Brighton & Hove City Council

SUSSEX-air Air Quality Partnership

Brighton & Hove City Council




Air Quality Action Plan

Environmental Protection Team

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In Support of Statutory Duties under Part IV of the Environment Act 1995 2011

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Executive summary

Decision makers should be aware that reductions in ambient pollution led by investment in technology is a multiple win situation; for the urban environment, human-health and a positive growth area for the economy. Improvements in air quality aim to protect the most vulnerable members of society; most especially the very young and those with existing respiratory illness. Given that prevention is better than cure it is in the financial interests of government and the health service to save capital by investing in a healthier urban environment. Where the air is poor; airborne pollution can contribute to heart and lung conditions and influence life expectancy. Based on past figures the government white paper on sustainable transport[1] estimated that poor air quality costs the UK economy £19 billion per year. As this assessment does not include all airborne pollutants it is likely to be an underestimate. Report by the committee on the medical effects of air pollution suggests fine particulate have a small contribution to 200,000 UK deaths in 2008[2] equivalent to a variable influence on one-third of annual mortality. A number of international studies also demonstrate a link between urban Nitrogen Dioxide (NO_2) and all cause mortality. The latest evidence now suggests that poor air quality is a greater risk to our society than; alcohol abuse, passive smoking, obesity, flooding and road traffic accidents.

Local business and the general public are both the cause and the solution for the problem of poor outdoor air. This action plan follows an open twelve-week consultation period and sets out how airborne pollution can be reduced in order to improve the outdoor air in Brighton. The final action plan takes account of consultee comments and includes new references to the London Mayor's Air Quality Strategy and the Sussex Low Emission Strategy. In 2011 Brighton and Hove have been awarded a grant under the Local Sustainable Transport Fund (LSTF) for reductions in emissions and improvements to local air quality.

The former AQAP (Air Quality Action Plan 2006) and LTP1 (First Local Transport Plan) acknowledged that road traffic was main course and encouraged modal shift; namely avoidance of private car usage and reduction in total traffic numbers, promotion of walking cycling and public transport. It has been identified that most of the traffic within the city is locally generated, with two thirds of vehicles on the road at any one time making trips which begin and end in the city. Many of these shorter journeys could be achieved by more sustainable means.

A successful program to reduce car usage makes sense in terms of reducing fuel consumption, minimising carbon footprint, freeing up road space for all users and making neighbourhoods more conducive to; cycling, walking, social cohesion and play. In our city's AQMA (Air Quality Management Area), private cars typically contribute

[1] Sustainable Transport White Paper; Creating Growth Cutting Carbon. Making Sustainable Transport Happen, Department of Transport, January 2011
http://www2.dft.gov.uk/pgr/regional/sustainabletransport/pdf/whitepaper.pdf

[2] Committee on the Medical Affects of Air Pollutants; Mortality Effects of Long Term Exposure to Particulate Matter, 2010 http://comeap.org.uk/component/content/article/28-page-linking/128-the-mortality-effects-of-long-term-exposure-to-particulate-air-pollution-in-the-uk.html

between: one-quarter and a half of roadside NO_2 pollution. Between three-quarters or a half can arise from other sources notably; trucks, vans, taxis and buses. The majority of locally derived pollution comes from either diesel vehicles or older petrol vehicles. Therefore a policy of travel choice has to be part of a much more comprehensive air quality action plan.

Local Authorities in the UK have a statutory duty to review and assess air quality against the Air Quality Standards or EU legally binding limits set out in the English Air Quality Strategy that is underwritten by part IV of the Environment Act 1995. Under section 84 Local authorities have to designate those parts of their areas where the prescribed standards are not likely to be met as Air Quality Management Areas (AQMA's).

In light of the early investigations the council was confident in its assessment that at some roadside locations Nitrogen Dioxide levels were above the prescribed legal limits. Therefore an AQMA was declared under section 84 of the Environment Act 1995. The local authority is then duty bound to deliver a Further Review and Assessment (FR&A) of air quality for the declared area. Following initial declaration of an AQMA in 2004, Brighton and Hove City Council (BHCC) produced its first Air Quality Action Plan (AQAP 2006).

Progressing the Review and Assessment, the Council designated a more substantial AQMA in February 2008. This area entirely includes the original AQMA and covers a much more substantial area including the city centre. In October 2008 the statutory declaration was amended to include the hourly limit value for Nitrogen Dioxide.

In assessing the way forward the defra Policy Guidance PG (PG09) was consulted. Since 2004 it has been clear that road transport is the primary (but not exclusive) reason as to why Nitrogen Dioxide is above legal limits in Brighton. In light of this it was concluded that the AQAP would be aligned with the Local Transport Plan (LTP). The city council's third Transport Plan (LTP3) has been approved by council and will be released to the public domain at about the same time as this AQAP (2011). The AQAP is delivered by the local authority to the Department of the Environment (defra) and LTP reports to the Department of Transport (DFT). Whilst the two documents feed into different sections of Central Government the reports share common objectives at a local level.

In Brighton there has been limited improvement in ambient Nitrogen Dioxide concentrations during the past year (2010) Concentrations remain above the legal standard at worse-case roadside locations in Central Brighton and Portslade. A similar situation is recorded in most large cities around Europe.

This AQAP has identified a package of measures designed to improve local air quality in and around the city and especially within the AQMA. In doing so careful consideration has also been given to any secondary effects which could have positive or negative influence on other services or stakeholders in the city.

The Department of Environment guidance sets out a suggested approach for summarising the costs, wider scale effects and air quality impacts so the individual

measures can then be ranked in terms of priority. Measures with high air quality impacts and low costs tend to be ranked high, however factors such as time scale and uncertainty over funding are also important.

It is recommended that going forward the measures in LTP3 are maximised in order to prioritise improvements in air quality. The new Sussex Low Emission Strategy looks to further integrate policy with development control, the planning process and vehicle fleet procurement. The AQAP must draw on a multi-faceted approach. It is recognised that in order to reduce the highest concentrations of Nitrogen Dioxide an intelligent and targeted strategy is required. Reduction in traffic alone may not lead to improvements in air quality because the majority of pollution are caused by a minority of vehicles. To this end it is recommended that there are measures in place to report the most polluting vehicles on the road. It also recommended that the MOT tail-pipe test include a vehicle standard for emissions of Oxides of Nitrogen (NO_x) and particulate. Commercials for new vehicles should cite MPG, CO_2, NO_x and particulate emissions so consumers can make informed decisions on potential purchases that are based on their potential contribution to the local air that we inhale in addition to fuel efficiency and green house gas emission. Education and public information campaigns with local schools, colleges, universities, businesses and media in combination website development are crucial to communicating the messages in the AQAP. Environmental Protection UK is running a Healthy Air Campaign at the same time that this action plan is released.

Generally vehicles are more polluting to the local environment if they are heavier, older or run on diesel. The position and geometry of buildings relative to the carriageway are significant, for example fewer vehicles will cause an air quality problem on St James Street (narrow) as compared to with Kingsway (wide).

It is difficult to tease out the effectiveness that early LTP measures have had in air quality. At priority locations pollution remains above legal limits and more needs to be done. Domestic and commercial heating emissions are likely to have had a greater than normal contribution to ambient Nitrogen Dioxide during colder conditions such as those experienced early-2009 and late-2010.

There is not a single short-term solution to the problem of common air pollution in high density cities around the world. From an engineering point of you it is not necessary for vehicles to be so heavy. As Einstein's theories will testify energy and mass equate to each other and more energy is required to give bulky mass momentum. Shifting weight costs fuel and emissions. Businesses capable of weaning themselves off of fossil fuel are likely to be at a distinct advantage in the future. In high density city streetscapes a decisive move away from dependence on diesel and older petrol engines is required as priority in order to meet all the air quality standards for the protection of human health.

1) Brighton and Hove and Air Quality Review and Assessment

1.1 Introduction and aims of the AQAP

Under the Environment Act 1995, local authorities are required to Review and Assess air quality on a regular basis. A *review* of air quality means a consideration of the levels of pollutants in the air for which limit values are prescribed in the regulations. An *assessment* of air quality is the consideration of whether estimated concentrations are likely to exceed the levels set in the Air Quality Objectives (Table 2). This entails a combination of monitoring, mapping and dispersion modelling. The timescales of this process are given in Table 1.

The main reasons for tackling poor air quality are the links with quality of life and the need to minimise the risk to human health. Largely due to ongoing work undertaken by the Committee on the Medical Effects of Air Pollutants (COMEAP), we now have a better understanding of the short-term and the long-term health effects of air pollution.

The first round of review and assessments (R&A) was completed in June 2000. The conclusion was that the National Air Quality Objectives were not likely to be exceeded in the city of Brighton & Hove. Since that time new guidance has been released by the Department for Environment, Food and Rural Affairs (defra) and we have a better knowledge of both the science and methods of assessing air pollution.

The Defra guidance at the time required local authorities to carry out an Updating & Screening Assessment (USA) of local air quality by the end of May 2003. This assessment identified aspects that had changed since the first round of review and assessment. The USA indicated which pollutants and specific locations within the city of Brighton & Hove required a Detailed Assessment (DA). The first Detailed Assessment took a closer look at these priority areas identified in 2003. To achieve this, all the available specific data relating to traffic flows, pollution monitoring and weather over the period 2003 to 2008.

Air Quality Progress Report were developed as the existing Review and Assessment process was seen to be too stop-start.

Table 1 Local Air Quality Management (LAQM) Review and Assessment

Review and Assessments Report	Dated
Stage 1 Consultation Draft	January 1999
Stage 2 & 3 Final Report	June 2000
Second round Updating Screening and Assessment	May 2003
First Detailed Assessment leading to declaration of the 2004-AQMA	**April 2004**
Second round Progress Report	April 2005
Third round Updating Screening and Assessment	April 2006
First Air Quality Action Plan for the 2004-AQMA	March 2007
Second Detailed Assessment leading to declaration of the 2008-AQMA	September 2007
Further Assessment following 2008-AQMA deceleration	Final January 2008
Third round Progress Report	April 2008
Declaration of expanded AQMA	**February 2008**
AQMA declaration amendment to include the short-term NO_2 AQO	**October 2008**
Fourth round Updating Screening and Assessment	April 2009
Further Review and Assessment on expanded AQMA	May-August 2010
Draft Air Quality Action Plan on expanded AQMA	
Fourth Round Progress Report	
Finalised Air Quality Action Plan	2011
Preston Drove Detailed Assessment	
Rotting dean Detailed Assessment	
Fourth Round Progress Report	

AQMA declarations are highlighted in bold

The review and assessment of air quality is the first step in the LAQM process. Local authorities have to designate any part of their area where the prescribed objectives are not likely to be met, as an Air Quality Management Areas (AQMAs). This applies only to those non-occupational locations where members of the public might be exposed over the relevant exposure period (Table 2). The guidance states that providing the AQMA covers the identified areas of exceedence it is at the local authorities discretion to define the exact boundaries.

Once an AQMA has been declared the local authority under section 84 of the Environment Act 1995, is required to report a Further Review and Assessment (FR&A) on the area of that declaration. The FR&A is designed to address a number of issues including-

- Confirm the original exceedence and subsequent AQMA declaration
- Establish the extent of the air quality problem within the AQMA and therefore what improvements are required
- Provide a technical justification of the measures to be included in the action plan

- Provide source apportionment details of the relevant pollutant within the AQMA

The aim of this AQAP is to identify specific measures and a package of relevant initiatives which will reduce levels of NO_2 in and around the city and especially within the AQMA. In doing so careful consideration has also been given to any secondary effects which could have positive or negative effects on other services or stakeholders in the city. For example, many of the measures likely to help improve air quality can also improve traffic flow and reduce congestion. Any potential negative effects must also be identified, such as introducing measures to combat poor air quality in one area may potentially have detrimental influences elsewhere, hence displacing the problem rather than removing it.

It was thought that improvements to engine and fuel technology would reduce NO_2 exceedences over time even if little action was taken locally. Nationally and internationally this has not happened to the extent that was anticipated. In many cities estimates for air quality improvement made in the period 2000 to 2010 have been found to be over optimistic. That said locally in Brighton significant improvements have been recorded up to 2008. It is likely that AQO compliance very close (<10 metres) to some heavily trafficked and congested roads is not likely to happen prior to 2015. Therefore further local intervention is required. Brighton and Hove's R&A reports have consistently confirmed that road traffic is the primary (but not exclusive) contributing factor to poor air quality in the city. Therefore the majority of improvement measures described in the report are related to road traffic including the decisions people make when travelling.

In the main poor air quality in Brighton and Hove is a combination of stop-start heavy vehicles, accelerating engines, and the proximity of buildings adjacent to traffic.

Through the R&A work a number of areas of exceedence within the AQMA have been identified which are the result of very localised traffic related issues, for example the frequent congestion that occurs; on New England Road or the southern approach to the Vogue Gyratory and where traffic on Viaduct Road merges with Ditchling Road. Therefore in addition to citywide measures, some local solutions will still need to be implemented in order to resolve air quality problems in some areas.

1.2 Background information on Brighton and Hove

Brighton & Hove is one of the largest unitary local authorities in the South East, with an area of 8,267 hectares and an estimated population just over 260,000 (2011 pre-census). The AQMA is approximately 12% of the city by area. However the cities' highest density wards reside in the AQMA. Awarded city status in 2001, it is a regional centre for shopping and employment; a popular coastal resort with a significant tourist trade (attracting over 8 million people a year) and an area that accommodates two universities; major leisure facilities; and is a sub-regional centre for health services.

Situated just over 50 miles south of Central London, the capital is less than an hour away by rail. London Gatwick International airport - the UK's second busiest airport is

just 25 miles or 30 minutes rail journey from the city centre. The local seaport of Newhaven only 15 miles away and the channel tunnel 75 minutes drive from the city centre provide Brighton & Hove with excellent links to Europe and beyond.
The city of Brighton & Hove is bounded by the English Channel to the south and the Sussex Downs to the north, which is designated as an Area of Outstanding Natural Beauty (AONB) and contains some rare and delicate chalk downland identified as a Habitat of European Interest in the EC Habitats Directive. Perhaps the most important site is Castle Hill (north of Woodingdean), designated as a National Nature Reserve. Other species-rich chalk grassland survives at Whitehawk Hill, Ladies Mile, Wild Park and Stanmer Park.

Within the city lie areas of urban woodland, including the National Elm Collection, which consists of 21 species of Elm, most notably at Preston Park and The Level. In addition, the 'vegetated shingle'; a habitat of international conservation importance survives at the beach along the Volks Railway, Black Rock Beach and at Shoreham Harbour.

The city boasts an impressive historic environment, and is renowned for its Regency Stucco architecture. There are now some 3,600 listed buildings in Brighton and Hove (a substantially higher proportion than in other authority areas in the country), and the local authority protects these buildings rigorously. The spectacular Brighton Pavilion built between 1784 and 1822 for the Prince Regent dominates the Old Steine near the city centre.

1.3 Key sectors

The city's economic activity rate is now higher than the national average, though lower than the average in the prosperous south-east.

Brighton & Hove has a strong service sector economy, with financial services and business services being key drivers of economic growth. The new media sub sector heralded as the largest new media cluster in Europe currently leads the city's growing creative sector. Other developing sectors are environmental technology, biotechnology, healthcare and advanced engineering.

The city has a relatively large public sector, with the universities employing more than 4,000 people between them. In total approximately 20% of the local workforce are employed in industries allied to the public sector.

The working age population is 185,000 of which 96.2% are employed. Major employers include American Express, Lloyds TSB, Epic Multimedia, Kimberly Clarke, BUPA International, Mott MacDonald, Brighton Health Care Trust and Brighton & Hove City Council.

1.4 Population

Of the total population, there are a high proportion of 20 - 44 year olds in Brighton and Hove (nearly 42% compared to 35% nationally) but a lower than average percentage of under 16's (16% compared to 20% nationally). A significantly lower than

average proportion of the population have been or are married (just over a third compared to around half nationally). There are just over 20,000 adult full-time students in the city, many of whom are concentrated around the Universities of Sussex and Brighton near Falmer, where over 40% of the population are students.

The population of Brighton & Hove is concentrated within a relatively small area. It is the fifth most densely populated area in the South East, and the population density is especially high in the southern half of the city partly because over half of all properties in the city are flats or maisonettes (compared to less than 20% nationally).

1.5 Transport

Since 2007 a decrease in traffic volumes has been observed at some locations. Further analysis of traffic flow changes is included in the 2010 Air Quality Progress Report (AQPR)[3]. Bus patronage has continued to increase every year since 1993. This compares favourably to the national trend, which has shown a more substantial growth in car use between 1993 and 2007.

The city's main commercial bus operator, the 'Brighton and Hove Bus & Coach Company' has achieved an increase in passenger journeys of approximately 5% each year since 1993. In addition, cycling in Brighton & Hove has substantially grown in recent years – a 27% increase was recorded in the 2006-2008 period. The seafront cycle lane has one of the highest daily flows of bicycles anywhere in the UK.

Based on 2001 Census figures, vehicle ownership in Brighton & Hove is the lowest in the south-east region (comparable to a London Borough) and one of the lowest nationally. Across the city, there is an average of less than 0.9 cars or vans per household, compared to 1.3 in the South East. Most traffic in the city is locally generated – some two-thirds of vehicles on the road at any one time are making trips, which begin and end within the city. Journeys from adjacent areas such as Shoreham, Worthing and Lewes also account for a significant proportion of the total traffic.

1.6 Future developments

A detailed section on new developments is given in the Air Quality Progress Report (AQPR). These include:

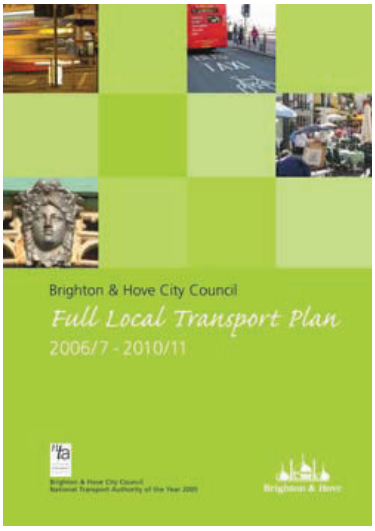
- LR2 Urban Development, London Rd (A23) and Lewes Rd (A270)
- Materials Recovery Facility and Waste Transfer Station, Hollingdean
- King Alfred Development
- Brighton International Arena at Black Rock
- Community Stadium, Falmer
- Brighton Station/New England Quarter
- Outer Harbour Development, Brighton Marina
- Jubilee St Development

[3] Link to the latest Brighton and Hove Air Quality Reports: http://www.brighton-hove.gov.uk/index.cfm?request=c1001183

- Brighton and Hove water treatment works (Black rock sewer outflow)
- Preston Barracks
- Brighton Centre
- Circus Street Development
- The Edward Street Quarter
- i360' West Pier Observation Tower and Heritage Centre
- Inner Harbour, Explore Living Development, Brighton Marina

One of the largest proposals in the South East outside of the Thames Corridor is the Shoreham Harbour regeneration plans which proposes; 12,000 new dwellings. The area straddles Brigthon and Hove's Western boundary and is shared with the adjacent administrative area of Adur in West Sussex. There are currently no other significant developments in neighbouring authorities which are having a significant effect on local air quality. However, through the Sussex Air Quality Steering Partnership (SAQP), this situation is constantly under review.

1.7 The report structure - Air Quality Action Plan and LTP



In assessing the way forward in the development of an AQAP the recent Defra policy guidance addendum LAQM.PG(09) was consulted as well as information gathered from the recent Further Review and Assessment (FRA) following BHCC's second AQMA declaration. It has been clear for some time that road transport under the governance of the local authority was the primary cause of the NO_2 exceedences. In light of this it was concluded that the AQAP would be incorporated into the second Local Transport Plan 2005/6-2010/11 (LTP2). Unfortunately however, there were some practical problems in linking the two reports together.

Despite their integration, the LTP and AQAP were assessed independently by the DfT and Defra respectively. The two reports also had different statutory submission dates. LTP2 was submitted in March 2006 and the first AQAP in March 2007. Therefore the AQAP information was considerably more detailed than that given in the LTP, which only provided a summary of the proposed measures. The progress made on addressing air quality issues were reported in the July 2008 LTP2 Progress Report with a summary of the factors that increase emissions rates from road traffic sources given as follows:

- Slow speeds,
- Stop and starting traffic flow
- Traffic accelerating; away from junctions or climbing slopes
- Congestion and queuing
- Idling vehicles such as lorries and taxis parked with their engines on

The AQAP is partly based on the measures set out in LTP going forward into the new third Local Transport Plan (LTP3). However this AQAP also includes a further package of measures identified by the Environmental Health Department.

2) The Problem and need for an AQAP

2.1) Pollutant sources and associated heath effects

There are serious health effects to people exposed to the current levels of air pollution at European roadside locations. COMEAP (United Kingdom Government Committee on the Medical Effects of Air Pollution) states that air pollution:

- Has short term and long term damaging effects on health
- Can worsen the condition of those with heart disease or lung disease
- Can aggravate asthma; and
- In the longer term, can have additional effects on individuals including some influence on average life expectancy,

Recent research is suggesting that there is no 'safe' threshold for particulate matter ($PM_{2.5}$) and that Air Quality Objectives do not represent a threshold below which air pollutants have no adverse effect.

COMEAP confirm there is evidence to show that some people with cardiopulmonary diseases can be adversely affected by day-to-day changes in the levels of air pollutants and that numbers of deaths and hospital admissions go up when air pollution levels are high, particularly for those with cardiovascular and lung disorders and especially amongst the elderly. COMEAP state that while it is not possible, at the moment, to say how premature these deaths are most people studying this field believe that is likely to be a matter of weeks and months rather than years.

Finally, they advise that the scientific evidence suggests that long-term exposure to air pollution has a lasting effect on health, though the effects vary depending on where one lives and the type of pollutant that people are exposed to. Though the full extent of the health effects of air pollution are hard to quantify, if lifelong exposure to fine particles was cut by half, life expectancy from birth could be increased, on average, by between 1 and 11 months (depending on assumptions as described in the COMEAP report on the quantification of the health effects of air pollution).

2.2) Pollutants in the National Air Quality Strategy

2.2.1) Carbon Monoxide

Carbon monoxide (CO) is an asphyxiating pollutant that reduces the ability of blood to carry oxygen to the different organs by affiliating with haemoglobin in red blood cells more readily than oxygen (O_2). Carbon Monoxide emission from road transport in UK, have declined considerably over the last forty years. Annual emissions of Carbon Monoxide have been falling steadily since the 1970's, for example an average car built in 1970 had approximately twenty times higher emissions of CO than a typical

one built in 2000. This is mainly due to improvements in the fuel processing efficiency of the internal combustion engine combined with the common use of catalytic converters.
Monitoring data (obtained with automatic infrared analysers) suggest that the Carbon Monoxide objective is unlikely to be exceeded at any location in Sussex. Health problems with CO these days are less common than in the past. CO-gas concentrations can be unnaturally high when emissions from open fires places, diesel generators, cigarettes or barbeque occur in a confined space, or a faulty appliance releases the gas indoors.

2.2.2) Benzene

Benzene is a known human carcinogen (cancer causing substance), and also contributes to the formation of ground-level ozone (summer smog). The main source emissions in the UK are petrol vehicles, petrol refining, and the fuel distribution from petrol stations without vapour recovery systems. National benzene concentrations have declined in recent years, due to the increasing use of catalytic converters and vapour recovery systems in petrol stations (Stage 1 and 2 regulatory control).

Since January 2000, EU legislation has reduced the maximum benzene content of petrol to 1%, from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of Benzene from the storage and distribution of petrol. The number of fuel stations in Brighton has declined, for example in the Lewes Road, Vogue Gyratory area; three down to one. The stations that remain are to be fitted with vapour recovery systems in accordance with their Pollution Prevention Control Permits (PPC). This mitigation will reduce emission of Votlatile Organic Compounds (VOC) including benzene. Local Authority monitoring of benzene at Presotn Circus over recent years has demonstrated compliance with the more stringent 2010 AQO.

2.2.3) 1,3 Butadiene

1,3-Butadiene is a suspected human carcinogen (cancer causing substance). The major source of 1,3-butadiene nationally is motor vehicle emissions, with localised sources being petrochemical and synthetic rubber producetion). Brighton does not have these processes. As with benzene, the fitting of catalytic converters to petrol vehicles has reduced the emissions of 1,3-butadiene. Agreed reductions in vehicle emissions and improvements to fuel quality (in the framework of the Auto-Oil programme), are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts ((LAQM.TG(09)).

2.2.4) Lead

Lead has been identified as causing acute and chronic damage to the nervous system, effects on the kidneys, joints and reproductive system. Historically, the major source of lead has been motor vehicle emissions, with other major sources being metal industries and power generation. The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels has led to the ban on sales of leaded petrol in the United Kingdom with effect from 1 January 2000. Emissions of lead are now restricted to a variety of

industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping ((LAQM.TG(03)).

2.2.5) Nitrogen Dioxide

Nitrogen Dioxide is a respiratory irritant associated with both acute (short-term) and chronic (long-term) effects on human health. Repetitive exposure can inhibit lung tissue growth and repair increasing the risk of poor respiratory health later in life. Some of the research evidence suggests chronic exposure can make the respiratory tract more susceptible to disease including allergens. Children under six (especially infants born early) and people with existing respiratory illnesses such as asthma and bronchitis are more vulnerable to repeated inhalation of Nitrogen Dioxide. Healthy adults are less likely to have any detrimental health effects solely due to the NO_2 at concentrations commonly found adjacent to European roadsides. Nitrogen Dioxide (NO_2) and nitric oxide (NO) are both Oxides of Nitrogen (NO_x). In the atmosphere oxides of Nitrogen also lead to the formation of other pollutants such as ground level ozone and particulate matter.

All combustion processes in air produce NO_x emissions. Heat during combustion breaks the binary bonds of ambient Oxygen molecules (O_2) releasing energy and allowing freed Oxygen atoms to oxidise plentiful atmospheric Nitrogen. It is expected that between 15 and 25% of NO_x emissions from vehicles are readily formed as Nitrogen Dioxide prior to emission. This is referred to as primary NO_2 and is released in the exhaust gas. The other 80% or so is Nitric Oxide which given time will convert to Nitrogen dioxide, in the atmosphere mainly as a result of reaction with ozone in the presence of sunlight. It is Nitrogen Dioxide that is associated with adverse effects upon human health.

The principal source of Nitrogen Oxides emissions in Brighton is road transport. In Brighton congested traffic in the city centre in combination with domestic and commercial heating and cooking are important sources.

NOx emissions can be mitigated by after-burning devices or recirculation of exhaust gasses. Emission of NO_x are comparatively low for modern petrol cars travelling at intermediate speeds. There is some evidence to suggest that older petrol vehicles have less effective catalytic converters and consequently higher emission of NO_x. In comparison diesel vehicles have higher emissions of NO_x and a significantly higher ratio of primary NO_2. As a general rule the older and heavier a vehicle the higher its emission of NO_x, but the most modern diesel cars may be an exception to this rule. That said driving style, speed and engine temperature are also factors that influence the emissions rates. Furthermore dispersion of the emission is influenced by meteorology and the built environment.

2.2.6) Sulphur Dioxide

Sulphur dioxide is an acute respiratory irritant, hence the short averaging time for its objective. The main source of sulphur dioxide in the UK is power stations, which accounted for more than 71% of emissions in 2000. There are also significant emissions from other industrial combustion processes. One hypothesis is that domestic coal burning may be increasing as open fire places and ranges have become

fashionable features in both older and modern homes. Brighton has a significant proportion of Regency, Georgian, Victorian and Edwardian homes with open fireplaces that could be utilised for coal and wood fuel burning. Sulphur dioxide emitted to air is proportional to the sulphur content of the fuel being burned. Road transport currently accounts for less than 1% of emissions ((LAQM.TG(03)). This is because the majority of sulphur in oil is extracted during the crude oil refining process and only traces remain in low sulphur petrol and diesel. Ultra low sulphur Diesel (ULSD) contains sulphur at a few parts per million, which compares favourably to a high grade (sweet) barrel of North Sea crude which contains approximately 0.4 % sulphur. Oils from some oilfields around the world can contain 3.5% sulphur.

2.2.7) Particulates (PM_{10})

Ulra-fine Particulate matter or $PM_{2.5}$ (airbourne particulates with a mean aerodynamic diameter of < than 2.5 microns) is of major health concern, as it has been linked with both increased morbidity and premature mortality. There is a wide range of emission sources that contribute to PM_{10} (particles < than 10 microns) in the UK. Research studies have confirmed that these sources can be divided into 3 main categories (AQEG, 1999): (I) *Primary particle* emissions are derived directly from combustion sources, including road traffic, power generation, industrial processes etc. (II) *Secondary particles* are formed by chemical reactions in the atmosphere, and comprise principally of sulphates and nitrates. (III) *Coarse particles* comprise releases from a wide range of sources, including re-suspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts, sea salt and biological particles. Total PM_{10} objective includes $PM_{2.5}$ and ultra particles that have travelled long distances (transboundary); the objective does however not include the sea-salt fraction. Defra are developing a better methodology on how best subtract sea-salt from total fine-particulate in the atmosphere.

2.2.8) Ozone

Ozone can make the airways of the lungs inflamed and more responsive to other factors causing them to constrict, thus reducing breathing efficiency. There is no evidence of particular long-term effects at this time.

Ozone is a secondary pollutant. It is not emitted directly, but is formed by photochemical reactions (in the presence of ultra violet radiation) in the atmosphere. Oxides of nitrogen (which come from combustion sources) combine with volatile hydrocarbons or free radicals (mainly emitted from transport and industry). Ozone levels are generally higher in rural areas (where Nitorgen Dioxide levels are correspondingly lower), downwind of the sources of the primary pollutants which precede it. The original sources can be hundreds or even thousands of kilometres away. Therefore the control of ozone forming compounds has to be addressed by national and international initiatives. The management and mitigation of ozone pollution it is not a statutory duty that resides with Local Authorities.

