Winchester City Council

AIR QUALITY ACTION PLAN

SUMMARY

In November 2003 Winchester City Council declared an Air Quality Management Area (AQMA) within Winchester city centre for the pollutants nitrogen dioxide (NO_2) and fine particles (PM_{10}). However, new guidance on comparing our PM_{10} data with the gravimetric based objectives means PM_{10} compliance is currently being achieved, although monitoring continues to assess compliance with 2010 objectives. There is a need therefore to reduce emissions of NOx (the precursor to the formation of NO_2) within the city centre. This document – the Council's Air Quality Action Plan – sets out the proposed measures to be implemented with the aim of achieving this goal and fulfils the requirements of Section 84(2) of the Environment Act, 1995.

The results of previous technical studies undertaken by the Council have shown that it is road traffic that is the main emission source of nitrogen dioxide. To this end, the main area of concern that forms the focus of attention of this Air Quality Action Plan is to change the way in which people access the city centre with particular emphasis on modal shift away from private vehicle use to more sustainable forms of transport.

The assessment has been performed in accordance with the Department of Environment, Food and Rural Affairs (DEFRA) technical guidance document LAQM PG(03) and, more recently, LAQM.PGA(05), which provides for the integration of an action plan into the Local Transport Plan (2006 – 2011). To this end, the role of Hampshire County Council as the management authority for the road network within the City Centre is clearly defined.

This Action Plan details a combination of actions that are currently being proposed and actions that require a detailed project appraisal before potential implementation. These can be broadly summarised as:

- Actions implemented as part of the MIRACLES project,
- Further development of Workplace and School Travel Plans,
- Promotion of walking and cycling,
- Improvements to public transport,
- Emission testing of road vehicles,
- Improved traffic management – including traffic rerouting,
- Improvements to taxi fleets,
- Review of car parking strategy,
- Improved information and advice on reducing pollution within AQMA.

It is the ultimate aim of an Action Plan to achieve the annual mean objective for nitrogen dioxide currently in force. However, where this proves impractical to do so, the authority must show that it is at least moving toward achievement of the objective.

The measures proposed above have been subjected to a detailed dispersion modelling assessment, the results of which show that, come 2010, Winchester City Council may still be required to maintain an Air Quality Management Area for the city centre. The extent of the AQMA is considerably smaller when compared to the 2005 area of exceedence. Nonetheless, the results show that additional measures may be required to bring about the necessary reductions in traffic emissions in the city centre to comply with the 2010 EU Limit Values. Additional measures that could be considered are:

1) The implementation of a Low Emission Zone (LEZ)

2) Further demand management measures.

3) Infrastructure development.

The County Council who manage the roads within the city centre has an important role to play in assisting the Council in further reducing the levels of pollution arising from road traffic. A strong partnership, built on a common willingness to improve the environment of Winchester city centre is crucial to the future success of the Council's Air Quality Action Plan. Therefore, the City Council fully intends to work in partnership with the County to realise the aspirations for improvement contained within this plan.

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Appendices

1.0 INTRODUCTION – THE NEED FOR AN AIR QUALITY ACTION PLAN

1.1 The Local Air Quality Management Regime

Since the implementation of Part IV of the Environment Act 1995 all local authorities have been under a duty to review air quality within their district. The current objectives that have to be met are prescribed under the Air Quality (England) Regulations 2000 (as amended) ***(1)***. It is a requirement that each local authority conducts a formal staged review of air quality within its district in accordance with a comprehensive set of guidance documents. These reports are then sent to the Department of Environment, Food and Rural Affairs (DEFRA) for approval.

The Regulations include a set of air quality objectives with different compliance dates between 2003 and 2010. Where it is predicted that air quality is unlikely to meet these objectives then an Air Quality Management Area (AQMA) needs to be declared to implement additional measures to try and achieve such compliance. Current air quality objectives, which are required to be assessed as part of this Local Air Quality Management (LAQM) regime, are shown in Table 1 below.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25μg/m^3	Running annual mean	31.12.2003
	5.00μg/m^3	Annual mean	31.12.2010
1,3-butadiene	2.25μg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0mg/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 (Provisional)	200μg/m^3 not to be exceeded more than 18 times a year	1 Hour mean	31.12.2005
	40μg/m^3	Annual mean	31.12.2005
Particles (PM10) (Gravimetric)	50μg/m^3 not to be exceeded more than 35 times a year	24 hour mean	31.12.2004
	40μg/m^3	Annual mean	31.12.2004
	50μg/m^3 not to be exceeded more than 7 times a year[1]	24 hour mean	31.12.2010
	20μg/m^3 [1]	Annual mean	31.12.2010

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
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. New objectives not currently within regulations but guidance recommends inclusion in an assessment

Table 1 – Current Air Quality objectives for England set within Regulations for the purpose of Local Air Quality Management

The key elements of the Environment Act 1995 concerning the current AQS are listed in Table 2.

Part IV Air Quality	Commentary
Section 80	Places a statutory duty on the Secretary of State (SoS) to produce a national air quality strategy.
Section 81	Obliges the Environment Agency to take account of the strategy.
Section 82	Requires local authorities to review air quality and to assess whether the air quality standards and objectives within their areas are likely to be exceeded.
Section 83	Requires a local authority, for any area where air quality standards are not being met, to issue an order designating it an air quality management area (AQMA).
Section 84	Imposes duties on a local authority with respect to AQMAs. The local authority must carry out further assessments and draw up an action plan specifying the measures to be implemented within the AQMA, and the time-scale for doing so, to move towards attainment of the air quality standards and objectives.
Section 85	Gives reserve powers to cause assessments to be made in any area and to give instructions to a local authority to take specified actions. Authorities have a duty to comply with these instructions.
Section 86	Provides for the role of County Councils to make recommendations to a district on the carrying out of an air quality assessment and the preparation of an action plan.
Section 87	Provides the SoS with wide ranging powers to make regulations concerning air quality. These include standards and objectives, the conferring of powers and duties, the prohibition and restriction of certain activities or vehicles, the obtaining of information, the levying of fines and penalties, the hearing of appeals and other criteria. The regulations must be approved by affirmative resolution of both Houses of Parliament.
Section 88	Provides powers to make guidance which local authorities must have regard to.

Table 2: Major elements of the Environment Act 1995

To date the following reports have been issued regarding air quality within Winchester's District:

- ***Winchester City Council Stage 1 Review (Dec 1998)*** – Concluded that only three pollutants needed further assessment, these being Carbon monoxide (CO), Nitrogen dioxide (NO_2) and Particles (PM_{10}'s).

- ***Winchester City Council Stage 2/3 Review*** **(Aug 2000)** – Concluded that CO, NO_2, and PM_{10} levels would comply with relevant objectives. However, DEFRA required further assessment for Nitrogen dioxide levels at houses close to main roads within the town centre. This report included a dispersion modelling study (AAQuIRE model) of South Hampshire performed by consultants CES.

- ***Winchester City Council Air Quality Review and Assessment (Additional Assessment of Nitrogen dioxide levels within Winchester Town Centre)*** **(Oct 2001) -** This report was in response to DEFRA's comments. It concluded that there were a small number of properties close to busy city centre roads that could have levels higher than the background site and that dispersion modelling should be performed to investigate these locations further. DEFRA rejected this conclusion advising that we should declare an AQMA and then perform this dispersion modelling.

- **Casella Stanger & Winchester City Council – Air Quality Review and Assessment – Detailed Dispersion Modelling (July 2003) –** This report was a detailed dispersion model of Winchester town centre using the BREEZE dispersion model. It predicted that failures of the annual nitrogen dioxide objective would occur after the set deadline. The model performed poorly for particles, it suggested that failures could occur but poor data ratification meant exact quantification was not possible. With regard to particles it was recommended that alternative models with better consideration of topographical effects were explored

- ***Winchester City Council Air Quality Review, Updating and Screening Assessment (USA).*** New guidance on the assessment of air quality was issued by DEFRA early 2003. The most important document being Technical Guidance LAQM TG(03) ***(2)***, which provides comprehensive guidance on performing such an assessment. In accordance with this guidance a re-review of the initial assessments was made. This report concluded that some monitoring was required for sulphur dioxide at the Alresford Station of the Watercress Steam Railway Line but all other conclusions remained valid.

- **Casella Stanger – Winchester City Council – Air Quality Review and Assessment – ADMS roads update August 2004.** This used the same data as Casella's July 03 report but utilised a different model (ADMS Roads) that included better consideration of topographical effects. However modelled results still failed to correlate with monitoring data. It was concluded that the level of exceedances for particles was less than that for nitrogen dioxide and that any action plan aimed at achieving the nitrogen dioxide standard should ensure compliance with the 24 hour particle standard. It was further concluded that additional sites for particle monitoring should be considered to check compliance is achieved.

All these reports are available on CD in Word or Acrobat formats by contacting Phil Tidridge at Winchester City Council Health and Housing Department (Tel 01962 848519 or E mail ptidridge@winchester.gov.uk)

1.2 Health impacts of air pollution

The air quality objectives are health based being derived mainly from epidemiological studies. The current air quality objectives are derived from a series of European Union Directives, which in turn were informed by considerable work previously performed in the deriving initial UK based standards.

Exposure to pollutants can have two types of effects. These are the acute effects – almost instantaneous adverse health effects in response to exposure. An example of an acute effect would be an asthma attack during peak periods of pollutant occurrence. The other health impact is the chronic or long term effect on health, for example the possibility of a permanently lowered lung function following long term exposure to certain pollutants. In general, acute effects result from high exposures over short time periods and chronic effects are due to lower exposures over long periods. It is for this reason that the air quality objectives are set over different averaging periods. For Acute effects short means (from 15 minutes to 24 hours) are considered whilst for chronic effects annual means are used. Some pollutants, including nitrogen dioxide and particles, are considered to have both acute and chronic health effects so have more than one air quality objective with different means.

The pollutant of most concern in the City Centre is that of nitrogen dioxide (NO_2). This pollutant is discussed in more detail below.

Nitrogen Dioxide – Road vehicles are responsible for 49% of UK emissions of oxides of nitrogen (2000) ***(3)***. Simply put, the burning of fossil fuels in air produces such oxides. Both nitric oxide (NO and nitrogen dioxide (NO_2) are produced, with nitric oxide being the major primary pollutant. This is the first stage in a complex series of chemical reactions, involving a range of other pollutants such as ozone. Together the two oxides are referred to as oxides of nitrogen or NO_x. The concentration of the different elements of NO_x will depend on the oxidising capacity of the local atmosphere.

Nitrogen dioxide has been identified as having a number of possible health effects associated with the respiratory system. Relatively high short term concentrations can cause inflammation of the airways and could for example precipitate or exacerbate episodes of asthma. Longer term exposures can increase reactivity to allergens, such as pollen, in sensitised individuals and reduce long term lung function. It has been suggested that exposure of children to elevated levels of nitrogen dioxide may increase the risk of respiratory infections and possibly lead to poorer lung function in later life ***(4).*** The UK Air Quality Expert Group has recently published a detailed study of “Nitrogen Dioxide in the United Kingdom” which provides a comprehensive review of this pollutant ***(3)***. This report observes that although total emissions of road transport NO_x have reduced by 34 percent between 1990 and 2000, changes in the balance between No and NO_2 means this has not resulted in a comparable reduction in the nitrogen dioxide levels. An increase in diesel car penetration rate in the UK fleet is highlighted to be of particular concern and could increase road transport nitrogen dioxide emissions by 3 percent by 2010.

1.3 Winchester City Council's Air Quality Management Area (AQMA)

Where an area has been identified as unlikely to meet air quality targets the authority must declare that area as an Air Quality Management Area (AQMA). Such an area has been declared for Winchester town centre for non compliance with the annual average nitrogen dioxide standard..

This AQMA for the City Centre is shown in figure 1.

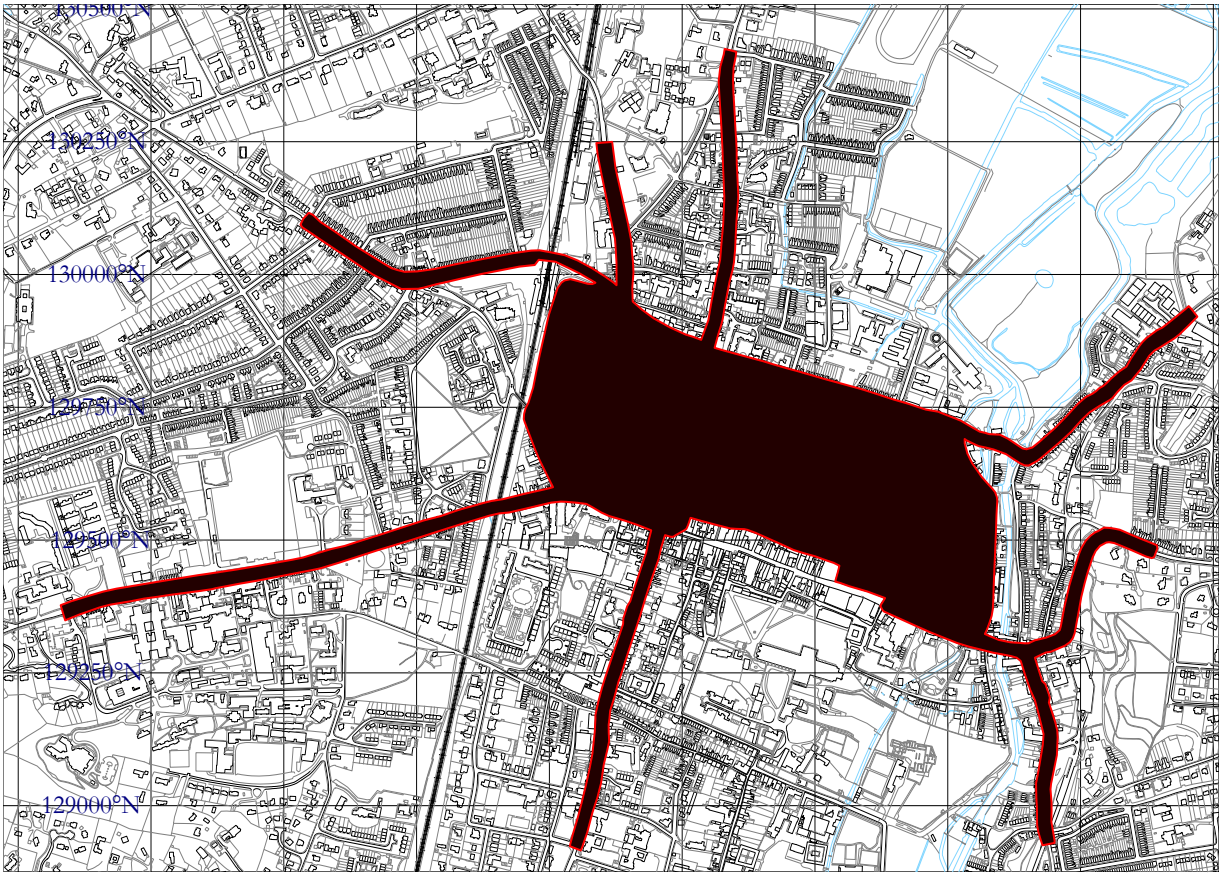

Figure 1 – Winchester Town Centre Air Quality Management Area (in Red)

This map is based upon the predicted modelled concentrations for annual average nitrogen dioxide levels at the end of 2005. Whilst the annual mean objective for 2005 is set at 40µg/m^3 the Council has taken a conservative approach to the declaration (due to uncertainties in the modelling predictions of 20 percent) and has used the predicted 36µg/m^3 contour as the basis for the AQMA.

1.4 Action Planning – What Needs to be Achieved?

Although the AQMA has been declared on the occurrence of nitrogen dioxide levels above the 36µg/m^3 contour, the results of predictive modelling and the ongoing monitoring undertaken by the Council within the City Centre show that concentrations above this threshold vary considerably. At a number of locations, a marginal increase above this level is shown to occur, whilst at other locations a substantial increase in levels of nitrogen dioxide is shown.

