



Air Quality
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**Air Quality Action Plan:
Babergh District Council –
Cross Street, Sudbury
AQMA**

October 2011



Experts in air quality
management & assessment

Document Control

Client	Babergh District Council	Principal Contact	James Buckingham
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Report Prepared By:	Penny Wilson and James Buckingham
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Air Quality Consultants Ltd
23 Coldharbour Road, Bristol BS6 7JT Tel: 0117 974 1086
12 Airedale Road, London SW12 8SF Tel: 0208 673 4313
aqc@aqconsultants.co.uk

Registered Office: 12 St Oswalds Road, Bristol, BS6 7HT
 Companies House Registration No: 2814570

Executive Summary

Part IV of the Environment Act, 1995, places a statutory duty on local authorities to periodically Review and Assess the air quality within their area. For each health-based air quality objective, local authorities have to consider whether the objective is likely to be achieved. Where it appears likely that the air quality objectives are not being met, local authorities must declare an Air Quality Management Area (AQMA). Following the declaration of an AQMA, the authority must then carry out a Further Assessment of existing and likely future air quality, and develop an Air Quality Action Plan (AQAP) which sets out the local measures to be implemented in pursuit of the air quality objectives.

An AQMA for nitrogen dioxide was declared for part of Cross Street in Sudbury in November 2008. This report is the AQAP for Cross Street, Sudbury in the District of Babergh. It aims to address a very specific air quality problem along certain sections of Cross Street related to the narrow, 'canyon'-like nature of the road, rather than providing a solution to wider traffic congestion in Sudbury. This report describes the processes that are in place, and sets out the measures that are currently being considered to deliver improvements to air quality within the AQMA. A semi-quantitative evaluation of these measures has been prepared. As far as possible, the document includes an analysis of the measures that could be implemented together with an indication of the improvements that might be expected. Confirmation of timescales and funding for the measures has been included, to the extent possible, although for some measures, this has not proved possible.

The Further Assessment of air quality in Cross Street assessed concentrations of nitrogen dioxide by both monitoring and modelling. The results indicated that that the AQMA should be extended to include the northern section of Ballingdon Street. It also showed that Heavy Goods Vehicles contribute the largest proportion to the overall concentration.

A number of suggested actions have been included within this document under the headings of:-

- Traffic management;
- Lowering emissions;
- Promotion of alternatives;
- Planning; and
- Education and Information.

The suggested measures range from inexpensive, easy to implement actions such as the promotion of existing sources of information that encourage behavioural change in relation to transport choice (such as car sharing websites, bus information etc), to major strategic options (such as changes to traffic management); many of these measures have been under discussion within other arenas. A semi-quantitative evaluation of the measures has been included, which incorporates the expected air quality impact of the suggested measures, together with the cost and feasibility of implementation. The timescale for implementation is also included in the analysis. Once the Action Plan is implemented, progress will be determined through the ongoing monitoring strategy in place for the AQMA.

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1 Introduction and Aims of the Plan

Introduction

- 1.1 Part IV of the Environment Act, 1995, places a statutory duty on local authorities to periodically review and assess air quality within their area. The concept of Local Air Quality Management (LAQM) and the process of 'review and assessment' was established in the 1997 National Air Quality Strategy (NAQS)¹. In 2000, the Government reviewed the NAQS and published the revised Air Quality Strategy for England, Scotland, Wales and Northern Ireland² (AQS). This established a revised framework for air quality objectives for seven pollutants, which were subsequently prescribed into legislation via the Air Quality Regulations 2000³. These were subsequently amended in 2002⁴. Since then, the UK Air Quality Strategy has been further reviewed⁵, but the objectives relevant for LAQM remain unchanged.
- 1.2 For each pollutant, local authorities have to consider whether the objective is likely to be achieved. Where it appears likely that an air quality objective is not being met, local authorities must declare an Air Quality Management Area (AQMA). Following the declaration of an AQMA, the authority must then carry out a Further Assessment of existing and likely future air quality and develop an Air Quality Action Plan (AQAP) that sets out the local measures to be implemented in pursuit of the air quality objectives.
- 1.3 Policy Guidance LAQM.PG(09)⁶, provides guidance on the development of Action Plans. Action Planning is viewed as the most important and significant aspect of the LAQM process, playing a key role in helping the UK Government deliver the air quality objectives and the EU limit values. The AQAP is expected to include the following:
- quantification of the source contributions to the predicted exceedences of the objectives, to allow the Action Plan measures to be effectively targeted;
 - evidence that all available options have been considered taking into account cost-effectiveness and feasibility;
 - how the local authority will use its powers and also work in conjunction with other organisations in pursuit of the air quality objectives;

¹ DoE (1997) The United Kingdom National Air Quality Strategy The Stationery Office

² DETR (2000) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working together for Clean Air, The Stationery Office

³ DETR (2000) The Air Quality Regulations 2000, The Stationery Office

⁴ Defra (2002) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum, The Stationery Office

⁵ Defra (2007) Air Quality Strategy for England, Scotland, Wales and Northern Ireland. (Cmd paper No 7169). www.defra.gov.uk/environment/quality/air/air-quality/approach/

⁶ Defra (2009) Policy Guidance LAQM.PG(09). www.defra.gov.uk/environment/quality/air/air-quality/laqm/guidance/policy/

- clear timescales over which the local authority and other organisations and agencies propose to implement measures within the Action Plan;
- quantification of the expected impacts of the proposed measures and, where appropriate, an indication as to whether the measures will be sufficient to meet the air quality objectives; and
- how the local authority intends to monitor and evaluate the effectiveness of the Action Plan.

1.4 The Policy Guidance makes clear that, *'the legal imperative to protect air quality should not be displaced with political imperatives if this means the local authority is not working towards compliance with the Air Quality Regulations (England) 2000, as amended'*.

1.5 In December 2001, the Office of the Deputy Prime Minister (ODPM) set out proposals to reform council services, with the intent to give more freedom and flexibilities to local authorities, and to reduce the burden to produce and submit plans. One outcome is that local authorities are no longer required to produce a separate AQAP where the problem is predominantly related to road transport. In such cases, local authorities are advised to incorporate the AQAP into their Local Transport Plan (LTP). Recent Department for Transport (DfT) Guidance on LTP's⁷ notes that the LTP could examine and report on options for addressing air quality problems and any risks that policies might have for achieving targets and meeting the EU limit value deadline for concentrations of nitrogen dioxide. Babergh District Council (BDC) is responsible for the production of the AQAP. However, the air quality issues are predominantly traffic related, so measures within the Action Plan will need to be incorporated into the LTP, which is the responsibility of Suffolk County Council (SCC). The current LTP (LTP3) is in two Parts, with a Strategic Plan running from 2011 covering the next two decades and an Implementation Plan which will follow every three years. There will be more flexibility in terms of timescales of future LTPs following the implementation of the Local Transport Act 2008. In terms of timing, it is anticipated that the measures within the AQAP will be integrated into LTP3.

1.6 Environmental Protection UK (EPUK, formerly NSCA) has also published two guidance documents entitled 'Air Quality Action Plans (2000)⁸ and 'Air Quality: Planning for Action (2001)⁹. These guidance documents have also been taken into account in the development of this Action Plan.

⁷ DfT Guidance on Local Transport Plans (July 2009) www.dft.gov.uk/pgr/regional/ltp/guidance/localtransportplans/

⁸ www.environmental-protection.org.uk/assets/library/documents/AQActionPlansInterim.pdf

⁹ www.environmental-protection.org.uk/assets/library/documents/AQActionPlansLAGuide.pdf

Status of this report

- 1.7 This report constitutes the Air Quality Action Plan (AQAP) for Cross Street, Sudbury in the District of Babergh. It describes the processes that are in place, and sets out the measures that will be implemented, or further investigated, to deliver improvements to air quality within the area. An evaluation of these measures has also been prepared. As far as possible, this document includes an analysis of the measures that will be implemented together with an initial indication of the improvements that might be expected and timescales for implementation.

2 Context of Air Quality and Transport in Cross Street, Sudbury

Cross Street, Sudbury AQMA

- 2.1 The Cross Street AQMA was declared in November 2008 as a result of measured exceedences of the annual mean nitrogen dioxide objective (concentrations above $40 \mu\text{g}/\text{m}^3$). Nitrogen dioxide is associated with adverse effects on human health. At high levels nitrogen dioxide causes inflammation of the airways. Long-term exposure may affect lung function and respiratory symptoms. Nitrogen dioxide also enhances the response to allergens in sensitive individuals⁵. The AQMA encompasses properties along Cross Street from the junction with Church Street to 5/89 Cross Street (Figure 1).



Figure 1: Cross Street AQMA.

Traffic Management in the AQMA

- 2.2 Cross Street is extremely narrow and ‘canyon’-like. A build-out was installed in the narrowest section of Cross Street in July 2005. It reduced the road to single carriageway width, so that north-bound vehicles had to give-way to southbound traffic. This was installed to prevent lorries mounting the kerb and causing damage to properties. The build-out led to an increase in congestion, as vehicles waited for on-coming traffic to pass, and queued on Ballingdon Street. This increased emissions along Ballingdon Street and Cross Street.
- 2.3 The ‘build-out’ has recently been removed and the footways widened to allow two-way traffic to flow more freely. However, traffic will still need to stop to allow two Heavy Goods Vehicles (HGVs) to pass at the southern end of Cross Street.
- 2.4 There are six parking bays in Cross Street, to the north of the former build-out, which effectively reduce the road to single carriageway when they are occupied. These also lead to congestion and queues, as vehicles are required to give-way to on-coming traffic. In combination with the build-out,

these bays have led to significantly increased vehicle emissions, as vehicles are required to accelerate and decelerate several times in this short section of road. Currently parking for up to 1-hour is allowed 8am to 6pm Monday to Saturday, with unrestricted parking outside these hours.

- 2.5 HGV flows on Cross Street make up 7% of the traffic flow but contribute 46% to annual mean nitrogen dioxide concentrations (see Source Apportionment below). Therefore measures that minimise HGV emissions are potentially important. Cross Street is part of the strategic lorry network in Suffolk/Essex and therefore potential measures to restrict HGV traffic are limited.
- 2.6 Only a very small number of buses and coaches travel through the AQMA (0.5% contributing 5% to annual mean nitrogen dioxide concentrations); one scheduled bus service an hour operates through the area. Therefore additional measures to reduce emissions from buses are unlikely to be effective in reducing concentrations.

Air Quality in the AQMA and Surrounding Area

- 2.7 Further monitoring of air quality in the Cross Street AQMA has been carried out and the results published in the Council's Further Assessment report (May 2010) and Progress Report 2010. This monitoring confirmed that the annual mean nitrogen dioxide objective was exceeded in both 2009 and 2010. Monitoring also indicated that the annual mean objective was being exceeded to the south of the AQMA, at the northernmost end of Ballingdon Street in 2009. However, monitoring in 2010 has since confirmed that concentrations were below the annual mean objective in that year.
- 2.8 In 2009 and 2010, concentrations in the existing AQMA ranged from 35 to 60 $\mu\text{g}/\text{m}^3$. The exceedences (concentrations above 40 $\mu\text{g}/\text{m}^3$) in Cross Street occur in the 'canyon' sections where traffic flows are interrupted by obstructions (the build-out and parking bays). Measured concentrations at 9 and 17 Cross Street have been consistently below the objectives. These sites are adjacent to parking bays. The highest concentrations are measured opposite these sites (78, 82, 87) where traffic is reduced to single file. Measured concentrations in Ballingdon Street north of the railway bridge also exceeded the objective.



Figure 2: Cross Street facing north towards 'build-out'.