Table 2 Air Quality Objectives (AQO)

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

2.3) Conclusions from previous round Review and Assessments

Conclusions from BHCC's historical Review and Assessments are outlined in the Action Plan of 2007 and the Progress Report of 2008. Past findings should not be referenced as a reflection of the current Air Quality Situation in the Brighton area. The 2004 AQMA with monitoring at that time is compared with the current situation below:

Figure 1 2004 Air Quality Management Area and monitoring sites – London –Viaduct - Lewes Road Area

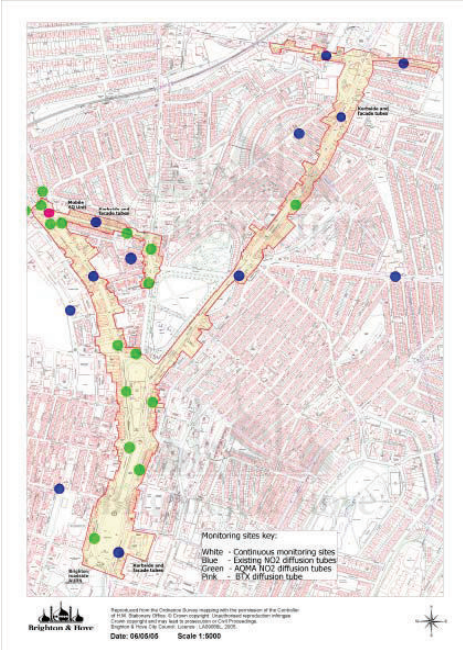
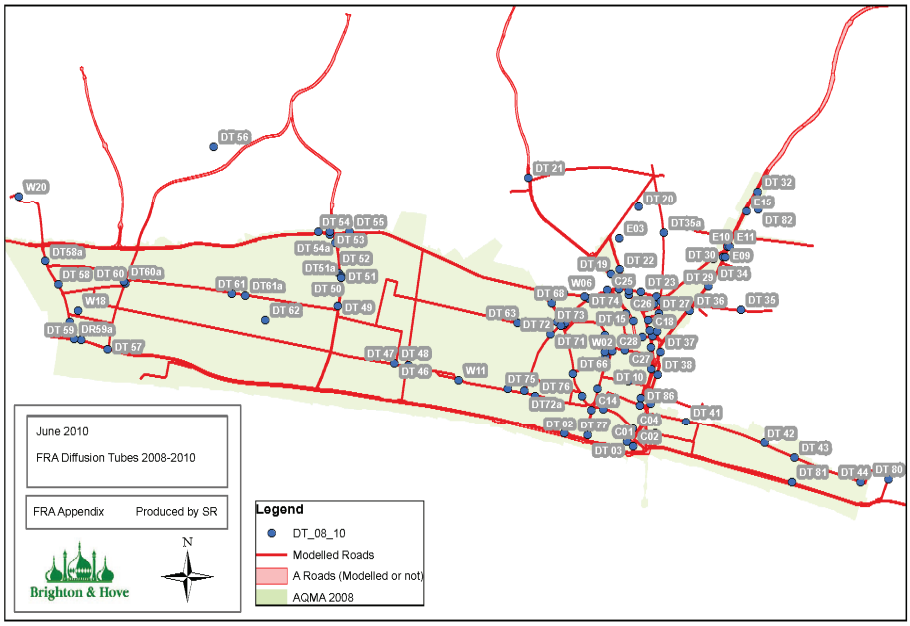


Figure 2 2008-10 AQMA passive tube monitoring sites



2.3.3) 2006 Further Review and Assessment (Stage 4 report)

In light of the AQMA declarations in 2004 the Council under section 84 Environment Act 1995, were required to report a further review and assessment of the AQMA. The further review is designed to address a number of issues including-

- Confirm the original declaration

- Establish the extent of the air quality problem within the AQMA and therefore establish what improvements are required to attain compliance

- Provide a technical justification of the measure to be included in the action plan

The council employed the Environmental Research Group, Kings College London (ERG-KCL) to complete the further review and assessment in 2007/08.

The report concluded the following:

- The council was correct in designating the AQMA as the results show that the annual NO_2 AQO exceeds at a number of public exposure locations

- Modelling of the Queens Road and Queens Road quad area confirms exceedence of the mean annual NO_2 AQO. This is in line with the findings of the local diffusion tube results

- Source apportionment work based on NO_x emissions shows that road transport emissions are the primary local source

The report recommended the following:

- Retaining the existing AQMA and under taking consultation on the findings of the report.

- Use the source apportionment results to identify potential actions that the council can take to improve local air quality

- Consider relevant exposure in the Queens Road and Queens Road Quad area in terms of the NO_2 annual mean AQO and expanding the AQMA accordingly

Further to the ERG-KCL findings the council also concluded the following points from the report:

- Consider potential further expansion of the existing AQMA, in light of mapped results

Mitigation measures detailed in the AQAP need to take account of the results of the source apportionment results as these give a good indication as to where the greatest improvements can be made. The results show that both buses and HGV's contribute significantly to the overall emissions, despite that fact that cars are the dominant vehicle type.

2.4) History of air quality in Brighton and Hove

Outside of the department of health Brighton Council began monitoring air quality in 1993 and a few of the existing monitoring locations have data that extends back to the 1990s. In some cases the monitoring records pre-dates the following events:

- The Environment Act 1995
- Brighton and Hove unification in 1997,
- City status in 2001
- AQMA declarations in 2004 and 2008.

As a result of the monitoring carried out over previous years we now have a much better understanding of local air quality. In light of this progress Brighton & Hove City Council has developed extensive monitoring surveys across the city to assess a number of pollutants listed in the Air Quality Strategy. The latest information is given in the 2010 and 2011 Progress Reports. The locality of the cities continuous analysers up to 2011 is given below in Figure 3. The results of the latest detailed dispersion modelling are presented in the 2010 Further Review and Assessment and also included below in Figure 4. The model predicts pollutant concentration throughout the city including at locations without a monitor. Figure 5 & 6 show long term trends of Nitrogen Dioxide at various monitoring location in the city.

Figure 3 Air quality continuous analyser monitoring sites (Recent years) across Brighton and Hove

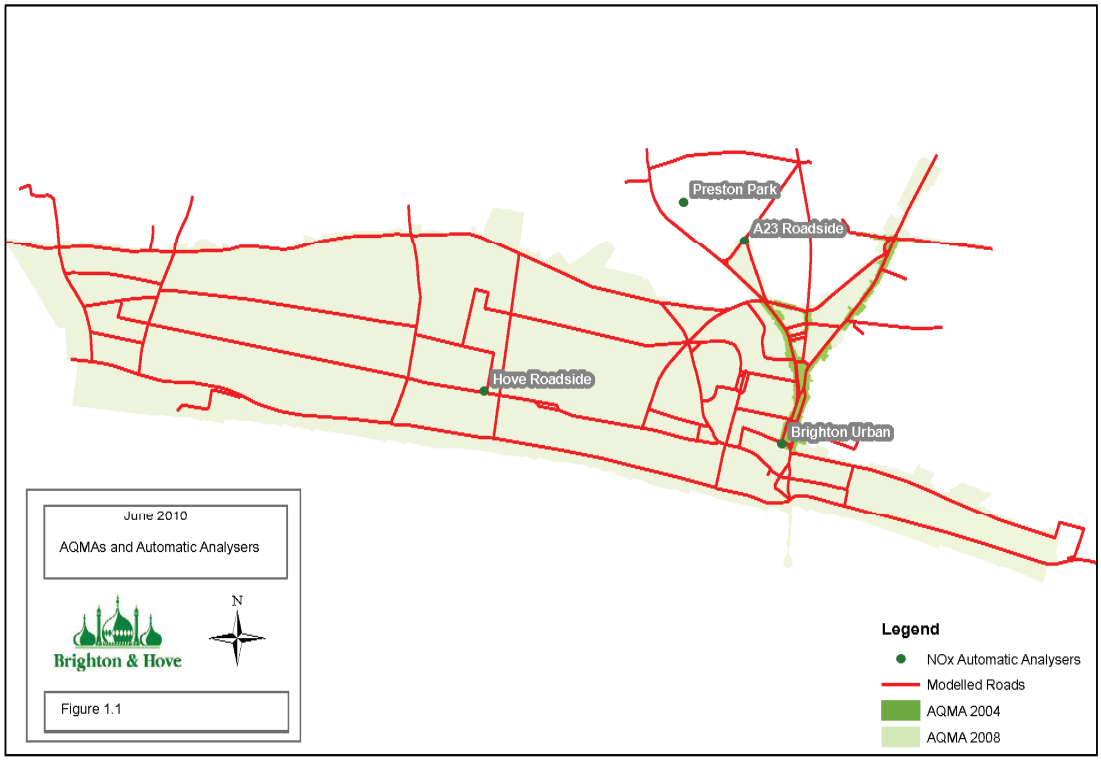


Figure 4 Model Estimation of NO_2 (µg m^{-3}) in & around the AQMA 2008[4]

[4] Pink and red colours are estimated to be above the limit value of 40 µg m^{-3}; full methodology and larger maps are given in the councils Further Review and Assessment for Air Quality 2010.

Figure 5 NO_2 Annual Means (Bias Corrected) Diffusion Tubes Results 2003 to 2010 The Long-Term Record

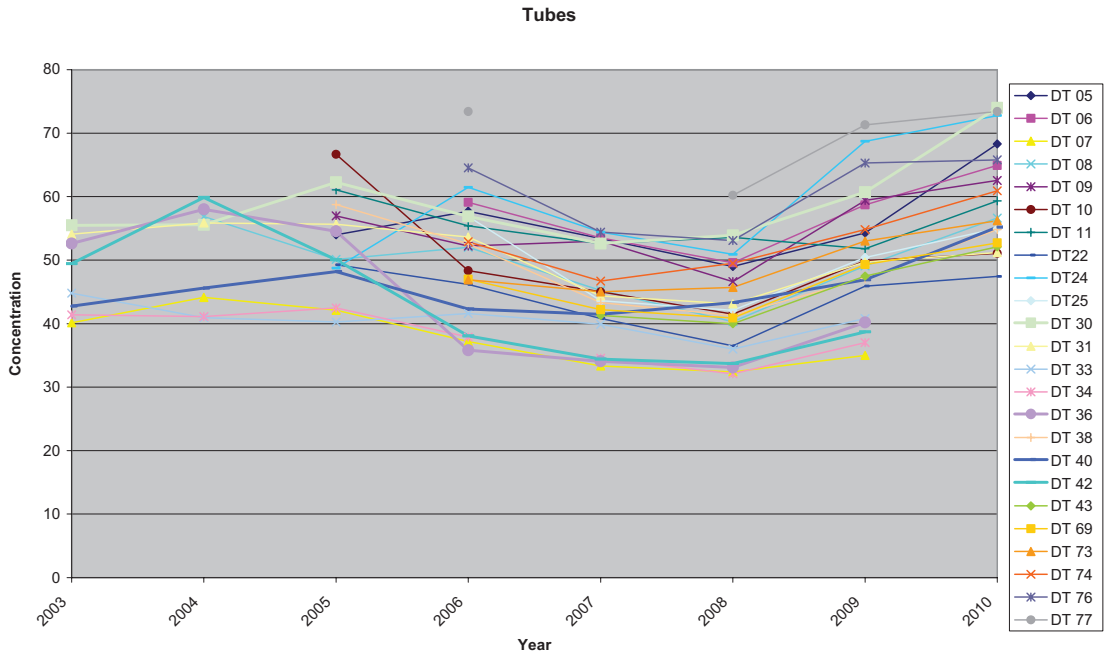
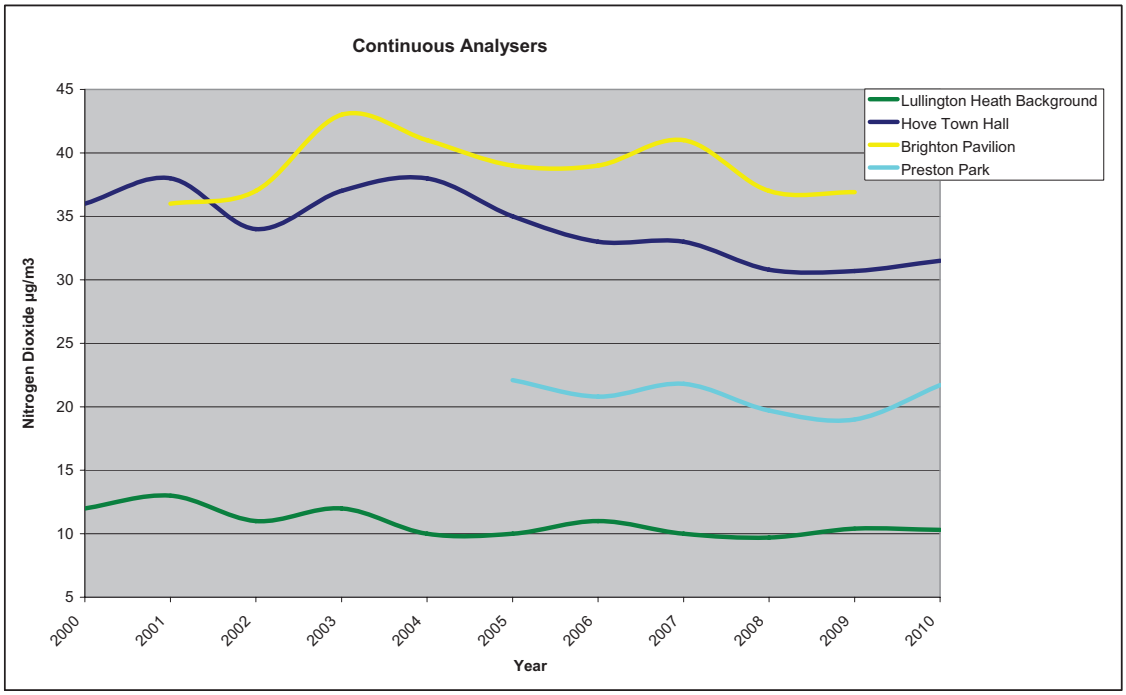


Figure 6 NO_2 Annual Mean Brighton and Hove Continuous Analysers 2000 to 2010



2.5) Level of reduction needed to meet the NO_2 annual AQO

The pollution concentration at any given location is determined by many factors both direct and indirect. These include emission rates, atmospheric processes, meteorology, topography as well as the influence of the built environment. Some streetscapes reside within a two to six storey street canyon where building facades flank the roadside on both sides. This arrangement effectively creates a mico-environment where the air-flow, sunlight and pollutant concentrations differ compared to open areas such as parks, gardens and the sea-front. Building structures in close proximity to busy roads can inhibit the dispersion of emissions from exhaust pipes and flues..

Table 3 Improvement required to meet the NO_2 annual mean AQO 2010

Diffusion Tube (DT) Area Number	Location	Annual mean concentrations ($\mu g/m^3$) Bias Adjusted	Improvement Required	
		2010 *0.85	($\mu g/m^3$)	Percentage
C18	Oxford Street London Road end	**76.6**	36.6	48%
E08	82A, Lewes road façade	**74.0**	34.0	46%
C11	50, North Sreet façade	**73.4**	33.4	45%
C21	3, Viaduct Terrace façade	**72.8**	32.8	45%
C04	Lower North Street façade nr East Street	**69.5**	29.5	42%
W01	61, Queens Road façade	**68.3**	28.3	41%
W10	88, Western Road façade	**65.8**	25.8	39%
W03	17-18, Terminus Rd façade	**64.9**	24.9	38%
C25	New England Road	**63.6**	23.6	37%
C24	47A, New England Road façade	**62.8**	22.8	36%
C09	9-11, Marlborough Place façade	**62.6**	22.6	36%
W05	13, Old Shoreham Rd façade	**60.9**	20.9	34%
C13	Lower Dyke Road lampost	**60.5**	20.5	34%
W19	106, Trafalger Road façade	**59.2**	19.2	32%
C19	Oxford Street Ditchling Rd end	**58.5**	18.5	32%
C23	63, London Road façade	**58.3**	18.3	31%
W17	21, Wellington Rd façade	**57.8**	17.8	31%
E17	65, Grand Parade façade	**56.6**	16.6	29%
W04	28, Chatham Place façade	**56.2**	16.2	29%
W21	Sackville Road façade near OSR junction	**56.2**	16.2	29%
C03	9, St James Street façade	**55.2**	15.2	27%
E02	Preston Road Preston Drove façade	**55.1**	15.1	27%
C20	20 Ditchling Road facade	**55.0**	15.0	27%

E16	16, Grand Parade façade	**54.8**	14.8	27%
E23	High Street Rottingdean façade	**53.7**	13.7	26%
E09	opp 82A Lewes Road façade	**53.4**	13.4	25%
W16	Wellington Rd - Basin Road junction	**53.0**	13.0	25%
C17	Cheapside Pelham Collage	**53.0**	13.0	24%
W08	6, Buckingham Place façade	**52.7**	12.7	24%
E14	5, Lewes Road facade	**52.5**	12.5	24%
E18	186, Eastern Road façade	**52.1**	12.1	23%
C28	Frederick Place	**51.6**	11.6	22%
E12	4, Hollingdean Road façade	**51.2**	11.2	22%
C15	26, Gloucester Place façade	**51.1**	11.1	22%
E10	Vogue gyratory east facing façade	**50.9**	10.9	21%
E01	Preston Road façade near Preston Circus	**50.1**	10.1	20%
E11	Vogue gyratory west facing façade	**49.8**	9.8	20%
W02	Surrey Street west facing façade	**49.8**	9.8	20%
C27	Trafalger Street façade	**48.9**	8.9	18%
E22	74, High Street Rottingdean façade	**48.5**	8.5	18%
W09	Montpelier Road LP Western Road end	**48.0**	8.0	17%
E21	116, High St/ Vicarage Lane, Rottingdean	**47.6**	7.6	16%
E06	47, Beaconsfield Road façade	**47.4**	7.4	16%
C02	Pool Coach Station North facing wall	**47.2**	7.2	15%
C14	West Street east facing facade	**46.9**	6.9	15%
W07	108, Dyke Road	**45.2**	5.2	12%
E19	270, Eastern Rd façade	**44.2**	4.2	10%
W22	102-105, Kings Road Grand Hotel	**43.9**	3.9	9%
W06	Old Shoreham Rd Upper, façade	**42.1**	2.1	5%
E03-E05	Beaconsfield Rd Stamford Av	**41.5**	1.5	4%

NB: The table includes new monitoring locations in the priority area. DT number refers to East (E), West (W) or Central (C) Brighton. *2010 Bias Correction factor from raw data annual mean.

To better understand the air quality improvement needed at a location to achieve the AQO's, it is necessary to determine the individual sources that contribute to the overall predicted pollution concentration.

In order to identify a suitable package of measures for the AQAP, the Further Review and Assessment modelled the entire AQMA and from this predicted the source apportionment of NO_x for different vehicle types. (The assessment was based on characterised traffic data supplied by the Transport Planning Department and East Sussex County Council. A combination of automatic and manual traffic survey counts have been used. The Environmental Protection Team have collated this data into a consistent format suitable for use with inventory database EMIT and Cambridge Environmental Research Consultant's dispersion model ADMS-Urban. Further

information on the methodology used is outlined in the Further Assessment Report of 2010.

Given the complexities of predicting NO_2 source apportionment emissions, the contribution from the different traffic sources can only be understood by examining NO_x sources as the primary emission. This reflects the fact that the relationship between NO_2 and NO_x is non-linear and determined by photochemistry that is highly location dependent. Therefore it is difficult to assess in terms of individual vehicle classifications what effect the various AQAP measures will have on NO_2 reductions. There are a number of issues associated with direct NO_2 emissions. Based in the Local Air Quality Management review and assessment tool it is estimated that in Brighton the local fleet of vehicles in 2008 had a primary NO_2 emission close to 17% of the total NO_x emission. This is the proportion of primary NO_2 that has been used with all vehicles in the dispersion model.

Carslaw (2005) and others have observed how the analysis of data from roadside monitoring sites in London showed that the NO_2/NO_X emissions ratio from road transport has increased markedly since 1997. The research concluded that Diesel Particulate Filters (DPF) are likely to make an important contribution to the increasing trend in the ratio along with other factors such as the increased use of diesel fuel in passenger cars.

However Carslaw (2005) also concluded that the apparent increase in NO_2 emissions might be considered as an acceptable consequence of controlling particle emissions, especially as there is greater evidence of adverse health effects related to particles than NO_2 (WHO, 2003). That said is widely acknowledged that NO_X is a contributory factor in particulate formation. Furthermore, the annual mean EU, English and WHO limit value for NO_2 of 40 μgm^{-3} in 2010 is for the protection of the most vulnerable members of a cohort and there is a legally binding duty to meet it. The best available technologies and management (BAT) must deliver reductions in emissions of NO, NO_2 (NO_x) particulate and black carbon whilst at the same time reducing fuel consumption and CO_2.

The dispersion model does not take account of the higher emissions associated with hard accelerating vehicles, although greater emissions are assumed for the slowest speeds and this is considered in detail throughout the AQMA.

Assumptions regarding NO_x emissions from road traffic are linked to Euro emission categories that are correct for vehicles tests (factory or laboratory) but not real time driving (urban streets, junctions and hill climbs). Therefore spatial predictions have been adjusted to agree with local roadside monitoring. It is important to assess the extent of the exccedence within the AQMA and therefore the reduction in road contributions required, as this will provide a baseline from which future improvements can be assessed. Table 3 shows the reduction required to meet the AQO at exceeding NO_2 diffusion tube sites within the AQMA, expressed both in terms of atmospheric concentration and percentage. The required reduction is based on the 2010 data set. It should be noted that since monitoring of Nitrogen Dioxide began in Brighton during the 1990s; the best case year with the lowest concentrations was 2008 (or 2009 for continuous analysers). Since that time the monitoring record suggests a rise in concentrations. In other words the improvements witnessed over

several years are no longer continuing. In addition to the LTP the findings of the FRA provide technical justification for the measures in the AQAP and the extent of the AQMA. Table 3 presents the actual NO_2 reduction that is required to meet the objective at the monitors that record an exceedence in 2010.

2.6) Brighton and Hove EMIT inventory

2.6.1) Emissions inventory

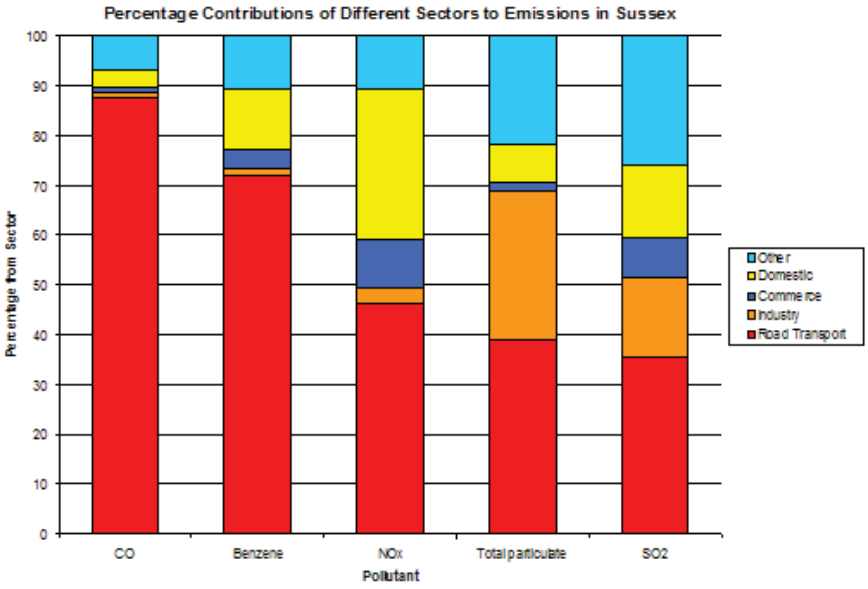
Integral to the assessment of air quality is the emissions inventory tool. Brighton and Hove uses the EMIT emissions Inventory developed by Cambridge Environmental Research Consultants (CERC). An emissions inventory is a geographically referenced list of pollution sources which estimate the type and quantity of pollutants emitted to the air from various sources. The emissions estimates are based on emission factors, e.g. a known amount of NO_x is emitted from a given type of vehicle's exhaust at a given speed (kph). The inventory is composed of total traffic flowa i.e. Annual Average Daily Traffic (AADT: equals a typical 24-hour traffic flow in the year). An AADT value is provided for each road link for buses, cars, lorries, vans and motorbikes. The emission factors for each vehicle type are derived from UK fleet compositions and engine tests. Vehicles are characterised on age and pollutant emission. Pre-Euro I vehicles are the oldest and have the highest emissions and Euro-6 vehicles the newest category; further details are given in section 3.1.2. However there is now compelling evidence that there has been little or no real-world improvement (differ from test conditions) in NO and NO_2 emissions from diesel vehicles between Euro-I and Euro-V[10]. Furthermore catalytic converters on petrol vehicles could be less effective with time and there is a higher proportion of older petrol vehicles on the road. Selective Catalytic Reduction for abatement of NO_x emissions is most effective when the internal combustion engine operates at optimum temperature and this is less likely after cold-starts, during short journeys and after slow moving.

The Brighton and Hove and Adur Inventory used with the 2010-FRA contains information on the following sources:

- Industrial sources including Part A processes (includes large combustion processes > 50 Mw such as the Shoreham Power Station regulated by the Environment Agency)
- Part B Processes (smaller industrial processes such as vehicle re-sprayers, waster oil burners and timber works, regulated by the local authority),
- Building sources for example NO_x cooking emissions from 2,000 commercial kitchens, over100,00 domestic kitchens, plus fireplaces and central heating systems
- Road traffic including; buses, trucks, cars, taxis, vans and motorbikes

A general idea of the contribution of the different sectors to none greenhouse gas emissions in Sussex is shown in fig. 6:

Figure 7 Emissions Inventory for Sussex



This chart shows the dominance of road transport as a source of many air pollutants in Sussex. For greenhouse gasses different proportions would be expected.

2.7) Base line air quality and the local environment

When considering the scope for air quality improvements within the city and the move towards a healthier local environment, it is important to firstly assess the potential for improvement in the context of both the existing environment (both natural and man-made) and pervading air pollution levels.

In addition to the traffic pressures highlighted in Section 2.9, Brighton and Hove has site specific topographic conditions which result in north-south traffic being funnelled down a relatively small number of corridors and east-west traffic being restricted due to the hilly nature of many of the suburbs and limited number of crossing points under or over the London-Brighton railway. These factors can therefore significantly contribute to the existing traffic conditions within the city, but their resolution would require significant long-term changes to transport infrastructure in the city in order to make significant improvements in local air quality and no such changes are planned.

2.8) Scope for air quality improvement

One of the fundamental aims of the LTP and to some extent the AQAP is to promote and provide a choice in transport alternatives to help achieve a modal shift in the type of transport used by residents and visitors. In order to achieve significant improvement in local air quality, a reduction in the need to travel and a move to more sustainable forms of transport are of the utmost importance.

Significant scope for change in terms of modal choice, has been identified in that most of the traffic within the city is locally generated, with two thirds of vehicles on the road at any one time making trips which begin and end in the city. Approximately half

of the morning peak traffic is associated with journeys to work or school, which can be influenced by Travel Plans.

Further evidence of the change in transport use has been demonstrated by the increase in bus patronage of 5% each year since 1993 and the approximate 50% increase in city centre cycling since 2000. This demonstrates that an increase in the usage of alternative modes can happen where the infrastructure is provided.

In order to improve the transport infrastructure in Brighton & Hove in the short and long term, developments and overall improvements are often considered in the city wide context. Therefore it is expected that as transport has been identified as the main source of local pollution, significant air quality improvements will also be achieved from this long-term citywide approach. It is therefore unrealistic to expect instant improvements as the current transport configuration that has developed over the past sixty-five years.

Despite this it is also unreasonable to state that the only way to tackle the problems of air pollution with in the city is purely through the long term vision. Therefore a number of proposals have been included in this AQAP that include increased awareness, education and practical changes to the road network that can be delivered in the short term.

2.9) Transport pressures in the city

It takes time to make a difference in the transport environment. Achieving increased mobility and accessibility through more local provision of services and dramatically improved public transport requires:

- Management of and investment in the transport network;
- Sustained demand for public transport
- Adequate levels of accessibility to facilities

Car-based transport is something many people and families have become accustomed to over a number of generations since the 1960s. Managing or influencing that use is made easier when people and facilities are in closer proximity to each other and alternatives to car use are practical and attractive on a scale sufficient to make a difference.

Only through changes to travel arrangements that offer practical alternatives can people make a travel choice and private vehicle use can be better managed. This may result in significant shifts from car use to alternative modes which will reduce noise and community severance[5] and reduce congestion freeing road space for other road users. The LTP is, therefore, about offering an acceptable alternative for at least one

[5] Community Severance is where roads difficult to cross or unpleasant to live beside, divide neighbourhoods and reduce the opportunities for play, social interaction; for example making and keeping local friends

journey in ten. This is not about discouraging car ownership, it is about appropriate car use which is informed by better knowledge of the alternatives. It is also not simply about directing traffic on to other routes but to offer whole journey alternatives.

Many routes in the central area are operating at close to (or beyond) capacity at peak times (so there may be few alternative routes which can accommodate additional traffic especially in the central area). Localised or small (<20%) changes to traffic levels are not sufficient either to address air quality concerns or to sustain greater mobility across the city.

To combine traffic reduction and redirection (where appropriate) and to accommodate larger numbers of people moving in and around the city needs better access for walking and cycling, and improved public transport. Many car-based journeys are for short distances and it is these that are most amenable to transfer to alternative modes (walking, cycling, and public transport). To do this, the council need to persuade all road users of the benefits of such change and this will require changes in travel behaviour and the travel decision individuals and companies make.

3) Planning policy context and existing strategies

In the context of effective and significant air quality improvements emissions reduction must be considered in the national and international policy context. This section sets out the main policies and strategies in place to reduce pollutant emissions in both the UK and Europe, before describing the local environmental policies of Brighton and Hove City Council and East Sussex County Council.

3.1) International and national policies

Air Quality Framework & Daughter Directives

The Air Quality Framework Directive, established a framework under which the EU set limit values for 12 specified pollutants for which subsequent daughter directives were set. These superseded the existing air quality legislation. The pollutants are sulphur dioxide, nitrogen dioxide, particulate matter, lead, carbon monoxide, benzene, ozone, polyaromatic hydrocarbons, cadmium, arsenic, nickel and mercury.

Some of the key European policies in pursuit of achieving air quality improvements in line with the Air Quality Framework are described below.

- **Auto Oil Program**

Both light and heavy duty motor vehicle emissions are regulated by directives under the Auto-Oil Program. The directives focus primarily on the emissions of Carbon Monoxide (CO), Volatile Organic Compounds (VOC), Nitrogen Oxides (NO_x) and fine particulates (PM_{10}).

Under these directives motor vehicles must meet specific standards for exhaust emissions before they can be approved for sale in the European Union. Under the program the European Union adopted catalyst-forcing standards for new petrol fuelled cars in the early 1990s (Euro 1 standards) and have gradually tightened them in several steps for diesel and petrol vehicles as Table 4.

Table 4 EU Vehicle emissions categories and time frame

EU Emission Category	From	To
Pre-Euro	Vehicles sold in the EU before early 1990s	
Euro I	Early 1990s	1996
Euro II	1996	2000
Euro III	2000	2005
Euro IV	2005	2008
Euro V	2008	2012
Euro VI	2014	

Therefore a Euro II emission category vehicle on the road in 2011 will be between eleven and fifteen years old. In practise up to Euro V the emission test cycles have

proved not to be representative of real world driving conditions and this has major implications for local air quality.

Stationary Source Emissions

- **National Emissions Ceiling Directive (NECD)**

The NECD sets emission ceilings for each Member State in the EU for four atmospheric pollutants to be met by 2010: Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOC's) and Ammonia (NH_3).

The pollutants addressed by this Directive can cause a range of harmful environmental effects, often at long distances from their source. The two main problems being addressed are acidification and ground-level ozone.

- **Integrated Pollution Prevention and Control (IPPC) 2000 now part of the Environmental Permitting Regulations (EPR)**

The aim of IPPC Directive is to minimise pollution from various industrial sources throughout the European Union. Operators of industrial installations covered by Annex I of the IPPC Directive are required to obtain an authorisation (environmental permit) from the authorities in each EU member state for example the Environment Agency in England and Wales and SEPA (Scottish Environment Protection Agency) in Scotland.

- **Large Combustion Plants Directive (LCP)**

The overall aim of the LCP Directive is to reduce emissions of acidifying pollutants, particles, and ozone precursors. Control of emissions from large combustion plants – those whose with thermal input is equal to or greater than 50 MW – plays an important role in the European Union's efforts to combat acidification, eutrophication and ground-level ozone as part of the overall strategy to reduce air pollution. The plants that are covered by the LCP Directive are also covered by the Integrated Pollution Prevention and Control (IPPC) Directive. In this respect, the LCP Directive only sets minimum obligations which are not as detailed as the conditions set out in the installations PPC permit, now part of the Environmental Permitting Regulations (EPR).

