IPSWICH
BOROUGH COUNCIL

Detailed Assessment of Air Quality for Ipswich Borough Council

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

June, 2024

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Executive Summary

Part IV of the Environment Act 1995 placed a requirement on local authorities to periodically review and assess air quality in their districts. This involves identifying those areas where it is considered likely that the Air Quality Objectives will be exceeded. Local authorities have a duty to designate any such locations as Air Quality Management Areas (AQMAs) and pursue improvements in air quality in those areas.

Ipswich currently has 4 AQMA's. This report is written in recognition that the boundaries of the existing AQMAs need reviewing on a regular basis to ensure they remain relevant.

This report has been prepared in accordance with Local Air Quality Management Guidance Note LAQM.TG (22).

Monitoring data indicates that there have been no measured exceedances of the air quality objective for NO_2 concentrations over the last five years in AQMA 1.

In light of this, the detailed assessment recommends the following:

- AQMA No. 1 is revoked.

Ipswich Borough Council will now consult with DEFRA and other statutory consultees, members, Suffolk County Council and members of the public regarding this decision.

Monitoring results in AQMA No 2, AQMA No 3 and AQMA No 5. still indicate NO_2 concentrations within 10% of the air quality objective at various locations within the last 5 years, and as such, no plans are being made to amend the boundary of these AQMAs.

Monitoring of nitrogen dioxide will continue at a number of locations within the Ipswich borough using both continuous monitoring and diffusion tubes. This will ensure that the AQMAs remain relevant, will identify other areas of poor air quality, and will, over time, give an indication of any improvement in air quality as the actions within the Air Quality Action plan are implemented.

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Background to Local Air Quality Management in Ipswich

Ipswich Borough Council has completed seven rounds of air quality review and assessment since 2000 and has submitted Annual Status Reports since 2016 as part of the LAQM system.

During the second round of review and assessment in 2003, the Council identified three areas where it was considered air quality objectives for Nitrogen Dioxide (NO_2) were likely to be exceeded. Faber Maunsell - AECOM were commissioned in 2005 to undertake a Detailed Assessment which verified that air quality objectives were not being met due to an exceedance of the annual mean of 40µg/m^3 for NO_2. The Council subsequently declared three AQMA's on 11th April 2006. The extent of the AQMAs as originally declared are shown below:

Figure 1: Ipswich Air Quality Management Order No.1, 2006: Norwich Road, Chevallier Street and Valley Road

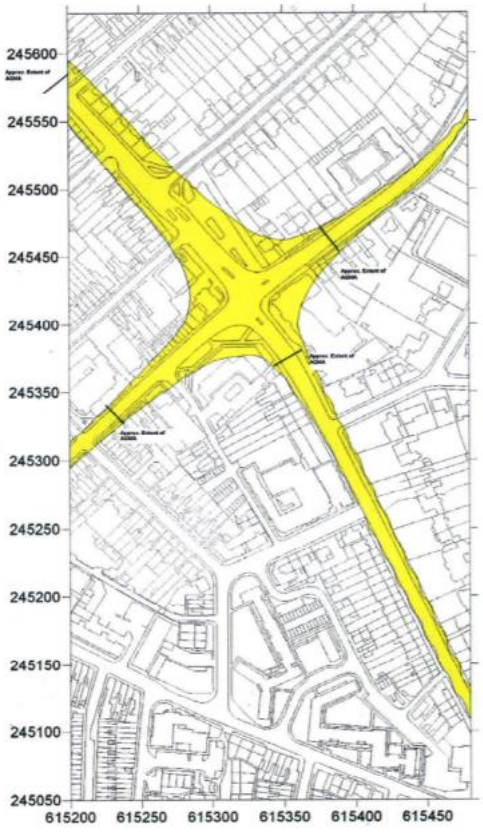


Figure 2: Ipswich Air Quality Management Order No.2, 2006: Junction of Crown Street with Fonnereau Road and St Margaret's Street and St Margaret's Plain

