December 2015

Air Quality

Detailed Assessment Report

For

Ipswich Borough Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

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Executive Summary

This report is written in recognition that the boundaries of the existing Air Quality Management Areas (AQMAs) need reviewing on a regular basis to ensure that they remain relevant.

The report has been prepared in accordance with Local Air Quality Management Technical Guidance Note LAQM.TG (09).

Monitoring data indicates that there are some areas of Ipswich where the annual average nitrogen dioxide objective level is being exceeded outside of the existing AQMAs. In addition, there are areas of the existing AQMAs where, for several years, there have not been exceedances of the objective levels. As such, it is recommended that three of the four existing AQMAs be amended/varied and 1 new AQMA declared based on newly defined boundaries. The AQMAs would be subject to consultation with members, Suffolk County Council highways, local residents and statutory consultees.

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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1 Introduction

1.1 Introduction to Local Authority Area

Ipswich is the county town of Suffolk and is a multi-cultural centre for business, culture, entertainment and sport. Ipswich has a population of more than 130,000 and is home to University Campus Suffolk and Suffolk New College. The main routes into and out of Ipswich are congested during typical rush hour times and travel across Ipswich is restricted to certain routes by the River Orwell. Transport and traffic management are key strategic priorities for the town as the Waterfront and other areas of the town are undergoing significant redevelopment. In particular an area of 200ha to the north of Ipswich is identified through the adopted Core Strategy and Policies Development Plan for the development of housing and associated facilities prior to 2021 in part, and as a broad area for housing and associated facilities after 2021 on the remainder. Continuing the economic prosperity is dependent on people being able to move around the town for work, shopping and leisure. At present a significant number of these journeys are made by car.

'Ipswich - Transport Fit for the 21st Century' is a Suffolk County Council scheme to improve travel around Ipswich in the future, with the aim of offering an alternative to the car. The stated vision of the proposal is - “As the County Town of Suffolk, and a major growth point within the Haven Gateway sub region, Ipswich needs and deserves a sustainable transport system. 'Ipswich - Transport Fit for the 21st Century' is an integrated scheme designed to achieve a step change in travel behaviour, challenging and changing existing patterns of travel, and providing the foundation for Ipswich to thrive in the decades ahead. Our preferred approach is to influence patterns of travel in the Ipswich area, to reduce reliance on the car, particularly for peak hour travel. We can then begin to tackle congestion and associated air quality problems and our transport networks will be better placed to support development growth. Ipswich must maintain a vibrant economy to match its housing growth and investment in a sustainable transport system will prevent growing congestion. This investment is essential if we are to attract employers into the town and enhance Ipswich's position in delivering services to the wider county and sub-region. Achieving this outcome, which will require much better accessibility of employment and housing sites for people without cars, is the principal focus of our transport strategy for Ipswich, of which this Major Scheme is a key element”.

1.2 Detailed Assessments

Where an Updating and Screening Assessment has indicated that there is a risk of the air quality objectives being exceeded, the authority will need to carry out a Detailed Assessment. A Detailed Assessment is also required where the local authority wants to revoke or amend/vary an existing Air Quality Management Area (AQMA).

As explained in the Local Air Quality Management Technical Guidance (TG09), the aim of the Detailed Assessment is to determine, with reasonable certainty, whether or not there is a likelihood of the air quality objectives not being achieved. In some cases, local authorities may choose to designate the AQMA over a much wider area than the geographical extent of the area of exceedance.

1.3 Scope of the Detailed Assessment

This detailed assessment will focus on the area sited in, around, and between, the existing 4 AQMAs already declared for Ipswich, and the 2 areas considered in the 2012 Detailed Assessment Reports for Ipswich Borough Council.

2 Background

2.1 Requirement for a Detailed Assessment Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their area, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedances are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

This report follows on from the Detailed Assessments of 2012, Updating and Screening Assessment 2012, and the Progress Reports 2013 and 2014.

2.2 Summary of Previous Review and Assessments

Round 1

The first round of air quality review and assessment was completed in March 2001 and consisted of three stages, each reported separately and progressively looking into more detailed analysis when required;

Stage 1 comprised of an initial study to identify which pollutants required further investigation;

Stage 2 required estimating, modelling or measuring pollutants where there was an indication that national objectives would not be achieved; and

Stage 3 involved using advanced modelling techniques and emissions inventories.

The final assessment (third stage report) concluded that the Air Quality Objectives would be met. There were, however, some areas of concern where levels of nitrogen dioxide from road traffic pollution were expected to be close to reaching the objective level and the need to keep these under review was recognised.

Round 2

In 2003, all local authorities were required to complete a second round of air quality reviews and assessments. The Government issued guidance to assist with this and to direct authorities on the methodology for completing the review. The first stage of the review was an Updating and Screening Assessment (USA). This was based on a checklist to identify those matters that had changed since the first review was completed in 2001 and which required further assessment. The USA covered new monitoring data, new sources of pollution and other changes that affected air quality.

The Council's USA, completed in December 2003, concluded that further detailed assessments of nitrogen dioxide from road traffic sources and particulate matter from an industrial source were required to determine whether air quality objectives would be exceeded in 2005. In July 2005, further detailed assessments were completed in respect of the impact of road traffic on concentrations of nitrogen dioxide in St Margaret's Street, Norwich Road/Chevallier Street junction and the Star Lane gyratory system/St Helen's Street. The assessment was completed using a dispersion model, traffic and meteorological data and an ambient real time continuous monitor to produce concentration plots for 2005 and 2010.

The results of the detailed assessments for nitrogen dioxide indicated that the annual mean objective pollution level would be exceeded along most of the roads under study. In places, the exceedance of the 40µg/m^3 annual mean standard extended 50 metres from the kerb into residential areas.

Under Section 83(1) of the Environment Act 1995, local authorities have to designate areas with a predicted exceedance of the Air Quality Objectives as Air Quality Management Areas (AQMAs). Ipswich Borough Council declared three AQMAs on the 11th of April 2006:

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

This junction is located on one of the main routes into Ipswich town centre with four roads leading into a double mini roundabout (the extent of the AQMA is shown in Map 1). Generally, the area around this junction is open with some green space and buildings set back from the road. However, there is a public house (with flat above) and some residential flats that are both located adjacent to the junction. In addition, one road, Chevallier Street, leading from the roundabout has terraced properties facing directly onto a pavement.

- 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.

This AQMA includes four roads all leading off each other (the extent of the AQMA is shown in Map 1). There are main traffic lights at the junction of St Margaret's Street and St Margaret's Plain and pedestrian crossing lights just beyond the junction of Crown Street and Fonnereau Road. The area along St Margaret's Street was partially a street with canyon like properties. St Margaret's Street has historically been flanked by flats on one side, and a vacant building on the other. The vacant building has been demolished but historic permission has been given for this to be turned into residential dwellings. There are residential buildings on all roads within the AQMA.

- Ipswich Air Quality Management Order No 3, 2006: Star Lane gyratory system and St. Helens Street/Grimwade Street.

The gyratory system is a circular network of one-way roads located next to the docks (the extent of the AQMA is shown in Map 1). There are many residential dwellings (mainly high-rise flats) within these areas and some commercial and office buildings. Further development of the Gyratory system and Dockside is ongoing, although slower in recent years. Traffic flow through many of the areas of this AQMA can be congested.

The Department for Environment, Food and Rural Affairs (DEFRA) also requires that local authorities should submit annual air quality (Progress Reports) in-between three yearly USAs. Ipswich Borough Council completed a Progress Report in September 2005.

Round 3

The third round of review and assessment commenced in 2006 and Ipswich Borough Council completed its USA in January 2008. The USA concluded that four of the seven prescribed pollutants were likely to meet their Air Quality Objectives and as such a Detailed Assessment was not required. However, it was found that further screening works for Benzene, Nitrogen Dioxide (NO_2) and particulates (PM_{10}) were required, as well as a Detailed Assessment of both NO_2 and PM_{10} at the Yarmouth Road/ Bramford Road and Chevallier Street Junction.

The Detailed Assessment, recommended in the USA, was completed in draft in December 2009 and finalised August 2010, and concluded that there were likely to be exceedances of the annual mean NO_2 objective at this location. It was unlikely that the hourly objective would be exceeded. 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 on Map 1:

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

For the pollutant PM_{10}, modelling indicated a very unlikely risk of exceeding the annual mean PM_{10} objective in the base year and the future year of 2010.

The screening works resulting from the round 3 USA was completed as part of round 4 USA. At the advice of DEFRA, the information usually included in a progress report was also incorporated into the round 4 documents.

Round 4

The fourth round of review and assessment began in 2009. The USA was completed in January 2010. The USA concluded that five of the seven prescribed pollutants were likely to meet the Air Quality Objectives. However, it was found that a Detailed Assessment for NO_2 was required for the Civic Drive/St Matthew's Street Junction and St Helen's Street, along with a Detailed Assessment of both NO_2 and PM_{10} at a Biomass Boiler on Nacton Road.

The Detailed Assessment of NO_2 and PM_{10} of the Biomass Boiler on Nacton Road was completed in September 2011 and concluded that there was no need for any further assessments of the process. Further screening for NO_2 and PM_{10} at the Biomass boiler at the Reg Driver Centre, Christchurch Park was also required and was reported in the 2010 Progress Report which was completed in October 2010. It was found that the emissions rates from the Reg Driver Centre were well below those requiring further investigation or screening.

The 2011 Progress Report highlighted a small number of locations that exceeded the nitrogen dioxide objective level outside of the existing Air Quality Management Areas, all of which have been investigated as part of previous or ongoing assessments, or are very close to an AQMA boundary where they will be reviewed as part of this Detailed Assessment.

Particulate monitoring in the Borough showed no exceedances of the PM_{10} objectives over the course of 2010.

The detailed assessment of St Matthews Street roundabout area in 2012 indicated that concentrations of nitrogen dioxide were above air quality objective values along parts of St Matthews's Street either side of the Civic Drive Roundabout. Based on the detailed assessment and review of the monitoring data within the area under assessment it was concluded that specific areas along St Matthew's Street either side of the roundabout be considered for declaration as Air Quality Management Areas. Similarly, a detailed assessment undertaken in 2012 indicated that concentrations of nitrogen dioxide were above air quality objective values along parts of St Helen's Street and Woodbridge Road. Based on the detailed assessment and review of the monitoring data within the area under assessment it was concluded that further areas along St Helen's Street and Woodbridge Road be considered for declaration as Air Quality Management Areas.

Round 5

The fifth round of review and assessment began in 2012. The 2012 Updating and screening assessment concluded that there were continuing exceedances of the Nitrogen Dioxide annual average objective levels within the AQMA areas. Overall the 2011 diffusion tube assessment indicated a slight decline in the majority of the Nitrogen Dioxide levels in the borough although it was impossible to say at that stage if it was an ongoing trend.

The 2013 and 2014 Progress Reports concluded that at some locations outside of the existing AQMAs monitoring indicated exceedances of the nitrogen dioxide annual average objective level. A detailed assessment was required.

Summary of LAQM reporting

The various stages of the previous review and assessments are summarised in Table 1.

Table 1: Summary of previous review and assessments carried out by Ipswich Borough Council.

Round	Date	Type of Assessment	Conclusions/Outcome
1	March 2001	Final Assessment	Predicted that the Air Quality Objectives would be met. Areas of concern where levels of nitrogen dioxide from road traffic pollution were expected to be close to reaching the objective level were kept under review.
2	December 2003	Updating and Screening Assessment	Concluded that further detailed assessments of nitrogen dioxide from road traffic sources and particulate matter from an industrial source was required to determine whether Air Quality Objectives would be exceeded in 2005.
	July 2005	Detailed Assessment	Concluded that the annual nitrogen dioxide mean objective pollution level would be exceeded along most of the roads under study.
	April 2006		Declaration of 3 AQMAs.
3	January 2007	Progress Report	
	January 2008	Updating and Screening Assessment	Concluded that four of the seven prescribed pollutants were likely to meet the Air Quality Objectives and as such a Detailed Assessment was

			not required. Recommended further screening works for Benzene, Nitrogen Dioxide and particulates and a Detailed Assessment of both Nitrogen Dioxide and Particulates at the Yarmouth Road/Bramford Road and Chevalier Street junction.
	January 2008	Further Assessment	
	September 2008	AQ Action Plan	
	December 2009	Detailed Assessment	Completed draft December 2009. Submitted December 2009. Finalised August 2010. Concluded that there were likely exceedances of the Nitrogen Dioxide annual mean objective at the Bramford Road/Yarmouth Road/Chevallier Street junction.
4	January 2010	Updating and Screening Assessment	Concluded that a Detailed Assessment for nitrogen dioxide was required at St Matthews Street and St Helens Street. A Detailed Assessment was also required for a 2.90MW biomass combustion plant on Nacton Road for particulate matter with consideration given to nitrogen dioxide. Particulate matter and nitrogen dioxide emissions from the Reg. Driver Centre, Christchurch Park, Ipswich, also required

			further screening work.
	October 2010	Progress Report	Further investigation of emissions of particulate matter and nitrogen dioxide emissions from the Reg. Driver centre, Ipswich, concluded that they were well below those requiring further investigation or screening. Particulate monitoring at one location within the borough showed no exceedances of the objective levels. Six new or previously unidentified local developments were acknowledged as requiring further investigation during the next USA, scheduled for 2012.
	December 2010		Declaration of 1 AQMA.
	January 2011	Progress Report	
	September 2011	Detailed Assessment of Biomass Combustion Plant, Nacton Road	Concluded no exceedances of objective levels.
	August 2012	Detailed Assessment	Concluded that specific areas along St Matthews Street be considered for declaration as AQMA.
	August 2012	Detailed Assessment	Concluded that specific areas along St Helens Street be considered for declaration as AQMA.
5	January 2013	Updating and Screening Assessment	Continuing exceedances of the Nitrogen Dioxide annual average objective levels within the AQMA areas. Overall the

			diffusion tube assessment 2011 indicated a slight decline in the majority of the Nitrogen Dioxide levels in the borough although it was impossible to say at that stage if it would be an ongoing trend.
	February 2013	Progress Report	Diffusion tubes and Continuous Monitors located both within and outside of the existing AQMAs indicated exceedances of the nitrogen dioxide annual average objective level.
	July 2014	Progress Report	

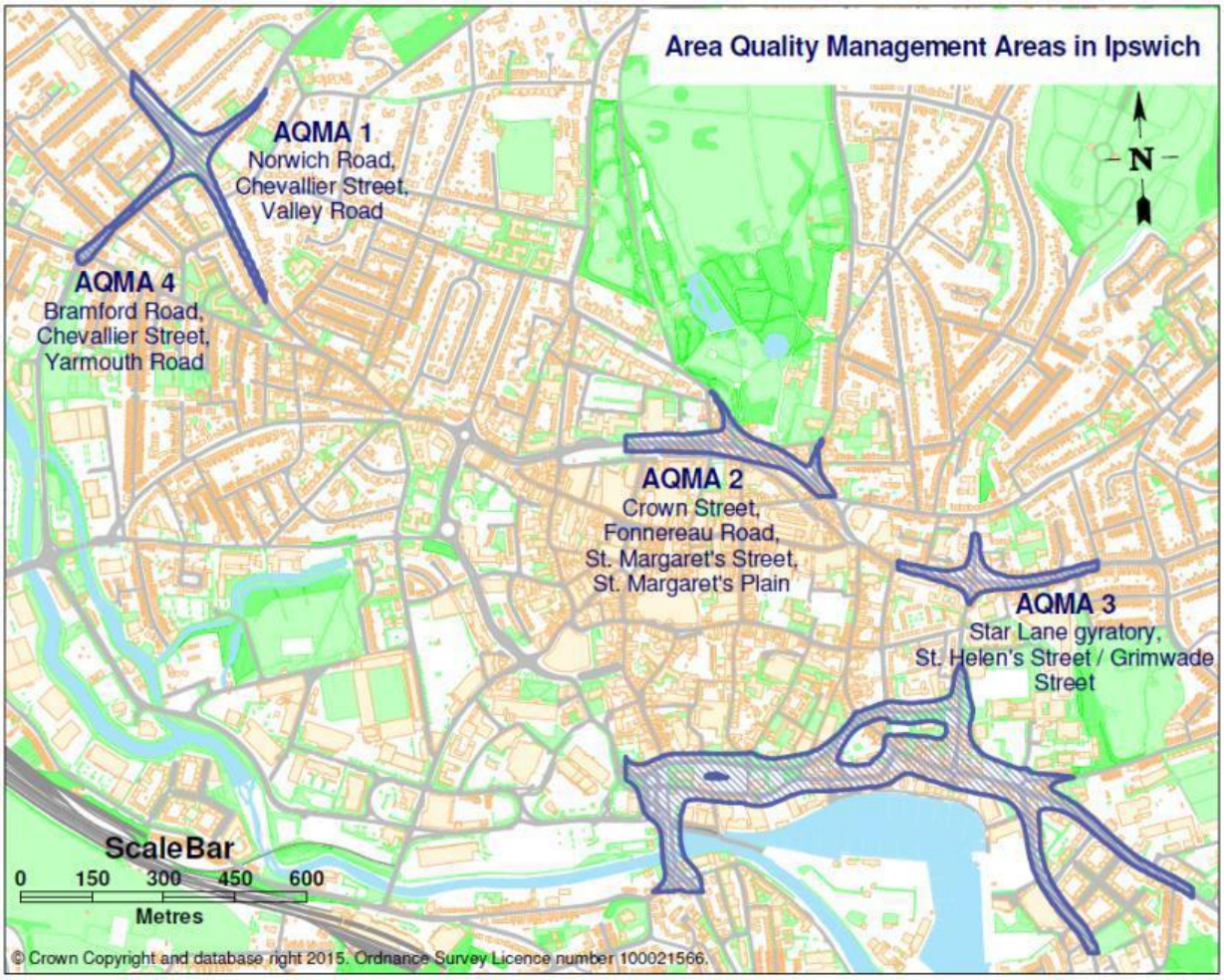
2.3 Existing AQMAs

There are currently 4 AQMAs within the borough of Ipswich:

- Ipswich Air Quality Management Order No 1, 2006: Norwich Road, Chevallier Street and Valley Road junction;
- 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;
- Ipswich Air Quality Management Order No 3, 2006: Star Lane gyratory system and St Helen's Street/Grimwade Street junction;
- Ipswich Air Quality Management Order No 4, 2010: Bramford Road, Yarmouth Road, Chevallier Street junction.

The extent of the AQMAs is shown on Map 1.

Map 1 Air Quality Management Areas in Ipswich



3 Detailed Assessment for Nitrogen Dioxide

3.1 The National Perspective

Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen. Together they are collectively referred to as NO_x. All combustion processes in air produce NO_x emissions, largely in the form of NO which is then converted in the atmosphere to NO_2.

High levels of nitrogen dioxide are associated with adverse effects on human health causing inflammation of the airways. Respiratory problems can be caused by long term exposure and an enhanced response to allergens can be caused in sensitive individuals.

The principal source of NO_x emissions is road transport. Motorways which carry large volumes of high speed traffic are a predominant source, as are roads in congested city or town centres where there are large volumes of slow moving traffic combined with poor natural dispersion.

The contribution of road transport to NO_x emissions has declined significantly in recent years due to the introduction of tighter vehicle emission standards. Further reductions are expected to occur over the coming years. However, despite a continued reduction in NO_x emissions there has been growing concern about levels of primary NO_2 emissions from vehicles. Recent research indicates that these are greater than previously recognised and may have increased in some areas as a result of retrofitting particulate emission control to some vehicles.

Other significant sources of NO_x emissions include the electricity supply industry and other industrial and commercial sectors. Emissions from both these sectors have also been dramatically reduced in recent years due to the introduction of low NO_x burners and the widespread replacement of solid fuel boiler plant with natural gas.

The majority of the AQMAs which have already been declared in the UK are based on an exceedance of the annual average nitrogen dioxide objective due to traffic emissions.

3.2 Review of monitoring results 2006 – 2014

Monitoring of NO_2 has been carried out by Ipswich Borough Council at a number of locations across the borough. This detailed assessment will review the results over a number of years, with a view to determining the area of exceedance of the NO_2 annual average objective level.

The results for those sites showing an exceedance of the annual mean objective level, or close to the objective level, are summarised in Tables 2 and 3. Some diffusion tubes have been relocated, even when showing a result close to the objective level, where the site has become unavailable or where tubes were removed by members of the public on a too frequent basis (vandalism). In addition a number of tubes are located at sites where there is not an immediate relevant receptor. In some cases they are representative of a relevant receptor further along the road, and in some cases they provide monitoring information at a location where there is no other possible site available due to either physical limitations or due to vandalism of tubes.

Continuous Monitoring

The automatic monitor is routinely calibrated every month by an Ipswich Borough Council Environmental Protection Officer. It is audited and serviced twice a year by contractors.

All data collected from the automatic monitor is managed by external consultants to quality procedures developed under the UK National Network. The data management processes represent best practice and fully meet the requirements set out in LAQM TG(09).

All data are screened and scaled (on the basis of site calibrations) and the final data sets presented within this report have benefited 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.

Table 2 Continuous Monitor Results - Annual Mean Concentration (µg/m3)

Site	2009	2010	2011	2012	2013	2014
Chevallier Street	32	34	31	34	45 (unreliable result)	29 (78% data capture)
St Margarets Street	48	51	50	49	52	N/A

The Chevallier Street monitor is co-located with triplicate tubes, numbers 45, 46, and 47 and is in an existing AQMA. The monitor shows consistently low results except for an unusually high result for 2013. Due to the unusual nature of this result, and the fact that results for the months of Jan – April were excessively high but dropped when the machine was changed, it is felt that the 2013 result is unreliable.

The continuous monitor results show exceedance of the annual mean objective at St Margaret's Street which is located within an existing AQMA. This monitor was co-located with triplicate diffusion tubes, numbers 11, 12, and 19. Unfortunately due to the age of the machine, it became uneconomical to run and this machine has now been removed. Diffusion tubes will continue to be placed in the area and a new site for a continuous monitor within this AQMA is under consideration.

Diffusion Tube Results

The diffusion tubes have been supplied by Environmental Scientifics Group since 2010 and are 50% TEA in Acetone. The laboratory takes part in the Workplace Analysis Scheme for Proficiency (WASP) and the tubes are analysed in accordance with Defra guidelines. Prior to this the tubes were supplied by Bureau Veritas (Gradko International Ltd laboratory).