- **Waste Incineration Plants**

The aim of the Directive is to prevent or to reduce as far as possible negative effects on the environment caused by the incineration and co-incineration of waste. In particular, it should reduce pollution caused by emissions to air, soil, surface water and groundwater, and thus lessen the risks which these pose to human health. This is to be achieved through the application of operational conditions, technical requirements, and emission limit values for waste incineration and co-incineration plants within the community.

3.2) Emerging national and international policy.

3.2.1) The CAFE Program -Implementation of the Thematic Strategy on Air Pollution (Europe)

The European Commission has proposed a strategy for achieving further significant improvements in air quality across Europe. The Thematic Strategy on air pollution aims by 2020 to cut the annual number of premature deaths from air pollution-related diseases by almost 40% from the 2000 level. It also aims to substantially reduce the area of forests and other ecosystems suffering damage from airborne pollutants.

While covering all major air pollutants, the Strategy pays special attention to ultra fine particulates, and ground-level ozone pollution because these pose the greatest danger to human health. Under the Strategy the Commission regulates fine airborne particulates, known as $PM_{2.5}$, which can penetrate deep into human respiratory tract; via the trachea, bronchioles and alveoli to the blood stream. The Commission proposes to consolidate air quality legislation by merging existing legal instruments into a single Ambient Air Quality Directive, a move that will contribute to better regulation.

3.2.2) Consultation on the review of the Air Quality Strategy – options for further improvements in air quality (UK)

Defra have been seeking views on potential additional new policy measures which, if implemented, could secure further improvement in air quality and move the UK closer to achieving the Strategy's air quality objectives. These include:

- New tighter European vehicle emission standards (Euro-standards)
- Low Emissions Zones
- Incentives for cleaner vehicles
- Further reductions in emissions from small combustion plants
- Further reductions in emissions from ferries and commercial shipping

3.3) Sussex and local policies

3.3.1) Planning Policy for East Sussex and Brighton & Hove City Council (General)

The planning framework consists of a Planning Act, which sets out the statutory powers and limits to planning. The current planning framework is changing. The Planning and Compulsory Purchase Act 2004 is now in force and this has changed the 'development plan' although transitional arrangements are currently in force.

Before the 2004 Act, the 'development plan' consisted of a Structure Plan plus a Local Plan (or a single UDP – Unitary Development Plan). The Structure Plan set out the main strategic issues and the local plan turned these into more detailed, site specific

policies. The government set out planning guidance and regional guidance but these were not statutory.

Brighton & Hove was unusual in that it was a unitary authority but shared a jointly prepared Structure Plan with East Sussex County Council (and shared jointly prepared minerals and Waste Local Plans with the County) whilst preparing its own Local Plan. The Brighton and Hove Local Plan was adopted in 2005.

The new planning system replaces regional guidance and the statutory Structure Plan with the Regional Spatial Strategy. This is a statutory plan – not just regional guidance and must be taken into account when framing local policy. The Local Plan will be replaced with a portfolio of documents which will make up the Local Development Framework for Brighton and Hove, some of which are statutory and some not. These include a Core Strategy last published in February 2010 (section 3.5.2). It includes a Statement of Community Involvement (public and stakeholder consultation) site allocations plans, generic development control policies, Area Action Plans and Supplementary Planning Documents SPDs.

Air quality is recognised as a 'material consideration' in making planning decisions. Further up to date information is given in the 2010 Progress Report. More details on the strategies and policies referred to in this section are available on the council's website at www.brighton-hove.gov.uk/planning

3.3) Existing local plans and policies

3.4.1) Brighton and Hove Local Plan

Following the revocation of the South East Plan by the Secretary of State for Communities and Local Government on the 6th July 2010, the Development Plan for Brighton & Hove consists of the adopted Local Plan. The Brighton & Hove Local Plan was adopted on 21 July 2005 and provides the basis for land-use planning in the city. The council has submitted its Core Strategy for public examination in April 2010. The Core Strategy is the first of the Development Plan Documents to be prepared by the Council under the Local Development Framework to replace the Local Plan. The Core Strategy is a material consideration.

In relevant Brighton and Hove "policies and hooks" for air quality can be outlined as follows:

Strategic Objective:

SO19: Principles of healthy urban planning & ensure pollution is minimised and actively seek improvements in air quality

SO21: Promote and Provide sustainable transport so there will be less airborne pollution

Development Areas

DA1 Brighton Centre and Churchill Square Area

DA3 Lewes Road Area

DA4 New Quarter England and London Road Area

DA5 Eastern Road and Edward Street Area

DA6 Hove Station Area although not in the policy wording paragraph 2.68 of the supporting text reference air quality issues at the junction of Sackville Road and Old Shoreham Road.

DA7 Shoreham Harbour Area

Special Areas

SA1 The Seafront – recognises in the policy the need to improve air quality along A259

SA2 Central Brighton – recognises in the policy the need to improve air quality (see paragraph 2.115 also).

SA3 Valley Gardens – recognises in the strategy the need to improve air quality

City Policies

CP1 Sustainable Buildings and emission reduction

CP3 Public Streets and Spaces includes a reference to tree planting in the policy although this does not directly reference air quality

CP4 Healthy City – makes reference to air quality in paragraph 3.29 of supporting text and health impact assessments or ensuring developments maximise positive impacts on health would require issue of air quality to be addressed by developers.

link that to improve air quality in the supporting text.

CP8 Sustainable Transport

Other City Policies

Air quality not currently referenced or cited in the following city-wide policies however it is also relevant to:

CP2 Urban Design - especially important to make room for dispersion of road traffic emissions and entrainment of fresher air and avoid creation of deep and closed street canyons with heavy traffic passing through the streetscape where ever possible

CP6 Open Space - important for lower concentrations of pollutants

CP13 Housing Density - high building density close to busy roads influences air quality

CP18 Hotel Accommodation - hotels are relevant receptors at the worse case locations

Local Plan

SU2 Efficiency of development use of materials, energy and water, Green House Gas (GHG) reduction

SU9 Pollution and Nuisance Control

BHCC Environmental Policy 2010

Transport and Built Environment

Procurement and Purchasing

Sustainable Community Strategy

Section 7 Promoting Sustainable Transport, Page 70; Air and Noise pollution and congestion

• Section 1. Making the connection between land use and transport promoting accessibility and managing demand

The council's aim is to improve travel to and within Brighton and Hove. It seeks to limit the growth of traffic to help it move more freely, whilst also promoting forms of transport that are less damaging to the environment with lower levels of air and noise pollution. The policies of this chapter are intended to complement the proposals in the Local Transport Plan.

The plan introduces the key principle of planning for the demand for travel that any development generates. When considering planning applications, it will be important that the development site is considered in relation to neighbouring uses. For example, applicants and developers will need to consider how the development of their sites can contribute to the provision or improvement of sustainable transport links in Brighton and Hove.

• Section 2 Energy, Water, Pollution and Waste Policy SU9 Pollution and nuisance control

Development that may be liable to cause pollution and / or nuisance to land, air or water will only be permitted where:

- Human health and safety, amenity, and the ecological well-being of the natural and built environment is not put at risk
- It does not reduce the planning authority's ability to meet the Government's air quality and other sustainability targets; and
- It does not negatively impact upon the existing pollution and nuisance situation.

All proposed developments that have a potential to cause pollution and / or nuisance, will be required to incorporate measures to minimise the pollution / nuisance and may invoke the need for an Environmental Impact Assessment. Where appropriate, planning conditions will be imposed and / or a planning obligation sought in order to secure the necessary requirements. Planning permission will only be granted for development on a site adjacent to an existing pollution / nuisance generating use and / or within an air quality 'area of exceedence' or potential 'hot spot' where:

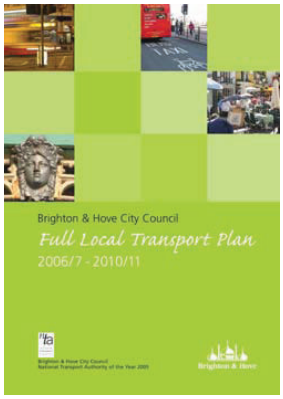
- The effect on the proposed development, its occupiers and users will not be detrimental; including where a development may introduce future residence to an area of known poor air quality

- The proposed development will not make the pollution and / or nuisance situation worse and where practicable, helps to alleviate the existing problem(s) there by avoiding adverse change

In applying this policy, particular attention will be given to a proposal's location and its impact on other development, land uses and local air quality.

Since the adoption of these policies and PPS23 (national guidance), Environmental Protection UK's Planning guidance (2010 update) in air quality has been published (Section 3.6.2). When assessing planning applications in the city, air quality is a material consideration, taking account of; PPS23, the emerging Core Strategy and other planning documents to come forward under the Brighton & Hove Local Development Framework (LDF) and supporting documents such as the 2010 air quality planning guidance.

3.4.3) Brighton and Hove Local Transport Plan



The city's second LTP [LTP2] was published in 2006 and third version [LTP3] in 2011. LTP3 has no fixed duration, imposed targets or formal reporting documents. The key drivers are; climate change, air quality, health, healthier children, social inclusion, stronger and safer communities and better local economies. In addition to identifying the need to address air quality issues in the 'Challenges and Opportunities' chapters, LTP also incorporates a chapters summarising the AQAP.

The former Local Transport Plan believed that poor air quality co-exists with congestion and vehicle idling, however the real situation is likely to be more complex. The latest research suggests NO_x emissions peak where engines are in load and this is commonly experienced during standing start acceleration away from busy junctions or congested road sections.

Driving style and poorly maintained vehicles are important. It is hoped that developments in the field of cleaner vehicle fuel and emission controls will contribute towards reductions in air-borne pollutants in accordance with the concept of the EU's auto oil programme. That said LTP should recognise that the internal combustion engine is unlikely to be the most effective method for reducing emissions. LTP does

recognise that investment by the motor industry and continuing research in vehicles with lower emissions will bring benefits by reducing local air quality impacts. Subsequent investment in newer cleaner stock and initiatives by fleet operators (including the council, freight distribution companies and transport operators such as buses and taxis) will further maximise the benefits for air quality.

Proposals to assist in reducing the need to travel and increase available choices of transport also help to reduce harmful emissions and this is a key element of the overall transport strategy and sustainable transport fund. Opportunities to reduce the adverse impact of road traffic on the environment, economy and society can deliver important benefits, in particular reducing congestion. As road traffic contributes significantly to greenhouse gases especially carbon dioxide, the Government fully recognises the international responsibilities that exist for climate change. More locally, the council is developing further its own Climate Change Action Plan. Fundamental to the transport strategy for the city is the objective of developing the road network enabling the improved movement of people and vehicles to increase efficiency and help minimise the environmental impact of motorised travel. This remains particularly important along key corridors where the use of alternative transport continues to be encouraged.

3.5) The Local Development Framework (LDF)

3.5.2) Core Strategy

The Core Strategy is the first Development Plan Document (DPD) to be produced as part of the Brighton & Hove Local Development Framework. It will provide the overall spatial vision and strategy for Brighton & Hove through to 2026. Once adopted, it will replace many of the policies set out in the 2005 Local Plan. The submitted Core Strategy (February 2010) sets out how the council will meet the social, economic and environmental challenges that face city, how it will respond to local priorities and how it will work with partners to reduce inequalities. It identifies the broad locations, scale and type of development and supporting infrastructure that will take place in the city. It will take forward the planning-related aims of the Community Strategy while also taking into account other city-wide plans and strategies, including those produced by other agencies.

In setting out the spatial vision for the city to 2026, there are a number of key aims that the Core Strategy will seek to achieve. These include:

• In 2026 there will be more people but less traffic and congestion in the city through a reduction in car use of 10-20%. There will be less air borne pollution, less traffic noise and far lower carbon emissions. The city will have a flexible transport network incorporating transport interchanges, more sustainable transport corridors and be able

to accommodate peaks of demand. There will be a Coastal Transport System to move people efficiently to and between major leisure, retail, tourism and employment sites as well as major residential developments, and; people will be able to move more easily, safely and effectively around the city on foot, by bicycle and on public transport.

• Through an integrated package of long term and short term measures, significant change and improvement will have been made in local air quality.

In order to achieve the spatial vision for the city, the Core Strategy includes a number of spatial objectives. These provide a framework for more detailed policies in the other planning documents that will make up the Local Development Framework (LDF). Of relevance are:

S01 Contribute to a reduction in the ecological footprint of Brighton & Hove and champion the efficient use of natural resources and environmental sustainability. Ensure that new development in Brighton & Hove is sustainable in terms of design, construction and the predicted local impacts of climate change. Promote improvements to the sustainability of existing buildings.

SO19 Across the city apply the principles of healthy urban planning and work with partners to achieve an equality of access to community services (health and learning), to opportunities and facilities for sport and recreation and lifelong learning. Ensure pollution is minimised and actively seek improvements in water, land and air quality and reduce noise pollution.

SO21 Promote and provide for sustainable forms of transport so that there will be less congestion, less air borne pollution, less traffic noise and less greenhouse gas emissions and work with partners to develop safe and sustainable means of access to and across the city including measures to improve bus and rail services and the provision of a coastal transport system and sites for park and ride.

Reflecting the 2010 Air Quality Further Assessment, Development Area proposals for Lewes Road (DA3), London Road and New England Quarter (DA4), Eastern Road indicate that there are certain air quality issues within these areas that need to be addressed and these are set out in the local priorities. Further the special area policy SA1 The Seafront recognises the need to tackle air quality along certain junctions of the A259. Air quality is also a priority consideration in the vicinity of the Main Station transport interchange and on Trafalgar Road in Portslade; a key route to the docks.

The 2010 core strategy also includes the following relevant city wide policies:

- CP1 Sustainable Buildings requires demonstration that new development will reduce air pollution;
- CP3 Public Streets and Spaces seeks the incorporation of street trees wherever possible;
- CP4 Healthy Cities requires a Health Impact Assessment on all strategic developments in the city and the need for larger developments to demonstrate how they maximise positive impacts on health within the development or in adjoining areas; and

- CP8 Sustainable Transport recognises that an integrated sustainable transport system will contribute to a safer, cleaner and quieter city.

• Supplementary Planning Documents. (SPD's)

These will provide guidance on how policies in the saved Local Plan and replacement Development Plan Documents (within the LDF) will be implemented and include:

SPD03 - Construction and Demolition Waste

SPD06 – Trees and Development Sites

SPD08 – Sustainable Building Design

SPD10 – London Road Central Masterplan

SPD11 – Nature Conservation and Development

• Future policy guidance on Air Quality
In order to inform the development control process and advise developers, the potential for producing further guidance, in the form of a Planning Advice Note (PAN) or any other suitable planning document on air quality policies, will be evaluated. Progress on this will be reported through subsequent AQ Progress Reports. Further information on Low Emission Strategy and links to planning policy is given in the appendix.

3.6) National development control guidance documents

At present the council regularly makes reference to the following two planning guidance documents to assist with the air quality assessments of planning developments in the city.

3.6.1) Environmental Protection UK's Air Quality Planning Guidance Development Control updated 2010[6]

The document provides the framework for air quality considerations to be accounted for in local development control processes and includes guidance on air quality impact both outside and within existing AQMA's.

The guidance contains an approach to addressing potential air quality impacts from development in qualitative terms, rather than relying on the more traditional numerical thresholds which allows the involvement of professional judgement and experience at a local level. It is expected that the guidance will complement the Low Emission Assessment Methodology.

This method is linked to a process for developing recommendations to reduce the air quality impacts of development proposals.

The guidance also addresses some specific concerns relating to low-polluting developments, cumulative impacts, impacts from construction, and the importance of exposure and dose in local air quality management.

3.6.2) PPS23: Planning and Pollution Control (Annex1)

PPS23 starts from the premise that the planning system plays a key role in deciding the location of development that may give rise to pollution. This pollution, significantly, may arise directly or indirectly. The planning system must also safeguard other developments and uses from future pollution. Therefore the impact of development on land, water and air quality is a material consideration.

The PPS also seeks to simplify the procedures for reviewing pollution issues as part of the planning process. It requires that where pollution issues arise, intending developers should hold informal pre-application meetings with the local planning authority, the relevant pollution control authority and any other legitimate stakeholders.

Annex 1 contains specific guidance on LAQM, directing Local Planning Authorities to pay particular note to the impact of development on AQMA's or areas of EU limit value exceedence. With respect to assessing air quality as a material consideration in development control decisions PPS 23 sates:

It is not the case that all planning applications for developments inside or adjacent to AQMAs should be refused if the developments would result in a deterioration of local air quality. Such an approach could sterilise development, particularly where authorities have designated their entire areas as AQMAs. LPAs, transport authorities and pollution control authorities should work together to ensure development has a beneficial impact on the environment, for example by exploring the possibility of securing mitigation measures that would allow the proposal to proceed.

It may be appropriate in some circumstances for the developer to fund mitigation measures elsewhere inside the AQMA to offset any increase in local pollutant emissions as a consequence of the proposed development. These measures could be secured through Section 106 Agreements under the Town and Country Planning Act.

That said PPS23 is likely to be replaced with changes to the Planning System.

3.7) Development control

Development Control is responsible for the determination and monitoring of planning applications and other associated applications (listed building consent, advertisement consent, etc) submitted to the council under the Planning Acts. Brighton Hove have worked with Environmental Protection UK in the publication of Development Control Planning for Air Quality 2010[6]

In terms of potential air quality and environmental implications from major developments, applicants are required to submit a formal environmental statement for all development proposals exceeding the relevant thresholds or meeting at least one of

[6] Development Control Planning for Air Quality 2010
http://www.environmental-protection.org.uk/aqplanning/

the criteria set out in Schedule 2 of the Environmental Impact Assessment Regulations. Proposals below these thresholds may also be required to submit a comprehensive environmental statement where there is potential for significant impacts on people or the built and natural environment. In 2011 Brighton and Hove have produced a checklist for air quality for Development Control Officers. This is outlined in the Appendix.

3.8) Construction Environnemental Management Plans (CEMP'S)

The construction impacts of major developments including traffic routeings of the individual projects are considered by the council in Construction Environmental Management Plans. All CEMP's are drawn up in conjunction with the council in order to minimise the impacts of construction on the environment and local air quality.
In drawing up CEMP's careful consideration is given to the existing AQMA and other known local air quality hot spot areas.

3.9) Other local policies and strategies

3.9.1) Sustainability Strategy (Local Agenda 21)

The aim is to provide a framework for improving the environment and the quality of life enjoyed by people who live in Brighton and Hove and those who visit the City.

The Strategy sets out the council's commitment to take action for a more sustainable future and is intended to provide a starting point for a Local Agenda 21 for Brighton and Hove. The Strategy identifies 12 'key objectives' which provide the basis for preparing a series of Action Plans. To help achieve the 12 objectives, the Action Plans will set out specific activities together with a clear indication of how they will be achieved; by when; and who will be involved.

The key sustainability objective in terms of air quality is to reduce air pollutants and maintain a commitment to improving good long-term air quality by influencing ourselves and others to provide and use sustainable forms of transport and encouraging energy sources that are not based on fossil fuels.

3.9.2) Climate Change Action Plan

AQEG reports on Air Quality and Climate Change have concluded that there exist many complex linkages between air quality and climate change and that a holistic

approach to both is essential if progress is to be made in limiting the impact of human activity[7].

The council has now drawn up a Climate Change Action Plan to address the following issues:

- To reduce greenhouse gas emissions as a result of the council's actions, specifically reducing energy use, waste, and the use of unsustainable forms of transport.
- To encourage other sectors of the city to reduce their greenhouse gas emissions.
- To prepare for the changes that will happen because of the changing climate
- To create a behaviour change around how we use natural resources
- To illustrate the economic, social and environmental benefits of taking action on climate change.

The report is currently in draft form and is out for consultation, therefore further details on this will be given through AQAP progress reporting. Given the important relationships between air quality and climate change highlighted in the AQEG report the council will continue working on integrating the two issues together both in terms of policy and planning. Further information is provided in the 2010 Air Quality Progress Report where some examples of the different priorities if local air quality and broader climate change are discussed.

3.9.3) Cycling Town Status

Cycling in Brighton & Hove has seen substantial growth in recent years. (27% increase recorded in the 2006-2008 period.) However, around 45% of workers employed in the city use a car to get to work drive less than three miles. This is estimated to be over 27,000 car journeys per day, so there is great potential for increasing safe bicycle use - and also to bring other benefits on both an individual and a wider level.

As a national exemplar Cycling Town, the city council is dedicated to promoting healthy and environmentally friendly travel. Cycle lanes are provided across the city, including along the seafront, Grand Avenue and The Drive, Hove to Hangleton, and Lewes Road. Many of these are part of the national and regional cycle route network.

A new north south cycle freeway has been completed and provides a link between the Downs, from the Dyke Railway Trail in Hangleton to the seafront via Hove station. The southern section along Grand Avenue and The Drive is segregated from other vehicles and designed as a European-style cycle freeway.

[7] Air Pollution Action in a Changing Climate, defra April 2011
http://www.defra.gov.uk/publications/files/pb13378-air-pollution.pdf

There are a variety of Brighton & Hove cycle maps that cover the city, the city centre, the coastal route, the route linking the seafront to The Downs, in addition to maps, guides and information about cycling in and around the city.

The council has set also an example as an employer by publishing a comprehensive Staff Travel Plan, providing secure cycle parking at its key buildings, offering mileage allowances for work-related bicycle journeys, cyclists' showers and interest-free loans for staff to buy bikes.

Additional cycle parking places are also being installed across the city and a number of further schemes to encourage cycling are being progressed by the city council as a partner in a successful bid for European Civitas funding for the Archimedes project. Research shows that if more cyclist use an area motorist become more aware of their presence making cycling safer

That said there is still scope to further improve the cities' cycle network and better integrate cycle lanes with adjacent Local Authority areas for example along the coast to Adur & Worthing. Continued shift from oil based transport to cycling is a multiple win as follows:

- Reduces dependence on fossil fuel
- Switch from private vehicles to bicycles eliminates emissions of benzene, NO, NO_2 and fine particulate and can potentially contribute to improvements in local air quality
- Can lower both individual and city-wide carbon footprint
- Transport mode shift to bicycles can alleviate congestion by reducing the number of short car journeys, freeing road space for other bikes and vans carrying out local business
- Keeps a wide age-range of the populace active so reducing the risks of obesity and cardio-pulmonary disease
- As the price of fuel, car insurance, road tax and parking continues to increase cycling becomes an increasingly attractive financial option
- Cycling as a regular mode of transport is one way of reducing personal and family expenses, reduction of personal debt can have a positive influence on mental as well as physical health

3.9.4) Sussex Air Quality Partnership

- **Aim**

The main aim of the Group is to support all participating local authorities with their duties under Environment Act 1995 and implementation of the United Kingdom Air Quality Strategy. This aim is to be supported through promotion of collaboration and co-ordination, collation, interpretation and dissemination of information.

- **History**

The Sussex Air Quality Steering group was formed in 1995 as a response both to Central Government, who had produced a document "Air Quality: Meeting the Challenge", and to more local work looking at air quality in Sussex.

The group is made up of representatives from City, Borough and District Councils in East and West Sussex, East and West Sussex County Councils, the Sussex Primary Care Trusts, the Environment Agency, the University of Sussex and the University of Brighton.

The group is made up principally of specialist officer staff, with Chief Officer representation. The Group has always sought economies of scale and consistency of approach (through joint working and purchasing) and has sought to make the linkages between air quality and other policy areas (such as land use planning). The Group has also tried to provide relevant timely information on air quality to decision-makers.

One of the first tasks the Group completed was to carry out an inventory of all major pollution sources across Sussex (Section 2.6). This emissions inventory was subsequently linked to mapping tools and has been further developed by Brighton Hove City Council for the City. The Group has had a full-time Project Development Officer for over ten years to organise funding and assist in the air quality management process and to raise the profile of the Group.

3.9.5) Sussex Air Quality Strategy

The document sets out the current understanding of air quality in Sussex, describing the tools used to assess and monitor air quality, and how we affect air quality both beneficially and adversely. The document explains policies and actions currently in place to protect air quality and the possible "threats" to our current levels of air pollutants.

The aim of the document is to act as an Air Quality Partnership (SAQP) template for the agencies in Sussex that belong to Sussex Air Quality Steering Group. The National Air Quality Strategy recognises that every local authority can make a contribution to continued improvements in air quality by the development of their own strategies. By developing and implementing local air quality strategies an integrated approach to air quality can be obtained.

However, vital to ensuring a consistent approach is maintained in the aim and purpose of every authority's strategy, all agencies participating in SAQP have agreed to the Guiding Principle and Aims of improving air quality in Sussex.

- **Guiding principle**

To promote and encourage the improvement of air quality throughout Sussex, to protect public health, quality of life and the environment.

- **Aims**

- To maximise the opportunities for improving air quality throughout Sussex.

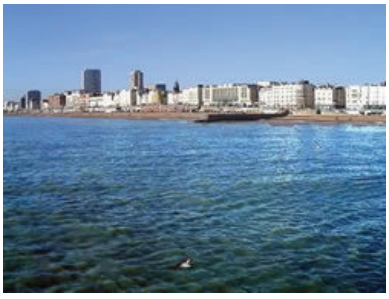
- To provide a framework for dealing with local air quality issues on a Sussex wide basis in co-operation and consultation with regional stakeholders.
- To ensure air quality is fully considered by public authorities when carrying out their functions and duties.
- To encourage air quality to be considered by residents, businesses and organisations when making decisions about their behaviour.
- To promote the importance of air quality as a determinant of public health and well being.
- To address air pollution more widely.

All of this work is set against a changing policy, economic and technical background and therefore it is vital that any strategy is reviewed, updated and implemented. SAQP will be undertaking extensive consultation with its partners to ascertain their response to this document and will be undertaking wider consultation to ascertain the public's view.

- **Implementation timescale**

The strategy is currently being revised by the SAQP in light of new developments within Sussex such as the declaration of AQMAs and subsequent development of AQAP's. Once completed the document is likely to by adopted by Brighton & Hove City Council.

3.10) New developments within the city



The 2008 Progress Report identified a number of new developments and provided an update on ongoing developments within the city. An up to date summary of major new developments in the city with accompanying maps can be found in the 2010 Air Quality Progress Report.

4) Proposed measures

4.1) Developing the action plan measures

In order to develop measures to tackle air pollution we need to understand what are the courses and in what proportions. It is clear from the results of the Review and Assessment process that given the relative absence of major industrial polluting processes in Brighton and Hove, road transport continues to be the main contributor to local air pollution. Ground level roadside sites have higher concentrations of Nitrogen Dioxide compared with; rooftops, parks, gardens, school fields and the sea-front. The South Downs Area of Outstanding Natural Beauty has some of the lowest concentrations in South East England. That said the contribution from the following sources varies considerably between neighbourhoods and streetscapes:

- Heavy goods vehicles i.e. articulated lorries and ridged trucks
- Buses, coaches and minibuses
- Cars and taxis
- Vans and light goods vehicles
- Mopeds and motorbikes
- Shipping in port and close to shore
- Construction vehicles and fixed plant machinery
- Diesel generators associated with organised events
- NO_x emissions from domestic and commercial kitchens
- Domestic and commercial heating sources such as; gas, oil, wood fuelled boilers and open fireplaces
- Fugitive sources such as uncontrolled fires, bonfires, fireworks and barbeques

Many of the sources listed are transient that is to say their frequency and duration is limited to a few hours or days in the year. These sources may contribute to short-term peaks in air pollution for example bonfire night. However such events have a small contribution to long-term average concentrations and this is the key for AQS (Air Quality Strategy) and NO_2 objective compliance. It is clear from the level of exceedence seen across the AQMA (as shown in Table 3) and from the transport pressures previously identified in Brighton & Hove, that there is no single short term solution for tackling the problem. Therefore the council will continue to develop and deliver an integrated package of longer and shorter shot measures that are needed to bring about significant change and improvements in local air quality. The package of measures described in this AQAP can be categorised into the following headings:

- **Major intervention measures (long-term)** – such as road construction and road infrastructure changes

- **Soft measures and smarter choices** – such as public transport partnerships, travels plans and walking and cycling,

- **Education and public information-** such as campaigns work with local schools, colleges, universities, businesses and on website development

- **Congestion management** – such as traffic signal technology (e.g SCOOT, UTMC, MOVA) and the use of variable message signs

- **Development Control** – ensuring that the impact on the transport network of development proposals is sufficiently integrated and that design will promote and provide for sustainable travel patterns whilst also not introducing sensitive residents to areas that continue to exceed the AQO (Air Quality Objectives)

- **Emissions reduction** – Investment in cleaner vehicles or roadside emissions testing, changes to the local vehicle fleet and idling enforcement

As described in Section 2 the Further Review and Assessment has both quantified the level of NO_2 exceedence within the AQMA and more specifically identified the source apportionment of NO_x with respect to the vehicle classification split and other sources. These findings therefore provide the main technical justification for the measures described in this AQAP.

On the majority (but not all) roads links in the AQMA Private cars and vans are the dominant vehicle class (see 2010 FR&A report). Notable exception is Western Road, North Street and upper Queens Road which are restricted to deliveries, buses and taxis. Throughout the city emission totals from lorries, buses and coaches are disproportionate compared to their numbers. For example the emission of NO_x is at least several times greater from a heavy vehicle 12 tonne bus (with a nine litre engine) or an articulated lorry up to 44 tonnes (with a 15 litre engine) compared to an average car weighing one or two tonnes (with a 1 or 2 litre engine). Therefore a policy to manage heavy vehicles is required to improve roadside pollution in the vicinity of priority road links.

Therefore the package of measures needs to consider and tackle the current and future impact from buses and HGV's as well as focusing on overall traffic reduction. In some areas measures to limit the majority vehicle type i.e. the private car may reduce congestion and improve the overall flow of traffic. A smoother flow of traffic with less breaking of momentum and fuel demand could reduce the total emission on any given road section. Furthermore, passenger shift from car use to full buses will reduce both fuel consumption and carbon footprint.

It is important to note, that a number of the measures detailed in this report have been primarily developed through the LTP2 (Local Transport Plan) and Brighton and Hove Local Plan both of which are coming to the end of their active period in 2011. LTP was based on addressing three other national priorities for transport, in addition to air quality. These are:

- Road Safety
- Accessibility
- Congestion

When designing measures targeted at air quality improvement, careful consideration has therefore had to be given to the potential secondary effects on these key priorities. Some measures could generate positive or negative secondary effects. For

example, higher emissions in high density areas are often associated with stop-start traffic, therefore reduced congestion will have the effect of smoothing the traffic flow. This will reduce emission of NO_x as acceleration (engine in load pulling in low gears) have the highest emissions. If this resulted in quicker driver speeds, it could result in a potentially detrimental effect on safety or accessibility (pedestrian ability to cross the road).

The LAQM PG (09) Defra guidance states that all options must first be considered and then an explanation given to why certain options have been discounted. In order to ensure that the assessment of potential measures is robust, account was taken of the Defra action plan appraisal checklist as shown on the action plan help desk website. The following table describes the measures considered as part of the 2010 AQAP.