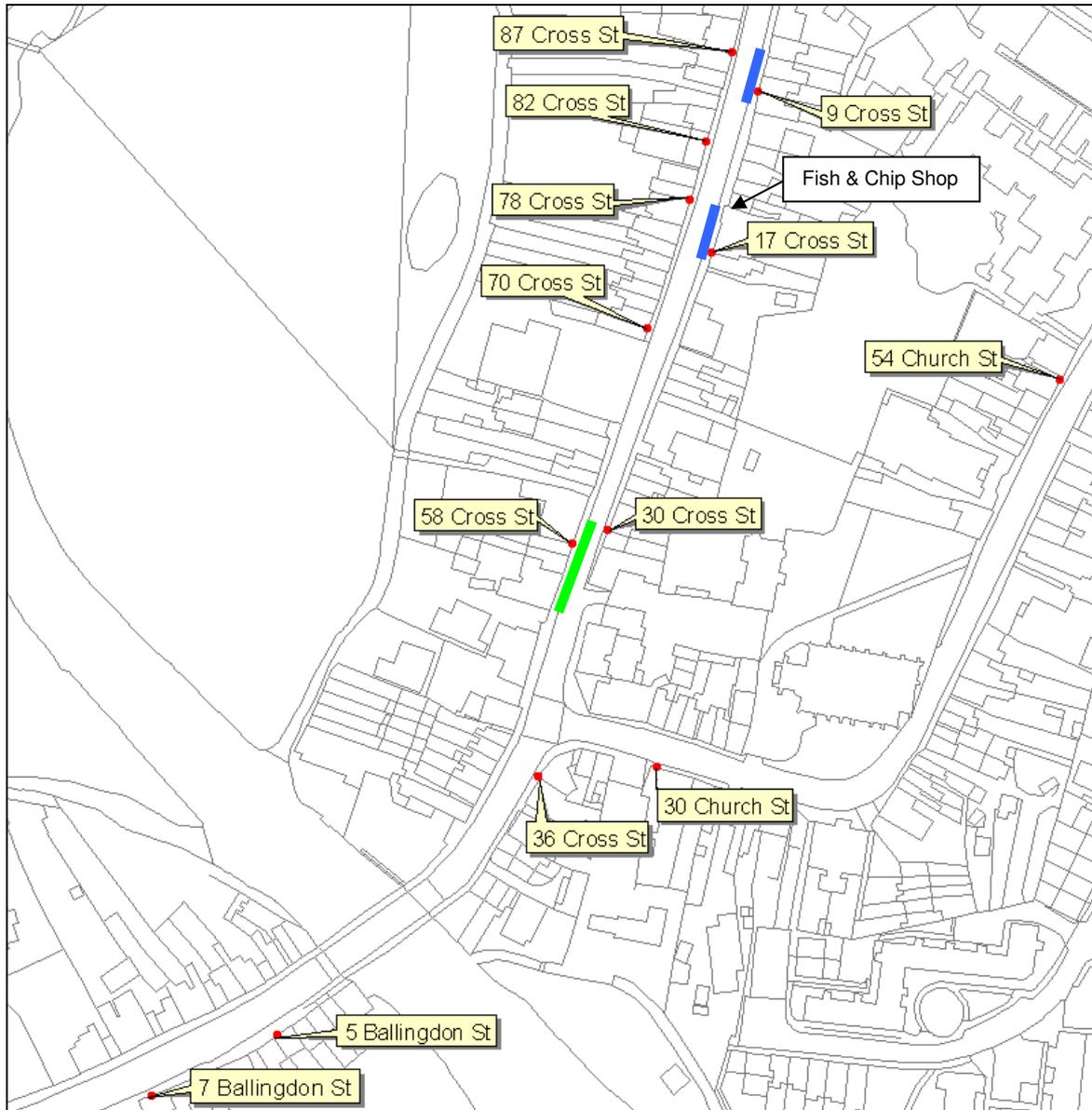


Figure 3: Monitoring locations in close proximity to the Cross Street AQMA (parking bays shown in blue and 'build-out' location shown in green).

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Source Apportionment

2.9 Source apportionment of the local traffic emissions was undertaken as part of the Further Assessment. This showed HGVs contribute the largest proportion to the overall concentration (approximately 46%). In most cases, the ambient background concentration and emissions from cars also contribute a significant proportion to the overall concentration. This highlights the

importance of keeping all sources under consideration when contemplating measures to include within this Action Plan.

Air Quality Improvements Required

- 2.10 The highest nitrogen dioxide concentration is that measured at 87 Cross Street in 2009 (60.3 µg/m³), requiring a reduction of 20.3 µg/m³ in order for the objective of 40 µg/m³ to be achieved.
- 2.11 Table 1 sets out the reduction in local emissions of oxides of nitrogen (NOx) that would be required at three of the diffusion tubes where an exceedence was measured in 2009, in order for the annual mean objective to have been achieved. At 87 Cross Street, local emissions would need to be 51.8% lower in order to meet the objective.

Table 1: Improvement in Annual Mean Nitrogen Dioxide Concentrations and in Emissions of Oxides of Nitrogen at Receptors in 2009.

Receptor	Required reduction in annual mean nitrogen dioxide concentration (µg/m ³)	Required reduction in emissions of oxides of nitrogen from local roads (%)
87 Cross Street	20.3	51.8
30 Cross Street	17.6	47.8
7 Ballingdon Street	6.1	21.8

Scenario Testing

- 2.12 The effectiveness of four potential Action Plan measures was assessed in the Further Assessment. Removing the build-out and parking bays have the potential to bring about the greatest reduction in nitrogen dioxide concentrations. Making Cross Street one-way would also have a significant impact in improving air quality. However, neither of these measures would result in sufficient improvements for the objective to be met at all receptors. Further details of the impact of various scenarios is provided in Appendix 1.

Air Quality Action Plan Process

- 2.13 The approach to the Air Quality Action Planning process in Babergh has been to use a Steering Group to draft the Air Quality Action Plan. This Steering Group is made up of individuals representing the following District, County and Town Council departments:
 - Environmental Protection (BDC);
 - Development Control (BDC);
 - Transport Policy (BDC);
 - Highway Network Improvement Manager (SCC);

- Highways Maintenance (SCC);
 - Air Quality and Noise Manager (SCC);
 - Lorry Manager (SCC);
 - Public Transport (SCC); and
 - Councillors representing Sudbury Town Council and Babergh District Council.
- 2.14 The Steering Group met in August 2009 and January 2010 to discuss possible measures for this Action Plan.
- 2.15 Public consultation on this Action Plan will be carried out following submission of the draft report to Defra.
- 2.16 The AQAP process has followed guidance published by both Defra⁶ and Environmental Protection UK⁹. Specifically, the following steps have been undertaken:
- **Identification of potential options** – this was undertaken through the Steering Group, with advice from Air Quality Consultants;
 - **Evaluation of the options** – with regard to air quality impact, other environmental impacts cost, feasibility and timescales. This was started at the steering group meetings and more fully undertaken with assistance from Air Quality Consultants; and
 - **Prioritisation of the options** – this was undertaken largely through consultation within the Steering Group.
- 2.17 Once the Action Plan is implemented, progress will be monitored and reported annually. More details of monitoring the effectiveness of the Action Plan can be found in Chapter 6.

3 Existing Policies and Strategies relevant to Air Quality

Transport Policy

- 3.1 The Suffolk Local Transport Plan 2011-2031¹⁰ is part of a wider strategic framework through which Suffolk County Council, working with its partners, is tackling the challenges the County faces over the next two decades. The plan sets out how the County Council intends to meet the Government's shared transport priorities of improving Suffolk's transport networks, reducing congestion and improving access to jobs and markets. The Local Transport Plan acknowledges that 'Sudbury has severe air quality problems in Cross Street as a result of heavy goods vehicle traffic and queuing at obstructions'.
- 3.2 A number of on-going interventions have been identified in pursuit of reducing air pollutant emissions and reducing the impact of poor air quality on local communities. These include:
- Seasonal park & ride in tourism areas;
 - Appropriate weight restrictions;
 - Route signing for lorries to minimise vehicles on inappropriate roads;
 - Formalising existing discussion with freight companies by developing Freight Quality Partnerships;
 - Developing a public rights of way network to improve accessibility for walking, cycling and horseriding;
 - Demand responsive bus services in place of traditional less flexible services: enhance marketing and publicity;
 - Speed management tools including vehicle activated signs, speed cameras;
 - Working with partners to implement appropriate transport improvements, review car parking policies and encourage sustainable travel through marketing, improved services and publicity;
 - Working with developers to ensure that new developments minimise the impacts of the private car in areas of high natural heritage value;
 - Assessing the viability of bypass options against weight restrictions in towns and villages;
 - Continuing to implement the lorry management plan;
 - Completing, in partnership with Sustrans, National Cycle routes in Suffolk;
 - Developing integrated public rights of way and rural footway network;

¹⁰ www.suffolk.gov.uk/TransportAndStreets/Policies/LocalTransportPlan.htm

- Feasibility studies for new rail stations;
- Applying vehicle emissions standard on all tendered bus services; and
- Continuing to apply environmental assessment to all schemes.

3.3 Progress on these interventions and possible additional measures that could be included in the Air Quality Action Plan, are discussed in the next section.

Other Regional and Local Policies

3.4 In July 2010, the Secretary of State for Communities and Local Government revoked Regional Strategies with immediate effect. In the longer term the legal basis for Regional Strategies will be abolished through the “Localism Bill”, and new ways for local authorities to address strategic planning and infrastructure issues based on cooperation will be introduced. The full impact of this change on local planning processes and local transport planning processes within Babergh is still uncertain.

3.5 The Local Development Framework process will proceed and local authorities will continue to develop core strategies and other Development Plan Documents. Local authorities will now be responsible for establishing the right level of local housing provision in their area, and identifying a long term supply of housing land without the burden of regional housing targets. Some authorities are likely to retain their existing housing targets set out in the revoked Regional Strategies, but others may review them.

3.6 The Regional Transport Strategy has also been revoked in light of the above “Localism Bill” and The Government Office Network is currently in discussion with the Department for Transport about transitional arrangements for the work previously carried out at regional level. Again, at the time of writing, it is unclear what the impact of these changes will be.

3.7 In 2004, the planning system in England and Wales underwent a significant change, with the Planning and Compulsory Purchase Act 2004 (the ‘Act’) replacing much of the Town and Country Planning Act 1990. The Act abolishes Structure Plans and Local Plans, replacing them with Local Development Frameworks (LDFs), Local Development Schemes (LDS) and Local Development Documents (LDDs), although the statutory status of Structure Plans, Unitary Development Plans, Local Plans or Structure Plans will be retained until LDFs are in place. In Babergh the Local Plan, Alteration No. 2 was adopted in 2006. To ensure continuation of planning policy coverage during the transition from the adopted Babergh Local Plan (2006) to the new Babergh Development Framework, the Council applied to the Secretary of State (GO-East) to ‘save’ the majority of policies contained in the Babergh Local Plan Alteration No. 2 until such time as the new Babergh Development Framework is adopted. Confirmation has been received from the Secretary of State that most of the policies contained in the current adopted Babergh Local Plan are ‘saved’ (and thereby remain in place) whilst others expired on 2 June 2009. This confirmation is in the form of a ‘Direction under paragraph 1(3) of schedule 8 to the Planning and Compulsory Purchase Act 2004.

Further information is available on the Council's website¹¹. The Local Development Framework will form the statutory Development Plan for the District.