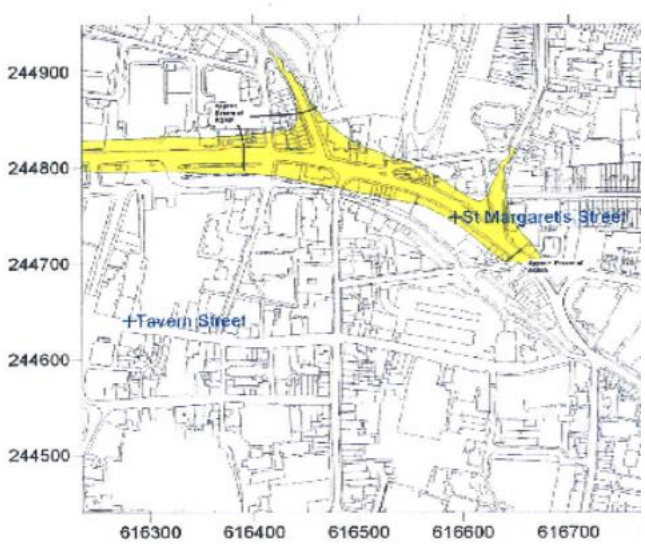
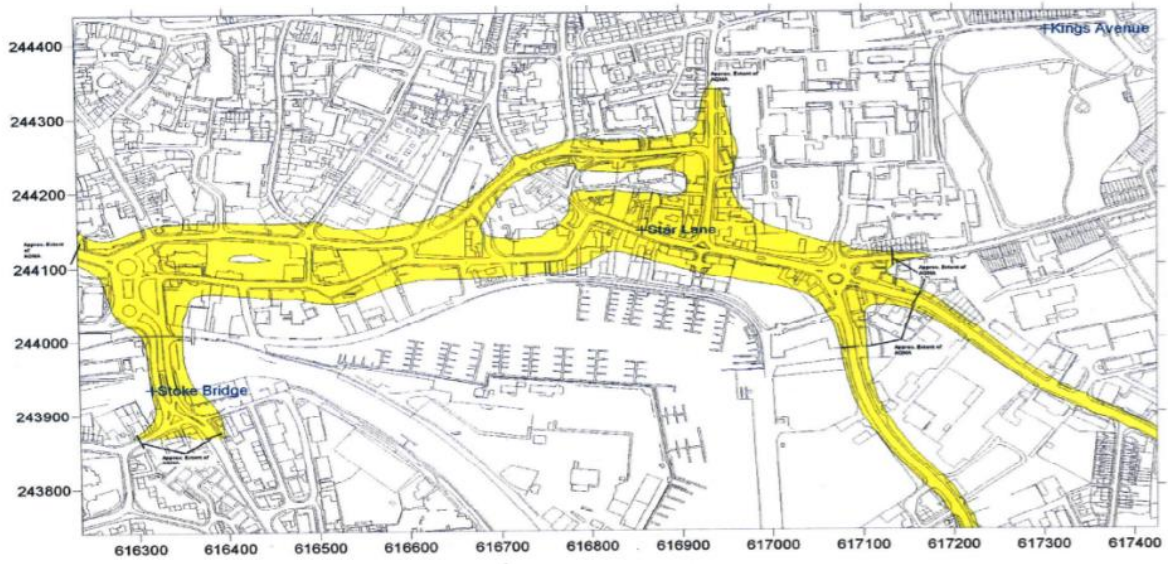


