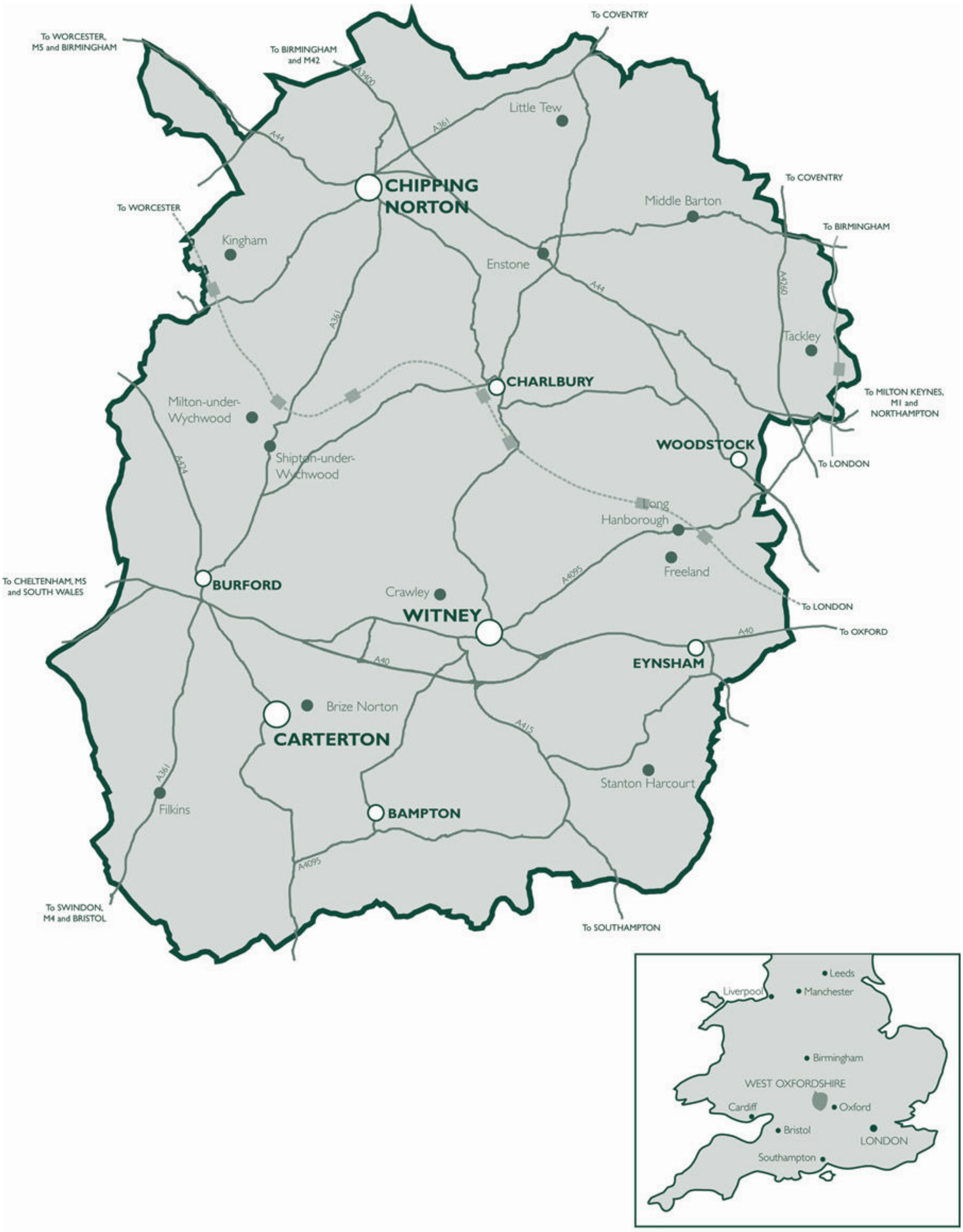
WEST OXFORDSHIRE
DISTRICT COUNCIL

Draft
Air Quality
Action Plan
Bridge Street, Witney, Oxfordshire

Community Services **December 2010**


To COVENTRY
To WORCESTER, M5 and BIRMINGHAM
To BIRMINGHAM and M42
A3400
A44
A361
Little Tew
CHIPPING NORTON
To WORCESTER
Kingham
Enstone
Middle Barton
To COVENTRY
To BIRMINGHAM
A4260
Tackley
CHARLBURY
To MILTON KEYNES, M1 and NORTHAMPTON
Milton-under-Wychwood
Shipton-under-Wychwood
WOODSTOCK
To LONDON
A424
Long Hanborough
Freeland
A4095
To CHELTENHAM, M5 and SOUTH WALES
BURFORD
Crawley
WITNEY
To LONDON
A40
To OXFORD
EYNSHAM
Brize Norton
CARTERTON
A415
Stanton Harcourt
A361
Filkins
BAMPTON
To SWINDON, M4 and BRISTOL
To SOUTHAMPTON
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1.0 Introduction

1.1 On 1st March 2005 West Oxfordshire District Council (The Council) declared two Air Quality Management Areas (AQMAs) in Witney and Chipping Norton because, after detailed investigation, it was concluded these areas would fail the Government's objective for the nitrogen dioxide annual mean concentration.

1.2 The duty of the Council was to produce an Action Plan with measures to reduce nitrogen dioxide air pollution to support the Government in meeting its National Air Quality Strategy commitments. The Action Plan for Chipping Norton was completed in November 2008 and submitted to Defra.

1.3 For the Witney AQMA a range of measures were developed by West Oxfordshire District Council and Oxfordshire County Council and these are put forward in this document "Draft Air Quality Action Plan - Bridge Street, Witney, Oxfordshire ". The transport management options in this case have been appraised and modelled for their predicted air quality benefits as an integral part of a projected local traffic relief scheme – the Cogges Link Road. The results of this study were thus available at the beginning of the drafting process and prior to initiating any consultation process. The full report is available to view on the Web pages of:
Oxfordshire County Council(OCC) / Roads and Transport / Major Projects.

http://www.oxfordshire.gov.uk/plink/publicsite/councilservices/W/Internet/Council+services/Roads+and+transport/Major+projects/RT+-+MP+-+Cogges+Link

Within the OCC Web site, the relevant detailed reports include (at #1) the Environmental Statement (Volume 1, Chapter 17, Air Quality) and (at #28) the Air Quality Assessment (Volume 2D). Figure 26 summarises projected NO_2 concentrations within the AQMA and the surrounding area. The first of these reports can also be found at Appendix 4 of this document.

1.4 There has been previous (OCC led) public planning consultation regarding the Cogges Link Road (CLR). Further consultation conducted by WODC will investigate the merits of supporting and alternative measures to improve air quality within the AQMA.

1.5 The result of the consultation process, together with the air quality modelling study will be used to complete the final Action Plan which will set out what will be done to reduce nitrogen dioxide air pollution. That report will consider the outcome of the consultation process and set out the rationale behind the final proposals for the action plan looking at their costs and benefits and providing a timetable for implementation. It will not repeat the detailed consideration of all options considered in this draft action plan nor the detail of the consultation process for the proposed Cogges Link Road, although the statutory background, health effects and analysis of the sources of nitrogen dioxide will be repeated.

2.0 Witney AQMA - Statutory background and source apportionment.

2.1 The provisions of Part IV of the Environment Act 1995 establishes a national framework for air quality management, requiring all local authorities in England, Scotland and Wales to conduct local air quality reviews. Where the reviews indicate that objectives set out in the National Air Quality Strategy will not be met, the relevant authority is required to designate an Air Quality Management Area (AQMA).

2.2 Under Section 88(1) of the Environment Act 1995 ('the Act'), the Department for Environment, Food and Rural Affairs (Defra), the Scottish Executive and the Welsh Assembly Government has published Local Air Quality Management technical guidance LAQM.TG(09). Under section 88(2) of the Act, local authorities are required to have regard to this guidance. Section 82(1) of the Act requires local authorities to undertake reviews of the current air quality in their area and of the predicted air quality in future years and to assess them against standards and objectives prescribed in the Strategy and in 'The Air Quality (England) Regulations 2000 as amended.

2.3 A detailed assessment into air quality in the vicinity of Bridge Street, Witney, concluded that nitrogen dioxide was likely to fail the Government's annual mean objective for nitrogen dioxide:

Objective:
40 $\mu g/m^3$ when expressed as annual mean, to be achieved by 31st December 2005

It was concluded that as there was no other significant source of nitrogen dioxide in the area, traffic was the main source of this pollution. An explanation of the connection between nitrogen dioxide and air pollution can be found at Appendix 1.

2.4 Under S84(1) the Council had to undertake further assessment work to supplement the information the authority had in relation to air quality. The Regulations require that the further assessment information be reported within 12 months of the declaration (March 2006).

Whilst this work was being undertaken, a draft of an action plan was required within 18 months of the original declaration.

Under S86(3) of the Environment Act 1995, County Councils have a duty to put forward proposed actions which they themselves can implement to work towards meeting the air quality objectives in AQMAs. County Councils should therefore include these measures within the air quality section of the Local Transport Plan (LTP).

In the case of the Witney AQMA it was not practical to consider mitigating measures until a decision had been made regarding a projected 'relief road'. The OCC preferred option, the Cogges Link Road, received planning approval - W14/08 - dated 16 February 2009.

2.5 The Air Quality Management Area (AQMA) in Witney includes all of Bridge Street and parts of High Street, Witan Way, Mill Street, West End, Newland and Woodgreen. The Witney AQMA is shown in Appendix 2. Whilst traffic is thought to be the main source of NO_2

pollution, it is necessary to determine the extent to which the different types of vehicles are contributing to this pollution (source apportionment) so that the options considered in the action plan can be better assessed in terms of the impact they are likely to have on air quality.

2.6 Witney

Bridge Street and High Street constitute the main route for traffic travelling along the A4095 to and from the North East of the town. The B4022 is also a busy road and is a main route to and from the areas lying to the North (Chipping Norton and area) and the South East (Oxford) of the town. The area is a combination of commercial and residential premises. There are approximately 50 residential properties in Bridge Street and High Street, a significant number of which fall within the predicted NO_2 contours exceeding the objective standard. There are further residential properties in the adjoining roads and a number of these are also predicted to fall within areas of exposure above the objective standards.

2.7 Details of the vehicle fleet composition utilising an average of vehicular fleet composition for the major roads constituting the Witney AQMA are presented in Table I and Chart I below.

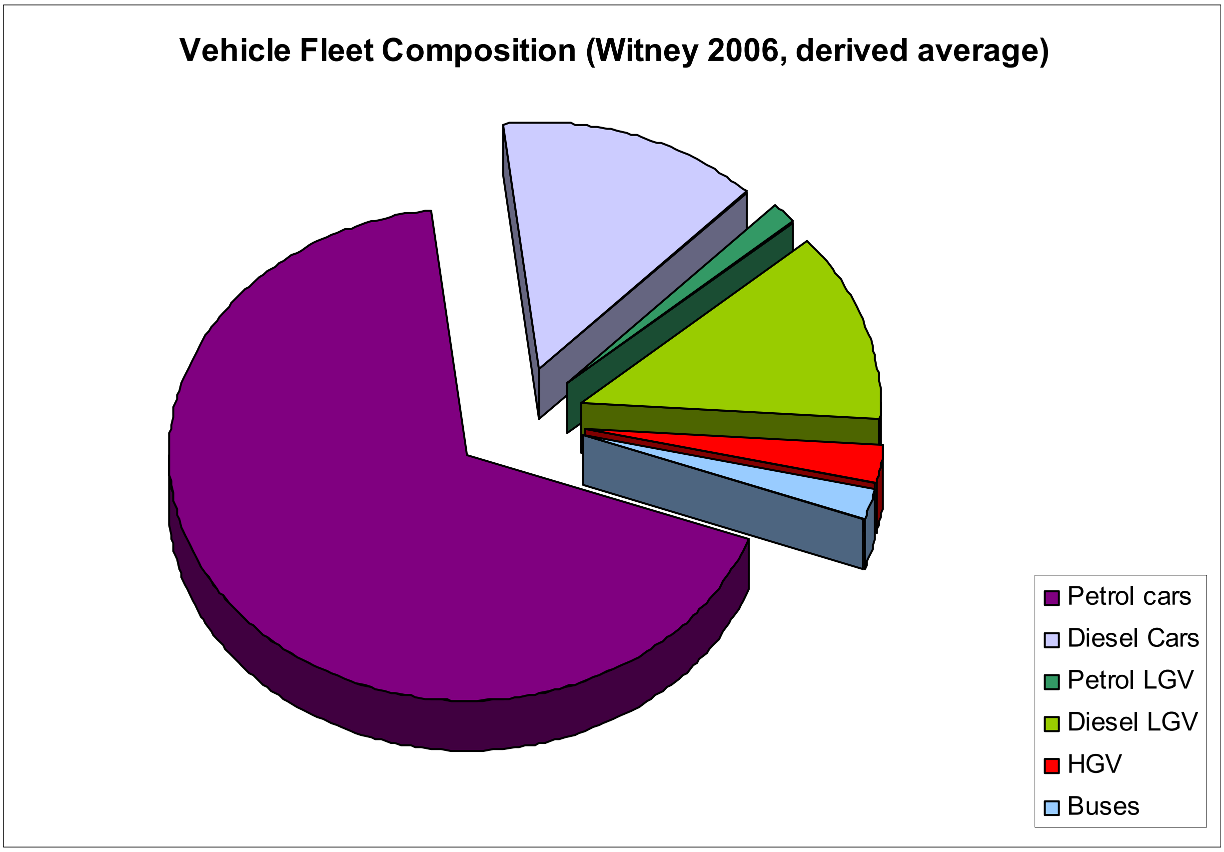
[This will be updated with 2010 data together with the revised dispersion modelling for 2010]

Table I

Vehicle Type	Petrol Cars	Diesel Cars	Petrol Light Goods Vehicles	Diesel Light Goods Vehicles	Buses	HGVs
Fleet composition as % of total	67.5	14.2	1.5	12.5	2.4	1.9

Data provided by Oxfordshire County Council – March 2006 Manual Count
Diesel cars and diesel LGV percentage calculated using NETCEN UK fleet composition projections v2.

Chart I



2.8 Despite petrol cars comprising the dominant category of road traffic passing through Bridge Street and its environs, proportionately they may not constitute the greatest source of NO_2. The different fuel, age and exhaust emission standards that apply to each vehicle type have to be factored into the calculation to appropriately delineate the contribution of each vehicle category to the ambient concentration of NO_2 in the vicinity.

2.9 This contribution was calculated by integrating the traffic composition data with the Casella Stanger EFT Multiple v3a spreadsheet. Calculation of NO_2 emissions within EFT is facilitated by consideration of the emissions factors for the year and vehicle type alongside the average vehicular speed, taken here to be approximately 24 km/h. The vehicle fleet composition data input into the spreadsheet was taken from the Oxfordshire County Manual Count Study. The results are provided in Table 2 and Chart 2.

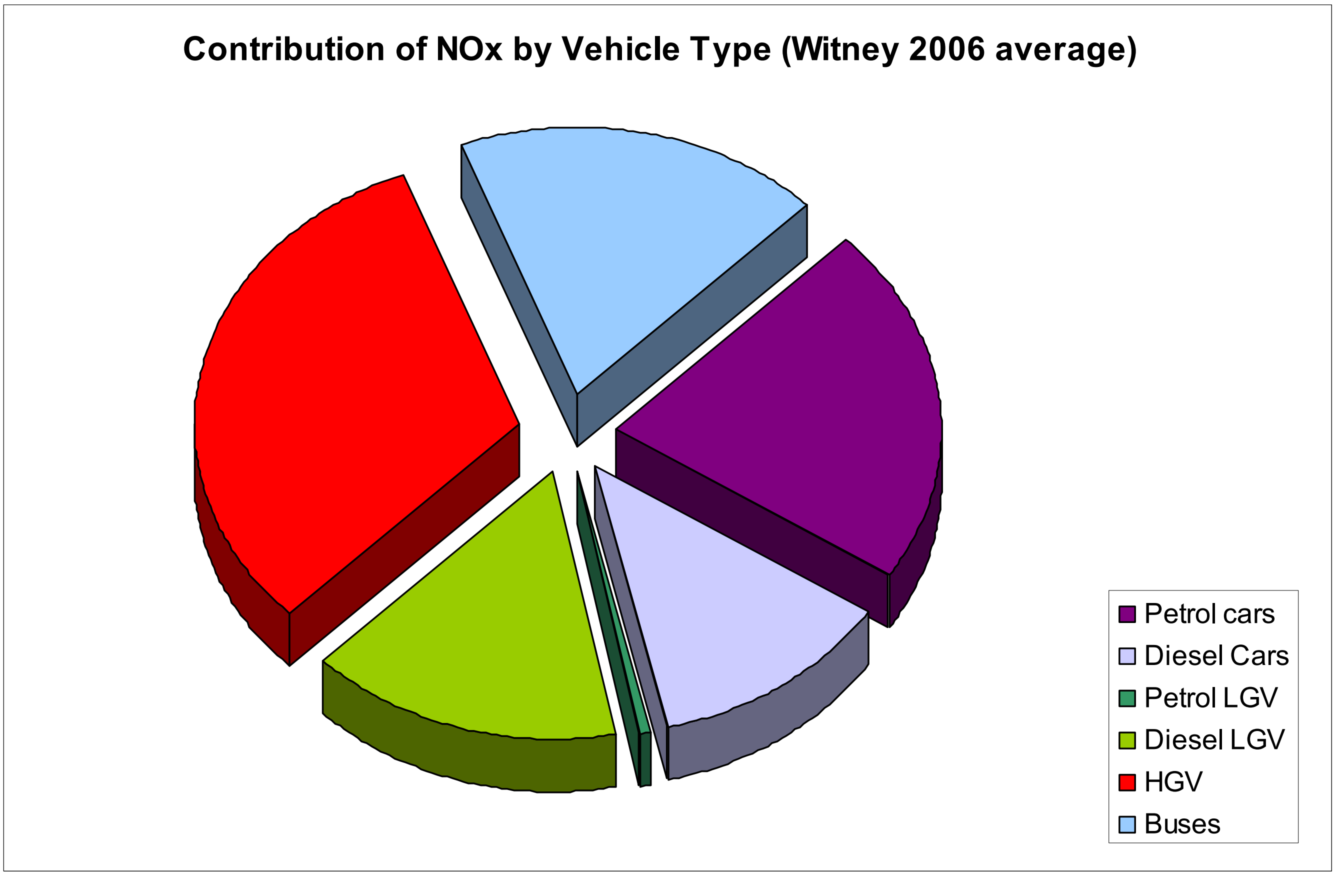
[This will be updated with 2010 data together with the revised dispersion modelling for 2010]

Table 2 % Contribution to NOx emissions of different vehicle types

Vehicle Type	Vehicle Count AADT	NOx g/km	% Contribution to NOx Emissions
Petrol cars	4546	0.185016	21.64
Diesel Cars	957	0.501644	12.35
Petrol LGV	98	0.155931	0.39
Diesel LGV	841	0.715993	15.50
HGV	165	7.469601	31.72
Buses	129	5.541795	18.40

Diesel cars and diesel LGV percentage calculated using NETCEN UK fleet composition projections v2 allowing calculation of the ratio of petrol and diesel vehicles for 2006. AADT – Annual Average Daily Traffic Flow

Chart 2 Contribution to NOx emissions of different vehicle types



2.10 Table 2 and Chart 2 emphasise the diverse nature of NOx contributions from the various vehicular classes passing through the AQMA. When considered as a single class, cars (petrol + diesel) are the primary source of NOx in the Witney AQMA, followed closely by HGV's; diesel LGV's and buses also make a significant contribution to the ambient concentration of NOx.