- 3.8 Paragraphs 2.53 – 2.62 of Chapter 2¹² of the Local Plan outline Babergh District Council's policy on air quality. The Council recognises its responsibilities to take account of central Government's guidance on the Air Quality Strategy, and the Local Plan therefore outlines the Council's commitment to maintain and improve air quality. Preparation of the Local Plan took into account the findings of the District Council's review and assessment work and the potential pollution 'hotspots' identified in the district, at that time.
- 3.9 The principal source of air pollution in Babergh District, at the time the current Local Plan was produced, was identified as road traffic with the principal hotspots located in areas close to the A14 and A12 trunk roads. The Local Plan clearly identifies these locations as unsuitable for further residential development.
- 3.10 As transport is the main source of many pollutants particularly in urban areas, transport policy is identified as being key in improving local air quality. Other significant areas identified include town centre retail, industrial and commercial development. Specific policies aimed at improving air quality were therefore included in other areas of the Local Plan.
- 3.11 The Council has adopted a strategy where new developments are located in towns and villages with good public transport facilities. These are considered to be the most sustainable locations as the extent of air pollution generated by car journeys is minimised. Other policies relevant to air quality issues are outlined within the transport policy.
- 3.12 Transport policy which relates to air quality is outlined in Chapter 9 of the Local Plan¹³. The Council supports the principle of park and ride and has co-operated with the County Council to identify suitable sites for park and ride car parks in the district. A successful park and ride facility is currently located at the Copdock Interchange, although there are currently no plans to introduce permanent park and ride facilities in Sudbury.
- 3.13 The first Development Plan Document that the Council is preparing as part of the Local Development Framework is the Core Strategy. Preparation of the Core Strategy has been delayed following revocation of the Regional Spatial Strategy, to allow Babergh District Council to determine future growth levels for itself. However, the Council is currently consulting on its Core Strategy Submission Draft document¹⁴, which sets out the authority's broad strategy for sustainable growth over the next twenty years and is a key part of its future planning policy

¹¹ www.babergh.gov.uk/Babergh/Home/Planning+and+Building+Control/Local+Plan/List+of+Saved+Policies.htm

¹² www.babergh.gov.uk/NR/rdonlyres/D3062F34-54D7-48C7-8FAE-42FCD3CBF573/0/Chapter02.pdf

¹³ www.babergh.gov.uk/NR/rdonlyres/A533DA23-AB09-4F69-B654-A3A61C90F06D/0/Chapter09.pdf

¹⁴ www.babergh-south-suffolk.gov.uk/Babergh/Home/Planning+and+Building+Control/Local+Development+Framework/Core+Strategy+%282011+-+2031%29+Submission+Draft.htm

framework. The Core Strategy will replace some of the remaining Local Plan policies and will set out the spatial vision, spatial objectives, policies and a monitoring and implementation framework for Babergh. An Issues and Options document was published for consultation in April 2009 to inform the development of the Core Strategy. This acknowledges the air quality issue in Cross Street, Sudbury and identifies that the LDF can help in delivering good air quality by ensuring new development is located away from any sources of pollution and encouraging development in locations where the use of the private car is minimised. However, the Issues and Options document also identifies Sudbury as a location for both housing and retail growth. This clearly may have implications for the AQMA in Cross Street and further work will need to be undertaken through the LDF process to ensure that air quality is properly considered.

3.14 The Issues and Options document notes that the following improvements are already required in Sudbury (progress to date shown in brackets):

- *Belle Vue junction improvements (minor changes to improve pedestrian and cycle safety and minor alterations to the west of the junction in King Street to improve pedestrian flow);*
- *Sudbury bus station facilities and better rural bus interchange (currently on hold);*
- *A134/A131 roundabout - cycle safety scheme (recently completed);*
- *Improved access around the town for cyclists and pedestrians (identified in LTP3);*
- *Cross Street area traffic management (completed);*
- *Measures to improve air quality in particular areas of the town; and*
- *Sudbury Western bypass (long-term aspiration).*

3.15 Some of these measures will have a positive impact on the AQMA, although care will need to be taken to ensure that negative impacts are not experienced elsewhere. The route of the bypass is currently safeguarded in the adopted Local Plan. Consideration will be given to inclusion of the route in the Site Specific Allocations Document, as part of the LDF process.

3.16 Babergh District Council and Suffolk County Council have commissioned a review of the wider transport issues associated with planned residential and employment growth within Sudbury up to 2031 and the anticipated infrastructure requirements associated with such development. Given the short/medium term limitations in delivering significant transport infrastructure projects which could help to at least alleviate existing traffic issues within the town, this Sudbury Transport Study¹⁵ has focussed on identifying a range of transport measures which could help to promote sustainable travel behaviour, both in terms of existing movements and those likely to result from the proposed growth in the region. The Study has taken into account the air quality issues in Cross Street and

¹⁵ www.babergh-south-suffolk.gov.uk/NR/rdonlyres/1DA7D9E4-B6FD-40FA-A2ED-520F0DB9BF6C/0/SudburyTransportStudyAECOM.pdf

has recommended a package of measures which help to minimise the impact of the planned employment and residential growth on the town's local transport networks.

- 3.17 The Babergh District Delivery Plan 2011/12¹⁶ sets out the outcomes of the ten-year Strategic Plan (2008-2018) that the Council intends to achieve in the year 2011/1. This includes a target to publish this Air Quality Action Plan and commence implementation.

Policies on Climate Change

- 3.18 Suffolk Strategic Partnership's Community Strategy¹⁷ sets out an aim to be the 'greenest county', aiming to be the county with the greatest reduction in carbon emissions. Suffolk Strategic Partnership's Climate Change Action Plan¹⁸ sets out measures to achieve this goal. This includes specific objectives to improve air quality, and also to manage demand for travel alongside encouraging modal shift. All Suffolk local authorities are committed to improving air quality in designated AQMAs through the development and implementation of Air Quality Action Plans which will be integrated into the Local Transport Plan. These, and other actions, will contribute to the aims of this Air Quality Action Plan.

- 3.19 The Babergh District Council Carbon Management Plan¹⁹ sets out how the Council will work to reduce emissions of climate change gases in the district. The Medium Term Plan (3-years) aims to reduce the carbon footprint of selected estate by 30%, reduce the carbon footprint of the district and ensure the adoption of policies within the Local Development Framework to enhance, enable and improve climate change mitigation and adaptation. There are two actions identified for 2013/14 within the Carbon Management Plan that are specifically related to reducing vehicle emissions. These are:

- Initiate travel plans for contractors/staff to reduce transport mileage CO₂ emissions; and
- Driver training and fuel technology and maintenance initiative.

- 3.20 The Babergh District Delivery Plan 2011/12 also sets out specific targets in relation to climate change for the current year. This includes an aim to reduce the Council's own carbon dioxide emissions by 8% compared with the 08/09 baseline.

¹⁶ www.babergh.gov.uk/NR/rdonlyres/544B92AE-298F-4727-A38B-48156275F9B6/0/FINALDELIVERYPLAN201112_11Feb2011_.pdf

¹⁷ www.transformingsuffolk.co.uk/vision-and-priorities/community-strategy

¹⁸ www.greensuffolk.org/about/climate_change_in_suffolk

¹⁹ www.babergh.gov.uk/NR/rdonlyres/9305574D-7227-4CE9-9AC1-8F3C3CEE25C/0/K018App.pdf

4 Possible Measures for Delivering Air Quality Improvements in Cross Street, Sudbury

- 4.1 Participants at the Steering Group meetings on 19th August 2009 and 15th January 2010 identified the initial list of potential measures to be considered for inclusion in the Action Plan. This chapter briefly describes each of these measures, prior to their evaluation in the next chapter.
- 4.2 The measures are split into five 'categories' for ease of presentation. The categories are:
- Traffic Management
 - Lowering Emissions
 - Promotion of Alternatives
 - Planning
 - Education and Information.
- 4.3 For each proposed measure, this chapter identifies whether it has been discounted at this stage, or whether it will be taken forward for inclusion in the Action Plan. For those measures to be taken forward, some will require extra feasibility work prior to any final decision. This is also highlighted in this chapter.

Traffic Management

'Build-out' in Cross Street

- 4.4 **Remove 'build-out' in Cross Street.** The build-out was installed in the narrowest section of Cross Street in July 2005. It reduced the road to single carriageway width, so that northbound vehicles had to give-way to southbound traffic. This was installed for a trial period to prevent lorries mounting the kerb and causing damage to properties. The build-out led to an increase in congestion, as vehicles waited for on-coming traffic to pass, and to queues on Ballingdon Street, which were increasing emissions.
- 4.5 Reduction of this section to single carriageway focused all vehicle movement on one area of roadway, leading to damage to the carriageway. Suffolk County Council allocated funding in the budget for the 2009/10 financial year to deal with this damage, with the potential to include removal of the build-out and to narrow the carriageway by widening the footways. Suffolk County Council consulted residents and formal consultees on removing the build-out and amending on-street

parking in November 2009. Responses were generally supportive of removing the build-out but opposed the amendments to on-street parking provision²⁰ (see next section).

- 4.6 Removal of the build-out was completed in April 2010. This included widening the eastern footway, to allow a 4.9m carriageway with bollards on the pavement. This allows two cars, or a car and a lorry to pass each other but not two lorries. There therefore continues to be queuing when two lorries approach the area from opposing directions. However, this is significantly less frequently than when the build-out was in place.
- 4.7 During the work on the carriageway, Cross Street was closed for 5 weeks. During this period traffic was diverted via Church Street, Friars Street and Gainsborough Street.
- 4.8 Air quality model results in the Further Assessment indicate that the removal of the build-out will significantly reduce concentrations in Cross Street, near to the build-out (see Figure 3) and the northern section of Ballingdon Street (where queuing traffic is reduced). However, there are uncertainties associated with this modelling and results of monitoring in the area will need to be examined to determine how effective removing the build-out has been. These monitoring results will inform whether additional measures will be required in this area.

The effectiveness of the removal of the build-out will be reviewed as part of the Action Plan.

Parking Bays in Cross Street

- 4.9 **Amend on-street parking provision in Cross Street.** There are six parking bays in Cross Street, towards the northern end of Cross Street (as shown on Figure 3), which effectively reduce the road to single carriageway when they are occupied. These lead to congestion and queues as vehicles are required to give-way to on-coming traffic. In combination with the road narrowing at the build-out location, these bays lead to significantly increased vehicle emissions, as vehicles are required to accelerate and decelerate several times in this short section of road. Currently parking for up to 1-hour is allowed 8am to 6pm Monday to Saturday, with unrestricted parking outside these hours.
- 4.10 There is a fish and chip shop at No. 15 Cross Street, where there is a risk of unauthorised parking, if appropriate provision is not made for patrons. In addition, investigation may be required of alternative parking for residents and their visitors in the area.
- 4.11 In November 2009, consultation was carried out on amending on-street parking in Cross Street, in conjunction with consultation on removal of the build-out. This proposed prohibiting all parking in the existing bays between numbers 7 and 9 Cross Street at all times. In addition, it was proposed that in the parking bays near to the fish & chip shop:
- parking be prohibited between 7-11am and 2-6.30pm (to minimise the effect in peak periods)

²⁰ Consultation on Removing the Build-out and Amending Parking Provision at Cross Street, Sudbury. Suffolk County Council, January 2010

- parking be allowed for a maximum of half an hour 11am-2pm and 6.30-8.30pm
- parking be unrestricted between 8.30pm-7am and on Sundays.

- 4.12 Of the people who responded to the consultation, 64% opposed the proposal and only 5% were in support²², although it should be noted that the number opposed included a petition from the fish & chip shop. Apart from the impact on the fish & chip shop, the residents were also concerned about further restrictions, when parking available to residents is already limited.
- 4.13 Following the negative response, it was decided that the amendments to on-street parking would not be made in conjunction with the removal of the build-out. However, the report did recommend that the proposals be included in this Action Plan and the results of on-going monitoring be considered prior to implementation of further parking restrictions.
- 4.14 Air quality model results included in the Further Assessment indicate that removing these parking bays would significantly improve air quality in the vicinity. However, there are uncertainties associated with this modelling. Therefore air quality monitoring data following the removal of the build-out will be examined to determine whether removing this obstruction and narrowing the carriageway width has had an effect on air quality. Depending on the results of this monitoring it may be appropriate to consider again amendments to on-street parking provision. This may be received by residents more favourably if the air quality benefits are stated more clearly and also if possible alternative parking is provided at the same time.
- 4.15 Suffolk County Council has agreed to pursue the development of a Traffic Regulation Order to restrict parking on Cross Street. An Experimental Order is proposed to enable the impact of this measure to be monitored before any Permanent Order is made. This is to be on a 'short' timescale and is identified in Chapters 5 and 6 as being implemented within 1 to 2 years. They have also stated that they will endeavour to achieve an outcome within one year. The details of the Traffic Regulation Order may vary from those previously advertised.

