Air Quality Action Plan for Sheffield 2003

Sheffield City Council

Environmental Protection

Air Quality Action Plan for Sheffield

April 2003

Status

This is the draft action plan for improving air quality in Sheffield. At the present time it does not represent the official position of Sheffield City Council or any of the other bodies and agencies with responsibilities in the area.

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AIR QUALITY ACTION PLAN FOR SHEFFIELD

Executive Summary

The Issue

Poor air quality has been shown to be detrimental to health at concentrations similar to those seen in many parts of the UK. A series of reports have been produced by Sheffield City Council to investigate air quality throughout the City, including most recently the Stage 4 Review and Assessment report published in December 2002. These reports forecast that annual average concentrations of nitrogen dioxide (NO_2) will exceed the standard laid down in the national air quality strategy in designated Air Action Zones[1] in two parts of Sheffield, the City Centre and areas around the M1. The largest contributions to NO_2 levels in the two AAZs are from road traffic (for both the M1 and the city centre) and 'area' sources (for the city centre alone, covering the domestic, commercial, public and small industry sectors). Further analysis by Sheffield's Environmental Protection Service suggests that a reduction in emissions of oxides of nitrogen (NOx) in the two locations of around 30% will be required to meet the air quality objectives.

Sheffield City Council was required to produce an action plan following designation of the two AAZs to identify the best ways of moving towards the government's health-based air quality targets. In circumstances where transport emissions are the major reason for exceedence of air quality objectives, DEFRA suggests that in the future the action plan can be integrated with the Local Transport Plan (LTP). This approach is not appropriate here for a variety of reasons discussed in this action plan, such as the need to account for non-transport sources of emissions, particularly in the City Centre. Furthermore the LTP has effectively been finalised until the year 2006.

Approach

The information presented in this action plan is taken from several sources:

- Earlier air quality modelling work undertaken in Sheffield.
- Extensive consultation with local people, businesses, other organisations and agencies, and Council officers. To ensure that the consultation is effective in reaching people, it has been carried out through four main routes:
- Establishment of the M1CCAP (M1 Corridor Clean Air Partnership).
- Establishment of the CCCAP (City Centre Clean Air Partnership).
- Development of websites for the two partnerships[2]
- Individual contacts made by the Environmental Protection Service.
- Individual contacts made by consultants appointed by the Council (EMRC, AEA Technology and the Stockholm Environment Institute).

[1] The term "Air Action Zone" used in and around Sheffield is analogous to the term "Air Quality Management Area" used more widely elsewhere.

[2] M1CCAP website: www.m1airaction.com
CCCAP website: www.sheffieldairaction.com

- Local and regional plans.
- National guidance.
- Maps generated by the Stockholm Environment Institute from available plans and consultation.
- EMRC/AEA Technology's '*AirAction*' system and database for managing the action planning process and identifying and characterising options for air quality improvement.

The plan provides the following:

- Information on the overall process of assessing air quality, the background to the development of the action plan.
- Identification of an overall strategy that could be followed in the interests of meeting the air quality objectives.
- A list of recommended options that can be implemented to move towards the national air quality targets, with review of associated costs and effects.
- A timetabled list of actions for pursuing the recommended options.

Selection and Prioritisation of Options

More than 100 possible options were considered during the development of the action plan, and debated with stakeholders. From the perspective of air quality improvement one of the main criteria for inclusion of an option within the plan was cost-effectiveness with respect to reducing NOx emissions. However, other considerations were also factored in, for example, consistency with other local policies. During this process it was noted that the measures considered had a wide variety of impacts between them, affecting, for example:

- Greenhouse gas emissions (e.g. through reducing fuel consumption).
- Emissions of other hazardous air pollutants (e.g. fine particles, PM_{10})
- Noise (e.g. through changes in delivery times and reduction in vehicle speeds).
- Social inclusion (e.g. through extension of quality public transport systems).
- Congestion (e.g. by encouraging modal shift).
- Economic vitality (e.g. through better fuel and other efficiencies and reduced congestion).

These and other impacts were taken into account during the selection and prioritisation of measures for the plan, though it is acknowledged that the data on which the assessment was made were limited.

Content of the Air Quality Action Plan

The overall strategy involves the adoption of a broad suite of options relating to both traffic and other sources of nitrogen dioxide.

Although focused on the Air Action Areas the plan reinforces and supports the Local Transport Plan and other city-wide strategies. It also seeks to identify

and maximise opportunities to secure air quality improvements as well as social and economic benefit through the promotion of good practice.

Whilst the Government consider air quality to be a material planning consideration the action plan is designed to promote environmental quality rather than to inhibit development. It does, however, raise air quality as an important environmental concern to be considered in other strategies.

Recommended Options
Options were combined into a series of eight packages to create a logical structure for implementation.

Package 1: Improving public transport
This package calls for a step-change in the urgency and priority given to the implementation of existing public transport proposals, for example:

- Various measures to improve bus transport in South Yorkshire, such as the Quality Bus Corridor Programme and the Bus Strategy.
- Use of individual marketing techniques to encourage modal shift.
- Extension of the Supertram.

It then argues for the following:

a) Advancement of the Quality Bus Corridor (QBC) programme in Sheffield.
b) A major expansion in park and ride provision serving the city.
c) Stricter enforcement of bus priority measures, particularly bus lanes.

Package 2: Transport infrastructure
The plan recognises that significant changes are being made to transport infrastructure in Sheffield through various plans, particularly the City Centre Masterplan. Again, this plan generally supports the measures that are being introduced under these other initiatives, particularly completion of the Northern Inner Relief Road and pedestrianisation schemes. Against this background of change and the uncertainty that it brings so far as air quality is concerned, it would be inappropriate to suggest wide ranging measures. The one area that is identified for further action is:

a) To investigate the potential for further pedestrianisation and cycle routes in Sheffield City Centre. Whilst this measure was supported by a number of stakeholders it is acknowledged that there may be little scope for such action beyond current plans.

Package 3: Traffic control
The use of variable message and other signing to better direct drivers to where they wish to go should provide tangible benefits in air quality terms, as will other traffic control measures that are either being implemented or recently proposed. Other measures recommended here are as follows:

a) Alter delivery times to Sheffield City Centre and other congested locations as necessary to avoid the most congested periods.
b) Improve co-ordination of road works, and signing around them (could be linked to VMS systems)
c) Continue to explore the potential for additional traffic control measures that will benefit air quality.

Like the new measures identified for Package 1, these options reinforce existing policy.

Package 4: Cleaner vehicles

Existing actions to reduce vehicle emissions beyond the significant advances made in vehicle design and fuel quality since 1990 include:

- South Yorkshire's vehicle emission testing programme. Although this will inevitably be restricted to a limited number of vehicles, the programme provides an excellent opportunity to publicise the need for drivers to keep their vehicles in good order.
- Promotion of cleaner vehicles and fuels, for example through the Energy Saving Trust's Transport Energy initiative.

Two additional measures are proposed in this area:

a) Set minimum emission standards for vehicles used by Sheffield City Council and encourage their adoption by service providers contracted by the Council.
b) Set minimum emission standards for buses, taxis, delivery vehicles, refuse collection vehicles, etc. operating in the Air Action Zones/AQMA.

There is also an action in the plan to review the outcome of the vehicle emission testing programme once it is approaching completion and to consider whether a further proposal to continue the work should be made to central government.

Package 5: Options specific to reducing emissions from the M1

Several options specific to the M1 Corridor and its AAZ are recommended:

a) Reduce speeds on the M1 to a speed optimal for NOx emissions.
b) Use Variable Message Signing to direct traffic more efficiently (e.g. to car parks with spaces at particularly busy times).
c) Change the road system around Tinsley and Brinsworth[3], using signs and redesign entrances to Bawtry Road to shift through traffic to surrounding roads and away from Tinsley and Brinsworth. Sheffield Road may also benefit from similar treatment in conjunction with the Halfpenny Road Initiative.
d) Sheffield City Council and HGV operators that require access to Tinsley to jointly develop an action plan for reducing the impacts of that traffic on the community.

Close liaison with the Highways Agency, probably involving more detailed assessment of vehicle flows on and around the motorway, will be needed prior to implementation of the first two options in particular.

Given how widespread exceedence of the annual mean NO_2 standard is around the UK's motorways there is a clear need for further national debate on approaches for dealing with the issue. Any such debate will need to be very transparent with respect to the weightings put on the different impacts of

[3] Brinsworth is part of Rotherham, but is mentioned here as action to reduce traffic on Bawtry Road would benefit both communities, and an integrated approach to the problem is required of the two Councils.

measures like speed reductions (air quality and hence health improvement, reductions in noise, longer journey times, etc.).

Package 6: Control of industrial combustion and process emissions
Industry is already subject to extensive and effective regulation, increasingly based on the concept of 'Best Available Techniques' developed through IPC (Integrated Pollution Control) and IPPC (Integrated Pollution Prevention and Control). On this basis just one additional measure is identified.

a) Encourage operators to adopt accredited environmental management systems, noting the potential for cost savings arising through more efficient resource use.

This recommendation should be seen as applicable not just to manufacturing industry, but also to the public, commercial and service sectors. It is accepted that work in this area is already going on (see also package 7). However, given improved knowledge of air quality across Sheffield as a result of the monitoring and assessment work that has been done leading up to this plan, there would now appear to be potential to target those facilities with the greatest effect on air quality in the AAZs.

Package 7: Planning issues, and eco-efficiency
Again, there is already much activity in this area through the City Council, Business Environment Centre, etc., with the result that the plan seeks largely to strengthen existing activities. The following are recommended:

a) Implement green procurement policy across the public sector, relating to purchase of materials, vehicles, building design, etc.
b) Increase use of Sheffield's existing district heating system to displace small boilers that release emissions at low level.
c) Promote the adoption of Travel Plans by all significant employers in the area (not just new businesses and the council), and others with environmental responsibilities.
d) Set up an Environment Co-ordination Office (ECO) to promote activities that lead to greater environmental efficiency in Sheffield.
e) Revise current guidance on air quality and land use planning and adopt as Supplementary Planning Guidance.

The key action here is the establishment of the ECO. It is envisaged that this will, amongst other things, provide a forum for targeted action on the AAZs and improve coordination of eco-efficiency activities.

Package 8: Actions for consideration by national government.
During the development of the plan a series of measures were identified that could be taken forward at the national level. These were as follows:

a) Consider green procurement policy for the UK public sector.
b) Present existing environmental information on the performance of specific industrial plant in a more accessible form than is currently available from the Public Registers.
c) Improve building standards in the light of experience in other countries.
d) Report on the practicability of the recommendation made in the Energy Review by the Performance Innovation Unit in the Cabinet

Office of substantial improvements to domestic energy efficiency, and develop policy accordingly.

e) Review some aspects of competition legislation as it affects public transport provision.
f) Provide clarification on position with respect to the implementation of a national congestion charging scheme where revenues could be directed to reduce transport taxation elsewhere, and improved public transport.
g) Set up a centralised website for access to useful information on environmental improvement measures – a vast amount of information is already available, but not always easy to locate.
h) Provide guidance on the potential usefulness of scrappage subsidies and any legal implications that they might have.
i) Make funds available to improve air quality for sources other than road traffic.

The role for Sheffield City Council within this final package is simply, through this plan, to raise these issues with government, and to seek further guidance where appropriate.

Overall, the list contains a wide variety of measures that should complement each other. Some of the measures require substantial investment; others do not, but are necessary to improve the efficiency of the delivery of good air quality in the sensitive areas. Initially it would seem appropriate to investigate the voluntary introduction of some measures, though mandatory application may become necessary at a later date if necessary improvements in air quality are not seen.

Turning Options to Action

The plan includes a detailed timetable of actions that are related to each of the recommended options. Key elements in the list of actions are:

- Appointment of a steering group to coordinate action across different council departments and appropriate development bodies.
- Delegation of actions from the steering group to those empowered to act.
- Continuation of the effective stakeholder dialogue that has been a feature of the development of the present plan.
- Extension of the Council's air pollution modelling capability to enable actions to be designed from as full an information base as possible.
- Development of an effective monitoring system for the plan (monitoring parameters are proposed in the plan, though are to be regarded as preliminary until a full understanding of data availability is gained).
- Review of existing plans of benefit to air quality to see if there is opportunity for advancing actions.
- Targeting of actions on those areas or organisations most likely to make a difference.

The actions include commitment to continued stakeholder engagement. This maintains existing arrangements and strengthens dialogue with some key players, such as the Highways Agency and local businesses.

Resource Implications
This plan identifies specific actions for implementation. Some of these actions are already taking place within existing resources, but there are others that are not currently resourced. The full resource implications of implementing these actions will need to be considered further. This will include investigating any external sources of funding, for example Supplementary Credit Approval.

The City Council already funds the required expertise in the measurement and prediction of air quality across the City. However, this Action Plan places lead responsibility on the Council for both monitoring and reporting progress, as well as the core function of driving its implementation, even though delivery of some parts will be the responsibility of other organisations.

The following are tasks identified in the plan for which funding across a range of sources will need to be identified: -

1. Continuation of support for new business with the development and implementation of Green Travel Plans.
2. Provision of support for existing businesses, schools and other public organisations in the development of Green Travel Plans.
3. Initiate and drive forward work on each of the Plan Packages (including seeking funding for feasibility studies and implementations).
4. Monitoring and reporting progress on the specific Packages and the Action Plan.
5. Establishment of the ECO and coordination of the activity of the partner organisations across City.
6. Review of existing and proposed City plans to identify opportunities to support air quality improvements.

Consistency with National Guidance
Development of the plan has paid close attention to guidance provided by DEFRA and various other bodies such as the National Society for Clean Air and Environmental Protection. Appendix 1 of the plan includes a checklist to demonstrate compliance.

Economic Development and Improvements to Air Quality
An independent economic assessment was undertaken to compare the measures listed in this plan with the strategic vision and economic development aspirations for the region. This found no inconsistency in the approaches and, indeed, concluded that adoption of the options proposed in this plan would largely reinforce actions being taken to encourage the development of a high-skills, knowledge-based economy in an attractive, healthy environment in which people want to live and work. The full report is attached as Appendix 6 of the Action Plan.

Consultant's Recommendations
Consultants (EMRC/AEA Technology) appointed by Sheffield City Council EPS to assist with the development of this plan made the following specific recommendations.

1. The key challenge will be the integration of the action plan with regeneration strategies for Sheffield and the region. The Sheffield First Partnership seems well placed to take overall responsibility for this task. It would seem logical for Sheffield First for Environment to monitor and report on the progress of the actions which comprise the Plan, in collaboration with Sheffield City Council's Environmental Protection Service (EPS).

2. The proposed Environment Coordination Office (ECO) is also key to the action plan, and needs to be resourced accordingly if it is to meet its potential for assisting development in the city. The ECO's role in encouraging the formation of broader partnerships of environment-related professionals than currently exist provides a firm basis for more efficient and effective working than is currently possible.

3. Closer ties are needed between EPS and other council departments, to ensure air quality is considered at the outset of any plan that may have an effect on air quality. In particular, there is a need to share any data on traffic forecasts at the earliest opportunity and to make sure that EPS are told of developments when plans are initiated. It is accepted that the will to do this already exists, and one means of ensuring that closer ties are developed and maintained would be the establishment of a steering group to take the action plan forward.

4. Closer working with the Highways Agency would be beneficial, possibly in partnership with other councils who have reported air quality problems on major roads.

5. EPS should examine ways of extending the use of the Airviro model, in particular, to explore the potential for the model to be used for testing alternative scenarios. This would provide enhanced capability for early prediction of the effects of proposed developments on air quality, which in turn would ensure that planners are provided with air quality data at a stage that is most useful to them.

   It is accepted that the results of scenario based modelling do not reflect the 'real world', but what would happen if a hypothetical scenario came into being. However, they do provide a basis for making timely (if preliminary) judgements that can subsequently be refined if appropriate.

6. The stakeholder consultation process developed for this plan (particularly the M1CCAP and CCCAP) and the outputs that it produced, deserve broader recognition. Many of the suggestions and comments made are relevant beyond the air quality debate, particularly with respect to public transport services, provision of facilities for pedestrians and cyclists, and industry in the region. Planners may also be interested in some of the recorded perceptions of policy in the region.

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List of Abbreviations

AAZ	Air Action Zone (equivalent to an AQMA)
AQMA	Air Quality Management Area (equivalent to an AAZ)
AUN	Automatic Urban Network (of pollution monitors)
CCCAP	City Centre Clean Air Partnership
CO	Carbon monoxide
COMEAP	Committee on the Medical Effects of Air Pollutants
DEFRA	Department for Environment, Food and Rural Affairs (formerly DETR, Department for Environment, Transport and the Regions)
EEQLI	East End Quality of Life Initiative
EPAQS	Expert Panel on Air Quality Standards
EPS	Environmental Protection Service
EU	European Union
HSE	Health and Safety Executive
IPC	Integrated Pollution Control
IPPC	Integrated Pollution Prevention and Control
LA	Local Authority
LPG	Liquefied petroleum gas
LTP	Local Transport Plan
MCA	Multi-criteria assessment
M1CCAP	M1 Corridor Clean Air Partnership
NAEI	National Atmospheric Emissions Inventory
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Oxides of nitrogen (the mixture of NO and NO_2 in the atmosphere)
NSCA	National Society for Clean Air and Environmental Protection
O_3	Ozone
PAH	Polycyclic aromatic hydrocarbons
Pb	Lead
PM_x	Particulate matter with a diameter of *x* micrometres or less
ppb	Parts (of pollutant) per billion (of air)
SO_2	Sulphur dioxide
SUN	Statutory Urban Network (of pollution monitors)
SYPTE	South Yorkshire Passenger Transport Executive
UDP	Unitary Development Plan
UNECE	United Nations Economic Commission for Europe
VOCs	Volatile Organic Compounds
WID	Waste Incineration Directive

PART 1: Background Information

1. **Introduction**
2. **Development of the Action Plan**

1 Introduction

1.1 The Need for an Air Quality Action Plan in Sheffield

Research since the mid 1980s has linked existing levels of air pollution with poor health, particularly for the very young and old, and other sensitive groups such as asthmatics (for references and other useful sources of information here and elsewhere, see Section 7). Research literature now associates air pollution with various health impacts, ranging from increased use of bronchodilators by asthmatics, to hospital admissions and 'premature death'[4].

National government investigated the problem largely through two committees, EPAQS (Expert Panel on Air Quality Standards) and COMEAP (Committee on the Medical Effects of Air Pollutants). Following their deliberations the government developed a National Air Quality Strategy, setting standards for individual pollutants with timescales for compliance. Local authorities were required to assess air quality using monitoring and computer based models. In the event that national standards were exceeded, Councils were required to investigate the issue in more detail and to designate air quality management areas (here called 'Air Action Zones' or AAZs).

Following extensive analysis of air quality using monitoring equipment and computer-based dispersion models, Sheffield City Council designated two AAZs in December 2001. One is located in the city centre whilst the other is next to the M1 (adjoining an Air Quality Management Area declared by Rotherham Metropolitan Borough Council in January 2002). Designation was necessary as annual average concentrations of nitrogen dioxide (NO_2)[5] are forecast to exceed the national air quality standard set for 2005.

Further review and assessment of air quality in Sheffield has recently been completed (the 'Stage 4 Review'), with updated information on emissions, etc., being integrated with the dispersion model, and identification of the contribution of different sources (road traffic, industry, etc.) to poor air quality in the AAZs. This new work largely confirmed the earlier analysis with respect to the areas in which exceedence is forecast and the extent of exceedences.

In circumstances where transport emissions are the major reason for exceedence of air quality objectives, DEFRA recommends that the action plan is integrated with the Local Transport Plan (LTP). This recommendation is not applicable here for a variety of reasons:

1. It would fail to recognise the role played by area sources which, as already noted, are particularly important in the City Centre. Restriction of abatement options to transport-related sources would thus reduce the cost-effectiveness of the plan and make it far more difficult to achieve the standards.

[4] Premature in the sense that people would have lived longer in the absence of air pollution, though air pollution may not be the primary cause of death.

[5] For Information on the different measures of nitrogen oxides (NOx, NO, NO_2), see Section 1.7.5.

2. Vehicles using the M1 are largely outside the remit of the LTP.
3. Some management activities that need to be carried out as part of this action plan (for example, more detailed air quality modelling, maintained involvement of stakeholder groups set up specifically for the AAZs) are outside the scope of an LTP.
4. Differences in the timescales for the LTP and the air quality strategy would cause significant problems.

However, it would be quite inappropriate to regard the LTP as immaterial to the development of the action plan. Extensive account has therefore been taken of both the objectives declared for the LTP and the recommendations made in it during the development of this action plan.

This report completes the 'first cycle' of the process, by describing an air quality action plan. Following adoption the process will be continued through:

- Implementation of the plan.
- Monitoring of progress made with the plan.
- Further review and assessment of air quality in the city.
- Revision and updating of the plan.

Local Authorities must report to DEFRA on an annual basis, ensuring that momentum on improvements to air quality, and hence health, is maintained. Whilst the detail of the plan might be considered a little fluid, the Council will need to be able to justify any major changes to the action programme.

1.2 The UK's Air Quality Strategy and EU Directives

Ambient air quality standards for the protection of human health under UK and European Union (EU) legislation are shown in Table 1 and Table 2 respectively. These are the maximum permitted concentrations of various pollutants in locations outside the workplace[6] where people are likely to be exposed for a significant amount of time.

In some cases the UK's air quality strategy seeks early implementation of the EU's limit values, reflecting the belief that standards can and should be achieved more quickly in the interests of protecting public health. The UK's standard of 40µg.m^{-3} for NO_2 to be met as an annual mean concentration by 31st December 2005 is described as a provisional target. The same figure is adopted in the EU Directive, though the compliance date is set back to 2010, and the EU standard is final, not provisional.

The UK air quality strategy is periodically reviewed (e.g. DEFRA, 2001) to ensure that the standards it sets are achievable, and maintain a reasonable level of protection of human health taking into account the latest research.

[6] Exposure to air pollution in the workplace is covered under separate legislation.

Table 1 - UK air quality standards for the protection of human health[7]

Pollutant	Objective	Measured as	To be achieved by
Benzene	16.25 µg/m^3 (5 ppb)	Running Annual Mean	31-Dec-2003
	5 µg/m^3 (1.5 ppb)	Running Annual Mean	31-Dec-2010
1,3-Butadiene	2.25 µg/m^3 (1 ppb)	Running Annual Mean	31-Dec-2003
Carbon monoxide (CO)	10 mg/m^3 (8.5 ppm)	Running 8 Hour Mean	31-Dec-2003
Lead (Pb)	0.5 µg/m^3	Annual Mean	31-Dec-2004
	0.25 µg/m^3	Annual Mean	31-Dec-2008
Nitrogen dioxide (NO_2)	200 µg/m^3 (105 ppb) Up to 18 exceedences / year	1 Hour Mean	31-Dec-2005
	40 µg/m^3 (21 ppb)	Annual Mean	31-Dec-2005
Ozone (O_3)	100 µg/m^3 Up to 10 exceedences of running 8 hour mean / year	Running 8 hour Mean	31-Dec-2005
PAHs	0.25 ng/m^3	Annual mean	31-Dec-2010
Particles (PM_{10})	50 µg/m^3 Up to 35 exceedences / year	24 Hour Mean	31-Dec-2004
	40 µg/m^3	Annual Mean	31-Dec-2004
Particles (PM_{10})	50 µg/m^3 Up to 7 exceedences / year	24 Hour Mean	31-Dec-2010
	20 µg/m^3	Annual Mean	31-Dec-2010
Sulphur dioxide (SO_2)	266 µg/m^3 (100 ppb) Up to 35 exceedences / year	15 Minute Mean	31-Dec-2005
	350 µg/m^3 (132 ppb) Up to 24 exceedences / year	1 Hour Mean	31-Dec-2004
	125 µg/m^3 (47 ppb) Up to 3 exceedences / year	24 Hour Mean	31-Dec-2004

Reference is made in the tables to a number of permitted exceedences of several of the standards in any year. This reflects the fact that periodic events (climate, bonfire night, etc.) make it unlikely that the standards given could be met at all times. By permitting a maximum number of exceedences, a higher level of protection is provided for public health than would be given if the standards were raised to a level that could reasonably be met at all times.

[7] Units in the tables are given as µg.m^{-3} (micrograms, or millionths of a gram per cubic metre of air) with the following exceptions: Carbon monoxide for which concentrations are given in mg.m^{-3} (milligrams, or thousandths of a gram, per cubic metre of air); PAHs – polycyclic aromatic hydrocarbons – for which concentrations are described in ng.m^{-3} (nanograms, or billionths of a gram, per cubic metre of air). Equivalent units of ppb (parts per billion) and ppm (parts per million) are also given if appropriate.

Table 2 - EU air quality standards for the protection of human health

Pollutant	Objective	Measured as	To be achieved by
Benzene	5 µg/m^3 (1.66 ppb)	Annual Mean	2010
1,3-Butadiene	No EU standard		
Carbon monoxide (CO)	10 mg/m^3 (8.5 ppm)	Running 8 Hour Mean	2005
Lead (Pb)	0.5 µg/m^3	Annual Mean	2005
Nitrogen dioxide (NO_2)	200 µg/m^3 (105 ppb) Up to 18 exceedences / year	1 Hour Mean	1-Jan-2010
	40 µg/m^3 (21 ppb)	Annual Mean	1-Jan-2010
Ozone (O_3)	120 µg/m^3 (60 ppb) Up to 25 exceedences / year averaged over 3 years	Maximum daily 8 Hour Mean	2010
Particles (PM_{10})	50 µg/m^3 Up to 35 exceedences / year	24 Hour Mean	1-Jan-2005
	40 µg/m^3	Annual Mean	1-Jan-2005
Indicative PM_{10} levels for 2010	50 µg/m^3 Up to 7 exceedences / year	24 Hour Mean	1-Jan-2010
	20 µg/m^3	Annual Mean	1-Jan-2010
Sulphur dioxide (SO_2)	350 µg/m^3 (132 ppb) Up to 24 exceedences / year	1 Hour Mean	1-Jan-2005
	125 µg/m^3 (47 ppb) Up to 3 exceedences / year	24 Hour Mean	1-Jan-2005

DEFRA announced in August 2002 that they will set new UK targets for PM_{10} for 2010. Table 1 shows the targets that apply to England outside of London. The targets for London are set higher, permitting 10 exceedences each year of the 24 hour mean rather than 7, and setting the annual mean target to 23 µg.m^{-3} rather than 20 µg.m^{-3}. These limits recognise that it will be more difficult to reduce pollutant levels in London than elsewhere in England, partly because of the size of the conurbation and the amount of traffic that it attracts, and partly through the proximity of the south-east of England to emission sources in the rest of Europe.

The European Commission is currently debating further legislation to address PAHs, arsenic, cadmium, mercury and nickel.

1.3 Guidance on Achieving the Standards

1.3.1 Factors to consider

Guidance has been issued by both DEFRA and the National Society for Clean Air and Environmental Protection (NSCA). In addition, DEFRA are funding a

helpdesk to assist with action plan development[8]. The DEFRA guidance lists four factors that have to be considered in the selection of options:

a) Air quality improvement;
b) Non air quality effects;
c) Cost effectiveness;
d) Perception and practicability.

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

Non air quality effects: An action plan should be designed to account for other policies. By doing so it should account also for the social, economic and broader environmental impacts of the measures considered.

Cost-effectiveness: a key feature of an action plan should be that measures proposed are cost-effective, in other words, they need to be closely targeted on the problem being addressed and should not waste money. Costs and benefits to be considered in the process of assessing cost-effectiveness go beyond implementation costs and air quality improvement, to include, for example, costs to local businesses that may result from a loss of trade (e.g. through severe restrictions on parking), and on the other hand, again for example, congestion relief.

Perception and practicability: To be successful an action plan needs to gain wide support across the community. The guidance considers four groups, the public, industry and commerce, elected representatives and external agencies. Each of these groups has different views and concerns when a specific measure is recommended to improve air quality, and so needed to be involved in the consultation process.

1.3.2 The action planning process

The NSCA guidance describes the following stages for action planning, those shown in bold being the stages that this plan is mainly concerned with:

a) Establish baseline conditions
b) Involve all relevant stakeholders
c) Generate a list of options
d) Consider the costs and effects of these options
e) Prioritise options
f) Evaluate and monitor the plan
g) Continue consultation on the plan during its implementation.

[8] For further information on the helpdesk go to: http://www.stanger.co.uk/jointprojects/DEFRA-Home.asp?jointprojectid=10.

1.4 Existing actions that have improved air quality

Legislation that has already been introduced at the European or national level will ensure that most of these standards are met by the dates given in the UK strategy. This legislation includes, but is not limited to:

- The introduction of strict emission standards for industry, enhanced in the last few years by the adoption of the integrated pollution prevention and control (IPPC) regime, revisions to emission standards for incinerators and large combustion plant.
- Improved standards for fuel quality for vehicles and for stationary combustion plant. This has, for example, led to major reductions in the sulphur, benzene and lead content of fuel.
- Progressive improvements to vehicle emission standards. Perhaps most notable so far has been the introduction of the 3-way catalytic converter in petrol-engined vehicles from the early 1990s, which significantly cut emissions of NOx, CO and organic compounds such as benzene.
- National energy policies that caused a widespread switch from coal to gas burning (this legislation has had a major impact on air quality, though was of course not introduced with this objective in mind).

Effects of these measures on air quality have been confirmed with data from the national air pollution monitoring network. As a result, exposure to some pollutants (but not all) has fallen markedly over the last 40 years.

In addition to the measures identified above there are also local initiatives for improving air quality, including industrial zoning policy, car parking policy and a requirement for new businesses that meet certain criteria to adopt travel plans.

1.5 Other Policies that Affect Air Quality

This section provides an overview of the existing policies which will continue to address air quality directly or indirectly in the future. Three levels of policy are relevant, local, regional and national.

1.5.1 Local Policy

The most significant documents dealing with air quality improvement at a local level are the Unitary Development Plan (UDP) and the South Yorkshire Local Transport Plan (LTP). A significant number of local plans draw upon the recommendations of the UDP, which is currently under review. In these local plans, air quality issues are considered explicitly or implicitly and sometimes air quality improvement is mentioned as a specific objective. The main source of air pollution in Sheffield (acknowledging that there is localised variation) is traffic, and so many of the options that can be considered in the interests of improving air quality are likely to also reflect transport related objectives. For instance transport objectives within the Sheffield City Centre Master Plan are as follows:

- Creation of a high quality, safe and pedestrian-dominated City Core, to encourage walking and cycling by reconnecting spaces and districts within the city.
- The continuation of a policy to divert through-traffic away from city centre.
- Development of a series of "access loops" to improve access to key city centre car parks.
- A refocusing of the public transport system to respond to changing patterns of activity and passenger need.
- An improvement of passenger facilities and an aid to efficient bus operations within the city centre, together with an improvement in the quality of vehicles and occupancy levels.
- An improvement in the legibility of the city centre to all users, focusing on the provision of better signage.
- An improvement in the key gateways to the City Centre and in particular, the creation of a high quality public transport hub around the main railway station.

Improvement of air quality is also identified as a matter of concern in some of the local area plans within Sheffield, such as the draft action plan for Darnall.

The various local plans that have been considered in the development of this action plan are listed in Section 7.

1.5.2 Regional Policy

At a regional level, the main planning document with an air quality/ environmental element is the Regional Planning Guidance for Yorkshire and Humber. However, in the document, air quality improvement is addressed in a very broad sense as the document refers to the protection of the environment and the prudent use of natural resources as objectives to attain. The South Yorkshire LTP also, of course, addresses issues related to air pollution from a regional perspective.