Table 6 Options not taken forward during LTP2 to 2011

Measure	Reason	Future Likelihood
Low Emission Zone	For LEZs to have the intended impact it would need to be in implemented in high density commercial areas which carry large amounts of vehicles such as the London Road area. In this case, an LEZ could potentially affect business and trade and further affect the economy of a retail area that is already identified as being in need of regeneration. Another argument is improvement in the urban environment will encourage more cyclists and pavement foot fall and actually stimulate local retail activity and be beneficial for neighbourhood property value.	An LEZ is not proposed during the lifetime of LTP2 up to 2011. However since 2008 there has been no improvement in NO_2 in the AQMA. During 2011BHCC and the Sussex Air Quality Partnership are developing low emission strategies. This is likely to focus on vehicle procurement, major development funding mechanisms and encourage greater uptake of alternative fuels including hydrogen cell, bio-methane and electric vehicles. Further details on page 71 and in the Appendix.
Congestion pricing zone	There are no plans to introduce this initiative in the foreseeable future. The council has continued to be successful in increasing the number of people using public transport and has adopted a parking management strategy that includes appropriate levels of charging. This fiscal measure has contributed to satisfactorily managing traffic and travel patterns.	In the much longer term congestion pricing may need to be considered if levels of traffic congestion and associated air quality levels increased at an unsustainable rate. Any decision taken to introduce such a measure as Road User Charging will always depend on the political climate at the time.

4.2) National and international emissions reduction.

In the context of effective and significant air quality improvements emissions reduction must first be considered on a national and international level. A summary of the main EU and UK policies are given in Section 3.

The following sections describe the measures that will be taken forward in the Brighton & Hove City Council AQAP.

The tabulated summary of action plan measures is included in the appendix section of this report and includes items identified and delivered as part of the second Local Transport Plan 2006/07 through to 2010/11. Further details about these measures, as defined in 2006, and updated in 2008 are set out in LTP and can be viewed on the council's website. http://www.brighton-hove.gov.uk/index.cfm?request=c1146323

4.3) Major intervention measures

4.3.1) Coastal Transport System [CTS] (formerly known as RTS – Rapid Transport System)

The CTS is designed to create a step change in public transport services and infrastructure in Brighton & Hove by providing an attractive, alternative for some journeys to reach both existing and future planned destinations. This will provide sufficient choice for some car drivers and assist in contributing towards transport modal shift that is in line with the council's LDF Core Strategy. CTS aims to deliver a socially inclusive transport mode. The increased capacity of the public transport network will offer environmental and economic benefits to the city.

CTS will initially link key social, leisure, residential, business and employment destinations between Worthing (West), Brighton Marina (East) and Brighton Station (City Centre). Utilising a high quality, frequent express with limited stops, the CTS will complement, rather than compete with, existing local bus and train services.

The CTS is propsed to use two key corridors (east and west) with segregated priority on the route and at junctions where possible. The route will be :

- Brighton Station – North Street –Eastern Road – Royal Sussex Hospital – Brighton Marina.

- Brighton Station – West Street – Kings Road – King Alfred Centre

The routes will link the railway station, the retail centre, major businesses such as American Express, the Royal Sussex County Hospital and visitor destinations such as the Marina and the seafront.

CTS is based on the concept of high frequency, limited stop services to primarily meet the needs of passengers who otherwise may not have considered conventional local

bus services. It is expected that there will be 10 RTS stops in Brighton & Hove.

- **Brighton Station** – a key interchange for longer distance passengers seeking links to American Express, Hospital, Marina or Shoreham Harbour developments – the number and type of buses and taxis needs to be managed at this interchange from an air quality point of you

- **Clock Tower** – access to Churchill Square and other central retail areas in Brighton centre although the number of buses at this junction must be managed with a view to the air quality implications

- **North Street** – access to the Cultural Quarter, tourist, retail and employment areas, plus bus to bus interchange, North Street has between 3,500 and 4,000 buses a day

- **American Express** (Edward Street) – serving one of the city's major employers

- **Royal Sussex County Hospita**l (Eastern Road) – a key sub-regional health facility

- **Brighton Marina** – a significant leisure destination and retail destination , as well as serving major residential development and the proposed Brighton International Arena

- **Brighton Conference Centre** – gives access to the Brighton seafront as well as an important destination

- **Hove Seafront** – offering an intermediary stop serving residential and employment uses, as well as offering a tourist link

- **King Alfred Centre** – a potential redevelopment site

- **Shoreham Harbour** – significant regeneration potential for residential, commercial, leisure and community uses

Subject to acceptance of the Business Case by the Government, CTS could begin in 2011/12.

4.3.2) Urban Realm Developments

There are a number of recent or imminent developments in and around the centre of the city, many of which are located in a small corridor stretching south from Brighton station to Brighton Pier and the seafront, and east to the Valley Gardens. This area has nominally been branded the 'Cultural Quarter'.

As these developments have been built, the council has sought to enhance the surrounding urban realm to encourage a change in the way that space is used. Locations where this has been achieved include

- New Road
- Pool Valley Coach Station
- Ship Street

Further plans are being implemented in the East Street area and under development for the Brighton Station area. In the longer term, the Valley Gardens area will be improved.

Two of the key outcomes expected from these urban realm improvements are **:-**

1. Reduced congestion by encouraging alternative transport modes. Also better designed and rationalized carriageway space and junction

2. Improved air quality from reduced private vehicle usage and reduced congestion

4.3.3) Valley Gardens



At the southern end of the A23, the northern and southern carriageways are divided by a series of green spaces, known as the Valley Gardens, the North Steine and the Level.

What appears from the air to be a vast city-centre park, in fact it operates as a series of large roundabouts that allow vehicles to circulate. As a result, the green space – which is segregated from the rest of the city on both east and west – does not operate as well as it could. There is insufficient distance between surrounding buildings and the A23 carriageways on all sides for effective dispersion of vehicle emissions. Furthermore the various traffic management and bus priority measures make the operation of the carriageway confusing to pedestrians and require significant amounts of guard-railing, thereby segregation the area from the cultural and retail heart of Brighton including; the main retail sector, Pavilion, theatres, and North Lanes.

In order to attempt to return this space to those who could make best use of it - that is, local and visiting pedestrians including tourists - the City Council intends to

investigate the feasibility of re-connecting the green space with the Pavilion Gardens, St Peter's Church, the North Lane and elsewhere. This would:

- allow safe and convenient access to the green space for pedestrians,
- afford the opportunity to reduce crime and disorder in some of the secluded or poorly lit green spaces that currently exist in the area,
- create public space with increased acreage, amenity and acceess whilst reducing vehicle noise and pollution, thereby allowing the space to be enjoyed to its full extent

In the LDF Core Strategy the city council has committed to undertaking a transport modelling exercise to inform its approach to working with public and private sector partners to enhance and regenerate the Valley Gardens area in an integrated manner that reinforces its strategic significance, emphasises its historic and cultural character, reduces the adverse impact of vehicular traffic, improves local air quality and creates a continuous green boulevard that reconnects the area to the surrounding urban realm.

One of the main aims for the area is to reduce the severance impact of traffic on the enjoyment of the public realm through environmental improvements;

The proposal could build on work already undertaken throughout LTP via other programmes, such as the walking programme, urban realm improvements and clear zone.

Valley Gardens and London Road have resided in the AQMA for seven years and the proposal could be one of the key drivers to achieving improvements in air quality in this area, in the longer-term. The City Council is also aware that the scheme would need to be developed against the background of a rapidly improving and growing city, and take account of other proposals such as the CTS (Coastal Transport Scheme)

In terms of air quality improvement, both CTS and the Valley Gardens proposals have the potential to have a major positive impact on the central area of the AQMA. The current level of congestion in the area as a result of both the level of traffic and existing road structure, results in significantly greater emissions. The acceleration of traffic from a standing start in this area results in considerably higher rates of emissions per vehicle than would be the case if the traffic flow was smoothed and travelling at a more constant intermediate speed. This is particularly important in terms of the source apportionment split shown in the further review and assessment, as smoothing out the traffic flow could significantly reduce the emissions currently attributable to buses and heavy vehicle traffic. In addition gases and particulate emitted from slow moving traffic less than ten metres from the building line disperses less effectively. It is recommended that the main carriageways are more at least twelve metres from the building line. The lack of fresh-air entrainment and effective dispersion of emissions directly influences ambient concentrations of pollutants adjacent to the carriageway.

4.3.4) Sustainable Transport Corridors (STCs) and the Quality Bus Partnership.

The ongoing five per cent growth in public transport patronage is one of the great success stories in Brighton & Hove. Key to the continued success of this is the informal working partnership between the Brighton & Hove Bus and Coach Company and the city council. In recognition of this and to cope with the pressures ahead, the partnership builds on the linkage between improvements to service performance and continued infrastructure investment.

As part of the bus company's commitment to this partnership, it is expected that they will:

- Maintain the high service frequencies to appropriate areas of the City such that 80% of passengers have a daytime frequency at least every 10 minutes

- Offer a range of attractive ticket deals including a highly successful bus ID scheme to encourage travel among young people aged 5 – 18

- High profile marketing initiatives including On Route magazine and Bus Times as well as the launch of a new livery and development of the METRO brand

- Provide the highest standards of information including 'Bus Times', the most comprehensive web site for a bus company and detailed information displays at almost all bus stops

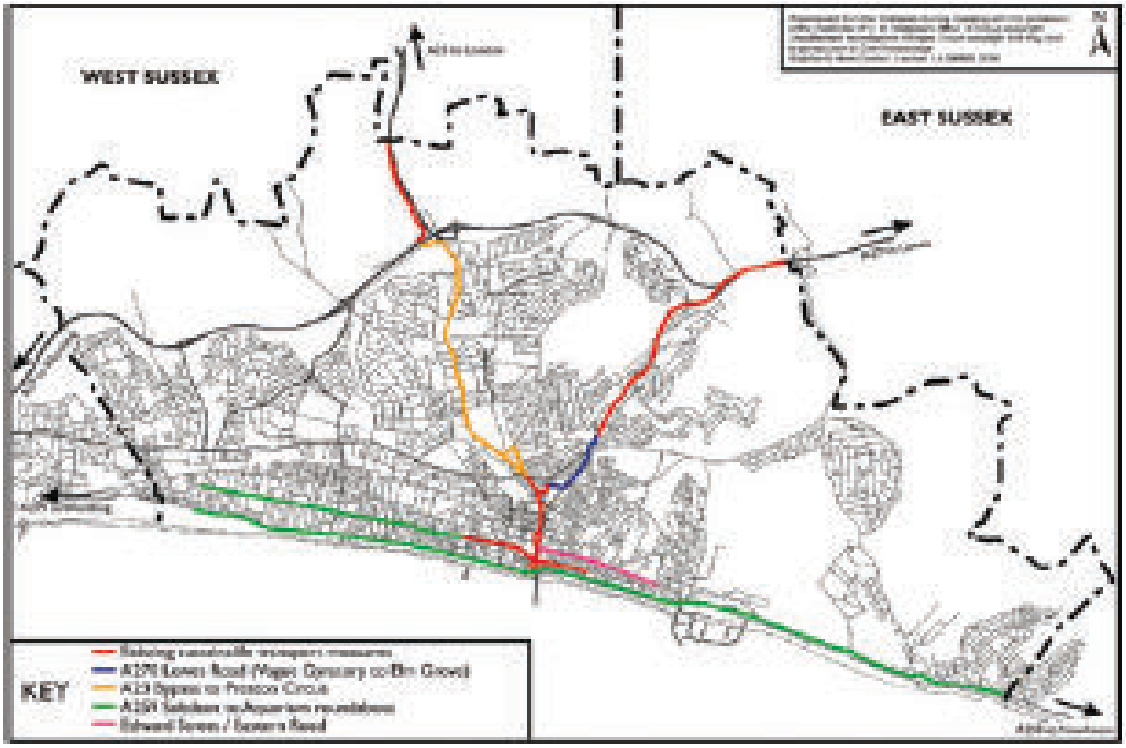
The City Council will continue to improve conditions along existing bus routes and to better manage bus and passenger movement across the city. As part of this the City Council has been implementing improvements along key Transport Corridors on the following roads leading in and out of the AQMA:

- Church Road/Western Road

- A259 between Ovingdean Roundabout and Telscombe Cliffs (jointly with East Sussex County Council)

- A23 London Road corridor (extension of previous works)

Figure 8 Key Transport Corridors entering and exiting the AQMA



4.3.5) London Road and Lewes Road area [LR2]

The LR2 Study has sought to identify regeneration opportunities through economic investment, retention of the mixed land uses and provision of a multi purpose living space for all users of the current and future facilities.

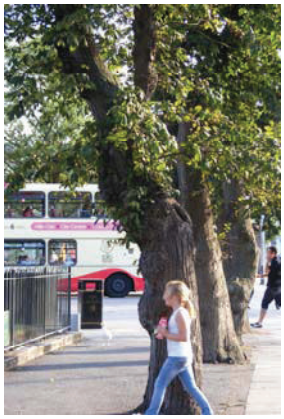
The study area encompassed two strategic corridors and subsequent feeder links, which have fundamental and opposing attributes, firstly to provide a strategic link between the city and the surrounding regional areas, and secondly to provide local access for those who live along the corridors to facilities that are located on those corridors.

The study has sought to achieve a balance between these competing needs by the provision of improved access to the current facilities and enabling future expansion of these facilities for both local and regional users. The area is within BHCC first Air Quality Management Area originally declared in 2004 and continues to be one of the priority areas for air quality within the current AQAP.

The subsequent LR2 Regeneration Strategy (London Road and Lewes Road Regeneration Strategy 2007) identifies options and opportunities for the regeneration of the London Road and Lewes Road area. The emphasis is on measures to improve the quality of urban design, streetscape and enhance the gateways to the city and to seek development opportunities in the area. Addressing air quality is one of the key objectives.

4.4) Softer Measures and Smarter Choices

4.4.1) Walking and cycling

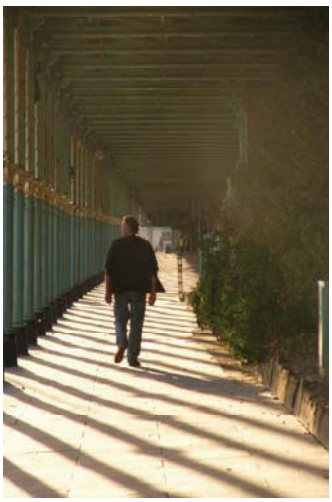


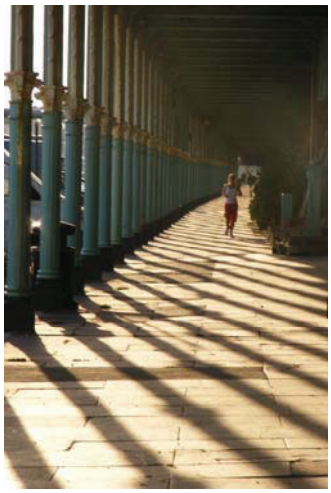
The City Council nominated 2009 as the Year of Walking and Cycling in accordance with LTP. A significant proportion of the City Council's capital expenditure Between in the current period will be directed toward walking and cycling projects.

Partly as a result of this commitment, Brighton & Hove was awarded Cycling Demonstration Town (CDT) status in 2005, which has resulted in about £500,000 per year grant funding for cycling projects over three years. The City Council matched this funding from a diverse range of funding streams (e.g. urban regeneration funding and section 106 planning gain) to create a funding stream for cycling totalling at least three million pounds over three years. A further three years worth of funding at a similar level for 2009-2011 was secured when the city subsequently became designated as a Cycling Town.

The purpose of the Cycling England programme has been to test the assertion that cycling measures – funded to European levels – can go some way to delivering Dutch levels of urban cycling. The main focus of investment in walking and cycling has been as follows:

- **Walking and Running**





An identifiable and accessible Walking Network.

By identifying 'areas of attraction' that are popular destinations for people, the city council has been identifying links or corridors between that have become the focus of pedestrian improvements.

The City Council has also sought opportunities to link the walking corridors with green areas of the city to create an Urban Greenway, improving accessibility to serenity and clear zones (areas with few emissions and noise) within the city along pleasant routes that will further enhance the benefits of moving around the city on foot.

A coherent, state-of-the-art pedestrian signing programme,
This has given pedestrians the confidence to be able to find their destination without having to rely on traffic signing, as well as promoting walking by identifying the time (in minutes) that it would take to reach their destination.

- **Cycling**

Cycling freeway routes

The City Council has undertaken work to identify appropriate cycle freeway routes, such that they offer the ability for potential cyclists to travel between the most popular destinations within the city whilst segregated from traffic.

Enhanced system of cyclist signing

The City Council has also introduced enhanced cyclist signing network to co-ordinate with the new Cycle Freeways, the national and the local cycle lanes and the new pedestrian signing programme.

Ongoing programmes of improvements in walking and cycling also include :-

- Installing dropped kerbs
- Rationalising street furniture
- Improving pedestrian facilities at traffic signals
- Providing sitting and resting opportunities
- Extending the existing national and local cycle network
- Provision of cycle parking facilities across the city.

4.4.2) Travel planning

The city council will continue to implement travel planning on three separate levels

Personalised Travel Planning

Personalised Travel Planning is a community-based programme that encourages people to use alternatives to travelling in their private vehicle. The city council has been developing and implementing the largest Personalised Travel Planning Programme in the UK as part of its Cycle Demonstration Town project.

Over 10,000 households are visited each year by a dedicated team of travel advisers who offer advice and resources that could help residents save money, time and improve their health (this links with Brighton & Hove's status as a 'Healthy City') and make Brighton & Hove a nicer place to live by reducing road congestion and pollution. The personal contact not only helps residents become more informed about their travel options, but more importantly prompts them to think about the sorts of journeys they make and how they make them. Regular team meetings with our Travel Advisors and performance feedback ensure that the project harnesses a unique energy and skill set which contributes to a high level of motivation and commitment. At the doorstep, we want every customer to feel valued and empowered when receiving targeted bespoke information and incentives.

Each year around 100 participants receive a tailored package of information and incentives in the form of whatever is needed to encourage them to start cycling for the first time; anything from a new bike, cycle training, helmets and locks. PTP results show fewer car trips, more walking and cycling trips, in the households. The programme has focused on households in Central Hove, Stanford ward, parts of Withdean and Goldsmid Wards.

Workplace Travel Planning

In 2005, the City Council formally launched its Staff Travel Plan, which is designed to reduce car use and provide improved travel options to employees of Brighton & Hove City Council. The types of journeys covered in this plan include:

- staff journeys to and from work
- travel within the working day

The Staff Travel Plan aims to:

- remove the requirement for any employee to use their private vehicle for work if they choose not to
- reduce unnecessary car usage by employees
- encourage the development and use of alternative methods of travel
- encourage those who have to travel as part of their work, to do so in a way that minimises the environmental impact
- adopt the principal that car usage should not attract financial gain
- allow equality of access to work places for those who do not have access to a private car

The plan will help identify schemes (both pre-existing and proposed) towards these aims, including:

- discounted bus tickets for staff
- free bus travel between Brighton Town Hall, Kings House and Hove Town Hall
- interest free public transport season ticket loans
- interest free bicycle purchase loan
- showering and changing facilities at the City Council's main administrative bases
- car sharing programme, including preferential parking and a guaranteed ride home
- pool car and pool bike provision

As the council's scheme is already up and running, officers have successfully worked with organisations to draw up travel plan options.

The Brighton & Hove Travel Plan Partnership has approximately 40 organisations that have either developed Travel Plans, or are in the process of developing them. This accounts for over 20,000 employees. Quarterly Workplace /Business Travel Plan Network meetings have been successful and encourage employees to network amongst themselves to discuss the benefits of travel planning and targets. LTP funding

has supported 5 match-funded grants to 5 organisations that wished to improve their cycle parking provision. In 2008/2009, £35,000 was allocated to support organisations via match-funded grants, to encourage employees to travel in a sustainable way.

A Workplace Travel Plan resource pack for employers has been developed, detailing the logistics of producing a workplace Travel Plan, and the kind of benefits they offer. With the benefit of additional funding from Civitas (Institute for the study of civil Society), plus the city council will be exploring how to target specific sectors of employers i.e. retail, hotels etc, with the aim of producing best practice on how to work with them on producing workable Travel Plans.

Successful negotiations with Southern Railways are ongoing to produce a Station Travel Plan for Brighton. This includes Access for All and funding from Department for Transport to reopen the Trafalgar Street entrance. A new entrance on Trafalgar Place has opened up the New England Quarter, as well as improving pedestrian access on Queens Road.

School Travel Planning

Brighton & Hove's school travel planning programme formed the core of the City Council's first School Travel Strategy (STS) and remains integral to the Sustainable Modes of Travel to School [SMoTS] Strategy.

Brighton & Hove City Council has a dedicated School Travel Team, which supports all schools and some nurseries in the city to develop and implement School Travel Plans. The team has been working in partnership with schools in the city to develop travel plans that meet the government's DfCSF standard. These plans aim to encourage school communities to travel as often as they can on foot, by bicycle and by public transport. Where this is not possible then initiatives such as park and stride (where children walk part-way to school) or car-share are encouraged.

A number of initiatives are on offer to schools to ensure that the plans remain live documents and benefit children, staff, parents and the wider community. The school travel planning work programme can include the following elements which can assist in reducing emissions:

- walking buses
- cycling proficiency (Bikeability) courses
- child pedestrian training

It is expected that at the end of 2010 that 100% of local authority schools will have Travel Plans. Work is continuing with private and independent schools such as the 22 schools in BHCC, as only a few have achieved approved travel plan status. Officers are currently working with a number of schools following successful independent schools travel action day.

School Travel Plans can form an important element of Safer Routes to School scheme planning and we work to make a routes to school safer, more accessible and more sustainable.

VMS summary

4.4.4) Accessible bus stops

The City Council has implemented over 260 accessible bus stops since 1998, either as 'stand-alone' projects, as part of wider integrated transport projects, or associated with development proposals.

In order to make public transport a more attractive option the City Council will continue to add further accessible bus stops which make boarding and alighting easier for people with buggies, shopping trolleys and those with other walking difficulties. The city council has won a number of awards in recognition of its work in this area.

Accessible bus stops include raised 'Kassel' kerbs, which are tyre-friendly. This allows the bus to pull right up to the kerb and gives level access from pavement to bus platform. In a minority of cases a kerb build-out may be needed to ensure unimpeded access for the bus: this applies at bus stops where there is a history of regular obstructive parking by other vehicles.

Between 2008/09 – 2010/11the target is for a further 80 bus stops to be completed. Of these 45 will be funded by LTP, 25 through Section 106 funding and 10 as part of larger sustainable transport schemes.

4.4.5) Service 700 Quality Bus Partnership

The City Council has worked with a number of local authorities such as West Sussex, East Sussex and Hampshire County Councils, as well as Portsmouth City Council, to help achieve a step change in passenger transport provision along the south coast.

The aim has been to build on the success of individual bus schemes in Brighton & Hove and elsewhere to achieve improvements in ticketing, branding, information, facilities and services throughout the area with the overall aim of improving accessibility, increasing bus patronage. A formal signed partnership agreement has been put in place.

4.4.6) Rail Passenger Transport

Train use in the South East (and nationally) is growing. Locally, journeys are predominantly made between Portslade-Hove-Brighton and London, and the city council will be seeking ways to further develop the east-west links across Brighton and Hove to Worthing as a further sustainable solution to traffic problems. This will of course only be possible in conjunction with Network Rail and the relevant Train Operating Companies. (TOC's). There are 8 train stations in the city which offer great potential to encourage greater use of rail as a sustainable, quick and reliable form

of transport for some journeys. With the exception of South West trains all operators are electric and is expected that the last remaining diesel trains operating into Brighton from the west will be phased out during the next few years.

- **Access to rail stations**

The City Council has been undertaking a programme of work with the relevant TOCs, funded partly through the LTP, to enhance the 8 local stations across the City to encourage make better use of the rail network. The very first improvements at London Road station led to London Road being named 'Station of the Year' at the National Cycle-Rail Awards. The City Council was also highly commended at those awards for 'Best Local Government Contribution' for its partnership with Network Rail and local Train Operating Companies for delivering cycle parking improvements to Brighton Station. Further, the authority was commended for delivering measures that can be replicated by other authorities.

Overall this work has created disabled access, additional passenger shelters and improved cycle parking with CCTV at London Road Station; additional passenger shelters, seating and cycle storage facilities at Hove Station; and CCTV cameras in the forecourt at Falmer Station. Most recent investment has provided :

- Additional passenger shelters at Portslade Station
- Additional cycle storage facilities at Portslade Station
- Additional cycle storage facilities at Hove Station
- Additional CCTV cameras covering the subway at Falmer Station

Many of these features have assisted the train operator, Southern Railways, in achieving "Secure Station" accreditation for the majority of the eight stations in the city.

Further work has been undertaken to install improved passenger shelters, subway lighting and cycle storage at Aldrington Station, and cycle storage facilities at Preston Park Station. Further plans include enhanced cycle storage facilities at Brighton Station, in conjunction with the wider aspirations of the Station Travel Plan. Funding may be made available towards the opening up an entrance to Brighton Station from Trafalgar Street. It is intended to improve wheelchair access to the eastbound platform at Moulsecoomb Station, through provision of a dropped kerb to the footpath, and improved signing and lighting, and to provide additional passenger seating on all platforms at Hove Station, and to further extend cycle parking provision at Falmer Station. Investigations are currently underway, with Network Rail, into the possibilities of improving disabled access to Preston Park Station. If this proves feasible and affordable, a contribution towards this work will be made from LTP funds.

4.4.8) Car Clubs

The central concept of a car club is to allow people access to a car in their neighbourhood or workplace without having to own it. A car club operator will provide one or more vehicles in a given area which are available for members to hire.

Brighton & Hove has been one of the leading promoters of Car Clubs in the UK, with the Car Club vehicles operating in the city since 2003. There are benefits to users as the overall costs are lower for drivers of low to average mileages compared with personal car ownership. There are wider benefits of a reduction in congestion and pressure on parking due to the reduction in overall vehicle numbers, which also allows access to vehicles for those who might not otherwise be able to afford one. The scheme recognises that in the metropolitan area active people that usually cycle, walk or use public transport may from time to time need timely, short-term access to a car or van for example when moving equipment. There are now two Car Clubs with designated parking operating in the city. There are 70 dedicated vehicles parking bays spread throughout the city and more than a 1,000 registered users. It is recommended that the car clubs investigate alternative fuels such as bio-methane and electrical and consider lighter smaller cars as part of their fleet. It is recommended that eco-driving courses are available to drivers of the club with the aim of reducing fuel costs and emissions whilst increasing mpg.

4.4.9) Powered two wheeler parking (P2W)

The City Council recognises the significance of this increasingly popular component of transport provision. For some routes such as the A259 that are prone to queuing at junctions motorbikes are the quickest way of getting from A to B. Ownership and use of motorcycles and scooters (collectively referred to here as Powered Two-Wheelers) has grown considerably in recent years. There are many reasons for this, but they provide a popular alternative for some people because of overcrowding on public transport or too much congestion on the roads, or difficulty in finding a parking space. The councils further review and assessment has estimated that P2Ws do not contribute more than 3% to roadside Nitrogen Dioxide in the city.

The city council has increased the provision of secure parking at new and existing on-street motorcycle parking bays and in new parking schemes. Due to their light weight many scooters and motorbikes regularly used in the AQMA need not run on petrol. The use of electrically powered scooters is to be encouraged with charging facilities recommended for appropriate major business and home developments in the AQMA.

4.5) Education and public information

4.5.1) Education and campaigns

In pursuit of air quality education and awareness, the council is already involved with a number of schools, universities and local groups for the wider promotion of air quality issues within the city. The aim in this regard is to further develop both the current plans and as well a those in the pipeline.

- **Presentations and lectures.**

For a number of years the council has been part of the teaching curriculum for different courses at the University of Brighton. The students attending the lectures have wide ranging academic interests, from health through to environmental science and chemistry. The purpose of the lectures is to give the students an overview of the council's responsibilities on air quality management as well as provide details on local air quality issues and concerns. Given the large student population in Brighton and Hove this is considered a vital part of public involvement on local air quality issues and it is hoped that similar initiatives will be expanded.

- **School Initiatives**

The Environmental Protection Team has now established strong links with a number of local schools, many of which send students through for work experience days. Further to this the department has worked with two schools (Hove Park and Dorothy Stringer) on local air pollution monitoring projects. The students observe various monitoring surveys including investigation of biological indicators such as lichens. During the past two years the Air Quality Officer has delivered successful presentations to school students, on local air quality as part of their environmental studies. Furthermore discussions are linked to local transport developments and sustainable travel options that may reduce impact on the local environment.

It is recommended that air quality is part if the national curriculum as it is directly relevant to health, human biology, chemistry, geography, physics, and engineering.

CIVITAS (Institute for the Study of Civil Society) School Projects Emission Monitoring Proposal Part I

Balfour Junior will be the fist school to be involved in the emission and ambient air educational project. This summary sets out involvement and responsibilities of the partners. The proposed project is a partnership between; Imperial College, BHCC and Balfour Junior coordinated by Duvas Technologies Ltd. It is primarily funded by CIVITAS with support from the Defra air quality grant.

The main aims of the project are:

- To assess the impact of Walk To School (WTS) week from several perspectives pertaining to personal exposure, vehicle fleet composition and local ambient air quality
- Improved understanding of the effects of transport activity on local air quality through the development and delivery of tailored educational programs for schools
- Raising the consciousness of the environment in school-children, their parents and teachers
- Deployment of novel and innovative techniques for measuring real time local air quality
- Long-term impact assessment studies with view to developing greener local transport initiatives and policies.

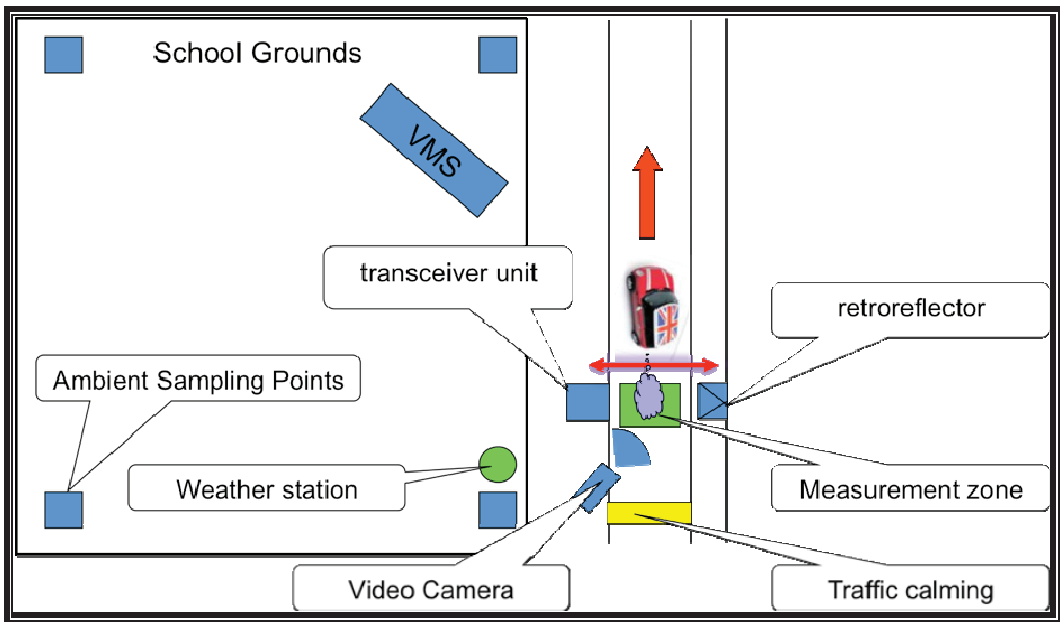
The project will involve the following to meet the above objectives:

Pollution measuring
Data will be collected for a 3 week period before, during and after Walk to School week in October 2010 and if necessary repeated in 2011. Data will be collected during school operation hours (7:00 – 17:00). The pollution measuring systems will be provided by Duvas Technologies. BHCC will provide an engineer to deal with the units at the start and end of the day. Balfour Junior will be responsible for providing a safe place to display the hardware during the day in the school grounds.

