# AIR QUALITY ACTION PLAN


# BROXTOWE BOROUGH COUNCIL

## Executive Summary

Part IV of the Environment Act 1995 requires all local authorities to review and assess the current and future air quality in their area against objectives set out for eight key pollutants, under the provisions of the Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002.

Where an exceedence of the objectives is likely, the local authority is under a duty to declare the area an Air Quality Management Area (AQMA) to improve air quality.

Following detailed work reviewing and assessment the air quality in Broxtowe, it was predicted that the annual mean nitrogen dioxide ($NO_2$) concentrations in certain locations would not achieve the provisional UK objective of 40µg/$m^3$ or less by the end of 2005. Accordingly, Broxtowe Borough Council declared 4 Air Quality Management Areas (AQMA's) within the borough along the M1 corridor. A $NO_2$ reduction of around 0.6µg/$m^3$ was required in order to achieve the UK and EU objectives.

In line with its statutory duty, Broxtowe Borough Council has produced this Action Plan to manage the air quality throughout the borough to try to ensure the air quality standards and objectives are met. This Action Plan supersedes a draft action plan which was published in January 2007 following comments from statutory consultees and stakeholders. Their comments have been incorporated where possible.

The primary source of $NO_2$ within the AQMA's in from vehicle emissions from motorway transport. Unfortunately, the motorway's control is outside the Council's remit and responsibility lies with the Highways Agency. Nonetheless, the Council has considered various strategies, taking into account factors such as whether the Council has the ability to implement the options identified, cost, feasibility and non-air quality benefits. It has been determined that the best course of action for the Council will be to continue discussions with the Highways Agency.

Whilst the primary source of $NO_2$ within the AQMA's is outside the Council's remit, the Council has identified other options that will have an effect on the contributing levels of $NO_2$ to improve the air quality both in the AQMA's, as well as the rest of the borough. A summary of these actions can be found in Chapter 12.

Whilst modelling has predicted the $NO_2$ levels throughout the borough will be met prior to 2010 without any active intervention, the Council has increased its monitoring within the AQMA's to ascertain whether the air quality standards are to be met.

**Comments**

Further comments can be made on this document using the details below:

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## LIST OF ABBREVIATIONS AND TERMS

| | |
|---|---|
| AQAP | Air Quality Action Plan |
| AQMA | Air Quality Management Area |
| CO | Carbon Monoxide |
| COMEAP | Committee on the Medical Effects of Air Pollution |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges |
| EA | Environment Agency |
| EC | European Commission |
| EPA | Environmental Protection Act 1990 |
| EPAQS | Expert Panel on Air Quality Standards (UK Panel) |
| EU | European Union |
| HA | Highways Agency |
| LAQM | Local Air Quality Management |
| NAEI | National Atmospheric Emissions Inventory |
| NAQS | National Air Quality Standards |
| $NO_2$ | Nitrogen dioxide |
| $NO_x$ | Oxides of nitrogen |
| NSCA | National Society for Clean Air |
| $PM_{10}$ | Fine particles of less than 10 micrometres (μm) in diameter |
| Receptor | In the context of this study, the relevant location where air quality is assessed or predicted (for example, houses, hospitals and schools) |
| $SO_2$ | Sulphur dioxide |
| UNECE | United Nations Economic Commission for Europe |

## Contents

## 1.0. OVERVIEW OF AIR QUALITY

### 1.1. Air Quality Legislation

Research since the mid 1980's has linked existing levels of air pollution with poor health, particularly for the very young and old, and other sensitive groups such as asthmatics. The role of air pollution at levels typical of Western Europe is generally seen as exacerbating existing conditions. Research literature now links air pollution with various health impacts, ranging from increased use of bronchodilators by asthmatics, to hospital admissions and death.

At a scientific and medical level, the UK national government has investigated the problem, largely through two committees, EPAQS (The Expert Panel on Air Quality Standards) and COMEAP (The Committee on the Medical Effects of Air Pollutants). In response to their conclusions, the government developed the National Air Quality Strategy, setting objectives for individual pollutants with timescales for compliance. These objectives are similar to those developed by the European Union through the Framework Directive on Ambient Air Quality and a series of 'daughter directives' that set limits for individual pollutants.

Much has already been done through National and European legislation to control emissions from dwellings, vehicles, industry and other stationary sources. Despite this, local factors such as traffic volumes, road layouts and proximity of housing to industrial facilities or roads are very important in determining whether or not these air quality limits are exceeded. Recognising this, Government requires all local authorities to assess air quality under the regulatory framework of Local Air Quality Management (LAQM).

Part IV of the Environment Act 1995 provides the framework for LAQM in the UK and local authorities' duties under this Act. The Air Quality (England) Regulations 2000 and Air Quality (England) (Amendment) Regulations 2002 list the air quality objectives and the dates for achieving them. For each objective, local authorities have to consider present and future air quality and assess whether the objectives are likely to be achieved by the set date and in subsequent years. The methods by which this is to be done are set out in Part IV of the Environment Act 1995, Local Air Quality, Technical Guidance, DEFRA 2004 (LAQM.TG03)

A location where the objectives are not likely to be achieved and where members of the public might reasonably be exposed must be designated as an Air Quality Management Area (AQMA) by means of an order under Section 83(1) of the 1995 Act.

Within an AQMA, section 84(1) of the Act requires local authorities to carry out a further assessment of air quality within 12 months of the designation order (Stage 4 Assessment). Section 84(2) requires that they also produce an Air Quality Action Plan setting out the measures they will introduce in pursuit of the air quality objectives.

Local authorities are required to continue to review and assess air quality in their areas to check if there have been any changes in respect of the pollutants and to also produce progress reports on review and assessment and action planning. They may choose to combine both progress reports in one report. In local authorities with a designated AQMA, DEFRA's expectation is that these progress reports are produced annually.

**The local authority is not legally obliged to meet the air quality objectives but must demonstrate that it is working towards them. The Secretary of State for Environment Food and Rural Affairs has reserve powers under section 85 of the Act (to be used as a last resort) to require local authorities to take action where they are failing to make sufficient progress.**

### 1.2. Policy Context, Existing Strategies and Consultation

There are a number of European and national policies that are expected to contribute to improving air quality over the next few years. These include tighter emission standards for new vehicles and additional controls over certain industrial processes. Some of the relevant policies are summarised in table 1.2.1.

Table 1.2.1: European and national policies to reduce pollution

| Policy | Summary |
|---|---|
| Air Quality Framework and Daughter Directives | The Framework Directive establishes the principle that the European Union can set limit values for specific pollutants |
| Auto Oil programme | All new vehicles must comply with stringent emission standards. There are also controls over fuel quality, which also reduces emissions |
| Acidification strategy | This is a strategy which aims to reduce areas at risk of acid rain by reducing emissions of $SO_2$, $NO_x$, and ammonia. It consists of:<br>▪ A Directive which limits the sulphur content of liquid fuels<br>▪ Emission limits for new large combustion plant and a national limit for total $SO_2$ emissions from existing plant. |
| EC Solvents Directive | This aims to reduce emissions of volatile organic compounds from certain industrial installations |
| Integrated Pollution Prevention and Control Directive | This limits emissions from certain industrial installations, requiring them to take steps to ensure that EC objectives are met. Many of these processes are already controlled under national legislation (Environmental Protection Act 1990) |
| UNECE convention on long range transboundary air pollution | This aims to reduce the impact of transboundary pollution from one country to another by requiring emission reductions. It covers heavy metals, including cadmium, lead and mercury as well as some of the pollutants with objectives in the national air quality strategy. |
| Planning framework | The land use planning system and the transport framework are expected to have regard to the National Air Quality Strategy. |

Although air quality is expected to improve as a result of these initiatives, local action will also be necessary to reduce pollution within Broxtowe to meet the levels set in the Government's air quality objectives and this action is discussed in the following chapters.

## 2.0. INTRODUCTION AND AIM OF ACTION PLAN
## 2.1. Introduction

Concern over the effects of modern day pollution, primarily from industrial and road transport sources led to the introduction of the EU Directive on Air Quality. This was adopted by the UK in the form of the Environment Act 1995 and subsequently led to the Government's National Air Quality Strategies of 1997 and 2000.

These documents outline government policy in relation to eight key pollutants:

- Nitrogen dioxide
- $PM_{10}$ particulate
- Benzene
- 1,3-Butadiene
- Lead
- Sulphur dioxide
- Carbon monoxide
- Ozone*

*Although ozone is to be addressed at a national level, the Environment Act 1995 places a duty on local authorities to review and assess the other key pollutants in their area against air quality standards and objectives laid down in the Air Quality Regulations 2000.

Following a review and assessment carried out by external consultants Netcen, published in 2004, Broxtowe Borough Council commissioned Netcen to carry out a detailed assessment in May 2005.

This detailed assessment identified a significant (>50%) risk of exceedence of the UK annual average objective for $NO_2$ in 2005 in the following four areas:

1. M1/A6007 Closest houses to east of M1 in Iona Drive and Tiree Close
2. M1/A609 Houses on the Nottingham Road and Derbyshire Avenue closest to the M1
3. M1/B600 Houses on the Nottingham Road and Watnall Road closest to the M1

The report recommended that consideration be given to declaring air quality management areas in the above locations.

4. M1 Trowell Services buildings closest to the motorway.

Whilst the annual average objective was predicted to be exceeded in 2005, there was no requirement to declare an air quality management area in this location as there were no permanent residents in the buildings.

## 2.2. Action Plan

Part IV of the Environment Act 1995 requires local authorities to review and assess the current, and likely future, air quality in their areas. Where a local authority considers that one or more of the air quality objectives, as prescribed in regulations, is unlikely to be met by the required date, it must declare an air quality management area (AQMA), covering the area where the problem is expected. It must then draw up an action plan setting out the measures it intends to take in pursuit of the air quality objectives in the area.

The Action Plan should contain the scenarios that have been modelled in the Stage 4 review and assessment. It should contain a summary of the air quality improvements that might be possible for each of the scenarios identified. The Stage 4 provides the technical justification for the measures an authority includes in its Action Plan.

The Action Plan should also contain simple estimates of the costs and feasibility of implementing those scenarios. The Action Plan may also consider the non-health benefits of implementing scenarios, for example, reductions in road traffic accident deaths as a result of road improvements designed to reduce vehicle emissions.

The local authority can then identify which scenario(s) offer the most cost-effective or cost-beneficial ways of improving air quality

## 2.3. Action Plan Aims and Objectives

Air Quality Action Plans ultimately provide the mechanism by which local authorities in collaboration with national agencies and others will state their intentions for working towards the air quality objectives through the use of powers they have available.

The overall aim of the Action Plan is to attempt to minimise the effects of air pollution on human health. The Action Plan should include all measures proposed by the Council to improve air quality and should be wider in geographical scope than the area of any air quality hotspot which may be its focus.

Due to the nature of Broxtowe Borough Council's AQMA's (primary source vehicle emissions from M1 Motorway), the Action Plan has been divided into 2 general areas:

1) Direct actions upon the Motorway (The Highways Agency and their contractor UK Highways, has full control over the M1 Motorway)

2) Actions that will benefit the AQMA and also contribute to improving air quality throughout the whole district. These comprise of numerous projects and initiatives that the Council is able to feed into or implement itself. The Council also has more control over these

actions and sees them as ways to ensure that other areas of Broxtowe do not need to be designated AQMA's.

The primary objective of Broxtowe's Action Plan is therefore:

*To achieve the National Air Quality objective for Nitrogen Dioxide ($NO_2$) within Broxtowe's Air Quality Management Areas*

The secondary objectives of Broxtowe's Action Plan are:

*To reduce the air pollution as a whole with the Broxtowe area*

*Continue to inform and provide up to date information on air quality within the district*

*Ensure that all Council activities are considered with reference to their effect upon air quality*

*Ensure that the Council works with Nottinghamshire County and other Nottinghamshire Authorities to encourage a uniform approach to air quality management across Nottinghamshire*

*To support national initiatives to improve air quality*

## 2.4. Timescales

The Action Plan is a legal requirement. There is a legal timescale for action plans which requires that they are produced within 12 months after the designation of an Air Quality Management Areas. Within the action plan itself, realistic actions should be considered.

The Action Plan should be considered in parallel with the Stage 4 Report.

## 2.5. Consultees for the Action Plan and Stage 4 Report

- Secretary of State
- The Environment Agency
- The Highways Agency
- Transport for London
- Broxtowe Borough Council Departments
- Nottinghamshire County Council
- Nottinghamshire Authorities
- Neighbouring Authorities
- Members of the Public

## 3.0. Health Impacts of Air Pollution

In the UK, air pollutants come from a range of sources. These include transport (with the bulk of transport related pollution coming from road transport), industry, energy production and use, and natural sources.

The Government's Air Quality Strategy and The Expert Panel on Air Quality Standards (EPAQS) have identified eight key pollutants:

- Nitrogen dioxide
- $PM_{10}$ Particulate
- Benzene
- 1,3-Butadiene
- Lead
- Sulphur dioxide
- Carbon monoxide
- Ozone (National)

Within Broxtowe AQMA's, the Council is attempting to reduce the levels of $NO_2$; however, most initiatives to reduce $NO_2$ will also have positive reductions on the other air pollutants such as $PM_{10}$. The health implications of the three main vehicle emission types are considered below.

### 3.1. Nitrogen Oxides (NOx)

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

At relatively high concentrations, nitrogen dioxide causes inflammation of the airways. There is evidence to show that long-term exposure to $NO_2$ may affect lung function and that exposure to $NO_2$ enhances the response to allergens in sensitised individuals.

The principal source of $NO_2$ emissions is road transport, accounting for approximately 49% of total UK emissions in 2000. 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.

### 3.2. Particulates ($PM_{10}$)

The composition, size, production, distribution, behaviour and specific effect of particulate matter in the air is a highly complex subject. Particles are produced both directly from such human activates as combustion and other processes (e.g. from brakes and tyres of vehicles) and from some natural

activities such as the weathering of soils. They are also produced as 'secondary particles' by chemical reactions in the air.

Particles arising from different processes have different properties. In health terms, one important property is the extent to which particles become deposited in the lungs. This in turn depends on a variety of factors, one of which is the size of the particle. Generally, small particles have more chance of reaching the deeper parts of the lungs. These are likely to pass through the nose and larynx and enter the lungs. As a rule, particles produced from combustion and condensation tend to be 'fine' while those from mechanical processes tend to be 'coarse'.

Associations between particle levels and a range of health outcomes have been identified. These include decreases in lung function, increases in respiratory symptoms and the exacerbation of asthma. Because of the variation of individual thresholds within the population and the variability in personal exposure at a measured concentration, it may well not be possible to detect a measured concentration below which no one in the population will be affected.

### 3.3. Carbon Monoxide (CO)

Carbon monoxide is a colourless, odourless, tasteless gas that is slightly lighter than air.

It is a poisonous gas produced by the incomplete combustion of fuel. It acts by combining with the haemoglobin in red blood cells and so reducing oxygen carriage by the blood. At levels below those which are lethal, this reduction in oxygen-carrying capacity can precipitate angina in those susceptible and reduce mental performance, resulting in confusion and reducing co-ordination.