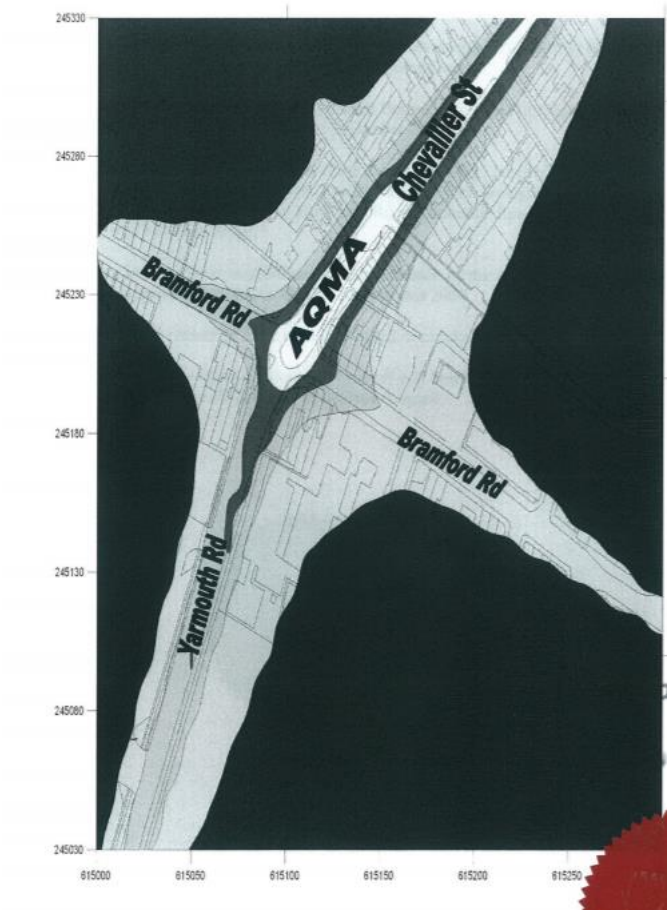
Figure 3: Ipswich Air Quality Management Order No 3 2006: Star Lane gyratory system and St Helen's Street/Grimwade Street



The Council produced an Air Quality Action Plan (AQAP) in 2008 for the three declared AQMAs. Source apportionment identified road traffic emissions as the main source of pollution responsible for the exceedance of the annual average Nitrogen Dioxide objective.

As part of the Councils third round of review and assessment, a Detailed Assessment, finalised August 2010, concluded that there were likely to be exceedances of the annual mean NO2 objective at the Bramford Road/Yarmouth Road/Chevallier Street junction. The predicted exceedances of the annual mean objective were attributed to slow moving vehicles, congestion and queuing traffic. A new AQMA was declared in December 2010 and is shown below:

Figure 4: Ipswich Air Quality Management Order No 4, 2010: Bramford Road, Yarmouth Road, Chevallier Street junction.



The Council carried out Detailed Assessments in 2012 as part of its fifth round of review and assessment and concluded that specific areas along St Helens Street be considered for declaration as an AQMA. Furthermore, it concluded that specific areas along St Matthews Street be considered for declaration as an AQMA.

In 2015, a further Detailed Assessment was carried out. Monitoring data indicated some areas of Ipswich where the annual average nitrogen dioxide objective level were being exceeded outside of the existing AQMAs. In addition, there were areas within the existing AQMAs where, for several years, there had not been exceedances of the objective levels. As such, it was recommended that AQMAs No. 1, 2 and 3 were amended and one new AQMA declared. Again, traffic emissions were identified as the main pollution source responsible for the declaration of an additional AQMA. In 2017, the existing AQMAs were amended and AQMA No.5 was declared. AQMA No:5 as originally declared is shown below (it has not been amended since the original declaration):

Figure 5: Ipswich Air Quality Management Order No 5, 2017: St. Matthews Street / Norwich Road between the Civic Drive roundabout and Bramford Road

In 2020, a further Detailed Assessment was carried out. Monitoring data indicated an area outside of AQMA No. 3 where the annual average nitrogen dioxide objective level was being exceeded. In addition, there were areas within the existing AQMAs where, for several years, there had not been exceedances of the objective levels. As such, it was recommended that AQMA No. 1 was amended to reduce the boundary, AQMA No.3 amended to marginally increase the boundary, and that AQMA No.4 was revoked.