Open path real time pollution measurement
Emissions from passing vehicles in close proximity to the school (site to be decided following a site visit) will be monitored and the data will be displayed in the schoolyard dynamically through Variable Message Signs. The way in which this data will be displayed will be decided at a later stage between the partners. The analysis will identify vehicle age, type and engine size and match it with the emissions data. For this reason video footage of traffic activity at the monitoring point will also be captured during trials. Once vehicle type is obtained, registration details will be deleted as part of the (data protection) process and vehicle emission date will be confidential.

Ambient Air quality measurement
State of the art breakthrough technology will be trialled to enable data gathering on personal exposure. This technology is able to measure very short (up to one second) changes in ambient air quality.

Figure 9 CIVITAS education project proposed pollution monitoring equipment layout



Educational element

In advance of the 3 week data collection the school will receive a tailor-made educational programme as follows:

- Balfour Junior will become part of the OPAL project and receive help and support in from OPAL. This will involve distribution of study packs for school children such as monitoring kits and specific activities that centre on collecting and analysing environmental data
- An OPAL community scientist will visit and work with the school in delivering the tailor made work shop on the impact of air pollution
- A group of students (anticipated to be 30-35 students) will visit Imperial College's Reach Out Lab. This visit will be organised by Imperial College and transport and related costs will be funded by the project

Evaluation and dissemination of data

Reports would be compiled jointly by Imperial with input from the Schools and BHCC where necessary. The data collected will at the very least allow a qualitative understanding of the impact of WTS week from various perspectives (as previously mentioned) i.e. driver habits, local ambient air quality and personal exposure.

It is attended that the project will evaluate effectiveness of the education on the pupils – particularly in respect of how they now view pollution related issues and whether their interests in this area have increased. Interim reports will be written after the deployment at Balfour Junior to evaluate the first phase for the project before it is tried at other schools in Brighton.

- **Other Council School projects Campaigns and events**

Given the links between air quality and transport, much of this work will involve linking in with existing campaigns in the transport strategy. This work includes the development of travel plans, road safety information and behaviour change and sustainable transport information.

One such campaign which has been very successful in the past is the 'In town without my car day'. Environmental Health has linked in with this by setting up monitoring equipment in town and providing the public with information on local air quality issues.

4.5.2) Air Alert message service.

airALERT is a telephone and text service which vulnerable members of the public can sign up to. The free service informs the individual when air quality is forecast to be moderate or high. They can then make informed choices on their activities for that day. The project is being run by SAQP and the Environmental Research Group (ERG), part of Kings College at the University of London. The service is to be linked to the councils air quality pages to be updated in late 2010.

4.5.3) Travel behaviour change, education and road safety

Education on travel options and road safety play a vital part in maximising the benefits of the measures detailed in this AQAP. This helps public awareness of all the safe transport options available for travelling around the city. The more informed the public is on travel modes and road safety information, the greater the likelihood of positive impacts on pollution reduction as usage of alternative ways of getting around is likely to increase.

- **Road Safety Engineering Plan (RSEP)**

As part of the councils RSEP, works are prioritised based on reducing casualties, especially at locations where people are killed or seriously injured. Measures include:

- enhanced pedestrian crossing facilities
- improved road line and junction markings and signage
- changes of priority at junctions and accompanying measures e.g. mini-roundabouts
- programme for installation and removal of temporary speed and hazard warning signs on routes that meet the criteria approved by the City Council.
- traffic calming facilities

The RSEP is supported by the following programmes:

- **Road Safety Education and Training Programmes**

These include:

- Bikeability training (formerly known as cycling proficiency)
- Child Pedestrian Training Programme
- resource provisions to schools to enable teachers to incorporate road safety and risk assessment elements within the curriculum

Of these initiatives, Bikelability is considered to be particularly key.

The City Council's dedicated paid instructors have trained some 1,300 pupils annually. This is crucial to ensuring children have the knowledge required for them to cycle with confidence and in a safe manner. From 2008/09, Year 5 and Year 6 Bike It pupils are now provided with free Bikeability Training. All cycle training offered by the city council is now Bikeability. The Council has been successful in securing the services of a dedicated; "Bike It" Officer from Sustrans, who has worked with at least 12 schools each year. This Officer has a budget for engineering and promotional incentives. Secure, sheltered cycle parking, bike breakfasts, 'Bring Your Bike' events, and dedicated maps are just some of the measures used to date. The enthusiasm generated by the Bike It Officer in the target schools, has had a remarkable impact on the number of children cycling to school.

- **Safer Routes to School**

The Safer Routes to School programme focuses safety engineering measures around a school or group of schools to improve Road Safety around the school and encourage children and their parents to walk or cycle to school. These measures will also benefit the wider local community and encourage local people away from private car use.

4.5.4) Journey on Transport campaign and website

In 2006/07, the City Council began an extensive transport marketing campaign to support the overall approach to transport and road safety and improve the general public's understanding of transport problems and what can be done to solve them (including changing behaviour). This approach stems from the success of other established campaigns applied to road safety (notably drink-driving and seat belt use). It helps to maximise awareness of the city's sustainable transport strategy and demonstrate that all schemes and changes in travel behaviour contribute to the strategy.

Evidence from a number of studies across the UK suggest behavioural change is more likely when peoples life change for some reason for example; they move house, get a

new job, start a college course, retire, end a relationship, start a relationship, become a parent, children leave home and so on. At this stage in life people are more likely to change their routine travel patterns. As a collective this is the cities opportunity to switch to more healthy and sustainable modes of transport especially for journeys that start and end in the city.

The first step of the campaign were about raising awareness of the options available for sustainable travel around the city, by providing an opportunity to make different choices by supplying up to date and useful information through a journey planning website. This is supported by more traditional media, which promote the website and sustainable transport messages. The "journey on" website allows visitors, businesses and residents the opportunity to plan their route into or across the city, with interactive mapping and directions for multiple modes of transport.

Additional initiatives have included:

A Blogger's Competition where six people were selected to write a weekly 'blog' about how they would keep to their transport resolution. Visitors to the website were invited to read the blogs and vote for their favorite, every week. Over a period of six weeks one 'blogger' a week was voted off. The remaining blogger then received a pair of shoes and the final winner won a total of six pairs of shoes!
6 bloggers posted 64 blogs in total (average approx 300 words per blog). Over the six weeks of the competition, the website received over 8,000 unique visits with many of these as returning visitors. 230 comments were posted on the site in response to the blogs.

Car Free Days during which residents and visitors moved freely around roads closed to traffic for a free public event called 'streets for people'. In the 2007 event music and family entertainment were provided and businesses were invited to put out tables and chairs to use the streets to create a café atmosphere. Tarmac turned to turf when an area of road was covered in artificial turf to create a village green in the centre of the city.

During 2008, a free outdoor event on bikes formed part of Brighton Festival's outdoor programme. The JourneyOn campaign provided a free 'Bike Doctor' for residents to have their bikes checked and serviced when they come along to performances.

Also for cyclists, free bike breakfasts during Bike Week were organised for cyclists who commute to work by bike! At various locations in the city there was musical entertainment, a healthy snack and drink to all those who arrive by bike.

4.5.5) Public information sources

The aim is to expand (in terms of both detail and public access) the existing promotional information as well as develop further options.

The council's air quality website requires revision and updates in order to reflect the Further Review and Assessment work carried out by the council since 2008. Through

the AQAP more detailed information and links will be available for informing the public on both transport options and air quality issues within the city.

4.5.6) Website development

The council presently has an air quality section on the website (www.brighton-hove.gov.uk/cityairwatch) which contains detail and information on all the work that is carried out by the council in terms of LAQM. Dissemination of information is part of the AQAP. This includes:

- The most up to date LAQM Further review and assessment reports
- Details on all pollutants including sources and health effects
- What's new section: informing the public of the latest air quality issues.
- Links to many other relevant air quality websites including Air Alert and Sussex Air

The website was voted as the third best local authority website in the county in 2005 by Air Quality Management Magazine. That said going beyond 2010 further updates are required to better present all the air quality investigations carried out since that time. The councils understanding of air quality and pollution geography continues to improve since the first AQMA declaration in 2004. The intention is to expand the website to include a section on air quality action planning and specifically what's happening in Brighton and Hove. Having the air quality reports on the website is a vital part of the on going consultation process which will encourage public involvement. Details of comments will be included in future AQAP progress reports.

The council has its weather station. However with better quality assured data from the Meterological Office and other local organisations such as the University of Sussex and the Environment Agency this facility is not longer deemed to be a priority.

As described in Section 4.3.14, the council now has a city transport website for providing the public with details of travel options within the city as well as real time bus information.

4.5.7) Air quality forecasts and bulletin.

This service has now been replaced by Air Alert. At the SAQP, Sussex Air website the public can downloadable pollution concentrations data either compared to the objective or any preferred period of time chosen for example a graph for daily or monthly concentrations.

4.6) Emissions reduction

4.6.1) Roadside Emissions Testing (RET)

Through the provisions of the Environment Act 1995 roadside emissions testing has been extended from the Vehicle Inspectorate to any local authority declaring an Air Quality Management Area (AQMA). The original funding, which has since been ceased by the Department for Transport provided local authorities with the opportunity to test vehicles driving in an AQMA, under the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002. The general aims of the emissions testing were to establish compliance with the MOT standards, and to raise public awareness of the issues concerning polluting vehicles. Targeting specific vehicles during testing could increase the identification of high-emitting vehicles. It is recommended that the MOT test include a standard for NO_x and particulate.

The National Society for Clean Air (NSCA) concluded the following:

a.) During the period 2002 to 2004, approximately 25,196 roadside emission tests were undertaken through local authority activities. RET has been operated in very different ways across the UK, with a surprisingly wide range of experiences and results. For most local authorities, it has been a useful and positive initiative. As requirements to meet air quality objectives become more demanding, RET remains one of the few direct control options available to local authorities.

b.) The relatively small number of vehicles which are identified as polluting, and subsequently rectified, is unlikely to result in a measurable contribution to air quality improvement. However from a wider perspective of public information, through its deterrent effect, RET may be playing a useful role within air quality action plans. Some authorities ran very effective and wide-reaching information campaigns linked to RET. Authorities are divided on the question of whether such action is cost effective compared to other air quality measures currently being considered by Defra and local authorities.

Environmental Protection UK (Formerly National Society for Clean Air NSCA) recommendations:

1. RET should remain an option for local authorities wishing to tackle air quality and increase public awareness of air pollution issues.

2. Consideration should be given to continuing central funding for RET programs where they can be demonstrated to have a worthwhile impact on air quality and/or public awareness.

3. Local authorities and VOSA should collaborate in targeting air quality areas of exceedence.

4. Where defective vehicles are identified, owners should be required to provide evidence of rectification and retest.

5. Taxis are a particularly polluting sector. Local authorities need to use their licensing powers to encourage modern, clean taxi fleet. Consideration should also be given to more frequent MOT testing for taxis.

6. Guidance should be developed to help RET target the more polluting types of vehicles. Further research on the range of discrepancy between vehicles of the same age or size would also be helpful.

7. Further work on the relationship between in-service testing and overall air quality objectives is needed.

Brighton and Hove City Council will investigate the possibility of undertaking RET as part of the AQAP, however issues with funding need to be considering in more detail.

4.6.2) Promote cleaner fuel use

- **Energy Saving Trust (EST)**

The work with the EST was to target local employers such as the City Council, NHS Trusts, the Police and a number of private sector employers to promote cleaner fuel options for their vehicle fleets, and along with the work within LTP to develop sustainable travel plans. Unfortunately Central Government has previously scrapped some of the schemes funded through the EST. In light of this the council will now be liaising with the trust on options currently available and how they can assist the Brighton and Hove AQAP. Details on this will be reported in the annual progress reports.

- **Low Emission Strategy (LES)**

London and Brighton were the first cities in the UK to provide kerbside electrical charging points for vehicles. These initiatives are likely to be useful for both companies and private individuals in combination with home and work-place charging points. The Sussex Low Emission Strategy (LES) encourages the accelerated uptake of alternative fuels most especially bio-methane and electrically fuelled vehicles by way of the planning process[8], developer contribution, business fleet procurement and government incentives[9]. In London electrical vehicles are exempt from the congestion charge. In all areas the vehicles are exempt from road tax and in some boroughs parking and electrical charging are free and car insurance falls in the lowest-price bracket. Gatwick Airport has installed a number of charging points at both terminals and want to promote this to potential users around the South East. Four hours worth of parking and charging is being offered free for a year.

[8] Details of comprehensive support for air quality in the cities core strategy and planning policy are given in section 3.3.
[9] Link to the Low Emission Strategy http://www.lowemissionstrategies.org/

Such vehicles have no emission from an exhaust pipe. There is £5,000 government grant available for purchase of new electrical vehicles. Alternative fuel strategy for vehicles should be coupled with a policy to reduce the need to travel. Businesses must adapt to home working and encourage walking and cycling. From 2011 onwards it is recommended that in order to save fuel consumption and emissions there is preference for cars commonly used in the urban centre to weight less than <1100 kg for four seats and <700 kg for two passengers and this requirement does need to compromise safety or performance. When coupled with alternative fuels this measure is likely to benefit air quality far more than simply switching to the latest diesel emission category.

Further information of how the LES will be adopted in existing planning policy and strategic planning guidance (SPD) is included in the appendix.

- **Buses and strategy discussion**

Local bus companies have been successful in increasing bus patronage in Brighton for sixteen out of the last seventeen years. .Our best dispersion model estimations indicate that diesel buses (with 5% bio-fuel blend) contribute 32% to ambient NO_2 on Lewes Road and 59% on North Street. On Brighton's main-routes the bus contribution to local air quality is generally more than in London; where it is typically 25%[14]. The bus contribution to ambient Nitrogen Dioxide as a fraction of total traffic impact varies, with a maximum estimated to be 75%. 1,400 buses a day are counted on Lewes Road and 3,500 on North Street; equal to one of the highest constant bus flows in the UK. The bus contribution to variable ambient Nitrogen Dioxide is highest along the North Street-Western Road corridor, Oxford Street and St James Street. That said other locations in the BHCC AQMA such as Viaduct Road-East and Hollingdean Road (east of the railway) do exceed the NO_2 limit value and the contribution from buses is negligible. In these cases the main contributors are lorries, cars and vans.

Despite exhaust abatement technology such as Selective Catalytic Reduction (SCR), the diesel engines that we can foresee (next decade) are unlikely to deliver the necessary NO_x emission improvement required in order to mitigate the roadside NO_2 problem. Recent evidence suggests little or no improvement in real drive cycle emission of NO and NO_2 from diesel engines during the past fifteen years up to

Euro-V[10]. In certain priority streetscapes a policy that leads to an increase the number of diesel vehicles, including buses is not likely to benefit or improve air quality adjacent to the roadside.

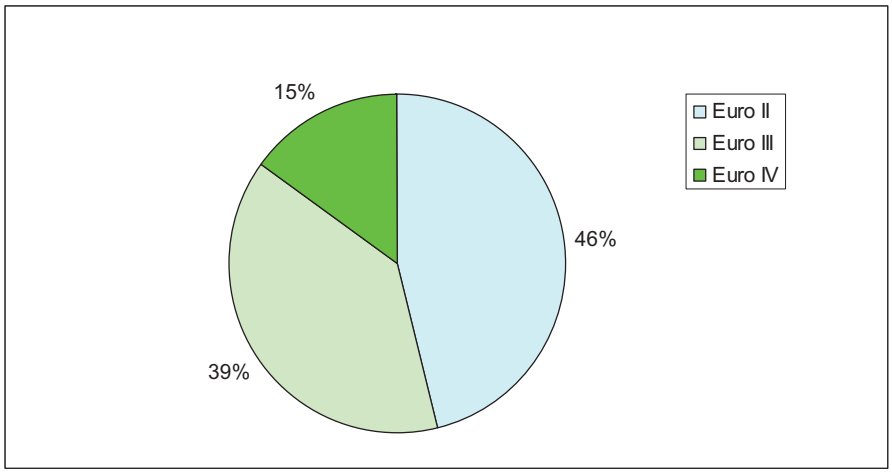
Brighton and Hove buses make up the majority of operating passenger vehicles in Brighton with other operators including; Stagecoach, the Yellow Lemon and National Express. Brighton and Hove buses have successfully phased out pre-Euro II emissions category vehicles (sold in the EC prior to 1996). The city has a modern bus fleet compared to many areas in the UK, although a direct comparison with the national emissions inventory beyond 2011 suggests that other cities for example Cambridge will catch up with the investment example previously set by Brighton. A local advantage is the high use and mileage of Brighton's bus fleet has allowed for reasonably rapid turnover of the fleet.

Air Quality dispersion model prediction (presented in the 2010-FRA) are based on the latest available national emission factors. Beyond 2010 the emissions inventory is less certain as it makes assumptions that vehicles will become cleaner. In practise the investment in cleaner vehicles may not happen as soon as previously predicted across the EU partly due to private and public sector deficits and fiscal cuts.

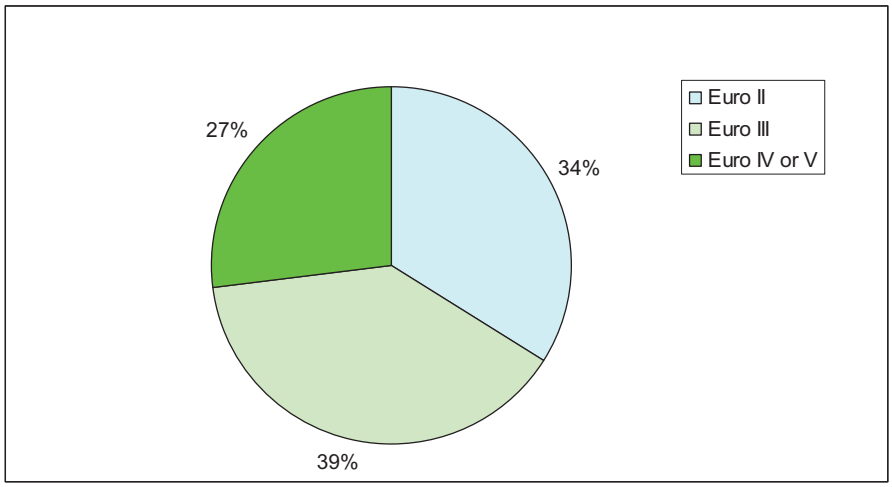
Current EU Directorates dictate that all new purchased vehicles must be compliant to the latest Euro emissions standard. In recent years the development of the Brighton and Hove bus fleet through the Bus Quality Partnership has been ahead of the minimum emission standards and the average age of the fleet has remained below its target of eight years. The break down in terms of emission standards for Brighton and Hove buses is as follows:

[10] Trends in NO_x and NO_2 emissions and ambient measurements in the UK, March 2011 http://uk-air.defra.gov.uk/reports/cat05/1103041401_110303_Draft_NOx_NO2_trends_report.pdf

Brighton and Hove Buses Euro Category proportions 2008/09



Brighton and Hove Buses Euro Categories Estimation for 2012/13



Meeting the latest and future Euro emissions standards and keeping the average age of the bus fleet less than eight years old, is no guarantee of compliance with the ambient NO_2 objective. Outdoor urban NO_2 concentrations are influenced by:

- The number of heavy vehicles including; buses, coaches and lorries
- The number of light vehicles including; cars, taxis, vans and motorbikes (the contribution from motorbikes is estimated to be always below 3%)
- The Urban background concentration (which is the sum or regional-rural concentrations plus the contribution from sources other than traffic; light industry, property heating, kitchens ect)
- The proximity of buildings adjacent to the road

It is probable that there will continue to be exceedence of the NO_2 annual mean objective where large numbers of buses (more than 1,000 a day) pass closely (within 10-15 m) of the building facade. Narrow and tall street canyons such as St James Street (11 m wide) have capacity for fewer buses before exceeding the NO_2 objective

(AQO) compared with wide boulevards such as western New Church Road, Hove; which does not exceed the AQO. The two examples have very similar daily counts of the same types of buses and the later has approximately ten times the total traffic flow.

As previously discussed the comparatively higher emission rates of heavy vehicles will be significantly worsened by the stop, start congested traffic patterns that can occur in and around the AQMA. Therefore the smoothing of traffic flow by improving the road network and reducing the reliance on private vehicles will bring about improvements. The 9-litre engines on board buses are similar to those used in lorries for long distance freeway driving. Therefore it is recommended that the bus engines are finely tuned to the stop-start drive cycles that they are expected to perform which includes pulling laden weight from a standing start on a regular basis and accelerating up slopes on some routes.

Brighton and Hove Bus and Coach Company have a strict idling policy which they enforce on drivers. The most modern buses automatically switch off their engines when stopping at terminus points along the route. Manual override or failure to comply with this is considered a disciplinary offence. That said a peak in emissions is more likely as the bus pulls away from the bus stop or accelerates.

It is estimated that at busy centres buses spend 30% of a route circuit-time issuing paper tickets. Smart tickets (combined with train) such as *Oyster*, credit card swipe or imbedded chip and pin could slash bus waiting and idling times[11]. Potentially the technology could reduce route travel and the number of buses required on a route without compromising capacity. This measure scores highly on emission reduction and cost benefit analysis.

[11] Go Ahead Group Corporate Responsibility Report 2010
http://www.investis.com/goahead/docs/cr-2010.pdf

Table 5 compares the weight of various vehicles and divides loaded weight by the number of passengers the vehicles can safely carry. It demonstrates how when fully used buses can perform well in terms of emission per passenger km[12]. Managing all vehicles (passenger and freight) so they are not driving at partial capacity is of the upmost importance going forward. It is advised that computer software is employed to optimise vehicle utilisation in order to reduce the number of journeys required in the city.

Table 5 Comparison of Vehicle weights Vs Passenger numbers

Vehicle	Empty weight (Kg)	Loaded Weight	Capacity or max people carried	Vehicle Weight / number of passengers			Empty weight as percent of Full
				Driver only	Half Load	Max Load	
T25 Prototype	550	775	3	625	442	258	71%
Smart Car	730	880	2	805	562	440	83%
Mini Car	1100	1400	4	1175	625	350	79%
Standard Car	1800	2175	5	1875	795	435	83%
Hackney Cab	2500	2950	6	2575	908	492	85%
Sports Utility Vehicle	3200	3575	5	3275	1355	715	90%
Single Decker Bus	9000	13500	56	9075	396	236	68%
Double Decker Bus	11800	17800	80	11875	370	223	66%

Average person assumed to be 75 kg. All weights in kg.

It has been discussed how fuel demand is greater for heavy vehicles and combustion demand and fuel burned are major factors in NO_x emission. Improvements in internal combustion engine efficiency can drive down carbon and particulate emission to an optimum, but the final percentage gains are likely to be expensive to engineer.

Diesel price has increased 230% since 1999. Recent cost increases are more closely related to rises in crude oil price and UK diesel refining capacity than rises in tax[13]. Similar or steeper increases during the next decade will severely compromise the growth and viability of many businesses. UK oil refineries are not configured to supply the increased total home demand for diesel so surplus requirement is imported (hence the growing difference in diesel and petrol price). As fossil fuel is finite and global demand is rising very sharply reducing UK fuel demand is essential for national security.

It is recommended that going forward buses are not replaced when they reach a certain age but instead those with the highest real world emissions are phased out.

During real drive-cycles the latest diesel engines continue to contribute to ambient NO_2 and fine particulate. Improvements to the internal combustion engine and exhaust abatement technology such as SCR (selective catalytic reduction) are unlikely to be sufficient to mitigate NO_2 at worse-case roadside locations in urban centres.

[12] Brighton and Hove buses Corporate Responsibility Report 2009
http://www.buses.co.uk/pdfs/BrightonHoveCorporateResponsibility.pdf

[13] House of Commons Library, Social and General Statistics; Diesel and Petrol Prices, April 2011
http://www.parliament.uk/briefingpapers/commons/lib/research/briefings/snsg-04712.pdf

Vehicle manufactures are strongly advised to engineer lighter chassis weights (double-decker bus weights have actually increased by 48% since the route-master). The bus companies must do more to implement renewable fuels such as; hybrid, hydrogen-cell and bio-methane. London examples cite hybrid buses as 40% more efficient than conventional buses[14]. Given the large numbers of passengers now successfully transported in accordance with examples set by the rail network the best environmental option is for main-routes must be electrification. This could be a, trolley bus or cable car. The centralised supply should be from a renewable grid source such as the planned Sussex offshore wind farm[15]. Vehicles on this main-line system would have no tail-pipe emissions. This measure requires infrastructure investment, but it would be especially beneficial for the urban realm, city well being and local air quality in the AQMA. The measure is supported by LA21 and the government's policy to decarbonise the economy and create growth and jobs in emerging sectors.

- **Taxi's (inc. Private Hire and Hackey Carriage)**

Taxis are recognised as a key component in the City Council's transport solution, and facilities are gradually being improved towards their greater use. The City Council has now provided new waiting facilities at key ranks and are encouraging taxi operators to invest in new vehicles including wheelchair accessible taxis.

The introduction of bus lanes to ease the flow of public transport through congested areas of the city has helped improve the flow of buses and taxis. From their inception, any licensed hackney carriage or private hire vehicle has been permitted to use the lanes and that has undoubtedly contributed to quicker and cheaper taxi journeys within the city. This will therefore reduce the impact of the local taxi fleet on congestion and emissions. Hackney Carriage drivers are required by local by-laws to return to the ranks when they are not on call. As with buses engines should be switched off when waiting from example at the taxi ranks outside the station and at East street.

The council ensures through licensing conditions that older vehicles are not permitted to operate within the city, with no new licensed taxi's being more than 5 years old and no re-licensed taxis being more than 10 years old. However NO_x emission reductions from switching to new diesel vehicles are likely to be limited. Unlike the 2010 London Strategy it is recommended that in the future low emission vehicles can continue beyond their age limit. Taxi policy should evolve away from age limits and adopt real incentives for lighter vehicles, low NO_X, particulate and CO_2 emissions and alternative fuels. It is hoped that in the long-term this will save drivers money and arrest the trend in their diminishing profit margins.

To improve emissions, options for introducing LPG upgrades to the local taxi fleet

[14] The London Mayor' Air Quality Strategy, December 2010
http://www.london.gov.uk/publication/mayors-air-quality-strategy

[15] E.ON welcomes award of South Coast Round 3 offshore wind farm zone, January 2010
http://pressreleases.eon-uk.com/blogs/eonukpressreleases/archive/2010/01/08/1481.aspx

have recently been considered. However this was not deemed to be a viable option at the time due to issues of costs, reliability and lost storage space. London Borough of Camden has successful examples of financial incentives for converting licensed hackney carriage to cleaner fuels and funding for similar initiatives should be investigated further. In the future larger mini-bus taxis with wheelchair provision should be complemented with smaller lighter cars licensed to carry two or three passengers. Electrical vehicles, Hybrid petrol and bio-methane fuelled vehicles should be considered as viable alternatives to diesel. As in London it is suggested that taxi drivers attend an eco-driving course with the aim of reducing emissions fuel demand and costs.

- **Cut engine cut pollution signs**

West Sussex County Council commissioned a study into the feasibility and effectiveness of erecting signs at levels crossings to encourage drivers to switch off their engines whilst waiting. A design was agreed with other authorities in Sussex (including Brighton and Hove City Council) as well as the neighbouring county of Surrey. It was considered that having a single design would be potentially more effective as it would be instantly recognisable over a wider area.

Research to date suggests that the signs continue to be effective even after their first inception. The council will investigate options to further promote this measure to other areas, such as drop off points at stations and public places. This could be implemented in line with the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002, or as part of a road side emissions testing program.

4.7) Congestion management

4.7.1) Freight and distribution.

The source apportionment results from dispersion modelling included in the Further Review and Assessment 2007 and 2010 show that HGV's (Heavy Goods Vehicles i.e. rigid and articulated lorries) contribute significantly to NO_x emissions and ambient roadside concentration. At many roadside locations in Brighton approximately a quarter to a third of the total roadside NO_2 is derived from heavy goods vehicles plus up to 11% from light (<3,5 t) commercial vehicles such as vans. Older heavy vehicles built prior to the mid-1990s contribute disproportionately to these sub-totals. Further

information is presented in the council's 2010 air quality Further Review and Assessment.

There are now approximately 200 Low Emissions Zones (LEZ) in the EU. The Greater London LEZ only allows HGVs that are compliant with the more recent, EU emission categories and this is achieved either by buying new vehicles or retrofitting older lorries with the necessary abatement technology. In the case of London this policy is largely justified on grounds of roadside air quality. The cost of the LEZ tends to fall more heavily on smaller businesses as larger haulage companies and retailers are more likely to replace their vehicle stock on a more regular basis. In Brighton management of freight and distribution within the city is of the utmost importance for improving local air quality. However a mechanism based on the Euro emission categories may not be effective in improving local air quality as recent research suggests no real world improvement NO_x emissions from diesels up to Euro-V[10.] Furthermore roadside monitoring ceases to show an improvement in ambient NO_2.

Central to the lifeblood of the city's economy, market forces suggest that the demand for goods in Brighton and Hove will continue to increase in coming years, as the population grows and the economy recovers. The challenge for the City Council is to ensure that the activities and requirements of the freight industry are understood, and that schemes are developed so that freight movements are managed in a more sustainable way. According to a 1995 U.S. Government estimate, the energy cost of carrying one ton of freight a distance of one kilometer averages 337 kJ for water, 221 kJ for rail, 2,000 kJ for trucks[16]. The European Parliament is moving to ensure that charges on heavy-goods vehicles should be based in part on the air and noise pollution they produce and the congestion they cause, according to legislation approved by the Transport Committee[17]. The intention is that a managed approach will not only provide benefits to the freight operators but will also help to achieve environmental, safety and social targets in the city centre. Exert from the defra's Air Quality Action Plan for achievement of EU limit value for NO_2[18].

> 4.13 The UK Government heavily subsidises rail travel, helping to keep fare prices and freight costs down, and thereby encouraging modal shift to rail. In addition, the Government has committed to a number of mode shift grants, designed to encourage freight transport by rail, inland waterway, or sea. The grants have a confirmed combined budget of £20m for 2010/11, and £20m for 2011/12 and the UK Government expects they will help to remove around 1.5 million lorry journeys in that time.

- **Urban Freight Management Plan**

The City Council hopes to develop an Urban Freight Management Plan as part a

[16] Energy Efficiency and the Transport Sector
http://www.eia.gov/emeu/efficiency/ee_ch5.htm
[17] MEPs back polluters pays principal for lorry charges
http://www.europarl.europa.eu/sides/getDoc.do?language=en&type=IM-PRESS&reference=20090209IPR48793
[18] Defra's Air Quality Plan for achievement of EU Air Quality Limit Value for NO_2 in the UK, June 2011
http://www.defra.gov.uk/consult/files/draft-overview-doc.pdf

CIVITAS project . Without pre-empting the outcomes of this analysis, some of the key issues to be reviewed are likely to be:

- Freight demand and capacity on existing and reconfigured routes
- Assessment of the appropriateness of alternative routes for freight
- Locations of businesses whose servicing would be directly affected by new traffic scheme, and any associated changes in traffic volumes
- Assessing opportunities for specific servicing roads, traffic management measures and signage for freight
- Potential conflicts with buses and transport modes on constrained routes

Strategic Freight Working Group

In seeking to achieve a more sustainable approach to the impact of distribution activity on Brighton and Hove, the City Council will develop policies for two distinct types of freight movement:

- Strategic freight issues are associated with the movement of goods between key supply chain nodes such as ports, distribution centres and manufacturing sites. By their very nature, strategic movements tend to be long distance, and therefore the geographical scope of Brighton and Hove Unitary Authority places limits on the extent of influence the City Council can have. However, it is essential to understand the impacts of strategic freight upon the area, and to work with neighbouring authorities to develop co-ordinated policies and targets in this regard. Some of the highest flows of heavy goods vehicles in the area occur along the Wharf Road-Kingsway-Wellington Road-Trafalgar Road link in Portslade. Essentially this is a strategic route for goods travelling from Shoreham port (and associated businesses) to the hinterland. If UK bound freight can be moved by sea to London-Tilbury, Southampton, and other coastal ports instead of overland this should be considered by the freight management plan.