Review Traffic Management in Sudbury

- 4.16 **Review traffic management in Sudbury.** There may be scope to reduce traffic flows on Cross Street by altering traffic management in the town. This could involve altering priorities at certain junctions or changing certain sections of road to one-way, to encourage people to use alternative routes. Such changes have the potential to have knock-on effects for air quality, noise and road safety in other areas. Therefore any such options would require detailed traffic and air quality modelling, with particular attention paid to lorry movements, as well as consideration of road conditions, such as severe bends and structural stability.
- 4.17 One possible option is implementation of a one-way system from the Cross Street/Church Street junction north to Gregory Street, and includes introduction of a one-way system from the junction of Friars Street/King Street, south to Cross Street and the introduction of signals at the junction of

Cross Street and Church Street to allow large vehicles to negotiate the bend in the road (see Figure 4). This option extends the one-way system within Friars Street, used during the Ballingdon bridge works.

- 4.18 Introduction of this system could potentially have effects across the town. Therefore detailed traffic and air quality modelling would be required in order to determine the extent of any negative effects outside the AQMA. Effects of controlled pedestrian crossings and traffic signals within the system will also need further investigation.

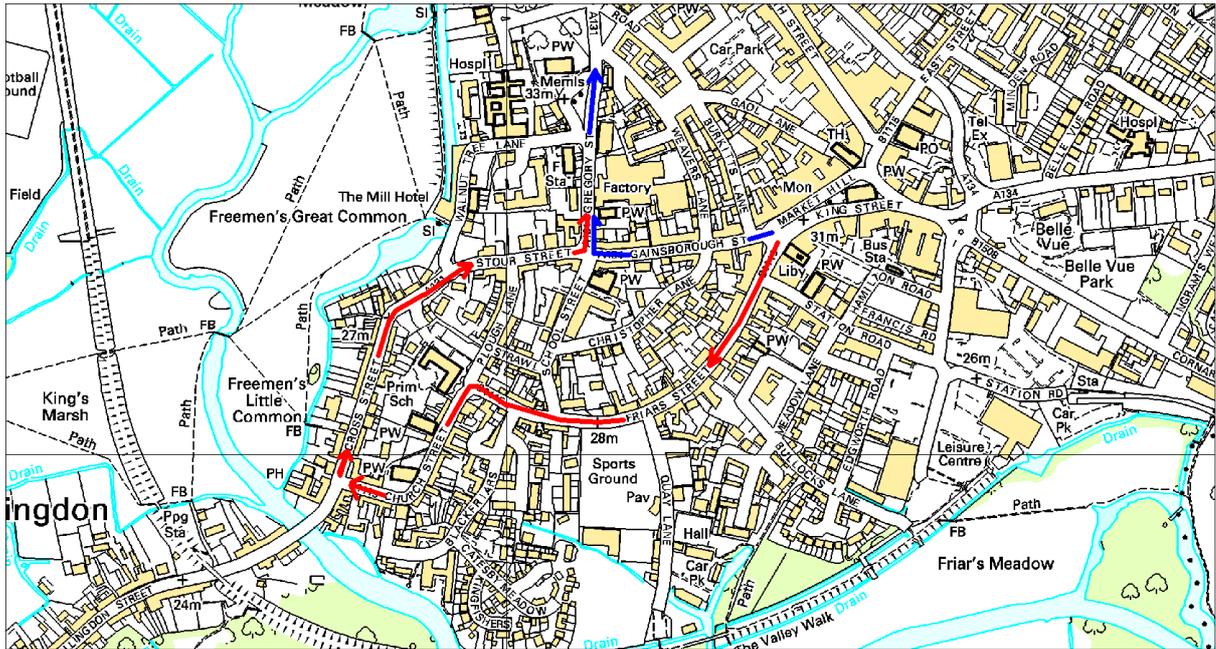


Figure 4 Possible one-way system in Sudbury

- 4.19 Initial air quality modelling carried out as part of the Further Assessment considered the effect of a one-way system on Ballingdon Street, Cross Street and Church Street only. This concluded that although such a system would reduce concentrations in Cross Street, there would be corresponding increases in concentrations in Church Street, although remaining below the annual mean objective. However, near to the junction with Cross Street (where traffic lights may be required) concentrations would be well above the objective.
- 4.20 Suffolk County Council is committed to carrying out a feasibility study into a range of traffic management options, for instance investigation of one-way systems, traffic and waiting restrictions. The Council has agreed to complete this by the end of the second year of the Action Plan and, have secured partial funding through Defra. This work has already commenced.

Bypass

4.21 **Sudbury Western Bypass.** The alignment for a Sudbury Western Bypass, which would remove traffic from Cross Street, in particular lorries, is protected in the adopted Local Plan. A business case was submitted to DfT in pursuit of funding in July 2003. However, in December 2003 Ministers rejected the proposal on the grounds that the benefits were outweighed by the adverse environmental impacts of the scheme. The decision letter stated that;

'You should consider the implementation of measures within the town centre to reduce and manage the impact of high traffic volumes. We recognise that these measures may not meet in full the objectives of the bypass and, therefore, you should monitor the situation over a number of years before any further consideration is given to bypassing the town.

4.22 The current Local Transport Plan states that "A western bypass has been identified as providing relief and removing vehicles to reduce congestion and improve air quality. A funding bid for the bypass was rejected by the Government in 2003 on environmental grounds. Delivery of a bypass solution in the future will require significant work to overcome these concerns".

4.23 A bypass would deliver significant air quality benefits within the AQMA, although it could have adverse impacts on landscape, biodiversity and heritage resources along the route. The costs of a bypass are significant and reliant on central government funding. In addition, the timescale for implementation is long-term (at least 10 years).

4.24 In order for a bypass to remain a viable option in the future it must be allocated in both the Local Development Framework and the Local Transport Plan. Therefore an action to lobby for retention of a scheme within these documents is a prerequisite for keeping the bypass option viable, as is the implementation of short and medium term management of the town centre traffic.

Redefine the Strategic Lorry Route

4.25 Initial air quality modelling carried out as part of the Further Assessment demonstrated that HGVs, although they make up a relatively small proportion of the total traffic volume (7.0% on Cross Street), have the largest impact on concentrations (contributing around 45% to nitrogen dioxide concentrations). This modelling indicates the potential effectiveness of reducing HGV emissions on pollutant concentrations.

4.26 Cross Street is part of a County and National Strategic route (see Figure 5). There are no reasonable alternative routes for vehicles travelling from the south towards Bury St Edmunds. One possible option for further investigation is to redefine the Strategic Lorry Route from the A131 south of Sudbury, onto the A134 (Figure 6). This would reduce the HGV traffic within Cross Street and provide more direct entry into Sudbury's Chilton Industrial Estate. The A134 is currently a Zone Distributor Lorry Route and extensive further discussions with Essex County Council and Colchester Borough Council will be required, together with the Road Hauliers and Freight

Transport Associations. An accident assessment will also be required, together with a review of directional signage in Suffolk and Essex and an air quality assessment of the new route. Suffolk County Council has sought funding from Defra and has commenced feasibility study work on this proposal.