The region's Objective 1 status is also a major influence at the present time, as it provides a basis for substantial inward investment to assist in the transition to a more vibrant economy.

1.5.3 National and European policy

The main areas of national policy with an effect on air quality in addition to the air quality strategy and associated European legislation are:

- The 10 year transport plan
- The introduction of IPPC (Integrated Pollution Prevention and Control)
- The EU's Waste Incineration Directive (WID)
- The EU's Noise Directive
- Energy and climate change policy, for example, implementation of the UK's obligations under the Kyoto Protocol.

In most cases there are opportunities for significant cross-benefits between these policies and improved air quality. In the context of Sheffield, the Noise

Directive is of most significance in the Tinsley area, given the high level of noise that is generated by traffic on the M1 (the same applies to Brinsworth, in Rotherham's AQMA). IPPC is probably also of more significance close to the M1, given the proximity of major industrial plant, such as the Avesta Polarit works. Climate change policy should benefit air quality both in and around the M1 corridor and in the city centre.

The one possible exception relates to the effects of the 10 Year Transport Plan on the communities next to the M1. Central Government announced a number of motorway widening schemes across the country in December 2002. One of these will affect the M1 finishing just south of the county boundary. Another widening scheme that includes those parts of the motorway that go through Sheffield and Rotherham has been recommended by the consultants carrying out the South and West Yorkshire Multi-Modal Study (SWYMMS). At the present time this is just a recommendation and will require considerable further investigation before implementation, should it happen. There is concern that the recommendations, as they currently stand, do not align well with the LTP, particularly the raft of measures contained within it for the promotion of public transport.

1.5.4 Summary

It would clearly be wrong to develop air quality policy in Sheffield independently of the policies listed above. To do so would ignore the fact that joined-up policy making offers substantial benefits in terms of cost-effectiveness. For this reason the impacts of options for air quality improvement on transport, noise and climate change (amongst other issues) are considered in the discussion of options that follows in later chapters of this action plan.

It is a matter of much concern that some stakeholders have said that they believe that measures to improve air quality will conflict with development objectives in the region. Whilst some measures that may be introduced for air quality improvement could run counter to regeneration policy, many others seem to be likely to themselves promote regeneration, with a cleaner environment being one factor that will attract inward investment. Recognising this concern, Sheffield City Council appointed an independent economic expert to review this action plan, particularly in the context of the South Yorkshire region's Objective1 status.

1.6 Air Quality Assessment in Sheffield

1.6.1 Which standards are most difficult to meet?

The most problematic pollutants, in terms of meeting the standards listed in Table 1 and Table 2 are NO_2, PM_{10} and O_3. NO_2 is discussed at length in the remainder of this plan. Less attention is given to PM_{10} and O_3. Ozone is not emitted directly in significant quantity from any process, but instead forms in the atmosphere following the emission of NOx and VOCs (volatile organic compounds). It is a pollutant whose concentrations are determined by

emissions over very large areas (the European scale), and consequently local authorities have very little control over local concentrations. In view of this the appropriate mechanism for reducing ozone levels in any location in Europe is through international negotiation on reducing emissions of the precursor pollutants, rather than local initiatives (these can help, but to a lesser extent than for particles, NO_2 and so on). Such action is being taken, for example, through the UNECE's Gothenburg Protocol and the EU's National Emission Ceiling Directive which together set the maximum permitted emission levels for NOx and VOCs (as well as SO_2 and ammonia) for each country in Europe. These emission ceilings are to be attained by 2010. Particles are not considered in detail here because analysis carried out in Sheffield has found that the 2005 targets will be attained as a result of existing policies. However, further analysis will be required under the next round of review and assessment for completion in 2004, to see whether the UK targets for 2010, which have only just been finalised, will be met. Many of the options defined here for dealing with the NO_2 problem will also reduce PM_{10} levels.

Following initial analysis that suggested that the annual average NO_2 standard would not be met in parts of Sheffield, further analysis was undertaken by the City Council in accordance with Government guidance. The further analysis (the 'Stage 4 Assessment') has used new data; such as updated vehicle emission factors, and new information about industrial, domestic and commercial processes. It was concluded that the original findings were broadly correct. The designation of the AAZs in Sheffield city centre and the M1 corridor was therefore justified, though will remain subject to review.

1.6.2 Designation of Air Action Zones in Sheffield

Two Air Action Zones (AAZs[9]) were designated in Sheffield through an Air Quality Management Area Order made on 5th December 2001. One is located along the M1 and the other is in the city centre (see Box 1).

Given the extent of current development in the City Centre it is considered that it would be misleading to provide finer resolution mapping of air quality across the AAZ. Once the Northern Inner Relief Road is complete (assuming that it is to be funded) the problem may well move within the city centre. However, it is not considered likely that existing plans will improve air quality to the extent that the standards would be met.

Analysis by Rotherham Metropolitan Borough Council provides support for the designation of an AAZ along the M1, as they have declared an air quality management area for Brinsworth, adjoining Sheffield's AAZ which is centred on Tinsley. Rotherham's Stage 4 Review and Assessment identified further problems linked to the M1 at Wales, just south of Junction 31, and recommended the declaration of a further AQMA. Recognising the need for complementary actions across the Sheffield-Rotherham boundary, development of action plans has been undertaken in close partnership by the two Councils.

[9] Sheffield adopted the term 'Air Action Zone', where others tend to use the phrase 'Air Quality Management Area' (AQMA).

Box 1: The Sheffield Air Action Zones

The M1 Air Action Zone (AAZ) (see Figure 1) was declared on the grounds that nitrogen dioxide levels in the area are unlikely to meet the annual objective by 2005. The size of the AAZ is 3.78 km^2. The residential population inside the AAZ is approximately 3,000 and the working population, approximately 2,180 though forecast to rise significantly as a consequence of Objective 1 developments. There are 3 schools in the area. The primary source of NO_2 is road traffic, with 300,000 vehicle movements in the AAZ on a typical day.

The City Centre Air Action Zone (see Figure 2) was also designated on the grounds that NO_2 levels are unlikely to meet the annual objective by 2005. The size of the AAZ is 3.86 km^2. The residential population of the AAZ is approximately 4,000 at the present time, though forecast to rise to 15,000 through actions to bring residential development to the city centre. The working population is approximately 100,000. The city centre contains five schools. The primary source of NO_2 is again road traffic, with the AAZ having 302,000 vehicle movements on a typical day.

It is reasonable to ask whether there is any direct evidence that health of people living in the AAZs is any worse than the health of those living elsewhere in the city. The East End Quality of Life Initiative (EEQLI) reports that "*In Tinsley, hospital admissions for respiratory disease and asthma are two and three times the city average respectively*", based on Sheffield Health data for 1994 to 1997. In consideration of such data it is necessary to consider that air pollution is only one of several possible factors involved, the others including variation in income levels, housing standards, smoking behaviour and population characteristics. However, the data reported by EEQLI show that there is evidence in Sheffield itself that supports the need to take air quality problems seriously.

1.6.3 Plans under Objective 1 in and around the AAZs

Locations proposed for development under Objective 1 are shown in Figure 3. A variety of applications have been made to date for these sites, including offices, warehousing, retail units, hotels, and leisure facilities. Some applications, if approved, are likely to attract a large amount of traffic. Comparison with the maps showing the boundaries of the AAZs demonstrates that many of these sites are intimately linked with the AAZs. Recognising that Objective 1 is an EU initiative which focuses strongly on environmental protection and compliance, and that this is also a key theme in Sheffield's economic development strategies, it is clearly important that developers consider air quality issues. Further information on this is provided in the independent economic review (Appendix 6).

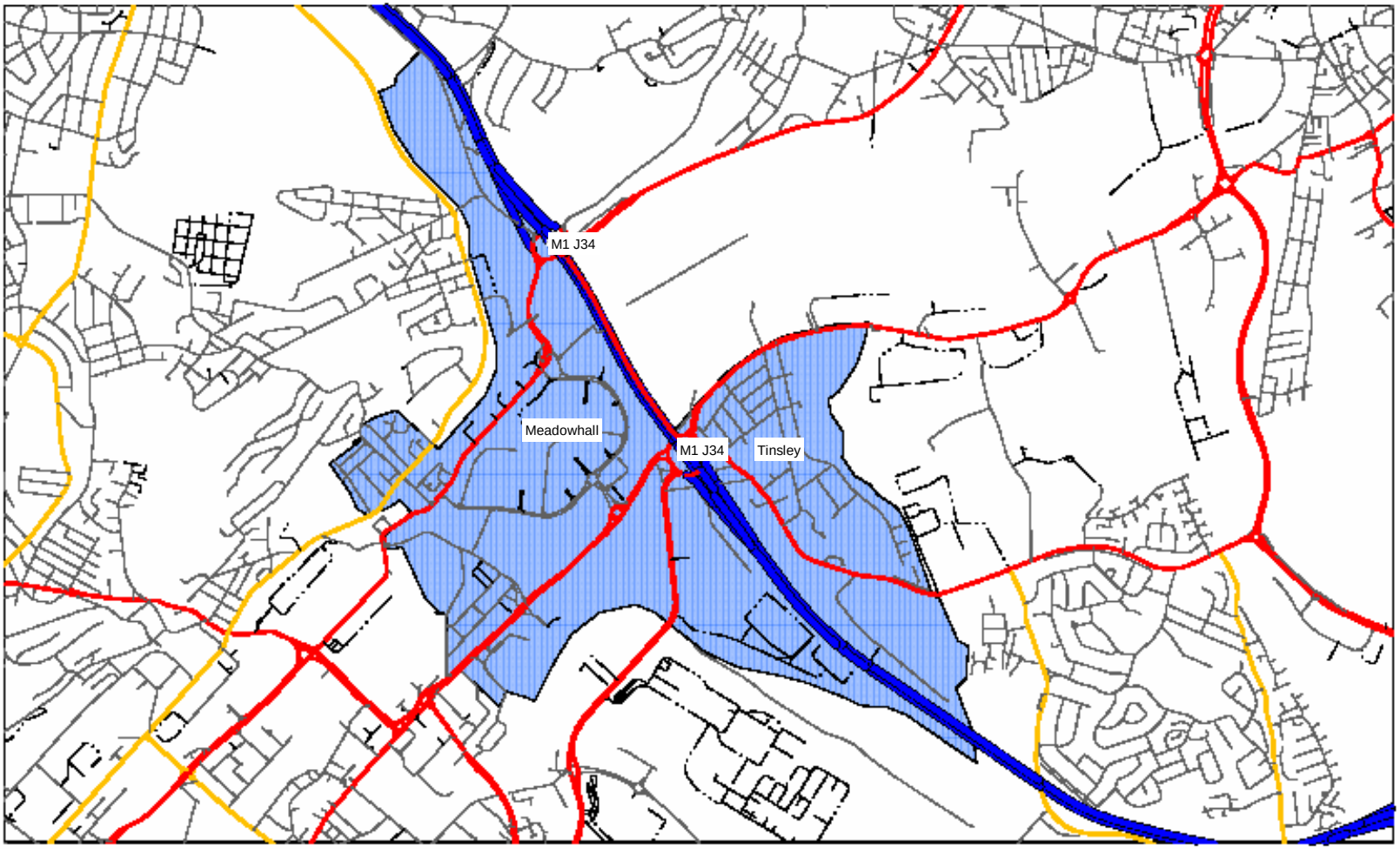

Figure 1 – Sheffield's M1 Air Action Zone.

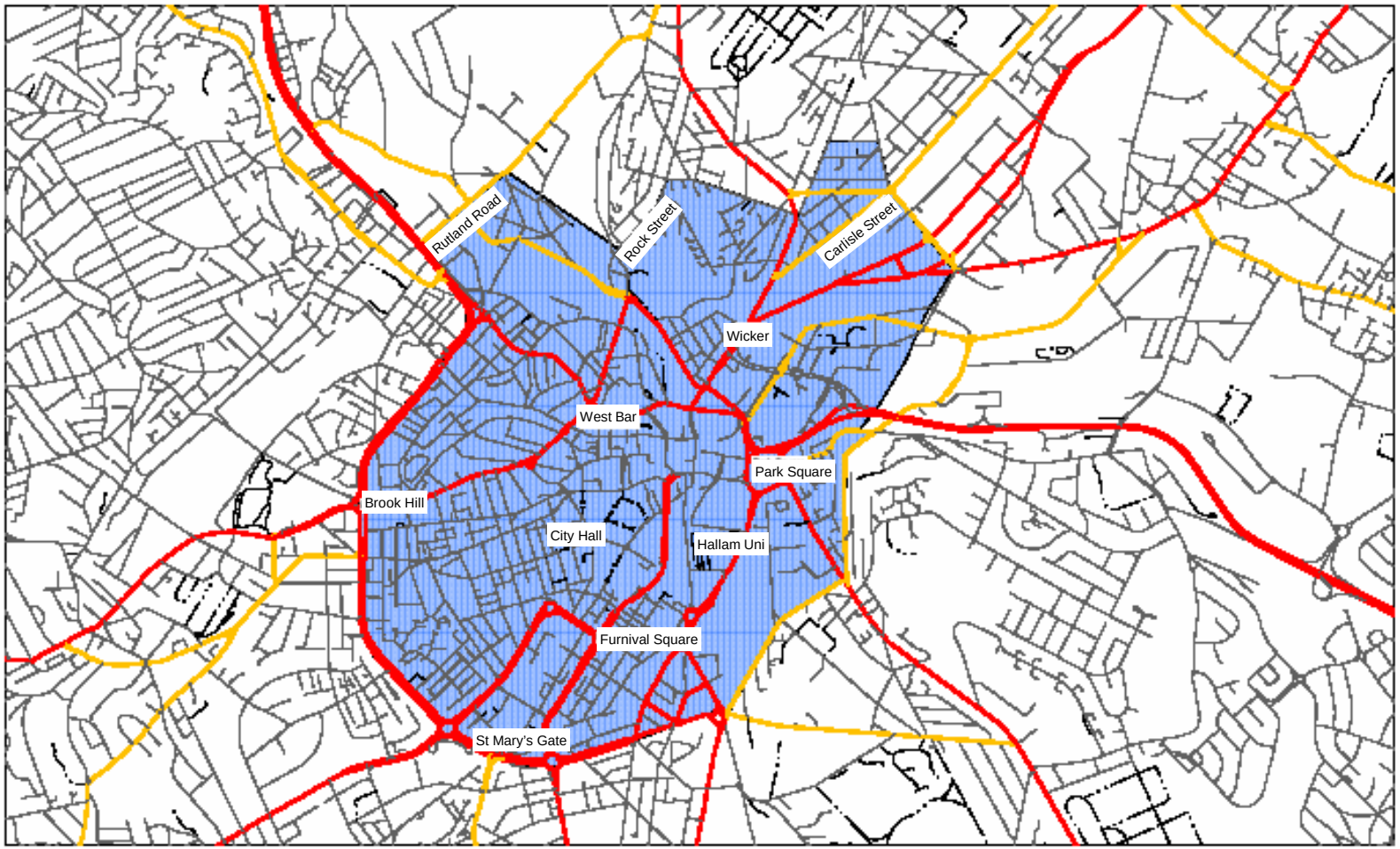

Figure 2 – Sheffield's City Centre Air Action Zone.

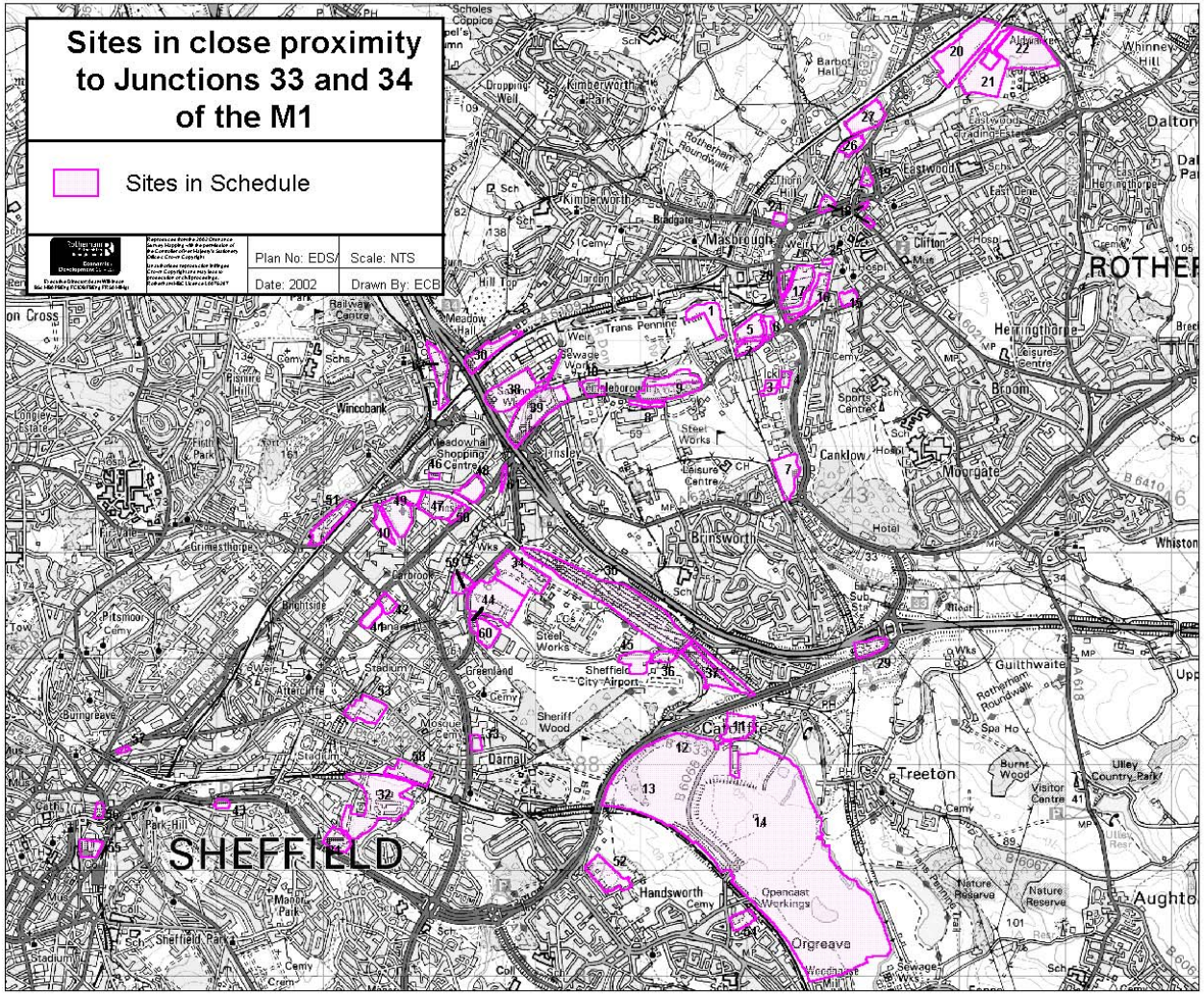

Figure 3 – Location of areas subject to Objective 1 plans (shaded pink) in and around the Sheffield AAZs

1.7 Source Attribution – What Causes the Problems?

1.7.1 Methods

Relative contributions of NOx/NO_2 from traffic, industrial point sources (regulated processes that emit through tall chimneys), area sources, and heavy and light vehicles have been assessed to apportion air quality problems in the Sheffield AAZs to the sources responsible. Two methods have been used:

a. A study of the emission data base, using the Airviro *search* function for the whole of Sheffield.
b. Dispersion modelling in the AAZs and a comparison of the predicted levels (for various sources) at selected monitoring stations.

1.7.2 City-wide emissions

Results of the Airviro *search* analysis are shown in Table 3:

Table 3 – Attribution of city-wide NOx emissions in Sheffield to sources, using the method described in paragraph (a) above

Source	Proportion of NOx %
Traffic – heavy vehicles	38%
Traffic – light vehicles	22%
Industrial Point Sources	22%
Area Sources	18%

This table suggests that the major source of NOx emissions in Sheffield is traffic and that heavy vehicles are the main emitters. Whilst industrial sources contribute significantly to overall emissions from the City, their contribution to ground level concentrations within the City is small because of the height at which they release NOx (see Table 4 and Table 5). The category 'Area Sources' includes other industrial facilities (along with domestic, commercial and public sector sources) emitting close to ground level.

1.7.3 Source attribution for the M1 Air Action Zone

Results for the M1 AAZ are shown in Table 4:

Table 4 - % contribution of different sources to NOx levels in the M1 AAZ, using the method described in paragraph 1.7.1(b) above

Source	Brightside	Tinsley 1	Tinsley 2
Traffic – heavy vehicles	47%	59%	61%
Traffic – light vehicles	23%	24%	21%
Industrial point sources	10%	8%	10%
Area sources	20%	9%	8%
M1 traffic as % of total emissions	20%	60%	68%

Tinsley 1 is the Environmental Protection Service's monitoring station at Tinsley Infant School at Siemens Close. Tinsley 2 is located at Tinsley community centre.

The conclusions drawn from this table are;

a. The dominant NOx source in the M1 AAZ is traffic.
b. In Tinsley, the motorway contributes about 60% of the total NOx at a distance of approximately 100m from the M1.
c. Heavy vehicles account for about 60% of the total emissions close to the M1 in Tinsley.
d. Industrial processes (there are several large steelmakers in this area) contribute about 10% to the M1 AAZ area.
e. Area sources (commercial and domestic combustion) account for about 10% of the total emissions.
f. As might be expected, the sources in the M1 AAZ area are different from the city as a whole, traffic being a more dominant source in the M1 AAZ.

1.7.4 Source attribution for the City Centre Air Action Zone

Similar analysis has been carried out for Sheffield City Centre. An estimate of the proportion of NOx that various sources contribute to the overall concentrations in the City Centre has been made for two monitoring stations. Results are shown in Table 5.

Table 5 – % contribution of different sources to NOx levels in Sheffield City Centre

Source	Wicker	HSE
Traffic – heavy vehicles	31%	31%
Traffic – light vehicles	16%	27%
Industrial Point sources	1%	1%
Area sources	52%	41%

The monitoring station at the Wicker is at the South Yorkshire African-Caribbean Centre SYAC. HSE is the monitoring station at the Health and Safety Executive building at Broad Lane.

The following conclusions are drawn;

a. Area sources and traffic have a similar importance in determining NOx levels across the City Centre.
b. Industrial processes have a small impact on the city centre.

1.7.5 A first perspective on the measures required to meet the annual mean NO_2 in the Air Action Zones

Roughly 95% of the NOx emitted from combustion sources is in the form of NO rather than NO_2. NO_2 is formed in the atmosphere from reaction between ozone (O_3) and NO, leading to the formation of NO_2 and oxygen (O_2). The high levels of NOx present in Sheffield and downwind areas mean that there is relatively little ozone available for reaction. Under such conditions a large reduction in NOx emissions is required to achieve a reduction in NO_2 concentrations. Modelling work undertaken by Sheffield City Council estimates that the total NOx emission predicted for 2005 would need to be reduced from approximately 8500 tonnes to 7000 tonnes/year to achieve the NO_2 target. This corresponds to;

a. 30% of traffic emissions, or;
b. 80% of emissions from industrial processes, or;
c. All emissions from domestic and commercial heating.

This analysis is prone to a significant level of uncertainty. However, the results are useful for demonstrating the scale of the problem, and strongly suggest that a significant level of action is needed to ensure that the annual average air quality standard for NO_2 is met.

2 Development of the Action Plan

2.1 Overview

The City Council's Environmental Protection Service (EPS) set up two stakeholder groups for consultation prior to designation of the two AAZs:

- The M1 Corridor Clean Air Partnership (M1CCAP, run jointly with EPS/Rotherham Metropolitan Borough Council), and
- The City Centre Clean Air Partnership (CCCAP).

These were also convened at regular intervals throughout the action planning process and both have played an essential role in development of the plan, providing a level of understanding of current conditions and developments that would otherwise be missing. Those invited to participate in the partnerships included local Councillors, local community representatives, businesses, public sector agencies and development bodies, and local groups. EPS engaged expertise from the consultants, BDOR Ltd, and Talking Solutions to facilitate early consultation on the action plan to identify possible options.

Subsequent development of this plan has been guided using the AirAction system developed at AEA Technology. The system's modular structure is shown in the central box of Figure 4. The boxes on either side show the roles of the Environmental Protection Service of Sheffield City Council and the Stockholm Environment Institute (based at the University of York) in the development of the plan.

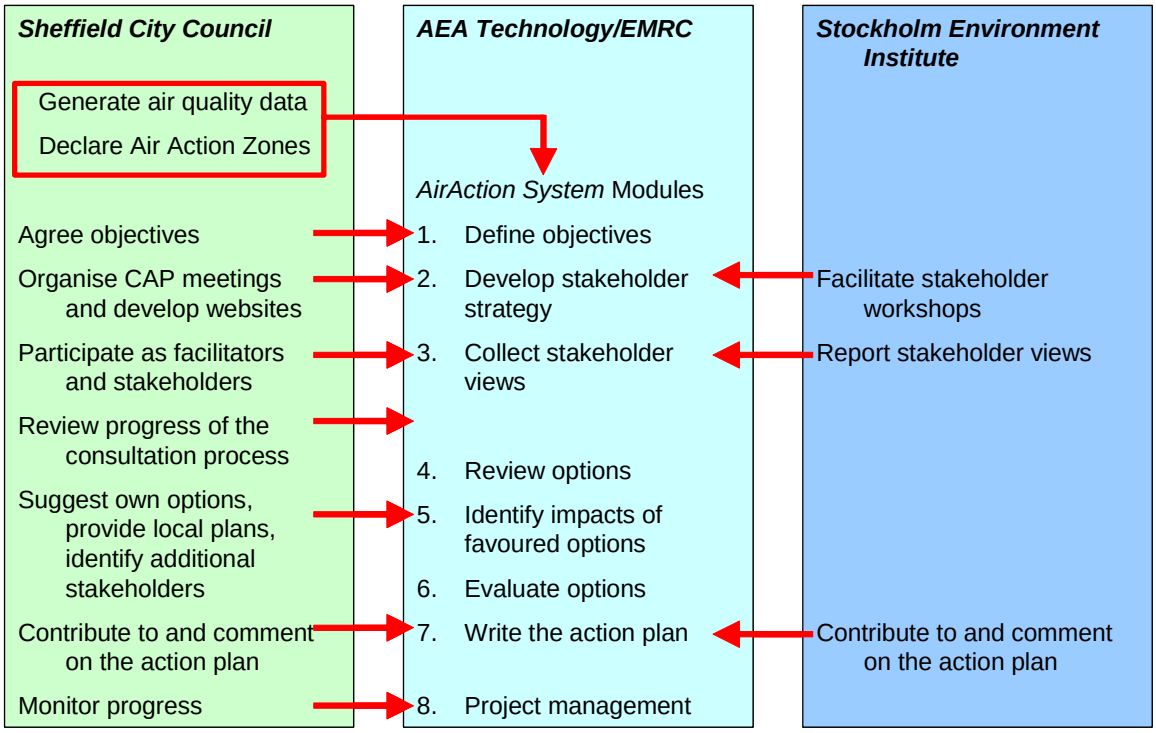

Figure 4 – Scheme adopted in the development of this plan following earlier analysis of air quality in Sheffield.

Websites were developed to disseminate information on air quality in Sheffield (see Section 7.1) and updated regularly. Monitoring and modelling of air quality was carried on throughout the process, leading to the production of the Stage 4 Review and Assessment Report in December 2002.

In the final stages of development of the plan a consultant, Peter Faircloth of Cranfield Economics, undertook an independent economic review of the plan to assess the interaction with other local plans and objectives. The report on that work is reproduced here in Appendix 6. Following consideration of issues raised in that work, some changes have already been made to this action plan.

The following represent the key elements of the approach used in Sheffield:

1. Extensive stakeholder consultation throughout the development of the plan, and particularly, though not exclusively based around the M1CCAP and CCCAP. This provided insight on the types of options that people favoured, and the reasons for preferences expressed.
2. Review of the options that could be adopted to improve air quality in Sheffield, and the impacts that are linked to them. This is carried out using data from several sources.
    a. Local information presented in various plans (e.g. the Local Transport Plan).
    b. Information gathered from stakeholders during the consultation process.
    c. AirAction's database of options for improving air quality, which includes information from various sources on costs and impacts of many of the options listed, drawn from the international literature.
3. Continued stakeholder involvement in review of the draft plan, and, subsequently in implementation of the plan.

The following sections provide further detail on the process, proceeding sequentially through the stages shown in Figure 4.

2.2 Modelling Air Quality

The following describes the way that air quality modelling has been carried out in Sheffield. A full description of this work is given elsewhere (see the websites), but information is given here to demonstrate the detail considered in the work that led to the designation of the Air Action Zones and subsequent source attribution.

2.2.1 NOx emission data

Sources of data describing NOx emissions in Sheffield are shown in Table 6.

Table 6 – Source data for describing NOx emissions in Sheffield

Source of emissions	Source of data
Large industrial installations (Part A processes[10])	The Environment Agency, company environmental managers, public register
Medium to small industrial installations (Part B Processes[11])	Process authorisations held on the public register[12] and from process operators
Commercial and industrial emissions from oil, coal and gas combustion that are not Part A or Part B processes	National Atmospheric Emissions Inventory (NAEI)
Domestic emissions from coal, oil and gas combustion	NAEI
Emissions from traffic on the major road network	Vehicle flow information from the City Council's Transport Planning team and emissions factors from the NAEI
Emissions from traffic on the minor road network	Vehicle flow details from the City Council's Transport Planning team, and emissions factors from NAEI

2.2.2 Models used

Sheffield has used the Airviro model. DEFRA guidance on air quality modelling describes the Airviro system as an advanced model:

> "*(Airviro is) a modular system that can be built progressively as user requirements develop. Airviro provides dispersion simulation at different scales within options of five models: Street Canyon, Urban, Grid, Match and Heavy Gas. The dispersion results are overlaid on a map and can be imported/exported to standard GIS software. Airviro has inbuilt wind models, complex terrain handling and direct links to a dynamic emissions database which can handle unlimited numbers of point, area and line sources and grid layers."*

The guidance describes the main feature of advanced models, and the Airviro system fulfils all the criteria. These are listed as:

- Treatment of more than one type of source, i.e. point sources (such as large industrial plant), area sources (as from domestic boilers) and line sources (such as traffic on the M1);
- Simultaneous multi-source modelling;

[10] As described in the Environmental Protection (Prescribed Processes and Substances) Regulations 1991 (SI 4720) (As Amended)
[11] As 10 above
[12] Environmental Protection (Applications, Appeals and Registers) Regulations 1991 (SI 507), as amended.

- Generation of outputs over averaging periods ranging from 15 minutes to one year, to enable a wide range of pollutant standards to be assessed;
- Ability to model worst case conditions, e.g. adverse combinations of meteorology and emissions, which could result in pollution episodes;
- Ability to account for complicating factors such as atmospheric photochemistry, complex terrain and building effects.

2.2.3 Designating the Sheffield AAZs

In line with Government guidance the boundaries proposed for each AAZ follow recognisable physical features such as roads and railway lines (see Figure 1 and Figure 2 in Section 1.6.2). Details of the designation are provided in the December 2001 order for each Air Action Zone that was submitted to DEFRA for their approval, following approval by the City Council. Further information is given in the Stage 4 Review and Assessment report (see websites).

2.3 Stakeholder Consultation

As noted already, the stakeholder consultation process was developed around two groups (one for each of the Air Action Zones), the M1 Corridor Clean Air Partnership (M1CCAP), and the City Centre Clean Air Partnership (CCCAP). Several meetings of each group were convened during the development of the plan. Separate meetings were organised with stakeholders unable to participate in these groups, where possible. A summary list of consultees who attended meetings or provided written comment is given in Table 7[13]. Table 8 shows the major meetings arranged during consultation on the action plan (excluding meetings with individuals).