- Local freight issues are those concerned with deliveries and collections that take place within Brighton and Hove, and this is more directly-affected by transport schemes or restrictions implemented by the City Council. The local impacts of freight on businesses, residents and visitors all need to be considered and measures developed that encourage sustainable urban distribution. A key is to reduce surplus capacity by sharing haulage services. It is advised that Larger articulated lorries avoid the central AQMA with distribution centres set up outside. Electrically powered vans could be employed to carry goods into the central retail area.

To ensure that Brighton & Hove sets an agenda for improvements in both strategic and local freight sustainability, the City Council will initiate a Strategic Freight Working

Group (with public and private sector interests including ESCC, WSCC, HA and Industry Representatives).

4.7.2) Decriminalised Parking Enforcement (DPE)

DPE was introduced in 2001, and has helped significantly to improve the flow of traffic on important corridors within the city, particularly along bus routes and at bus stops, where illegal parking can obstruct vehicles result in traffic blockages, further congestion and affect the reliability of services.

- **Residents' Parking Schemes**

As part of Brighton & Hove's measures to address network management, congestion and parking issues, the council has agreed a programme of resident parking scheme consultation and implementation in areas under significant parking pressures. Residents' Parking Schemes (RPSs) have reduced illegal parking in Brighton & Hove but unfortunately this can mean displacement to other areas, often in the form of commuters and a small number of residents from other zones using roads without parking restrictions. Recently, new schemes were introduced in the west of the city, along Hove seafront and up to Old Shoreham Road (Area R and Area W). The introduction of revised and new schemes continues to be preceeded by extensive public consultation.

A further programme for schemes has been agreed by the council, which involve developing and implementing, (if supported after consultation) parking schemes in other areas suffering from parking pressures. These include Preston Park station area, Stanford area around new developments, London Road station area, Area H extension area, Hanover & Elm Grove, and the West Hove-Portslade area.

- **Strategic reviews of on-street parking**

A review of residents' parking schemes found that a number of operational differences within and between schemes were resulting in confusion amongst both drivers and enforcement officers. As a result, in 2006/07, the City Council introduced a simplified approach to parking controls and their enforcement in order to create a fairer and more effective operation for both drivers and enforcement officers.

A complex review of the central Brighton area was also successfully completed, by spring 2007. This involved a thorough re-examination of historic parking zones that had grown up since the 1960s in the most central part of our city. 8 small zones were amalgamated into 2 zones and voucher parking was replaced with pay & display, making parking regulations more simple to understand and easier to use. A major review of Area H, around the Royal Sussex Hospital has also been undertaken.

- **Parking charges**

The strategic review of on-street parking included a rationalised 'zoned' approach to charging in order to simplify the charging structure. Reviewing parking charges helps to maintain a balance between the costs of using the car compared to public transport.

Any significant difference between those costs can be a disincentive to use public transport for some journeys.

4.7.3) Intelligent Transport Systems (ITS)

The role of Intelligent Transport Systems in Brighton & Hove is a key element for supporting the City Council's sustainable transport goals, as well as the economic vitality of the city. While Brighton & Hove is well placed in its development of ITS in the city, there are areas where there could be real benefits in terms of reducing delays and congestion, assisting modal shift and improving traveller information. As such, the authority is continuing the development of ITS in Brighton & Hove, building on the current systems to improve the efficiency of road network management in the city. This will take the form of the following work programmes:

- **SCOOT and UTMC (traffic light management)**

The traffic lights in the main corridors of the city operate under SCOOT (Split Cycle Offset Optimisation Technique) but there is scope for inclusion of further areas in the AQMA:

- **The Queens Road corridor** has two junctions currently controlled by fixed time plans. This is a key corridor for buses linking the city centre to the train station, there is scope for improvement where pedestrians wait to cross North Road whilst continuing along Queens Road

- **Western Road corridor** has two junctions operating independently under normal detectors. The introduction of SCOOT will enable the implementation of bus priority measures here to improve bus punctuality.

- **The Lewes Road corridor** has junctions currently controlled by fixed time plans. This is a major strategic corridor and the introduction of SCOOT here will effect improvements in network performance, enabling the introduction of bus priority and other traffic management measures to reduce congestion i.e. gating of traffic or queue relocation techniques.

  The schemes will optimise the junctions, reducing stops and delays and provide network information; thereby helping to reduce congestion and pollution levels at these locations. Further to this, the City Council will study the possibility of implementing UTMC (Urban Traffic Management Control) outstations. Some of the traffic control equipment within the city is now reaching the end of its expected life and needs to be updated. The development of the UTMC system requires that this equipment meet new performance standards if it is to be integrated with other systems. It is proposed that this be undertaken as part of a rolling programme of replacement.

- **Kingsway by Hove Street** the traffic lights on the A259 have a changing pattern that holds large volumes of eastbound traffic at the light in close proximity to Viceroy House. The AQAP recommends that the light changing phase should be reviewed in order to ease traffic queuing and improve air

quality at this location.

- **York Place (western façade) by St Peters Place** the location has consistently exceeded the AQO since 2004. The AQAP recommends that light phase changes are reviewed in order to ease congestion approaching this junction from the south.

The use of MOVA technology is also increasing and this could be applied at some of the congested junctions.

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- **Real Time Passenger Transport Information (RTPI)**

The RTPI system was implemented in Brighton and Hove at a cost of £2.4 million and has been viewed nationally as a successful implementation of a state-of-the-art system, recognised by the winning of a number of national awards. The major bus operator has also contributed significantly financially and the project has been extended into East Sussex in Eastbourne and the information is expected to extend more widely across the whole of Sussex providing significant cost sharing and integration of public transport networks.

- **Variable Message Signs**

The City Council has invested in a number of traffic information signs to provide visitors and residents with information about their trips within the city, but it is recognised that scope exists to improve the information for people using both local authority routes and those of the Highways Agency (the A23 and A27 Trunk Roads). The City Council is therefore working with the Highways Agency to share information.

The A23 can suffer from problems during the summer months due to the large number of visitors to the city. The interchange of A23/A27 can sometimes become congested causing extensive queuing on the A23. This is a challenge when major events are planned in the city.

That said congestion caused by traffic attracted to Brighton is not likely to contribute

to a calendar-year air quality problem. The frequency and duration of such events is not sufficient enough to influence; the NO_2 winter or annual mean; the most difficult AQO to attain compliance. Long-term average pollution concentrations are influenced by many "mini episodes" above baseline with the most frequent source the every day traffic produced from within the conurbation. The hypothesis that annual NO_2 concentrations are influenced by influxes of summer traffic is not born out by the monitoring record which consistently demonstrated lower concentrations of NO_2 during the summer months compared with the winter.

The introduction of Variable Message Signs (VMS) on the approach to the city – in partnership with the Highways Agency - could provide information on suitable alternative routes into the city, as well as general traffic information to assist drivers. The City Council is therefore seeking to provide one VMS sign and linked static signing on the A23 approaching the city. The Highways Agency has agreed in principle to provide additional funds towards this project, the extent of which is under negotiation.

One option in the AQAP is for SAQP to investigate the possibility of introducing air quality information to the Variable Message Signs to further inform local residents and visitors alike.

- **Journey time analysis**

The use of Automatic Number Plate Recognition (ANPR) camera technology can provide detailed information on the road network. Sussex Police are utilising this technology and there may be scope for partnership working between the police and the City Council to obtain live information on network incidents. The police are looking to introduce cameras in the city for crime and safety purposes and it may be feasible to share the information gathered to establish journey times.

Linking the UTMC open standard database with the information gathered on the network by the police could enable better data collection for future forecasting of the impacts of schemes and journey time on particular roads.

This technology can be utilised to obtain vehicle age information for the city in order to assess future changes to the local vehicle fleet, which can have significant implications for air quality in terms of emissions.

4.7.4) Highway maintenance and the implications for air quality.

In line with the LTP3 Highways Maintenance programme, when maintenance is required, individual sites will continue to be inspected to determine what other neighbouring works can be undertaken concurrently to make the most of the resources, maximise the benefits for the network whilst minimising the impact on road users and congestion and air quality.

Freeze-thaw conditions have undoubtedly caused damage to local roads during the last two winters. Incidence of potholes were common; January-March 2009 and December to February 2010. Strong anecdotal evidence suggests that disruption to

private and public transport as a result of potholes and the associated maintenance to fix them was an issue high on the public's agenda.

The AQAP suggests that selected new road surfaces have a higher durability and drainage specification that enables the road surfaces to better resist freeze-thaw over a number of winters. Such an investment would aim to implement best available techniques and reduce the risk of repeated and costly maintenance which contributes to disruption and congestion. It is suggested that more durable quality road surfaces are prioritised in the AQMA or more specifically road-links that contribute to an exceedence of the AQO.

It is recognised that smoother road surfaces in combination with recommended vehicle tire pressures will, improve vehicular efficiency (increase MPG), thereby reducing fuel consumption and emission of NOx, particulate and CO_2. Furthermore finer grained road surfaces are more attractive to slim-tired road cyclists as a slicker, smoother ride requires less effort. Well drained or porous urban surfaces also help mitigate against the risk of flash flooding and pooling surface water –which can lead to surface freezing. A road without puddles, ice, potholes and surface debris is more practical and safer for small vehicles, motorcyclists and cyclists.

4.7.4)1. Fuel efficient Tire campaign

Drivers can save money and fuel by buying and maintaining better tires. Hi-tech tires can reduce breaking resistance, whilst improving grip and traction performance so propulsion is more effective. In 2012 the EU will launch labelling for all new tires citing ratings for fuel efficiency, durability and noise[19].

4.8) Other local authority air quality work

Prior to the development of the action planning process the city council had a number of measures and practices in place for reducing local air pollution which will continue.

4.8.1) Local Air Pollution Prevention and Control (LAPPC)

The Pollution Prevention Control Act 1999 and PPC Regulations 2000 have been rolled together into the Environmental Permitting Regulations 2010. The council is responsible for authorising the emissions to air, water and land for Part A2 process and emissions to air from Part B processes. Currently in Brighton and Hove there are 42 permits in all as follows:

- 18 dry cleaners,
- 2 crematoria,
- 1 SWOB,
- 2 vehicle sprayers,
- 1 timber works and

[19] Environmental Protection UK; Campaign for Better Tyres, March 2011
http://www.environmental-protection.org.uk/news/detail/?id=2792

- 18 petrol stations

As part of our LAQM responsibilities under the Environmental Act 1995 the council carried out an Updating and Screening Assessment which was submitted to Defra in April 2006 and 2009. With reference to the Defra guidance notes in the online template and TG (09), none of the identified processes were considered to be significantly polluting in terms of the Air Quality Objectives. One of the two crematorium has opted to invest in mercury abatement technology and this will reduce the concentrations of mercury emitted from the chimney stack.

4.8.2) Domestic Smoke Control (SCA)

Under the Clean Air Act 1993, the Local authority has statutory powers to control smoke from domestic and industrial sources. The legislation allows Authorities to create Smoke Control Areas (SCA's) which place restrictions on domestic fuel combustion. The original Clean Air Act 1956 was set up to tackle the urban Pea Souper smog problems which had detrimental heath effects on those living in urban areas up to the early 1950s. Thankfully, the days of sulphurous-particulate smogs are a phenomenon of the past, however the SCA remains in place to minimise the contribution from domestic and industrial sources to background ambient air pollution concentrations. Brighton has five SCA covering the city centre and Bevendean, Hove has none. Interest in burning wood has risen considerably in recent years and this is now a fashionable activity in many homes. In order to burn wood or coal in SCA the owner is legally obliged to fit a defra approved appliance. The more efficient combustion in the appliance is much more likely to destroy fly ash and emissions of carbon monoxide, solid carbon and particulate. BHCC has applied to defra to run an awareness campaign on wood burning and implications relating to the Clean Air Act and SCAs. The council has worked jointly on with Environmental Protection UK on the Biomass and Air Quality Guidance for Local Authorities[20].

4.8.3) Domestic bonfires

Bonfires can cause statutory nuisance in the form of smoke and odour to local residents and result in fine particulates (PM_{10}'s) being released into the air. Therefore controlling these emissions is important in terms of public health, and minimising nuisance.

Under the Environmental Protection Act 1990 the local authority has enforcement powers to mitigate against the problems associated with bonfires which have potential fines of £5000.

The council policy clearly discourages unnecessary bonfires advising that household refuse is collected by the dustman and that bulky and garden refuse can go the Civic Amenity sites at Wilson Avenue, or Leighton Road, Hove. The Council can often help

[20] Biomass and Air Quality Guidance for Local Authorities
http://www.environmental-protection.org.uk/biomass/

those without transport, or the elderly or infirm, by collecting but usually for a charge. However, many things can be recycled and the best example of recycling is the compost heap.

Woody material can be shredded and used for composting or mulching. If people have a lot of woody waste then shredders can be bought or hired and some allotment societies have their own.

In many parts of Brighton, it is not possible to have a bonfire without causing a nuisance because residential areas are high density. However, a bonfire can be a convenient way of getting rid of waste, or for recreational purposes on Guy Fawkes night for instance. If a bonfire is the best practical option for disposing of garden waste, the council states the following guidelines:

- Only burn dry material, for example wood seasoned over two summers (freshly felled timber has a mass that is typically 50% water) logs with higher moisture content do not burn as effectively. This is because the water content effectively smothers oxygen supply and the resulting low temperature, partial burn produces a higher rate of Carbon Monoxide and particulate
- Never burn, rubber tyres or anything containing plastic, foam, creosote or paint
- Do not use old engine oil, meths or petrol to light or encourage the fire
- Avoid lighting a fire in unsuitable weather conditions. Smoke hangs in the air on damp still days and in the evening. If it is windy smoke may be blown into neighbour gardens and across roads, people are more likely to have their windows open on warm days and this can cause neighbour nuisance when smoke ingresses indoors
- Avoid burning at weekends and on bank holidays when people want to enjoy their gardens
- Where possible inform the neighbours of your intention to have a fire. This will give them the opportunity to shut windows, bring in washing etc
- Never leave a fire unattended or leave it to smoulder, low temperature combustion only partially burns the fuel and leads to higher emissions of smoke (unburned fuel as airborne particulates with steam and Volatile Organic Compounds)

4.8.5) Commercial bonfires

Under the duty of care provisions contained within the Environmental Protection Act 1990, the Environment Agency permits only the burning of green waste which has been produced on site and no other materials. However, Brighton and Hove City Council can take enforcement action on any commercial/industrial operations if they cause a statutory smoke nuisance. This action can result in a fine of up to £20,000.

4.8.6) Development control

Effective land use planning and development control are vital for the future development of the city and are key factors in combating current and future impacts of development on congestion and air quality. Section 3.7 details the councils policy on planning and development control.

4.9) Specific measures in light of the findings of the FR&A (2006/07 and 2010)

Certain measures are specifically targeted at directly reducing the emissions impact of buses and lorries such as Freight Management, walking and cycling initiatives. The aim is to improve air quality through congestion avoidance, smoother flow, traffic reduction. For example, reallocation of road space and development will smooth the flow of public transport and reduce overall emissions.

5 Impact assessment

The Defra guidance LAQM. PG (09) sets out a suggested approach for summarising the costs, wider scale effects and air quality impacts so the individual measures can then ranked in terms of priority. Measures with high air quality impacts and low costs tend to be ranked high, however factors such as time scale and uncertainty over funding are also important. The various measures have been summarised to the following tables.

5.1) Air quality benefits.

Before making an assessment as to the potential gains in terms of air quality from the various measures, careful consideration needs to be given to the number uncertainties associated with such assessments. For example reducing traffic levels by the same amount in two different parts of the city is unlikely to yield the same results due to a number of variables such as:

- Traffic composition; the age and type of vehicles and the fuel used
- Driving style for example vehicles tend to accelerate away from corners and junctions, hard accelerating puts the engine in load increasing the rate of emissions
- The gradient on a road; hill climbs require more propulsion, and this increases fuel consumption and the localised emission
- Traffic speed - intermediate speeds have lower emissions than slow speeds
- Distance from source to dwelling – this is the crucial zone in which emissions of pollutant in the gaseous and particulate phase can disperse before they are inhaled, typically emissions are of the order parts per million and ambient concentrations are of the order parts per billion; it is normal for this considerable reduction in concentrations to occur within the first 15 to 20 metres after the release of the emission form the exhaust pipe
- The nature of the streetscape for example a wide boulevard is a very different air quality environment to a narrow street with buildings enclosing the road on both sides
- The prevailing meteorological conditions and the orientation of the street relative to the most common and uncommon wind directions

Assessment of the impacts of various sources and variables can be achieved through dispersion modelling. Many of the measures detailed in the AQAP are generic and target general traffic reduction or transport modal choice across the city as a whole. The worse case localities will require more substantial improvements in vehicular emissions and or reductions in specific vehicle numbers if the residential building line is to comply with short-termNO_2 AQO objectives.

With regard to the more direct measures such as the CTS, the improvement of STCs and modifying traffic-light phase changes to reduce congestion, it is more viable to model the direct effects on local air quality. Therefore based on Defra guidance and the Environmental Protection UK planning guidance (2010) Council has adopted the

following system for ranking the AQ benefits measures in the AQAP or the potentially beneficial or adverse impact of developments in an area:

NEGLIGIBLE or INPERCETABLE CHANGE

Not possible to model the likely impact, any change is imperceptible < 0.4μgm^{-3} = < 1% change to the AQO (NO_2 annual mean)

SMALL OR LOW

Difficult to model, or predict a small change 0.41 to 2μgm^{-3} = 1.1 to 5% of the AQO

MODERATE (1)

Lends itself to modelling the likely impact as a perceptible change 2.1 to 4 μgm^{-3} =5.1% to 10% of the AQO

LARGE or HIGH

Possible to model the change at as significant > 4μgm^{-3} = > 10% of the AQO

The tables will be updated through the annual progress reports as more detailed traffic data becomes available for analytical assessment. In many cases it will not be possible to tease out a quantifiable change of a measure in the AQAP. In practise improvements in air quality are influenced by a complex series of variables. That said the inventory and model can be interrogated in order to estimate the ambient-air contribution from various sources; road traffic and other.

5.2) Costs.

The defra guidance, LAQM.PG (09) states that there are no strict rules on how an assessment of cost-effectiveness should be carried out, only that the authority should take a consistent approach. In doing so the council considered the following:

- what are the over all costs for each measure?

has the measure been developed primarily for improving air quality or for other transport related problems? Actions to improve air quality are more likely to be implemented if other problems are tackled at the same time.

Clearly if a measure has been developed in the AQAP to specifically target air quality, such as RET and the expansion of measures within the LTP to target air quality, then the costs can be directly included in the assessment of cost benefit analyses. However, as many measures have been developed through the LTP the cost assessment is considerably more complex. After consultation with the Action Plan Help Desk, the council identified the following options:

1. include the costs in the assessment of cost-effectiveness for only those measures which require new funding

2. include all costs for AQAP measures in the assessment of cost-effectiveness, but make it clear whether funding has been secured (and through what source)

DfT guidance states that all measures described in the LTP should be developed in line with the four shared priorities for transport - one of which is AQ. Therefore as AQ is one of the main issues behind why the measures have been or are being developed, the council assessed costs in line with option 2. Adopting this approach has helped to establish the priority of those schemes with respect to AQ. Further to this, as some schemes for Brighton & Hove are still under development this cost-effectiveness assessment may provide greater support for a scheme in terms of justification and priority in the future.

For measures derived through the LTP the costs shown in the tables are taken directly from those given in the former LTP report.

Certain measures included in the AQAP are statutory requirements for the council at present and have been for some time, such as LAPPC, statutory nuisance controls and enforcing SCA's etc. So these measures can be discounted in terms of direct cost implications. Where relevant this is noted in the summary AQAP tables below. Table 5 summarises the current AQAP proposals.

Table 6 2010 Action Plan Progress Summary - six pages below

a.	Local Authority	Table 5 - 2010 Action Plan Progress Summary Brighton and Hove City Council - Page 1								
b.	Title of measure	Walking Network	Pedestrian Signage	Cycle freeways	Cycle Signage	Walking/Cycling facilities rolling program	Pool Valley Coach Station	Urban Realm Developments	Real Time Passenger Transport Information (RTPTI)	Kick Start
c.	Summary	Phase 1included improvements along the seafront from Middle Street to Black Lion Street also part of the Central Clear zone	Implementation of pedestrian way finding signage and information across the City to inform and advise pedestrians of the quickest and most desirable routes	The scheme proposals include a 1.5 meter cycle lane along the Old Shoreham Road from BASVIC to Hove Park	Upgrading of existing cycle route signage and replacement with time based signage to further encourage cycling	Implementation of small scale cycle and pedestrian measures (drop kerbs, hand rails, cycle parking) to meet demand and address residents requests	New passive diffusion tube NO_2 Monitoring in the vicinity of the Central coach station	Some streets to be pedestrians or traffic movements restricted	See Table 9.2	Bid to central Government for funding to enhance late night bus network, increase in night services in recent years
d.	Has the measure been implemented? (Y/N)	Yes	Yes	N	N	Partially	Yes	Clear zone around East Street		No decision by DfT
e.	When was the measure first implemented?	Jul-09	Aug-09			Oct-09	Jan-10	Jan-10	Jan-10	Not Known
f.	Any updates on progress	Phase 2 is currently underway	Implementation complete	Scheme is likely to begin in mid 2010	Routes audited and sign locations agreed. Due for implementation in early 2010	Majority of dropped kerbs and hand rails installed. On road cycle parking due for implementation early 2010	N	mid-2010 to 2011	Popular with the public and encourages greater bus use	Awaiting decision by DfT
g.	Has the potential impact of the measure on emissions of NOx been quantified quantitatively? (Y/N)	Minor factor potentially influencing a measurable reduction in private traffic in the city centre	N	Minor factor with the potential to take some cars off the road	N	N	n/a	YES monitoring started Jan-2010	n/a	Increase in night time buses likely to have an impact on NO_2 long term concentrations

a.	Local Authority	2010 Action Plan Progress Summary Brighton and Hove City Council - Page 2								
b.	Title of measure	Better access to Rail Stations	Urban Traffic Management Control (UTMC)	Variable Message Signs	City Transport website	Taxi and Bus idling and emissions enforcement	Campaigns and events	Website development	Air Alert	Talks and training
c.	Summary	Joint funding project for additional passenger shelters at Preston Park Station, and additional cycle stands at Hove Station	See Table 9.2	See Table 9.2	Real time bus information	Bus Engines have Automatic Switch off on standing -Brighton & Hove Buses	Walk to School Week, Bike to Work Week, No car Sunday	BHCC Air Quality website requires updates and the 2010; Further Assessment, Action Plan and Progress Report to be linked to the city air website	Sussex air Quality Steering Group Air Alert	Talks by AQ office at Environmental Protection UK, Brighton University, Brighton Cycle Forum, and Council Scrutiny of 20 mph speed limits
d.	Has the measure been implemented? (Y/N)	Coming Soon			Yes	Yes	Yes	n/a		Yes
e.	When was the measure first implemented?				Some years ago	Rolling Programme	Number of years ago	City Air Watch website started several years ago	Air Alert successful for several years and expanded recently	2009-2010
f.	Any updates on progress	Installation Expected 2010			Positive Feedback from the Public		Encourage behavioural change for longer durations than the actual events	Mid-2010	Success over a number of years Positive Feedback from the Public & concept exported to other Counties	n/a
g.	Has the potential impact of the measure on emissions of NOx been quantified quantitatively? (Y/N)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

a.	Local Authority	2010 Action Plan Progress Summary Brighton and Hove City Council - Page 3						
b.	Title of measure	Monitoring and education Schools Project	Smoke Control Area Info	Bonfire policies	LAPPC	Best environmental option for Energy provision	Encourage best available techniques in biomass combustion	Involvement with large planning applications
c.	Summary	CIVITAS monitoring project with Imperial College London interactive with school	SCA partly co-located with AQMA	Log Statutory Nuisance when it occurs, respond to complaints	Mercury abatement project on selected crematorium	Project for conversation of oil fired boilers at schools to be biomass powered at sites outside the AQMA	Onus on developers to install and the most efficient biomass combustion in Brighton. For example; suitable site selection, effective dispersion, fuel feed and particulate filters	Air Quality comments on all major planning applications in AQMA and adjacent
d.	Has the measure been implemented? (Y/N)	Started	Yes		Ongoing with substantial investment	On Hold		Yes
e.	When was the measure first implemented?	May-10			Jan-10	2010 to 2011		2010 to 2011
f.	Any updates on progress	Updates expected 2011			Substantial investment in Best Available Technique abatement technology by the permit holder			Influence on Development Control land use planning; position of residential units, private amenity space and ventilation strategy
g.	Has the potential impact of the measure on emissions of NOx been quantified quantitatively? (Y/N)	n/a	n/a	n/a	n/a	Proposed		n/a

a.	Local Authority	2010 Action Plan Progress Summary Brighton and Hove City Council - Page 4						
b.	Title of measure	Links to sustainability team and climate change	Detailed Emissions Inventory and source apportionment model	A23 Pedestrian & Cycle Scheme	Acceleration in the uptake of Euro-V vehicles amongst the diesel fleet or replacement with alternative fuels	Freight Partnership Initiatives	Electrical Charging Points in the Central AQMA	Priority Car Club parking in the Central AQMA
c.	Summary	Y	YES part of Further Assessment, EMIT and ADMS urban model with approximately 250 City centre road links	Implementation of pedestrian and cycle facilities on the A23 London Road between Carden Avenue and the A23/A27 roundabout	Priority phasing out of Euro III and earlier corporate diesel fleet frequenting the Central AQMA - onus on the Council, bus & coach companies	Sharing of HDV frequenting the Central AQMA	First UK city outside of London to have kerbside electrical car charging points	
d.	Has the measure been implemented? (Y/N)	Yes	Yes	N	Ongoing	Awaiting Decision from Transport Planning, pending funding	Yes	Yes
e.	When was the measure first implemented?	2010 to 2011	2009 to 2011	Feb-10	2010 to 2014	TBC	2009 to 2011	2008 and 2009
f.	Any updates on progress	n/a	n/a	Permission to construct granted and detailed design commenced. Construction to begin Feb 2010	Outlined in the 2010-AQAP	Project replaced by Central Clear Zone 2009/10	Outlined in the 2010-AQAP	Successful and popular with; domestic, corporate and local authority users, shared community use of prime central parking
g.	Has the potential impact of the measure on emissions of NOx been quantified quantitatively? (Y/N)	n/a	n/a	N	Dispersion modelling strongly suggests that diesel-Euro II & III vehicles contribute to an exceedence of the NO_2 AQO in the central AQMA	Source apportionment shows that Heavy Diesel Vehicles are major source of ambient NO2 in a number of areas	N	N

a.	Local Authority	2010 Action Plan Progress Summary - Page 5		
b.	Title of measure	**Low Emission Strategy for Sussex**	**Tree Management and planting initiatives in the AQMA and hotspots**	**Community garden space and avoidance of closed streetscapes such as street canyons and continuous building lines i.e. a green buffer zone to avoid road enclosure**
c.	Summary	Funded initiative for pan-Sussex low emissions	Potential Project with Arboreal department, Lancaster University and Developers	Developers encouraged to create and fund green community space, especially when residential space is proposed in close proximity to slow & busy roads
d.	Has the measure been implemented? (Y/N)	Started	Yet to start	Started
e.	When was the measure first implemented?	Meeting to discuss strategy commenced 2009/10	2010 to 2013	Ongoing for the long-term
f.	Any updates on progress	Only recently started	Not yet started	Some early success where Air Quality Officers have engaged developers at the pre-application stage - best practise example in the AQMA
g.	Has the potential impact of the measure on emissions of NOx been quantified quantitatively? (Y/N)	N	See next box	Trees are a potential sink for ambient pollutants & kerb-side space makes room for effective dispersion of emissions and allows mixing with fresh-air

	Local Authority	2010 Summary of Action Plan Progress Page 6		
b.	Title of measure	Real Time Passenger Transport Information (RTPTI)	Urban Traffic Management Control (UTMC)	Variable Message Signs
c.	Summary	Real time bus information now available for any stop via a text message.	MOVA added to Lewes Rd/Coldean Lane giving a significant reduction in congestion	3 new signs to give motorists traffic information and help prevent unnecessary queues from forming
d.	Has the measure been implemented? (Y/N)	Yes	Yes	Yes
e.	When was the measure first implemented?	June/July 2009	Oct-09	Jan-10
f.	Any updates on progress			
g.	Has the potential impact of the measure on emissions of NOx been quantified quantitatively? (Y/N)	No	No	No

LTP2 AIR QUALITY ACTION PLAN OPTIONS.

