



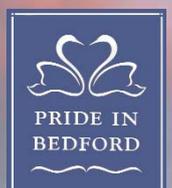
BEDFORD BOROUGH COUNCIL

Air Quality Action Plan for the Bedford Borough Council

November 2007

Amended as of July 2008

- Technical Services Group
- Environmental Health Service
- Pollution Control Section



YOUR AIR QUALITY



Bedford Borough Council

Introduction

Clean air is essential for a good quality of life and progress has been made since the smogs of the 1950s by regulating industry and introducing smoke control areas. However, there are still problems with certain pollutants, particularly from vehicles. In July 1995, the Environment Act 1995 received Royal assent. Part IV of the Act established a new framework for improving air quality, embracing the National Air Quality Strategy, and incorporating health based standards and systems for the management of air quality.

In keeping with the objectives of the Environment Act and as part of a commitment to sustainable development, Bedford Borough Council approved a Local Air Quality Strategy. A corner stone of this Strategy is the Review and Assessment of Bedford's air quality. The objective is to undertake monitoring and evaluation of air quality throughout the borough in a staged process in order to reduce pollution hot spots and integrate air quality into strategic decision making and policies on a local basis. Review and Assessments of local air quality are required every three years and, if necessary, Air Quality Management Areas (AQMA) declared where pollution levels are found likely to exceed national standards. This continual need to review air quality is because of the consequence of changing circumstances including new and expanding industry and increasing vehicular use which could all potentially impact on local air quality.

Air Quality Review & Assessment (2004-2005)

Two Detailed Assessments carried out as part of the second round of Review and Assessment confirmed that emissions of Nitrogen Dioxide from the traffic within three locations in Bedford (High Street, Prebend Street and the A421 running through the village of Great Barford) were such that the annual mean National Standard for Nitrogen Dioxide was likely to be exceeded by the objective date of 31st December 2005. In addition, it was concluded that the emissions from the Stewartby Brickworks were such that all three National Standards for Sulphur Dioxide were likely to be exceeded by their respective objective dates, the earliest being 31st of December 2004.

In 2005 the Borough Council declared four AQMA's and commenced two Further Assessments with which to inform the two Action Plans that will be needed to bring about the improvements in air quality necessary to ensure the National Standards are met. A Progress Report in 2005 provided further confirmation of the highlighted exceedances and also identified a need to expand the Nitrogen Dioxide passive air quality monitoring resources, particularly for those sites in London Road and Dame Alice Street. A commitment was also

made to install new, more accurate, real time air quality monitoring stations in key locations to monitor both Sulphur Dioxide and Nitrogen Dioxide.

Air Quality Update and Screening Assessment (2006)

As part of its continuing obligations under the Environment Act 1995, Bedford Borough Council commenced the third round of Review and Assessment in 2006 with an Update and Screening Assessment. The purpose being to re-examine the local air quality within the whole Borough to establish if there had been any changes since the second round of Review and Assessment which could threaten air quality elsewhere in the Borough other than those areas where AQMA's had been previously declared. This report incorporated the results of the newly expanded passive air quality monitoring resources for Nitrogen Dioxide. It concluded that, as a consequence of emissions from traffic, there may be a need to expand the existing AQMA's on the High Street and Prebend Street, Bedford. In addition, concerns were raised over the air quality on part of Goldington Road and Ampthill Road Bedford where again, emissions from traffic could threaten achievement of the annual mean National Standard for Nitrogen Dioxide.

Air Quality Further Assessment (2006)

Bedford Borough Council has now completed two Further Assessments in respect of the air quality situation in the previously declared AQMA's. These in depth studies have been conducted to characterise the sources of pollution so as to enable effective targeting within the Action Plans. The Further Assessment for Nitrogen Dioxide has supplemented information the Borough already had on the need to either designate further AQMA's or expand those already existing. The Further Assessment has outlined areas outside of the AQMA's where the National Standards are being exceeded. Following completion of the Detailed Assessments, Bedford Borough Council will identify if an AQMA needs to be declared for the whole town Centre, or if expansion of the existing areas is adequate to encompass the areas where exceedances are identified. The Further Assessment for Sulphur Dioxide has shown that the National Standards are still being exceeded in and around the Stewartby area. The existing AQMA incorporates the area of exceedance which the Action Plan will work towards improving in the future.

Air Quality Action Plan (2007)

The AQAP drawn up by Bedford Borough Council details the measures that the Borough and its partners are taking to help improve the Air Quality of Bedford. The AQAP reflects the results of previously declared AQMA's by introducing schemes and measures to reduce the pollution emitted from vehicles and Stewartby Brickworks. The AQAP is a working document and will be continually reviewed and updated in order to achieve each new target set. The AQAP details the need of a multidisciplinary approach, involving all partners in order to improve Bedford Air Quality.

Moving Forward - Improving Local Air Quality

To inform the Detailed Assessment, Further Assessment and Action Plan processes, the real time air quality monitoring resources are to be expanded further. The Borough Council currently only operates one real time air quality monitoring station measuring Sulphur Dioxide in Stewartby though this has recently been upgraded and modernized to improve the quality of the data obtained. Funding has been secured to install three more stations. These will be placed in the existing AQMA's and will monitor Sulphur Dioxide or Nitrogen Dioxide as appropriate. In addition, a local company who operates a station in Kempston, is now supplying the Borough Council with their Sulphur Dioxide data. There are also the two stations measuring Sulphur Dioxide operated by the owners of the Brickworks which are based in Stewartby and Kempston Hardwick. Therefore, in total there will be five monitoring stations measuring sulphur Dioxide and two stations measuring Nitrogen Dioxide within the Borough. This is a significant achievement and will ensure a good spread of accurate air quality monitoring data be continually obtained for years to come.

Our Commitment to You

Bedford Borough Council's Corporate Plan identifies 6 key priorities to which the Council is fully committed, one of these is to provide a "Clean and Green Borough". As part of this commitment the Council strives for a continuing improvement of air quality within the Borough making it a safe and clean place to live, work, visit and enjoy. With this in mind the Council will use its best endeavours to secure the achievement of the National Standards.

David Logan

Head of Service (Environmental Health, Bedford Borough Council)



Air Quality Action Plan For the Bedford Borough Council

Executive Summary

Studies of air quality in the Borough undertaken by the Council have identified that some of the Government's air quality objectives have not been met by the specified dates. As a result the Council is required to work towards achieving these air quality objectives within the Borough. This Air Quality Action Plan (AQAP) details the measures that the Bedford Borough Council and its partners are taking, intending and considering that will help to improve air quality.

Most of the air pollution in the Bedford AQMAs is caused by two main sources; road traffic for those AQMAs declared for nitrogen dioxide and Stewartby brickworks for the AQMA declared for sulphur dioxide. The AQAP reflects this by including measures to reduce the impact of pollution emitted from vehicles on the roads and to reduce pollution from the brickworks. Bedford Borough Council is also addressing emissions from non-road sources such as industrial activities and domestic heating for the areas declared for nitrogen dioxide.

The AQAP is a working document that should stimulate new ideas and focus existing policies to improve air quality across the Council and beyond.

Widespread and continuing consultation and participation are essential, both within the Council and externally with relevant stakeholders and the public. An effective Action Plan, that will achieve its targets, is one that has gained Member and Corporate commitment and support.

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1. Introduction to the Bedford B.C Air Quality Action Plan

This is the Air Quality Action Plan for the Bedford Borough Council (the “Council”) that will help to improve air quality and work towards the achievement of the Government’s air quality objectives in the Borough. The Action Plan includes details of existing initiatives as well as proposed measures and their implementation.

The Action Plan is a requirement of the Council’s continuing Local Air Quality Management responsibilities under the Environment Act 1995. The Council is seeking to produce the Action Plan in partnership with other stakeholder organisations and for that purpose has established an Air Quality Steering Group to which representatives of the Environment Agency, Highways Agency and Bedfordshire County Council have been invited to participate.

Background

1.2.1 Government’s Air Quality objectives

Part IV of the Environment Act 1995 introduced new responsibilities to both national and local government throughout the UK. These responsibilities include the requirement upon the national government and devolved administrations to develop an Air Quality Strategy (AQS) for England, Wales, Scotland and Northern Ireland (DEFRA, 2000). The overall purpose of the AQS is to seek improvements in air quality for the benefit of public health. The first AQS was produced in 1997; it was amended in 2000 and is currently undergoing a further revision.

Local air quality management (LAQM) was also introduced by the Environment Act 1995. It requires local authorities to periodically review and assess air quality across their areas. The AQS confirms that LAQM provides a major component of the government’s plan for air quality improvement across the UK.

Air quality objectives have been set for those air pollutants deemed to be of most concern and seven of these are included under the LAQM regime. A summary of these pollutants and the air quality objectives is given in Appendix 1. The objectives are all based on health-based standards using current scientific advice taking into account the likely cost and benefits, as well as feasibility and practicality in meeting the objectives. The objectives are mostly in line with limit values prescribed by EU Directives, although additional objectives (including bringing forward the date for compliance) have been included for some pollutants.

1.2.2 Bedford Borough Council position

The LAQM process requires a phased approach. This is to ensure that each local authority undertakes a level of assessment that is commensurate with the risk of an air quality objective being exceeded. Previously the Council has assessed and screened (most recently in 2006): benzene, 1,3 butadiene, carbon monoxide, lead and particulate matter (PM₁₀) and found that they were not likely to exceed to the air quality objectives in the Borough (see Table 7).

However for nitrogen dioxide (NO₂) and sulphur dioxide (SO₂), the Council undertook a Detailed Assessment of air quality. This showed that the annual mean objective of 40 µg m⁻³ for NO₂ and the 15 minute mean objective of no more than 35 periods with a 15 minute mean concentration exceeding 266 µg m⁻³ for SO₂ were exceeded in parts of the Borough.

The Council declared four AQMAs for the parts of the Borough affected by these high concentrations (see Figure 1, 2, 3 and 4). The Orders making the declaration for the AQMAs came into force on 26 January 2004.

Figure 1 Bedford B.C Air Quality Management Area 1

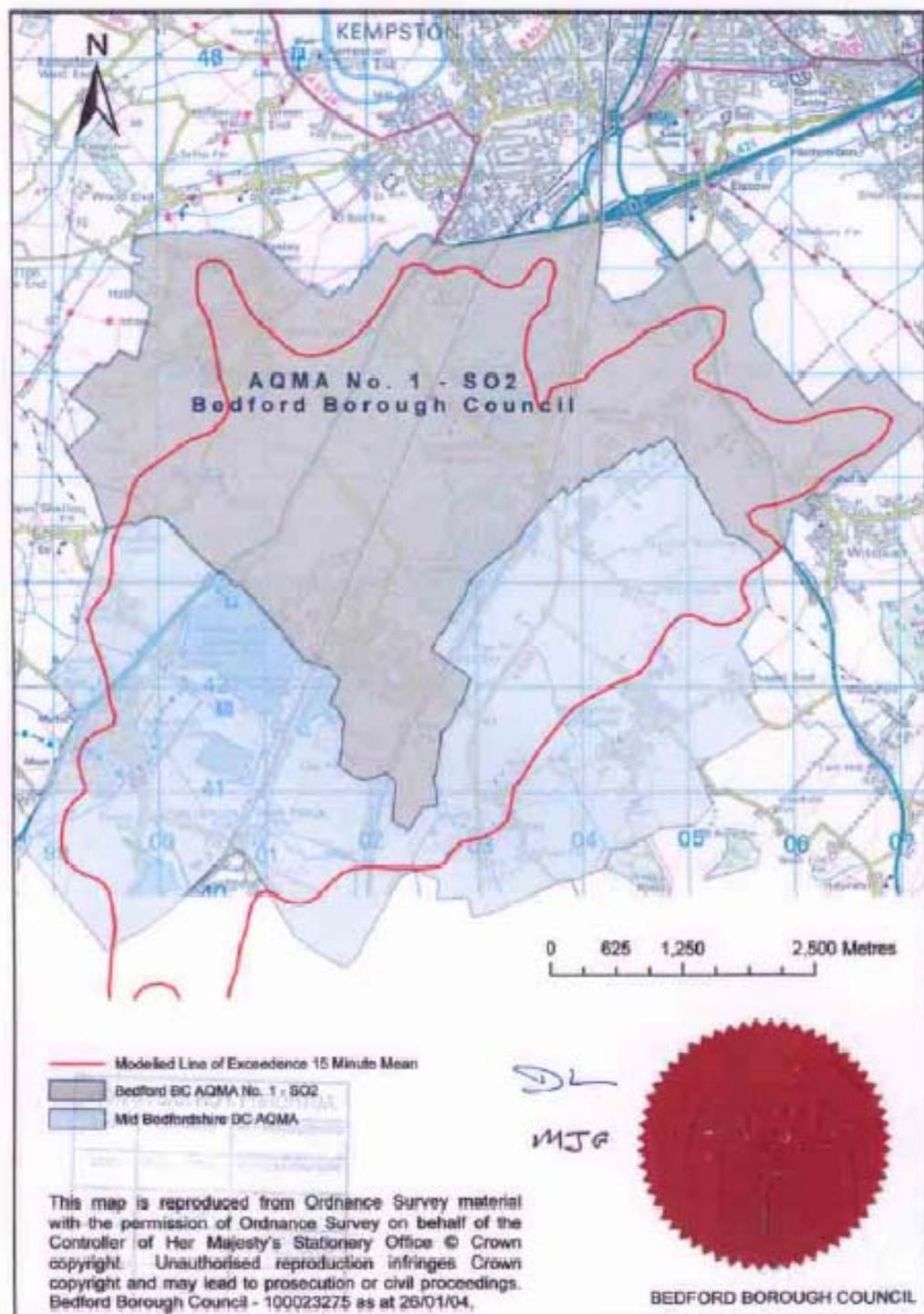


Figure 2 Bedford B.C Air Quality Management Area 2

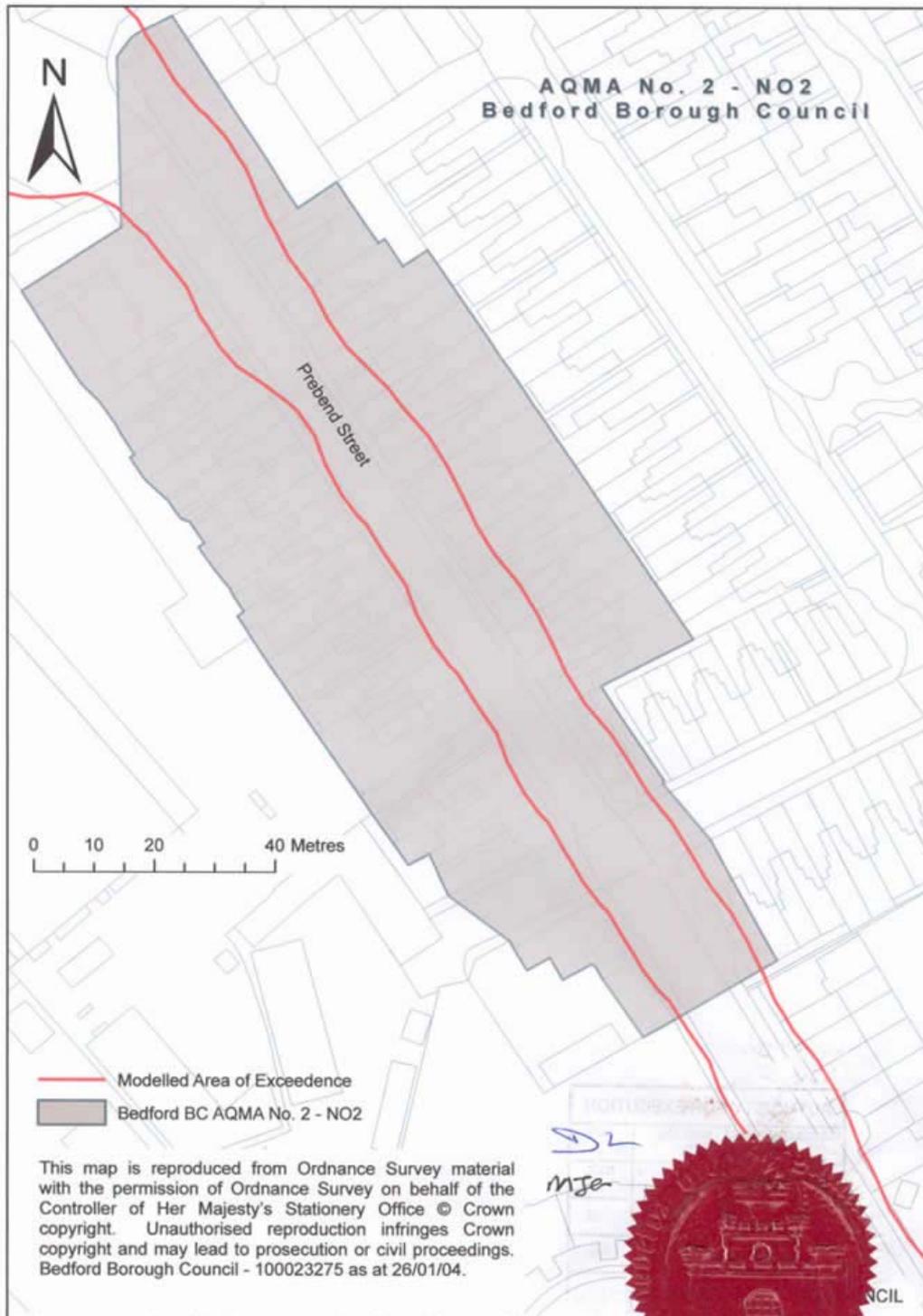


Figure 3 Bedford B.C Air Quality Management Area 3



Figure 4 Bedford B.C Air Quality Management Area 4



1.3 Bedford Further Review and Assessment

Having declared an AQMA, a further assessment of air quality was required. This was undertaken separately for the NO₂ and SO₂ AQMAs to determine the relative contribution of the different sources of pollution.

This further review and assessment provided a technical justification for the measures contained in this Action Plan and allowed the Council specifically:

- To confirm the original assessment of air quality and to show that the Council was right to declare an AQMA
- To calculate more accurately how much of an improvement in air quality will be required to deliver the air quality objectives within the AQMA
- To refine knowledge of the sources of air pollution so that the Bedford B.C AQAP is properly targeted
- To take account of any developments in local or national policy which have occurred since the AQMA was declared, which were not factored into the earlier assessment work

The most recent monitoring reported in the Further Assessments continued to show that the NO₂ and SO₂ objectives are being exceeded in the AQMAs (see Appendix 2).

To better understand the improvement needed at a location to achieve the AQS objectives, it was necessary to determine the individual source emissions that contribute to the overall predicted pollution concentration. Both pollutant emissions and atmospheric processes, including meteorology, determine the pollution concentration at any given location. For AQMAs 2, 3 and 4 this is further complicated by the varying activities contributing to the source of emissions.

For NO₂, the contribution from the different sources could only be understood by examining the contribution of oxides of nitrogen (NO_x) sources as the main emission. This is because NO₂ is mostly a secondary pollutant, formed from NO_x as a result of atmospheric chemistry.

A series of locations were chosen across the AQMAs declared for NO₂ (see Appendix 2) to help understand the source contribution of oxides of nitrogen (NO_x). These were selected to provide a representative understanding of locations with predicted high concentrations of pollution in the Borough. The sites were predicted to exceed the 2005 objective for NO₂ by between 0.4 – 24 µg m⁻³. The largest predicted exceedence was the street canyon location of Prebend Street. The results confirmed the importance of road traffic to air quality, with a contribution of 75% NO_x from road transport and the other 25% from various background sources (such as domestic heating). This is a median result of the locations examined.

The understanding for SO₂ was more straightforward since it is a primary pollutant i.e. it is directly emitted from a known source, the brickworks, at a level that far exceeds the other emission sources that can be considered to contribute to the background concentration. In this instance a source apportionment was undertaken between the individual sources of pollution (i.e. the separate kilns used at the brickworks).

This review also tested the effectiveness of possible measures to improve air quality within the Borough, providing indicative results. The scenarios for AQMAs 2 and 3 reflected the fact that road transport is the main source of emissions. The tests included: 1) a 2010 scenario (with no vehicle growth between 2005 and 2010); 2) a 2010 scenario (with 10% vehicle growth between 2005 and 2010) and 3) 2005 base with a 10% reduction in traffic.

The results indicated that for all locations and scenarios tested, the annual mean concentrations reduce of NO₂ will reduce. This reduction reflects both the changes to vehicle flows and stock, plus for the 2010 scenarios, the predicted reduction in background concentrations in the area.

The 2010 base scenario indicated the greatest reduction in concentrations from that of the 2005 base case prediction. Additional sites predicted to meet the 2005 annual mean air quality objective for NO₂ included: BF 46 in Ashburnham Road, BF38 and BF 48 in Prebend Street, BF06 in the High Street

and BF53 in Dame Alice Street. Despite these reductions, concentrations were still predicted to exceed the objective at other locations in the High Street, Prebend Street and the Broadway.

The 2010 with 10% additional vehicle growth scenario results in higher predicted concentrations than the 2010 base scenario, by up to $3.1 \mu\text{g m}^{-3}$. Additionally BF48 in Prebend Street was predicted to exceed the objective with this scenario.

The scenario with least improvement of those tested is that for 2005 with a reduction of vehicles of 10% on the Bedford town centre roads, based on 2005 traffic flows and vehicle stock. This scenario indicated a reduction of up to $4.5 \mu\text{g m}^{-3}$ from the 2005 base case at the most polluted location, i.e. BF42 in Prebend Street. This reduction in concentrations was however insufficient for any of the locations examined to meet the AQS objective, apart from BF46 in Ashburnham Road.

For AQMA 1, scenarios were modelled exploring ways of reducing ground level concentrations of SO_2 including: an increase in stack height only; an increase in efflux velocity only; and scenarios based on the individual emissions from the kilns. The results for all scenarios indicated that the 15-minute mean objective will still be exceeded, with a slight reduction for both stack height and changed efflux velocity scenarios.

The individual kiln modelling produced the greatest reduction in concentrations. The results from the smaller kiln (ck3) had the smallest area that was predicted to exceed. For this scenario the predicted concentrations just exceeded the objective at the Council's Stewartby site.

1.4 Monitoring air quality

The monitoring of air quality in Bedford is crucial if well informed policy decisions are to be made on matters that could affect pollution levels in the air. The Council currently has two long-term continuous monitoring stations at:

Stewartby (BF1) - This site opened in November 2000 and is located at a background site in a playing field in Stewartby; as such it is representative of relevant public exposure. The site is part of the Herts and Beds Air Pollution Monitoring Network (HBAPMN). It is operated to standards of QA/QC similar to the government's AURN and therefore it meets those of the government LAQM (TG 03) guidance.

Kempston (BF3) - The Council also very recently opened a new site in October 2006 at a background location, close to the southern edge of the urban area of Bedford. It is also representative of relevant public exposure and is part of the Herts and Beds Air Pollution Monitoring Network (HBAPMN).

The pollution levels measured at these stations, and results from NO_2 diffusion tubes (16 of which are located in and around AQMAs 2, 3 and 4) were used for validation of the modelling work undertaken in all review and assessment work.

Bedford's Air Quality Reports can be accessed on
<http://www.bedford.gov.uk/Default.aspx/Web/AirPollution>

For up to date and historical air quality data see
<http://www.hertsbedsair.org.uk/hertsbeds/asp/Home.asp>

The Council is also looking to install two continuous analysers in the Bedford town centre AQMAs to measure NO_2 .

2. Building upon existing plans

2.1 Introduction

This document sets out the actions that Bedford Borough Council is currently taking and intending to take to improve air quality in the borough. The actions described include those taken by the Council on its own, and those taken in partnership with the local community, local businesses as well as other regional and national agencies.

The Action Plan seeks to be consistent and build on other Council policies such as the Corporate Plan, Community Plan, and the newly emerging Local Development Framework. Importantly it also seeks consistency with the Bedfordshire County Council's Local Transport Plan.

The Action Plan has been developed within the context of Bedford Borough Council's key priorities (see below) and the written in accordance with guidance issued by government's Department for the Environment, Food and Rural Affairs (DEFRA) and the National Society for Clean Air (NSCA).

Air pollution arises from a wide variety of sources and the Action Plan reflects this by including actions relating to domestic, commercial and industrial activities as well as road transport. This Action Plan draws on all the measures that the Council is taking where air quality will benefit and also seeks to show how these actions have a wider significance. The wide range of proposed measures is intended improve air quality in the Borough.

2.2 The Council's vision

The Council set out its vision for delivering high quality services to its citizens in its Corporate Plan for 2004/7. The Council is fully committed to the provision of high quality, cost effective and responsive public services. Our strong financial and corporate management seeks to ensure that there is capacity to deliver the aims and objectives underpinning this vision.

The plan covers six areas and is deliberately aligned to link with national and governmental priorities of clean, green and safe environments for all citizens and the delivery of a vibrant town centre and a balanced housing market providing good quality homes to meet the needs of our diverse communities. Equally important, this plan is about releasing Bedford's potential as an historic market and county town. This plan is about restoring Bedford as a local and regional centre to be proud of.

The plan sets out, for each its key priority areas, the objectives for delivery and improvement and a clear statement on how the overall plan is likely to be financed, resourced and managed. It is through this plan that the Council will maintain a focus to drive its overall aim and objectives. The plan is the key document whereby citizens can find our vision and direction and understand how it fits within the Community Plan, which we are delivering with our partners. The plan not only sets out our service priorities but the actions that will ensure their success. The priorities are consulted on widely before the Council agrees them.

Council Key Priority Areas

The Council has developed the following six priority areas to achieve its vision:

- A Listening Council
- A Clean and Green Borough
- A Safer Borough
- A Prosperous Borough
- An Enjoyable Borough
- A Balanced Housing Market

Each key priority includes specific key objectives, aligned with key activities and targets to deliver the objectives.

2.3 The Community Plan

Bedford Borough Council has undertaken an extensive community consultation exercise in an effort to produce a visionary strategy designed to promote and enhance the social, economic and environmental well being of the Borough and its residents.

The second Community Plan (2004-2010) is co-ordinated by the Bedford Partnership Board, a multi-agency group that brings together representatives from the statutory, voluntary and business sectors to produce a long-term plan for the Borough and its diverse communities.

The over-arching aim is “Working Together to Improve Health and Well-Being” and our objective is to lay the foundation stone for an improved quality of life for everyone who lives, works or visits the Borough. Central Government has promoted the establishment of Local Strategic Partnerships as the most effective vehicle to deliver local Community Plans and to create the over-arching Plan from which all other plans and strategies should flow. Sustainable development is a key theme that runs through the Community Plan and legislation places a duty on Local Authorities to publish and distribute the Community Plan and Government guidance.

The second Community Plan will run from 2004 to 2010 but will be reviewed regularly to take account of progress made, changing circumstances and the feedback the Council receives from its on-going consultations with other organisations and the community.

The key themes covered by the **Community Plan** are:

Promoting Community Safety
 Providing Housing and Building Communities
 Improving the Environment
 Improving Health
 Strengthening the Economy
 Developing Learning Opportunities and Skills
 Creating Better Transport
 Promoting Leisure
 Including Everyone

The Community Plan will be reviewed and updated regularly; updated sections will be available from <http://www.bedford.gov.uk/Default.aspx/Web/CommunityPlan>.

2.4 Bedford planning policies

The Planning system plays a pivotal role in shaping and protecting the quality of our urban and rural areas thus making a central contribution to our well being and quality of life by:

- Creating opportunities for development;
- Conserving environmental quality;
- Achieving sustainable development;
- Promoting public participation; and
- Helping to protect the rights of the individual.

Recent changes to the Planning legislation require the Council to replace its Unitary Development Plan with a Local Development Framework. This is a portfolio of planning documents, individually known as Local Development Documents that deliver the spatial development strategy for the Borough and builds upon existing local and regional strategies and initiatives, in particular the Community Plan.

The new planning system places an emphasis on strengthening community and stakeholder involvement in the planning process. The Statement of Community Involvement (SCI) sets out how local communities and stakeholders with an interest in the area can play a part in the preparation and revision of planning documents and the consideration of planning applications. On the 17th May 2006 the SCI was formally adopted.

The Bedford Development Framework currently includes the following Local Development Documents:

- Local Development Scheme
- Statement of Community Involvement
- Core Strategy and Rural Issues Plan
- Bedford Town Centre Area Action Plan
- Development Plan Documents
- Proposals Map
- Area Action Plans
- Supplementary Planning Documents
- Annual Monitoring Report

The Local Development Scheme (LDS) is a three-year project plan that sets out all the documents that will be produced and timetable for their preparation. The new system involves substantial community participation from the beginning of the plan preparation process. Policies in Local Development Frameworks relate to 'spatial' matters rather than land use issues which Unitary Development Plans focus on. All policies and proposals are subject to a Sustainability Appraisal and Strategic Environmental Assessment to ensure that social, economic and environment issues have been taken into consideration This LDS has been prepared in consultation with the Government Office for the East of England (GO-East). The Executive approved this LDS on 9th March 2005, and it was brought into effect on 1st April 2005.

The Core Strategy and Rural Issues Plan is a key document in the Bedford Development Framework. It contains planning policies for the Borough as a whole and deal with 'strategic' planning policies as opposed to detailed or site-specific policies.

The objectives of the two relevant regional planning documents (the East of England Plan and the Milton Keynes South Midlands Sub-Regional Strategy) have also been taken into account. It is considered that the proposed objectives of the Core Strategy and Rural Issues Plan are compatible with the objectives of both of the regional plans. Having identified the objectives of the Plan, the objectives will then be addressed by producing planning policies. The following are the proposed objectives of the Core Strategy and Rural Issues Plan:

1. Deliver growth based on sustainable principles focussed on Bedford and Kempston and specific locations in the northern Marston Vale.
2. Provide for 11,400 jobs in the Borough in the period 2001-2021.
3. Restrain growth in the more rural, less sustainable locations within the Borough but maintain a focus on local needs.
4. Provide for 16,270 dwellings in the Bedford growth area and 830 dwellings in the residual area in the period 2001-2021. Ensure that a mix of housing types, sizes and tenures are provided to meet market and affordable housing needs.
5. Foster employment growth with an emphasis on the high value knowledge based sector as a prerequisite to a strengthening of the housing market and a better balance between homes and jobs.
6. Protect and maintain employment sites identified as being of importance and identify a strategic location for high value knowledge based industries.
7. Foster viable and vital retail centres.
8. Encourage reinvestment in Bedford town centre through the expansion and revitalisation of the existing centre and enhancement of the town's cultural and tourism function to create a prosperous focus for the sub region.
9. Address Bedford's infrastructure deficit and improve east/west communications.
10. Deliver strategic transport, green, community and social infrastructure as a key contribution to developing sustainable communities.

11. Minimise the environmental impact of travel, by reducing the need to travel, encouraging the use of more environmentally friendly modes of transport, and widening choice of modes.
12. In the rural areas (outside the growth area) focus on rural vitality and diversification in the context of a rural hierarchy, which prioritises the most sustainable locations.
13. Protect and enhance the Borough's built and historic assets and promote design excellence, distinctiveness, safety and accessibility in the built environment.
14. Protect and enhance the natural environment, including its biodiversity and landscape character and give priority to the enhancement of the Marston Vale.
15. Minimise the use of energy whilst encouraging the greater use of energy from renewable sources.

2.5 Bedfordshire's transport policies

The Bedfordshire County Council (B.C.C) submitted its second Local Transport Plan (LTP2) to the Department for Transport and GO-East on 31st March 2006. It is a statutory document setting out how the Bedfordshire's transport will develop for the next five years to 2010/2011 in the context of national, regional and local policies. The LTP has been the subject of consultation and it also forms the basis for bidding for funds for traffic and transport schemes.

The overall long-term aim of the LTP2 is:

To improve the quality of life and economic prosperity in Bedfordshire by connecting communities and businesses, and improving access to services and amenities.

The priority objectives of the LTP2 are:

- Preparing for growth
- Developing the economy and
- Managing our transport assets
- Managing congestion
- Accessibility
- Safer travel
- Air quality and the environment

LTP2 Objective - Air quality and the environment

7 "To protect and enhance the best of Bedfordshire's natural and built environment, and to tackle and prevent specific problems caused by transport, particularly in relation to Air Quality Management Areas."

The LTP also outlines the 19 strategies that will contribute to meeting these objectives. For improving air quality a collection of actions are planned. An overriding environmental issue is one of minimising the additional impact of the designated Growth Area for Bedfordshire, including the Milton Keynes and South Midlands (MKSM) sub region. This area, part of the government's Sustainable Communities Plan is subject to its own spatial strategy, which seeks to increase the number of new homes, provide for economic growth, focus on urban areas, meet existing and future infrastructure needs and create sustainable communities. The Strategic Environmental Assessment (SEA) produced for the LTP2 has helped ensure all significant environmental effects are addressed.

The LTP2 sets out how the B.C.C is setting out to implement the priorities through the adoption of a delivery programme with targets.

On air quality issues specifically, the LTP2 approach to tackling problems of poor air quality are a collection of actions, which when added together aim to reduce the impact of traffic on the environment. The B.C.C will meet the shared priority by establishing and maintaining links with the Council, helping develop Air Quality Action Plans and taking an active role in the management of traffic through sensitive areas.

The Network Management strategy of the LTP2 and the implementation of Major Projects are considered to be of benefit to this shared priority because they will lead to a more efficient use of the network. The completion of the infrastructure programme will help to reduce the impact of traffic in existing centres and allow planned growth to take place with minimal impact.

2.6 Bedford Borough Council Sustainable Development Policy

The Borough Council is responsible for many services including planning, refuse collection and recycling, tourism, benefits, licensing, public health, parks and open spaces, housing advice, recreation and leisure. The Council recognises that the provision of these services has impacts on the Borough, and that the Council has a responsibility to manage those impacts and lead by example.

To ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs, the Council, therefore, aims to reduce negative impacts from its services, and deliver services that are sustainable, and which consider equally social, economic and environmental aspects. All Council sections have adopted a Sustainable Development Action Plan from August 2005, and the actions identified below will help deliver this overall aim.

In particular in the delivery of its services, the Council will seek to:

- ◆ Continually improve its environmental performance by involving staff in reducing resource consumption within Council activities, in particular energy efficiency and waste minimisation;
- ◆ Integrate sustainable development principles within its policies and strategies, including a commitment to Fair Trade;
- ◆ Purchase goods and services locally, which have a reduced environmental impact and are from an ethical source wherever possible;
- ◆ Promote greener travel within the Council;
- ◆ Promote and encourage energy efficiency and waste minimisation, reuse and recycling and general resource efficiency to the community;
- ◆ Ensure that levels of environmental pollution are kept to a minimum and where possible encourage improvement in the general standard of the quality of the environment;
- ◆ Protect the diversity of nature through delivery of the Biodiversity Action Plan;
- ◆ Use the Council Planning Policy process to work with existing communities and developers to achieve sustainable communities;
- ◆ Comply with relevant environmental legislation and regulations, and with other requirements, which are subscribed to;
- ◆ Work with suppliers and contractors to ensure that they are aware of and support this Policy.

3. Identification of Transport Related Measures

3.1 Proposed actions for AQMAs 2 and 3

Transport plays a significant part in our daily lives so it is essential that policies and plans regarding transport integrate with other initiatives in supporting the achievements of the Council's priorities.

An important objective underlying the whole of the government's strategy is balancing the need to travel with the need to improve quality of life. This is through working to promote initiatives that can reduce congestion, improve local environments and encourage healthier and safer lifestyles. Many of these initiatives are part of the broader cross government agenda for Creating Safer Greener Communities.

As already highlighted the greatest amount of air pollutants in AQMAs 2 and 3 arises from road transport emissions. Roads in the Borough are the responsibility of the Bedfordshire County Council (B.C.C), with the Highways Agency (HA) having responsibility for the main trunk routes, which are outside the AQMAs. As the Council does not have direct responsibility for roads such as these any plans to control pollution needs to be in partnership with the B.C.C (and the HA). The Council can however lobby for improvements.

AQMAs 2 and 3 both have slow moving traffic that link to the two river crossings in the town centre. Although it is important to also note that additional investigations undertaken by the Council in its third round Updating and Screening Assessment have indicated that the NO₂ annual mean objective is also exceeded in other parts of the town centre. It is considered that the findings for the Council's Detailed Assessment (to be prepared shortly) will result in the need to designate one or more AQMAs in additional parts of the Bedford town centre.

3.2 Proposed actions for AQMA 4

The Council additionally designated part of the Great Barford village as its AQMA number 4. At the time of designation the A428 main trunk road ran through the village centre, with consequent high levels of slow moving traffic. At the time of the designation of the Great Barford AQMA, the proposal for the A421 Great Barford Bypass scheme was well underway. The Environmental Impact Assessment produced for the road demonstrated that there would be a significant reduction in pollutant concentrations with the proposed Bypass in place (see <http://www.highways.gov.uk/roads/projects/4617.aspx>). Construction has taken place over the past two years and the Bypass opened to traffic on the 24th August 2006. The new road is a dual carriageway, which is 7.7 km long connecting to the A1 at an enlarged Black Cat Roundabout.

Following the opening of the new road, the Council proposes to continue monitoring at its existing sites in Great Barford for at least the next 12 months. This will permit sufficient time to assess whether or not there has been a reduction in concentrations below AQS objective. On the assumption that concentrations do reduce sufficiently, the Council will revoke the designation of the AQMA in accordance with the government's policy guidance.

Road network

The LTP2 expects that traffic levels on Bedfordshire's roads (including Bedford's) will continue to increase. This is as a result of an expected period (to 2021) of prolonged and sustained growth will increase the resident population by 18% and create 50,000 new jobs, an increase of 21% over the current Bedfordshire and Luton figure. Much of the new infrastructure that is proposed will meet current and short term demands, and will not keep pace with the increasing numbers of road users that the planned growth in the area will bring. Even with the measures put in place to reduce dependency on the private car, the absolute increase in population and vehicle movements will lead to additional pressure on both the strategic and local networks.

As a result, the B.C.C will take a much more proactive approach to manage the network, and to an extent, in work with external agencies such as the Highways Agency. The new partnership arrangement with Bedfordshire Highways has already enabled a Draft Network Management Strategy and a Draft Asset Management Plan to be developed, both of which will allow a priority approach to

the network hierarchy to be established. This also means a more flexible approach to highway management and repair can be adopted, as well as more being more responsive and proactive.

Major projects

The most relevant schemes in the LTP2 to the AQMAs are those planned for delivery or promotion due for completion within the life of the LTP. Of the nine schemes outlined the most relevant to the Bedford Borough (and the AQMAs) are:

LR9 (Bedford Western by pass), which is a local road scheme linking the A421 and A428 at Great Denham that has received general public support. The anticipated opening is 2008/9.

LR9 (Bedford Western by pass), which is the A428 to A6 section that forms part of the residential development proposals north of Bromham Road. This development has planning consent (subject to completing legal agreements). It is envisaged that the road will open in around 2010.

LR20 (Bedford Town Centre), which recognises the significant regeneration efforts of the local planning framework and the need overcome problems (including poor air quality) in the town centre. It is recognised that substantial investment in transport will be required. The redevelopment process is expected to deliver a new bus station in the town centre, improvements to some existing highway junctions and improve the environment for walking, cycling and taxi/private hire operations. Even with this investment and other changes already planned, the recommendation from recent studies is that further major transport investment will be needed.

To create public transport and private transport networks that will be capable of providing the accessibility essential to support a vibrant town centre, a new river bridge close to the centre will be needed. As the redevelopment progresses, it is envisaged that a major scheme bid will be made through the LTP system.

Network Management

Managing the use of transport networks is one of the key 'consolidation' themes for LTP2 and beyond. Optimising the use and performance of the infrastructure is one of the main ways to contribute to the objectives.

The Network Management Duty commenced in January 2005 and a Traffic Manager was appointed by the B.C.C to develop a team structure to progress the reduction of congestion and the wider availability of traffic information within Bedfordshire.

The full scope of the Network Management Strategy was finalised following the establishment of new partnership arrangements. The B.C.C plan to update existing traffic signal systems in urban areas to provide better management of traffic to primarily reduce delays and congestion and improve efficiency of the road network; but will have the added benefit of providing the means to integrate public transport measures, air quality control measurement, off street car park capacity and route management. Funds are being sought to do this for the Bedford area as part of the investment needed to support growth. Investment in, and making improvements to, new UTC systems also reflects the main traffic management issue raised during public involvement exercises, which was to improve UTC systems to help minimise traffic congestion, particularly in urban centres.

The old UTC system was approximately 10 years old and the hardware obsolete with spares difficult to obtain. An investment of £50k was made to replace the UTC system and upgrade to SCOOT MC3. The new system is UTMC compliant and a UTMC interface used to drive the existing transmission equipment. The use of SCOOT MC3 allows the use of alternative communications systems and delivers a range of bus priority tools. This is seen as the first step on the UTMC path and it is intended to develop the system over the coming years with the aim of delivering an improved traffic control service and real time information to road users.

The Environment Act 1995 has also confirmed that Traffic Regulation Orders, and hence management schemes, may be used for air quality management purposes. Traffic calming has been shown to increase localised emissions and may only displace traffic elsewhere; however the potential

improvement in air quality by reducing traffic volumes, congestion etc means that these schemes still play a part in vehicle emission management in particular areas. The overall impact on improving air quality would be minimal, but such schemes can contribute to the net aim of this Action Plan and are particularly effective at reducing vehicle speeds, as well as the frequency and severity of accidents.

Another way in which the road network can be managed is by allocating capacity to different vehicle types. Bus lanes have been introduced to improve the journey times and reliability of public transport for some years. The general approach is to try and do so in a way that provides improvements overall, without worsening conditions for other road users so much that the total delay to people (bus and car) is increased. Where bus lanes have been introduced they have also been allocated for cyclists, which is particularly beneficial if no separate cycle track is available. The trial use of bus lanes in Bedford by private hire vehicles is also planned, now that these vehicles are easily identifiable.

Freight

Road transport is by far the most important mode for freight crossing Bedfordshire as a whole. The central issue for the LTP2 is providing appropriate road networks and managing lorry use and to aid this, a Freight Strategy has been adopted, with the aim of achieving LTP policy objectives. Local freight quality partnerships are also to be implemented.

Distribution within the central area of Bedford is however regulated, especially in the pedestrian zone, with loading/ unloading restrictions and limited hours of access.

3.7 Parking and enforcement

Parking supply and charging policies for both on and off street parking can significantly influence parking demand, parking space turnover and ultimately car use and ownership. A good parking strategy, balances the needs of regulating car use whilst at the same time not penalising town centre economies.

The Council undertakes parking enforcement and a Joint Parking Board administers this on behalf of the B.C.C. The general policies applied are making parking cover the costs of provision as far as possible and continuously moving to an emphasis of short-stay use only in the Bedford town centre.

Parking standards for new development are controlled using development control and based on standards. Although in Bedford, the Council treats all cases on their merits in line with existing policies and standards.

Park and ride facilities have also been established at Elstow (since 2005) and this has been well supported. Further potential exists, with three more park and ride sites proposed for Bedford, to be accompanied by the implementation of bus priority measures along the respective radial routes before the end of LTP2.

3.8 Buses

Bus travel provides a key alternative to travelling by private car, as well increasing accessibility and relieving local congestion. The LTP2 can provide a co-ordinating role and supplement the network by subsidising routes and through seeking better public transport information and ticket integration. The B.C.C will also extend recent progress on Quality Bus Partnerships. In recent years patronage has declined on some routes, whilst on others including those to Bedford town centre, it has increased as a result of investment by the main operator, including providing new buses with low floors, increasing frequencies, providing real time information and revising timetables. The new bus station proposed for the Bedford town centre is a particularly important opportunity to improve public transport in the area.

A new Urban Traffic Control system has been installed that will manage the majority of traffic signals. Discussions have already started to research and evaluate the benefits augmenting this system. These improvements would improve the provision of information on a number of issues e.g. road works, road closures, congestion and variable messaging systems, as well as improving existing real time bus information capability.

Working in conjunction with appropriately equipped buses, the traffic control system will be able to activate certain traffic signals at difficult junctions giving buses priority if they are running late. Consultation with bus operators has identified several junctions in Bedford that would benefit from this approach and support the aim, and the public priority of improving bus punctuality. The first two of these junctions were upgraded in 2006. The remaining junctions will all be assessed and improved over the LTP period

3.9 Rail

One main rail line runs through Bedford and the numbers of journeys to Bedfordshire have risen. The LTP2 considers that rail can provide an alternative to road based travel for some trips and recognises the potential of this mode of travel, particularly if intermodal journeys are improved. In Bedford the feasibility of improving rail and bus interchanges is being explored using developer funding. GAF funding is also being used to improve rail interchange.

The LTP2 is seeking significant improvements in quality and reliability of service, in line with public priorities; more initiative shown in promotional activity, including integrated and special ticketing, improved information provision and encouraging access by non-car modes; better access and interchange arrangements at all stations, including parking management that is more sensitive to the local context; better integration with local public transport and improved Walking and Cycle accessibility; and recognition and action on improving the role of Bedford in line with regional policy. The role of the Marston Vale line (Bedford - Bletchley) should be considered for its potential to reduce town centre congestion.

In addition through the work on preparing a new planning framework for Bedford Town Centre, consideration is being given to relocating the main rail station. Part of the rationale for this is to improve access and interchange.

3.10 Walking and Cycling

According to Central Government, 45% of car journeys are less than 5km. Walking and cycling offer significant potential to contribute to more sustainable journey patterns as well as promoting better health. The LTP2 recognises that there is potential to encourage walking and cycling. In Bedford cycling is already relatively popular for work-related and other travel.

The draft walking strategy (to be completed under the LTP2) outlines uses of the development planning process to identify walking requirements within new developments. Footway links within a new development and connections to existing highway are coordinated wherever possible to ensure accessibility and security.

Good signing for walkers, particularly in urban areas, can also be a key component in encouraging walking. The Council encourages this approach and it is reflected in the B.C.C's Transport Asset Management Plan.

The LTP2 foresees that maintaining and developing the off-highway, as well as highway-based cycle networks, will become an issue as their use matures. Indeed poor maintenance of infrastructure (mainly roads) is a safety issue for cyclists. For the purposes of this LTP, measures will be put in place to monitor the condition of the network and it should be possible to work with voluntary cycle groups to facilitate this.

A central feature of the local cycling strategy is getting the balance right between investment in hard infrastructure and other measures to increase cycling such as promotional activity and better cycle skills. It is recognised that people need advice and support to build confidence and cycle independently. The B.C.C are currently researching the situation regarding availability of cycling instructors and should gaps be identified the B.C.C will work with partners to make more training available.

3.11 School travel plans

Based on 2005 data for Bedfordshire, 31% of journeys to school were made by car. The B.C.C through the LTP2 will continue to strive to increase the share of active modes of travel such as walking and cycling. Accessibility planning work identifies that the potential to walk and cycle, particularly to lower and middle schools is good in Bedfordshire.

The national target is for all schools (including independent, special, nursery and pupil referral units) to have an approved travel plan in place by 2010, in other words during LTP2. In addition to this, public involvement exercises identified school travel plans as a key way to tackle safety and congestion issues associated with 'school run' traffic, and as such this is an initiative widely supported by the public. The B.C.C school travel strategy was adopted in June 2005 and this details how the goal is to be achieved. By end of this financial year (i.e. March 2007) it is estimated that there will be 151 schools with completed Travel Plans.

However, for the independent schools in Bedford a different approach is required, and to this end school travel advisors are working with the larger independent schools to achieve a change in travel patterns through the development of their travel plans.

3.12 Smarter choices

'Smarter Choices' are approaches to changing people's travel behaviour through voluntary means, using packages of information, marketing and technology. The establishment of choice is a key element in encouraging a shift towards travel by sustainable modes.

Travel plans are one of the most effective and recognised ways of achieving changes in travel behaviour. A travel plan is a strategy for delivering choice to a site or new development focussing on sustainable modes. It should contain both the physical and behavioural aspects within a package that work together, and is an essential tool with which to deliver the travel choice essential to the core strategy of the LTP2.

The development control process is key to the delivery of green travel plans for new and expanded developments, and both the Council and B.C.C have had considerable success in securing travel plans through this process. Guidance to inform the development control process to ensure delivery of effective and relevant travel plans, in line with the public priority of making such new developments more sustainable is currently being developed. A good quality travel plan will ensure that the correct mechanisms are in place to provide travel choice.

Existing businesses are also encouraged to take up travel plans and European funding has been secured by the B.C.C to work with SMEs to develop travel plans. Personal travel planning can also help to increase modal shift.

4. Identification of Non Transport Related Measures

Proposed actions for AQMA 1

Stewartby brickworks have been confirmed in the Council's Detailed Assessment as the main contributor to SO₂ emissions in the parishes of Elstow, Stewartby, Wilstead and Wootton.

The Environment Agency, as the authority responsible for the permitting and enforcement of pollution controls at this site under the Pollution and Prevention Act 1999 and the Pollution Prevention and Control (England and Wales) Regulations 2000, issued Hanson Bricks a permit for operations at the Stewartby Brickworks in November 2004. This permit includes a condition requiring the operator to reduce SO₂ emissions so as to comply with the Air Quality (England) Regulations 2000 for sulphur dioxide.

Hanson Bricks submitted an Alternative Options (AOS) report to the Environment Agency, detailing the application of Best Available Technology (BAT) to reduce emissions at the brickworks (B.B.C Further assessment for SO₂, 2006). The principal focus of the report was to determine an appropriate control option (or options) for compliance with the government's air quality objectives.

The AOS report outlines a series of new options for improving air quality and each of these was assessed in a qualitative way in that report, and all are subject to one major proviso. This is that Hanson has decided not to operate its permitted installation (under permit BX1616IU) from the end of 2008, unless it can demonstrate, to the satisfaction of the Environment Agency, that it will achieve full compliance with the government's 15-minute air quality objective for SO₂.

The Environment Agency determines the practicability of introducing technological improvements and the possibility of reducing the numbers of bricks produced at the brickworks. The Council can however lobby for improvements and can maintain and increase its monitoring capability.

To ensure that there is not an increase in SO₂ in the AQMA the Council can also use its development control powers to impose conditions on any relevant new planning application.

The following sections apply to all the Council's AQMAs.

Domestic Energy Efficiency

The Home Energy Conservation Act 1996 (HECA) placed a duty on local authorities to improve energy in all Council housing stock by 30% by 2010. The Council has an affordable warmth/fuel poverty strategy and has continued to implement policies to meet the requirements of the HECA. Changes in the energy efficiency of the housing stock in the Borough are carefully monitored. The Ninth HECA Progress Report for Bedford Borough Council was submitted to the Government Office for the Eastern Region in September 2005. The Council has currently achieved a 14.4% decrease in energy consumption within the Borough.

The Council has joined forces with Milton Keynes Energy Agency and the National Energy Foundation to offer the Energy for Good scheme to its residents. The Energy for Good scheme helps informed decisions to be made about the electricity and heating in home and also the renewable energy systems that could be installed.

Raising Public Awareness through the Council Website

The Council is part of the Herts and Beds Air Pollution Monitoring Network (HBAPMN) and the provision of air quality information to the public and others is available from its website (see <http://www.hertsbedsair.org.uk/hertsbeds/asp/home.asp>). The site contains general air quality information, together with up-to-date monitoring data and links to other websites. Downloadable copies of key Council air quality documents are available from the Council's website (see <http://www.bedford.gov.uk/Default.aspx/Web/AirPollution>).

The content of the site is reviewed regularly and updated as new information becomes available.

Industrial Emissions

Although road transport accounts for the greater part of the emissions of both nitrogen oxides pollution in Bedford, other sources including those from industrial emissions are contributory factors to air quality and therefore should be considered.

The Environmental Protection Act 1990 introduced a system of Local Air Pollution Control (LAPC) and Integrated Pollution Control (IPC). Both systems regulated air pollution from industrial sources, the former controlling small/medium size operators and administered by the Council (Part Bs) and the latter dealing with larger operators and administered by the Environment Agency (Part As). More recently, as a result of European Legislation, the Pollution Prevention and Control Act 1999 set out the Integrated Pollution Prevention and Control (IPPC) regime. The principals are essentially the same but the respective regimes are now called Local Air Pollution Prevention and Control (LAPPC) and Integrated Pollution Prevention and Control (IPPC). Under this new system local authorities are the regulators for Part A2s as well as Part Bs and the Environment Agency for Part A1s. Under the new regime site operators are required to apply 'Best Available Technique' (BAT). The Borough currently has 47 Part B installations, including petrol stations. There also six processes regulated by the Environment Agency.

The Council will continue to work closely with existing authorised or permitted installations to ensure compliance with conditions set by the Council in accordance with legislation. The Council is part of the Herts and Beds PPC group dedicated to authorised/permitted processes and also has a programme for identifying processes, which should be part of the regulatory regime.

Other industrial premises are controlled by nuisance powers under the Environmental Protection Act 1990 and the prohibition of dark smoke from industrial or trade premises under the Clean Air Act 1993. The latter legislation makes it an offence to burn any material that is likely to produce dark smoke. Under this Act the Council can take action after a fire has extinguished if there is evidence of material on the fire, such as plastics and rubber, which may have given rise to dark smoke. This is particularly useful where unscrupulous individuals/ businesses burn waste at night, hoping to avoid detection.

5. Impact assessment and options appraisal

5.1 Introduction

The Bedford AQAP has been developed with the assistance of many bodies outside the Council, as well as different Service Areas within the Council. As a result the identification of the different parties is implicit, since no one Service Area can implement all the actions outlined. The actions included are mostly outlined within the Council's Corporate priorities, which as outlined, are assessed each year.

5.2 Impact assessment

The Council's AQAP has also considered that there are wider impacts to the measures proposed, since it is clear that many of the actions have other non-air quality impacts. These considerations were considered when the action plan was formulated. Additional benefits and shortfalls of air quality improvement measures were assessed in terms of:

1. Other (non-NO_x/ SO₂) air pollutants – those measures aimed at reducing emissions of NO_x and SO₂ from combustion sources through direct and indirect measures will in many instances lead to reductions in greenhouse gases and other toxic pollutants.
2. Congestion – measures to reduce car use and increase use of other sustainable modes e.g. cycles and walking will remove vehicles from the road in the short term and thereby relieve congestion. If however congestion is relieved there is a potential for increasing traffic speeds with potential impacts being increased noise and emissions.
3. Attractiveness of public transport – this is an important consideration since any increase in public transport must be accompanied by improved attractiveness of stock and infrastructure, including public safety issues.
4. Social inclusion – this relates to access to key facilities by public transport, as well as other issues relating to the Bedford town regeneration and reduced car parking.
5. Economic vitality of local businesses – this is a consideration of many of the planning and transport planning related actions. Economic objectives can sometimes conflict with AQ objectives.
6. Other – many of the actions proposed relate directly to Council only based actions. This provides an important signal to others in the Borough that the Council is leading on initiatives to improve air quality, including promoting and educating good practice.

Implementation

In line with the different bodies that have helped develop this AQAP, the key partners have been identified. These are indicated in the Action table and outlined in the following table.

Table 1 Who is responsible for AQAP actions

BBC	Bedford Borough Council
BCC	Bedfordshire County Council
EA	Environment Agency
HA	Highways Agency
All	All

6. Cost Effectiveness

6.1 Introduction

The purpose of assessing the cost effectiveness is to enable the actions to be prioritised in order to determine which of the actions are to be implemented and in what order.

The Bedford AQAP, however in line with the government's guidance, does not provide a full cost benefit analysis of the plan, with detailed costs of all the measures considered as well as the likely benefits that would arise. Since this would entail a detailed study of air pollution reduction costs e.g. the costs of improving air quality by $1 \mu\text{g m}^{-3}$ in the Borough, as well as that of the health benefit costs associated with air quality improvements. This is considered beyond the scope of the action plans and therefore not a requirement.

6.2 Cost effectiveness categories

The value of assessing the cost effectiveness of the actions is limited for a number of reasons. For example, the Council and its partners were carrying many of the actions described in this plan out prior to formulation. Furthermore, other actions included in the action plan are statutory duties of the Council and therefore must be carried out regardless of the cost.

There is no accepted means for assessing the cost effectiveness of actions. A quantitative assessment is almost impossible to achieve given the difficulty in obtaining accurate costs and accurate measures of air quality impacts. For these reasons, a quantitative method of prioritisation has been used using professional judgement. It should also be noted that the costs are indicative of the costs of the action and therefore are not for the Council only. The costs also do not include the costs that may be incurred by third parties.

Table 2 Cost rating descriptions

Cost banding	£	Description
Low (1)	< 50k	Cost is covered by existing budget
Medium (2)	50k - 200k	Additional funding is required, but this may be incorporated within forward planning.
High (3)	> 200k	Additional funding is required that cannot be incorporated into existing budget

Table 3 Air Quality impact rating descriptions

Air Quality Rating	Definition
Low (1)	Impact is small and localised. Will be beneficial as part of a wider measure.
Medium (2)	Impact improves air quality and benefits from the action(s) are considered important and clearly seen.
High (3)	The impact on air quality improvement is considered significant and the actions(s) are seen as core.

These ratings are used to determine the cost/impact shown in the AQAP table (see Table 5). The existing Council budgets are able to meet the costs of most of the actions defined within the low cost rating definition. Those actions categorised as medium or high may require additional funding.

The actions described in this AQAP will have a greater chance of success where there is public support and where they strike a balance between environmental and other objectives such as improvements in human health, noise, safety etc. The achievement of air quality objectives must therefore not be considered in isolation, although the definition of 'cost' in this AQAP is not intended to encompass additional effects.

A matrix has been used to assign an overall effectiveness value (1 - 9) based on how much of an improvement in ambient air quality the action will achieve and how much it is likely to cost. The most effective actions are given a value of 9.

Table 4 Costs and Benefits Assessment Matrix

Cost x impact = effectiveness	High Impact	Medium Impact	Low Impact
High cost	3	2	1
Medium cost	6	4	2
Low cost	9	6	3

Monitoring progress on the Bedford AQAP

The actions set out in Table 5 of this Plan will be reviewed and assessed twelve months after the Council has adopted the AQAP.

TABLE 5 - AIR QUALITY ACTION PLAN PROPOSALS

Part I Actions – AQMA 1 – for SO₂

	Action	Who	When	Cost	AQ Impact	Effectiveness ¹	Wider Impacts	Progress
1	The Environment Agency, as the Regulatory Authority, will enforce the conditions incorporated into the PPC, and subsequent variation, issued in November 2006 to Hanson Building Products Ltd. Bedford Borough Council will continue to monitor in and around AQMA 1.	EA/BBC	Ongoing (Short - term)	1	3	9	Reduce other pollutants	Monitoring will continue until end December 2008, funded by DEFRA
2	Conditions will be imposed on any development which is likely to result in an increase in the frequency of SO ₂ exceedences within AQMA 1.	BBC	2007 Ongoing (Short - term)	1	2	6	Ensures that pollution does not worsen	Brickmaking production at Stewartby ceased March 2008
3	The Environment Agency will explore with Hanson reductions in the volumes of bricks being produced at the Stewartby brickworks. ²	EA	Ongoing (Short - term)	1	3	9	Reduce other pollutants	Brickmaking production at Stewartby ceased March 2008
4	The Environment Agency will explore with Hanson the practicability of introducing technological improvements that will reduce SO ₂ emissions. ²	EA	Ongoing (Short - term)	1	3	3		Hansons have advised that they intend to decommission the brickmaking plant but this has yet to be confirmed by a closure report to the E.A. followed by a surrender of the existing permit

¹ Note – derived from Table 4

² Based on results from Bedford Borough Council further assessment of SO₂

Part II Actions - AQMAs 2 and 3 – for NO₂

	Action	Who	When	Cost	AQ Impact	Effectiveness	Wider Impacts	Progress
1	Bedford Borough Council will increase its air quality monitoring in and around AQMAs 2 and 3.	BBC	Ongoing (Short -term)	2	2	4	May lead to additional AQMA(s)	One AQ Monitoring station being installed on Prebend St . Delays have been encountered in the acquisition of a site for the intended High Street Monitoring Station.
2	Bedfordshire County Council will further encourage the use of County Hall car parking at weekends by shoppers/visitors, including improved signing of this facility.	BCC	2007 (Short -term) Ongoing	1	1	3	May encourage car reliant access to central Bedford	Car park is open at the weekends
3	Bedfordshire County Council will update urban traffic control in central Bedford by modernising the Scoot System, including a review of signalling junctions in order to (a) reduce standing/slow moving traffic and (b) support increased bus travel by assisting the introduction of bus priority where practicable.	BCC	Ongoing (Short -term)	2	2	4	Reduce congestion	Replaced hardware, running new software, implementing SCOOT – initial findings are less vehicles in queues
4	The Borough Council will continue to consider air quality as capable of being a material consideration and will attach the appropriate weight to the issue of air quality as determined by the facts of each individual application especially relating to developments which will impact upon AQMAs 2 and 3.	BBC/ BCC	Ongoing (Short -term)	1	3	9		BCC have submitted technical guidance to BBC and will be incorporated into general D.C. guidance for BBC by August.

5	The Borough Council will consider the imposition of conditions to mitigate the impact of poor air quality on new residential development within AQMAs 2 and 3, subject to such conditional requirements being relevant, necessary, viable and proportionate.	BBC	Ongoing (Short -term)	1	3	9		Air Quality Assessments being asked for developments in the AQMAs leading to conditions of fixed windows and mechanical ventilation.
6	Bedfordshire County Council, as statutory highway/transport consultee to Bedford Borough Council in its role as Planning Authority, will advise on how best to ensure that new development can assist bus travel, smarter choices, walking/cycling etc in accordance with national/local policies.	BCC/ BBC	Ongoing (Short -term)	1	1	6		Already in place
7	Bedfordshire County Council/Bedford Borough Council will continue to collaborate in seeking to implement the Bedford Western Bypass.	BCC/ BBC	Ongoing (Short -term)	3	3	3	Provision of route alternatives	Work on Phase 1 Started Completion 2009/2010 BBC/BCC collaborating with Government, landowners and developers to facilitate phase 2 as soon as possible
8	Bedford Borough Council, as Building Control Authority, will provide guidance to developers who have submitted building regulation applications to Bedford Borough Building Control on how best to meet technical standards which relate to conservation of fuel and power as set out in the Building Regulations 2000 (as amended).	BBC	Ongoing (Short -term)	1	1	3	Reduce CO ₂ emissions	Each application is examined to determine if targets, set by the Government for fuel and energy, are met. The Building Control Unit ensures that in each case there is 100% compliance.

9	BCC/BBC will continue to collaborate in detrafficking the High Street, Bedford and St Paul's Square (north), Bedford.	BCC/ BBC	Ongoing (Medium – term)	1	3	9	Reduce NO ₂ emissions in High Street/increased traffic on other parts of the road network	Included as an option in the Town Centre Study, will be worked up in detail following the opening of the Western bypass in its entirety.
10	Steering Group members will collaborate in a joint scheme promoting public awareness of air quality.	ALL	Ongoing (Short -term)	1	1	3	Sets example of good practice.	To be actioned following the approval of a revised action plan in October 2008 followed by annual update
11	Bedford Borough Council will work to encourage improvement in domestic energy efficiency through promotion and engagement.	BBC	Ongoing (Short -term)	1	1	3	Reduce CO ₂ emissions and fuel poverty	The ESS Team continue to undertake promotions to raise awareness of energy efficiency and encourage take up of grants.
12	Bedford Borough Council will implement taxi licences which require new vehicles to comply with the Euro IV emission standard.	BBC	(Medium -term)	1	1	3	Reduce other pollutants, newer cars quieter	The Council is consulting on the number of additional hackney carriages to licence. This will determine the number that will be added to the fleet to comply with the Euro IV standard.
13	Police/Bedford Borough Council/Vehicle and Operator Services Agency will collaborate and carry out periodic checks on vehicle	Police/ BBC/ VOSA	(Medium -term)	1	1	3	Reduce other pollutants	The checks are being undertaken at broadly six monthly intervals. At the last

	emissions from taxis.							check in November 2007 no vehicles failed the emissions tests.
14	Bedfordshire County Council trialling pilot scheme for private hire vehicles to use bus lanes.	BCC	2007 Ongoing				Reduce congestion	Still under consideration
15	Bedfordshire County Council will seek to implement bus and freight quality partnerships.	BCC	(Medium -term)	1	1	3	Reduces congestion	Strategic development in progress by BCC has been put on hold due to Local Government restructuring.
16	Bedfordshire County Council will stimulate bus travel by the introduction of further Park & Ride schemes in addition to the Elstow facility.	BCC	(Medium -term)	3	3	3	Reduces congestion	Dependent on development coming forward
17	Bedfordshire County Council will stimulate bus travel by the introduction of real time information systems at bus station/railway station/bus stops.	BCC	(Medium -term)	2	1	2	Improves uptake of public transport	Locations identified
18	Bedfordshire County Council will stimulate bus travel by the introduction of through ticketing and better access to key facilities (eg railway station).	BCC	(Medium -term)	1	1	3	Improves uptake of public transport	Bedford Plusbus in operation
19	Bedfordshire County Council/Bedford Borough Council will collaborate via planning agreements and other liaison with businesses to promote Green Travel Plans. The Borough Council will normally require major new developments to adopt a Green Travel Plan as a condition of planning permission.	BCC/ BBC	(Medium -term)	1	1	3	Reduce congestion	Work with planning applicants ongoing. Development work on Council arrangements on hold pending the establishment of Unitary Authorities.

20	Bedford Borough Council will continue to discourage long stay parking within central Bedford by management of parking tariffs.	BBC	(Medium -term)	1	1	3	Reduce congestion at peak times	Long stay tariffs have been increased in the past but further review is required.
21	Bedfordshire County Council will undertake additional vehicle counts to increase and maintain information on traffic volumes, which will help Bedford Borough Council in respect of further modelling and monitoring of air quality.	BCC/ HA	(Medium -term)	1	1	3		Counts to continue with diffusion tube monitoring of NOx at the locations.
22	Bedfordshire County Council, in collaboration with English Partnerships, the Highways Agency and Bedford Borough Council, will pursue a major LTP bid for Bedford Borough aimed at achieving a step change improvement in the highway/transport networks and notably the implementation of a third river bridge in central Bedford: this package will disperse traffic by offering greater route choice and increase the opportunities for establishing bus priority routes/networks.	BCC/ BBC/ HA	(Medium -term)	3	3	3	Reduce congestion, noise in AQMAs, although may increase pollution elsewhere	Under consideration through stage 2 of the Bedford Town Centre Transport Study.
23	Bedfordshire County Council will stimulate bus travel by the introduction of bus network loops and bus priority lanes in the following: Bedford/Kempston urban area Highway routes in other parts of Bedford Borough.	BCC	(Medium -term)	2	1	4		No progress but linked to the replacement and upgrading of the SCOOT system
24	Bedfordshire County Council will consider the introduction of traffic demand restraint measures to reduce traffic volumes in central Bedford.	BCC	(Long -term)	3	3	3	Reduce congestion, noise	Under consideration through Stage 2 of the Bedford Town

								Centre Transport Study.
25	Bedfordshire County Council will consider expansion of the Blue Solos scheme.	BCC	(Long -term)	2	1	4	Reduce car reliance	Delayed pending Unitary
26	Consider the promotion/organisation of car sharing clubs.	ALL	(Long -term)	1	2	6	Reduce car reliance	Ongoing through Travel Plans. Travel plans linked to specific development are considered when relevant.

Part III Actions – AQMA 4 – for NO₂

	Action	Who	When	Cost	AQ Impact	Effectiveness	Wider Impacts	Progress
1	Bedford Borough Council will recommend to DEFRA that AQMA 4 should be revoked following the diversion of traffic onto the new Great Barford Bypass.	BBC	Short-term	1	1	4	Measures taken have diverted the pollution from areas of habitation, but have not reduced it in absolute terms	Now have a years worth of data after the Bypass was built. Once consulted with steering Group. July 2008 G.P. Committee will be asked to approved the submission to DEFRA of a revocation request.

7. Consultation and stakeholder engagement

7.1 Introduction

The Bedford Air Quality Action Plan is intended to be an evolving plan that will further develop in time, it will as a result will be the subject on going consultation by stakeholders and others.

Stakeholder involvement

Initial formulation has been undertaken with Air Quality Steering Group, to which representatives of the Bedfordshire County Council, Environment Agency and Highways Agency were invited to participate. Consultation was initially limited to the Air Quality Steering Group for feedback.

In addition many of the actions in the AQAP have already been the subject of separate intensive consultation, e.g. those relating to the Council's planning and transport policy and processes. We also regularly meet with local voluntary groups and the Bedford Partnership Board. This stakeholder engagement will continue throughout the life of the AQAP.

Council decision making

The Council's Vision for Bedford has already been outlined and this underlines the Council's commitment to sustainable development in the Borough. This AQAP will be the subject of Council approval from its General Purposes Committee. Regular annual progress reports will be issued through the Council's standard reporting mechanisms outlining and updating AQAP progress.

Appendix 1

Table 5 Air quality objectives (from Air Quality Regulations 2000 and Amendment Regulations 2002)

Pollutant	Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g m}^{-3}$	Running Annual Mean	31 Dec 2003
	5 $\mu\text{g m}^{-3}$	Annual Mean	31 Dec 2010
1, 3 Butadiene	2.25 $\mu\text{g m}^{-3}$	Running Annual Mean	31 Dec 2003
Carbon Monoxide	10 mg m^{-3}	Daily Maximum Running 8 hour mean	31 Dec 2003
Lead	0.5 $\mu\text{g m}^{-3}$	Annual Mean	31 Dec 2003
	0.25 $\mu\text{g m}^{-3}$	Annual Mean	31 Dec 2008
Nitrogen Dioxide (provisional)	200 $\mu\text{g m}^{-3}$ not to be exceeded more than 18 times a year	1 hour mean	31 Dec 2005
	40 $\mu\text{g m}^{-3}$	Annual Mean	31 Dec 2005
Particles (PM ₁₀)	50 $\mu\text{g m}^{-3}$ not to be exceeded more than 35 times a year	24 hour mean	31 Dec 2004
	40 $\mu\text{g m}^{-3}$	Annual Mean	31 Dec 2004
Sulphur Dioxide	350 $\mu\text{g m}^{-3}$ not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 $\mu\text{g m}^{-3}$ not to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004
	266 $\mu\text{g m}^{-3}$ not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005

Table 6 Proposed new particle objectives (from Air Quality Strategy Addendum (2003))

Pollutant	Objective		Date to be achieved by
	Concentration	Measured as	
Particles (PM ₁₀) (NB the objective for London is given in brackets)	50 $\mu\text{g m}^{-3}$ not to be exceeded more than 7 (10) times a year	24 hour mean	31 Dec 2010
	20 (23) $\mu\text{g m}^{-3}$	Annual Mean	31 Dec 2010

Carbon monoxide (CO) is a colourless and odourless gas produced by the burning of fuels. Exposure to CO leads to a decreased uptake of oxygen by the lungs and can lead to a range of symptoms as the concentration increases. Early symptoms of exposure include tiredness, drowsiness, headache, pains in the chest and sometimes stomach upsets. Some people, for example those with heart disease, are at an increased risk. Exposure to very high concentrations will lead to death. However such conditions, where there are very high concentrations, are most likely to arise in confined spaces, rather than outdoors where the public are exposed and the air quality strategy (AQS) applies.

Benzene at normal ambient temperatures occurs as a liquid, but it readily evaporates and small amounts are detectable in the air. It is known from workplace studies that benzene is potentially carcinogenic, that is, exposure to it may lead to the development of cancer. EPAQS (1994) considered that the risks associated with the levels found in the air in the UK to be small and not be measurable with any accuracy. Nevertheless, it considered that efforts continue to be made to reduce the levels even further as a precautionary measure.

1,3 Butadiene arises from the combustion of petroleum products and its manufacture and use in the chemical industry. It is not present in petrol but is formed as a by-product of combustion. It is also produced by tobacco smoking, which is an important indoor source. EPAQS examined that the adverse effects of 1,3-butadiene on human health and concluded that it was a genotoxic human carcinogen (that is, it is able to cause cancer by damaging genetic material in cells).

Lead in particulate form in air can be inhaled directly by people, and ingested indirectly following its deposition on soil and crops. Exposure to lead has been known to be harmful to people for many years, with severe adverse effects on the blood, the nervous system and the kidneys (although these effects only occur with high exposures). More subtle effects caused by lower exposure to lead can also arise, such as may occur from the presence of lead in drinking water, paint and dust, and in the ambient air. These effects include the impaired intellectual development of children. EPAQS concluded that the available evidence suggests that the risks associated with the levels found in the air in the UK are very small and cannot be measured with any accuracy (EPAQS, 1998). However, efforts to reduce the levels even further continue as a precautionary measure.

Nitrogen dioxide (NO₂) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce NO_x emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health. At high concentrations NO₂ causes inflammation of the lung. Long-term exposure is also considered to affect lung function and exposure to NO₂ is particularly important for people with asthma and related diseases. NO_x is also important in the formation of ozone and secondary particle formation.

Sulphur dioxide (SO₂) is a colourless gas, produced from burning fossil fuels like coal and oil. Power stations and oil refineries are the main sources in the UK, with small releases from other industries. SO₂ is also found naturally in the air at low concentrations from natural releases such as volcanoes and forest fires. SO₂ also has role in the formation of secondary particles. SO₂ can cause breathing difficulties at high concentrations over short periods of time, particularly to those with asthma and chronic lung disease. As a result the AQS objectives are all incident based.

PM₁₀ (particles measuring 10µm or less aerodynamic diameter) represent those particles likely to be inhaled by humans, accepting that the chemical and physical composition varies widely. In view of this there is a wide range of emission sources that contribute to PM₁₀ concentrations in the UK. Research studies have confirmed that these sources can be divided into 3 main categories (APEG): (i) Primary particle emissions derived directly from combustion sources, including road traffic, power generation, industrial processes etc. (ii) Secondary particles formed by chemical reactions in the atmosphere, comprising principally of sulphates and nitrates. (iii) Coarse particles comprising emissions from a wide range of sources, including re-suspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles. Particles are associated with a range of health effects, including effects on respiratory and cardiovascular systems, asthma and mortality. As a result, EPAQS recommended a daily standard based on the evidence reviewed with an annual mean standard to assist with policy formation.

A subgroup of the Committee on the Medical Effects of Air Pollutants (COMEAP) is currently preparing a report which will, as far as possible, quantify the benefits to health of reducing air pollution in the UK. This group have previously advised that there is strengthening evidence base that links long-term exposure to particles and mortality and are of the view that the associations reported are likely to represent causal relationships with air pollution. They are also investigating the effects on morbidity and aim to publish a detailed report.

Appendix 2

Figure 5 Bedford town centre diffusion tube sites



Table 7 Bias adjusted diffusion tube monitoring in Bedford AQMAs 2,3 and 4 (2002 to 2005) ($\mu\text{g m}^{-3}$)

Address	Code	Type	2002	2003	2004	2005
20 High St Bedford	BF06	K	41.6	46.0	44.6	45.5
Great Barford	BF16	K	26.7	28.7	27.9	31.0
Prebend Street Bedford	BF25	K	34.6	46.8	41.5	39.8
Great Barford o/s no. 11 Bedford Rd	BF34	K			49.4	52.0
Great Barford o/s 5 Bedford Rd	BF36	R			44.1	51.6
High Street Bedford o/s Ladbrokes	BF37	R			54.1	61.1
Prebend St nr 24 Commercial Rd	BF38	R			43.4	52.2
The Broadway Bedford o/s Collins jewellers	BF40	K			59.9	57.7
High Street Bedford o/s Luddingtons	BF41	R			51.5	56.2
Prebend Street Bedford Opposite no. 8	BF42	R			49.9	63.6
St Mary's St Bedford o/s Kings Arms PH	BF44	R			48.8	56.0
Prebend Street Bedford nr Crown Quay	BF45	R			48.8	52.2
Prebend Street Bedford o/s no. 44	BF48	R			54.1	62.9
Great Barford near 37 Bedford Road	BF49	K			46.2	49.4
Great Barford outside 610 Roxton Rd	BF51	R			29.9	33.8
St Johns St Bedford o/s old BT building	BF52	R			32.6	46.4

Table 8 SO₂ monitoring in Bedford (2001 to 2005)

Objective	2001	2002	2003	2004	2005
15min mean	25	26	118	135	44
Hourly mean	1	2	4	8	3
24hr mean	0	0	0	0	0
Data capture %	85	99	98	96	76

(Note – bold indicates AQS objective exceeded)

Figure 6 Location of SO₂ monitoring sites near AQMA1