Currently, Ipswich Borough Council has declared a total of four AQMAs, all due to continued exceedance of the annual mean NO_2 objective level. These are:

- Ipswich AQMA No.1 - Encompassing the land in and around the junction of Norwich Road, Chevallier Street and Valley Road, this area extends along Chevallier Street to the junction with Providence Lane (declared 2006; amended 2017; amended 2021);
- Ipswich AQMA No. 2 - From the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street. (declared 2006; amended 2017);
- Ipswich AQMA No. 3 - Encompassing the land in and around College Street, Key Street, Salthouse Street, Fore Street, Star Lane, Neptune Square and Grimwade Street (declared 2006; amended 2017; amended 2021);
- Ipswich AQMA No. 5 - Incorporating the land in or around St. Matthews Street / Norwich Road between the Civic Drive roundabout and Bramford Road (declared 2017).

Figure 6 below shows the current Air Quality Management Areas in Ipswich.

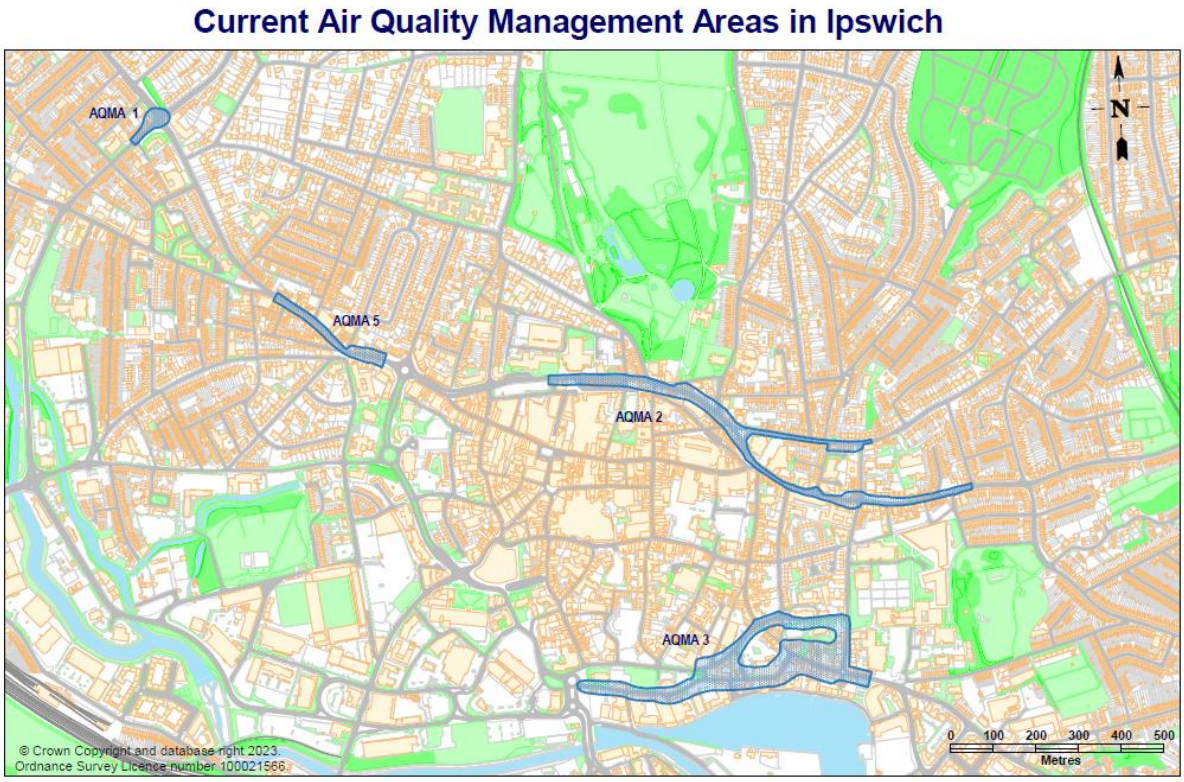


Figure 6: Current Air Quality Management Areas in Ipswich

In 2019, the Council published its latest Air Quality Action Plan aimed at addressing the exceedances of the NO_2 annual mean objective level. The Action Plan was updated in 2021 to reflect the reduction in the number of AQMAs in the town.