The early stages of consultation were conducted at a relatively general level, dealing with:

- Identification of options that stakeholders liked and disliked;
- Development of an understanding of how this varied between different stakeholders;
- Assessment of attitudes to issues facing people in Sheffield, from health and environment to employment and safety.

In the final stage of consultation some more specific questions were raised:

- Did stakeholders support the list of measures identified?
- Was the emphasis given to different options appropriate?
- Were there any options not listed that stakeholders believed should be reconsidered?
- Was it possible to rank the measures that stakeholders would like to see introduced in terms of how attractive they perceived them to be?
- Were data on costs, effectiveness, benefits and disadvantages reasonable?
- Were the timescales listed reasonable?
- Was responsibility for implementing the options allocated correctly?

[13] A full list of those invited to participate in the consultation process is given in Appendix 2.

Table 7 – Stakeholder consultation (A = attended meetings, W = provided written response outside meeting)

Stakeholder	M1CCAP	CCCAP	Other
Statutory Consultees			
Local councilors	A	A	
Environment Agency	AW	AW	
Highways Agency			W
Rotherham Metropolitan Borough Council	AW	AW	AW
Primary Care Trusts	AW	AW	
Local Authority Departments			
Environmental Protection Service	AW	AW	AW
Transport Road and Safety	AW		AW
Urban Traffic Control	A		AW
Planning, Development Control	AW	AW	A
Other Public Bodies			
Brinsworth (Rotherham) Parish Councillor	A		
Catcliffe Parish Councillor	A		
Govt. Office for Yorkshire and Humber	A	A	
Objective 1	A		
Sheffield First	A		
Sheffield One		AW	
Sheffield Health Authority		A	
Sheffield Primary Care Trusts		A	W
South Yorkshire Passenger Transport Executive	AW	A	
Yorkshire Forward	A	A	
Residents, businesses, etc.			
Arriva Trains Northern		A	
Avesta Polarit	AW		
Brinsworth (Rotherham) residents	A		A
British Land Corporation	AW		
Bus Operators Serving South Yorkshire (BOSSY)			A
Chamber of Commerce		AW	
Christian Ecology Link			A
City centre residents		A	A
City Centre workers			A
Corus	A		
Cycling Forum		A	A
East End Quality of Life Initiative	AW		
East End Strategy Group			W
EWS Railway	A	A	
First (Mainline)		A	
Manor, Castle Area Panel		A	
Meadowhall	A		
Onyx (operators of the Sheffield waste to energy plant)		AW	
Pedal Pushers (Cycle Campaign group)			A
RAP (Residents Against Pollution, Brinsworth)			A
Sheffield and District Chamber of Trade		AW	
Sheffield Friends of the Earth	AW	AW	
Sheffield Hallam University		A	
South Yorkshire Police		A	
Tinsley Forum	A		A
Tinsley residents	A		A
Tinsley Tree project			A
Tinsley Wire	A		
University of Sheffield		A	
White Young Green	A		

Table 8 – Major meetings arranged during development of the plan, showing target audience, dates and number of attendees (excluding external facilitators and members of Sheffield City Council's Environmental Protection Service)

Date	Target audience	No. of attendees
17 11 00	M1CCAP	18
11 01 01	M1CCAP	19
29 01 01	M1CCAP	27
20 03 01	M1CCAP	14
20 03 01	CCCAP	9
16 05 01	M1CCAP	17
25 07 01	M1CCAP	11
25 09 01	CCCAP	13
05 11 01	M1CCAP	41
03 12 01	M1 CCAP	34
05 03 02	M1CCAP	25
10 04 02	CCCAP	8
08 05 02	CCCAP	9
03 09 02	City Centre Citizens and Community Organisations	7
15 10 02	Retail and manufacturing, Devonshire quarter	2
17 10 02	Major retailer, High Street	1
22 10 02	Major retailer, The Moor	1
23 10 02	City Centre Citizens and Community Organisations	11
28 10 02	M1CCAP	25
28 10 02	CCCAP	9
28 11 02	M1 Corridor Citizen and Community Organisations	6
29 11 02	Tinsley forum	8
09 12 02	M1CCAP	22
09 12 02	CCCAP	8

Maps were generated during this process that usefully highlighted issues of concern to business and residents, proposed developments, etc., and allowed some detailed suggestions to be made on options (illustrated in Figure 5 to Figure 8).

In addition, commitment for stakeholders to act to improve air quality was sought through the consultation process. As an example of the commitment that exists, the operators of the Meadowhall shopping centre are currently examining the potential for a variety of options for improving air quality.

This consultation work has been funded by Government through the Supplementary Credit Approval regime. Significant resources have been essential to gain transparency and inclusiveness in the assessment of air quality and the development of the action plan.

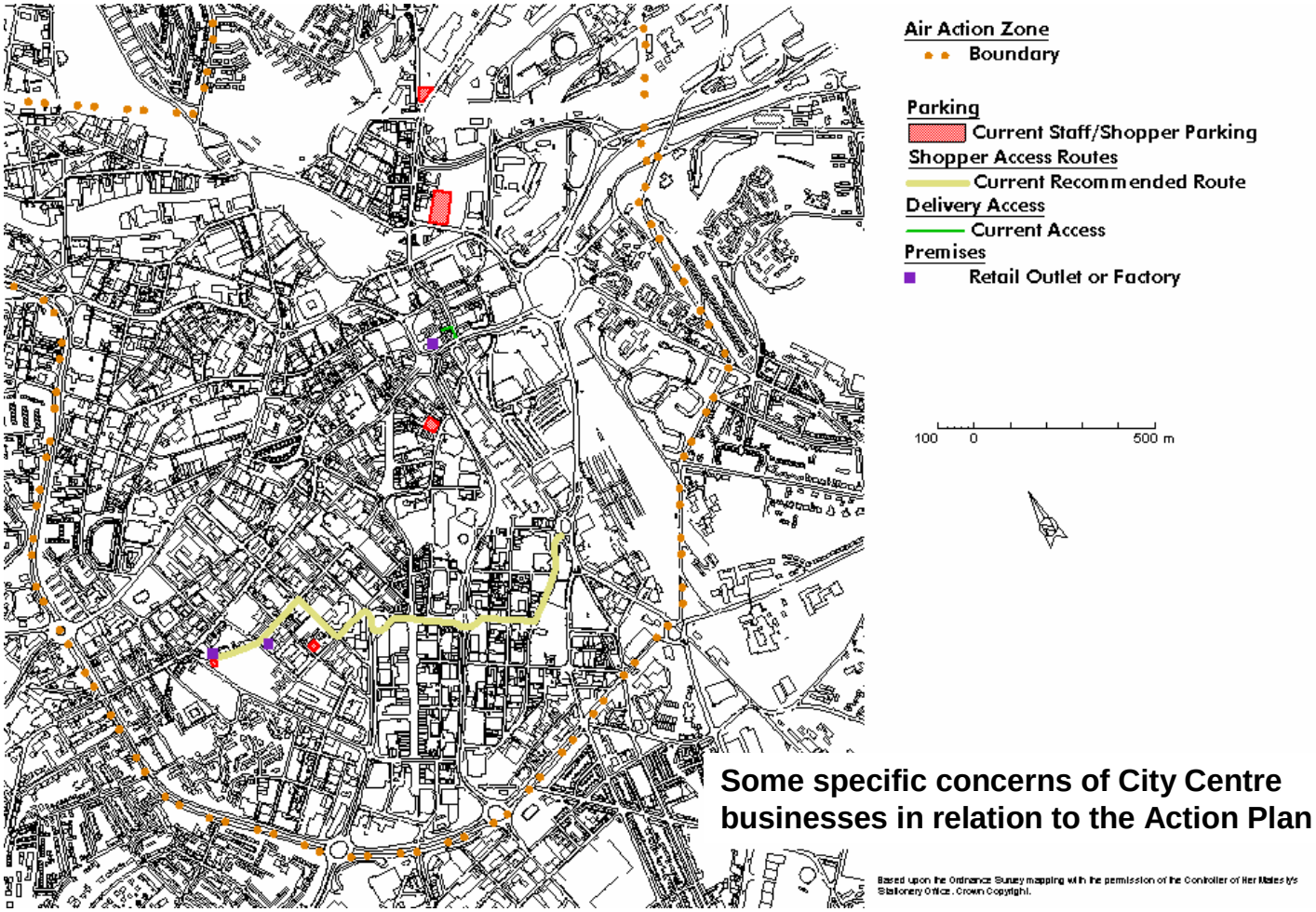

Figure 5 – Examples of mapped outputs from stakeholder consultation for the City Centre AAZ: Concerns of City Centre businesses

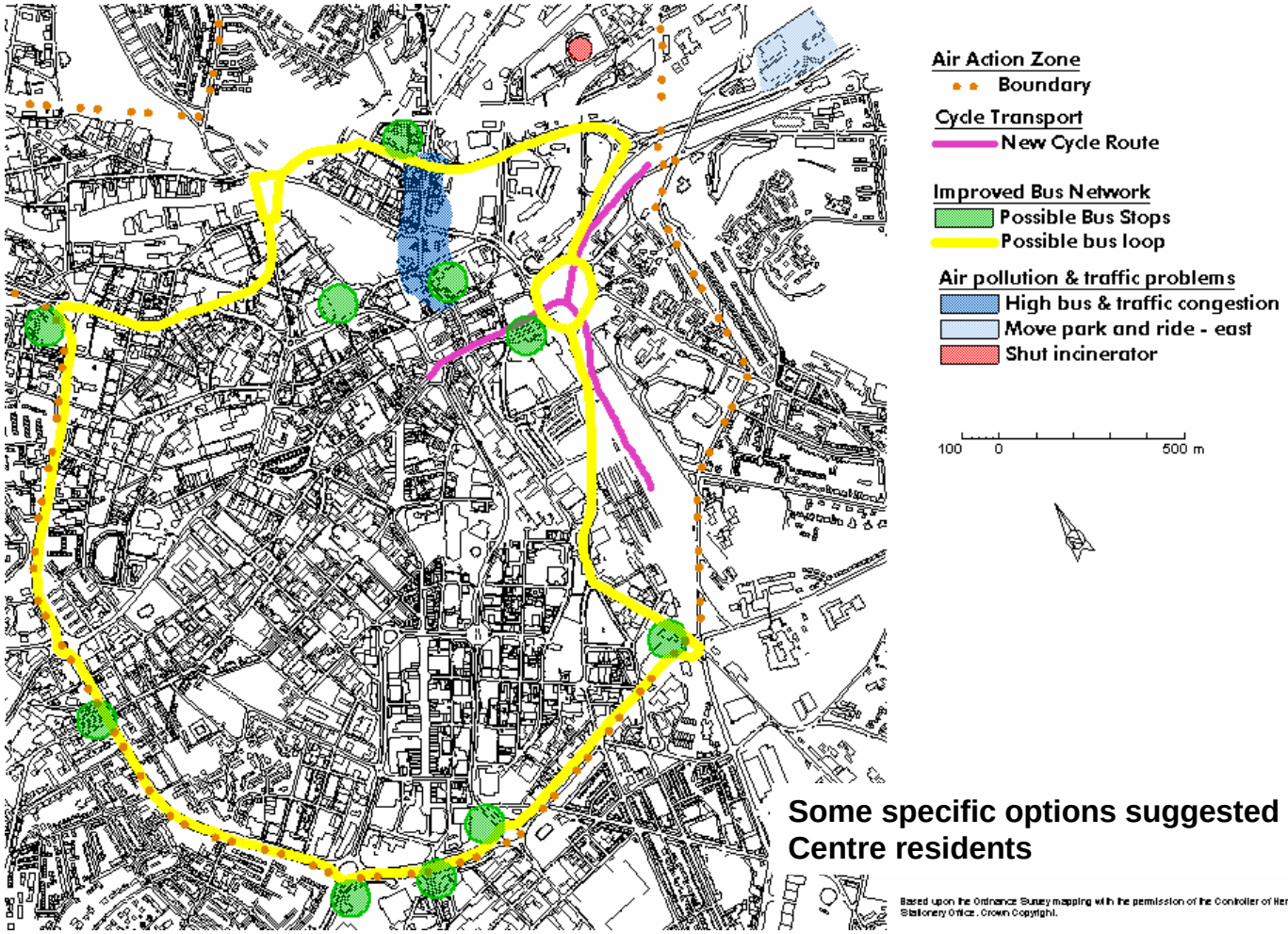

Figure 6 – Examples of mapped outputs from stakeholder consultation for the City Centre AAZ: Some of the actions suggested by City Centre residents

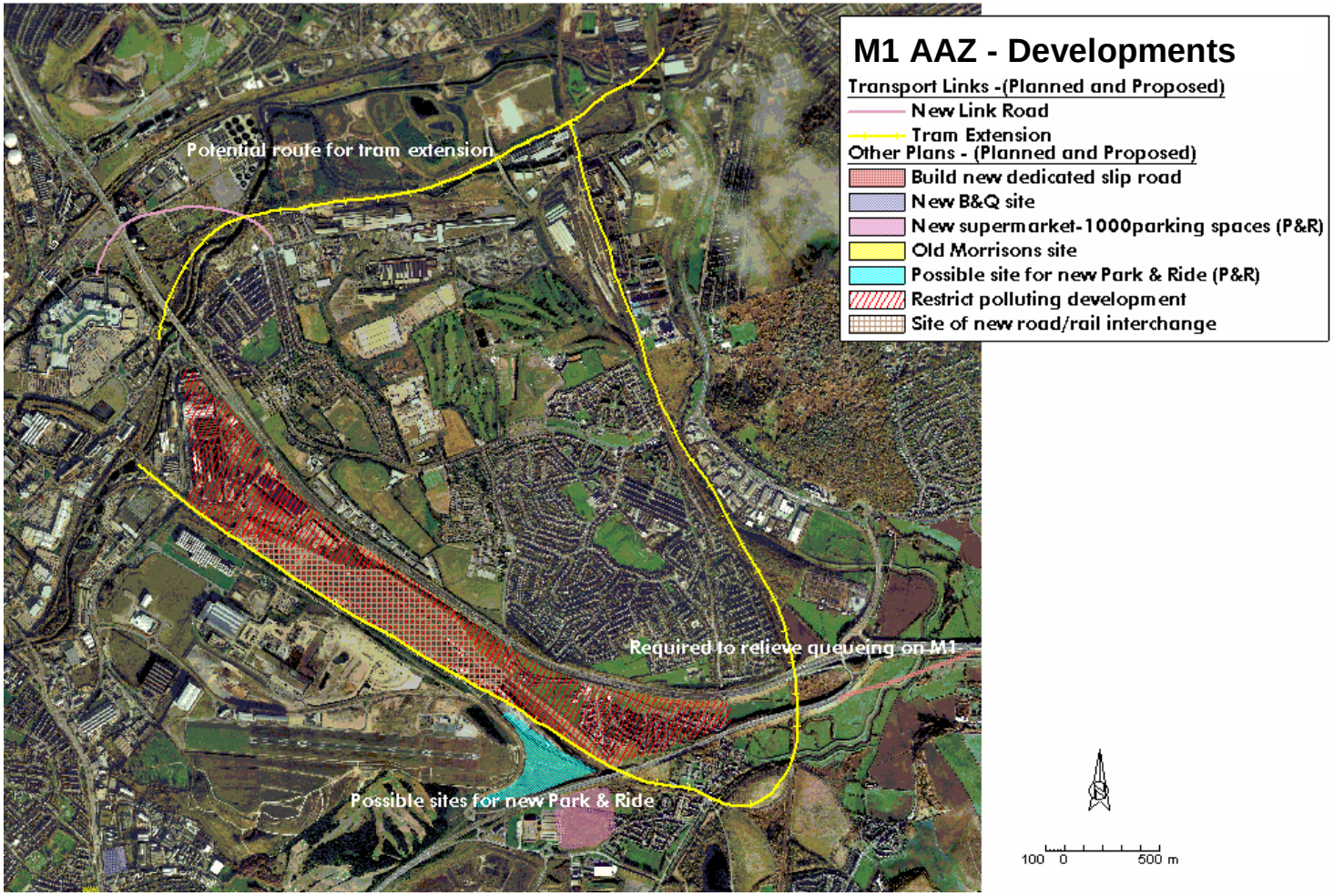

Figure 7 – Examples of mapped outputs from stakeholder consultation for the M1 AAZ: Planned and proposed developments

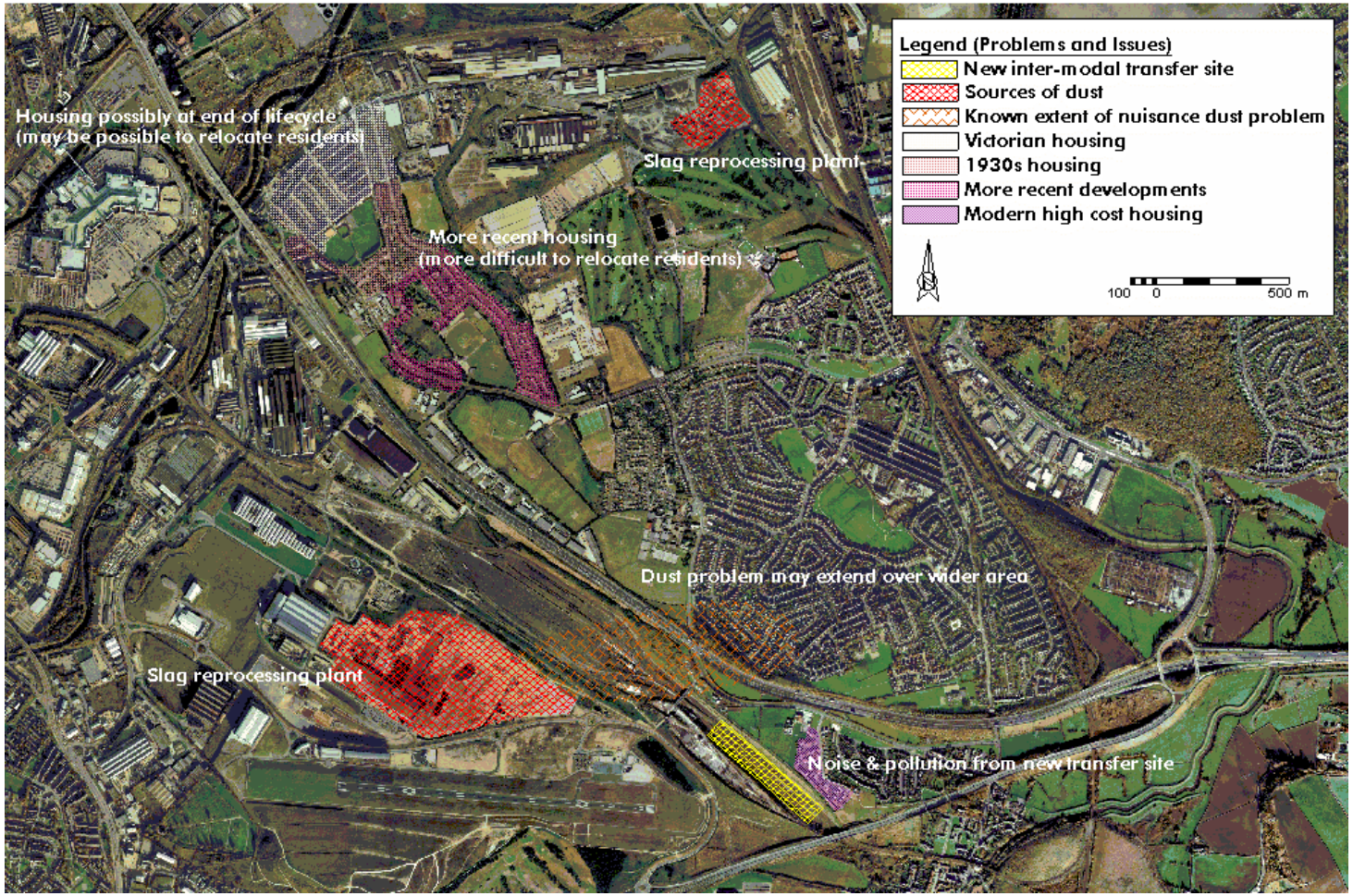

Figure 8 – Examples of mapped outputs from stakeholder consultation for the M1 AAZ: Issues of concern to Tinsley residents

2.4 Identifying Options for Improving Air Quality

The main source of information for identifying the options considered in this report has been a database developed for AEA Technology's *AirAction* system. This has drawn on numerous sources such as research reports for UK government (e.g. Holland *et al*, 2001, 2002) and the European Commission and includes more than 150 options. In addition to this, other options have been identified in the consultation process. Many of these have a more local flavour than those contained in the *AirAction* database (demonstrating the value of effective consultation).

In total over 100 options were considered during the development of this action plan. Many of these were ruled out through initial screening by Sheffield City Council, the M1CCAP and CCCAP, and the consultants working with EPS.

2.5 Option Appraisal and Prioritisation

Having identified options a number of questions were asked:

1. How far do they each go in resolving air quality problems?
2. Are the different options compatible?
3. Do they cost a significant amount of money, or can they lead to significant cost savings?
4. Who is responsible for seeing that options are adopted?
5. Who is responsible for paying for options?
6. On what timescale can an option provide the necessary air quality improvements?
7. What is the primary objective of the option under consideration? Is it, for example, to reduce emissions of air pollutants, or to reduce congestion?
8. How voluntary is the adoption of any measure?
9. What sector is targeted by an option? Is it industry, traffic, local businesses, local residents, etc.?
10. How broad are the impacts of any option? Do they just affect emissions of a single air pollutant, of several pollutants, or air pollution together with other issues such as local employment, the local economy, congestion, safety, etc.

These questions are answered drawing on earlier examples, using data from South Yorkshire, the rest of the UK, Europe and the rest of the world if need be. In many cases it is not possible to give precise estimates in response to these questions at this stage, making it appropriate to conduct feasibility studies ahead of final adoption of the measures in question. Hence, at this stage, uncertainty in the answers to the above questions is of limited importance as we are seeking to identify the options that are likely to be most promising. What is needed is a set of estimates of costs and effectiveness that are reliable in "ball-park" terms, as information can be refined during implementation of the action plan.

Having derived information from available sources and consulted the stakeholders, information has been evaluated using techniques based on multi-criteria analysis (MCA). A full MCA would require all impacts of the options considered to be scored, and then the different impact categories weighted by stakeholders. However, limits on data availability and the complexity of the plan meant that a detailed MCA was not practicable. It is intended that sufficient data is presented in this plan to enable stakeholders to understand why some options are preferred to others, and to appreciate the types of impact linked to each option.

The prioritisation presented seeks to take an integrated approach in accounting for the different attributes of each individual option relative to:

1. Cost.
2. Effectiveness in reducing NOx emissions.
3. Effectiveness relative to NO_2 levels in Sheffield City Centre or the M1 Corridor.
4. Potential to implement the option before 2005, and then 2010.
5. Additional (non-NO_2) benefits of the measure.
6. Disbenefits linked to the measure.
7. Complementarity of measure with local development objectives.

In relation to the non-NO_2 benefits and disbenefits linked to options in the plan, the following categories were considered most significant[14], and are considered specifically in Appendix 5:

- Control of other regulated pollutants, especially fine particles, in view of the proposed 2010 standards and recognising that epidemiological studies have failed to identify a threshold for particles.
- Control of greenhouse gases.
- Economic vitality of Sheffield and South Yorkshire (as it feeds through to employment, and recognising the numerous benefits that this will bring, including improvements to health).
- Transport efficiency (covering mobility, congestion and other elements).
- Social inclusion.
- Noise.

Other impacts tended to be less generally applicable. These were considered on a case by case basis to fine-tune the prioritisation of options.

2.6 Development of Implementation and Monitoring Mechanisms

In addition to developing a list of options this plan includes description of mechanisms for implementation and monitoring, to ensure that the process for successful application of the plan is understood.

[14] Importance here is assessed against the context of the action plan. Other impacts may well be more important in a broader context, but may not be influenced significantly by actions to address air quality.

2.7 Future Development of the Action Plan

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

PART 2: The Action Plan

3. **Objectives and Strategies**
4. **Recommended Options for Air Quality Improvement in Sheffield**
5. **Implementation Programme**
6. **Concluding Remarks**
7. **References and Other Useful Sources of Information**

3 Objectives and Strategies

3.1 Overall Objectives of the Action Plan

The principal objective of the action plan is to improve air quality in Sheffield so that no-one is subject to exposure to any pollutant in excess of the legal objectives (see section 1.2). However, as noted in Section 1.3, the objectives for the plan need to account for many options under consideration having a variety of impacts in addition to reducing emissions of the specific air pollutants that the plan needs to target. Some of these will tend to be beneficial; others may tend to be detrimental[15]. This point is illustrated in Table 9 (though note that this table is provided at this point purely for the purposes of illustration).

Table 9 - Examples of the impacts of some options for air quality improvement

Option	Positive impacts	Negative impacts
1. Improvements in energy efficiency in the domestic sector	a) Reduced emissions of air pollutants b) Cost savings in the medium to long term c) Reduction in fuel poverty d) Improved health	a) Additional expense in the short term (though this will be recouped later)
2. Increased parking charges	a) Reduced usage of vehicles in the target area, so reduced congestion, noise, etc. b) Local reduction in emissions	a) Possible displacement of vehicles to other areas, so shifting pollution, congestion, etc. c) Potential for economic impacts on local businesses d) Possible loss of transport service for those who cannot afford to pay, unless valid alternatives are provided
3. Various options for increasing the use of public transport, such as reduction in journey times, improved information systems, better-ticketing, new routes, etc.	a) Reduced usage of vehicles in the target area, so reduced congestion, noise, etc. b) Local reduction in emissions c) Local employment opportunities d) Improved access to services and amenities for some sections of society. e) Improved efficiency of transport systems	a) Improved bus journey times can create delays for other vehicles. b) Bus priority can increase congestion for Industry and Business.

[15] The word 'tend' is used here to qualify the statement, as the potential for beneficial and detrimental effects from any measure will vary according to local characteristics, the way that options are applied, and the combination of options introduced.

With this in mind the objectives considered during the development of the action plan have been written in very broad terms (Box 2). These reflect the economic, social and environmental dimensions of sustainability.

Box 2. Objectives considered during the development of the Sheffield Air Quality Action Plan

Meet the air quality standards laid down in the National Air Quality Strategy, whilst:

- improving the quality of life of the residents and people who work in Sheffield
- acting in a cost-effective manner, through careful selection of options and by integrating our work with the activities of other Council Departments and other agencies,
- taking account of the views of local people,
- seeking, where possible, to maximise benefit in reducing other environmental burdens, such as emissions of greenhouse gases

3.2 Action Planning Strategies – General Considerations

3.2.1 Necessary level of abatement of NOx emissions

It has already been noted (section 1.7.5) from modelling work undertaken by Sheffield City Council that the reduction in NOx emissions in Sheffield in 2005 corresponds to;

a. 30% of traffic emissions, or;
b. 80% of emissions from industrial processes, or;
c. All emissions from domestic and commercial heating.

Accepting the uncertainties of this analysis, the results suggest that strong action is needed to move to the annual average air quality standard for NO_2. Whilst it would plainly be absurd for the plan to suggest that, for example, all domestic and commercial heating across the City from fossil sources should cease, these results show that in order to succeed the plan will need to do more than rely on purely voluntary action, or minor changes to existing practice.

3.2.2 Strategies

One issue on which the action planning process set out to encourage debate on concerned the level of ambition that Sheffield[16] holds for becoming a 'sustainable city'. This influences the selection of options for meeting the objectives and hence also resource and funding demands on the Council and other stakeholders. Under a very strong commitment to sustainability the plan could feature a mix of voluntary actions and specific measures. Under a weak commitment to sustainability the plan would need to be less flexible, with very little emphasis, if any, on voluntary actions. In this scenario the costs of the

[16] Not just the Council, but also the businesses and individuals who live and work in and around it.

final plan would probably be significantly higher than the costs of a plan that includes significant voluntary commitment. Businesses and individuals that adopt a number of options for environmental improvement are likely to benefit from (for example) reduced consumption of energy, water and materials, and associated cost savings. They would also have more control over the precise options that they adopt and the timescales for their introduction.

Four different strategies were considered in the consultation process:

- Strategy 1: Do nothing beyond implementation of existing plans (in other words, do not introduce further measures specifically targeted at air quality).
- Strategy 2: Reduce traffic using a few measures implemented to an extreme degree.
- Strategy 3: Develop a flexible strategy, still restricted to traffic, but using a broader range of options to maintain access to transport services (in other words, not restricting the freedom to travel).
- Strategy 4: A yet more flexible strategy, based on strategy 3, but bringing in other (non-traffic) sectors.

Each of these is now discussed in more detail.

Strategy 1: Do Nothing Beyond Implementation of Other Plans
Here, the Air Quality Action Plan would propose nothing that has not already been adopted in other plans for Sheffield and South Yorkshire more generally, or is already under consideration. This option assumes that planners are sufficiently conversant with air quality to deal effectively with the problems that have been identified. The action plan would then consist of little more than a list of measures for monitoring success in moving towards the standards.

Stakeholders generally agreed that this strategy would not provide the necessary improvements, in accordance with the data on the necessary scale of abatement needed to meet the standards (Section 3.2.1). However, some felt that the benefits to air quality of a number of existing actions were significant and should thus be given greater recognition in the development of the plan than was then the case. This has now been done.

Strategy 2: Reduce Traffic
The primary causes of air quality exceedences in Sheffield are:

1. Traffic moving along the M1 and using roads that link with the M1.
2. Traffic going to and moving through the City Centre, and emissions from disperse ‘area sources’ in and around the city centre.

This strategy would seek to meet the air quality standards solely by reducing traffic, a strategy that can be based on a relatively small number of options. These measures could include:

1. A ban on certain types of vehicles (e.g. those not meeting particular Euro-standards for emissions, or passenger cars, etc.) accessing certain areas.

2. Congestion charging for the City Centre (as is being applied now in Durham, and to be applied in Central London from February 2003) and the imposition of tolls to use the M1.
3. Closing roads.
4. Removing parking spaces or greatly increasing parking charges.

Under this strategy, the option or options selected would be pursued until they delivered the necessary improvement. This reflects the approach identified by the Mayor of London, who has said that the initial £5/day congestion charge for vehicle access to central London may be increased until the desired reduction in congestion is achieved.

This strategy had some attractive features:

- Focused on a limited number of measures it could easily be designed to *ensure* that the air quality standards would be met (you could close roads and increase congestion charges and tolls until traffic was reduced sufficiently).
- Being of limited complexity through its focus on a small number of measures it would also be quite easy to implement compared to other strategies.
- Revenues could be directed to improvement of public transport (though they could equally be used for other priorities).

However, it would also be problematic:

- It could lead to a loss of transport service, which would affect all parts of the community, though inevitably some parts would be harder hit than others.
- It might move traffic into other areas, where air quality, accidents and local opposition would worsen. Overall, this could lead to no improvement, or even a worsening, in public health.
- It may encourage shoppers (etc.) to abandon Sheffield in favour of places that are considered easier or cheaper to access.
- It could well be unpopular with the majority of people in the region, particularly if money raised through charges was diverted away from transport.
- It would conflict with the broader development aims for South Yorkshire, deterring inward investors.

On balance, this strategy was also rejected, though a number of stakeholders considered it worthy of future consideration in the event that other strategies were unable to deliver the necessary air quality improvements.

Strategy 3: Flexible Strategy on Traffic

A more flexible strategy could be implemented to meet the standards, but still be focused on traffic alone. This could involve the measures identified above, but also bring in the following options. Many actions of these types are already underway in some form. Where this is the case existing frameworks should perhaps be strengthened.