## 4.0. AIR QUALITY WITHIN BROXTOWE

In line with its statutory obligation, Broxtowe Borough Council has continually reviewed and reported on the air quality within the borough. A summary of these reports is given below. Reference is made to Broxtowe Borough Council's Updating and Screening Assessment (July 2003), Detailed Assessment (May 2005) and Progress Report (July 2005) for more comprehensive information, all of which have been submitted to and approved by DEFRA.

### 4.1. Update and Screening Assessment (2003)

Broxtowe Borough Council employed external consultants Netcen to carry out an Update and Screening Assessment (2003). The report concluded that there were no significant industrial sources of $NO_2$ in Broxtowe. However, the DMRB screening tool and review of the Stage 3 assessment indicated that the annual average objective was likely to be exceeded in 2005 at locations close to the M1, the Nuthall roundabout and near crossings of the M1. The identified locations were:

- Iona Drive, Trowell
- Trowell Services
- Nuthall roundabout
- Crossing of M1 by A609, A6007 and B600.

Although diffusion tube data indicated that the predicted 2005 annual mean concentrations at the monitoring sites would be below the objective, a detailed assessment of the locations was recommended.

Netcen considered that further $NO_2$ modelling was required to characterise exposure at the receptors in Broxtowe. Further modelling of receptor areas to assess control strategies was unlikely to be helpful without monitoring data.

### 4.2. Detailed Assessment (2005)

Broxtowe Borough Council commissioned the same consultants to carry out real time monitoring within the borough for the Detailed Assessment. The real time monitoring was carried out between 1 April 2004 and 30 April 2005 at a roadside location adjacent to the M1 motorway approximately 40m away from the roadside. Three diffusion tubes were collocated with the monitoring equipment which calculated the bias adjustment for the other diffusion tubes located throughout the borough.

The results of the continuous monitoring can be found in table 4.2.1.

Table 4.2.1. Summary of continuous nitrogen dioxide ratified data from 1 April 2004 to 30 April 2005

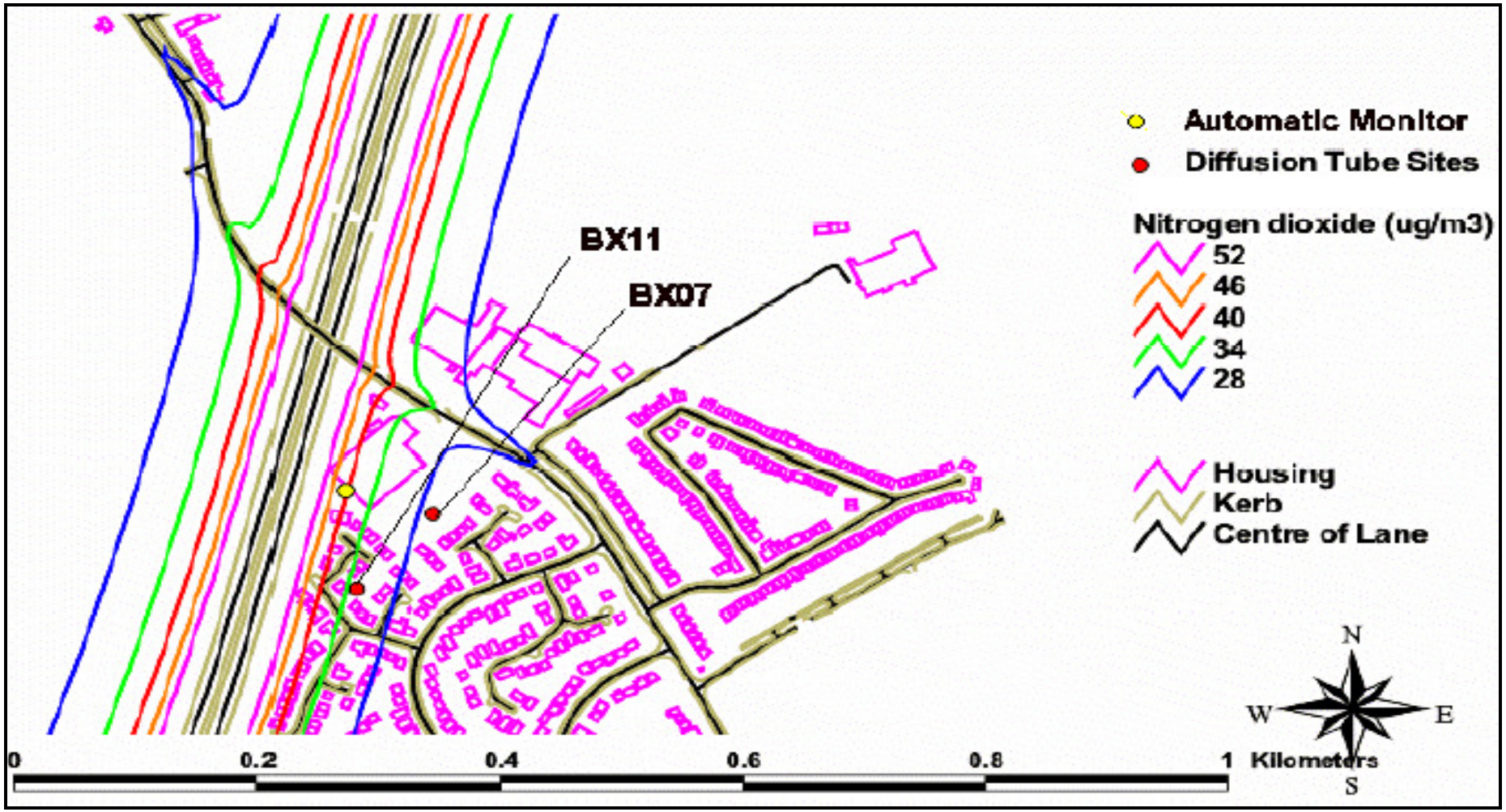
| | Concentration, $\mu g/m^{-3}$ |
|---|---|
| Average | 40.6 |
| Maximum hourly | 143 |

Verified modelling identified a significant (>50%) risk of exceedence of the UK annual average objective for $NO_2$ in 2005 in the following areas:

- M1/A6007 Closest houses to east of M1 in Iona Drive and Tiree Close
- M1/A609 Houses on Nottingham Road and Derbyshire Avenue closest to the M1
- M1/B600 Houses on Nottingham Road and Watnall Road closest to the M1

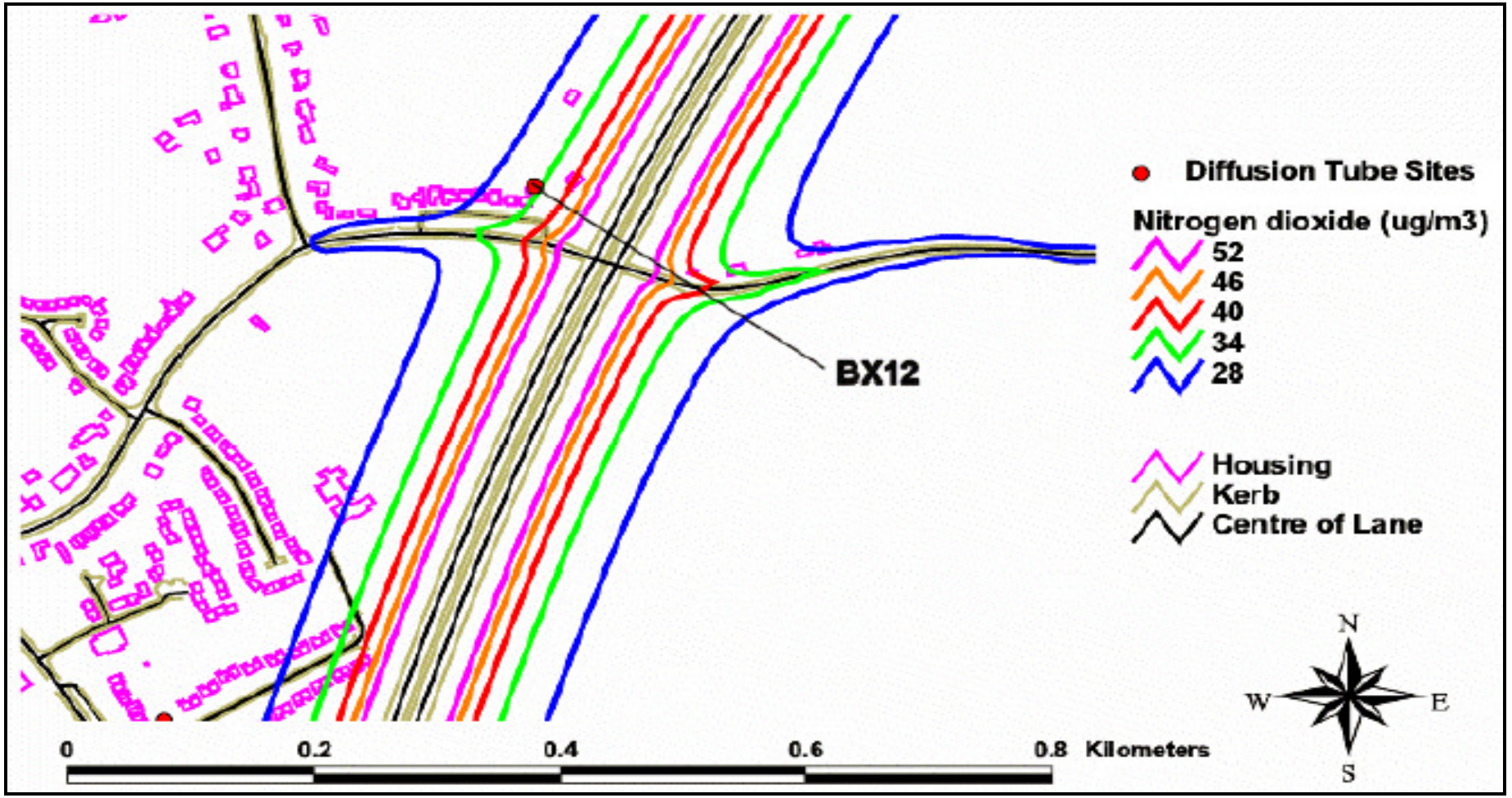
Maps of these can be seen in the figures below.