2.11 Further assessment of air quality in 2006

Continuous chemiluminescent monitoring of nitrogen dioxide in Witney between August 2001 and May 2005 established the likelihood that the objective for nitrogen dioxide would not be met in the statutory timeframe. As part of the Stage 4 assessment, a chemiluminescent nitrogen dioxide monitoring station was positioned by the Newland / Bridge Street junction and, between the dates above, collected data from this location. Faber Maunsell, who originally carried out the Quality Assurance (QA) and modelling for the 2004 study, were commissioned to carry out the QA and to model the air quality data in support of the AQMA declaration.
The conclusion of the further air quality assessment was to recommend no change to the defined AQMA.

2.12 Calculation of the % Reduction in NO_x Emissions Required within the AQMA

Table 7 of the Faber Maunsell Report (2006), presented in Appendix 3 of the Draft Action Plan, details the relationship between NO_x and NO_2 measured in Witney. These were derived from continuous chemiluminescent monitoring in Witney in 2006. The figures presented in Table 7 facilitate the extrapolation of monitored NO_2 concentrations into NO_x concentrations. The following methodology allows calculation of the required reduction in NO_x emissions, in order to achieve the NO_2 Air Quality Objective.

1	Calculation of maximum acceptable contribution of NO_2 from Bridge Street / Newland traffic:

A mean background concentration of nitrogen dioxide (16 $\mu g/m^3$) was calculated from NO_2 diffusion tube data captured at Early Road and Abbey Road. The air quality objective is 40 $\mu g/m^3$, therefore the contribution from traffic sources must be no greater than 24 $\mu g/m^3$

NO_2 Source	NO_2 $\mu g/m^3$	Data Source
Background NO_2	16	(6 year average 2003 – 2008 diffusion tube derivation)
Objective	40	(Air Quality Objective)
Required Contribution from traffic*	24	(Objective – Background)

*Contribution required to meet the Air Quality Objective, assuming traffic is the only source of NO_2 emissions to the air in Bridge Street.

2	Calculation of NO_2 air quality objective exceedence on Bridge Street:

The predicted concentration for nitrogen dioxide along Bridge Street is 52.0 µg/m^3 which is 12 µg/m^3 above the required level.

NO_2 Source	**NO_2 µg/m^3**	**Data Source**
Max Concentration (Bridge Street)	52	(model prediction Faber Maunsell)
Objective	40	(Air Quality Objective)
Exceedence level	12	(Max Bridge Street concentration - Objective)
Predicted contribution from traffic*	36	(Max Concentration – Background)

* Contribution, assuming traffic is the only source of NO_2 emissions to the air in Bridge Street.

3	Contribution of Bridge Street traffic to ambient NO_2 conc. and required abatement:

The actions to reduce NOx emissions will be targeted at traffic. Therefore a 33.3% reduction of traffic NO_x emission is required from traffic sources in this area (28.2/84.6 x 100).

NO_2 Source	**NO_2 µg/m^3**	**NOx µg/m^3**
Reduction required on Bridge Street	12	28.2*
Predicted contribution from traffic	36	84.6*
Required max traffic contribution.	24	56.4*

* At 52 µg/m^3 Table 7 of the Faber Maunsell report indicates a conversion factor of 2.35 from NO_2 to NO_X.

3.0 Witney Draft Action Plan Consultation

3.1 The Consultation Period will commence with, where possible, the electronic (Email) distribution of copies of the Draft Action Plan to statutory consultees (Appendix 6 – List of Consultees). There will also be extensive publicity to advertise that the same document is available 'on line' on the WODC website.

3.2 This procedure was adopted in view of the particular circumstances referred to in 1.4 above and as a measure to minimise the use of printing material.

3.3 However, a printed copy of the Draft Action Plan will be made available at the Witney Town Centre Shop and in the reception area of the Elmfield Council Offices where there will also be a display board.

3.4 Comment on the plan - specific to the Witney AQMA rather than the Cogges Link Road *per se* - will be invited either in writing or by Email, each to a specified address.

4.0 Development of Draft Action Plan Options.

4.1 The process of the development of the draft action plan began by officers of the District and County Council meeting to discuss those measures that could apply to the area with the result of reducing nitrogen dioxide concentrations.

The process was led by the (District) Principal Environmental Health Officer in consultation with the (County) Transport Planning officers responsible for Witney. A series of meetings were held where proposals were generated and developed for inclusion in the draft of the action plan.

4.2 Defra policy guidance LAQM.PG(09) provides a suggested approach to the appraisal of the options generated for the action plan. The methodology is detailed in an example in Table 3:

<u>Table 3</u>

Measure	Description	Lead organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking
Relief Road	Road to divert traffic	Oxfordshire County Council	High	Long	V High	Pros: Reduced noise Improved safety	4
						Cons: Increase in CO_2 emissions	

<u>Key</u>

<u>Air Quality Impact</u> – as reduction in annual mean NO_2
High = 2$\mu g/m^3$. Moderate = 1 to 2$\mu g/m^{3.}$ Low = 0.2 to 1$\mu g/m^3$.
Very Low (Negligible) = < 0.2 to 1$\mu g/m^3$.

<u>Timescale</u>
Long = 5 to 10 years. Medium = 2 to 5 years. Short = Less than 2 years.

<u>Cost</u>
V High = > 1 million. High = £500k to 1 million. Medium = £100K - £500K. Low = Less than £100K.

<u>Calculation of Ranking</u>.

To produce a ranking of the options based on cost effectiveness a scoring system is introduced which attributes a score to each of the high, medium and low air quality descriptors multiplied by the score attributed to the cost descriptor.

<u>Cost</u>.		<u>Air Quality Impact</u>	
VHigh	= 4	High	= 1
High	= 3	Medium	= 2
Medium	= 2	Low	= 3
Low	= 1	V Low	= 4

Therefore a high cost / low impact measure would rank as 9 (ie of low benefit) whereas low cost / high impact measures would rank as 1 (one) and would therefore rank higher (ie more beneficial) in cost / benefit terms.

Additional Factors.

Each measure with a cost and benefit score will have non air quality impacts which may be beneficial or otherwise – pros and cons.
To consider these within the ranking would not necessarily improve the appraisal of options as this analysis remains crude in that there is no weighting applied to the pros and cons. However, the discussion around the options addresses their merits and practicalities in a more detailed way.

Discussion of Options

The text discussion of 'Options' which includes some 26 'Transport Initiatives', 'Supporting Initiatives' and 'Vehicle Emissions Strategies' plus 10 'Complementary Measures to CLR Introduction' are not presented in 'ranked' order (either in text or tables) as they are grouped in subject order.

5.0 Draft Action Plan Options for Witney

5.1 All the options considered are summarised in tabular form (after 5.4.4) and ranked in accordance with the procedure outlined in the previous section. Each individual option or group of options is discussed in turn to consider their benefits and in particular whether they generate other adverse impacts such as increasing air and noise pollution to other areas, increases in climate change gas emissions such as carbon dioxide, road safety and ecological impacts.

5.2 Traffic Management Proposals (OCC in conjunction with Jacobs UK Ltd)

Jacobs UK Ltd were commissioned by Oxfordshire County Council to appraise two traffic management options, Cogges Link Road (CLR) and Shores Green (SG). Their brief was to investigate the options proposed by OCC and to provide a report outlining their feasibility through the use of observation, traffic surveys and the use of appropriate modelling techniques. The Jacobs CLR report is reproduced in Appendix 3.

5.2.1 Option 1 Relief Road Investigation

In order to be progressed, this option required a full feasibility study. The question here is appropriateness and balance. The obvious drawbacks are environmental harm elsewhere (landscape impact, noise, ecology, habitat and air pollution) and as a measure it will, in itself, do nothing to reduce vehicle usage or reduce emission of CO2. Its benefit as a proposal is that it is designed to minimise traffic passing through Witney and there will be a projected positive impact on air quality. A next stage in the study of this Option was to predict the reduction in nitrogen dioxide pollution as a result of an alternative traffic route.

Jacobs investigated the engineering feasibility, attractiveness, cost and environmental impacts of two relief road corridors for the County Council. Of two options, the Cogges Link Road (CLR) was determined to be more advantageous and planning permission was sought for this route.

Traffic modelling has indicated that the CLR would be likely to remove between14.9% and 17.4% of traffic from Bridge Street [Tables 2.2 and 3.10 Environmental Statement, Volume 2A,Traffic Model Forecasting Report]. It is unlikely that the proportion of HGVs removed would be any higher, since a great proportion of these vehicles would be transiting to and from the town centre to access various parts and not necessarily be making through journeys.

The local impact on the environment is considered in:
The Cogges Link Road Environmental Statement - Habitats and Species Overview - B0834600/Doc/CLR/11 April 2008 - is accessible via the link at paragraph 1.3, above.

The timescale for delivering a relief road is dependent upon a number of factors, not all of which are within local control. A period of 2 years from scheme conception to start of works is a reasonable estimate of the minimum period required to deliver a scheme such as the CLR. Construction would be likely to take a further 18 – 24 months. Such a timetable could not be guaranteed as it would be dependant upon successful completion of a number of statutory processes.

Funding is obviously a critical issue in the delivery of such a scheme and, through the Oxfordshire County Council Integrated Transport Improvement Programme , provision for the CLR is achieved through Supported Capital Expenditure and Developer Contributions. (OCC LTP 2006 - 2011).
A section covering the data used within this document prior to any public consultation entitled 'Summary and Overview of Air Quality Modelling of Traffic Management Options and Proposals' can be found at Appendix 5.

5.2.2 Option 2 Review of strategies to develop and encourage use of a relief road.

Strategies to modify or develop the road network within Witney are both difficult and limited due to a single river crossing point offering few opportunities for alternative routes. The existing bridge towards the northern side of the town provides the link between the commercial centre of the town together with those residential areas mainly to the south and west and that residential area to the north and north east. The CLR, as proposed, offers an alternative route to and from the south of the town centre and is projected to reduce traffic within the AQMA.

A reduction in traffic flow through Bridge Street would include some reduction in HGVs and so the impact on emissions is likely to prove significant.

Any further HGV restriction in Witney would be on environmental grounds and consequently there would be an exception for access. This makes enforcement difficult and a low priority for police enforcement. Given this and the additional length and time for making the journey into the town centre via the CLR it is unlikely that a statutory HGV restriction would significantly reduce HGV levels below those achieved by the advisory signing.

5.2.3 Option 3 Road User Charging

As in the case of a sign-posting scheme, the options encouraging alternative routes could to be supported by Road User Charging via the use of number plate recognition technology. A Road User Charging Scheme would encourage use of a preferred route and assist with enforcement. A general charging regime would not specifically target those vehicles which are the source of the air quality problem but affect all road users (including local residents) and is likely to be unpopular. A more targeted scheme (such as for through lorries only) would incur the same costs to set up and run but would generate fewer revenues and would potentially make an expensive future charge on revenues. The potential for displacement of lorries onto other less suitable roads to avoid the charge would be a real concern with such a scheme. For these reasons this option is not being taken forward.

5.2.4 Option 4 Queue relocations – Gated scheme.

The air quality problem has been associated with slow moving and queuing traffic. Therefore smoothing the traffic flow within the AQMA by controlling the traffic entering the area could help to improve the situation. This would be achieved by signal control of a gating system. It is usually applied using a traffic management system with real time traffic flow data to control the sequencing of the traffic lights. The traffic manager defines the threshold degree of traffic saturation at the bottleneck which then feeds back and progressively reduces the green time at the "gated links" at the access points to the AQMA, thus easing any congestion. The main drawback of this method of control which would have to be assessed before proceeding with such a scheme is that queuing traffic and hence increased noise and air pollution could be created in new areas.

The main source of queuing is related to the volume of traffic at peak times. A system to smooth traffic flow has merits on its own and such a scheme may be integrated into the gating/queue relocation scheme.

The overall cost of introducing such a system would depend on the precise system specification but would probably be in the range £150,000 – £200,000. There would be advantages to conducting a trial of this system before making a final decision to proceed with such a scheme but this is not considered feasible without incurring a large part of this expenditure.

- A local strategy for a gating system would be required to investigate the operational complexities of the system with the selection of sensible gating points.

Such a scheme needs careful consideration to avoid undesirable effects such as queuing problems blocking back into the AQMA due to the multistage method of control that would be necessary.

Typical gating systems show that:

- Over-capacity problems are likely at various junctions and although timing could be set to avoid overcapacity on approaches, queuing will inevitable result.
- Any speed advantage gained by better progression is balanced out by delays and queued traffic. Capacity shortfalls on one road or approaches is also likely to result in traffic diverting onto another street (though in Witney this would be less likely).
- Journey times are generally similar (although slightly increased) to existing levels in both morning peak and interpeak periods.
- Average queues / queuing times are increased at most junctions.

The implications of this option for congestion on the approaches to the town would need to be fully spelled out in any consultation on the scheme as this is likely to be a major factor in determining local support. Before such a scheme was introduced it would also need to be clear that there was no transfer of the air quality problem from the town centre to the areas, mostly residential, to where the queues would be relocated.

Although this has been covered as an option, in view of the fact that a relief road, as proposed, is the primary suggested solution, the gating option is not being carried forward as a proposal.

5.2.5 Option 5 Establishment of bus and cycle routes

The CLR option includes bus and cycle routes / lanes to encourage bus and cycle use and, in theory, to reduce the need for some travel by car. However such a measure with regard to bus lanes would not be appropriate in a small town such as Witney where, because of it size, there is little need to use public transport to get around and where the road capacity is such that dedicating roadspace would inevitably result in increased general congestion levels. Bus lanes would not greatly improve public transport because journeys will be, in the main, outside of the town. Thus, giving buses priority would not significantly improve attractiveness or reliability. More importantly however, is the simple fact that there is little road space to create priority lanes, and in engineering terms this option would not be feasible.

It is recognised however that cycle lanes are different to bus lanes and a lot easier to achieve. Cycling in to Witney from local villages should be encouraged. A current off road cycle route extends halfway to Long Hanborough; a completed link may encourage more people to use it.

In addition to CLR associated cycle lanes there may be scope within Witney to make conditions more attractive for cycling. This generally would entail either reducing traffic volumes or speeds. The preceding discussions have shown the difficulty in achieving traffic reductions in Witney. Speed reductions could be achieved by extensive traffic calming in the town although this may have implications for remaining vehicles.

It is unlikely though that these measures would achieve any significant reductions in emissions since they would not be likely to further reduce the numbers of HGVs in the town, nor reduce the conflicts between vehicles on the most sensitive roads.

5.2.6 Option 6 and 7 Access control & clear zones, Low emission zones or other HGV restriction. Restriction of vehicles to those which are (for example) Euro V compliant (post 01 Oct 2009)

A Clear Zone is a clear urban area which exploits new technologies and operational approaches to improve quality of life and support economic growth, whilst minimising the adverse impacts of its transport system. The range of measures could include telematics to provide better information, 'clean vehicles' and better managed transport services. An access control strategy would be required to support it , reallocating road space to more sustainable forms of transport. Such schemes are promoted in large cities because of their cost and engineering considerations.

A town such as Witney with a lack of alternative routes is not suitable therefore for such a scheme. For the same reasons it is advised that a Low Emission Zone is not feasible. Costs and enforcement of such a scheme would be prohibitive, unless such a scheme incorporating permits and number plate recognition technology associated with road user charging was commissioned on a county wide or national basis. Such a scheme would be highly political and controversial and would be many years in the planning if it were to go ahead at all. A county wide investment into a feasibility study would have to be initiated following political agreement to move this issue forward. For these reasons this option is not being taken forward.

5.2.7 Option 8 Compulsory purchase.

The AQMA is so designated because people are residing in the area. Therefore, if the people are removed, so is the basis for an AQMA. However, this is obviously an extreme measure and a last resort, although as a measure, it is unlikely to be acceptable under any circumstances because of local objection.
With approximately 50 residential properties within the area of Bridge Street and High Street the cost of such a proposal would be several £million. Such a measure would not produce knock-on benefits such as congestion reduction and the promotion of alternative forms of transport, but the cost would be offset against a well planned redevelopment or conversion scheme which could produce benefits from the introduction of new business to the area. This measure probably has its place in a situation where there exists only a very small number of

homes where it would be cost effective to purchase the properties as opposed to investing in measures to tackle air pollution. These circumstances do not exist in Witney and therefore, this measure is not being put forward for further consideration.

5.3 General supporting initiatives to reduce air pollution.

5.3.1 Options 9 to 11 Lobbying National and Local Government / Environmental Policy

The Government has over the years introduced policies aimed at reducing vehicle use and at the same time required manufacturers through tighter emissions standards, to improve the technology of engines. Tax penalties for high polluting vehicles and tax breaks for lower polluting vehicles have been introduced. However, an integrated transport plan for the UK is not yet in place, particularly one which reduces car use in favour of public transport and grants aimed at helping motorists to shift to cleaner technologies are not readily available.

Information on low carbon vehicle research and development can be found at:

http://www.innovateuk.org/ourstrategy/innovationplatforms/lowcarbonvehicles.ashx

and also at:

http://www.cenex.co.uk/

These may provide avenues for funding for alternative refuelling stations and electric recharging points - alternative refuelling infrastructure - including electric vehicle recharging, natural gas, hydrogen and bio-methane refuelling

However, there is little funding or incentives available for the individual business or motorist to convert or change their vehicle to a type with a cleaner technology.

The Council therefore has a role to play in monitoring Government policies, commenting and, in particular, lobbying the Secretary of State for improvements. There are a number of mechanisms for doing this:

- Officer or member response to government consultations
- Councillors at a district and County level to lobby the Secretary of State on specific issues
- Officer groups such as the Three Counties Thames Valley Environmental Protection Advisory Group (TVEPAG) to coordinate responses to Government Policy

The Council runs a number of Green Transport initiatives to promote ideas and awareness concerning people's use of transport. These include promoting local walks, awareness about local public transport, the use of travel plans and guidance on better driving techniques. These of course are local initiatives that are regularly applied in the hope of gradually changing people's attitude towards transport. They also focus on the Climate Change issue, but such local measures must be backed up by strong policies at a national level if a true difference is to be made, hence the need to lobby government on matters.