In order to determine what needs to be achieved by the City Council's Air Quality Action Plan it is important that the maximum concentration of nitrogen dioxide is determined.

Results of the monitoring and modelling work show that the areas within the city centre that pose the most significant threat to compliance with the annual mean objective are:

- St George's Street
- Jewry Street

Using this as our main target it has been calculated that it will be necessary to implement a series of local measures that reduces the predicted 2005 nitrogen dioxide emission concentrations by a further 17 percent.

Once an AQMA has been declared it is necessary to produce and consult upon an Air Quality Action Plan (AQAP) that identifies the extent of the problem, evaluates all potential solutions on a cost benefit basis and identifies actions that will be taken. This document is the final version of our Air Quality Action Plan. A draft version of this plan has already been subject to a lengthy consultation processes throughout 2005.

DEFRA policy guidance PG(03) ***(5)*** on local air quality management provides detailed guidance on producing an AQAP. Since the declaration of the AQMA in November 2003, a joint officer/members working party has reviewed all the options detailed within this guidance. It has subsequently had to reassess this process in light of the new DEFRA guidance note PGA(05) ***(6)***. Chapter 3 of this document provides details of the options that are either being implemented or will require more detailed assessment and evaluation before final implementation.

2.0 THE AQAP IN THE CONTEXT OF OTHER PLANS, POLICIES & STRATEGIES

2.1 BACKGROUND

Air Quality Action Plans should support existing or forthcoming plans, policies and strategies within the City / County and vice versa. The following documents contain either air quality information or ways that we are working to try and reduce pollution, providing additional support to the Action Plan:

- **Hampshire Local Transport Plan 2006 – 2011**
- **Winchester Movement and Access Plan WMAP**
- **Community Strategy**
- **Corporate Strategy 2005 -2008**
- **Winchester District Local Plan**

2.2 HAMPSHIRE LOCAL TRANSPORT PLAN 2006-2011

It is important to recognise that Hampshire County Council, as the local Highway Authority, is responsible for the majority of transport and highway proposals in the Plan area, although the Department for Transport (DfT) is responsible for motorways and trunk roads.

Hampshire County Council, through the Hampshire Local Transport Plan, sets out the Highway Authority's detailed proposals for developing an integrated transport strategy over a five year period. The first Local Transport Plan, covering the period 2001-2006, had 7 objectives:

- to increase accessibility to services
- to promote safety
- to reduce the impact and effect of congestion
- to widen travel choice
- to contribute towards improvements in air quality
- to support wider quality of life objectives
- to encourage value for money and efficient asset management

The local transport plan was put together by the County Council in partnership with City and Parish Councils and other key stakeholders. Action to improve air quality is one of the objectives. Specific initiatives that have had, and are predicted to have a positive impact on air quality include: -

- MIRACLES
- Park & Ride
- School & Workplace Travel Plans
- Improvements to Public Transport Services and Facilities

The second Hampshire Local Transport Plan was published in March 2006. This will cover the period from 2006 to 2011. The Guidance published by the Department for Transport has already made it clear to local authorities responsible for the production

and publication of local transport plans that one of the key issues to be addressed in the next plan period will be Air Quality.

LAQM.PGA(05) provides an updated policy viewpoint for those authorities with AQMAs declared in their areas, for which local road traffic has been identified as the main emission source. Where this is the case, an authority may wish to integrate its action plan into the Local Transport Plan (2006 – 2011).

Air Quality is included within the LTP Second Round (LTP2) as a shared priority – Safety, Congestion and Accessibility forming the other priority areas. Formula funding for the allocation of funds associated with schemes geared toward delivery of these shared priority areas currently favours those local authorities with declared AQMAs (for the Air Quality Shared Priority). Thus, where good integration and alignment of air quality priorities with the LTP2 occurs, additional funding may be allocated. In the case of Winchester City Council, Hampshire County Council is the relevant authority responsible for the delivery of LTP2.

The County Council has already integrated this action plan into the Local Transport Plan for 2006 – 2011. It is intended that future progress reporting on transport measures applicable within this action plan will be undertaken through the annual LTP Progress Report schedule.

An integral part of the LTP process for those authorities with AQMAs within their areas is the setting of targets in line with Mandatory Indicator LTP8. Guidance highlights that:

> *When setting targets to be achieved within the lifetime of the LTP for improvements in air quality in Air Quality Management Areas (AQMAs) an authority is expected to set realistic, yet stretching, targets for those pollutants that have triggered the declaration of the AQMA (Mandatory Indicator LTP8).*
>
> *The requirements for Mandatory Indicator LTP8 are:*
> - *Set a baseline concentration(s) (2004) for those pollutants that have triggered the declaration of the AQMA(s)*
> - *Set a target concentration(s) (2010) for those pollutants that have triggered the declaration of the AQMA(s)*
> - *Set annual trajectories (intermediate outcomes) for annual assessment of the performance of the LTP. It is strongly recommended that authorities avoid the use of pollutant concentrations for intermediate outcomes due to the influence of meteorology on the dispersal of pollutants, which may lead to elevated levels of pollution, despite progress with reducing emissions within an AQMA.*

Prior to setting any targets for the Winchster City Centre AQMA consideration has been made to what is achievable in realistic terms over the lifetime of the LTP when considered in the wider context of the following:

1. Underlying growth in traffic.
2. Local topography and geography of the area.
3. The existing network infrastructure.
4. Emerging evidence that primary NO_2 levels are increasing (Air Quality Expert Group Report on Nitrogen Dioxide published April 2004)
5. Underlying trend of increasing background ozone levels (more NOx to NO_2), which means that existing NOx to NO_2 conversion rates unlikely to hold in future

years ((Air Quality Expert Group Report on Nitrogen Dioxide published April 2004).

Authorities are recommended to use intermediate outcomes to establish the performance of the LTP on an annual basis on air quality, thereby avoiding any influence of meteorological conditions on pollutant concentrations. The use of intermediate outcomes is considered more fully in the LTP.

2.3 WINCHESTER MOVEMENT AND ACCESS PLAN (WMAP)

The Winchester Movement and Access Plan was produced in 1991 and included as part of the Local Transport Plan 2001-2006. However, as part of developing the second Local Transport Plan 2006-2011 WMAP will be superseded by a new strategy or plan for the city. Winchester falls within the Central Hampshire Transport Strategy (CHTS) area. CHTS is one of the four transport strategy areas for Hampshire. It covers parts of the districts of Winchester, East Hampshire, Test Valley and Basingstoke and Deane. The updated transport strategy for Winchester will take forward many of the aims and objectives from WMAP, but revise them to be consistent with the future vision for the city. The aims of the Strategy are to develop a better, more integrated transport system to tackle the problems of traffic congestion and pollution. The Strategy will increase the use of public transport, cycling and walking whilst limiting some of the adverse effects of motor vehicles and maintaining a healthy economy. The measures will increase personal choice by improving travel alternatives for everyone.

The existing WMAP Strategy has been developed through close collaboration between Hampshire County Council and Winchester City Council, and is supported by Central Government.

WMAP Aims

The aims of WMAP have been amended to reflect the ongoing views of key stakeholders and policy initiatives such as the Future of Winchester study within the overall framework of the vision. These aims seek to:

- Reduce the impact of traffic on the environment.
- Reduce traffic accidents and the severity of casualties.
- Reduce air pollution, noise and vibration.
- Reduce the visual intrusion of traffic.

Objectives

The aims set out above have been adopted with the following objectives in mind:

- To provide pleasant pedestrian areas with safe footways and road crossings, paying particular attention to the needs of people with mobility impairments.
- To reduce traffic in the central area by providing Park & Ride services operating from car parks located at strategic sites close to major access corridors on the outskirts of the city.
- To improve the efficiency and attractiveness of public transport by introducing bus priority measures so that buses become a viable and preferred option to the car.
- To reduce traffic speeds, accidents and manage demand though traffic management and environmental improvement schemes which provide a safer and more attractive environment for pedestrians and cyclists.

- To encourage more and safer cycling by providing a comprehensive network of on-road and off-road cycle routes serving the city centre, other key employment sites, schools and colleges.

- To provide better information to travellers through the introduction of intelligent transport systems which assist in managing the network, the management of transport demand and to provide travellers with real time information enabling them to make informed travel choices.

2.4 COMMUNITY STRATEGY

A Community Strategy for Winchester City

"Our vision for the Winchester City is of diverse and dynamic communities, where people work together to ensure that everyone has the opportunity to lead a fulfilling life now and in the future."

The **Community Strategy** for Winchester City sets out a vision for the City over the next 10 to 15 years. It has been drawn up from extensive consultation with local communities, and with business, cultural, public, voluntary and community sectors. The Strategy sets out how a range of partnerships can work together to help achieve a good quality of life for the people of this City.

The Community Strategy was created by **'Winchester and City Working Together…'**, 'Winchester and City Working Together…' is a partnership of the major agencies in Winchester City – public, private and voluntary – who are working together to improve the quality of life for those who live, work and visit the area. This is also known as a Local Strategic Partnership. It has been working for two years to produce the Community Strategy that identifies the priority issues facing Winchester City and what the partnership can do to address them. By sharing their aims through this strategy, the partners can direct their resources most effectively to promote the future prosperity of the area.

The Community Strategy aims to achieve better linkages across different organisations and to develop new solutions to problems which matter to the community. Over the next five to ten years, the partnership will be working to deliver the aims set out in the strategy. A series of Action Plans will be developed under each theme and these will be supported by the policies and strategies from each key partner.

The Strategy is split into nine themes which reflect important aspects of people's lives. With respect to Air Quality the key theme is:-

Transport and Access

Our shared aim

To improve accessibility so that everyone can enjoy a good range of shops, employment and leisure opportunities as well as having easy access to basic services such as health and education, while minimising the adverse environmental impacts of travel.

1. Accessibility is an important issue for everyone in the community as it involves the ability of any individual to participate in a particular activity, including employment, shopping, leisure, education and health. However, accessibility issues are different across the District. In the urban area of Winchester town centre, there are environmental problems caused by traffic congestion, air quality, noise and vibration, while in the rural areas, the car has become essential in order to achieve access to basic services. New technology offers alternative forms of access to some services

but not all people are able to benefit from this, either because of technical or financial constraints or because they lack the desire, skills, equipment, knowledge or confidence to use it.

2. Our aim is to balance the conflicting requirements of improving accessibility for all sections of the community while minimising the adverse impacts that such improvements may have on the quality of life in this District. Any proposed improvements also have to be achievable in terms of cost and be acceptable to the community. They must also take account of the varied needs of individuals, particularly those who have a disability, those who are not fluent in English and those who have difficulty with the written word.

3. Transport and access policies must complement other strategic issues. These include health with the benefits of walking and cycling, education with the transport problems to and from schools, safety with the need to reduce the number of road traffic accidents, and economic prosperity where many large and small businesses are dependant on good transport links.

4. We need to find ways of improving accessibility for all sections of the community, and at the same time ensuring that Winchester is a pleasant and safe place to live, to work and to visit. Providing more road capacity to carry more cars is not an environmentally sustainable solution, although the car will remain the primary form of transport for many, particularly in rural areas. Alternatives to the car will be encouraged for trips to work and school, and for trips within the built up areas of the district. There is also a need to reduce social exclusion by improving both public and community transport.

Present Situation

5. WMAP has been in place since 1991 and several projects have achieved significant improvements in Winchester town centre:

- The introduction and subsequent expansion of Park & Ride at Bar End has removed traffic and reduced congestion in the town centre.
- Major enhancements to High Street and Jewry Street have reduced traffic speeds and created a better environment for pedestrians.
- A major scheme outside Winchester Station has greatly improved bus/rail interchange and provided better access for buses, taxis, pedestrians and cyclists.
- The MIRACLES Quality Bus Partnership has enhanced bus services on routes 1 and 5 through Winchester with new buses, improved frequencies and upgraded stopping places.
- A Controlled Parking Zone has been introduced to discourage commuter parking in residential areas and the City Council has taken over on street parking enforcement.

Future Trends and Pressures

6. Despite the encouragement of more sustainable approaches to transport in recent years, both the level of car ownership and the level of car usage have continued to increase. There have also been increases in the number of rail passenger journeys per year and the level of walking, but the number of bus passenger journeys[1] and the

[1] Contrary to national indicators for the level bus passenger journeys the development of the Winchester QBP (through the MIRACLES initiative) has helped to increase overall bus patronage into the city.

level of cycling have reduced. There have been significant reductions in the number of people killed and injured in road traffic accidents. There has also been some success in encouraging the development of workplace and school travel plans. The transfer of journeys to work and school on to public transport are most important in reducing traffic congestion and achieving environmental benefits.

7. In general while the community often accepts the principles of sustainable transport, individuals find it difficult to change their travel habits and are reluctant to give up the flexibility, convenience and comfort of their cars. We recognise that there is scope for improving both bus and community transport services but will need to find ways that this can be done at a cost acceptable to the community. We also acknowledge that there is often local pressure to provide more bus and rail services in the evenings and on Sundays in order to improve accessibility to leisure activities.

8. The growth in electronic communications is likely to continue as the distinction between phones, computers and televisions becomes increasingly blurred, people become more comfortable with the technology and more used to being able to access many services at whatever time is convenient to them. This will have an impact on traditional working practices and may see a move away from the need for a 'shop front' in some sectors of the economy. Use of electronic systems within organisations can allow a stronger focus on specialist customer centres, with the potential for more joined up working between different public organisations.

Medium Term Improvements

9. We will take the following steps to help us realise our long term vision. Action on these will be the overseen by a transportation consortium formed from representatives of various transportation liaison groups that currently operate within the District.

Key Indicators

- Measures of air quality in Winchester Town Centre (from road side monitoring equipment)
- Annual average traffic flow on selected roads in the city (from measurements made by Hampshire County Council and ONS)
- Percentage of residents using different types of transport (from residents' survey)
- Percentage of children travelling to school by different types of transport (from residents' survey or survey of schools)
- Number of community transport/dial a ride
- Use of rural transport services and number of bus and train passengers on Winchester services

Links to Existing Strategies

The following strategies set out more detailed actions to address issues raised in this chapter:

- Hampshire Local Transport Plan
- Winchester District Local Plan 1998 and Winchester District Local Plan Review (Revised Deposit 2003)

Improvement	Lead Partner	Contributes to following aims:								
		Housing	Health	Freedom from Fear	Transport & Access	Economic Prosperity	High Quality Environment	Lifelong Learning	Leisure & Recreation	Inclusive Society
TA1. Establish Park and Ride on all principal routes into Winchester.	HCC				✓	✓	✓			
TA2. Consider means to improve accessibility to Winchester Railway Station.	HCC				✓	✓				
TA3. Extend Park & Ride buses to the Hospital.	WCC				✓	✓	✓			
TA4. Improve air quality in Winchester town centre by reducing levels of congestion.	HCC		✓				✓			
TA5. New high quality bus station as part of the Friarsgate redevelopment.	WCC				✓	✓	✓			
TA6. Provide safer and more convenient walking and cycling routes.	HCC		✓		✓		✓			
TA7. Reduce social exclusion by improving public and community transport, including addressing rural issues.	HCC				✓					✓
TA8. Reduce vehicle emissions particularly from buses and advocate alternative fuel systems.	Bus		✓				✓			
TA9. Support the production of workplace and school travel plans.	WCC				✓	✓	✓			✓
TA10. Enhance rural life through sustainable access initiatives.	HCC				✓					✓
TA11. Encourage the provision of rural demand responsive bus services.	HCC		✓	✓	✓	✓	✓	✓	✓	✓
TA12. Ensure new developments encourage use of sustainable transport options.	WCC				✓		✓			
TA13. Encourage greater public participation in the transport debate.	WCC				✓					✓
TA14. Develop local access points throughout the District.	WCC & PCs	✓	✓	✓	✓	✓	✓	✓	✓	✓
TA15. Ensure that people with disabilities are able to access services.	WAC	✓	✓	✓	✓	✓	✓	✓	✓	✓

Bus – Bus Companies
HCC – Hampshire County Council
PCs – Parish Councils
WAC – Winchester Area Community Action
WCC – Winchester City Council

2.5 CORPORATE STRATEGY - 2005-2008

THE COUNCIL'S AIM AND VALUES

The Community Strategy for this District, developed through the Winchester Local Strategic Partnership, sets out a vision for improving quality of life across the District over the next ten years. As our contribution to delivering this vision, Winchester City Council:

… wants people to be able to live, work and enjoy life in the District with a real sense of belonging. We will provide leadership for the area and we will work with partners to ensure that services are provided in ways that best meet the needs of the residents, now and in the future.