Figure 4.2.1. shows computer modelling of $NO_2$ for 2005 for M1/A6007



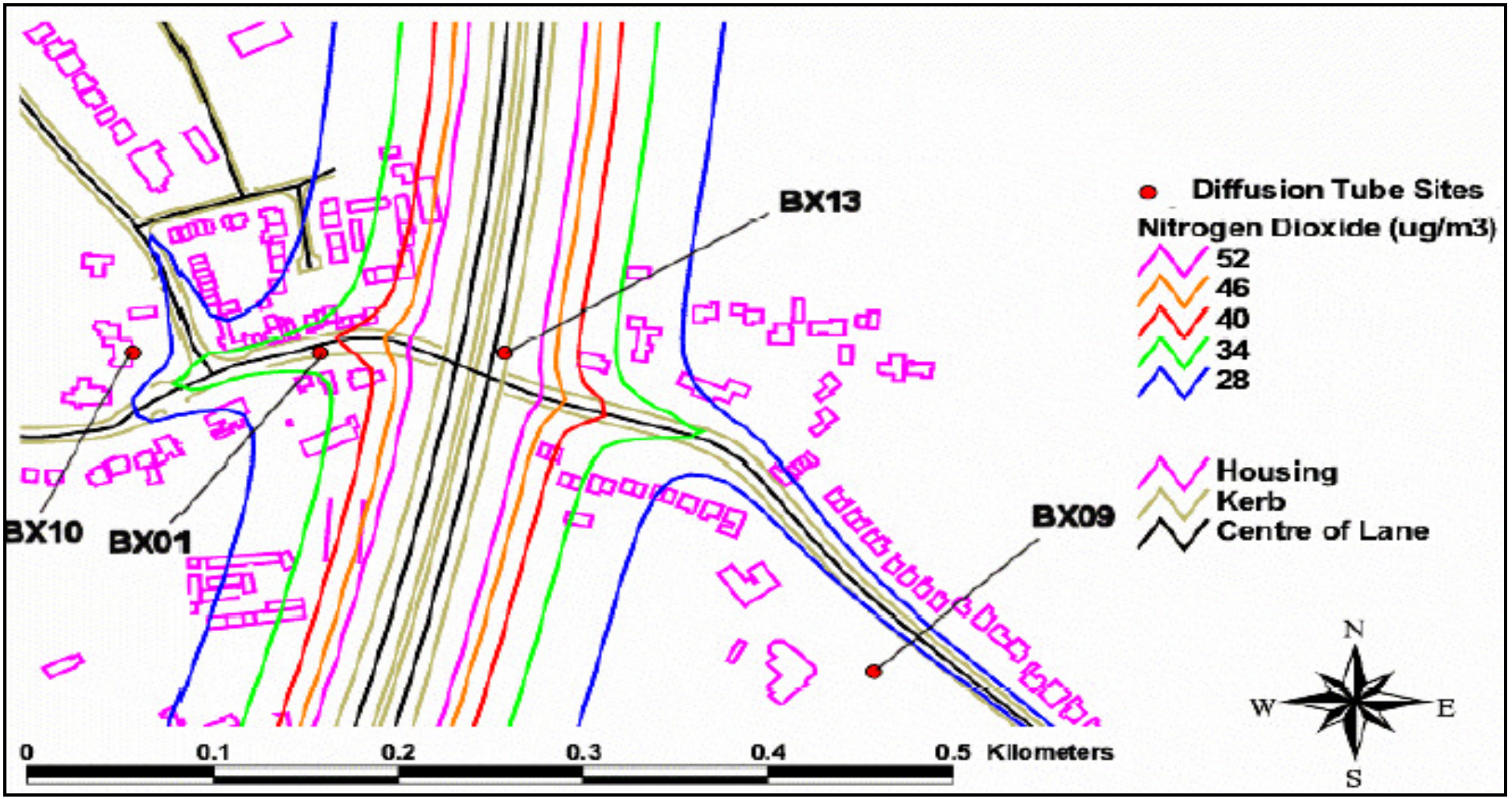

Source: Broxtowe Air Quality Review Detailed Assessment May 2005

Figure 4.2.2. shows computer modelling of $NO_2$ for 2005 for M1/A609




Source: Broxtowe Air Quality Review Detailed Assessment May 2005

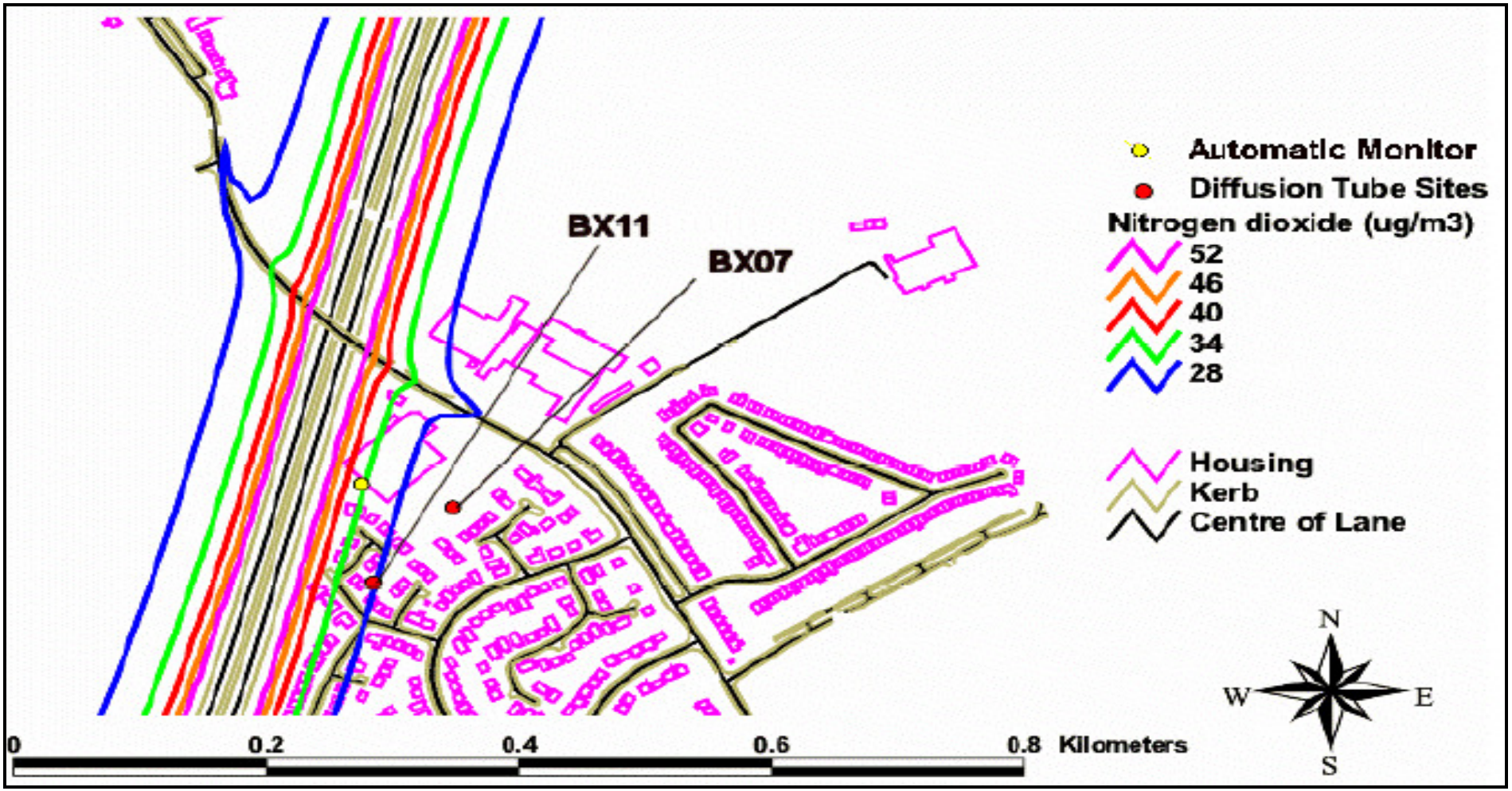
Figure 4.2.3. shows computer modelling of $NO_2$ for 2005 for M1/B600




Source: Broxtowe Air Quality Review Detailed Assessment May 2005

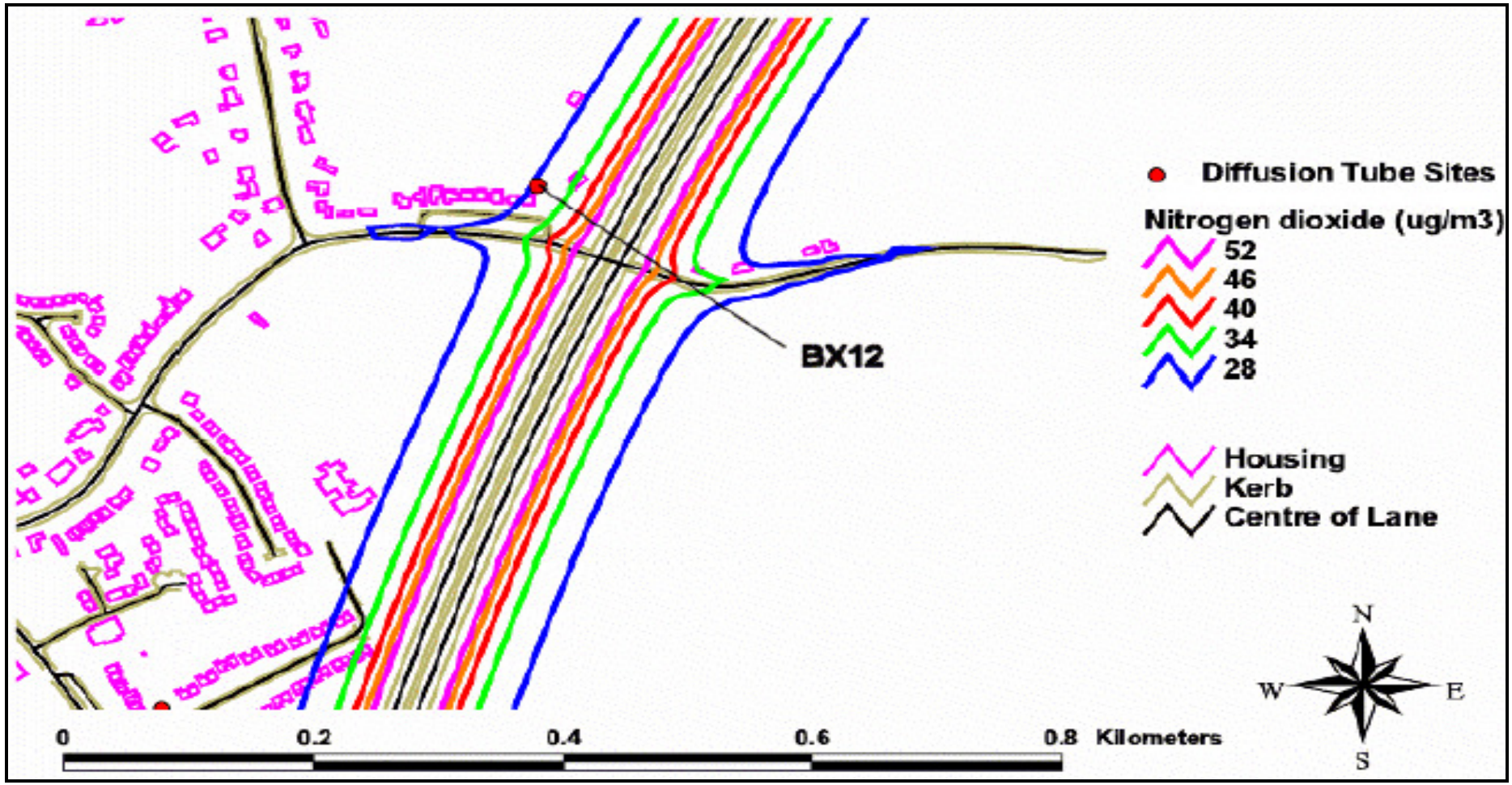
Broxtowe Borough Council commissioned Netcen to carry out predicted modelling for $NO_2$ in 2010 without any active intervention. The results are as follows:

Figure 4.2.4. shows computer modelling of $NO_2$ for 2010 for M1/A6007



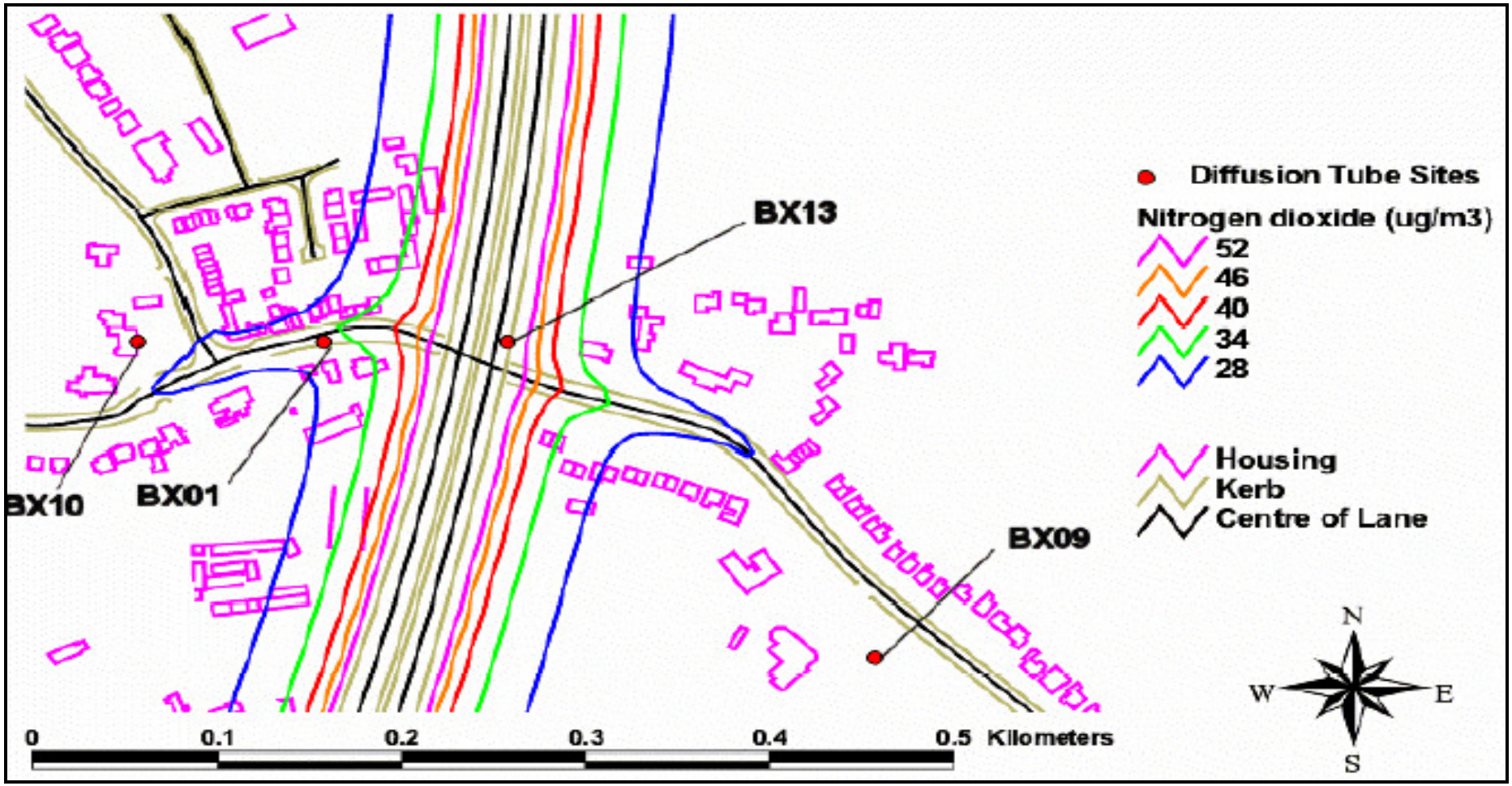

Source: Broxtowe Air Quality Review Detailed Assessment May 2005

Figure 4.2.5. shows computer modelling of $NO_2$ for 2010 for M1/A609




Source: Broxtowe Air Quality Review Detailed Assessment May 2005

Figure 4.2.6. shows computer modelling of $NO_2$ for 2010 for M1/B600




Source: Broxtowe Air Quality Review Detailed Assessment May 2005

The consultants report concluded that consideration be given to declare Air Quality Management Areas in the above locations although the air quality objectives would be met prior to 2010 without any active intervention.

Following the publishing of this report, DEFRA was consulted and recommended that Broxtowe declare Air Quality Management Areas where the relevant exposure existed.

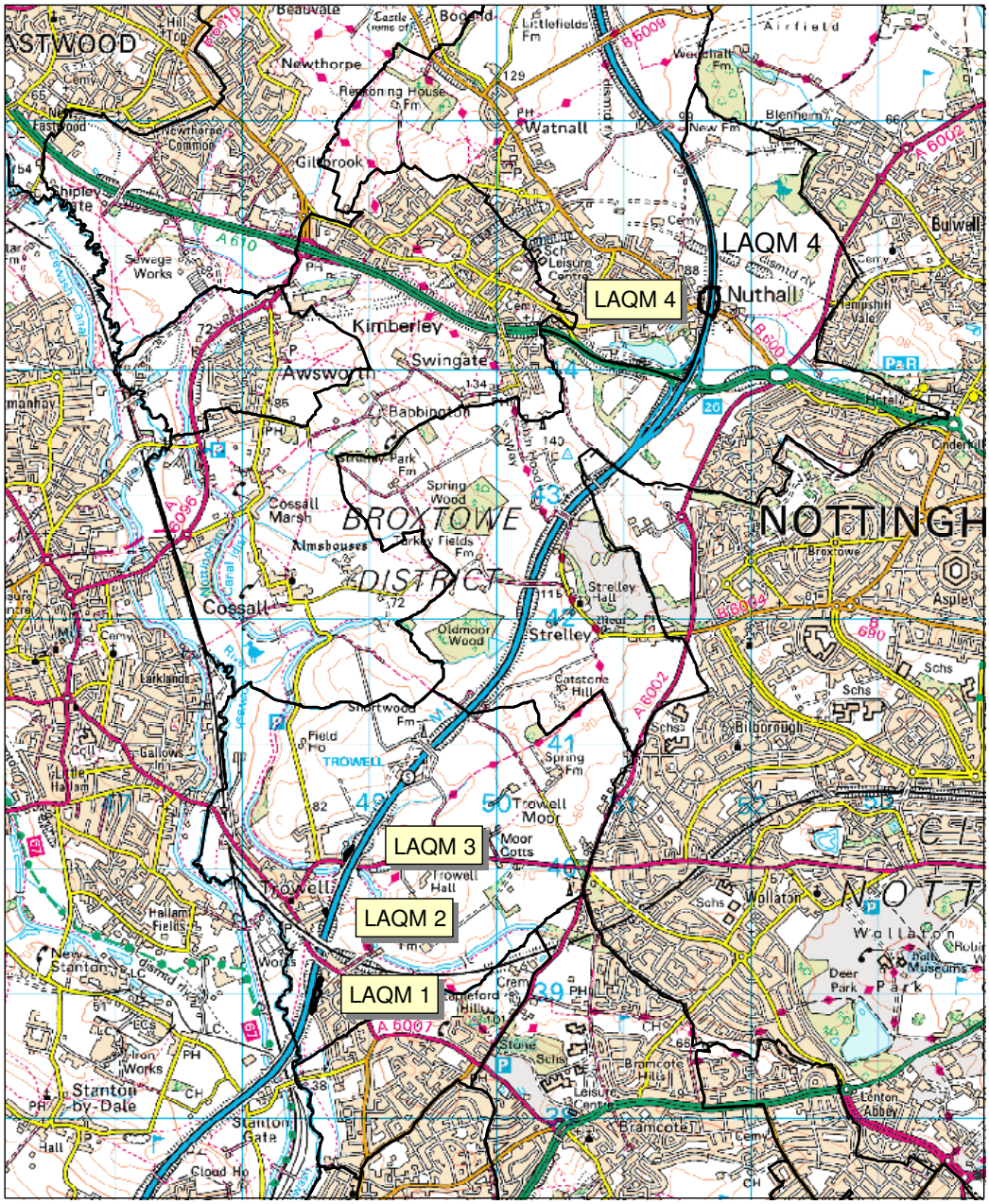
### 4.3. Progress Report (2006)

On 1 February 2006, Broxtowe Borough Council declared 4 AQMA's encompassing a total of 37 properties along the M1 corridor.