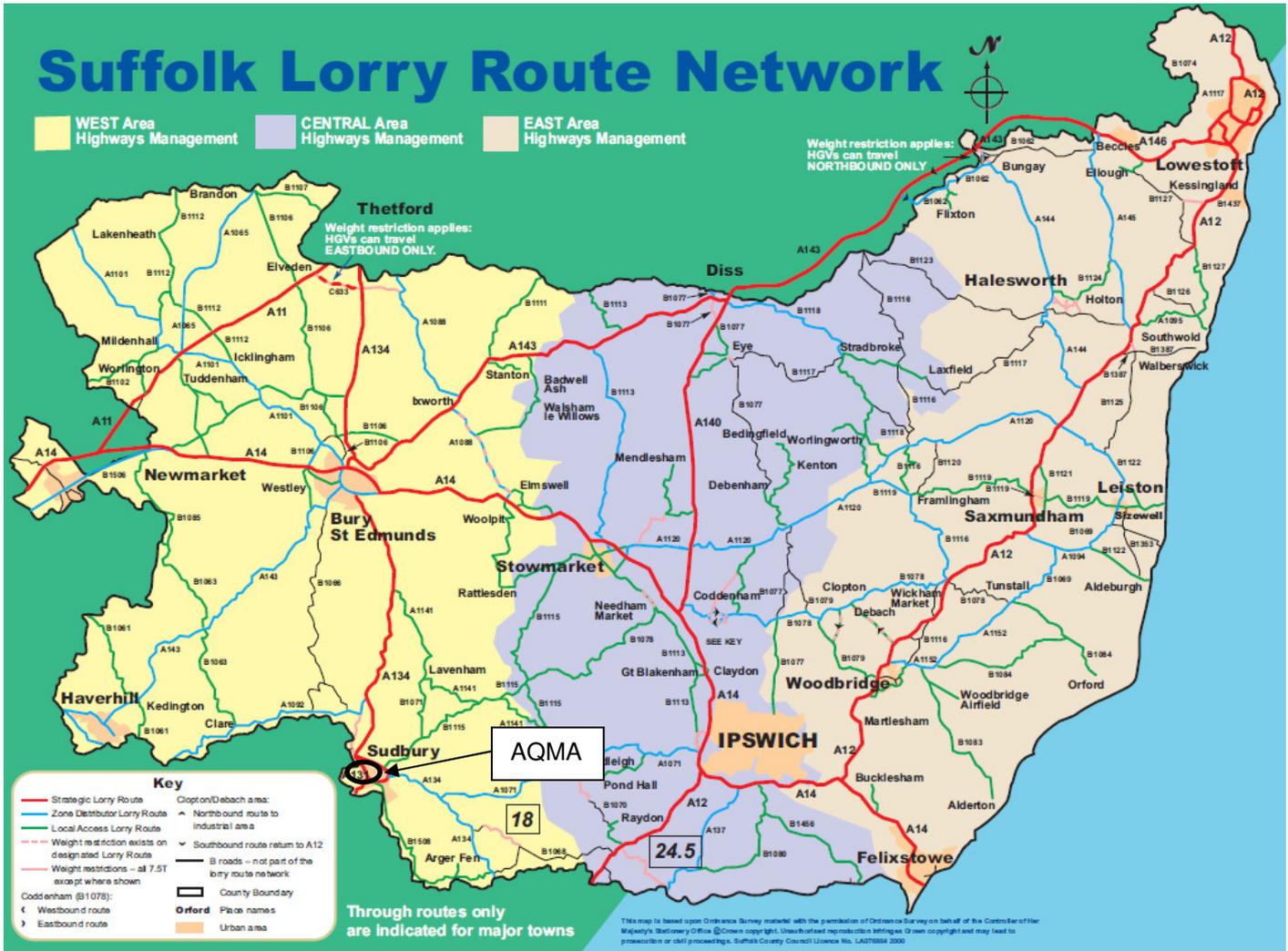


Figure 5 Existing Suffolk Lorry Route Network

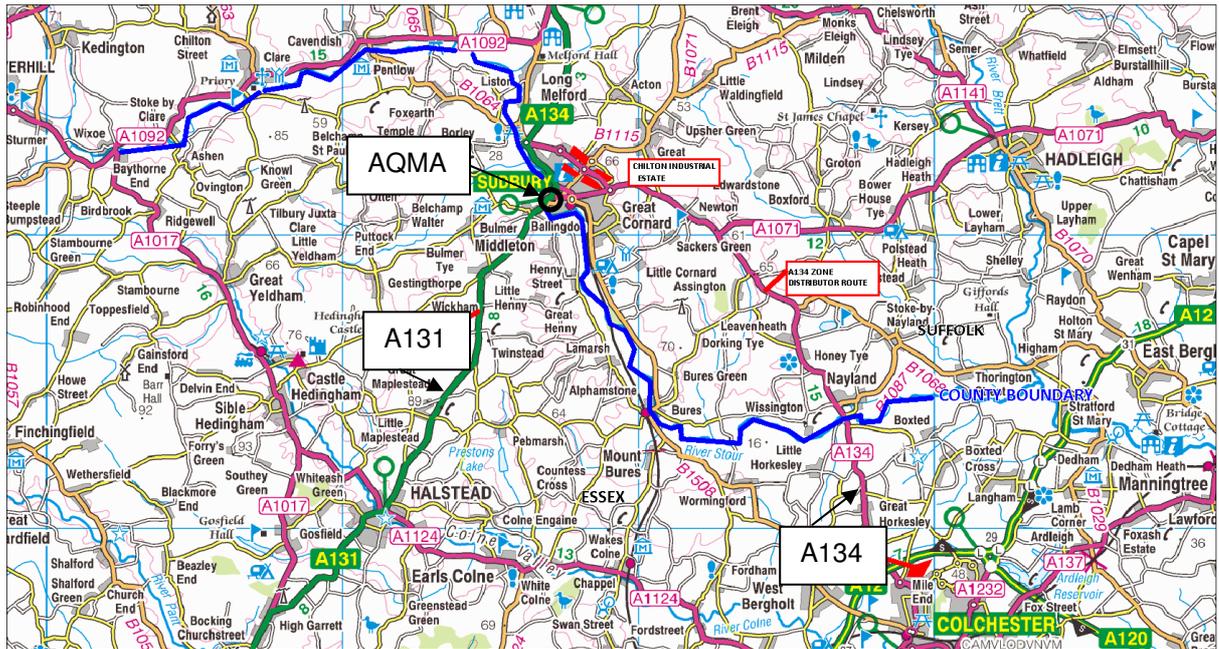


Figure 6 Sudbury Area Road Network

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Lowering Emissions

One-way Weight Restriction

- 4.27 Initial air quality modelling carried out as part of the Further Assessment considered the effect of a one-way system for HGVs on Ballingdon Street, Cross Street and Church Street only. This concluded that although such a system would reduce concentrations in Cross Street, there would be corresponding increases in concentrations in Church Street, particularly near to the junction with Cross Street, where concentrations would be well above the objective. Also HGVs tend to follow the main traffic flows and unless specifically directed by Satellite Navigation Systems, are likely to disregard the restriction.

This proposal has been discounted at this stage.

New junction on the A12

- 4.28 The scheme is situated on the A12 north of Colchester (Figure 7). The new junction has been completed and construction of a new Northern Approaches Relief Road linking it to the A134 is scheduled for completion in 2012. The new junction will provide the transport infrastructure required to enable the development of substantial housing and employment opportunities to the north of Colchester. It will also improve access to and from the A12 for existing businesses and residents.

4.29 The new junction will serve an area of redeveloped land collectively referred to as Cuckoo Farm, which incorporates the new Colchester United Football Club stadium and other mixed uses. It will form a direct link between the A12 and the new Northern Approaches Relief Road and will also serve a relocated BP Service Area and a possible Park and Ride facility.

Features of the scheme are:

- New exit and entry slip roads to and from the northbound and southbound carriageways of the A12 trunk road;
- New roundabouts either side of the A12 trunk road;
- A three lane bridge over the A12 trunk road linking the new roundabouts;
- A three lane road between the new roundabout on the south side of the A12 trunk road and the stadium roundabout;
- An underpass for pedestrian and cycle use;
- Highway lighting at the junction; and
- Drainage and landscaping.

4.30 This scheme would make it more attractive to travel to the north of Sudbury via the A134, than the A131 (see Figure 6) and thus potentially reduce the amount of long-distance traffic travelling along Cross Street. This would have a beneficial impact on air quality in the AQMA, however, there would be potential negative impacts on air quality at receptors alongside the alternative route. However, HGV routes and journey patterns can be complex and it is not possible to accurately determine the number of HGVs that would reassign from the A131 onto the A134. Signage for vehicles travelling to the north will be discussed with Essex County Council and the Highways Agency to determine if vehicles can be encouraged to avoid Cross Street.

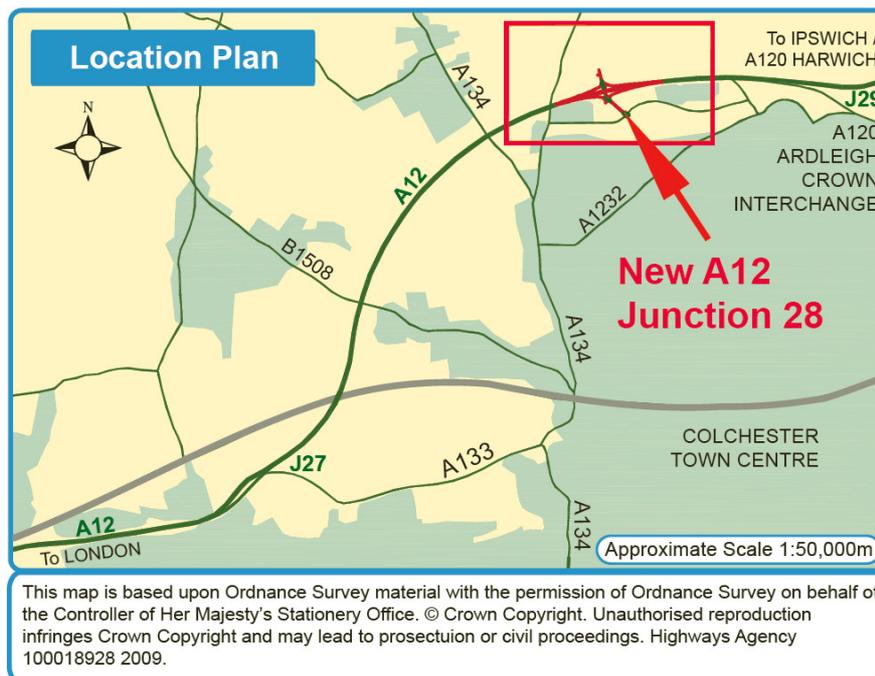


Figure 7 New A12 Junction near Colchester

Freight Quality Partnership

4.31 **Initiate discussions with the Freight Quality Partnership.** Suffolk County Council is a member of the East of England Freight Quality Partnership. This group looks at the regional and national issues of freight transportation in the region. As a group in recent times they have looked at the environmental impacts HGVs have on the rural areas of the region and are committed to ensuring that freight is kept to the agreed freight network within the region. This they feel can be done, but there is a need to ensure that county freight maps are consistent with neighbouring counties. One of the group's medium term aspirations is to have a regional freight map with a view that this could be a catalyst for a national map in the future, which could form the bases of the next generation of "lorry friendly" Satellite Navigation Systems. Further discussions will be carried out with the group to disseminate information about the nature of the AQMA in Cross Street, Sudbury.

Low Emission Zones

4.32 **Investigate Low Emission Zone (covering HDVs).** Low Emission Zones (LEZs) are defined areas that restrict entry to vehicles meeting certain emissions criteria or standards. The objective of LEZs is to accelerate the introduction of cleaner vehicles into the fleet and reduce the number of polluting vehicles in order to improve local air quality, and not to reduce numbers of vehicles. Such zones have been successfully operated in other European Countries such as Sweden for many years. A Low Emission Zone covering most of Greater London was designated in February 2008, within which diesel-engined lorries, buses, coaches, large vans and minibuses are required to

meet specific emissions standards, or pay a daily charge. LEZs do not have to be implemented over large areas such as Greater London, or cover large numbers of vehicle types. In Oxford an LEZ to be introduced in 2013 to cover buses in the town centre. Norwich City Council, in conjunction with Norfolk County Council has implemented a LEZ in a restricted area by obtaining a Traffic Regulation Condition (TRC) via the area Traffic Commissioner to regulate vehicle emissions from buses. In Norwich this has been undertaken in conjunction with other measures such as eco-driving training for bus drivers and a 'switch-off' campaign.

- 4.33 As discussed above, Cross Street is a County and National strategic route and therefore an LEZ is not likely to be appropriate.

This proposal has been discounted at this stage.

Council-wide Measures to Reduce Emissions

- 4.34 **Support the Babergh District Council Carbon Management Plan.** The Babergh District Council Carbon Management Plan¹⁹ sets out how the Council will work to reduce emissions of climate change gases in the district. There are two actions identified for 2013/14 within the Carbon Management Plan that are specifically related to reducing vehicle emissions. These are:

- Initiate travel plans for contractors/staff to reduce transport mileage CO₂ emissions; and
- Driver training and fuel technology and maintenance initiative.

Both of these actions have the potential to reduce emissions of nitrogen oxides within Sudbury and are thus complementary to the aims of this Action Plan. It is therefore appropriate to support the achievement of these actions and include them as targets with this Action Plan.

- 4.35 **Support the Suffolk Climate Change Action Plan.** The Suffolk Climate Change Action Plan (SCCAP) sets out a number of actions and targets in relation to reducing emissions of greenhouse gases in the county. Many of these actions will also contribute to reductions in nitrogen oxides emissions and thus assist in reducing background nitrogen dioxide concentrations across Suffolk. Babergh District Council and Suffolk County Council will therefore endeavour to support and contribute to the SCCAP wherever possible.

Promotion of Alternatives

Public Transport

- 4.36 **Improve local promotion of public transport services.** Suffolk County Council actively promotes use of public transport via the suffolkonboard.com website and various other 'Get on Board' branded publicity material. However, there is less local promotion of public transport within Babergh or Sudbury. It is therefore proposed that checks are made to ensure that the Sudbury 'Get on Board' leaflet is freely available in all relevant locations, such as the library, bus and railway stations.

Travel Plans

- 4.37 **Review staff travel plan.** As part of its strategic planning process for the medium term (2010-2013) Babergh District Council has undertaken to develop a new Green Travel Policy and Action Plan covering its own activities and employees. Babergh already has a car sharing scheme in place for its employees, but the Council will also seek to encourage more employees to choose non-car modes of transport.
- 4.38 **Encourage uptake of business travel plans.** Suffolk County Council is currently reviewing business travel plan provision and will identify businesses in the area that can be targeted. It has a Travel Plan Support Pack available for businesses, which can be found at www.suffolktravelplans.com/workplace-travel-plans.asp. There is scope to investigate the feasibility of increased involvement with businesses. However, there is a potential conflict with encouraging businesses to develop Travel Plans when free parking is available in Sudbury.
- 4.39 **Residential travel planning.** Suffolk County Council has included a section on residential travel planning on its website www.suffolktravelplans.com/residential-travel-plans.asp. Travel Plans are already a requirement for inclusion in s106 Agreements for all sizeable new developments such as Chilton Woods, and this will continue to be the case. This initiative is considered further under the section on 'Planning' below.
- 4.40 **Personalised travel planning.** Suffolk County Council has carried out a large-scale personalised travel planning project in Lowestoft. A smaller scale project, including a map guide, could be effective in Sudbury
- 4.41 **Promote personal journey planning websites (such as www.travelinesoutheast.org.uk/ or www.transportdirect.info).** These are websites which provide information on journeys door to door for buses, trains, walking, cars etc., and make comparisons for the specific journey being undertaken. This could be a very cost effective option and as the websites are up and running and could be promoted through (for example) links on how to get to particular council services/buildings etc.
- 4.42 **School travel plans.** All schools in Sudbury and the surrounding area now have School Travel Plans. A number of initiatives have been investigated with St Gregory's Primary School in Church Street, which have included a Park & Stride Scheme with parents parking in the Leisure Centre Area, and children walking along Friar's Street. However the pavements were found to be too narrow for safe walking. Cycle storage at the school has been improved and Junior Road Safety Officers designated. An idea for an incentive scheme to encourage walking has also been put forward and a poster competition to discourage parking. Currently 54% walk to school and 8% cycle, with the remainder coming by car or taxi. Numbers at the school are expected to increase in the next two years when pupils up to Year 6 will be admitted. All schools are encouraged to keep their Travel Plans up to date and Suffolk County Council continues to work with them.