The latest 2024 Annual Status Report (ASR) currently being prepared indicates that there have been no measured exceedances of the air quality objective for NO_2 concentrations over the last five years in AQMA No.1. In light of this, the Council is now reviewing the monitoring data to determine whether the existing AQMA is still appropriate and whether it can be revoked.

A copy of the Councils air quality reports can be found at:
https://www.ipswich.gov.uk/airqualitymanagement

Detailed Assessment of NO_2 Monitoring in Ipswich

Overview of Monitoring

DEFRA's LAQM Helpdesk has previously confirmed that dispersion modelling is not essential for the purposes of a Detailed Assessment. Paragraph 3.55 of LAQM.TG(22) supports this and states "*in some instances if compelling evidence exists, detailed modelling to support the decision to amend/revoke an AQMA may not be necessary and an AQMA may be amended or revoked following a screening assessment or on the basis of robust monitoring evidence*."

The Council currently monitors NO_2 levels using 93 diffusion tubes positioned at 83 locations in and around the perimeter of the AQMAs, at background locations, or at locations where it is suspected that concentrations may be close to the annual objective level. In addition, the

Council operates two continuous monitors that measure concentrations of nitrogen dioxide, one of which is located just outside the periphery of AQMA No.1 on Chevallier Street, and the other being located just outside the periphery of AQMA No.5 on St Matthews Street.

Monitoring results in AQMA No 2, AQMA No 3, and AQMA No 5. still indicate NO_2 concentrations within 10% or above the air quality objective at various locations within the last 5 years, and as such, no plans are being made to amend the boundaries of these AQMAs. In light of this, the focus of this detailed assessment is on AQMA No.1.

This detailed assessment is based on diffusion tube readings placed out in and around the perimeter of AQMAs No.1 over the last 10 years. It is also based on continuous monitor data obtained from the Chevallier Street monitor over the last 7 years.

In accordance with the current LAQM regime in the UK, a copy of this assessment will be appended to the Councils next Annual Status Report.

Diffusion Tube Analysis

Triplicate tubes reviewed in this assessment have been suitably checked for precision and accuracy and were found to have good precision overall. All diffusion tubes reviewed in the assessment had a high data capture rate (above 75%).

All diffusion tube results have been suitably corrected for bias. A national bias correction factor was applied to results between 2014 – 2017. A locally derived bias correction factor was used for the 2018 - 2021 results due to the resumption of automatic air quality monitoring at the Chevallier Street site, with a high rate of data capture (99% in 2018, 98% in 2019 and 2020, 92% in 2021). A national bias correction factor was again used in 2022, due to less than 75% data capture from the analyser as a result of exceptional temperatures experienced in the summer of 2022; data between June and September had to be rejected as the analyser could not be cooled sufficiently despite the procurement of a new air conditioning unit. Furthermore, the same monitor experienced faults in both May – June and December 2023. As a result of this, we had less than 75% data capture for the Chevallier Street site and were unable to calculate a combined local bias correction factor for 2023 either.

Paragraph 1.63 of LAQM.TG(22) states that likely exceedances of the objectives should be assessed in relation to ‘the quality of the air at locations which are situated outside of buildings or other man-made structures, above or below ground, and where members of the public are likely to be regularly present’. Building facades of residential properties, schools, hospitals and care homes would all be relevant in terms of long-term annual mean objectives.

Where diffusion tube locations were not representative of annual mean exposure to relevant receptors, the data was distance corrected, where possible, using the Defra Nitrogen Dioxide fall off with distance calculator to estimate the annual mean NO_2 concentration at the façade of the closest property.

Automatic Monitoring

The automatic monitor located on Chevallier Street (IPS3) used in this assessment is subject to fortnightly routine calibration by an Ipswich Borough Council Environmental Health Officer or Technical Officer. The analyser has also been serviced and the monitoring site audited biannually by Matts Monitors and Ricardo Energy & Environment respectively. The Chevallier Street monitor is co-located with triplicate tubes, numbers 45, 46, and 47 and is just outside the boundary of AQMA No.1.