## 4.4. Air Quality Management Areas (AQMA's)

Broxtowe Borough Council declared 4 Air Quality Management Areas (see figure 4.4.1).

Figure 4.4.1. The map shows location of AQMA's within the borough. Further details of the properties enclosed within the AQMA's can be found in Appendix 1.



## 5.0. CURRENT AIR QUALITY WITHIN BROXTOWE

### 5.1. Sources of Air Pollution (Nationwide)

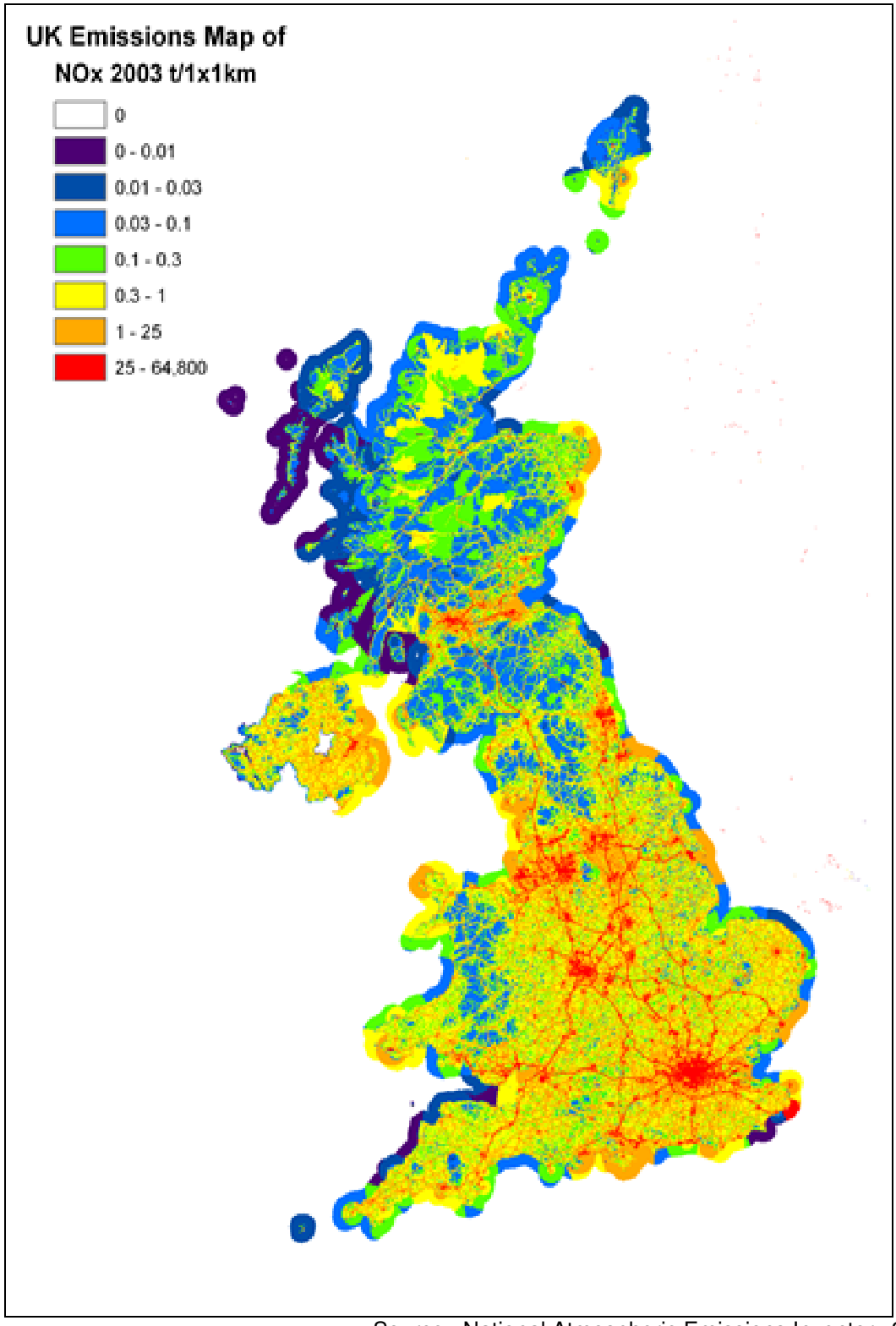
There are multiple sources of $NO_2$ throughout the Country, including

- Road Transport
- Other Transport
- Industry
- Domestic

Road traffic is the major source of air pollution throughout the Country. Figure 5.1.1. shows the concentration of NOx emissions throughout the United Kingdom.

As can be seen from the map, the higher $NO_x$ concentrations are in direct correlation with the major road networks.

**Figure 5.1.1. UK Emissions Map of $NO_x$ 2003**




Source : National Atmospheric Emissions Inventory 2007

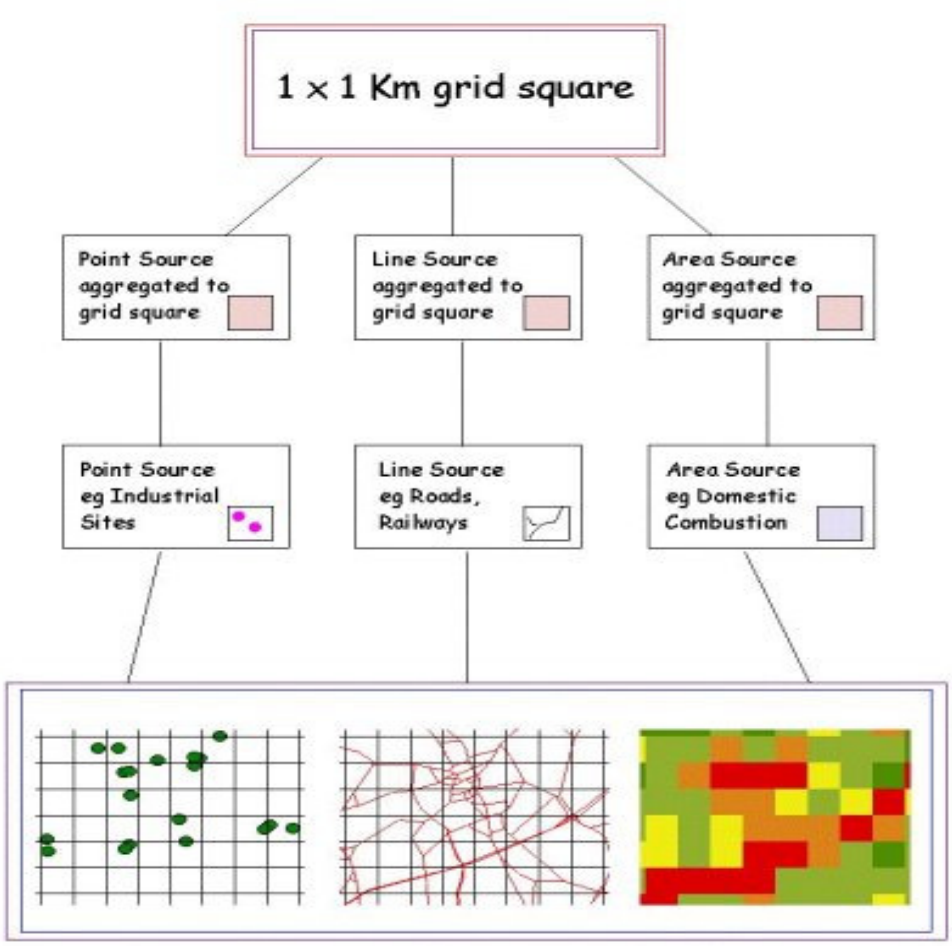
## 5.2. Sources of Air Pollution (Broxtowe)

As well as the UK emission maps, Nottinghamshire authorities commissioned independent consultants to complete an emissions inventory on their behalf. The most recent emissions inventory was completed in May 2006.

The emissions inventory takes into account a point source for a pollutant into a 1x1km grid square (i.e. an industrial source). The map is then placed over the road network where the Annual Average Daily Traffic (AADT) figures are calculated with the speed related emissions factors. Emission factors were provided and calculated on petrol cars, diesel cars, petrol LGV's, diesel LGV's, rigid HGV's, articulated HGV's, buses and motorcycles.

Figure 5.2.1. is taken from the most recent Emissions Inventory and shows how the 1x1km grid squares are calculated.

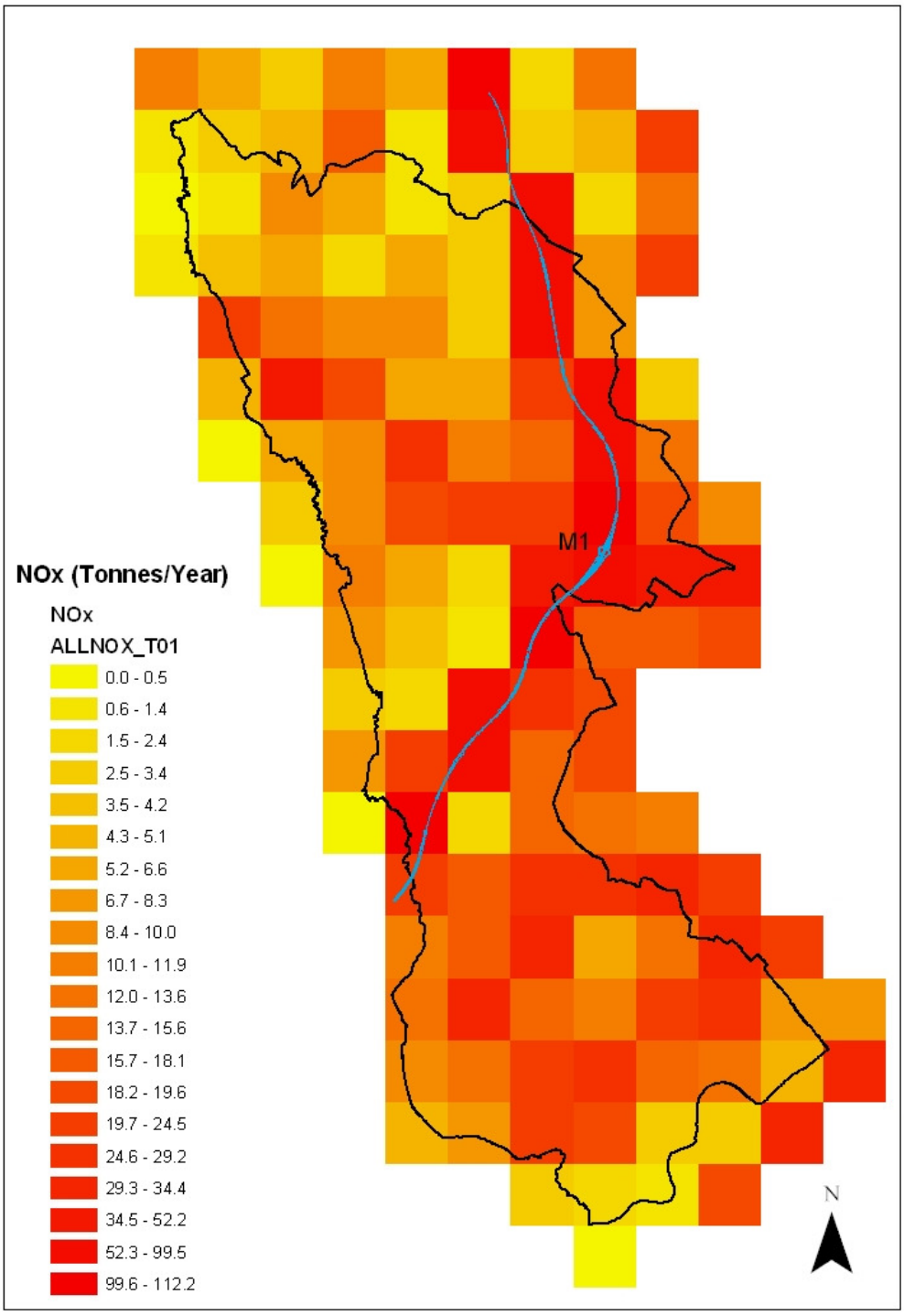
**Figure 5.2.1. Figure shows how Km grid squares are calculated**




Source : Nottinghamshire Emissions Inventory 2006

The emissions inventory was compiled for the whole of Nottinghamshire. The emissions map for Broxtowe can be seen in Figure 5.2.2. The M1 has been highlighted on this map.

**Figure 5.2.2. Map shows the concentration of $NO_x$ (tonnes/year) within Broxtowe**



As can be seen from Figure 5.2.2., the higher levels of $NO_x$ concentration follow the M1 motorway.

## 5.3 Sources of Air Pollution within the Air Quality Management Areas

The AQMA's have been declared along the M1 corridor due to a primary source of $NO_2$ from vehicles travelling along the motorway. The Motorways control is outside the Council's remit, and the enforcing authority is the Highways Agency.

The latest Road Traffic Information figures (2004) are supplied by the County Council. The information informs the reader of the daily traffic figures and the make-up of these vehicles.

| Road | Location (from – to) | AADT (2004) | % OGV1 | % OGV2 | % PSV |
|---|---|---|---|---|---|
| M1 | Junction 27 – 26 | 116,750 | 5.8 | 10.6 | 0.3 |
| M1 | Junction 26 – 25 | 121,550 | 16 | - | 0 |

OGV1 = Contains 2 and 3 axle ridged HGV's
OGV2 = Contains 4 axle ridged and all articulated HGV's
PSV = Passenger Service Vehicle

Emissions from vehicles utilising the M1 are the dominant source of $NO_2$ within the AQMA's and should therefore be the primary focus for the Action Plan.

It is difficult to precisely say what reduction in vehicles is necessary for the air quality objectives to be met as other factors apply such as congestion of traffic. Equally, information is not available for engines which may run or experience cold starts / hot soaks which will also have an effect of the vehicles emissions.

However, before the Action Plan can be formulated, the sources of the pollution must be examined to see whether the Council can have a direct effect on them, and subsequently the air quality.

Using the National Atmospheric Emissions Inventory website (NAEI), the postcode of each AQMA has been entered into the database to show the Major Point Sources of air pollution within 5km of that postcode. The results are shown in the following tables. All figures are the average emission around the postcode in tonnes per annum per $km^2$.