Duplicate and triplicate tubes are placed at a number of sites to measure precision. Precision checks on the duplicate and triplicate tubes have been carried out using the Defra precision check tool. In general the precision accuracy is good with just two instances of poor precision during 2013 and two in 2014 (2014 checks have only taken place for locations where co-located tubes exceed the objective levels). The 2013 and 2014 duplicate and triplicate tube precision results are shown in appendix 1 for information.

The full diffusion tube results for 2010 – 2014 are shown in appendix 2. Table 3 shows a summary of those sites either exceeding, or close to exceeding, the annual average objective level for NO_2. All results are bias adjusted each year, either to a local bias adjustment factor, or if this is not possible (for example due to low data capture at the continuous monitor), to a national factor for the appropriate laboratory and tube type. A fall off with distance correction has also been applied to relevant sites using the Defra NO_2 distance from roads calculator – issue 4.

Table 3 Diffusion Tube results for sites either exceeding, or close to exceeding, the annual average NO_2 objective level.

Tube No.	Grid Ref	Year	Result (bias adjusted) $\mu g/m^{-3}$	Fall off with distance result $\mu g/m^{-3}$	Exceedance Y/N	In existing AQMA?
2	615142/245242	2010	45.8	42.4	Y	-
	615142/245242	2011	46.4	42.7	Y	-
	615142/245242	2013	39.7	36.8	N	-
	615142/245242	2014	42.5	39.4	N	Y
4	615923/244923	2010	41	32.6	N	-
	615923/244923	2011	39.5	31.1	N	N
5	616858/244146	2006	41.8	-	Y	-
	616860/244147	2007	42	-	Y	-
	616860/244147	2008	38.8	Not Req'd	N	-
	616860/244147	2009	42.8	Not Req'd	Y	-
	616860/244147	2010	52.1	Not Req'd	Y	-
	616860/244147	2011	40.3	Not Req'd	Y	-
	616860/244147	2013	41	Not Req'd	Y	-
	616860/244147	2014	39.8	Not Req'd	N	Y
10	619347/245136	2006	41.3	-	Y	-
	619317/245127	2007	39.9	-	Y	N
11	616593/244748	2006	48.1	-	Y	-
	616578/244759	2007	41.7	-	Y	-
	616578/244759	2009	51.4	Not Req'd	Y	-
	616578/244759	2010	50	Not Req'd	Y	-
	616578/244759	2011	45.3	Not Req'd	Y	-
	616578/244759	2012	43.2	Not Req'd	Y	-

	616578/244759	2013	53.2	Not Req'd	Y	-
	616578/244759	2014	43.5	Not Req'd	Y	Y
12	616593/244748	2006	45.8	-	Y	-
	616578/244759	2007	41.8	-	Y	-
	616578/244759	2009	50.5	Not Req'd	Y	-
	616578/244759	2010	51.4	Not Req'd	Y	-
	616578/244759	2011	43.6	Not Req'd	Y	-
	616578/244759	2012	44.8	Not Req'd	Y	-
	616578/244759	2013	52.8	Not Req'd	Y	-
	616578/244759	2014	43.1	Not Req'd	Y	Y
19	616593/244748	2006	48.4	-	Y	-
	616578/244759	2007	41.5	-	Y	-
	616578/244759	2009	49.7	Not Req'd	Y	-
	616578/244759	2010	49.8	Not Req'd	Y	-
	616578/244759	2011	42.4	Not Req'd	Y	-
	616578/244759	2012	44	Not Req'd	Y	-
	616578/244759	2013	53.3	Not Req'd	Y	-
	616578/244759	2014	40.9	Not Req'd	Y	Y
13	615339/245423	2006	42.7	-	Y	-
	615342/245422	2007	39.1	-	N	-
	615361/245436	2010	39.9	36.6	N	-
	615361/245436	2011	40.6	36.9	N	Y
14	615275/245383	2006	47.9	-	Y	-
	615283/245391	2007	46.7	-	Y	-
	615283/245391	2008	44	-	Y	-
	615283/245391	2009	45.8	-	Y	-
	615283/245391	2010	54.7	53.7	Y	-

	615283/245391	2011	49.4	48.5	Y	-
	615283/245391	2012	47.6	46.8	Y	-
	615283/245391	2013	49	48.1	Y	-
	615283/245391	2014	46.7	45.7	Y	Y
16	616086/244571	2006	40.3	-	Y	-
	615342/245422	2007	38.6	-	N	-
	615361/245436	2009	39.7	36	N	-
	615361/245436	2010	41.9	38.3	N	-
	615361/245436	2011	39.7	36.2	N	Y
17	616086/244571	2006	46.5	-	Y	-
	615283/245391	2007	47.2	-	Y	-
	615283/245391	2008	42.8	-	Y	-
	615283/245391	2009	48.3	-	Y	-
	615283/245391	2010	56.6	55.5	Y	-
	615283/245391	2011	54.2	53.1	Y	-
	615283/245391	2012	49.4	48.6	Y	-
	615283/245391	2013	50.7	49.7	Y	-
	615283/245391	2014	47.4	46.3	Y	Y
21	616490/244806	2009	39.7	Not Req'd	N	-
	616490/244806	2010	41.3	Not Req'd	Y	Y
22	616477/244790	2009	39.3	-	N	-
	616477/244790	2010	45	45.4	Y	-
	616477/244790	2011	40.8	41.1	Y	Y
24	616659/244689	2008	41.7	-	Y	-
	616659/244689	2009	44.8	-	Y	-
	616659/244689	2010	51	50.1	Y	-
	616659/244689	2011	43.4	42.7	Y	-

	616659/244689	2012	39.1	38.6	N	-
	616659/244689	2013	40.8	40.1	Y	-
	616659/244689	2014	42.2	41.6	Y	Y
25	616750/244578	2008	44.5	43	Y	-
	616750/244578	2009	47.3	45	Y	-
	616750/244578	2010	49.6	45.9	Y	-
	616750/244578	2011	46.4	43.3	Y	-
	616750/244578	2012	43	40.6	Y	-
	616750/244578	2013	39.7	37.2	N	-
	616750/244578	2014	41.1	39	N	N
26	616968/244510	2009	39.9	Not Req'd	Y	-
	616968/244510	2010	43.2	Not Req'd	Y	Y
27	616961/244536	2008	39.8	39.2	N	-
	616961/244536	2009	43.3	42	Y	-
	616961/244536	2010	48.7	47.9	Y	-
	616961/244536	2011	46.6	45.8	Y	-
	616961/244536	2012	42.1	41.5	Y	-
	616961/244536	2013	43.7	43	Y	Y
29	617102/244077	2010	40.4	Not Req'd	Y	Y
30	616963/244133	2008	39.1	-	N	Y
31	616336/244133	2010	51.3	No rel. Receptor	Y	Y
32	616336/244133	2009	39.1	No rel. Receptor	N	-
	616336/244133	2010	50.1	No rel. Receptor	Y	Y
33	616336/244133	2010	51	No rel. Receptor	Y	Y

34	616466/244072	2010	45.5	Not Req'd	Y	-
	616466/244072	2011	42.9	Not Req'd	Y	-
	616466/244072	2012	42.1	Not Req'd	Y	-
	616466/244072	2014	41.6	Not Req'd	Y	Y
35	616341/244095	2008	44.2	-	Y	-
	616341/244095	2009	46.4	-	Y	N
36	616307/244141	2009	43.2	-	Y	N
38	616664/244177	2009	39.9	-	Y	-
	615898/244789	2010	41.7	33.5	N	N
39	616730/244246	2008	45	-	Y	-
	616730/244246	2009	47.7	-	Y	-
	616730/244246	2010	48.5	No rel. Receptor	Y	-
	616730/244246	2011	42.2	No rel. Receptor	Y	-
	616730/244246	2012	42.6	No rel. Receptor	Y	-
	616730/244246	2013	40.8	No rel. Receptor	Y	Y
41	616786/244260	2008	39.3	Not Req'd	N	-
	616787/244244	2010	39.7	Not Req'd	N	N
43	615107/245197	2008	39.9	-	Y	-
	615107/245197	2009	42.6	-	Y	-
	615107/245197	2010	45.5	44.6	Y	-
	615107/245197	2011	42.5	41.7	Y	-
	615107/245197	2012	39.9	39.3	N	Y
44	615049/245234	2009	43.5	38	N	-
	615049/245234	2010	46.4	Not Req'd	Y	-

	615049/245234	2011	40.3	Not Req'd	Y	-
	615049/245234	2012	39.7	Not Req'd	N	N
49	615803/244872	2008	45.8	-	Y	-
	615803/244872	2009	46.7	46	Y	-
	615803/244872	2010	51.3	50.6	Y	-
	615803/244872	2011	43.1	42.8	Y	-
	615803/244872	2013	42.3	42	Y	-
	615803/244872	2014	41.6	41.4	Y	N
52	615822/244869	2011	49.5	44.1	Y	-
	615822/244869	2012	46.8	42.5	Y	-
	615822/244869	2013	47.6	42.4	Y	-
	615822/244869	2014	44.6	40.4	Y	N
53	615817/244856	2011	50.5	45.2	Y	-
	615817/244856	2012	46	42	Y	-
	615817/244856	2013	44.2	39.8	N	-
	615817/244856	2014	49.1	44.3	Y	N
62	615926/244804	2011	43	37.5	N	N
	615926/244804	2013	39.2		N	N
63	615955/244783	2011	51.8	Not Req'd	Y	-
	615952/244785	2012	39.2	Not Req'd	N	N
64	615686/244936	2012	58.8	56.3	Y	-
	615686/244936	2013	52.4	50.1	Y	-
	615686/244936	2014	51.7	49.6	Y	N
65	615686/244936	2012	56.8	54.5	Y	-
	615686/244936	2013	53.5	51.1	Y	-
	615686/244936	2014	51	48.9	Y	N
66	616804/244667	2011	42.6	44.6	Y	-

	616804/244667	2012	40.9	42.5	Y	N
68	616901/244655	2011	49.7	49.2	Y	-
	616901/244655	2012	47.4	47	Y	-
	616901/244655	2013	47.6	47.2	Y	-
	616901/244655	2014	46.2	45.8	Y	N
72	617119/244534	2011	39.5	Not Req'd	N	-
	617119/244534	2012	40.3	Not Req'd	Y	-
	617119/244534	2013	39.1	Not Req'd	N	Y
76	616948/244518	2011	41	Not Req'd	Y	Y
80	616819/244543	2011	40.6	No Rel. Receptor	Y	Y
81	616819/244543	2011	44.2	No Rel. Receptor	Y	-
	616819/244543	2012	40.3	No Rel. Receptor	Y	Y
82	616819/244543	2011	41	No Rel. Receptor	Y	-
	616819/244543	2012	39.4	No Rel. Receptor	N	Y
92 (became 28)	615192/245289	2011	43.3	Not Req'd	Y	Y

Years not included where data for less than 9 months.

Taking each final measurement (bias adjusted and fall with distance corrected), and concentrating on the years 2011-2014 (inclusive), the following tube locations exceed the annual average mean objective level for nitrogen dioxide:

Tube locations that exceed the annual mean objective level for nitrogen dioxide (3 or more years exceedances 2011-2014)	11;12;19;14;17;24;27;34;39 (but no rel. receptor);49;52;53;64;65;68
Tube locations that have exceeded the annual mean objective level for one or two years 2011-2014 (may include sites where levels are high but tubes have only been placed for one or two years).	2;5;22;25;43;44;63;66;72;76;80 (but no rel. receptor);81 (but no rel. receptor);82 (but no rel. receptor);92(now listed as number 28)

The following locations exceeded the annual mean objective level at some point since 2006 but not consistently. These locations should continue to be monitored:

Tube numbers 10;21;26;29;31;32;33;35;36;

Given the limitations of diffusion tubes, it is Defra's recommendation that Local Authorities do not rely upon diffusion tube data alone as the basis of a Detailed Assessment or declaration of an AQMA for Nitrogen Dioxide. However, Defra have also made it clear that automatic monitoring is not always possible and that in some instances diffusion tubes are the only practicable monitoring method. If there is to be a reliance on diffusion tube monitoring the following advice is given in guidance document LAQM TG (09):

- that the monitoring be carried out for a full year;
- tubes be deployed at several sites in the vicinity;
- the precision of the tubes should be ascertained and a good supplier of tubes be selected; and
- the accuracy of the tubes should be quantified and an appropriate bias adjustment factor be applied to the annual mean (calculated for the calendar year being reviewed).

Within this report the tube results with bias correction applied are provided; the QA/QC of tubes is evidenced; tubes are placed for longer than a year and results are not reported for calendar years where fewer than 9 months results are obtained; tubes are placed around the vicinity of areas of exceedance; and the precision of the tubes is checked and evidenced within the report. Given the high cost of running automatic monitors, it is concluded that given the above, the use of the diffusion tube results is satisfactory.

3.3 Summary of monitoring points exceeding the annual average objective level for Nitrogen Dioxide

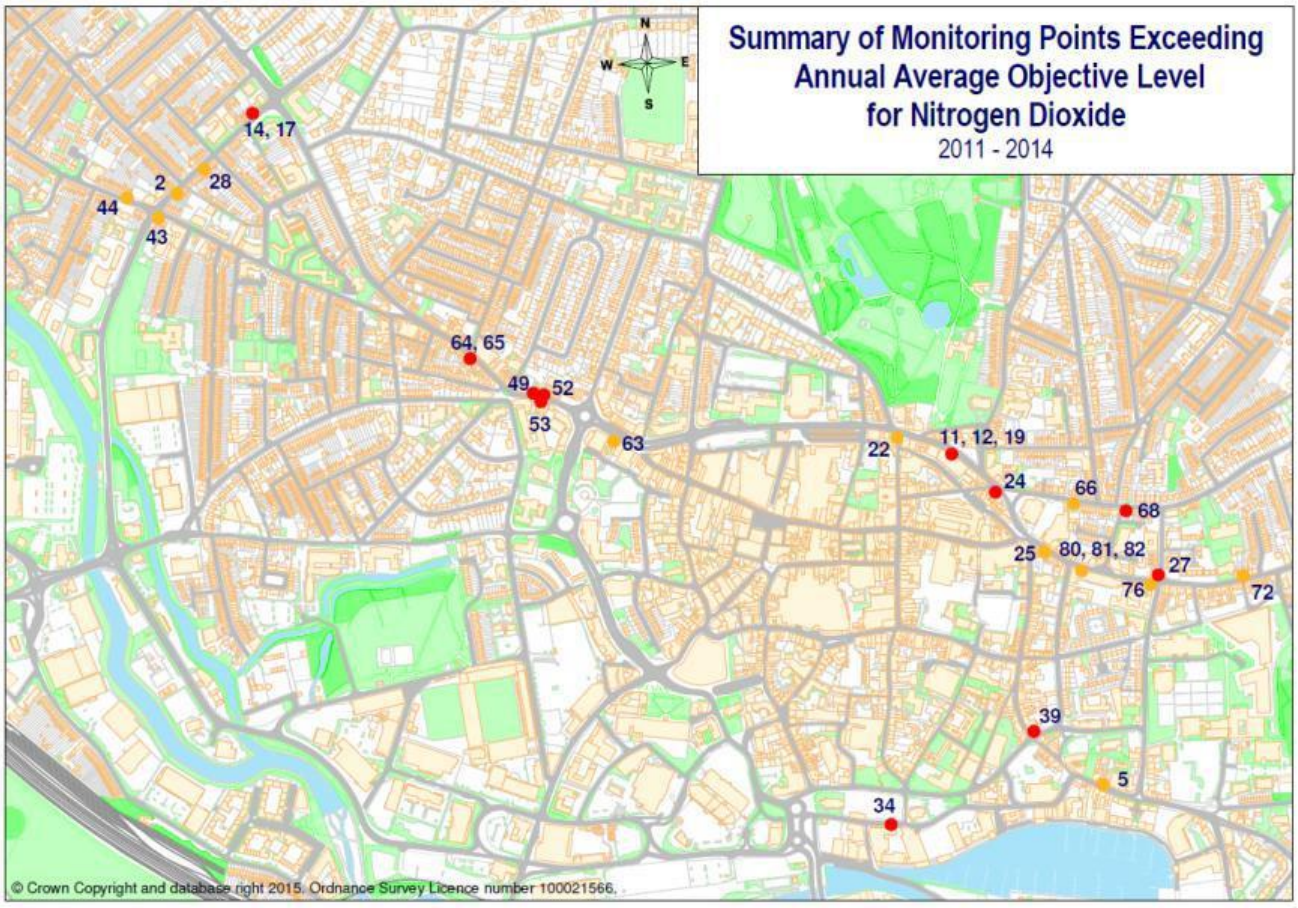
Likely exceedances of the objectives should be assessed in relation to 'the quality of the air at locations which are situated outside of buildings or other man-made structures, above or below ground, and where members of the public are likely to be regularly present' (LAQM.TG09). It is important that Review and Assessment reports focus on those locations where members of the public are likely to be regularly present and are likely to be exposed for the period of time appropriate to the averaging period of the objective.

LAQM.TG09 box 1.4 states that for the annual mean averaging period, the air quality objectives should apply at all locations where members of the public might be regularly exposed. Building facades of residential properties, school, hospitals and care homes would all be relevant in terms of long-term annual mean objectives.

These conditions apply to all of the locations found to exceed the national objectives apart from two. Number 39 is on the junction of Star Lane and Fore Street and was placed in that position due to a shortage of sites in the area. Tube numbers 80, 81, and 82 are located on St Helens Street in an area with some residential properties but with few areas to locate tubes.

Map 2 shows the areas of exceedance after bias adjustment and fall off with distance calculations.

Map 2 Monitoring Points Exceeding Annual Average Objective Level for Nitrogen Dioxide 2011- 2014.



(red – 2011-2014 monitoring results – 3 or more years of exceedance)

(amber – 2011-2014 monitoring results – 1 or 2 years of exceedance)(tubes may be exceeding each year but have only been in place for one or two years).

4 Ipswich Borough Council Air Quality Management Areas

4.1 Amending/Varying the Original AQMAs

Ipswich Borough Council has previously declared 4 AQMAs. The area covered by the four original AQMAs is still generally relevant. However on three of the four there could be some boundary changes where areas within the AQMA have been found to be achieving the objective levels or objective levels are exceeded at areas outside of the existing AQMAs. Details of the boundary changes are outlined below. In addition there is a need to declare an AQMA on St Matthews Street where a new area of exceedance has been identified.

4.1.1 *AQMA Order No. 1 2006 – Norwich Road, Chevallier Street and Valley Road junction.*

The original AQMA was declared on the basis of air quality monitoring and modelling. Further monitoring has since shown that it is unlikely that there will be exceedances of the nitrogen dioxide annual average objective level on the 'arms' of the AQMA along Norwich Road and Valley Road. The AQMA Order will therefore be amended/varied and reduced in size to cover current areas of exceedance of the objective level along Chevallier Street and a small area on Norwich Road roundabout.

4.1.2 AQMA Order No. 2 2006 – Junction of Crown Street with Fonnereau Road and St Margaret's Street and St Margaret's Plain.

The original AQMA was declared on the basis of air quality monitoring and modelling. Monitoring has since shown that it is unlikely that there will be exceedances of the nitrogen dioxide annual average objective level on Fonnereau Road or St Margaret's Green. Monitoring has shown that there is one location on Woodbridge Road that is exceeding the objective level but was not included in the original AQMA declaration. It is therefore considered sensible to extend the boundary of the original AQMA 2 to include part of Woodbridge Road and to 'take' part of original AQMA 3 at the top of Grimwade Street. This has been done by taking the AQMA along the road to join the areas of exceedance and create one AQMA rather than having 3 separate AQMAs. Monitoring at Argyle Street has shown that the air quality objectives are unlikely to be exceeded and as such the AQMA is reduced in size at this location. It is also changed around the Grimwade street junction where monitoring has shown no exceedance of the objective level.

4.1.3 AQMA Order No. 3 2006 – Star Lane gyratory system and St Helens Street/Grimwade Street junction.

The original AQMA was declared on the basis of air quality monitoring and modelling. Monitoring has since shown that there are unlikely to be exceedances to the South of the river at Bridge Street and Dock Street or towards Fore Hamlet/Duke Street/Back Hamlet. There are other small boundary changes. The original AQMA 3 included the St Helens Street/Grimwade Street junction but this is more logically combined with AQMA 2 (Crown Street, Fonnereau Road, St Margarets Street, St Margarets Plain AQMA) in terms of administration and action planning. It is therefore proposed that AQMA Order No 3 is reduced in size to exclude the St Helens Street/Grimwade Street junction area which will be 'taken into' AQMA Order No. 2; and to exclude the area east of Grimwade Street, south of Bridge Street, and part of Star Lane.

4.1.4 AQMA Order No. 4 2010 – Bramford Road, Yarmouth Road, Chevallier Street junction.

This original AQMA is immediately adjacent to the original AQMA Order No.1 and will remain unchanged.

4.2 Declare a new AQMA for part of St Matthews Street – Proposed AQMA No.5

This is a new AQMA and as such is a straightforward declaration based around monitoring locations showing exceedances of the annual average nitrogen dioxide objective level.

4.3 Setting the AQMA boundaries

Local authorities have a duty under section 83(1) of the 1995 Environment Act to designate those areas where air quality objectives are unlikely to be, or are not being, met as air quality management areas. These areas have to be designated officially by means of an 'order'.