The Energy Saving Trust also runs a Green Fleet Review programme which provides free Green Travel audits for fleets of over 50 vehicles, and telephone support to those with less. The Council will promote these free services to local organisations.
http://www.energysavingtrust.org.uk/business/Business/Transport-in-business

5.3.2 Option 12 Promotion of the use of the cycle

The Council's Green Travel Plan (available via the link at Appendix 7) promotes the local cycle routes to Council staff, Councillors and residents of the district. This is due to be updated in December 2010.

The District Council's Environmental Policy team will map and promote in-town Witney cycle routes for residents and staff alike within the Green Travel Plan. An increase in the number of off road cycle/walking routes will make cycling a safer and more attractive option.

5.3.3 Option 13 Implementation of County Bus Strategy, Provision of intelligent timetable information

The bus strategy puts the main bus routes from Witney to surrounding settlement (Carterton, Burford, Eynsham and Long Hanborough) as "Second Tier" services for which the target is a frequency of between 30 and 60 minutes. Frequencies on all these routes currently meet the requirements for this level of the Bus Route Hierarchy.

Plans to upgrade the bus route between Oxford and Witney during the period 2007-2009 involved the enhancement of bus stop poles, flags, shelters, waiting areas, and clearways. The project formed the first phase in the plan to upgrade the route to Premium Route standard. It is intended that real-time information signs will be provided at key stops along the route and real-time information will be available via SMS and online for the whole route. There will also be some service improvements. Oxfordshire County Council will be working closely with Stagecoach, who is scheduled to replace the current buses with newer models of a higher standard.

The latest revision to route scheduling includes the Stagecoach S1 and S2 services running at frequencies generally between every 15 and 30 minutes between Carterton - Witney – Eynsham – Botley Road – Oxford (S2 does a different route). Both these services transit through the Witney AQMA.

5.3.4 Options 14 and15 Promotion of Green Strategies to vehicle operators.

Engage with local public transport operators (buses and taxis) to:

a) promote the procurement of vehicles with cleaner engine technologies and
b) to promote the use of cleaner fuels

As part of the improvements described in Option 13 above, buses with Euro IV or Euro V engines will become the standard on major routes and the standard for the vehicles used on other routes can be addressed during reviews of the services. The Euro V standard is preferable, offering greater reduction in PM and NOx emissions.

Engage with freight transport operators to:

a) promote the procurement of vehicles with cleaner engine technologies and
b) to promote the use of cleaner fuels.

Oxfordshire County Council and West Oxfordshire District Council both have regulatory responsibilities for the issue of licences for the operation of these vehicles. There is therefore the opportunity to engage the operators to consider improvements to their fleet and put them in touch with organisations such as the Energy Savings Trust. Also their licence conditions can be reviewed to incorporate, where appropriate, measures to reduce emissions.

5.3.5 Option 16 Review and comment on the impact of neighbouring local authorities' Local Transport Plans.

This option should be a part of routine consultative work. However it is included here to highlight the importance of vetting schemes in other Counties which may have a potential adverse impact within Oxfordshire and the AQMAs. Objection could be raised and heard by the County in question and/or by Defra.

5.3.6 Options 17 (and 23) Car Parking Review

A review of car parking is required which should be linked to the action plan because of the potential to include in it measures to reduce congestion. Officers have recently begun conducting such a review which should include measures to maximise the existing facilities, promote alternative forms of transport (cycling, footpaths, public transport) and measures to deter car use for unnecessary journeys.

Associated with the new multi-storey car park within the Marriots development, the introduction of Variable Message Signing should optimise public car parking in this and other outdoor car parking areas.

Increased cycle parking within the town will encourage more people to cycle. There may be further options to promote schemes which may help to reduce congestion in places, reduce carbon dioxide emissions and help to raise awareness about traffic related air pollution.

5.3.7 Option 18 Restriction on timing of town centre deliveries

Through the County Council, the Parking Order could be modified to restrict deliveries of good vehicles to outside of those more congested times. This option would probably meet opposition from traders and could have implications regarding viability for some and would be difficult to implement and enforce. It could also have the negative effect of concentrating delivery times thus causing disruption and undesirable conditions during the specified delivery periods. For these reasons this option is not being taken forward.

5.3.8 Options 19 (and 23) Development of Green Travel Plan and School Travel Plans

The Green Travel Plan – in line with the Council's Environmental Management Strategy and (proposed) Climate Change Policy – can be used to help negate the issues caused by traffic in Witney. The WODC Green Travel Plan is provided in Appendix 7 and is due for update in December 2010.

The 'school run' is often a period characterised by congestion and inconvenience, and a reduction in traffic often occurs during school holidays. Promoting school travel plans may therefore help to raise awareness with staff, parents and pupils and help reduce levels of traffic at the beginning and the end of the school day. Any initiative which reduces car use helps also to reduce carbon dioxide emissions. The Eco-schools project and related work co-ordinated by OCC can be used to promote alternatives to the school run (e.g. lift sharing, cycling, walking trains).

The County Council has a target for all schools to have an agreed, up to date Travel Plan by 2010. All the schools in Witney (details below) have such a plan, with periodic reviews on the OCC website: www.oxfordshire.gov.uk/travel2school

- Infant 1 St. Mary's
- Primary 8 Madley Brook, Our Lady of Lourdes, Queen's Dyke, The Batt, The Blake, Tower Hill, West Witney, Witney Community
- Secondary 2 The Henry Box, Wood green
- Special 1 Springfield

Successful Travel Plans will reduce the amount of car commuting to these schools. This in turn will reduce the overall levels of congestion and traffic conflicts which appear to play a major part in the development of the air quality problem in the town. These clearly therefore have a role in the overall package of measures to reduce emissions in the town, although this is likely to be small and hard to predict.

5.4 Vehicle emission reduction strategies

5.4.1 Options 20,21 and 22 Reducing the emissions from WODC vehicle fleet.

These options consider staff and work vehicles. Currently, procurement of vehicles is a function of the Street Scene section and environmental considerations have to be taken into account such as fuel type, efficiency and CO2 production. Alternative fuels have been trialled such as electric vehicles, LPG and CNG, the latter being unsuccessful because of reliability problems. Further work will be carried out on viable options to reduce the environmental impact of the Council's fleet as part of the (proposed) Climate Change Policy. In the present Waste Procurement process, the successful tender will be committed to operating vehicles of at least Euro V standard thereby reducing PM and NOx emissions.

5.4.2 Options 24, 25 and 26 Idling vehicles and vehicle emission testing

For those primary and relatively stable pollutants emitted from vehicles such as carbon monoxide, hydrocarbons and a proportion of particulate matter, reductions in the emissions will be reflected in improvements in the air pollution concentrations .The National Audit Office also reported that the 'direct effect of emissions' testing, research and analysis carried out by the European Commission, provided broad estimates of the impact of [the enforcement of] emissions testing and associated vehicle maintenance on emissions levels. This work found a 15% reduction in non-catalyst petrol cars' emissions of carbon monoxide and a 5% reduction for catalyst cars. For diesel vehicles the current test reduced emissions of particles comprising both visible and fine particles by 25%. The report also provided estimates of reductions of hydrocarbons and nitrogen oxides. (Enforcement of vehicle emission standards by local authorities – consultation, Dept of Transport 2002).

However, caution needs to be exercised in the consideration of the air quality benefits of roadside emission testing. Research into this was conducted by the Transport Research Laboratory (Macrae, Latham and Boulter PG (2004). A review of roadside emission testing by local authority in the United Kingdom. TRL report UPR SE/144/04) and concluded that roadside emission testing had little impact on air quality and that the test parameters did not correspond to NOx because there are no in-service standards. They advised that such measures to be of benefit must be linked to wider public education and centralised publicity campaigns. Such campaigns do however have the ability to improve capture rates for high emitting vehicles.

Powers to issue Fixed Penalty notice to drivers who are stationary, but leaving their engines idling, are available and these could be applied to the air quality management areas. Whilst on its own, it is not a measure that will have much of an impact on air quality, it is a measure that raises awareness and indicates how serious the local authority is taking the matter.

5.4.3 Options Complimentary measures to CLR introduction

These include a range of measures including providing signals at Newland / Bridge Street and Mill Street / Bridge Street junctions. They have little benefit as stand alone schemes but traffic light control systems such as SCOOT or MOVA could be investigated for their feasibility at these locations to control congestion and allow bus priority for example. Such measures could then be further assessed for their impact on air quality before a final decision on their application.

Traffic calming and signage may also have little stand alone value in air quality terms but they would act to encourage traffic along the Cogges Link Road and traffic calming would have the added benefit improving pedestrian safety. The signing of routes around Witney could also be used to encourage the use of the Cogges Link, although again this is not a stand alone measure . Other measures to improve the safety for cyclists and thereby encourage cycling as a means of transport could include advanced stop signs at junctions.

5.4.4 Options Other measures

Should the Cogges Link Road not be built in the next few years then other options might be considered including alternative measures such as widening of pavements, upgrading of pedestrian crossing, improving facilities for bus users, alterations to junction layouts and improvements to street furniture. Such measures could be beneficial in improving the environment for pedestrians and improving road safety, but may have little benefit in air quality terms.

Summary of Draft Action Plan Options for consideration in the Improvement of Air Quality in Witney

OCC Transport initiatives for Witney.							
Options	**Description**	**Lead Organisation**	**Air Quality Impact**	**Timescale**	**Cost**	**Pros** **Cons**	**Ranking**
1	Bypass – Feasibility of route for relief road around Witney	OCC	High	Medium	V High	• Reduce congestion and traffic levels • Redistribution of traffic density therefore no automatic increase in climate change C02 emissions • Distribution of levels of air pollution to other areas remain low • For a scheme of this size, relatively quick to implement • Funding availability known and to a degree within local control — • Impact on environment. Destruction of habitat • Increase in noise levels along route of bypass	4
2	Implementation of signing scheme with environmental HGV restriction to encourage alternative routes	OCC	V Low	Short	Low	• May help to reduce traffic congestion (but only if in conjuction with relief road) — • Impact uncertain if a 'stand alone' measure • Lack of suitable alternative routes • It is difficult to enforce • May shift traffic and pollution to other areas	4

OCC Transport initiates for Witney.							
Options	**Description**	**Lead Organisation**	**Air Quality Impact**	**Timescale**	**Cost**	**Pros** **Cons**	**Ranking**
3	Feasibility of road user charging used to support option 2 and signing	OCC	Med	Long	V High	• Reduces air pollution • Reduces congestion --- • Cost of enforcement • Inconvenience to local businesses • Disproportionate impact on lower income groups who are less likely to be able to afford charges • Likely to transfer traffic to other areas and increase pollution there • May be impractical for small area with significant through traffic	8
4	Queues relocated to the edge of town with traffic control on routes through town centre	OCC	Medium	Medium	Medium	• Reduces queues and congestion in town centre • Lower emissions --- • Transfer of pollution to other areas • Potential increase in noise level from stationary traffic in relocated queue • May shift traffic and pollution to other areas • It is difficult to enforce	4
5	Feasibility of traffic re-routeing and changes to road hierarchy – Establishment of bus and cycle lanes	OCC	V Low	Long	Low	• Improves traffic flow and reduces congestion if sufficient space • Promotion of public and environmentally friendly transport --- • Transfers traffic to other areas and therefore increases air pollution in those areas • May increase congestion due to reduction of road space • Road space will be a limiting factor • Inconvenient to motorists • Enforcement costs	4

OCC Transport initiates for Witney.

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking
6	Access control & clear zones	OCC	Medium	Medium	Medium	Pros: • Improves traffic flow and reduces congestion Cons: • Transfers traffic to other areas and therefore increases air pollution in those areas • Inconvenience • Cost of enforcement • Not possible to identify a zone that can be focussed upon • Lack of alternative routes	4
7	Low emission zones or other innovative HGV restriction Restriction of vehicles to those which are Euro IV or Euro V compliant (post 01 Oct 2009)	OCC	Medium	Medium	Medium	Pros: • Improves traffic flow and reduces congestion Cons: • Cost of enforcement • Inconvenience to local businesses • Requires suitable alternate transport route for non- compliant vehicles • Disproportionate impact on lower income groups who are less likely to own compliant vehicles • Not possible to identify a zone that can be focussed upon	4
8	Compulsory purchase	OCC WODC	Zero impact	Long	V High	Pros: • Would allow for the removal of the AQMA declaration. Cons: • Unacceptable on all levels because there is an established residential population	16

Supporting initiatives to reduce air pollution. 1) General.

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking
						Pros	
						Cons	
9	Lobbying and support of Government to create policy to increase the use of cleaner vehicles and fuels	WODC	Low	Short	Low	• Lowers emissions • Increases profile of green transport and fuel • Promotes research and development	3
						• No powers for WODC to require action • Additional cost to consumer • Will take a long time to implement • The impact and success not measurable at this stage	
10	Lobbying of Government to create national policy to facilitate use of greener forms of public transport and to make public transport a more viable option	WODC	Low	Short	Low	• Lowers emissions • Increases profile of green transport and fuel • Promotes research and development	3
						• No powers for WODC to require action • Additional cost to consumer • Will take a long time to implement • The impact and success not measurable at this stage	
11	WODC and OCC to support "Leave your car at home" initiative	WODC OCC	V Low	Short	Low	• Fewer vehicles on the road • Increased profile of alterative transport	4
						• No powers for WODC to require action • Success difficult to measure and improvements, if any, will be long-term	

Supporting initiatives to reduce air pollution. 1) General.

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking
12	Promotion of the use of the cycle	WODC OCC	V Low	Short	Low	**Pros:** • Vehicle reduction • Encouragement for people to exercise **Cons:** • No powers to require cycle routes • Uptake difficult to predict - Air quality improvements difficult to predict	4
13	Implementation of county bus strategy Provision of intelligent timetable information	OCC and transport providers	V Low	Short to long	Low	**Pros:** • Increased profile of alternative transport • Real time information of benefit to the public **Cons:** • No powers for WODC to require action • Success difficult to predict • Long term measure	4
14	Engage with local public transport operators (Buses and Taxis) to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels	WODC OCC	Low	Short to medium	Low	**Pros:** • Lowers emissions • Increases profile of green transport and fuel • Promotes research and development **Cons:** • Only likely to have an impact when linked to profitability / financial incentive • The impact and success not measurable at this stage – success is therefore difficult to predict • Long time to implement	3
15	Engage with freight transport operators to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels	WODC OCC	Low	Medium	Low	**Pros:** • Lowers emissions • Increases profile of green transport and fuel • Promotes research and development	3

Supporting initiatives to reduce air pollution. 1) General.

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking Score
						Pros	
						Cons	
16	Review and comment the impact of neighbouring local authorities' Local Transport Plans	OCC WODC	V Low	Short	Low	• Identifies whether neighbouring transport routing measures could have an adverse impact on the AQMA	4
						• Limited scope to influence other LTP'S	
17	Encourage take up of commercial workplace management schemes	WODC	V Low	Short	Low	• Disincentive for driving to work • Fewer vehicles on road	4
						• Unpopular with employees – especially those who are required to use their cars for work • Success will depend on availability of alternatives • No WODC powers to implement • Success difficult therefore to predict	
18	Restriction on timing of town centre deliveries	WODC	V Low	Medium	Low	• Reduced congestion and emissions during key periods	4
						• Difficult to introduce and enforce • WODC has negligible influence • Inconvenience to local residents and businesses • Many increase congestion at other periods	
19	Development of School Travel Plans and promotion of WODC Green Travel Plan	OCC	V Low	Short	Low	• Encourage walking/cycling/public transport to reduce emissions	4
						• Requires commitment from local schools • Success will depend on availability of alternatives • Success difficult therefore to predict	

Supporting initiatives to reduce air pollution. 2) WODC/OCC Operations							
Options	**Description**	**Lead Organisation**	**Air Quality Impact**	**Timescale**	**Cost**	**Pros** / **Cons**	**Ranking**
20	Review of make up of WODC fleet with regard to improving their emission levels		V Low	Medium	Low	Pros: • Lead by example • Fewer polluting vehicles Cons: • Conversion to other fuels is costly • Reliability is an issue with CNG	4
21	Employee incentives for greener vehicle purchase/lease		V Low	short	Low	Pros: • Lead by example Cons: • Uptake of scheme may be optional • Competes with other budget priorities • May penalise less well paid employees	4
22	Manage parking to reduce traffic congestion and improve air quality. Park and Ride. Measures to promote alternative travel routes		Low	Medium	Low	Pros: • Lowers emissions • Reduced congestion and emissions during key periods Cons: • Increased costs to motorists if charging scheme introduced • Success will depend on availability of alternatives	3
23	Promotion of staff Green Travel Plan		V Low	Short	Low	Pros: • Lead by example • Fewer vehicles and less congestion • Main Council Offices in Witney, therefore may have an impact Cons: • Unpopular with employees – especially those who are required to use their cars for work • No WODC powers to implement. Success difficult therefore to predict • Success dependant upon employee implications and availability of alternative transport	4

Vehicle emission reduction strategies

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking
24	Encouragement of increase in Vehicle Inspectorate emission testing	WODC	V Low	short	Low	Pros: • Raises profile • Encourages servicing and maintenance of vehicles Cons: • Cost to vehicle owners – greater impact on lower income groups	4
25	Implementation of powers for OCC/WODC to conduct vehicle emission testing	WODC	V Low	short	Medium	Pros: • Raises profile • Encourages servicing and maintenance of vehicles Cons: • Cost to enforce • Cost to motorist if fined	8
26	Acquisition of powers to require drivers to switch off their engines if they are left idling	WODC/OCC	V Low	short	Low	Pros: • Raises profile Cons: • Cost to enforce • Cost to motorist if fined	4

Complementary measures to CLR introduction

1	Signalise junction Newland / Bridge Street junction – signals	OCC	Medium	Medium	Medium	Pros: • Helps to increase benefits of Cogges Link • Provides opportunity to build in bus priority • Provides improved pedestrian crossing facilities Cons: • Will have little impact as stand alone scheme (without alternative route to Bridge St for traffic) • Increases delays for some motorists	4