**Table 5.3.1. Air Quality Management Area 1**

| Operator | Site Name | 1,3, Butadiene | Benzene | CO | $CO_2$ | $NO_x$ | $SO_2$ | $PM_{10}$ | VOC |
|---|---|---|---|---|---|---|---|---|---|
| Amcor Flexibles Ltd. | Ilkeston | - | - | - | - | - | - | 0.87 | 55 |
| Bramcote Crematorium | Bramcote | - | - | 0.37 | - | 0.80 | 0.14 | 0.000066 | 0.034 |
| J Sainsburys Supermarkets Ltd. | Beeston | 0.0022 | 0.025 | - | - | - | - | - | 15 |
| McGregor Rutland Ltd | Ilkeston | - | - | - | - | - | - | 0.12 | 18 |
| Tesco Stores Ltd | Toton Extra | 0.0024 | 0.27 | - | - | - | - | - | 16 |
| Trowell Services | Trowell | 0.0014 | 0.017 | - | - | - | - | - | 9.8 |

The only significant point source of $NO_x$ within 5km of AQMA 1 is Bramcote Crematorium. This is currently an IPPC process and complies with the conditions within the permit.

**Table 5.3.2. Air Quality Management Area 2**

| Operator | Site Name | 1,3, Butadiene | Benzene | CO | $CO_2$ | $NO_x$ | $SO_2$ | $PM_{10}$ | VOC |
|---|---|---|---|---|---|---|---|---|---|
| Amcor Flexibles Ltd. | Ilkeston | - | - | - | - | - | - | 0.87 | 55 |
| Bramcote Crematorium | Bramcote | - | - | 0.37 | - | 0.80 | 0.14 | 0.000066 | 0.034 |
| J Sainsburys Supermarkets Ltd. | Beeston | 0.0022 | 0.025 | - | - | - | - | - | 15 |
| McGregor Rutland Ltd | Ilkeston | - | - | - | - | - | - | 0.12 | 18 |
| Trowell Services | Trowell | 0.0014 | 0.017 | - | - | - | - | - | 9.8 |

The only significant point source of $NO_x$ within 5km of AQMA 2 is Bramcote Crematorium. This is currently an IPPC process and complies with the conditions within the permit.

**Table 5.3.3. Air Quality Management Area 3**

| Operator | Site Name | 1,3, Butadiene | Benzene | CO | $CO_2$ | $NO_x$ | $SO_2$ | $PM_{10}$ | VOC |
|---|---|---|---|---|---|---|---|---|---|
| Amcor Flexibles Ltd. | Ilkeston | - | - | - | - | - | - | 0.87 | 55 |
| Bramcote Crematorium | Bramcote | - | - | 0.37 | - | 0.80 | 0.14 | 0.000066 | 0.034 |
| J Sainsburys Supermarkets Ltd. | Beeston | 0.0022 | 0.025 | - | - | - | - | - | 15 |
| J Sainsburys Supermarkets Ltd. | Kimberley | 0.0022 | 0.025 | - | - | - | - | - | 15 |
| McGregor Rutland Ltd | Ilkeston | - | - | - | - | - | - | 0.12 | 18 |
| Trowell Services | Trowell | 0.0014 | 0.017 | - | - | - | - | - | 9.8 |

The only significant point source of $NO_x$ within 5km of AQMA 3 is Bramcote Crematorium. This is currently an IPPC process and complies with the conditions within the permit.

**Table 5.3.4. Air Quality Management Area 4**

| Operator | Site Name | 1,3, Butadiene | Benzene | CO | $CO_2$ | $NO_x$ | $SO_2$ | $PM_{10}$ | VOC |
|---|---|---|---|---|---|---|---|---|---|
| A R Wilson Packaging Ltd | Nottingham | - | - | - | - | - | - | 0.0043 | 2.5 |
| Amcor Flexibles Ltd. | Ilkeston | - | - | - | - | - | - | 0.87 | 55 |
| Asda Stores Ltd | Hyson Green | 0.0014 | 0.017 | - | - | - | - | - | 9.8 |
| British Bakeries Ltd | Nottingham | - | - | - | - | - | - | - | 31 |
| J Sainsburys Supermarkets Ltd. | Kimberley | 0.0022 | 0.025 | - | - | - | - | - | 15 |
| PP Payne Ltd | Giltbrook | - | - | - | - | - | - | 1.0 | 35 |
| PZ Cussons (UK) Ltd | New Basford | - | - | - | 2261 | - | - | - | - |
| Rolls Royce Plc | Nottingham | - | - | - | - | 5.0 | - | - | - |
| Tesco Stores Ltd | Hucknall | 0.0024 | 0.027 | - | - | - | - | - | 16 |
| Tesco Stores Ltd. | Nottingham Top Valley | 0.0024 | 0.027 | - | - | - | - | - | 16 |
| Trowell Services | Trowell | 0.0014 | 0.017 | - | - | - | - | - | 9.8 |
| WM Morrison Supermarkets Ltd | Burwell | 0.0019 0.022 | - | - | - | - | - | - | 13 |

The only significant point source of $NO_x$ within 5km of AQMA 4 is Rolls Royce PLC. This is based within a neighbouring authority and is expected to close prior to the end of 2007.

**In Conclusion, road traffic emissions are the dominant source of $NO_2$ affecting the AQMA's and should therefore be the primary focus for the Action Plan. The secondary focus of the Action Plan will be to reduce $NO_2$ throughout the borough, which contributes to the exceedence of $NO_2$ within the AQMA's. No particular point source is identified as having an effect on the AQMA's.**

**As discussed in Chapter 4.2., the Detailed Assessment carried out by external consultants has shown air quality objectives should be met prior to 2010 without any active intervention.**

## 6.0. MONITORING INFORMATION

### 6.1. Pre AQMA declaration

Prior to the AQMA's being declared, there were 27 NOx tubes located within the borough at 22 target receptors. As discussed in Chapter 4.2., the Council commissioned external consultants to install and operate a continuous monitor within the borough to measure air pollution. Three NOx tubes were co-located with the continuous monitor to assist the Council with its bias adjustment of the tubes.

This information supported the Council's requirement to declare 4 AQMA's along the M1 corridor.

### 6.2. Declaration of AQMA's

Upon declaration of the AQMA's, the Council increased the passive diffusion network with extra NOx tubes being located at receptors closest to the M1 motorway to ensure monitoring was being carried out within the four AQMA's.

Furthermore, the Highways Agency, as part of their Environmental Impact Assessment, have commissioned consultants to carry out continuous monitoring within the borough, ensuring the proposed M1 widening will not have adverse effects on the air quality standards.

Real time monitoring is currently being carried out by Arup Consultants, on behalf of the Highways Agency at a site located within the borough. Three $NO_x$ tubes are also co-located at this site. The average of these tubes has been taken to calculate the bias adjustment.

Using guidance in LAQM.TG(03), a bias correction of diffusion tube data has been utilised. The real time monitor found the diffusion tubes to be underestimating and a bias correction of 1.1 has been calculated to the diffusion tubes within the AQMA's. The air quality information supplied by Arup's can be found in Appendix 2.

Correction factors have also been calculated to give the estimated $NO_2$ concentration for 2010.

**Table 6.2.1. Air Quality Management Area 1**

| | | Annual average concentration, µg m-3 | | |
|---|---|---|---|---|
| Location | ID | 2006/07 Annual Averages (Uncorrected) | 2006/07 Annual Averages (Corrected) | Predictions for 2010 |
| 7 Colonsay Close, Trowell | Bx07 | 31.23 | 34.35 | 29.30 |
| 34 Iona Drive, Trowell | Bx11 | 40.47 | 44.52 | 37.87 |
| 18 Tiree Close, Trowell | Bx31 | 39.69 | 40.3 | 34.28 |

**Table 6.2.2. Air Quality Management Area 2**

| | | Annual average concentration, µg m-3 | | |
|---|---|---|---|---|
| Location | ID | 2006/07 Annual Averages (Uncorrected) | 2006/07 Annual Averages (Corrected) | Predictions for 2010 |
| 30 Derbyshire Avenue, Trowell | Bx32 | 34.94 | 38.43 | 30.30 |

**Table 6.2.3. Air Quality Management Area 3**

| | | Annual average concentration, µg m-3 | | |
|---|---|---|---|---|
| Location | ID | 2006/07 Annual Averages (Uncorrected) | 2006/07 Annual Averages (Corrected) | Predictions for 2010 |
| 81 Nottingham Road, Nuthall | Bx33 | 34.75 | 38.23 | 32.51 |

**Table 6.2.4. Air Quality Management Area 4**

| | | Annual average concentration, µg m-3 | | |
|---|---|---|---|---|
| Location | ID | 2006/07 Annual Averages (Uncorrected) | 2006/07 Annual Averages (Corrected) | Predictions for 2010 |
| 19 Nottingham Road, Nuthall | Bx01 | 37.95 | 41.75 | 35.51 |
| 20 Nottingham Road, Nuthall | BX13 | 41.19 | 45.31 | 38.54 |

The tables show whilst there is currently an exceedence of $NO_2$ within the borough, it is predicted that this will fall below the standard of 40.0µg/$m^3$ at some time before 2010 without any active intervention.

## 6.3. Air Quality Management

The findings of the air quality monitoring indicate that the Council is on target to meet the required objectives prior to 2010. The Council does not consider it necessary to expand or revoke any of the Air Quality Management Areas at this time.

## 7.0. ACTION PLAN PROCESS

This chapter focuses on the Action Plan process of determining the courses of action Broxtowe Borough Council will undertake to achieve the prescribed air quality standards.

### 7.1. Guidance on Achieving the Standards

#### 7.1.1. Factors to consider

Guidance has been issued by both DEFRA and the National Society for Clean Air and Environmental Protection (NSCA). The DEFRA guidance lists four factors that have to be considered in the selection of options, as follows:

- Air Quality Improvement
- Non-Air Quality Effects
- Cost-effectiveness
- Perception and Practicability

**Air Quality Improvement**
Analysis starts by considering the sources of air pollution that lead to exceedence of the air quality standards to quantify the improvements required. In the case of $NO_2$, the link between emission and concentration needs to take account of chemical processes in the atmosphere – there is not a simple linear relationship between reduced emissions of $NO_x$ and reduced concentrations of $NO_2$.

**Non-Air Quality Effects**
An Action Plan should be designed to account for other policies. By doing so it should account for the social, economic and broader environmental impacts of the measures considered

**Cost-Effectiveness**
Measures proposed in an Action Plan must be cost-effective. In other words, they need to be closely targeted on the problem being addressed and should not waste money, either by being inefficient, or by causing significant and negative secondary effects.

**Perception and Practicability**
To be successful, an Action Plan needs to gain wide support across the community. The guidance considers four groups of stakeholders, the public, industry and commerce, elected representatives, and external agencies. Each of these groups will have different views and concerns when a specific measure is recommended to improve air quality, and so need to be involved in the consultation process.

## 7.2. The Action Planning Process

The NSCA guidance describes the following stages for action planning. Those shown in bold represent the stages that this plan is mainly concerned with:

- Establish baseline conditions
- **Involve all relevant stakeholders**
- **Generate a list of options**
- **Consider the costs and effects of these options**
- **Prioritise options**
- Evaluate and monitor the plan
- Continue consultation on the plan during its implementation

### Consultation

The consultation process is proceeding in a series of stages, designed to ensure timely input from all those with an interest in the improvement of air quality within Broxtowe. These stages are:

1. Discussions with traffic authorities (District Council, County Council and Highways Agency)
2. Dissemination of the draft plan and other relevant materials to other stakeholders (e.g. members of the public, Environment Agency, neighbouring local authorities, etc.) with invitation to comment
3. Discussion with elected members of the Council
4. Submission to DEFRA

### Identification of Options

Options are identified from a number of sources. These include

- Highways Agency website
- M1 Multi-Modal Study
- Cost-effectiveness assessments for DEFRA relating to $NO_x$
- Guidance issued by NSCA
- Literature reviews
- Actions Plans prepared by other local authorities

In accordance with the guidance, it is necessary to consider a wide range of options in order to arrive at a cost-effective solution. For this reason, this document identifies a larger number of options than will be finally be adopted under the Action Plan. This will encourage debate on which options are likely to be most beneficial and which should be rejected. It is important to understand that the same problem in different locations may merit different solutions, reflecting local circumstances.

## 7.3. Option Appraisal

The process of prioritisation applied in the development of this plan seeks to take an integrated approach in accounting for the different attributes of each option relative to:

- Cost
- Effectiveness in reducing $NO_x$ emissions
- Effectiveness relative to $NO_2$ levels in the Broxtowe AQMA's
- Potential to implement the option prior to 2010
- Additional (non-$NO_2$) benefits of the measure
- Disbenefits linked to the measure
- Complementary of measure with local and regional development objectives

Additional benefits and disbenefits of air quality improvement measures have been assessed in terms of:

- Other (non $NO_x$) air pollutants
- Noise
- Congestion
- Attractiveness of public transport
- Social inclusion
- Economic vitality of local businesses

## 7.4. Prioritisation

Prioritisation is carried out in two stages. The first stage prioritises options in terms of costs and effectiveness in controlling $NO_2$ with no reference to other effects. This has been based on the following matrix:

| | **% improvement in Air Quality** | | | | | |
|---|---|---|---|---|---|---|
| **Financial Cost** | <0.01% | 0.01-0.1% | 0.1-1.0% | 1-5% | 5-10% | >10% |
| <£0 | | | | | | |
| £0 | | | | | | |
| £0 – 1,000 | | | | | | |
| £1,000 – 10,000 | | | | | | |
| £10,000 – 100,000 | | | | | | |
| £100,000 – 1 million | | | | | | |
| £1 million – 10 million | | | | | | |
| >£10 million | | | | | | |

| **Key:** | |
|---|---|
| | **Most cost-effective** |
| | **Moderately cost-effective** |
| | **Least cost-effective** |

The top row of the matrix contains measures that reduce costs, these typically being options that improve efficiency in the use of energy or some other resource.

The second stage factors in consideration of additional benefits, disbenefits and complementary with other plans. Hence, if an option might be highly recommended on grounds of cost-effectiveness with respect to controlling $NO_2$, but has secondary impacts of a serious and negative nature, it may be reasonable to exclude it from the plan. Similarly, if an option has significant secondary benefits, its prioritisation could be increased.

### 7.5. Implementation, monitoring and future development of the Action Plan

In addition to developing a list of options it is essential that the final plan includes description of the delivery mechanism, in other words, how it is to be implemented, and how progress will be monitored. It is clearly necessary to wait until there is agreement on the measures to be taken before developing this part of the plan any further.

The agreed Action Plan should be regarded as flexible and open to adjustment as new information or new techniques for pollution control become available. Prior to undertaking some of the options that are listed in the plan it will be necessary to commission specific feasibility studies, particularly where costs will be high. If any option is found impracticable, for example on cost grounds, or has impacts that were not foreseen or are far more significant than originally thought, the plan should clearly be adapted. Equally, if experience elsewhere shows than an option not included in the plan is more attractive than originally thought, it may be appropriate to adopt that option.

### 7.6. Relationship between Air Quality Action Plans and Local Transport Plans

In circumstances where transport emissions are the major reason for exceedence of air quality objectives, DEFRA recommends that consideration be given to full integration of the Action Plan with the Local Transport Plan (LTP). There are several reasons for not following this recommendation in the case of Broxtowe, including:

- Motorway control lies outside the remit of the LTP
- The timescale for preparation of the Action Plan does not fit with the revision of the LTP
- Broxtowe Borough Council is responsible for the development of the Action Plan, not the Nottinghamshire LTP.

This does not, however, mean that transport planning within the borough is immaterial to the development of the Action Plan. It is simply the case that development of a separate air quality action plan has a number of advantages that would otherwise be lost.