1. Promotion of public transport (ensuring that accessibility is maintained in the event of a ban on traffic, or improved).

2. Encouraging less polluting vehicles.
3. Raising awareness of energy efficiency measures (ranging from ensuring that tyres are properly inflated to driver training).
4. Greening of procurement policy for the Council's vehicle fleet and for vehicles used by the Councils' various contractors.
5. Development of Travel Plans for the Council, businesses, etc.
6. Etc.

This list of options addresses some of the problems of the previous strategy by relying on a greater range of measures, and seeking to ensure that, for example, access to transport services is at least maintained. The Council is also seen to be taking the lead through measures to green its vehicle fleet and develop Travel Plans. On the negative side, the benefits of these additional measures are difficult to forecast, and the plan would still need to pursue some of the strict options identified for Strategy 2 (though not to the same extremes). The lack of focus would also be problematic, perhaps creating difficulty in attracting necessary funding. Also, the plan misses the opportunity to generate improvements in other sectors, particularly through the promotion of measures that improve the efficiency of resource (mainly energy) use, and offer the opportunity to make substantial financial savings.

Strategy 4: Flexible Strategy for All Pollution Sources
This strategy would still be focused primarily on traffic, as it is traffic that is the main cause of the forecast exceedences of the air quality standards in the region (accepting the significant role of area sources in the City Centre). However, by bringing in non-traffic related options in all sectors (business, the Council and other public sector, domestic), it provides further opportunity over Strategy 3 to soften some of the more draconian policies that may be necessary to bring about anything like a significant reduction in traffic emissions.

This strategy does more in the pursuit of sustainable development than the other strategies considered here. Importantly it offers real potential for local businesses to become more competitive by saving money on fuel and other bills, and also for households to save money on their energy bills. It also demonstrates that responsibility for a clean and healthy environment is one that needs to be taken on board by everyone, not just one section of the population or sector of activity.

A disadvantage of this strategy is that the adoption of a large number of options for improving air quality may mean that the plan lacks focus (as was suggested also for strategy 3) and that few options are adequately implemented.

3.3 Stakeholder Views on Strategies

Stakeholder views on the strategies are summarised in Table 10. The Table includes a brief indication of the level of support for the different options from the stakeholders. '---' indicates strong concern, '+++' indicates strong

support. Stakeholders identified significant merits for each of the strategies identified, though by far the strongest support was for strategies 3 and 4, recognising their potential benefits in terms of cost-effectiveness.

To address the lack of focus that may arise if the flexible strategies are adopted, threatening the effective implementation of the action plan, options are presented in the following chapters combined into a number of packages, or sets of options. Responsibility for seeing through each package of measures, setting targets, disseminating good practice, monitoring progress, etc. has been allocated in this plan, though may need to be revised as more information becomes available. Where options do not work those responsible should seek to identify any barriers to progress, and then investigate if and how those barriers can be overcome.

Table 10 – Stakeholder views on the strategies

Strategy	Strength of support	Merits	Disadvantages
1. Current plans	+	A number of actions currently underway in the region will improve air quality. This needs to be recognised as a basis for the plan, though no-one suggested that it would be sufficient on its own.	Will not meet the air quality standards.
2. Reduce traffic	---/+	Targets the sector that is mainly responsible for the air quality problems. Restriction to a few measures makes it administratively easier to implement. Of all the strategies it is the only one that would ensure that the standards were met.	Seems likely to deter inward investment to the region. Indiscriminate nature of the strategy ignores the benefits of transport. Ignores measures that may be extremely cost effective.
3. Flexible transport measures	+++	More cost-effective than strategy 2, and unlike strategy 1, it could deliver the necessary improvements to air quality. Less likely to act as a deterrent to investment into the region than strategy 2.	Diverse nature of the options included in such a strategy makes it very difficult to ensure that targets will be met. May be difficult to attract funding for some activities, driving it back towards strategy 2.
4. Flexible measures covering all sectors	+++	All polluters are expected to act. Should be the most cost-effective strategy, provided that it can be made to work.	As strategy 3.

4 Recommended Options for Air Quality Improvement in Sheffield

4.1 Introduction

This Chapter identifies the options recommended for improving air quality across Sheffield. Some measures are specific to the City Centre or the M1, though a number provide air quality benefits over a wider area. The implementation programme (Section 5) shows how the recommendations made here will be put into action. This gives additional details, for example, which options will require feasibility and other studies ahead of their possible introduction.

Information presented on both the costs and effectiveness of options is preliminary. Where possible, data have been taken from examples of the implementation of schemes, but as these are often not in South Yorkshire there are questions as to how reliable the extrapolation of data is. Development of the plan has recognised uncertainties where they are unavoidable, believing that it is better to start from some estimate of cost-effectiveness (etc.) than not, in order to provide insight on the prioritisation process. In general it is most appropriate to interpret figures as being relative across the overall set of options taken into consideration, rather than actual. This should not be considered a barrier to proceeding with the plan, as it is important for it to evolve over time as new information becomes available.

A more detailed breakdown of the environmental, health, economic and other effects of the options considered in the development of the plan is given in Appendices 4 and 5.

Options are prioritised on a scale from 0 to 3:

- 0: Options that are not recommended for taking further, typically because they conflict with other local initiatives, or have significant disbenefits.
- 1: Options that are likely to have a limited effect on air quality either in total or per £ spent.
- 2: Options with some potential to make a significant contribution, but for which there are concerns over the time needed for deployment relative to the time scales given in the air quality legislation, cost-effectiveness in the context of Sheffield, etc.
- 3: Strongly recommended as options that may be able to provide a cost-effective and significant reduction in emissions, thus making a substantial step towards the air quality targets.

Details of the prioritisation process are given in Section 2.5.

4.2 Linking Strategy and Options

As stated in Section 3.3, stakeholders consider that a flexible strategy for dealing with the air quality problems in Sheffield is to be preferred to a draconian one focused on a small number of traffic related measures. With this in mind a series of packages of measures were developed for the plan:

- Package 1: Improving public transport
- Package 2: Transport infrastructure
- Package 3: Traffic control
- Package 4: Cleaner vehicles
- Package 5: Options specific to reducing emissions from the M1
- Package 6: Control of industrial combustion and process emissions
- Package 7: Planning issues, and eco-efficiency
- Package 8: Actions for consideration by national government.

Some of these packages demand more new activity than others. For example, measures to reduce emissions by using cleaner vehicles may require new purchasing guidelines for the Council and other bodies, and the fitting of abatement equipment to many vehicles that routinely access Sheffield. In contrast, there may be very little that needs to be done by the industrial sector given the existence of the IPC and IPPC regimes.

4.3 Package 1: Improving Public Transport

4.3.1 Options already being implemented or identified in other plans

Many options for improving public transport are included in the LTP and other plans such as the South Yorkshire Bus Strategy which provides a general framework for improving the quality of bus travel. Some are listed in Appendix 3. They include:

- A rolling programme of Quality Bus Corridors across South Yorkshire.
- Improvements to passenger facilities (real time information, new shelters).
- Improvements at interchanges, including the access to tram facilities at Sheffield Rail Station.
- Improved links to walkers and cyclists for public transport facilities.
- Expansion of the Supertram system, and addition of new stops within the existing routes.
- Smartcards and other improvements to ticketing and provision of information.
- Improvements to the reliability of services.

These measures should contribute to improvements in air quality by providing a service that is much superior to that currently in existence, and hence encouraging people out of their cars. Accordingly these options are supported in this action plan.

One of the most common points raised by stakeholders in relation to public transport was the deficiencies of the current ticketing systems on buses. Different stakeholders raised a wide variety of possible solutions to these problems, such as the use of smartcards and the re-introduction of bus conductors (noting that conductors are present on the Supertram). It was felt, however, that since this was already being addressed through the bus strategy for South Yorkshire it was appropriate to monitor progress of the strategy rather than introduce additional measures at this stage.

Another point raised by many stakeholders relates to integration of public transport services in and around Sheffield city centre. Stakeholders felt that a circulatory bus route should be introduced serving the proposed system of distributed public transport termini around the city centre (should it be implemented), and that the fare for use of this bus should be factored into other fares to avoid the need to buy several different tickets when crossing the city. It is understood that the option of a bus service running on an 'inner loop' is being considered through the City Centre Masterplan.

SYPTE has recently been awarded £50,000 by government to use individual marketing techniques to encourage modal shift (to public transport, cycling and walking) in the Hillsborough and Middlewood areas of the city among the 3,000 residents that live in the area. Those participating in the scheme will be provided with personal journey plans and free public transport tickets for a month, as appropriate. Both areas have Supertram and several bus routes. All journeys under two miles are to be targeted. It is anticipated that as many as 400 people in the target group will participate. Results will be used to draw up marketing plans for public transport in South Yorkshire. Similar work elsewhere has led to a significant increase in public transport use. Work should be completed by early 2004. It should be kept under close review by those responsible for this air quality action plan, given that measures that directly address a culture shift away from private car use where it is not necessary are likely to be extremely cost-effective.

In the final stages of preparation of the action plan the SYPTE kindly provided access to the Draft of a Park and Ride study undertaken by Halcrow Group Limited. This provides an up to date view on the potential for the introduction of new park and ride facilities across South Yorkshire, and a prioritised list of these sites.

4.3.2 Additional measures

Three options have been identified for improvements to public transport under the air quality action plan. The first assumes that QBCs (Quality Bus Corridors) are the way ahead for Sheffield, as they combine improvements in the quality of buses, bus infrastructure and bus priority. It is possible that simpler systems, perhaps based solely on bus priority could deliver a more cost-effective (though perhaps short-term) solution.

a) **Advancing the QBC programme.** It will first be necessary to assess progress under the existing programme, identifying any barriers that exist and taking action to remedy them. Following that, work should move to identification of additional routes for new QBCs,

and consideration of measures such as increasing times of operation of bus priority measures such as bus lanes.

b) Major expansion in park and ride provision. The Draft of a Park and Ride study undertaken by Halcrow Group Limited for SYPTE (see above) provides an up to date view on the potential for the introduction of new park and ride facilities across South Yorkshire, and a prioritised list of these sites. Consideration of that report is clearly the start of any action to increase provision of park and ride facilities.

c) Strict enforcement of bus priority measures, particularly bus lanes. This option is likely to require decriminalisation of parking offences to permit enforcement through the Council rather than the police.

Feasibility studies will first be needed to assess the potential for (a) and (b) in this list to deliver significant air quality benefits. A number of the Sheffield sites considered scored well in the ranking exercise featured in the Park and Ride Study. All of the sites considered in Sheffield are listed in Table 11. Several of these sites were also considered for park and ride facilities serving Rotherham.

Table 11 – Performance of possible Sheffield Park and Ride schemes in the draft SYPTE study covering South Yorkshire

Site	Mode	Rank
Waverley/Orgreave M1 J33	Dedicated bus Supertram Rail	1 2= 2=
A57 Swallownest	Rail	5
A629 Chapeltown	Rail	6=
M1 Junction 31 (Option 1)	Dedicated bus	9=
Tinsley	Supertram	11
A6101 Malin Bridge (Option 1)	Supertram	13=
A621 Dore	Supertram Rail	13= 13=
M18 Junction 1	Supertram	16=
M1 Junction 31 (Option 2)	Dedicated bus	18=
A6102 Lowedges/Batemoor	Dedicated bus	18=
A6101 Malin Bridge (Option 2)	Supertram	21=
A621 Millhouses/Carter Knowle	Rail Supertram	21= 21=
Woodhouse	Rail	21=
A6102 Middlewood	Supertram	25=
A61 Grenoside	Dedicated bus	29=
A621 Dore	Dedicated bus	29=

Further information on these options is given in Table 12 at the end of this chapter. Appendix 5 provides a more detailed breakdown of the environmental and other impacts of each option.

Significant successes have been reported with improved public transport schemes, Sheffield's Supertram being a good example. Oxford is reported as having seen a doubling of bus passengers and a 63% reduction in traffic in the city centre since 1991 when a major park and ride programme came into operation, in combination with strong action on car parking in the city centre. It is acknowledged that there is much potential for variation in the success of public transport initiatives, and that this will clearly need to be accounted for in the implementation and monitoring schemes developed in the plan.

4.3.3 Other Stakeholder Views

Views expressed by Sheffield One underline that a significant improvement in the quality of public transport services is essential:
"*Public transport has to become the mode of choice for more people…firm belief that you do this by making public transport better in every respect…must be hugely improved before introducing restraint measures. Willing it to happen will not do and will certainly not make people abandon their cars.*"

Several other stakeholders share these views. Some, however, have expressed reservations that improved bus provision would not have significant benefits, particularly given the relatively high levels of bus patronage that already exist in the region.

4.4 Package 2: Transport Infrastructure

4.4.1 Options already being implemented or identified in other plans

The main planned infrastructure developments beyond those already identified for improving public transport relate to:

- The Sheffield Northern Inner Relief Road
- The Halfpenny Bridge Initiative.

Delivery of these improvements is currently subject to obtaining the necessary funding, planning approval and land. The Sheffield Northern Inner Relief Road is the more significant of the two schemes, offering potential for a significant reduction in congestion in the City Centre. The scheme is currently budgeted at over £50 million, and could be in place on the timescale of the current LTP, in other words, by 2006/7. Effective traffic control will be needed to ensure that benefits of this new road are maximised. Public transport provision will need to be regarded as sufficiently high quality that the additional road capacity is not filled as soon as it is provided.

The City Centre Masterplan proposes the removal of through traffic along Moor Head, Bridge Street and across The Wicker, measures that the City's Transport Planners feel can make a significant contribution in reducing through traffic.

The City Centre Masterplan includes action to rationalise parking provision. In addition, a recent report has proposed increases in fees at car parks run by the City Council, the first since 1997, and increases in parking fines (the first since 1996).

4.4.2 New options

One option on infrastructure that has received support from a number of stakeholders involves:

a) Further pedestrianisation and cycle routes in Sheffield City Centre.

This needs to be considered in the context of the City Centre Masterplan, and it is possible that little could be done beyond what has already been proposed. The view of the City's Transport Planners is that there are few, if any, streets left in the city centre that would be sensible for pedestrianisation.

The Sheffield and District Chamber of Trade noted the connection between this option and the proposed New Retail Quarter. The measure would be useful in separating the public from traffic emissions generally, with benefits from reduced exposure to particles perhaps being particularly prominent from an air pollution perspective. The extent of any such benefit would of course be dependent on the quality of vehicles using the City Centre. The measure would have other benefits, such as reducing exposure to noise. Like a number of other measures identified here this would need a detailed feasibility study prior to action being taken.

This plan does not include other new measures for the promotion of walking or cycling, though some such actions are included in other plans (the Sheffield Station Master Plan, for example, includes an action to improve safe walk and cycle links between the rail station, bus station and tram network), and strategies on walking and cycling are currently under development in the City. Whilst such actions should be encouraged in some way through the air quality action plan (refer to Package 7) it was felt that they were unlikely to offer sufficiently significant benefit on the necessary time scales to be included.

4.5 Package 3: Traffic Control

4.5.1 Options already being implemented or identified in other plans

Traffic controllers have suggested a number of options that would help to relieve congestion and hence improve air quality. The most significant of these seem likely to concern:

- The use of variable message signing, for example the proposed Don Valley scheme.
- Action to direct city centre users to car parks in Sheffield City Centre with available space.
- Action to direct traffic onto the Inner Relief Road in preference to the streets inside the Sheffield City Centre.

These measures are supported in this action plan as they should be of considerable benefit to all concerned.

4.5.2 New options

The following additional options are identified under this Package:

a) **Alter delivery times to Sheffield City Centre and other congested locations to avoid the most congested periods.**
b) **Improve co-ordination of road works, and signing around them (could be linked to VMS systems)**
c) **Continue to explore the potential for additional traffic control measures that will benefit air quality.**

On option (a) the Sheffield and District Chamber of Trade noted that there could be some conflict with calls for increased pedestrianisation. Any change to delivery times will clearly need to be done in a way that does not lead to significant adverse impacts such as additional noise disturbance for city centre residents, or excessive additional costs to business.

Option (c) is quite non-specific, but is included here to highlight the importance of traffic control for air quality improvement, and to promote the further involvement of officers in traffic control with the future development of this plan.

4.6 Package 4: Cleaner Vehicles

4.6.1 Options already being implemented or identified in other plans

The most extensive programme for promotion of clean vehicles in the UK is the Energy Saving Trust's TransportEnergy initiative, mainly funded by the government and covering the PowerShift and CleanUp programmes. These seek to promote vehicles using alternative fuels (electricity, LPG – liquefied petroleum gas, and CNG – compressed natural gas), and to reduce emissions from conventionally fuelled vehicles. Most of the money provided under the CleanUp programme to date has been spent fitting taxis and heavier diesel vehicles with particle traps. Recently, however, funding has become available to fit such vehicles with NOx abatement technologies.

The South Yorkshire Vehicle Emissions Testing Partnership (comprised of South Yorkshire Police, the Highways Agency, Barnsley, Doncaster and Rotherham Metropolitan Borough Councils and Sheffield City Council) has recently been awarded funding for a vehicle emission testing programme, to enable checking of vehicles on the road. Participation in the programme will be voluntary and will help identify vehicles that do not meet the relevant standards and will also provide useful publicity for the wider clean air action

plan. Proposed testing sites of most relevance to the Sheffield Air Action Zones are:

- M1 Corridor Sheffield AAZ/Rotherham AQMA
  - Sheffield Road, Templeborough
  - Meadowhall Road, Meadowhall
  - A631 Bawtry Road, Brinsworth
- Sheffield City Centre AAZ
  - A61 Penistone Road, Hillfoot
  - Brightside Lane
  - Queens Road
- Barnsley AQMA, junctions 35a to 38 of the M1
  - A616T junction with Warren Lane
  - Westwood New Road
  - M1 junction 38 and Hague Lane

Information from pilot programmes conducted in the UK found between 3.7% (Birmingham) and 11.7% (Middlesborough) of vehicles failed the test, with an average of 6.1%. Data from Westminster show roughly equal failure rates amongst vans, cars and taxis. Interestingly, no failures were identified among the 187 trucks tested or the 74 buses tested in the Westminster programme.

The effectiveness of the measure is likely to be heavily dependent on the surrounding publicity, given the relatively small number of vehicles that can be tested in such a programme. Recognising this, the application for funding included a substantial publicity campaign.

Stakeholders at one meeting reported that there are already 8 filling stations in the city supplying LPG.

4.6.2 New options

New options proposed in this area are as follows; further details are given in Table 12:

a) Set minimum emission standards for vehicles used by Sheffield City Council and by service providers contracted by the Council.

b) Set minimum vehicle standards for buses, taxis, delivery vehicles, refuse carts, etc. operating in the AirAction Zones/AQMA.

It is questionable to what extent the City Council could require contractors to adopt minimum emission standards given regulations on tendering, though there is no barrier to setting a standard as one criterion on which proposals will be evaluated.

In some cases the second of these options would simply require reallocation of vehicles, with the less polluting switched to the most sensitive areas, and the more polluting ones switched to less sensitive areas. Overall it would be likely to encourage operators to move to newer vehicles in the medium to long term. It is arguable whether this measure should be mandatory or not, though it is noted that the City Centre Clean Air Partnership argued for it to be so.

However, it is possible that voluntary agreements with businesses may yield a very substantial proportion of the likely benefits that could be gained from a mandatory system, without the need for expensive and difficult enforcement measures to be put in place. A mandatory system is only likely to work with continual enforcement. Further assessment of the merits of voluntary and mandatory schemes should be carried out as part of the plan, prior to full implementation.

Scrappage subsidies have been implemented elsewhere to take the most polluting vehicles off the roads. There is, however, a general lack of support for them in the UK. Their desirability should be assessed following the vehicle emission testing campaign that is shortly to start in South Yorkshire.

4.7 Package 5: Options specific to reducing emissions from the M1 and traffic using the motorway

4.7.1 Options already being implemented or identified in other plans

A number of activities are underway that may have a major effect on emissions from motorway traffic. Under the 10 Year Transport Plan Central Government has recently announced a programme of road widening schemes across the country. One scheme will affect the M1 just south of the Yorkshire border. Also late in 2002, the conclusions of the South and West Yorkshire Multi-Modal Study (SWYMMS) were announced. In relation to the M1 in Sheffield, SWYMMS proposes widening the motorway and introducing area charging to control traffic volumes (to prevent the potential gains from widening in terms of congestion reduction being offset by increased traffic on the motorway). Such options are clearly long-term, and also outside the control of the Council. Costs would be extremely high (hundreds of millions of pounds). Anticipated effects on air quality are negligible according to the SWYMMS report, though this finding inevitably needs further validation, particularly in respect of the range of scenarios considered in the report.

Development along the M1 corridor seems certain to attract traffic to the area, worsening air quality. It is not possible to predict the precise effect of development on air quality at the present time, given uncertainties in the way that development will be carried out, the sites concerned, and the success of the plans that are currently in place. However, scenario-based modelling may be informative, and should be carried out under the action plan. The impact of development along the M1 on the M1 Corridor AAZ must be recognised.

Another national scheme of relevance to the M1 communities is the re-surfacing of motorways using less noisy materials. Given that the M1 through Sheffield has only recently been resurfaced it would seem that this section of the motorway is unlikely to be prioritised in the resurfacing programme. Although the benefits of resurfacing relate primarily to noise reduction, there should also be some small reduction in air pollutant emissions. On the same

subject, noise barriers have been erected in the area, but local residents report that they have given little benefit.

Together, these activities present a complex background against which to develop an air quality action plan. Given current government attitude to road widening it may be considered likely that the SWYMMS recommendations will be adopted at some time, and that the motorway through Sheffield will be widened. In the interest of cost-effective improvement of quality of life for residents in the area it is essential that long term perspectives are taken, and that any measures that are introduced on air quality, etc., are not enacted piecemeal, but as part of a co-ordinated strategy. Given the proximity of the Tinsley and Brinsworth communities to the M1 there is a strong case for significant funding for environmental and urban design improvements in the area to be provided by central government under its roads programme, ahead of any scheme such as road widening. It would clearly be inequitable to make communities that are already acknowledged as having to cope with poor environmental and urban design standards bear further impacts 'in the national interest' without significant mitigation of some kind from the national transport budget. The same may apply to parts of Barnsley as well, which has declared an AQMA along a significant length of the M1.

4.7.2 New options

The measures identified to reduce emissions specifically along the M1 corridor in Sheffield are:

a) **Slow traffic on the M1 to a speed optimal for NOx emissions**
b) **Use Variable Message Signing to direct traffic more efficiently** (e.g. to car parks with spaces at particularly busy times).
c) **Changes to the road system around Tinsley and Brinsworth[17],** using signs and redesign entrances to Bawtry Road to shift through traffic to surrounding roads and away from Tinsley and Brinsworth. Sheffield Road may also benefit from similar treatment in conjunction with the Halfpenny Bridge Road Initiative.
d) **Sheffield City Council and HGV operators that require access to Tinsley to jointly develop an action plan for reducing the impacts of that traffic on the community.**

Preliminary analysis suggests that (a) and (b) would be the most cost-effective of the options identified. It seems possible that it could be implemented ahead of 2005. Costs would be likely to be in the order of a few million pounds for set up, with additional costs for enforcement of speed limits on the motorway. Both measures require action by the Highways Agency. Recognising the cost-effectiveness of these measures, they are given a priority ranking of 3 (highest priority).

Option (c), specific to the road system serving Tinsley and Brinsworth has the objective of moving traffic off Bawtry Road to surrounding roads that are less

[17] Brinsworth is part of Rotherham, but is mentioned here as action to reduce traffic on Bawtry Road would benefit both communities, and an integrated approach to the problem is required of the two Councils.

residential. This measure is given the highest priority as cost-effectiveness may be reasonable, and it could be completed in a short time. It would appear, however, that local residents' groups feel that it could have very little impact if it is non-enforceable. Construction of alternative access to the non-residential sites currently served by Bawtry Road (e.g. the Excel Logistics site) was considered, but seems impractical.

Option (d), as proposed here, would at least in the first instance be based on voluntary agreement. Should this course of action fail, mandatory measures may need to be considered.

In addition to a high proportion of people in poor respiratory health (see Section 1.6.2) Tinsley is identified in the draft Environment Strategy for Sheffield from Sheffield First for Environment as an area with poor quality urban design (compared to other areas of the City). An alternative strategy for the Tinsley/Brinsworth area would therefore be to undertake a more radical programme of improving the design of the area. The draft outline plan for 2003 for the Darnall Area contains details of such a programme under its Priority 5 ("To produce a high quality urban environment"). Actions undertaken in such a programme would clearly go well beyond those that have an air quality benefit, but could include the diversion of traffic onto other roads. Provided that resources are available a more integrated approach like this would make far more sense than a piecemeal approach. It is essential that a long term vision is developed for this area, taking account of potential developments of the M1 in particular.

4.7.3 Highways Agency Views

Given that the Highways Agency has responsibility for options specific to the M1, its views are particularly relevant. The response from the Agency stated that

"*Key elements of the plan must be to:*
i) Persuade people to travel by some other means or to car share through measures such as travel plans, improved public transport, increased parking charges
ii) Reduce emissions from the vehicle fleet through vehicle emissions testing, minimum vehicle emission standards for service vehicles accessing Sheffield (this should also reduce emissions from the M1) and a switch to cleaner fuels.

These measures should have benefits over a wide area. As approximately 70% of the vehicle emissions from the M1 are from heavy duty vehicles, any measures that reduce the flow of heavy duty vehicles or reduce emissions from this sector would be particularly beneficial, although this is difficult to achieve."

These measures are indeed proposed in the plan (Packages 1, 3, 4 and 7). However, analysis undertaken by Sheffield City Council strongly suggests that they will not be anything like sufficient on their own to reduce NO_2 concentrations around the M1 to the standard. Action on traffic using the M1 will therefore be needed.

The Highways Agency is concerned about the costs and the broader effects of options (a) and (b). It is, of course, accepted that a fixed reduction in speed would have no effect when traffic is moving slowly (i.e. less than 50 or 55 mph), so data are needed to ascertain the time over which such conditions apply. Also, that a large number of travellers at other times would indeed see journey times increase. However, the length of motorway affected under Sheffield's plan would be relatively short, so the change in journey time would be negligible. As an example, reducing the speed limit for a 10 mile stretch from 70 mph to 50 mph would increase journey times for those driving at the limit by 206 seconds (about 3½ minutes: 10 miles is selected here, and the time given in seconds, purely as an example to make scaling the change in journey time straightforward for other distances). Given frequent, unanticipated and longer delays on the motorway system through accidents, road works, etc., a routine increase in journey time of this order may not seem an undue price to pay for moving towards the air quality standards for people living close to the motorway. The reduction in speed would also bring about a reduction in noise levels, which would be particularly beneficial for schools located next to the motorway. The Highways Agency were also concerned about the costs of enforcement, though this seems to conflict with the proliferation of safety cameras across the country in recent years. Public acceptance of safety cameras is another issue, but can be improved by identifying the reasons for any change in speed limits on signs in the area.

The Implementation Programme for this package (Section 5.4.5) is designed to undertake a series of actions to promote closer working with the Highways Agency. This will recognise not just their concerns, but also those of people that live and work in the M1 AAZ.

4.8 Package 6: Industry

4.8.1 Existing options

Industry is regulated by the Environment Agency and Local Authorities, according to the size of plant and the nature of processes carried out. The Agency implements IPPC (Integrated Pollution Prevention and Control) legislation to ensure that 'Best Available Techniques'[18] are adopted at all plant defined under Part A1 of the legislation. Local Authorities are responsible for implementing the legislation at plant defined as Part A2 processes.

Local Authorities are also responsible for authorisation and regulation of Part B processes under separate regulations. In permitting any process the relevant authority is required to take account of the proximity of sites to any AAZs. The Environmental Protection Service in Sheffield controls about 180 processes, compared to the 26 more polluting and complex processes that are regulated by the Environment Agency. Details of processes, operators

[18] Best Available Techniques, commonly abbreviated to BAT, are described in a series of Reference documents prepared by the European Commission's IPPC Bureau in Seville.

and the nature of what is emitted are provided on the Public Register based in the Council's Carbrook offices.

Sheffield City Council's role is to write the authorisation for processes under its control, describing the nature of each process, any conditions that control operation and appropriate emission standards or pollution levels. Facilities are inspected typically once or twice a year, or more often where problems are encountered. Breach of permit conditions can lead to prosecution.

In addition, the Council can use the Clean Air Act 1993 to prohibit dark smoke from any chimney, industrial or trade premises, control emissions from industrial furnaces and to forbid the burning of coal or wood in the Smoke Control Areas that cover all but the most rural parts of Sheffield.

Local Authorities also have powers to deal with emissions that are prejudicial to health or a nuisance. If the Authority is satisfied that a statutory nuisance, as defined in Part III of the EPA 1990 legislation, either exists or is likely to recur, the Authority can serve an abatement notice. Complaints of such nuisance are investigated by the Council's environment and regulatory services.

The most significant major industrial development in Sheffield over the next few years is likely to be the construction of a new waste to energy plant (municipal waste incinerator), replacing one that has operated in the city for many years. The application to build this new plant was recently approved. Emissions from the new incinerator will be regulated in accordance with the EU's Waste Incineration Directive. A number of stakeholders, expressed concerns over the new development, and the ability of incinerator operators to maintain emissions within set limits. In view of these concerns and in the interests of transparency, there is a need for reporting guidelines for the plant to be reviewed to assess whether they will provide local people with the information needed to have confidence in the way that the plant is operated. It should be noted that the opinion of environmental pressure groups on waste incineration is currently split, with the National Society for Clean Air and Environmental Protection (NSCA) concluding that plant operating to modern standards need pose no significant risk to people living in the vicinity[19]. This conclusion has, however, been challenged by Greenpeace.

4.8.2 New options

In view of the existing regulatory regime, the only option identified for this sector in this plan is:

a) **Regulators to encourage operators to adopt accredited environmental management systems.**

It is recognised that there are existing initiatives in place to do just this (see section 4.9). The recommended mechanism for building on these initiatives is through the establishment of the Environment Coordination Office (again, see

[19] The same would not apply to incineration plant operating to lesser standards, though these have largely been closed down already under earlier legislation.

section 4.9). The scope for action beyond this is extremely limited given the existing regulatory regime. However, an issue raised for the attention of central government in Package 8 (Section 4.10) concerns extension of existing regulatory powers for small industry in cases where it is responsible for significant emissions of those pollutants that lead to the designation of AAZs/AQMAs.

4.8.3 Stakeholder views

The Environment Agency's Pollution Inspector has participated fully in the consultation process surrounding development of this plan. The fact that the recommended additional measures are somewhat limited in their scope reflects the extent of regulation of major industries through IPPC and other legislation.

At a meeting held by SEI (at which no Council officers were present) at the Tinsley Community Centre concern was expressed by local residents about the possibility of unaccounted emissions, as well as synergistic effects of pollution from different proximate sites. Although NO_2 was identified as a particular concern - nuisance dust was most frequently cited – it was felt that the declaration of an AAZ may give the Council and local businesses added impetus to resolve concerns. Residents should of course still address their concerns to the Environmental Protection Service in Sheffield as a first port of call.

Concern from some stakeholders relating to the new waste to energy plant was discussed in Section 4.8.1.

4.9 Package 7: Planning Issues, and Eco-efficiency

4.9.1 Existing options

Planning issues are brought together with eco-efficiency in this package in recognition of the importance of the former in establishing firm foundations for the latter.