The City Council recognises that the way we work and our values as an organisation determine the quality of services we provide. The Council strives to be an organisation which:

- makes our residents top priority
- is guided by strong political leadership
- is financially prudent
- communicates openly and honestly
- constantly improves by learning from others and seeking creative and innovative ways of working
- delivers in partnership
- values diversity and equality of opportunity for all
- acts in a sustainable way and encourages others to do likewise

In delivering the priorities set out in this Strategy, the Council will act according to these values.

BETTER SERVICE

Taking account of the Community Strategy and the vision set by the Council and having considered the current circumstances of the District and the views of citizens, the Council has identified the following as the key service areas on which we will focus over the period of the Corporate Strategy:

1. **Homes**

   To address the longer term aim of providing decent affordable homes for all sectors of our community, over the period of this Strategy we will:

   - respond to the housing needs of the District by facilitating the delivery of new housing in the light of Government targets;
   - work with Parishes and other public sector bodies to identify suitable sites, including exception sites, for affordable rural housing;
   - work with the Housing Forum to address the housing needs of vulnerable elderly people (informed by the Supporting People review of Sheltered Housing) and of the student population;
   - by 2010, meet the outcomes dictated by the Housing Options Appraisal so far as the Decent Homes Standard for Council housing is concerned.

2. **Community Safety**

To create communities that feel safe and further reduce levels of crime and anti-social behaviour in the District, over the period of this Strategy, we will:

- be a vigorous and challenging member of the Community Safety Partnership and fulfil our obligations under the new Community Safety Strategy;
- work with the police and other partners to reduce the incidence of anti-social behaviour;
- provide a neighbourhood warden scheme in Stanmore and Highcliffe and consider extending this as resources allow;
- review the contribution that CCTV is making to community safety and consider the future role of CCTV.

3. **Green Agenda**

To minimise pollution and waste and to make efficient use of resources, over the period of this Strategy we will:

- significantly reduce landfill, encourage increased re-use and promote recycling;
- **promote more sustainable transport in order to reduce congestion and improve air quality, including implementation of the Air Quality Action Plan in partnership with Hampshire County Council;**
- increase the number of routes into Winchester where Park & Ride is available and press Hampshire County Council to develop a second Park & Ride site urgently;
- work with partners to increase local communities' pride in the place where they live;
- work with Hampshire County Council to improve the condition and safety of roads and pavements.

4. **Social Inclusion**

To ensure that everyone can play a full part in the life of their community, over the period of this Strategy we will

- work towards the aims set out in the Council's Social Inclusion Strategy
- review the contribution that services provided by our partners are making towards the joint aims agreed in the Community Strategy, Community Safety Strategy and Social Inclusion Strategy.
- take our services and those of other agencies to all our communities.

5. **Economic Prosperity**

To achieve a strong and diverse urban and rural economy which builds on local strengths and offers opportunities for all, over the period of this Strategy we will:

- create opportunities for start up businesses working with local universities and colleges;
- recognise, support and develop local businesses in Winchester, the market towns and the rural areas of the District.
- revitalise the commercial areas of Winchester, including Winnall Industrial Estate and the Friarsgate/Broadway area (*"Silverhill development");*
- develop a vision for the evening economy;
- increase the contribution made to the local economy by a well organised and sustainable range of creative and cultural events and activities.

6. **Cultural and Leisure Opportunities**

To increase access to cultural and sporting activities, over the period of this Strategy, we will:

- encourage healthy lifestyles by promoting use of local facilities and working in partnership with local Primary Care Trusts;
- promote Winchester and District as a centre for culture, education, conferences and tourism;
- develop new ways to provide better public access to heritage services, where possible in partnership with Hampshire County Council and other local organisations;
- invest in projects and partnerships which will provide for the leisure, sporting and cultural interests of young people.

WORKING BETTER

To deliver services efficiently and effectively, the Council must be well managed. In seeking to improve management, we also seek to work according to our agreed values. The Council has identified the following as its key areas in which we will improve corporate management over the period of the Corporate Strategy:

7. **Aims & Priorities**

We will have in place a robust planning framework to link the vision set out in the Community Strategy and priorities set out in this Corporate Strategy with day-to-day targets and objectives. Over the period of this Strategy we will:

- work with partners on the Local Strategic Partnership to ensure the Community Strategy is regularly reviewed and progress towards the improvements it identifies monitored;
- review the Corporate Strategy annually to ensure it identifies priorities which meet the District's needs;
- develop and maintain a Performance Plan and Departmental Business Plans which provide a basis for identifying improvements to implement this Corporate Strategy and monitor its delivery;
- develop and implement a medium term (3-year) Service and Resource Plan.

8. **Performance Management**

We will have in place a robust system for setting targets, monitoring progress against those targets and guiding corrective action where necessary. Over the period of this Strategy we will:

- report the Council's progress in delivering the Corporate Strategy and Business Plan targets on a quarterly basis;
- drive continuous service improvement by undertaking an annual programme of reviews, as agreed with Cabinet and Principal Scrutiny Committee;
- continue to demonstrate high standards in managing the taxpayers' money - being open to scrutiny, providing services that are efficient and at reasonable cost, avoiding profligacy, maintaining sensible levels of reserves and planning ahead.

9. **Council Structures and Procedures**

We will have efficient structures and procedures to provide political leadership to the Council and District. We will have effective organisational arrangements and management to deliver continuous service improvement. Over the period of this Strategy we will:

- review annually decision-making structures and procedures to ensure they remain efficient, open and accountable;
- review the Council's arrangements for scrutiny of the Executive to hold Cabinet to account and contribute constructively to policy and service development;
- maintain an overview of staff levels and management to ensure they can deliver the Council's priorities effectively.

10. **How We Work**

We will follow work practices which are consistent with our corporate values. Over the period of this Strategy we will:

- improve arrangements for communicating the Council's aims, objectives, policies and performance to Members, staff and the wider community;
- make customer service the key to all we do by seeking to provide services which reflect the needs of our citizens, by improving access to our services and by improving the timeliness and accuracy of advice and information we provide;
- improve working across departments and with external partners to provide joined-up and efficient services;
- ensure our staff are well trained and properly resourced to provide excellent services.

11. **Corporate Policy Framework**

The Council has developed a number of key policies which guide its effective management. Over the period of this Strategy we will keep these under review and implement improvements identified in the:

- Corporate Programme for making Council buildings and services more accessible;
- Communications Strategy;
- Environment Strategy;
- Financial Strategy;
- Policies and programmes for enhancing electronic access to services
- Procurement Strategy;
- Corporate protocol for project management;
- Risk Management Strategy;
- Sustainability Strategy;
- Corporate policy for the protection of vulnerable children and young people.

2.6 WINCHESTER DISTRICT LOCAL PLAN

Planning decisions can have a significant, longer term impact on travel behavior and levels. The Council, through its function as a planning authority, can influence new development to ensure that it is designed and located so as to reduce the need to travel. It may also provide a range of attractive and convenient travel choices, encouraging alternatives to car use, in accordance with national planning policy.

Land use proposals in the Local Plan complement and are fully integrated with the Local Transport Plan's objectives. In particular, they promote sustainable development that minimises the demand for travel, particularly by car, and promote the use of walking, cycling and public transport.

The Adopted (1998) Local Plan and its implications on Air Quality

The integration of land use, transport and highways is key to the Council facilitating delivery of sustainability. Our Local Plan adopted 1998 sets a number of guiding policies.

> Proposal EN.14 Planning permission for development which potentially generates air, land or water pollution, and which accords with other relevant proposals of this Plan, will normally only be permitted provided the Local Planning Authority is satisfied that it has been designed to reduce its impact to an acceptable level. Proposals will normally need to comply with the statutory standards of environmental quality required by the pollution control authorities, and to include a statement setting out how the requirements have been met in designing the proposal.
>
> Proposal EN.16 Planning permission for new development which accords with other relevant proposals of this Plan will normally only be permitted provided the Local Planning Authority is satisfied that it achieves an acceptable standard of environmental quality and minimises levels of pollution affecting the development, both within buildings and in spaces around them.

The District Local Plan Review

The Local Plan Review will replace the adopted District Local Plan, when adopted (adoption expecting in 2006). A Revised Deposit version of the Local Plan Review was published in May 2003. A Public Local Inquiry was held from June 2004 to March 2005 and the Inspector's Report was published in September 2005. Proposed modifications to the Local Plan following the public inquiry were published in January 2006. The Revised Deposit Plan contains the following specific section on pollution:

Specific Design and Development Principles

3.50 This section details Design and Development Principles for:

- pollution-generating development;
- unneighbourly uses;
- pollution-sensitive development;
- development on contaminated land;
- public utility development;
- renewable energy schemes.

Pollution generating development

3.51 When formulating development proposals, early consideration should be given to the potential for pollution from a proposed use. Guidance should be sought from the appropriate pollution control authorities on the standards of environmental quality required and features that need to be incorporated in the design process. Where possible, proposals should strive to exceed statutory standards and show how they contribute to sustainable development.

3.52 For advice on acceptable noise levels, standards of air quality, and other measures to avoid adverse environmental affects or nuisance, developers should consult the City Council's Environmental Health Department. For proposed uses listed in Part A of the Environmental Protection (Prescribed Processes and Substances) Regulations 1991, applicants will need to consult the Environment Agency. Developers also should consult the Environment Agency for advice on standards of water quality (see also Proposal DP.9), waste disposal and contaminated land.

3.53 All planning applications for development with potential to cause pollution should include a statement setting out how the proposed location and design minimises the problem, and how the effects are to be mitigated.

Proposal DP.13

Development which may generate air, land, light or surface water or groundwater pollution, and which accords with other relevant proposals of this Plan, will only be permitted where the Local Planning Authority is satisfied that it has been designed to reduce the impact to an acceptable level. Proposals should comply with the statutory standards of environmental quality and environmental protection policies required by the pollution control authorities, and include a statement setting out how the requirements have been met in designing the proposal.

3.54 Developers who are in doubt as to whether their proposals are likely to cause pollution should contact the Environmental Health Department of the City Council before submitting a planning application.

3.0 DEVELOPING ACTIONS IN THE PLAN

3.1 INITIAL STUDY

The National Society for Clean Air and Environmental Protection (NSCA) guidance document, Turning Reviews into Actions, identifies a range of options that may be introduced to improve air quality. These options, together with those detailed in DEFRA guidance PG3(03) were used as the basis of an initial assessment by the Air Quality Working Group. The conclusions of the working group were used to develop the draft plan which was subject to a wider public consultation exercise before it was refined into this, the Action Plan.

3.2 ACTIONS IN THE PLAN

The Twenty Actions included are a mixture of policies, publicity, schemes and initiatives. ***The numbering of the actions relates to the order of their appearance in the Matrix in Section 5****.* The relevant effects, the broad scale of costs, timescales and responsibilities for each action identified is detailed in a Matrix assessment shown in section 5. For schemes and measures to be financed through the Local Transport Plan, the funding and timing of those measures will be subject to appropriate feasibility studies, the level of capital funding made available from Central Government and decisions on budget allocations arising from that funding. Inevitably there is some overlap between different elements of the Action Plan as a number of different, but similar initiatives are heading towards the same goal. The Actions can be summarised into a number of different headings

ENGINEERING SOLUTIONS

- Park & Ride
- Traffic Management
- Walking and cycling schemes

MIRACLES

- Clear zones
- Roadside vehicle emission testing
- Environmentally linked parking strategy
- Improved collective passenger transport
- Bikeabout
- Alternative delivery solutions
- Traveller information
- Cleaner vehicles

POLICY & PROMOTIONAL SOLUTIONS

- Parking Policies - Car Parking Review
- Publicity and Promotion of Air Quality Issues
- Integration and compatibility with other policies and strategies
- Development Control & Environmental Impact Assessments
- Workplace and School Travel Plans
- Promotion of walking and cycling
- Promotion of Public transport – Rail and bus
- Taxis and Private Hire Vehicles
- Traffic Reduction Schemes

The final section in this chapter briefly deals with the issues of 'beyond the plan' and what we may have to consider if the identified actions fail to deliver the required improvements to air quality.

3.3 ENGINEERING SOLUTIONS

3.3.1 PARK & RIDE

Park & Ride is a cornerstone of the Winchester Movement and Access Plan. It still allows the flexibility of car use for our journeys, without placing undue pressure on the historic city core and the AQMA. Whilst accepted as an important part of an Integrated Transport Strategy, to be most effective, Park & Ride schemes should be complemented by measures such as reductions in town centre parking, bus priority measures or pedestrianisation.

The expansion of Park & Ride around the outskirts of Winchester is a critical part of the Winchester Movement and Access Plan. The Council has now completed the extended Park & Ride facilities at Bar End. This site now has capacity for over 780 cars, which would otherwise be on the city's road network. An additional Park & Ride site is proposed for the south and potentially north of the city. The timing of these facilities are subject to statutory and design procedures and acceptance by the DfT for financial support.

Experience and monitoring of the existing Park & Ride corridor into the city has found that the introduction of a Park & Ride/Bus Priority facility can reduce traffic growth along its corridor. It is expected that the proposed expansion of Park & Ride will create the ability to more effectively manage traffic growth in the city centre and help to reduce air pollution

All Park & Ride proposals have the potential to reduce car traffic in the AQMA by providing an alternative for commuters travelling into the City centre from the primary commuter residential areas outside the city. However Park & Ride is also known to increase car journeys on routes to and from sites, and can attract additional local vehicle movements.

ACTION 1: We will work with the County Council to provide an additional Park & Ride facility to the south of Winchester.

Of course 'Park & Ride' replaces car-based travel around the city centre with bus-based travel, therefore it is imperative that we ensure that the buses providing the 'Ride' service are clean in terms of pollution emissions, though we have to allow some consideration of economic limitations. The buses operating on the Park & Ride service do so under contract to the city council and therefore we are in a position to select the type of vehicles used. The MIRACLES project funded the trial of low-emission hybrid diesel/electric buses, feedback from this trial and other similar trials will be useful in the selection of appropriate vehicles to use in future Park & Ride contracts.

ACTION 2: We will ensure that the buses on the Park & Ride service are increasingly environmentally friendly, making allowance for economic and technical considerations.

3.3.2 TRAFFIC MANAGEMENT

Traffic regulation

The Road Traffic Regulation Act 1984 (RTRA) gives traffic authorities extensive powers to make traffic regulation orders (TROs). These can prohibit, restrict or regulate traffic or particular types of vehicle. New TROs or changes to existing TROs could be used to improve traffic flow on congested sections of the local highway network e.g. loading restrictions in the city centre. Many of the city streets already have 'peak-time' loading bans to help traffic flow at those times.

ACTION 3: We will review the loading restrictions in the town centre and on the main approach roads to the city.

Variable Message Signing (VMS)

Variable Message Signing (VMS) can help guide vehicles to specific destinations or relay information to travellers. VMS can also be used to reduce traffic 'searching' for parking spaces by directing cars to available spaces. VMS has recently been installed on the approach roads leading to the Park & Ride service indicating parking availability at the different car parks.

The use of Real Time Information (RTI) systems is increasing in use on public transport systems across the UK. Although Winchester has a number of bus shelters with RTI, these are now past their prime and the County Council proposes to replace all the real-time information at bus shelters within and around the city in 2006.