## 8.0. POSSIBILITIES FOR DIRECT ACTIONS TO IMPROVE AIR QUALTIY WITHIN THE AQMA

Of the pollutants in the UK Air Quality Strategy, exceedence is only predicted for the annual mean $NO_2$ objective in Broxtowe. This exceedence is related to the levels of traffic along the M1 corridor. Therefore methods to reduce vehicle emissions are to be considered as direct action to improve air quality within the AQMA's. These have been considered within this chapter.

### 8.1. History of the M1

Opened in 1959, the M1 motorway is a heavily used strategic route linking London with the Midlands and the North of England. At the time it was designed, it was anticipated to carry up to 67,000 vehicles per day. Current traffic flow figures show the M1's current usage of 103,000 to 153,000 vehicles per day and it is significantly congested at peak times, and especially during periods of road works or following incidents on the motorway. This congestion causes delays to traffic and increases the risk of accidents.

### 8.2. Need for Expansion

The Government reviewed the transport infrastructure needs of the region and published the East Midlands Multi Modal Study in 2001. The study investigated all forms of transport options and, as part of its recommendations, included the widening of the M1 to four lanes in each direction. The Secretary of State considered this report and requested the Highways Agency to complete further evaluation works for entering into the Highways Agency's Targeted Programme of Improvements.

In April 2004, the project was added to the Highways Agency's Targeted Programme of Improvements

### 8.3. Highways Agency Environmental Impact Assessment

As part of the proposed M1 widening, the Highways Agency has submitted an Environmental Impact Assessment covering such factors as:

- Noise
- **Air Quality**
- Water Quality
- Ecology and Biodiversity
- Landscape and Visual Issues
- Pedestrians, Cyclists, Horse Riders and Walkers
- Archaeology, Cultural Heritage and Protected Sites of Interest

***Air Quality***

*"The effects of the scheme on local and regional air quality have been assessed by comparing the pollution levels that would occur with and without the widening of the motorway. The effect of the proposal on local air quality is largely expected to have minor impact. There will be an increase in carbon dioxide ($CO_2$) emissions, however, this will have no direct effect on the local communities or the local air quality.*

*In no instance will the predicted pollutant levels exceed UK and European standards including those within areas currently designated as Air Quality Management Areas by the local authorities. As a result of improving vehicle design, emissions of pollutants and particles from road traffic are forecast to decline significantly between today and the completion of this scheme."*

Source: Non-Technical Summary Environmental Statement of Contract 1 works (J25 – 28) M1 Widening the M1 J21 – 30 (March 2006)

Further information is available on the Highways Agency website http://www.highways.gov.uk. A copy of the Environmental Statement can be viewed at The Highways Agency office below:

Birmingham
5 Broadway
Broad Street
Birmingham
B15 1BL

## 8.4. Direct Actions within the AQMA

The following actions have been considered which may have an impact on air quality within the AQMA. They have been considered with regards to the improvement in air quality and the financial cost:

- Active Traffic Management (ATM)
- Compulsory Purchase of Dwellings
- Reductions in Traffic Volume
- Continue consultation with Highways Agency

## 8.5. Option 1 – Active Traffic Management (ATM)

### 8.5.1. Objective

To reduce vehicle emission through speed regulation, rather than the flow of vehicles. This could either be implemented on a blanket speed limit or a variable limit depending on traffic flow and time of day.

### 8.5.2. Control of this Option

The Highways Agency

### 8.5.3. Air Quality Improvements

Piloted on a section the M42 corridor between Junction 3A and 7, Active Traffic Management (ATM) utilises modern technology to make road travel smoother and safer by controlling the speed limit.

When traffic reaches a certain level and is in danger of slowing or suffering stop-start traffic jams, variable speed limits are introduced on the overhead gantries, similar to the system on parts of the M25. This improves traffic flow as slower speeds mean traffic travels closer together and more smoothly, meaning the same roadspace can be used by far more vehicles.

If flows increase more, or variable speed limits can't keep traffic moving, ATM steps up and switches on ramp metering. This uses the slip-road traffic lights to allow a few vehicles at a time to join the motorway, preventing congestion caused by large amounts of traffic trying to merge in all at once.

By controlling the flow and speed of traffic, $NO_2$ levels should improve as there will be less congestion and the vehicle engines are operating nearer to their optimum speed

### 8.5.4. Non Air Quality Impacts

- May improve safety along the stretch of M1
- Reduced fuel consumption and beneficial effects on carbon dioxide emissions and fossil fuel reserves
- Possibly decrease journey times, economic consequences particularly for businesses

### 8.5.5. Cost and Feasibility

Active Traffic Management is expensive to implement and requires continual management. Set- up costs includes vehicle detection 'loops' (MIDAS traffic sensors) set into the road surfaces beneath each lane at regular intervals, a network of CCTV cameras to detect traffic speed and density, enforcement cameras, computers, variable message signs (VMS). Further costs to set up

lay-bys at frequent intervals along the hard shoulder with space for several vehicles and equipped with emergency phones.
The scheme is still being piloted and is unlikely to be implemented due to the costs incurred to the Highways Agency in light of proposals to widen the motorway.

### 8.5.6. Summary

This is an expensive option and whilst it may be the most effective way of reducing air pollution within the AQMA, it is dependent upon the Highways Agency. This option is unlikely to take place unless it is part of a larger package of options or motorway strategy.

### 8.6. Option 2 – Compulsory Purchase of Dwellings (CPoD)

#### 8.6.1. Objective

To remove affected residents by purchasing affected dwellings and relocating residents.

#### 8.6.2. Control of this Option

Broxtowe Borough Council

#### 8.6.3. Air Quality Improvements

There will be no effect on air quality; however, the relevant exposure will not exist.

#### 8.6.4. Non Air Quality Impacts

- Socio-economic impacts
- May be beneficial to residents if factors such as noise and vibration are evident

#### 8.6.5. Cost and Feasibility

Likely to be relatively good compared to option 1 (Active Traffic Management). One off cost. Could be less attractive if CPO is resented in terms of general upheaval, stress levels, social impact and affect on residents general well being. Potential legal problems in executing CPO. Possible variation may be to defer CPO until properties come onto the market naturally.

#### 8.6.6. Summary

Although removing the receptors would appear to be a theoretically possible option with one off cost implications it has been discounted for several reasons.

The exceedence of the air quality objective is marginal, and it is predicted that it will be comparatively short lived. To compulsorily purchase the homes of residents in these circumstances is both politically and socially unacceptable and would undoubtedly not be achievable from a legal viewpoint.

## 8.7. Option 3 – Reduction in Traffic Volume

### 8.7.1. Objective

A reduction in traffic volume along the M1 will lead to a reduction in the overall emissions and thereby assist in improving ambient air quality

### 8.7.2. Control of this Option

Highways Agency, County Council, Broxtowe Borough Council

### 8.7.3. Air Quality Improvements

If sufficient dispersion of traffic is achieved, the pollution should also be dispersed, reducing the $NO_2$ levels within the AQMA below the prescribed standard.

### 8.7.4. Non Air Quality Improvements

- May reduce ambient noise levels
- Likely to improve safety along the stretch of M1
- Displaced traffic may impact negatively upon other non motorway routes
- Economic consequences of altered journey times

### 8.7.5. Cost and Feasibility

No direct cost to the local authority, as the option would not be financially implemented by Broxtowe Borough Council. In terms of feasibility, it would in practice be difficult to reduce the volume of traffic utilising the M1.

### 8.7.6. Summary

If real reductions can be achieved, this is likely to be an effective measure to achieve improved air quality improvements. However, this would include changing the habits of drivers throughout the country who use the M1, and would be difficult to implement at a local level.

## 8.8. Option 4 – Continue Consultation with Highways Agency

### 8.8.1. Objective

The Highways Agency is the operator of the trunk roads and it is therefore essential that the Council continue to liase with them with regards to any current or future plans for the M1 within its district.

The Highways Agency is aware of the AQMA's declared by the Council. This information is included in the Environmental Impact Assessment, which is discussed in Chapter 6.3. of this report. It is anticipated that the proposed widening of the M1 motorway, from three lanes to four, will have a positive reduction of $NO_2$ as it will create free flowing traffic and ease congestion, allowing vehicle engines to operate at their optimum speed.

### 8.8.2. Control of this Option

Highways Agency and Broxtowe Borough Council

### 8.8.3. Air Quality Improvements

The Environmental Impact Assessment, published by the Highways Agency has identified that the widening will have either no increase in pollutant concentrations or a minor increase by 2010. All national objectives and EU limit values are predicted to be met in the relevant years both with and without the proposals in place.

### 8.8.4. Non Air Quality Improvements

There will be an increase in the safety of the roads as vehicles will not be as congested.

### 8.8.5. Cost and Feasibility

Consultation with the Highways Agency will require minimal resources and is the most effective way for the Air Quality to be managed.

### 8.8.6. Summary

This is the most cost effective method for Broxtowe Borough Council and should be implemented. Close liaison with the Highways Agency on an ongoing basis is essential in order to enable the Local Authority to pursue the air quality objectives for $NO_2$.

## 8.9. Actions

The Council will continue to liase and consult with the Highways Agency with regards to the M1 expansion.

## 9.0. ACTIONS TO REDUCE EMISSIONS FROM TRANSPORT SOURCES

As discussed in Chapter 4.5.1. the predominant source of $NO_2$ within the AQMA's is emissions from vehicles travelling along the M1. Chapter 6 considers possible actions to be taken to reduce vehicle emissions along the M1. This chapter will provide methods to reduce traffic overall through local policies.

### 9.1. Transport Reduction Schemes

Under a business as usual scenario, traffic growth is still predicted to rise throughout the country. Even with the progressive cleaning of vehicle emissions, unrestrained traffic growth could eventually negate air quality improvements by the sheer weight of numbers and increased travel mileage.

It is therefore vital to reduce traffic volumes in order to protect and sustain air quality and other environmental, social and economic improvements.

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

### 9.2. Local Transport Plan (LTP)

The Nottinghamshire Local Transport Plan (LTP) is a five-year strategy, which sets out how the transport network will be improved in the period of 2005/06. Improving air quality is one of the key objectives of the LTP. A number of strategies have been developed through the LTP to encourage and improve public transport, cycling and walking.

The aims and objectives of the second LTP have been developed both nationally and locally. Nationally, the objectives were developed through the Department for Transport and the Local Government Association. Locally, through consultation, the plans have also been developed to take account of what local people feel is important.

Nationally, four objectives were determined which all local authorities in the country must address within their transport plan. These are:

- Improving accessibility to services
- Improving road safety
- Reducing congestion
- **Improving air quality**

As a result of consultation, the County Council has also adopted three local objectives, which the public and stakeholders felt were important. These are:

- Improving quality of life
- Regenerating less well-off areas
- Making best use of the existing highway network

### 9.2.1. Measures within the LTP to improve air quality

In line with its statutory duty, the LTP has developed initiatives throughout Nottinghamshire to reduce vehicle use and improve air quality.

These include:

- Car Share Scheme
- Alternative methods of transportation throughout Nottinghamshire

**Car Share Scheme**

Nottinghamshire County Council, Nottingham City Council and the Greater Nottingham Partnership have teamed up with *liftshare*, Britain's largest car-sharing network, and set up http://www.nottinghamshare.com, to promote car sharing as part of the Local Transport Plans. This web site aims to maximise peoples travel options whilst also reducing the number of cars on the roads, cutting pollution, saving money and protecting the environment.

The website caters for everyone for work, school, shopping and social activities and aims to reduce congestion and pollution. The scheme is free and has been designed for both drivers and passengers and can be used to find a match for one-off trips or regular journeys.

**Alternative methods of transportation throughout Nottinghamshire**

The Big Wheel is based on the Local Transport Plan and outlines strategies for Nottingham's transport network. It promotes pollution free methods of transportation such as walking and cycling by creating a safer environment for people to travel.

The Big Wheel also promotes existing methods of transport such as buses, park and rides and the tram system, reducing congestion and pollution.

Further information is available from the website http://www.thebigwheel.org.

### 9.2.2. Actions

The Council will support the County Council with its aim to achieve traffic reduction by improving the infrastructure needed to encourage sustainable travel and reduce unnecessary car use.

### 9.3. Traffic Reduction and Planning Land Use

Good transport links are fundamentally important to the economic and social well being of the borough. There is growing realisation that heavy reliance on the use of private cars cannot continue, as levels of congestion and environmental pollution rise. The planning system has an important role to play in securing a more sustainable pattern of development by helping reduce the need to travel and locating new development close to where public transport is, or can be, provided, and where walking and cycling are safe and viable alternative means of getting around.

#### 9.3.1. The Local Development Framework and its implications on Air Quality

The integration of land use, transport and highways is key to the Council facilitating delivery of sustainability. The Council's Local Plan, adopted September 2004, sets a number of guiding policies.

*Local Plan policy (2004), Chapter 3, The Environment, E26, states:*

> *"Planning permission will not be granted for development which would result in a significant deterioration in air quality, significant loss of health or amenity to the occupants of nearby premises due to pollution, or contamination of either surface waters or the site of the development or other land nearby."*

In applying policy E26, whether or not an impact is "significant" will be assessed having regard to the characteristics of the site and surroundings, together with the opinions of Environmental Health Officers and, where appropriate, the Environment Agency

#### 9.3.2. Environmental Impact Assessments

Few development proposals received by the Council are large enough to necessitate the submission of an Environmental Impact Assessment. However, applicants can be requested to provide information on, for example, the air quality implications of a development proposal.

The Council will look for evidence that developers have taken appropriate steps to minimise the emissions associated with the development. The impacts of changes in land use planning practice tend by their nature to be felt only in the long-term. The proposals described here are designed to consolidate a trend in development and land use planning towards recognising air quality as an important consideration.

All planning applications are scrutinised for their potential impact on the environment, and where appropriate, applicants are requested to provide detailed information on the relevant issues, including air quality. If the Council is satisfied that the proposal will result in significant deterioration in air quality, the application will be refused.

### 9.3.3. Actions

The Council will continue to look for evidence that developers have taken appropriate steps to minimise any increases in air pollution regardless of their location. This will include an assessment of the air quality implications where applicable.

## 9.4. Broxtowe Travel Plan (2007 – 2012)

A Travel Plan is a general term for a package of initiatives or projects aimed at promoting sustainable travel and reducing overdependence on the car. Essentially, the Plan aims to reduce the impact of travel on the environment and provide a framework for a package of actions and targets. A travel Plan should not be seen as an anti-car scheme, but simply as a means to provide employees / Councillors and visitors with more sustainable travel choices.