All automatic monitoring data collected is managed by Ricardo Energy & Environment using the same quality control procedures utilised by Defra's national air quality network stations. These procedures represent best practice and fully meet the requirements set out in LAQM.TG(22).

All collected data is screened and scaled (based on site calibrations) and the final data sets presented within this report have benefitted from a full process of data ratification, including thorough additional data quality checks that include site audits and a ratification process that corrects data for instrument sensitivity drift between routine calibrations.

Further details on the QA/QC for the air quality monitoring data can be found in the ASR's, Updating and Screening Assessments and Progress Reports on the Councils website.

Monitoring Data

The map and table below show the monitoring locations and annual mean NO_2 concentrations within AQMA No. 1 for the period 2014 – 2023.

AQMA No.1

A map detailing the monitoring locations in and around the perimeter of AQMA 1 is shown below:

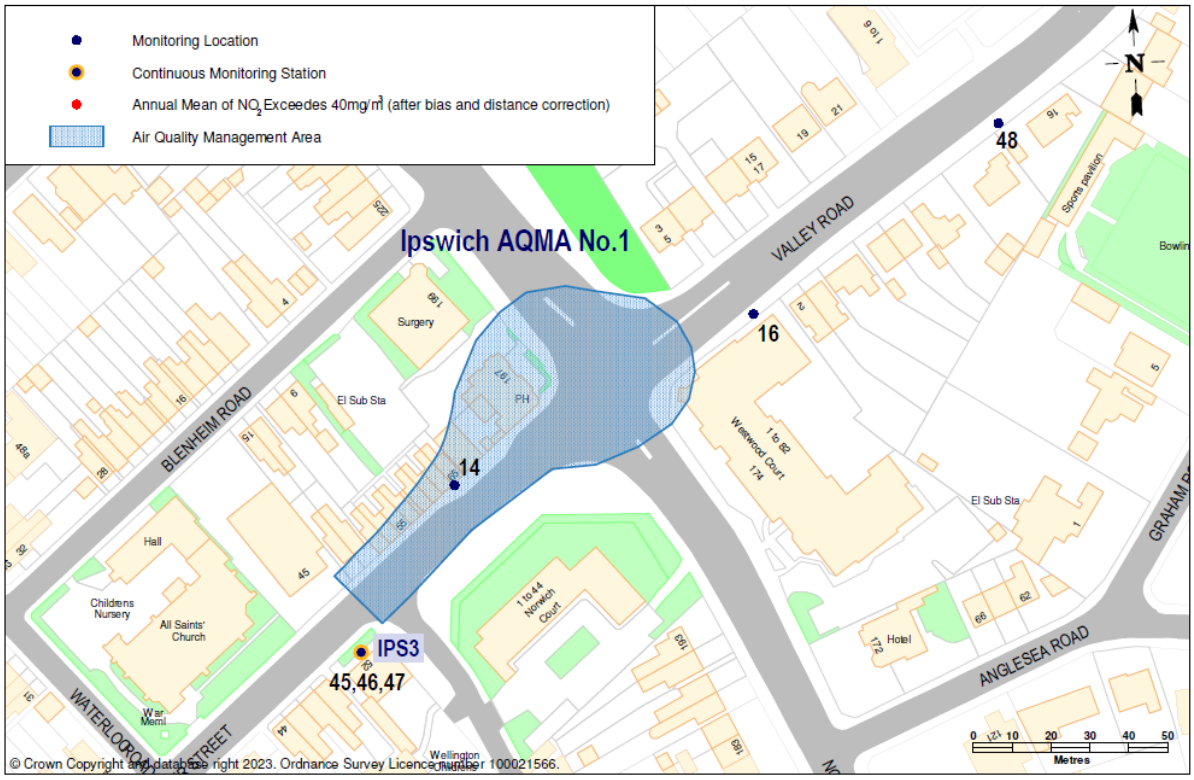


Figure 7: Monitoring Locations in and around AQMA 1

Table 1: Values of NO2 at façade for monitoring sites near AQMA 1 *(note: IPS3 is a continuous monitoring site)*