As has already been noted, a commitment to account for air quality in planning decisions is made in numerous documents, particularly the UDP. In many cases this is carried through, though during the development of this action plan a number of exceptions have been noted. Specific guidance has been prepared in the form of the '*Air Quality and Land Use Planning Guidance Note*' produced by Sheffield City Council EPS. This supplements the SPG on traffic impact assessment.

With respect to eco-efficiency, Sheffield City Council is committed to improving its performance and is beginning to establish eco-management and audit systems throughout its services. The Council has adopted a 10 part system to guide this development which is also being used increasingly to guide its work with stakeholders in the wider community. These include the recently established Environmental Performance Working Party, Travel Plan

Network, Stakeholder Environmental Performance Network, Eco-Schools Network, Suppliers and Contractors Environment Network. All have terms of reference that include the strategic objective of reducing the impact of waste released to air and 10 practical management objectives by which improvements could be achieved.

The Council also has in place a procedure that requires all officers making recommendations to members and senior officers to assess in advance the environmental implications of their recommendations. This also includes the strategic objective of reducing the impact of air pollution.

Beyond this, efficiency measures across many sectors are already being implemented under a variety of actions, such as:

- Promotion of EMAS by the Business Environment Centre in Sheffield, and in the City Council by EPS.
- Promotion of environmental best practice through the government's Envirowise scheme as part of City Council work with suppliers and contractors and other stakeholders.
- Reducing vehicle emissions by subsidising cleaner vehicles, through schemes run by the Energy Savings Trust. The Council's fleet managers are already taking advantage of these schemes and promoting them.
- Promotion of energy efficient devices through the use of energy labels.
- Options to improve domestic energy efficiency in Council housing stock through Sheffield Housing Service's Achieving Affordable Warmth Programme. The City Council has made major progress in this area, comparable to the best in the country, in meeting the performance targets set by the government under the Home Energy Conservation Act.
- Promotion of actions to reduce the use of gas and electricity in Council buildings. Also, to use more sustainable sources of fuels – 20% of the electricity used by the City Council now comes from 'green' sources.
- Travel Planning, for example through the Councils' own travel planning officers and SYPTE, and drawing on the Sustrans TravelSmart projects that seek to encourage people to walk, cycle and use public transport in preference to using cars. Travel Plans are required for many new developments, but not for existing operations at the present time, a factor that clearly limits the existing scope of such plans to contribute to improvements in the city.

The great appeal of these measures is that in addition to reducing impacts on the environment, they tend to save money (in terms of lower bills for energy, water and other resources). They can therefore improve the economic vitality of an area through improved competitiveness, increases in disposable incomes, etc., without impinging on access to energy, transport and other services. They are often referred to as "win-win" measures because of this.

Sheffield is one of the few existing urban centres in the UK to be served by an extensive district heating system which is linked to the waste to energy plant run by Onyx. At the present time the system appears to have substantial

spare capacity. Recognising the importance of area sources in the NO_2 problems faced by the City Centre (see Table 5), increased use of the system could have clear air quality benefits. However, there may be some economic barriers to the use of the system, as it appears cheaper (from a short-term perspective) for developers to install self-contained heating systems than link into the network. In contrast, life cycle costs (including capital, maintenance and fuel costs) are believed to be significantly less for those using district heating. If this is the case, further use of the system could add to the economic vitality of the city. Beyond the existing scheme there also seems to be interest in the development of district heating by other organisations, particularly in the M1 corridor.

Sheffield City Council is working in partnership with the government-sponsored Warm Front Team to raise awareness of grants of up to £2,500 for free energy efficiency improvements such as insulation and in some cases extra heating. Those eligible are homeowners and tenants of private landlords who receive certain income or disability related benefits.

The Council may negotiate Section 106 agreements with developers to mitigate environmental impacts. There is perhaps potential for this to be done on a more regular basis in Sheffield than currently, and experience from other councils should be assessed.

The existence of the activities listed and others demonstrates a commitment to environmental improvement across the region, though the funding for some posts is not secure beyond the short term. However, the disparate nature of the activities listed raises the question of whether they could be carried out more extensively and effectively if there was greater co-ordination of activities.

4.9.2 New options

The following new measures are proposed:

a) **Implement green procurement policy across the public sector, relating to purchase of materials, vehicles, building design, etc.**
b) **Increase use of Sheffield's existing district heating system to displace small boilers that release emissions at low level.**
c) **Promote the adoption of Travel Plans by all significant employers in the area, and others with environmental responsibilities.**
d) **Set up an Environment Co-ordination Office (ECO) to promote activities that lead to greater environmental efficiency in Sheffield.**
e) **Revise current guidance on air quality and planning and adopt as Supplementary Planning Guidance.**

The third option listed is designed to extend the adoption of travel plans to existing operations as well as new ones covered under existing arrangements.

As proposed under this plan, the main thrust of the Environment Co-ordination Office will clearly need to be on air quality, rather than general environmental improvements. The objective of setting up an Environment Co-ordination

Office (ECO) is not to replace existing activities that are performing well. It is, instead, to assist those carrying out this work to act more effectively and will operate by:

1. Providing a first point of contact for stakeholders interested in reducing environmental impacts and improving environmental performance.
2. Providing a key source of environmental policy (air quality) co-ordination and guidance for the City.
3. Encouraging all sectors including the public sector to identify where the greatest environmental, (and particularly air quality) improvements could be made.
4. Co-ordinating an annual air quality action planning process that encourages stakeholders to set SMART[20] targets to address their most significant environmental impacts.
5. Promoting Eco-Management and Audit Systems / eco-efficiency including training.
6. Co-ordinating and contributing to the development and maintenance of appropriate networks enabling all types of stakeholders exchange ideas on improved environmental performance / eco-efficiency.
7. Providing guidance to stakeholders in the development of systems and procedures to manage environmental performance.
8. Providing an audit function to assess progress in environmental performance improvement across all sectors.
9. Working with all sectors to improve the environmental performance of supply chain / suppliers and contractors.
10. Working to ensure that all sectors put in place procedures that take into account the environmental impacts of new activities.

Beyond this, the office would have responsibility for:

- Securing long-term funding for staff such as travel plan officers.
- Assessing the adequacy of resources, and identify the areas that could benefit most from additional resource.
- Identifying gaps in existing activities, and recruit to fill those gaps.

The precise format of such an office and its location within existing structures is a matter for future debate. However, such debate needs to be undertaken with urgency in order for the ECO to be able to inform development in the city in a timely fashion. With this in mind, the consultants working on the action plan for the Council that recommended establishment of the ECO further recommended that it be located within the existing Environmental Protection Service. The ECO should be accountable to Sheffield First for Environment in recognition of the Sheffield First Partnership's lead in promoting sustainability in the City.

4.9.3 Stakeholder views

Stakeholders were supportive of the more flexible strategies for meeting the air quality targets partly because they included win-win options that would

[20] The acronym SMART relates to targets being Specific, Measurable, Actioned, Resourced and Timetabled. Ensuring that these elements are all in place at the outset increases the likelihood of targets being met.

benefit both the environment and the local economy. However, there was recognition that it was difficult to focus these measures on the AirAction Zones and that the contribution of many of the softer options to meeting the necessary air quality improvements would not be great. Accepting this view, it was concluded that, under the air quality action plan, the most appropriate recommendation would be to provide a better focus for existing actions (the ECO) than to suggest a diverse variety of options for efficiency improvements, each of which would probably struggle for funding.

4.10 Package 8: Actions for Consideration by National Government

A variety of issues have been raised in the consultation on action planning in Sheffield (and Rotherham), where some actions by national government (in other words, beyond local government control) could be of significant benefit. These options would be useful in setting a framework within which other options could be considered and developed more effectively. Cost implications of these measures are in many cases small, some could save money, and most would (in the context of air quality action planning in general) appear to be very cost-effective. The measures identified here as likely to be of significant air quality benefit are:

a) Reinforce green procurement policy for the UK public sector.
b) Present existing environmental information on the performance of specific industrial plant in a more accessible form than is currently available from the Public Registers.
c) Reassess building standards in the light of experience in other countries.
d) Report on the practicability of the recommendation made in the Energy Review by the Performance Innovation Unit in the Cabinet Office of substantial improvements to domestic (etc.) energy efficiency, and develop policy accordingly.
e) Review some aspects of competition legislation as it affects public transport provision.
f) Provide clarification on position with respect to the implementation of a national congestion charging scheme.
g) Set up a centralised website for access to useful information on environmental improvement measures – a vast amount of information is already available, but not always easy to locate.
h) Provide guidance on the potential usefulness of scrappage subsidies and any legal implications that they might have.
i) Extend the scope of regulation to all major sources of NOx (etc.) where AAZs/AQMAs are designated.
j) Adopt new national speed limits for all urban motorways.

In the context of an action plan for Sheffield, the City Council needs to raise these issues with national government, and consider collaboration in any exploratory studies that may be undertaken.

Table 12 – Additional measures for improving air quality. The shading is used to distinguish the different packages of measures from each other.

Package/ option	Priority	Option	Lead organisations	NOx effect	Cost	Other benefits	Disadvantages
1/a	3	Advancing the QBC programme, to develop more routes and bring schemes into action more quickly, increase periods when bus priority schemes are operational	Bus operators, SYPTE, Councils	1-10% as part of an overall package of pro-bus measures that demonstrate a modern and efficient system	Several million pounds depending on number of routes to be implemented	Significant as part of an overall package of pro-bus measures	Implemented well, such a system could be beneficial to both bus users and car drivers, implemented badly it has been seen as anti-car modest impact only.
1/b	3	Major expansion of park and ride provision	Public transport operators, SYPTE, Councils	1-10% reduction in vehicle emissions	Substantial, varying according to location of sites, number of sites, etc.	Significant as part of an overall package of pro-bus measures	May involve developments in the Green Belt and land use planning issues.
1/c	3	Strict enforcement of priority schemes such as bus lanes	Councils	Significant as part of an overall package of pro-bus measures	Cost neutral if fines can be retained for PT use	Significant as part of an overall package of pro-bus measures	There is a perception that this could affect shops by bus lanes, but evidence for this seems weak.
2/a	2	Further pedestrianisation and cycle routes in Sheffield City Centre	Sheffield City Council	1-2%? But dependent on other options in the City Centre	£million+	Reduced exposure to noise and other air pollutants.	Access restrictions
3/a	2	Alter delivery times to businesses in Sheffield City Centre	Businesses, Sheffield City Council	Around 1%	Dependent on the flexibility of businesses and whether the option can be adopted voluntarily	Reduced congestion, emissions of other pollutants.	Interference with established stock management practices. Possible increases in noise in the early morning and evening
3/b	3	Improve co-ordination of road works and provide more effective signing around them	Businesses, Sheffield City Council	Around 1%	Costs of signage and for planning the coordination	Reduced congestion, emissions of other pollutants	

Package/ option	Priority	Option	Lead organisations	NOx effect	Cost	Other benefits	Disadvantages
3/c	2	Explore further potential for traffic control measures that would benefit air quality	Sheffield City Council	Up to a few percent, but dependent on other developments	Dependent on any additional measures that may be agreed.	General reductions in congestion, noise, all traffic related pollutants	
4/a	3	Set minimum emission standards for Council vehicles and organisations contracted by the Councils	Councils and their contractors	Probably less than 1%, recognising the relative size of the Council and related vehicle fleets	Small as part of a rolling vehicle replacement programme. Potential for cost savings through the use of more efficient vehicles	General improvements in emissions, potential also for reduced noise. Demonstrates commitment to air quality improvement.	May restrict the list of potential tenderers for Council business. Dirtier vehicles may simply be deployed elsewhere, reducing air quality in other areas.
4/b	3	Set minimum emission standards for vehicles routinely accessing sensitive areas (e.g. taxis, buses using the city centre, etc.)	Sheffield City Council	In the order of 5%?	Small in the long term as part of a rolling vehicle replacement programme. Short term costs dependent on flexibility of operators, which is likely to be function of their size	General improvements in emissions, potential also for reduced noise. Modern vehicle fleet demonstrates the direction that the region wishes to move in.	May create problems for some operators in the short term, though this can be controlled by adjusting time scales, giving sufficient warning of the action, etc.
5/a	3	Reduce speed limit on the M1 to a more optimal level for NOx and PM emissions. Could be in place by 2004.	Highways Agency	Possibly >10%, depending on overall levels of congestion on relevant stretches of the motorway.	£1 million, including enforcement costs?	Change in emissions of other air pollutants and noise.	Possibly increased congestion and traffic growth as traffic slows down and modest capacity increases. Information would need to be provided to tell drivers why a reduced speed limit was in force.

Package/ option	Priority	Option	Lead organisations	NOx effect	Cost	Other benefits	Disadvantages
5/b	3	Introduce variable message signing to smooth traffic flows on the M1 and on surrounding link roads, directing vehicles heading to car parks, ,and avoiding composition hot spots etc. By 2005.	Highways Agency, Sheffield City Council	1 - 5% change in emissions?	Sufficient variable message signs may already be planned but implementation funds of £1.2m are needed.	Reduction in emissions of other air pollutants and noise, reduced risk of accidents, lower congestion, etc. System has worked well on the M25.	
5/c	3	Use signs and redesign entrances to Bawtry Road to shift through traffic to surrounding roads and away from Tinsley and Brinsworth. By 2005. A similar scheme could also be useful for Sheffield Road, in conjunction with the Halfpenny Road Initiative.	Sheffield City Council	1 - 3% change in exposure, no change in emission?	Crude estimate of £50,000 to £500,000, depending on the exact nature of the scheme. Clearly, more robust cost data would be needed here as elsewhere, prior to implementation.	Reduction in emissions of other air pollutants and noise, reduced risk of accidents, lower congestion, etc.	Impact on local business located along Bawtry Road..
5/d	3	Councils to develop a joint action plan with HGV operators that require access to Tinsley and Brinsworth.	Sheffield and Rotherham Councils and relevant HGV operators	1 - 5%?	Could be possible to undertake some measures in a cost-neutral manner	May also improve noise, and foster closer relationships between businesses and residents	
6/a	2	Encourage industries to adopt accredited environmental management and auditing systems	Environment Agency	Potentially several %, but dependent on the extent to which available measures have already been adopted	Measures should save money when EMAS (etc.) is implemented well.	General improvements in emissions and reduction in environmental impact	

Package/ option	Priority	Option	Lead organisations	NOx effect	Cost	Other benefits	Disadvantages
7/a	2	Implement green procurement across the public sector	Sheffield City Council and national government	Several % in the long term. Probably very small in the short term	Significant potential for cost savings through more efficient use of resources	Widespread improvements in environmental performance	
7/b	3	Increase use of Sheffield's existing district heating systems	Onyx, Sheffield City Council, developers	Several % in the long term. Probably very small in the short term	Significant potential for cost savings for those owning or leasing connected buildings	General reduction in CO_2 and local pollutant emissions	Additional costs during development (though these are believed to be recoverable during operation)
7/c	3	Promote adoption of travel plans by all significant employers in the area	Sheffield City Council, SYPTE, businesses	Potentially several %	Should be cost neutral or better following initial investment	General reduction in emissions, congestion, etc.	
7/d	3	Set up an Environment Co-ordination Office (ECO) to promote best practice and co-ordinate actions to improve environmental efficiency	Councils, Sheffield First for Environment	Several % in the long term, with significant short term gains also possible	Significant potential for cost savings through more efficient use of resources as a result of ECO actions, though the Council would have to fund the office.	Provides a focus for a diverse range of activities that are already underway, strengthening them through greater access to resource, closer liaison, etc.	
7/e	2	Revise current guidance on air quality and planning and adopt as Supplementary Planning Guidance	Sheffield City Council	At certain locations, several % in the longer term	Small	Council would be seen to factor air quality properly into planning decisions	

5 Implementation Programme

5.1 Introduction

The Environmental Protection Service will continue to fulfil the Council's statutory duties relating to the continuing review and assessment of air quality across Sheffield. These duties include the production of a yearly progress report (for submission to DEFRA) reporting progress towards the Action Plan's overall objective of meeting the air quality targets. However, the scope of the Plan is wide and its success will depend on the active involvement of a number of local and national organisations, Central Government, and the general public. Furthermore, new structures and partnerships will need to be established to take responsibility for specific actions which have been identified, and to monitor and review progress towards specific objectives.

The key challenge will be the integration of air quality objectives and the plan itself with regeneration strategies for Sheffield and the region. Consultants appointed by Sheffield City Council to assist in the development of the action plan consider that the Sheffield First Partnership is well placed to take overall responsibility for this task (see Section 6.5). It would seem logical for Sheffield First for Environment to monitor and report on the progress of the actions which comprise the Plan, in collaboration with EPS.

A pre-requisite to assigning responsibility for specific actions will be the establishment of clear performance indicators and time related targets against which progress can be measured. At a practical level, the establishment of a partnership to co-ordinate air quality focused action across the City is proposed in the Plan as a means of maximising the effectiveness of actions to be taken. This idea will require further refinement and will depend on corporate commitment across the Council and amongst its partners. Terms of Reference for this body will need to be clarified of course, but its overall purpose would be to co-ordinate and integrate action which has the potential to affect air quality, and thereby to maximise the potential for achieving air quality improvement in the Air Action Zones and generally across Sheffield.

5.2 Objectives

5.2.1 Year 1

The following objectives are set for the first year of implementation of the action plan:

1. Set up the Environment Co-ordination Office (see Package 7/d).
2. Develop and apply scenario-based air quality modelling capabilities in Sheffield City Council
3. Continue high level of stakeholder involvement through the M1CCAP, CCCAP and individual meetings as appropriate.
4. Maintain the Council’s air quality website.
5. Establish air quality expertise in decision making bodies.

6. Monitor activities within and outside the plan that are likely to affect air quality.
7. Refine plan based on updated information on cost-effectiveness and other data.
8. Prepare first year progress report on implementation of the plan.
9. Develop performance indicators.
10. Continue assessment of resource and funding issues.
11. Initiate the process of integration of the Action Plan with the LTP process (as recommended by DEFRA).
12. Lobby central government for funding for those types of action that either don't fit within the existing Local Transport Plan objectives or timescales, and for other non-transport initiatives that will help to offset NO_2 contributions from road sources.

5.2.2 Year 2 onwards

Specific objectives for subsequent years will be developed during Year 1, as further information becomes available on which to determine how best the plan should evolve.

5.3 General Actions

5.3.1 Steering group

Noting the relevance to numerous different policy areas that exists within the action plan, it would be greatly beneficial for a steering group to be formed for the action plan, involving senior staff from various departments within Sheffield City Council the numerous development bodies working in the area, and other groups if appropriate. This will be particularly important in the first year of the plan to ensure that those with greatest influence over the success of the recommended options for improving air quality understand what is being done and why, and provide the necessary backup to EPS.

It is suggested that the Steering Group be kept informed through progress reviews on a three monthly cycle for the first year. Review should be undertaken using the SOFT format:
Situation: Where each element of the plan stands on funding.
Opportunities: Identification of available sources of additional funding or of efficiencies that can be made through actions contained in the plan.
Faults: Problems experienced with each element of the plan that require resolution, or are being resolved.
Threats: Early warning of potential problems that may necessitate additional actions, or revision of the plan.

5.3.2 Stakeholder consultation

The air quality consultation process is now well established. Action should be taken to ensure that the websites are kept up to date and the Clean Air Partnerships are maintained.

For improvement of air quality around the M1 it is important that further action is taken to engage the Highways Agency, in particular. Mechanisms for doing this are described in Section 5.4.5.

5.3.3 Monitoring air quality

The Council is required to carry on monitoring and reporting on air quality. Additional action from this plan is not necessary, beyond a need to ensure that resources are targeted on those areas that will provide the most useful data. Existing monitoring and modelling arrangements will therefore need to be reviewed in the plan.

5.3.4 Monitoring the success of the plan

Section 5.6 provides discussion of specific measures that can be used to assess the success of the plan. The proposals made there require review to assess the likely availability of data. This review should also give consideration to the adequacy of the proposed monitoring programme and to whether there are additional measures that should be added to the monitoring regime.

5.3.5 Reporting

In addition to progress reports prepared for the steering group, the following will also be required:

- Annual progress report to DEFRA
- Progress reports to the Clean Air Partnerships for consideration at their meetings.

5.4 Actions Specific to the Recommended Packages of Options

5.4.1 Package 1: Improving public transport

A large part of the actions linked to this package will involve assessment of the implementation of existing plans for public transport, and encouraging the adoption of others (such as the extensions to Supertram) that are currently proposed and would provide significant air quality benefits. This will require monitoring implementation, and the undertaking of traffic modelling and scenario-based air quality modelling to gain a better understanding of the effect of schemes that are currently in the pipeline. From this it should be possible to develop a priority list of schemes in terms of air quality improvement. These schemes may then be monitored more closely to ensure that they are implemented on schedule, or if possible on a faster timescale. Improved links between air quality experts and those responsible for improving public transport in Sheffield and the wider region should also be developed, to ensure that air quality is given due consideration in future evaluation of schemes. Such improved links would also better facilitate exchange of information gathered in the stakeholder consultation process that will remain a feature of Sheffield's air quality work.

The new options in this package are focused on the further development of quality bus corridors and park and ride facilities and enforcing bus lane restrictions. Again, scenario based modelling would assist in gaining a better understanding of the effects of actions on air quality. Examples of scenarios that would usefully inform the selection of options are as follows:

- Estimation of the impact of fixed percentage reductions in car traffic in Sheffield.
- Assessment of the air quality effects of varying degrees of modal shift along specific routes.

Information from the work to be carried out by SYPTE in Hillsborough and Middlewood to encourage modal shift should provide useful data that can be used for air quality scenario development. If the scheme is successful in encouraging people out of their cars it will be appropriate to consider where else it may be applied in the City.

Having established which options appear most likely to offer significant air quality benefits, further action would be needed to:

1. Disseminate results of the analysis to promote adoption of such options.
2. Identify sources of funding.
3. Secure funding.
4. Implement options.
5. Monitor the success of selected options.

This process clearly needs full integration with the Local Transport Plan.

5.4.2 Package 2: Transport infrastructure

One option has been identified in this package, further pedestrianisation and cycle routes in Sheffield City Centre, for example, serving the new Retail Quarter. Again, the appropriate course of action here is first to model air quality effects of existing agreements on the development of the city centre (such as the Supertram extension), and then to assess the potential for new schemes. Immediate actions are therefore as follows:

1. Liaise with those responsible for the City Centre Masterplan to gain deeper understanding of proposed developments, such as the new retail quarter.
2. Develop and model scenarios to assess effects on air quality of potential pedestrianisation and pro-cycling schemes.
3. Report back to stakeholders.
4. Determine future course of action.

5.4.3 Package 3: Traffic control

Again, there is a need under this package to assess existing plans in more detail than has so far been possible, using updated traffic data, etc.

On the first option in this package, voluntary alteration of delivery times to city centre businesses in order to improve air quality by reducing rush hour congestion, there are three actions for immediate attention:

1. Consultation with city centre businesses to gain a better understanding of existing delivery schedules and associated issues, and comparison of these with the times at which congestion is worst.
2. Development of alternative scenarios.
3. Modelling of these alternatives.

If it is concluded from the results of this analysis that it is appropriate to develop a further plan on delivery times, the following sequence of actions would be needed:

1. Development of a proposal by Sheffield City Council.
2. Consultation with city centre businesses on this proposal.
3. Refine and implement proposal.

Development of the second option in this package, improved co-ordination of road works, would require a similar scheme:

1. Sheffield City Council to develop proposals for improved co-ordination.
2. Convene workshop of statutory undertakers (gas, electricity, phone, water providers, Council contractors, etc.) to gain understanding of current arrangements and pressures on those involved.
3. Refine and implement proposal.

The third option recommended for this package, exploration of the adoption of additional traffic control measures of benefit to air quality, requires the following:

1. Further meeting between Sheffield City Council's Environmental Protection Service and Traffic Control Department to identify locations where additional traffic control measures may be implemented with greatest benefit to air quality.
2. Maintenance of regular contact between the two departments, with EPS undertaking additional air quality modelling work if required to provide justification for further traffic control measures.

5.4.4 Package 4: Cleaner vehicles

There are three parts to this package, the first being the programme of vehicle emission testing across South Yorkshire that has recently been awarded funding, for which the following actions are appropriate:

1. Carry out the vehicle emission testing programme and the supporting publicity campaign.
2. Analyse the data collected during the programme with a view to refinement of inputs to air quality models, and also of the action plan.
3. Develop and submit a proposal to central government for funding of further testing if it is concluded appropriate.

The second is to encourage the adoption of cleaner vehicles and technologies, including NOx abatement, for which the following actions are necessary. The proposed Environment Coordination Office should be able to provide support to those with specialist experience in this area, to encourage wider penetration of information than would otherwise be possible.

1. Identify organisations whose vehicle fleets make a significant contribution to NOx emissions in and around Sheffield.
2. Target these organisations with information from (e.g.) the Energy Savings Trust.

The third part of the package is to encourage improved emission standards for vehicles run by the Council and its contractors and for those vehicles routinely entering the AAZs:

1. Review vehicle emissions, in part using information collected elsewhere (such as in the recent London Low Emission Zone Study) to identify appropriate standards for the option.
2. Propose programme for introducing standards to the Council fleet, containing information on the limits to be applied and the timescales involved.
3. As paragraph 2, but in relation to council tendering procedures.
4. As paragraph 2, but in relation to vehicles routinely entering the AAZs.
5. Consult with those affected by the proposals.
6. If necessary, alter the proposal in line with stakeholder comments (recognising that there are advantages to adopting this as a voluntary measure rather than a mandatory one).
7. Assess the extent to which the limits are observed, with a view to making the measures mandatory if insufficient progress is made, and air quality modelling suggests that significant benefits are likely.

5.4.5 Package 5: Options specific to reducing emissions from the M1

The effectiveness of three of the four options identified in this package (speed reductions, increased use of variable message signing and diverting traffic from Bawtry Road and the Tinsley end of the Sheffield Road) needs to be assessed in greater detail in collaboration with the Highways Agency and Rotherham Metropolitan Borough Council prior to further action being undertaken. This will initially involve scenario-based modelling (as for some of the above packages) to assess, for example:

- Consequences of possible speed reductions on the M1
- Consequences of development planned for the M1 corridor
- Emissions from different types of vehicle on the motorway
- Emissions from through- and local-traffic on and around the M1
- Consequences of other options included in the action plan.

Following this a more detailed appraisal of cost-effectiveness will need to be carried out for those options that appear most robust.

In year 1, therefore, the following actions will be undertaken in relation to options (a) to (c) of Package 5:

1. Sheffield and Rotherham Councils to contact the Highways Agency to discuss progress with the air quality action plan, and ways forward in relation to the M1.
2. Identify scenarios for assessment, with data sources.
3. Analyse scenarios and report findings.
4. Review options in the light of this and other new data.

The fourth option, development of a joint action plan with HGV operators that need to access Tinsley and Brinsworth, would not need further modelling, but would require establishment of effective debate on air quality issues between Sheffield and Rotherham Councils and the operators concerned. Advice would be sought from the Energy Savings Trust and other relevant organisations.

5.4.6 Package 6: Control of industrial combustion and process emissions

Actions here concern encouragement of plant operators to adopt EMAS, and are as follows:

1. Hold workshop with relevant parties (EPS, Environment Agency, Business Environment Centre, etc.) to assess progress to date, and agree on way forward.
2. Identify the sites with the most significant air pollution emissions of relevance to the AAZs.
3. If appropriate, carry out a pilot trial of EMAS on one or more of these sites.
4. Assess likely air quality benefits of a wider programme.
5. Implement programme if it is considered appropriate.

5.4.7 Package 7: Planning issues, and eco-efficiency

The principal action in this package is to set up the Environment Coordination Office (ECO). Further development of other options under this plan (recognising the activities that are already underway) should largely be delayed until the ECO is up and running to ensure effective integration of activities.

1. Convene workshop of those with professional expertise relevant to the ECO, to discuss management and other structures, objectives, degree of liaison with other bodies, etc., and to develop a detailed plan for taking the concept forward.
2. Based on the results of this, define any additional funding or resource requirements for the ECO (recognising the resource efficiencies that will be brought about by the ECO).

Specific action is also needed in one other area, investigation of ways in which the city's district heating system may be put to greater use.

1. Convene workshop of interested parties to assess the scope for the existing system to displace ground level emission sources, identify barriers to further uptake of the system, ways to encourage its use, and to develop a plan for taking this option forward if appropriate.
2. Undertake scenario based modelling based around conclusions from (1) to assess likely air quality benefits for the City Centre AAZ in particular.

5.4.8 Package 8: Options for consideration by national government.

There is one action here, for the Council to lobby central government regarding the issues raised in package 8 of this plan.

5.5 Resource Implications

5.5.1 Local Transport Plan

Government guidance indicates the Local Transport plan is the means of delivering funding for the necessary measures where AQMAs are designated due to road traffic. However, the South Yorkshire Local Transport Plan (LTP) has been developed, and agreed by Government, to deliver specific transport measures up until 2006 prior to the development of this action plan, and hence does not account for all of the measures identified within it.

Major capital expenditure has therefore been committed to measures that may or may not contribute to improving air quality, and there is little scope for redirecting funds specifically towards actions identified in the Air Quality Action plan. If any LTP funds are available they are likely to be limited to about £100,000. Elected members would need to specifically redirect funding from other previously agreed LTP measures.

Within the LTP framework there is a possibility of making supplementary annual bids. However, this mechanism is not encouraged, so it is difficult to say how effective it would be in attracting additional funds for air quality measures.

The LTP also only provides capital funds, and so, to a large extent, cannot be used to fund salary costs, precluding appointment of Travel Plan Coordinators, for example.

5.5.2 Funding of non–transport air quality measures.

There are unlikely to be any other funds made available by government for the specific delivery of air quality measures. The inference therefore is that local authorities should use existing resources to achieve the required air quality improvements.

This plan identifies, through the flexible strategy option preferred by most key stakeholders, other measures that would contribute to an improvement in air quality while at the same time delivering on other complementary objectives. Examples include the affordable warmth strategy which has implications for social inclusion, and use of the city's district heating scheme which has implications for greenhouse gas emissions. Consequently there are unlikely to be funds that will specifically assist with the further promotion of these measures.

This plan has already explored how other strategies will contribute to air quality improvements and concluded that these will be insufficient on their

own for objectives to be met. It is clear, therefore, that the Government needs to assist Local Authorities by making funds available that are specifically ring fenced to the delivery of air quality improvements. Where additional objectives can also be delivered this could give the initiative a greater weighting and perhaps priority for funding in any bidding scheme.

5.5.3 Staffing Implications for Sheffield City Council

This plan identifies specific actions for implementation. Some of these actions are already taking place within existing resources, whilst others are not currently resourced. The full resource implications of these actions will need to be considered further. This will include investigating any external sources of funding, for example Supplementary Credit Approval.

The City Council already funds the required expertise in the measurement and prediction of air quality across the City. However, this Action Plan places lead responsibility on the Council for both monitoring and reporting progress, as well as the core function of driving its implementation, even though delivery of some parts will be the responsibility of other organisations.

Funding will need to be identified for the following tasks from the plan:

1. Continuation of support for new business with the development and implementation of Green Travel Plans.
2. Provision of support for existing businesses, schools and other public organisations in the development of Green Travel Plans.
3. Initiate and drive forward work on each of the Plan Packages (including seeking funding for feasibility studies and implementations).
4. Monitoring and reporting progress on the specific Packages and the Action Plan.
5. Establishment of the ECO and coordination of the activity of the partner organisations across City.
6. Review of existing and proposed City plans to identify opportunities to support air quality improvements.