Car sharing

- 4.43 **Promote car sharing scheme.** Car sharing refers to the practice of two or more people sharing a single car rather than driving alone. Local and national websites such as www.suffolkcarshare.com and www.nationalcarshare.co.uk provide a useful database for finding and offering lifts both on a regular basis, but also for one-off journeys and events. Babergh District Council (maybe as part of its Travel Plan review) could continue to promote car sharing through these established websites and their own website.

Cycling and Walking

- 4.44 Cycling is integrated into the LTP as a part of the Transport Strategies for individual towns and also for Suffolk as a whole. Further work is in progress and will be developed in the implementation of LTP3.

Car Parking

- 4.45 **Introduce car parking charges.** Parking charges can assist in discouraging journeys by car and encouraging walking, cycling and use of public transport and also the development of Business Travel Plans. In October 2010 Babergh District Council introduced charging for use of its long-stay spaces in the Station Road Car Park (Kingfisher Leisure Centre) and The Station Car Park in Sudbury. No charges are made for short-term use of Babergh District Council's car parks in Sudbury or for on-street car parking in the town. This situation will be monitored as part of the Air Quality Action Plan and the free parking policies for short stay and on-street parking will be reviewed.
- 4.46 **Decriminalise parking.** Illegally parked vehicles on roads during the rush hour can cause significant congestion, and associated additional pollution. Decriminalised parking enforcement means that most non-endorsable parking offences become enforceable by the local authority rather than the police, with local authorities able to retain the penalties collected. These changes are available under powers available to local authorities under the Road Traffic Act 1991. A review of decriminalised parking across the County had been proposed, but is unlikely to proceed in the near future due to lack of funding.

Planning

Review Planning Guidance

- 4.47 **Review Suffolk Supplementary Planning Guidance/Protocol at regular intervals.** The Suffolk Air Quality Management Group, which includes Babergh District Council, has prepared a draft Supplementary Planning Guidance/Protocol on Air Quality Management and New Development which is expected to become available at the end of 2011. Its two principal aims are to maintain and where possible improve air quality and ensure a consistent approach to local air quality

management and new development across the county. The document sets out circumstances when an air quality assessment may be required and provides details of the information expected within such an assessment. It also suggests possible mitigation measures that could be introduced. It will be important to keep this document under review to ensure that it remains consistent with current good practice and that it contains appropriate provision for developments in or affecting the AQMA.

- 4.48 **Review Local Validation Document** It is important to ensure that air quality issues are taken into consideration in all relevant planning applications. Therefore a review of the requirements for air quality information accompanying planning applications which is governed by the Local Planning Authority's Local Validation Document will be carried out. A review would ensure the document is 'fit for purpose' and informs developers of the type and nature of developments that require information to accompany their applications.
- 4.49 **Develop formula for s106 contributions.** Future developments could have a significant impact on the AQMA. Therefore consideration will be given to developing a transparent and enforceable formula that could be applied for calculating contributions from developers towards the Air Quality Action Plan. Any such formula will need to comply with the recently introduced Community Infrastructure Levy Regulations 2010. A Suffolk wide group is currently considering the potential use of s106 contributions for funding measures to mitigate air quality impacts, which will be included in Supplementary Planning Guidance on s106 Agreements.
- 4.50 **Include residential/business Travel Plans in s106 Agreements.** Suffolk County Council already requires residential or business Travel Plans to be included in the s106 Agreements for all sizeable developments. This will continue to be the case for future applications.

Consultation on Planning Applications

- 4.51 **Review consultation mechanism between the Environmental Protection and Planning departments.** At present Babergh District Council's Environmental Protection Department is generally only consulted on air quality considerations for major planning applications. However, there may be smaller applications that could introduce new or additional public exposure, affect dispersion of pollutants or increase emissions within areas of potentially poor air quality.
- 4.52 The draft Suffolk Supplementary Planning Guidance/Protocol requires consideration of air quality as part of the review of all routine applications. An internal mechanism should therefore be developed for ensuring that air quality impacts are considered in relation to any planning application that may be affected by or have an affect on areas of potentially poor air quality.

Development in Cross Street

4.53 **Restrict development in Cross Street.** There are three ways that development in Cross Street could affect the AQMA. These are:

- generate additional traffic movements;
- increase relevant exposure; and
- increase the 'canyon-effect'.

4.54 The first two effects are likely to occur as a result of intensification of use. The 'canyon-effect' is most likely if development is proposed alongside the road, on the site of the existing garage. Any developments within Cross Street that would give rise to these effects would therefore need to be very carefully scrutinised.

Chilton Mixed-use Development

4.55 **Obtain support for the Air Quality Action Plan from the developers of the Chilton mixed-use development.** The Chilton mixed-use development to the north of Sudbury is allocated in the adopted Local Plan. This could provide around 700 new dwellings plus employment opportunities and local facilities. The Local Plan acknowledges that a package of measures will be required to ensure that the development does not have a detrimental impact on people living adjacent to major traffic routes. A Masterplan for the site is currently being developed. This large development on the outskirts of Sudbury provides an opportunity to improve walking, cycling and public transport provision in the town. It may also be possible to obtain contributions to traffic management schemes via section 106 contributions from developers.

4.56 **Specify lorry routes to and from the Chilton development.** There is scope to minimise the impact of heavy vehicles during the construction phase by attaching a condition to the planning permission specifying routes for construction vehicles travelling to and from the site that avoid the AQMA, and if possible, the centre of Sudbury.

Bus Station Redevelopment

4.57 **Ensure that the redevelopment of Sudbury bus station does not have a negative impact on the AQMA.** Babergh District Council has published a Supplementary Planning Document covering the redevelopment of the area around the bus station in Sudbury²¹. These proposals could have implications for the AQMA and affect measures for traffic management in the town. Therefore a watching brief is proposed to ensure that the Environmental Protection Department is consulted at every stage of the process to ensure that the development does not have a negative impact on the AQMA. The redevelopment of the bus station also provides an opportunity to promote public

²¹ Development Brief Hamilton Road Quarter, Sudbury Town Centre. Policy SD06 Supplementary Planning Document. Babergh District Council, March 2010.

transport in the town. Any expansion of bus services should, however, be based on the cleanest vehicles, otherwise air quality could deteriorate in Sudbury.

Local Development Framework (LDF)

- 4.58 **Ensure air quality policies are included in LDF documents.** It is imperative that appropriate air quality policies are included in all the relevant LDF documents, as new developments must be considered in relation to these policies. The presence of a suitable air quality policy, or policies, will be particularly useful where a refusal of planning permission leads to an appeal and subsequent public inquiry. Therefore appropriate policies should be developed in Babergh District Council's LDF.

Education and Information

Raising awareness

- 4.59 **Provide information about the AQMA to local schools.** All local authority schools in Suffolk now have travel plans in place. The aim of these plans is to ensure that children are happy cycling and walking to school and that the parents have the confidence to let them. Providing additional information to local schools about the AQMA may help to further encourage people to choose non-car modes of transport for travelling to and from school.
- 4.60 **Provide information about the AQMA to local residents.** The recent consultation on the removal of the build-out and parking bays did not include any detailed information on the nature of the air quality problem in the AQMA or the possible air quality benefits of removing the bays. If residents are provided with information about air quality and the extent of the exceedence it may help them to understand why removing the parking bays would be beneficial. Local residents should therefore be made aware of the issues within the AQMA.

Air Quality Monitoring

- 4.61 **Continue air quality monitoring.** In order to determine the effectiveness of the Air Quality Action Plan it is essential that air quality monitoring continues inside and adjacent to the AQMA. Publication of this information is a useful tool to raise awareness of air quality issues. Air quality monitoring will be required to assess the effectiveness of the Air Quality Action Plan in pursuing achievement of the air quality objectives.

Information on Traffic Flows

- 4.62 **Carry out regular classified vehicle counts.** To fully understand the nature of the air quality problem and effectively target actions, it is important to understand the composition of traffic within the AQMA. A significant amount of data has already been collected, but regular classified traffic counts should be carried out and a bid for further funding has been submitted. Traffic flow requirements including the collection of queue data and also identification of suitable counting sites

will be reviewed and an appropriate counting regime implemented. It will also be helpful to understand why these vehicles are travelling through the AQMA. This could be achieved through origin and destination surveys.

Specific Events

- 4.63 **Specific events e.g. cycle-to-work week, European Car Free Day.** Travel awareness campaigns, such as 'Travelwise' or 'In town without my car' use a wide range of media aimed at improving general public understanding of problems resulting from transport choices, and what can be done to solve these problems including changing individuals own behaviour. As well as focusing on local environmental and health impacts, travel awareness campaigns also aim to provide information on the facilities available for walking, cycling and public transport use. A review of the impact of these types of awareness-raising events suggests that some campaigns (notably the road safety TV campaigns, which were relatively high budget and high profile) can reach awareness levels of 70% or more. However, it is more common for 20-40% of residents to become aware of travel awareness campaigns and their messages. The effect of this increased knowledge on car use is more difficult to assess, but results suggest that the amount of behaviour change achieved is variable depending on the degree of targeting, intensiveness and the nature of intervention.

Other

Do-nothing

- 4.64 The monitoring and modelling results indicate that annual mean nitrogen dioxide concentrations at locations of relevant exposure are up to $60 \mu\text{g}/\text{m}^3$ (i.e. $20 \mu\text{g}/\text{m}^3$ above the objective of $40 \mu\text{g}/\text{m}^3$). If an Action Plan is not implemented, the objectives will continue to be exceeded for the foreseeable future. Doing nothing is not an option, as it runs counter to the legislation requiring local authorities to develop an Action Plan in pursuit of meeting the objectives.

This proposal has been discounted at this stage.

5 Evaluation of Measures

5.1 The identified measures have been set out in the following tables, and evaluated against four specific criteria:

- air quality impact (i.e. reduction in emissions or concentrations);
- cost of measure;
- feasibility or practicability of option (including the wider non-air quality impacts); and
- timescale for implementation.

Air Quality Impact

5.2 Air quality impacts have been classified using a scale from 'low' to 'high' impact. For each measure, the expected reduction in annual mean nitrogen dioxide concentrations has been determined based on professional judgement, drawing wherever possible on experience gained from other studies. The following classification scheme has been used:

Low: *imperceptible* (a step in the right direction). Improvements unlikely to be detected within the uncertainties of monitoring and modelling;

Medium: *perceptible* (a demonstrable improvement in air quality). An improvement of up to $2\mu\text{g}/\text{m}^3$ NO_2 , which could be shown by a modelling scenario. Improvement is not likely to be shown by monitoring due to confounding factors, in particular the weather; and

High: *significant*. Improvement of more than $2\mu\text{g}/\text{m}^3$ NO_2 . Can be clearly demonstrated by modelling or monitoring (a significant improvement may only be achievable by a package of options rather than by a single intervention).

Cost

5.3 The implementation of the measures set out in this Action Plan is dependent on securing a sufficient and consistent level of funding both to support any additional staff that may be required, and to deliver the programme. In line with current Government guidance, it is not necessary to carry out a detailed cost-benefit analysis. Rather the aim is to provide a broad indication of costs so that the proposed measures can be ranked according to the cost and the expected improvement to air quality. A scale from 'low' to 'high' costs has been used, as follows:

- **'Zero'**, funding already obtained/allocated
- **'Low'** cost is expected to be under £25K,
- **'Medium'** cost is £25-100K, and
- **'High'** cost is over £100K.

Feasibility

5.4 The feasibility of individual measures is not straightforward to quantify. The following factors have been taken into consideration:

- Alignment / synergies with other Babergh District Council and Suffolk County Council initiatives, strategic initiatives, regional planning strategies or Local Transport Plans;
- Wider non-air quality impacts (social, environmental or economic);
- Stakeholder acceptance / “political” feasibility; and
- Source of funding available or possible.