The Council approved a range of measures in the original 2002 – 2006 Broxtowe Borough Council Travel Plan. The measures in the Travel Plan were aimed at reducing car use and other consequences of ever-increasing road traffic such as congestion, road accidents, noise and emissions of pollutants affecting health

This included:

- Piloted bio-diesel for fleet vehicles
- Improved shower facilities
- Secure motorbike storage at the Council Offices in Beeston
- Produced an Easy Rider leaflet mapping cycling routes in Broxtowe
- Updated the 'How to Get to Broxtowe' leaflet
- Joined the Nottinghamshare Carshare Scheme
- Promotion of travel alternatives and initiatives to employees via articles in newsletters and on the website
- Yearly Cycling events during Bike Week e.g. Ridewise event
- Promoted European Car Free day to staff at Kimberley Depot and Leisure Centre
- Held a cycling event in Beeston Square
- Produced a Travel Plan handbook for employees
- Promoted travel initiatives to the Broxtowe Partnership
- Completed three staff surveys
- Developed the Travel Plan Working Group
- Attendance and display at induction events
- Travel Plan promoted to all new starters via a welcoming e-mail or letter
- Overall winner of the Big Wheel Travel Plan Award 2002
- Promoted cycle training to staff
- Walk to Work events

The 2007 – 2012 Travel Plan has built on these actions and has specified timescales in which to achieve these. This can be seen overleaf.

**Broxtowe Borough Council Travel Plan (2007 – 2012)**

| **Marketing / Consultation and Securing Commitment** – Objective: All employees and members are aware of the Travel Plan, with Chief Officer commitment to furthering the aims of the Travel Plan | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Develop a Communication Strategy | Dec 07 | Develop a strategy targeting all employees and members. This will include evens, promotion of facilities available, awareness raising campaigns, press releases | To raise awareness of sustainable travel with all employees and members<br><br>To ensure consistent and regular campaigns | CEO / Corporate Communications Manager<br><br>DPCD / Community Development Officer | Within existing resources |
| Promotional events at least twice a year at different locations | Yearly | Promotional event linking to national campaigns such as Walk Week, Bike Week, European Car Free Day. Link with Communication Strategy 09/09 onwards | Raise awareness of the plan with both employees and the wider community using the opportunity to do press releases | DPCD / Community Development Officer<br><br>TPWG | Within existing resources |

**Broxtowe Borough Council Travel Plan (2007 – 2012)**

| **Commuting Journeys** – Objective: Reduce the number of one-person car trips between home and work by employees, resulting in a reduction of $CO^2$ emissions and congestion | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Improve cycling / motorcycle provision where needed on a priority basis | 07 / 08<br>Yearly | To look at secure cycle storage at work sites where needed. Year 1 report prioritising sites and then one site a year | To reduce the number of commuter journeys by car, reducing $CO^2$ emissions / reducing congestion<br><br>To improve facilities as requested | DPCD / Community Development Officer<br><br>TWS | Within existing resources / external resources might be required |
| Promote Nottinghamshare | Yearly | To promote through different media to employees. Develop a business case for car sharing parking places. | To reduce the number of commuter journeys by car<br><br>To increase awareness of the scheme and reduce single car occupancy | DPCD / Community Development Officer<br><br>TPWG | Within existing resources |

**Broxtowe Borough Council Travel Plan (2007 – 2012)**

| **Commuting Journeys** – Objective: Reduce the number of one-person car trips between home and work by employees, resulting in a reduction of $CO^2$ emissions and congestion | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Promote Cycling | Yearly | Promote cycling on a yearly basis during bike week. Seek funding for larger scale promotion using external organisations such as Company of Cyclists | To reduce the number of commuter journeys by car<br><br>Partnership work promoting cycling to the wider community | DPCD / Community Development Officer<br><br>TPWG | Within existing resources / external resources might be required |
| Seek public transport discounts / promotions | 08 / 09 | To work in partnership with Nottinghamshire County Council / Big Wheel and local bus companies to provide employees with discounts | Promote public transport use, reducing CO2, congestion and lone car use | DPCD / Community Development Officer<br><br>CEO / Head of Human Resources | Within existing resources |

**Broxtowe Borough Council Travel Plan (2007 – 2012)**

| **Business Journeys** – Objective: Reduce the number of private car journeys at work, resulting in reduced mileage, savings and reduced emissions | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| To launch Pool Bike Scheme at Kimberley Depot | Aug 07 | To launch the pool bikes in Summer 2007<br><br>To set up administration of the scheme and monitor usage | Reduce private car journeys and monitor pool bike use. Base line data to be established. | TWS / Fleet Manager<br><br>DPCD / Community Development Officer | Within existing resources |
| Lease Car Review | Dec 08 | Review lease cars, with a specific focus on incentives for smaller / cleaner engined cars | To reduce business mileage and the number of commuting journeys | CEO / head of Human Resources | Within existing resources |
| Car Allowances | March 08 | Review car allowances, with a specific focus on reducing the expense rate for bigger engine cars / standard rate all cars | | CEO / Head of Human Resources | |
| Work Place Parking | March 08 | Review work place parking, with a specific focus on reducing access to freely available work place car parking for lone drivers, introducing priority parking for car sharers | | TWS / Environment Officer<br><br>DLAS | |

**Broxtowe Borough Council Travel Plan (2007 – 2012)**

| **Business Journeys** – Objective: Reduce the number of private car journeys at work, resulting in reduced mileage, savings and reduced emissions | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Transport Map | Dec 07 | Develop a transport map specifying which modes of transport the organisation considers acceptable for specific types of trip (single occupancy car travel only being acceptable if all other modes are not possible). This will link with the Travel Policy | Reduce business mileage | DPCD / Community Development Officer<br><br>TPWG | Within existing resources |
| Feasibility study of having Bus Card / Tickets for employee use | June 08 | BBC buy card in bulk at a discount and hold at reception for employees to use.<br><br>Sign out when use and return for business travel | Cost savings. Reduce need for administration. | DPCD / Community Development Officer<br><br>CEO / Head of Human Resources | Funding required |
| Access use of pool vehicles | March 09 | Use of current council vehicles to be assessed for potential wider 'pool' use. Potential for separate pool vehicles to be explored | Efficiency savings and potential to reduce commuter journeys to and from work | TWS / Fleet Manager | External funding required (possible source NCC) |

**Broxtowe Borough Council Travel Plan (2007 – 2012)**

| **Alternative Working Practices** – Aim: Reduce the need for employees to travel to work and business mileage resulting in a reduction of $CO^2$ emissions | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Design, plot and estimate opportunities for remote, mobile, home working | Dec 07 | Review the findings of the home working trial and site specific impact on travel patterns in phase one, December 2007 | Reduce the number of commuting journeys to work meeting aims of the Plan | CEO / head of Human Resources | Within existing resources |
| Business case for extending remove / flexible / alternative working practices | Dec 08 | Consider the business cases for the extension of remove / flexible / alternative working and its impact on office space / business miles / commuting journeys | Reduce the number of commuting and business journeys meeting aims of Plan<br><br>Using successful initiatives from other organisations to meet this aim | CEO / Head of Human Resources<br><br>DPCD / Community Development Officer | Capital Costs. Potential revenue savings. |

Key:

CEO - Chief Executive's Office
DPCD - Directorate of Panning and Community Development
TPWG - Travel Plan Working Group
TWS - Technical and Works Services
DLAS - Directorate of Legal and Administrative Services

### 9.4.1. Actions

Broxtowe Borough Council will continue to maintain and develop its Travel Plan, committing to tackling transport issues.

## 10.0. POSSIBILITIES FOR DIRECT ACTIONS TO IMPROVE AIR QUALTIY WITHIN BROXTOWE

As discussed in Chapter 4.5.1., the predominant source of $NO_2$ within the AQMA's is from motorway transport. However, it would be prudent to consider all sources of $NO_2$ throughout the borough, which may have a contributing factor to the exceedence of $NO_2$ within the AQMA's. It is logical that if improvements can be made throughout the borough, the air quality in the AQMA's will benefit.

### 10.1. Direct Actions within Broxtowe

The following actions have been considered which may have an impact on air quality within the borough:

- Regulation of Prescribed Processes Part A2 / B Processes (Environmental Protection Act 1990 / Pollution Prevention and Control Act 1999)
- Industrial Smoke Control (Clean Air Act 1993)
- Statutory Nuisance Legislation (Environmental Protection Act 1990)
- Bonfires
- Smoke Control Areas

### 10.2. Regulation of Prescribed Processes Part A2 / B Processes (Environmental Protection Act 1990 / Pollution Prevention and Control Act 1999)

The Environmental Protection Act 1990 (EPA) introduced new controls to a range of industrial processes with considerable pollution potential. Responsibility for industrial pollution control is split between agencies. The Environment Agency has responsibility for large-scale industrial processes with significant polluting power (Part A1 processes) and smaller scale potentially polluting industries (Part A2 or B processes) are regulated by Local Authorities. The regulation of industries by local authorities is shortly being changed from the EPA 1990 to the Pollution Prevention and Control Act 1999.

The Council currently permits one A2 process and 29 Part B process throughout the district. The permits require the operator to comply with set conditions which limits the substances emitted from the processes in accordance with the National Air Quality Standards (NAQS) based on European Directives, and places them under a general obligation to use the "best available techniques" to prevent or minimise pollution.

#### 10.2.1. Actions

Broxtowe Borough Council will continue to provide comprehensive control over Part A2 and Part B processes through a proactive inspection programme.

### 10.3. Industrial Smoke Control (Clean Air Act 1993)

The Council also controls emissions from certain industrial processes or trade premises which fall outside the provisions of the EPA using the provisions of the Clean Air Act 1993, which includes powers to:

- Prohibit black smoke from a chimney of any building (subject to certain exemptions)
- Prohibit dark smoke from industrial or trade premises (subject to permitted periods and certain exemptions)
- Require notification of installations of industrial furnaces
- Approve chimney heights of certain installations

#### 10.3.1. Actions

The Council will continue to proactively survey the district and take appropriate action as well as respond to any complaint to control emissions from industrial or trade premises.

### 10.4. Statutory Nuisance Legislation (Environmental Protection Act 1990)

The nuisance regime complements the more specific industrial pollution control regimes of the Clean Air Act 1993, the Environmental Protection Act 1990 and the Pollution Prevention and Control Act 1999. Local authorities are able to use it to deal with domestic as well as industrial emissions that, by definition, are prejudicial to health or a nuisance.

Those industrial processes that are not defined as Part 2A or B processes under section 2(1) of the Environmental Protection Act 1990 can operate without authorisation but must ensure that their operations do not cause a statutory nuisance to those around them and base their actions on a concept known as “best practicable means”.

Statutory nuisance can cover: smoke, fumes, gases, dust, steam and smells emitted from a premises, and where a local authority is satisfied that a statutory nuisance exists the Council’s enforcement officers have a duty to take enforcement action requiring the abatement of the nuisance

#### 10.4.1. Actions

The Council will continue to proactively survey the district and take appropriate actions as well as responding to any complaints about nuisance.

### 10.5. Bonfires

Bonfires that produce visible smoke can contribute to increasing the levels of air pollution. Fine particulates ($PM_{10}$) as well as larger particles and other pollutants such as dioxins and other known carcinogens may also be produced if plastics or rubber are burnt. Where bonfires cause a statutory nuisance, enforcement action can be taken under the Environmental Protection Act 1990.

The Council promotes composting as an alternative method of disposal of garden waste. Schemes to encourage home, community and centralised composting have been set up to help reduce the need for bonfires.

Composting units are available to anyone in the district, at discounted rates. These are able to take a significant amount of compostible waste, which may have been otherwise burnt or placed in domestic refuse.

#### 10.5.1. Actions

The Council will provide information and advice to residents and companies in the areas about problems caused by bonfires, and enforcement action will be taken against persistent offenders who contravene the Clean Air Act and Environmental Protection Act. The Council will also encourage residents to compost waste rather than burning it on bonfires.

### 10.6. Smoke Control Areas

The main purpose of a smoke control area is to reduce pollution from domestic chimneys within the borough by prohibiting the burning of fuels such as coal and wood on open fires. The majority of properties in the borough are in designated smoke control areas. The effect of this is that domestic premises with open fireplaces or approved appliances must only burn authorised fuel exempted by legislation.

#### 10.6.1.Actions

The Council will continue to proactively survey the district and take appropriate action as well as responding to any complaints to ensure that only authorised fuels and exempted fireplaces are used within the borough.

## 11.0. THE PROMOTION OF AIR QUALITY ISSUES

### 11.1. Improve public Information

It is important that information is provided on air quality in a clear and accessible way. The popularity of the Internet increases every year and therefore a decision was taken to provide a much larger range of information on the Council's website.

All reports in relation to air quality are available on the Council's website http://www.broxtowe.gov.uk,

### 11.2. Nottinghamshire Air Quality Steering Group

The Nottinghamshire Air Quality Steering Group was formed in 1998 and comprises representatives from each local authority, Nottingham Health Authority, Highways Agency, Nottinghamshire County Council and the power generators. The group acts as a consultation body to advise local authorities of procedures and to ensure wide consultation in relation to air quality issues, in particular air quality reviews and assessments.

### 11.3. Raising Public Awareness

Local campaigns to promote awareness on environmental pollution from vehicles and alternatives will continue to be expanded. Free advice on air quality issues is also available to members of the public.

## 12.0. SUMMARY OF PROPOSALS TO REDUCE AIR POLLUTION

### 12.1. Summary of Actions

The following tables identifies the actions identified within this report for the Council's commitment to air quality issues.