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking
2	Signalise junction Bridge Street / Mill Street junction – signals	OCC	Medium	Medium	Medium	**Pros:** • Helps to increase benefits of Cogges Link • Provides opportunity to build in bus priority • Provides improved pedestrian crossing facilities • Helps junction to function more efficiently **Cons:** • Will have little impact as stand alone scheme	4
3	Traffic calming (bus friendly) between Newland / Bridge Street junction & Jubilee Way junction on both routes. Woodgreen and Newland traffic calming	OCC	Medium	Long	Medium	**Pros:** • Encourages traffic to use Cogges Link • Decreases speeding **Cons:** • Cannot be implemented before Cogges • Traffic calming often unpopular with motorists	4
4	Signing review. A review of signing to take account of the Cogges Link Road and the complementary measures	OCC	Medium	Long	Low	**Pros:** • Encourages traffic to use Cogges Link • No roadworks required **Cons:** • Local residents won't always follow signing	2
5	Regrading of routes around Witney	OCC	Low	Long	Low	**Pros:** • Encourages traffic to use more suitable routes **Cons:** • Success will depend on availability of alternative route	3

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros Cons	Ranking
6	Cycle measures Advanced stop lines at signalised junctions	OCC	Low	Short	Low	• Increased profile of alternative transport • Improved safety for cyclists • Success will depend on extent of measures • Impact and success not measurable at this stage	3
7	West End Link 2 A new river crossing from Mill Street to Hailey Road	OCC	High	Long	V High	• Impact and success measurable at this stage (this is a longer term safeguarded scheme) • Increases benefits of Cogges Link Road • Provides alternative route into town centre for NW Witney residents • Impact on environment • Draws more traffic into the central area	4
Other measures							
8	High Street pedestrian improvements Widening of pavement, upgrading of pedestrian crossing, improving facilities for bus users. Alterations to junction layouts and improvements to street furniture	WODC/OCC	Medium	Short	V High	• Could improve the streetscape • Reinforces message that town centre should be pedestrian friendly zone • By discouraging through traffic, pedestrian/cycle safety increased • Creates better environment for bus users • High maintenance costs • Likely design conflicts between different user groups	8

Options	Description	Lead Organisation	Air Quality Impact	Timescale	Cost	Pros / Cons	Ranking
9	A40/Downs Road All movements junction to divert HGVs away from town centre route	OCC	Medium	Med	V High	**Pros:** • Diverts polluting HGVs away from routes through the town centre • Enables easier access to Downs Rd employment areas for longer distance traffic • Can be implemented with/without Cogges **Cons:** • Environmental impacts of constructing scheme	8
10	Other public transport improvements Improvements to Oxford premium route	OCC	Medium	Short	Low	**Pros:** • Increase profile of alternative transport • Decrease in congestion if more people traffic to Oxford by bus **Cons:** • Bus fuel less clean • Unpopular with motorists	2

6.0 Draft Action Plan Proposals

This section outlines the proposals for the draft action plan. They have been put forward on the following basis:

- They are cost effective
- They show a significant air quality benefit

The air quality benefit must not be outweighed by adverse impacts such as transfer of pollution to other areas, increases in noise or congestion, harm to the environment such as the destruction of ecologically sensitive areas and habitats. The proposals listed below are being investigated and their respective impacts on air quality will be considered:

- Relief Road – Cogges Link Road
- Implementation of signposting scheme and strategies to encourage alternative routes
- Pedestrian crossing modifications

This information will influence the final proposals put forward in the Action Plan.

Action	Lead Organisation	Contingent Factors	Resources	Timescale	Additional Comments
1 Cogges Link Road	OCC	Design	Supported Capital Expenditure and Developer Contributions. (OCC LTP 2006 - 2011).	2008	There are proposed additional works to realise the full benefits of the Cogges Link Road Note the 10 complementary measures proposed by OCC
		Planning Application / Public Enquiry		2009 - 2010	
		Construction Phase		2011 - 2012	
2 Implementation of signing scheme to encourage alternative routes	OCC	Post construction of CLR	OCC Budget	A stand alone / purely advisory scheme may be easier and quicker to implement but practicalities mitigate against this and thus is unlikely to be effective.	
3 Lobbying and support of Government to create policy to increase the use of cleaner vehicles and fuels	WODC Environmental Policy	None	None	With Immediate effect	None

4 WODC and OCC to support "Leave your car at home" initiative.	WODC Environmental Policy. Environmental Protection	Budget provision	Policy	Annually	None
5 Promotion of the use of the cycle	WODC Environmental Policy OCC	None	Low	Annual initiatives	None
6 Implementation of county bus strategy. Provision of intelligent timetable information	OCC and transport providers	None	Low	Route upgrades are envisaged	None

Action	Lead Organisation	Contingent Factors	Resources	Timescale	Additional Comments
7 Review the powers avaialable controlling idling vehicles	WODC/OCC	None	Existing officers	2010 - 2011	Investigate and make recommendations regarding the adoption of these powers.
8 Engage with local public transport operators (buses and taxis) to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels.	OCC WODC	The impact of this measure is likely to be low unless accompanied by financial incentives and enforcement.	Low	Continual technical development	None
9 Engage with freight transport operators to a) promote the procurement of vehicles with cleaner engine technologies and b) to promote the use of cleaner fuels	OCC WODC	The impact of this measure is likely to be low unless accompanied by financial incentives and enforcement.	Low	Continual technical development	None

Action	Lead Organisation	Contingent Factors	Resources	Timescale	Additional Comments
10 Development of School Travel Plans and promotion of WODC Green Travel Plan	OCC	Engagement with and support from local schools, parents and staff	Low	2010	Periodic review led by OCC
11 Manage parking to reduce traffic congestion and improve air quality	WODC	Review of Car Parking within Witney	Low	2011	Consultation required in its own right

7.0 Conclusion

7.1 This action plan provides a range of measures not only concerned with the reduction of HGV movements though Witney but also with other measures associated with the overall reduction of car usage in the area. The monitoring of nitrogen dioxide in Witney will continue which will serve as an indicator of the success of the action plan. The implementation of the plan needs to be monitored carefully and modified as supporting strategies to the plan are developed. The success or otherwise of the relief road proposal will determine whether it is necessary to introduce additional proposals.

7.2 The success of the action plan will be difficult to predict because it will depend upon the successful completion of the relief road proposal, the cooperation and support of business and the public and the ability to enforce certain aspects of the plan. It is vital that the plan, as well as being integrated into the Local Transport Plan, be kept current and its profile maintained within the development and implementation of the Climate Change and Sustainable Communities ("Shaping Futures") Strategies to ensure they are complimentary and supportive of each other. The plan must be considered as part of a wider agenda of carbon reduction, sustainable development and the improvement of air quality. Of particular importance will be future development proposals for Witney to be progressed through the Local Development Framework.

7.3 References

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Appendix 1

Nitrogen Dioxide and Air Pollution

1 Overview

The Government and the Devolved Administrations have adopted two Air Quality Objectives for nitrogen dioxide:

Objective: 40 µg/m^3 when expressed as annual mean, to be achieved by 31st December 2005. 200 µg/m^3 when expressed as a 1 hour average, not to be exceeded more than 18 times per year. To be achieved by 31st December 2005.

The First EU Air Quality Daughter Directive (1999/30/EC) also sets limit values for nitrogen dioxide, which have been transposed into UK legislation. The Directive includes a 1-hour limit value of 200 µg/m^3, not to be exceeded more than 18 times per year, and an annual mean limit value of 40 µg/m^3; both to be achieved by 1 January 2010.

Nitrogen dioxide is a brown gas, with the chemical formula NO_2. It is released into the atmosphere when fuels are burned (for example, petrol or diesel in a car engine or natural gas in a domestic central heating boiler or power station). NO_2 can affect our health. There is evidence that high levels of it can inflame the airways in our lungs although such levels have not been measured nor are expected in Witney. Sensitive receptors, such as people with asthma are particularly affected. Over a long period of time it can affect how well our lungs work. It can also adversely affect vegetation.

Nitrogen dioxide

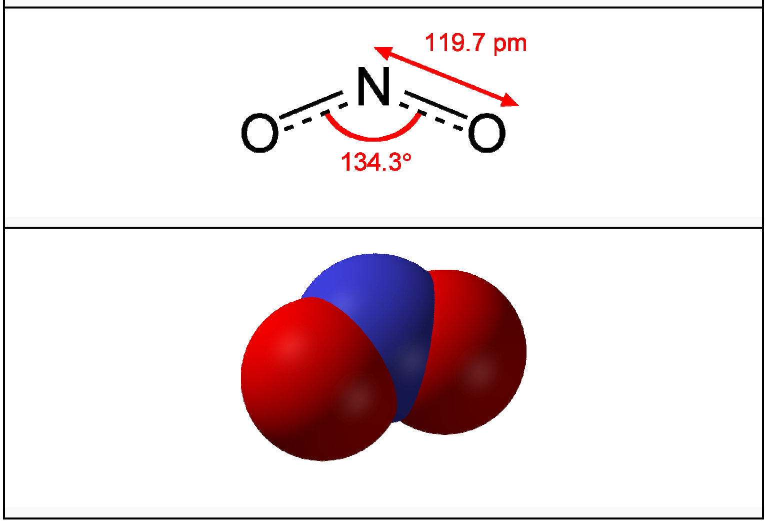
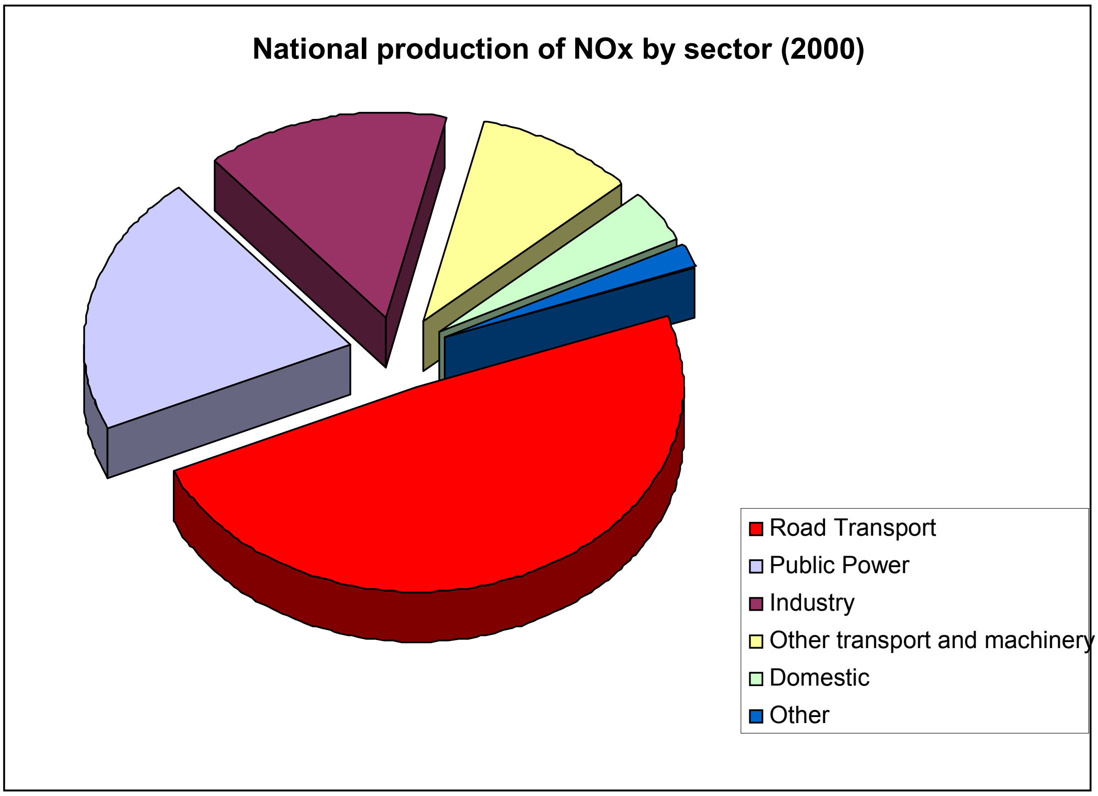


Figure 1 Wikipedia 2007

2 The National Perspective

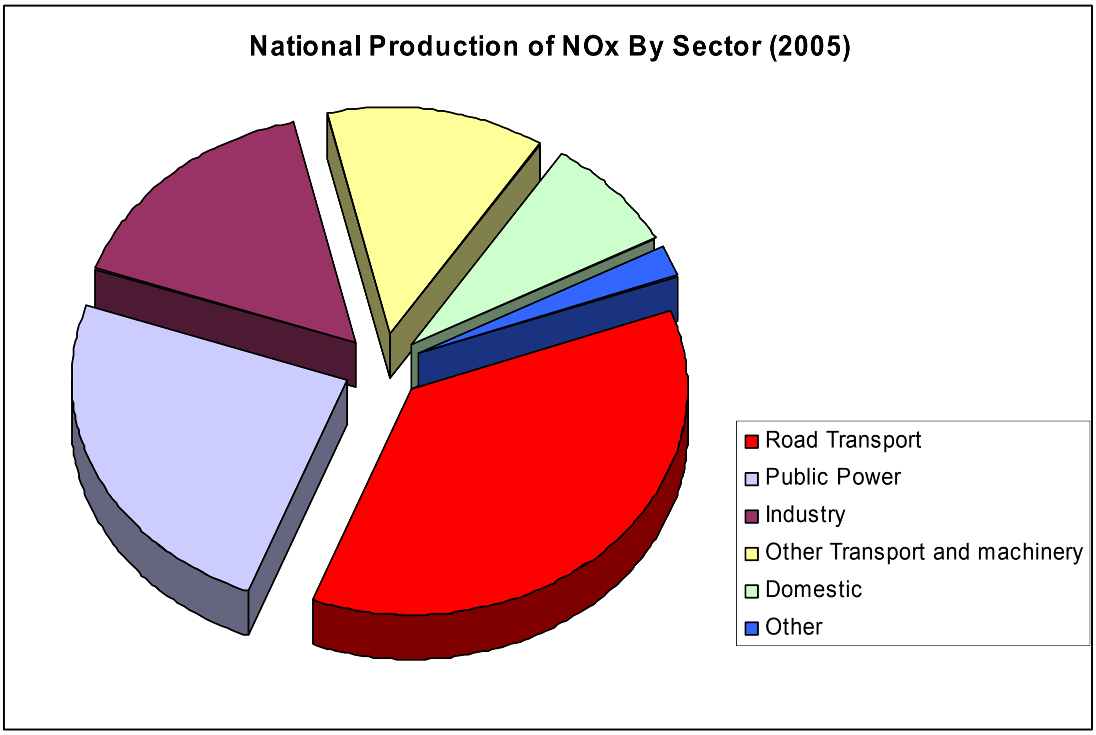
Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO_X). All combustion processes produce NO_X emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone (O_3) in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health. However, because NO in the atmosphere is converted to NO_2, reductions in NOx emissions need to be made in order to reduce nitrogen dioxide concentrations in the air. Therefore in the Action Plan, improvements will be judged by reductions in NOx emissions.

The principal source of NOx emission is road transport, which accounted for about 49% of total UK emissions in 2000 [Air Quality Expert Group. Defra 2004]. Major roads carrying large volumes of high-speed traffic (such as motorways and other primary routes) are a predominant source, as are conurbations and city centres with congested traffic. Within most urban areas, the contribution of road transport to local emissions will be much greater than for the national picture. As an example, road transport is estimated to account for more than 75% of nitrogen oxides emissions in London.



National Atmospheric Emissions Inventory (NAEI) 2007

The contribution of road transport to nitrogen oxides emissions has declined significantly in recent years as a result of various policy measures, and further reductions are expected up until 2010 and beyond. For example, urban traffic nitrogen oxides emissions were estimated to fall by about 35% between 2000 and 2005, and by 46% between 2000 and 2010 (NAEI 2007).



NAEI 2007

Other significant sources of nitrogen oxides emissions include the electricity generation industry and other industrial and commercial sectors, which accounted for about 24% and 16% respectively in 2005 (NAEI 2007). Emissions from both sources have also declined, due to the fitting of low nitrogen oxides burners, and the increased use of natural gas plant. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels, although breaches of the hourly nitrogen dioxide objective may occur under rare, extreme meteorological conditions, due to emissions from these sources.

NO_2 has a number of environmental effects. It is damaging to ecosystems as it stunts growth and stresses plant life, making it more susceptible to other effects such as frost damage and disease. It is one of the gases that contribute to acid rain, affecting the natural balance of rivers, lakes and soils, causing damage to wildlife and vegetation and damaging buildings by gradually dissolving the stonework. It reacts with other pollutants to form ground-level ozone, which can damage plant life and materials such as rubber.

When nitrogen dioxide is present with sulphur dioxide, the combination of effects is greater than the sum of the individual effects of the two chemicals – a synergistic effect. This increases the damage to plant life.

3 Global environmental effects

Nitrogen dioxide can react with organic peroxy radicals, one source of which are vehicle emissions, (formed from the breakdown of Volatile Organic Compounds in the air) to form PANs (peroxyacetyl nitrates), which can serve as a temporary reservoir for reactive nitrogen and may be transported long distances, persisting in the environment for a longer time than NO_2.

The annual mean objective of 40 µg/m^3 is currently widely exceeded at roadside sites throughout the UK, with exceedences also reported at urban background locations in major conurbations. The number of exceedences of the 1-hour objective show considerable year-to-year variation, and are predominantly driven by meteorological conditions which give rise to winter episodes of poor dispersion and summer oxidant episodes. In recent years, exceedences of the short-term objective have generally only been recorded at roadside or kerbside sites in close proximity to heavily-trafficked roads in major conurbations.

In practice, meeting the annual mean objective in 2005, and the limit value in 2010, is proving to be considerably more demanding than achieving the 1-hour objective. National studies indicated that the annual mean objective was likely to be achieved at all urban background locations outside of London by 2005, but that the objective may be exceeded more widely at roadside sites throughout the UK in close proximity to busy road links. Projections for 2010 indicate that the EU limit value may still be exceeded at urban background sites in London, and at roadside locations in other cities.