Winchester has a number of 'rotational' type signs directing traffic towards car parks, but again these are somewhat dated and do not relay information relating to the availability of spaces. A comprehensive system of VMS signing for car parking locations and availability is under consideration for implementation in 2006/07.

ACTION 4: We will work with the County Council to replace the Real-Time Information systems in bus stops in and around the city and implement Variable Message Signing (VMS) for the town centre car parks.

As part of the MIRACLES project, four roadside Variable Message Signs have been installed on strategic routes entering the city. These display air quality, journey time and travel information.

ACTION 5: We will support the County Council (MIRACLES project) in the implementation and use of Variable Message Signing (VMS) on approach routes to the Town, informing travellers of journey conditions.

Reallocation of road space

Reallocating space to buses, pedestrians and cycles can make these modes of transport more attractive. However, limited available road space in the city centre restricts this option.

Traffic Control

Modern Urban Traffic Management and Control (UTMC) systems can optimise capacity of the highway to deal with congested conditions or to release capacity for other road users, normally buses cyclists and pedestrians. Also UTMC systems can give priority to pedestrians.

The traffic control system in Winchester (SCOOT®) is one of the most modern available. Though it could be adapted to hold queues outside an area when congestion or pollution exceeds a pre-set threshold, or provide additional priority to buses.

Vehicle restricted areas

Traffic Orders to restrict access to a road or area to some or all vehicles at different times of the day. Restricting access to town centres has been shown to improve the local environment. Winchester already has some Vehicle Restricted Areas for example the High Street. Further restrictions would have to be considered alongside a wider review of the local highway and access network.

Traffic Management Options for Winchester

Options for revising the current traffic circulation system in the town centre will be evaluated. This could include bus lanes & priority measures, and changing parts of the one-way system to two-way roads. In addition improvements to the A34/M3 junction could prevent traffic diverting through the town centre during periods of congestion on the A34/M3.

ACTION 6: We will work with the County Council to carry out an investigation of possible traffic management options and with the Highways Agency on possible measures on the Trunk Road network. The objective being to reduce town centre congestion and therefore improve air quality.

3.3.3 WALKING AND CYCLING SCHEMES

Cycling and walking are both viable options for short local journeys, either on their own or in combination with public transport. They can have a positive impact in terms of helping to reduce traffic congestion, pollution and noise. All local highway authorities have been asked to develop a local cycling strategy and a local walking strategy as part of their local transport plans (LTPs). These should identify gaps in the local infrastructure and improvements needed in cycling and footway networks.

Winchester City Council works closely with the County Council on the development and implementation of cycle schemes. In addition, the City Council is working to develop its own Walking and Cycling Strategy.

Winchester also benefits from a Cycle Working Group, run in conjunction with the Cycle Touring Club (CTC), which has a consultative role in considering proposals from the County Council.

Like walking, cycling is a very clean (and healthy) mode of transport and can make a contribution to improving air quality. The City Council is therefore keen to see more people cycling safely and responsibly on the carriageway. We want to encourage cycling through a programme of installing cycle facilities which will be identified through a new Walking and Cycling Strategy.

ACTION 7: We will develop our own Walking and Cycling strategy and we will continue to work with the County Council on the development and implementation of facilities for cyclists and pedestrians and to support the MIRACLES Bikeabout initiative. This will include working with both the County Council and the Primary Care Trust to promote walking and cycling as a healthy alternative to car based travel.

3.4 MIRACLES

Multi Initiatives for **R**ationalised **A**ccessibility and **C**lean, **L**iveable **E**nvironment**S**

The Consortium undertaking the **MIRACLES** project consists of: Hampshire County Council; Winchester City Council; The Transportation Research Group University of Southampton; Atkins and the Met Office. This Consortium is responsible for the development, implementation and evaluation of the project. MIRACLES (February 2002 to May 2006) demonstrated a variety of sustainable transport measures in the city, some of which will continue to operate beyond the life of the project

The **MIRACLES** project in Winchester focuses on a number of measures, contained within eight work packages, which build on work undertaken in the Clear Zones concept. Vehicle emissions will be monitored in order to discourage "gross-polluting" vehicles from entering the city centre. An environmentally linked, flexible parking strategy which rewards drivers of clean vehicles has been developed. MIRACLES is increasing patronage of public transport by improving service quality and information. Cycling is being encouraged through improved cycle facilities and implementation of the MIRACLES Bikeabout scheme. New concepts for the distribution of goods are being developed. Support is being made available to assist with the procurement of clean vehicles, and cleaner fuel and engine technology is being introduced to municipal and public transport fleets.

3.4.1 CLEAR ZONES

The Clear Zones initiative was designed to encourage solutions to traffic problems in towns and cities while making sure town centres retain their accessibility, vitality and economic viability. A clear focus of the initiative was to reduce congestion and improve air quality by developing an integrated transport policy to meet local needs.

During the first three years the MIRACLES project has made significant progress in building on the work of the Clear Zones initiative. A brief description of progress on the various work packages is set out below:

3.4.2 ROADSIDE VEHICLE EMISSIONS TESTING

The aim of this measure is to reduce the number of poorly maintained vehicles entering Winchester, thereby reducing the level of emissions and pollution. Implementation of a city centre clean zone is progressing by monitoring emissions and developing an emissions database. Innovative remote sensing equipment has been developed for this task and will be used to monitor traffic in the city. Gross polluters can be identified using the remote sensing equipment and action can then be taken to reduce their emissions. Two sets of regulations are available if formal action is needed to stop polluters:

- **Stationary vehicles with engines running.** Regulations allow action against drivers who leave their vehicle engines running unnecessarily when parked. WCC could choose to include such initiatives in its AQAP.
- **Testing cars at the roadside.** Recent regulations also allow local authorities with an AQMA to conduct roadside vehicle emissions tests. Fixed penalties (£60) could be issued to drivers whose vehicles are found exceeding current emissions limits.

ACTION 8: We will apply for Central Government powers to allow us to take action against vehicles which exceed vehicle emission standards. Long term usage of these powers to be assessed following an initial MIRACLES trial project

3.4.3 ENVIRONMENTALLY LINKED PARKING STRATEGY

An environmentally linked, flexible parking strategy has been developed that offers discounts on city centre car park season tickets to drivers of clean vehicles. These discounts are based on the level of carbon dioxide per kilometre emitted by the vehicles. The aim of the strategy is to influence those considering the purchase of a new vehicle to opt for a 'low emission' model.

ACTION 11: We will keep our parking policies, availability and charges under review to maximise the use of the Park & Ride facilities. We will continue to offer parking discounts to “cleaner” vehicles to encourage their use over other vehicles (a MIRACLES initiative).

3.4.4 IMPROVED COLLECTIVE PASSENGER TRANSPORT

The MIRACLES Quality Bus Partnership (QBP) was agreed with the local bus operator, Stagecoach plc, to improve the quality of vehicles and service provided on services 1, 5, and Park & Ride. Further QBP's are being considered in conjunction with the County Council.

Infrastructure improvements have been implemented, with a bus/rail interchange, bus and taxi priority schemes and 76 new bus stop poles and timetables. Enhanced shelter provision and raised boarding kerbs are being brought forward in conjunction with the County Council.

A new urban public transport map 'PT Plus' has been produced, with the newest version being distributed in September 2004. This pocket map includes details of bus, rail, and National Express coach services, along with opening times of city centre attractions. A detailed city map has been included to enable users to travel around the city on foot, as well as by public transport.

ACTION 9: We will continue to support and encourage the use of an integrated Public Transport system with special emphasis on Quality Bus Partnerships to improve buses including a reduction in their emissions to the latest standard. We will bring forward measures to enhance public transport opportunities within the city.

3.4.5 ALTERNATIVE DELIVERY SOLUTIONS

Freight surveys have been completed and alternative delivery practices were investigated and discussed with Winchester Freight Forum.

An alternative home delivery service, provided by Collectpoint plc, was trialed in Winchester . Customers could chose to have their purchases delivered direct to a 'Collectpoint', which were mainly local convenience stores that are open seven days a week, early until late. This removed the need for the customer to stay at home to wait for deliveries, and reduced the number of failed deliveries by couriers and postal service.

A new Winchester Freight Map has been produced and distributed to help road freight operators and drivers of commercial vehicles find the most appropriate routes to the main freight delivery destinations in Winchester. The map includes vehicular restrictions and highlights advisory routes.

3.4.6 BIKEABOUT

A MIRACLES Bikeabout scheme has been developed to offer the free loan of bicycles within Winchester. Bikeabout currently operates from three sites and has a total of 50 bicycles available for loan.

Revised cycle maps and signing have been produced and new cycling parking stands have been installed around the city. The County Council have introduced two electric bicycles and a folding bike which are available for business use by staff.

ACTION 7: We will develop our own Walking and Cycling strategy and we will continue to work with the County Council on the development and implementation of facilities for cyclists and pedestrians and to support the MIRACLES Bikeabout initiative. This will include working with both the County Council and the Primary Care Trust to promote walking and cycling as a healthy alternative to car based travel.

3.4.7 COMMUNITY INVOLVEMENT, AWARENESS AND PUBLICITY

A public relations plan aimed at raising awareness of project initiatives was developed and implemented. Information was disseminated through leaflets, posters, website, radio and newspaper advertisements, and press releases. MIRACLES has supported Winchester Bike Week and Alternative Transport Day events for the past two years, and has exhibited at a number of local conferences. As well as coverage of MIRACLES in the media and at local events, awareness of the project is also raised through regular surveys and consultation exercises.

A pollution forecasting model was developed for MIRACLES by the Met Office. This is used to provide air quality information via the Winchester MIRACLES, Hantsweb and ROMANSE on-line websites, via roadside Variable Message Signs and through other media such as radio.

3.4.8 TRAVELLER INFORMATION

This work package aims to improve the quality and quantity of traveller information available for all modes, including car travel, to allow users to make informed transport decisions, and improve the conditions of the transport network.

Network management has been improved through the introduction of a first phase of an Automatic Number Plate Recognition (ANPR) system. This provides journey time data, calculated in real-time, for both public and private transport.

Four new electronic information kiosks were installed at various sites around the city at the end of September 2004. These provide public transport, journey planning and local information.

New bus departure information displays have been installed at the bus station and railway station.

Improved multi-modal traveller information is to be provided in the form of large information displays located at large employers. The displays will provide real-time information on air quality and bus and train departures, and real-time journey information for strategic routes out of the city.

Four roadside Variable Message Signs have been installed on strategic routes entering the city. These signs display air quality, journey time and travel information.

3.4.9 CLEANER VEHICLES

Various measures were implemented to reduce the level of emissions from the local bus fleet and from the County Council fleet vehicles. The project also aimed to influence private businesses in their fleet purchasing decisions.

As part of the Quality Bus Partnership, a programme has been under way since May 2004 to fit new, environmentally friendly engines, exhausts after treatments and particulate traps to mid-life buses operating in the city, to make the emissions as clean as possible. This has resulted in Winchester having one of the cleanest bus fleets in the UK.

Seven liquid petroleum gas (LPG) powered vehicles and 30 Euro IV diesel cars were introduced as part of the County Council's Network Management fleet replacement programme. The Project monitored the use of these vehicles, with the aim of developing a business case to support the implementation of clean vehicles. Winchester City Council Parking Service currently operates a green fleet, which is predominantly LPG powered.

Through MIRACLES the County Council joined the Motorvate scheme in March 2004, and benchmarking of selected fleet vehicles has been taking place. Motorvate will report on their findings shortly, after which a programme will be developed by the Motorvate consultants to assist the County Council in reducing CO_2 emissions from the vehicle fleet.

Hampshire County Council also purchased six alternative fuel vehicles, including: two petrol/electric hybrid cars, two dual-fuel petrol/LPG cars, and two battery electric vans. These vehicles were loaned to local businesses for up to one month, in order to break down barriers and increase exposure to alternative fuel vehicles.

ACTION 12: We will use cleaner and alternative fuelled vehicles within our own fleet where such options are a viable alternative. We will support the promotion of cleaner vehicle technologies and cleaner fuels.

3.5 POLICY & PROMOTIONAL SOLUTIONS

3.5.1 PARKING POLICIES - CAR PARKING REVIEW

The control and availability of parking spaces is a key determinant of whether or not people use a car for a certain journey. Therefore policies that affect car parking can be directly related to the volume of traffic in and around the city. Winchester City Council already controls and manages significant amounts of parking in the city and therefore is in a position to affect Air Quality in the AQMA by the use of its parking policies.

The City Council carried out a review of its Parking Policies in 2004 and a review of parking charges was completed in 2005. It is anticipated that on-going reviews will be an important element of the AQAP. It is accepted that the availability and price of the parking stock will need to be carefully considered against the economic vitality of the city and improvements to the Air Quality. The reviews have included: Short/long stay balance, Pricing strategy, On street parking restrictions and Enforcement (e.g. HGV loading bans and bus priorities). In association with additional Park & Ride provision, in order to make it effective, there would be a need to relocate long-term parking from the city centre to Park & Ride sites

As part of the Local Transport Strategy, the Council seeks to influence modal choice

to ensure that the car is not the only option for people wishing to move about Winchester. As a component of the overall policy, parking is seen as a key consideration. Over the recent years, the Council has increased day and annual long-stay parking charges to encourage use of the Park & Ride service, maintain turnover and discourage commuter parking. It has also taken control of parking enforcement in the city by declaring a “Special Parking Area” and employing its own parking attendants. Parking for new development is controlled through maximum parking standards. Over the years the Council has extended the control parking area from the City Centre to peripheral parts of the City Centre.

The introduction of the Controlled Parking Zones within the centre of Winchester has helped control the number of vehicles coming into the city centre, specifically at peak times. Priority is given to residents of the area and the charging regime seeks to discourage long-term commuter parking. It is possible that further extensions of the Controlled Parking Zones will take place within the time period of this plan. The extension of the Controlled Parking Zone over a wider area will encouraging a modal shift from car travel to other more environmentally friendly means such as public transport, walking and cycling. This will have benefits of reducing congestion in the City Centre, and hence improve air quality.

ACTION 10: We will continue to manage parking in the city through the Controlled Parking Zones, appropriate charging levels, enforcement and parking availability.

ACTION 11: We will keep our parking policies, availability and charges under review to maximise the use of existing and future Park & Ride facilities. We will continue to offer parking discounts to “cleaner” vehicles to encourage their use over other vehicles (a MIRACLES initiative).

3.5.2 PUBLICITY AND PROMOTION OF AIR QUALITY ISSUES

Alternative Fuelled Vehicles for WCC

The Council is committed to considering alternatives to fossil fuels in an effort to reduce the pollution from its vehicles. It is also important that the Council encourages local vehicle operators to use environmentally friendly vehicles. Low emission vehicles and alternatively fuelled vehicles are available as alternatives to some conventional vehicles. The Council should seek to adopt these types of vehicle in its fleet, both because of the direct improvements in air quality that can be achieved directly, and to give an example to other fleet operators in the area.

Winchester City Council is keen to set a good example by using LPG (Liquefied Petroleum Gas) vehicles where possible; Development Services, Parking Services, Environmental Health and the Mayor all have vehicles which can be powered by LPG.

The MIRACLES project has provided a number of alternative fuelled vehicles for trial by businesses in an around the city. Full details are found in section 3.4.9

The Energy Savings Trust 'Powershift ' programme initially helped increase the uptake of clean vehicle technologies and provides funding towards the cost of such vehicles. This programme has now finished.

ACTION 12: We will use cleaner and alternative fuelled vehicles within our own fleet where such options are a viable alternative. We will support the promotion of cleaner vehicle technologies and cleaner fuels.

Alternative Transport Day / National Bike Week

The Council takes part in and promotes the annual National Bike Week Campaign. Sustainable transport issues are also promoted throughout the City on Alternative Transport Day. We will continue to use the Alternative Transport Day and National Bike week to publicise and make people aware of Air Quality issues.