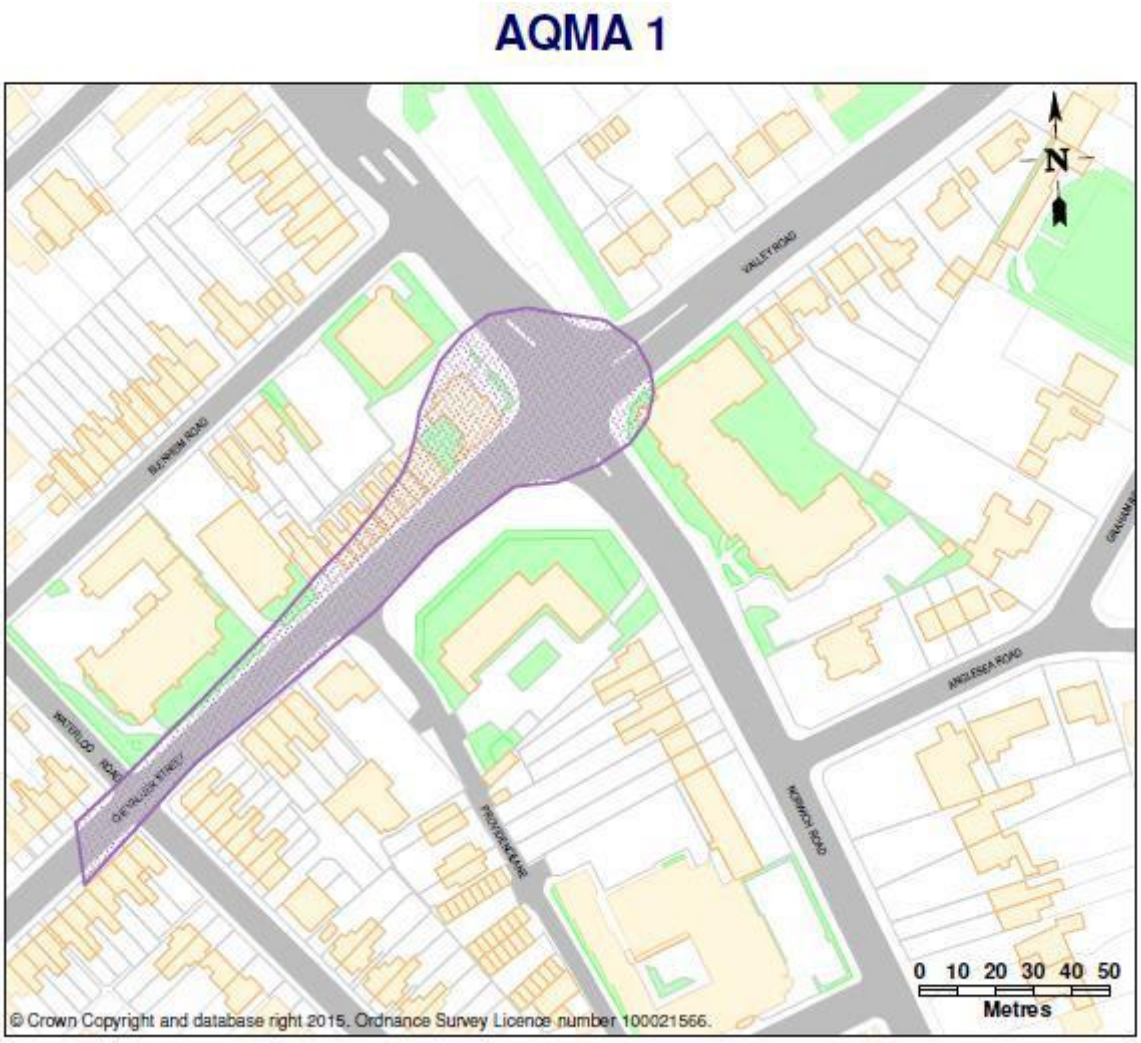
Setting the boundary of an air quality management area involves an element of judgement and can vary from the designation of an isolated property to designation of a whole local authority area. However, the air quality management area must encompass all known and predicted areas of exceedance where there is relevant exposure. The local authority can base AQMAs on geographical or man-made features or roads rather than individual properties. This may reduce the potential for blight on any individual property. In addition inherent uncertainty in monitoring results or modelling results needs to be considered. If justified, local authorities may choose to allow for the uncertainties by declaring AQMAs where results are a little lower than the objective level (to ensure that all possible areas of exceedance are included) whilst others may decide to do the opposite and allow for uncertainties by only declaring areas definitely exceeding well above the objective level (to allow for over-reading by the modelling or monitoring results). Ipswich Borough Council has historically taken a view that allowing for uncertainties either way, and using methods to reduce the uncertainties where possible, the AQMAs will be declared to include areas showing results of 40ug/m^3 or above which is the objective for annual average nitrogen dioxide.

Maps 3-6 show the proposed areas to be covered by the amended/varied, or new, AQMAs. These have been drawn taking into consideration monitoring locations and traffic flows, and are subject to further consultation with Members of the Council, Suffolk County Council as Highways Authority, and the public. Suffolk County Council (Highways) has already been consulted to consider the practicalities of the proposed AQMA areas with regard action planning and transport and some changes were made at their suggestion.

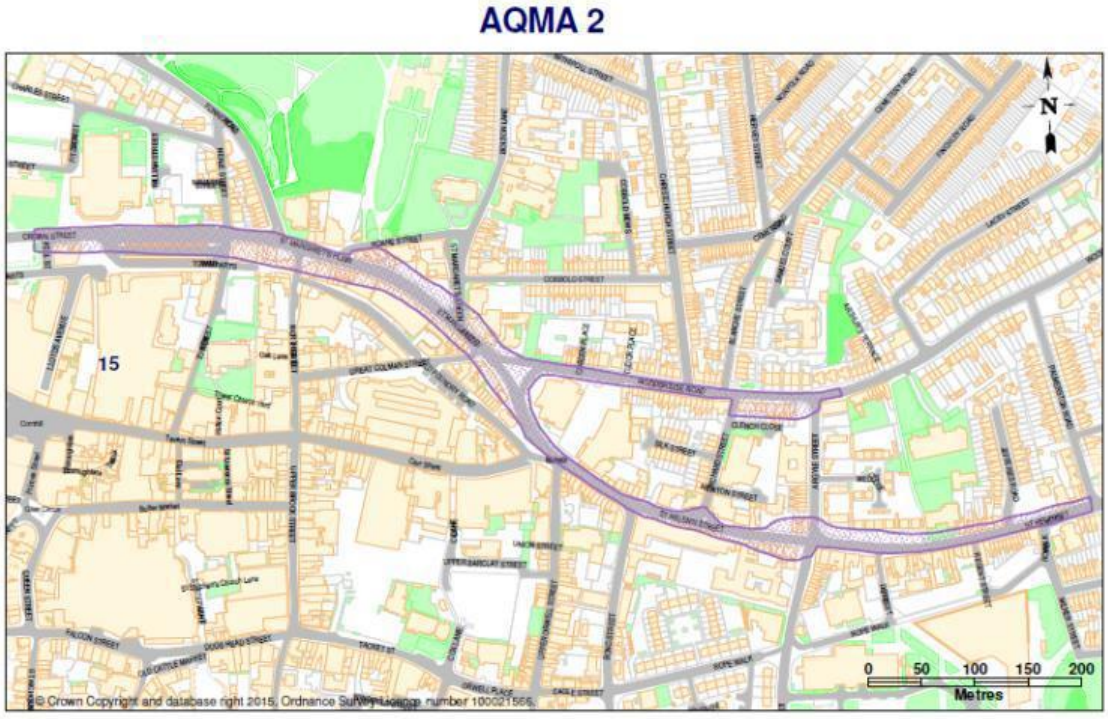
It should be noted that there will be some areas within the proposed AQMAs that will not be exceeding the annual average nitrogen dioxide objective level but for the purposes of action planning and administration are included.

Map 3 - 6 Recommended area to be covered by the amended/varied or new AQMAs

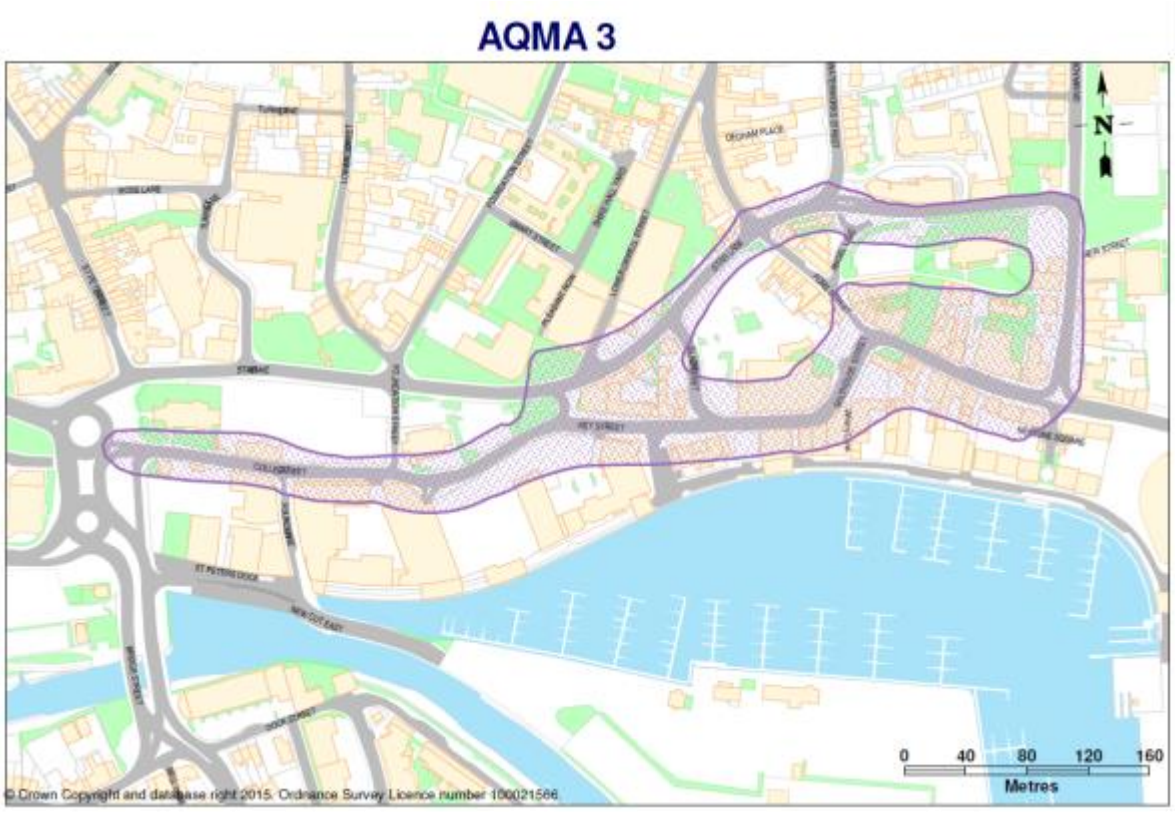
Map 3 Amended/varied AQMA 1: Norwich Road, Chevallier Street.



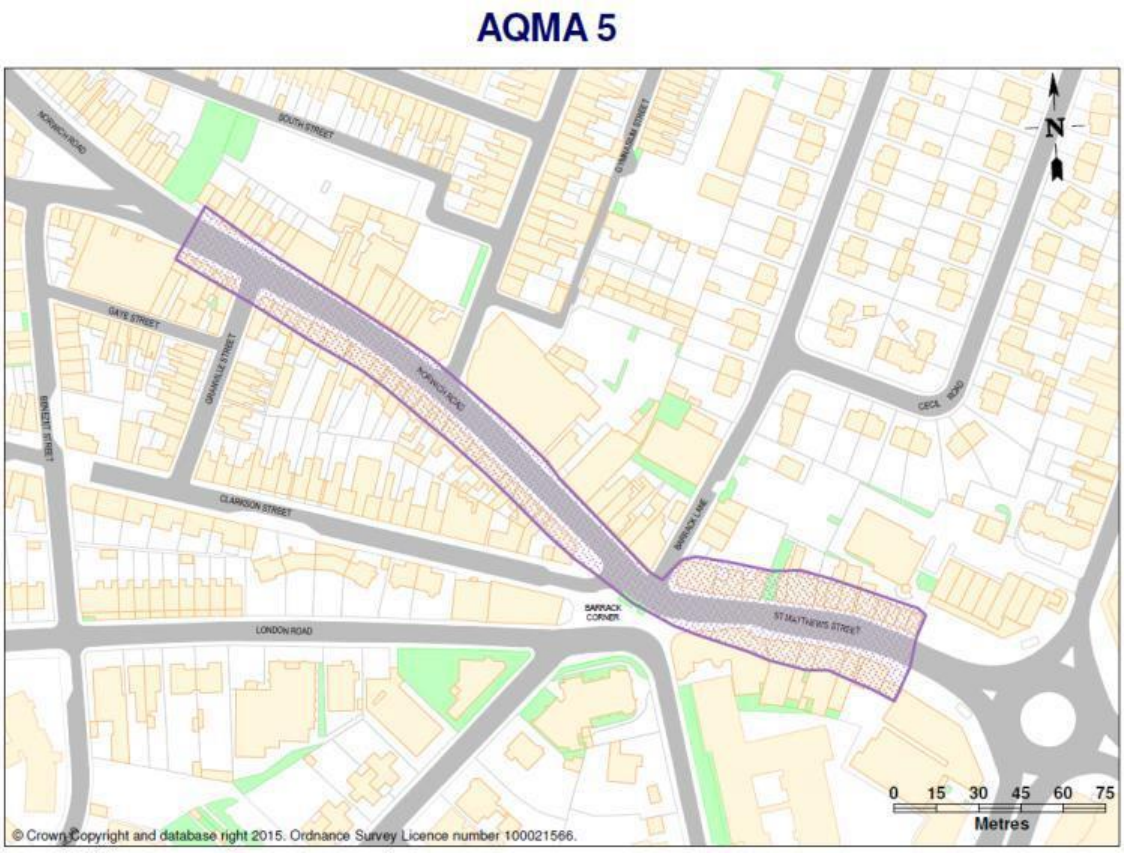
Map 4 Amended/varied AQMA 2: Crown Street, St Margarets Street, Woodbridge Road, St Helens Street.



Map 5 Amended/varied AQMA 3: Star Lane, Key Street, and College Street gyratory



Map 6 Map of proposed new AQMA number 5 – St Matthews Street, Norwich Road



4.4 Estimating Population Exposure

Local authorities are required to estimate the number of people exposed to pollutant concentrations above the objective levels, and the maximum pollutant concentration (measured or modelled) at a relevant receptor location. The information is required to help Defra and the Devolved Administrations quantify the health benefits of improving air quality within the LAQM regime.

Defra acknowledge that it is not feasible to take into account subtleties such as transient exposure (e.g. at schools) or exposure at different heights within these assessments, and authorities should assume that the residential population is representative within the exceedance area.

Defra inform that it is the population within the exceedance area that is of interest, and not the population within the AQMA.

Total relevant exposure has been estimated within the area using GIS and manual surveys. The total population for the area of exceedance is estimated to be 220. The population within the proposed AQMAs is greater than this.

The maximum pollutant concentration at a relevant receptor location is 56.3 µg/m3 measured by diffusion tube.

5 Conclusions and Recommendations

Monitoring of nitrogen dioxide indicates that there are several locations across Ipswich where the annual average objective level for nitrogen dioxide is exceeded. Most of these locations fall within existing AQMAs but some do not. There are areas of the existing AQMAs where monitoring indicates that there is no continuing exceedance of the objective level.

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 actions by the local authority Executive, it is recommended that amendments/variations are made to three of the four existing AQMAs, and one new AQMA be declared.

Once the AQMAs have been declared, section 84(1) of the Environment Act 1995 requires local authorities to carry out a Further Assessment of existing and likely future air quality within 12 months. An Air Quality Action Plan should be completed within 18 months following the date of designation. This will be accomplished in consultation with Suffolk County Council as Highways authority.

Monitoring will continue within the AQMAs, at locations close to exceeding the objective level, or where exceedance has historically occurred. Further changes to the AQMAs will be made as and when required, dependent on the outcome of the Further Assessment and future monitoring or air quality modelling results.

Appendices

Appendix 1 Diffusion Tube precision checks

Tube Precision Results 2013

It has been decided to only report the precision results for 2013 and 2014 in this document. Please contact Ipswich Borough Council if other results are required.

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm $^{-3}$	Tube 2 µgm $^{-3}$	Tube 3 µgm $^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	50.0	46.7	51.1	49	2.3	5	5.7			Good	
2	29/01/2013	26/02/2013	38.1	44.0	40.1	41	3.0	7	7.5			Good	
3	26/02/2013	26/03/2013	51.9	51.8	46.7	50	3.0	6	7.4			Good	
4	26/03/2013	22/04/2013	45.1	40.6	39.2	42	3.1	7	7.7			Good	
5	22/04/2013	28/05/2013	40.2	38.0	36.2	38	2.0	5	5.0			Good	
6	28/05/2013	25/06/2013	39.8	41.8	42.2	41	1.3	3	3.2			Good	
7	25/06/2013	30/07/2013	44.3	40.5	36.4	40	4.0	10	9.8			Good	
8	30/07/2013	27/08/2013	36.7	39.3	41.0	39	2.2	6	5.4			Good	
9	27/08/2013	24/09/2013	46.2	45.9	47.3	46	0.7	2	1.8			Good	
10	24/09/2013	29/10/2013	44.4	47.6	47.5	47	1.8	4	4.5			Good	
11	29/10/2013	27/11/2013	51.1	52.7	50.4	51	1.2	2	2.9			Good	
12	27/11/2013	07/01/2014	39.6	43.9	33.2	39	5.4	14	13.4			Good	
13													
											Overall survey -->	Good precision	

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

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	8,9,10

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 0 periods of data
Bias factor A
Bias B

Diffusion Tubes Mean: µgm^{-3}
Mean CV (**Precision**):

Automatic Mean: µgm^{-3}
Data Capture for periods used:

Adjusted Tubes Mean: µgm^{-3}

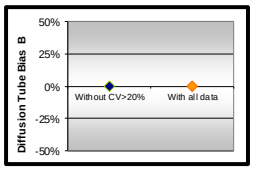
Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 0 periods of data
Bias factor A
Bias B

Diffusion Tubes Mean: µgm^{-3}
Mean CV (**Precision**):

Automatic Mean: µgm^{-3}
Data Capture for periods used:

Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm $^{-3}$	Tube 2 µgm $^{-3}$	Tube 3 µgm $^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	57.1	52.8	53.8	55	2.3	4	5.6			Good	
2	29/01/2013	26/02/2013	41.4	42.8	47.2	44	3.0	7	7.5			Good	
3	26/02/2013	27/03/2013	40.0	37.8	37.5	38	1.4	4	3.4			Good	
4	27/03/2013	23/04/2013	41.4	38.9	41.8	41	1.6	4	3.9			Good	
5	23/04/2013	28/05/2013	51.0	48.3	46.9	49	2.1	4	5.2			Good	
6	28/05/2013	25/06/2013	37.6	40.0	39.2	39	1.2	3	3.0			Good	
7	25/06/2013	31/07/2013	50.1	48.4	49.8	49	0.9	2	2.3			Good	
8	31/07/2013	27/08/2013	47.3	52.5	55.1	52	4.0	8	9.9			Good	
9	27/08/2013	25/09/2013	61.0	59.3	61.0	60	1.0	2	2.4			Good	
10	25/09/2013	30/10/2013	57.3	56.9	53.3	56	2.2	4	5.5			Good	
11	30/10/2013	27/11/2013	55.2	53.8	49.7	53	2.9	5	7.1			Good	
12	27/11/2013	08/01/2014	51.3	55.3	56.6	54	2.8	5	6.9			Good	
13													
											Overall survey -->	Good precision	

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

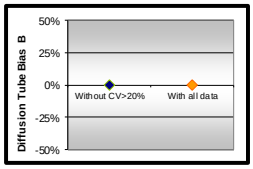
Site Name/ ID:	11.12.19

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm $^{-3}$	Tube 2 µgm $^{-3}$	Tube 3 µgm $^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	48.7	51.3		50	1.8	4	16.5			Good	
2	29/01/2013	26/02/2013	42.7	43.1		43	0.3	1	2.5			Good	
3	26/02/2013	26/03/2013	35.6	34.3		35	0.9	3	8.3			Good	
4	26/03/2013	22/04/2013	37.8	39.1		38	0.9	2	8.3			Good	
5	22/04/2013	28/05/2013	33.3	39.3		36	4.2	12	38.1			Good	
6	28/05/2013	25/06/2013	38.1	39.7		39	1.1	3	10.2			Good	
7	25/06/2013	30/07/2013	37.7	39.7		39	1.4	4	12.7			Good	
8	30/07/2013	27/08/2013	41.0	44.9		43	2.8	6	24.8			Good	
9	27/08/2013	24/09/2013	50.8	51.5		51	0.5	1	4.4			Good	
10	24/09/2013	29/10/2013	42.8	51.6		47	6.2	13	55.9			Good	
11	29/10/2013	27/11/2013	53.9	54.0		54	0.1	0	0.6			Good	
12	27/11/2013	07/01/2014	49.2	46.6		48	1.8	4	16.5			Good	
13													
											Overall survey -->	Good precision	

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

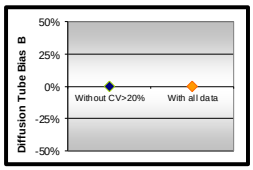
Site Name/ ID:	13,16

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	69.0	59.5		64	6.7	10	60.4			Good	
2	29/01/2013	26/02/2013	57.4	65.6		62	5.8	9	52.1			Good	
3	26/02/2013	26/03/2013	56.2	66.1		61	7.0	11	62.9			Good	
4	26/03/2013	22/04/2013	56.3	69.3		63	9.2	15	82.6			Good	
5	22/04/2013	28/05/2013	56.8	59.9		58	2.2	4	19.7			Good	
6	28/05/2013	25/06/2013	62.1	63.5		63	1.0	2	8.9			Good	
7	25/06/2013	30/07/2013	58.8	62.7		61	2.8	5	24.8			Good	
8	30/07/2013	27/08/2013	56.0	58.0		57	1.4	2	12.7			Good	
9	27/08/2013	24/09/2013	65.1	68.2		67	2.2	3	19.7			Good	
10	24/09/2013	29/10/2013	58.5	50.9		55	5.4	10	48.3			Good	
11	29/10/2013	27/11/2013	81.3	73.2		77	5.7	7	51.5			Good	
12	27/11/2013	07/01/2014	56.9	63.6		60	4.7	8	42.6			Good	
13													
											Overall survey -->	Good precision	

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

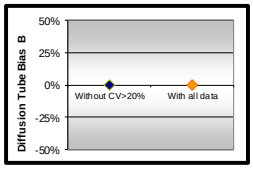
Site Name/ ID:	14,17

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	48.6	46.8	50.1	49	1.7	3	4.1			Good	
2	29/01/2013	26/02/2013	42.8	47.5	47.3	46	2.7	6	6.6			Good	
3	26/02/2013	26/03/2013	55.4	50.8	50.9	52	2.6	5	6.5			Good	
4	26/03/2013	22/04/2013	46.9	44.3	48.8	47	2.3	5	5.6			Good	
5	22/04/2013	29/05/2013	38.7	36.6	36.9	37	1.1	3	2.8			Good	
6	29/05/2013	25/06/2013	37.5	36.6	37.5	37	0.5	1	1.3			Good	
7	25/06/2013	30/07/2013	40.0	40.6	38.3	40	1.2	3	3.0			Good	
8	30/07/2013	27/08/2013	36.6	35.8	37.4	37	0.8	2	2.0			Good	
9	27/08/2013	24/09/2013	44.6	38.9	39.8	41	3.1	7	7.6			Good	
10	24/09/2013	29/10/2013	50.3	45.0	46.1	47	2.8	6	6.9			Good	
11	29/10/2013	27/11/2013	47.6	45.8	47.3	47	1.0	2	2.4			Good	
12	27/11/2013	07/01/2014	38.4	36.4	34.2	36	2.1	6	5.2			Good	
13													
											Overall survey -->	Good precision	