Monitoring site	In AQMA	Distance correction required	NO_2 Concentrations (µg/m^3) (unadjusted values not located at façade of relevant receptor provided in brackets)									
			2014 - NF	2015 - NF	2016 - NF	2017 - NF	2018 - LF	2019 - LF	2020 - LF	2021 - LF	2022 - NF	2023 - NF
IPS3	N	Did not distance correct monitor data	N/A	N/A	N/A	29	28	26	20.7	23	20	20
DT45 (trip)	N	Y	(29.6)	(29.1)	25.7 (27.4)	25.0 (26.5)	26.5 (28.3)	24.3 (25.7)	19.2 (19.4)	21.1 (22.3)	20.8 (22.0)	19.4 (20.5)
DT46 (trip)	N	Y	(29.3)	(28.4)	25.7 (27.4)	25.0 (26.5)	26.5 (28.3)	24.3 (25.7)	19.2 (19.4)	21.1 (22.3)	20.8 (22.0)	19.4 (20.5)
DT47 (trip)	N	Y	(28.6)	(28.0)	25.8 (27.6)	25.0 (26.5)	26.5 (28.3)	24.3 (25.7)	19.2 (19.4)	21.1 (22.3)	20.8 (22.0)	19.4 (20.5)
DT14	Y	Y	**45.7 (46.7)**	**46.2 (47.8)**	**45.9 (47.4)**	**43.7 (45.1)**	**43.5 (44.5)**	39.8 **(41.0)**	31.5 (32.1)	33.5 (34.2)	32.4 (33.1)	31.6 (32.2)
DT16	N	Y	(33.2)	(36.4)	32.2 (35.1)	33.6 (36.7)	32.0 (35.3)	30.3 (33.0)	23.8 (25.7)	25.1 (27.3)	25.8 (28.3)	24.6 (26.9)
DT48	N	Y	(27.1)	(27.4)	23.1 (27.1)	24.4 (28.8)	22.5 (26.5)	21.6 (25.0)	17.3 (19.1)	18.2 (20.7)	18.6 (21.6)	18.1 (21)

Bias Correction Factor used: NF – National Factor / LF – Local Factor
N/A – no data held

The results show that with the exception of DT14, all monitoring sites have been reading below the relevant objective for the last ten years. DT14 is located on a narrow stretch of road, leading up to a roundabout that is often congested, particularly at peak times.

Analysis of Trends in NO_2 Monitoring Data

According to LAQM TG.(22), when considering whether to revoke or amend an AQMA, local authorities should consider measurements for several years or more (i.e. three to five years). They should also investigate national trends and local influences that may be affecting the AQMA. The guidance also states that when conducting trend analysis, several years' worth of data should be assessed to demonstrate whether trends are statistically significant. The reason for this is because changes in concentrations occur from year to year due to meteorological conditions. Given that the Council has obtained ten years of data for most of the monitoring sites used in this review, it can be confident of the findings.

This section considers the trends in annual mean concentrations measured in the period 2014-2023 within AQMA 1 against the annual mean objective level of 40*µg/m^3*. Figure 8 presents the same information from Table 1 in graphical form.

LAQM.TG (22) states that "*exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60µg/m^3*". From the above table it is clear that monitoring values at all sites for the last nine years are significantly below the annual mean value of 60µg/m3. Therefore, the Council does not consider there to be a risk of exceedance of the hourly objective at any site.

AQMA No.1 - Trends in NO_2 concentrations

Figure 8 below shows that although concentrations exhibit a small year on year variability, the overall trend is for concentrations to have declined since 2014. With the exception of DT14, once bias and distance corrected, all diffusion tube sites have experienced concentrations below the objective since 2014. The automatic monitor IPS3 has also read below 30µg/m3 since its reinstatement in 2017.

Although DT14 recorded an annual mean of 39.8 µg/m^3 in 2019, the Council is now confident that levels will not exceed the objective in future years. Concentrations have remained below 10% of the annual mean objective level since the COVID-19 pandemic in 2020, and have remained below 10% of the annual objective level since.