5.6 Monitoring the Plan

The action plan needs to include a monitoring programme so that progress towards the air quality objectives and other effects linked to the plans can be evaluated. This should cover the following issues:

- Indicators of success for specific options, such as increased numbers of people using public transport, greater use of the existing district heating system, and changes in vehicle numbers.
- Air quality monitoring, which should concentrate on NO_2, PM_{10} and ozone.
- Monitoring non-air quality impacts, such as noise levels in sensitive areas.
- Cost control.
- Continued stakeholder involvement, possible greater use of the M1CCAP and CCCAP.

Suggested parameters for monitoring the plan are given in Table 13. In the interests of efficiency, and noting particularly the comments made on funding in Section 5.5, it is clear that monitoring should be based on data that are already routinely collected. The following suggestions are therefore made, though it is acknowledged as preliminary and better alternative measures are likely to be available in some areas. The monitoring programme will therefore require refinement during the first year of implementation of the action plan.

Table 13 – Proposed parameters for monitoring the success of the action plan

	Parameter
Implementation of the action plan	1. Record of actions completed for comparison with those listed in Table 14. 2. Implementation costs.
Air quality assessment	3. Measurements of air quality. 4. Modelled air quality data.
Package 1: Public transport	5. Public transport use. 6. Modal share. 7. Surveys of customer satisfaction.
Package 2: Transport infrastructure	8. Length of dedicated cycle routes and pedestrianised areas in the City centre. 9. Measures of City centre congestion.
Package 3: Traffic control	10. Proportion of businesses timing deliveries to avoid peak congestion. 11. Measures of City centre congestion.
Package 4: Cleaner vehicles	12. Proportion of council vehicles operating to each Euro standard, running on alternative fuels, etc. 13. As [12], but for contractors' vehicles. 14. As [12], but for vehicles routinely accessing AAZs (buses, delivery vehicles, etc.). 15. Vehicles passing/failing vehicle emission tests. 16. Uptake of advice and grants from the Energy Savings Trust by Sheffield-based organisations.
Package 5: Measures specific to the M1	17. Vehicle numbers (split by type of vehicle) on the M1 and surrounding roads. 18. Age of vehicles on the motorway. 19. Vehicle speeds. 20. Measures of congestion. 21. Noise levels in communities around the M1.
Package 6: Industry	22. Number of industrial companies using EMAS or similar schemes.
Package 7: Planning issues, and eco-efficiency	23. Uptake of EMAS (and similar schemes) in commercial and public sector operations. 24. Uptake of travel plans. 25. Implementation of travel plans. 26. Housing standards regarding energy efficiency. 27. Use of the City's district heating system. 28. Energy consumption and travel data for all Sheffield City Council operations.

The number of actions listed is a consequence of the adoption of a flexible strategy for improving air quality across the city. The alternative to this type of strategy is the implementation of a much more draconian approach, probably

based on controversial measures that could well conflict with regional development objectives.

5.7 Timetable

A timetable of actions for the first year of implementation of this plan is provided in Table 14. Figure 9 gives a key to the layout of the timetable. The timetable for subsequent years is dependent on conclusions of the Year 1 actions. The timetable will be subject to revision by the parties involved, as necessary.

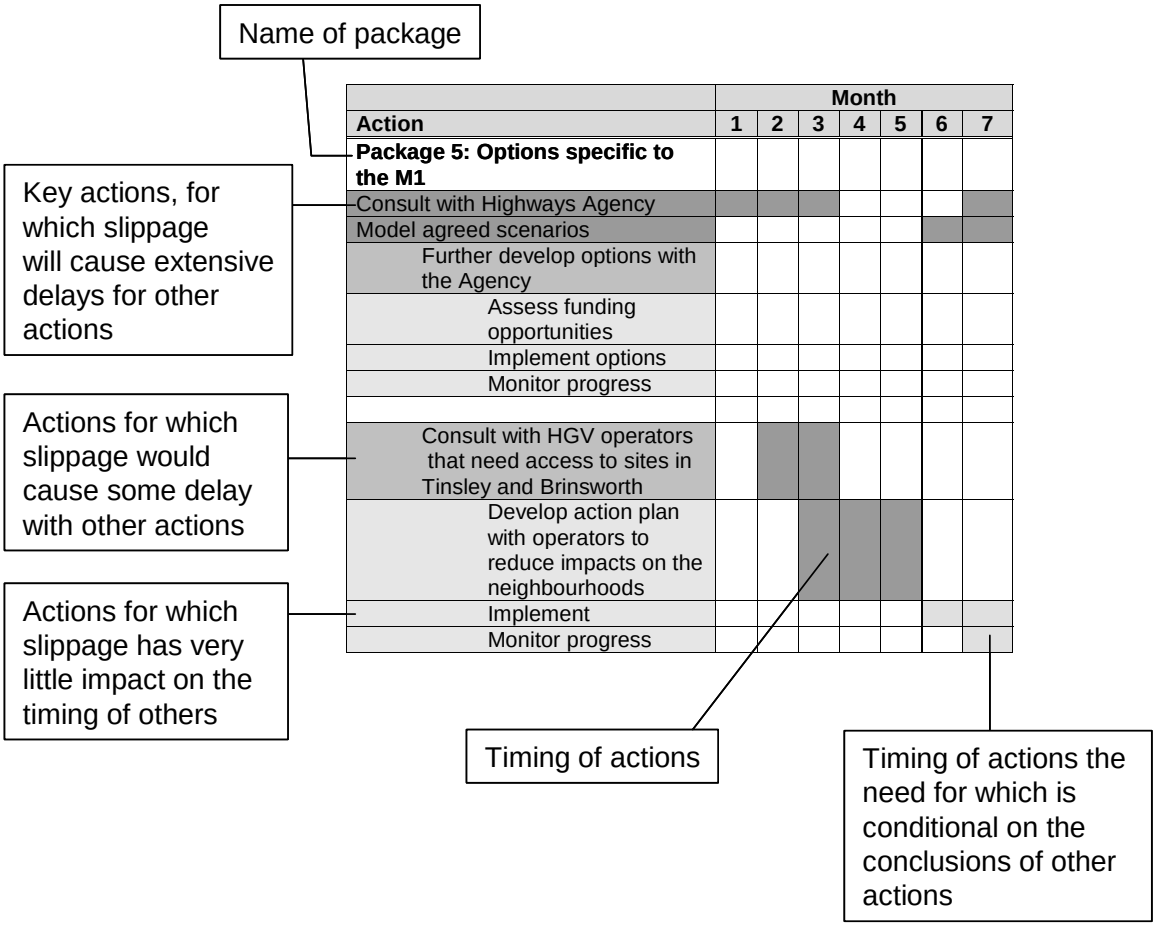

Figure 9 – Key to Table 14.

It is apparent from Table 14 that there are a large number of actions necessary to take the plan forward. Delegation by the Steering Group of responsibility to appropriate staff empowered to take actions forward and effective coordination of these staff is therefore key to success of the plan. Coordination will be achieved by:

- Effective communication of the air quality problems, their consequences, and the action plan.
- Provision of a detailed specification of what is needed from each person involved with the plan.
- Clear reporting guidelines for progress that are not unduly onerous.
- Clear reporting guidelines for any problems that may be encountered.

Table 14 - Timetable for actions in year 1 (for key, see Figure 9)

	Month												Continue
Action	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**to year 2**
Steering Group													
Establish steering group													
Steering group meetings													
Allocate specific responsibility for tasks													
Stakeholder consultation (see also Package 5)													
Liaise with Sheffield City Council Transport Planners, Traffic Control officers and other transport professionals as appropriate													
Liaise with development bodies													
Liaise with neighbouring Local Authorities													
Liaise with eco-efficiency professionals (e.g. BEC, travel planners)													
M1CCAP													
CCCAP													
Maintenance of websites													
Monitoring air quality													
Review existing arrangements vs. the needs of the action plan													
Modelling air quality													
Develop scenario based modelling capability in EPS													
Define scenarios with stakeholders													
Analyse/report on scenario analysis													

Table 14 (continued) - Timetable for actions in year 1 (for key, see Figure 9)

	Month												Continue
Action	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**to year 2**
Monitoring the success of the plan													
Finalise monitoring programme in collaboration with other stakeholders													
Monitor against agreed metrics													
Provide monitored data for annual progress report													
Reporting													
Reports to stakeholder groups													
Annual progress report to DEFRA													
Package 1: Public transport													
Review success of existing plans													
Identify barriers to progress in existing plans and seek solutions													
Review recommended options on public transport in the light of any new data that may be available													
Identify specific options (routes, locations of park and ride, etc.) of most benefit to air quality in the AAZs													
Assess funding opportunities													
Implement													
Monitor progress													

Table 14 (continued) - Timetable for actions in year 1 (for key, see Figure 9)

	Month												Continue
Action	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**to year 2**
Package 2: Transport infrastructure													
Review recommended options in the light of any new data that may be available													
Identify specific options (routes, etc.) of most benefit to air quality in the AAZs													
Assess funding opportunities													
Implement													
Monitor progress													
Package 3: Traffic control													
Consult on delivery times, model air quality implications of results													
If appropriate, SCC to develop a proposal for changes to delivery times													
Consult and refine proposal													
Implement proposals													
Monitor progress													
SCC to develop proposals for better coordination of road works													
Consult on proposal													
Refine proposal and implement													
Monitor progress													

Table 14 (continued) - Timetable for actions in year 1 (for key, see Figure 9)

	Month												Continue
Action	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**to year 2**
Package 4: Cleaner vehicles													
Complete vehicle emission testing programme													
Analyse and use results													
Prepare new proposal to Central Government for extension of the programme													
Identify organisations that make a significant contribution to traffic NOx emissions in Sheffield													
Target these organisations with information from EST, etc.													
Review vehicle emissions data, develop proposals for minimum emission standards													
Propose programmes for council fleet, council contractor's fleets, vehicles routinely entering AAZs													
Consult and revise proposals													
Implement													
Review, with a view to enforcing voluntary arrangements													

Table 14 (continued) - Timetable for actions in year 1 (for key, see Figure 9)

	Month												Continue
Action	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**to year 2**
Package 5: Options specific to the M1													
Consult with Highways Agency													
Model agreed scenarios													
Further develop options with the Agency													
Assess funding opportunities													
Implement options													
Monitor progress													
Consult with HGV operators that need access to sites in Tinsley and Brinsworth													
Develop action plan with operators to reduce impacts on the neighbourhoods													
Implement													
Monitor progress													
Package 6: Control of industrial emissions													
Consult with relevant parties to agree on way forward for promoting environmental management systems by industry in and around AAZs													
Identify most significant sites													
Implement													
Monitor progress													

Table 14 (continued) - Timetable for actions in year 1 (for key, see Figure 9)

	Month												Continue
Action	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**to year 2**
Package 7: Planning issues and eco-efficiency													
Revise Air Quality and Land Use Planning Guidance Note													
Adopt this guidance note as SPG													
Hold workshop of relevant professionals to determine structure, scope, objectives, etc. of the Environment Coordination Office (ECO)													
Develop resource plan for the ECO, decide on location, etc., and assess funding implications													
Implement													
Monitor progress													
Hold workshop to discuss ways of increasing the use of the city's district heating system													
Undertake scenario based modelling to determine associated air quality benefits in the City centre AAZ													
Implement													
Monitor													
Package 8: Options for consideration by national government													
Lobby central government on options over which the Council has little or no control													
Lobby central government on funding for the plan													

6 Concluding remarks

6.1 Strategy

Analysis suggests that without significant action the annual mean air quality objective for NO_2 will not be met. Following consultation it was concluded that the best overall strategy for moving towards the objective is one that is flexible, drawing on a broad range of measures. As shown in Section 5.7, this has significant implications for the implementation of the plan.

The alternative is to follow what most stakeholders considered to be a draconian policy limited to a few measures applied at a high level that would force behavioural changes. It is widely considered that this would deter inward investment, and so has been rejected given existing economic conditions in the region. Whilst such a strategy would be easy to implement because it is more focused, a flexible strategy would be able to bring in some extremely cost-effective measures (including those efficiency improvements that save money).

The Council will clearly need to demonstrate strong leadership in carrying the recommended measures towards meeting the air quality targets, particularly in respect of the following:

1. Allocation of sufficient resource to carry out the action plan.
2. Continued recognition of the role that a healthy environment can play in promoting regeneration in the region.
3. Development of a green procurement policy for vehicles, buildings, equipment.
4. Liaison with the Highways Agency (etc.) to develop agreed scenarios for changes in traffic arising from regeneration in the region. These scenarios can then be used by the Environmental Protection Services to improve air quality modelling. This will, in turn, permit improvement in the cost-effectiveness of options developed to improve air quality in line with legislation.
5. Providing a focal point for those working on environmental improvement (e.g. travel planners, those promoting EMAS, LA21 officers) and for dissemination of their activities.

6.2 Options

6.2.1 Traffic

There is a strong focus on traffic in the options recommended, because of its major contribution to air pollution in the region, as indeed it is in most parts of the UK where AirAction Zones/AQMAs have been declared.

Experience elsewhere, for example in the Netherlands, demonstrates that modern public transport services can provide a viable alternative to the car, even one that provides a major benefit (through reduced congestion) to those to whom use of a car is essential, such as:

- People who require a car or other motor vehicle to do their work
- Those with impaired personal mobility
- People buying large, heavy or awkward items

Given our capacity to accept very high levels of congestion, there is a clear need for radical thinking on transport. Here, particular prominence is given to improving bus services through the development of more quality bus corridors and much increased park and ride provision, and controlling traffic in and around the M1. However, many other options can play an important role. It may well be the case that there is insufficient resource for all apparently worthwhile measures to be pursued. In this circumstance it would appear better to pursue a smaller number of options in a vigorous manner, than a larger number with only limited commitment to each.

Responsibility for improvements in the performance of traffic lie with a large number of stakeholders, local Councils, the Highways Agency, developers, public transport providers, people who live and work in the area, those responsible for enforcing traffic regulations, and so on.

6.2.2 Major industries

There is limited attention paid here to options that will lead to reduced emissions from major industries in the area, largely because of the effect of existing or incoming regulations. The new incinerator, for example, will need to comply with the new Waste Incineration Directive (WID) that sets emission standards that are significantly beyond those that the old incinerator operated to. It should be remembered that the WID is an advance on the earlier Incineration Directive, which itself was responsible for the closure in the mid 1990s of a very large number of incinerators across Europe that operated with little regard to environment or health.

Other major plant are subject to other specific standards or are required to adopt 'Best Available Techniques' (BAT) under the IPPC Directive. A good example is the Avesta Polarit works, which has reduced emissions substantially over the last 20 years. It is understood that the plant has submitted a recent application that will increase production on the site whilst further reducing emissions (a good example of development and environmental aims going hand in hand).

Sheffield, the Environment Agency and the businesses concerned should continue to work in partnership to ensure effective communication of information on development and performance on the major industrial sites. The Councils may wish to take the lead in facilitating stakeholder engagement where there is a significant level of concern about any operation or proposal.

6.2.3 Smaller industries and other businesses

Smaller industries and other businesses may be able to make significant improvements in their environmental performance through the adoption of environmental management systems. The Business Environment Centre in Sheffield already provides this kind of advice, which can generate significant savings through more efficient use of energy and other resources. Some

such systems have been found to be unduly onerous, but some groups such as the Peterborough Environment City Trust (PECT) have developed approaches that reflect the availability of resources in small businesses. The significant savings referred to have been made even when environmental management systems are operated on a reduced scale. Rather than being an additional burden on business the benefits of environmental management have helped some businesses to flourish.

6.2.4 Individuals living and working in the region

People living and working in Sheffield have a clear role to play in improving the quality of their environment, as reflected by the importance of area sources in contributing to City Centre NOx levels. This can be done in several ways, the main ones being adoption of energy efficiency measures (remembering that these can lead to significant cost savings), observance of traffic controls such as bus lane times, a willingness to use public transport and a willingness to accept the changes that are necessary.

6.2.5 National government

National government also has a role to play in assisting Sheffield and Rotherham meet the air quality targets, beyond that defined by existing legislation and other measures that are in the process of adoption, such as the WID. This will include issues as diverse as ensuring liaison between relevant agencies, development of green procurement policies for the public sector and consideration of the effects of existing competition policy on public transport provision. Consideration of additional funding to assist the implementation of action plans is needed urgently.

6.3 Progress Towards the Objectives Through the Action Plan

With no other changes it is clear that the introduction of the options recommended in this plan would move air quality towards the annual mean air quality objective for NO_2. This will be countered to a greater or lesser extent by some of the pressures arising from development initiatives in the region as these will attract more traffic. However, other actions that fall under the same initiatives, for example extension of the Supertram network, and possibly completion of the Northern Inner Relief Road, will be beneficial in air quality terms and hence are supported through this plan.

At the present time it is not possible to quantify the benefits of the recommended options in detail as much work remains to be done to characterise effects on traffic flow, speed, modal shift, etc. Taking a worst case scenario (generation of large additional traffic volumes, strong tendency of models to underestimate concentrations, very limited uptake of emission control measures) the air quality objectives will not be met. Under a best case scenario the opposite could be true. Overall, there is consensus amongst air quality professionals in the region that it is unlikely that the objectives will be met. Further modelling work is needed to assess the extent of air quality

exceedences after 2005, particularly out to 2010 when the EU Directive limit for NO_2 comes fully into force, along with possible new objectives for PM_{10}.

6.4 Development Concerns

Concrete examples of environmental improvement furthering development goals are not hard to find. This report has referred to "win-win" measures, where air quality is improved by increasing the efficiency of resource use (energy, water, materials). Such measures save businesses money, and hence improve their viability. Indeed, Sheffield's Business Environment Centre is so confident in this respect that their Yellow Pages entry guarantees that they will identify cost-cutting measures. Another example of environment and development going hand in hand in Sheffield is the Supertram. The provision of a fast, clean and modern public transport service has clearly encouraged people out of their cars, as demonstrated by the popularity of the park and ride facilities at tram stops.

An independent economic assessment was undertaken to compare the measures listed in a late draft version of this plan with the strategic vision and economic development aspirations for the region (see Appendix 6). This found no inconsistency in the approaches and, indeed, concluded that adoption of the options proposed in this plan would largely reinforce actions being taken to encourage the development of a high skills, knowledge-based economy in an attractive, healthy environment in which people want to live and work. Some revisions have been made to the action plan in the light of the recommendations made in the economic assessment.

In determining the appropriate level of resource that should be directed towards the action plan it should be remembered that, in the event that the plan does not succeed, some residents of Sheffield will remain exposed to levels of air pollution that are considered unacceptable by national government and the European Union.

6.5 Consultant's Recommendations

Consultants (EMRC/AEA Technology) appointed by Sheffield City Council EPS to assist with the development of this plan make the following recommendations. To a large extent these already feature in the plan, but the consultants felt that they deserve particular emphasis.

1. The key challenge will be the integration of the action plan with regeneration strategies for Sheffield and the region. The Sheffield First Partnership seems well placed to take overall responsibility for this task. It would seem logical for Sheffield First for Environment to monitor and report on the progress of the actions which comprise the Plan, in collaboration with EPS.

2. The proposed Environment Coordination Office (ECO) is also key to the action plan, and needs to be resourced accordingly if it is to meet its potential for assisting development in the city. The ECO's role in

encouraging the formation of broader partnerships of environment-related professionals than currently exist provides a firm basis for more efficient and effective working than is currently possible.

3. Closer ties are needed between EPS and other council departments, to ensure air quality is considered at the outset of any plan that may have an effect on air quality. In particular, there is a need to share any data on traffic forecasts at the earliest opportunity and to make sure that EPS are told of developments when plans are initiated. It is accepted that the will to do this already exists, but it would appear that the high level of pressure on planners (etc.) in the city and wider region is acting as a barrier to truly efficient collaboration. One means of ensuring that closer ties are developed and maintained would be the establishment of a steering group to take the action plan forward.

4. Closer working with the Highways Agency would be beneficial, possibly in partnership with other councils who have reported air quality problems on major roads.

5. EPS should examine ways of extending the use of the Airviro model, in particular, to explore the potential for the model to be used for testing alternative scenarios. This would provide enhanced capability for early prediction of the effects of proposed developments on air quality, which in turn would ensure that planners are provided with air quality data at a stage that is most useful to them.

   It is accepted that the results of scenario based modelling do not reflect the 'real world', but what would happen if a hypothetical scenario came into being. However, they do provide a basis for making timely (if preliminary) judgements that can subsequently be refined if appropriate.

6. The stakeholder consultation process developed for this plan (particularly the M1CCAP and CCCAP) and the outputs that it produced, deserve broader recognition. Many of the suggestions and comments made are relevant beyond the air quality debate, particularly with respect to public transport services, provision of facilities for pedestrians and cyclists, and industry in the region. Planners may also be interested in some of the recorded perceptions of policy in the region.

7. Following from this, it has been noted that few people in Sheffield outside of the council and development bodies appear to have a good understanding of the overall effect of the many plans that are currently underway. This conclusion is disturbing, as those that participated in the stakeholder process are presumably a group that has a stronger interest than most in local affairs. A simple guide to the numerous bodies that exist and the plans that they are generating would seem generally useful.

7 References and Other Useful Sources of Information

7.1 Earlier documents prepared in relation to review and assessment of air quality in Sheffield

Earlier information on air quality assessment in Sheffield can be found at the websites:

www.sheffieldairaction.com

www.m1airaction.com .

These websites include minutes of the M1CCAP and CCCAP meetings and numerous other data relevant to the action plan.

More general information on the activities of Sheffield's Environmental Protection Service is:

http://www.sheffield.gov.uk/services/del/ers/Environmental_protection/default.HTM

The Sheffield Warm Front Team can be contacted on 0800 952 1555.

7.2 Websites for Neighbouring Councils

Barnsley:
http://www.barnsley.gov.uk/service/ehealth/pollutioncontrol.asp

Doncaster:
http://www.doncaster.gov.uk/community/categories.asp?WSCAT=CommHealth%2BEnviro%2BAir

Rotherham:
http://www.rotherham.gov.uk/pages/council/services/environment/airquality.htm

7.3 Air Quality Strategy

Guidance on action planning has been produced by DEFRA and the Welsh Assembly (jointly) and by the NSCA in an initiative supported by DEFRA:

Part IV of the Environment Act 1995: Local Air Quality Management Draft Policy Guidance. DEFRA/Welsh Assembly, 2002.

Air Quality Action Plans: Interim Guidance for Local Authorities, NSCA, 2000.

Air Quality: Planning for Action. Part 2 of the NSCA's Guidance on the Development of Air Quality Action Plans and Local Air Quality Strategies. NSCA, 2001.

Air Quality Action Planning Helpdesk, funded by DEFRA and run by Casella Stanger and TTR (Transport Travel Research) Ltd.:

http://www.stanger.co.uk/jointprojects/DEFRA-Home.asp?jointprojectid=10

Further information on the national air quality strategy can be found at http://www.defra.gov.uk/environment/airquality/index.htm

Further guidance for local authorities can be found at: http://www.airquality.co.uk/archive/reports/reports.php?action=category&section_id=6

In developing the strategy DEFRA has commissioned a substantial amount of research, which is accessible at: http://www.airquality.co.uk/archive/reports/reports.php?action=category&section_id=2

Amongst this work were cost-effectiveness studies for PM_{10} and for NOx: Holland *et al* (2001) The costs of reducing PM_{10} and NO_2 emissions and concentrations in the UK: Volume I, PM_{10}. Report for UK Departments of Environment, Food and Rural Affairs (DEFRA) and Trade and Industry (DTI). http://www.aeat.co.uk/netcen/airqual/reports/nags2001/aeat-env-r-0342.pdf . Volume II, NO_2. Report for UK Departments of Environment, Food and Rural Affairs (DEFRA) and Trade and Industry (DTI).

The Environment Agency has also provided guidance on improving urban environments in the documents 'Our Urban Future: Putting the environment at the heart of urban renewal' and the more detailed assessment 'The Urban Environment in England and Wales'.

7.4 Information on EU Legislation

Information on the legislation developed on air quality by the European Commission can be accessed through: http://europa.eu.int/comm/environment/air/index.htm

7.5 Local Plans and Other Documents

Air Quality and Land Use Planning Guidance Note, Environmental Protection Service, Sheffield City Council.

City Centre Masterplan, Transport Strategy Document, Sheffield City Council, June 2002.

Corporate plan 2002-2005, Sheffield City Council.

Cultural Industries quarter action plan, for consultation, Planning Transport & Highways, Sheffield City Council, October 1999.

Darnall Area Action Report - Draft Outline Plan for 2003 for Darnall Area Panel Briefing January 2003.

Darnall Environment and Health Audit, A review by Sheffield City Council and Sheffield Health, 2001.

Don Valley Variable Message Signing Scoping Study. Pell Frischmann, June 2002.

Final report on the Halfpenny Transportation Initiative, Oscar Faber, February 2002.

Final Air Quality Review and Assessment, Environmental Protection Service, Sheffield City Council, December 2000.

Guidelines for the preparation of Transport Assessments and Travel Plans, Sheffield City Council, June 2001.

Healthy Travel Plans - a review of the progress of Sheffield Hospital Trusts, for the city wide transport and health group, September 2001.

Planning, Transport and Highways, Devonshire Quarter Action Plan, July 2001.

Report of the Head of Planning, Transport and Highways, SCC Travel Plan.

Review of the Sheffield Unitary Development Plan, Summary of issues for the Darnall area panel, approved by the City Council's cabinet on the 10th December 2001

Sheffield City Centre: Planning Guidance for the New Retail Quarter, Supplementary Planning Guidance and Interim Planning Policy, Draft for Consultation, November 2001.

Sheffield City Master Plan: Transport Improvements, Sheffield City Council/South Yorkshire PTE/Sheffield One, Strategy Document, May 2002.

Sheffield First for Environment: Environment Strategy for Sheffield, 2003 – 2006 Draft.

Sheffield Northern Inner Relief Road. Updated Annex E Submission, Faber Maunsell, August 2002.

Sheffield Trends 1999, Sheffield First Partnership.

Sheffield Unitary Development Plan, 1998.

South Yorkshire Bus Strategy, South Yorkshire Local Transport Plan, September 2001.

South Yorkshire Local Transport Plan 2001-2006 and its Annual Progress Report covering 2001.

South Yorkshire Passenger Transport Executive: Park and Ride – Criteria and Sites. Draft Executive Summary, December 2002. Produced for SYPTE by Halcrow Group Limited.

South Yorkshire Vehicle Emissions Testing Partnership. Application for Funding, October 2002.

Speed Management Plan, Final Report. Mott MacDonald for Sheffield City Council, September 2002.

Strategic Economic Zone Integrated Development Plan, Yorkshire Forward, April 2001.

Information on the M1 Corridor Clean Air Partnership and the City Centre Clean Air Partnership can be found at the websites:

www.sheffieldairaction.com and www.m1airaction.com .

7.6 Guidance on Consultation

Arup (1999) Good practice Guide: Air quality and land use planning. A report prepared by Arup Environmental for the Royal Town Planning Institute. Printed by NSCA: Brighton

Bush, J., S. Moffatt, and C. Dunn (2001) “Keeping the public informed? Public negotiation of air quality information” Public Understanding of Science Vol.10: 213–229

Cinderby, S. (1999) “Geographical Information Systems for Participation: The Future of Environmental GIS?” International Jnl. Environment and Pollution Vol.11(3).

Forrester, J. (1999) “The Logistics of Public Participation in Environmental Assessment” International Journal of Environment and Pollution Vol.11(3): 316-330

NSCA (National Society for Clean Air and Environmental Protection) (1999) Consultation for Local Air Quality Management: the How To Guide Brighton: NSCA

Renn O., Webler T., and Wiedermann P. (eds) (1995) Fairness and Competence in Citizen Participation: evaluating models for environmental discourse. Dortrecht: Kluwer Academic Publishers.

Yearley, S., J. Forrester and P. Bailey (2001) “Participation and expert knowledge: a case study analysis of scientific models and their publics” in Hisschemöller, M., R. Hoppe, W.N. Dunn and J. R. Ravetz (eds) Knowledge, Power and Participation in Environmental Policy Analysis. Policy Studies Review Annual Volume 12. Transaction Publishers, New Brunswick and London: 349-370.

Information was also used from various publicity accessible websites from the DoH, DETR, HEA, and also from FoE.

PART 3: Appendices

1. **Action plan checklist**
2. **List of all those Specifically Invited to Participate in the Stakeholder Consultation**
3. **Review of Some of the Existing Actions on Public Transport in South Yorkshire**
4. **Transport Options that are Not Recommended in the Draft Plan**
5. **Review of Options and Impacts**
6. **Economic Review of the Sheffield/Rotherham Draft Air Quality Action Plan**

Appendix 1: Checklist

DEFRA have contracted Casella Stanger, in collaboration with Transport Travel Research Ltd, to appraise local authority Air Quality Action Plans and to provide helpline support. The helpdesk provides a website:

http://www.stanger.co.uk/jointprojects/DEFRA-Home.asp?jointprojectid=10

Amongst other information, this website provides the following checklist, reproduced here as a check on likely compliance of this plan with national guidance. Minor changes are made to the original reflecting the context of this action plan.

	Section	**Comments**
1. Local Authority Information	Front of plan	
2. Process Adherence to Guidelines and Consideration of Policies		
Have Statutory Consultees been consulted?	Table 7	
Secretary of State		Consultation with the Sec. of State will be based on the plan as submitted to DEFRA
Environment Agency	Table 7 Section 4.8.3	
Highways Agency	Table 7 Section 4.7.3	A closer working relationship with the Highways Agency would be useful
Contiguous Authorities	Section 1.6.2 Table 7 Section 4.6.1	
Have other local authority departments been consulted?	Table 7	
Have other relevant consultees been consulted?	Table 7	
Has a statement of the problem causing the AQMA, as identified in the Stage 4, been clearly stated?	Section 1.7	
Have the principal sources of the pollutants causing the exceedence been identified?	Section 1.7	
Have other local authority plans/policies been considered?	Section 1.5 Section 4.3.1 Section 4.4.1 Section 4.5.1 Section 4.6.1 Section 4.7.1 Section 4.8.1 Section 4.9.1 Section 6.3 Appendix 6	The economic assessment of the action plan presented in Appendix 6 provides an independent assessment of the plan.

	Section	Comments
Has an options timescale been included?	Section 5.7 Table 14	The timescale provided concentrates on actions to be undertaken in the first year of the plan. This is different to an 'options timetable', but does provide a structure for pursuing the action plan on a broad front. This will establish the timescale for further activities.
Have costs of options/plan been set out?	Table 12 Appendix 6	Available cost estimates are approximate. Further work is needed to better define both costs and the effectiveness of the recommended options.
Have impacts been assessed?	Table 12 Appendix 5 Appendix 6	Again, available data are approximate, and would need to be refined in future feasibility studies.
3. Process - Checklist of Measures		
Five general pollutant source have been identified:- Road Transport/ Other transport/ Industry/ Domestic/ Aviation		'Other transport' and 'Aviation' are not significant sources in Sheffield
For each general pollutant source, a number of measures have been identified. The list provided here is not intended to be exhaustive and local authorities should include additional measures that they may have considered.		Additional measures to those included in the list have been considered in the action plan.
Evidence to support the local authorities' selection or rejection of each considered measure will be sought by identifying the following issues:	Section 4 Appendix 4 Appendix 5 Appendix 6	
How many options have been considered?	Section 2.4	In total, over 100 options were considered, though this plan reports on a smaller number that were accepted or rejected after detailed consideration.
Have transport, air quality, socio-economic and other environmental impacts been assessed?	Section 4 Appendix 4 Appendix 5 Appendix 6	Assessed largely qualitatively, drawing where possible on reports of similar schemes elsewhere.

With respect to options, Table 12, Table 14, Appendices 4, 5 and 6 are all generally relevant. This section of the Table therefore refers only to the sections where further discussion is provided of options.