The Hampshire Local Transport Plan Air Quality Group

Representatives from each District and the County Council formed a working group in 2003 to help co-ordinate air quality management in Hampshire. This collaboration not only reflects the important role that all local authorities in Hampshire play in protecting the environment, but also signals the closer working together on air quality issues for the future. The group has developed very successfully over the last 12 months and will be continue to promote air quality initiatives across Hampshire. The group will also ensure that Air Quality issues and schemes to improve air quality are given due prominence in the second Local Transport Plan for Hampshire. We will continue to contribute to the Hampshire Local Transport Plan Air Quality Group as a means to ensure that Air Quality issues are disseminated to a wider audience and due regard is paid to air quality issues in the preparation of the next Local Transport Plan for Hampshire.

Provide up to date monitoring Information to the Public

Within Winchester there exists a 'real-time' air quality display that provides detailed but easily understood information on the current air quality within the City. Information is also in place to explain what it means and where to obtain further information.

It is important that we provide information on air quality in a clear and accessible way. The popularity of the Internet increases every year and therefore we decided to provide a much larger range of information on our website.

Daily pollution levels can be seen quickly and easily as well as providing information on a range of air quality issues. We will be working with the County Council through the Local Transport Plan process to develop a strategy for the dissemination of Air Quality Information to the public and will continue to maintain the Air Quality Information displays.

Raise Public Awareness of Air Quality Management Area

It is hoped that as the issues are raised and awareness of the effects of poor air quality increases, the public and businesses will be persuaded to modify their behaviour and accept various measures to improve the air quality within Winchester.

Through the development and implementation of the draft Action Plan we have already:

- Had a 'public launch' of the draft Air Quality Action Plan to further raise public awareness of the issues involved. The final Air Quality Action Plan being altered from the draft to reflect feedback received.
- Prepared an advisory leaflet describing local air quality issues, which was made available to the public at Council outlets and other locations within and around the AQMA.
- Developed the Council's web-site to include information on air quality and data from the monitoring sites across the city.
- Raised the profile of air quality through the media.
- Initially assessed ways of promoting awareness in schools through the education system.

ACTION 13: We will take action to increase public awareness of the existence and impacts of poor air quality. We will work with the County Council to develop a strategy for the dissemination of Air Quality Information.

3.5.3 INTEGRATION AND COMPATIBILITY WITH OTHER POLICIES AND STRATEGIES

It is important that Air Quality Action Plans should support existing and forthcoming plans, policies and strategies within the local area and vice versa. The following documents contain either air quality information or ways that we are working to try and reduce pollution. These documents provide additional support to the Action Plan:

- Hampshire Local Transport Plan
- Winchester Movement and Access Plan WMAP
- Community Strategy
- Corporate Strategy
- Winchester District Local Plan 1998 and Winchester District Local Plan Review (Revised Deposit 2003)

Full details of these policies and strategies are found in Section 2 of this report.

ACTION 14: We will ensure that all existing and forthcoming plans, policies and strategies affecting the City take due account of air quality issues and the AQMA. Special regard will be paid to air quality issues in the preparation of the next Local Transport Plan for Hampshire.

3.5.4 DEVELOPMENT CONTROL & ENVIRONMENTAL IMPACT ASSESSMENTS

It is important that in the consideration of proposed developments in and around the city that the effects of any development on air quality is assessed as part of the evaluation of the proposal. Air Quality is a material consideration in the Planning process, but it is also important that its effect should be considered when evaluating other schemes promoted by the Council.

The Council would look for evidence that developers have taken appropriate steps to minimise the emissions associated with the development.

The Environmental Health Department is consulted on all planning applications where there is likely to be an impact on the environment. Consideration is then given to the potential impact upon air quality and planning permission may be refused if the Council is satisfied that it would be seriously detrimental to local air quality.

ACTION 15: We will ensure that new developments and transport schemes take account of their effects on Air Quality and the Air Quality Management Area.

3.5.5 WORKPLACE AND SCHOOL TRAVEL PLANS

It is Government policy to encourage businesses, schools, hospitals, local authorities and other organisations to develop and implement travel plans. These are packages of measures designed to reduce car dependency by supporting more sustainable forms of travel and, particularly in the case of schools, improving safety. They can help local authorities to meet their obligations to improve local air quality in order to cut car use for journeys and hence reduce congestion.

Workplace Travel Plans

We are working with major employers throughout Winchester to help them develop Travel Plans. Winchester has its own Commuter Forum for major employers. The forum meets three to four times a year. Among its achievements are a good working relationship with local bus operators which had secured discounted travel for staff.

The City Council are lead partners in the Winchester Commuter Forum which acts to exchange best practice and promote more sustainable travel across the city. This forum also encourages businesses to engage in voluntary travel planning.

There is a range of circumstances where new development will necessitate the development of a Workplace Travel Plan. The Planning Authority expects developers to submit a Travel Plan as part of Transport Assessments for all appropriate developments within the City as a means of reducing and regulating car dependency.

WCC Work Travel Plan Working Group

Representatives from throughout the council are continuing to work on implementing travel reduction measures for staff at the City Council. Improvements already achieved have included pool bicycles, shower facilities, bicycle storage and discounts on seasonal bus and train passes.

ACTION 16: We will encourage businesses and other organisations to implement Travel Plans and promote more sustainable travel to their staff. This will include the requirement for Travel Plans though the planning process. Winchester City and Hampshire County Councils will continue to develop their own travel plans.

Hants CarShare

Hants CarShare is a free-to-use service that aims to match potential car sharers across the county. For security, potential car sharers are put in touch via their work contact details. The actual arrangements, for example how often to share and what radio station to listen to etc, are left up to the individuals concerned. The administration of Hampshire CarShare is jointly funded by the County Council and the City Council and promoted widely by both Councils via extensive media and direct approach campaigns. Website: www.HantsCarShare.com

Car Clubs

Car Clubs are a relatively new inititative, they provide access to a car without the need for ownership. This can work in both residential and commercial areas. Cars are usually located at reserved parking bays; overheads are low, and cars can be hired by the hour, day or weekend. Car Clubs are not a stand-alone solution: they work best where there are good alternatives to private car use including; good local facilities, regular and reliable public transport links, and safe/pleasant cycleways and walkways. Members tend to make changes to their travel habits; making more use of public transport, cycling and walking, and cutting out unnecessary journeys altogether.

ACTION 17: We will continue to support the Hampshire CarShare scheme and the introduction of Car Clubs.

School Travel Plans and Safer Routes to Schools

Throughout Winchester a series of initiatives is being implemented to try to ease congestion and improve safety at schools in the morning and evening peaks. The scheme is run by the County Council and is fully supported by the City Council.

Initiatives can include walking in organised 'Walking Buses', traffic calming near schools, and park and walk as well as educational initiatives such as 'biking basics' and 'footsteps' that aim to give children the skills needed to walk and cycle to school in safety.

ACTION 18: We will continue working with the County Council and local schools to increase the number of Schools with Travel Plans.

In conjunction with the County Council we intend to increase the awareness and understanding of Transport Issues in and around the city by designing and circulating new teaching packs; these will be distributed to each school in the City. Any changes that result in a reduced reliance in car based school transport will have an associated improvement in Air Quality.

3.5.6 PROMOTION OF WALKING AND CYCLING

The high prevalence of physical inactivity in the population and its strong association with increased risk of illness make trying to get more people to do exercise a public priority. Walking and cycling offers advantages over other forms of transport in that there are direct health benefits.

The financial costs of increasing physical activity via walking and cycling programmes, to both us and to the individual is relatively low compared with other modes of transport. A major outcome of the project is that it is hoped that we may be able to influence the 'habits' of people and try to reduce the reliance upon the car for short trips where it may actually be possible to walk. In doing so, reducing the reliance on car-based transport will reduce the pollution burden.

ACTION 7: We will develop our own Walking and Cycling strategy and we will continue to work with the County Council on the development and implementation of facilities for cyclists and pedestrians and to support the MIRACLES Bikeabout initiative. This will include working with both the County Council and the Primary Care Trust to promote walking and cycling as a healthy alternative to car based travel.

3.5.7 PROMOTION OF PUBLIC TRANSPORT – RAIL AND BUS

The promotion of public transport continues to be a main feature of the Local Transport Plan and the Winchester Movement and Access Plan.

Promotion of Rail based travel can have a positive effect on Air Quality, especially in its use as a Park & Ride type facility. There is an opportunity for parking at local stations such as Micheldever Station and Shawford to catch the train into Winchester. It may be possible in future years to increase car parking at such locations to increase the viability of this option.

The opening of the new station at Chandlers Ford now allows train access to Winchester from an urban area previously unserved.

As the most important public transport option for most local journeys, buses are essential to integrated transport, but effective local traffic management measures may also be necessary to encourage people to use them. Quality Bus Partnerships (QBP's) between local authorities and bus operators may also help to improve local air quality.

The MIRACLES project assisted the reduction of emissions from individual buses through improved vehicle technology, in conjunction with the Quality Bus Partnership covering a number of routes. Full details of this initiative are found in the section on MIRACLES.

ACTION 9: We will continue to support and encourage the use of an integrated Public Transport system with special emphasis on Quality Bus Partnerships to improve buses including a reduction in their emissions to the latest standard. We will bring forward measures to enhance public transport opportunities within the city.

3.5.8 TAXIS AND PRIVATE HIRE VEHICLES

Taxis and Private Hire Vehicles have an important role to play in an integrated transport system. The licensing Authority can set standards for vehicle emissions from Taxis and Private Hire Vehicles in accordance with any local air quality management strategies.

There is no firm evidence available as to the exact number or range of movements undertaken by taxis in the town centre, a rough estimate of 100 taxis doing 20 movements each in the town centre during a working day would equate to 2,000 movements or 14% of the total of 14000 counted movements in St George's Street. Efforts to make these vehicles as clean as possible will have a beneficial effect on the Air Quality within the Management Area.

Currently there are five taxi ranks in the City, the Broadway, the Guildhall, Jewry Street, Upper High Street and outside the Station, four of which are within the AQMA.

ACTION 19: We will review the taxi licensing regime to assess whether to include additional conditions aimed at reducing vehicle emissions.

3.5.9 TRAFFIC REDUCTION SCHEMES

Without intervention, traffic growth is still predicted to continue within the South East. Even with the progressive cleaning of vehicle emissions, unrestrained traffic growth could effectively negate air quality improvements by the sheer weight of numbers and increased travel mileage. It is therefore vital to reduce traffic volumes in order to protect and sustain air quality and other environmental, social and economic improvements.

The Road Traffic Reduction Act 1998 requires the County Council as the local highways authority to assess traffic levels and make proposals to reduce levels or the rate of growth of traffic and publish these in a report. The Council has endorsed the concept of traffic reduction in the City and throughout Hampshire. The Hampshire Local Transport Plan incorporates the traffic growth targets selected for the County and the mechanisms for achieving these targets.

ACTION 20: We will support the County Council in its aim to achieve traffic reduction by encouraging sustainable travel and reducing the need to travel by car.

3.6 BEYOND THE CURRENT ACTION PLAN

If the measures in the Action Plan fail in delivering the reductions in traffic that are necessary to achieve the improvements in air quality, additional measures that could subsequently be reconsidered have been identified as:

- The implementation of a Low Emission Zone (LEZ) – a geographically defined area into which only vehicles of a specified minimum emission standard can enter. An LEZ specifically aims to target those vehicle classes that are deemed to be the most polluting – namely, buses and coaches, heavy goods vehicles and light duty vehicles.
- Further demand management measures, which have previously been dismissed on a cost /befit analysis.
- Further infrastructure development.

The lead in times for such schemes is likely to be several years and would involve considerable additional public consultation. There will therefore be a need to continually monitor the performance of the Action Plan and to amend it as appropriate as the wider impacts of the actions identified take effect.

ACTION 21: We will monitor the performance of the action plan and reassess the necessity & feasibility of introducing additional measures if these are shown to be necessary to meet the air quality objectives.

4.0 MONITORING AND EVALUATION WITHIN AQMA

The aim of the town centre AQMA is to reduce levels of nitrogen dioxide to below those specified in the national air quality standards. In order to ensure these objectives are achieved, the following criteria have been identified as being capable of being monitored:

4.1 Traffic Flows

Some of the identified measures try to encourage less private car usage within the town centre. We will continue to liaise with Hampshire County Council regarding traffic flows data. Recent work by Hampshire County Council will provide greater information on average vehicle speeds, composition and numbers than has existed historically. There are already automatic vehicle counters on the main roads leading into the town centre as well as at St Georges Street within the town centre.

This data can be evaluated and included in our ongoing review process.

4.2 Air Quality

Air quality will be reviewed annually to establish if and when compliance is achieved. As some of the air quality objectives are set as annual means then air quality reviews will be performed at the end of each calendar year.

It is therefore proposed to implement the following air quality monitoring scheme that will be supported provisionally up to the year 2010:

- In April 2005 we replaced all our monitoring equipment on a like for like basis (except the background CO monitor) to limit the amount of downtime caused by the use of older more unreliable equipment. The new contract up to 2010 includes a hot swap agreement to replace any instruments that cannot be repaired within 48 hours. This together with the new equipment should limit equipment down time and improve on the quality of the data available for performing future assessments. In addition 3rd party auditing and reporting on the air quality data has been arranged to further improve confidence on its accuracy.

- Continuation of the enhanced town centre nitrogen dioxide diffusion tube survey (34 locations) allows for a detailed geographical spread of nitrogen dioxide data. Continuing this survey will allow for an in depth assessment of trends in concentrations across the town centre, as well as providing comparisons between one site to another. This allows assessments of both compliance with objectives and spatial changes in concentrations that may occur if any traffic management schemes are implemented.

- The recent installation of 3 indicative Turnkey particle monitors (light scattering devices) at lamppost locations within the town centre, with Hampshire County Council financial support. One device has initially been located against the type approved particle analyser within a monitoring station to obtain a bias correction factor that can be applied to the data. As it has proven impossible to accurately model particle levels, additional monitoring will allow for a better assessment of compliance with the particle objectives across the town centre, including the more stringent 2010 objectives.

4.3 Public Perception

Part of our strategy is to encou rage less reliance on private car usage by the greater uptake of public transport alternatives. This modal shift relies on the acceptance of these options and measuring satisfaction levels should provide useful data to their likely uptake. It is therefore considered important to assess any changes in public willingness to utilise such options. As part of the MIRACLES project, analysis before and after the project will include issues relating to the uptake and acceptability of public transport. Additional ways of obtaining such information, such as via the Council's Citizens Panel, will also be investigated.

5.0 THE MATRIX - RESPONSIBILITIES FOR INITIATIVES AND ACTIONS

Key to Abbreviations

HCC : Hampshire County Council
HCC - MIRACLES : Hampshire County Council - MIRACLES project
HCC - LTP : Hampshire County Council - Local Transport Plan (LTP2 covers period 2006-2011)
PCT : Primary Care Trust
WCC : Winchester City Council

For schemes and measures to be financed through the Local Transport Plan, the funding and timing of those measures will be subject to appropriate feasibility studies, the level of capital funding made available from Central Government and decisions on budget allocations arising from that funding.