They are highlighted under the following headings:

- Direct Actions to Improve Air Quality within the AQMA's (targeting the M1 Motorway)
- Wider Actions to reduce emissions from transport sources (Local Transport Plan)
- Travel Reduction through Land Use Planning (Local Development Framework)
- Reduction in pollution throughout Broxtowe Borough Council
- Promotion of Air Quality Issues

| **Direct Actions to Improve Air Quality within the AQMA's (targeting the M1 Motorway)** | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Continue discussions with the Highways Agency | Ongoing | Continue liaising and consulting with the Highways Agency with regards to the M1 expansion. | To ensure the M1 widening does not have an adverse effect on residents in respect of pollution or noise. | HHL / Environmental Health Department<br><br>DPCD / Planning Department<br><br>TWS / Highways | Within existing resources |

| **Wider Actions to reduce emissions from transport sources (Local Transport Plan)** | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Support the Nottinghamshire Local Transport Plan | Ongoing | Supporting the County Council with its aim to achieve traffic reduction by improving the infrastructure needed to encourage sustainable travel and reduce unnecessary car use. | To improve accessibility to services, improve road safety, reduce congestion and improve air quality | HHL / Environmental Health Department<br><br>DPCD / Planning Department<br><br>TWS / Highways | Within existing resources |

| **Travel Reduction through Land Use Planning (Local Development Framework)** | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Consider the impact of new developments on air quality | Ongoing | The Council will continue to look for evidence that developers have taken appropriate steps to minimise any increases in air pollution regardless of their location. This will include an assessment of the air quality implications where applicable | To ensure the Council is not required to widen / declare further AQMA's within the borough | DPCD / Planning Department<br><br>HHL / Environmental Health Department | Within existing resources |
| Produce Broxtowe Travel Plan | Completed (to be reviewed annually) | Detail the Council's commitment to promote sustainable travel to all Broxtowe Employees / Councillors and visitors | To reduce the need for car travel for sustainable transport | DPCD / Community Development Officer | Within existing resources |

| **Reduction in pollution throughout Broxtowe Borough Council** | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Proactively inspect IPPC permitted processes | Ongoing | Continue to proactively inspect prescribed Part A2 / B processes (Environmental Protection Act 1990 / Pollution Prevention and Control Act 1999) | To ensure the Council is not required to widen / declare further AQMA's within the borough | HHL / Environmental Health Department | Within existing resources |
| Investigate dark / black smoke allegations at industrial premises | Ongoing | Investigate and take appropriate action to industrial and trade waste fires that produce dark / black smoke under The Clean Air Act 1993 | To improve air quality to residents of Broxtowe | HHL / Environmental Health Department | Within existing resources |
| Investigate allegations of smoke nuisance throughout the borough | Ongoing | Investigate and take appropriate action to smoke nuisance under The Environmental Protection Act 1990 | To improve air quality to residents of Broxtowe | HHL / Environmental Health Department | Within existing resources |

| **Reduction in pollution throughout Broxtowe Borough Council** | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Advise of sustainable methods of waste disposal | Ongoing | Advise businesses and residents of alternative methods of waste disposal rather than burning | To improve air quality to residents of Broxtowe | HHL / Environmental Health Department<br><br>TWS | Within existing resources |
| Proactively advise and investigate complaints relating to smoke control areas | Ongoing | Ensure appliances are only using authorised fuels and exempted fireplaces which comply within Smoke Control Areas | To improve air quality to residents of Broxtowe | HHL / Environmental Health Department | Within existing resources |

| **Promotion of Air Quality Issues** | | | | | |
|---|---|---|---|---|---|
| *Action* | *Timescale* | *Details* | *Outcome* | *Lead Dept/Post* | *Budget* |
| Improve Public Information | Ongoing | Continually update the website with regards to air quality reports and information for members of the public. | To inform the public of air quality progress | HHL / Environmental Health Department | Within existing resources |
| Continue meetings with Nottinghamshire Air Quality Steering Group | Ongoing | Continue to meet and discuss air quality issues with the Nottinghamshire Air Quality Steering Group on a quarterly basis | To improve relations with neighbouring authorites and discuss impacts on air quality | HHL / Environmental Health Department | Within existing resources |
| Raising Public Awareness | Ongoing | Provide free advice to members of the public and local businesses | To increase awareness of issues of air quality | HHL / Environmental Health Department | Within existing resources |

## 13.0. Conclusion

In line with its statutory duty, Broxtowe Borough Council declared four Air Quality Management Areas (AQMA's) due to an exceedence of the pollutant, $NO_2$. These areas were declared 1 February 2006.

This report identifies that the exceedence is as a result of vehicle emissions from motorway traffic. Unfortunately, the control of this source is outside of the borough Council's remit.

Whilst the Council does not have control over this source of pollution, options have been considered for combating the level of pollution to a level below that prescribed. In considering these options, the Council has taken into account cost and feasibility against the environmental impact.

The Action Plan has identified "direct" and "indirect" options to improve the air quality within the AQMA's. Continuing consultation with the Highways Agency (the operator of the road) has been determined as the most effective method of combating the levels of pollution and discussions with the Highways Agency will continue.

Measures have also been identified that the Council will take which will have an "indirect" effect on the air quality within the AQMA's as well as the rest of Broxtowe. The Council will continue to support proactive initiatives to improve air quality as identified in the LTP. Furthermore, the Council will refuse planning permission if the air quality standards and objectives are compromised at relevant locations.

The Council will also continue to survey the district for incidents which may have a detrimental effect on air quality and react to complaints.

It is anticipated that the steps identified in this Action Plan will ensure the Council will meet the annual mean objective for $NO_2$ prior to 2010 and monitoring has increased throughout the AQMA's to ensure that the prescribed standards and objectives will be met.

**APPENDIX 1**

**Map 1**
Local Air Quality Management Area 1


Local Air Quality Management Area 1

(This area encompasses Tiree Close and Iona Drive, Trowell, Nottingham)

N

Scale: 1:2000

DIRECTORATE
OF
HOUSING, HEALTH & LEISURE

**Map 2**
Local Air Quality Management Area 2

Local Air Quality Management Area 2

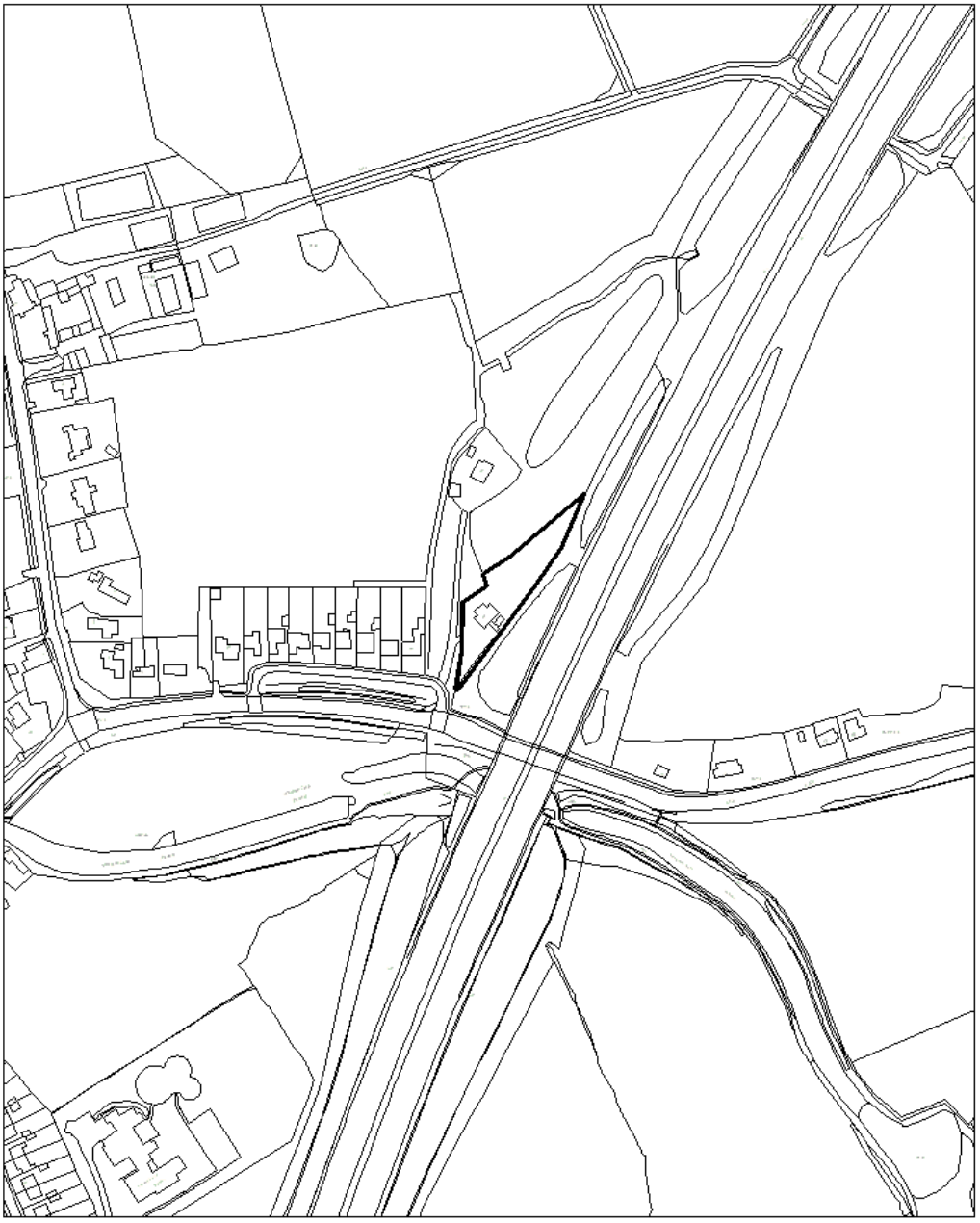
(This area encompasses Derbyshire Avenue, Trowell, Nottingham)

N

Scale: 1:2750

DIRECTORATE
OF
HOUSING, HEALTH & LEISURE

**Map 3**
Local Air Quality Management Area 3



Local Air Quality Management Area 3

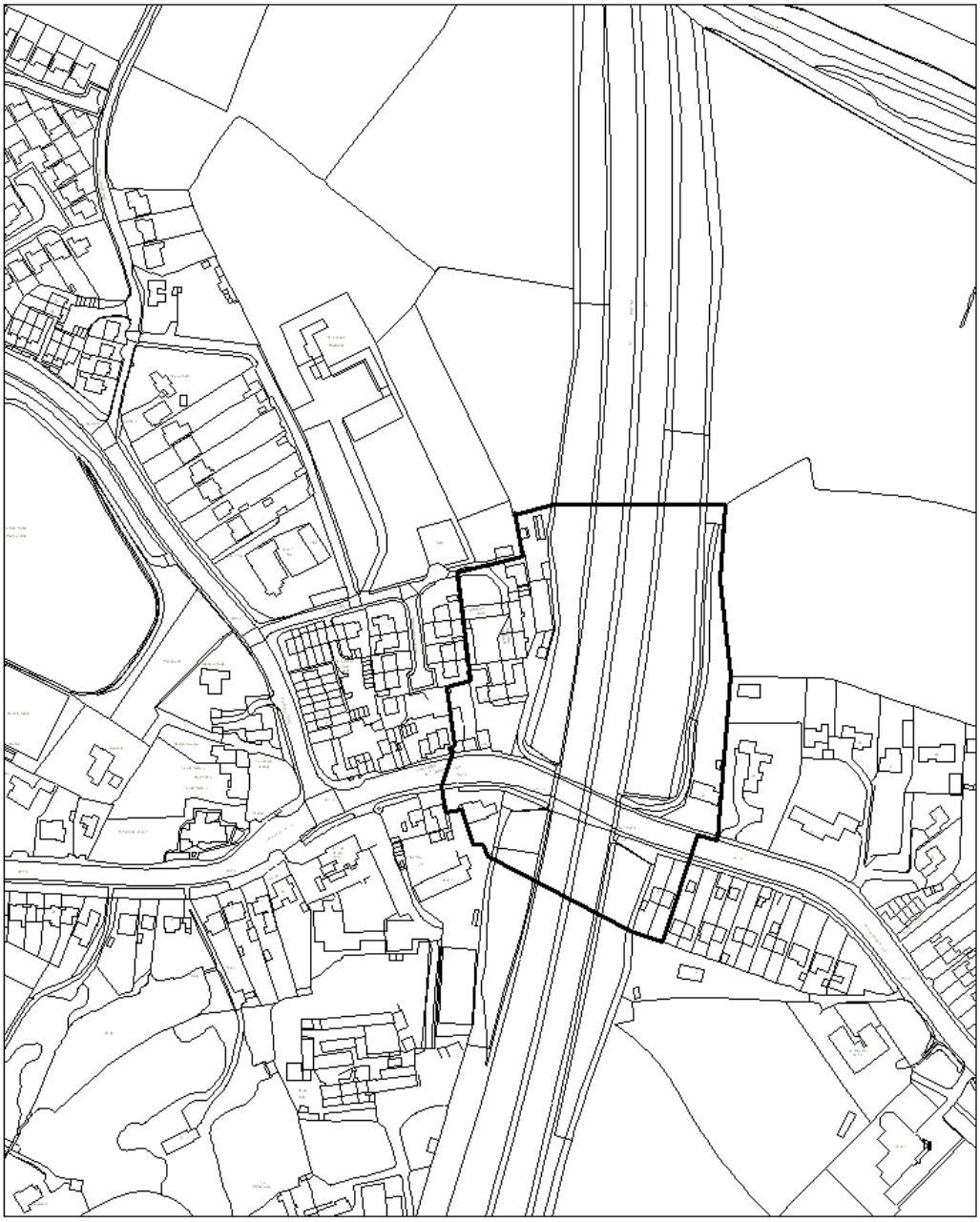
(This area encompasses Nottingham Road, Trowell, Nottingham)

N

Scale: 1:2750

DIRECTORATE
OF
HOUSING, HEALTH & LEISURE

**Map 4**
Local Air Quality Management Area 4



Local Air Quality Management Area 4

(This area encompasses Nottingham Road and Back Lane, Nuthall, Nottingham)

Scale: 1:2750

N

DIRECTORATE
OF
HOUSING, HEALTH & LEISURE

**APPENDIX 2**

**Produced by AEA Energy & Environment on behalf of Ove Arup**

# BROXTOWE
# 1 October to 31 December 2006

**These data are provisional from 01/10/2006 and may be subject to further quality control**

| POLLUTANT | NO | $NO_2$ |
|---|---|---|
| Number Very High | - | 0 |
| Number High | - | 0 |
| Number Moderate | - | 0 |
| Number Low | - | 2201 |
| Maximum 15-minute mean | 484 µg $m^{-3}$ | 164 µg $m^{-3}$ |
| Maximum hourly mean | 406 µg $m^{-3}$ | 136 µg $m^{-3}$ |
| Maximum running 8-hour mean | 322 µg $m^{-3}$ | 97 µg $m^{-3}$ |
| Maximum running 24-hour mean | 241 µg $m^{-3}$ | 78 µg $m^{-3}$ |
| Maximum daily mean | 231 µg $m^{-3}$ | 77 µg $m^{-3}$ |
| Average | 36 µg $m^{-3}$ | 39 µg $m^{-3}$ |
| Data capture | 99.7 % | 99.7 % |

All mass units are at 20'C and 1013mb

| Pollutant | Air Quality (England) Regulations 2000 and (Amendment) Regulations 2002 | Exceedences | Days |
|---|---|---|---|
| Nitrogen Dioxide | Annual mean > 40 µg $m^{-3}$ | - | - |
| Nitrogen Dioxide | Hourly mean > 200 µg $m^{-3}$ | 0 | 0 |

**Produced by AEA Energy & Environment on behalf of Ove Arup**

# BROXTOWE
# 1 January to 31 March 2007

**These data are provisional from 01/01/2007 and may be subject to further quality control**

| POLLUTANT | $NO_X$ | $NO_2$ |
|---|---|---|
| Number Very High | - | 0 |
| Number High | - | 0 |
| Number Moderate | - | 0 |
| Number Low | - | 2147 |
| Maximum 15-minute mean | 1125 µg $m^{-3}$ | 204 µg $m^{-3}$ |
| Maximum hourly mean | 798 µg $m^{-3}$ | 118 µg $m^{-3}$ |
| Maximum running 8-hour mean | 552 µg $m^{-3}$ | 91 µg $m^{-3}$ |
| Maximum running 24-hour mean | 406 µg $m^{-3}$ | 78 µg $m^{-3}$ |
| Maximum daily mean | 399 µg $m^{-3}$ | 78 µg $m^{-3}$ |
| Average | 89 µg $m^{-3}$ | 40 µg $m^{-3}$ |
| Data capture | 99.4 % | 99.4 % |

All mass units are at 20'C and 1013mb
$NO_X$ mass units are $NO_X$ as $NO_2$

| Pollutant | Air Quality (England) Regulations 2000 and (Amendment) Regulations 2002 | Exceedences | Days |
|---|---|---|---|
| Nitrogen Oxides ($NO_2$) | Annual mean > 30 µg $m^{-3}$ | - | - |
| Nitrogen Dioxide | Annual mean > 40 µg $m^{-3}$ | - | - |
| Nitrogen Dioxide | Hourly mean > 200 µg $m^{-3}$ | 0 | 0 |