Appendix 2

The Air Quality Management Area

and

Oxfordshire Highways Cogges Link Road AQMA Projections - Jacobs UK Ltd

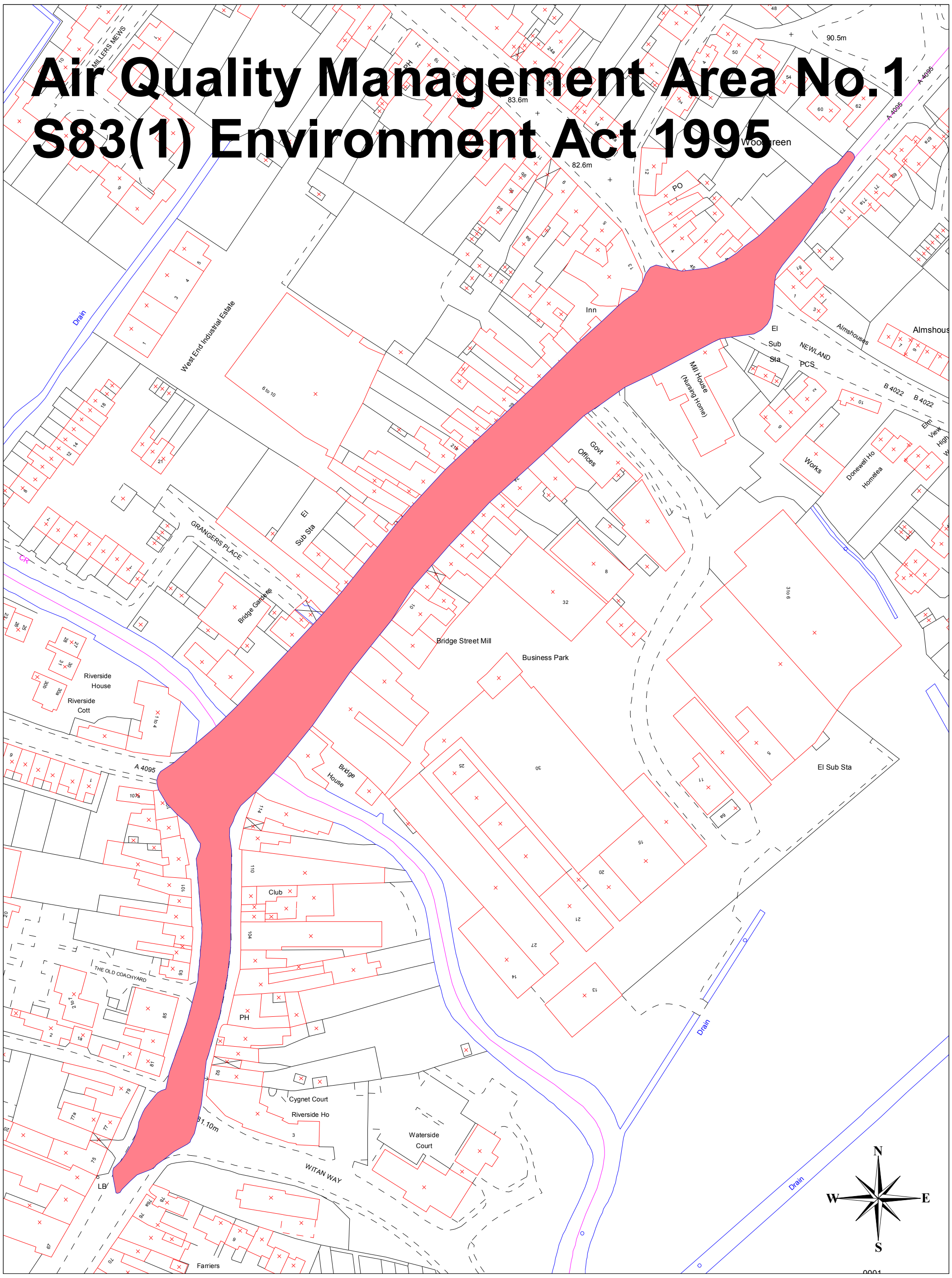
[Cogges Link Road Environmental Statement, Air Quality Assessment, B0834600/Doc/PA/CLR/28 34]

Figure 1
Witney Air Quality Management Area

Figure 2
Baseline : Annual Mean Nitrogen Dioxide Concentrations 2005

Figure 3
Do Minimum : Annual Mean Nitrogen Dioxide Concentrations 2011

Figure 4
Do Something : Annual Mean Nitrogen Dioxide Concentrations 2011



West Oxfordshire District Council
Woodgreen
Witney
Oxfordshire
OX28 1NB

Tel: 01993 702941
Fax: 01993 770255
www.westoxon.gov.uk

Map Title:	**Air Quality No.1 Witney**
Department:	
Map No:	
Date: 25:04:05	Scale: 1:1800

Figure 1
Witney Air Quality Management Area

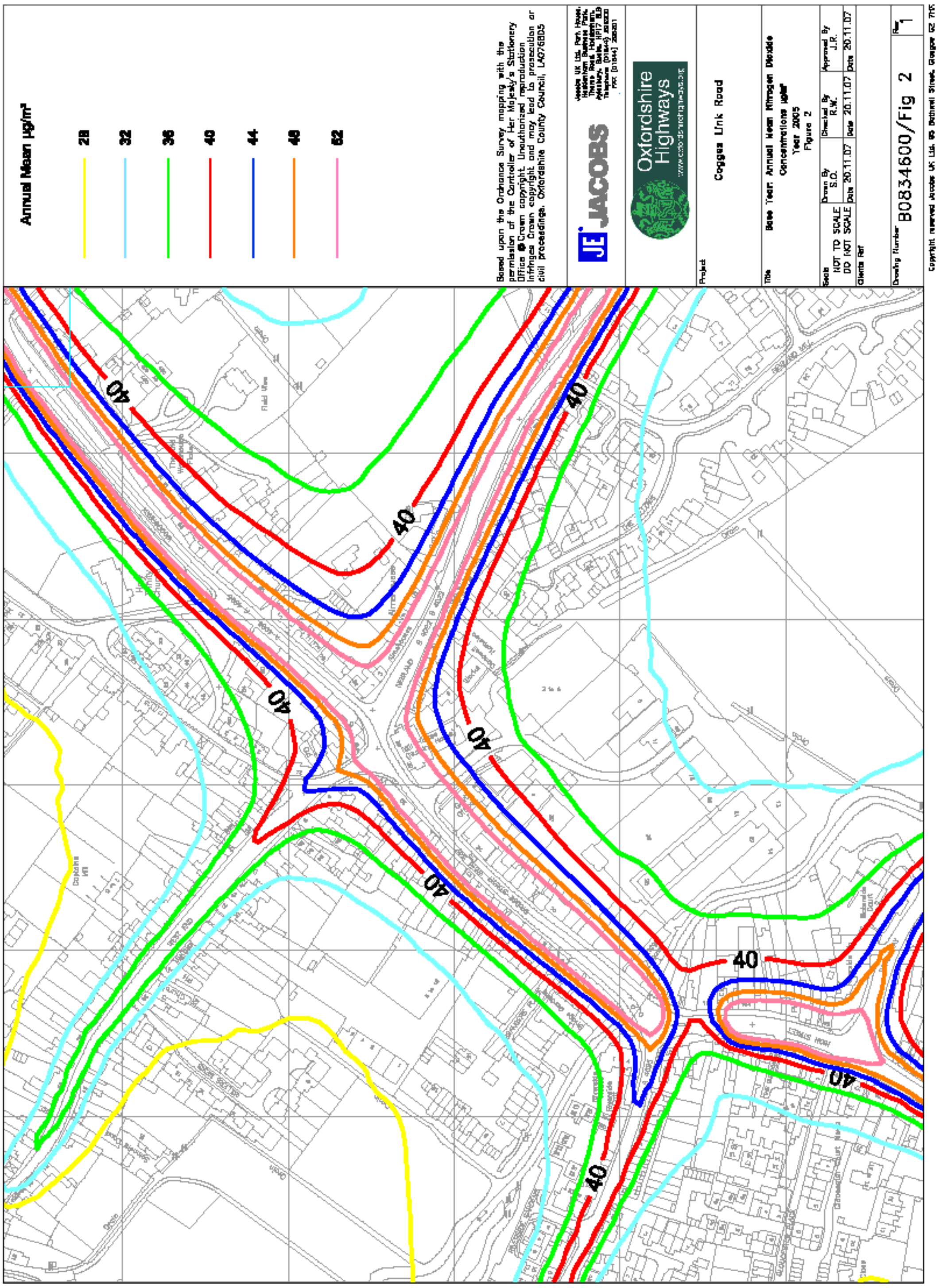


Figure 2
Baseline : Annual Mean Nitrogen Dioxide Concentrations 2005

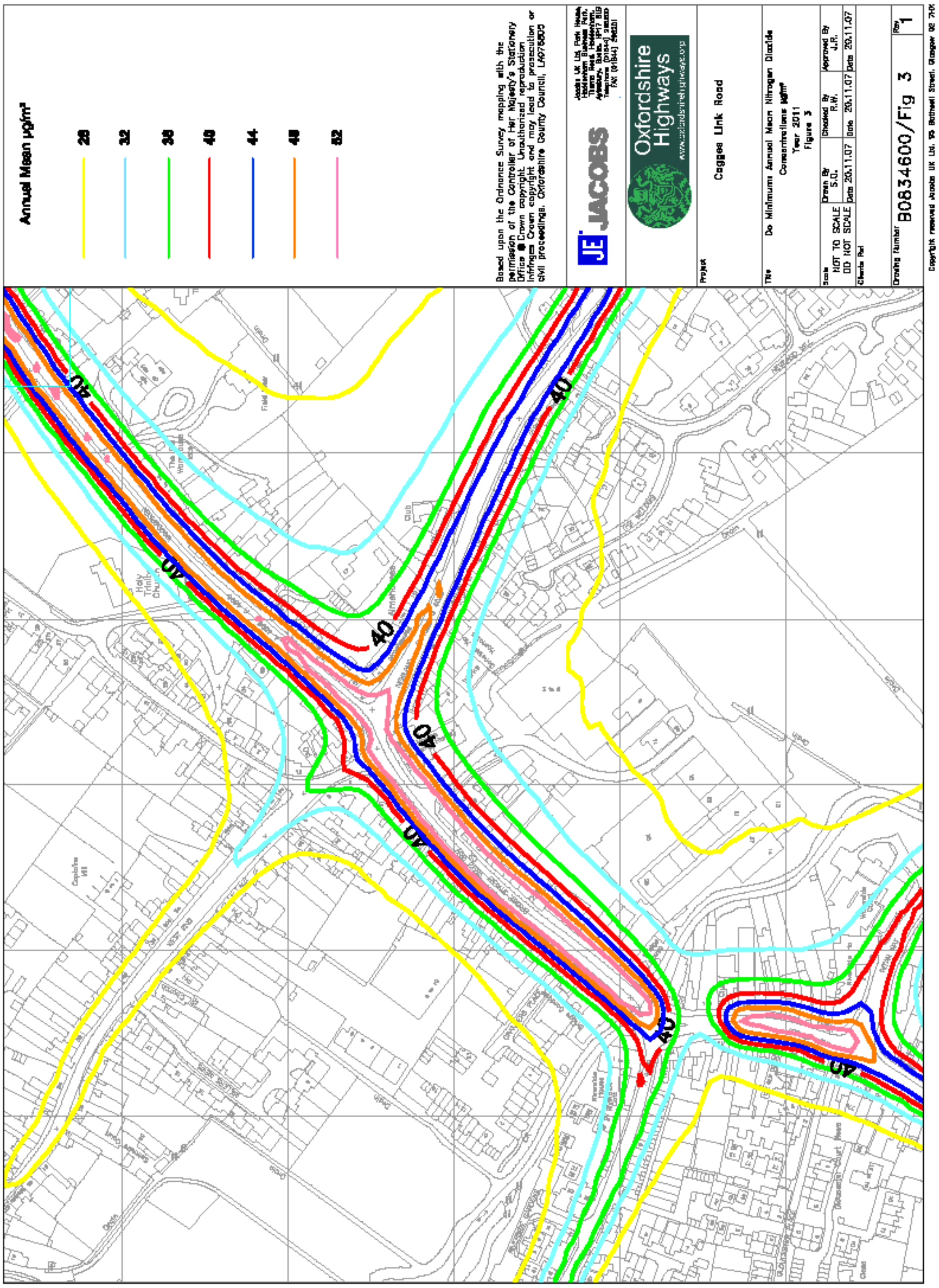


Figure 3
Do Minimum : Annual Mean Nitrogen Dioxide Concentrations 2011

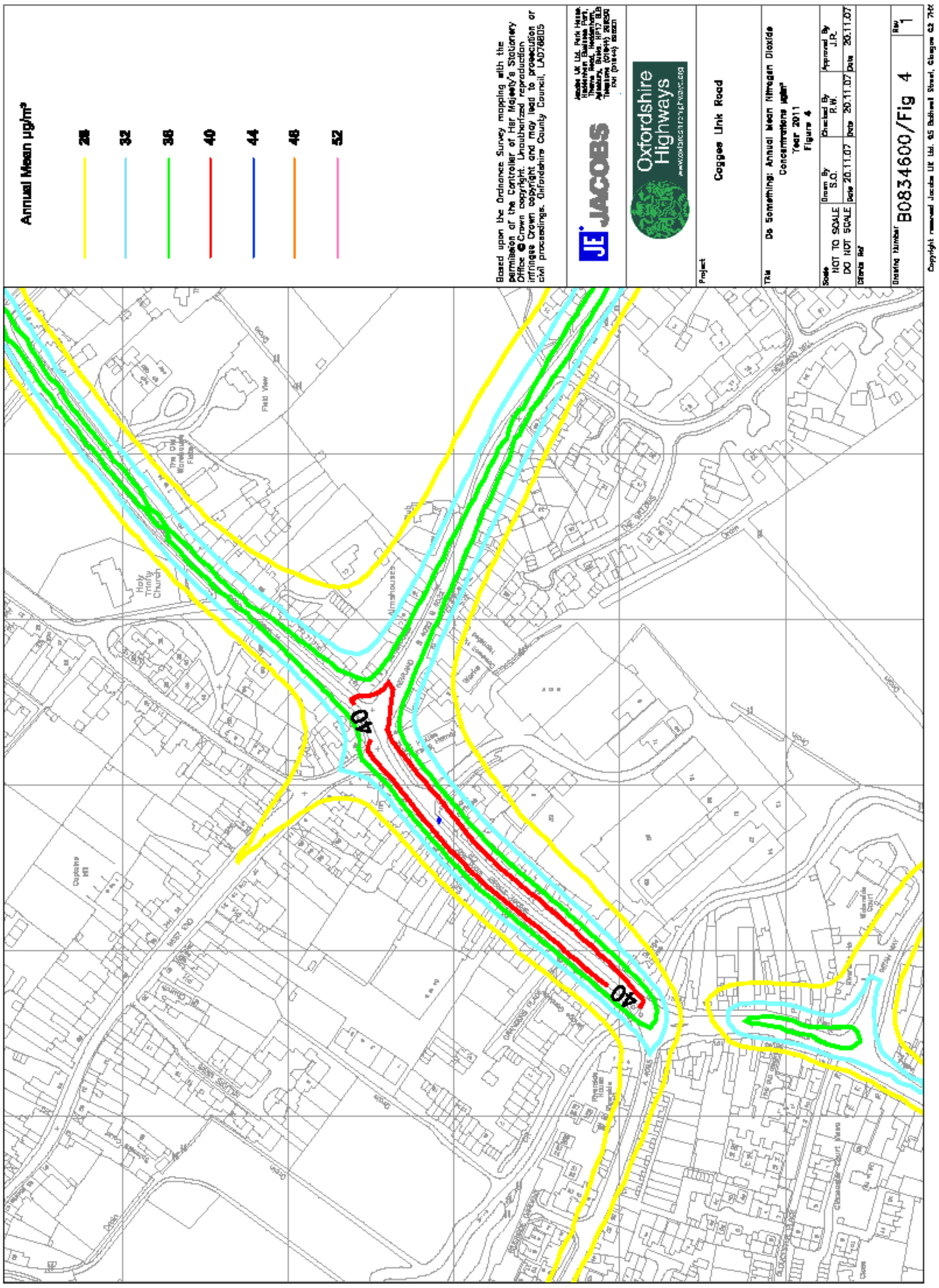


Figure 4
Do Something : Annual Mean Nitrogen Dioxide Concentrations 2011

Appendix 3

Faber Maunsell - Witney Air Quality Assessment

West Oxfordshire District Council
May 2006

Table of Contents

1. Introduction

This report details the results of dispersion modelling and data ratification for nitrogen dioxide (NO_2) in Witney. This work was commissioned by West Oxfordshire District Council.

A Detailed Assessment of air quality in West Oxfordshire District [7] was produced in June 2004. This assessment determined a likely exceedence of the UK air quality objectives for NO_2 at Bridge Street and a possible exceedence at the junction of Witan Way with the High Street.

This report considers NO_2 monitoring data collected between January 2004 and April 2005 at a monitoring location on the Witney High Street and compares the measurements with the National Air Quality Standards. Detailed dispersion modelling has been carried out around this location with regard to NO_2 concentrations.

1.1. Statutory Background

The provisions of Part IV of the Environment Act 1995, establish a national framework for air quality management, requiring all local authorities in England, Scotland and Wales to conduct local air quality reviews. Where the reviews indicate that objectives set out in the National Air Quality Strategy will not be met, the relevant authority is required to designate an Air Quality Management Area.

Under Section 88(1) of the Environment Act 1995, the Department for Environment, Food and Rural Affairs (Defra), the Scottish Executive, and the Welsh Assembly Government have published Local Air Quality Management technical guidance: LAQM.TG(03) [1]. This replaces the guidance previously issued as LAQM.TG1(00) to TG4(00). Section 88(2) of the Act sets out a system of local air quality management in which local authorities take the lead. Section 82(1) of the Act requires local authorities to undertake reviews of the current air quality in their area, and of the predicted air quality in future years, and to assess them against standards and objectives prescribed in the Strategy and in 'The Air Quality (England) Regulations 2000' [5].

1.2. The Role of Review and Assessment

The Air Quality Strategy establishes the framework for air quality improvements. Measures agreed at the national and international level are the foundations on which the strategy is based. It is recognised, however, that despite these measures, areas of poor air quality will remain, and that these will best be dealt with using local measures implemented through the LAQM regime. The role of the local authority review and assessment process is to identify areas where it is considered likely that the Air Quality Objectives will be exceeded.

2. Nitrogen Dioxide

2.1. Background

The Government and the Devolved Administrations have adopted two Air Quality Objectives for nitrogen dioxide (NO_2); an annual mean concentration of 40 µg/m^3, and a 1-hour mean concentration of 200 µg/m^3, to be exceeded no more than 18 times per year. These objectives were to be achieved by the end of 2005.

