



ASHFIELD DISTRICT COUNCIL

**Review & Assessment
Local Air Quality Management
DETAILED ASSESSMENT
Consultation Copy
APRIL 2004**

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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 second round detailed assessment of local air quality.

1.0 CHAPTER ONE

1.1 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 (see 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 two phased approach, initially conducting an 'updating and screening assessment'; based upon checklist criteria to identify those matters that have changed since previous rounds of review and assessment were completed and which now require further assessment, then a 'detailed assessment' where the updating and screening assessment has indicated that an air quality objective may be compromised.

An updating and screening assessment for Ashfield was undertaken against the criteria listed in the LAQM Technical Guidance (03) and reported in May 2003. It was reported that the Air Quality Objectives for all the pollutants would be achieved across Ashfield, except in the location of Pinxton Green where the updating and screening assessment had indicated that the 24-hour mean objective for particles (PM₁₀) might be compromised. It was therefore recommended that a detailed assessment for PM₁₀ be undertaken at this location. This recommendation was later endorsed by DEFRA when the Updating and Screening Assessment was submitted for approval.

1.2 Summary of the Detailed Assessment Process

1.3 Particles PM₁₀

A detailed assessment for PM₁₀ adjacent to a single dwelling within close proximity to the M1 Motorway 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 shown that the air quality objectives for PM₁₀ will be achieved in this location.

The results of this detailed assessment will be submitted to DEFRA, in accordance with the Government's prescribed deadlines, and will form the statutory submission for Ashfield District Council upon which the Government will determine compliance with the current National Air Quality Objectives.

2.0 CHAPTER TWO

Introduction

This report presents the findings of a detailed assessment undertaken at Pinxton Green as part of the second round of review and assessment for the district of Ashfield. The detailed assessment focuses solely on PM₁₀ concentrations monitored at Pinxton Green and makes recommendations as to whether declaration of an Air Quality Management Area is appropriate. The criteria on which recommendations have been made have been derived in accordance with LAQM Technical Guidance (03).

Where an updating and screening assessment identifies a risk that an air quality objective will be exceeded at a location where relevant public exposure is likely, the authority is required to undertake a detailed assessment. The aim of the detailed assessment is to identify with reasonable certainty whether or not a likely exceedance would occur. The assumptions within a detailed assessment are therefore considered in greater detail than the screening process and use data quality assured to a high standard to ensure that the authority is confident in the decisions it reaches. Where a likely exceedance of a pollutant is identified, the assessment is required to be sufficiently detailed to determine both its magnitude and geographical extent. Local Authorities may only declare an Air Quality Management Area (AQMA) where a Detailed Assessment has been completed.

2.2 **Air Quality and Health**

The main reason for tackling poor air quality is to minimise detrimental effects on human health. We now have a better understanding of the short-term and long-term health effects of air pollution, largely due to the work undertaken by the Committee on the Medical Effects of Air Pollutants (COMEAP).

Short-term increases in particles, sulphur dioxide and nitrogen dioxide are associated with increased deaths brought about by respiratory or cardiovascular disfunction in the elderly and those who are already ill. These pollutants can also worsen symptoms in those with asthma. COMEAP has also recently reported that long-term exposure to particles is associated with reduced life expectancy mainly as a result of earlier deaths from heart disease. Carbon monoxide increases symptoms in those with heart disease and lead affects brain development in children. Benzene and 1,3-butadiene are both associated with causing cancer³.

2.3 **Public Exposure**

The Regulations make clear that likely exceedances of the objectives should be assessed in relation to *‘the quality of the air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present’*. Review and assessments should thus be focussed on those locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Authorities are advised not to consider exceedances of the objectives at any location where public exposure would not be realistic⁴.

Authorities are therefore under a clear duty to review and assess air quality, and, where appropriate, designate AQMAs, wherever people are likely to be regularly exposed. It is not possible to exclude locations from the review and assessment process on the grounds that only a few people are likely to be exposed. Nor is it possible to prescribe a minimum size for an AQMA, as the policy guidance makes clear. This means that for the purposes of all stages of LAQM, including AQMA designation, individual houses are relevant locations.

2.4 **Consultation**

This report and associated appendices will be made available to the public via libraries on the district, at the Council Offices in Kirkby-in-Ashfield and on the Council's Web Site. The Nottingham Air Quality Steering Group, established to co-ordinate consultation across Nottinghamshire authorities, will continue to be involved in the Local Air Quality Management process. A copy of this report will be put before this group for consultation.

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

3.0 CHAPTER THREE

3.1 DETAILED ASSESSMENT OF PM₁₀ PINXTON GREEN

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 40 µg/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 particles 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 therefore taken consideration of these potential new limits.

3.2 Historic summary of monitoring at Pinxton Green

3.3 First round of Review and Assessment Information

A review for PM₁₀ was conducted at Pinxton and Selston during the first round of review and assessment evaluating receptors within close proximity to the M1 Motorway. The report concluded that air quality objectives for PM₁₀ would be achieved at this location⁵. The report also made a recommendation that periodic monitoring should be undertaken at this location to ensure that the 24-hour mean objective would continue to be met.

3.4 Updating and Screening Assessment

Further monitoring was undertaken at Pinxton during 2002 and presented in the updating and screening assessment reported in May 2003. This report concluded that a more detailed assessment of PM₁₀ would be required to determine whether air quality objectives could continue to be achieved at this location⁶.

3.5 Monitoring Location

The detailed assessment considered a single dwelling at Pinxton Green situated at a distance of 20m, from the edge of the hardshoulder of the M1 Motorway. The PM₁₀ monitor was located in a trailer adjacent to the B6019 and next to this property at a

distance of 16 metres from the hardshoulder of the M1 Bridge over this road (see fig 1–2). Using the Design Manual for Roads and Bridges (DMRB) model justified that this property represented the most sensitive receptor along the ‘M1 Corridor’ through Ashfield (see Appendix i.). The sample inlet of the monitor is approximately 4 metres below the height of the M1. The site is situated northeast of an industrial estate with both light and heavy industry present.

During November 2003 work was undertaken by the Highways Agency to erect a noise attenuation barrier on either side of the motorway covering a substantial distance along the North carriageway and 200m either side of the bridge on the South carriageway (see fig 3.0). This involved an extensive amount of construction work adjacent to the monitoring trailer, which may have increased local background concentrations of PM₁₀ between November and December 2003.

3.6 Monitoring Equipment and Quality Assurance.

The particulate sampler used in this detailed assessment is a ESM Sequential particulate sampler, type FH95 SEQ supplied by Unicam Chromatography (now Onix Process Analysis Limited). It is designed for the manual gravimetric mass concentration determination of suspended particulate in ambient air and has 16 filter cassettes stacked in a magazine to allow an automated and accurate filter change. The sampler also has a pressure and temperature compensated probe to allow the precise measurement of the airflow rate at ambient and standard conditions. The flow rate of 1m³/hr is controlled by a pump with a stability of approximately 1%. The PM₁₀ inlet (1m³/hr) is USA-EPA approved and corresponds to EN12341 (1995). The sampler is set up so that the filters are each exposed for 24 hours from midnight to midnight. The PM₁₀ head and O ring are checked and cleaned once every 2 months in accordance with the operating instructions.

The sampler is located inside a purpose built trailer. The trailer is equipped with an air conditioning unit to keep the instrumentation cool and ensure that excessively warm temperatures inside the trailer do not compromise particulate matter collected on the filters. Filters are replaced once every 14 days. The inlet is located on top of the trailer approximately 2.5 metres above ground level.

‘Whatman’ Glass microfibre filters are used for the collection of suspended particulate matter. These are 47mm in diameter and have a 1.6 µm pore size. They are capable of collecting particles < 1µm in size. The Occupational Hygiene & Environmental Monitoring Laboratory of TES Bretby carry out the pre and post weighing of filters. A UKAS accredited in-house procedure is used for undertaking this work, which is based on the general principles outlined in the Health & Safety Executive (HSE) document MDHS 14/3 ‘General methods for sampling and gravimetric analysis of respirable and inhalable dust’.

All filters are conditioned in an air-conditioned balance room overnight (minimum period of 16 hours) prior to weighing. This environment is supplied with ionised air up to the point of weighing to negate any potential effects caused by a build up of static electricity.

Filters are weighed and re-weighed on a micro-balance with a resolution of 1µg, this is calibrated twice daily by laboratory staff and twice annually in situ by a UKAS accredited balance calibration house. Filter weights are automatically captured by a Laboratory Information Management System (LIMS).

The pre-weighed filters are placed in filter cassettes and then in labelled metal tins and posted to the Council. The Council maintains a rigorous procedure for recording the correct identification and location of all filters whilst in their possession. Once the filters have been exposed, they are replaced into the appropriate metal tins and returned to TES Bretby, along with the accompanying sample details.

On receipt at the laboratory, the sample information is booked into the LIMS database, and each sample is allocated a unique identification number. Filters are not removed from the cassettes for conditioning until this process has been completed. Samples are then re-condition in the laboratory balance room environment (minimum period 16 hours) prior to being re-weighed.

The Test Reports subsequently issued are produced directly from the information stored in the LIMS database.

Figure 1.
Location of the FH95 Sequential Gravimetric Monitor at
Pinxton Green, Pinxton (B6019 – M1 Motorway Location)

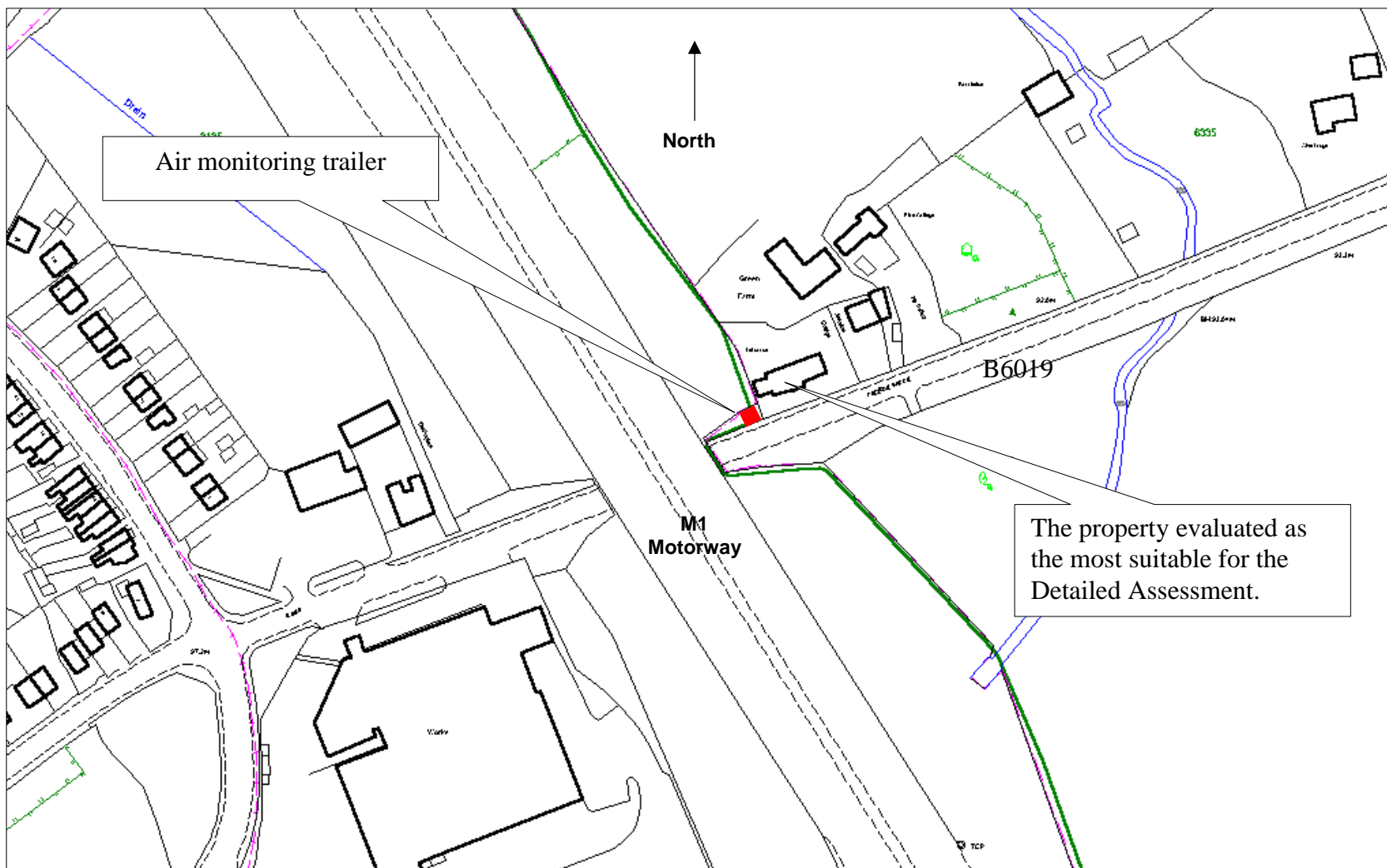


Figure 2.

Location of Air Quality Monitoring Trailer at Pinxton Green.



Figure 3.

Noise Attenuation Barrier erected across the bridge over the M1 Motorway at Pinxton Green



3.7 Monitoring at Pinxton Green between 2002-2004

Please note that monitoring results for Pinxton Green between Feb-June 2002 presented below have already been included in the 'Updating and Screening Assessment' reported in May 2003. They are included within this detailed assessment for continuity and completeness. All previously reported data and information is shaded in grey.

Table 3.0 Monitoring undertaken at Pinxton Green for PM₁₀ between 2002 and 2004.

Location	Dates
Pinxton Green	February – June 2002
	July 2003 – February 2004

Monitoring Results from Pinxton Green, Pinxton (B6019), Close proximity to M1 Motorway 2002

Measurement period: 6th February to 16th June 2002
Total data capture 126 days out of a total of 131 days.

Monitoring results

The 24-hour objective refers to 35 exceedances per year, which roughly equates to 12 exceedances in 126 days (February to June 2002). There have been 22 exceedances of this objective throughout the monitoring period (see Fig 3.1). Elevated levels of PM₁₀ were observed on 25th, 27th to 30 March, 3rd to 5th, 10th to 12th and 16th-17th April, 8th to 10th and 23 May, 1st to 2nd, 5th-8th and 16th of June 2002.

The mean PM₁₀ concentration during this monitoring period was 35 µg/m³, below the annual mean objective of 40µg/m³ (see Table 3.0). A more detailed summary, chart and estimated annual mean calculations can be found in the Appendix,

Table 3.0 Summary of monitoring data undertaken at Pinxton Green
6th February to 16th June 2002

Location	24 hour means			
	Measured Period Mean ($\mu\text{g}/\text{m}^3$)	Min ($\mu\text{g}/\text{m}^3$)	Max ($\mu\text{g}/\text{m}^3$)	No. of exceedances of the $50\mu\text{g}/\text{m}^3$ objective
Pinxton Green (B6019)	35	8	97	22

Only short-term data was available for the updating and screening assessment at this location as referred to above. Estimated annual means and predicted exceedances of the 24-hour objective were calculated to determine whether the 2004 and 2010 objectives would be compromised. Table 3.1 tabulates the results for this location.

Table 3.1 Pinxton Green (B6019) Estimated PM_{10} Annual mean concentrations and 24-hour mean (35) exceedances for 2004 and (7) 2010

Location	Estimated Annual Mean 2002 ($\mu\text{g}/\text{m}^3$)	Estimated Annual mean in 2004 ($\mu\text{g}/\text{m}^3$)	Estimated Exceedances in 2004	Estimated Annual mean in 2010 ($\mu\text{g}/\text{m}^3$)	Estimated Exceedances in 2010
Pinxton 2002	37.2	35.9	56	32.6	40

Discussions

The estimated annual mean for Pinxton in 2004 was calculated as $35.9\mu\text{g}/\text{m}^3$ below the objective of $40\mu\text{g}/\text{m}^3$. The number of 24-hour exceedances of $50\mu\text{g}/\text{m}^3$ was estimated using the relationship with the annual mean as described in the LAQM Technical Guidance (03) and calculated as 56 exceedances, well above the objective of 35 exceedances.

There were 22 exceedances of the 24-hour objective recorded during the monitoring period, which indicated that the 2004 24-hour objective might be compromised.

3.8 **Updated information since the updating and screening assessment**

At the time of reporting the results for the Updating and Screening Assessment there was no regional AURN data available with which to compare the monitored results. Ratified monitoring data from Nottingham, Leicester and Sheffield AURN sites is now available for evaluation as part of the Detailed Assessment. This indicates that the majority of exceedances observed at Pinxton Green during this period were associated with regional episodes of elevated background concentration (see figures 4 - 6). It is likely therefore that these elevated levels of PM_{10} would be experienced throughout the district and not just at Pinxton Green.

Figure 4.
 PM₁₀ Comparison Results with **Nottingham** AURN Site
 Monitoring Results from 8th February to 16th June 2002 when the gravimetric sampler was at
 Pinxton Green, Pinxton (M1 Motorway Location)

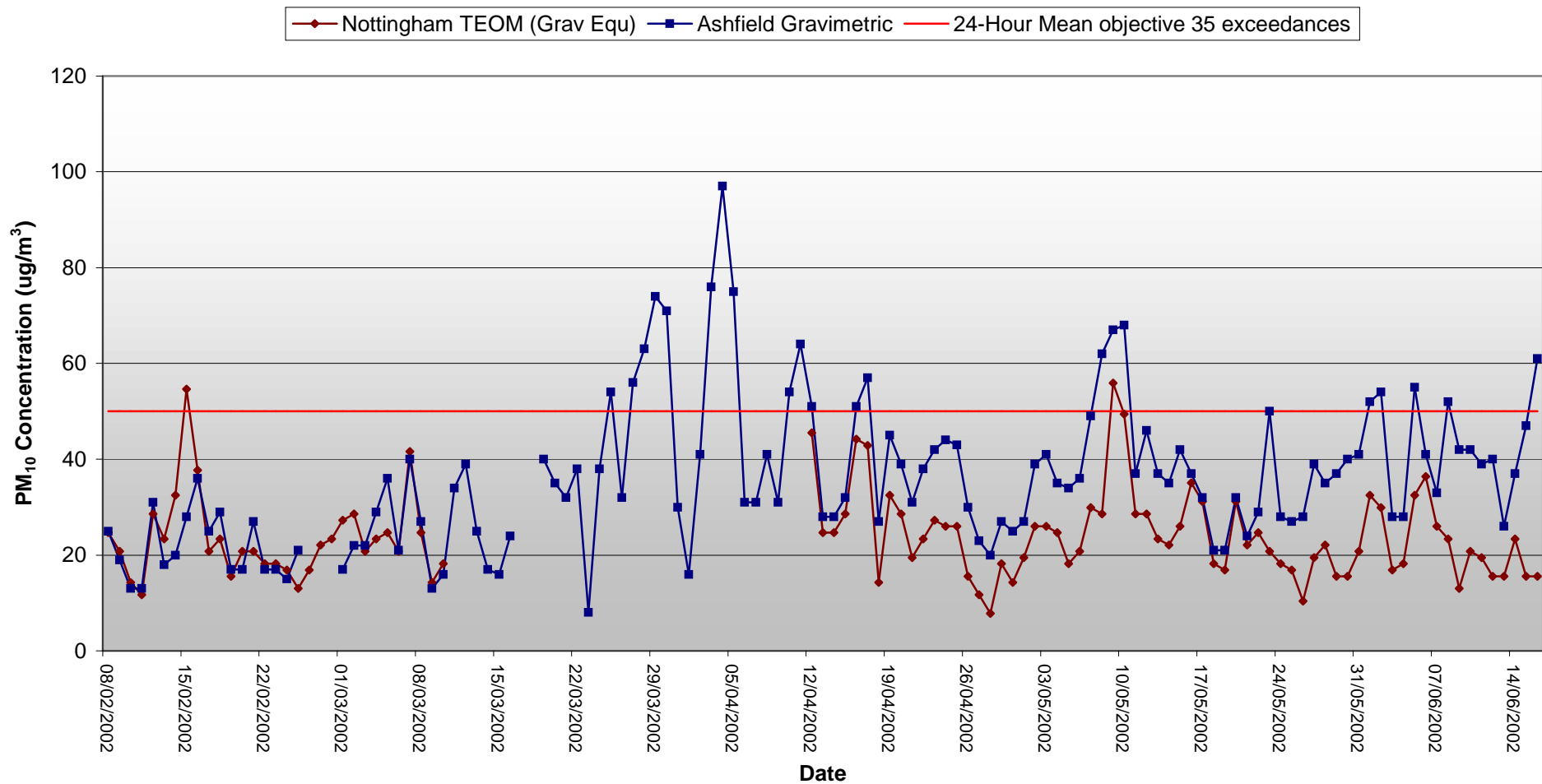


Figure 5.
 PM₁₀ Comparison with **Leicester** AURN Site.
 Monitoring Results from 8th February to 16th June 2002 when the gravimetric sampler was at Pinxton Green,
 Pinxton (M1 Motorway Location)

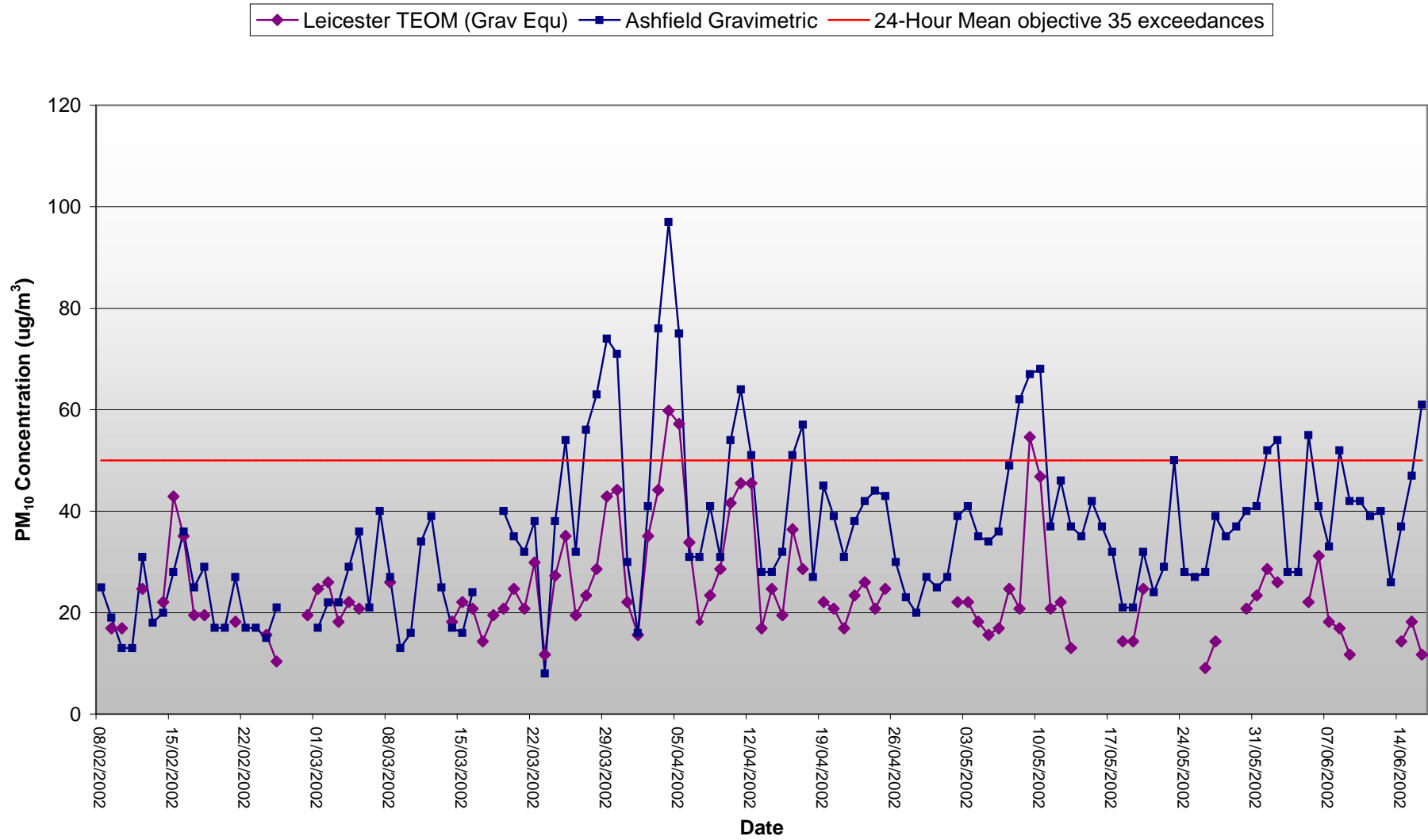
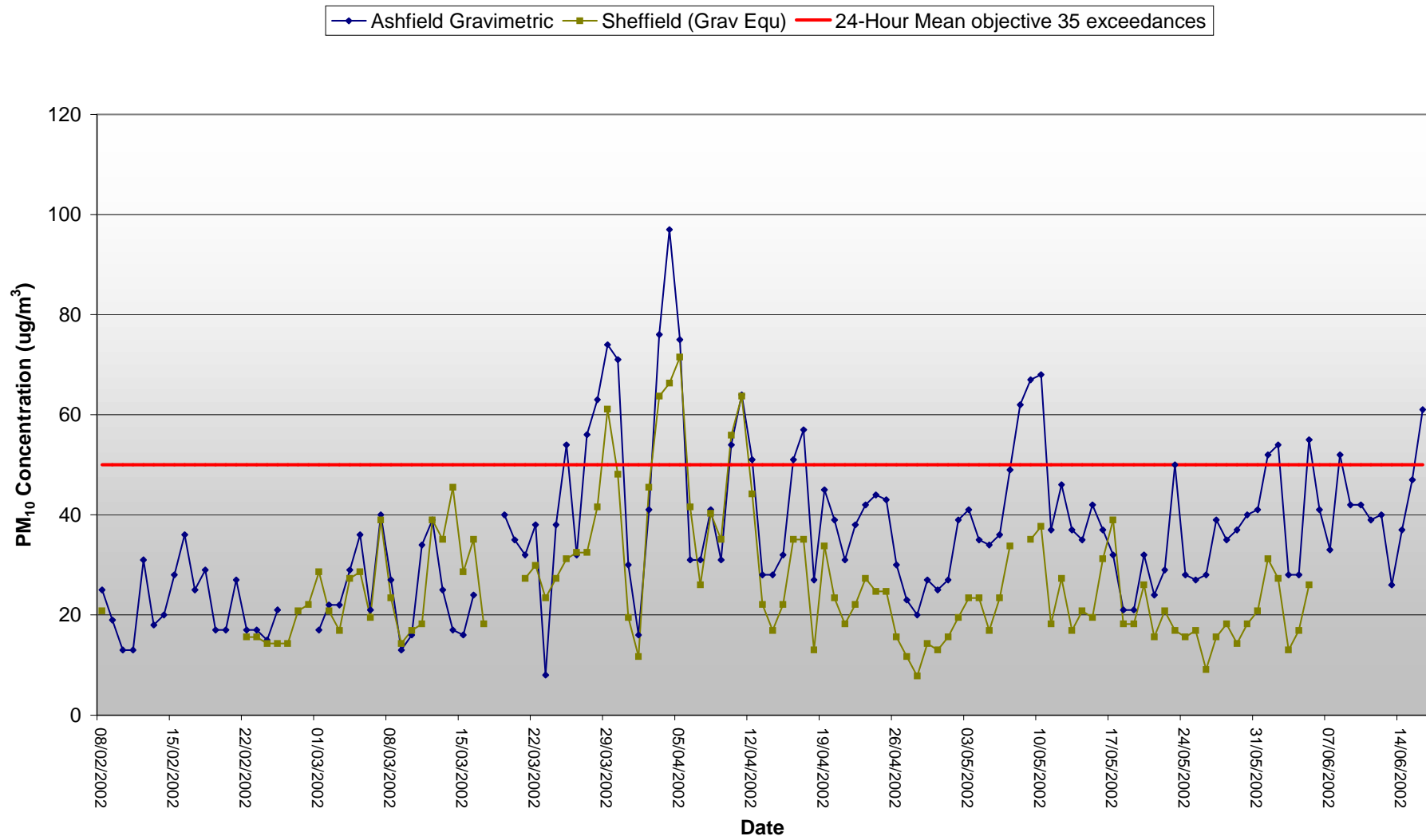


Figure 6.
 PM₁₀ Comparison data with **Sheffield** AURN Site
 over the monitoring periods from 8th February to 16th June 2002 when the gravimetric sampler was at
 Pinxton Green, Pinxton (M1 Motorway Location)



3.9 Monitoring Results from Pinxton Green

Measurement period: 24th July 2003 to 21st February 2004
Total data capture 200 days out of a total of 200 days.

Monitoring was undertaken at Pinxton Green in accordance with recommendations from the Updating and Screening Assessment, which concluded that a Detailed Assessment for PM₁₀ be undertaken to determine whether the 24-hour mean objective would continue to be met.

The LAQM Technical Guidance (03) recommends that at least 12 months monitoring data should be obtained to confidently determine annual mean concentrations and achievement of the 24-hour objective for detailed assessments. However, where it is not possible to consider a full year's data, a shorter period of results can be used to predict the annual mean and the number of 24 hour mean exceedances employing the criteria within the Guidance.

A total of 200 days (approx. 7 months) monitoring results were available for evaluation with data recorded over July 2003 – February 2004. Estimated annual means and predicted exceedances of the 24-hour objective were calculated to determine whether the 2004 and 2010 objectives would be compromised. Table 3.2 tabulates the results.

Table 3.2 Summary of monitoring data undertaken at Pinxton Green
July 2003 to February 2004 (Ongoing)

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)	
Pinxton Green (B6019)	27	5	62	15

3.10 Monitoring results

The 24-hour objective refers to 35 exceedances per year, which equates to 19 exceedances in 200 days. There have been 15 exceedances of this objective throughout the monitoring period (see fig 8.) with elevated levels of PM₁₀ observed on 6th-9th, 11th August, 21st November and 10th, 16th –19th December 2003, 9th 12-13th and 16th February 2004.

The mean PM₁₀ concentration during this monitoring period was 27 µg/m³, well below the annual mean objective of 40µg/m³ (see Table 3.2). A more detailed summary, chart and estimated annual mean calculations can be found in the Appendix.

Table 3.3 *Pinxton Green Estimated PM₁₀ Annual mean concentrations and 24-hour mean exceedances for 2004 and 2010*

Location	Estimated Annual Mean 2002 (µg/m ³)	Estimated Annual mean in 2004 (µg/m ³)	Estimated Exceedances in 2004	Estimated Annual mean in 2010 (µg/m ³)	Estimated Exceedances in 2010
Pinxton 2003-4	28.7	27.8	20	25.5	14

3.11 2004 Objectives (Statutory)

The estimated annual mean for Pinxton in 2004 was calculated as 27.8 µg/m³ well below the objective of 40µg/m³. The number of 24-hour exceedances of 50µg/m³ was calculated using the method described in the LAQM Technical Guidance (03) at 20 exceedances, well below the objective of 35 exceedances.

There were 15 exceedances of the 24-hour objective recorded during the monitoring period, however a number of these exceedances were the result of elevated regional background concentrations experienced at a number of AURN sites close to Ashfield District. (see fig. 8 - 10). The calculations denote that the 24-Hour mean will not be compromised at this location.

3.12 2010 Objectives (Guidance)

The estimated annual average for Pinxton in 2010 was calculated as 25.5µg/m³ above the objective of 20µg/m³. The number of 24-hour exceedances of 50µg/m³ was calculated using the method described in the LAQM Technical Guidance (03) as 14 exceedances, above the objective of 7.

The results from Pinxton currently suggest that the 2010 annual mean and 24-Hour mean objectives may be compromised at this location. Future review and assessment to determine whether this will be the case will need to be undertaken at this location.

3.13 Discussion

The evaluation of all monitoring data of PM₁₀ concentrations close to the motorway, from July 2003 to February 2004 suggest that the annual mean and 24-hour mean objective were not compromised. Further data analysis to estimate the annual mean and annual number of exceedances of the 24-hour mean in accordance with DEFRA guidance, suggest that both objectives for PM₁₀ will be met at this property by the end of 2004.

3.14 Recommendations

Based upon the Detailed Assessment undertaken at Pinxton Green the PM₁₀ objectives for 2004 will be met. In view of this conclusion there will be no requirement for Ashfield District Council to declare an Air Quality Management Area for this location.

Figure 8.
PM₁₀ Comparison with data from **Nottingham** AURN Site
PM₁₀ Monitoring Results from July 2003 to February 2004 when the gravimetric sampler was at
Pinxton Green.

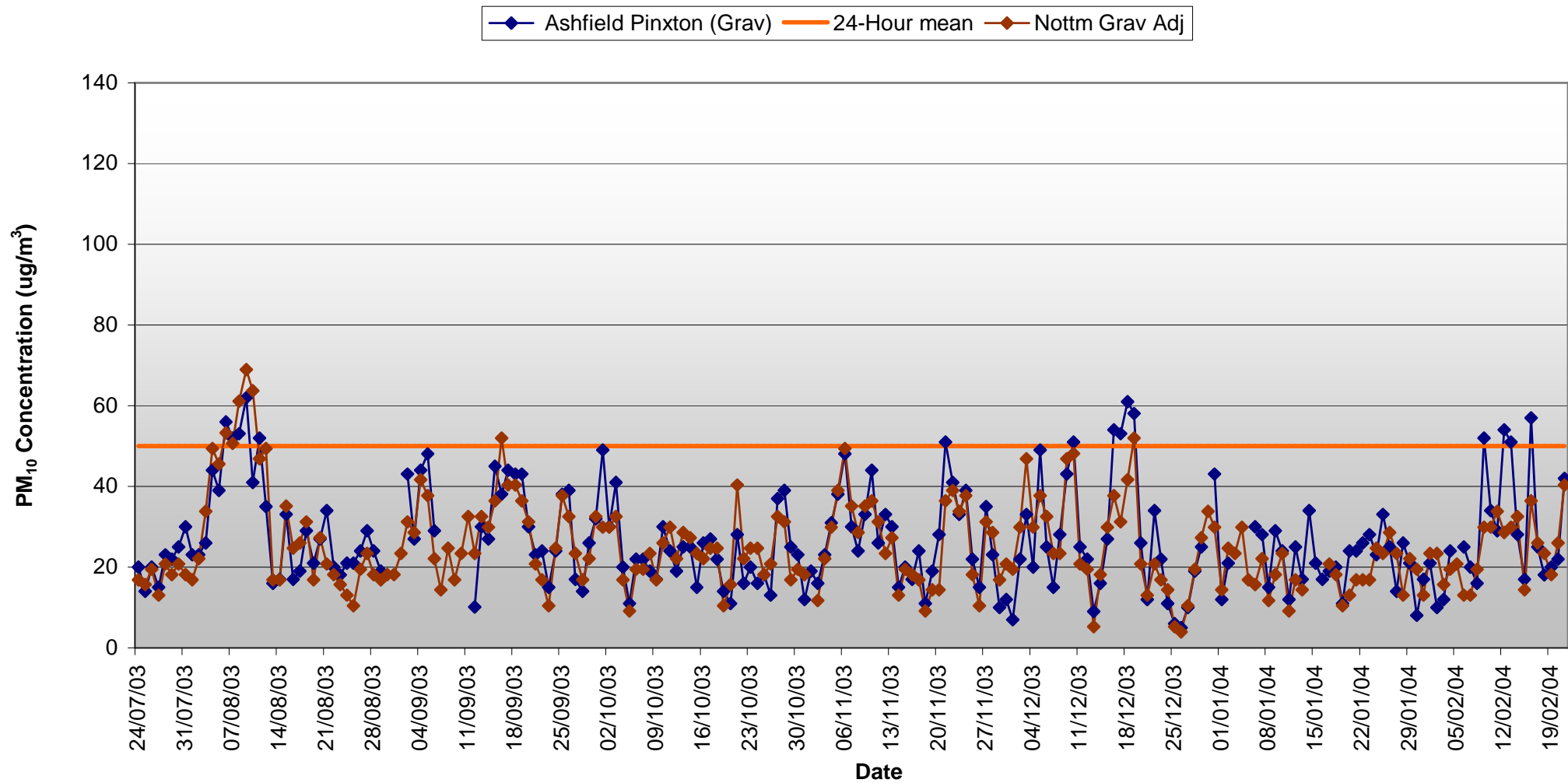


Figure 9.
PM₁₀ Comparison with data from **Leicester Centre AURN Site**
PM₁₀ Monitoring Results from July 2003 to February 2004 when the gravimetric sampler was at
Pinxton Green.

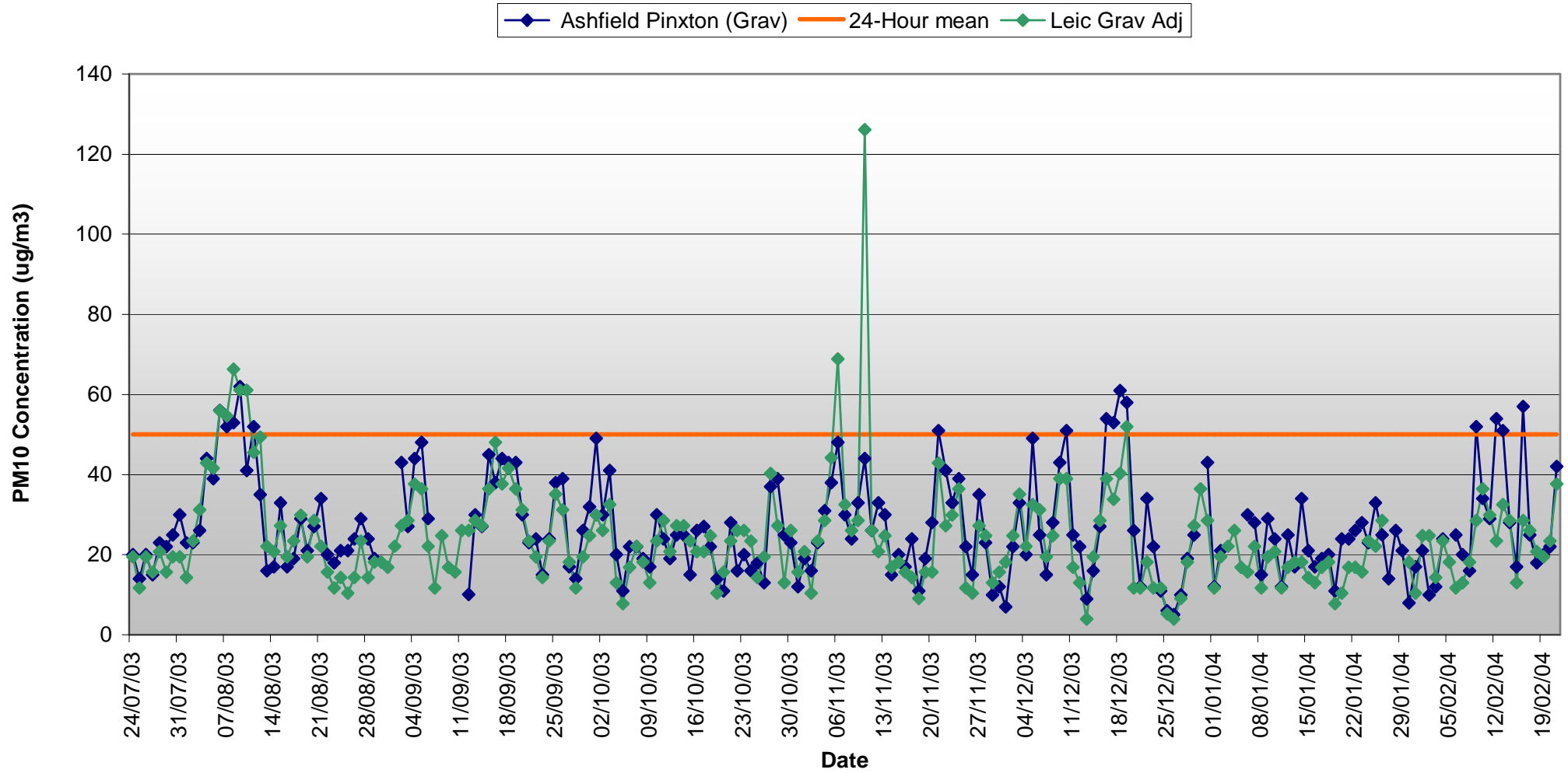
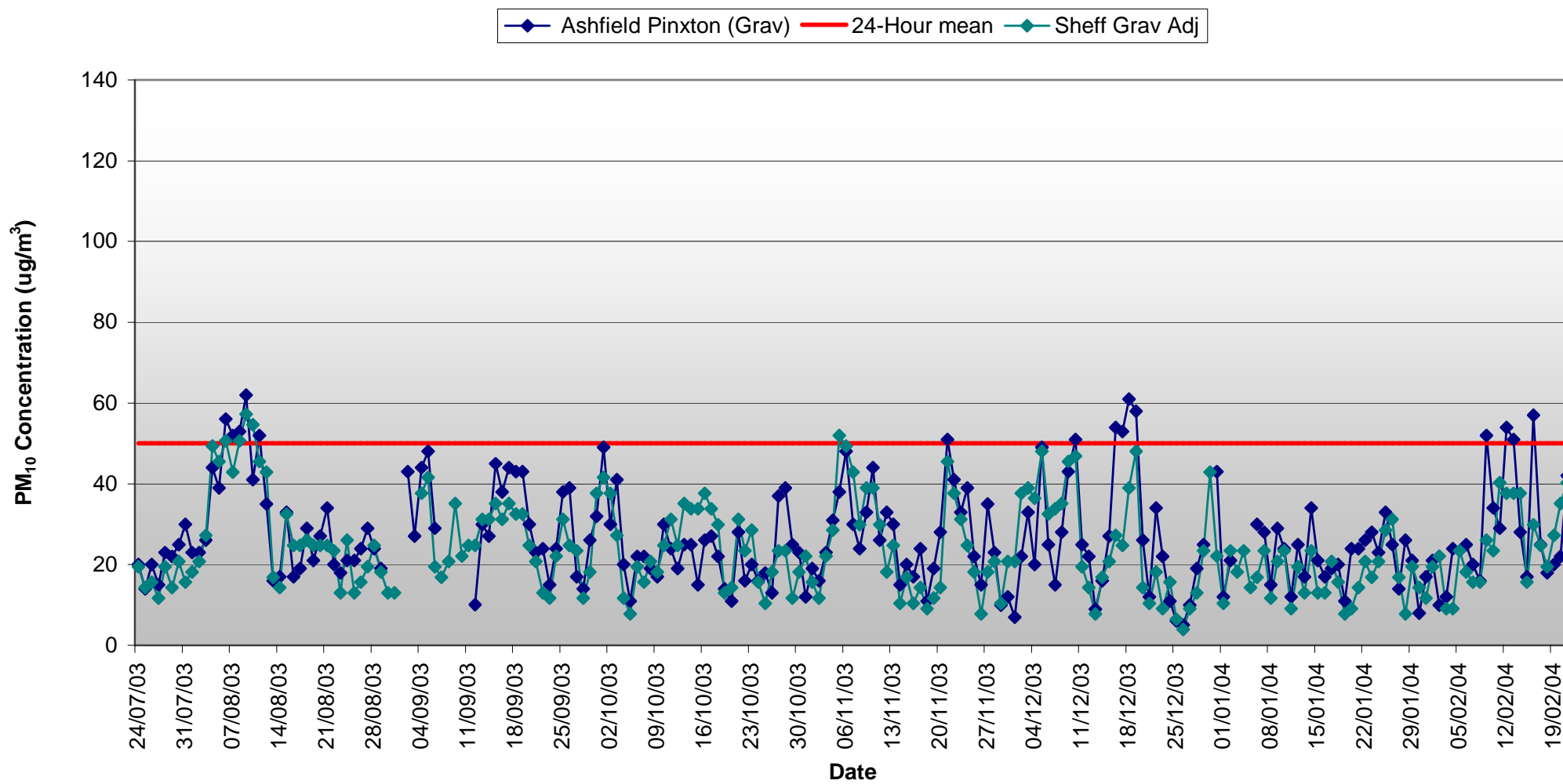


Figure 10.
 PM₁₀ Comparison with data from **Sheffield Centre** AURN Site
 PM₁₀ Monitoring Results from July 2003 to February 2004 when the gravimetric sampler was at
 Pinxton Green.



CHAPTER FOUR - 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, Policy Guidance, LAQM.PG(03), DEFRA. 2003.
4. Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance, LAQM.TG(03), DEFRA. 2003.
5. Air Quality Review and Assessment Stage Three Report, Ashfield District Council, 2001.
6. Air Quality Review and Assessment Stage Updating and Screening Assessment, Ashfield District Council, 2003.

5.0 CHAPTER FIVE – ABBREVIATIONS & GLOSSARY OF TERMS

5.1 Abbreviations

AADT	Annual Average Daily Traffic (vehicles per day)
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural (air quality monitoring) Network
COMEAP	Committee on the Medical Effects of Air Pollutants
DEFRA	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges Screening Model
GIS	Geographical Information System
HDV	Heavy Duty Vehicles (includes Rigid and articulated Heavy Goods Vehicles, Buses and Coaches)
PM₁₀	particulate matter with an (equivalent aerodynamic) diameter of ten microns (10 µm) or less

5.2 Glossary of Terms

Air quality standard The concentrations of pollutants in the atmosphere, which can broadly be taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also Air Quality Objective).

Annual mean The average of the concentrations measured for each pollutant for one year. In the case of the Air Quality Objectives this is for a calendar year.

Air Quality Management Area An area that a local authority has designated for action, based upon predicted exceedences of Air Quality Objectives.

Automatic Urban and Rural Network Air pollution measurement sites, managed by contractors on behalf of DEFRA and the Devolved Administrations.

Concentration The amount of a (polluting) substance in a volume (of air), typically expressed as a mass of pollutant per unit volume of air (for example, microgrammes per cubic metre, µg/m³) or a volume of gaseous pollutant per unit volume of air (parts per million, ppm).

Data capture The percentage of all the possible measurements for a given period that were validly measured.

Exceedance A period of time where the concentration of a pollutant is greater than the appropriate Air Quality Objective.

Fine particles, Particulate matter, (PM₁₀) in air with a (equivalent aerodynamic) diameter of ten micrometres (10 µm, 10 micrometres) or less.

Maximum hourly average The highest hourly reading of air pollution obtained during the time period under study.

Microgramme (µg), one millionth of a gramme.

Micrometre (µm), also referred to as a micron, one millionth of a metre.

mg/m³ milligrammes per cubic metre of air. A unit for describing the concentration of air pollutants in the atmosphere, as a mass of pollutant per unit volume of clean air. This unit is one thousand times larger than the µg/m³ unit listed below.

µg/m³ microgrammes per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

Percentile A value that is the rank at a particular point in a collection of data. For instance, a 98th percentile of values for a year is the value that 98% of all the data in the year fall below, or equal.

Parts per billion (ppb). The concentration of a pollutant in air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10⁹) units of air, there is one unit of pollutant present.

Parts per million (ppm) The concentration of a pollutant in air in terms of volume ratio. A concentration of 1 ppm means that for every million-(10⁶) units of air, there is one unit of pollutant present.

Ratification (Monitoring) involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used.

Running mean a mean or series of means calculated for overlapping time periods, and is used in the calculation of several of the National Air Quality Objectives. For instance, an 8-hour running mean is calculated every hour, and averages the values for eight hours. The period of averaging is stepped forward by one hour for each value, so running mean values are given for the periods 00:00 – 07:59, 01:00 – 08:59 etc. By contrast a non-overlapping mean is calculated for consecutive time periods, giving values for the periods 00:00 – 07:59, 08:00 – 15:59 and so on. There are, therefore, 24 possible running 8-hour means in a day (calculated from hourly data) and 3 non-overlapping 8-hour means.