The Feasibility has been classified as “low” to “high” feasibility:

- **Low feasibility**
- **Medium feasibility**
- **High feasibility**

Ranking of measures

5.5 In order to give a ranking to the options, a combined assessment of air quality impact, cost and feasibility is required. This ranking is qualitative and allows a relative view of the various measures to be undertaken, within each category. It is important to note that the rankings are within each category and comparisons should not be made between categories. For example, the measure ranked 1st within ‘promotion of alternatives’ may not necessarily be ranked overall higher than the measure ranked 3rd within the ‘traffic management’ category. The final selection of measures to be incorporated into the Action Plan **will not rely solely on this ranking**, but will also be influenced by other criteria such as whether it is likely to be included for funding within other Council budgets, whether the wider benefits mean that it is implemented even though the air quality benefits may not be as good as another measure.

Timescale

5.6 The timescale for the implementation of measures has also been considered. The following classifications have been used; **Short-term** relates to those measures that can be implemented within 1-2 years; **Medium-term** relates to those implemented within 3-5 years; **Long-term** options are those which are 6+ years (i.e. those potentially subject to feasibility studies at this stage, and be considered for implementation in future rounds of Local Transport Plans).

5.7 These timescales are also indicated in the following tables, and their consideration will also influence the measures chosen for the Action Plan.

5.8 Timescales for those measures to be taken forward have been refined in section 6 with more specific timescales included where possible.

Table 2 Evaluation of Traffic Management Measures

Traffic Management						
Proposed Measure	Impact on air quality	Cost	Feasibility	Responsible Authority	Timescale	Ranking ^a
Remove 'build-out in Cross Street and widen footways	H	N/A	H	SCC	Complete	1
Remove parking bays in Cross Street	H	L	M	SCC	Short	2
Redefine Strategic Lorry route	H	M	M	SCC/ECC	Medium	3
Feasibility study into local traffic management options	L	M	H	SCC	Short/Medium	4
Western bypass	H	H	L	SCC	Long	5

^a Within Traffic Management category. It is important to note that the rankings are within each category and comparisons should not be made between categories.

Table 3 Evaluation of Measures to Lower Emissions

Lowering Emissions						
Proposed Measure	Impact on air quality	Cost	Feasibility	Responsible Authority	Timescale	Ranking ^a
Support BDC Carbon Management Plan	L	L	H	BDC/SCC	Short	1
Support Greenest County initiative	L	L	H	BDC/SCC	Short/Medium	2
Engage with Freight Quality Partnership	L	L	H	SCC	Short	3
A12 junction changes/signage linked to Colchester development	M	L	H	SCC/Essex CC/HA	Short	4

^a Within Lowering Emissions category. It is important to note that the rankings are within each category and comparisons should not be made between categories.

Table 4 Evaluation of Measures to Promote Alternatives

Promotion of Alternatives						
Proposed Measure	Impact on air quality	Cost	Feasibility	Responsible Authority	Timescale	Ranking^a
Improve local promotion of public transport	L	L	H	BDC/SCC	Short	1=
Promote car sharing	L	L	H	BDC/SCC	Short	1=
Review BDC Travel Plan	L	L	H	BDC	Short	2=
School Travel Plans	L	L	H	SCC	Short	2=
Encourage the implementation of Business Travel Plans in Babergh	L	L	H	SCC	Short	3
Introduce long stay car parking charges	L	N/A	M	BDC	Complete	4
Review short stay and on-street car parking	L	L	M	BDC/SCC	Medium/Long	5
Cycling/Walking	L	L	M	SCC	Medium/Long	6
Promote personalised travel planning	L	M	M	SCC	Medium	7
Decriminalise parking	L	H	M	SCC/BDC	Long	8

^a Within Promotion of Alternatives category. It is important to note that the rankings are within each category and comparisons should not be made between categories.

Table 5 Evaluation of Planning Measures

Planning						
Proposed Measure	Impact on air quality	Cost	Feasibility	Responsible Authority	Timescale	Ranking^a
Continue consultation between Environmental Protection and Planning	L	L	H	BDC	On-going	1
Ensure air quality policies in LDF documents	L/M	L	H	BDC	Short	2
Restrict development in Cross Street	M	L	H	BDC	On-going	3
Consider development of formula for s106 contributions	L/M	L	M	BDC	Short	4
Review Local Validation Document	L	L	H	BDC	Short/Medium	5
Ensure that s106 Agreements for all reasonable size developments include a requirement for residential and/or business Travel Plans	L	L	H	BDC	Short	6
Ensure that Bus station redevelopment does not have negative impact on AQMA	L	L	H	BDC	Short	7
Obtain support for the AQAP from the Chilton developers	L	L	H	BDC	Short/Medium	8
Specific lorry routes to Chilton development and designated lorry park	L/M	L	H	BDC	Short/Medium	9
Review Suffolk Supplementary Planning Guidance/Protocol at regular intervals	L	L	H	BDC/SCC/All Suffolk local authorities	On-going	10

^a Within Planning category. It is important to note that the rankings are within each category and comparisons should not be made between categories.

Table 6 Evaluation of Measures to Improve Education and Information

Education and Information						
Proposed Measure	Impact on air quality	Cost	Feasibility	Responsible Authority	Timescale	Ranking ^a
Provide information about the AQMA to local schools as part of School Travel Plans	L	L	H	SCC	Short	1=
Provide information about the AQMA to local residents	L	L	H	BDC	Short	1=
Continue air quality monitoring	L	L	H	BDC	On-going	2
Frequency and method of traffic counting to be reviewed and regime implemented	L	L	H	SCC	On-going	3
Specific events e.g. cycle to work week, European car free day	L	L	H	SCC	On-going	4

^a Within Education and Information category. It is important to note that the rankings are within each category and comparisons should not be made between categories.

6 Implementation and Monitoring

6.1 Babergh District Council will work jointly with all relevant partners, particularly Suffolk County Council, Essex County Highways, planners and transport operators to implement the Action Plan measures. To secure the necessary air quality improvements there must be involvement by all local stakeholders and Babergh District Council will work to ensure this happens. A technical working group will continue to meet as measures are implemented, both to ensure implementation progresses and to amend the Action Plan in future if necessary.

6.2 Ultimately the delivery of this Action Plan is dependent on adequate levels of resourcing, both for capital costs and staffing. At this stage, there are a number of funding sources which could be investigated:

- **Defra Air Quality Grant Programme.** A joint application was submitted by Suffolk County Council and Babergh District Council for an Air Quality Grant from Defra for £57,500. This was requested to cover feasibility studies into potential traffic management options including a one-way system and diverting the strategic lorry route. Defra has awarded a partial grant of £30,730 for 'traffic and air quality scenario modelling specific to the AQMA' and work is progressing.

- **Local Transport Plan Funding.** A further potential source of funding for measures to improve air quality is the Local Transport Plan (LTP). LTPs, for the first two planning cycles have been implemented on a 5 year basis and the next bidding document LTP3 has been completed in 2011. At present the criteria for the next round of LTP funding are unclear, however, measures within this Action Plan will be given consideration for inclusion.
- **Local Sustainable Transport Fund.** The Government has recently announced plans for a Local Sustainable Transport Fund. It will be available to local authorities to develop, *'packages of measures that support economic growth and reduce carbon in their communities as well as delivering cleaner environments, improved safety and increased levels of physical activity'*. Details of how the fund will operate are available.
- **Climate Change Funding.** Some of the actions identified in the Babergh District Council Carbon Management Plan are complementary to those within this Action Plan. Many of the measures in the Carbon Management Plan have already had funding sources identified. These include initiation of contractor travel plans and driver training.
- **Section 106 Agreements.** There is a potential opportunity to obtain contributions towards certain measures as part of s106 Agreements for specific developments that may have an impact on the AQMA.

6.3 The implementation and effectiveness of the AQAP will be carefully monitored through the monitoring of nitrogen dioxide concentrations at relevant locations within the AQMA. In addition, other indicators such as traffic flow, proportions of different categories of vehicles, use of public transport and levels of cycling will be incorporated (through the LTP monitoring process). There will be regular reviews of the Action Planning proposals, which will be reported on an annual basis to Defra and the public. These reviews will include both direct air quality monitoring information, as well as information on proxy measures for monitoring specific proposals (for example, number of school travel plans implemented or increases in bus patronage). The following tables include, where possible, targets for each measure and a more refined timescale for implementation.

Air Quality Action Plan

Table 7 Traffic Management Measures and Targets

Traffic Management			
Proposed Measure	Target	Responsible Authority	Timescale
Remove 'build-out' in Cross Street and widen footways.	Removal of build-out and widening of footways to allow cars to pass simultaneously	SCC	Complete
	Review air quality monitoring data to determine impact of removing build-out	BDC	Complete
Remove parking bays in Cross Street	Carry out consultation on removing some or all parking bays	SCC	Early 2012
	Progress Experimental Traffic Regulation Order to remove bays.	SCC	2012
Investigate redefining Strategic Lorry Route	Accident assessment of A134 corridor	SCC	2011/12
	Consultation with Essex CC and other relevant bodies	SCC	2011/12
	If strategic HGV route is changed, production of new lorry maps	SCC	2012
Traffic management in Sudbury	Undertake feasibility study of traffic management in Sudbury	SCC	2011/12
	Carry out air quality modelling	SCC/BDC	2011/12
	If determined as appropriate, implement changes to traffic management	SCC	Beyond 2013
Western bypass	Retain western bypass in LTP3	SCC	Complete
	Raise awareness of air quality issues and lobby for support for Bypass	BDC/SCC	Beyond 2015
	Prepare business case, if funding becomes available	SCC	Beyond 2015

Table 8 Measures and Targets to Lower Emissions

Lowering Emissions			
Proposed Measure	Target	Responsible Authority	Timescale
Support BDC Carbon Management Plan	Carry out driver training	BDC	2012/14
	Initiate contractor travel plans	BDC	2013/14
Support Greenest County initiative	Implement Suffolk Strategic Partnership's Climate Change Action Plan	BDC/SCC	On- going
Engage with Freight Quality Partnership	Make FQP aware of AQMA	BDC/SCC	By December 2011
	2-way sharing of relevant information	BDC/SCC	By December 2011/On-going
A12 junction changes/signage linked to Colchester development	Contact Essex CC/HA to discuss signage plans	SCC	By Spring 2011

Table 9 Measures and Targets to Promote Alternatives

Promotion of Alternatives			
Proposed Measure	Target	Responsible Authority	Timescale
Improve local promotion of public transport	Add local public transport info to BDC website	BDC	2011/12
	Ensure 'Get on Board' leaflet readily available in bus/rail station, libraries etc in Sudbury	BDC	2011/12
Promote car sharing	BDC/SCC to continue promoting for staff	BDC/SCC	Ongoing
	Research feasibility of promoting with wider business community as part of business travel plans	BDC/SCC	Ongoing
	Already promoted in school travel plans where appropriate	SCC	Ongoing
Review Babergh DC Travel Plan	Develop new Green Travel Policy	BDC	2012
	Prepare new Green Travel Action Plan	BDC	2013

Promotion of Alternatives			
School Travel Plans	Contact Schools closest to the AQMA to ensure Plans are kept up to date and to raise awareness of air quality	SCC	Ongoing
Encourage the implementation of Business Travel Plans in Babergh	SCC to continue engagement with businesses on development of business travel plans	SCC	Ongoing
	SCC to investigate the feasibility of increased involvement with businesses	SCC	2012
Review car parking charges	Introduce charging for long-stay spaces in Station Road Car park and The Station Car Park in Sudbury	BDC	Complete
	Review free parking policies for short stay and on-street parking	BDC/SCC	Beyond 2013
Cycling & walking	Include measures to make cycling and walking more attractive within LTP3	SCC	Complete
Promote personalised travel planning	Investigate feasibility of small-scale project, possibly including map guide	SCC	2013
	Create links to the BDC and SCC websites	BDC/SCC	2011/12
Consider Decriminalising parking	Carry out review	SCC/BDC	Beyond 2013