General Measure	Specific Project	Description	Authority	Year of start and Timescale	AQ Impact	Costs (£'000s) LTP	Other Impacts	Geographical Target Area	Ranking
ROAD TRANSPORT MEASURES									
Rapid Transport System		Integrated rapid public transport system to link major new and existing developments.	BHCC and Brighton and Hove Bus Co.	2008-2009	HIGH (2)	11,400	Reduce impact of private car use resulting in less noise, congestion and improved road safety.	Targeted at specific road network but will also reduce private vehicle traffic citywide.	1
LR2		Regeneration project for the London Road/Lewes Road area. This will have significant implications of the local road network within the AQMA.	BHCC	Urban capacity study completed, feasibility study underway.	Impact unknown due to early stage of project development	(see Urban Realm Developments)	Reduce congestion and enhance local environment.	Area specific	TBC
Home Zones		Redevelopment of urban areas for traffic calming and increased pedestrianisation.	OPTIONS UNDER REVIEW				Reduced impact of car so improving the local environment. Increased road safety through traffic calming measures.	Area specific	TBC
Year of walking and cycling 2009	Walking Network	Establishing greater links and corridors between 'areas of attraction'	BHCC	2006-2009	MOD (1)	4466	Enhanced accessibility for sustainable traffic modes. Reduced congestion.	City wide	2
	Pedestrian Signage	To give direction/ location and walking time info etc. without relying on traffic signs	BHCC	2006-2009			Enhanced accessibility for sustainable traffic modes. Reduced congestion.	City wide	
	Cycle freeways	a radically enhanced form of on street cycle lane, fully segregated from traffic.	BHCC	2006-2009			Enhanced accessibility for sustainable traffic modes. Reduced congestion.	City wide	
	Cycle Signage	to give cyclists the same level of info on destination as drivers.	BHCC	2006-2009			Enhanced accessibility for sustainable traffic modes. Reduced congestion.	City wide	
	Walking/Cycling facilities rolling program	incremental year on year improvements	BHCC	2006-2009			Enhanced accessibility for sustainable traffic modes. Reduced congestion.	City wide	

Pool Valley Coach Station		Redevelopment of the existing station.	BHCC and National Express coach network.	2006-2007	LOW	1000 (500 from LTP and 500 from other funding)	Reduced congestion and increase in tourism revenue.	Local/Regional/ National	**3**
Urban Realm Developments		Land Use planning developments to promote cycling and walking and improve traffic flow.	BHCC	2006/7	Impact unknown due to early stage of project development	Total for Urban Realm Developments: 5716 (incs 500 from non LTP source)	Reduce congestion and enhance local environment.	Area specific	**TBC**
Valley Gardens Environmental Improvement		Redevelopment of the entire area to reduce congestion and improve traffic flow.	BHCC	2010-2011	HIGH (2)	2,386	Enhanced both access and use of existing urban parkland. Reduced congestion and road safety from rationalised carriageway space/junctions.	Area specific	**1**
Road Safety	**Road safety engineering plan**	to improve crossing facilities, road markings, junction priority and traffic calming.	BHCC	LTP period	LOW	3250 (funding also from other source, 334)	Improved road safety and accessibility. Reduced congestion.	City wide	**3**
	Road safety education and publicity programmes	including targeted training programmes and cycle proficiency.	BHCC	LTP period	LOW	1200	Improved road safety and accessibility. Reduced congestion.	City wide	**3**
Passenger Transport	**Quality Bus Partnership**	Continue to develop in terms of service information and ticket deals. Further develop the sustainable transport corridors.	BHCC and Brighton and Hove Bus Co.	LTP period	further research needed to quantify impacts due to recent developments with respect to direct NO2 emissions.	2870 (also funding from other sources, 1000)	Improved accessibility and journeys. Reduced congestion and improved road safety through enhanced pedestrian facilities.	City wide	**TBC**
	Accessible bus stops	Raised and glowing kerbs to improve access.	BHCC and Brighton and Hove Bus Co.	LTP period	NEG	850	Improved access for the mobility impaired. Encouragement of bus use and reduced congestion.	City wide	**TBC**
	Real Time Passenger Transport Information (RTPTI)	system for informing passengers of bus times so to be expanded to include suburban areas.	BHCC and Brighton and Hove Bus Co.	2006-2009	LOW	240 (also funding from other sources, 40)	Increased accessibility through information. Reduced congestion through increased bus patronage.	City wide	**2**
	Sussex Coastal Fast way	project to achieve a step change in passenger transport along the south coast.	BHCC, WSCC, ESCC, Hampshire County Council and Portsmouth City Council.	major schemes bid in 2008/9	LOW	TBC	Reduced congestion from less reliance on private vehicles.	City wide	**TBC**
	Kick Start	programme to improve the night time bus service for night and shift workers.	BHCC and Brighton and Hove Bus Co.	TBC	NEG	bid submitted	Reduced congestion from less reliance on private vehicles.	City wide	**TBC**

	Passenger Transport	To developed the east - west transport links across the city	BHCC and Brighton and Hove Bus Co.	TBC	LOW	TBC	Reduced congestion and improved journey time.	City wide	**TBC**
	Access to Rail Stations	Programme of accessibility enhancement to promote greater use.	BHCC	2007-2011	LOW	200	Reduced congestion , environmental enhancement and improved security and disability access.	City wide	**2**
Traffic Management (intelligent transport systems)	**SCOOT**	Assess and expand the current SCOOT system to included other areas such as the AQMA and known AQ hotspots.	BHCC	LTP period	MEDIUM (2)	240 (also funding from other sources, 410)	Reduced congestion through improved traffic flow.	Area specific/City wide	**2**
	Urban Traffic Management Control (UTMC)	Development of UTMC out stations	BHCC	2006-2008			Better provision for public transport through greater information. Enhanced improved network efficiency to met with the requirements of the Traffic Management Act.	Area specific/City wide	
	Variable Message Signs	Further develop to possibly include AQ info.	BHCC and Highways Agency	2006-2008	NEG	160 (also funding from other sources, 120)	Visual information allowing public to make informed choices on routes and traffic modes.	Area Specific	**3**
	City Transport website	Develop AQ information within the site.	BHCC	2006-2008	NEG (increasing with greater promotion)	100	Visual information allowing public to make informed choices on routes and traffic modes.	City wide	**3**
Decriminalised Parking Enforcement		Continue to review/develop and enforce both the residents parking and on street parking schemes, including a strategic review of charging.	BHCC	LTP period	HIGH (1)	5000 from parking funding	Reduced congestion from enhanced parking provisions and enforcement. Provides incentive towards sustainable transport modes.	Area specific/City wide	**1**
Urban Freight Management Plan		Assessment of existing and alternative routes, assess opportunities for servicing roads, traffic management and signage for freight. Also consider businesses affected by new traffic schemes.	BHCC, WSCC, ESCC, Highways Agency and industry representatives.	LTP period	MEDIUM (2)	TBC	Reduced congestion and parking problems for freight vehicles.	Targeted at specific road networks.	**TBC**

Travel Behaviour Change	**Transport Campaign**	Implement an extensive transport marketing campaign, including road safety, local transport problems and how behaviour can solve them.	BHCC	LTP period	NEG	500	Improved accessibility through better information regarding transport modes. Reduced congestion from modal shift. Increased road safety.	City wide	**3**
	Personalised Travel Planning.	A community based programme for encouraging alternatives to private vehicle use.	BHCC	LTP period	LOW (increasing with greater promotion)	690	Improved accessibility through better information regarding transport modes. Reduced congestion from modal shift. Increased road safety.	City wide	**3**
	Staff and Business Travel Planning.	Improved travel options for employees of B&HCC and further development of plans for external organisations.	BHCC	LTP period			Improved accessibility through better information regarding transport modes. Reduced congestion from modal shift. Increased road safety.	City wide	
	School Travel Plans	Expand on the 44 LEA schools who are currently implementing plans.	BHCC	LTP period			Improved accessibility through better information regarding transport modes. Reduced congestion from modal shift. Increased road safety.	City wide	
Car Clubs		Develop where possible the existing car clubs to improve the public travel options.	BHCC and TMO	LTP period	NEG (increasing with greater promotion)	50 from grant funding and 80 from TMO subsidy	Improved model option and accessibility for those with out cars. Reduced congestion and parking pressure.	Area Specific	**3**
Powered two-wheelers		Expand the provision of both resident and on street parking provisions.	BHCC	LTP period	NEG	0 from LTP and 25 from parking funding	Improved model option and accessibility for those with out cars. Reduced congestion and parking pressure.	City wide	**3**
Journey Time Analysis		Can be used to assess the age of the local vehicle fleet and enforce LEZ's in the UK.	BHCC	LTP period	N/A	1870	Improves accessibility to public transport	City wide	**N/A**

NON-LTP2 AIR QUALITY ACTION PLAN OPTIONS.

General Measure	Description	Authority	Year of start and Timescale	AQ Impact	Costs	Target Impact	Other Impacts	Link to LTP measures	Geographical Target Area	Ranking
ROAD TRANSPORT MEASURES										
Road side emissions testing	Stop vehicles on highway to inspect engine emissions.	BHCC, Police, SAQSG and VOSA	TBC	NEG	TBC	Enforces emission control and improves the emissions of the local vehicle fleet.	Promotes the issues of local AQ and the AQMA/AQAP		Area Specific	3
Promote cleaner fuel vehicles	Work with local business and employers to increase use of cleaner fuels.	BHCC and the Energy Saving Trust.	TBC	NEG (increasing with greater uptake)	TBC (grant system set up under the Energy Saving Trust)	Improves the emissions of the local vehicle fleet.	Promotes the issues of local AQ and the AQMA/AQAP. Promotes sustainability	Can be developed as part of Business travel plans.	City wide/organisation specific	TBC
Cut Engine Cut Pollution Signage	**OPTIONS FOR EXPANSION UNDER REVIEW.**					Reducing the impact of idling emissions.				TBC
Taxi and Bus idling and emissions enforcement	Continue to enforce local emission conditions and polices.	BHCC and the Brighton and Hove Bus Co.	on going	High (1) - on going impact as condition s are enforced and the bus fleet is renewed.	Not possible to quantify	Reducing the impact of idling emissions.	Promotes sustainable travel use in the city and reduces congestion.	Promotes sustainable travel use in the city and reduces congestion.	City wide	N/A
Campaigns and events	Involvement with sustainable travel campaigns and events such as in town without my car day.	BHCC and local education organisations.	2006 (LTP period)	NEG/INFORMATIVE	TBC	public information	Promotes knowledge and discussion in the community on air quality and transport issues.	Linked to travel and road safety education.	Campaign specific/City wide	3
Leaflets	Detailing LAQM and the AQAP.	BHCC	TBC	NEG/INFORMATIVE	TBA	Inform public and interested bodies of AQAP and LAQM	Promotes knowledge and discussion in the community on air quality.	Can be linked in with the transport campaigns.	City wide	3
Website development	Develop details of AQAP on the councils existing City Airwatch website	BHCC	2006 with on going development.	NEG/INFORMATIVE	officer time	Consultation and inform public and interested bodies of AQAP actions.	Promotes knowledge and discussion in the community on traffic air quality.	web links	City wide	3

AQ Bulletins	Produce daily AQ forecast and monthly graphical displays.	BHCC and local media.	on going (LTP period)	NEG/INFORMATIVE	officer time	public information	Helps people make informed choices on health the transport.		City wide	**3**
Forecasts in local media	OPTIONS UNDER REVIEW.	BHCC and local media.	2006 (LTP Period)	NEG/INFORMATIVE	TBC	public information	Helps people make informed choices on health the transport.		City wide	**3**
Air Alert text se4rvice	Telephone and text service for advising public of poor air quality	SAQSG	pilot project run in 2006 to be further promoted in 2007.	N/A	TBC	public information for public with respiratory health problems.	Promotes education on air quality issues.	N/A	N/A	**N/A**
Talks and training	Talks to local groups/schools universities etc on AQ issues.	BHCC and local education organisations.	on going (LTP period)	NEG/INFORMATIVE	officer time	public information	Improved road safety, increased knowledge on air quality issues and reduced congestion.	Linked to travel and road safety education.	City wide	**3**
School Projects	Work with local schools on AQ projects	BHCC and local education organisations.	2006 (LTP period)	NEG/INFORMATIVE	officer time and some basic scientific equipment costs	Inform schools and parent groups on the impacts of the school run (e.g.) on AQ.	Reduce congestion and improve road safety.	Linked to travel and road safety education.	City wide	**3**
Monitoring and assessment	For fill the statutory requirements for LAQM	BHCC and SAQSG	on going	n/a	in internal budget for statutory work.	Report on local air quality.	Informs the Transport Planning an Development Control processes.	Provides information for the APR's and LTP8 indicator.	City wide	**N/A**
INDUSTRIAL AND DOMESTIC MEASURES										
Smoke Control Area Info	Continue to enforce SCA policies.	BHCC	on going	LOW (domestic air pollution)	on going statutory duties	Smoke control public information within existing SCA's	Reduces the impact on background air pollution levels.	Assists in reducing local pollution levels.	The City has five SCA's declared under the Clean Air Act.	**2**
Bonfire policies	Continue to enforce bonfire policies.	BHCC	on going	LOW (domestic and commercial air pollution)	on going statutory duties	Prevent nuisance and pollution.	Reduces the impact on background air pollution levels.	Assists in reducing local pollution levels.	City wide	**2**
LAPPC	Continue to enforce LAPPC policies.	BHCC	on going	LOW (commercial air pollution)	on going statutory duties	Ensure relevant industrial processes meet emission standards.	Reduces the impact on background air pollution levels.	Assists in reducing local pollution levels.	Industry specific	**2**

Energy use in terms of domestic change initiatives and CHP	Assess the location and impacts of the potential switch to sustainable fuels	BHCC	on going	Difficult to quantify due to variable technology impacts.	officer time	Minimise or eliminate impact from emissions and location assessment.	Potentially positive impact on climate change and CO_2 emissions.	Assists in reducing local pollution levels.	City wide	**N/A**
OTHER MEASURES										
Involvement with large planning applications	Have informed scientific input on the AQ impact of developments.	BHCC	on going	BHCC works with all developers to minimise negative impact and mitigate where necessary.	on going statutory duties	To assess the air quality impact and potential mitigation options of developments.	Reduces the impact on background air pollution levels.	Traffic and pollution closely liked in developments.	Application Specific	**N/A**
Links to sustainability team and climate change	Involve council sustainability and climate change teams with AQAP, given strong links between climate change and air quality.	TBC	2006	N/A	officer time	Develop further understanding of the links between local air quality management and climate change.	Potentially positive impact on climate change and CO_2 emissions.	Requirement of LTP process to assess CO_2/climate change Impact.	City wide	**N/A**
Emissions Inventory	Development of local emissions inventory for LAQM work	BHCC and SAQSG.	2006	N/A	TBC (costs relate to subscription membership of the SAQSG)	Develop an more accurate analytical data set for local emission to assist in dispersion modelling projects and development control.	Could be linked to climate change emissions inventories.	Requirement of LTP process to assess CO_2/climate change Impact.	City wide	**N/A**
Data Monitoring - TRAFFIC	Develop agreed monitoring programme for the purpose assessing future improvements	BHCC	LTP period	N/A	250 (total spent on traffic monitoring for entire LTP)	Assesses improvements in vehicle numbers and model change for LTP/AQAP listed measures.	N/A	Traffic data used for transport planning purposes	City wide	**N/A**
Data Monitoring - AIR QUALITY	Continue and develop where necessary the extensive AQ monitoring network for informing both the public and the LAQM process.	BHCC	LTP period	N/A	on going statutory duties	Assesses actual improvements in annual air pollutant levels to assist in the LTP/AQAP process.	N/A	Provides air quality data for assessing transport measures during life of LTP	City wide	**N/A**

Part 2 2010 Summary of Action Plan Progress

	Local Authority			
b.	**Title of measure**	Real Time Passenger Transport Information (RTPTI)	Urban Traffic Management Control (UTMC)	Variable Message Signs
c.	**Summary**	Real time bus information now available for any stop via a text message.	MOVA added to Lewes Rd/Coldean Lane giving a significant reduction in congestion	3 new signs to give motorists traffic information and help prevent unnecessary queues from forming
d.	**Has the measure been implemented? (Y/N)**	Yes	Yes	Yes
e.	**When was the measure first implemented?**	June/July 2009	Oct-09	Jan-10
f.	**Any updates on progress**			
g.	**Has the potential impact of the measure on emissions of NOx been quantified quantitatively? (Y/N)**	No	No	No

6) Implementation and monitoring

6.1) Implementation of measures

In accordance with the Defra guidance LAQM.PG(09) the council is required to implement an AQAP Progress Report each year. During 2010 the revised action plan following the 2008 AQMA expansion. The FRA (2010) was submitted in parallel with the Review and Assessment Progress Report. Progress on the AQAP was reported in the 2008 LTP2 Progress Report.

In light of the Further Review and Assessment and LTP3 more advanced indicators need to be developed that take account of enduring Nitrogen Dioxide exceedence.

6.3) Timescales for meeting the objectives.

The AQAP and monitoring programme should focus on the worse case exposure location in accordance with the legislation as follows:

"The 2010 Regulations state that sampling points directed at the protection of human health must be sited to provide data on the highest concentrations to which the population is likely to be exposed for a period which is significant in relation to the averaging period of any of the EU limit values".

To this end the council is currently taking proactive step to relocate its continuous analysers to the worse-case streetscapes within the broader AQMA. The long running monitors at Brighton Pavilion and Hove Town Hall demonstrate improvement and year on year compliance with the limit value. These monitoring locations are not the worse case localities for NO_2 in Brighton. Therefore the assets will be better utilised at locations where they can provide new information.

Unless there are major changes to vehicles flow or the type of engines and vehicles employed locally NO_2 exceedence are likely to persist at worse-case façade locations for some years to come. It is probable that the limit value will be exceeded at some roadside façade locations during the period 2011-2015.

6.4) Influence of the Economic Downturn on Air Quality

The economic downturn or "credit crunch" has a number of potential influences on air quality in the city, some adverse and others beneficial. After a continued trend of traffic increase for many years a number of automated traffic counters have recorded a decrease in total traffic numbers since 2007. It is thought that this observation is influenced by both the active measures cited in LTP combined with a slow down in the economy. A notable shift towards cycling & walking can be attributed to both. It is reasonable to assume that a less active retail and construction sectors combined with a less buoyant jobs market will reduce the totals of heavy goods vehicles and cars on the road. Bus-use on the other hand has continued to increase. The buses are fuller than before with less empty seats and in some cases the number of buses on the road has also increased. On the Lewes Road for example an increase in bus patronage can possibly be attributed to the greater demand from students. It is

generally understood that the number of young people (18-30) in full time education tends to increase as a proportion of the total during times of recession. However as student contributions to fees increase from 2013 the demand for places and transport services along Lewes Road could decline.

As cycling, walking and running become more popular, it is plausible that car owners will use their vehicles less often. Car owners with low mileage vehicles are less likely to invest in replacements and this could increase the average age of vehicles sometimes used in the city. Similarly small and medium sized companies with less trade are less likely to replace older vans and trucks and invest in new ones. Predictions on future air quality assume an uptake in newer cleaner vehicles with more efficient combustion technology and lower emissions. In practise this is unlikely to happen at the rate previously predicted. There is an opportunity when the economy recovers to take a substantial step change in vehicle technology and go directly to Euro-VI emission category vehicles in combination with reducing dependence on the internal combustion engine and fossil fuels. In the past the environmental impact of increased traffic flow on the roads has been offset by the improvements in vehicle technology. This can not be sustained without further innovation and behavioural change.

6.5) Air quality monitoring surveys

Air quality monitoring takes place at a number of locations around the city of Brighton & Hove using passive diffusion, gravimetric and continuous methods. The council currently has five continuous analysers.

Further details on the these monitoring surveys and associated data is given in the 2010 Progress Report and will be updated annually through the Review and Assessment Progress reporting process.

6.4.1) Quality Control/Quality Assurance

AURN Sites

All AURN (UK Auotmatic Urban Rural Monitoring Netwrork)-affiliated sites/analysers are subject to the quality assurance/quality control objectives set out in the Netcen site operators manual.

B&HCC sites

All remaining continuous analyser sites not covered by the AURN are subject to the following QA/QC procedures.

- Overnight 24hr IZS calibration checks
- fourth weekly manual zero/span calibration using certified cylinders.
- Full data analyses and ratification through ERG (Environmental Research Group)

- Six monthly audits by National Physical Laboratory and bi-annual service visits carried out by the maintenance contractor

Diffusion tube surveys

- NO_2 and VOC diffusion tubes are supplied and analysed by Bristol Scientific Services

- All diffusion tube results from 2001-2009 are subject to a triplicate chemiluminescent collocation bias correction factor. (Hove Roadside AURN) and the council aims to introduce further roadside co-located triplicates for bias correction

6.6) Traffic/transport monitoring surveys

Transport monitoring is required for both local dispersion modeling and to assess the progress made towards meeting former LTP2 targets, especially those relevant to the AQMA and throughout Brighton & Hove as whole. There are a number of different programmes of transport surveys that are carried out regularly or periodically. These include Permanent Automatic Traffic Counts with inner and outer city cordan and scheme specific surveys. To supplement the automatic surveys the Environmental Protection team has commissioned additional manual counts to fill in any gaps in the AQMA. Further details are outlined in the FRA (2010).

6.7) The next steps in LAQM for Brighton & Hove

- **Particulates (PM_{10})**

Given that the monitoring data and some of the modelling results for PM_{10} show that there are areas close to the 2004 PM_{10} 24 hr AQO, the council commits to under taking further monitoring within the city, further information is given in the 2010 AQ Progress Report.

7) Consultation

Following initial consultation with transport planning and planning departments the action plan went through a twelve week consultation ending January 2011.

7.1) Statutory consultees.

The Defra policy guidance sets out all the statutory organisations which must be consulted on as part of the AQAP consultation process. For Brighton they are:

- The Secretary of State
- The Environment Agency
- The highways authority (in English authorities only)
- All neighbouring local authorities; (Mid-Sussex, Worthing-Adur and Lewes)
- The county council (East and West Sussex)
- South Downs National Park authority
- Other public authorities as appropriate
- Bodies representing local business interests and other organisations as appropriate.

7.2) Historic consultation

The council has historically worked closely with local residents and stakeholder groups in a two way process to establish a better understanding and appreciation of air quality issues within the city.

In 1999 the council commissioned a workshop program entitled The Public Perception of Air Quality. The objectives of the program were:

- To establish what local air quality means to Brighton & Hove residents,
- To gauge perceptions of current methods of communication and consider alternatives,
- Evaluate resident responses to French AQ information indices - 'ATMO'

In order to assess this, the following survey groups (of mixed ages) were drawn up:

1) Those that didn't necessarily know about air quality issues-
    - Lewes Road area, Brighton

- St Anne's Wells/Wilbury Road area, Hove

2) People with health problems (individuals or family member, such as asthma, heart conditions, chest infections etc)

- Fiveways area, Brighton

- Portland Road/New Church Road area, Hove

Additionally, 216 street interviews were conducted.

The results of the survey provided the council with vital public information with respect to issues such as:

- Public perception on what affects air quality
- Methods used by residents to detect poor air quality
- Who the public think should take the lead in tackling air quality problems
- How the public should be informed on air quality issues

The results of the workshops helped shape the way that Brighton & Hove City Council present information to, and liaise with, the public on air quality issues.

7.3) The AQAP consultation process

Formal consultation with respect to many of the measures described in this AQAP has already been implemented through LTP. The measures were prepared in consultation with a wide range of interested parties (including input from the public, key stakeholders, the 2020 Local Strategic Partnership and Council Members) and takes into account the progress to date made by the City Council and its stakeholders in addressing local transport issues. Further details of this are given in the introductory section of the LTP which can be found on the council's website:

http://www.brighton-hove.gov.uk/index.cfm?request=c1146323

Therefore it must be noted that this AQAP consultation is concerned with the package of measures in terms of air quality impacts and should not be seen as consultation of transport planning in general. However one of the aims of the AQAP is to identify any potential secondary effects that may arise from these measures, therefore comments are included with respect to this.

Please note that the AQAP also contains a package of measures which are not included in the LTP.

This consultation is primarily aimed at all local residents, business and interested parties who have concerns on local air quality issues. However as part of the wider consultation process the council welcomes comments from other interested

individuals and organisations throughout Sussex and beyond. This document has been amended based on consultation with defra, councillors and the public.

For effective consultation of the action plan the following questions have been set and the answers received are included:

1) Do you understand and/or agree with the objectives and reasons for the AQAP? YES, although some aspects and arguments in the AQAP are complex and very technical.

2) Do you think the measures listed in the plan are relevant and suitable for tackling air quality in Brighton and Hove? Previous experience would suggest that measures do not go far enough; more needs to be done if we are to solve the local problem both in Brighton and elsewhere.

3) If not what other measures do you think the council should be considering? Further suggestions include: public reporting of smoky vehicles, incentivised improvements or retrofitting of the most polluting vehicles, no idling policy, more controlled parking zones, controlled routing of some buses to avoid problem areas, more green space and trees, electrical taxis, improved traffic flow, decreased acceleration that make streets more friendly for pedestrians, cyclists

4) Of the listed measures, do you think they go far enough or should they be developed further? Links to best practise used elsewhere, prioritisation for improving air quality in LTP3, air quality should be a major driver for transport policy

5) In producing the AQAP the council had to assess the potential secondary affects of the listed measures. Do you have any concerns over other secondary effects? (effects maybe economic, social or environmental etc.) The current impact of air quality and related congestion is a major problem for this city that has; profound social, economic and environmental consequences.

6) Do you feel overall that the AQAP can bring about worthwhile change? YES, but it needs to make the points more strongly and influence transport policy

7) Do you have any other comments relating to the AQAP process? The public needs to be enganged more with the topic. Continue school projects and educational initiatives are and excellent idea.

In the interest of sustainability, paper copies of the document have not been issued to consultees and instead copies of both the full and summary documents can be sourced from the following:

- The council website

http://www.brighton-hove.gov.uk/index.cfm?request=c1001183

- Public libraries (summary version only)

- Council City Direct offices at Brighton Town Hall and Hove Town Hall
- Brighton and Hove Town Halls and Portslade Neighbourhood Office

In addition to the statutory consultees a consultation invitation has been issued to the following:

- Local Schools and Universities
- Health Protection Agency (HPA)
- Brighton and Hove PCT
- All Brighton and Hove Councillors and MP's
- The Cycle Forum
- Brighton and Hove District Cycling Group
- Brighton and Hove Motor Club

- Environmental Protection UK
- Friends of the Earth, South East
- Sussex Air Quality Partnership
- Brighton and Hove Buses
- Brighton and Hove Taxis

Local resident, business and community groups will be consulted via the following:

- Local Strategic Partnership and Sub Group
- The Brighton and Hove Community and Voluntary Sector Forum
- Business Forum and the Economic Partnership in Brighton and Hove
- Federation of Disabled People
- Old Persons Council
- Young Persons Council

Paper copies and CD ROMs of the full or reports can be made available if the documents cannot be accessed via the council website.

7.4) Ongoing and future consultation

As the implementation process begins it will continue to involve regional bodies, key stakeholders, and crucially the public. Furthermore, it is also recognised that as time progresses unforeseen events and circumstances may change. Brighton & Hove is poised to develop rapidly on economic recovery. Therefore, future consultation will again play an important part in how the council and AQAP react to these developments.

Table 7 Glossary of Terms

Glossary of terms

ANPR	**Automatic Number Plate Recognition**
APR	**Annual Progress Report**
AQ	**Air Quality**
AQAP	**Air Quality Action Plan**
AQMA	**Air Quality Management Area**
AQEG	**Air Quality Expert Group**
AQMS	**Air Quality Monitoring Station**
AQO	**Air Quality Objectives**
AURN	**Automatic Urban and Rural Network**
BAT	**Best Available Techniques and Management**
BHCC	**Brighton and Hove City Council**
BHEP	**Brighton and Hove Economic Partnership**
BRE	**Building Research Establishment**
BV	**Bureau Veritas**
CDT	**Cycle Demonstration Town**
CHP	**Combined Heat and Power**
CO_2	**Carbon Dioxide**
CEMP	**Construction Environmental Management Plan**
CFC	**Chlorofluorocarbons**
CO	**Carbon monoxide**
COMEAP	**Committee on the Medical Effects of Air Pollutants**
CTS	**Coastal Transport Scheme**
DA	**Detailed Assessment**
defra	**Department for Environment Food and Rural Affairs**
DMRB	**Design Manuel for Roads and Bridges**
DPD	**Development Plan Document**
DPF	**Diesel Particulate Filters**
DPE	**Decimalised Parking Enforcement**
DfT	**Department for Transport**
EC	**European Community**
EMIT	**Emissions Inventory**
ESCC	**East Sussex County Council**
EST	**Energy Saving Trust**
ERG-KCL	**Environmental Research Group -Kings College London**
EU	**European Union**
FR&A	**Further Review and Assessment**
GHG	**Green House Gases**
HA	**Highways Agency**
HGV	**Heavy Goods Vehicles**
IPPC	**Integrated Pollution Prevention and Control**
ITS	**Intelligent Transport Systems**
IZS	**Internal Zero Span**
LA	**Local Authority**
LR2	**Lewes Rd/London Rd Urban Development**
LDF	**Local Development Framework**
LAQM	**Local Air Quality Management**
LEAM	**Low Emission Assessment Methodology**
LAPPC	**Local Air Pollution Prevention and Control**
LES	**Low Emissions Strategy**
LET	**Low Emission Toolkit**
LEZ	**Low Emission Zone**
LCP	**Large Combustion Plants Directive**
LPA	**Local Planning Authority**
LPG	**Liquid Petroleum Gas**

LTP (2)	**Local Transport Plan (second)**
MRF	**Materials Recovery Facility**
mg/m^3	**Milligrams of the pollutant per cubic metre of air**
NAQS	**National Air Quality Strategy**
NECD	**National Emissions Ceiling Directives**
O_3	**Ozone**
QA/QC	**Quality Assurance/Quality Control**
$\mu g/m^3$	**Micrograms of the pollutant per cubic metre of air**
ppb	**Parts per billion**
PAN	**Planning Advice Note**
PATC	**Permanent Automatic Traffic Count**
PPC	**Pollution Prevention and Control**
ppm	**Parts per million**
PPS 23	**Planning Policy Statement 23**
NAQS	**National Air Quality Strategy**
NETCEN	**National Environmental Technology Centre**
NSCA	**National Society for Clean Air**
NO	**Nitric Oxide**
NO_x	**Oxides of Nitrogen**
NO_2	**Nitrogen dioxide**
P2W	**Powered Two Wheelers**
PAH	**Polycyclic Aromatic Hydrocarbons**
PCT	**Primary Care Trust**
PM_{10}	**Particles with diameter less than 10µm**
$PM_{2.5}$	**Particles with diameter less than 2.5µm**
QA/QC	**Quality Assurance / Quality Control**
R & A	**Review and Assessment**
RBMP	**Regular Base Monitoring Program**
RET	**Roadside Emissions Testing**
RIBA	**Royal Institute of British Architects**
RSEP	**Road Safety Engineering Plan**
RPS	**Residents Parking Schemes**
RTPI	**Real Time Passenger Information**
RTS	**Rapid Transport System**
SAQSG	**Sussex Air Quality Steering Group**
SCA	**Smoke Control Area**
SCOOT	**Split Cycle Offset Optimisation Technique**
SO_2	**Sulphur Dioxide**
STC	**Sustainable Transport Corridor**
SPD	**Supplementary Planning Document**
SNCI	**Site of Nature Conservation Impotence**
STC	**Sustainable Transport Corridor**
STP	**School Travel Plan**
STS	**School Travel Strategy**
TATC	**Temporary Automatic Traffic Counters**
TOC	**Train Operating Companies**
UDP	**Unitary Development Plan**
USA	**Updating & Screening Assessment**
UTMC	**Urban Traffic Management and Control**
UWE	**University of the West of England**
VMS	**Variable Message Signs**
VOSA	**Vehicle and Operator Services Agency**
VOC	**Volatile Organic Compounds**
WASP	**Workplace Analysis Scheme for Proficiency**
ESCC	**East Sussex County Council**
WHO	**World Health Organisation**
WTS	**Waste Transfer Station**

Early AQAP References

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8) Appendix Sussex Low Emission Strategy and Development Control Initiatives

The Brighton and Sussex Low Emission Strategy is included. The document will be linked to Brighton's existing policies such as: the air quality hooks in the Core Strategy and Supplementary Planning Document (SPD08) for sustainable buildings. It is also supported by statements in the councils Environmental Policy and Sustainable Community Strategy. This is intended as a more strategic approach supported by a number of documents and references rather than creating one specific council SPD for Low Emission Strategy.

The LES draws on a number of measures including fleet procurement advice and an assessment toolkit to establish developer contribution. At the time of writing the council is co-consultee on development of the toolkit in order to establish a formalised methodology comparable with the Building Research Establishment Environmental Assessment Method (BREEAM).

Electrical charging points for scooters and light cars are a good example of measures for mixed mode developments (work-place-residential) that have parking bays. It is proposed this is dealt with by way of a condition on new developments. The wiring costs as part of the broader development are likely to be negligible if fitted before ground services are finished.

Site specific requirements can usually be dealt with by a Planning condition.

For site specific requirements that cannot be met via a planning conditions planning obligations are possible through section106 Agreements, under the Town and Country Planning Act 1990. This could be for site specific requirements that cannot be met via planning conditions (such as requirements for financial sums towards off-site measures) or off-site requirements and mitigation due to the impact of the development.