	Section	**Comments**
Road Transport Measures		
Physical traffic management: speed & flow	Section 4.7.2 Section 5.4.5	
Re-routing and road hierarchy	Section 4.4.1 Section 4.7.2 Section 5.4.2 Section 5.4.5	
Access control & clear zones	Section 4.5 Section 5.4.3	
Low emission zones	Section 4.6.2 Section 5.4.4	
Road user charging	Appendix 4	Not recommended, at least until further information is available from London's Congestion Charging scheme.
Parking management & charging	Appendix 4	Not recommended at least until other measures are given a chance to work
UTMC Systems	Section 4.5 Section 4.7.2 Section 5.4.3	
Infrastructure development	Section 4.4 Section 5.4.2	
Reallocated road space	Section 4.4 Section 5.4.5	
Public transport initiatives - Bus	Section 4.3 Section 5.4.1	Various recommendations made, and support given to other local plans
Public transport initiatives – Rail	Section 4.3	Support given to some rail based park and ride schemes.
Public transport initiatives – other	Section 4.3	Numerous measures that are already planned (e.g. extension to Supertram) are supported in the plan. Some potential new measures, e.g. expansion of park and ride, also recommended.
Development of cycling and walking	Section 4.3.1 Section 4.4 Section 4.9 Section 5.4.2	Supported in the plan
Partnerships & travel plans (workplace & school)	Section 4.3.1 Section 4.9 Section 5.4.7	
Promotion, education & awareness raising	Section 4.3.1 Section 4.9 Section 5.4.7	
Fleet management & clean fuels	Section 4.6.2 Section 4.7.2 Section 5.4.4 Section 5.4.7	
Land use planning	Section 4.9 Section 5.4.7	

	Section	Comments
Freight measures	Section 4.5.2 Section 4.7.2 Section 5.4.5	
Roadside emissions testing	Section 4.6.1 Section 5.4.4	
Compulsory purchase		Not considered at this stage
Other Transport Measures		
Passenger rail		Several stakeholders reported problems with rail services, but the nature of these problems go well beyond what is appropriate to address here.
Freight rail		Consideration will shortly need to be given to a road/rail interchange that could attract significant traffic to the M1 AAZ.
Maritime and ports		Not relevant
Inland waterways		Not relevant
Other Improved coordination of road works	 Section 4.5.2	
Industrial Measures	Section 4.8	Consideration in this plan is also given to emissions from the commercial and public sectors
Local abatement, emission reduction	Section 5.4.6	High level of abatement has already occurred, and will continue through IPPC.
Closure or Relocation		Rejected early on – industry is not a dominant source of the city's NO_2
Other. Promote use of district heating Increase EMAS take-up	 Section 4.9 Section 5.4.7 Section 4.8 Section 4.9 Section 5.4.6 Section 5.4.7	
Domestic Measures		Consideration in this plan is also given to emissions from the commercial and public sectors
Energy conservation	Section 4.9 Section 5.4.7	
Fuel improvement	Section 4.9.2 Section 5.4.7	
Fuel switch	Section 4.9.2 Section 5.4.7	
Appliance improvement	Section 4.9 Section 5.4.7	
Smoke control	Section 4.9 Section 5.4.7	
Nuisance policy (bonfires etc.)	Section 4.9 Section 5.4.7	
Other. Establish ECO Green procurement policy	 Section 4.9.2 Section 4.9 Section 5.4.7	
Airport Measures - Airside Activity		Not relevant in Sheffield

	Section	Comments
4. Appropriateness and Proportionality		
Do measures seem appropriate to the problem? Has the right balance been struck?	Appendix 6	
How have measures been assessed?	Section 1.3.1 Section 2 Section 3.2 Section 4 Appendix 4 Appendix 5	
Are the measures likely to achieve their stated goal? This may be the adoption of a new AQ measure or a tightening of an existing measure.	Section 6.3	This aspect of the plan requires further analysis, for example through feasibility studies, some of which are already underway. .
Have the wider impacts been appraised appropriately?	Appendix 5 Appendix 6	
Was the method of assessing costs appropriate?		See the independent economic review produced with this action plan.
Is it likely for LAQM objectives to be met? How will success be measured? What impact will wider initiatives/policies have on the measures?	Section 1.6.3 Section 4 Section 5 Section 6	Available data suggest that it will be extremely difficult to meet targets, particularly if there is nothing that can be done with respect to traffic on the M1. The City Council regards the measures proposed to be a proportionate response to the air quality problems of Sheffield at the present time. Further action may be necessary once the baseline (e.g. post-Objective 1) is better defined.
Is it likely for Directive values to be met? How will success be measured? What impact will wider initiatives/policies have on the measures?		Modelling of the situation in 2010 has yet to be completed. Directive values for those pollutants for which earlier dates apply will be met.
Do the chosen measures comply with wider Government Policies?		See the independent economic review produced with this action plan.

	Section	Comments
5. Implementation		
Are measures realistic in light of the objective deadline(s)?	Section 6.3	Measures necessarily reflect not just the objective deadlines, but also others, relating in particular to the Objective 1 status of the region.
Have responsibilities been assigned to the relevant party? Does the assigned party have the necessary powers?	Section 5	Appropriate delegation of responsibility will need to be considered further in the initial stages of the implementation of the plan.
Has financing been secured and who will pay. Is this realistic?	Section 5.5	At the present time significant sources of additional funding have yet to be identified. Barriers to the use of certain types of fund are discussed in Section 5.5.

Appendix 2: List of those Specifically Invited to Participate in the Stakeholder Consultation

The following lists all those organisations, businesses and other groups contacted during the development of this action plan. Those that actively participated were listed in Table 7 of the main text.

Stakeholders, A to N	Stakeholders, N to Z
Abbey National plc	Meadowhall
Airy Fairy	Midland Mainline
Argos Ltd	National Car Parks
Arriva Trains Northern	Nether Edge, Sharrow, Broomhill Area Panel
Atkinson's	Netherthorpe, Hillsborough
Avesta Polarit	Norrow Estates Ltd
BBC	Northern General
BHS	Objective 1, South Yorkshire
Black Community Forum	Onyx Sheffield Ltd.
Boots The Chemist, Ltd.	Orchard Square (shopping)
BOSSY (Bus Operators Serving South Yorkshire)	Pedal Pushers (Cycle Campaign group)
Brinsworth (Rotherham) Parish Council	Pets for Life
Brinsworth (Rotherham) residents	Planning, Development Control
British Land Corporation	Post Office Property Holdings
Burngreave Area Panel	Primark
Bus Operators Serving South Yorkshire (BOSSY)	Programme Executive Priority 5
Business Environment Centre	Railtrack
Business Link South Yorkshire	RAP (Residents Against Pollution, Brinsworth)
Catcliffe Parish Council	Road Haulage Association
Cathedral Quarter	Rotherham Health Authority
Central Trains	Rotherham Industrial Development Office
Chamber of Commerce	Rotherham Metropolitan Borough Council
Chamber of Trade	Royal Hallamshire
Childrens' Hospital	Secretary Sheffield Taxi Trade Association
Christian Ecology Link	Sharrow & Nether Edge Area Panel
City Centre Catering Ltd	Sheffield and District Chamber of Trade
City centre residents	Sheffield Business Club
City Centre Small Business Group	Sheffield Chamber of Commerce & Industry
City Centre workers	Sheffield Chamber of Trade
City Development Unit – Sheffield City Council	Sheffield City Council
Cole Brothers	Sheffield First
Consignia	Sheffield Friends of the Earth
Corus Plc	Sheffield Hallam University
CPRE	Sheffield Health Authority & West Primary Care Trust
Cultural Industries Quarter	Sheffield Information Service (SCC/NHS)
Cycling Forum	Sheffield International Venues

Darnall Forum	Sheffield Markets
Debenhams plc	Sheffield North Primary Care Trust
Department for Environment, Food & Rural Affairs	Sheffield One
Devonshire Quarter Community Association	Sheffield Primary Care Trusts
East End Quality of Life Initiative	Sheffield Regional Green Business Club
East End Strategy Group	Sheffield South East Primary Care Trust
Elected Members - Rotherham Metropolitan Borough Council	Sheffield South West Primary Care Trust
Elected Members - Sheffield City Council	South Yorkshire Housing Association
English, Welsh and Scottish Railways	South Yorkshire Passenger Transport Executive
Environment Agency	South Yorkshire Police
Environmental Protection Service	T.J Hughes
EWS Railways (Central)	The Førum Shopping Centre and Cafe Bar
First (Mainline)	The Futon Shop
Five Weirs Walk Trust	The Moor Shopping Centre
Freight Transport Association	Tinsley Forum
Freightliners Ltd.	Tinsley residents
Government Office for Yorkshire & the Humber	Tinsley Tree project
GT News	Tinsley Wire
Handsworth Forum	Transport Policy Unit – Sheffield City Council
Healthy Sheffield	Transport Road and Safety
Heeley City Farm	Ufi Sheffield (learning for business)
Highways Agency	University of Sheffield
HLM Architects (Sheffield Offices)	Urban Traffic Control
IMPACT	Virgin Trains
JARVIS RAIL	Westfield Health Scheme
Langsett Cycles	White Young Green
Learning & Skills Council	Women's Forum
Make it in Sheffield (part of Sheffield First group)	Yorkshire Bank plc
Manor, Castle & Woodthorpe Area Panel	Yorkshire Forward
Marks & Spencer	

Appendix 3: Review of Some the Existing actions on Public Transport in South Yorkshire

Mode	Actions	Project	Costs	Timetable	Effectiveness	Source
Buses	**Bus related actions**					
	1.b Implementation of a significant rolling programme of 13 Quality Bus Corridors across the county	1.b.a Abbeydale Road/Chesterfield Road Quality Corridor	£150,000	2001/02-2005/2006	Local bus services (Vehicle Kilometres per year) 89m in 00/01, 86.2m in 01/02	SYPTE, Business Plan 2002/03-2006/07
		1.b.b Bus Priority: Sheffield's Western Approaches Corridor (S10 Quadrant): Preliminary work	£150,000	2001/02-2005/2006	Subsidised bus services - cost per passenger journey (PTE Definition) 70.7p in 01/02 instead of 69.8p targeted	SYPTE, Business Plan 2002/03-2006/07
		1.b.c Ecclesall Road		1999-2004	Proportion of scheduled Bus Journeys operated 97.5% in 01/02, with a target of 98% for 02/03	LTP 2001/02 - 2005/06
		1.b.d Sheffield - Hillsborough		from 2004	Percentage of Users Satisfied with Local Bus Services 61% in 00/01, with a target of 75% for 05/06	LTP 2001/02 - 2005/06
		1.b.e Sheffield Rotherham M1 Corridor Preliminary work	£50,000	2002/03 - 2006/07		SYPTE, Business Plan 2002/03-2006/07
		1.b.f Wickerley/Worshop: Quality, speed and reliability improvements on bus corridor. Aim to improve modal share	£200,000	2002/03 - 2006/07		SYPTE, Business Plan 2002/03-2006/07

Mode	Actions	Project	Costs	Timetable	Effectiveness	Source
	1.c Completion of the Tendered Services Review and work with bus, tram, voluntary and community transport operators to develop and implement a sustainable core network					
	1.d other measures funded by the PTA/Executive's Revenue and Capital Expenditure Programme (see Annex 7 and Para 5.26-28)	1.e.a Charter Row (inline with Charter Row Phase I)	£1,250,000	2001/02-2005/2006		Sheffield Northern Inner Relief Road, SCC, August 2002
	1.e Bus Stops/Facilities	1.e.b Fitzwilliam Street (in line with Charter Row Phase I)	£1,250,000	2001/02-2005/2006		
		1.e.c Eyre Street	£1,250,000	2001/02-2005/2006		
		1.e.d Commercial Street		2001/02-2005/2006		
		1.e.e Waingate		2001/02-2005/2006		
		1.e.f Fitzalan Square		2001/02-2005/2006		
		1.e.f Castlegate		2001/02-2005/2006		
	1.f Shelters	1.f Bus Shelters Countywide - new shelters and replacements for life expired	£230,000	2002/03 - 2006/07		SYPTE, Business Plan 2002/03-2006/07
	1.g Interchange information Improvements	1.g Completion of installation of on-screen departure system at all sites	£40,000	2002/03 - 2006/07		SYPTE, Business Plan 2002/03-2006/07

Mode	Actions	Project	Costs	Timetable	Effectiveness	Source
	1.h Real Time Information - Sheffield Quest	1.h.a Modifications to operational system (including traffic signal priorities)	£40,000	2002/03 - 2006/07		SYPTE, Business Plan 2002/03-2006/07
		1.h.b Joint South and West Yorkshire project to provide real time infrastructure and equipment	Secured funding at a level of £2.5 million	From 2003		LTP Annual Progress 2002/03
Rail	1 Improve safe walk and cycle links between the rail station, bus station and tram network	1 Sheffield Station Master Plan		2001/02-2005/2006	Supported Heavy Rail Service - Annual net cost per passenger journey £4.37 in 01/02 instead of a target of £4.17	LTP 2001/02 - 2005/06
	2 Sheffield Midland RPP	2 Preliminary work on station facilities and forecourt modelling	£850,000	2002/03 - 2006/07	Supported Heavy Rail Services - Passenger journey pa 4.3 million in 01/02 same as target	SYPTE, Business Plan 2002/03-2006/07
Tram	1 Feasibility into extending Supertram up to University/Hospitals area	1 Evaluation of major extension programme	£ 25,000.00	2002/03 - 2006/07	Supported Light Rail Services - Passenger journey 11.4m in 01/02 instead of 11.2m	SYPTE, Business Plan 2002/03-2006/07
	2 Supertram Tramstop - Park Grange Croft	2 Completion of new tram stop providing Supertram access in a busy, well populate area	£5,000	2002/03 - 2006/07	Supported Light Rail Services - Punctuality 97.8% in 01/02 instead of target 98$	SYPTE, Business Plan 2002/03-2006/07

Mode	Actions	Project	Costs	Timetable	Effectiveness	Source
	3 Sheffield Rail Station Tram Stop	3 Revisions to a new tram stop linking to the rail platforms	£5,000	2002/03 - 2006/07	Supported Light Rail Services - Reliability 100% in 01/02 same as target	SYPTE, Business Plan 2002/03-2006/07
	4 Sheffield Station Bridge Extension	4 Extension of bridge from rail platforms to Supertram with the aim of providing a far better integration	£1,715,803	2002/03 - 2006/07	Supported Light Rail Services - Satisfaction target of 75% by 05/06	SYPTE, Business Plan 2002/03-2006/07
					in 2002, 22% of Supertram passengers previously used the private car for the trip as either driver or passenger	LTP Annual Progress 2002/03
Car Parks	8 Secured car parks	8 Achieve that all Supertram park and ride sites have secured car park status				

Appendix 4: Transport Options Not Recommended in the Draft Plan

A large number of options were considered during the development of the action plan. Many, however, were removed during an initial screening exercise. Others, shown here, were considered in more detail during the development of the plan.

Priority	Option	Local support	NOx effect	Cost	Reason for excluding option from the action plan
0	Alternative drive trains (fuel cells, electric vehicles, etc.)	CCCAP	<1% by 2010, but significantly higher thereafter.	£millions	Alternative drive trains are not recommended here because they seem likely to make only a small impact on emissions of the overall vehicle fleet by 2010.
0	High occupancy vehicle (HOV) lanes		<1%?	£100,000 to £millions	We have not identified areas in Sheffield City Centre where there is either sufficient space for HOVs. Conclusions of SWYMMS suggest that demand for an HOV on the motorway may be too small to justify it.
0	Home zones	Some support in Tinsley and Brinsworth, East End Strategy Group		£10,000 to £millions, depending on size	We have not identified areas that would appear to benefit significantly in air quality terms from the development of home zones. There are, however, numerous other reasons why one might wish to develop home zones.
0	Traffic calming		Could increase emissions, unless it leads to a significant reduction in traffic	£10,000 to £1 million per sceme	Traffic calming can have both positive and negative effects on air quality, the former from reducing vehicles on targeted roads, the latter from the cycle of acceleration and braking as one passes over speed bumps. Tinsley already has a Traffic Calming Scheme.
0	Congestion and other similar traffic charging schemes	SWYMMS?	Could be substantial if charges were set at a high enough level.	The charge in London is set at £5/day, Could raise revenue for improvement of public transport.	Would not be implemented before 2005, and possibly 2011. Recommendation at this stage, before it has been possible to learn any lessons from the introduction of congestion charging in London from January 2003, would be premature. A national scheme, where charges are offset against fuel duty and the road fund licence may gain more support, as it targets car taxation much more closely on the areas where problems are worst.

Priority	Option	Local support	NOx effect	Cost	Reason for excluding option from the action plan
0	Road network redesign			£millions	Substantial works are under consideration in relation to South Yorkshire's regeneration programme (see, for example, the Sheffield City Centre Masterplan). It is premature to go beyond these plans.
0	Increased parking charges and reduction in number of car parking spaces.	Support may come if the standard of public transport provision continues to improve.	Dependent on the strength of any adopted measures	Strong variation amongst different parties, potentially some winners and some losers.	Rationalisation of the city centre parking arrangements are being undertaken in the City Centre, though this will not lead to a reduction in parking space. Some new housing developments in the city are designated as car free. Not recommended here, but may be reconsidered at a later date if adopted options do not deliver the necessary improvements.
0	Motorway tolls	SWYMMS?	Could be substantial (10%+?) if the toll was set at a high enough level.	Could raise revenue for improvement of public transport	May divert traffic away from the motorway to other roads, increasing local congestion and accidents. Will affect some sectors of the community harder than others. Would require a change in national policy.
0	Provision of alternative access to industrial and warehouse sites off the Bawtry Road	May be some support in Tinsley and Brinsworth, East End Strategy Group?	Perhaps significant if alternative access routes could be identified.	£millions	There seem to be problems with the vertical alignment of areas where additional links could be constructed.

Appendix 5: Review of Options and Impacts

Consideration was given to the following issues for all options considered:

- Cost
- Physical feasibility
- Technical feasibility
- NO_2 effectiveness

However, other impacts need to be considered in the assessment. Accordingly, a list was developed of impacts ***potentially*** linked to the options first identified, and then consideration was given to which of these were likely to be of any importance. It was concluded that some were of no real significance (e.g. effects on water quality) and that some would vary in the same way (e.g. fuel consumption and greenhouse gas emissions) and so could be combined into single categories to simplify the analysis. A summary is given in the following Table.

Table A5.1 – Possible impacts of air quality improvement options

Sector	Impact	Comment
Economy	Effects on local trade	Combine into category 'economic vitality
Economy	Local employment	Combine into category 'economic vitality
Economy	Employment	Combine into category 'economic vitality
Economy	Equity	Potentially important for a few options
Economy	Fuel consumption	Likely to vary in the same manner as greenhouse gas emissions, also has effects on economic vitality
Environment	Biodiversity	No effect
Environment	Land use planning	Important for a few options
Environment	Solid wastes	No effect
Environment	Water quality	No effect
Health	Accidents	Important for a few options
Health	Greenhouse gases	Important
Health	Noise (daytime)	Combined with Noise (night-time)
Health	Noise (night-time)	Combined with Noise (day time)
Health	Other local air pollutants	Important for PM emissions, but likely to behave in the same way as GHG emissions
Health	Physical fitness	Important for a few options
Society	Acceptability	Function of other impacts
Society	Historic/cultural environment	No effect
Society	Safety/security	Important for a few options
Society	Severance	Important for a few options
Society	Visual amenity	No effect
Transport	Access to transport	Combine into impact 'Attractiveness of city transport options, but note any major effects
Transport	Congestion	Important
Transport	Transport efficiency	Combine into impact 'Attractiveness of city transport options, but note any major effects
Transport	Transport integration	Combine into impact 'Attractiveness of city transport options, but note any major effects
Transport	Transport reliability	Combine into impact 'Attractiveness of city transport options, but note any major effects
Planning	Protection of open spaces	Covered under Environment/Land use planning

Based on this list, each of the options considered in assessment of the plan was evaluated against the following list of options:

- Greenhouse gas emissions and fuel use
- Noise
- Economic vitality
- Congestion
- Attractiveness of city transport systems
- Social inclusion
- Other impacts

The 'Other impacts' category is a catch-all group, intended to make sure that nothing important was omitted, whilst reducing the assessment to a level that was both manageable and relatively easy to understand.

Assessing the performance of each option against each impact is not easy in the absence of feasibility and other studies specific to Sheffield that have themselves undertaken quantitative and detailed impact analysis. In view of this it was concluded that the most appropriate method for scoring impacts would be to follow a simple scale going from -3 to +3:

-3	**Clear and important negative impact**
-2	**Negative impact probable, but may not be significant**
-1	**Negative impact possible, but unlikely to be significant**
0	**No impact**
+1	**Positive impact possible, but unlikely to be significant**
+2	**Positive impact probable, but may not be significant**
+3	**Clear and important positive impact**

Results are shown in Table A4.2. It is acknowledged that in some cases the results will be subject to significant variation in effect for options applied in different parts of the city. Also, some options will work far better in combination than alone. However, the table seems likely to provide reasonable guidance on options and their impacts.

The table provides a synthesis of cost-effectiveness in terms of NOx control and the priority rankings given in the main text. Cost effectiveness is assessed on a three point scale:

- H (high cost-effectiveness – options likely to give the largest reduction in emission per pound spent)
- M (medium cost-effectiveness)
- L (Low cost-effectiveness – options likely to give the smallest reduction in emission per pound spent)

Cost-effectiveness expressed in this way (essentially £/tonne NOx) does not of course account for the other benefits and disadvantages of the listed options.

Table A5.2 – Qualitative evaluation of the impacts of options for air quality improvement. Shading divides the table by package.

Option	GHG and local pollutant emissions, fuel use	Noise	Economic vitality	Congestion	Attractiveness of city transport systems	Social inclusion	Other impacts	Cost- effectiveness	Priority
Proposed actions									
1a: Advancing the QBC programme	2	1	2	2	3	2		M	3
1/b: Expand park and ride	3	-1/+1	2	3	2	1	Land use	M	3
1/c: Strict enforcement of public transport priority	1	1	2	2	3	2		H	3
1/d: Effective linkage of public transport in city centre	1	1	2	2	3	2		M	3
2/a: Further pedestrianisation and cycle routes in city centre	1	-1/+2	2	2	1	2	Access restrictions	L/M	2
3/a: Alter delivery times to city centre businesses	2	-2	-1/+2	2	0	0		M	2
3/b: Improve control and co-ordination of road works	2	2	3	3	2	0		H	3
3/c: Assess further potential for traffic control measures	2	2	3	3	2	0		M	3
4/a: Set minimum emission standards for Council (etc.) vehicles	3	2	0	0	0	1	Restricting tenderers for Council work?	M	3
4/b: Set minimum emission standards for vehicles routinely accessing AAZs	3	2	-1/0	0	0/+1	-1/+2	Affordability for all operators?	M	3
5/a: Reduce speeds on the M1	3	3	-1/0	-1	0	2		H	3
5/b: Increase use of variable message signing	2	2	1	3	1	2		H	3
5/c: Use new signing to move traffic from Bawtry and Sheffield Roads	2	3	0	0	0	2	Reduced potential for accidents in M1 AAZ?	M	3
5/d: Develop action plan with Tinsley and Brinsworth HGV operators	1	3	2	0	0	2		M	3
6/a: Encourage industry to adopt EMS/EMAS	2	2	2	0	0	0		H	2
7/a: Implement green procurement in public sector	3	1	2	0	0	1		H	3
7/b: Increase use of Sheffield's existing district heating systems	3	0	2	0	0	1		H	3

Option	GHG and local pollutant emissions, fuel use	Noise	Economic vitality	Congestion	Attractiveness of city transport systems	Social inclusion	Other impacts	Cost- effectiveness	Priority
7/c: Promote adoption of travel plans by all significant employers	2	1	1	2	2	2		M	3
7/d: Set up Environment Coordination Office (Note: would have knock on impacts through action linked to the planning system)	3	2	3	2	2	2		M	3
7/e: Revise/adopt supplementary planning guidance on air quality	2	2	0	2	2	1		H	2
Rejected actions									
Alternative drive trains	3	2	0	0	1	0		L	0
High occupancy vehicle lanes	2	1	0	2	1	0		L	0
Home zones	1	3	0	0	0	3	Perception of a safer env'ment	L	0
Traffic calming	-2	-2	0	-2/+2	0	0		-	0
Congestion charging[21]	3	2	?	3	2	-3		?	0
Motorway tolls	-1	-2/+2	-1	-2/+3	0	-3	Increased traffic on local roads	M	0
Car park charge rises	3	2	-3	3	3	-3		M	0
Reduced number of parking spaces in city centre	3	2	-3	3	3	0		M	0
Provision of alternative access to sites off Bawtry Road	2	3	0	0	0	2		L	0

[21] It would be prudent to wait to gauge the success of the London congestion charging scheme before completing all cells in this row of the table.

Appendix 6:

Economic Review of the Sheffield/Rotherham Draft Air Quality Action Plan

Final, January 24, 2003

Note:
The draft of the action plan on which this economic assessment is based has been updated, partly because of recommendations made here. As a result there is some minor inconsistency in the referencing of packages of air quality measures. To ease comparison of the report and the plan, some additional notes have been added to Tables 4.1 and 4.2 below.

One of the major differences between the earlier draft plan and the one presented here was that the earlier document was produced jointly by Sheffield and Rotherham, reflecting the close liaison between the two Councils through the M1CCAP. However, at this stage, separate plans are needed for Sheffield and Rotherham in order that Councillors, DEFRA and other interested parties fully understand the implications for each Council.

So, although the plan on which this assessment is based has been refined, the conclusions presented here remain valid.

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Executive Summary

Introduction

In early December 2002, Sheffield City Council and Rotherham Metropolitan Borough Council released the first draft of the document 'Air Quality Planning in Sheffield and Rotherham'. To ensure that the actions proposed in the plan did not conflict with wider economic development policy – or, if they did, that the implications of any such conflict were properly understood – Sheffield City Council commissioned consultants to undertake a review of the plan from the perspective of the wider development framework. This report sets out the findings of that review. It gives an overview of the draft air quality plan, an overview of the regional development framework and an assessment of the implications of the plan when considered within the context of that framework.

The Wider Economic Development Framework

Integrated economic and transport development policy for the Yorkshire and Humber region is formulated and implemented in accordance with national policy through a hierarchy of agencies, strategies and plans. This section provides a brief overview of these agencies and documents to establish the context against which the potential economic impacts of the Air Quality Action Plan are assessed.

The Regional Economic Development Framework

The vision reflected in the Regional Economic Strategy (RES) aims to improve the region's economic performance faster than its European competitors. The 2002 Spending Review places the RES at the heart of activities to meet the government's growth targets across the UK. The Regional Action Plan, together with its sub-regional counterparts, sets out the actions by which the aims of the RES are to be achieved. Regional Planning Guidance (RPG) sets out a regional framework for local authority development and transport plans to 2016, and provides the longer-term framework for the RES and Action Plans. It incorporates the Regional Transport Strategy (RTS), thereby providing a regional context for Local Transport Plans (LTP). The Strategic Transport Priorities are those considered to be of most importance in achieving the economic regeneration of the region and in implementing the RES. The central objective of the South and West Yorkshire Multi-Modal Study (SWYMMS) is to reduce congestion on the motorways, seeking solutions from all transport modes.

European Structural Funds

The Objective 1 programme was launched in July 2000, funds must be committed by end 2006 and spent by end 2008. The Single Programme Document (SPD) describes South Yorkshire's economic problems, what needs to be done, the types of activity supported and how these can contribute to economic regeneration. It is linked closely to the RES.

Investment of combined funds of £1.8 billion is projected to create 35,000 jobs and increase GDP by a total of 4% in the period to 2006, thereby laying the foundations for longer term economic growth. The focus of investments is on: *Business and Enterprise* (new and high technology business sectors); *Development and Infrastructure* (strategic sites and urban centres; removing development barriers caused by poor transport links); and *People, Communities and Skills* (building a world leading learning region and creating opportunities for targeted communities). Economic regeneration is based on cluster developments targeting advanced manufacturing and metals, bioscience, and creative and digital industries; environmental and energy technologies; and business, professional and financial services. Development is focused on three Strategic Economic Zones (SEZs), plus Sheffield City Centre and the Rotherham, Doncaster and Barnsley town centres. Integrated Development Plans (IDPs) have been prepared for each of these areas, giving an integrated context for their longer term strategic planning and development.

The Sub-Regional (South Yorkshire) Economic Development Framework

Relevant documents are the South Yorkshire Action Plan and the Local Transport Plan (LTP) (including the South Yorkshire Bus Strategy). The Action Plan has six core themes: a radical restructuring of the economic base; unlocking the potential of all communities; enhancing businesses, stimulating new activity and removing barriers to change; achieving a step change in education, training and skills; developing the strategic transport links needed by an internationally competitive region; creating sustainable environments that meet the expectations of a modern, high value economy and providing a distinctive quality of life. Key elements include implementing the cluster development plans and investment in the three strategic economic zones and the four urban centres. The creation of distinctive business investment districts is foreseen in the IDPs. The LTP sets out a long-term strategy for the development of an integrated transport system in South Yorkshire. Important elements of the Bus Strategy relate to quality bus corridors, bus priority measures and park and ride schemes:

The Local Economic Development Framework

The importance of the City Centre as an economic driver for the sub-region is recognised by Objective 1 with a total of £35m set aside to assist in the creation of a strong and sustainable economy. The Unitary Development Plan is the statutory basis for the future development of the city; it recognises that environmental quality, economic development and transport policy are all inextricably linked. The City Masterplan focuses on four strategic objectives: building a new high technology based economy in the city centre; creating a vibrant city; improving accessibility; and celebrating the public realm. A well-functioning city, with good infrastructure and a high quality environment, is recognised in the City Council Corporate Plan as being essential for the city's future success. It strongly supports the strategies set out in the Masterplan, the City Strategy and Objective 1. Its anti-car image of the past is replaced by an approach that seeks to improve choices for all road users. The Sheffield

City Strategy brings together Sheffield's strategic citywide plans, and relates strongly to national, regional and sub-regional plans. A key aim is to attract and develop identified industrial 'clusters' to drive the city's transformation.

The M1 Corridor SEZ has the potential to develop as a Technology Corridor, by attracting high technology based firms and establishing a high profile for firms in key growth sectors. The M1 AAZ lies within the central section of the zone, straddling the M1 between Junctions 33 and 34. The Babtie Report concluded that there was potential for up to 20,000 new jobs within the SEZ, but that current transport systems would not cope without improvement. Managing traffic differently and improving bus services would not be enough to carry the traffic generated under Objective 1; major investment was needed in public transport systems, traffic management and green travel plans. In addition, further highway investment was unavoidable, particularly in the vicinity of Junctions 33 and 34. Even with this assessment, it was concluded that employment in the Lower Don Valley would be constrained unless there was a radical shift to public transport. It also concluded that although improvements in vehicle and fuel technology would offset the effects of additional traffic, the problem areas of Brinsworth and Tinsley would remain, and that measures would need to be agreed with the Highways Agency to reduce pollution levels. Without this, regeneration would be made more difficult if developers had to demonstrate that they were not worsening air quality.