Action	Description	Lead Org.	Potential Impact on Air Quality	Wider Scale Impacts	Cost	Funding	Timescale
1	We will work with the County Council to provide an additional Park & Ride facility to the south of Winchester.	HCC	✓✓	**Improved accessibility**	**££££**	HCC (LTP)	Timetable to be prepared by 2005/06 to enable implementation by 2011
2	We will ensure that the buses on the Park & Ride service are increasingly environmentally friendly, making allowance for economic and technical considerations.	WCC	✓✓	**Improved accessibility**	**££**	WCC	Review of current contract by Summer 2005
3	We will review the loading restrictions in the town centre and on the main approach roads to the city.	HCC & WCC	✓✓	**Potential for increased congestion on other parts of the road network.**	**£ to ££**	WCC/HCC	Review and implement changes by 2006/7

Action	Description	Lead Org.	Potential Impact on Air Quality	Wider Scale Impacts	Cost	Funding	Timescale
4	We will work with the County Council to replace the Real-Time Information systems in bus stops in and around the city and implement Variable Message Signing (VMS) for the town centre car parks.	HCC & WCC	✓✓	**Improved traffic flows and increased uptake of public transport**	**££**	WCC/HCC	Replace RTI systems by 2005/06 Implement VMS system by 2006/7
5	We will support the County Council (a MIRACLES project) in the implementation and use of Variable Message Signing (VMS) on approach routes to the Town, informing travellers of journey conditions.	HCC - MIRACLES WCC	✓	**Increased uptake of public transport and improved accessibility.**	**££**	HCC MIRACLES	Implement by 2005/6
6	We will work with the County Council to carry out an investigation of possible traffic management options and with the Highways Agency on possible measures on the Trunk Road network. The objective being to reduce town centre congestion and therefore improve air quality.	HCC WCC Highways Agency	✓✓✓	**Improved traffic and pedestrian flows.**	**£££**	HCC (LTP) Highways Agency	Initial evaluation report by 2007/08 Any HCC implementation by 2011
7	We will develop our own Walking and Cycling strategy and we will continue to work with the County Council on the development and implementation of facilities for cyclists and pedestrians and to support the MIRACLES Bikeabout initiative. This will include working with both the County Council and the Primary Care Trust to promote walking and cycling as a healthy alternative to car based travel.	HCC & WCC PCT	✓	**Healthier and more active local population.**	**£ to ££**	HCC MIRACLES (Up to Jan 2006) HCC (LTP) PCT Development contributions	WCC Walking & Cycling Strategy produced 2005/06 Implementation through to 2011 and beyond

Action	Description	Lead Org.	Potential Impact on Air Quality	Wider Scale Impacts	Cost	Funding	Timescale
8	We will apply for Central Government powers to allow us to take action against vehicles which exceed vehicle emission standards. Long term usage of these powers to be assessed following an initial MIRACLES trial project.	HCC - MIRACLES WCC	✓✓	**Increase in level of abandoned cars and fly-tipping. Increased associated clear-up costs.**	**££**	HCC MIRACLES (initial trial project) WCC	Initial assessment 2005/06 Implementation (if appropriate) by 2006/07
9	We will continue to support and encourage the use of an integrated Public Transport system with special emphasis on Quality Bus Partnerships to improve buses including a reduction in their emissions to the latest standards. We will bring forward measures to enhance public transport opportunities within the city.	HCC WCC PT operators	✓✓	**Improved accessibility and increased public transport use. Reductions in CO_2 emissions.**	**£££**	HCC MIRACLES (funding provided) HCC (LTP) PT operators Development where appropriate	2005/06 (emission reductions) Other issues ongoing
10	We will continue to manage parking in the city through the Controlled Parking Zones, appropriate charging levels, enforcement and parking availability.	WCC	✓✓	**Reduced accessibility.**	**££**	WCC (from parking income)	Review parking charges and strategy on an Annual basis

Action	Description	Lead Org.	Potential Impact on Air Quality	Wider Scale Impacts	Cost	Funding	Timescale
11	We will keep our parking policies, availability and charges under review to maximise the use of existing and future Park & Ride facilities. We will continue to offer parking discounts to "cleaner" vehicles to encourage their use over other vehicles (a MIRACLES initiative).	WCC	✓✓	**Reduced accessibility.**	**£**	WCC (from parking income)	Review parking charges and strategy on an Annual basis
12	We will use cleaner and alternative fuelled vehicles within our own fleet where such options are a viable alternative. We will support the promotion of cleaner vehicle technologies and cleaner fuels.	WCC HCC	✓	**Associated costs for provision of infrastructure to supply alternatives.**	**££**	WCC HCC and HCC MIRACLES (up to Jan 2006)	Ongoing; some vehicles already replaced with LPG/Petrol.
13	We will take action to increase public awareness of the existence and impacts of poor air quality. We will work with the County Council to develop a strategy for the dissemination of Air Quality Information.	WCC HCC	✓	**Improved education and understanding of air quality issues.**	**££**	WCC - Equipment HCC -Strategy	New air quality monitoring equipment 2005/06 Air Quality Information Strategy to be developed 2006/07

Action	Description	Lead Org.	Potential Impact on Air Quality	Wider Scale Impacts	Cost	Funding	Timescale
14	We will ensure that all existing and forthcoming plans, policies and strategies affecting the City take due account of air quality issues and the AQMA. Special regard will be paid to air quality issues in the preparation of the next Local Transport Plan for Hampshire.	WCC HCC	✓	**Social, economic and regeneration**	**£**	WCC	Ongoing Input into LTP2 by 2005/06
15	We will ensure that new developments and transport schemes take account of their effects on Air Quality and the Air Quality Management Area.	WCC	✓	**Delays in planning application approvals**	**£**	WCC Development where appropriate	Ongoing
16	We will encourage businesses and other organisations to implement Travel Plans and promote more sustainable travel to their staff. This will include the requirement for Travel Plans though the planning process. Winchester City and Hampshire County Councils will continue to develop their own travel plans.	WCC HCC	✓	**Increased productivity and economic prosperity and healthier staff**	**£**	WCC HCC Development where appropriate	Ongoing WCC Staff Travel Plan; a live document
17	We will continue to support the Hampshire CarShare scheme and the introduction of Car Clubs.	HCC & WCC	✓	**Reduced CO_2 emissions**	**£**	HCC WCC	2005 onwards
18	We will continue working with the County Council and local schools to increase the number of schools with Travel Plans.	HCC WCC	✓	**Healthier children and reduced rate of accidents**	**££**	HCC (LTP1 and LTP 2)	ongoing

Action	Description	Lead Org.	Potential Impact on Air Quality	Wider Scale Impacts	Cost	Funding	Timescale
19	We will review the taxi licensing regime to assess whether to include additional conditions aimed at reducing vehicle emissions.	WCC	✓	**Reduced CO_2 emissions. Higher charges leading to poor accessibility.**	**£**	WCC (may be self funding)	Review to be completed by 2005/06 Implementation by 2006/07
20	We will support the County Council in its aim to achieve traffic reduction by encouraging sustainable travel and reducing the need to travel by car.	HCC & WCC	✓	**Reduced CO_2 emissions.**	**££**	HCC	ongoing
21	We will monitor the performance of the action plan and reassess the necessity & feasibility of introducing additional measures if these are shown to be necessary to meet the air quality objectives.	HCC & WCC	-	**-**	**£££**	HCC & WCC	ongoing Main Review in 2009/10

6.0 CONSULTATION

A draft version of this document was completed in December 2005 and was widely consulted upon, including the following:

- Written invitation to respond to the draft AQMA was sent on a CD to all organisations listed in Appendix 3.
- Press releases to local media.
- Articles on Winchester and Hampshire County Council's intranet based news letters.
- Two evening public "drop in" sessions on air quality.
- Town Centre Forum meeting on the draft AQMA.
- Production of a summary leaflet designed for public consultation. Distributed to all town centre reception areas at Winchester and Hampshire County Councils.
- Article on Winchester's web site, including link from the front page. Both full draft AQAP and summary downloadable in PDF format.
- Distribution of a supply of AQMA leaflets at MIRACLES technical management committee meetings.
- Separate consultation letter to local taxi operators inviting comment on air quality issues.

As with many such consultation exercises the level of response was disappointing. In total we received 16 responses from the main consultation exercise with an additional 6 from the separate taxi driver consultation. As would be expected the most detailed response was from Hampshire County Council. The draft AQAP was significantly altered in light of comments. In particular it was felt that the initial 32 actions proposed were too vague, we have now replaced this with 20 actions which are thought to be more specific. Subsequent meetings were also held with Hampshire County Council to ensure the actions proposed will dovetail into the LTP2 strategy now being developed.

7.0 IMPACT ASSESSMENT OF THE PLAN

The Technical Appendix to the plan provides the approach taken to establishing the likely improvements to air quality within the AQMA that may arise as a consequence of the implementation of specific measures under a “Low Intensity” approach and a “High Intensity” approach. In both cases, the 2010 scenarios have constrained traffic growth over the lifetime of the Local Transport Plan – the main instrument for implementation of the measures – to zero.

Results show that improvements in air quality in the AQMA will occur by 2010. However, St Georges Street and Jewry Street are likely to remain above the annual mean objective of 40µg/m^3. However, these locations have limited domestic residences compared to other locations currently within the AQMA.

The precise extent of exceedence in George Street is difficult to ascertain from the current modelling approach. Whilst reasonable agreement between the monitored and modelled concentrations for 2004 are shown to occur elsewhere across the AQMA, the model is shown to under-predict in George Street by some 22 – 27%. As such, the predicted exceedences in 2010 within George Street may be a low as 40µg/m^3 or as high as 50µg/m^3.

The impact of the measures contained within the plan (or those that lend themselves easily to a dispersion modelling assessment) is shown to be relatively minor. By far, the largest contribution to improvements in future air quality is attributed to the constrained traffic growth within the AQMA. When compared to the future base scenario, implementation of the action plan measures under a “Low Intensity” approach is likely to lead to a maximum additional reduction in the annual mean NO_2 of 0.6%. Under a “High Intensity” approach, the maximum reduction on the annual mean NO_2 is anticipated to be 0.9%.

Results of the dispersion modelling assessment show that the extent of the AQMA will decrease considerably over the lifetime of the next Local Transport Plan. However, continued exceedences of the annual mean objective for NO2 may occur beyond 2010, the precise extent of which requires further work and clarification on the model parameter inputs – particularly for George Street where the model is shown to under-predict when compared to monitored data.

It is clear that additional future measures might need to be considered in order that compliance with the annual mean objective can be achieved.

Additional measures that could be considered are:

- The implementation of a Low Emission Zone (LEZ) – a geographically defined area into which only vehicles of a specified minimum emission standard can enter. An LEZ specifically aims to target those vehicle classes that are deemed to be the most polluting – namely, buses and coaches, heavy goods vehicles and light duty vehicles.
- Further demand management measures, which have previously been dismissed on a cost /befit analysis.
- Further infrastructure development.

It is therefore proposed to reassess the feasibility and necessity of such measures within the year 2009/10. This will allow:

- Time to implement and monitor impacts of other measures already proposed,
- Collection of real time monitoring data to compare reality against modelled uncertainties,
- The phasing-in of other measures within the next Local Transport policy beyond 2011, as these measures are likely to require large capital funding allocations.

APPENDICES

Appendix 1 - References and Further Reading

Numbered References:

1. The Air Quality (England) Regulations 2000 SI 2000 928 (www.hmso.gov.uk/si/si2000/20000928.htm).
As amended by the Air Quality (England) (Amendment) Regulations 2002 SI 3043 (www.hmso.gov.uk/si/si2002/20023043.html.

2. DEFRA – Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance LAQM TG(03), 2003, ISBN 0-85521-021-4

3 DEFRA, Nitrogen Dioxide in the United Kingdom, Air Quality Expert Group 2004, DEFRA code PB9025A.

4. Department of the Environment - Expert Panel on Air Quality Standards, Nitrogen Dioxide, HMSO, ISBN 0 11 753352 1.

5. DETR - Expert Panel on Air Quality Standards, Airborne Particles, TSO, ISBN 0 11 753599 0.

6. DEFRA – Part IV of the Environment Act 1995, Local Air Quality Management, Policy Guidance: Addendum LAQM PGA(05), 2005.

Further Reading (Key Documents in Bold):

NSCA, Air Quality: Planning for Action, Part 2 of the NSCA's guidance on the development of air quality action plans and local air quality strategies, June 2001, NSCA publication (Tel 01273 878770)

Department of the Environment, Transport & Regions. The Air Quality Strategy for England, Scotland Wales and Northern Ireland, ISBN 0 10 145482-1

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Department of the Environment - Expert Panel on Air Quality Standards, Benzene, HMSO, ISBN 0 11 752859 5

Department of the Environment - Expert Panel on Air Quality Standards, Particles, HMSO, ISBN 0 11 753199 5

DETR - Expert Panel on Air Quality Standards, Lead, TSO, ISBN 0 11 753447 1.

Department of the Environment - Expert Panel on Air Quality Standards, Ozone, HMSO, ISBN 0 11 752873 0

Department of the Environment - Expert Panel on Air Quality Standards, Carbon Monoxide, HMSO, ISBN 0 11 753035 2

Department of the Environment - Expert Panel on Air Quality Standards, Sulphur Dioxide, HMSO, ISBN 0 11 753135 9

Department of the Environment - Expert Panel on Air Quality Standards, 1,3-Butadiene, HMSO, ISBN 0 11 753034 4

DEFRA - Expert Panel on Air Quality Standards, Second Report on 1,3-Butadiene, TSO, ISBN 0 85521 010 9.

DETR - Expert Panel on Air Quality Standards, Report on Polycyclic Aromatic Hydrocarbons TSO, ISBN 0 11 753503 6.

Department of the Environment - Expert Panel on Air Quality Standards, Particles, HMSO, ISBN 0 11 753199 5

Environment Act 1995 - Chapter 25, HMSO, ISBN 0 10 542595 8

Department of Health – Committee on the medical effects of air pollution. Handbook on air pollution and health, August 1997, ISBN 0-11-322096-0.

AEA Technology - Air Quality Monitoring: A Handbook for Local Authorities, AEA Technology, August 1996, AEA/RAMP/20029001/01.

Appendix 2 Terminology

AAQuIRE – An air quality dispersion model. Was used throughout Southern Hampshire in 2000 to predict future mean air quality concentrations associated with major roads and industrial sources.

ADMS ROAD – Another air quality dispersion model. Was used unsuccessfully in 2004 to try to predict more accurately future mean particle concentrations within Winchester Town Centre.

AQAP - Air Quality Action Plan. This document is an AQAP.

AQMA – Air Quality Management Area. This is an identified area where it is predicted that air quality objectives will not be met without the implementation of additional measures.

BAM - Beta attenuation mass monitor. Used to measure particle concentrations within Winchester Town centre, uses the principle that thickness (weight) of dust deposited is proportional to the amount of beta radiation absorbed.

BREEZE – An air quality dispersion model. Was used in 2003 to predict in detail future mean air quality concentrations within the Town Centre.

CO – Carbon monoxide.

DA's (Detailed Assessments) – A formal detailed assessment of any particular air quality issue which has been identified as necessary in a USA review. Detailed reviews have to be submitted to DEFRA within 12 months after the submittal of the relevant USA.

DEFRA – Department for Environment Food and Rural Affairs). The Central Government Department responsible, amongst other issues, for environmental legislation including air quality transport issues (www.defra.gov.uk)

DETR - Previous Central Government Environment Department – now DEFRA.

DfT – Department for Transport. The National Government Department responsible for transport issues (www.dft.gov.uk)

DoE - Previous Central Government Environment Department – now DEFRA.

ENVIEW – Software used at Winchester City Council to collect and process air quality data from the town centre monitoring stations.

Environment Agency – A national agency whose responsibilities include the enforcement of legislation in relation to flood prevention, fisheries, waste management, water quality and emissions from large potentially polluting industries (www.environment-agency.gov.uk)

IZS – Internal Zero and Span. An automatic nightly calibration check performed by the gas analysers in the air quality monitoring stations.

LAQM - Local Air Quality Management. The term used to refer to the whole process of assessment and management of local air quality as specified in national regulations.

LTP – Local Transport Plan. Hampshire County Council are the local transport authority and have the responsibility to produce plans covering all aspects of transport. The current plan covers 2006 to 2011.

mg/m^3 or mgm-3 A way of measuring any gaseous or solid pollutant in air. 1mg/m^3 means a weight of 1 mg (one thousandth of a gram) of the pollutant in 1 metre cube of air.

MIRACLES – A European transport based initiative standing for **M**ulti Initiatives for **R**ationalised **A**ccessibility and **C**lean, **L**iveable **E**nvironment**S.** The Consortium undertaking the MIRACLES project within Winchester City consists of: Hampshire County Council; Winchester City Council; The Transportation Research Group, University of Southampton; Atkins Transport Systems and the Met Office.

NSCA – National Society for Clean Air and Environmental Protection. A registered charity with a long history in the promotion of environmental protection issues including air quality. They run workshops and have issued guidance on most aspects relating to air quality. (www.nsca.org.uk)

NO_2 - Nitrogen dioxide.

NO – Nitrogen Monoxide (or nitric oxide).

NO_X – Oxides of nitrogen. The sum of both Nitrogen dioxide and Nitrogen monoxide which exist in equilibrium within the atmosphere.

PPB - Stands for Parts Per Billion. A way of measuring the concentration of a gaseous pollutant in air. 1 part per billion means one volume of the pollutant in a billion volumes of air. This is at a given temperature and pressure, which unless specified otherwise is, for air pollution work, taken to be 20^{o}C and 101.3kPa.

PPM – Stands for Parts Per Million. A way of measuring the concentration of a gaseous pollutant in air. 1 part per million means one volume of the pollutant in a million volumes of air. This is at a specified temperature and pressure, which unless specified otherwise is, for air pollution work, taken to be 20^{o}C and 101.3kPa.

PG(03) - The reference number to current DEFRA policy guidance on local air quality management.

PM_{10} – A measurement of particle concentrations. Stands for particle matter with an average aerodynamic diameter of less than 10 microns

Stage 1, 2, 3 and 4 Reviews – Air quality reviews that were required to be submitted to DEFRA under older air quality guidance. Now replaced by USA's and DA's.

TEOM - Tapered Element Oscillating Microbalance. The most common methodology for measuring particle concentrations within the UK. This uses the principle that as dust is deposited on the balance it vibrates at a different rate which is proportional to the deposited mass.

TG(03) - The reference number to current DEFRA technical guidance on local air quality management.

µg/m^3 or µgm-3 A way of measuring any gaseous or solid pollutant in air. 1µg/m^3 means a weight of 1 µg (one millionth of a gram) of the pollutant in 1 metre cube of air.

USA – Updating and Screening Assessment. A formal re-review of previous air quality assessment conclusions. These assessments are required on a rolling programme for submittal to DEFRA. Last report issued by Winchester City Council in August 2003. Next review due by April 2006.

WMAP – Winchester Movement and Access Plan (Panel). This is one of a number of strategies dealing with specific parts of Hampshire. The aims of the Strategy are to develop a better, more integrated transport system to tackle the problems of traffic congestion and pollution. The plan was developed jointly between Winchester City and Hampshire County Councils.

Appendix 3 – Organisations consulted on draft AQAP

Large Local Businesses (Winchester City Centre)

Beales	The Brooks Shopping Centre
Boots	35 39 High Street
Debenhams	103/104 High Street
Iceland	10 Middle Brook Street
J Sainsbury	2 Middlebrook Street
Marks and Spencers	138 High street
Somerfield	9/11High Street
Superdrug	55 56 High Street
WH Smith	110 High Street

Local Associations

Ministers Residents Association, Winchester.
Sleepers Hill Residents Association, Winchester.
St Cross Residents Association, Winchester.
St Giles Hill Residents Association, Winchester.
St Swithum Street & Symonds Street Residents Association, Winchester.
St Thomas Street Residents Association, Winchester.
Stanmore and District Community Association, Winchester.
Winchester City Residents Association, Winchester
Winchester Meadows Conservation Alliance, Winchester
The City Of Winchester Trust Ltd, Winchester.
Winchester Chamber of Commerce, Winchester.
The Winchester City Centre Partnership, Winchester.
Cycling Forum, Winchester.

National Health Service

Primary Care Trust, Winchester.

Bus Companies / Transport

Hampshire Stagecoach
Solent Blue Line
South West Trains
Virgin Trains
Network South West

Fire Service/ Police

Hampshire Fire and Rescue
North Walls Police Station, Winchester.

Other Local Authorities/Agencies

Test Valley Borough Council.
Eastleigh Borough Council.
Fareham Borough Council.
East Hants Borough Council.
Portsmouth Borough Council.
Basingstoke & Deane Borough Council.
Havant Borough Council.
Environment Agency.
Hampshire County Council.
Highways Agency.

Appendix 4
TECHNICAL DISPERSION MODELLING – IMPACT ASSESSMENT

Enclosed document is extracted and reformatted but with text unaltered from Bureau Veritas report ref BV/AQ/AGGX0544/LP/2398/v0.3 dated March 2006

Introduction

This Technical Annex details the dispersion modelling undertaken in order to assess the impact of various proposed Air Quality Action Plan measures on air quality in Winchester City Centre Air Quality Management Area (AQMA). The Technical Annex provides details of;

- Predicted impact of the proposed Action Plan measures on traffic flows in Winchester City Council;
- Scenarios modelled;
- Dispersion modelling methodology;
- Model parameters;
- Verification of the dispersion model against monitored concentrations.

Local Monitoring Data

Continuous Monitoring

Continuous monitoring of NO_x and NO_2 concentrations is undertaken by Winchester City Council at a background and roadside location within the modelled area. The locations of the monitors are illustrated in Figure 1 and Figure 2. Both NOx/NO_2 are measured at the site and the annual concentrations for 2004 are reported in Table 1. The concentrations monitored at the background location have been incorporated into the model, and the concentration monitored at the roadside has been used to verify the modelling.

Table 1: Automatic Monitored NO_x/NO_2 Concentrations Winchester City Council in 2004

	Background		Roadside	
	NOx	**NO_2**	**NOx**	**NO_2**
Annual Average	61.1	29.5		52.1
% Data Capture	98%		89%	
No Hours >200	-	0	-	0

Figure 1: Location of Background Continuous Monitor

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Figure 2: Location of Roadside Continuous Monitor, NOx/NO_2 and PM_{10}

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NO_2 Diffusion Tubes

Winchester City Council monitors NO_2 passively using diffusion tubes. The tubes are prepared and analysed by Gradko using the 50% TEA in Water method. There are 20 diffusion tube monitoring sites within the modelled area, all of which are on, or close to, building facades.

Diffusion tubes are often co-located with continuous monitors in order to determine the bias of the diffusion tube measurements relative to the continuous monitor. Co-locating the diffusion tubes in triplicate also allows the precision and accuracy of the diffusion tube measurements to be determined. Diffusion tubes have been co-located, in triplicate, with continuous monitoring by Winchester City Council. The resulting bias adjustment factor for 2004 was 1.23. Due to the malfunction of the roadside analyser there was little real time data in August 04, therefore the bias adjustment factor is calculated on the remaining 11 months.

Bias of diffusion tubes is thought to be largely associated with the laboratory and preparation method used. Data from NO_2 diffusion tube collocation studies across the UK is collated on behalf of Defra, and is available thorough the Defra's Review and Assessment Helpdesk. This allows the calculation of a default bias adjustment factor for the period under consideration and the laboratory and preparation method employed which can be applied to the diffusion tube measurements. The default bias adjustment factors for the diffusion tubes used by Winchester City Council are shown in Table below. The bias adjustment factor derived in Winchester City is higher than bias adjustment factors derived from the 4 other studies using the same laboratory and preparation method in 2004. Therefore using the default bias adjustment factor would produce lower concentrations.

Table 2: Default Bias Adjustment Factors for diffusion tubes are prepared and analysed by Gradko using the 50% TEA in Water method for 2004.[2]

Site Type	Local Authority	Length of Study (months)	Mean Concentration µg/m^3		Bias	Bias Adjustment Factor (Cm/Dm)
			Diffusion Tube (Dm)	Automatic Monitor(Cm)		
R	Mid Devon DC	11	47	53	-11.7%	**1.13**
R	Thurrock Council	12	44	40	11.1%	**0.90**
UB	Thurrock Council	12	35	34	3.2%	**0.97**
UB	AEA Tech Intercomparison	12	25	24	2.2%	**0.98**
Overall Factor for 4 studies						**0.99**

Annual mean NO_2 concentrations measured using diffusion tubes in 2004, adjusted for bias; are provided in Table 3.

[2] Compiled February 2006

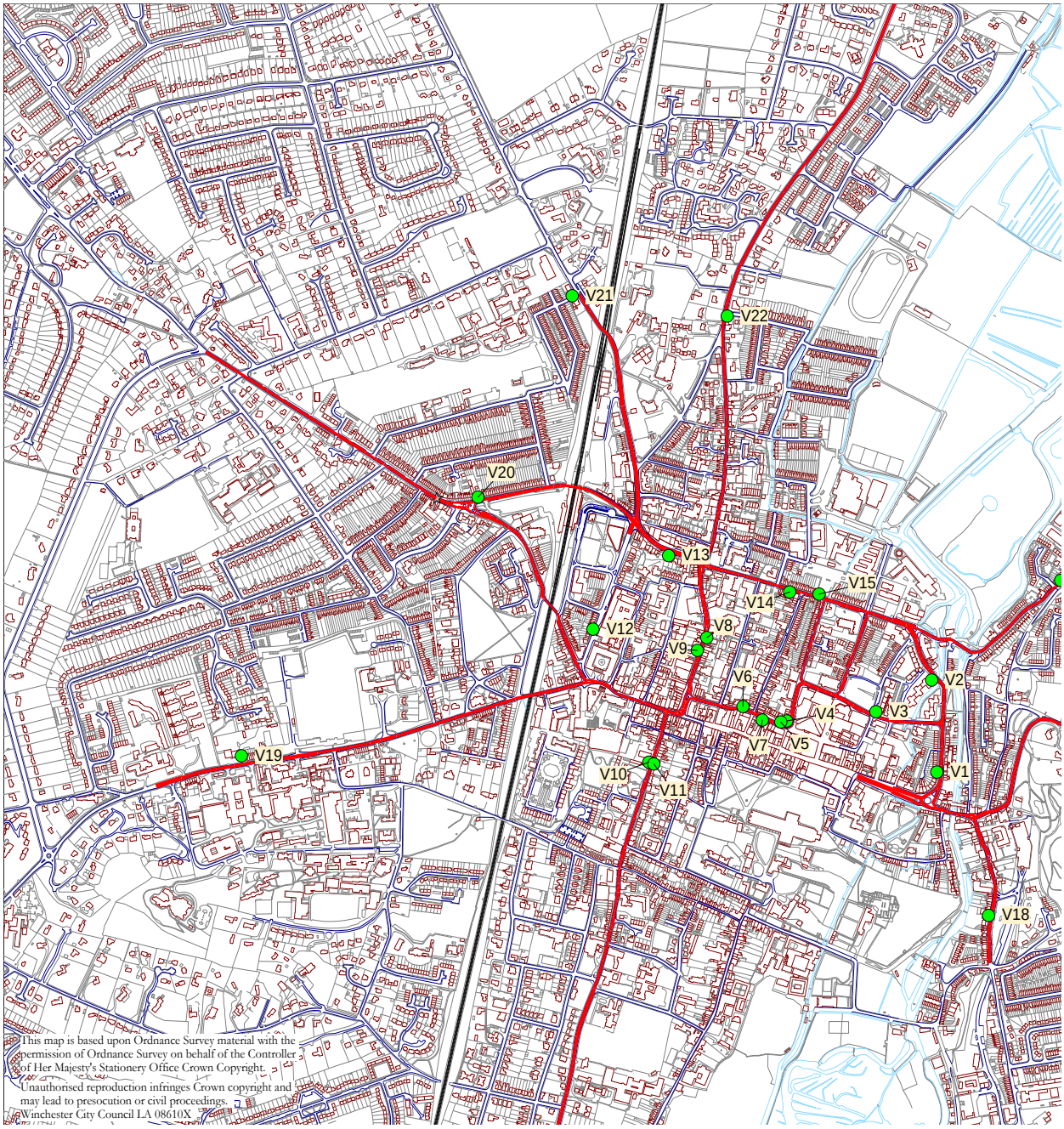
Table 3 Diffusion Tube Location Information and Monitored 2004 Annual Mean NO_2 Concentrations

Verification Receptor Number	Site code	Location	OS Grid Ref X(m)	OS Grid Ref Y(m)	Height Z(m)	Annual mean NO_2 □g/m^3
V1	Site 1	10 Eastgate St	448562.91	129390.35	1.7	42.2
V2	Site 2,3,4	Greyfriars	448551.22	129596.26	1.75	39.7
V3	Site 5	Friarsgate	448426.38	129525.5	2.4	34.4
V4	Site 6	Middle Brook St	448226.47	129504.9	2.45	43.6
V5	Site 7,8,9	Roadside Monitor	448213.31	129502.2	1.7	51.9
V6	Site 10	St Georges St TC	448128.41	129537.11	2.45	59.1
V7	Site 11	St Georges St Lad	448171.66	129506.96	2.4	63.3
V8	Site 12	Jewry St CH	448047.19	129691.23	2.4	47.7
V9	Site 13	Jewry St FK	448028.25	129665.53	2.35	52.1
V10	Site 14	Southgate St DV	447917.38	129412.51	2.6	43.0
V11	Site 15	Southgate St CH	447928.38	129408.73	2.5	55.2
V12	Site 16	Sussex St	447792	129710.29	2.6	42.6
V13	Site 17	City Road	447961.69	129874.97	3	47.0
V14	Site 18	74 Northwalls	448233	129793.58	2.65	47.5
V15	Site 19	15 Northwalls	448299.12	129788.77	2.3	38.8
V16	Site 20	Wales St	448840.62	129819.3	2.45	36.9
V17	Site 21	Alresford Rd	449381.34	129439.99	1.9	28.3
V18	Site 22	Chesil St	448678.84	129069.48	2.6	40.0
V19	Site 23	Romsey Rd HL	447003.78	129426.87	1.9	25.6
V20	Site 24	Stockbridge Rd	447534.19	130005.79	2	25.2
V21	Site 25	Andover Rd	447745.53	130456.48	2.3	34.7
V22	Site 26,27,28	Worthy Rd	448092.88	130410.97	2.5	35.1

Diffusion tubes V21, V17 and V12 have not been used to verify the model as they are located on the limits of the model area and the contribution from roads have not been modelled appropriately. Tube V19 and V20 have not been used as the results reported for 2004 are below the background levels monitored.

The location of the diffusion tubes in relation to the modelled area (roads shown in red) is illustrated in Figure 3.

Figure 3 - Location of Diffusion Tubes in Winchester



Assessment methodology

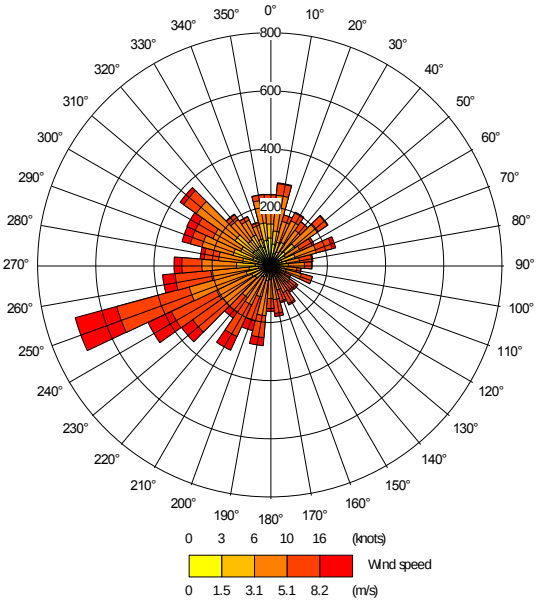
The impact of proposed Action Plan measures on annual mean NO_2 concentrations has been assessed through the prediction of pollutant concentrations using detailed dispersion modelling. The modelling has been undertaken using the Cambridge Environmental Research Consultants (CERC) Ltd ADMS-Roads advanced Gaussian air dispersion model.

Details of the model inputs are provided below.

Meteorological Data

The meteorological data used in Winchester City Council's Detailed Assessment was Hurn (2002) and this has been incorporated into the model. The wind rose for the Hurn meteorological data shown below shows the dominant west south westerly wind direction.

Figure 4 Wind Rose for Hurn Meteorological Station, 2002.



ADMS-Roads is the latest model in the ADMS family from Cambridge Environmental Research Consultants. Based on the ADMS-Urban system, it can model up to 150 road sources and 7 industrial sources at any one time. The model has been extensively used by Local Authorities for Detailed Assessments of air quality, with approval from Defra, and is frequently used in Environmental Impact Assessments. A considerable number of validation studies have been completed, showing overall excellent agreement between model outputs and observations at continuous monitoring sites. ADMS-Roads has integrated modules to take into the account the effects of street canyons and plume chemistry.

Road Sources

All major roads within Winchester City Council's AQMA have been incorporated into the model. Sections of Andover Road, Chesil St, City Road, Cross St, Friarsgate, George St, High St, Hyde St, Jewry St, Middlebrook St, North Walls, Stockbridge Rd, Union St, Upperbrook St, Upper High St and Wales St have been treated as street canyons in the model, in order to account for limited dispersion within the canyon which may result in elevated concentrations.

Emissions Factors

The emissions factors incorporated into ADMS-Roads, which were used to calculate the NO_x for each road link in the assessment, and are the most up-to-date emission factors available. These factors, released in 2002 by Defra and Department for Transport (DfT) available from the National Atmospheric Emissions Archive, are the same as those calculated with the Emission Factors Toolkit[3] and the DMRB[4] widely used throughout the UK. The emissions factors are available for three different road types which act as a proxy for the differences in fleet composition of traffic in different conditions; urban rural and motorway. The roads modelled for this assessment were assigned the emissions factors for urban roads.

Background Pollutant Concentrations

It is important to consider the 'background' component of each pollutant when undertaking an air quality assessment of this type. That is, the general level of pollutants that occur as a result of natural and/or other activities which are not associated with any direct emission.

Background concentrations monitored by Winchester City Council using a continuous NO_x /NO_2 analyser in 2004 have been incorporated into the model. Factors published by Defra, in LAQM.TG(03), have been used to estimate concentrations in the years to be assessed. The pollutant concentrations that have been incorporated into the assessment are shown in Table 4.

Table 4 Annual mean background Concentrations, µg/m^3

Concentrations (µg/m^3)	2004	2005	2010
NO_x	61.1	59.3	47.8
NO_2	29.5	28.9	25.3

Model Input Parameters

Atmospheric chemical reactions are incorporated into the model. The NO_x - NO_2 Correlation module has been selected for this assessment. This uses the Derwent-Middleton[5] relationship to estimate that concentration of NO_2 from NO_x concentrations.

The minimum height above ground level above which vertical turbulence is inhibited (the Monin-Obukhov length) was set to a minimum of 50 m in the model to represent the stability of the atmosphere due to the characteristics of the local area.

[3] Emission Factor Toolkit developed by Casella Stanger for Defra.
[4] Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 Air Quality. Highways Agency, February 2003
[5] Derwent, R.G. and Middleton, D.R. (1996) *An Empirical Function for the Ratio NO_2:NO_x* Clean Air, Vol 26, No3/4

A surface roughness length of 1 m has been assigned in the model.

Traffic Data

The same traffic data used in Winchester City Council's Detailed Assessment was used in the model, provided by Hampshire County Council. The following traffic data was supplied for 2002;

- Annual Average Daily Traffic flows
- Average vehicle speed
- Proportion of Heavy Duty Vehicles
- Diurnal variation in traffic flows

Traffic flows for 2005 were predicted using the traffic growth factors derived using NRTF[6] High growth factors combined with regional adjustment factors for Winchester City Council area derived from Tempro[7], in accordance with the methodology set out in Tempro Guidance Note April 2003.

In accordance with guidance from Winchester City Council[8], no traffic growth has been assumed between 2005 and 2010.

Modelled Scenarios

The impact of the proposed Air Quality Action Plan measures was assessed by modelling the following Scenarios;

- **2010 Do-nothing scenario** – assuming traffic growth in line with national forecasts, regionally adjusted for Winchester, for the lifetime of the LTP (2005 to 2010);
- **2010 Do-minimum scenario** – assuming no traffic growth in line with road traffic reduction targets for the lifetime of the LTP (2005 to 2010);
- **2010 Do-something scenario (Low Intensity)** – assumed constrained traffic growth in line with road traffic reduction targets plus impact of travel plans (City and County Councils only) and low intensity implementation of Quality Bus Partnerships. Assumed to result in a 5% reduction in peak hour flows across the lifetime of the LTP (by 2010).
- **2010 Do-something scenario (High Intensity)** – assumed constrained traffic growth in line with road traffic reduction targets plus;
    - impact of travel plans (all 15% of employers within the City including City and County Councils) assumed to result in a 7.5% reduction in peak hour traffic flows and;
    - high intensity implementation of Quality Bus Partnerships (including Park & Ride), assumed to result a 1% decrease in traffic daily traffic flows (due to a model shift to public transport) and the removal of 1114 vehicles per day on the preferred route of the proposed park and ride[9].

These changes in traffic flow were incorporated into the model through the alteration of the daily traffic flows and diurnal variation of traffic.

[6] DETR, National Road Traffic Forecasts (Great Britain) 1997
[7] Tempro (Trip End Model Presentation Program) version 4.2.3 , dataset v1.4, Department for Transport
[8] Advised by Hampshire County Council
[9] Winchester (South) Park and Ride, Demand Forecasting Report – Draft Final Repor5t, Atkins March 2006.

Model Output

ADMS-Roads dispersion model has been used to model concentrations NO_2 in Winchester City Council's AQMA at a height of 1.5 m above ground level to represent typical exposure height. In addition, the monitoring locations were modelled at their specific heights.

The geographic information system (GIS) link has been used to analyse the model output and produce maps illustrating annual mean NO_2 concentrations in Winchester with and without the proposed Action Plan measures in place.

Model Verification

Model verification involves the comparison of modelled concentrations to monitored concentrations. The model has been used to predict concentrations of NO_2 at the current diffusion tube locations and roadside continuous monitoring location within the modelled area in order to verify the model against the monitored concentrations. A comparison of modelled and monitored concentrations is provided in Table 5.

Table 5: Comparison of 2004 annual mean modelled and monitored NO_2 concentrations, µg/m^3

Receptor name		Modelled		Monitored NO_2	Data Capture	Monitored -Modelled	% over/under prediction
		NO_x (as NO_2)	NO_2				
Site 1, 10 Eastgate St	V1	70.5	**40.3**	**42.2**	92%	1.9	-5%
Site 2,3,4, Greyfriars	V2	70.2	**40.3**	39.7	97%	-0.6	2%
Site 5, Friarsgate	V3	68.1	39.6	34.4	100%	-5.2	15%
Site 6, Middle Brook St	V4	72.3	**41.1**	**43.6**	83%	2.5	-6%
Site 7,8,9, Roadside Monitor	V5	98.1	**48.2**	**51.9**	92%	3.7	-7%
Site 10, St Georges St TC	V6	80.7	**43.4**	**59.1**	75%	15.7	-27%
Site 11, St Georges St Lad	V7	103.1	**49.3**	**63.3**	92%	14.0	-22%
Site 12, Jewry St CH	V8	98.1	**48.2**	**47.7**	100%	-0.5	1%
Site 13, Jewry St FK	V9	105.9	**50.1**	**52.1**	100%	2.0	-4%
Site 14, Southgate St DV	V10	76.5	**42.4**	**43.0**	100%	0.6	-1%
Site 15, Southgate St CH	V11	75.5	**42.1**	**55.2**	100%	13.1	-24%
Site 17, City Road	V13	72.1	**40.9**	**47.0**	100%	6.1	-13%
Site 18, 74 Northwalls	V14	76.1	**42.1**	**47.5**	67%	5.4	-11%
Site 19, 15 Northwalls	V15	74.9	**41.7**	38.8	100%	-2.9	8%
Site 20, Wales St	V16	67.3	39.4	36.9	83%	-2.5	7%
Site 22, Chesil St	V18	67.1	39.2	**40.0**	75%	0.8	-2%
Site 26,27,28, Worthy Rd	V22	66.9	39.2	35.1	78%	-4.1	12%

The modelled concentration (48.2 µg/m^3) at the site of the roadside continuous monitor (near George St) was 7% lower than the monitored concentration in 2004 (52.1 µg/m^3).

Modelled concentrations are within 30% of all concentrations monitored using diffusion tubes. Furthermore, modelled concentrations are within 15% of monitored concentrations aside from at three diffusion tube locations in St George St (-27% and -22%) and Southgate St Ch (-24%).

In general, where discrepancies between modelled and monitored concentrations do exist, these could be due to a variety of reasons, for example:

- Discrepancies in traffic data (flows, speeds or fleet composition)
- Model set up (i.e. road widths, elevations and receptor locations)
- Model limitations (treatment of roughness and meteorological data) and
- Uncertainty in monitoring data
- Background concentrations

The factors above were investigated, as part of the model verification process when determining the final model setup. The sensitivity of the modelled concentrations to model input parameters was also investigated.

- Decreasing the monin-obukhov length to 30m
- Altering the depth and width of the street canyons
- Decreasing the average vehicle speed at junctions further and increasing the distance at which traffic begins to decelerate, to account for congestion in the vicinity of junctions

These parameters were shown to have limited impact on NO_2 concentrations predicted in the vicinity of George St and Southgate St. It is likely that the under estimation of concentrations monitored at George St is due to the specific dispersion characteristics of the street canyon in relation to the meteorological conditions and/or an underestimation of the traffic flow in this area.

The Southgate DV and CH diffusion tube locations (V10 and V11) are directly opposite each other, with Southgate DV on the west side of Southgate St and Southgate CH on the east side. As the model is under estimating monitored concentrations on the east of the road by 24%, but only underestimating monitored concentrations on the west side by 1%, the underestimation is likely to be due to the specific dispersion characteristics of the street canyon in relation to the meteorological conditions, in particular the prevailing wind direction.

As the underestimation of the model in George St and Southgate St is thought to be location specific, and all other modelled concentrations are within 15% of monitored concentrations it was not considered appropriate to adjust the modelled concentrations to bring them in line with monitored concentrations. The possible underestimation of the model in the vicinity of George St has been taken into account in the conclusions of this study.

Results

The modelled NO_2 concentrations at the monitoring locations in Winchester City Centre, tabulated below in Table 6, give an indication of the impact of the proposed Action Plan measures. The scenarios assessed are;

- 2004 (base)
- 2005 (base)
- 2010 do nothing (with traffic in line with national forecasts)
- 2010 do minimum (with no traffic growth since 2005)
- 2010 with low intensity action plan measures
- 2010 with high intensity action plan measures (inc Winchester South Park & Ride)

The impact of the proposed Air Quality Action Plan measures is summarised below in Table 7, through a comparison of NO_2 concentrations predicted with the low and high intensity Action Plan scenarios to concentrations predicted for the 2010 do minimum scenario.

The annual mean NO_2 concentrations predicted for 2010, with the LTP measures alone (i.e. no traffic growth), indicate that concentrations exceed the objectives at only two of the monitoring locations, whereas modelled concentrations for 2004 are above the objective at 13 of the 17 locations (monitored concentrations are above the objective at 12 of the 17 locations).

The improvement in air quality in future years is, in part, due to improvements in vehicle technology and projected improvements in background NO_2 concentrations arising as a consequence of existing national and international policy measures and agreements. The improvement in air quality at the local level is additionally attributed to the constrained traffic growth predicted in Winchester resulting in real benefits in reducing the extent of the AQMA by 2010.

Table 6: Predicted Annual mean NO_2 concentrations at monitoring locations within Winchester City Council, $\mu g/m^3$

Receptor name		2004 base	2005 base	2010 base	2010 base (no traffic growth)	2010 low intensity LTP	2010 high intensity LTP
Site 1, 10 Eastgate St	V1	**40.3**	39.4	33.6	33.5	33.5	33.5
Site 2,3,4, Greyfriars	V2	**40.3**	39.4	33.6	33.5	33.5	33.3
Site 5, Friarsgate	V3	39.6	38.8	33.1	32.9	32.9	32.9
Site 6, Middle Brook St	V4	**41.1**	**40.1**	34.4	34	34	34
Site 7,8,9, Roadside Monitor	V5	**46.3**	**45.5**	39.2	38.6	38.6	38.4
Site 10, St Georges St TC	V6	**43.4**	**42.6**	36.5	36.1	36.1	35.9
Site 11, St Georges St Lad	V7	**47.2**	**46.5**	**40.1**	39.4	39.4	39.2
Site 12, Jewry St CH	V8	**48.2**	**47.2**	37.1	**40.1**	**40.1**	**40**
Site 13, Jewry St FK	V9	**50.1**	**49.1**	**42.6**	**41.9**	**41.7**	**41.5**
Site 14, Southgate St DV	V10	**42.4**	**41.5**	35.6	35.2	35	35
Site 15, Southgate St CH	V11	**42.1**	**41.1**	35.2	34.8	34.8	34.6
Site 17, City Road	V13	**40.9**	**40**	34.2	33.8	33.8	33.8
Site 18, 74 Northwalls	V14	**42.1**	**41.1**	35.2	35	34.8	34.8
Site 19, 15 Northwalls	V15	**41.7**	**40.9**	35	34.6	34.6	34.6
Site 20, Wales St	V16	39.4	38.4	32.9	32.7	32.7	32.5
Site 22, Chesil St	V18	39.2	38.2	32.7	32.5	32.5	32.5
Site 23, Romsey Rd HL	V19	38	37.3	31.7	31.7	31.7	31.7
Site 24, Stockbridge Rd	V20	**40**	39	33.5	33.1	33.1	33.1
Site 26,27,28, Worthy Rd	V22	39.2	38.2	32.7	32.5	32.5	32.5

Table 7: Predicted impact of the proposed Action Plan Measures on Annual mean NO_2 Concentrations in 2010

Receptor name		base (no traffic growth)	low intensity AQAP measures		high intensity AQAP measures	
		NO_2 μg/m^3	NO_2 μg/m^3	Difference %	NO_2 μg/m^3	Difference %
Site 1, 10 Eastgate St	V1	33.5	33.5	0.00	33.5	0.00
Site 2,3,4, Greyfriars	V2	33.5	33.5	0.00	33.3	-0.60
Site 5, Friarsgate	V3	32.9	32.9	0.00	32.9	0.00
Site 6, Middle Brook St	V4	34	34	0.00	34	0.00
Site 7,8,9, Roadside Monitor	V5	38.6	38.6	0.00	38.4	-0.52
Site 10, St Georges St TC	V6	36.1	36.1	0.00	35.9	-0.55
Site 11, St Georges St Lad	V7	39.4	39.4	0.00	39.2	-0.51
Site 12, Jewry St CH	V8	**40.1**	**40.1**	0.00	**40**	-0.25
Site 13, Jewry St FK	V9	**41.9**	**41.7**	-0.48	**41.5**	-0.95
Site 14, Southgate St DV	V10	35.2	35	-0.57	35	-0.57
Site 15, Southgate St CH	V11	34.8	34.8	0.00	34.6	-0.57
Site 17, City Road	V13	33.8	33.8	0.00	33.8	0.00
Site 18, 74 Northwalls	V14	35	34.8	-0.57	34.8	-0.57
Site 19, 15 Northwalls	V15	34.6	34.6	0.00	34.6	0.00
Site 20, Wales St	V16	32.7	32.7	0.00	32.5	-0.61
Site 22, Chesil St	V18	32.5	32.5	0.00	32.5	0.00
Site 23, Romsey Rd HL	V19	31.7	31.7	0.00	31.7	0.00
Site 24, Stockbridge Rd	V20	33.1	33.1	0.00	33.1	0.00
Site 26,27,28, Worthy Rd	V22	32.5	32.5	0.00	32.5	0.00