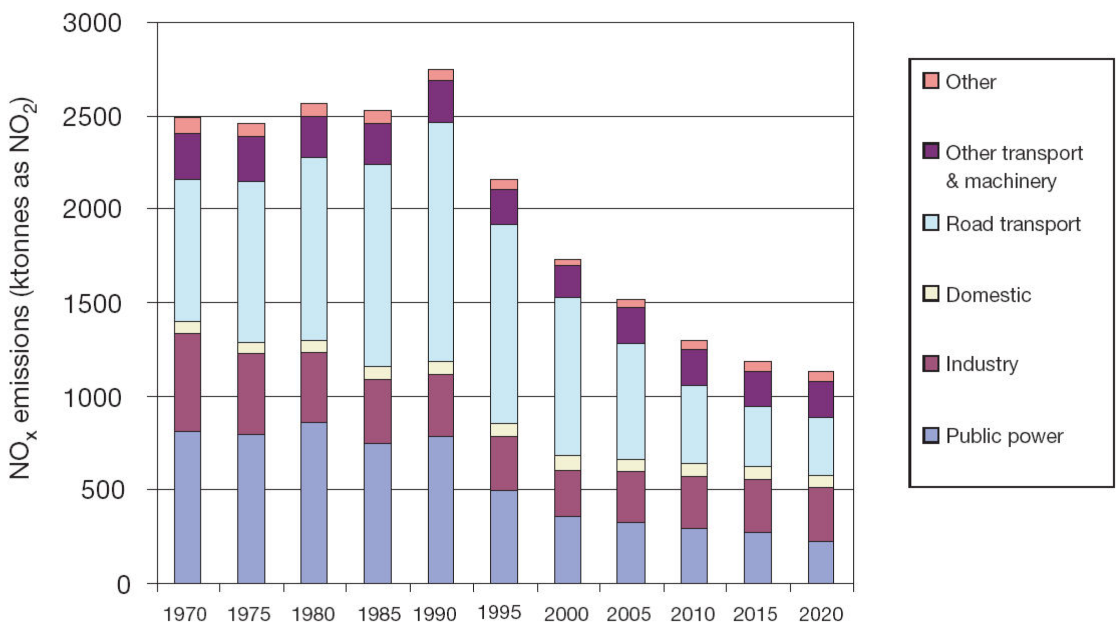
The EU First Daughter Directive also sets limit values for NO_2, which have been incorporated into UK legislation. The Directive includes a 1-hour limit value of 200 µg/m^3, not to be exceeded more than 18 times per year, and an annual mean limit value of 40 µg/m^3, both to be achieved by 1st January 2010. In practice, meeting the annual mean objective in 2005 is expected to be considerably more demanding than achieving the 1-hour objective.

NO_2 and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as NO_X. All combustion processes produce NO_X emissions, largely in the form of NO, which is then converted to NO_2, mainly as a result of the reaction with ozone in the atmosphere. It is NO_2 that is associated with adverse effects upon human health.

As shown in Figure 1, estimates for 2005 show that road transport accounts for the largest proportion (~45%) of total UK NO_X emissions, with public power industries being the second largest contributor. The contribution of road transport to emissions has declined significantly in recent years as a result of various policy measures, and further reductions are expected up until 2010 and beyond. For example, road transport emissions are estimated to fall by about 50% between 2000 and 2010.

Emissions from industrial and public power sources have also declined significantly, due to the fitting of low NO_X burners, and the increased use of natural gas plant. Industrial sources generally make a very small contribution to annual mean NO_2 levels, although breaches of the hourly NO_2 objective may occur under rare meteorological conditions, due to emissions from these sources.

Figure 1:National Trend of NO_X Emissions (1970 – 2020)



This figure has been reproduced from the Air Quality Expert Group (AQEG) Report on NO_2 in the UK [12].

The annual mean objective of 40 µg/m^3 is currently widely exceeded at roadside sites throughout the UK, with exceedences also reported at urban background locations in major conurbations. The number of exceedences of the 1-hour objective show considerable year-to-year variation, and is driven by meteorological conditions, which give rise to winter episodes of poor dispersion and summer oxidant episodes.

National studies have indicated that the annual mean objective is likely to be achieved at all urban background locations outside of London by 2005, but that the objective may be exceeded more widely at roadside sites throughout the UK in close proximity to busy road links. Projections for 2010 indicate that the EU limit value may still be exceeded at urban background sites in London, and at roadside locations in other cities.

3. Monitoring

This report assesses data based on the continuous monitoring station located on the junction of Newlands and Bridge Street, Witney, between January 2004 and April 2005, and three diffusion tube monitoring locations in 2004 and 2005.

The monitoring station is at a kerbside location near to a busy street open to two-way vehicle traffic. Two of the diffusion tube locations, Mill Street and Bridge Street, are located within the area of interest.

3.1. Ratification

The raw NO and NO_X monitoring data are recorded in fifteen-minute increments, which are used to calculate hourly mean concentrations. This data is modified using baseline and peak span levels recorded during regular equipment calibrations.

The ultimate result of the ratification is to identify erroneous data and adjust for calibration factors, and ensure that good data lies above the zero baseline.

3.2. AURN Data

Continuous monitoring data from the nearest three UK Automatic Urban and Rural Network (AURN) sites have been collected for use as a comparison with the monitoring data collected in Witney. Table 1 contains a summary of the site types and the results in 2004 and 2005.

No exceedences of the UK objectives for nitrogen dioxide were determined at the rural or urban background sites. However, the Oxford Centre roadside site recorded an exceedence of the annual mean standard. This site has the same classification as the Witney continuous monitor and so these data may be considered to be comparable.

Table 1: Continuous Monitoring Data for Nearest Three AURN Stations

Site	Type	NO_2 (µg/m^3)			
		2004 Annual Mean	No. of Hourly Exceedences, 2004	2005 Annual Mean	No. of Hourly Exceedences, 2005
Harwell	Rural	12.0	0	11.8	0
Oxford Centre	Roadside	67.9	6	67.0	12
Reading New Town	Urban Background	25.4	0	24.0	0

3.3. Continuous Monitoring Results

The monitored results for the whole of 2004 and part of 2005 are shown in Table 2. The mean concentrations are similar and both are below the 2005 annual mean objective level of 40 µg/m^3. No exceedences of the 200 µg/m^3 hourly mean objective were recorded at the site during either period.

Table 2: Annual Mean NO_2 Concentrations

Period	NO_2 Concentration / µg/m^3	Exceedences
2004 Annual Mean	31.5	0
2005 Mean[1]	32.7	0
2005 Annual Adjusted Mean[2]	37.3	NA

Note:[1]Up to April 7 2005, [2]Seasonally adjusted using data from Harwell and Reading New Town background sites.

The seasonally adjusted 2005 annual mean has been calculated using the guidance in Box 6.5 in LAQM.TG(03) to estimate an annual mean from the 3-months of data collected in Witney. The sites used to generate the ratio were Harwell and Reading New Town, which were selected as representative of the regional background concentrations. The seasonal bias has increased the annual mean, but the results indicate that it is not likely to exceed the UK objective.

3.4. **Data Capture**

The EU Directive for NO_2 (85/203/EEC) specifies a 75% data capture threshold for assessing compliance with limit and guidance values. If the 75% threshold is not achieved, the data are still useful, but less precise than required for formal assessment of compliance with the limit and guide values. The UK NAQS (National Air Quality Strategy) recommends a data capture rate of 90% for ratified data as a target for monitoring for Local Authority Review and Assessment work.

Table 3: Data Capture Rates during 2004 and 2005

Period	Capture Rate
2004	80.8%
2005[1]	86.9%[2]

Note: [1]Up to April 7 2005, [2]Based on monitored period of 2318 hours (January 1 – April 7 2005)

The results shown in Table 4 indicate that the capture rates during the monitored periods were above the EU Directive level of 75%, but failed to reach as high as the UK NAQS capture rate. The capture rate was higher in 2005, however, indicating that a complete twelve month period may have provided opportunity for the capture rate to increase further.

3.5. **Diffusion Tube Monitoring Results**

The diffusion tube monitoring results for Witney are shown in Table 4. The sites at Bridge Street and Mill Street are within the AQMA near the town centre, which is reflected in the comparatively high measured concentrations.

Table 4: NO_2 Diffusion Tube Results

Site Name	Site Type	NO_2 Concentration / µg/m^3		
		2003	2004	2005
Bridge Street	R	55	38	44
Mill Street	R	50	30	36
Early Road	B	16	14	14
Abbey Road	B	34	16	19
Staple Hall 1	R	-	27	35
Staple Hall 2	R	-	23	33
Staple Hall 3	R	-	23	34

4. Modelling

4.1. Overview

The AAQuIRE 6.1.1 regional air quality dispersion modelling package was used to predict concentrations of NO_2 from road traffic in 2005.

The model was developed by Faber Maunsell and has been used widely for the past 15 years. The model uses the dispersion algorithms CALINE4 (for line sources) and AERMOD (for point, area and volume sources), which have both been independently and extensively validated. A more detailed description of the AAQuIRE dispersion model is included in Appendix C.

There are 4 main categories of air pollutant sources: road traffic sources, industrial sources (Part A and B processes), diffuse sources (e.g. domestic heating), and mobile sources (e.g. airports, rail and shipping). For the purposes of this study, a detailed assessment was performed on the major roads within Witney. Contributions from all the other pollutant sources were amalgamated into the background concentration (see Section 4.4).

4.2. Modelling Study Areas

The area of study was based around Bridge Street, Mill Street and High Street as these were the areas identified in the previous assessment and currently comprising the major parts of the AQMA for NO_2.

All the modelling was performed on a two-dimensional receptor grid, with a grid spacing of 10 metres to ensure that a high level of spatial resolution was obtained, as recommended by the LAQM.TG(03) guidance. The results produced allowed the generation of NO_2 concentration contour plots.

Concentrations were also predicted at a number of specific receptors representing the diffusion tube and continuous monitoring locations.

4.3. Meteorological Data

A meteorological dataset was compiled using data from Brize Norton RAF base, which was considered by the Meteorological Office to be the most suitable site for the study area. Data from several recent years were studied, and 2005 was considered to give a good representation of typical meteorological conditions for the area in any one year.

Appendix B provides further details about the methodology used to compile the meteorological data ready for the model.

4.4. Background Concentrations

The background concentration used in the study was determined using the NO_2 diffusion tube located at Early Road, Witney. This location was selected as it is representative of the urban background concentration. The concentration of NO_X was calculated using the NO_X / NO_2 ratio determined from the continuous analyser (see Section 4.6). The values used are shown in Table 5.

Table 5: Background Concentrations used in the Modelling (µg/m^3)

Location	NO_2, 2005	NO_X, 2005
Early Road Diffusion Tube	14.1	22.6

As the local authority has some control over emissions of NO_X but little or no control over the atmospheric oxidants that oxidise NO to NO_2, it is more appropriate to review NO_2 by first modelling NO_X. It is for this reason that a NO_X background is applied to the modelled NO_X concentration before being converted to NO_2 (see Section 4.6).

4.5. **Traffic Data**

The traffic data required for the modelling were provided by Oxfordshire County Council, and were based on manual automated traffic counts conducted in 2004 and 2005. Where necessary, 2005 traffic flows were calculated using traffic growth factors defined by Oxfordshire County Council. Average speeds were reduced to account for busy, congested areas, and junctions. HGV proportions were provided for all the roads. The traffic data are listed in Appendix D.

Road transport represents the major source of pollution in the study area and it was therefore imperative that the emission data were as accurate as possible. Speed related emission factors were derived from the latest factors supplied on the National Atmospheric Emissions Inventory website.

Emissions of some pollutants are higher when the engine is cold, yet cars take about 3 minutes or 1.6 km before the engine is 'hot'. This engine warming factor was accounted for by using a variable vehicle composition profile for each road, and for each year. This information was taken from the QUARG[11] inventory. Enhancement of pollutant emissions due to cold starts is given in Table 6. This table summarises vehicle emissions testing, which has demonstrated, for example, that a Light Duty Vehicle (LDV) with a cold catalyst will emit 1.3 times the quantity of NO_X as the same LDV once the catalyst has warmed up.

Table 6: Ratio of Emissions of Cold Engines Relative to Hot Engines

LDV Category	NO_X
Non catalyst petrol	1.0
Catalyst petrol	1.3
Diesel	1.2

4.6. **Conversion of NO_X to NO_2**

As explained in Section 2.1, the proportion of NO_2 in NO_X varies greatly with location and time according to a number of factors including the amount of ozone available and the distance from the emission source.

Data from the continuous analyser located at the junction of Bridge Street and Newland was used to produce a NO_2/NO_X relationship. This was used to convert the annual average NO_X concentrations generated by the model to annual average NO_2 concentrations. However, as NO_X concentrations are expected to decline in future years, NO_2 concentrations will not be limited as much by ozone. Consequently, it is possible that the future year NO_2/NO_X ratio will increase.

Table 7: Witney NO_2/NO_X Relationship, 2004

NO_X/µg/m³	NO_2/µg/m³	NO_X/µg/m³	NO_2/µg/m³	NO_X/µg/m³	NO_2/µg/m³
0	0.0	110	48.6	210	69.7
10	6.4	120	51.4	220	71.1
20	12.7	130	54.1	230	72.3
30	18.1	140	56.5	240	73.4
40	23.0	150	58.8	250	74.3
50	27.4	160	61.0	260	75.2
60	31.6	170	63.0	270	75.9
70	35.4	180	64.9	280	76.5
80	39.1	190	66.6	290	77.0
90	42.4	200	68.2	300	77.4
100	45.6				

4.7. **Model Error and Verification**

The results from the modelling study will be subject to error due to uncertainties in modelling dispersion algorithms and the input data. Therefore, it is imperative that the performance of any modelling study is verified by comparison with local monitoring data. The modelling results have been verified by comparison with data from nearby diffusion tube sites.

Table 8 shows the 2005 monitoring data for the three diffusion tube sites.

Table 8: Diffusion Tube Data used for Model Verification (µg/m^3)

Diffusion Tube Site	Grid Reference	2005
Newlands Continuous Analyser[1]	435938,210334	37.3
Bridge Street	435825,210240	44.1
Mill Street	435665,210199	35.5

Note:[1]Seasonally adjusted using data from Harwell and Reading New Town background sites.

5. Results

5.1. Data Verification

As discussed in Section 4.7, when undertaking a dispersion modelling study, it is standard practice to make a comparison between the modelling results and the monitoring data, to ensure that the model is reproducing actual observations. The accuracy of the future year modelling results are relative to the accuracy of the base year results, therefore greater confidence can be placed in the future year concentrations, if good agreement is found for the base year.

Modelling results are subject to systematic and random error; systematic error arises due to many factors, such as uncertainty in the traffic data and the composition of the vehicle fleet, and uncertainty in the meteorological dataset. This can be addressed and, if necessary, adjusted for by comparison with monitoring data.

Data from the two diffusion tubes and the continuous analyser have been used to adjust the modelled results. The continuous analyser is expected to produce more reliable results, but the diffusion tubes are in locations of higher exposure which are of greater significance to the assessment of the AQMA.

The model under predicted the concentrations of NO_2, so the modelled results were adjusted using a calibration factor derived from the results of the monitored and modelled specific receptor locations. The steps in the adjustment procedure are described below:

$$NO_{X\ [monitored,\ traffic\ contribution]} = NO_{X\ [monitored]} - NO_{X\ [background]}$$
$$NO_{X\ [modelled,\ traffic\ contribution]} = NO_{X\ [modelled]} - NO_{X\ [background]}$$

$$\text{Adjustment Factor} = NO_{X\ [monitored,\ traffic\ contribution]} / NO_{X\ [modelled,\ traffic\ contribution]}$$

$$NO_{X\ [model\ adjusted,\ traffic\ contribution]} = NO_{X\ [modelled,\ traffic\ contribution]} \times \text{Adjustment Factor}$$
$$NO_{X\ [model\ adjusted]} = NO_{X\ [model\ adjusted,\ traffic\ contribution]} + NO_{X\ [background]}$$

Therefore, the modelled NO_X traffic contribution data were multiplied by the adjustment factor (3.58), and the background NO_X added to give the adjusted NO_X concentrations ($NO_{X\ [model\ adjusted]}$). The adjusted NO_X concentrations were converted to NO_2 using the ratio determined from the continuous analyser. This procedure is in accordance with that detailed in technical guidance note LAQM.TG(03). Table 9 compares the adjusted modelling results and the monitoring results for 2005.

Table 9: Model Verification

Site	Annual Mean NO_2 / $\mu g/m^3$ (2005)		Difference
	Modelled	Monitored	
Newlands Continuous Analyser	36.0	37.3[1]	+3.6%
Bridge Street Diffusion Tube	45.1	44.1	-2.3%
Mill Street Diffusion Tube	29.4	35.5	+20.7%

Note:[1]Seasonally adjusted using data from Harwell and Reading New Town background sites.

5.2. **Random Error of the Model**

In addition to the systematic errors, as described above, the model is still likely to predict concentrations slightly different to actual ambient values. This is termed random error, and must be considered. It is possible to account for the degree of random error, according to guidance provided by the NSCA.

'Stock U Values', figures provided by NSCA, allow the standard deviation of the model (SDM) to be calculated. The Stock U Value for NO_2 is between 0.1 and 0.2 for an annual mean (it is higher for shorter averaging periods). The SDM can be calculated according to:

SDM = U x Co

Where Co is the air quality objective; so 40 µg/m^3 for the NO_2 annual mean objective. Therefore:

SDM = 0.1 x 40 = 4 µg/m^3

This calculation quantifies the uncertainty in the identification of areas where an exceedence of the air quality objective can be considered possible. This region, therefore, extends between 36 µg/m^3 to 44 µg/m^3 at 1 standard deviation from the objective.

The following terminology is used in conjunction with the modelling uncertainty results.

Table 10: Probability of Exceedence of Annual Mean NO_2 Objective

Probability of Exceedence	Uncertainty	Concentration Range / µg/m^3
Very likely	> Mean + 2 SD	>48
Likely	Mean + 1 SD – Mean +2 SD	44 – 48
Probable	Mean - Mean + 1 SD	40 – 44
Possible	Mean - Mean – 1 SD	36 – 40
Unlikely	Mean - 1 SD – Mean - 2 SD	32 – 36
Very Unlikely	< Mean – 2 SD	< 32

5.3. **Modelling Results for Nitrogen Dioxide**

This assessment considers the annual mean and hourly air quality standards, as specified in the Air Quality (England) Regulations 2000. For NO_2, the standards to be achieved by the end of 2005 are an annual mean of 40 µg/m^3 (21 ppb), and an hourly mean of 200 µg/m^3 (105 ppb) to be exceeded no more than 18 times per year (equivalent to 99.8th percentile). It is generally considered that the annual mean objective is more stringent, and so if it is met, it can be assumed that the hourly objective will also be met.

The area of highest concentrations is Bridge Street, between Mill Street and the junction with Newlands, with another smaller area of high concentration around the junction of the High Street and Witan Way. These areas are the same as those identified in the previous assessment of June 2004, and include the areas defined in the AQMA.

The peak concentrations at the building façade are approximately 52 µg/m^3 on the south east side of Bridge Street, and 48-50 µg/m^3 on the north west side. The peak concentration at the building façade at the junction of High Street and Witan Way is approximately 42 µg/m^3.