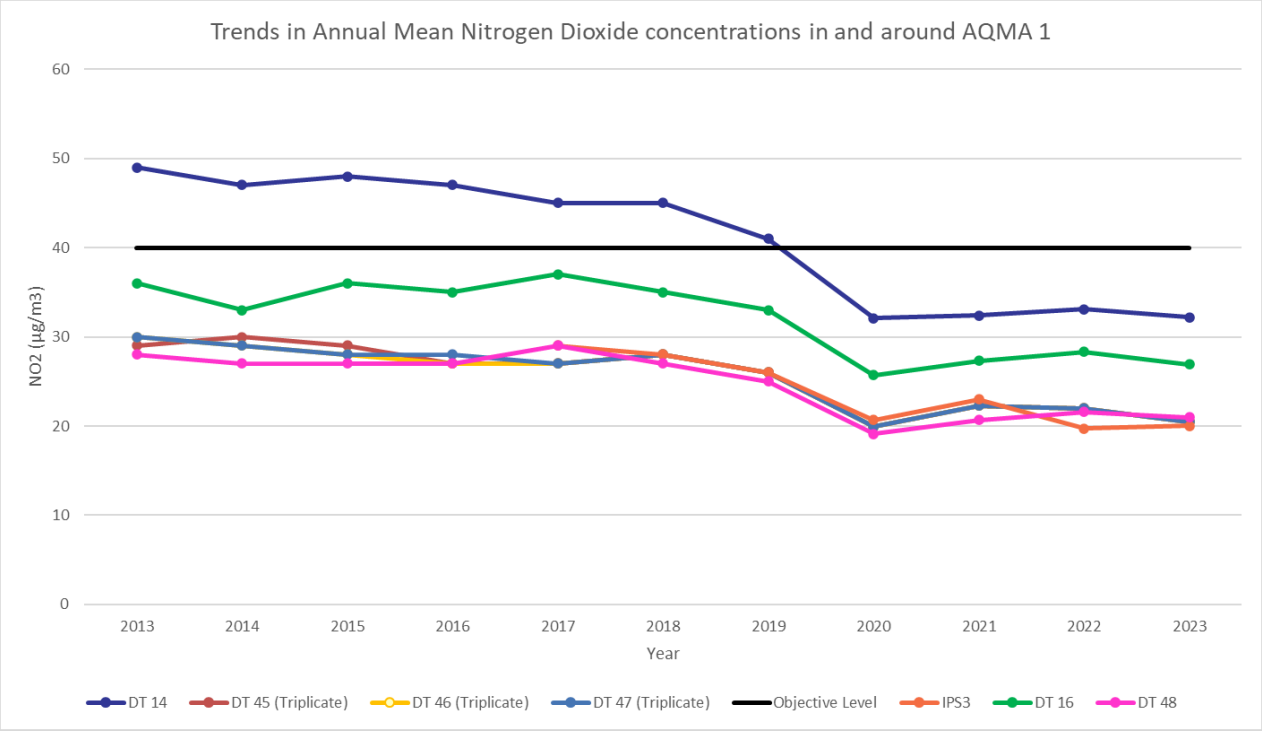


Figure 8: Trends in annual mean NO2 concentrations in and around AQMA 1

Due to NO_2 concentrations remaining below the annual mean objective level for the last five years, it is proposed that AQMA No.1 is revoked.

Conclusions and Recommendations

Monitoring of nitrogen dioxide indicates that there is no continuing exceedance of the annual average objective level in AQMA No.1.

In light of the above, it is recommended that the following actions are taken:

- AQMA No. 1 is revoked.

As such, and following approval of this report by Defra, consultation will take place with members of the council, the statutory consultees and the public. Following consultation, and assuming approval of the proposed action by the local authority Executive, it is recommended that the AQMA is revoked.

Monitoring will continue within and around the AQMA where exceedance has historically occurred. Further changes to any of Ipswich's other AQMAs will be made as and when required, dependent on the outcome of any Further Assessment and future monitoring or air quality modelling results.