Currently Planning Obligations through s106 Agreements can continue **until** the council adopts a CIL (Community Infrastructure Levee) during a four year transitionary period ending 6/4/2014) - at which point s106 will be scaled back to on-site mitigation measures and purposes only: which are necessary to granting of planning permission.

The council intends to adopt a CIL by mid 2013. The government by this time should have then provided further guidance on the scaling back of s106 planning obligations so there is no 'double charging' when applying s106 and CIL.

LOW EMISSION STRATEGIES: SUPPLEMENTARY PLANNING GUIDANCE

INTRODUCTION

The Low Emission Strategies Partnership (LESP) was formed in 2007, by the 'Delivering Cleaner Air' Beacon Councils and the UK Centre of Excellence for Low Carbon and Fuel Cell Technologies (Cenex), to promote best practice in reducing road transport emissions. This can be achieved by way of:

- *Intelligent procurement of Council and Cooperate vehicle fleets with lower emissions of pollutants (NO_x and Particulate) and Green House Gasses (GHG)*
- *Land-use planning system*
- *Influence emission improvements through the implementation of integrated local transport plans and procurement strategies*

The over-arching aim of the LESP is to improve air quality and reduce Green House Gas (GHG) emissions, simultaneously. This will be done by incentivising and encouraging the more rapid uptake of cleaner vehicle fuels and technologies. It is national and Council policy to promote trip reduction and modal shift, the LESP seeks to compliment such approaches through residual, road transport emission improvements.
Funded through DEFRA Air Quality Grant, Communities & Local Government (CLG) Beacon Council - Peer Support funding and local authority contributions, the LESP undertakes programmes to promote understanding among local authorities of policies and measures that can be adopted, cost effectively, to improve detrimental emissions, thus increasing capability and capacity to effect necessary change.
Further information about the LESP can be found on the website – www.lowemissionstrategies.org

In January 2010 DEFRA published good practice guidance prepared by the LESP – ***Low Emission Strategies: Using the Planning System to Reduce Transport Emissions*** *as part of the Local Air Quality Management (LAQM) Technical Series. The report can be downloaded at:*
http://www.defra.gov.uk/environment/quality/airquality/local/guidance/documents/low-emissions-strategies-2010.pdf

The LESP has produced the following planning guidance to build on the approaches outlined in the original 2010 Guidance, thus assisting local authorities wishing to promote Low Emission Strategies in their area. The Guidance provides an update on approaches to Low Emission Strategies Assessment Methodology, Low Emission Mitigation Measures (including availability and applicability of Low Emission Technology and Fuel Options) and approaches to Off-Set Formulae and Tariffs. This Guidance is tailored to the specific circumstances of Brighton and Hove City Council while also utilising the national framework, in respect of the Low Emission Strategies approach. In producing this Guidance, it is believed that developers will also benefit from improved clarity and consistency while local authorities will be better equipped to co-ordinate, and deliver, their environmental improvement strategies.
Further assistance for local authorities implementing Low Emission Strategies can be obtained by contacting the LESP – info@lowemissionstrategies.org

PRINCIPLES OF IMPLEMENTING A DEVELOPMENT SCHEME LOW EMISSION STRATEGY

- Integrated, evidence based approach to residual, road transport emission reduction via the simultaneous assessment and mitigation of both regulated air quality pollutants and Greenhouse Gases (GHG)
- Feasibility study into using grid electricity (including the proposed offshore wind farm) to power Brighton's public transport routes especially North Street or Lewes Road by way of a trolley-bus or tram without any tail pipe emissions or individual vehicle charging requirement
- Improve existing road transport emissions via the encouraged uptake of cleaner fuels and technologies through concerted action to incentivise the procurement of low emission vehicle fleets
- Recognition of road transport emissions creep, due to the cumulative impact of development schemes, and the need to improve assessment methods for establishing impact and options for mitigation where necessary
- Recognition of the incremental benefits of individual development schemes and residual road transport emissions improvement, aggregated across the area
- Pro-active, integrated approach to land-use planning with BREEAM and the local plan (SU9) complimenting low emission strategies that reduce road transport emissions at developments through transport plans, community/social fleet emission improvement strategies, economic development and procurement strategies
- Achieve development scheme acceptability through the implementation of reasonably practicable on and off-site low emission mitigation measures, including the consideration of compensatory damage costs (off-set tariff), required through either planning conditions or Planning Obligations through Section 106 (S106) of the Town and Country Planning Act 1990 or the Community Infrastructure Levy (CIL)
- Consideration of the use of CIL , in situations where it is likely to be triggered, for the implementation of low emission, road transport infrastructure

CONTENTS OF THE SPD GUIDANCE

The Low Emission Strategy is in support of the following City Council documents:

- **2011 Air Quality Action Plan**
- **2011 Climate Change Action Plan**
- **Local Transport Plan LTP3**

- **Local Plan SU9 Pollution and Nuisance Control**

This is in accordance with Council statutory duties; under Part IV of the Environment Act 1995, the Air Quality Strategy for England, EU and WHO standards for key airborne pollutants. In Brighton the priority is to reduce emissions of Oxides of Nitrogen and Ultra Fine Particulate Matter. Furthermore air quality is considered as a material consideration in planning applications.

Recommended contents of a Low Emission Strategy SPD:

1) **Background to the SPD**
   - (suggested references are provided in **Annex A**),
   - Brighton and Hove City Council recognises that there is a need to reduce ambient levels of Nitrogen Dioxide especially in the technical-breach areas of the city. It is also acknowledged that there is no safe level of fine particulate matter and benzene. Emission reduction is sought, in order to reduce the risk of pollution and nuisance in accordance with the councils local plan SU9
2) **Low Emission Assessment Methodology (LEAM)**
   - The LES provides details on a methodology for undertaking a low emission assessment, including the triggering development criteria and recommended tools and techniques for carrying out the scheme impact assessment and evaluating the options for mitigation
3) **Low Emission Mitigation and Off-Set Measures**
   - Brighton and Hove City Council will provide details of recommended low emission vehicle technologies and fuels that they would wish to see implemented as part of, either, on or off-site mitigation, associated with development scheme types. Infrastructure needed to support these measures will form part of the recommendations, including, where relevant, where mitigation may be sought through section 106 Obligations and CIL
4) **Low Emission Off-Set Formulae and Tariffs**
   - BHCC will develop formula, relevant to their local circumstances, for the consideration of compensation for the, residual road transport emission impact resulting from a development scheme (examples of differing local authority approaches to financial contributions through the planning system can be found in **Annex C**)

Annexes:

A) Socio-Environmental Context
B) Land-Use Planning Context

Table 1 – Low Emission Assessment Methodology Summary
Table 2 – Low Emission Strategies: Assessment Criteria and Assessment Type
Table 3 – Low Emission Strategies: Recommended Mitigation Measures
Table 4 – Low Emission Technologies: Availability and Applicability

Table 5 – Recommended Electric Vehicle Re-charging Infrastructure Provision

LOW EMISSION ASSESSMENT METHODOLOGY (LEAM)

Guidance on the assessment of development impact, to-date, has been concerned with the modelling of predicted air quality concentrations, both with and without development taking place; often referred to as the do-nothing and do-something scenarios. It is acknowledged that such modelling has inherent uncertainty, compounded by the assumptions such as traffic fleet emissions and the capability and applicability of the modelling tools themselves. As a general rule air quality predictions are less reliable further into the future.

It is common practise in BHCC to consider the likely exposure of future residents of a scheme to regulated air pollutant concentrations, in most cases Nitrogen Dioxide. This is to assess the potential change in exposure (adverse or beneficial) on existing and future residents as a result of the proposed development. BHCC will accept detailed air quality assessments where;

- The development proposes to introduce new exposure in a technical breach area
- or the development introduces new emission to air from increased traffic movements and or power provision such as a boiler or biomass burner
- The assessment compliments existing understanding of air quality in the city and adds value to the most recent detailed and further assessments carried out as part of LAQM, a screening will not improve understanding of air quality in the AQMA

Guidance on air pollution modelling, in relation to development planning, has been produced and updated by Environmental Protection UK (EPUK 2010). Often in the city centre developments with little parking or no combustion process have little impact on air quality and further assessment is not necessary. With these cases the primary concern is the introduction of new residents to an area of existing poor air quality.

There is much evidence to show that air pollutant modelling lacks the precision to definitively classify the impact of future development scheme as either significant or not. The result is often described as an adversarial process between developer and local authority. Meteorological, traffic and emission data in modelling can provide uncertainty in output predictions that render the assessment and quantification of scheme modification and mitigation scenarios irrelevant and incapable of assessing the aggregation of development schemes within an area.

Current pollution analysis of a development does not include the assessment of GHG arising from residual road transport emissions, associated with a development scheme proposal.

Given the imperative need to quantify emissions creep, due to the accumulation of development within an area, to scenario test options for scheme mitigation and to combine the assessment of both regulated air pollutants and GHG, arising from a scheme, a Low Emission Assessment Methodology LEAM) is proposed by the Low Emission Strategies Programme. This methodology is outlined below.

Emission assessment protocols currently exist and provide input data for air quality modelling. However, they tend to ignore the improvements that can be made to

residual road transport emissions, once trip reduction analysis has been applied to a scheme. The Low Emissions Assessment Methodology (LEAM) seeks to improve current assessment techniques, standardise approaches and increase applicability, making them more relevant to priority development schemes submitted to local authorities.

To assist local authorities and developers, in undertaking a LEAM, the Low Emission Strategies Programme is developing a Low Emission Toolkit (LET). While the outlined LEAM may be undertaken using other, approved tools and techniques, the LET aims to provide a best available methodology in emission analysis, capable of providing robust data that is fit for purpose in underpinning evidence based decision making. A 'beta version' of the LET has now been produced and testing will now be undertaken and modifications made prior to general release in 2011. Further information about the LET can be obtained by contacting info@lowemissionstrategies.org

Emission analysis is reliant on input data and assumptions that may vary in robustness, although they are likely to improve over time. This may be recognised and a precautionary approach adopted. Where there are knowledge gaps, reasonable default data may be used eg. the LET provides default trip distances for a variety of land uses per given land-use both in and outside London, allowing for a calculation of overall annual GHG emissions associated with the development. It is envisaged that both developers and local authorities alike will be motivated to improve understanding of transport emissions, arising from development.

Low Emission Assessment Methodology (LEAM) Considerations

The following methodology, which, although providing a framework for a consistent approach nationally, allows for variations, that accommodate local considerations, such as low emission mitigation feasibility, scheme viability and refinements in approach that may integrate with other environmental assessment methodologies.

The basic, recommended steps of the LEAM are summarised in **Table 1**. **Step 1** – Developers of major and other relevant applications should be encouraged to hold Pre–Application meetings with Development Control officers prior to submitting planning applications. At these meetings agreement should be established on approaches to LEAM and scenarios for implementing low emission strategies where these are triggered.

At this stage, the regulated air pollutants and GHG to be assessed should be established. The years of interest for assessment should also be agreed. The latter will be influenced by the anticipated, operational commencement and lifespan and occupation of the development, years of interest for achieving specified national targets (eg Air Quality Regulations) and availability of robust emissions data. Additionally, consideration of construction phases may be relevant where extended build programmes are anticipated.

A LEAM will not be considered appropriate for smaller-scale development (see Table 2). Potentially, such developments may introduce additional exposure to an area of known poor air quality or contribute to increased road transport emissions and, as such, may be required to pay a nominal off-set tariff (for non-CIL measures). This could be towards the cost of providing community electric vehicle recharging (EVR) facilities. Policies determining applicability of off-set tariffs or other compensation measures should be determined according to local circumstances (see section on Low Emission Off-Set Formulae and Tariffs).

Step 2 - Using approved tools and techniques calculate the baseline, residual road transport emissions from a development, for the first operational year and specified

future years (dependent on future use and lifespan) after development trips have been reduced as far as is reasonably practicable. The calculation should be based on business as usual scenarios (ie without the introduction of low emission mitigation).
When assessing residual emissions, the evaluation should be standardised to reflect annualised emissions.
Step 3 – Evaluate the impact on residual road transport of applying low emission mitigation measures, both on and off-site, against business as usual baseline levels, for specified years of interest. Local authorities should provide a list of feasible mitigation measures that can be applied by a developer (using reasonable or best endeavours), dependent on development type.

Consideration is needed as to whether mitigation can be applied through planning conditions or via s106 Planning Obligations or CIL in respect of off-site mitigation measures. . In respect of s106, consideration needs to be given to the 3 policy tests that are to be applied i.e. that measures are necessary to make the proposed development acceptable, directly related to the scheme and are fairly and reasonably related in scale and kind etc. Details of the Section 106 policy tests are provided in **Annex B.**
Depending on development scheme type, scale and impact, local authorities may consider opportunities to introduce non-mass market technology mitigation options, thus assisting in market transformation, by accelerating the wider introduction of new technologies. It may be possible to weight technologies according to future potential and not only in respect of their current emission profiles.
[Note – *Care is needed in evaluating off-set road transport infrastructure where Community infrastructure Levy has been adopted, or is likely to be triggered through infrastructure requirements on 5 or more developments. There is no requirement on a local authority to spend CIL funding on all infrastructure measures listed as such, nor to provide the infrastructure in any particular location (CIL removes a development from its impact). The former point is relevant when determining that a development is acceptable, the latter may be relevant if specific measures are required in relation to an AQMA, although as final arbiter, the local authority is in a position to ensure that they are discharging their duties properly.**]**
There is the possibility that some low emission technologies may cause an increase in one emission type, while ameliorating another. For example, a diesel particulate filter (DPFs) could result in a marginal increase in fuel consumption. (In terms of DPFs, the significant particulate reduction benefit gained from their introduction – over 85% fine particulate reduction, is likely to outweigh any marginal fuel consumption and CO_2 increase, particularly where air pollutant exposure is of concern).
Step 4 – Once on and off-site mitigation measures have been agreed, the remaining residual road transport emissions should be quantified.
Careful consideration is needed in respect of low emission recharging and refuelling infrastructure. Such facilitating technology, necessary for the uptake of key low emission technologies, can have non-direct emission benefits and ways to accommodate these considerations, within the LEAM, should be outlined within the SPD. Alignment of approach with the wider, local authority low emission strategy is required.
***[Step 4a - Table 1** includes an option for applying a LEAM, allowing the introduction of a Low Emission Scheme Classification System, similar to that associated with the Building Research Establishment Environmental Assessment Methodology (BREEAM). Emission reduction targets could be established by development type, allowing for low emission*

classifications to be applied for developments achieving a specified emission reduction target or level of low emission mitigation intensity. For example, a scheme could be described as 'low emission excellent' if it meets a specified % reduction in residual road transport emissions, at a given point in time, compared with baseline levels. Low emission mitigation scenarios would be continually compared to baseline emission levels until a specified target has been met. See also ***Considerations for Streamlining LEAM****. In situations where all feasible mitigation has been exhausted and the target emission reduction has not been achieved, an off-set tariff, representing the damage costs (or ratio of) of the emission reduction shortfall could be considered.*
The LESP will provide further guidance on this approach in 2011. Integration of LEAM with other assessment frameworks, such as BREEAM and Code for Sustainable Homes, is currently being considered by the LESP.]

Step 5 – Translate the calculated, remaining, residual road transport emissions, arising from the development scheme into damage costs for the pollutants of concern. In evaluating damage costs, consideration should be given to discrepancies in pricing, established nationally and by the EU. The pricing option chosen to evaluate damage costs should be clearly stated within the local authority SPD. Damage costs differ, dependent on pollutant type – at the discretion of the local authority, the final reckoning may refer to a single, chosen pollutant of interest or a combination of pollutants. *Further information on damage costs is available from the DEFRA Interdepartmental Group on Costs and Benefits (IGCB) – see updated DEFRA website*

Step 6 – BHCC will develop formulae, relevant to their local circumstances, to determine the compensation payment they would wish to levy for the residual, road transport emission impact of a development. This payment is termed the **Low Emission Off-Set Tariff** (often referred to as a developer contribution). Formulae development and Off-Set Tariff considerations are outlined in the section below – **Low Emission Off-Setting Formulae and Tariffs.**

BHCC will determine whether to levy the tariff or not, on the basis of a fair and transparent policy laid out in the LES.

Local authorities should provide a list of pre-evaluated low emission projects that Off-Set Tariffs will be used to fund. Such projects should be aligned to the wider, local authority low emission strategy.

Step 7 – BHCC should maintain a database of all low emission development scheme approvals within their area. Details should be recorded of development scheme emission impacts, effect of mitigation, quantified damage costs, any off-set tariffs set and received and the low emission projects that such funding has been used for. The database should be made publicly available.

The costs of maintaining such a database that may be recovered through CIL receipts will be explored.

Considerations for Streamlining LEAM

Local authorities may be able to streamline their LEAM. Some, or all, development proposals within an area are often of a similar nature and would lend themselves to categorisation. Local authorities could pre-evaluate the likely residual, road transport emissions impact of such schemes, informing the categorisation process. Depending on the development scheme category, local authorities could stipulate a package of recommended on and off-site mitigation measures, including the likely, additional off-set tariff that would be incurred, depending on the package of measures agreed. The mitigation measures would be pre-evaluated as to their emission benefits and, in addition to the pre-quantified damage

costs, the overall low emission strategy settlement (mitigation and off-set) could be determined by a sliding scale formula.
This approach could tie in with Option 4a, discussed above, whereby scheme-classification is dependent on the implementation of pre-evaluated, categorised, mitigation measures and off-set payment, depending on development type.
Local authorities will be mindful of the advantages and disadvantages of streamlining the LEAM procedure. One disadvantage is that the onus of emissions assessment is placed, initially, on local authorities however, there may be benefits arising from the integration of scheme emission impact analysis with LAQM, Local Transport Plan and Carbon reduction strategy work.
The LESP will provide further guidance on this approach in 2011.The integration of this approach with other assessment frameworks, such as BREEAM, will be considered.

LOW EMISSION TOOLKIT (LET):
The LESP has produced a prototype Low Emission Toolkit (LET), in conjunction with TTR, CERC and RPS. The LET will assist both local authorities and developers to undertake Low Emission Assessments (LEA) of new development schemes, evaluating baseline emissions and the potential impact when applying various Low Emission Strategy mitigation options. With additional funding provided by DEFRA, the LET will now undergo a series of tests, modifications and updates, informed by a series of LESP Workshops.
The LET will be issued later in 2011, free-of-charge, with associated guidance on how it can be used as part of the Low Emission Assessment Methodology process. For further information contact info@lowemissionstrategies.org

Table 1 – Low Emission Assessment Methodology Summary

Assessment Steps	Assessment Activity	Notes
Steps 1	Establish the appropriate assessment based on development criteria and the relevant pollutants and years of concern	See Table 2. Pre-application discussions essential
Step 2 [Medium, Large & Major Developments]	Evaluate the residual road transport emissions baseline after trip rates have been reduced as far as is reasonably practicable	Determine 'business as usual' for both current and specified future years of interest. Use Low Emission Toolkit or other agreed techniques
Step 3	Evaluate the impact on the residual emissions by applying low emission strategy mitigation scenarios to the proposed development scheme plans, both on and off-site, for specified years of interest[1]	For mitigation options see Table 3 and Table 4. Use Low Emission Toolkit or other agreed techniques
Step 4	Quantify the remaining, residual road transport emissions, arising from the scheme, following the application of agreed mitigation measures, either on or off-site	Use Low Emission Toolkit or other agreed techniques
Step 4a	Option: Continue to apply mitigation measures, both on and off-site, until a specified emission reduction target has been achieved	Method may be used as part of Low Emission Scheme Classification System
Step 5	Establish the damage costs resulting from the remaining, residual emissions	Based on pollutant emission per annum
Step 6a	Option a) Waive payment of damage cost compensation due to weighting of mitigation measures applied[2], according to local formula	This option is termed 'non-tariff' - refer to off-setting formula
Step 6b[3]	Option b) Require payment of a ratio of the damage costs, according to local formula	This is termed the 'Off-Set Tariff' (or developer contribution) - refer to off-set formula
Step 7	Final emissions data balance should be recorded in a database	A Low Emissions Strategy Database should be kept by the planning authority and made publicly available.[4]

[1] Consider whether measures form part of adopted Community Infrastructure Levy (CIL) or whether CIL is likely to be triggered (ie infrastructure sought on 5 or more developments)
[2] Local authorities may place added weight to key, strategic mitigation measures, desired as part of an overall Low Emission Strategy. The ability of a development scheme to introduce new technologies or pull technology forward, thus creating market transformation, should be acknowledged
[3] Off-set tariff cannot include funding for measures sought through the Community Infrastructure Levy (ie 'double dipping'). Scheme viability to be taken into account
[4] Necessary costs for setting up and maintaining the Low Emissions Database should be explored as to how this could be met from CIL receipts. The database should include a record of all off-set mitigation measures and tariffs (with a reference to how this funding has been used)

LOW EMISSION MITIGATION AND OFF-SET MEASURES

Local authorities should specify recommended low emission mitigation measures that may be implemented, as part of the development planning process, to secure scheme acceptability. In considering appropriate measures, local authorities may take into account:

- Development location, timescales and likely impact
- Potential that development scheme types have for assisting market innovation and transformation
- Balance short term emission benefits with those that may accrue over the longer term
- Technology and uptake incentive feasibility
- Technology emission profiles
- Technology road maps and readiness
- Desirability to promote key technologies in line with other, locally-integrated, residual road transport emission reduction strategies
- Potential economic development associated with technology and incentive options

Local authorities may wish to consider these measures or others, pertinent to their area.
A list of recognised **low emission vehicle technologies and their availability** can be found in **Table 4.** Local authorities may wish to consider these technologies or others, in conjunction with recommended low emission strategy scheme mitigation.
Local authorities may wish to categorise low emission measures, based on the considerations listed above. This may assist in developing low emission scheme classification systems, such as that outlined as an option in Step 4a of the LEAM. Instead of the continual assessment of the impact of scheme mitigation options, a pre-evaluated series of recommended mitigation options and packages could be applied, dependent on the evaluated, anticipated scheme impact. An example of how low emission measures may be categorised is presented in **Table 5**.

LOW EMISSION OFF-SET FORMULAE AND TARIFFS

BHCC will determine appropriate assessment methodology for translating scheme damage-cost compensation into a fair and transparent off-set tariff (often referred to as a developer contribution). Many local authorities currently have policies on developer contributions towards Air Quality Action Plans and Climate Change Mitigation Strategies. Examples of LES related SPD can be found in **Annex C.**
Often, contributions are based on scheme aspects, including development type (ie residential or commercial), floor space or parking spaces. Some emerging SPD relate

to increases in trip rates. Contribution levels vary considerably from district to district, town to town and city to city. Both local authorities and developers alike have stated the need for a more consistent, evidence based approach. This is not to say that current practitioners should change their policies – if a current policy for contributions is working and fit for purpose then there may be no need to change. Examples of current developer contribution rates, required in relation to air quality and climate change, are provided in **Annex C**

BHCC Low Emission Strategies SPD will have regard to scheme acceptability and viability, plus any CIL requirements, when considering whether to levy or waive an off-set tariff. Where an emission-based approach to assessment has been taken, local authorities should consider aligning this procedure with an emission-evidenced approach to securing an off-set tariff that reflects both the impact of the development and the need to improve emissions in the wider community.

BHCC will produce a database of low emission projects which could be funded via off-set tariffs, including a record of where such funding has been defrayed.

To assist in the development of an emission based off-set tariff formula, an example approach is outlined below.

Consideration will be needed as to whether the off-set tariff is determined with respect to one pollutant of interest or all pollutants of interest combined. Additionally, consideration is needed as to whether the tariff should reflect the damage costs of the first operational phase year, the damage costs over a specified number of years or the damage costs over the expected lifespan of the development.

Example Off-Set Tariff Formula:

Off-Set Tariff = **Annualised Residual Emission Damage Cost per pollutant, or sum of pollutants considered (AREDC)** [1]
Multiplied by scheme adjusted lifespan of development in years (SAL)[2]
Then
Multiplied by a local, scaling co-efficient (K)[3]**, expressed as a fraction**

Off-Set Tariff = (AREDC) × (SAL) × (K)

[1] The off-set tariff may consider a single pollutant or a sum of all pollutants considered

[2] Scheme Adjusted Lifespan – for example: year 1, aggregated first 5 years, 15 years etc., or sum of selected years eg years 1, 5 and 10, determined by local authority

[3] Where K represents a score from 0 to 1, based on a locally determined ranking system of development scheme low emission strategies, taking into consideration scale and impact of a development scheme, the type and scale of mitigation, applied to scheme proposals and other local factors.

ANNEX A

Socio-Environmental Context

It is important that Low Emission Strategies are underpinned by coherent, socio-environmental policies, adopted at a local level, in line with National Strategies. These should include:

- **National Air Quality Strategy 2007**, including associated Local Air Quality Management Policy and Technical Guidance 2009
- **Local Air Quality Action Plans**, including reference to the **Air Quality Management Area**, where designated. Such plans should integrate all relevant council activity, capable of effecting emission reductions, including fleet management plans, alternative fuel infrastructure plans and procurement strategies. In London, consideration will be given to the Mayor's Air Quality Strategy 2010)
- Climate Change or Carbon/Green House Gas (GHG) reduction strategies
- Environmental Impact Assessments Directive (EIA Directive 85/337/EEC as amended)
- Health Improvement Plans and Strategies
- Other relevant local and regional strategies eg Economic Development etc

In articulating the benefits of tackling GHG and air pollutant emissions simultaneously, reference should be made to relevant Government guidance, including '**Air Quality: Action in a Changing Climate (DEFRA, 2010)**. **The Mayor for London's Air Quality Strategy (2010)** refers to the benefits of implementing a Low Emission Strategies approach to development planning and states the requirement for an emissions assessment to be provided alongside any air quality assessment submitted as part of a planning application.
Reference should be made to the co-ordination of the low emission strategy approach through either **Local Transport Plans (LTP2 and 3)** or **Local Implementation Plans** (delivery of the **Mayor's Transport Strategy** by London Councils).

ANNEX B

Land-Use Planning Context

The Government is revising planning guidance with a view to simplifying the Planning and Policy Statement guidance system. Additionally, local authorities are to take account of 'localism' within the revised planning system. Regional planning guidance has been removed. While the new system becomes apparent it is clear that the Government would like to see planning policy enable motorists to make green vehicle choices, particularly enabling the uptake of electric vehicles.

The approach outlined within this guidance is in line with emerging Government Policy and the LESP will provide further guidance on implementing LES through the Planning System where needed. The following information remains pertinent until further guidance is issued.

approach to land-use planning should be detailed within a **Local Development Plan** or **Framework**.
Guidance exists at a national level that sets out the regulatory basis for implementing Low Emission Strategies through the land-use planning system. In the first instance, see best practice guidance – '**Low Emission Strategies - Using the Planning System to Reduce Road Transport Emissions'**, Defra (2010).

The Government is currently revising the Planning and Policy Statement system with a view to simplifying guidance. While the planning guidance system is in a state of flux, the following formal guidance is still applicable, subject to announcements and amendments known to date:

- Planning and Policy Statement 23 – Pollution Control & Contaminated land:
    - States that air quality is a material consideration in the planning process
    - States that national and international strategies and conventions on air quality and climate change should be taken into account
    - Introduces the 'precautionary' and 'polluter pays principle'
    - States that aggregated impacts of developments should be considered
    - States that planning process should be a force for positive change
    - Introduces concept of off-setting the impact of development
- Planning and Policy Statement 4 – Planning for Sustainable Economic Growth
- Planning and Policy Statement 12 – Local Spatial Planning
- Planning and Policy Guidance 13 – Transport
- Draft Planning and Policy Statement Development Management (consultation finished 17th March 2010 – takes into account Killian Pretty Review):
    - States the need for pro-active engagement from outset to delivery
    - To include revised and now statutory policy tests of Circular 05/2005 Planning Obligations in annex. These are:
        1) *Necessary to make the proposed development acceptable in planning terms*
        2) *Directly related to the proposed development*
        3) *Fairly and reasonably related in scale and kind to the proposed development*
- Community Infrastructure Levy Regulations 2010
- The London Plan 2010 and Mayor's Air Quality Strategy for London 2010

ANNEX C

Several local authorities has produced SPD that relate to Low Emission Strategies, including requirements for developers to pay for off-site initiatives relating to air quality and climate change. The following examples are provided:

Croydon Council draft Air Quality SPD (www.croydon.gov.uk)

The draft SPD requires that Low Emission Strategies approach to development scheme mitigation is adopted. Developer contribution levels (off-set tariff) and measures they will support in line with the Air Quality Action Plan are outlined:

- Assistance with enforcing vehicle idling regulations
- Contributions towards improving HGV emission improvements through a Freight Quality Partnership
- A contribution towards AQAP delivery is costed per development parking space

Greenwich Council Section 106 Agreements SPD (www.greenwich.gov.uk)
Developers are required to contribute the following rates towards air quality and waste management measures:

- £100 per residential dwelling towards both AQ and Waste
- £10 per sqm commercial development towards both AQ and Waste

Greenwich have used AQ funding towards a variety of mitigation measures including electric vehicle recharging infrastructure and gas vehicle demonstration, to inform the Council's Anaerobic Digestion Strategy

Kensington and Chelsea Air Quality Air Quality SPD (www.rbkc.gov.uk)
A low emission strategies approach to scheme mitigation is requested with developer contributions sought for low emission vehicle technology and infrastructure projects, public transport improvements and air quality action plan funding. An emissions assessment and site specific low emission strategy is required for specified schemes.

Merseyside (Policy Note Update to Ensuring Choice of Travel SPD)- www.sefton.gov.uk
The Liverpool City Region has agreed a policy update to the Ensuring Choice of Travel SPD to require electric vehicle recharging provision to a minimum of 10% of parking spaces on new developments.

Mid Devon Air Quality SPD (www.middevon.gov.uk)
Mid Devon are currently revising planning policy to integrate Low Emission Strategies concepts within their Infrastructure and Site Allocation Plans. The Air Quality SPD currently requires developers to contribute towards 50% of the costs of delivering the Air Quality Action where applications are made in either Crediton or adjoining areas, or other settlements specified in the Core Strategy, according to the following criteria:

Market housing - £2800 - £5509 per dwelling
Affordable housing (100%) - £0
Employment - £1000 - £2030 per 100 sqm ground floor area (GFA)
Retail Food - £55,500 - £103,449 per 100 sqm GFA
Retail non-Food - £9000 - £17616 per 100 sqm GFA

Milton Keynes
A tariff of approximately £8,000 is levied on residential dwellings towards the Council- wide carbon reduction programme.

Salford (www.salford.gov.uk)
Developer contributions are levied at £200 per residential dwelling and £2 per sq metre of commercial floor space towards climate change mitigation, including peatland restoration and tree planting programmes.

Waltham Forest (www.walthamforest.gov.uk)
Waltham Forest require developer contributions towards air quality action plan measures, including up to £750 per development parking space

Wigan (www.wigan.gov.uk)
Wigan has an established Air Quality SPD that requires developers to off-set their emissions through contributions to fund air quality action plan measures

York
York is currently producing a LES SPD that will be issued in Spring 2011. Further details on the development of the SPD can be found on their LES Region Group Initiative website ***(www.lcrrgi.org.uk)***

ANNEX D

Sustainability and Equal Opportunities Appraisals

In preparing an SPD, Sustainability and Equal Opportunities Appraisals should be undertaken, however, if these have been carried out as part of Core Planning Strategy development then this is considered sufficient. A statement should be included in the SPD to this effect. It is possible that the LESP may consider providing assistance, if required, in providing outline details to undertake such appraisals.