Using the SDM value of 4 µg/m^3 discussed in Section 5.2, these predicted concentrations indicate that sensitive receptors on Bridge Street, such as properties or local residents, are 'very likely' to exceed the 40 µg/m^3 UK annual mean objective for NO_2. It is also 'probable' that the sensitive receptors at the junction of High Street and Witan Way will exceed the objective.

6. Conclusions

Faber Maunsell has undertaken a detailed dispersion modelling study to predict concentrations of nitrogen dioxide (NO_2) in the centre of Witney.

The study predicted that the annual mean NO_2 air quality objective for 2005 is likely or very likely to be exceeded at one location in Witney, where the term 'likely exceedence' has been defined as taking into account the SDM value of 4 µg/m^3 (see Table 10):

- Bridge Street, between Mill Street and Newlands.

The modelling study also indicated one location of probable exceedence, where the term 'probable exceedences' has also been defined as taking into account the SDM value of 4 µg/m^3 (see Table 10):

- High Street at the junction with Witan Way.
- Mill Street near the junction with the High Street
- Woodgreen Hill near the junction with Bridge Street

The results indicate:

- The concentration at the façade of buildings on Bridge Street is between 48 µg/m^3 and 52 µg/m^3.
- The peak concentration at the façade of properties facing the junction of High Street and Witan Way is approximately 42 µg/m^3.

These results predominantly agree with the findings of the previous detailed assessment performed in June 2004.

6.1. Recommendations

It is recommended that the current extent of the AQMA is maintained, primarily based on the monitoring results, but in conjunction with the modelling predictions. On the basis of both the 36 µg/m^3 and the 40 µg/m^3 contours, additional areas to the north and south of the present AQMA have been predicted to exceed the annual mean NO_2 objective.

Two options should be considered based on the modelling results:

- Maintain the existing AQMA and increase monitoring, or:
- Extend the existing AQMA to encompass the areas discussed above.

7. References

[1] Defra (2003) Local Air Quality Management. Technical Guidance. LAQM.TG(03).

[2] National Atmospheric Emissions Inventory website, http://www.naei.org.uk/

[3] NETCEN, National Air Quality Archive, http://www.airquality.co.uk/

[4] Defra, 'UK Air Quality Strategy', http://www.defra.gov.uk/environment/airquality/strategy/index.htm

[5] Defra, The Air Quality (England) Regulations 2000, http://www.defra.gov.uk/environment/airquality/airqual/index.htm

[6] West Oxfordshire District Council, Stage 2 Review and Assessment of Air Quality, 2000

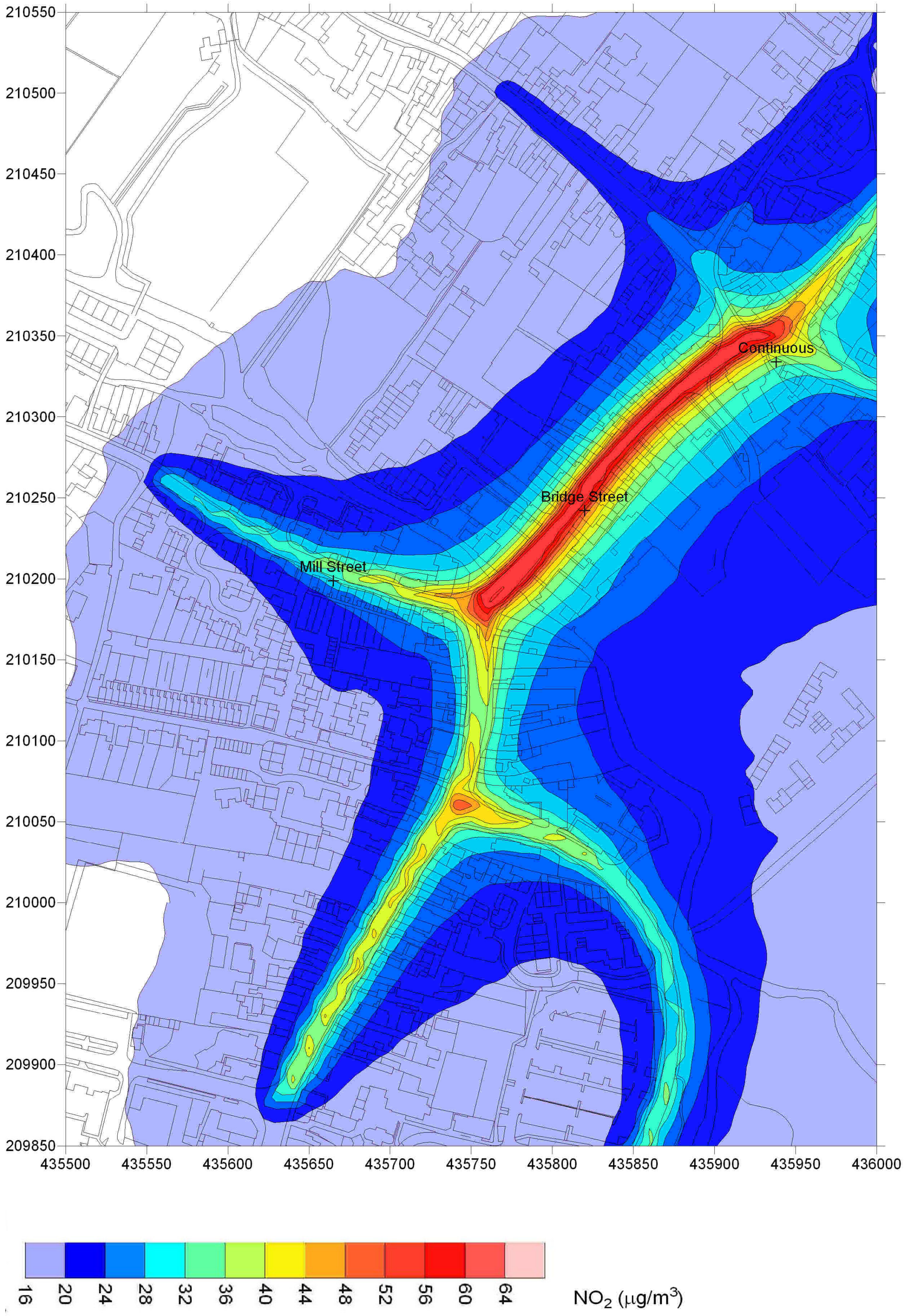
[7] Oxfordshire District Council, Detailed Assessment of Air Quality, 2004.

[10] Department of Health Advisory Group on the Medical Aspects of Air Pollution Episodes. Oxides of Nitrogen - Third Report. HMSO, 1993.

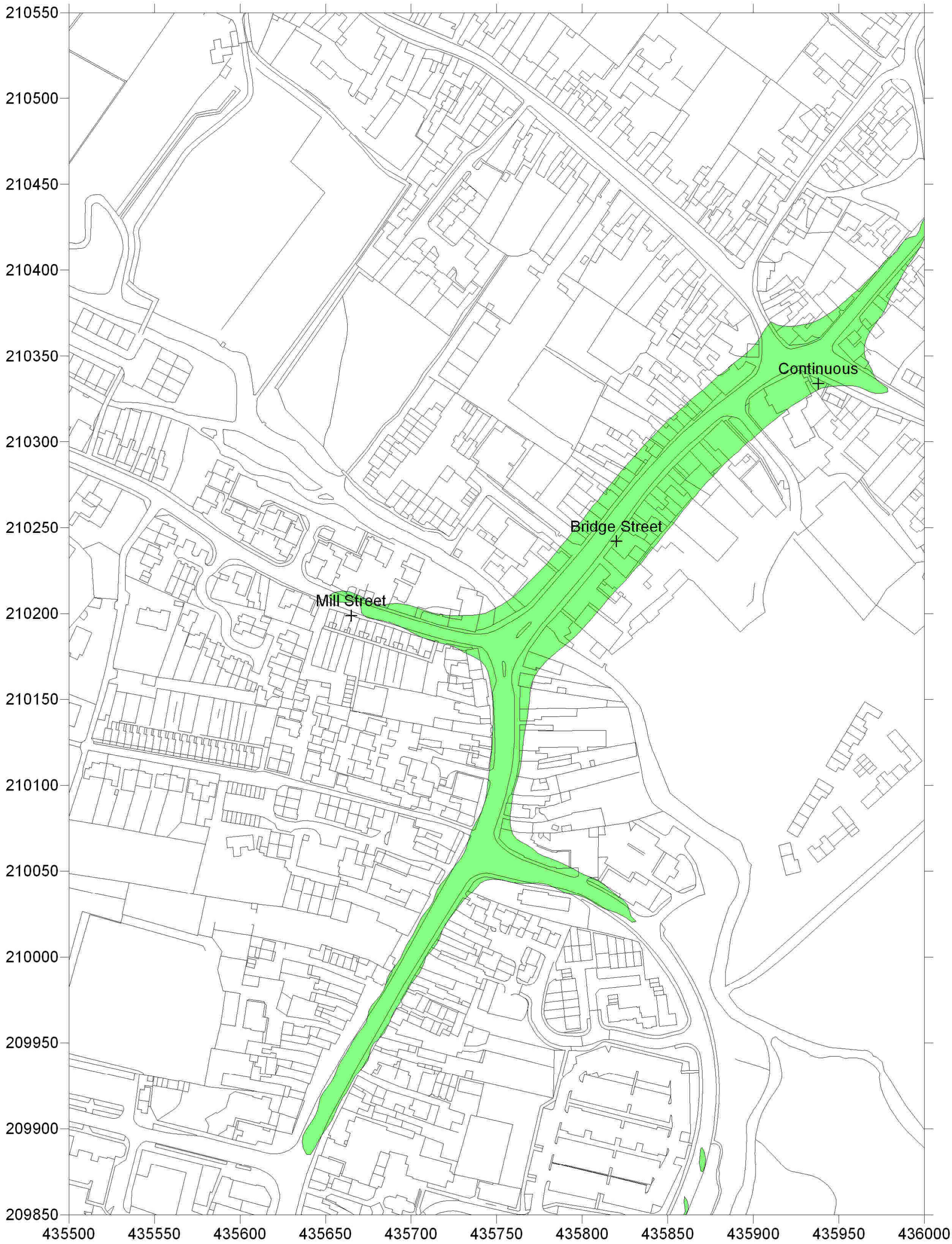
[11] Department of the Environment, Quality of Urban Air Research Group (QUARG), Urban Air Quality in the UK, 1993.

[12] Air Quality Expert Group (AQEG), Report on NO_2 in the UK, 2004.

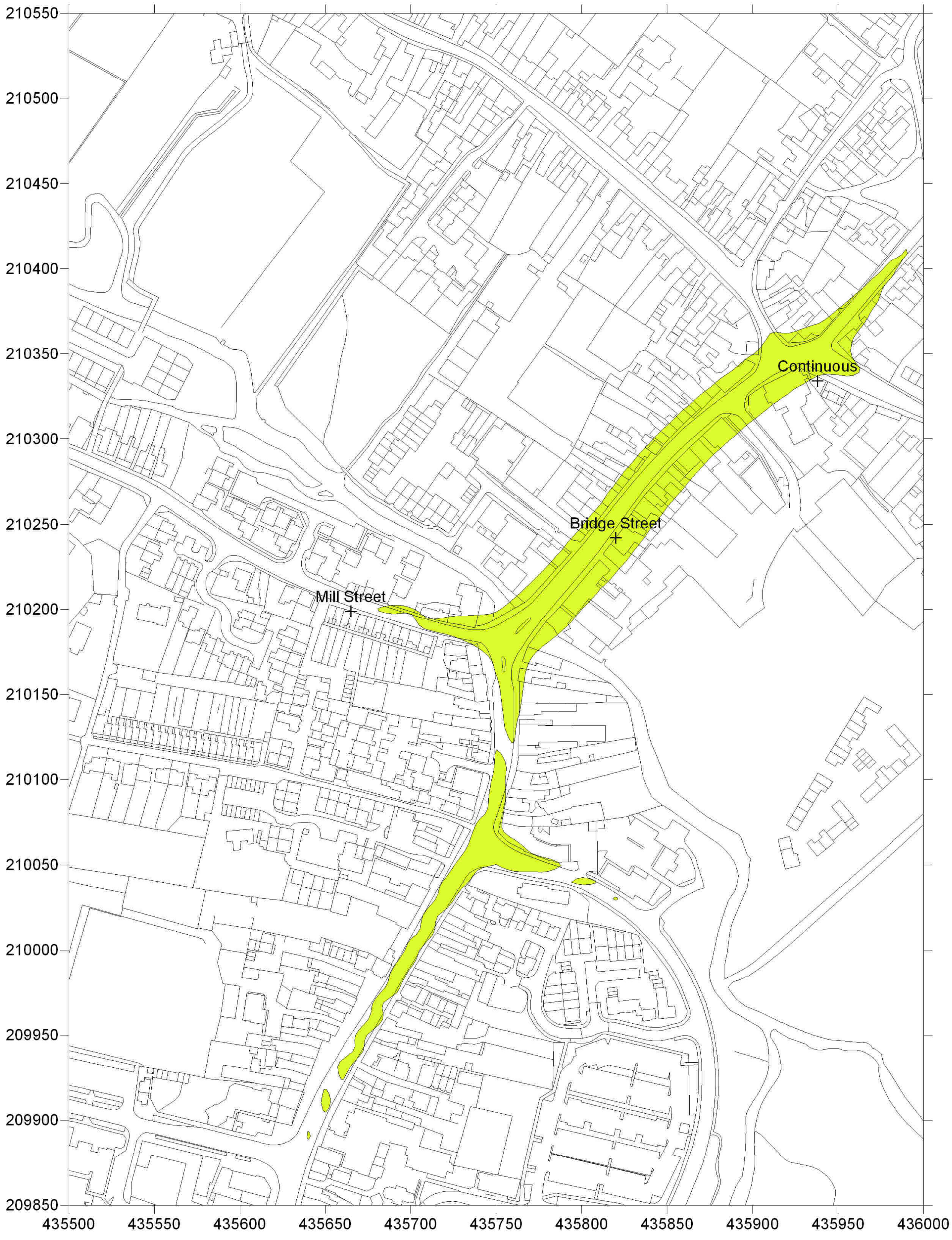
Appendix A: Nitrogen Dioxide Contour Plot



Appendix B: Nitrogen Dioxide 36 µg/m³ Contour Plot



Appendix C: Nitrogen Dioxide 40 µg/m^3 Contour Plot



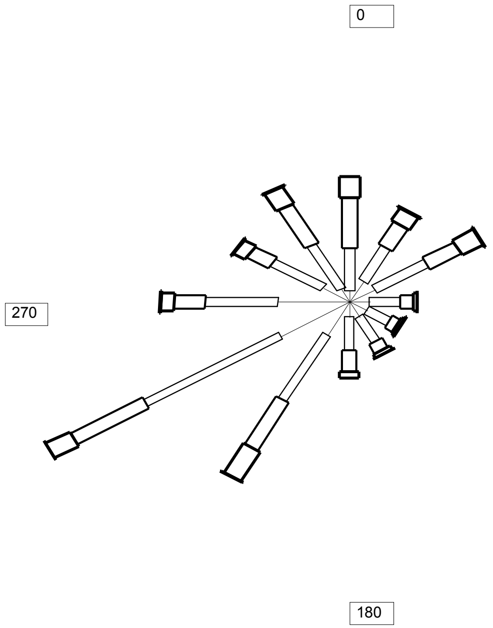
Appendix C: Meteorological Data

Meteorological data measured at Brize Norton RAF base, in 2005, were used in this modelling study. The data consisted of the frequencies of occurrence of wind speed (0-2, 2-4, 4-6, 6-10, 10+ m/s), wind direction (30° resolution) and Pasquill stability classes. Pasquill stability classes categorise the stability of the atmosphere from A (very unstable) through D (neutral) to G (very stable).

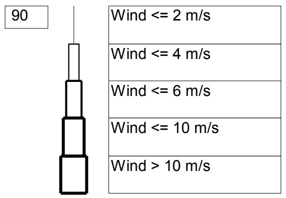
Calm winds were distributed evenly between the wind direction sectors in the 1 m/s category. The stability classes used were C, D and E where all of the unstable classes were grouped in C and all of the stable classes in E.

The meteorological data were used to produce a wind/stability rose (below). Each wind rose bar is designed to illustrate three wind properties: the direction the wind is coming from; the relative number of hours the wind is from this direction; and the magnitude of the wind speeds. These data are also tabulated to show the total number of hours and the wind speed split for each wind direction sector.

Figure 2:Brize Norton Wind Rose, 2005



	Wind <= 2 m/s	Wind <= 4 m/s	Wind <= 6 m/s	Wind <= 10 m/s	d > 10	Total
D >= 345 or D < 1!	64	255	288	125		732
15 <= D < 45	136	230	151	85	1	603
45 <= D < 75	148	296	184	119	8	755
75 <= D < 105	102	157	66	18	1	344
105 <= D < 135	100	127	50	16	2	295
135 <= D < 165	107	160	58	27	1	353
165 <= D < 195	87	196	120	40		443
195 <= D < 225	221	435	320	193	5	1174
225 <= D < 255	394	778	415	136	1	1724
255 <= D < 285	359	361	153	66	4	943
285 <= D < 315	154	285	132	67	2	640
315 <= D < 345	84	299	252	116	3	754
Total	1956	3579	2189	1008	28	8760



Appendix D: AAQuIRE Model

The AAQuIRE 6.1.1 software is a system that predicts Ambient Air Quality in Regional Environments and comprises a regional air quality model and statistical package.

AAQuIRE was developed by Faber Maunsell Ltd to meet three requirements in predictive air quality studies. The first requirement was an immediate need for a system that produced results that could be interpreted easily by non-air quality specialists to allow for proper informed inclusion of air quality issues in wider fora, the main example being to allow consideration of air quality issues in planning processes. This was achieved by allowing results to be generated over a sufficiently large study area, and at an appropriate resolution, for the issue being considered. The results are also presented in a relevant format, which is normally a statistic directly comparable with an air quality criterion or set of measured data being considered. For example, the UKNAQS PM_{10} 24-hour objective level of 50 $\mu g/m^3$ is expressed as a 90^{th} percentile of hourly means. AAQuIRE can also produce results directly comparable with all ambient air quality standards.

The second requirement was for a system to be based, initially, on existing and well-accepted and validated dispersion models. This has two advantages. The primary one is that it avoids the need to prove a new model against the accepted models and therefore enhances acceptability. The second advantage is that when appropriate new models are developed they can be included in AAQuIRE and be compared directly with the existing models, and sets of measured data, using the most appropriate statistics.

The final primary requirement for AAQuIRE was a consideration of quality assurance and control. An important aspect of modelling is proper record keeping ensuring repeatability of results. This is achieved within AAQuIRE by a set of log files, which record all aspects of a study and allow model runs to be easily repeated.

The ways in which AAQuIRE and the models currently available within it operate are discussed below.

