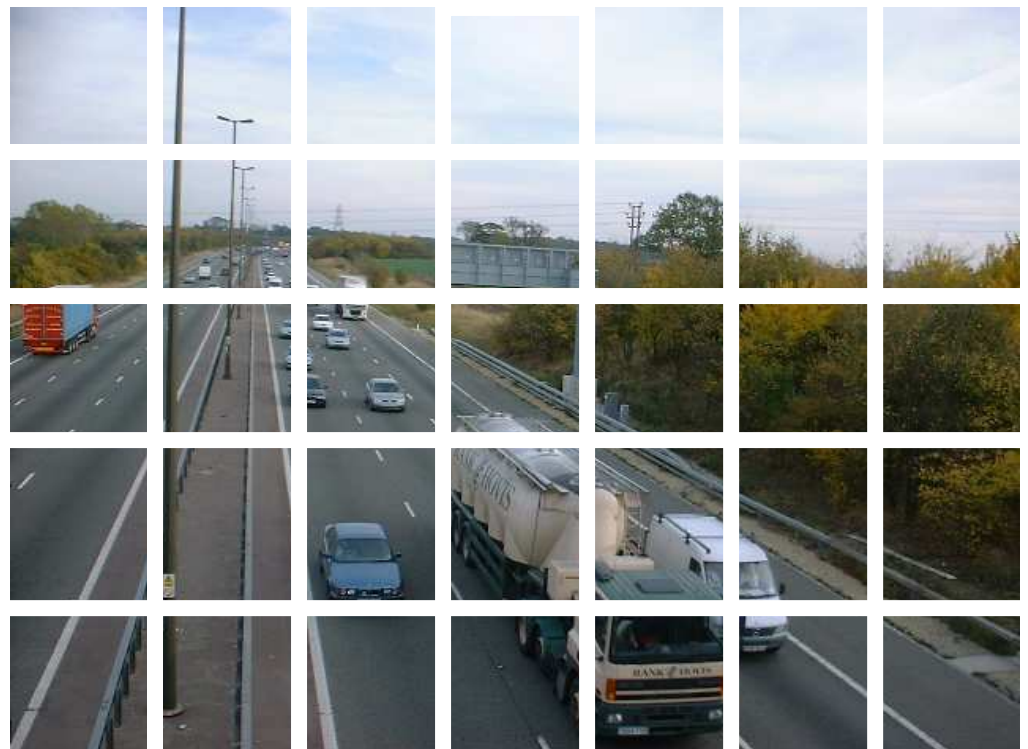


ASHFIELD DISTRICT COUNCIL AIR QUALITY REVIEW AND ASSESSMENT

Progress Report 2005



ENVIRONMENTAL PROTECTION SECTION



ASHFIELD DISTRICT COUNCIL

**Review & Assessment
Local Air Quality Management**

**PROGRESS REPORT
APRIL 2005**

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Acknowledgements

The Council would like to thank those who have provided help, co-operation, information and resources to enable Ashfield District Council to undertake this local air quality Progress Report

Ashfield District Council Progress Report 2005

1.0 Executive Summary

Part IV of the Environment Act 1995¹ requires local authorities to review and assess the current and future air quality in their areas against objectives set out for eight key air pollutants, under the provisions of the National Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002² (Table 1.0).

A review and assessment of air quality is the first step in the Local Air Quality Management (LAQM) process. Part IV of the Act requires each local authority to review air quality 'from time to time'. The National Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002 prescribe air quality objectives and the dates for meeting them. For each objective, local authorities have to consider present and future air quality and assess whether the objectives are likely to be achieved by the prescribed date.

Review and assessment is now undertaken using a phased approach, initially conducting an 'Updating and Screening Assessment'; this is based on a checklist approach to identify those matters that have changed since the first round of review and assessment was completed and which now require further assessment. Then a 'Detailed Assessment' where the updating and screening assessment indicates that an Air Quality Objective may be compromised. Guidance for progress reports has been given in Technical Guidance LAQM. TG(03)³.

1.1 Progress Reports

Progress reports have now been introduced into the Local Air Quality Management (LAQM) system following a detailed evaluation of the first round of review and assessment. The evaluation report recommended that "*Careful consideration should be given to requiring an annual LAQM report instead of less frequent review and assessment reports. It would help ensure continuity in resourcing air quality within local authorities so as to maintain the capacity and skills required to manage LAQM. Such a report should provide both a review and update on air quality issues, including information on developments that might affect air quality and the results of monitoring. It would ensure that circumstances requiring a detailed assessment were identified early and acted upon without delay*".

Progress reports are designed to ensure continuity in the LAQM process. They thus fill the gaps between the three yearly requirements to carry out a review and assessment of air quality. Guidance for progress reports has been given in LAQM.PRG(03)⁴.

Progress reports are only required in years when the authority is not carrying out an Updating and Screening Assessment or a Detailed Assessment. Thus, this report forms the first Progress Report produced by Ashfield District Council following the Updating and Screening Assessment submitted to Defra in 2003, a Detailed Assessment submitted in April 2004 and a further Detail Assessment submitted in December 2004^{5,6,7}.

1.2 Summary

A review of air quality measurement during 2003/04 has demonstrated that all the air quality objectives continue to be achieved across Ashfield. There is no requirement to proceed to a Detailed Assessment for any of the Air Quality Strategy pollutants as a result of air quality data reported within this Progress Report.

1.3 Introduction

The aim of this report is to detail the progress on implementing local air quality management across Ashfield by presenting new monitoring data and a review of local developments which might affect local air quality. This Progress Report represents the fifth report on air quality produced by Ashfield District Council. It is recommended that the report is read in conjunction with the preceding reports, Air Quality Review and Assessment Third Stage August 2001, Updating and Screening Assessment May 2003, Detailed Assessment April 2004 and Detailed Assessment December 2004⁸.

The objectives of this report are to:

- Provide an update on monitoring that has taken place since the Updating and Screening Assessment submitted to Defra in May 2003.
- Review any new developments or changes that might have an affect on local air quality
- Provide the means for communicating air quality information to members and the public.

The report adopts the same format as the Updating and Screening Assessment by utilising the profile suggested within the Technical Guidance LAQM. TG(03) and the Progress Report Guidance LAQM.PRG(03). Air quality has been assessed against a list of guidance criteria and where necessary new monitoring data has been reviewed and updated.

Table 1.0 Objectives included in the Air Quality Regulations (England) (Wales) 2000 and in Air Quality (England) (Wales) (Amendment) Regulations 2002 for the purpose of Local Air Quality Management.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured As	
Benzene ¹	16.25 µg/m ³	Running annual mean	31.12.2003
	5 µg/m ³	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon monoxide ¹	10.0 mg/m ³	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5µg/m ³	Annual mean	31.12.2004
	0.25µg/m ³	Annual mean	31.12.2008
Nitrogen dioxide ²	200 µg/m ³ not to be exceeded more than 18 times a year.	1-hour mean	31.12.2005
	40 µg/m ³	annual mean	31.12.2005
Particles (PM₁₀) (gravimetric) ³	50 µg/m ³ not to be exceeded more than 35 times a year.	24-hour mean	31.12.2004
	40 µg/m ³	annual mean	31.12.2004
Sulphur dioxide	350µg/m ³ not to be exceeded more than 24 times a year.	1-hour mean	31.12.2004
	125µg/m ³ not to be exceeded more than 3 times a year.	24-hour mean	31.12.2004
	266µg/m ³ not to be exceeded more than 35 times a year.	15-minute mean	31.12.2005

¹ The Air Quality Objective of 5 µg/m³ for benzene and the objective of 10µg/m³ for carbon monoxide came into force in separate Air Quality (Amendment) Regulations for England and Wales on 11 December 2002 and 31 December 2002 respectively.

² The objectives for nitrogen dioxide are provisional.

³ Measured using the European gravimetric transfer sampler or equivalent

2.0 CARBON MONOXIDE

The Government and Devolved Administrations have set a new objective of 10mg/m³ as a daily running mean concentration, to be achieved by the end of 2003, bringing it into line with the Second Air Quality Daughter Directive limit value².

National Objective:

10mg/m³ Max daily running eight-hour mean. 31st. December 2003

2.1 (A) Monitoring Data

No local monitoring has been undertaken for carbon monoxide in Ashfield since the Updating and Screening Assessment reported in 2003, which concluded that the annual objective concentration of 10mg/m³ in 2003 will be met across the district. There has been no significant increase in carbon monoxide sources identified within Ashfield.

A considerable amount of data relating to emissions of carbon monoxide was compiled and entered into an emission inventory utilised during the Updating and Screening Assessment⁹. It is planned to revise and update this emission inventory during 2005 in preparation for the next round of review and assessment in April 2006. The review will consider all sources of carbon monoxide and will be undertaken by consultants acting on behalf of Nottinghamshire authorities.

There has been no significant increase in carbon monoxide sources identified within Ashfield. Low resolution modelling conducted during the first round of review and assessment indicated that carbon monoxide levels were predicted to be between 0.3 mg/m³ – 0.6 mg/m³ (1997), considerably below the new objective¹⁰.

Automatic Urban Network Stations

A summary of maximum 8-hour mean concentrations measured at nearby Automatic Urban Network Stations (Table 2.1) indicate there has been no exceedances of the objective and results are well below the standard.

Table 2.1 *Summary of Maximum Carbon Monoxide 8-Hour mean concentrations measured at a number of National Network Monitoring Sites (2001 – 2004)*

Site	Site Classification	Maximum daily 8-hour mean concentration (Objective 10mg/m ³)			
		2001 mg/m ³	2002 mg/m ³	2003 mg/m ³	2004 mg/m ³
Nottingham Centre	Urban Centre	0.57	0.39	0.43	0.47
Birmingham East	Urban Background	0.39	0.26	0.27	0.23
Sheffield Centre	Urban Centre	0.50	0.41	0.40	0.37
Leicester Centre	Urban Centre	0.55	0.49	0.49	0.34

2.2 (B) Very Busy Roads or junctions in Built-up areas

Local authorities are only required to undertake a review and assessment for road traffic sources of carbon monoxide in respect of the 2003 objective, where there are 'very busy' roads with daily average traffic (AADT) flows that exceed the following criteria:

- i. single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day.
- ii. dual carriageway (2 or 3 lanes) roads with daily average traffic flows which exceed 120,000 vehicles per day.
- iii. Motorways with daily average traffic flows which exceed 140,000 vehicles per day.

There are no new roads in Ashfield that have been identified as 'very busy' and therefore no further assessment has been undertaken for this section.

2.3 CONCLUSION

The assessment of carbon monoxide has been reviewed against the checklist criteria contained in the LAQM Technical Guidance (03). It is expected that the annual objective concentration of 10mg/m^3 in 2003 will continue be met across Ashfield.

There is no requirement to undertake a detailed assessment for carbon monoxide in any location within Ashfield.

3.0 BENZENE

The Government and Devolved Administrations have adopted a running annual mean of $16.25\mu\text{g}/\text{m}^3$ as the air quality standard for benzene, with an objective for the standard to be achieved by the end of 2003. However, in light of the health advice from the Expert Panel on Air Quality Standards (EPAQS) and the Department of Health's Committee on Carcinogenicity of Chemicals in Food, Consumer Products and the Environment (COC), additional tighter objectives have been set. The Second Air Quality Daughter Directive for benzene, which has been transposed into UK legislation, sets a limit value, annual mean of $5\mu\text{g}/\text{m}^3$ to be achieved by 1st January 2010².

National Objectives:

$16.25\mu\text{g}/\text{m}^3$ running annual mean 31st. December 2003

$5\mu\text{g}/\text{m}^3$ annual mean 31st. December 2010

3.1 (A) Monitored Data

No local monitoring has been undertaken for benzene in Ashfield since the Updating and Screening Assessment, which concluded that the annual objective concentrations of $16.25\mu\text{g}/\text{m}^3$ (2003) and $5\mu\text{g}/\text{m}^3$ (2010) would be met across Ashfield.

A considerable amount of data relating to emissions of benzene was compiled and entered into an emission inventory utilised during Updating and Screening Assessment in 2003. It is planned to revise and update this emission inventory during 2005 in preparation for the next round of review and assessment in April 2006. The review will consider all sources of benzene and will be undertaken by consultants acting on behalf of Nottinghamshire authorities.

Automatic Monitoring Network Data

A summary of maximum annual running mean concentrations measured at nearby Automatic Urban Network Stations (Table 3.0) indicate there has been no exceedances of the objective and results are well below the standard.

Table 3.0 *Summary of Maximum Running Annual Mean Concentrations measured at National Monitoring Sites (2000-2003)*

AUN Site		Maximum Running Annual Mean Concentration			
		2001	2002	2003	2004
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
Urban Centre	London Marylebone Rd	4.55	3.93	3.31	2.76
Rural	Harwell	0.62	0.62	0.58	0.42

Figures in the above table are well below the objective before correction factors have been applied (which will reduce the figures further).

3.2 (B) Very Busy Roads or junctions in built-up areas

Local authorities are only required to undertake a review and assessment for road traffic sources of benzene in respect of the 2003 objective, where there are 'very busy' roads with daily average traffic (AADT) flows that exceed the following criteria:

- iv. single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day.
- v. dual carriageway (2 or 3 lanes) roads with daily average traffic flows which exceed 120,000 vehicles per day.
- vi. Motorways with daily average traffic flows which exceed 140,000 vehicles per day.

There are no roads in Ashfield that have been identified as 'very busy' and therefore no further review and assessment has been undertaken for this section.

3.3 (C) Industrial sources

There have been no new industrial sources of benzene identified within Ashfield as determined against the checklist in Annex 2 of the LAQM Technical Guidance (03) and therefore no further assessment has been undertaken for this section.

3.4 (D) Petrol Stations

None of the Petrol stations in Ashfield meet the required criteria for assessment stipulated in the LAQM Technical Guidance (03) and therefore no further assessment has been undertaken.

3.5 (E) Major fuel storage depots (Petrol only)

There are no major fuel storage depots located within Ashfield and therefore no further assessment has been undertaken for this section.

3.6 CONCLUSION

The assessment for benzene has been completed against the criteria checklist contained in the LAQM Technical Guidance (03). It is expected that the annual objective concentrations of $16.25 \mu\text{g}/\text{m}^3$ (2003) and $5 \mu\text{g}/\text{m}^3$ (2010) will be met across Ashfield.

There is no requirement to undertake a detailed assessment for benzene within Ashfield.

4.0 1,3 BUTADIENE

The Government and Devolved Administrations have adopted a maximum running annual mean concentration of $2.25 \mu\text{g}/\text{m}^3$ as an air quality standard for 1,3 butadiene. The objective is for the standard to be achieved by the end of 2003.

National Objectives:

$2.25\mu\text{g}/\text{m}^3$ running annual mean 31st. December 2003

4.1 (A) Monitoring Data

No monitoring for 1,3-butadiene has been undertaken in Ashfield since the Updating and Screening Assessment in 2003, which concluded that the annual objective concentration of $2.25\mu\text{g}/\text{m}^3$ (2003) will be met across the district. There has been no significant increase in 1,3-butadiene sources identified within Ashfield.

A considerable amount of data relating to emissions of 1,3-butadiene was compiled and entered into an emission inventory utilised during Updating and Screening Assessment in 2003. It is planned to revise and update this emission inventory during 2005 in preparation for the next round of review and assessment in April 2006. The review will consider all sources of 1,3-butadiene and will be undertaken by consultants acting on behalf of Nottinghamshire authorities.

Automatic Monitoring Network Data

A summary of annual mean concentrations measured at Automatic Urban Network Stations (Table 4.0) indicate there has been no exceedances of the objective and results are well below the standard.

Table 4.0 Summary of annual mean concentration of 1,3-butadiene (2001 – 2004)

Annual Mean Concentration					
AUN Site		2001	2002	2003	2004
		$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
Rural Background	Harwell	0.11	0.04	0.03	0.02
Urban Background	London Marylebone	1.12	0.95	0.64	0.57

4.2 (B) New Industrial Sources

There have been no new industrial sources identified since the Updating and Screening Assessment likely to give rise to exceedances of the running average mean objective for 1,3-butadiene.

4.3 (C) Industrial sources with substantially increased emissions.

There has been no substantial increase of 1,3-butadiene emissions identified since the Updating and Screening Assessment likely to give rise to exceedances of the running average mean objective for 1,3-butadiene.

4.4 CONCLUSION

The assessment of 1,3-butadiene has been reviewed against the checklist criteria contained in the LAQM Technical Guidance (03). There have been no significant changes and it is expected that the annual objective concentration of $2.25\mu\text{g}/\text{m}^3$ (2003) will continue to be met across Ashfield.

There is no requirement to undertake a detailed assessment for 1,3-butadiene within Ashfield.

5.0 LEAD

The Government and Devolved Administrations have adopted an annual mean concentration of $0.5\mu\text{g}/\text{m}^3$ as the air quality standard for lead, with an objective for the standard to be achieved by the end of 2004. In addition, a lower air quality objective of $0.25\mu\text{g}/\text{m}^3$ to be achieved by the end of 2008 has also been set⁴.

National Objectives:

$0.5\mu\text{g}/\text{m}^3$ annual mean 31st. December 2004

$0.25\mu\text{g}/\text{m}^3$ annual mean 31st. December 2008

5.1 (A) Monitoring Data

No local monitoring has been undertaken within Ashfield to determine the concentrations of lead against the objective concentrations. There was no emission inventory compiled during the Updating and Screening Assessment as evidence suggested that there was no risk of the objective being exceeded. There has been no significant increase in sources of lead since the Updating and Screening Assessment.

5.2 (B) New industrial sources

There have been no new industrial sources of lead identified since the Updating and Screening Assessment as likely to give rise to exceedances of the annual mean objectives for lead in 2004 or 2008.

5.3 (C) Industrial source with substantially increased emissions

There has been no substantial increase in lead emissions from any source within Ashfield therefore no further assessment has been made.

5.4 CONCLUSION

The review for lead has been completed against the criteria contained in the LAQM Technical Guidance (03). It is expected that the annual objective concentration of $0.5\mu\text{g}/\text{m}^3$ (2004) and $0.25\mu\text{g}/\text{m}^3$ (2008) will be met across Ashfield.

There is no requirement to undertake a detailed assessment for lead within Ashfield.

6.0 NITROGEN DIOXIDE (NO₂)

The Government and Devolved Administrations have adopted two Air Quality Objectives for nitrogen dioxide, as an annual mean concentration of 40µg/m³ and a 1-hour mean concentration of 200µg/m³, not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005⁴.

The first Air Quality Daughter Directive also sets limit values for nitrogen dioxide, which has been transposed into UK legislation. The directive includes a 1-hour limit value of 200µg/m³ not to be exceeded more than 18 times per year and an annual mean limit value of 40µg/m³ both to be achieved by 1st January 2010⁴.

UK National Objectives:

200 µg/m³ 1 hour mean (18 exceedances) 31st. December 2005

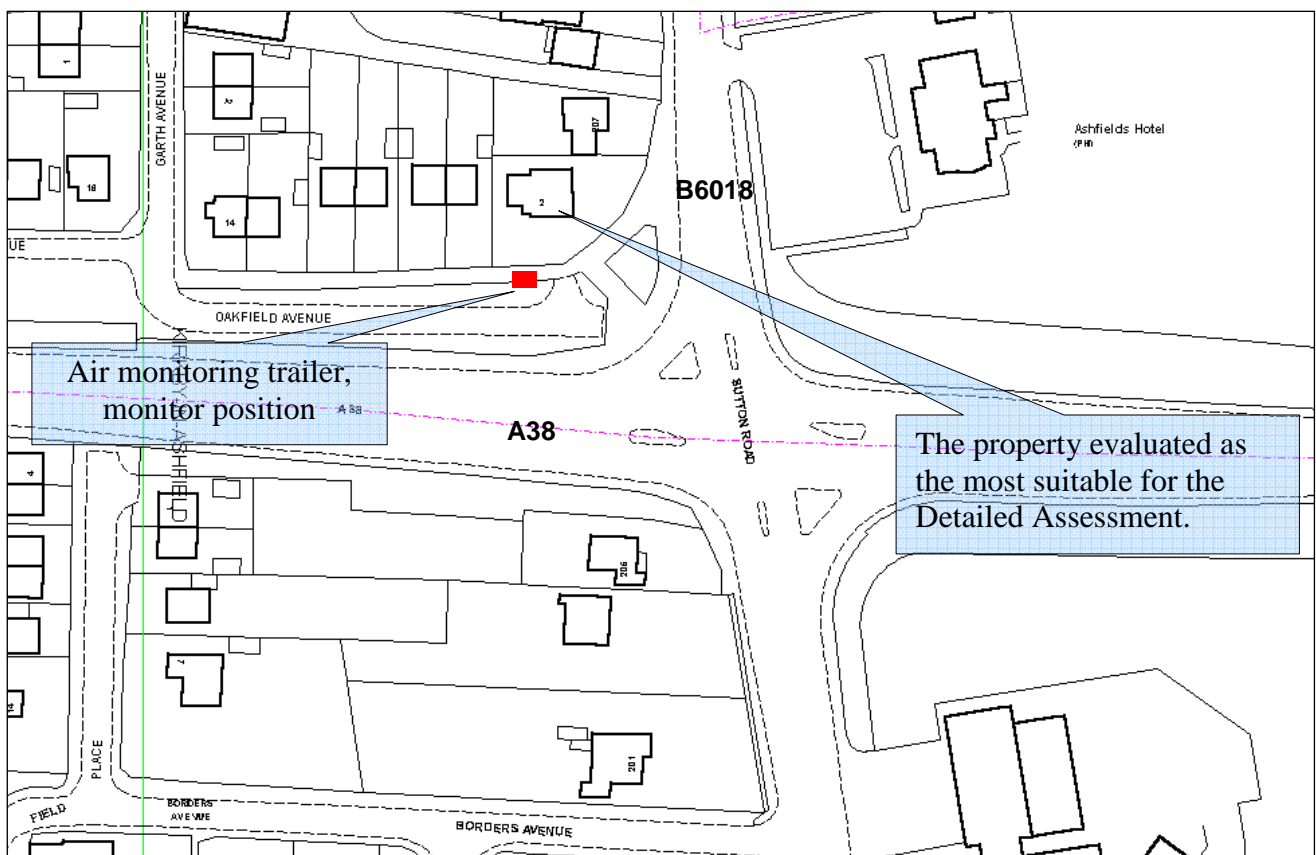
40 µg/m³ annual mean 31st. December 2005

6.1 (A) Monitoring Data

6.2 Oakfield Avenue, Kirkby-in-Ashfield (Junction of A38 and B6018)

Measurement period: July 8th 2002 to May 14th 2003
Total data capture 311 days out of a total of 311 days.

Figure 6.0 Location of the Chemiluminescence Monitor at Oakfield Avenue B6018 and A38



40m, from the junction of the A38 and 26m from the B6018. The chemiluminescence

monitor was located in a trailer adjacent to a property at a distance of 24 metres from the centre of the main trunk road of the junction (see Fig. 6.0).

Monitoring Result

Monitoring was undertaken at Oakfield Avenue between July 2002 and May of 2003. Data recorded between 8th July 2002 and 28th February 2003 was reported within the Updating and Screening Assessment. However the monitor remained in this location for a further three months. The additional data has therefore been reviewed and a summary of the results are tabulated below (Table 6.0). The mean concentration recorded over the monitoring period was 41.1µg/m³. The highest 1-hour mean concentration was 159µg/m³ (see figure 6.1).

Table 6.0 *Summary of nitrogen dioxide monitoring data Oakfield Avenue, Kirkby-in-Ashfield*

Location	24 hour means (monitoring period)			EU 2010
	Measured Period Mean (µg/m ³)	Min 1 hour (µg/m ³)	Max 1 hour mean (µg/m ³)	No of 1-hour limit value exceedances >200 (µg/m ³)
Oakfield Avenue Kirkby-in-Ashfield 2002/03	41.1	0	159	0

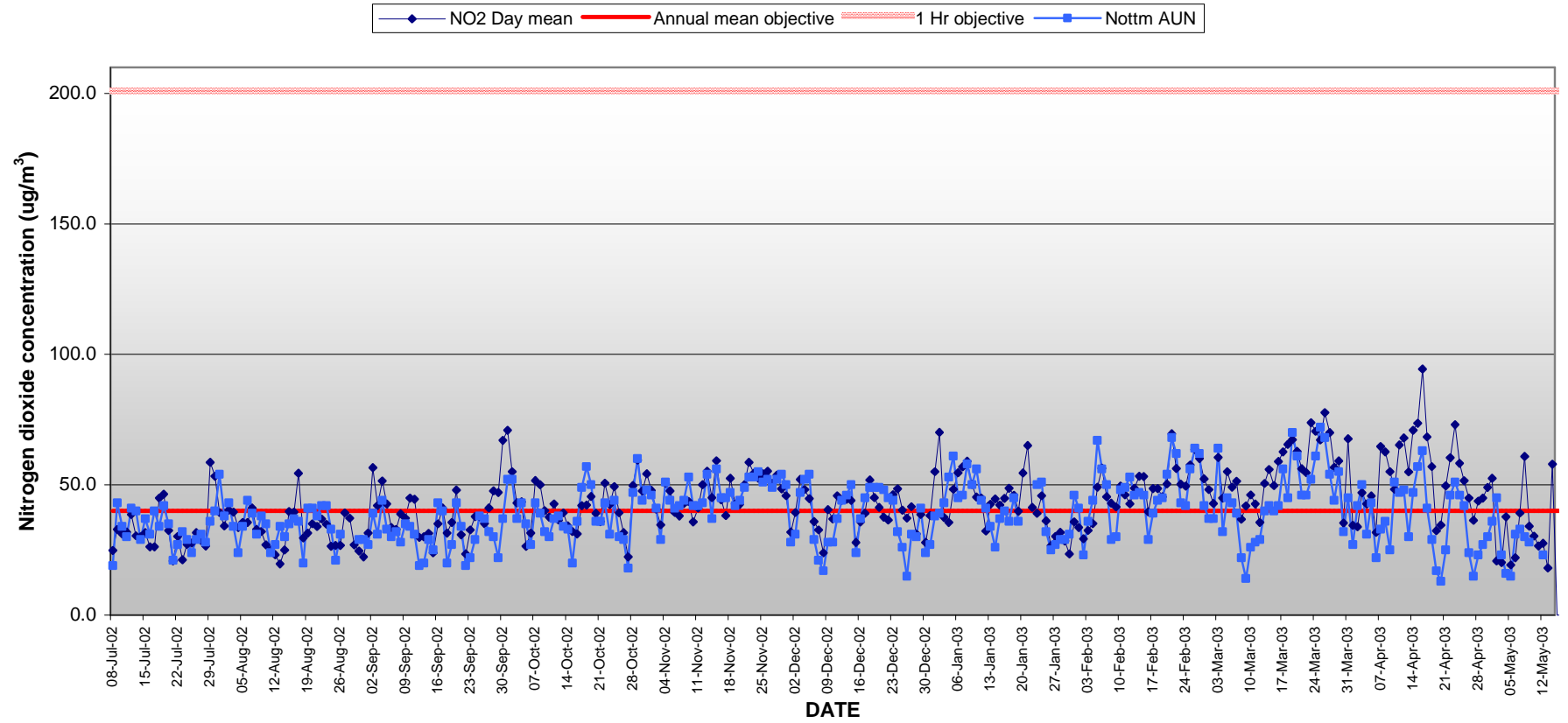
A period of approximately 10 months monitoring data was available for assessment at this location as recorded above (July 2002 to May 2003). Only 10 months data was available for the assessment at this location. Estimated annual averages were therefore calculated in accordance with the LAQM Technical Guidance (03) (Box 6.5 and 6.6) and then extrapolated to determine whether the 2005 and 2010 objectives would be compromised. Table 6.1 tabulates the results for this location.

Table 6.1 *Estimated nitrogen dioxide annual mean concentration for 2005 and 2010 Oakfield Avenue*

Location	Estimated Annual Mean in 2003 (µg/m ³)	Estimated Annual mean in 2005 (µg/m ³)	Estimated Annual mean in EU 2010 (µg/m ³)	2005 & 2010 Annual mean Objective (µg/m ³)
Oakfield Avenue 2003 data	39.8	37.7	30.5	40

The estimated annual mean at Oakfield Avenue for 2003 was calculated as 39.8µg/m³ based upon a 10 month monitoring period commencing 8th July 2002 to 14th May 2003. The estimated annual mean in 2005 was calculated as 37.7µg/m³ below the 2005 objective of 40µg/m³. The estimated annual mean at Oakfield Avenue for 2010 was 30.5 µg/m³ well below the 2010 objective of 40µg/m³.

Figure 6.1
Nitrogen Dioxide Monitoring results at Oakfield Avenue (A38 & B6018)
Summary of results from the chemiluminescence analyser from 8 July 2002 - 12 May 2004



Comparisons made with nitrogen dioxide results from the Automatic Urban Network (AUN) site in Nottingham City Centre are shown in figure 6.1 and indicate that elevated concentrations measured between February and April 2003 were associated with relatively high regional nitrogen dioxide concentrations. Furthermore, the receptor at this location was situated an additional 20 metres back from the road than the monitoring equipment, as such a further reduction in the nitrogen dioxide concentration would be expected at the façade of the building.

Further review and assessment of nitrogen dioxide levels will be undertaken at this location in future years to determine the continued achievement of nitrogen dioxide air quality objectives.

Based upon the continued monitoring carried out at Oakfield Avenue there is no requirement for Ashfield to proceed to a detailed assessment for nitrogen dioxide in respect of the 2005 or 2010 objectives at this location.

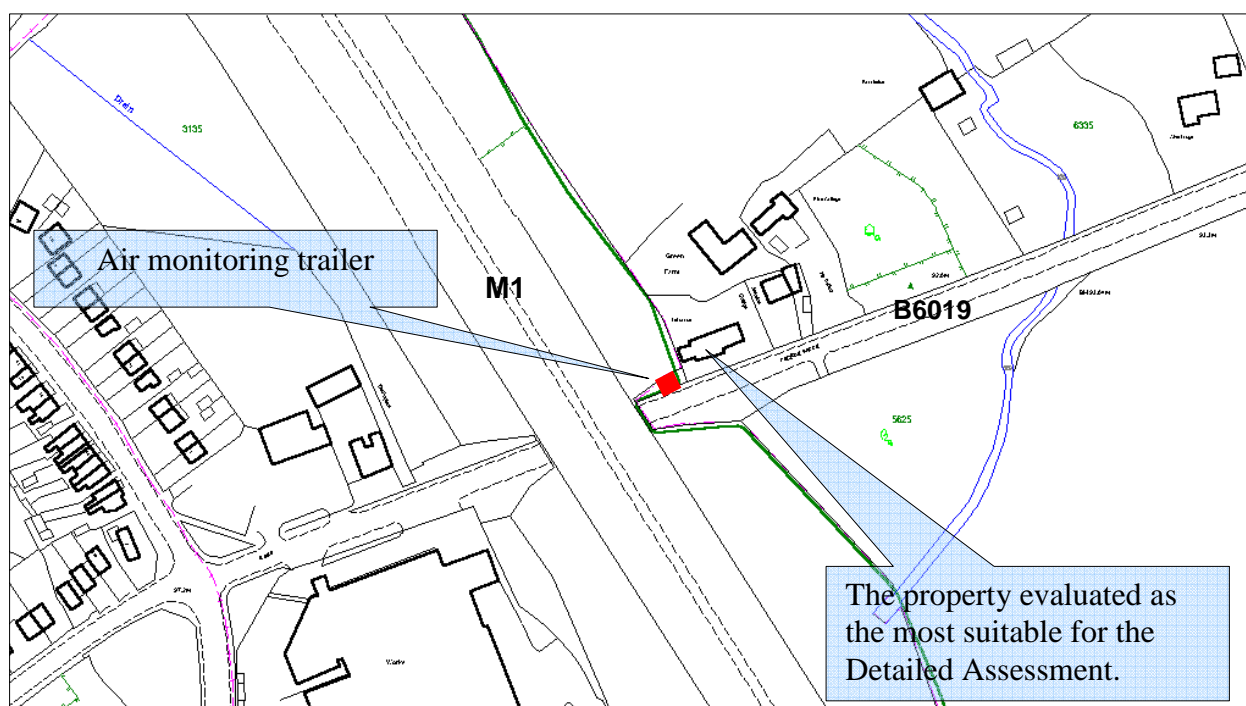
6.3 Pinxton Green, Pinxton (B6019) Within close proximity to M1 Motorway.

Measurement period: 24th July 2003 to 29th April 2004
Total data capture 214 days out of a total of 274 days.

The Monitoring Location

The monitoring trailer was located at Pinxton Green, Pinxton adjacent to houses to the east of the M1 (figure 6.2). The monitoring site was adjacent to a house on the B6019 and approximately 10 metres from the hardshoulder of the M1 Bridge over this road. The sample inlet was approximately 4 metres below the height of the M1. This site is situated Northeast of an industrial estate with both light and heavy industry present.

Figure 6.2 Location of the chemiluminescence monitor at Pinxton Green, Pinxton (B6019 – M1 Motorway Location)



Monitoring Results

Monitoring was conducted at Pinxton Green between July 2003 and April of 2004. A summary of the results is tabulated below (see Table 6.3). The mean concentration recorded over the monitoring period was $34.2\mu\text{g}/\text{m}^3$. The highest 1-hour mean concentration was $133.6\mu\text{g}/\text{m}^3$. There were therefore no exceedances of any of the air quality standards throughout this monitoring period. Due to a technical fault with the monitoring equipment, data recorded between February – March 2004 has been omitted from the assessment (figure 6.3).

Table 6.3 *Summary of nitrogen dioxide monitoring data for Pinxton Green, Pinxton 24th July 2003 to 29th April 2004*

Location	24 hour means (monitoring period)			EU 2010
	Measured Period Mean ($\mu\text{g}/\text{m}^3$)	Min 1 hour ($\mu\text{g}/\text{m}^3$)	Max 1hour mean ($\mu\text{g}/\text{m}^3$)	No of 1-hour limit value exceedances >200 ($\mu\text{g}/\text{m}^3$)
Pinxton Green Pinxton 2004	34.2	3.0	133.6	0

Only short-term data was available for the Updating and Screening Assessment at this location as recorded above (July 2003 to April 2004). The estimated annual mean was calculated in accordance with the LAQM Technical Guidance (03) and then extrapolated to determine whether the 2005 and 2010 (Ref. Box 6.5 and 6.6 of guidance) objectives would be compromised. Table 6.4 tabulates the results for this location.

The base year for estimating the nitrogen dioxide annual mean for Pinxton Green was 2004. The estimated annual mean calculated was based upon the annual mean comparisons with four nearby long-term Automatic Urban Network sites, Nottingham (Urban Centre), Birmingham East (Urban Background), Leicester (Urban Centre) and Sheffield (Urban Centre).

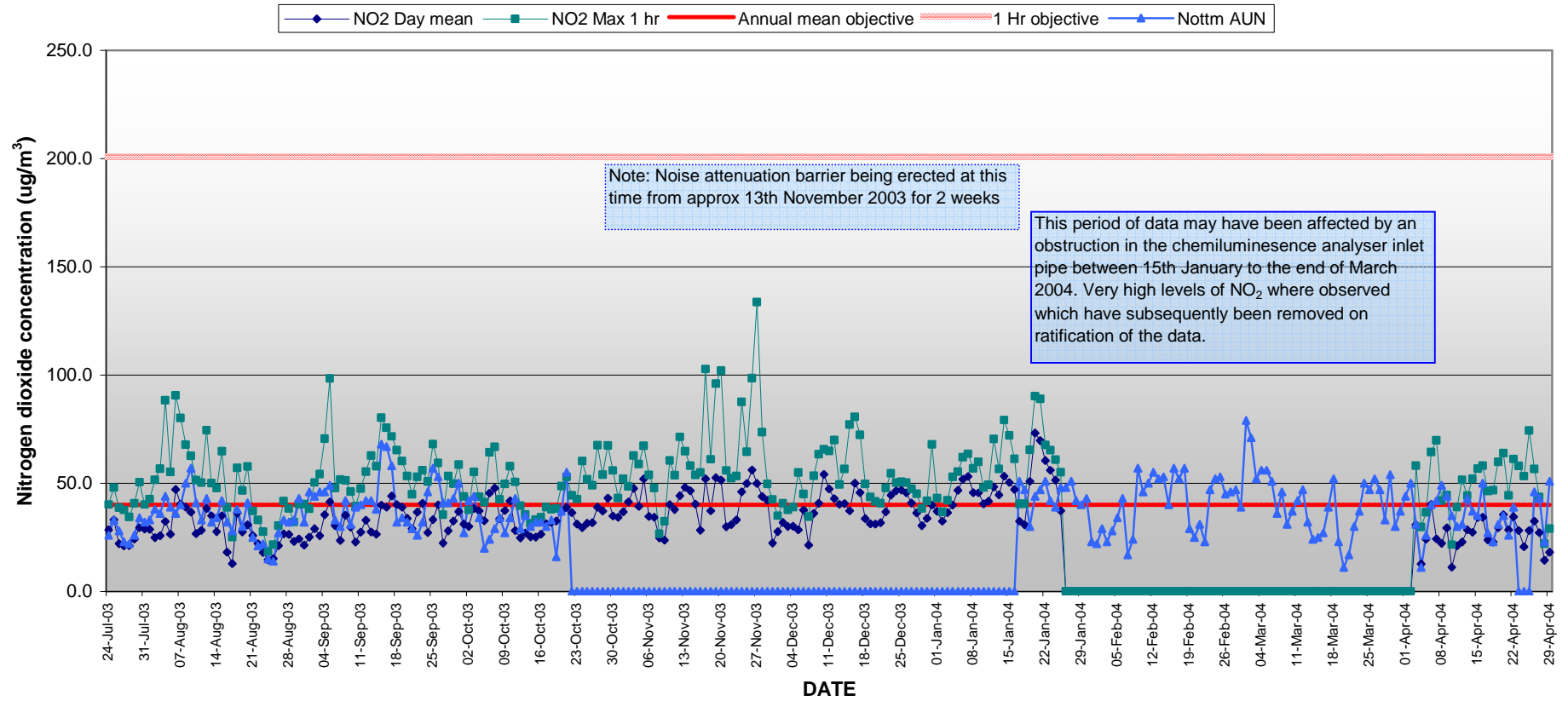
Table 6.4 *Estimated nitrogen dioxide Annual mean concentration for 2005 and 2010 Pinxton Green, Pinxton*

Location	Estimated Annual Mean in 2004 ($\mu\text{g}/\text{m}^3$)	Estimated Annual mean in 2005 ($\mu\text{g}/\text{m}^3$)	Estimated Annual mean in EU 2010 ($\mu\text{g}/\text{m}^3$)	2005 & 2010 Annual mean Objective ($\mu\text{g}/\text{m}^3$)
Pinxton Green Pinxton 2004 data	30.5	29.8	24.5	40

The estimated annual mean at Pinxton Green, Pinxton for 2004 was calculated as $30.5\mu\text{g}/\text{m}^3$ based upon a short-term monitoring period commencing 24th July 2003 to 29th April 2004. The estimated annual mean in 2005 was calculated as $29.8\mu\text{g}/\text{m}^3$ below the 2005 objective of $40\mu\text{g}/\text{m}^3$. The estimated annual mean at Pinxton Green for 2010 was $24.5\mu\text{g}/\text{m}^3$ well below the 2010 objective of $40\mu\text{g}/\text{m}^3$.

Based upon the results of the monitoring carried out at Pinxton Green, Pinxton there is no requirement for Ashfield to proceed to a detailed assessment for nitrogen dioxide in respect of the 2005 or 2010 objectives at this location.

Figure 6.3
Nitrogen Dioxide Monitoring results at M1 Pinxton From 24th July 2003 to 25th April 2004
Summary of results from the chemiluminescence analyser



6.4 Nitrogen Dioxide Diffusion Tubes Network - update

The supply and analysis of nitrogen dioxide diffusion tubes is currently undertaken by Harwell Scientifics who have held this contract since October 1999. A UKAS 1:1 acetone:triethanolamine method is utilised based upon a four week tube exposure period. The annual mean for 2003 and 2004 has been calculated and bias adjusted using the methodology established in the LAQM Technical Guidance (03). The bias corrected annual mean has then been extrapolated to estimate the annual mean in 2005 and compare it to the 2005 objective (see Tables).

Bias Correction for Diffusion Tubes

An approach to bias correction for nitrogen dioxide diffusion tubes is provided within the LAQM Technical Guidance (03). The method can only be calculated based upon the collocation of diffusion tubes with a continuous chemiluminescence monitor, typically over a full year's study. Ashfield have undertaken a collocation study from January 2003 – December 2003. This included locations where the monitor was situated at Oakfield Avenue (January to June) and Pinxton Green (June to December). A bias correction factor supplied by Harwell Scientifics was used for the Updating and Screening Assessment. However, 2003 diffusion tube results have been adjusted against a bias figure calculated from the collocation study. There was insufficient chemiluminescence measurement data available to repeat the collocation study for 2004 as a result of technical problems with the instrumentation, therefore the 2004 diffusion tubes results have been adjusted using the 2003 bias factor. The bias adjustment factor was determined as **0.82** as calculated from the equation:

Bias adjustment:

Adjustment Factor (A)= chemiluminescence mean (Cm)/Diffusion tube (Dm)

$$A = 37.9 / 46.0 = 0.82$$

Table 6.5 *Collocation results between Ashfield chemiluminescence and Diffusion tubes – Annual Mean*

Month	2003 Chemiluminescence analyser µg/m ³	2003 Diffusion Tube Average (mean 3 tubes) µg/m ³
January	41.8	47.8
February	48.2	69.7
March	55.3	53.9
April	53.2	41.6
May	18.9	34.6
June	-	38.2
July	26.8	42.8
August	27.6	39.3
September	32.5	44.1
October	33.9	40.1
November	40.6	52.3
December	37.8	47.6
Annual Mean	37.9	46.0

The correction factor to estimate 2005 annual means were calculated in accordance with the LAQM Technical Guidance (03) Box 6.6

Table 6.6 *Estimated annual mean nitrogen dioxide concentrations 2005 objective based upon 2003 diffusion tubes analysis.*

Location	2003 Annual Mean ($\mu\text{g}/\text{m}^3$)	Ashfield DC 2003 Bias Factor ($\mu\text{g}/\text{m}^3$) (0.82)	Year 2005 Estimated Annual Mean (AQ Objective 40 $\mu\text{g}/\text{m}^3$) ($\mu\text{g}/\text{m}^3$)
Sutton. Outram Street	47.8	39.2	37.2
Sutton Baths	37.6	30.8	29.2
A 38 Fire Station	64.4	52.8	50.1
Selston Kwik Save	39.3	32.2	30.5
Hucknall High street	56.2	46.1	43.7
Hucknall Croft/Beardall St	34.6	28.4	26.9
Kirkby Nag's Head	62.6	51.3	48.6
M1 Salmon Lane	48.7	39.9	37.8
M1 Pinxton	43.0	35.3	33.5
Castle Hill	48.5	39.8	37.7
Oakfield Ave (A38 new site)	45.1	37.0	35.1

Table 6.7 *Estimated annual mean nitrogen dioxide concentrations 2005 objective based upon 2004 diffusion tubes analysis.*

Location	Year 2004 Annual Mean ($\mu\text{g}/\text{m}^3$)	Ashfield DC 2003 Bias Factor ($\mu\text{g}/\text{m}^3$) (0.82)	Year 2005 Estimated Annual Mean (AQ Objective 40 $\mu\text{g}/\text{m}^3$) ($\mu\text{g}/\text{m}^3$)
Sutton. Outram Street	45.8	37.6	36.7
Sutton Baths	30.8	25.3	24.7
Field Place	37.8	31	30.2
Selston Kwik Save	36.9	30.3	29.5
Hucknall High street	50.4	41.3	40.3
Hucknall Croft/Beardall St	33	27.1	26.4
Kirkby Nag's Head	59	48.4	47.2
M1 Salmon Lane	56.7	46.5	45.3
M1 Pinxton	40.1	32.9	32.1
Castle Hill	47	38.5	37.5
Oakfield Ave (A38 new site)	38.8	31.8	31
Old Bleak Hall	33.2	27.2	26.5

Monitoring Results

The most recent nitrogen dioxide diffusion tube monitoring results indicate that the highest annual mean concentrations are typically situated along roads within the urban centres of Hucknall and Kirkby and within the vicinity of the M1. The annual mean concentrations estimated for 2005 at these locations were between 40 – 47 $\mu\text{g}/\text{m}^3$ above the 2005 objective of 40 $\mu\text{g}/\text{m}^3$. However, exposure in these locations would only be short term and it would be unlikely that anyone would be exposed to these levels of nitrogen dioxide over a whole year. A few metres back from the road it would be expected the nitrogen dioxide concentrations would be less than at the roadside.

High nitrogen dioxide concentrations recorded during 2003 at the A38 Fire station location were not considered to be representative of receptors adjacent to the A38. Subsequently the diffusion tube location was repositioned closer to properties adjacent to the A38, on Field Place. As a consequence the 2004 annual average for Field Place was significantly less than the concentration measured at the previous location (a difference of 20 $\mu\text{g}/\text{m}^3$) reflecting this change. The diffusion tubes located at Hucknall 'High Street' and Kirkby 'Nag's Head' have not been relocated as results from these locations form part of the Netcen 'UK Nitrogen Dioxide Network'¹¹.

Conclusions

The nitrogen dioxide diffusion tube results indicate that three locations will slightly exceed the 2005 objective. However, it should be noted that these three sites are all roadside locations where public exposure would be expected to be short term. They are therefore not considered suitable to represent relevant exposure to the annual mean objective (LAQM TG(03) Box 1.4), although they are an invaluable indicative source of spatial distribution of nitrogen dioxide across the district.

The nitrogen dioxide diffusion tube results do not required Ashfield to proceed to a detailed assessment in these areas.

6.5 Collocation diffusion tube study undertaken with Mansfield District Council

The data below (Table 6.8) originates from a collocation study undertaken between Ashfield District Council and Mansfield District Council during 2004 where nitrogen diffusions tubes were collocated together in two locations over a period of ten months. Mansfield District Council utilise the same UKAS 1:1 acetone:triethanolamine analytical method as Ashfield although they employ a different analytical laboratory (Gradko compared to Harwell Scientifics) This has made it possible to directly compare the results between analytical laboratories.

Table 6.8 *Diffusion tube – Collocation study with Mansfield District Council 2004*

Site	Test House	Jan 04	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Average
CB	GradKo	41	NR	NR	34	29	14	26	20	22	35	28
CB	Harwell Scientifics	45	NR	NR	34	30	16	NR	NR	29	32	31
HS	GradKo	45	57	59	56	56	32	41	48	42	46	48
HS	Harwell Scientifics	51	NR	53	53	56	33	39	47	NR	57	49

The results typically demonstrate reasonable agreement, especially when averaged over the 10 month monitoring period. Similarly there is also good agreement between the bias

adjustment factors which have been calculated for the separate diffusion monitoring studies.

Bias adjustment factor Ashfield = 0.82

Bias adjustment factor Mansfield = 0.89

6.6 (B) Monitoring data within an AQMA.

The assessment for this section is only applicable to authorities that have declared Air Quality Management Areas. Ashfield have not declared any Air Quality Management Areas within the district. No further updating and screening assessment has been undertaken for this section.

6.7 (C) Narrow congested streets with residential properties close to the kerb.

Local authorities are only required to undertake assessments of roads where there are narrow congested streets with residential properties within 5m of the kerb and which have traffic flows greater than 10,000 per day.

GIS software and local knowledge were used to evaluate roads within Ashfield against this criteria. AADT road flows were overlaid on GIS street maps to identify such locations. Where residential properties were identified as being within 5 metres of roads, they were located in areas where AADT traffic flows were below 10,000 vehicles per day and where stop start vehicle movements or congestion are not expected.

No locations were identified to warrant the use of the DMRB screening model for narrow congested streets in any location within Ashfield and therefore no further assessment has been undertaken for this section.

6.8 (D) Junctions.

Local authorities are required to undertake assessment of busy junctions within their districts. The LAQM Technical Guidance (03) interprets a 'busy' junction as '*one with more than 10,000 vehicles per day*'⁴. The identification of all busy junctions in Ashfield was undertaken during the first Updating and Screening Assessment utilising GIS software and local knowledge. A number of junctions were modelled which determined that none of these sites were likely to exceed the nitrogen dioxide objective for 2005. There have been no changes in respect of these results since the first Updating and Screening Assessment.

6.9 (E) Busy streets where people may spend 1-hour or more, close to traffic.

Local authorities are only required to undertake review and assessment against this section where there are busy street locations identified where members of the public might regularly spend 1-hour or more, e.g. streets with many shops, streets with outdoor cafes/bars. The guidance interprets 'busy' as those streets with more than 10,000 vehicles per day. There are no streets within Ashfield, which meet all the criteria of this section and therefore no further assessment has been undertaken for this section.

6.10 (F) Roads with high flows of buses and/or HGVs

Authorities are only required to undertake an updating and screening assessment for this section where roads are identified as having an unusually high proportion of buses or HGVs. An 'unusual high proportion of Buses or HGVs' is taken to be greater than 20% of the AADT, LAQM Technical Guidance (03) Box 6.2.

There have been no roads identified within Ashfield which show an 'unusually high proportion of buses and/or HGVs' and therefore no further screening assessment has been undertaken for this section.

6.11 (G) New roads constructed or proposed since first round of review and Assessment.

The Mansfield and Ashfield Regeneration Route (MARR) has now been completed and the road is now open. DMRD modelling undertaken during the first Updating and Screening Assessment did not predict any exceedances of the nitrogen dioxide Air Quality Objectives. However, real time monitoring may be undertaken in future review and assessment investigations to confirm the results of this modelled data.

6.12 (H) Roads close to the objective during the first round of review and assessment.

High resolution modelling for nitrogen dioxide were conducted by CERC during the first round of review and assessment and concluded that there would be no roads within Ashfield other than the M1 Motorway which would exceed the nitrogen dioxide objective in 2005¹⁰. Real time monitoring has since been undertaken at a relevant receptor adjacent to the M1 Motorway and indicates that the 2005 objective is unlikely to be exceeded. The most recent monitoring is reported with section 6.6 of this Progress Report.

No further review and assessment has been undertaken for this section.

6.13 (I) Roads with significantly changed traffic flows

Authorities are only required to undertake the assessment of roads with traffic flows greater than 10,000 vehicles per day that have experienced a large increase in traffic. The LAQM Technical Guidance (03) has interpreted 'large increase' as '*more than a 25% increase in traffic*'. All roads within Ashfield above 10,000 have been evaluated against this criteria.

There are no roads within Ashfield that have seen a 25% increase in daily traffic flow based upon 1997 and 2002 AADT traffic flow data and therefore no further updating and screening has been undertaken for this section.

6.14 (J) Bus Stations

There is only one bus station within Ashfield located at Sutton-in-Ashfield. The guidance only requires the updating and screening process to be undertaken if bus movements exceed 1000 movements a day, and if there is a relevant receptor within 10m, assessed against the 1-hour objective. An evaluation of the bus station has determined that there are well below 1000 bus movements per day. It is also very unlikely that any members of the public would remain in this location for over an hour. No further review and assessment has been undertaken for this section.

6.15 (K) New Industrial sources

A considerable amount of data relating to emissions of nitrogen dioxide was compiled and entered into an emission inventory utilised during Updating and Screening Assessment in 2003. It is planned to revise and update this emission inventory during 2005 in preparation for the next round of review and assessment in April 2006. The review will consider industrial sources of nitrogen dioxide and will be undertaken by consultants acting on behalf of Nottinghamshire authorities. There have been no new industrial sources of nitrogen dioxide identified within Ashfield. No further updating and screening assessment has been undertaken for this section.

6.16 (L) Industrial sources with substantially increased emissions

There have been no new industrial sources with substantially increased emissions identified within Ashfield. No further updating and screening assessment has been undertaken for this section.

6.17 (M) Aircraft

There are no relevant air quality issues relating to aircraft within Ashfield and therefore no further updating and screening has been undertaken for this section.

6.18 CONCLUSION

Further assessment for nitrogen dioxide has been completed against the checklist criteria listed in the LAQM Technical Guidance (03). It is expected that the Air Quality Objectives of $200\mu\text{g}/\text{m}^3$ 1-hour mean (18 exceedances) 2005 and $40\mu\text{g}/\text{m}^3$ annual mean 2005, will be met across Ashfield.

There is no requirement for Ashfield to proceed to a detailed assessment for nitrogen dioxide at any location within the district.

7.0 FINE PARTICLES (PM₁₀)

The Government has adopted two Air Quality Objectives for fine particles (PM₁₀), which are equivalent to the European Union Stage 1 limit values in the first Air Quality Daughter Directive. The objectives are 40µg/m³ as the annual mean and 50µg/m³ as the fixed 24-hour mean not to be exceeded more than 35 days per year. Both standards must be achieved by the end of 2004.

UK National Objectives:

50 µg/m³ (35 exceedances) 24hr mean to be achieved by 31st. December 2004

40 µg/m³ annual mean to be achieved by 31st. December 2004

The Government has also announced new objectives for PM₁₀. These supplement and strengthen substantially the current objectives set in the Air Quality Strategy. These European Union Stage 2 limit values are 20µg/m³ as the annual mean and 50µg/m³ as the 24-hour mean to be exceeded on no more than 7 days per year. The new particulate objectives for England, Wales, Northern Ireland and Greater London are not currently included in Regulations for the purpose of Local Air Quality Management. Local Authorities have no statutory obligation to assess air quality against these limits, however informal guidance has been provided to enable them to do so. Review and Assessment within Ashfield has taken consideration of these potential new limits.

7.1 (A) Monitoring

Ashfield District Council has undertaken two Detailed Assessments for particles since the submission of the Updating and Screening Assessment in 2003. Both assessments have been submitted and approved by DEFRA and a summary of their results is contained within this section for completeness. The Detailed Assessments are available as individual reports ^{6,7}.

Monitoring is currently being undertaken for background concentrations of particles at a potential landfill location in Kirkby Woodhouse.

Real time monitoring locations for 2002 - 2005.

PM₁₀ Monitoring undertaken for 2002 - 2005, locations and dates.

Location	Year	Period
Oakfield Avenue, Kirkby (A38)	2002 - 2003	Aug - May
PM ₁₀ Pinxton Green (M1)	2003 - 2004	July - February
Old Bleak Hall, Kirkby Woodhouse	2004 - 2005	September - Ongoing

7.2 Summary of the Detailed Assessment Process

Oakfield Avenue

A detailed assessment for PM₁₀ at Oakfield Avenue adjacent to a single dwelling within close proximity to the junction of the A38 and B6018 has been completed against the criteria contained within the LAQM Technical Guidance (03). Detailed assessment of data considered over the period 6th August 2002 to 30th May 2003 has determined that the air quality objectives for PM₁₀ will be achieved in this location.

Pinxton (M1 Location)

A detailed assessment for PM₁₀ adjacent to a single dwelling within close proximity to the M1 Motorway at Pinxton has been completed against the criteria contained within the LAQM Technical Guidance (03). Detailed monitoring conducted from 24th July 2003 until 21st February 2004, has determined that the air quality objectives for PM₁₀ will be achieved in this location.

7.3 Particulate monitoring at Old Bleak Hall, Kirkby Woodhouse

Monitoring for PM₁₀ is currently being undertaken at Old Bleak Hall on the edge of a potential landfill development site. Based upon proposed plans, Old Bleak Hall would be among a number of properties which would fall adjacent to this new development. The properties are also situated approximately 1.1 kilometres away from the M1 Motorway. Emissions from landfill sites are not well documented and it is difficult to predict PM₁₀ concentrations. The Council has chosen to measure background concentrations at this location to provide a baseline from which comparisons with future concentrations or deterioration of air quality can be assessed.

Location Description

Monitoring was carried out at this location as residential receptors are situated adjacent to the perimeter of the potential landfill site and within the prevailing wind of the proposed site. (See figure 7.0).

Measurement period: 22nd September 2004 to 23rd March 2005 (ongoing)
Total data capture to date 109 days out of a total of 146 days.

Figure 7.0 *Location of the Sequential Gravimetric Analyser at Old Bleak Hall, Kirkby Woodhouse.*

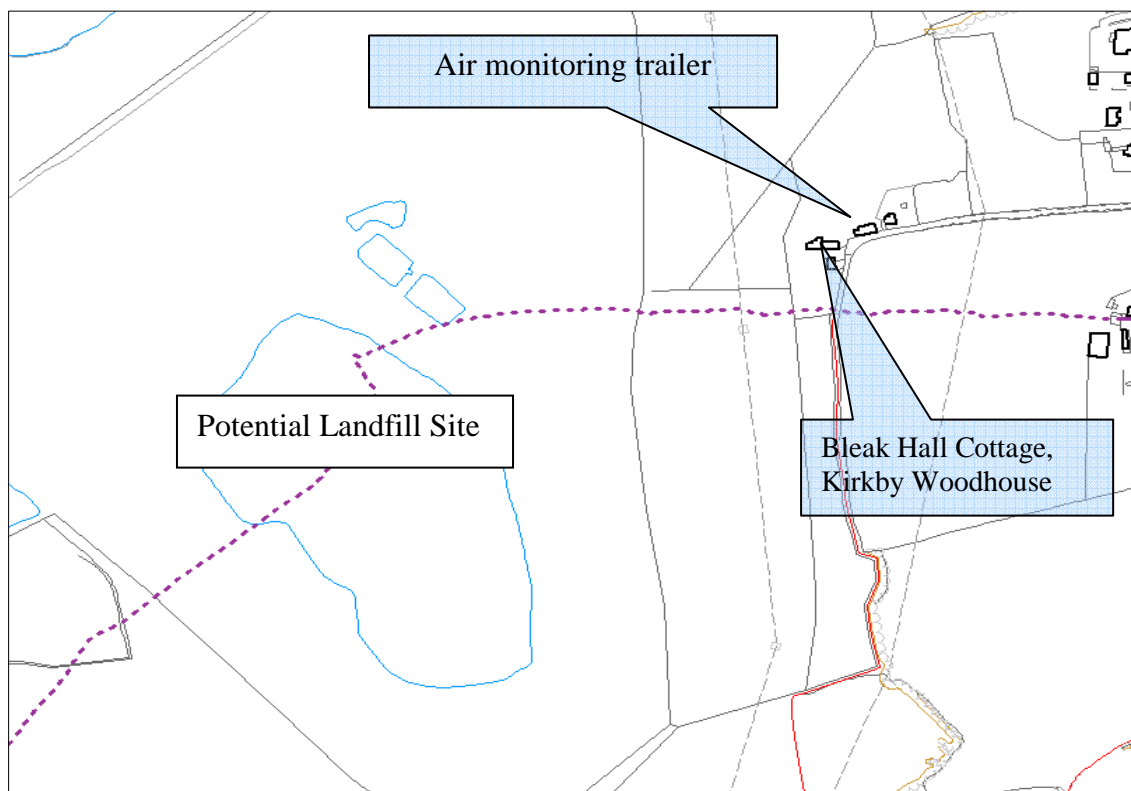
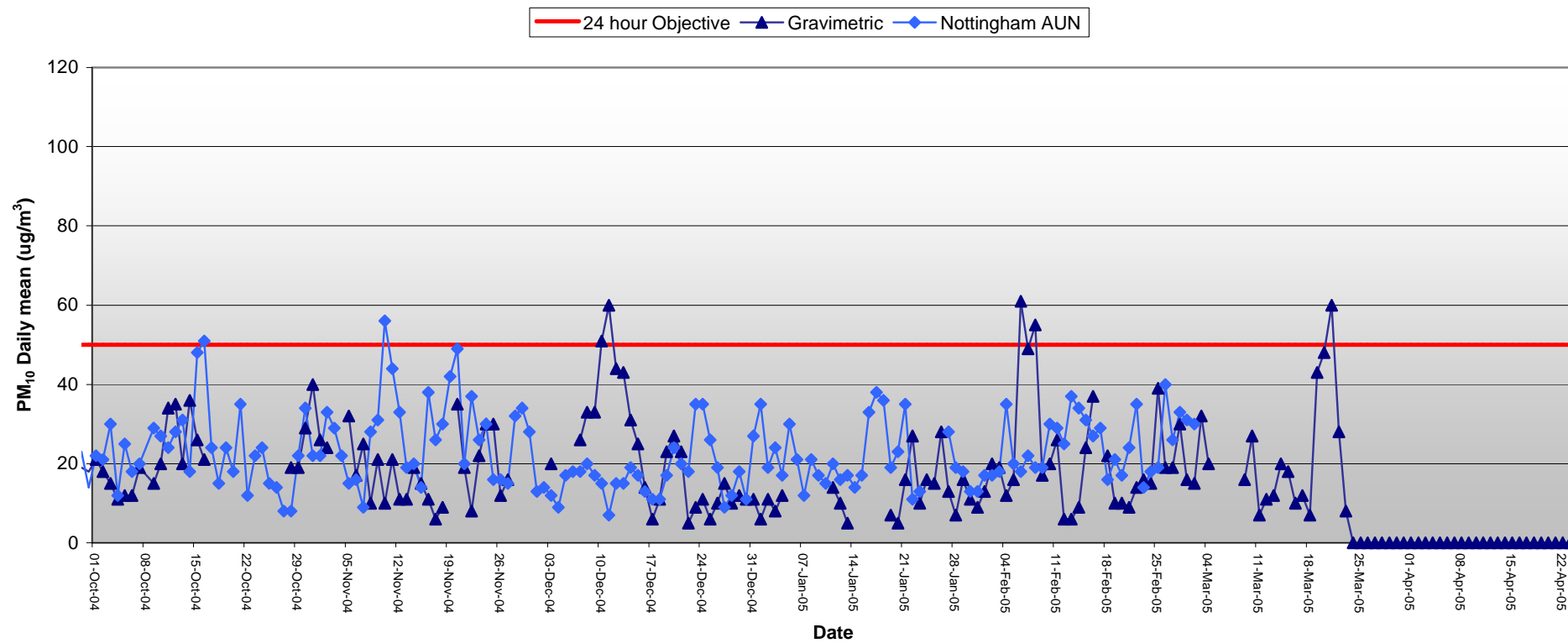


Figure 7.1
PM₁₀ Monitoring results from when the gravimetric sampler at Bleakhall Cottage, Annesley



Monitoring Results

The 24-hour objective refers to 35 exceedances per year, which roughly equates to 11 exceedances in 109 days (September 2004 to March 2005). There have only been 5 exceedances of this objective throughout the monitoring period (see fig 7.1). Elevated levels of PM₁₀ were observed on 10 – 11th December 2004, 6th and 8th February 2005 and the 21st March 2005. The mean PM₁₀ concentration during this monitoring period was 20.0µg/m³, well below the annual mean objective of 40µg/m³ (see table 7.1).

Table 7.1 *Old Bleak Hall, Kirkby Woodhouse, Monitored Period 22nd September 2004 to 23rd March 2005*

Location	24 hour means			No. of exceedances of the 50µg/m ³ objective
	Measured Period Mean (µg/m ³)	Min (µg/m ³)	Max (µg/m ³)	
Old Bleak Hall, Kirkby Woodhouse	20	5	61	5

The base year used for estimating the annual mean for Old Bleak Hall was 2004. The estimated annual mean for Old Bleak Hall in 2004 was calculated as 19.8µg/m³ well below the objective of 40µg/m³ and was based upon the annual mean comparisons with four nearby long-term Automatic Urban Network sites, Nottingham (Urban Centre), Birmingham East (Urban Background), Leicester (Urban Centre) and Sheffield (Urban Centre).

The number of 24-hour exceedances of 50µg/m³ was estimated using the relationship with the annual mean as described in Figure 8.1 of the LAQM Technical Guidance (03) and calculated as 3 exceedances, well below the objective of 35 exceedances. There have actually been 5 exceedances recorded in this location. Measured data compared with a National AUN site at Nottingham suggest that these exceedances maybe associated with local occurrences rather than elevated regional concentrations. Monitoring is continuing at this location and further review and assessment will be undertaken to determine this.

Based upon the results of the monitoring undertaken at this location, there is no requirement for Ashfield to proceed to a detailed assessment for particles in respect of the 2004 objectives.

7.4 (B) Monitoring Data within an Air Quality Management Area.

The assessment for this section is only applicable to those authorities that have declared Air Quality Management Areas. Ashfield have not declared any Air Quality Management Areas within the district. No further assessment has been undertaken for this section.

7.5 (C) Busy roads and junctions in Scotland

This section is not applicable to Ashfield.

7.6 (D) Junctions.

Local authorities are required to undertaken assessment of busy junctions within their districts. The LAQM Technical Guidance (03) interprets a 'busy' junction as 'one with more than 10,000 vehicles per day' Section D (Box 8.4). The identification of all busy junctions in Ashfield was undertaken during the first Updating and Screening Assessment and concluded that there were no exceedances of the PM₁₀ objectives. There have been no significant changes to these junctions and no further assessment has been undertaken.

There is no requirement for Ashfield to proceed to a detailed assessment for any busy junctions within the district.

7.7 (E) Roads with high flow of buses and/or HGVs

Authorities are only required to undertake an assessment for this section where roads are identified as having an unusually high proportion of buses or HGVs. An 'unusual high proportion of Buses or HGVs is taken to be 'greater than 20% of the AADT' LAQM Technical Guidance (03) Box 8.4). There have been no roads identified within Ashfield which show an 'unusually' high proportion of buses and/or HGVs and therefore no further assessment has been undertaken for this section.

7.8 (F) New roads constructed or proposed since the last round of review and assessment.

Mansfield and Ashfield Regeneration Route (MARR)

The Mansfield and Ashfield Regeneration Route (MARR) has now been completed and the road is now open. DMRD modelling undertaken during the first Updating and Screening Assessment did not predict any exceedances of the PM₁₀ Air Quality Objectives. However, real time monitoring may be undertaken in future review and assessment investigations to confirm the results of this modelled data.

7.9 (G) Roads close to the objective during the first round of review and assessment.

High resolution modelling for PM₁₀ which was conducted by CERC during the first round review and assessment concluded that there would be no roads within Ashfield other than the M1 Motorway, which would exceed the PM₁₀ objective in 2004¹⁰. A detailed Assessment for PM₁₀ has since been undertaken at a relevant location adjacent to the M1 Motorway demonstrating that the 2004 would not be exceeded⁶.

7.10 (H) Roads with significantly changed traffic flows.

Authorities are only required to undertake the assessment of roads with traffic flows greater than 10,000 vehicles per day, that have experienced a large increase in traffic. The LAQM Technical Guidance (03) has interpreted 'large increase' as 'more than a 25% increase in traffic'. All roads within Ashfield above 10,000 have been evaluated against this criterion. There are no roads within Ashfield that have seen a 25% increase in daily traffic flow based upon 1997 and 2002 AADT traffic flow data. No further assessment has been undertaken for this section.

7.11 (I) New industrial sources

A considerable amount of data relating to emissions of PM₁₀ was compiled and entered into an emission inventory utilised during Updating and Screening Assessment in 2003. It is planned to revise and update this emission inventory during 2005 in preparation for the next round of review and assessment in April 2006. The review will consider all sources of PM₁₀ and will be undertaken by consultants acting on behalf of Nottinghamshire authorities. There have been no new industrial sources of PM₁₀ identified within Ashfield. No further assessment has been undertaken for this section.

7.12 (J) Industrial sources with substantially increased emissions.

There have been no new industrial sources with substantially increased emissions of PM₁₀ identified within Ashfield. No further assessment has been undertaken for this section.

7.13 (K) Areas of domestic solid fuel burning.

Consideration of the results from the first round review and assessment has indicated that areas of densely populated housing burning solid fuel could constitute significant sources of PM₁₀. The LAQM Technical Guidance (03) has determined 'significant coal burning' as '*any area of 500x500m which contains more than 50 houses burning solid fuel as their primary*

source of heating LAQM Technical Guidance (03) Box 7.2. Ashfield undertook a comprehensive district wide survey of all potential solid fuel burning areas based upon these criteria of the LAQM Technical Guidance (03). The survey demonstrated that there was no significant solid fuel burning taking place within Ashfield. No further assessment has since taken place. It is envisaged that solid fuel burning will continue to decrease throughout the district.

There is no requirement for Ashfield to proceed to a detailed assessment for PM₁₀ in respect of domestic solid fuel burning.

7.14 (L) Quarries/Landfill sites/opencast coal/handling of dusty cargoes at ports etc.

Authorities are only expected to undertake a detailed assessment for PM₁₀ in regard to this section where locations with relevant exposure and substantiated problems associated with dust have been determined.

There is only one location within Ashfield, which meets the criteria of this section. This is Sutton landfill site. It has been determined that the landfill site has areas of relevant exposure, as residential properties are located close to the site boundary. The site is now permitted under the Integrated Pollution and Prevention (IPPC) Regulations as an A1 installation by the Environment Agency. The permit imposes strict conditions in respect of dust emissions from the site. There have been no recent complaints about dust emanating from the filling operations that take place on the site or any indication of significant dust problems. There is therefore no requirement for Ashfield to proceed to a detailed assessment for PM₁₀ in respect of this location.

7.15 (M) Aircraft.

There are no relevant air quality issues relating to aircraft within Ashfield. No updating and screening has been undertaken for this section.

7.16 CONCLUSION

Assessment for PM₁₀ has been completed against the criteria listed in the LAQM Technical Guidance (03). It is expected that the Air Quality Objectives of 50µg/m³ (35 exceedances) 24hr mean 31st. December 2004 and 40µg/m³ annual mean 31st. December 2004 will be met across Ashfield.

There is no requirement for Ashfield to proceed to a detailed assessment for particles in respect of the 2004 objectives. Further assessments will be undertaken against the 2010 annual mean and 24-Hour mean objectives

8.0 SULPHUR DIOXIDE (SO₂)

The Government and Devolved Administrations have adopted a 15-minute mean of 266µg/m³ as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times per year by the end of 2005. Additional objectives have also been set which are equivalent to the EU limit values specified in the First Daughter directive. These are for a 1-hour mean objective of 350µg/m³ to be exceeded no more than 24 times per year and a 24-hour objective of 125 µg/m³ to be exceeded no more than 3 times per year, to be achieved by the end of 2004⁴.

UK National Objectives:

266 µg/m³ 15 minute mean (35 exceedances) 31st. December 2005

350 µg/m³ 1-hour mean (24 exceedances) 31st. December 2004

125 µg/m³ 24-hour mean (3 exceedances) 31st. December 2004

8.1 (A) Monitoring Data

Air Quality Emission Inventory

A considerable amount of data relating to emissions of sulphur dioxide was compiled and entered into an emission inventory utilised during Updating and Screening Assessment in 2003. The inventory clearly demonstrated a reduction in the levels of sulphur dioxide across Ashfield and Nottinghamshire since the first round of review and assessment. It is planned to revise and update this emission inventory during 2005 in preparation for the next round of review and assessment in April 2006. The review will consider all sources of sulphur dioxide and will be undertaken by consultants acting on behalf of Nottinghamshire authorities.

King's Mill Hospital

Kings Mill Hospital was the subject of a Stage Three review during the first round of review and assessment against the 15-minute objective. Monitoring undertaken for the assessment determined that the objective would not be compromised subject to the hospital burning low sulphur coal⁶. The hospital trust has now made a decision to convert the boiler house at the hospital to gas. The proposed changeover is scheduled to be completed in 2007. Until that time the hospital will continue to burn low sulphur coal. Monitoring carried out by Mansfield District Council close to King's Mill Hospital and reported in the Updating and Screening Assessment determined that none of the Air Quality objectives were being exceeded from this location.

8.2 (B) Monitoring data within an AQMA

The assessment for this section is only applicable to authorities that have declared Air Quality Management Areas. Ashfield have not declared any Air Quality Management Areas within the district. No further assessments have been undertaken for this section.

8.3 (C) New Industrial Source

A considerable amount of data relating to emissions of sulphur dioxide was compiled and entered into an emission inventory utilised during Updating and Screening Assessment in 2003. It is planned to revise and update this emission inventory during 2005 in preparation for the next round of review and assessment in April 2006. The review will consider all sources of sulphur dioxide and will be undertaken by consultants acting on behalf of Nottinghamshire authorities.

There have been no new sources of sulphur dioxide identified within Ashfield. No further assessment has been undertaken for this section.

8.4 (D) Industrial Sources with substantially increased emissions

There have been no new industrial sources with substantially increased emissions identified within Ashfield. No further updating and screen has been undertaken for this section.

8.5 (E) Areas of domestic coal burning

Consideration of results from the first round of review and assessment has indicated that areas of densely populated houses burning solid fuel could constitute significant sources of sulphur dioxide, even if smokeless fuel is consumed. The LAQM Technical Guidance (03) has determined 'significant coal burning' as '*any area of 500x500m which contains more than 100 houses burning solid fuel as their primary source of heating*'⁴.

Ashfield undertook a comprehensive district wide survey of all potential solid fuel burning areas based upon these criteria of the LAQM Technical Guidance (03). The survey demonstrated that there was no significant solid fuel burning taking place within Ashfield. No further assessment has since taken place. It is envisaged that solid fuel burning will continue to decrease throughout the district.

8.6 (F) Small boilers >5 MW_(thermal)

An emissions inventory for Ashfield was reviewed and updated for the Updating and Screening Assessment, which included all boilers above 0.4MW⁹. Details relating to boiler plants were used to derive estimated emission maps for the district. There were no boilers within the district identified as being greater than 5MW_(thermal). It is proposed to review this emission inventory in 2005. No further assessment has been undertaken for this section.

8.7 (G) Shipping

There are no relevant air quality issues relating to shipping within Ashfield. No further assessment has been undertaken for this section.

8.8 (H) Railway Locomotives.

Authorities are only required to undertake assessment at locations where there is relevant exposure to diesel or coal fired locomotives, which are regularly stationary for periods of 15-minutes or more. There are no locations identified within Ashfield, which meet these criteria, and therefore no further assessment has been undertaken.

8.9 Sulphur dioxide Diffusion Tube monitoring

Objective is for the protection of ecosystems:

8ppb to be met by 31 Dec 2000.

Please note This objective is for the protection of ecosystems and **not** for local air quality management.

This standard is not for local air quality management but for action by Central Government. It has however, been included within the Progress Report for completeness. Table 8.0 tabulates the diffusion tubes results recorded over the 2003/2004 winter months. Figure 8.0 illustrates the long term concentration of sulphur dioxide since 1999

Table 8.0 *Sulphur Dioxide Diffusion Tube Monitoring across the district in the winter of 2003/2004 and long term trends from 97/98 to 03/04*

Annual mean and winter mean (Oct – Apr): 8ppb to be met by 31 Dec 2000. Objective for protection of ecosystems and not for local air quality management.			
Diffusion Tube Monitoring	Mean Concentrations (ppb)		
	Oct-Dec 2003	Jan-Mar 2004	Winter mean
Residential Areas : Lamp column or buildings			
Glenside, Kirkby	6.7	7.0	6.8
Carsic Road, Sutton	4.8	5.7	5.2
Albert Ave, Jacksdale	5.9	5.4	5.7
Sherwood Street. Annesley Woodhouse	4.8	4.8	4.8
Meadows Close, Hucknall	3.6	3.6	3.6

Comments:

The highest SO₂ winter mean concentrations are observed in areas where coal burning is more prevalent: Glenside, Kirkby; Albert Avenue, Jacksdale and Carsic Road, Sutton. However concentrations have now declined such that all areas are below the standard set by government for the protection of ecosystems.

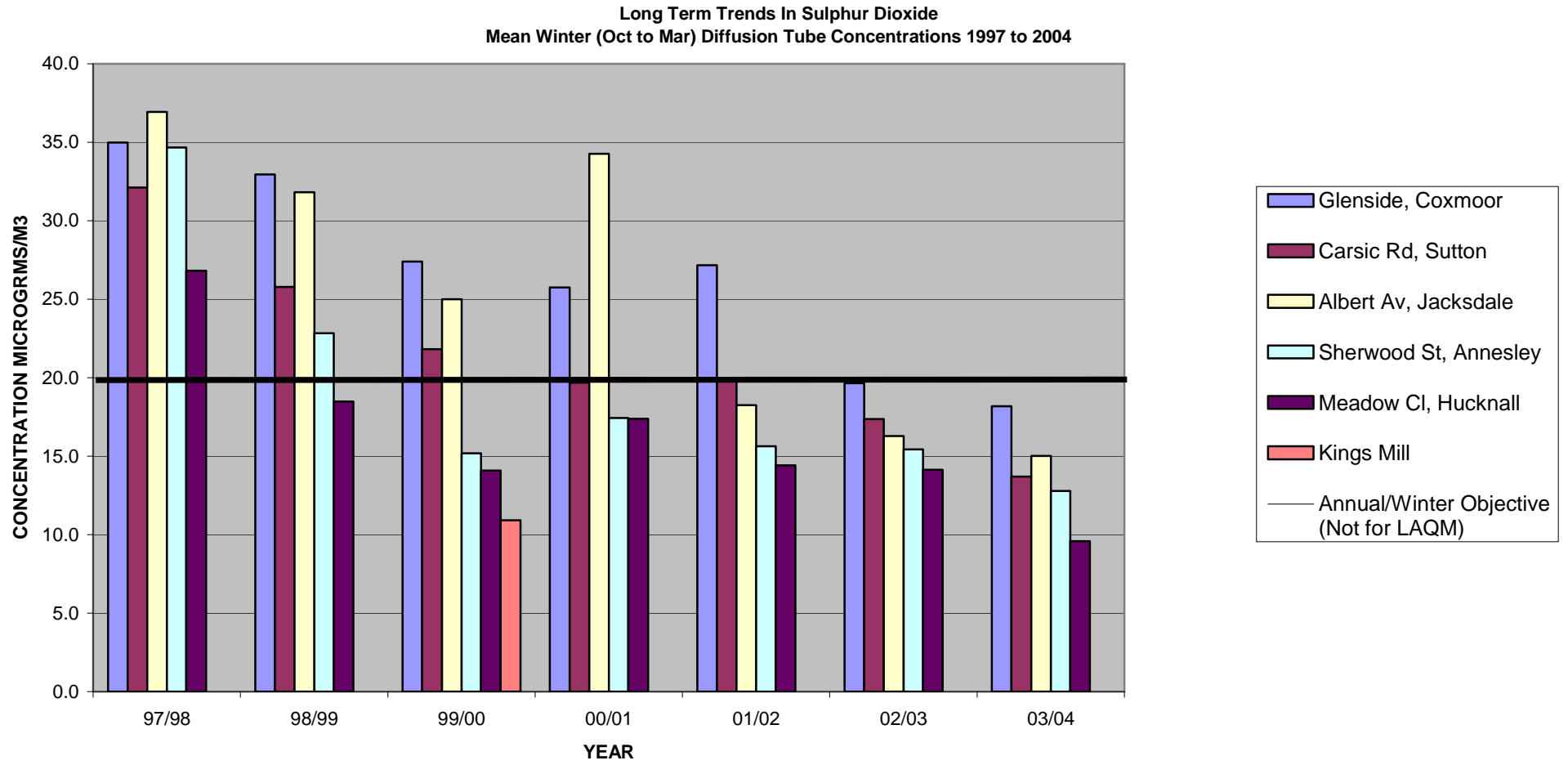
The long term trends in SO₂ winter mean concentrations are shown in Figure 8.0. Monitoring indicates that since the winter of 1997/98 there has been a decrease in SO₂ concentrations across the District which likely reflects the gradual decrease in coal burning as recorded within the review and assessment criteria.

8.10 CONCLUSION

The continual assessment for sulphur dioxide has been completed against the checklist criteria contained in the LAQM Technical Guidance (03). It is expected that the Air Quality Objectives of 266µg/m³ 15 minute mean (35 exceedances) 2005, 350µg/m³ 1-hour mean (24 exceedances) 2004, and 125µg/m³ 24-hour mean (3 exceedances) 2004, will be met across Ashfield. As there are now no further sources of Sulphur Dioxide likely to compromise the Air Quality Objective, Ashfield District Council no longer undertake monitoring for this pollutant.

There is no requirement for Ashfield to proceed to a detailed assessment for sulphur dioxide in any location within the district.

Figure 8.0



9.0 REFERENCES

1. The Stationary Office, Environment Act 1995, Part IV Chapter 25.
2. The Stationary Office, The Air Quality (England) (Amendment) Regulations 2002
3. Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance, LAQM.TG(03), DEFRA. 2003.
4. Part IV of the Environment Act 1995, Local Air Quality Management, Progress Report LAQM.PRG(03), DEFRA 2003.
5. Air Quality Review and Assessment Updating and Screening Assessment, Ashfield District Council, May 2003.
6. Air Quality Review and Assessment Detailed Assessment, Ashfield District Council, April 2004.
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8. Air Quality Review and Assessment Stage Three Report, Ashfield District Council, 2001.
9. Atmospheric Emission Inventory 2001 Update. ARIC, January. 2003
10. Atmospheric Emission Inventory and Dispersion Modelling Study for Nottinghamshire. Carruthers et al. CERC, May 1999.
11. Netcen 'UK Nitrogen Dioxide Network Non- Automatic Networks. Netcen is an operating division of AEA Technology plc.

Appendix

Content

Figure:

1. Adjustment of short term data at Oakfield Avenue, Kirkby-in-Ashfield to estimate the nitrogen dioxide annual mean in 2003 and 2005
2. Adjustment of short term data at Pinxton Green, Pinxton to estimate the nitrogen dioxide annual mean in 2004 and 2005
3. Adjustment of short term data at Old Bleak Hall to estimate the PM₁₀ annual mean in 2004.

Figure 1.0

**Short Term examination of Nitrogen Dioxide data from Oakfield Ave Kirkby-in-Ashfield Data
Determined in accordance with Box 6.6 of LAQM Technical Guidance TG(03)**

Long Term Site	Annual Mean 2003 (Am) ug/m ³	Period Mean 2002/3 (Pm) ug/m ³	Ratio (Ra)
Nottingham Centre	33.2	34.5	0.962
Leicester Centre	37.3	38.1	0.979
Birmingham East	36.4	38.6	0.943
Sheffield Centre	39.1	39.7	0.985
Aver (Ra)			0.967

M = Measured period mean concentration from site (Chem)

41.1 ug/m³

Estimated annual mean therefore = M x Ra

Site Location	Est. Annual mean ug/m ³ for 2003
Oakfield Avenue (Chem)	39.8

1. Correction factor of measured roadside concentrations:

The estimated NO₂ concentration at a roadside site at Oakfield Ave in 2003 is 39.8ug/m³

The correction concentration for 2005 is 39.8 x(0.892/0.941)

	2005
Annual mean 2003	39.8 ug/m ³
2003 factor	0.941 ug/m ³
2005 Factor	0.892

	2010
Annual mean 2003	39.1 ug/m ³
2003 factor	0.941 ug/m ³
2010 Factor	0.734

Annual Average 2005 (CHEM) =	37.7 ug/m³
Annual Average 2010 (CHEM) =	30.5 ug/m³

Figure 2.0

Short Term examination of Nitrogen Dioxide data from Pinxton Green Data
Determined in accordance with Box 6.6 of LAQM Technical
Guidance TG(03)

Long Term Site	Annual Mean 2004 (Am) ug/m ³	Period Mean 2003/4 (Pm) ug/m ³	Ratio (Ra)
Nottingham Centre	31	35.9	0.864
Leicester Centre	36.5	38.5	0.948
Birmingham East	35	38.1	0.919
Sheffield Centre	30.6	36.4	0.841
		Aver (Ra)	0.893

M = Measured period mean concentration from site (Chem)

34.2 ug/m³

Estimated annual mean therefore = M x Ra

Site Location	Est. Annual mean ug/m ³ for 2004
Pinxton Green (Chem)	30.5

1. Correction factor of measured roadside concentrations:

The estimated NO₂ concentration at a roadside site at Pinxton Green in 2004 is 30.5ug/m³

The correction concentration for 2005 is 30.5 x (0.892/.915)

	2005
Annual mean 2004	30.5 ug/m ³
2004 factor	0.915 ug/m ³
2005 Factor	0.892

	2010
Annual mean 2004	30.5 ug/m ³
2004 factor	0.915 ug/m ³
2010 Factor	0.734

Annual Average 2005 (CHEM) =	29.8 ug/m³
Annual Average 2010 (CHEM) =	24.5 ug/m³

Figure 3.0

**Short Term examination of Particles data from Old Bleak Hall at Kirkby Woodhouse Data
Determined in accordance with Box 8.5 of LAQM Technical Guidance TG(03)**

Long Term Site	Annual Mean 2004 (Am) ug/m ³	Period Mean 2003/4 (Pm) ug/m ³	Ratio (Ra)
Nottingham Centre	22	22	1.000
Leicester Centre	22	22	1.000
Birmingham East	21	23	0.913
Sheffield Centre	22	21	1.048
Aver (Ra)			0.990

M = Measured period mean concentration from site (Chem)

20 ug/m³

Estimated annual mean therefore = M x Ra

Site Location	Est. Annual mean ug/m ³ for 2004
Bleak Hall Cottage Kirkby Woodhouse	19.8