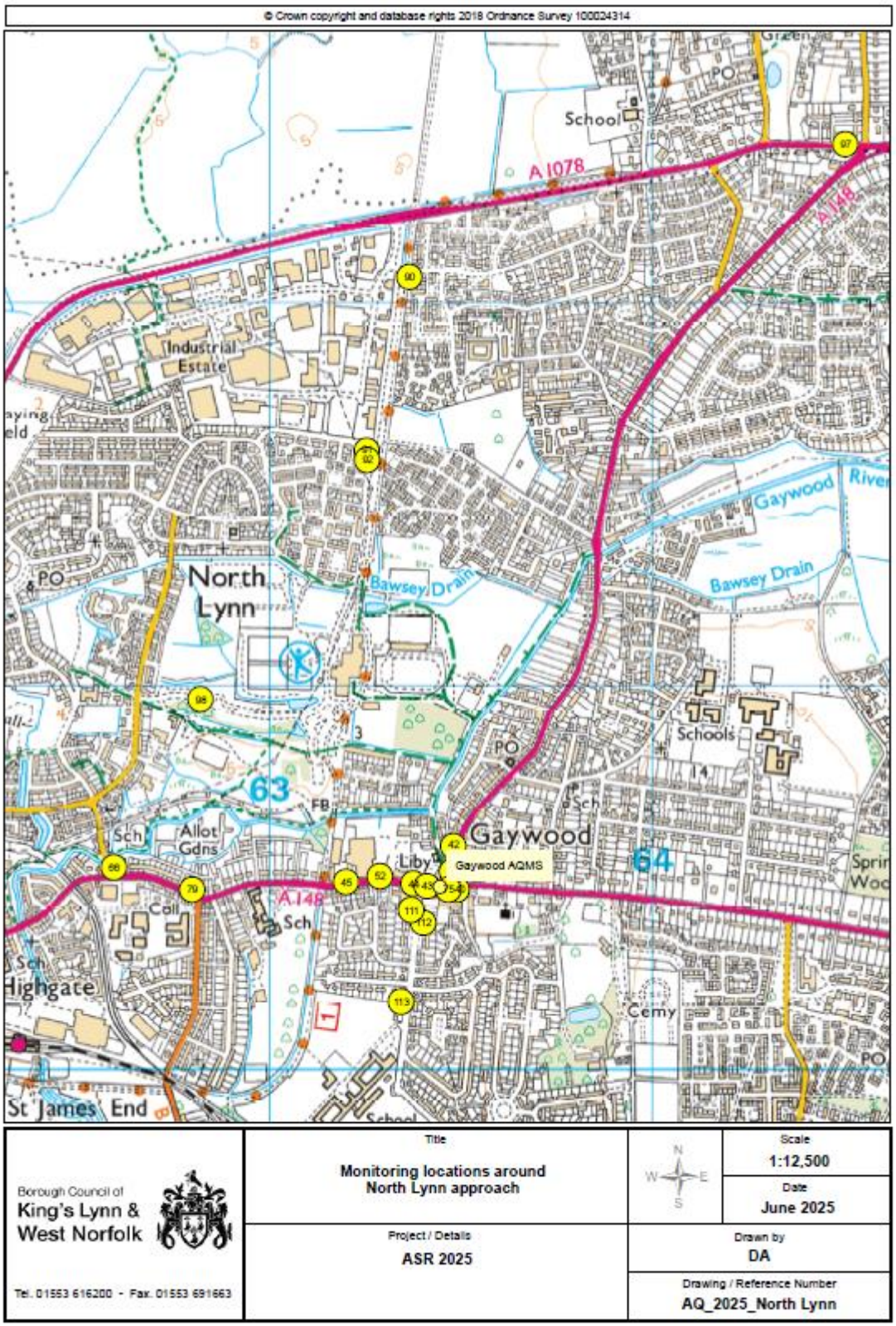

Figure D.6 – NO_2 Diffusion tube sites around the South Lynn Approach, including A10 (West Winch)