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

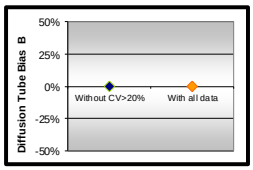
Site Name/ ID:	31,32,33

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	47.3	43.8	42.0	44	2.7	6	6.7			Good	
2	29/01/2013	26/02/2013	44.3	38.8	34.0	39	5.2	13	12.8			Good	
3	26/02/2013	26/03/2013	37.8	35.3	38.9	37	1.8	5	4.6			Good	
4	26/03/2013	22/04/2013	40.1	40.9	38.4	40	1.3	3	3.2			Good	
5	22/04/2013	29/05/2013	31.6	30.8	31.6	31	0.5	1	1.1			Good	
6	29/05/2013	25/06/2013	37.0	35.7	37.3	37	0.9	2	2.1			Good	
7	25/06/2013	30/07/2013	35.3	36.2	36.2	36	0.5	1	1.3			Good	
8	30/07/2013	27/08/2013	34.2	31.9	34.4	34	1.4	4	3.5			Good	
9	27/08/2013	24/09/2013	38.1	39.7	37.3	38	1.2	3	3.0			Good	
10	24/09/2013	29/10/2013	37.4	32.9	36.1	35	2.3	7	5.8			Good	
11	29/10/2013	27/11/2013	46.1	46.8	43.0	45	2.0	4	5.0			Good	
12	27/11/2013	07/01/2014	7.8	31.6	41.0	27	17.1	64	42.5			Poor Precision	
13													

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

Overall survey --> Good precision

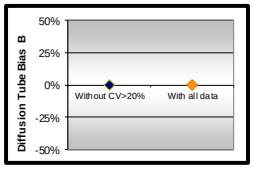
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	45,46,47

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



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Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	54.2	59.2	50.9	55	4.2	8	10.4			Good	
2	29/01/2013	26/02/2013	45.3	49.0	42.3	46	3.4	7	8.3			Good	
3	26/02/2013	26/03/2013	46.6	42.9	41.9	44	2.5	6	6.2			Good	
4	26/03/2013	22/04/2013	40.0	38.2	36.0	38	2.0	5	5.0			Good	
5	22/04/2013	28/05/2013	32.2	35.2	34.9	34	1.7	5	4.1			Good	
6	28/05/2013	25/06/2013	34.8	33.8	35.2	35	0.7	2	1.8			Good	
7	25/06/2013	30/07/2013	29.8	36.4	31.5	33	3.4	11	8.5			Good	
8	30/07/2013	27/08/2013	38.3	39.2	36.1	38	1.6	4	4.0			Good	
9	27/08/2013	24/09/2013	49.6	42.8	50.0	47	4.0	9	10.1			Good	
10	24/09/2013	29/10/2013	50.3	49.0	46.2	49	2.1	4	5.2			Good	
11	29/10/2013	27/11/2013	45.0	55.7	53.1	51	5.6	11	13.9			Good	
12	27/11/2013	07/01/2014	45.5	46.1	43.6	45	1.3	3	3.2			Good	
13													

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

Overall survey --> Good precision

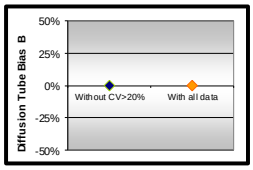
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	59,60,61

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	29/01/2013	87.6	73.1		80	10.3	13	92.1			Good	
2	29/01/2013	26/02/2013	64.3	73.6		69	6.6	10	59.1			Good	
3	26/02/2013	26/03/2013	56.8	50.0		53	4.8	9	43.2			Good	
4	26/03/2013	22/04/2013	49.1	49.1		49	0.0	0	0.0			Good	
5	22/04/2013	28/05/2013	66.1	60.8		63	3.7	6	33.7			Good	
6	28/05/2013	25/06/2013	48.2	51.4		50	2.3	5	20.3			Good	
7	25/06/2013	30/07/2013	55.6	58.3		57	1.9	3	17.2			Good	
8	30/07/2013	27/08/2013	61.0	67.8		64	4.8	7	43.2			Good	
9	27/08/2013	24/09/2013	80.4	92.9		87	8.8	10	79.4			Good	
10	24/09/2013	29/10/2013	65.4	72.1		69	4.7	7	42.6			Good	
11	29/10/2013	27/11/2013	79.3	81.6		80	1.6	2	14.6			Good	
12	27/11/2013	07/01/2014	72.1	71.2		72	0.6	1	5.7			Good	
13													
											Overall survey -->	Good precision	

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

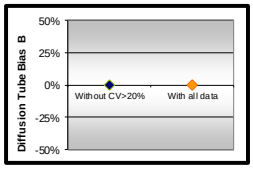
Site Name/ ID:	64,65

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	30/01/2013	39.3	43.7		42	3.1	7	28.0			Good	
2	30/01/2013	27/02/2013	27.5	39.9		34	8.8	26	78.8			Poor Precision	
3	27/02/2013	27/03/2013	35.0	31.3		33	2.6	8	23.5			Good	
4	27/03/2013	23/04/2013	29.1	26.6		28	1.8	6	15.9			Good	
5	23/04/2013	28/05/2013	24.7	21.8		23	2.1	9	18.4			Good	
6	28/05/2013	26/06/2013	25.1	23.3		24	1.3	5	11.4			Good	
7	26/06/2013	31/07/2013	24.3	21.2		23	2.2	10	19.7			Good	
8	31/07/2013	28/08/2013	25.2	22.0		24	2.3	10	20.3			Good	
9	28/08/2013	25/09/2013	30.8	33.0		32	1.6	5	14.0			Good	
10	25/09/2013	30/10/2013	33.7	32.0		33	1.2	4	10.8			Good	
11	30/10/2013	27/11/2013	39.6	39.8		40	0.1	0	1.3			Good	
12	27/11/2013	08/01/2014	36.8	40.0		38	2.3	6	20.3			Good	
13													
											Overall survey -->	Good precision	

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

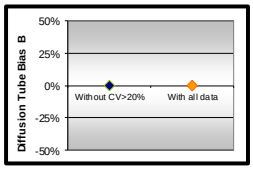
Site Name/ ID:	78,79

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	02/01/2013	30/01/2013	46.2	50.8	45.3	47	3.0	6	7.3			Good	
2	30/01/2013	27/02/2013	46.4	44.4	46.7	46	1.3	3	3.1			Good	
3	27/02/2013	27/03/2013	37.0	43.3	40.6	40	3.2	8	7.9			Good	
4	27/03/2013	23/04/2013	38.0	40.9	40.1	40	1.5	4	3.7			Good	
5	23/04/2013	28/05/2013	40.5	40.2	40.8	41	0.3	1	0.7			Good	
6	28/05/2013	26/06/2013	36.9	38.7	39.4	38	1.3	3	3.2			Good	
7	26/06/2013	31/07/2013	41.5	39.5	42.1	41	1.4	3	3.4			Good	
8	31/07/2013	28/08/2013	45.3	43.5	43.3	44	1.1	3	2.7			Good	
9	28/08/2013	25/09/2013	53.4	46.8	48.4	50	3.4	7	8.6			Good	
10	25/09/2013	30/10/2013	50.5	48.2	49.7	49	1.2	2	2.9			Good	
11	30/10/2013	27/11/2013	52.8	52.0	52.3	52	0.4	1	1.0			Good	
12	27/11/2013	08/01/2014	52.6	54.2	56.3	54	1.9	3	4.6			Good	
13													
											Overall survey -->	Good precision	

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

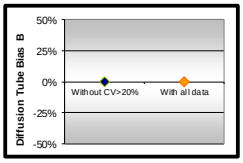
Site Name/ ID: 80,81,82

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

2014

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	08/01/2014	04/02/2014	62.4	63.1	61.9	62	0.6	1	1.5			Good	
2	04/02/2014	05/03/2015	54.8	59.9	53.9	56	3.2	6	8.0			Good	
3	05/03/2015	02/04/2014	53.0	54.7	44.7	51	5.4	11	13.3			Good	
4	02/04/2014	30/04/2014	49.3	45.8	45.9	47	2.0	4	4.9			Good	
5	30/04/2014	28/05/2014	57.3	50.0	51.5	53	3.9	7	9.6			Good	
6	28/05/2014	02/07/2014	51.5	43.7	41.5	46	5.3	12	13.1			Good	
7	02/07/2014	30/07/2014											
8	30/07/2014	27/08/2014	51.4	50.1	48.7	50	1.4	3	3.4			Good	
9	27/08/2014	01/10/2014	44.4	46.0	39.8	43	3.2	7	8.0			Good	
10	01/10/2014	27/10/2014	61.4	60.4	54.5	59	3.7	6	9.3			Good	
11	27/10/2014	03/12/2014	45.8	55.3	57.0	53	6.0	11	15.0			Good	
12	03/12/2014	09/01/2015	59.2	56.2	55.6	57	1.9	3	4.8			Good	
13													
											Overall survey -->	Good precision	

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

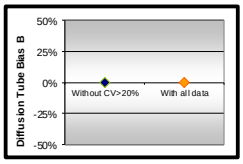
Site Name/ ID: 11,12,19

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	07/01/2014	04/02/2014	52.8	61.6		57	6.2	11	55.9			Good	
2	04/02/2014	04/03/2014	55.5	53.9		55	1.1	2	10.2			Good	
3	04/03/2014	01/04/2014	65.5	65.8		66	0.2	0	1.9			Good	
4	01/04/2014	29/04/2014	56.8	58.7		58	1.3	2	12.1			Good	
5	29/04/2014	28/05/2014	56.0	57.0		57	0.7	1	6.4			Good	
6	28/05/2014	01/07/2014	49.9	49.8		50	0.1	0	0.6			Good	
7	01/07/2014	30/07/2014	42.7	45.7		44	2.1	5	19.1			Good	
8	30/07/2014	26/08/2014	57.7	53.7		56	2.8	5	25.4			Good	
9	26/08/2014	30/09/2014	66.3	65.9		66	0.3	0	2.5			Good	
10	30/09/2014	28/10/2014	60.7	64.2		62	2.5	4	22.2			Good	
11	28/10/2014	02/12/2014	58.9	59.2		59	0.2	0	1.9			Good	
12	02/12/2014	07/01/2014	68.6	66.1		67	1.8	3	15.9			Good	
13													
										Overall survey -->		Good precision	

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

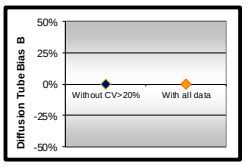
Site Name/ ID: 14,17

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (**Precision**):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (**Precision**):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	07/01/2014	04/02/2014	89.3	78.8		84	7.4	9	66.7			Good	
2	04/02/2014	04/03/2014	86.3	67.8		77	13.1	17	117.5			Good	
3	04/03/2014	01/04/2014	59.0	63.8		61	3.4	6	30.5			Good	
4	01/04/2014	29/04/2014		58.6									
5	29/04/2014	28/05/2014	52.7	52.7		53	0.0	0	0.0			Good	
6	28/05/2014	01/07/2014	42.1	43.8		43	1.2	3	10.8			Good	
7	01/07/2014	30/07/2014	42.9	45.5		44	1.8	4	16.5			Good	
8	30/07/2014	26/08/2014	62.0	69.8		66	5.5	8	49.6			Good	
9	26/08/2014	30/09/2014	53.4	55.8		55	1.7	3	15.2			Good	
10	30/09/2014	28/10/2014	77.1	81.1		79	2.8	4	25.4			Good	
11	28/10/2014	02/12/2014	64.9	71.8		68	4.9	7	43.8			Good	
12	02/12/2014	09/01/2015	73.0	65.7		69	5.2	7	46.4			Good	
13													
										Overall survey -->		Good precision	

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

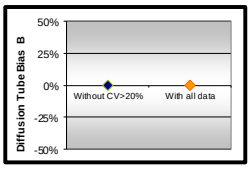
Site Name/ ID: 64,65

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (**Precision**):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (**Precision**):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm $^{-3}$	Tube 2 µgm $^{-3}$	Tube 3 µgm $^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1			59.0	58.5	59.1	59	0.3	1	0.8			Good	
2			50.4	50.4	53.3	51	1.7	3	4.2			Good	
3			49.1	46.5	50.0	49	1.8	4	4.5			Good	
4			36.4	41.9	42.0	40	3.2	8	8.0			Good	
5			46.0	43.1	44.1	44	1.5	3	3.7			Good	
6			29.9	34.7	32.5	32	2.4	7	6.0			Good	
7			30.5	30.2	28.8	30	0.9	3	2.3			Good	
8			43.4	42.9	42.6	43	0.4	1	1.0			Good	
9			39.1	36.0	39.3	38	1.9	5	4.6			Good	
10			46.8	50.2	48.1	48	1.7	4	4.3			Good	
11			49.9	33.0	44.7	43	8.7	20	21.5			Poor Precision	
12			26.6	46.7	49.9	41	12.6	31	31.4			Poor Precision	
13													
											Overall survey -->	Good precision	

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

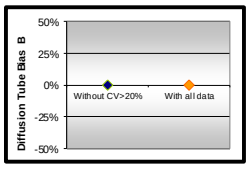
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	80,81,82

Precision 10 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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Appendix 2 Monitoring Results