Table 10 Planning Measures and Targets

Planning			
Proposed Measure	Target	Responsible Authority	Timescale
Review consultation mechanism between Environmental Protection and Planning following publication of Suffolk Supplementary Planning Guidance/Protocol	Establish mechanism for consultation between the two parties to ensure Environmental Protection are consulted on all relevant planning applications and policy documents	BDC	2012
Ensure air quality policies in LDF documents	Review draft Core Strategy to ensure adequate policies included	BDC	2012
	Review drafts of all future LDF documents	BDC	On-going

Planning			
Restrict development in Cross Street	Consider inclusion of specific policy in relevant LDF documents	BDC	2012
	Environmental Protection to review all planning applications within or likely to have an impact on the AQMA	BDC	On-going
Consider development of formula for s106 contributions	Suffolk Air Quality Management Group to determine whether County-wide formula would be feasible	BDC/SCC	2012
	Develop formula if feasible	BDC/SCC	2012
Review Local Validation Document	Carry out review and amend document as necessary	BDC	2012
Ensure that Bus station redevelopment does not have negative impact on AQMA	Environmental Protection to review all relevant planning applications and comment and/or seek contributions towards Action Plan as appropriate	BDC	On-going
Obtain support for the AQAP from the Chilton developers	Environmental Protection to review all relevant planning applications and comment and/or seek contributions towards Action Plan as appropriate	BDC	On-going
Specific lorry routes to Chilton development	Ensure that lorry routes specified in relevant planning permission(s)	BDC	On-going
Review Suffolk Supplementary Planning Guidance/Protocol at regular intervals	Publish Suffolk-wide Supplementary Planning Guidance on air quality	BDC/SCC	2011/12
	Review Guidance, as appropriate, to ensure it reflects local circumstances and local and national policy	BDC/SCC	On-going

Table 10 Measures and Targets to Improve Education and Information

Education and Information			
Proposed Measure	Target	Responsible Authority	Timescale
Provide information about the AQMA to local schools	Research educational materials available and suitability for inclusion in the curriculum	SCC	2011/12
Provide information about the AQMA to local residents	Provide information on air quality alongside consultation on removing parking bays.	BDC/SCC	Early 2012
Continue air quality monitoring	Retain monitoring at worst-case relevant locations within and adjacent to the AQMA	BDC	On-going
Traffic counts	Frequency and method of traffic counting to be reviewed and regime implemented	SCC	On-going
Specific events e.g. cycle to work week, European car free day	Review specific events already promoted by BDC/SCC and consider if others could be established.	SCC	2011/12

6.4 To summarise initial actions will involve:

- Reviewing air quality data to determine effectiveness of removing build-out;
- Providing air quality information to schools and residents near to the AQMA;
- Carrying out consultation on removing parking bays;
- Publishing a Suffolk-wide Supplementary Planning Guidance/Protocol on air quality;
- Improving local promotion of public transport, car sharing, personal travel planning websites, business and school travel plans.

In 2012 Babergh District Council and/or Suffolk County Council have committed to a number of measures

- Undertaking a review of traffic management in Sudbury;
- Investigating feasibility of removing Cross Street from the strategic lorry network;
- Considering development of a formula for s106 contributions;
- Developing a new Green Travel Policy for Babergh District Council;
- Reviewing the Core Strategy to ensure policies to protect and improve air quality are included;

- Reviewing the consultation mechanism between Environmental Protection and Planning following publication of Suffolk Supplementary Planning Guidance/Protocol on air quality; and
- Reviewing the Local Validation Document.

On-going measures include

- Reviewing of planning applications within or that could affect the AQMA;
- Air quality monitoring;
- Traffic counts; and
- Support of existing SCC and BDC initiatives to reduce emissions.

7 Expected Impact of the Air Quality Action Plan

- 7.1 At this stage, it has not been possible to quantify emissions reductions for specific actions. The document has, however, where possible, included targets for particular measures. Many of the more ambitious measures (with a greater impact) will require further feasibility work (and in some cases, this is already underway) before a decision is made jointly with Suffolk County Council, the Highways Agency and Babergh District Council. In most cases this feasibility work will include traffic modelling, which, where relevant, will be used to assess the air quality impacts of the specific measures. Based on professional judgement, and the improvements in air quality required at locations in the AQMA, it is considered that without at least some of these more ambitious measures in the Action Plan that the air quality objectives will not be met in the foreseeable future.

8 Conclusions

- 8.1 This Air Quality Action Plan sets out a series of suggested measures on which various stakeholders, have been consulted. These measures have been refined and prioritised and categorised into those which can be implemented and those which need further work or feasibility studies, with the aim to implement them in the longer term. The measures chosen will be implemented in partnership with key stakeholders, namely Suffolk County Council, the Highways Agency, planners and transport operators.
- 8.2 The measures highlighted in this Air Quality Action Plan should reduce concentrations of nitrogen dioxide at the relevant sensitive receptors, although it is too early to say exactly what impact they will have on improving air quality. The Council is continuing to monitor air quality at several

locations within the AQMA. The results of the monitoring will be made available through the annual review and assessment reports along with proxy measures for quantifying improvements.

9 Glossary

Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.
Exceedence	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations.
AQMA	Air Quality Management Area
NO ₂	Nitrogen dioxide.
NO	Nitric oxide.
NO _x	Nitrogen oxides (taken to be NO ₂ + NO).
µg/m ³	Microgrammes per cubic metre.
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
LTP	Local Transport Plan
SCC	Suffolk County Council
BDC	Babergh District Council
HA	Highways Agency

A1 Appendix 1 – Air Quality Impact of Specific Action Plan Measures

- 9.1 Four potential Action Plan measures have been identified by Babergh District Council for investigation. These are:
- a) Removing the build-out (completed April 2010);
 - b) Removing the build-out and the car parking spaces;
 - c) Removing the build-out and allowing only one-way HGV movements on Cross Street; and
 - d) Removing the build-out and allowing only one-way movements on Cross Street for all vehicles.
- 9.2 The potential impacts of these measures on annual mean nitrogen dioxide concentrations have been predicted at 16 receptors in and around the AQMA (Figure A1.1).
- 9.3 Table A1.1 shows that in Do-Nothing scenario, ten of the receptors are predicted to exceed the annual mean objective. The greatest reduction is brought about when the build-out and the parking bays are removed, however, these measures would not result in sufficient improvements within the AQMA for all predicted concentrations to meet the objective. By making Cross Street one-way for either HGVs or all vehicles the concentrations are significantly reduced at all receptors on Cross Street. Concentrations at receptors on Church Street would increase, however only one receptor would exceed the objective.
- 9.4 It is important to note that there are uncertainties associated with these predictions. The removal of the build-out and parking bays have been represented in the model as increases in speed. In reality, the changes will be more complex and therefore these model results represent a best estimate of the changes. The model predictions for the one way scenarios do not take into account any changes outside the immediate study area.

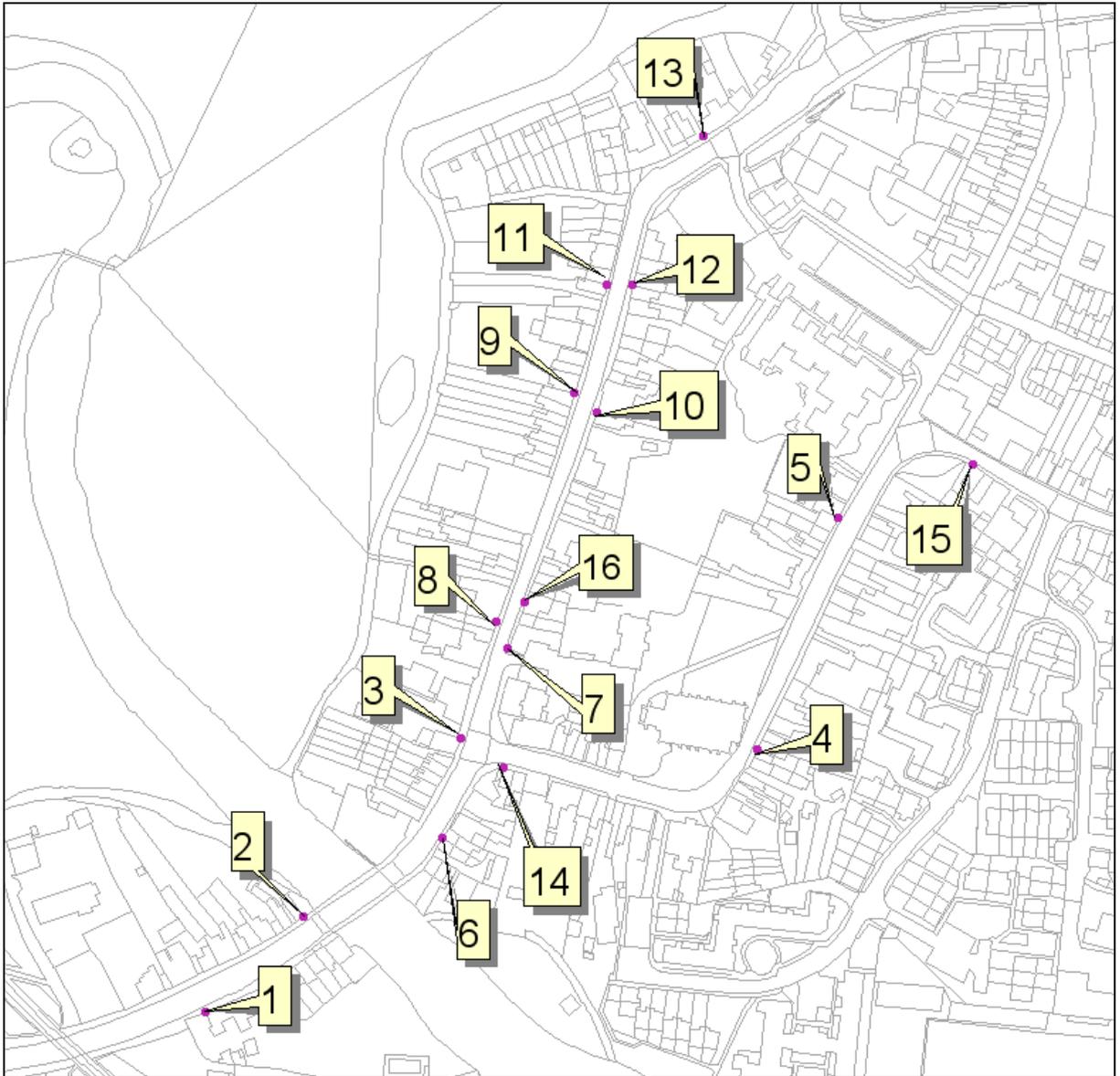


Figure A1.1: Receptor Locations.

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Table A1.1: Predicted Annual Mean Nitrogen Dioxide Concentration During 2009 for Potential Action Plan Measures^a

	Scenario				
	Do Nothing	Remove build-out	Remove build-out and car parking spaces	Removing build-out and making Cross Street one way for HGVs	Removing build-out and making Cross Street one way for all vehicles
Receptor 1	44.4	32.0	31.9	32.0	32.0
Receptor 2	48.2	33.0	32.9	33.0	33.1
Receptor 3	33.3	25.2	25.1	25.0	25.0
Receptor 4	24.5	23.9	23.8	30.6	34.4
Receptor 5	23.5	23.1	22.8	29.2	32.8
Receptor 6	32.0	23.3	23.2	23.4	23.6
Receptor 7	49.3	34.2	33.9	29.2	26.2
Receptor 8	55.2	40.2	39.9	33.3	29.2
Receptor 9	42.7	42.2	32.6	34.4	29.5
Receptor 10	42.4	41.9	33.1	34.1	29.4
Receptor 11	42.5	42.3	32.6	34.3	29.4
Receptor 12	42.1	41.9	33.1	34.1	29.2
Receptor 13	26.5	26.3	24.8	22.1	19.7
Receptor 14	40.5	36.1	36.0	45.5	50.5
Receptor 15	20.0	19.7	19.5	24.4	26.9
Receptor 16	59.1	42.4	42.0	35.0	30.5

^a Values in bold are predicted exceedences of the objective.