The operation of AAQuIRE can be divided into five main stages. These are:

- the preparation of the input data
- the generation of model input files
- dispersion modelling
- the statistical treatment of dispersion modelling results
- the presentation of results.

The first step in operating AAQuIRE is to prepare the input data. The following data are needed for the year and pollutant to be modelled:

- meteorological data expressed as occurrence frequencies for specified combinations of wind speed, direction, stability and boundary layer height
- road system layout and associated traffic data within and immediately surrounding the study area
- industrial stack locations and parameters
- a grid of model prediction locations (receptors).

The modelling is always carried out to give annual average results from which appropriate shorter period concentrations can be derived.

The second stage is the generation of the model input files required for the study. All the data collated in the first stage can be easily input into AAQuIRE, using the worksheets, drop down boxes and click boxes in the Data Manager section of the software. Data from spreadsheets can be easily pasted into worksheets, so that any complicated procedures required for data manipulation can be achieved before entry into AAQuIRE. Several diurnal and seasonal profiles can be defined for each separate source. The relevant meteorological data can also be specified at this stage.

The third stage is executing the models. The study area will usually be divided up into manageable grids and run separately using the Run Manager in AAQuIRE. The results from the separate files can be combined at a later stage. Pollutant concentrations are determined for each receptor point and each meteorological category and are subsequently combined.

The fourth stage is the statistical processing of the raw dispersion results to produce results in the relevant averaging period. Traffic sources and industrial sources can be combined at this stage provided the same receptor grid has been used for both. Background concentrations should also be incorporated at this stage.

The final stage is presentation of results. Currently the result files from the statistical interpretation are formatted to be used directly by the SURFER package produced by Golden Software Inc. Alternative formats are available to permit interfacing with other software packages. On previous projects the results have been imported into a GIS (e.g. ArcView and Map Info).

Currently AAQuIRE uses the CALINE4 model for the dispersion of road-traffic emissions and AERMOD for all other sources. Both these models are fully validated and have been extensively used worldwide. These are relatively complex models designed for detailed studies of local areas, which are used within AAQuIRE for both local and larger scale studies. This is considered necessary because of the frequent importance of local effects, such as traffic junctions, in properly assessing 'regional' effects.

Appendix E: Traffic Data

Table 11: Traffic Flow Data

Road Name	2005 AADT	2005 HGV
Woodstock	8711	5.6
Bridge Street	27565	5.6
Mill Street	9561	6.3
West End	4843	2.8
Newland	7164	2.9
High Street	11439	5.2
Witan Way	10756	5.2
Bridge Street / Woodstock	18138	5.5
New Yatt Road	1325	2.8

Prepared by: .... Duncan Urquhart Environmental Scientist

Approved by: .... Gareth Collins Principal Environmental Scientist

Rev No	Comments	Date
1		

Enterprise House, 160 Croydon Road, Beckenham, Kent, BR3 4DE
Telephone: 0870 905 0906 Fax: 020 8663 6723 Website: http://www.fabermaunsell.com

Job No 44414IBEE Reference DCU Date Created March 2006

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Appendix 4

Jacobs modelling assessment of the traffic management options

Oxfordshire Highways
Cogges Link Road
Environmental Statement
B0834600/Doc/PA/CLR/01 84

17 Air Quality

17.1 **Introduction**

17.1.1 An air quality assessment for Cogges Link Road is included in Volume 2D of the Environmental Statement. Vehicular traffic is one of the principal sources of urban air pollution and therefore the road traffic associated with the construction and operation of the proposed road has been assessed as it comprises a potentially significant source of local air pollution.

17.1.2 The purpose of this assessment was to:

- Identify existing levels of ambient air pollution in the study area;
- Assess potential air pollution as a result of the proposed development;
- Identify measures to mitigate these;
- Assess the residual impacts of the scheme.

17.1.3 The Environment Act 1995 (Part IV) sets out a requirement for a National Air Quality Strategy to be developed. The Strategy sets health based standards for a number of pollutants of concern (benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particles and sulphur dioxide). The UK Strategy was revised in 2000 and updated in 2007 (The Air Quality Strategy for England, Scotland, Wales and Northern Ireland). The 2007 Strategy re-established objectives for improvements in air quality in the United Kingdom and includes new targets for ultra fine particulates (PM2.5) utilising the exposure reduction methodology. Within the Strategy, the revised set of Air Quality Objectives (AQOs) are presented, with some objectives being dropped (PM10 Objective for 2010) as well as new additions, such as objectives for PM2.5 and ozone (O3) concentrations together with one for the protection of vegetation and fragile ecosystems.

17.1.4 The air quality assessment has been undertaken in accordance with the following documents:

- Air Quality Regulations, 1989;
- Air Quality (England) Regulations, 2000;
- Air Quality (England) Amendment Regulations;
- Air Quality Strategy for England, Scotland, Wales and Northern Ireland: (AQS 2007) (Department for Environment, Food and Rural Affairs - DEFRA); Environment Act, Part IV, 1995;

- Local Air Quality Management Technical Guidance LAQM. TG(03), 2007 (DEFRA);
- Design Manual for Roads and Bridges Volume 11 (2007).

17.1.5 Air quality within the site and the surrounding area has the potential to be affected by Cogges Link Road specifically from vehicular emissions both during construction (e.g. site plant and haulage vehicles), although this would be of a temporary duration and after it's opening. Of those pollutants for which AQOs have been set the key pollutants which have been considered in this assessment are nitrogen dioxide (NO2) and particulates (PM10). LAQM TG.03 gives various criteria which need to be exceeded before an air quality assessment of the emissions from road traffic sources needs to be undertaken for each pollutant species. In this case the threshold for pollutants other than NO2 and PM10 are not met, and therefore are not considered further in this assessment. Therefore the pollutants of NO2 and PM10 are of the most concern with regard to their likelihood of non-compliance with the Air Quality Objectives (AQOs) and the effect on health within the urban environment.

17.1.6 The potential impacts associated with dust from the construction phases of the proposal, including the importation of material to the site have been qualitatively assessed.

17.2 **Baseline Conditions**

17.2.1 Air quality in the area of Cogges Link is largely influenced by emissions from traffic using nearby roads. There are no large industrial processes in the vicinity that influence air quality. The area to the north and west is predominantly mixed residential and is characterised by moderately sensitive receptors. The receptors that may potentially be affected by air quality impacts are those residents living in Cogges; particularly those properties in Eton Close to the south of the residential development which are relatively close to the proposed route. Residential properties along the current road network of the High Street, Bridge Street, Witan Way, Newlands and Oxford Hill may also be potentially beneficially affected by reductions in traffic caused by the reassignment of traffic due to the opening of the proposed road

.

17.2.2 Bridge Street in the centre of Witney, currently carries the majority of traffic within the local road network. Traffic flows are heaviest during both the morning and afternoon peak hours producing queues around a number of junctions in the local road network. The limited storage capacity of these junctions leads to vehicles queuing and journey delays producing a situation which tends to generate significantly more emissions than free flowing traffic. Studies (Exhaust Emission Factors 2001: Database and Emission Factors. Barlow et al 2001) have shown that the highest rates of emissions occur in congested, slow moving traffic. Emission rates under stop start driving conditions are much higher than those when the vehicle is driven more smoothly. Hydrocarbon emissions from a car travelling at a steady speed have been shown to be only half of those measured at the same average speed but with the car driven in a more typical way over a driving cycle containing accelerations, decelerations and periods of idling.

17.2.3 The Environment Act 19952, specifically sections 82-84, requires Local Authorities to carry out reviews of air quality within their administrative areas and, where it is assessed that the AQOs may not be complied with by the objective dates; an Air Quality Management Area (AQMA) must be declared. The Local Authority must then formulate an Action Plan, setting out the measures that will be employed to achieve compliance with the objectives. In March 2005 West Oxfordshire District Council (WODC) declared two AQMAs in the towns of Witney and Chipping Norton. The Council's detailed investigation into the local air quality concluded that NO2 was likely to fail the Government's annual mean objective for NO2 in 2005.In particular, this assessment and subsequent Updating and Screening assessments of the local air quality carried out by West Oxfordshire District Council (WODC) have shown that the current concentrations of NO2 at certain locations are above the AQOs within the town centre. Therefore, an Air Quality Management Area (AQMA) has been declared for NO2 incorporating Bridge Street, together with its junctions with New Yatt Road, Newland, Mill Street and High Street.

17.2.4 This air quality assessment therefore focuses primarily on nitrogen dioxide as previous assessments carried out on behalf of the local authority have shown that concentrations of the other air pollutants associated with road traffic emissions, such as carbon monoxide (CO), benzene (C6H6), particulates (PM10) and 1,3-butadeine (C4H6) will meet the objectives in this area and they have therefore been scoped out of this assessment.

17.2.5 WODC has undertaken extensive NO2 diffusion tube surveys at sites located in the AQMA and in other areas of Witney. The survey has been undertaken with passive diffusion tubes with the aim of producing representative baseline concentrations of NO2. A continuous NO2 analyser also operated at the junction of Newland and Bridge Street and provided useful information about the baseline distribution of the pollutants and of the local NOX/NO2 relationship. A detailed dispersion modelling study carried out in 2006 predicted that the NO2 concentrations at the façade of the buildings in Bridge Street is between 48 □g/m3 and 52 □g/m3The results of detailed dispersion modelling for the baseline scenario 2005 and year of opening of the scheme, 2011 are detailed in Table 2 in Volume 2 of the ES.

17.3 **Environmental Impact and Mitigation**

Construction Phase

Air Quality

17.3.1 There would be some temporary periods of relatively high construction traffic movements, which would occur after the construction of the main site accesses off Oxford Hill and Witan Way. The transport assessment data indicate that the predicted increase in traffic is likely to be less than 10%. DMRB states that traffic flow increases of less than 10% are not considered significant in terms of air quality. It is therefore anticipated that there would be no significant change in the local air quality due to construction traffic.

Dust

17.3.2 Dust is defined in British Standard BS 6069 as comprising small solid particles between 1 and 75□m (microns) in diameter and it is present in the atmosphere from a variety of natural and manmade sources.

17.3.3 Dust emissions during the construction phase of the proposal could arise from various sources including:

- Mixing of aggregate on site (i.e. cement);
- Mechanical handling operations, including crushing and mixing processes, where in general the more powerful the machinery and the greater the
- volume of the material handled, the greater the potential for fugitive dust;On site storage of cement, finer fractions within stockpiles etc.

17.3.4 If not controlled, airborne dust can pose a nuisance to surrounding neighbours and sensitive receptors through:

- Annoyance;
- Health effects especially those sensitive to respiratory problems;
- Loss of amenity (e.g. due to dust deposition);
- Interference with sensitive industrial or commercial activities;
- Coating of vegetation.

17.3.5 Dust emissions from construction sites are very variable, depending on factors such as type of activity, ground conditions, the prevailing wind speed and over riding meteorological conditions. Measures may be undertaken to prevent dust from becoming airborne through careful management of the construction activities on site.

Operational Phase

Calculated Concentrations at Representative Locations

17.3.6 Predicted levels of pollutants (calculated in accordance with the methodology in TG.03) are used to compare the existing situation with the proposed Cogges Link Road scenario in place at representative locations and indicate that all of the objectives adopted in the Air Quality Strategy 2007 would be complied with at all locations studied for the year of opening (2011). The principal findings from the modelling of the Do Minimum 2011 and Do Something 2011 Scenarios, when the predicted levels of pollutants are compared with the existing situation at representative locations, are shown in Volume 2. This highlights the calculated concentrations at the chosen representative locations and indicates the expected decrease in pollutant emissions over time, with pollutant concentrations in the Do Minimum 2011 decreasing from the current ambient levels. Although reductions in the annual mean concentrations of NO2 are predicted they would however remain above the objective at a number of receptors.

17.3.7 In the Do Minimum scenario, traffic remains congested along Bridge Street, the High Street and Newland, with properties fronting on to the road experiencing annual mean NO2 concentrations in the mid 40s to low 50s □g/m^3. With the introduction of the scheme the reassignment of traffic would lead to a significant reduction in pollutant concentrations along these roads. The annual mean NO2 concentrations would fall by up to 14 □g/m^3, to below 40 □g/m^3 within the majority of the town centre. Other properties fronting onto roads in the highway network experiencing a reduction in traffic flows, such as Oxford Hill, Woodstock Road and Newland would also experience a reduction in pollutant concentrations of up to 6 □g/m^3, over the do-minimum scenario. The contour plots as detailed in Volume 2 of the proposed scheme's impact upon the pollutant concentrations within Witney town centre would indicate that the town centre AQMA could be redrawn and reduced in area or could be un-declared as an AQMA as a result of the introduction of the proposed Cogges Link Road as the annual mean NO2 concentrations are predicted to fall below the AQO of 40 □g/m^3.

17.3.8 Properties in Eton Close and Blakes Avenue, relatively close to the proposed scheme would experience an increase in pollutant concentrations with the opening of the road, with the annual mean NO2 concentrations increasing from low 20s □g/m^3 by up to 6 □g/m^3 to 26 □g/m^3. Pollutant concentrations would however remain within the Air Quality Objectives.

17.3.9 With both the Do Minimum and Do Something scenarios, at all properties considered in the assessment the pollutant concentrations would reduce from the current ambient levels for the year of opening, 2011. This is due to the expected decrease in pollutant emissions over time as a result of improvements in fuel and engine technology.

Mitigation
17.3.10 No mitigation measures in relation to air quality would be required.

17.4 **Residual Impacts**

17.4.1 It is concluded that the proposed road scheme would result in no residential properties experiencing a significantly adverse impact in terms of local air quality, with the introduction of the proposed road scheme. In addition there are a substantial number of properties within the centre of Witney that would experience a significant improvement in local air quality due to the reduction in town centre traffic associated with the scheme which would also result in a reduction in the size of the town centre AQMA. Overall the impact of the proposed scheme is positive in terms of local air quality with many properties experiencing improvements in air quality and no properties experiencing negative residual impacts.

Appendix 5

Summary and Overview of Air Quality Modelling of Traffic Management Options and Proposals

1 Scope/Purpose

This appendix provides a summary of the data used within this document prior to any public consultation. This summary is not designed to provide a critical analysis of the data nor comment on any data quality issues encountered.

2 Relevance

Air Quality modelling is an integral part of local air quality management; it allows Local Authorities with limited monitoring networks to predict concentrations of air pollutants at multiple locations simultaneously. Modelling predictions form an integral part of the Air Quality Action Plan (AQAP) drafted by West Oxfordshire District Council. The data provided by modelling has been utilised for the following purposes:

- Determination of the AQMA.
- Providing quantitative data, which allows WODC to formulate relevant strategies to reduce the concentration of air pollutants in Witney.
- Predicting the impact that proposed reduction strategies will have on the future Air Quality of Witney.
- Providing accurate data to stakeholders at the consultation phase.
- To predict the likelihood of WODC meeting its commitments in relation to the EU Daughter Directive and National Air Quality Strategy.

Reports, commissioned by OCC, underpin the air quality reduction strategies proposed in the Draft AQAP. When making a policy decision as to which reduction strategy, or combination of strategies, is the most effective and proportionate, it is necessary to understand the conclusions and implications.

3 Background

The Draft AQAP presents a number of options which are anticipated to improve air quality in the locality of Bridge Street, Witney, which is presently designated as an Air Quality Management Area.

To better inform the Local Authority and its stakeholders as to the extent of the air quality issue, alongside the potential impact the Local Authority's proposed options may have on the air quality within the management area, OCC commissioned a predictive modelling study. The study would consider options regarding the impact of reducing traffic density within the AQMA.

An additional scenario provided a predicted baseline case, where no local / regional options were adopted, therefore solely considering national trends and emission reduction programmes.

WODC is committed to reducing emissions of NO_2 to 40µgm^{-3}, measured as an annual average, within the district. This limit value is stipulated by the First European Daughter Directive 1999/30/EC.

4 Results

The modelling results are presented by scenario. WODC has secured a Defra Air Quality Grant to update the modelling. Using ratified data for 2010 the modelling will be commissioned in early 2011 and the results incorporated within the final Action Plan.

Scenario 1 – 2011 Do-minimum Baseline

Modelling predictions [Figure 3, Appendix 2], indicate the extent of the AQMA will decrease as a result of this policy decision. Consideration of the plots provided in the report indicate that the 2011 scenario's 36µgm^{-3} NO_2 plot (which has been used as a conservative estimate of where the NO_2 objective may be exceeded) covers a much reduced number of residential property facades than the 2005 data [shown at Figure 2, Appendix 2] .

Scenario 2 – Do Something [Cogges Link Road]

Modelling plots associated with this option [Figure 4, Appendix 2], identify significant reductions in NO_2 concentrations across the entirety of the AQMA and its adjoining junctions. It is the only modelled scenario which indicates with some certainty that the AQ objective for NO_2 will be complied with.

5 Concluding Remarks

Despite earlier predictions that Air Quality would improve due to the introduction of cleaner vehicles, fuels and retrofitting of aging vehicles (which, as yet, is not evident from monitoring within the AQMA), Scenario 1 would not address other concerns such as noise, vibration and public safety issues attributable to Heavy Goods traffic which will remain. As a consequence it does not facilitate integrated problem solving for traffic related problems experienced by residents of Witney.

Schemes which result in any reduction of traffic density (including HGVs) from the town centre are thus desirable. Modelling data supported the strategy to reduce NO_2 emissions and was therefore accepted as evidence for seeking a physical reduction of traffic density within the AQMA.

The AQ modelling of the Witney AQMA will be updated in 2011 and, together with the recently re-established continuous AQ monitor, now in Bridge Street, it will confirm the boundary of the AQMA and provide an up to date pre CLR construction base line to compare with any post construction data.

Appendix 6

List of Consultees

Consultee	Organisation / Address
Defra	Air and Environmental Quality Division
Local Authorities	Cherwell DC Cotswold DC South Oxfordshire DC Vale of the White Horse DC Oxford City
Environment Agency	Environment Agency, External Relations Department
County Councils – Highways and Planning	Oxfordshire County Council Warwickshire County Council
Oxfordshire Primary Care Trust	Public Health Department
Town and Parish Councils	Witney Town Council
Action Groups	Bridge Street
Trade Associations	Mr John Howells Road Haulage Association [Southern Region] John.howells@rha.uk.net Mr Gordon Telling Freight Transport Association [Southern Region] gtelling@fta.co.uk Marketing Manager Witney Town Partnership
Media	Witney Gazette (Via WODC Press Officer : Carys.Davies@WESTOXON.GOV.UK)

Appendix 7

WODC Green Travel Plan

West Oxfordshire District Council Green Travel Plan

http://www.westoxon.gov.uk/files/download/2691-1486.pdf

Note: The 2005 edition is due to be updated in December 2010