Nitrogen Dioxide Diffusion Tube Monitoring Results

2014

Diffusion Tube Data			Grid																		
Street	**Post Code**	**Locn.**	**Ref x/y**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Count**	**Min**	**Max**	**Mean**	**Bias**
																				National 0.
Civic Drive		(K) 1	615999/244399	46.4	44.8	42.2	32.1	29.4	23.2	21.9	28.9	29.1	38.6	36.6	45.6	12	21.9	46.4	34.9	28.269
Chevallier St o/s No's 6 to 8		(K) 2	615142/245242	68.2	60.1	59.5	54.3	46	38	40.2	47.2	53.2	62.3	52.1	48.4	12	38	68.2	52.45833	**42.49125**
Dock Street		(K) 3	616379/243894	39.9	36.6	43.3	36.8	32.5	24.8	27.8	34.7	36.2	38.1	34.1	41.4	12	24.8	43.3	35.51667	28.7685
Berners Street o/s No. 31		(K) 4	615923/244923	50.3	45.6	48.9	36.7	43.4	40.4	22.1	35.2	36.2	45.1	47.9	42.6	12	22.1	50.3	41.2	33.372
Fore Street		(K) 5	616860/244147	48.1	44.6	57	55	50.1	40.1	44.3	44	61.3	54.4	52.2	38.3	12	38.3	61.3	49.11667	**39.7845**
Kings Avenue		(B) 6	617299/244412	25.8	21.2	26.5	18.8	14.3	10.4	11.5	15.9	16	23.2	25.4	28.2	12	10.4	28.2	19.76667	16.011
Bramford Road o/s No 205		(K) 7	615004/245237	53.9	39.7	46.9	35.8	41.2	29.5	27.3	35.8	37.9	44	45.3	42.9	12	27.3	53.9	40.01667	32.4135
Bramford Road o/s No 122		(K) 8	615133/245201	46.3	33.8	48	45.6	35.6	31.9	33	35.3	48	42.9	43.4	40.4	12	31.9	48	40.35	32.6835
Bramford Road o/s No 122		(K) 9	615133/245201	42.6	41.1	48	42	38.6	25.4	32	39.4	49.7	42.3	40.9	48.1	12	25.4	49.7	40.84167	33.08175
Bramford Road o/s No 122		(K) 10	615133/245201	45.6	38.6	49.8	48	37.7	24.4	34.1	41.7	49.5	44.2	26	48	12	24.4	49.8	40.63333	32.913
St Margaret's Street		(K) 11	616578/244759	62.4	54.8	53	49.3	57.3	51.5		51.4	44.4	61.4	45.8	59.2	11	44.4	62.4	53.68182	**43.48227**
St Marg St co locat		(K) 12	616578/244759	63.1	59.9	54.7	45.8	50	43.7		50.1	46	60.4	55.3	56.2	11	43.7	63.1	53.2	**43.092**
Valley/Norwich Road		(K) 13	615361/245436	41.2	46.7	44.8	43.3	47.5	33.1	32.1	42	44.6	56.6	44.2	43.8	12	32.1	56.6	43.325	35.09325
Chevalier Street		(K) 14	615283/245391	52.8	55.5	65.5	56.8	56	49.9	42.7	57.7	66.3	60.7	58.9	68.6	12	42.7	68.6	57.61667	**46.6695**
Cornhill o/s No 17		(B) 15	616277/244641	39.2	36.1	29.8	28.1		20.5	17.6	25.8	25.9	34.6	36.6	45.6	11	17.6	45.6	30.89091	25.02164
Valley/Norwich Road co-locate		(K) 16	615361/245436	52.2	43.8	45.8	37	40.9	29.2	34.1	43.2	42.2	47.3	36.8	39.8	12	29.2	52.2	41.025	33.23025
Chevallier Street co-locate		(K) 17	615283/245391	61.6	53.9	65.8	58.7	57	49.8	45.7	53.7	65.9	64.2	59.2	66.1	12	45.7	66.1	58.46667	**47.358**
Yarmouth Rd o/s flat 2 No 5		(K) 18	615092/245137	35.9	30.1	40.7	36	32.9	30.8	30.7	36.8	45.7	37	39.1	42	12	30.1	45.7	36.475	29.54475
St Marg St co locat		(K) 19	616578/244759	61.9	53.9	44.7	45.6	51.5	41.5		48.7	39.8	54.5	57	55.6	11	39.8	61.9	50.42727	**40.84609**
St Margaret's Plain/Fonnereau		(K) 20	616455/244824	49.4	47.4	45.2	38.6	38.5		28.6	32	34.8	43.9	36.6	47.5	11	28.6	49.4	40.22727	32.58409
St Margaret's Plain		(K) 21	616490/244806	53.9	45.6	51.6	46.4	33.7	29.2	34.8	40.7	51.5	47.7	48	53.6	12	29.2	53.9	44.725	36.22725
St Margaret's Plain/Northgate		(K) 22	616477/244790	56.5	49.6	54	47.4	43.2	39.6	39.1	41.3	49.5	42.1	54.5	50.9	12	39.1	56.5	47.30833	38.31975
St Margarets Green		(K) 23	616641/244781	36.8	31.1	33.8	25.6	24.3	19.7	16.4	24.1	25.6	33.5	33	36.5	12	16.4	36.8	28.36667	22.977
St Margaret's Street		(K) 24	616659/244689	59.5	58.7	55.8	48.3	55.1	50	42.1	50.1	42.8	54.6	56.9	51.8	12	42.1	59.5	52.14167	**42.23475**
St Helen's Street		(K) 25	616750/244578	55.2	48.5	57.7	46.5	55.8	47.6	40.7	52.8	48	59.4	51	45.8	12	40.7	59.4	50.75	**41.1075**
St Helen's St/Grimwade Street		(K) 26	616968/244510	47.7	39.1	43	40.1	35.9	32.1	29.6	37	44	40.9	44.9	39.9	12	29.6	47.7	39.51667	32.0085
St Helen's St/Argyle Street		(K) 27	616961/244/536	51.7	53.6	53	45.2	45.6	27.9	31.9	43.1	47	45.8	48	51.9	12	27.9	53.6	45.39167	36.76725
Chevallier St o/s Nos 32/34		(K) 28	615192/245289	65.6	25.6	55.6	45.4	47.5	25.6	24.5	39.9	43.4	60.9	39.3	47.8	12	24.5	65.6	43.425	35.17425
Fore Hamlet		(K) 29	617102/244077	40.5	34.7	46.1	41.6	25.2	31.5	25.8	30.5	43.7	39.3	39	44	12	25.2	46.1	36.825	29.82825
Fore Street		(K) 30	616963/244106	40.6	32	40.4	35.4	35	29.3	27	34	39.7	38.4	40.3	41.5	12	27	41.5	36.13333	29.268
Star Lane opp St Peters St		(K) 31	616336/244133	41.4	40	38.8	44.2	41.8	28.4	31	36.1	46	45.6	47.5	39.6	12	28.4	47.5	40.03333	32.427
Star Lane co locate as 31		(K) 32	616336/244133	50.2	41.4	46.7	44.3	39.1	23.7	30.3	36	43.2	42.8	40.2	14.3	12	14.3	50.2	37.68333	30.5235
Star Lane co locate as 31		(K) 33	616336/244133	46.8	39.8	42.3	45.1	36.4	29.2		35.6	43.6	43.4	43.5	41.4	11	29.2	46.8	40.64545	32.92282
College Street		(K) 34	616466/244072	60.6	59.1	59.1	53	53.1	32.8	35.5	50.9	41	63.9	51.8	55.9	12	32.8	63.9	51.39167	**41.62725**
Cobden Place		(K) 35	616743/244692	43	40.3	38.3	31.3	29.7	23.9	22.2	32.1	28.4	40.4	35.1	42.4	12	22.2	43	33.925	27.47925
Franciscan Way/Wolsey St		(K) 36	616153/244242	45.5	37	40.4	33.2	25.6	23.8	26.6	30.2	34.3	40.7	31.6	43.8	12	23.8	45.5	34.39167	27.85725
Lower Brook Street		(K) 37	616480/244163	32.7	31.7	36.9	31	26.8	23.2	20	25.5		33.1	33.6	32.8	11	20	36.9	29.75455	24.10118
Civic Drive by Victoria PH		(K) 38	615898/244789	51.6	44.5	45.4	44.6	45	37.8	33.6	34.8	43.6	50.1	49.8	37.7	12	33.6	51.6	43.20833	34.99875
Star Lane/Fore Street		(K) 39	616730/244246	62.3	49.2	57.5	48.3	40.8	32.8	31.4	43	48.2	50.1	53.3	59.2	12	31.4	62.3	48.00833	38.88675
Norwich Road o/s No. 131		(K) 40	615457/245144	40.2	32.1	34.9	29.3	31.4	18.7	25.8	31.2	33.9	35.2	39.9	47.8	12	18.7	47.8	33.36667	27.027
Norwich Road o/s No. 69		(K) 41	615562/245008	50.4	51.4	38.6	40.4	47.4	34.6	42.7	43	40.4	55.5	53.2	48.4	12	34.6	55.5	45.5	36.855
Norwich Road between 8 &10		(K) 42	615741/244899	47	42.9	53	46.3	37.3	40.5	26	35.8	49.2	35.3	47.8	45.4	12	26	53	42.20833	34.18875
Yarmouth Rd/Bramford Road		(K) 43	615107/245197	51.7	50	49.7	48.3	46.7	39.4	38.1	42.2	47.6	47.5	39.1	48.5	12	38.1	51.7	45.73333	37.044
Bramford Road		(K) 44	615049/245234	53	44.2	51.6	45.5	41.4	37.8	32.7	43	48.2	50	47.4	49.4	12	32.7	53	45.35	36.7335
Chevallier Street		(K) 45	615257/245349	44.1	52.6	41.9	37.6	33.1	30	24.1	27.7	40.2	38.7	29.3	39.7	12	24.1	52.6	36.58333	29.6325
Chevallier Street - co locate		(K) 46	615257/245349	44.7	37.7	42.8	35.2	35.2	28.4	27.7	30.4	37.7	39.3	42.6	32.9	12	27.7	44.7	36.21667	29.3355
Chevallier Street - co locate		(K) 47	615257/245349	37.2	28.7	42.7	38.4	33.7	31.4	24.7	30.8	41.4	33.8	42.6	38.6	12	24.7	42.7	35.33333	28.62
Norwich Road/Anglesea Road		(K) 48	615397/245337	34.9	31.5	38.6	33.2	31.2	23.1		28.6	37.2	33.6	39.3	37.3	11	23.1	39.3	33.5	27.135
St Matthews Street		(K) 49	615803/244872	43.6	47.1	53.7	53.2		49.6	41.9	45.4	59	56.2	61.1	54.5	11	41.9	61.1	51.39091	**41.62664**
Barrack lane/St Matthews St		(K) 50	615758/244885	48.8	37.6	37.3	32.5	28.7	20.3	17	27.4	23.4	38.2	22.6	34.5	12	17	48.8	30.69167	24.86025
St Matthews St/Portman Rd		(K) 51	615765/244865	51.5	41.3	47.8	42.6	37.8	45.4	32.6	27.8	48.6	52.4	63.1	47.2	12	27.8	63.1	44.84167	36.32175
St Matthews St o/s No. 60		(K) 52	615822/244869	56.6	52.9	65.6	59.8	47.8	38.9	38.3	46.9	60.2	60.3	69.9	64.2	12	38.3	69.9	55.11667	**44.6445**
St Matthews St o/s No. 67		(K) 53	615817/244856	76.9	70.4	63.6	56.4	60.3	41.9	42.7	53.9	53.3	71.1	69.6	66.8	12	41.9	76.9	60.575	**49.06575**
St Matthews St/Berners St		(K) 54	615891/244863	48.7	41.6	41.8	38	37.8	30.2	28.3	32.5	35.7	44.3	37	35.4	12	28.3	48.7	37.60833	30.46275
Berners St o/s No. 21		(K) 55	615912/244893	45.4	37.6	37.7	36.7	35.3	24.7	25	28.8	39.5	42.5	44.7	44.1	12	24.7	45.4	36.83333	29.835
Berners St o/s No. 32		(K) 56	615928/244908	49.5	34.5	43.2	36.6	8	22.3	20.7	28	34.6	42.3	43.5	42.5	12	8	49.5	33.80833	27.38475
Berners St o/s No. 41-43		(K) 57	615936/244977	41.9	31.7	35.2	28.5	26.3	22	20.5	28.3	41.4	29.8	39.9	29.5	12	20.5	41.9	31.25	25.3125
Berners St o/s No. 58		(K) 58	615975/245034	43.5	38.9	36	27.4	27.3	16	14.4	22.4	26.6	38	43.5	36.2	12	14.4	43.5	30.85	24.9885
St Matthews St rbt co-locate		(K) 59	615921/244841	49.6	42.8		38.7	37.4	26.9	24.6	32.3	41.3	46.2	45.1	49.7	11	24.6	49.7	39.50909	32.00236
St Matthews St rbt co-locate		(K) 60	615921/244841	61.5	46.3		44.5	35.8	32.2		36.9	40.9	46.4	44.3	53.6	10	32.2	61.5	44.24	35.8344
St Matthews St rbt co-locate		(K) 61	615921/244841	48.4	44.2		40	39.2	18.9	31	35.1	40.2	47.2	44.1	53.1	11	18.9	53.1	40.12727	32.50309
St Matthews St o/s No. 27		(K) 62	615926/244804	56.2	53.3	51.7	45.6	38.5	35.1	36.3	41.6	42.1	58.2	51.1	56.1	12	35.1	58.2	47.15	38.1915
St Matthews St o/s No. 19		(K) 63	615952/244785	53	46.5	52.5	43.6	39.6	34.4	31.8	45	42.6	60.2	42.5	54	12	31.8	60.2	45.475	36.83475
Norwich Rd btwn No's. 13/15		(K) 64	615686/244936	89.3	86.3	59		52.7	42.1	42.9	62	53.4	77.1	64.9	73	11	42.1	89.3	63.88182	**51.74427**
Norwich Rd btwn No's. 13/15		(K) 65	615686/244936	78.8	67.8	63.8	58.6	52.7	43.8	45.5	69.8	55.8	81.1	71.8	65.7	12	43.8	81.1	62.93333	**50.976**
Woodbridge Rd o/s No 30A		(K) 66	616804/244667	56.1	52.6	49.7	47.1	50.9	41.6	34.1	49	44.9	52.8	42.2	48.6	12	34.1	56.1	47.46667	38.448
Woodbridge Rd/Blanche St		(K) 67	616886/244672	52.3	40.6	44.4	33.5	35.1	26.3	22.4	28.9	32.3	42.1	40.4	46.3	12	22.4	52.3	37.05	30.0105
Woodbridge Rd o/s No. 62		(K) 68	616901/244655	66.7	55.6	63.1		58.8	45.3	40.7	55.2	63.4	56.1	62.5	59.4	11	40.7	66.7	56.98182	**46.15527**
Argyle Street o/s Nos. 2-4		(K) 69	616974/244589	44.3	39	38.6	32.1	28.9	21.1	20.9	28	34.4	34.8	41.5	42.9	12	20.9	44.3	33.875	27.43875
Argyle Street o/s No. 11		(K) 70	616962/244572	53.3	47.8	46.6	28.1	39.1	23.3	23.5	38.1	36.8	46.8	50.3	48.2	12	23.3	53.3	40.15833	32.52825
St Helens Street o/s No. 93		(K) 71	617027/244536	37.1	33.5	33.3	29.8	23.5	21.1	20.5	27.8	32.3	30.9	34.4	36.8	12	20.5	37.1	30.08333	24.3675
St Helens St o/s No. 125		(K) 72	617119/244534	46.5	51.1	51.4	47.7	35	35.3	34.2	44.6	54.4	47.7	54.3	59.7	12	34.2	59.7	46.825	37.92825
Regent St/St Helens St		(K) 73	617120/244518	39.7	32.8	31.7	28.4	18.4	14.4	13.8	22.8	29.1	28.8	32	39.3	12	13.8	39.7	27.6	22.356
Grimwade St o/s No. 25		(K) 74	616948/244438	42	38.7	33.9	32.6	27.5	20.8	19.6	25.1	30.9	36.3	39.4	31.3	12	19.6	42	31.50833	25.52175
Grimwade St o/s No. 28		(K) 75	616928/244360	37.7	31.8	32.7	27.5	24.8	20	18.3	24.5	23.7	31.2	36.8	33.7	12	18.3	37.7	28.55833	23.13225
St Helens St/Grimwade St 44		(K) 76	616948/244518	54.8	46.9	51.2	45	44.9	30.7	26	45.4	49.4	51.4	50.3	44.3	12	26	54.8	45.025	36.47025
St Helens St - Albury Ct		(K) 77	616899/244539	40	33.2	36.4	37.8	22.3	28.2	22.7	26.5	39.2	34.4	42.8	30.4	12	22.3	42.8	32.825	26.58825
Orchard St o/s No. 7		(K) 78	616867/244583	41.5	29.9	30.3	27.5	28.1	16.2	15.9	21.7	28.5	31.6	38	34	12	15.9	41.5	28.6	23.166
Orchard St - co-locate		(K) 79	616867/244583	40.9	34.4	33.9	27.3	17.1	12.9	15.9	22.9	24.6	31.3	37.6	36.7	12	12.9	40.9	27.95833	22.64625
St Helens St - County Hall		(K) 80	616819/244543	59	50.4	49.1	36.4	46	29.9	30.5	43.4	39.1	46.8	49.9	26.6	12	26.6	59	42.25833	34.22925
St Helens St - co-locate		(K) 81	616819/244543	58.5	50.4	46.5	41.9	43.1	34.7	30.2	42.9	36	50.2	33	46.7	12	30.2	58.5	42.84167	34.70175
St Helens St - co-locate		(K) 82	616819/244543	59.1	53.3	50	42	44.1	32.5	28.8	42.6	39.3	48.1	44.7	49.9	12	28.8	59.1	44.53333	36.072
Bond Street o/s No. 29		(K) 83	616788/244497	48.5	36.2	43.4	37.6	39.1	30.7	25.5	32.3	39.9	39.1	51	40.5	12	25.5	51	38.65	31.3065
Carr Street/Majors Corner		(K) 84	616697/244595	40.4	30.1	37.2	32.9	33.4	25.4	23.9	29.5	33	30	42.8	39.1	12	23.9	42.8	33.14167	26.84475
Old Foundry Road o/s No. 5		(K) 85	616677/244622	49.4	45	44.2	36.8	35.5	26.7	27.5	33.9	31.5	43.1	47.2	46.6	12	26.7	49.4	38.95	31.5495
																				0
	Special Project Tubes - Bramford Road - Commenced November 2013																			0
Bramford Road Location 1		B	B1 613268/245948	34	31.2	33.5	28.8	26.7	21.7	Project concluded						6	21.7	34	29.31667	23.7465
Bramford Road Location 2		B	B2 613274/246019	39.8	29.5	37.6	29.6	19.2	19.9	Project Concluded						6	19.2	39.8	29.26667	23.706

2013

Diffusion Tube Data			Grid																	M3 worksheet wk/201	
Street	**Post Code**	**Locn.**	**Ref x/y**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Count**	**Min**	**Max**	**Mean**	**Bias**	
																				National	**Do not use**
Civic Drive		(K)	1 615999/244399	45.8	34.5	35.4	27	25.8	25.8	32	30.1	37.7	37.6	47.7	37.8	12	25.8	47.7	34.8	27.8	37.5
Chevallier St o/s No's 6 to 8		(K)	2 615142/245242	56	46.2	51.2	54.4	40.8	46	52.1	49.7	30.7	56	59.4	53.3	12	30.7	59.4	49.7	39.7	**53.6**
Dock Street		(K)	3 616379/243894	42.7	36.7	35.4	29.5	34.2	33.2	32.3	34.5	48.3	37.7	51.9	44.9	12	29.5	51.9	38.4	30.8	**41.5**
Berners Street o/s No. 31		(K)	4 615923/244923	51.9	42.7	39.2	32.8	38.7	36.2	35.9	38.9	53.1	48.6	57	42.8	12	32.8	57	43.2	34.5	**46.6**
Fore Street		(K)	5 616860/244147	52.4	52.8	46.9	59.6	51	53.9	54	49.4	53.9	48.7	53.6	39.5	12	39.5	59.6	51.3	**41.0**	**55.4**
Kings Avenue		(B)	6 617299/244412	34.2	28.2	25.7	19.6	12.8	18	14.5	14.5	24.5	25.5	20.9	21.2	12	12.8	34.2	21.6	17.3	23.4
Bramford Road o/s No 205		(K)	7 615004/245237	47.7	37.2	40.1	38.9	36	36.7	39.1	40.9	45.7	44.9	45	42.8	12	36	47.7	41.3	33.0	**44.6**
Bramford Road o/s No 122		(K)	8 615133/245201	50	38.1	51.9	45.1	40.2	39.8	44.3	36.7	46.2	44.4	51.1	39.6	12	36.7	51.9	44.0	35.2	**47.5**
Bramford Road o/s No 122		(K)	9 615133/245201	46.7	44	51.8	40.6	38	41.8	40.5	39.3	45.9	47.6	52.7	43.9	12	38	52.7	44.4	35.5	**48.0**
Bramford Road o/s No 122		(K)	10 615133/245201	51.1	40.1	46.7	39.2	36.2	42.2	36.4	41	47.3	47.5	50.4	33.2	12	33.2	51.1	42.6	34.1	**46.0**
St Margaret's Street		(K)	11 616578/244759	57.1	41.4	40	41.4	51	37.6	50.1	47.3	61	57.3	55.2	51.3	12	37.6	61	49.2		**53.2**
St Marg St co locat		(K)	12 616578/244759	52.8	42.8	37.8	38.9	48.3	40	48.4	52.5	59.3	56.9	53.8	55.3	12	37.8	59.3	48.9		**52.8**
Valley/Norwich Road		(K)	13 615361/245436	48.7	42.7	35.6	37.8	33.3	38.1	37.7	41	50.8	42.8	53.9	49.2	12	33.3	53.9	42.6	34.1	**46.0**
Chevallier Street		(K)	14 615283/245391	69	57.4	56.2	56.3	56.8	62.1	58.8	56	65.1	58.5	81.3	56.9	12	56	81.3	61.2	**49.0**	**66.1**
Cornhill o/s No 17		(B)	15 616277/244641	40.5	35.5	30.1	27.5	23.2	24.8	22.6	26	34.1	37.5	43.8	41.6	12	22.6	43.8	32.3	25.8	34.8
Valley/Norwich Road		(K)	16 615361/245436	51.3	43.1	34.3	39.1	39.3	39.7	39.7	44.9	51.5	51.6	54	46.6	12	34.3	54	44.6	35.7	**48.2**
Chevallier Street		(K)	17 615283/245391	59.5	65.6	66.1	69.3	59.9	63.5	62.7	58	68.2	50.9	73.2	63.6	12	50.9	73.2	63.4	**50.7**	**68.4**
Yarmouth Rd o/s flat 2 No 5		(K)	18 615092/245137	47.2	41.4	38.8	35.4	33.9	39.9	32	35.8	44.8	37.9	48	32	12	32	48	38.9	31.1	**42.0**
St Marg St co locat		(K)	19 616578/244759	53.8	47.2	37.5	41.8	46.9	39.2	49.8	55.1	61	53.3	49.7	56.6	12	37.5	61	49.3		**53.3**
St Margaret's Plain/Fonnereau		(K)	20 616455/244824	45.7	40.4	34.1	30.3	36.9	37.1	38.4	38.1	45.9	45.5	46	51.3	12	30.3	51.3	40.8	32.6	**44.1**
St Margaret's Plain		(K)	21 616490/244806	49.1	51	45.8	41.5	43.1	46.6	39.6	40.9	50.1	46.8	54.2	45.8	12	39.6	54.2	46.2	37.0	**49.9**
St Margaret's Plain/Northgate		(K)	22 616477/244790	55.6	49	54.1	45.6	42.3	38.8	46.1	45	48.9	50.4	51.6	45.3	12	38.8	55.6	47.7	38.2	**51.5**
St Margarets Green		(K)	23 616641/244781	36.7	30.1	22.4	23.5	22.9	24.1	23.5	25	30.9	34.4	33.8	34.7	12	22.4	36.7	28.5	22.8	30.8
St Margaret's Street		(K)	24 616659/244689	57.6		47.7	42.9	47.7	48	44.7	48.7	54.7	52.6	59.8	56	11	42.9	59.8	50.9	**40.8**	**55.0**
St Helen's Street		(K)	25 616750/244578	56.4	53.2	46.5	48.7	45.1	41.6	43.6	46.6	60.8	48.5	55.7	49.1	12	41.6	60.8	49.7	39.7	**53.6**
St Helen's St/Grimwade Street		(K)	26 616968/244510	46.8	46.9	46.8	45.1	35.7	37.8	34.1	38.3	43.7	38.4	45.3	36.8	12	34.1	46.9	41.3	33.0	**44.6**
St Helen's St/Argyle Street		(K)	27 616961/244/536	67.1	60.8	59.4	57.4	49.2	47.7	46.2	50.3	60.2	52.2	60.3	44.9	12	44.9	67.1	54.6	**43.7**	**59.0**
Chevallier St o/s Nos 32/34		(K)	28 615192/245289	59.5	34.7	46.1	46.1	38.4	40.1	41	41	49.6	58.5	56.8	49.2	12	34.7	59.5	46.8	37.4	**50.5**
Fore Hamlet		(K)	29 617102/244077	48.4	47	42.3	42.4			36.7	35.2	43.1	41.3	49.6	25.5	10	25.5	49.6	41.2	32.9	**44.4**
Fore Street		(K)	30 616963/244106	40.9	39.2	42.7	32.4	28.9	33.6	30.9	31.5	37.7	40.7	34.4	35.1	12	28.9	42.7	35.7	28.5	38.5
Star Lane opp St Peters St		(K)	31 616336/244133	48.6	42.8	55.4	46.9	38.7	37.5	40	36.6	44.6	50.3	47.6	38.4	12	36.6	55.4	44.0	35.2	**47.5**
Star Lane co locate as 31		(K)	32 616336/244133	46.8	47.5	50.8	44.3	36.6	36.6	40.6	35.8	38.9	45	45.8	36.4	12	35.8	50.8	42.1	33.7	**45.5**
Star Lane co locate as 31		(K)	33 616336/244133	50.1	47.3	50.9	48.8	36.9	37.5	38.3	37.4	39.8	46.1	47.3	34.2	12	34.2	50.9	42.9	34.3	**46.3**
College Street		(K)	34 616466/244072	53.6	55	49.3	46.3	43.7	38.2	43.2	45.7		49.6	55	50.1	11	38.2	55	48.2	38.5	**52.0**
Cobden Place		(K)	35 616743/244692	46.2	32.5	30.8	28.6	25.2	21.9	30.1	28.9	38.8	39	40	41.9	12	21.9	46.2	33.7	26.9	36.4
Franciscan Way/Wolsey St		(K)	36 616153/244242	49.4	42.7	36.3	32.5	30.7	29.7	30.3	32.6	38.3	40.5	50.1	38.1	12	29.7	50.1	37.6	30.1	**40.6**
Lower Brook Street		(K)	37 616480/244163	43.7	37.8	40.5	34.5	26	30.4	26.8	25.8	34.1	34.7	39.1	31.5	12	25.8	43.7	33.7	27.0	36.4
Civic Drive by Victoria PH		(K)	38 615898/244789	48.4	33.2	49.1	45	33.9	42.5	45.9	42.9	52.6	49.1	51.6	41.3	12	33.2	52.6	44.6	35.7	**48.2**
Star Lane/Fore Street		(K)	39 616730/244246	66.9	57.8	54.5	42.6	42.4	41.2	41	45.1	55.3	58.5	57.2	49.5	12	41	66.9	51.0	**40.8**	**55.1**
Norwich Road o/s No. 131		(K)	40 615457/245144	41.6	40.9	38.5	33.5	25.8	29	15.3	26.3	35.2	37.7	45.7	36.1	12	15.3	45.7	33.8	27.0	36.5
Norwich Road o/s No. 69		(K)	41 615562/245008	49.3	41.1	38.9	36.4	36	36.3	46.2	41.6		45	53	52.4	11	36	53	43.3	34.6	**46.8**
Norwich Road between 8 &10		(K)	42 615741/244899	49	53.7	56.5	51.3	39.2	41.9	41.1	38.4	45.3	44.1	54.2	36.6	12	36.6	56.5	45.9	36.8	**49.6**
Yarmouth Rd/Bramford Road		(K)	43 615107/245197	57.5	46.8	41	43	40.8	40.4	44	45.2	51.1	49.7	53.2	48.4	12	40.4	57.5	46.8	37.4	**50.5**
Bramford Road		(K)	44 615049/245234		50.1	49.6	43.6	39.6	42.6	36.8	42.7	50.2	47.8	60.2	47.2	11	36.8	60.2	46.4	37.1	**50.1**
Chevallier Street		(K)	45 615257/245349	47.3	44.3	37.8	40.1	31.6	37	35.3	34.2	38.1	37.4	46.1	7.8	12	7.8	47.3	36.4	29.1	39.3
Chevallier Street - co locate		(K)	46 615257/245349	43.8	38.8	35.3	40.9	30.8	35.7	36.2	31.9	39.7	32.9	46.8	31.6	12	30.8	46.8	37.0	29.6	**40.0**
Chevallier Street - co locate		(K)	47 615257/245349	42	34	38.9	38.4	31.6	37.3	36.2	34.4	37.3	36.1	43	41	12	31.6	43	37.5	30.0	**40.5**
Norwich Road/Anglesea Road		(K)	48 615397/245337	39.9	38.3	35.8	34	28.2	29.6	30.6	29.2	40.4	36.4	38.7	37.6	12	28.2	40.4	34.9	27.9	37.7
St Matthews Street		(K)	49 615803/244872	58.8	57.7	63.4	53.5	41.2	47.9	48.7	45.4	54.3	57.4	58.2	48.5	12	41.2	63.4	52.9	**42.3**	**57.2**
Barrack lane/St Matthews St		(K)	50 615758/244885	41.8	37.1	32.1	21.9	26.4	23.8	26.3	26.8	37.9	37.9	38.7	38.9	12	21.9	41.8	32.5	26.0	35.1
St Matthews St/Portman Rd		(K)	51 615765/244865	55.8	48.3	56.6	39.4	29.8	37.8	38.5	35.1	39.6	55.6	46.9	47.3	12	29.8	56.6	44.2	35.4	**47.8**
St Matthews St o/s No. 60		(K)	52 615822/244869	69.1	68	68.3	60.4	50.6	35.8	49.2	52.7	65.1	66.3	70.2	58.8	12	35.8	70.2	59.5	**47.6**	**64.3**
St Matthews St o/s No. 67		(K)	53 615817/244856	66.3	49.6	51.4	46	49.7	44.6	50.5	55.3	59.7	56.4	68.1	66.1	12	44.6	68.1	55.3	**44.2**	**59.7**
St Matthews St/Berners St		(K)	54 615891/244863	46.1	38.6	40	32.9	30.3	32.1	35.6	32.8	40.6	41.8	44.9	42.5	12	30.3	46.1	38.2	30.5	**41.2**
Berners St o/s No. 21		(K)	55 615912/244893	50.1	40.7	43.7	34.9	32.8	37.4	32.8	33.3	45.9	42.9	49.9	41.1	12	32.8	50.1	40.5	32.4	**43.7**
Berners St o/s No. 32		(K)	56 615928/244908	43.5	40.3	44.3	32.7	28.3	32.3	32.3	32.8	44.6	8.1	18.3	31.5	12	8.1	44.6	32.4	25.9	35.0
Berners St o/s No. 41-43		(K)	57 615936/244977	39.9	38.5	33.1	26.9	26.8	27.2	24	26.4	36.9	37.9	46.5	34.4	12	24	46.5	33.2	26.6	35.9
Berners St o/s No. 58		(K)	58 615975/245034	46.7	36	40.6	22.2	23.3		23.8	23.4	34.1		42.1	42.4	10	22.2	46.7	33.5	26.8	36.1
St Matthews St rbt co-locate		(K)	59 615921/244841	54.2	45.3	46.6	40	32.2	34.8	29.8	38.3	49.6	50.3	45	45.5	12	29.8	54.2	42.6	34.1	**46.0**
St Matthews St rbt co-locate		(K)	60 615921/244841	59.2	49	42.9	38.2	35.2	33.8	36.4	39.2	42.8	49	55.7	46.1	12	33.8	59.2	44.0	35.2	**47.5**
St Matthews St rbt co-locate		(K)	61 615921/244841	50.9	42.3	41.9	36	34.9	35.2	31.5	36.1	50	46.2	53.1	43.6	12	31.5	53.1	41.8	33.4	**45.2**
St Matthews St o/s No. 27		(K)	62 615926/244804	56	48.2	42.3	35.1	43.3	38.6	48.7	49.4	61.3	57.3	58.3	50	12	35.1	61.3	49.0	39.2	**53.0**
St Matthews St o/s No. 19		(K)	63 615952/244785	53.5	46.6	41.1	36.8	40.9	39.2	44	50	57.2	56.7	54	49	12	36.8	57.2	47.4	37.9	**51.2**
Norwich Rd btwn No's. 13/15		(K)	64 615686/244936	87.6	64.3	56.8	49.1	66.1	48.2	55.6	61	80.4	65.4	79.3	72.1	12	48.2	87.6	65.5	**52.4**	**70.7**
Norwich Rd btwn No's. 13/15		(K)	65 615686/244936	73.1	73.6	50	49.1	60.8	51.4	58.3	67.8	92.9	72.1	81.6	71.2	12	49.1	92.9	66.8	**53.5**	**72.2**
Woodbridge Rd o/s No 30A		(K)	66 616804/244667	53.1	44.6	43.1	43.1	43.3	39	44.3	41.1	53.1	52.3	52.9	52.7	12	39	53.1	46.9	37.5	**50.6**
Woodbridge Rd/Blanche St		(K)	67 616886/244672	51	36.9	38.3	24.9	29.2	28.2	28.5	32.4	38.6	44.3	42.9	38.9	12	24.9	51	36.2	28.9	39.1
Woodbridge Rd o/s No. 62		(K)	68 616901/244655	73.2	64.5	63	46.1	50	46.3	56.3	52.6	63.7	63.6	69	65.5	12	46.1	73.2	59.5	**47.6**	**64.2**
Argyle Street o/s Nos. 2-4		(K)	69 616974/244589	47.9	40.8	44.4	31.5	25.5	30.6	27.8	29.2	36.7	38.4	44.2	41	12	25.5	47.9	36.5	29.2	39.4
Argyle Street o/s No. 11		(K)	70 616962/244572	52.2	44.9	39.5		40.1	35.6	31.6	39.4	53.9	52.6	53.6	51.5	11	31.6	53.9	45.0	36.0	**48.6**
St Helens Street o/s No. 93		(K)	71 617027/244536	39.2		33.9	30	30.2	31.3	26.2	29.2	32.7	35.3	41.7	37.4	11	26.2	41.7	33.4	26.7	36.0
St Helens St o/s No. 125		(K)	72 617119/244534	53.2	49.1	55.1	42.3	45.7	45	40.8	43.2	54.7	51.9	54.4	51.3	12	40.8	55.1	48.9	39.1	**52.8**
Regent St/St Helens St		(K)	73 617120/244518	40.7	34.6	37.6	24.9	24.7	24	23.6	25.1	32.5	32.3	38.8	38.8	12	23.6	40.7	31.5	25.2	34.0
Grimwade St o/s No. 25		(K)	74 616948/244438	49.3	36.9	40.8	33.6	27.4	29.7	27	28.7	37.1	37.3	43.3	39	12	27	49.3	35.8	28.7	38.7
Grimwade St o/s No. 28		(K)	75 616928/244360	40.4	34.7	31.1	24.7	23.3	25.5	23.9	24.1	32.6	33.9	35.6	35.8	12	23.3	40.4	30.5	24.4	32.9
St Helens St/Grimwade St 44		(K)	76 616948/244518	52.2	44	49.2	44.6	37	30.9	42.2	42.3	52.4	49.1	43.8	48.3	12	30.9	52.4	44.7	35.7	**48.2**
St Helens St - Albury Ct		(K)	77 616899/244539	42.2	39.9	45.2	37	30.1	32	29.6	32.2	42.4	37	38.5	36.2	12	29.6	45.2	36.9	29.5	39.8
Orchard St o/s No. 7		(K)	78 616867/244583	39.3	27.5	35	29.1	24.7	25.1	24.3	25.2	30.8	33.7	39.6	36.8	12	24.3	39.6	30.9	24.7	33.4
Orchard St - co-locate		(K)	79 616867/244583	43.7	39.9	31.3	26.6	21.8	23.3	21.2	22	33	32	39.8	40	12	21.2	43.7	31.2	25.0	33.7
St Helens St - County Hall		(K)	80 616819/244543	46.2	46.4	37	38	40.5	36.9	41.5	45.3	53.4	50.5	52.8	52.6	12	36.9	53.4	45.1	36.1	**48.7**
St Helens St - co-locate		(K)	81 616819/244543	50.8	44.4	43.3	40.9	40.2	38.7	39.5	43.5	46.8	48.2	52	54.2	12	38.7	54.2	45.2	36.2	**48.8**
St Helens St - co-locate		(K)	82 616819/244543	45.3	46.7	40.6	40.1	40.8	39.4	42.1	43.3	48.4	49.7	52.3	56.3	12	39.4	56.3	45.4	36.3	**49.1**
Bond Street o/s No. 29		(K)	83 616788/244497	46.3	38.9	46.2	35.8	30.7	33.2	32.7	31.4	39	44	43.2	43.5	12	30.7	46.3	38.7	31.0	**41.8**
Carr Street/Majors Corner		(K)	84 616697/244595	46.5	36.3	41.6	30.4	28.7	32.5	29.1	30.2	39.2	37.9	42.6	36.9	12	28.7	46.5	36.0	28.8	38.9
Old Foundry Road o/s No. 5		(K)	85 616677/244622	47.8	43.8	39.3	31.8	32.9	33.2	31	35.1	37.4	40.9	48	41.2	12	31	48	38.5	30.8	**41.6**
	Special Project Tubes - Bramford Road - Commenced November 2013																				
Bramford Road Location 1		B	B1 613268/245948											29.9	22.1	2	22.1	29.9	26.0		
Bramford Road Location 2		B	B2 613274/246019											26	24.7	2	24.7	26	25.4		

2012

Diffusion Tube Data			Grid																	
Street	**Post Code**	**Locn.**	**Ref x/y**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Count**	**Min**	**Max**	**Mean**	**Bias**
																				National 0.
Civic Drive		(K) 1	615999/244399	36.4	42.1	45.9	21.6	24.5	25.5	29.8	32.1	34.7	38.4	38.6	38.7	12	21.6	45.9	34.025	26.9
Chevallier St o/s No's 6 to 8		(K) 2	615142/245242	52.1	58	62.3	53.6	42.2	47.9	50.7	57.2	5.1	51.6	51.7	48.2	12	5.1	62.3	48.38333	38.2
Dock Street		(K) 3	616379/243894	45.1	46.5	46.4	35.1	32.8	24.5	31.7	30.5	38.3	39.3	45.3	44.5	12	24.5	46.5	38.33333	30.3
Berners Street o/s No. 31		(K) 4	615923/244923	57.5	49.1	49.7	47.1		33.9	41.4	49.4	51.1	54.3	56.5	43.5	11	33.9	57.5	48.5	38.3
Fore Street		(K) 5	616860/244147	49.2	50.5	57.2	48.1	36.9	39.7	47.1	46.3	49.5	54.8	51.1	53.8	12	36.9	57.2	48.68333	38.5
Kings Avenue		(B) 6	617299/244412	26.3		31.5	20.8	54.2	13.7	14.5	19.9	20.6	27.7	25	49.4	11	13.7	54.2	27.6	21.8
Bramford Road o/s No 205		(K) 7	615004/245237	50	43.4	49.6	40.9	15.9	35.4	38.8	42.8	43.6	46.8	44.4	58	12	15.9	58	42.46667	33.5
Bramford Road o/s No 122		(K) 8	615133/245201	49.7	47.7	49.6	42.7	36.6	34.5	34.8	35.8	39.5	45.4	43.8	44	12	34.5	49.7	42.00833	33.2
Bramford Road o/s No 122		(K) 9	615133/245201	49.8	51.4	52.2	45	40.9	37.8	31.6	36.5	40.5	47	47	49.7	12	31.6	52.2	44.11667	34.9
Bramford Road o/s No 122		(K) 10	615133/245201	44.6	49.7	49	43.9	38.3	32.1	28.3	34.3	37.9	42.9	45.7	45.6	12	28.3	49.7	41.025	32.4
St Margaret's Street		(K) 11	616578/244759				51.3	38.8	43	55.3	58.1	55.9	56.9	62.1	71.1	9	38.8	71.1	54.72222	**43.2**
St Marg St co locat		(K) 12	616578/244759				54.5	43.1	49	54	65.5	64	54.1	62.7	63.7	9	43.1	65.5	56.73333	**44.8**
Valley/Norwich Road		(K) 13	615361/245436	47.7	47.2	46.1	46	41.4	39.4	46.2	53.4	57.3	51.9	52.4	46.9	12	39.4	57.3	47.99167	37.9
Chevalier Street		(K) 14	615283/245391	64	72.9	72.4	70.1	36.1	51	61.4	57	64.8	67.8	43	61.9	12	36.1	72.9	60.2	**47.6**
Cornhill o/s No 17		(B) 15	616277/244641	41.8	39.1	44	29.4	66.8	24.1	24.2	28.2	36.5	31	41.8	38.7	12	24.1	66.8	37.13333	29.3
Valley/Norwich Road		(K) 16	615361/245436	38.5	52.8	53.7	44	24.5	40.3	33.9	46.5	47.8	53.5	51.6	48.1	12	24.5	53.7	44.6	35.2
Chevallier Street		(K) 17	615283/245391	68.5	68	79.9	69.1	36.5	56.1	43.2	55.9	57.9	65.8	61.3	87.7	12	36.5	87.7	62.49167	**49.4**
Yarmouth Rd o/s flat 2 No 5		(K) 18	615092/245137	43.4	48.5	43.7	37.1	53.1	27.7	44.6	30	40.9	44.4	31.8	34.7	12	27.7	53.1	39.99167	31.6
St Marg St co locat		(K) 19	616578/244759				52.8	33	53.3	52	63.9	56.5	57.7	62.2	69.7	9	33	69.7	55.67778	**44.0**
St Margaret's Plain/Fonnereau		(K) 20	616455/244824	33	43.4	23.6	37.4	41.8	32.6	37.4	39.3	41.9	39.2	41.4	43.9	12	23.6	43.9	37.90833	29.9
St Margaret's Plain		(K) 21	616490/244806	31.2	47.2		50.2	31.1	42.7	42.6	45.2	55.9	52.1	54.8	67.5	11	31.1	67.5	47.31818	37.4
St Margaret's Plain/Northgate		(K) 22	616477/244790	50.1	49.3	28.9	46.2	43.6		49.9	43.9	43.2	49.9	51.1	53.6	11	28.9	53.6	46.33636	36.6
St Margarets Green		(K) 23	616641/244781	40.1	36.3	19.5	27.9	42.1	26.6	27.1	29.2	31.9	33.4			10	19.5	42.1	31.41	24.8
St Margaret's Street		(K) 24	616659/244689	55.1	51.8	30.3	53.4	27	38.8	42	56.3	48.1	63.2	62.9	64.8	12	27	64.8	49.475	39.1
St Helen's Street		(K) 25	616750/244578	58	60.3	33.4	53.7	45.3	46	53.7	56.7	56.8	59	61.9	68.5	12	33.4	68.5	54.44167	**43.0**
St Helen's St/Grimwade Street		(K) 26	616968/244510	47.9	48.1	25.4	39.5	43.6	32.6	30.7	37.8	38.1	46.4	44.7	47.4	12	25.4	48.1	40.18333	31.7
St Helen's St/Argyle Street		(K) 27	616961/244/536	67.7	63.1	33	46.9	40.3	43	48.4	54	57.5	59.1	61.8	65.4	12	33	67.7	53.35	**42.1**
Chevallier St o/s Nos 32/34		(K) 28	615192/245289	53	44	48.9	45.6	46.5	45.4	40.9	55	44.7	49.7	58.6	53.2	12	40.9	58.6	48.79167	38.5
Fore Hamlet		(K) 29	617102/244077	49.1	48.4	46.3	44.5	34.4	29.8	30	32.9	38.3	45.9	42.9	50	12	29.8	50	41.04167	32.4
Fore Street		(K) 30	616963/244106	42.7	44	43.4	35.1	35.5	25.6	29.7	39.2	37.8	44.2	40.6	45.5	12	25.6	45.5	38.60833	30.5
Star Lane opp St Peters St		(K) 31	616336/244133	36.3	53.5	47.9	42.3	29.3	36.6	42.2	44.1	40.2	45.1	39.2	50.9	12	29.3	53.5	42.3	33.4
Star Lane co locate as 31		(K) 32	616336/244133	42.6	46.7	48.2	44	41.6	39.5	46.8	47.3	40.7	42.4	45.7	55.5	12	39.5	55.5	45.08333	35.6
Star Lane co locate as 31		(K) 33	616336/244133	45.5	42.7	51.3	37.3	41	38.2	33.5	42.6	39.9	42.9	47.3	40.1	12	33.5	51.3	41.85833	33.1
College Street		(K) 34	616466/244072	56.3	58	53.5	53.4	37.7	41.1	45.8	57	49.9	54.1	62.1	70	12	37.7	70	53.24167	**42.1**
Cobden Place		(K) 35	616743/244692	40.3	39.2	38.9	32.3	39.2	30	33	36.1	33.9	38.9	39.9	46.5	12	30	46.5	37.35	29.5
Franciscan Way/Wolsey St		(K) 36	616153/244242	51.3	45.8	45.9	38.3	25.8	27.1	28.6	34.8	37.6	39.3	45.9	50.9	12	25.8	51.3	39.275	31.0
Lower Brook Street		(K) 37	616480/244163	37.4	41.7	38.3	30.8	30.2	23.6	23.6	30	29.6	30	43.1	29.7	12	23.6	43.1	32.33333	25.5
Civic Drive by Victoria PH		(K) 38	615898/244789	38.8	40.4	45.9	44.6	26.4	37.5	45.5	44.3	42.6	49.2	51.9	51.6	12	26.4	51.9	43.225	34.1
Star Lane/Fore Street		(K) 39	616730/244246	70.4	63.4	53.3	49.6	41.3	40.9	39.9	50.3	49.5	55.6	67.7	65.1	12	39.9	70.4	53.91667	**42.6**
Norwich Road o/s No. 131		(K) 40	615457/245144	45.4	42.1	38.9	36.4	39.5	25.1	27.5	29.1	28.3	38	43.9	45.2	12	25.1	45.4	36.61667	28.9
Norwich Road o/s No. 69		(K) 41	615562/245008	51.2	51.4	45.2	37.1	28.8	35.6	47	54.4	50.3	49.1	56.6	52.5	12	28.8	56.6	46.6	36.8
Norwich Road between 8 &10		(K) 42	615741/244899	57.6	48.1	60.2	55.4	41	33.6	36.1	38.4	39.7	48.4	46.5	56	12	33.6	60.2	46.75	36.9
Yarmouth Rd/Bramford Road		(K) 43	615107/245197	53.7		55.7	49.1	47.4	42.6	48	48.8	48.8	52.6	51.7	56.7	11	42.6	56.7	50.46364	39.9
Bramford Road		(K) 44	615049/245234	59.5	61	58	52.1	45.5	35.4	37.8	39.9	48.1	51	55.3	59.2	12	35.4	61	50.23333	39.7
Chevallier Street		(K) 45	615257/245349	45.7	44.2	45	38	45.2	28.3	34.1	32.9	34.5	42	41.9	44.1	12	28.3	45.7	39.65833	31.3
Chevallier Street - co locate		(K) 46	615257/245349	42.5	45.5	41.9	39.9	32.3	30	31.5	32.7	34.2	37.7	41.4	49	12	30	49	38.21667	30.2
Chevallier Street - co locate		(K) 47	615257/245349	43.6	43.8	44.4	41.2	33.2	33.3	32	32.4	34.5	43.1	40	40	12	32	44.4	38.45833	30.4
Norwich Road/Anglesea Road		(K) 48	615397/245337	44.3	45.8	41.8	37.2	31.9	25.6	29.3	29	33	35.9	37.3	36.2	12	25.6	45.8	35.60833	28.1
St Matthews Street		(K) 49	615803/244872	53.2	58.1	63.8	53.6	33.9	21.9	46	46.3	46.2	57.7	52.3	48.8	12	21.9	63.8	48.48333	38.3
Barrack lane/St Matthews St		(K) 50	615758/244885	47.6	37.7	41.5	33.4	56		26.5	31.5	34.3	41.8	42.4	36.1	11	26.5	56	38.98182	30.8
St Matthews St/Portman Rd		(K) 51	615765/244865	51.7	50.8	52.4	37.8	23.9	34	33.5	36.3	40	46.2	53.2	48.8	12	23.9	53.2	42.38333	33.5
St Matthews St o/s No. 60		(K) 52	615822/244869	72.8	72.3	56.8	65.8	36.6	45.7	49.5	54.8	58.4	65.7	70.2	61.4	12	36.6	72.8	59.16667	**46.7**
St Matthews St o/s No. 67		(K) 53	615817/244856	63.9	63.5	62.4	59.9	55.9	56.5	55	62.7	46.1	64.1	78.3	30.1	12	30.1	78.3	58.2	**46.0**
St Matthews St/Berners St		(K) 54	615891/244863	49	43.1	41.7	34.4	52.2	40.5	38.2	38.7	38	43.7	48.8	57.6	12	34.4	57.6	43.825	34.6
Berners St o/s No. 21		(K) 55	615912/244893	53.2	37.4	46.4	41.3	38.2	29.3	30.7	31.7	42.5	47.2	44.9	59.2	12	29.3	59.2	41.83333	33.0
Berners St o/s No. 32		(K) 56	615928/244908	42.7	49.8	44.9	38.2	30.8	30.5	27.4	38	44.4	48.1	48.7	47.5	12	27.4	49.8	40.91667	32.3
Berners St o/s No. 41-43		(K) 57	615936/244977	47	41.6	41.5	36.4	26.1	20.5	27.6	29.2	38.4	39.6	45.5	60.5	12	20.5	60.5	37.825	29.9
Berners St o/s No. 58		(K) 58	615975/245034	46.3	44.1	39.5	33	25.9	21.3		28.4	32.8	39.1	39.4	35.2	11	21.3	46.3	35	27.7
St Matthews St rbt co-locate		(K) 59	615921/244841	48.4	53.2	55.7	38.4	34.3	31.8	35.2	40.4	46	50.2	56.5	54	12	31.8	56.5	45.34167	35.8
St Matthews St rbt co-locate		(K) 60	615921/244841	58.9	48.6	53.1	45.2	37.6	32.3	34.4	38.4	48.1	55.8	57	34.3	12	32.3	58.9	45.30833	35.8
St Matthews St rbt co-locate		(K) 61	615921/244841	56.5	50	49.8	36.2	34.5	33.1	36.4	42.3	46.3	46.1	53.3	57.3	12	33.1	57.3	45.15	35.7
St Matthews St o/s No. 27		(K) 62	615926/244804	47.1	45.6	54.4	35.4	38.8	39.2	50.6	53.1	47.9	54.7	60.6	57	12	35.4	60.6	48.7	38.5
St Matthews St o/s No. 19		(K) 63	615952/244785	53.7	49.5	55.6	48.7	35.2	37.9	52.5	51.2	51.3	54.9	56.6	48.9	12	35.2	56.6	49.66667	39.2
Norwich Rd btwn No's. 13/15		(K) 64	615686/244936	79.1	79.6	76.8	72	56.2	53.4	72.4	78.2	78.2	70.2	85.7	91.9	12	53.4	91.9	74.475	**58.8**
Norwich Rd btwn No's. 13/15		(K) 65	615686/244936	70.1	80.3	89.4	80.2	60.7	59.8	63.3	68.8	46.5	80.8	81.3	81	12	46.5	89.4	71.85	**56.8**
Woodbridge Rd o/s No 30A		(K) 66	616804/244667	58.8	50.1	57.3	51.7	41.1	41	52	51.3	67.2	52.2	54.4	43.8	12	41	67.2	51.74167	**40.9**
Woodbridge Rd/Blanche St		(K) 67	616886/244672	43.5	37	44.6	35.6	27.2	29.3	31.1	41.1	38.8	40.8	50.6	23.7	12	23.7	50.6	36.94167	29.2
Woodbridge Rd o/s No. 62		(K) 68	616901/244655	76.1	59.7	66.2	47	50.9	55.1	54.8	55.3	59.6	63	63.8	68	12	47	76.1	59.95833	**47.4**
Argyle Street o/s Nos. 2-4		(K) 69	616974/244589	42.4	40.3	43.6	35.4	28	23.7	24.9	30.3	36.1	39.9	41.8	22.6	12	22.6	43.6	34.08333	26.9
Argyle Street o/s No. 11		(K) 70	616962/244572	63.2	55.6	50.2	47.6	34.2	37.9	37.8	41.5	48.3	54.2	58	53.2	12	34.2	63.2	48.475	38.3
St Helens Street o/s No. 93		(K) 71	617027/244536	50.8	40.4	36.8	34.2	53.2	25.9	26.2	25.9	35.2	40	38.8	48.9	12	25.9	53.2	38.025	30.0
St Helens St o/s No. 125		(K) 72	617119/244534	55.9	61.8	59.2	51.7	43.4	47.1	33.9	41.6	49.3	56.5	49.1	62.8	12	33.9	62.8	51.025	**40.3**
Regent St/St Helens St		(K) 73	617120/244518	47	41.6	42.4	32.2	25.9	26.5	26.4	25.7	30.2	36.3	33.4	46.1	12	25.7	47	34.475	27.2
Grimwade St o/s No. 25		(K) 74	616948/244438	47.1	37.8	49.3	40.1	29.7	27.8	25.4	30.6	33.9	41.8	39.1	43.9	12	25.4	49.3	37.20833	29.4
Grimwade St o/s No. 28		(K) 75	616928/244360	39.2	40.9	33.8	29.9	24.8	22.7	29.2	36.9	31.1	33.2	40.7	45.1	12	22.7	45.1	33.95833	26.8
St Helens St/Grimwade St 44		(K) 76	616948/244518	58	51.2	55.7	49.3	42.3	40.7	40.8	47	50.1	49.6	39	55.1	12	39	58	48.23333	38.1
St Helens St - Albury Ct		(K) 77	616899/244539	54.5	44.8	45.7	38.7	30.4	28.6	21.1	37.3	36.6	39.8	38.6	41.1	12	21.1	54.5	38.1	30.1
Orchard St o/s No. 7		(K) 78	616867/244583	46.1	39.8	35.2	29.9	20.2	26.5	20.4	27.2	31.4	35.6	39.5	41	12	20.2	46.1	32.73333	25.9
Orchard St - co-locate		(K) 79	616867/244583	44.3	42.4	40.5	32.1	24.9	26.1	24.7	33.5	33.1	34.6	39.7	49.3	12	24.7	49.3	35.43333	28.0
St Helens St - County Hall		(K) 80	616819/244543	54.7	50.6	51.4	45.4	36.6	46.1	45.3	63	53.3	51	36.4	47.1	12	36.4	63	48.40833	38.2
St Helens St - co-locate		(K) 81	616819/244543	53.4	51.1	51	46.9	36.3	41.5	44.1	59.3	54.4	49.8	58.5	65.5	12	36.3	65.5	50.98333	**40.3**
St Helens St - co-locate		(K) 82	616819/244543	55.5	49.6	50.2	45	38.3	41	46.9	57.3	54.9	51.8	45.9	62.9	12	38.3	62.9	49.94167	39.5
Bond Street o/s No. 29		(K) 83	616788/244497	47	42.6	49.8	40	33.8	29.8	34.3	39.5	36.6	44.1	39.5	51.3	12	29.8	51.3	40.69167	32.1
Carr Street/Majors Corner		(K) 84	616697/244595	45.9	42.8	44.8	36.5	30.5	26.8	29		34.6	39.3	39.3	56.4	11	26.8	56.4	38.71818	30.6
Old Foundry Road o/s No. 5		(K) 85	616677/244622	49.3	47.1	46.9	40.3	33	29.2	33.5	39.3	40.4	44.4	43.3	64.3	12	29.2	64.3	42.58333	33.6

2011

Diffusion Tube Data			Grid																						
Street	**Post Code**	**Locn.**	**Ref x/y**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Count**	**Min**	**Max**	**Mean**	**Bias**		
																				National	**Local**	
Civic Drive		(K)	1 615999/244399	38.1	44.2	42.2	39	29.3	27.9	21.7	28.8	30.2	43.1	47.3	36	12	21.7	47.3	35.7	29.9	29.2	
Chevallier St o/s No's 6 to 8		(K)	2 615142/245242	62.3	65.8	55.8	50	49.7	54.7	46.7	46.5	53.4	65.2	66.9	46.2	12	46.2	66.9	55.3	**46.4**	**45.3**	
Dock Street		(K)	3 616379/243894	52.4	48.3	38.7	43.6	31.3	34.8	30.3	33.2	35	40.4	43.4	35.2	12	30.3	52.4	38.9	32.7	31.9	
Berners Street o/s No. 31		(K)	4 615923/244923	58.1	53.6	46.7	49	35.2	45.8	33.4	39.6	43.9	49.4	57.1	52.5	12	33.4	58.1	47.0	39.5	38.6	
Fore Street		(K)	5 616860/244147	56.1	53.3	50	57.7	40.7	43.6	38.2	43.7	44.3	48.3	55.1	44.4	12	38.2	57.7	48.0	**40.3**	39.3	
Kings Avenue		(B)	6 617299/244412	30.9	32.1	19.3	21.5	12.7	14.5	10.3	14.5	17.3	21	32.4	19.8	12	10.3	32.4	20.5	17.2	18.3	
Nacton Road		(K)	7 618974/242291	40.1		38.6	28.4	16.9	20.6	19.7	22.3	Tube Removed from September onwards				7	16.9	40.1	26.7	22.4	21.9	
Nacton Rd/A14 junct		(K)	8 620078/241263	33.8	37.7	41.2	28.1	17.2	26.1	20.9	22.2	Tube Removed from September onwards				8	17.2	41.2	28.4	23.9	23.3	
Nacton Rd/A14 junct		(K)	9 620078/241263	36	42.3	42.6	29	20.7	26.9	19.5	25	Tube Removed from September onwards				8	19.5	42.6	30.3	25.4	24.8	
Woodbridge Rd East		(K)	10 619294/245109	41.6	34.9	34.4	34.6	23.2	25.6	21.8	23.6	Tube Removed from September onwards				8	21.8	41.6	30.0	25.2	24.6	
St Margaret's Street		(K)	11 616578/244759	58	64	52	56	44.5	54		49.3					7	44.5	64	54.0	**45.3**	**51.8**	(0.96 based on AEA Ltd data)
St Marg St co locat		(K)	12 616578/244759	53.4	54.8	53.3	58.1	50.6	51.5	43.9	49.3					8	43.9	58.1	51.9	**43.6**	**49.8**	(0.96 based on AEA Ltd data)
Valley/Norwich Road		(K)	13 615361/245436	51.8	56.9	49	48.4	42.5	40.1	29.1	46.1	49.6	56.2	56.4	54.5	12	29.1	56.9	48.4	**40.6**	39.7	
Chevalier Street		(K)	14 615283/245391	82.1	71.4	66.8	63.6	37.4	52	42.9	56.3	56	61.8	78	38.1	12	37.4	82.1	58.9	**49.4**	**48.3**	
Cornhill o/s No 17		(B)	15 616277/244641	56.3	45.7	40.6	30.9	24.6	28.6	22.4	27.6	30.5	38.2	47.4	32.2	12	22.4	56.3	35.4	29.8	29.0	
Valley/Nonwich Road		(K)	16 615361/245436	52.6	54.1	46.4	50.4	43.7	44.5	36.1	40.2	53.8	49.6	55.7	39.6	12	36.1	55.7	47.2	39.7	38.7	
Chevallier Street		(K)	17 615283/245391	85.1	73.3	74.2	73.7	55	60.4	53.4	53.5	56.3	61.7	67	61.3	12	53.4	85.1	64.6	**54.2**	**53.0**	
Norwich/Blenheim Road		(K)	18 615269/245460	41.6	44.1	42.3	33.4	24.6	28.3	26.9	23.9	Tube Removed from September onwards				8	23.9	44.1	33.1	27.8	27.2	
St Marg St co locat		(K)	19 616578/244759	48.3	60.7	48.8	57.5	45	52.6	41.8	49.5					8	41.8	60.7	50.5	**42.4**	**48.5**	(0.96 based on AEA Ltd data)
St Margaret's Plain/Fonnereau		(K)	20 616455/244824	45	49	42.1	43.8	38.7	41	32.6	36.4	43.3	48.5	49.9	53.9	12	32.6	53.9	43.7	36.7	35.8	
St Margaret's Plain		(K)	21 616490/244806	50.5	52.5	50	44.4		43.6	35.6	40.3	41.9	45.7	52.8	44.4	11	35.6	52.8	45.6	38.3	37.4	
St Margaret's Plain/Northgate		(K)	22 616477/244790	58.2	57.9	55.8	53.6	43	39.1	37.2	41.9	42.9		59.5	44.9	11	37.2	59.5	48.5	**40.8**	39.8	
St Margarets Green		(K)	23 616641/244781	39.7	37.9	35.9	27.1	27.2	24.2	19.1	25.6	27.2	34.4	34	23.9	12	19.1	39.7	29.7	24.9	24.3	
St Margaret's Street		(K)	24 616659/244689	59.6	60.7	52.4	54.8	42.1	48.4	36.1	47	49.7	59.3	59.4	49.9	12	36.1	60.7	51.6	**43.4**	**42.3**	
St Helen's Street		(K)	25 616750/244578	63.6	62.5	56.9	60.6	45	51.7	40.1	47.6	56.6	60	63.1	55.7	12	40.1	63.6	55.3	**46.4**	**45.3**	
St Helen's St/Grimwade Street		(K)	26 616968/244510	53.8	52	57.6	47.5	36.4	39.4	30.7	36.1	40.4	42.3	51.3	32.3	12	30.7	57.6	43.3	36.4	35.5	0.89 (based on Cliff Lane)
St Helen's St/Argyle Street		(K)	27 616961/244/536	72.7	68.4	59	47.4	42.8	49.7	37	46.1	54.7	59.7	66	61.8	12	37	72.7	55.4	**46.6**	**45.5**	Kings Avenue
St Helen's St/Dove Street		(K)	28 617023/244508	44.8	39.1	41.4	31.8	24.1	25	21.9	26.8	Tube Removed from September onwards				8	21.9	44.8	31.9	26.8	26.1	Cliff Lane triplicate tubes
Fore Hamlet		(K)	29 617102/244077	58.6	48.7	54.2	39.7	28.8	31.4	31.6	29.1	32.4	39.5	50.9	35.2	12	28.8	58.6	40.0	33.6	32.8	Berners St (top end away from junction with St. Matthews St)
Fore Street		(K)	30 616963/244106	44	42.9	44.3	37.4	24.1	32.2	25.1	27.8	32	42.5	48.9	32.9	12	24.1	48.9	36.2	30.4	29.7	
Star Lane opp St Peters St		(K)	31 616336/244133	51.7	54.3	56.5	44.3	37.3	38.5	34.5	38.5	40.4	49.6	52.2	38.4	12	34.5	56.5	44.7	37.5	36.7	
Star Lane co locate as 31		(K)	32 616336/244133	36.2	37.7	56.9	53.1	39.2	38.2	31.7	38.1	41.1	50.5	58.4	37.5	12	31.7	58.4	43.2	36.3	35.4	37.7
Star Lane co locate as 31		(K)	33 616336/244133	52.6	55.1	55.7	53.3	30.8	36.2	36.6	37.3	40.9	43.6	55.8	41.2	12	30.8	55.8	44.9	37.7	36.8	Local:
College Street		(K)	34 616466/244072	54.1	58.1	51.6	51.7	44.2	52.6	35.8	44	48.6	59.8	60.2	51.5	12	35.8	60.2	51.0	**42.9**	**41.8**	0.82(based on Chev. St)
Cobden Place		(K)	35 616743/244892	28	43.3	32.7	34	27.7	34.3	21.7	28.5	33	41.5	46	36.2	12	21.7	46	33.9	28.5	27.8	All except those listed under Cliff Lane and St Margarets St
Franciscan Way/Wolsey St		(K)	36 616153/244242	51.9	47.2	44.8	43.5	28.7	35.5	25.7	33	33.6	42.1	53.8	35	12	25.7	53.8	39.6	33.2	32.4	
Lower Brook Street		(K)	37 616480/244163	41.8	42.7	39.3	38.8	24.5	28.5	21.5	28	29.1	37.5	46.3	27.6	12	21.5	46.3	33.8	28.4	27.7	
Civic Drive by Victoria PH		(K)	38 615898/244789	52	49.9		52.1	32.8	40.8	38.1	35.3	37.8	47.4	58.5	32.7	11	32.7	58.5	43.4	36.5	35.6	
Star Lane/Fore Street		(K)	39 616730/244246	8.5	68.7	64.9	49	46.6	47.2	32.9	47.1	50.7	60.4	68.4	58.4	12	8.5	68.7	50.2	**42.2**	**41.2**	
Cliff Lane Primary School		(B)	40 617531/243134	28.5	30.9	25.2	25.1	14.6	17.5	12.7	14.5	19.7	26.8	36.6	25.3	12	12.7	36.6	23.1	19.4	20.6	
Cliff Lane Primary School		(B)	41 617531/243134	31.3	30.7	26.5	24.4	16.1	16.9	13.3	15.4	20.1	28	32.9	24.9	12	13.3	32.9	23.4	19.6	20.8	
Cliff Lane Primary School		(B)	42 617531/243134	17.1	32.7	24.2	26.4	17.4	17.6	11.7	13.2	21.2	26.3	34	25.6	12	11.7	34	22.3	18.7	19.8	
Yarmouth Rd/Bramford Road		(K)	43 615107/245197	58.2	57.8	45.2	57.9	43	44.5		45.6	49.8	55	49.4	49.6	11	43	58.2	50.5	**42.5**	**41.4**	
Bramford Road		(K)	44 615049/245234	64.8	57.9	53.1	45.2	34.5	40.8	34.7	40.4	41.5	54.1	62.1	46.7	12	34.5	64.8	48.0	**40.3**	39.3	
Chevallier Street		(K)	45 615257/245349	50	48.3	46.4	42.6	24.3	38.4	26.5	30.7	34.6	41.8	47.9	32.5	12	24.3	50	38.7	32.5	31.7	
Chevallier Street - co locate		(K)	46 615257/245349	49.1	44.9	44.3	34.9	30.7	36.1	25.8	32.6	35.5	42.8	49.1	36	12	25.8	49.1	38.5	32.3	31.6	
Chevallier Street - co locate		(K)	47 615257/245349	50.6	45.6	43.5	42.3	27.1	31.4	28.4	32.5	36.5	39.7	49.3	34.3	12	27.1	50.6	38.4	32.3	31.5	
Norwich Road/Anglesea Road		(K)	48 615397/245337	44.6	41.6	38.8	37	28.5	29.2	26.8	28.1	30.2	38.6	44.9	33.7	12	26.8	44.9	35.2	29.5	28.8	
St Matthews Street		(K)	49 615803/244872	66.5	56	70.7	50.1	41.7	37.5	46.7	39.5	42.6	58.4	67	38.8	12	37.5	70.7	51.3	**43.1**	**42.1**	
Barrack lane/St Matthews St		(K)	50 615758/244885		46.9		30.7	23.6	27.2	19.7	30	33.5	40.6	47.1	40.5	10	19.7	47.1	34.0	28.5	27.9	
St Matthews St/Portman Rd		(K)	51 615765/244865	61.6	62.2	60.6	39.4	35.3	30.1	31.6	33.9	39.4	50.3	70.2	30.4	12	30.1	70.2	45.4	38.2	37.2	
St Matthews St o/s No. 60		(K)	52 615822/244869	73.5	69.7	72.6	60.4	43.7	49.6	39.5	53.5	52.7	67.2	71.8	52.3	12	39.5	73.5	58.9	**49.5**	**48.3**	
St Matthews St o/s No. 67		(K)	53 615817/244856	64.3	73.3	58.3	63.9	47.8	58.9	40.7	48.6	62.6	66.7	73.2	62.5	12	40.7	73.3	60.1	**50.5**	**49.3**	
St Matthews St/Berners St		(K)	54 615891/244863	47.5	49.5	46.2	41.3	29.3	33.4	25.4	31.6	34.2	39.9	54.5	38.7	12	25.4	54.5	39.3	33.0	32.2	
Berners St o/s No. 21		(K)	55 615912/244893	58.8	51.1	44.2	31.5	21.8	34.5	26.2	31	35.5	42.4	48.6	34.5	12	21.8	58.8	38.3	32.2	31.4	
Berners St o/s No. 32		(K)	56 615928/244908	49.8	50.3	48.9	34.5	33.4	31	23.4	26.1	38.1	44.9	52.6		11	23.4	52.6	39.4	33.1	32.3	
Berners St o/s No. 41-43		(K)	57 615936/244977	45.6	45	36.2	33.6	24.4	27.7	17.7	26.7	32.6	37.8	45.9	37.1	12	17.7	45.9	34.2	28.7	30.4	
Berners St o/s No. 58		(K)	58 615975/245034	44.9	49.7	36.5	33.3	22.8	25	17.3	24.8	31.3	40.1	57.3	28.4	12	17.3	57.3	34.3	28.8	30.5	
St Matthews St rbt co-locate		(K)	59 615921/244841	62.2	53.6	47.9	39.8	34.4	39.6	27.2	37	43.7	52.6	55.5	51.3	12	27.2	62.2	45.4	38.1	37.2	
St Matthews St rbt co-locate		(K)	60 615921/244841	55.7	54.7	52.2	40.7	28.8	41.5	19.6	40.7	45.2	51	53.5	46.6	12	19.6	55.7	44.2	37.1	36.2	
St Matthews St rbt co-locate		(K)	61 615921/244841	57	50.4	43.2	45.5	27	36.8	25.8	34.4	41	50.7	51.2	45	12	25.8	57	42.3	35.6	34.7	
St Matthews St o/s No. 27		(K)	62 615926/244804	56.5	58.7	52	45.6	47.1	52.4	32.1	45.7	54.2	58.7	61.7	49.8	12	32.1	61.7	51.2	**43.0**	**42.0**	
St Matthews St o/s No. 17		(K)	63 615955/244783	71.8	73.1	64	65.2	49.5					57.2	60.6	52.4	8	49.5	73.1	61.7	**51.8**	**50.6**	
St Georges St/St Matthews St		(K)	64 616006/244798	45.2	42.7	39.4	35.3	23.8	27.4	17.8	21.7	29.2	37.3	44.5		11	17.8	45.2	33.1	27.8	27.2	
St Georges St - co-locate		(K)	65 616006/244798	42.1	42.4	38	38.4	23.1	26	18.4	24.8	28	37.5	48.3		11	18.4	48.3	33.4	28.0	27.4	
Woodbridge Rd o/s No 30A		(K)	66 616804/244667	49.3	57.2	51.7	54.9	43.5	46.6	36.5	46.1	54.8	58.7	57.1	52.4	12	36.5	58.7	50.7	**42.6**	**41.6**	
Woodbridge Rd/Blanche St		(K)	67 616886/244672	43.8	50.3	46	44.8	29.9	33.1	24.2	31.7	36.9	48.3	53.4	36.4	12	24.2	53.4	39.9	33.5	32.7	
Woodbridge Rd o/s No. 62		(K)	68 616901/244655	71.6	61	67.2	64.1	46.6	48.7	45.2		55.1	66.7	70.1	54.7	11	45.2	71.6	59.2	**49.7**	**48.5**	
Argyle Street o/s Nos. 2-4		(K)	69 616974/244589	49.6	46	47	35.1	26.1	32.3	23.5	26.9	28.5	39.8	46.9	37.4	12	23.5	49.6	36.6	30.7	30.0	
Argyle Street o/s No. 11		(K)	70 616962/244572	58.3	54	50.7	39.9	24.7	38.6	27.2	37.4	44.9	48.3	54.8	45.8	12	24.7	58.3	43.7	36.7	35.8	
St Helens Street o/s No. 93		(K)	71 617027/244536	43.2	39.6	36.5	30.8	21	25.1	21.3	25.9	27.8	29.6	38.6	31.2	12	21	43.2	30.9	25.9	25.3	
St Helens St o/s No. 125		(K)	72 617119/244534	62	55.6	49.7	43.7	31.7	42.2	34.7	38.8	42.3	52	57.4	54.6	12	31.7	62	47.1	39.5	38.6	
Regent St/St Helens St		(K)	73 617120/244518	37.7	36	36.1	32.2	17	24.7	19.4	23.9	25.5	36	43.1	33.6	12	17	43.1	30.4	25.6	25.0	
Grimwade St o/s No. 25		(K)	74 616948/244438	47.5	48.6	47.9	38.4	23.9	27.7	22.2	29.5	32.8	37.2		35.6	11	22.2	48.6	35.6	29.9	29.2	
Grimwade St o/s No. 28		(K)	75 616928/244360	34.3	40.1	38.5	33.2	18.4	26.4	17.5	24.1	30.5	35.5	44	26.7	12	17.5	44	30.8	25.8	25.2	
St Helens St/Grimwade St 44		(K)	76 616948/244518	56.2	55.6	56.3	51.1	36.4	43		42	47.5	55.5	44.8	49.1	11	36.4	56.3	48.9	**41.0**	**40.1**	
St Helens St - Albury Ct		(K)	77 616899/244539	50.6	45.1	52	35.1	29	31.6		28.1	32.3	37.5	47.7	36.4	11	28.1	52	38.7	32.5	31.7	
Orchard St o/s No. 7		(K)	78 616867/244583	45.7	45.2	40.7	30	20.2	22.9	19.1	25.4	31.2	37.5	41.5	40.8	12	19.1	45.7	33.4	28.0	27.3	
Orchard St - co-locate		(K)	79 616867/244583	43.6	42.2	39.4	34.5	20.8	26.8	15.6	22.9	26.4	32.7	43.8	30.4	12	15.6	43.8	31.6	26.5	25.9	
St Helens St - County Hall		(K)	80 616819/244543	46.5	55.1	50.9	50.4	43.7	42.1	36.2	40.9	52	54.5	55.7	52.5	12	36.2	55.7	48.4	**40.6**	39.7	
St Helens St - co-locate		(K)	81 616819/244543	52.6	54	51.6	50.1	34.6	42.4		85.9	48.8	55.1	57.3	46.5	11	34.6	85.9	52.6	**44.2**	**43.2**	
St Helens St - co-locate		(K)	82 616819/244543	48.3	54	52.1	52.3	41.7	41.5	35.6	43.9	51.2	58.2	57.1	49.9	12	35.6	58.2	48.8	**41.0**	**40.0**	
Bond Street o/s No. 29		(K)	83 616788/244497	47.6		52.2	41.8	29.9	33	29.1	30.4	33.1	45.5	53.8	35.7	11	28.9	53.8	39.2	32.9	32.1	
Carr Street/Majors Corner		(K)	84 616697/244595	45.5	43	41.3	37	27.5	25.2	28.7	25.5	31.3	39.2	48.1	33	12	25.2	48.1	35.4	29.8	29.1	
Old Foundry Road o/s No. 5		(K)	85 616677/244622	46.1	48.6	39.8	38.6	26.6	31.5	33.1	33.7	34.7	49.3	48.8	44.3	12	26.6	49.3	39.6	33.3	32.5	
Bramford Road o/s No 170		(K)	86 615004/245257	47.6	44.6	44.3	32.1	19.7	28	20.4	24	Tube Removed from September onwards				8	19.7	47.6	32.6	27.4	26.7	
Bramford Road o/s No 205		(K)	87 615004/245237	55.3	54.4	47.3	50.5	34.2	41.7	35.4	35.9	44.6	49.9	53.2	39.5	12	34.2	55.3	45.2	37.9	37.0	
Yarmouth Rd o/s flat 2 No 5		(K)	88 615092/245137	52.6	43.7	41.9	34.4	29.3	32.1	34.9	34.9	19	34.7	41.6	33.4	12	19	52.6	36.0	30.3	29.6	
Bramford Road o/s No 122		(K)	89 615133/245201	57.2	50.7	48.6	44.7	32.8	39.8	38.3	34.9	32.3	46.1	54.4	35.8	12	32.3	57.2	43.0	36.1	35.2	
Bramford Rd - Co locate		(K)	90 615133/245201	62.4	52.9	51.4	45.2	28.8	36.7	40.2	28.9	35.4	46.2	55.2	43.4	12	28.8	62.4	43.9	36.9	36.0	
Bramford Rd - Co locate		(K)	91 615133/245201	60.4	50.4	41.4	41.9		35.8	34.3	34.1	36.8	38.2	46	40.4	11	34.1	60.4	41.8	35.1	34.3	
Chevallier St o/s Nos 32/34		(K)	92 615192/245289	63	65	59.5	52.7	41.3	39.8	30.3	42.2	53	58.8	64.8	47.9	12	30.3	65	51.5	**43.3**	**42.3**	
Waterloo Rd/Chevallier St 43		(K)	93 615200/245319	51.5	52.1	42.8	34.5	28.2	33.8	26.8	28.7	Tube Removed from September onwards				8	26.8	52.1	37.3	31.3	30.6	

2010

2010 Nitrogen Dioxide Levels in ug/m3

Local Authority: Ipswich Borough Council

Location: K - Kerbside
I - Intermediate
B - Background

Diffusion Tube Data

Street	Post Code	Locn.	Grid Ref x/y	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Count	Min	Max	Mean	Bias Adjustment	National Average
																				Local average 0.87; 0.85 (based on 18 studies)	
Civic Drive		(K)	1 615999/244399	38.7	42.7	33.7	31.3	29.8	30.1	30.4	26.6	35.4	32.4	38.1	43.8	12	26.6	43.8	34.4	29.9	29.3
Chevallier St o/s Nos 6 to 8		(K)	2 615142/245242	48.3	66.7	62.3	62.6	54.1	56.4	54.6	45.4	59.1	58.8	57.7	61.2	12	45.4	66.7	57.3	**45.8**	**48.7**
Dock Street		(K)	3 616379/243894	36.3	47.3	44.8	42.7	34.4	36.4	35.2	33.4	41.5	40.6	47.6	50.8	12	33.4	50.8	40.9	35.6	34.8
Berners Street o/s No. 31		(K)	4 615923/244923	51.2	53.9	46.4	46.1	41.1	43.6	44.7	35.3	44.7	45.1	54.5	59.1	12	35.3	59.1	47.1	**41.0**	**40.1**
Fore Street		(K)	5 616860/244147	51.7	63.4	63.1	56.2	54.3	61.1	49.5	49.1	56.1	53.8	50.3	56.7	12	49.1	63.4	55.4	**52.1**	**47.1**
Kings Avenue		(B)	6 617299/244412	28.9	32.6	26.5	18.9	15.6	13	14.6	15.1		22.5	27.7	33.5	11	13	33.5	22.6	19.7	19.2
Nacton Road		(K)	7 618974/242291	39.7	42.6	35.9	32	27.4	25.9	23.8	24.2	34	37.6	41.8	44.5	12	23.8	44.5	34.1	29.7	29.0
Nacton Rd/A14 junct		(K)	8 620078/241263	39.8	41.8	37.9	34.6	28.5	25.2	24.1	23.5	31.3	30.3	33	33.4	12	23.5	41.8	32.0	27.8	27.2
Nacton Rd/A14 junct		(K)	9 620078/241263	33.4	41.8	39.4	36.5	29.1	34	26.4	22.5	32.4	35.2	33.1	41.3	12	22.5	41.8	33.8	29.4	28.7
Woodbridge Rd East		(K)	10 619294/245109	31.2	39.8	32.7	32.3	28.2	26.1	26.8	26.2	32.3	29.4	39.4	47.8	12	26.1	47.8	32.7	28.4	27.8
St Margaret's Street		(K)	11 616578/244759	51.2	54.8	58.3	54	43.7	44.8	55.8	47.6	58.7	58.2	53.4	57.5	12	43.7	58.7	53.2	**50.0**	**45.2**
St Marg St co locat		(K)	12 616578/244759	59	56	59.5	52.1	44.9	49.7	62	48.1	57.6	55.3	55.3	57.1	12	44.9	62	54.7	**51.4**	**46.5**
Valley/Norwich Road		(K)	13 615361/245436	46.6	52.9	51.2	44.9	33.8	31.3	50.8	37.3	52.3	48.4	52.1	48.8	12	31.3	52.9	45.9	39.9	39.0
Chevalier Street		(K)	14 615283/245391	60.5	79.4	74.2	72	66.9	72	62.4	53.2	67.4	64.1	70.4	78.1	12	53.2	79.4	68.4	**54.7**	**58.1**
Comhill o/s No 17		(B)	15 616277/244641	41.6	46	42.2	32.9	23.8	24.9	24.2	24.8	36.8	37.5	38.8	53.3	12	23.8	53.3	35.6	30.9	30.2
Valley/Norwich Road		(K)	16 615361/245436	49.9	50.4	53	45.9	39.8	33.7	45.5	45.9	55.1	52.7	50.4	55.9	12	33.7	55.9	48.2	**41.9**	**41.0**
Chevallier Street		(K)	17 615283/245391	70.8	82.6	75	73.9	57.4	71.2		57.4	66.9	69.8	74.8	78.6	11	57.4	82.6	70.8	**56.6**	**60.1**
Norwich/Blenheim Road		(K)	18 615269/245460	48	51.2	40.6	38.4	33.6	34.3	28.3	25	38.9	40.8	45.5	54.2	12	25	54.2	39.9	34.7	33.9
St Marg St co locat		(K)	19 616578/244759	52.3		59.1	54.8	45.9	48.3	58.1	46.7	58.9	55.3		50.7	10	45.9	59.1	53.0	**49.8**	**45.1**
St Margaret's Plain/Fonnereau		(K)	20 616455/244824	41.8	43	45	35.8	36.1	35.4	25	38.3	44.1	44.3	45.9	44.9	12	25	45.9	40.0	34.8	34.0
St Margaret's Plain		(K)	21 616490/244806	50	53	53.8	47.1	46.4	44.9	32.6	40.5	44.9	50.8	49.6	55.6	12	32.6	55.6	47.4	**41.3**	**40.3**
St Margaret's Plain/Northgate		(K)	22 616477/244790	48.8	62.7	53.2	54.5	46.7	50	51	35.9	52.4	50	53.5	61.3	12	35.9	62.7	51.7	**45.0**	**43.9**
St Margarets Green		(K)	23 616641/244781	34.6	38.7	34.7	30.4	24.4	22.8	28.1	22.4	30.6	31.2	33.1	40.3	12	22.4	40.3	30.9	26.9	26.3
St Margaret's Street		(K)	24 616655/244689	51.1	63	59.6	51.3	48.3	49.7	57.2	46.5	56.8	55.1	54.1	58.4	12	46.5	63	54.3	**51.0**	**46.1**
St Helen's Street		(K)	25 616750/244578	56.6	63.5	60	57.4	49.9	45.1	58.8	54.9	59.7		58.1	63.6	11	45.1	63.6	57.1	**49.6**	**48.5**
St Helen's St/Grimwade Street		(K)	26 616968/244510	49.4	66	52.5	58.8	45.2	45.1	38.9	35.3	46.7	48.1	52.5	57.1	12	35.3	66	49.6	**43.2**	**42.2**
St Helen's St/Argyle Street		(K)	27 616961/244/536	56.5	68.8	63.7	55.2	49.2	43	51.7	50.9	51.9	60.5	53.5	66.7	12	43	68.8	56.0	**48.7**	**47.6**
St Helen's St/Dove Street		(K)	28 617023/244508	41.4	46.2	38.2	34.5	27.4	27.9	29.9	28	36.4	37.3	37.9	48.3	12	27.4	48.3	36.1	31.4	30.7
Fore Hamlet		(K)	29 617102/244077	42.8	56	47.9	48.1	47.2	44.5	30.4	31.9		50.2	53.9	57.4	11	30.4	57.4	46.4	**40.4**	39.4
Fore Street		(K)	30 616963/244106	42.9	54.9	45.9	43.7	36	36	31.1	26.7	40.2		44.8	31.7	11	26.7	54.9	39.4	34.3	33.5
Star Lane opp St Peters St		(K)	31 616336/244133	50.7	57.7	48.7	51.2	47.5	49.6	40.1	34.4	49.9	48.3	51.5	34.9	12	34.4	57.7	47.0	**51.3**	**40.0**
Star Lane co locate as 31		(K)	32 616336/244133	49.5	60.7	47.9	48.5	45.4	51.6	35.2	35.3	49.1	49.3	42.7	36.5	12	35.2	60.7	46.0	**50.1**	39.1
Star Lane co locate as 31		(K)	33 616336/244133	47.5	57.4	47.4	50.6	45.8	52.1	37.3	36.3	49.5	35.1	52.4	49.8	12	35.1	57.4	46.8	**51.0**	39.8
College Street		(K)	34 616466/244072	40.3	61.9		57.6	52.7	48.9	45.7	46.7	56.6	53.3	51.8	59.9	11	40.3	61.9	52.3	**45.5**	**44.5**
Cobden Place		(K)	35 616743/244692	39.1	41.5	36.7	36.7	27.4	28.8	27.7	31.9	35.2	37.4	30.6	40.8	12	27.4	41.5	34.5	30.0	29.3
Franciscan Way/Wolsey St		(K)	36 616153/244242	52.3	52.4	43.7	42.2	37.7	34	33.6	31.2	42.1	40.7	46.7	57.8	12	31.2	57.8	42.9	37.3	36.4
Lower Brook Street		(K)	37 616480/244163	36.1	45.8	36.3	33.6	30.8	30.9	24.7	26.7	35.7	35.6	41.9	43.7	12	24.7	45.8	35.2	30.6	29.9
Civic Drive by Victoria PH		(K)	38 615898/244789	51.4	55	49.1	48.6	44.7		41.3	35.5	49.7	45.1	49.9	57.2	11	35.5	57.2	48.0	**41.7**	**40.8**
Star Lane/Fore Street		(K)	39 616738/244246	50.2	69	55.6	54.7	42.2	48.6	46.5	46.1	57.7	63.2	61.7	73	12	42.2	73	55.7	**48.5**	**47.4**
Star Lane/Angel Lane		(K)	40 616787/244244	48.2	54.2	49.7	40.7	36.6	36.9	28.9	33.6	41.4	44.7			10	28.9	54.2	41.5	38.6	35.3
Star Lane co locate as 40		(K)	41 616787/244244	48.6	55.2	46.9	44.4	38	37.9	32.8	28.5	50.5	44.2			10	28.5	55.2	42.7	39.7	36.3
Star Lane co locate as 40		(K)	42 616787/244244	45.9	53	43.4	42	37.2	37.3	33.5	31.2	42.2	44.2			10	31.2	53	41.0	38.1	34.8
Yarmouth Rd/Bramford Road		(K)	43 615107/245197	52.7	63.2	56.8	53.9	51.1	53.9	48.3	45.5	54.1	49.3	38.2	60.2	12	38.2	63.2	52.3	**45.5**	**44.4**
Bramford Road		(K)	44 615049/245234	43.3	65.9	55.9	51.5	47.2	43.9	44.6	44.1	54.4	57.4	63.7	67.9	12	43.3	67.9	53.3	**46.4**	**45.3**
Chevallier Street		(K)	45 615257/245349	53.6	65.2	50.2	47.8	36.3	37.5	29.8	30.7	40	42.5	45	51.3	12	29.8	65.2	44.2	35.3	37.5
Chevallier Street - co locate		(K)	46 615257/245349	43.3	61.8	49.2	48.2	38.1	33.1	32.4	30.8	39	42.1	46.5	50.9	12	30.8	61.8	43.0	34.4	36.5
Chevallier Street - co locate		(K)	47 615257/245349	50.7	57.8	46.9	46.9	37.3	28.1	33.4	31.5	39.1	43.6	46.7	51.5	12	28.1	57.8	42.8	34.2	36.4
Norwich Road/Anglesea Road		(K)	48 615397/245337	42.1	46.6	37.7	39.9	38.2	33.4	28.4	28.4	35.1	40.1	41.5	45.5	12	28.4	46.6	38.1	33.1	32.4
St Matthews Street		(K)	49 615803/244872	62.2	75	63.3	66.6	57.6	59.7	45.7	35.7	58.6	60.1	56.4	67.2	12	35.7	75	59.0	**51.3**	**50.2**
Boyton Road o/s No. 60		(K)	50 618688/242083	34.1	34.9	25.9	25.3	19.3								5	19.3	34.9	27.9	24.3	23.7
New Location for Tube 50 from June																				0.0	0.0
Barrack lane/St Matthews St		(K)	50 615758/244885						26.6	31.7	29	36.7	37.2	41.6	50.1	7	26.6	50.1	36.1	31.4	30.7
New Location for Tubes 40, 41, 42 from December																				0.0	0.0
Cliff Lane Primary School		(B)	40 617531/243134												34.8					0.0	0.0
Cliff Lane Primary School		(B)	41 617531/243134												33.8					0.0	0.0
Cliff Lane Primary School		(B)	42 617531/243134												35.5					0.0	0.0
New Tubes/Locations From June																				0.0	0.0
St Matthews St/Portman Rd		(K)	51 615765/244865						46.1	34.6	28.6	50	55.2	59.7	60.2	7	28.6	60.2	47.8	**41.6**	**40.6**
St Matthews St o/s No. 60		(K)	52 615822/244869						61.7	59.3	50	66.8	72.5	76.1	81.3	7	50	81.3	66.8	**59.1**	**56.8**
St Matthews St o/s No. 67		(K)	53 615817/244856						54.9	66	51.1	63.8	65	62.9	70.7	7	51.1	70.7	62.1	**54.0**	**52.7**
St Matthews St/Berners St		(K)	54 615891/244863						38.9	36.8	31.3	38.6	40.3	42.9	48.8	7	31.3	48.8	39.7	34.5	33.7
Berners St o/s No. 21		(K)	55 615912/244893						36.1	29.9	33.7	41	44.9	53.9	53.2	7	29.9	53.9	41.8	36.4	35.5
Berners St o/s No. 32		(K)	56 615928/244908						35.7	18.6	29.8	39.8	44.9	43.8	49.2	7	18.6	49.2	37.4	32.5	31.8
Berners St o/s No. 41-43		(K)	57 615936/244977						28.4	30.5	26.3	34.5	37.4	45.3	47	7	26.3	47	35.6	31.0	30.3
Berners St o/s No. 58		(K)	58 615975/245034						27.1	24.6	23.6	33.1	38.9	43.8	44.3	7	23.6	44.3	33.6	29.3	28.6
St Matthews St rbt co-locate		(K)	59 615921/244941						38.5	41.5	37.6	44.4	51.6	53.1	57.2	7	37.6	57.2	46.3	**40.3**	39.3
St Matthews St rbt co-locate		(K)	60 615921/244841						38.7	41.6	37.7	50.3	44.8	52.7	60.2	7	37.7	60.2	46.6	**40.5**	39.6
St Matthews St rbt co-locate		(K)	61 615921/244841						39.4	36.4	35.1	50	51.3	57.2	59	7	35.1	59	46.9	**40.8**	39.9
St Matthews St o/s No. 27		(K)	62 615926/244804						45.7	47.3	44	51.7	46.7	54.9	56.9	7	44	56.9	49.6	**43.2**	**42.2**
St Matthews St o/s No. 17		(K)	63 615955/244783						48.2	53.2	55.3	66.2	62.2	75.3	73.6	7	48.2	75.3	62.0	**53.9**	**52.7**
St Georges St/St Matthews St		(K)	64 616006/244798						31.9	30	23	35	38.2	33.8	50.2	7	23	50.2	34.6	30.1	29.4
St Georges St - co-locate		(K)	65 616006/244798							29	23.9	33.6	34.7	31.1	41.9	6	23.9	41.9	32.4	28.2	27.5
Woodbridge Rd o/s No 30A		(K)	66 615804/244667						43.4	53.1	44.2	52.7	47.4	43.7	49.8	7	43.4	53.1	47.8	**41.5**	**40.6**
Woodbridge Rd/Blanche St		(K)	67 616886/244672							36.9	27.3	39.7		39.3	47.4	5	27.3	47.4	38.1	33.2	32.4
Woodbridge Rd o/s No. 62		(K)	68 616901/244655						60.5	58.6	53.4	65.4	65.3	58.2	76.6	7	53.4	76.6	62.6	**54.4**	**53.2**
Argyle Street o/s Nos. 2-4		(K)	69 616974/244589						30.7	28.6	27.4	36.6	37.9	43.6	48.3	7	27.4	48.3	36.2	31.5	30.7
Argyle Street o/s No. 11		(K)	70 616962/244572						31.1	39.1	32.1	46	47.6	52.8	61	7	31.1	61	44.2	38.5	37.6
St Helens Street o/s No. 93		(K)	71 617027/244536						25.4	29.7	27.4	35.5	40.1	36.6	48.6	7	25.4	48.6	34.8	30.2	29.5
St Helens St o/s No. 125		(K)	72 617119/244534						42.1	44	46.6	49.9		57	65	6	42.1	65	50.8	**44.2**	**43.2**
Regent St/St Helens St		(K)	73 617120/244518						26.1	28	25.8	34.3	36.6	42	45.7	7	25.8	45.7	34.1	29.6	29.0
Grimwade St o/s No. 25		(K)	74 616948/244438						30.4	30.9	28	38.6	40.9	46.8	44.2	7	28	46.8	37.1	32.3	31.5
Grimwade St o/s No. 28		(K)	75 616928/244360						24.8	28.1	25	32.8	35	38.8	43.1	7	24.8	43.1	32.5	28.3	27.6
St Helens St/Grimwade St 44		(K)	76 616948/244518						45.4	45.8	41.3	51.9	52.2		39.7	6	39.7	52.2	46.1	**40.1**	39.1
St Helens St - Albury Ct		(K)	77 616899/244539						36.4	34.6	32.6	42	41.5	50.5	46.7	7	32.6	50.5	40.6	35.3	34.5
Orchard St o/s No. 7		(K)	78 616867/244583						23.6	29.7	25.3	32.2	35.9	40.7	38.1	7	23.6	40.7	32.2	28.0	27.4
Orchard St - co-locate		(K)	79 616867/244583						22.2	24.9	23.9	29.9	34.8	41.1	46.1	7	22.2	46.1	31.8	27.7	27.1
St Helens St - County Hall		(K)	80 616819/244543						40.9	48.5	44.4	50	52.6	50.2	49.1	7	40.9	52.6	48.0	**41.7**	**40.8**
St Helens St - co-locate		(K)	81 616819/244543						41.7	48.6	43.6	51.5	47.9	47.8	50.7	7	41.7	51.5	47.4	**41.2**	**40.3**
St Helens St - co-locate		(K)	82 616819/244543						41.9	49.9	41.3	49.2	54.1	49	50.8	7	41.3	54.1	48.0	**41.8**	**40.8**
Bond Street o/s No. 29		(K)	83 616788/244497						35.7	35.1	29.5	42.7	48.1	45.5	49	7	29.5	49	40.8	35.5	34.7
Carr Street/Majors Corner		(K)	84 616697/244595						35.1	31.2	30.2	36.2	41.8	43.6	44.8	7	30.2	44.8	37.6	32.7	31.9
Old Foundry Road o/s No. 5		(K)	85 616677/244622						35.7	35.7	35.9	41.7	43.2	45.8	49.2	7	35.7	49.2	41.0	35.7	34.9
New Tubes/Locations From September																				0.0	0.0
Bramford Road o/s No 170		(K)	86 615004/245257									33.2	32.3	40.4	47.8	4	32.3	47.8	38.4	33.4	32.7
Bramford Road o/s No 205		(K)	87 615004/245237									46.8	39.1	49.7	48.3	4	39.1	49.7	46.0	**40.0**	39.1
Yarmouth Rd o/s flat 2 No 5		(K)	88 615092/245137									40.7	41.8	47.1	50.3	4	40.7	50.3	45.0	39.1	38.2
Bramford Road o/s No 122		(K)	89 615133/245201									47.5	50	52.5	57.5	4	47.5	57.5	51.9	**45.1**	**44.1**
Bramford Rd - Co locate		(K)	90 615133/245201									48.8	48.5	53.5	62.2	4	48.5	62.2	53.3	**46.3**	**45.3**
Bramford Rd - Co locate		(K)	91 615133/245201									47.3	46.9	53.3	57.9	4	46.9	57.9	51.4	**44.7**	**43.6**
Chevallier St o/s Nos 32/34		(K)	92 615192/245289									50.3	52.9	52.2	50.1	4	50.1	52.9	51.4	**41.1**	**43.7**
Waterloo Rd/Chevallier St 43		(K)	93 615200/245319									34.5	40.9	43.7	49.5	4	34.5	49.5	42.2	33.7	35.8

Bias Adjustment: 0.87
Local Bias:
Tube No. Monitor bias adjusted to
2 Chev St
5 St Marg
11 St Marg
12 St Marg
14 Chev St
17 Chev St
19 St Marg
24 St Marg
31 Star Lane/St Pet
32 Star Lane/St Pet
33 Star Lane/St Pet
40 Star Lane/Angel
41 Star Lane/Angel
42 Star Lane/Angel
45 Chev St
46 Chev St
47 Chev St
92 Chev St
93 Chev St