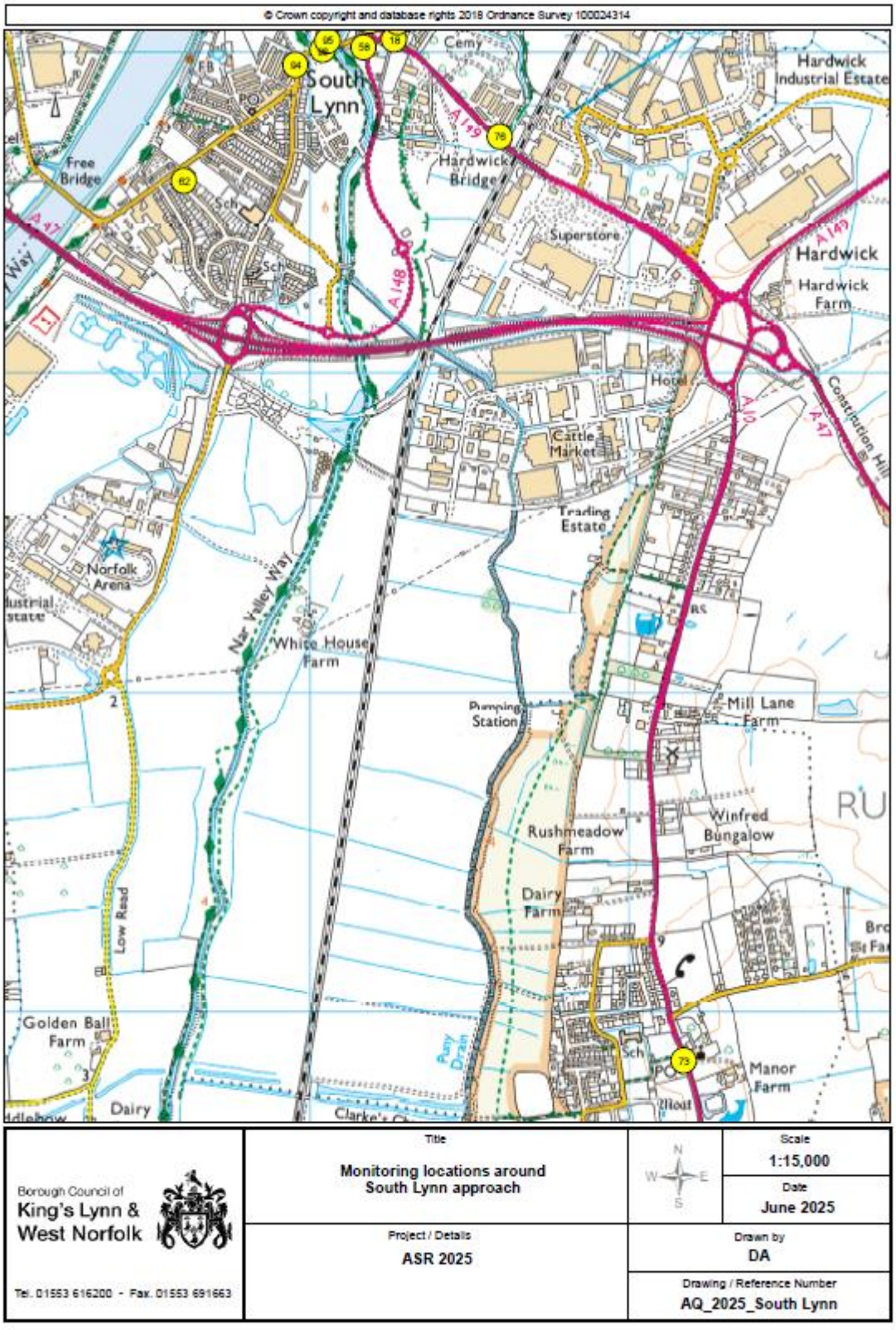

Figure D.7 – NO2 Diffusion site locations around Wisbech

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[39]

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

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

Appendix F- Other large point sources

Table F.1 – Biomass Boilers >45kWth

Name	Planning / Permit reference	therm_output (kW)	make appliance	fuel type
Biomass Boilers Reviewed in 2024				
Lodge Farm Hunstanton	24/01263/F	100	Herz Firematic or Pelletec	Woodchip
Westacre Estate	Certificate of Lawfulness 24/01384/LDE	200	Heizomat HSK-RA 200kW	Woodchip
Greenworld	Retrospective 21/01087 Permit EPR/HP3096NJ	3x 370	Dragon Heat	Woodchip from permitted composting facility
Fring Estate Church Farm	24/00920/AG	Aggregated 220	2x Windhager 60kW Hargasser 99kW	Wood pellet Wood chip
Anglia Wood Fuel Fring Estate Fring		990	Heizomat Model RH-AK 1000	Wood chip
Reeve Wood King's Lynn	Variation of existing	199	ETA Hack 199	chips
Current / Existing biomass boilers				
Kevley, Upwell	12/00356/F 13/00292/F	3x 995	Linka	Straw bales
Hillgate Nurseries, Terrignton 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
Downham Country Garden Store, Stonecross Rd, PE38 0AD	23/01524/F	295	Glenfarrow 295	Waste wood (non-treated)
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		

Table F.2 - Anaerobic Digestion Facilities

Name	Planning / Permit reference	Power of CHP	Comments
Riverside AD Estuary Rd, King's Lynn	FUL/2024/0010	235kW	AD Facility with approval to process up to 55,000 tpa of feedstocks with resultant biogas to power CHP (235kWth). Air dispersion modelling carried out by Isopleth (01.0043.003 v1) of the NO_2 from stack and flare showing negligible impact.

Estuary Farm, Greenworld	SCR/2024/0002 SCO/2024/0003	2x 1.35MW	AD Facility seeking approval to process up to 60,000 tpa of feedstocks with resultant biogas to power CHP (2x 1.35MW). Spare heat from AD to supply existing drying / composting facility that processes 10,000 tpa feedstocks and heated by 3x 370kW biomass boilers. Air quality impacts screened using SCAIL by APS (Kalaco, July 2024) of the NO_2 and SO_2 from stack and flare.
Wellington Lodge Farm	16/01151/FM 23/01276/F	-	AD Facility processes up to 65,000 tpa of feedstocks Gas injected into grid.
Warren Energy Ltd, Breckland Farm	FUL/2021/0011	800	Current variation FUL/2021/0011 is to reduce feedstocks down to original amount 49,000 tpa but to seek flexibility over feedstocks to allow other sources as opposed to those solely from the 'estate' farms.

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
ASHP	Air Source Heat Pump
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
BAT	Best Available Technology
BESS	Battery Energy Storage Systems
CMP / CEMP / CTMP	Construction Management Plan / Construction Environmental Management Plan / Construction Traffic Management Plan
CHP	Combined Heat and Power
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DCO	Development Consent Order
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
DMP	Dust Management Plan
EfW	Energy from Waste Facility
ES	Environmental Statement
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

Abbreviation	Description
LAPPC	Local Air Pollution Prevention and Control
MVHR	Mechanical Ventilation and Heat Recovery
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
QEH	Queen Elizabeth Hospital
RMM	Reserved Matters planning application
SO_2	Sulphur Dioxide
SCA	Smoke Control Area
TP / TA / TS	Travel Plan / Transport Assessment / Transport Statement
tpa	Tonnes per annum
TSP	Total Suspended Particulates
vpd	Vehicles per day
Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less

Abbreviation	Description
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide