Waveney District Council
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2010 Air Quality Progress Report for Waveney District Council

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

March 2010

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Executive Summary

This progress report has been produced as part of Waveney District Council's requirement to assess present and predicted future air quality against the objectives prescribed by the Air Quality Regulations 2000 (as amended). If an exceedence of any objective is considered likely, there is a requirement to proceed to a detailed assessment of that pollutant and to declare an Air Quality Management Area (AQMA), if the exceedence is confirmed. The Local Air Quality Management process set out in the 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 have all been followed.

In order to assess air quality in Waveney District, this report considers new monitoring data as well as assessing the impact of new development on air quality in the district. Air quality data is available in Lowestoft from a continuous analyser located in Belvedere Road and a network of 8 passive diffusion tube sites measuring NO_2 at relevant roadside locations on the A146, A1117 and A12, the major A-roads which pass through Lowestoft.

The conclusion is that there is no need for Waveney District Council to proceed to a detailed assessment in 2010 for any pollutants considered in this assessment. There are no newly identified or proposed point or diffuse sources which are likely have a significant impact on air quality in the Waveney District. The greatest nitrogen dioxide annual mean concentration of 37.732 µg/m^3 was to be found in Belvedere Road, which is close to the port and was measured by the automatic monitor. However, the dataset was incomplete and the mean was annualised to represent a full years data. A diffusion tube located in close proximity to the air monitor produced a measured annual mean of 34.23 µg/m^3. There was no relevant public exposure at the two monitoring sites, but it is proposed that monitoring will continue in this area with the relocation of the diffusion tube a short distance away where there is a relevant receptor. A triplicate co-location study will also be undertaken at the same location using the air monitor.

The annual mean concentrations of NO_2 obtained from the diffusion tube survey at the other monitoring sites gave no cause for concern. The Mill Road survey produced an annual mean concentration of 25 µg/m^3 at the façade of the nearest relevant receptor and this shows a substantial reduction in the concentrations of NO_2 when compared to previous years.

The current passive diffusion tube sites have been reviewed and the result is that some changes are necessary to ensure that relevant public exposure to NO_2 is determined more effectively at nearby receptors.

It is recommended that there is no need for Waveney District Council to proceed to a Detailed Air Quality Assessment at any of the locations surveyed.

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1 Introduction

1.1 Description of Local Authority Area

Population 117,700 (2009)

Situated in the northeast corner of Suffolk, Waveney District is bordered by the River Waveney in the north and the River Blyth in the south. The main urban conurbation is Lowestoft, which is a North Sea port and the second largest town in Suffolk. Lowestoft sustains a variety of industries including food processing and engineering. The port handles general cargo and is a base for servicing off-shore oil and wind energy installations.

Apart from Lowestoft the main urban centres are Beccles and Bungay situated on the River Waveney adjacent to the Norfolk border and Southwold and Halesworth, both on the River Blyth. The centre of the district is agricultural and is sparsely populated. The whole district has a steadily developing holiday trade.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment Reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1. includes the number of permitted exceedences in any given year (where applicable).

Table 1.1 Air Quality Objectives Included in Regulations for the Purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Detailed reviews of air quality within the Waveney District have concluded that the standards and objectives contained within the National Air Quality Strategy would be achieved by the relevant dates and accordingly it has not been necessary to declare any Air Quality Management Areas within the District at any time.

1.4.1 First Round of Review and Assessment

Waveney District Council completed the first round of air quality review and assessment in 2000, concluding that the risk of any of the UK air quality objectives being exceeded was negligible.

1.4.2 Second Round Review and Assessment

The Second Round Updating and Screening Assessment for Waveney District Council was published in May 2003. This assessment indicated that three specific and very localised areas (all associated with busy road junctions) needed a more detailed assessment to be sure that air quality in the Waveney District was still on target to meet the relevant criteria. However, further assessment determined that concentrations did not exceed 2004 objectives. The report recommended that a detailed survey of traffic flow at all three locations be commissioned when the South Lowestoft Relief Road bypass was opened.

In 2005, the Progress Report commissioned by Waveney District Council recommended that although there had been no exceedences of the air quality objectives in 2004, significant developments in Lowestoft town centre warranted monitoring of NO_2 and traffic flow to assess the effects on air quality.

1.4.3 Third Round of Review and Assessment

The Updating and Screening Assessment completed for Waveney District Council in May 2006 predicted that no exceedences of the air quality objectives for the UK would occur in Waveney. The review concluded that whilst there were no areas of the District exposed to levels of pollution exceeding national guidelines, it was necessary to keep the situation under review to monitor the effects of the new South Lowestoft Relief Road. In particular, an “Urban Traffic Management and Control” system was proposed, to improve traffic flow and a real time pollution monitor to be installed at a key point in Belvedere Road. The area in close proximity to the port was identified as requiring further monitoring and as a consequence a new diffusion tube survey at Mill Road was established in 2007, which has shown concentrations of NO_2 close to the objectives albeit with small data sets

1.4.4 The Fourth Round of Review and Assessment

The 2009 Air Quality Updating and Screening Assessment commissioned by Waveney District Council concluded that there was no need to proceed to a Detailed Assessment in 2009 for any of the pollutants considered in the assessment. However it was recommended that monitoring should continue in the Mill Road area due to possible exceedence of air quality objectives in the area of the port. There were no new developments nor existing sources identified in Waveney District that were likely to significantly affect air quality at locations with relevant public exposure.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There is one automatic continuous air quality monitor, which is operated by Suffolk County Council and this measures the concentration of NO_2 and oxides of nitrogen. The monitor is located by the roadside in Belvedere Road, Lowestoft, in close proximity to the port. Data from the Belvedere Road site can be found at www.airquality.co.uk. Other pollutants considered by this report are not measured by the monitor.

Routine calibrations and periodic site audits are carried out every two weeks by Waveney District.

Figure 2.1 Map of the Location of the Automatic Monitoring Site

Table 2.2 Details of Automatic Monitoring Sites

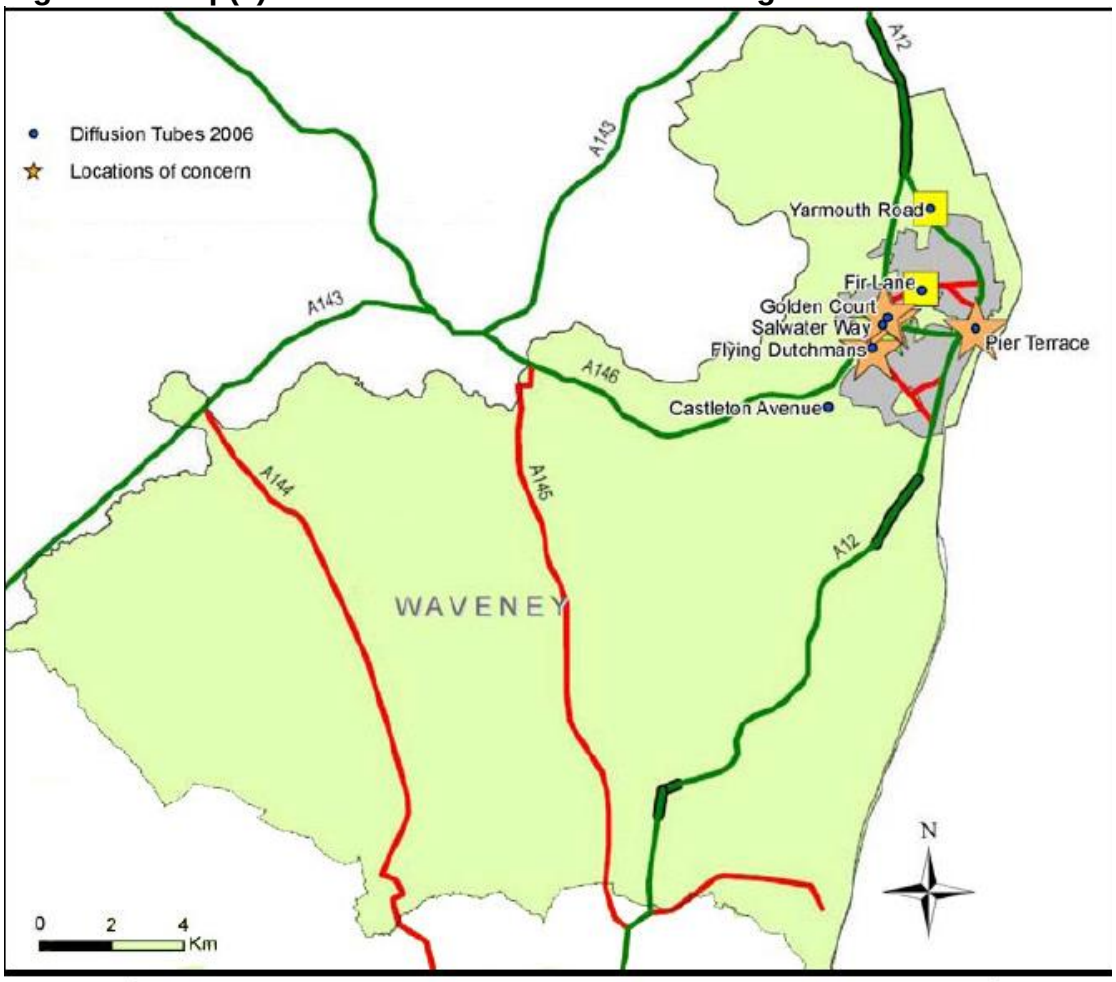
Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Belvedere Road	Roadside.	X654651	Y292619	NO_2	Chemiluminescent	No	No	n/a	Y

2.1.2 Non-Automatic Monitoring

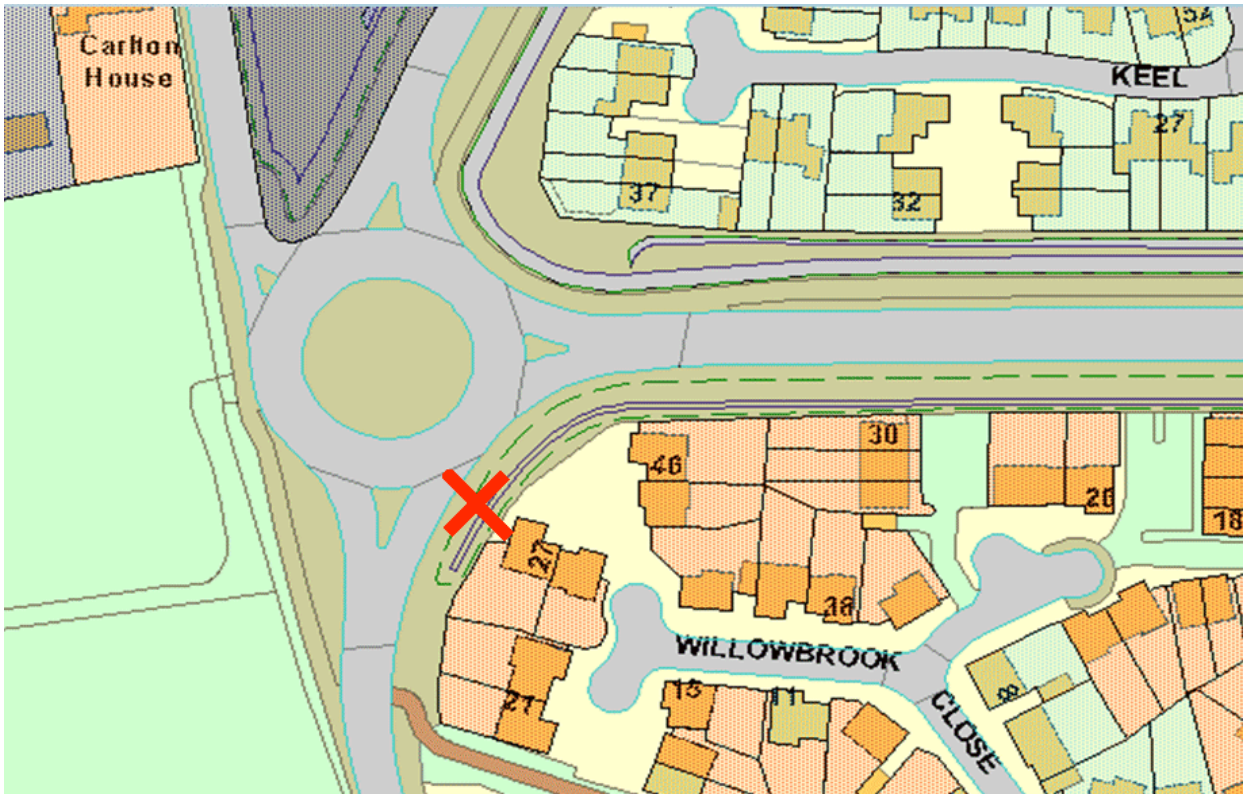
A network of 8 NO_2 diffusion tube monitoring sites extend coverage around the main urban centre of Lowestoft. The sites are situated around the port area and by the roadside of busy roundabouts on the major A-roads which pass through the town. No non- automatic monitoring is carried out to measure the other pollutants considered in this report.

There are no new monitoring sites in Waveney District and none have been discontinued since the 2009 Updating and Screening Report.

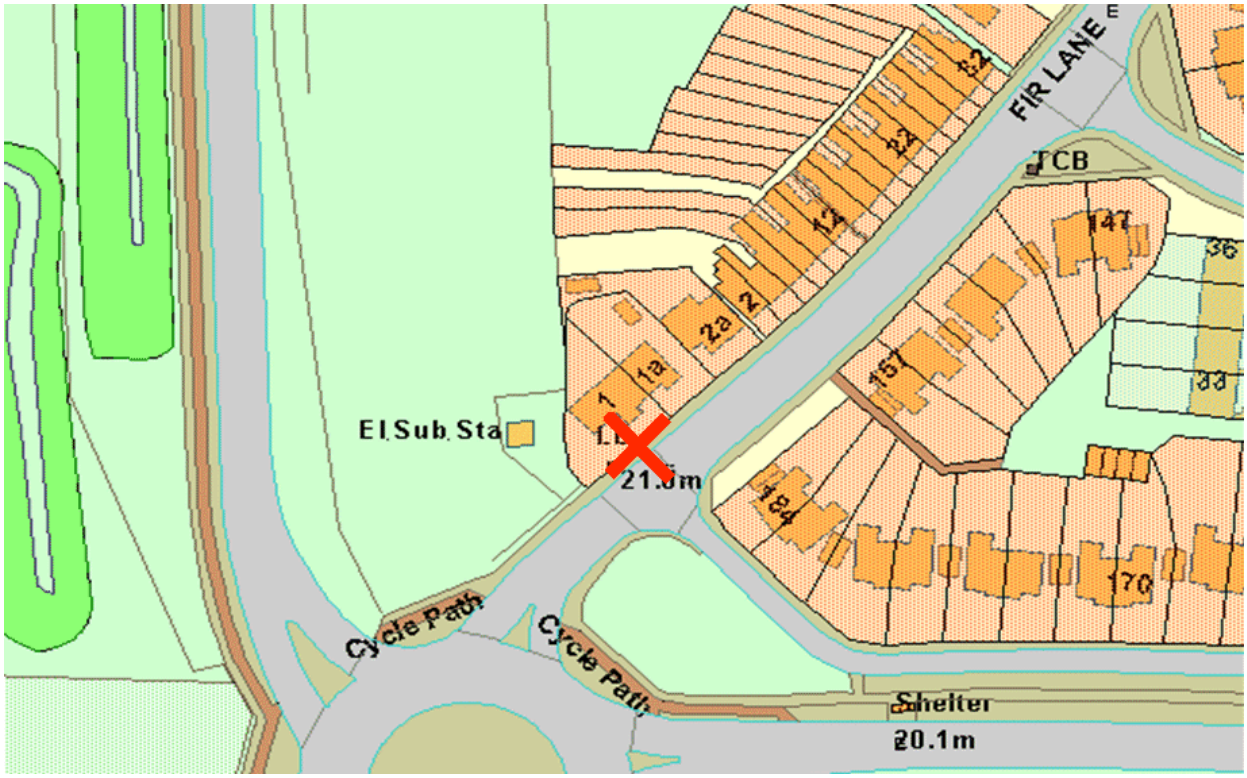
Figure 2.2 Map(s) of the Non-Automatic Monitoring Sites



NO_2 monitoring sites in Waveney district

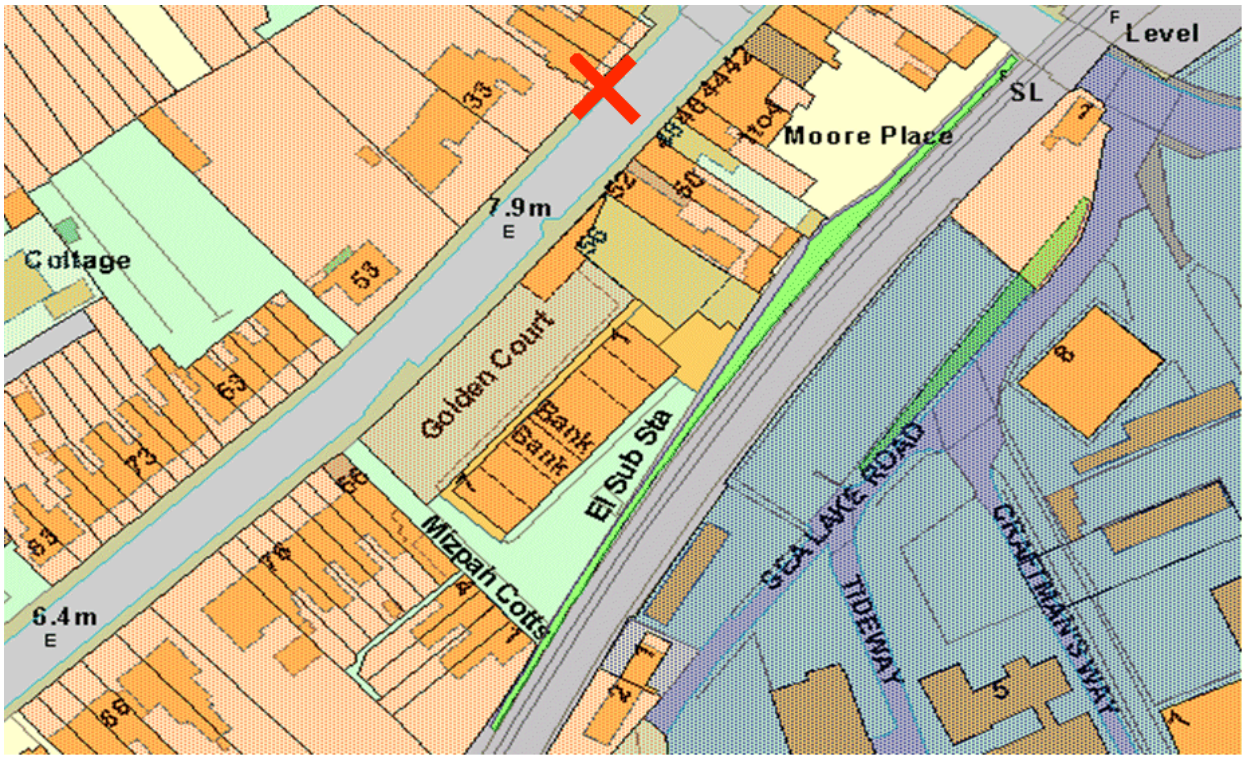


Diffusion Tube Site 1: Castleton Avenue, Carlton Colville.

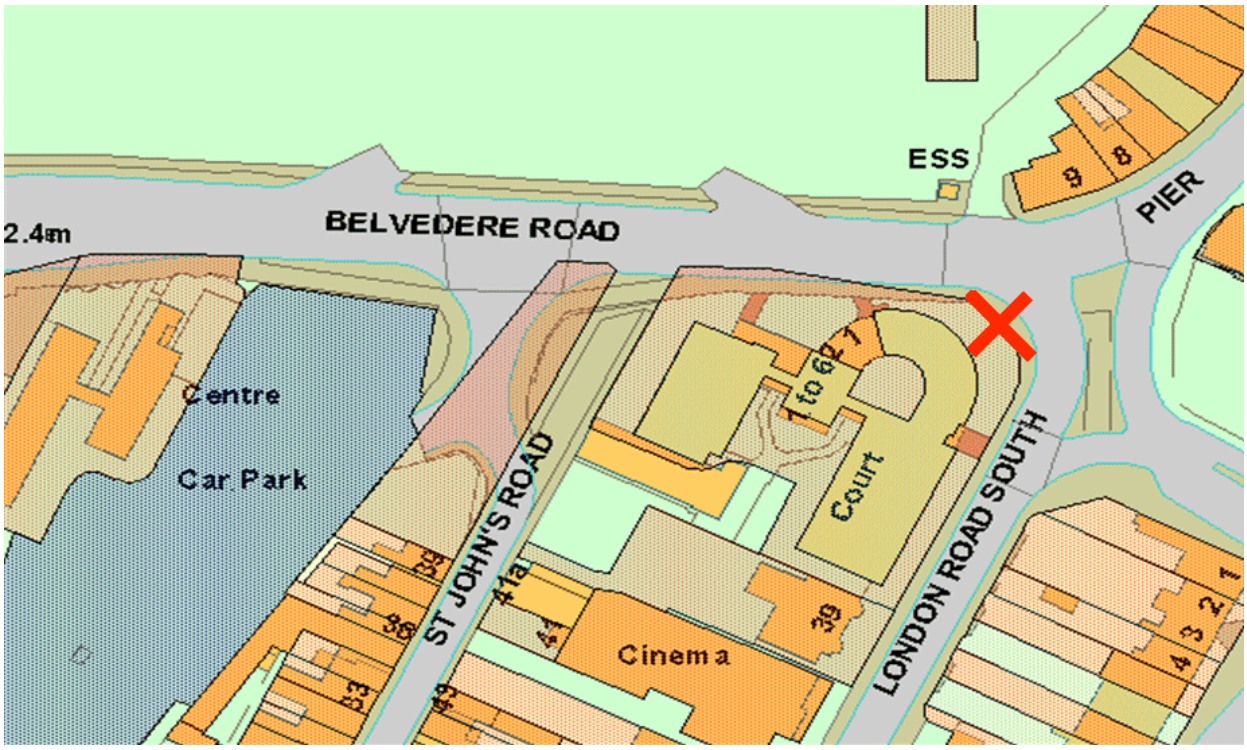


Diffusion Tube Site 2: Fir Lane, Lowestoft

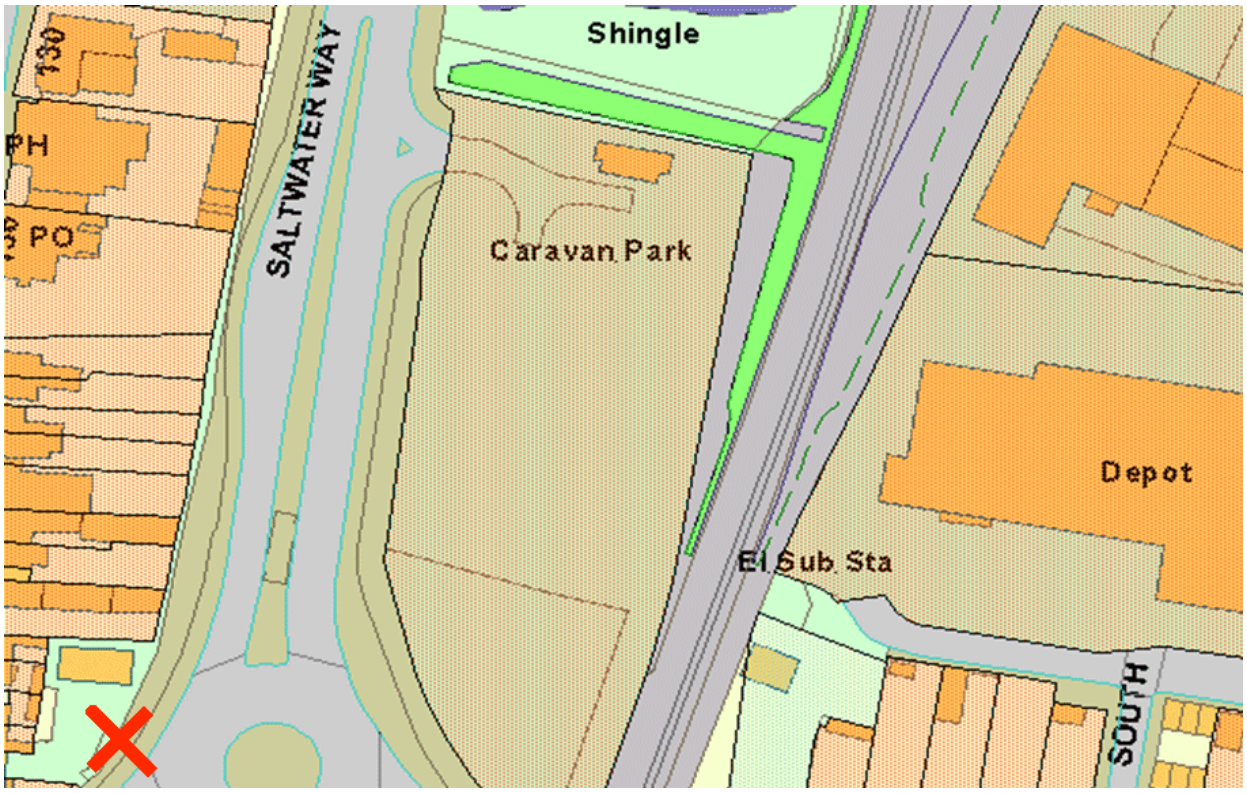
Diffusion tube site 3 :The Flying Dutchman, Cotmer Road, Oulton Broad



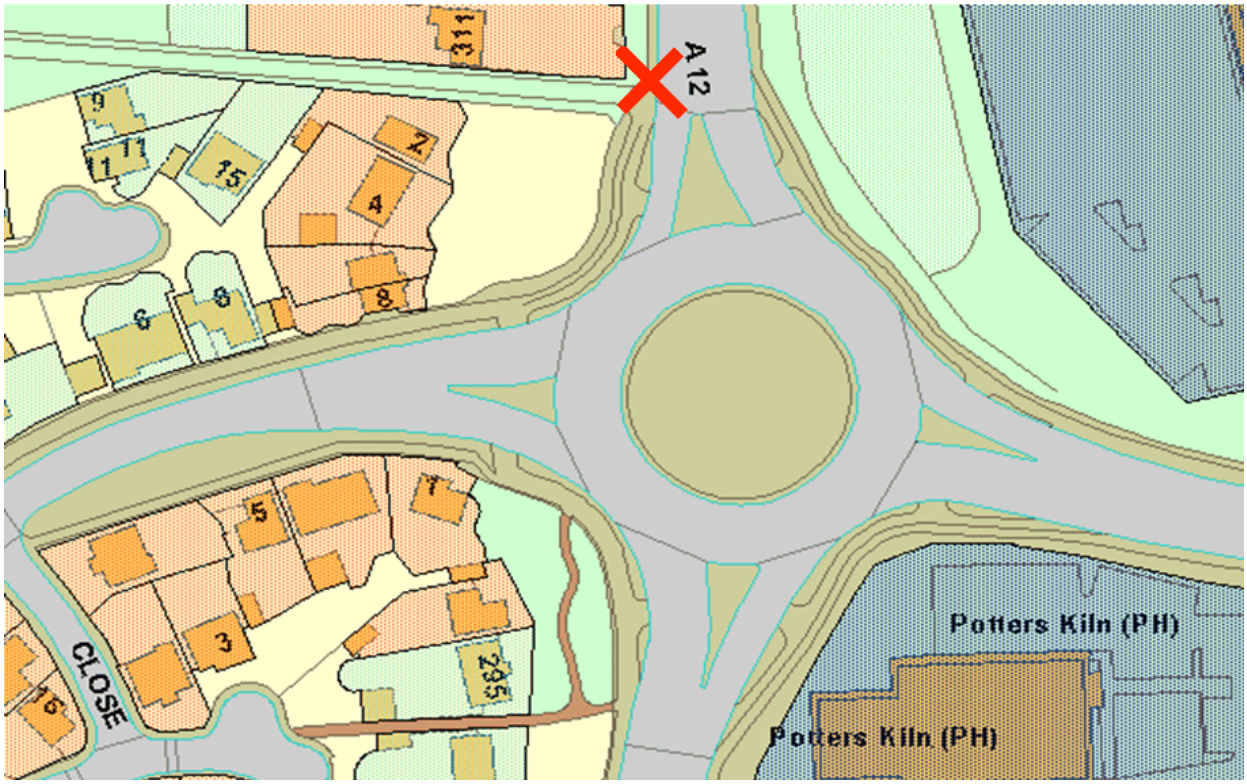
Diffusion Tube Site 4 : Golden Court, Bridge Road, Oulton Broad



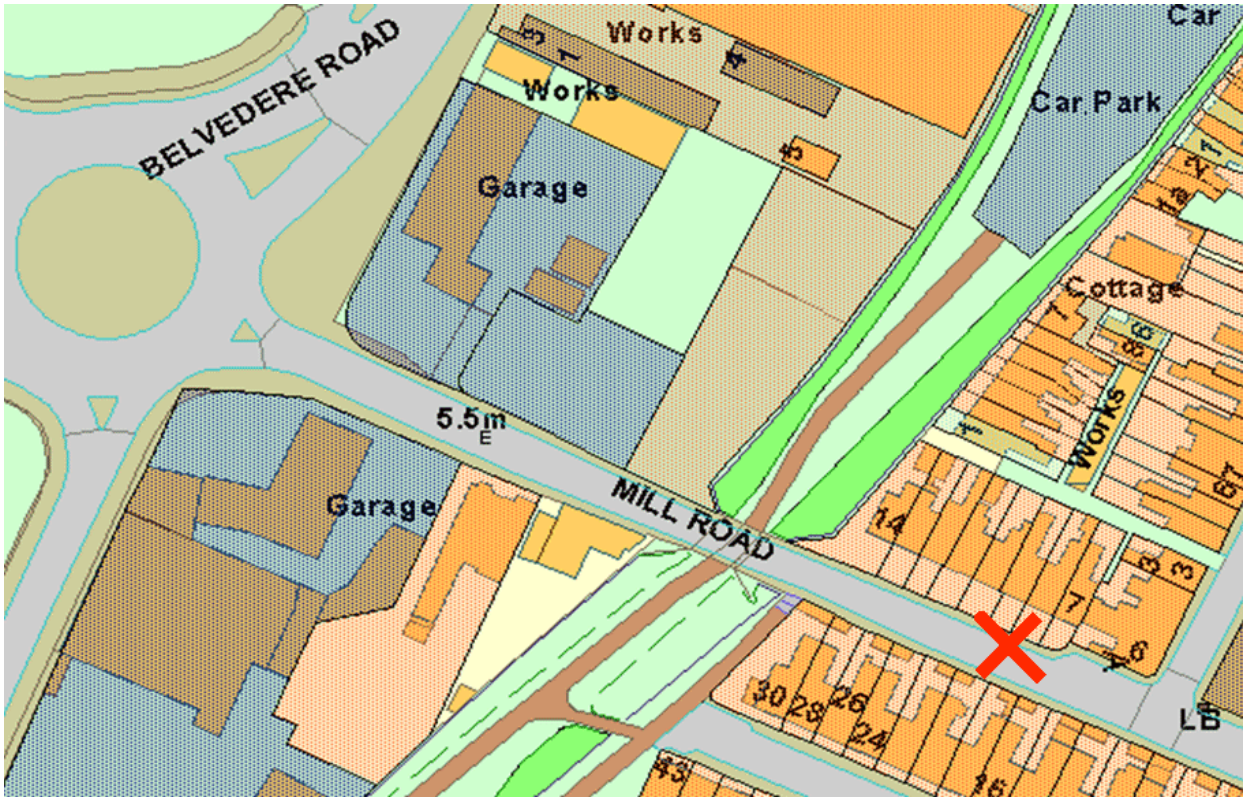
Diffusion Tube Site 5 : Pier Terrace/Belvedere Road, Lowestoft



Diffusion Tube Site 6 : Saltwater Way, Oulton Broad



Diffusion Tube Site 7 : Yarmouth Road, Lowestoft



Diffusion Tube Site 8 : Mill Road, Lowestoft

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Castleton Avenue	Roadside	X650617	Y222111	NO_2	Diffusion Tubes	N	Y (17m)	1.9m	Y
Fir lane	Roadside	X653223	Y290470	NO_2	Diffusion Tubes	N	Y (40m)	1.2m	Y
Dutchmans Court	Roadside	X651853	Y651853	NO_2	Diffusion Tubes	N	Y (5m)	2.4m	Y
Golden Court	Roadside	X852272	Y292960	NO_2	Diffusion Tubes	N	Y (9m)	1.8m	Y
Pier Terrace	Roadside	X654724	Y292658	NO_2	Diffusion Tubes	N	N	2.4m	Y
Saltwater Way	Roadside	X652137	Y292751	NO_2	Diffusion Tubes	N	Y (26m)	2.9m	Y
Yarmouth Road	Roadside	X653465	Y295997	NO_2	Diffusion Tubes	N	N	4.3m	Y
Mill Lane	Roadside	X653413	Y292388	NO_2	Diffusion Tubes	N	Y (6.8)	1.2m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

The data obtained by the monitor has been ratified from the start of monitoring in June 2008 through to May 2009.

It has only been possible to capture automatic monitoring data at the Belvedere Road site for five months in 2009.. Data is not yet available for the remainder of 2009 and this will be incomplete because of equipment malfunction.

Table 2.3(a) The Results of Automatic Monitoring for Nitrogen Dioxide: Raw Data

Period	Mean NO_2 concentration	Data Capture	Maximum Hourly NO_2
June-Dec 08	28.2µg/m^3	83.4%	181µg/m^3
Jan 09-May 09	34.1µg/m^3	98.0%	193µg/m^3

The annual mean for the Belvedere Road site is shown below and is an estimate as data is only available for part of the year. The mean is an annualised mean using a ratio calculated from data obtained from two AURN sites in the region. An adjustment factor of 1.103 was applied to the raw mean of 34.1µg/m^3

Table 2.3(b) Results of Automatic Monitoring for Nitrogen Dioxide: Comparison of Adjusted Data with the Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations (µg/m^3)		
					2007	2008	2009
A1	Belvedere Roac	N	98	40.8	n/a	n/a	37.6

There have been no exceedences of the 40µg/m^3 annual objective.

Table 2.3(c) Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Number of Exceedences of hourly mean (200 μg/m^3)		
					2007	2008[c]	2009
A1	Belvedere Road	N	98	40.8	n/a	0 (181)	0 (193)

There have been no exceedences of the 1-hour mean objective. The 99.8th percentile of the hourly means (in brackets) have been used because the period of valid data is less than 90% of a full year.

Diffusion Tube Monitoring Data

The diffusion tubes were exposed according to the calendar of suggested exposure periods for 2009 and the monitoring period at all diffusion tube sites was twelve months.

Table 2.4(a) Results of Nitrogen Dioxide Diffusion Tubes (Bias Adjusted)

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009[b] %	Annual mean concentrations (μg/m^3)		
					2007	2008	2009
1	Castleton Avenue	N	92	92	20.1	22.3	18.9
2	Fir Lane	N	92	92	29.3	29.9	23.24
3	Dutchmans Court	N	92	92	29.2	26.4	27.03
4	Golden Court	N	92	92	37.3	33.5	32.59
5	Pier Terrace	N	92	92	31.0	38.4	34.23
6	Saltwater Way	N	92	92	28.1	29.0	26.42
7	Yarmouth Road	N	92	92	25.4	27.6	26.02
8	Mill Road	N	67	67	45.5	42.3	33.78[1]

[1] The Mill Road annual average mean is an annualised estimate as the data capture at this site was less than 75%. An adjustment factor of 1.101 was used.

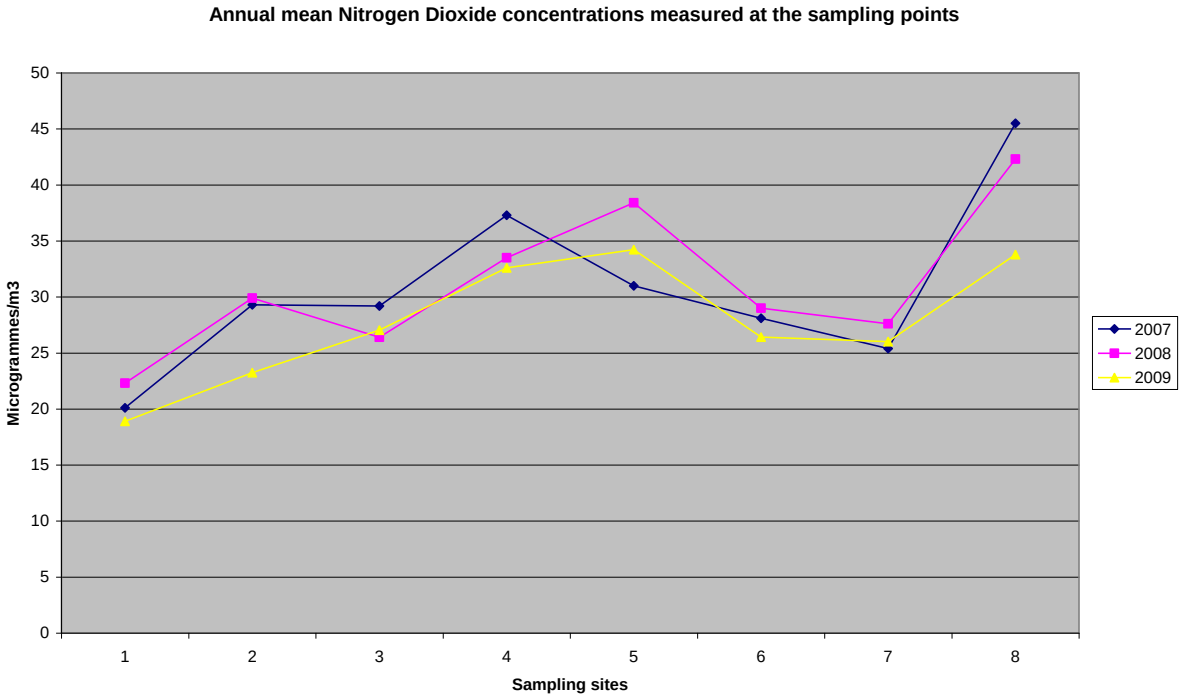
The results represent the annual mean concentrations measured at the road site monitoring sites and are unrepresentative of public exposure and Table 2.4(b) predicts the NO_2 concentration at the façade of the nearest relevant receptors.

Table 2.4(b) Nitrogen Dioxide Concentration Levels Estimated at the Nearest Relevant Receptor

Site Name	Annual mean concentrations (μg/m ^{3}at the façade of the nearest sensitive receptor	
	2008	2009
Castleton Avenue	17.00	15.4
Fir Lane	18.3	16.1
Dutchmans Court	23.8	24.4
Golden Court	26.13	25.7
Pier Terrace	n/a	n/a
Saltwater Way	21.6	19.9
Yarmouth Road	n/a	n/a
Mill Road	32.5	25.0

This prediction allows for the pattern of decline of NO_2 concentrations with distance from the road resulting in further NO_2 reduction in annual mean concentrations.

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites from 2007- 2010.



The trend shows that nitrogen dioxide concentrations have reduced at most roadside locations in 2009 when compared to the 2008 measurements. The only exception to this was at Dutchmans Court where there was a very slight increase. This trend can be explained as the 2009 annual means were calculated using a much larger data set, whereas in 2008 an annualised mean was used using data from an AURN roadside monitor, which is likely to over estimate concentrations. Please note that the comparisons are made using the data obtained direct from the measurements made by the roadside and not estimates of relevant public exposure.

2.2.2 PM_{10}

No monitoring of PM_{10} has been undertaken by Waveney District Council in 2009 as the 2009 Updating and Screening Assessment concluded that it was not necessary.

2.2.3 Sulphur Dioxide

No monitoring of SO_2 has been undertaken by Waveney District Council in 2009, as the 2009 Updating and Screening Report concluded that none was necessary

2.2.4 Benzene

No monitoring of C_6H_6 has been undertaken by Waveney District Council in 2009, as the Updating and Screening Report of 2009 concluded it was not necessary.

2.2.5 Other pollutants monitored

No monitoring of other pollutants has been undertaken by Waveney District Council in 2009 as the Updating and Screening Assessment Report of 2009 concluded that none was necessary.

Waveney District Council investigated 127 complaints in 2009 alleging smoke, dust or odour nuisance. One notice under the statutory nuisance provisions of the Environmental Protection Act 1990 was served on a commercial business in Oulton Broad for causing a statutory nuisance with the repeated combustion of waste materials giving rise to smoke nuisance.

The operations of a second commercial business located on the North Quay gave rise to fugitive emissions of furnace ash dust which caused nuisance. The activity has now ceased because of the intervention of Waveney District Council.

2.2.6 Summary of Compliance with AQS Objectives

Waveney District Council has examined the results from monitoring in the Waveney district. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

3.1 Road Traffic Sources

3.1.1 Narrow congested streets with residential properties close to the kerb

There are no new identified congested streets in Waveney with a flow of above 5000 vehicles per day and residential properties close to the kerb that have not been previously considered in the Updating and Screening Report 2009.

3.1.2 Busy streets where people may spend 1-hour or more close to traffic

There are no new or newly identified streets in Waveney where people may spend one hour or more close to traffic that have not been previously considered in the Updating and Screening Report 2009.

3.1.3 Roads with a high flow of buses and or HGVs

There are no new or newly identified roads in Waveney with high flows of buses or HGVs that have not been previously considered in the Updating and Screening Report 2009.

3.1.4 Junctions

There are no new or newly identified busy road junctions in Waveney that have not been previously considered in the Updating and Screening Report 2009.

3.1.5 New roads constructed or proposed since the last Updating and Screening Assessment.

There are no newly constructed or proposed roads in Waveney District that have not been previously considered in the Updating and Screening Report 2009.

3.1.6 Roads with significantly changed traffic flows

The South Lowestoft Relief Road (SLRR) and the traffic management and control system is operational which offers co-ordination of traffic signals enabling more efficient management of traffic, preventing traffic queues and traffic building in the port area around the Bridge. The system also checks air quality by means of the continuous air quality monitor located in Belvedere Road

3.1.7 Bus or coach stations

There are no relevant bus stations in Waveney District with the number of bus movements greater than 2,500 per day and there is relevant residential exposure within 10m of any part of a bus station where buses are present The largest bus station within Waveney has less than 1,000 movements per day and this is below the threshold level requiring further investigation

3.2 Other Transport Sources

3.2.1 Airports

There are no airports in Waveney District that have a throughput of 5 million passengers per year and / or 500,000 tonnes of freight.

3.2.2 Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

There are no locations in Waveney District where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with a potential for relevant exposure within 15m.

3.2.3 Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m

There are no locations in Waveney District where there is a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

3.2.4 Ports for shipping

The port of Lowestoft is located in Waveney and 2009 saw 65 vessels with a gross tonnage of 2500 tonnes visit the port. Pilot, fishing, pleasure and service vessels contributed to a total of about 1000 additional vessel movements during the year. No further action is needed as the total vessel movements are below the threshold (greater than 5000) requiring a Detailed Assessment.

3.3 Industrial Sources

3.3.1 Industrial installations: new or proposed installations for which an air quality assessment has been carried out

There are no new or proposed installations for which an air quality assessment has been carried out as part of a planning application granted by Waveney District Council or by a neighbouring local authority.

3.3.2 Industrial installations: existing installations where emissions have increased substantially or new relevant exposure has been introduced.

There is no existing installation in Waveney District where emissions have increased substantially or new relevant exposure introduced since the last Updating and Screening Report.

3.3.3 Industrial installations: new or significantly changed installations with no previous air quality assessment.

There are no new or significantly changed installations in Waveney District with no previous air quality assessment.

3.3.4 Major fuel storage depots storing petrol

There are no major fuel storage depots located in the Waveney District area storing petrol.

3.3.5 Poultry Farms

There are no new relevant poultry plants operating in Waveney District., but the Crown Chicken Limited , Becks Green Poultry Unit, Becks Green Lane, Ilketshall St Andrew has applied for a Environmental Permitting (England & Wales) Regulations 2007, permit variation to increase capacity to 350,000 places. The environmental risk assessment for this application concludes that the increase in production capacity will not impact significantly on the local air quality. Therefore, there is no need to proceed to a Detailed Assessment for PM_{10} at the location.

3.3 Commercial and Domestic Sources

3.4.1 Biomass combustion plant – individual installations

No new relevant biomass combustion plant installations have been identified since the last Updating and Screening Assessment Report.

3.4.2 Areas where the combined impact of several biomass combustion sources may be relevant

There are no areas identified in Waveney District where there could be a combined impact from several biomass combustion sources.

3.4.3 Areas where domestic solid fuel burning may be relevant

There are no new areas of significant solid fuel use (coal. anthracite, wood or smokeless fuel) as a primary source of heating in Waveney district.

3.4 New Developments with Fugitive or Uncontrolled Sources

Waveney District Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

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4 Planning Applications

5.1 Waveney District Council confirms that there are no planning applications for new developments which have been approved, which could impact on air quality.

5.2 Waveney District Council confirms that there are no planning applications for new developments which have not been approved but which could impact on air quality.

5 Air Quality Planning Policies

5.1 Environmental Health staff check all relevant planning applications for their potential impact on air quality.

5.2 The Suffolk Air Quality Management Group which Waveney District Council has membership of is currently preparing a supplementary planning document for use by the Suffolk local authorities. The document will be used primarily by planning officers, air quality officers and developers, and is currently at the formal draft consultation stage.

6 Local Transport Plans and Strategies

6.1 The Local Transport Plan 2006-2011 produced by Suffolk County identified a number of objectives to be achieved in Waveney and these are:

A to facilitate movement in and around Lowestoft: and

B to improve public transport, (including bus and interchange facilities), walking and cycling in and around Lowestoft: and

C to relieve congestion in and around Lowestoft town centre: and finally

D to minimise the impact of traffic and transport infrastructure (including air quality) in market towns, villages and tourism honeypots to protect the county's environment and built heritage.

6.2 A local transport plan 2006-2011 progress report has been produced by Suffolk County Council and this report notes a number of achievements and these are :

A the increase in the number of cyclists at certain points in Lowestoft due to a number of schemes which have introduced high quality cycle lanes: and

B the construction of the South Lowestoft Relief is now complete and traffic management measures are now operational which are designed to co-ordinate and monitor traffic levels and priority's to reduce congestion in the town centre: and

C as part of the South Lowestoft Relief Road and Associated Measures project, Suffolk County Council has installed one real time pollution analyser close to the A12 Bascule Bridge to monitor nitrogen dioxide in Belvedere Road: and

E work is being done with Bungay Town Council to develop a scheme to improve traffic flow in the Bungay town centre.

7 Conclusions and Proposed Actions

7.1 Conclusions from New Monitoring Data

Automatic and non-automatic monitoring data obtained near the port of Lowestoft shows that nitrogen dioxide concentrations at Belvedere Road, Mill Road and Pier Terrace are below the National Air Quality Strategy Objectives and are unlikely to exceed the Objectives in 2010. The greatest nitrogen dioxide concentrations are to be found at Pier Terrace, but there is no nearby relevant public exposure. The data obtained from the real time continuous air quality analyser situated in Belvedere Road indicates that monitoring should continue in the port area, however, the data from the analyser was incomplete and the results had to be annualised. The trend in concentration levels at other sites show small reductions over a three year period, apart from a slight increase in the measured concentration at the Dutchmans Court in 2009.

There is no evidence to suggest that there is a need to proceed to a Detailed Assessment for any of the pollutants considered in this report.

7.2 Conclusions relating to New Local Developments

There are no new Developments in Waveney District which will impact on local air quality significantly. Likewise the assessment of relevant sources indicates that there are no changes which will result in a significant impact on local air quality. Therefore, there is no need to proceed to a Detailed Assessment as exceedences of the National Air Quality Strategy Objectives are unlikely.

7.3 Proposed Actions

There is no need to proceed to a Detailed Assessment for any of the pollutants considered in this report.. A co-location study using triplicate diffusion tubes will be carried out in Belvedere Road in 2010, using the automatic air quality monitor. Passive monitoring, using diffusion tubes will continue in the port area as the nitrogen dioxide concentrations remain the highest in Waveney District. A number of the passive monitoring/sampling points will need to be repositioned in 2010 to enable relevant public exposure to be estimated with a greater level of confidence. An extra diffusion tube will be placed at a suitable location at the Pier Terrace and Belvedere Road Junction adjacent to a receptor to determine the relevant public exposure at this busy location. A further nitrogen dioxide passive monitoring site is to be established to measure urban background concentrations at a central location in Lowestoft.

The next action is the submission of the 2011 Progress Report.

8 References

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NO_2 Diffusion Tubes for LAQM: Guidance Note for Local Authorities, Prepared for Defra and the Devolved Administrations, AEAT/env/r/2140/Issue 1, March 2006.

NO_2 Concentrations and Distance from Roads, prepared by Professor Duncan Laxen and Dr Ben Marner of Air Quality Consultants Ltd

Appendices

Appendix 1: QA:QC Data

QA/QC of diffusion tube monitoring
The diffusion tubes used in Waveney District Council are supplied and analysed by Harwell Scientifics, which is currently ranked as a **Category Good** laboratory in the WASP inter-comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes. The tubes were prepared by spiking acetone:triethanolamine (50:50) into the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow auto-analyser with ultraviolet detection. The samples were analysed in accordance with Harwell Scientifics standard operating procedure HS/W1/1015 issue 14 which meets the guidelines set out in DEFRA's 'Diffusion Tubes For Ambient no2 Monitoring practical Guidance'

The results were initially calculated assuming an ambient temperature of 11^{o}C, and the reported values adjusted to 20 ^{o}C to allow for direct comparison with EU limits.

The reported results were not bias adjusted by Harwell Scientifics.

The diffusion tubes are stored and installed by Waveney District Council in accordance with "NO_2 Diffusion Tubes for LAQM:Guidance Note for Local Authorities"

The NO_2 diffusion tube calendar of exposure periods was followed in the latter half of 2009. As a consequence tubes were changed every month within +/- 2 days of the date specified by the calendar.

QA/QC of automatic monitoring
The organisation which carries out the QA /QC is AECOM, Registered Office: AECOM House, 63-77 Victoria Street, St Albans, Herts, AL1 3ER

QA/QC Procedures
Monitoring in Lowestoft is performed in accordance with the guidelines outlined in Technical Guidance Notes LAQM.TG(09), LAQM.TG(03) and LAQM.TG1(00). The continuous chemiluminescence NO_X analyser was set up and calibrated in strict accordance with the manufacturers' recommended procedures prior to and during use. An overview of QA/QC procedures are provided below.

Manual calibrations of the NO_X analyser are conducted every two to three weeks by the Local Site Operator (LSO) to quantitatively determine instrumental drift. Air Liquide specialist calibration gases are used to obtain span values and instrumental drift is accounted for during the processing of the data. The analyser filter is also changed during routine calibrations, with span and zero determinations being made before and after. Instrument span or zero drift between calibrations is assumed to be linear between discrete checks, and the data corrected linearly in accordance with any drift.

All fittings in contact with the sample gas stream are either polytetrafluoroethene (PTFE) or stainless steel, so that surface losses are kept to a minimum. Qualified engineers service the analyser at six monthly intervals. The analyser is covered by an unlimited 48-hour emergency call-out agreement, which allows serious analyser malfunctions and technical issues to be resolved in a timely manner.

Remote communications are possible by means of a web logger containing an internal GPRS device, which provides a continuous connection to a web-based server. All data are downloaded automatically to this server and can be displayed in real-time. The web logger and server facilitate easy visual screening of the data and allow any problems with the analyser to be detected at an early stage. This screening helps to minimise data loss due to technical issues.

Data Validation and Ratification Procedures

The raw NO and NO_X monitoring data are recorded in fifteen-minute increments. The data are downloaded continuously to a web-based server, which is refreshed every fifteen minutes. Validation of the data is carried out manually on a daily basis to 'flag' any suspicious data and remove obvious erroneous values. All validated data are marked as 'Provisional' and remains so until full data ratification is completed.

Data ratification is carried out quarterly and involves a thorough check of the raw data to identify erroneous data (those identified during validation and any additional spurious data that becomes apparent upon closer inspection), adjustment of the raw data for calibration factors and ensuring that good data lies above the zero baseline.

The main steps taken in the ratification process are:

- Collate all calibration records and ensure that the calibration factors are applied correctly to the raw data.
- The calibration-corrected data are examined to identify any anomalies in the dataset, including comparisons made with other nearby monitoring sites.
- Data shown to be erroneous are deleted.
- The monitoring data, calibration records and service reports are used to correct for baseline drift.
- Drift-corrected NO concentrations are subtracted from drift-corrected NO_X concentrations to obtain drift-corrected NO_2 concentrations.
- Conversion factors are applied to the ratified drift-corrected data to report concentrations in $\mu g/m^3$.
- The ratified 15-minute data are then processed to provide hourly mean pollutant concentrations.
- Basic statistical analysis of the data is performed to determine mean concentrations, maximum hourly mean concentrations and data capture rates.

Appendix 2

Diffusion Tube Bias Adjustment Factors

There has been no local co-location study conducted and the `Bias Adjustment Factor used in the studies was obtained from the spreadsheet, version 02/10, which is published by the Air Quality Consultants Limited on behalf of Defra, the Welsh Assembly Government, the Scottish Government and the Department of the Environment for Northern Ireland. An overall factor of 0.82 was used and this was obtained from 9 separate studies of Harwell Scientific Services, which is a laboratory achieving good precision. The coefficient of variation (CV) of diffusion tubes replicates is considered good (good precision) when the CV of eight or more periods less than 20%, and the average CV of all monitoring periods is less than 10%.

The bias adjusted means and raw means obtained from all diffusion tube sites are shown in the table below.

Site ID	Raw mean	Bias adjustment factor	Adjusted mean
Castleton Avenue	23.12	0.82	18.96
Fir Lane	28.36	0.82	23.26
Dutchmans Court	32.96	0.82	27.03
Golden Court	39.75	0.82	32.60
Pier Terrace	41.75	0.82	34.24
Saltwater Way	33.23	0.82	27.25
Yarmouth Road	31.74	0.82	26.03
Mill Road	41.20	0.82	33.79

Short-term to Long-term Data adjustment

The data capture from both the continuous monitor in Belvedere Road and the Mill Road diffusion tube monitoring site was less than 75% and the periodic data had to be annualised . The calculation used to estimate annual mean concentrations from short-term monitoring data was obtained from LAQM.TG(09) and an adjustment factor is used on the basis that patterns in pollutant concentrations usually effect a wide region thus if a short period is above average at one place it will almost certainly be above average at other locations in the region. Two long term continuous monitoring sites (AURN) measuring urban background concentrations of NO_2 which form part of the national network, at Southend and Thurrock were used to calculate a ratio of the annual mean to the period mean. Southend had a data capture rate of 91.4% and Thurrock achieved data capture of 97.4%. The two sites were the only sites providing appropriate background data in the region.

An adjustment factor of 1.101 was calculated from the average of the ratios obtained using data from the two sites and applied to the results from the Mill Road survey. An adjustment factor of 1.103 was calculated from the average of the ratios obtained using data from the two sites and applied to the results from the real time continuous air quality monitor survey.

Site	Site Type	Data Capture %	Annual Mean	Period Mean	Ratio
Southend	Urban Background	91.45	23.17	20.1	1.05
Thurrock	Urban Background	97.477	31	29.50	1.153
				Average	1.101

Table 1: Periodic Means/Ratio used to Annualise the Results from the Mill Road Diffusion Tube Study (April – June 09)

Site	Site Type	Data Capture %	Annual Mean	Period Mean	Ratio
Southend	Urban Background	91.45	23.17	21.02	1.13
Thurrock	Urban Background	97.477	31.0	27.873	1.11
				Average	1.103

Table 2: Periodic Means/Ratio to Annualise the Results from the Automatic Monitor in Belvedere Road (May to December 09)

Method used to Predict NO_2 Concentrations at Different Distances from Road

The monitoring sites are located in the areas of concern to represent the worst-case public exposure, but it is not possible to measure concentrations at the desired location because of practical reasons and the in most cases the relevant public exposure is located a short distance away. The calculator described in LAQM. TG(09) has been used to predict concentrations at the nearest point of relevant public exposure. The local background concentration in $\mu g/m^3$ of the appropriate years (2008 & 2009) have been obtained from the national maps published at www.airquality.co.uk. Results derived in this way will have a greater uncertainty than measured data and this uncertainty increases as the distance between the measuring location and relevant receptor grows larger.

The calculator as a spreadsheet is available on www.airquality.co.uk and is shown below.

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Enter data into the yellow cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	(Note 1)	0	**2.4**	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	(Note 1)	0	**5**	metres
Step 3	**What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?**	(Note 2)	0	**12.13**	$\mu g/m^3$
Step 4	**What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?**	(Note 2)	0	**26.4**	$\mu g/m^3$
Result	**The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor**	(Note 3)		**23.8**	$\mu g/m^3$

Note 1: This should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 2: 16/03/09. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Location	January	February	March	April	May	June	July	August	Sept	October	November	December
Castleton Avenue	39.4	26.2	23.7	0	13.3	23.1	14.1	18.5	21	24.1	18.9	32
Fir Lane	49.1	42.3	38.8	0	23	17.8	30.7	11.2	23.7	32	14.2	29
Dutchmans Court	44.1	40.9	37	0	25	31.9	24.1	20.4	28.5	40.7	36.9	33.1
Golden Court	57.7	40.2	39.9	0	30.9	29	36.6	21	42	43.8	48	48.2
Pier Terrace	93.7	43.9	49.8	0	27.2	29.1	28.8	30.3	29	44.1	36.6	46.8
Saltwater Way	71.5	39.6	38	0	22.9	24	25.4	20.9	21.3	32.2	33.8	35.9
Yarmouth Road	49.7	52.6	0	0	16.9	23.2	33.6	15.5	29.7	34.8	24.5	36.9
Mill Road	74	57.6	0	0	0	0	22.6	14.5	30	32.5	30.5	37.7

Raw (unadjusted) Measurements Obtained from the Diffusion Tube Studies