In its Interim Report, the Core Cities Working Group on Cities, Regions and Competitiveness found that creating internationally competitive regional cities would add significantly to the UK's economic growth potential. It identified as a key goal a reduction in congestion pressures on London and its surrounding regions. Given the regional growth potential of the Sheffield/Rotherham M1 corridor it would be unfortunate if environmental and congestion pressures there were to result in development being constrained at a time when London's economy is overheating and congestion pressures are intense. An alternative approach to motorway planning might therefore be to assess new proposals relative to their capacity to achieve nationwide rather than solely local strategic goals. Potential improvements in the M1 Sheffield/Rotherham corridor would then be assessed in terms of their significance not only for local/regional economic strategies but also for the incremental benefit such measures would bring in relieving congestion pressures in the London region. The scope for identifying innovative development proposals and investment finance might be correspondingly widened.

None of the actions proposed in the AQAP conflicts with any of the policy objectives or measures identified in these various programmes. Those related to public transport tend to reinforce these aims. One, reducing speed limits on the M1, will need to be revisited in the future if proposals for widening the M1 made in SWYMMS are implemented.

Assessment of the Air Quality Action Plan

Sheffield City Centre

The causes of excess NOx concentrations in the city centre are attributable to traffic and area sources. The draft AQAP proposes a mix of seventeen transport and non-transport related measures. These are listed in Table 4.1, which also details economic effects. These are summarised below.

- All measures relating to *public transport improvements* – quality bus corridors, park and ride schemes, strict enforcement of priority schemes, effective linkage of priority schemes – reinforce or extend existing policies and strategies towards public transport. None has any significant adverse impact on economic development policy.

- The practicality of *expanding the pedestrian* area in the City Centre beyond existing proposals depends on the scope for and the time frame within which such expansion could be implemented. The potential economic impact of such measures would depend on how businesses are affected and on the availability or otherwise of alternative routes to accommodate diverted traffic flows.

- Of the three *traffic control* measures – altering delivery times, improving co-ordination of road works, exploring the potential for further traffic control measures – only the proposal to alter delivery times has potentially adverse economic impact, and then only if restrictions are to be mandatory rather than voluntary. A voluntary scheme, backed by an awareness raising campaign, might be the best approach.

- The two '*cleaner vehicle'* measures alone have as their sole objective air pollution control. Setting emission standards for council vehicles and those of its contractors would show a commitment to attaining the vision to which it and its partners aspires. This is not expected to have any regional economic impact. Direct financial impact on contractors would be minimised by giving advance notice of the policy, prior to it becoming a condition of contract. Setting vehicle standards for buses, taxis, delivery vehicles, etc. will have no regional economic impact but may have cost implications for operating companies. This will depend on: (1) whether or not vehicle standards are to be made mandatory and (2) the time frame over which the policy is implemented. A mandatory scheme, announced in advance, might be the preferred option.

- No adverse economic consequences are associated with the two *industry* measures.

- No adverse regional economic consequences are associated with the five *efficiency and planning* measures. Implementing a 'green' procurement policy across the public sector will require resources to assess the environmental credentials of potential contractors.

Expanding the use of Sheffield's existing district heating system raises issues of 'ways and means' and competition policy.

The M1 Corridor

The causes of excess NOx concentrations in the M1 AAZ/AQMA are largely attributable to traffic, with the motorway being the principal contributor. The AQAP proposes four traffic-related measures. These are listed in Table 4.2, which also details economic effects. These are summarised below.

- The principal measure is to *slow traffic on the M1 to a speed optimal for NOx emissions*. The Highways Agency argues that this will extend journey times during non-congested periods and penalise motorists. Any such costs incurred by motorists must be measured against the health impacts on people living in the air quality zones. Within the context the polluter-pays principle, the proposed measure seems benign. The Babtie Report found that unless measures are agreed with the Highways Agency, regeneration of the area could suffer.

- The other three measures – the use of variable message signing, changes to the road system around Tinsley and Brinsworth, and the development of an action plan to reduce traffic impacts on the community – are not expected to have adverse economic consequences (although costs would be incurred in implementing the first two measures and possibly the third, depending on the outcome of the action plan).

Concluding Comments

South Yorkshire is undergoing a period of unprecedented socioeconomic change, moving from its heavy industrial and coal mining past and aspiring to a future based on clusters of highly skilled, knowledge-based industries, attracted by its physical characteristics and competitive advantages. Funds mobilised through Objective One are to play a major role in facilitating this change. A high quality, clean environment, together with a well functioning, reliable and efficient transport system, are important prerequisites and key selling points in the achievement of this goal.

Sheffield is recognised as a critical motor for growth and improved prosperity in the sub-region. It has a comprehensive, integrated strategy setting out its vision of becoming 'the core city of a balanced, diverse and sustainable high growth economy in South Yorkshire' that is entirely consistent with those for the wider region and sub-regions. The strategy draws on funds available through Objective 1 to stimulate economic development in the five 'cluster' areas seen as crucial to the region's future. Implementation of a small number of priority projects is expected to improve significantly the city's transport systems in a manner consistent with the Local Transport Plan and the Strategic Transport Priorities.

Sheffield is one of eight English Core Cities that came together in the 1990s to develop the distinctive roles they are expected to play in future national and regional life in helping to achieve Britain's goals of sustainable growth and greater social equity. A key factor in attracting high-value, knowledge-based businesses is environmental sustainability, and a reputation for environmental excellence and responsibility. A high-quality environment is vital to earning a reputation for being a premier business and lifestyle location, and a high quality environment has a powerful capacity to generate jobs and tackle social inequality. The UDP strongly emphasises the importance of environmental quality in sustaining a high value economy, and a key aim of Objective 1 is to strengthen competitive advantage through improvements in, and protection of, environmental quality.

As the principal cause of air quality problems is traffic, their solution depends heavily on developing measures that provide appropriate transport choices and traffic management. Thus, although air pollution is rightly seen as a problem, it is itself the effect of the more deep-seated problem of high traffic flows and congestion. One solution would be to bring in measures that constrain the use of motor vehicles – such as user charges or road closures, but it is noted that although options such as these were addressed during development of the AQAP they were rejected as being too prescriptive and economically inefficient. Instead, options have been identified that complement wider economic and transport priorities: those for widening transport choice were seen as preferable to those that narrowed it, an approach consistent with the philosophy of enabling opportunity rather than restricting choice. That is why many of the measures set out in the AQAP address the problem of air pollution indirectly, by focusing on transport systems and traffic management, and why only two aim specifically to reduce emissions from motor vehicles – those listed under 'cleaner vehicles'.

The review presented in Chapter 3 indicates that economic and transport policies are consistent at regional, sub-regional and local levels. The pollution control measures proposed in the AQAP also appear to be consistent with this framework, both in terms of their focus on achieving environmental excellence and on improving public transport quality and choice, both prerequisites for sustainable economic policy. The public transport-related measures basically call for a step-change in the urgency and priority given to the implementation of existing public transport proposals and an expansion of their scope.

The scale of the changes occurring in Sheffield and along the M1 corridor attests to the difficulty in predicting future air quality under existing development proposals. Much of this change – redeveloping the city centre, controlling vehicle access, facilitating knowledge-based industries – will have a beneficial impact on air quality. The inexorable rise in vehicle usage is likely to remain a key problem, both in the city and on the motorway. Congestion on the M1 between Junctions 33 and 34 is potentially a major constraint on economic activity and job creation in the M1 corridor, and traffic numbers are projected to continue to increase over the next decade. Management of traffic and a shift to alternative forms of transport are therefore fundamental to the long-term economic and environmental sustainability of the area.

The measures are not confined to transport: those proposed for the city centre also focus on the area sources – mainly domestic and commercial combustion – that continue to make a significant contribution to air pollution. Many are 'soft' insofar as they are not legally enforceable – their success will depend on effective promotion of their benefits. Broad measures, such as using energy efficiently, have an important role to play in improving both environmental conditions and economic competitiveness. The vision of Sheffield forging a step-change in its social and economic structure, how this can be achieved and what businesses and individuals can do to help achieve this goal, must be promoted strongly through public awareness and other campaigns if these opportunities are to taken up.

Problems are different for the M1 AAP/AQMA, where motorway users having no business to conduct in Sheffield or Rotherham cause much of the problem. The polluter-pays-principle recognises that those who create pollution should compensate society for the damage it causes. The Babtie Report found that a package of measures has to be agreed with the Highways Authority if the prospects for economic regeneration are not to be diminished. The SWYMMS study recommended widening the motorway to ease congestion, but only on the understanding that area charging or tolls would also be introduced to keep traffic flows at levels projected in the absence of widening. The AQAP makes the very reasonable proposal that the maximum speed limit on the motorway along this corridor should be restricted to a level at which NOx emissions are optimised.

In conclusion, the AQAP is considered to be entirely consistent with regional, sub-regional and local economic and transport strategies, in many cases urging greater urgency in the identification and provision of new and improved public transport services. This is seen as a step-change in the ambition for what can be achieved. Streamlined bus corridors and the strategic location of park and ride facilities at points of modal change, coupled with the balanced use of local government's discretionary powers to restrict traffic, are likely to be crucial to achieving this wider ambition.

It is felt that the Environmental Protection Service should have a higher profile in areas of policy formulation and strategy development that have a significant environmental dimension. The requirements of air quality legislation, for example, should feature more proactively in the planning process itself rather than being left until circumstances have either changed or deliberations on strategy development are already well advanced.

List of Abbreviations

AAZ Air Action Zone

AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
CCCAP	City Centre Clean Air Partnership
CfIT	Commission for Integrated Transport
DfT	Department for Transport
GDP	Gross Domestic Product
IDP	Integrated Development Plan
LTP	Local Transport Plan
M1CCAP	M1 Corridor Clean Air Partnership
NOx	Nitrogen oxides
RES	Regional Economic Strategy
RPG	Regional Planning Guide
RTS	Regional Transport Strategy
SEZ	Strategic Economic Zone
SPD	Single Programme Document
SWYMMS	South and West Yorkshire Multi-Modal Study
UDP	Unitary Development Plan
URC	Urban Regeneration Company

Table of Contents

1. Introduction

In early December 2002, Sheffield City Council and Rotherham Metropolitan Borough Council released the first draft of the document 'Air Quality Planning in Sheffield and Rotherham'. Wanting to ensure that the actions proposed in the plan did not conflict with wider economic development policy – or, if they did, that the implications of any such conflict were properly understood – Sheffield City Council commissioned consultants to undertake a review of the plan. The terms of reference for this work identify four tasks:

- Review the draft action plan from the perspective of the wider economic policy development framework within which it is to be implemented.

- Review the likely impacts of the draft action plan on non-air quality objectives.

- Review the reasonableness of the implementation cost estimates contained in the draft action plan.

- Ensure that the action plan is written in a manner that properly and clearly presents the results of the economic assessment.

This report constitutes the findings from Task 1. The assessment has involved:

- Meetings with the air quality consultants, representatives from the Sheffield and Rotherham councils, Yorkshire Forward and Objective 1,

- A review of recent documents relating to regional and local economic and transport development policies,

- Attendance at meetings held on December 9,2002, with the M1 Corridor Clean Air Partnership (M1CCAP) and the City Centre Clean Air Partnership (CCCAP) to discuss the draft document.

Details of individuals met and documents reviewed can be found in Annexes 1 and 2.

The report is divided into four sections in addition to this introduction:

Section 2: The Draft Air Quality Action Plan. This gives an overview of the action plan and the measures proposed in it to achieve air quality objectives.

Section 3: The Wider Economic Development Framework. This gives an overview of the regional economic and transport development framework and identifies policies that may be affected by or have some bearing on the proposed air quality controls.

Section 4: Assessment of the Air Quality Action Plan. This contains the results of the assessment and is divided into two parts. The first part examines each proposed air quality measure from the perspective of the economic development programme. The second sets out broad observations arising from the assessment.

2. The Draft Air Quality Action Plan

Air quality standards for the protection of human health are established under UK and EU legislation. The scope of an air quality action plan is defined in terms of the pollutants that are present at levels in excess of national standards and hence give rise to the declaration of Air Action Zones or Air Quality Management Areas (AQMAs). In the Sheffield and Rotherham cases the only pollutant present at such levels is nitrogen dioxide, NO_2. Under both UK and EU legislation the standard for NO_2 is 40µg.m^{-3} measured as an annual mean concentration[22]. This is set as a provisional target to be met by December 31st 2005 under the UK legislation but must be met by 2010 under EU legislation.

Two Air Action Zones (AAZs[23]) were declared in Sheffield on 5th December 2001 on the grounds that nitrogen dioxide levels in these areas were unlikely to meet the annual objective by 2005. Both follow recognisable physical features. One is located in the city centre and the other is along the M1. The City Centre AAZ was extended beyond the area of exceedence to cover the City Centre Masterplan area. It has an area of 3.86 km^2, a residential population of 4,000, a working population of 100,000, and contains five schools. The M1 AAZ has an area of 3.78 km^2, a residential population of 3,000, a working population of 2,180 and contains 3 schools. An AQMA was declared in Rotherham on 1st January 2002. The zone is defined by a combination of physical features that lead to it being significantly larger than the area over which targets are forecast to be exceeded. It has an area of 5.87 km^2, a residential population of 11,400, a working population of 6,865, and contains five schools and one residential care home. The Sheffield M1 AAZ and the Rotherham AQMA are contiguous and are treated as a single entity in the air quality analysis. Maps of the zones are given in Figure 1 and Figure 2 of the main report.

The dominant sources of NOx in Sheffield city centre are traffic and area sources – commercial and domestic combustion – in similar proportions (roughly 50% each). Industrial sources are not significant. Traffic is the main source of NOx in the Sheffield motorway zone (70-80%), with the motorway contributing some 60% of the total at a 100m distance from it. Heavy vehicles contribute about 70% of total vehicle emissions. Industrial and area sources each contribute about 10% of the total. Contributions from traffic and the percentage attributable to motorway traffic are found to be lower in the Rotherham motorway zone, although industrial and area sources are much the same as for Sheffield; a significant percentage is, however, attributed to unspecified 'background' contributions.

NOx concentrations in the two zones must be reduced by about 30% in order to conform to the standards. Note that future NOx concentrations have been predicted on the basis of information available for existing emissions sources

[22] µg.m^{-3} refers to micrograms, or millionths of a gram, per cubic metre of air.
[23] Sheffield adopted the term 'Air Action Zone', where others tend to use the phrase 'Air Quality Management Area' (AQMA).

– the potential impacts of projected changes in economic activity and transport (including road traffic) have not been factored in on account of uncertainty surrounding both the developments themselves and their emissions.

Four possible strategy approaches were considered in the consultation process:

- Strategy 1: Do nothing beyond the implementation of existing plans - i.e., do not introduce further measures specifically targeted at air quality. This was rejected on the grounds that existing measures are unlikely to achieve the necessary improvements, although it was recognised that the air quality benefits arising from many of the existing actions will be significant.

- Strategy 2: Reduce traffic using a few measures implemented to an extreme degree. Such measures – including banning certain vehicles, congestion charging and tolls, road closures, removing parking spaces and increasing parking charges – were rejected on account of its potential to deter inward investment, its wider transport related impacts and its exclusion of cost-effective measures. It was nevertheless felt worthy of future consideration if other strategies fail to achieve the necessary air quality improvements.

- Strategy 3: Develop a flexible strategy, still restricted to traffic, but using a broader range of options to maintain access to transport services. This widens the range of measures covered in Strategy 2 to include the promotion of public transport, low-pollution vehicles, energy efficiency, ‘green’ procurement plans and travel plans. Concern was expressed about a lack of focus and the exclusion of potentially beneficial measures applicable to non-transport related sectors.

- Strategy 4: A yet more flexible strategy, widening the scope of Strategy 3 to include measures applicable to other sectors, potentially enabling targets to be met without the need for the kinds of unpopular and economically damaging measures contained in Strategy 2. Again, concern was raised about a lack of focus and the potential difficulty this creates for ensuring that targets are met and for attracting funding to some of the measures.

The consultation process agreed to develop a flexible strategy, recognising its potential benefits in terms of cost-effectiveness. Concern about a potential lack of focus is addressed by grouping air quality control measures into discrete packages and by allocating specific responsibility for the implementation of each package. Six packages (a total of 17 measures) relate to the Sheffield City Centre AAZ and 1 package (a total of 4 measures) to the M1 AAZ/AQMA.

Packages of measures for air quality improvement in Sheffield City Centre are:

- Improving public transport
- Transport infrastructure
- Traffic control
- Cleaner vehicles
- Industry
- Efficiency measures in the domestic, industrial, commercial and public sectors and Planning

Details of these packages and the measures contained in them are summarised in Tables 2.1 and 2.2.

Table 2.1 – Packages and measures proposed for air quality improvements in Sheffield City Centre

PACKAGE 1: IMPROVING PUBLIC TRANSPORT		
Measure	1	Advancing the quality bus corridor programme, to develop more routes and bring schemes into operation more quickly, increase periods when bus priority schemes are operational
	2	Major expansion of park and ride provision
	3	Strict enforcement of priority schemes, such as bus lanes
	4	Ensure effective linkage of public transport systems in Sheffield City Centre
PACKAGE 2: TRANSPORT INFRASTRUCTURE		
Measure	5	Further pedestrianisation in Sheffield City Centre
PACKAGE 3: TRAFFIC CONTROL		
Measure	6	Alter delivery times to Sheffield City Centre and other congested locations to avoid the most congested periods
	7	Improve co-ordination of road works and signing around them (possibly linked to variable message signing)
	8	Continue to explore the potential for additional traffic control measures that will benefit air quality
PACKAGE 4: CLEANER VEHICLES		
Measure	9	Set emission standards for vehicles used by Sheffield City Council and by service providers contracted by the Council
	10	Set vehicle standards for buses, taxis, delivery vehicles, refuse carts, etc operating in the Air Action Zones
PACKAGE 5: INDUSTRY		
Measure	11	Present environmental information on the performance of specific industrial plant in a more accessible form in the Public Registers
	12	Encourage operators to adopt accredited environmental management and auditing systems
PACKAGE 6: EFFICIENCY MEASURES IN THE DOMESTIC, INDUSTRIAL, COMMERCIAL AND PUBLIC SECTORS AND PLANNING		
Measure	13	Implement green procurement policy across the public sector, relating to the purchase of materials, vehicles, building design, etc.
	14	Increase use of Sheffield's existing district heating system to displace small boilers that release emissions at low level
	15	Promote the adoption of travel plans by all significant employers in the area, and others with environmental responsibility
	16	Set up an Environmental Co-ordination Office (ECO) to promote activities that lead to greater environmental efficiency in Sheffield
	17	Identify plans where there has been inadequate assessment of air quality effects

Table 2.2 – Measures proposed for air quality improvements in the M1 AAZ/AQMA

PACKAGE 1: OPTIONS SPECIFIC TO REDUCING EMISSIONS FROM THE M1 AND TRAFFIC USING THE MOTORWAY		
Measure	1	Slow traffic on the M1 to a speed optimal for NOx emissions.
	2	Use Variable Message Signing to direct traffic more efficiently
	3	Changes to the road system around Tinsley and Brinsworth
	4	Sheffield City Council and HGV operators that require access to Tinsley to jointly develop an action plan for reducing the impacts of that traffic on the community.

3. The Wider Economic Development Framework

Integrated economic and transport development policy for the Yorkshire and Humber region is formulated and implemented in accordance with national policy through a hierarchy of agencies, strategies and plans. This section provides a brief overview of these agencies and documents to establish the context against which the potential economic impacts of the Air Quality Action Plan are assessed. Table 3.1 summarises this hierarchy. It is not exhaustive – the agencies and documents referred to are those of specific relevance to this study. The regional development framework is illustrated in Figure 3.1.

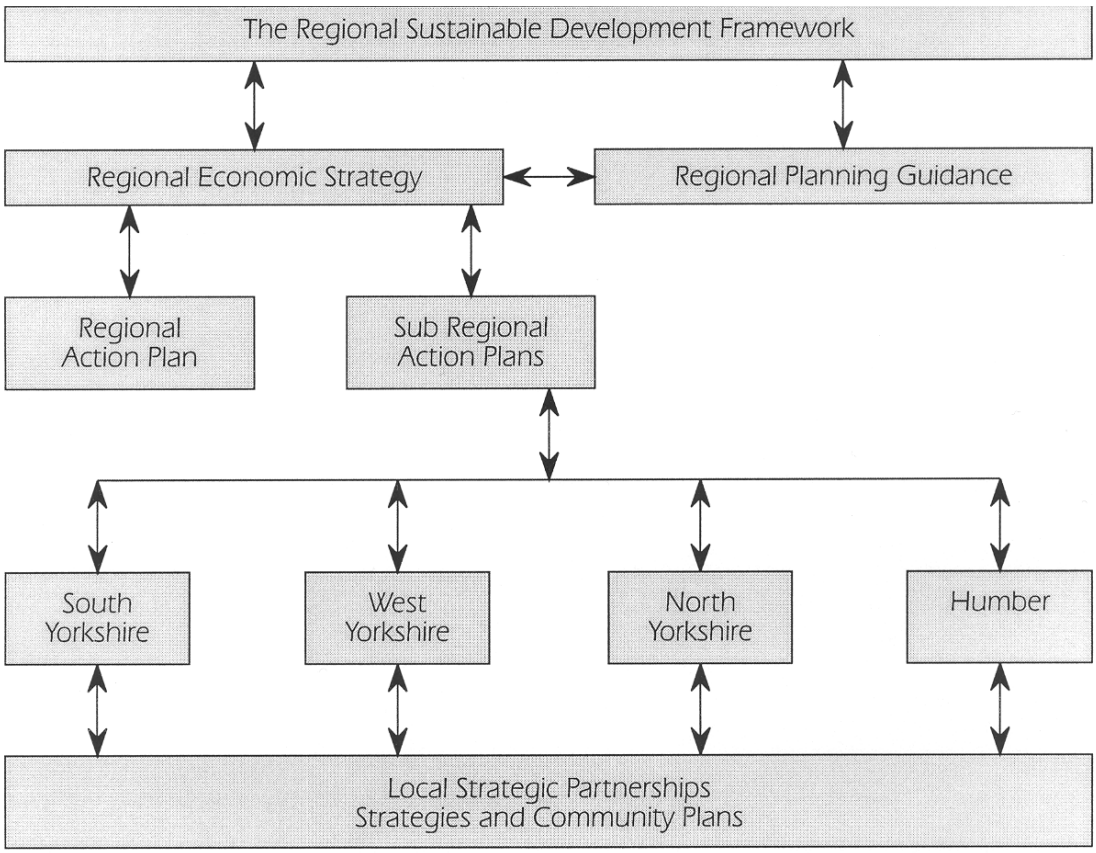

Figure 3.1 - The Regional Economic Development Framework

Table 3.1 – Hierarchy of wider economic development planning agencies, policies and documents

NATIONAL LEVEL	
Agency	**Policy and Strategy Documents**
Office of the Deputy Prime Minister	Public Subsidy for the Bus Industry, CfIT, December 2002
Highways Agency	Congestion Charging, CfIT, December 2002
Commission for Integrated Transport	Paying for Road Use, CfIT, February 2002
Working Group of Government Departments, RDAs, and English Core Cities	South Yorkshire: Objective 1 – Control of Development Memorandum of Understanding Between South Yorkshire Local authorities and Highways Agency
REGIONAL LEVEL	
Yorkshire and Humber Assembly	Regional Planning Guidance for Yorkshire and the Humber, Government Office for Yorkshire and the Humber, October 2001.
Government Office for Yorkshire and the Humber	Regional Action Plan, November 2001
Yorkshire Forward	South and West Yorkshire Multi-Modal Study, September 2002
	Draft Yorkshire and Humber Regional Economic Strategy (RES), Consultation document, November 2002.
	Yorkshire and Humber Strategic Transport Priorities, Yorkshire Forward, undated.
SUB-REGIONAL LEVEL	
The South Yorkshire Forum	Integrated Development Plan, M1 Corridor, Part B Delivery Plan, Draft, April 2001
Partnership of South Yorkshire Metropolitan Councils	Integrated Development Plan, M1 Corridor, Part A Strategy Final Report, May 2001
	South Yorkshire Single Programming Document, South Yorkshire Forum, 1999
South Yorkshire Public Transport Authority	South Yorkshire Local Transport Plan (LTP) 2001-2006, July 2000 plus 2001 and 2002 Annual Progress Reports
	South Yorkshire Bus Strategy (part of the LTP), September 2001
	South Yorkshire Action Plan, November 2001

Table 3.1 (continued)

DISTRICT LEVEL	
Sheffield City Council	Sheffield Unitary Development Plan, Sheffield City Council, March 1998
Sheffield First Partnership	Sheffield City Centre Master Plan, Sheffield One, February 2001
Sheffield One	Rotherham Urban Centre Integrated Development Plan, February 2001
	Sheffield City Centre Integrated Development Plan, May 2001
	Sheffield City Council Corporate Plan, 2002-2005, March 2002
	Sheffield City Master Plan: Transport Improvements, Faber Maunsell, May 2002
	Sheffield City Strategy 2002-5, Sheffield First Partnership, Draft July 2002
SUB-DISTRICT LEVEL	
Darnall Area Panel	Minutes of Meeting, 20th July 2000, Darnall Area Action Plan
East End Quality of Life Initiative	Health Impact Assessment of the Rotherham Sheffield Motorway Corridor Planning Study, January 2001

3.1 Regional Economic Development Framework

Yorkshire Forward, The Yorkshire and Humber Regional Development Agency, was created in April 1999 with the mission of revitalising the region's economy. The region is composed of four sub-regions: South Yorkshire, West Yorkshire, North Yorkshire and Humber. Regional strategy documents relevant to this study are the Regional Economic Strategy (RES), the Regional Action Plan, the Regional Planning Guidance (RPG), the Regional Transport Strategy (included in the RPG), Yorkshire and Humber Strategic Transport Priorities and, importantly, the Single Programme Documents and Integrated Development Plans associated with Implementation of (particularly) European Objective 1.

3.1.1 Regional Economic Strategy

The vision for Yorkshire and Humber – the creation of a world-class, prosperous region – is set out in the RES, published in early 2000. This aims to improve the region's economic performance faster than its European competitors and provides the blueprint for the spending priorities of a range of public agencies, including Yorkshire Forward. The RES is currently being reviewed, and a draft strategy was published in November 2002 for public consultation; Government approval is expected in early 2003. The 2002 Spending Review places regional economic strategies at the heart of activities to meet the government's targets for achieving sustainable economic growth across the UK. The strategy's objectives and its key priority actions for 2003 - 2006 are listed in Box 3.1.

3.1.2 Regional Action Plans

Recognition that the Strategy will only work if it is action-oriented is reflected in the Regional Action Plan, led by Yorkshire Forward and the Yorkshire and Humber Assembly, plus four sub-regional action plans led by sub-regional partnerships[24]. The South Yorkshire Action Plan is considered in Section 3.2.

[24] Revision of the Regional Action Plan will presumably occur following acceptance of the revised RES.

Box 3.1:Regional Economic Strategy Objectives and Key Priority Actions - 2003 – 2006

Strategy Objectives

(a) Grow the region's businesses, focusing on key clusters, to create a radical improvement in the competitiveness, productivity and value they add to the region's wealth.

(b) Achieve higher business birth and survival rates to create a radical improvement in the number of new, competitive businesses that last.

(c) Attract and retain more private and public investment by creating the right product for investors, and more effective marketing of the region.

(d) Radically improve the development and application of education, learning and skills, particularly high-quality vocational skills.

(e) Connect all of the region's communities to economic opportunity through targeted regeneration activity.

(f) Enhance and utilise the region's infrastructure of physical and environmental assets.

Key Priority Actions for 2003-2006

(a) Invest in five priority regional clusters of advanced engineering and metals, bioscience, chemicals, digital industries and food and drink, placing universities at the heart of economic development.

(b) Help a core of strong manufacturing companies to make step change improvements in innovation, productivity, and higher value products.

(c) Invest in enterprise and high quality public and private support services focussed on the needs of high growth businesses.

(d) Invest in Urban Regeneration Companies (URCs) to transform the city centres of Sheffield, Bradford and Hull.

(e) Ensure early action is taken on the region's seven strategic transport priorities to build a more efficient, integrated, less polluting and more accessible transport system.

Box 3.2: Summary Conclusions of SWYMMS

- Traffic is set to grow substantially over time. If nothing is done, the already poor levels of service on Yorkshire's motorways will become substantially worse.
- The travel reduction policies currently being applied by many local authorities may have some effect on traffic levels, especially on local roads, but cannot be relied upon to yield substantial reductions in traffic on the motorways.
- Improvements to public transport so substantial as to be both impractical and unaffordable would have little impact on motorway flows and congestion. Policies to transfer freight to rail would not reduce traffic on the motorways by much.
- The only effective way of reducing growth in traffic on the motorways, and thereby reducing congestion and the need for extra road capacity, is through area-wide road user charging applied to all roads.
- The introduction of an optimum area-wide road user charging system is recommended. The Government has indicated that this could not be before 2011. An optimum road user charging system would not remove all growth in traffic expected over the next decade. Thus, some widening of the motorways would be required if congestion is to be reduced to below today's levels.
- The motorways should not be widened beyond the extent required to accommodate the traffic flows that would arise from an optimum area-wide road user charging system. If area-wide road user charging is rejected, the widened motorways should be tolled to control traffic to about the levels which would occur without the widening.
- Prior to the introduction of either area-wide road user charging or motorway tolling no new capacity should be added to the motorways without ramp metering to control the use made of the widened roads.
- If motorway tolls and area-wide road user charging are rejected ramp metering should continue to be deployed. This will become less effective as time passes and traffic grows.
- Developments in the vicinity of the widened motorways that generate large volumes of car trips need to be controlled so that newly provided capacity is not eroded. A review of current controls on land-use development adjacent to the trunk road and motorway system should be undertaken. This should emphasise regeneration and urban renaissance of the towns of South and West Yorkshire and aim to minimise the location of developments generating large traffic flows close to trunk road junctions.

3.1.3 Regional Planning Guidance (RPG) for Yorkshire and the Humber

RPG provides a regional framework for the preparation of local authority development plans and local transport plans. It sets out a broad development framework for the region to 2016 and identifies priorities for, among others, the environment, transport, infrastructure and economic development. In order to integrate land-use and transport planning it incorporates a Regional Transport Strategy (RTS) that complements the land-use policies, provides a regional context for Local Transport Plans (LTP) and provides guidance on investment priorities for transport investments. It provides the longer-term framework for Yorkshire Forward's RES and Action Plans.

The agreed priorities in the RPG/RTS have been developed to address, among others, the following:

- Road congestion and the environment in urban areas
- Conflict between development and regeneration and road congestion and the environment in urban areas, particularly the lower Don Valley
- Road congestion on the M1 between Sheffield and Leeds
- Rail capacity and speed limitations, particularly between Sheffield and Leeds.

Strategic regional transport priorities that can only be delivered by national agencies (such as the Highways Authority) are addressed in Yorkshire Forward's Strategic Transport Priorities (see below) whereas the smaller, largely local, transport improvements needed to implement the RTS are addressed in LTPs. The South Yorkshire LTP is considered in Section 3.2.

3.1.4 Strategic Transport Priorities

Strategic transport priorities identified for the region are based on the investment priorities set out in the RTS, but also flow from work done by the Regional Assembly and Yorkshire Forward to identify priorities that will best assist the economic regeneration of the region and help implement the RES. There are seven strategic priorities. Those of direct significance to this assessment are:

- Leeds to Sheffield Corridor: rail and motorway improvements.
- Access to Strategic Economic Zones (see section 3.1.6): implement a package of public transport and highway improvements to support the three SEZs within the EU Objective 1 timescale, subject to the agreed outcomes of SWYMMS (see below).
- Strategic Access to Regional Centres: develop the South Yorkshire Supertram network with three extensions and investigate further options for park and ride facilities.

3.1.5 South and West Yorkshire Multi-Modal Study (SWYMMS)

The South and West Yorkshire Multi-Modal Study (SWYMMS) is one of several multi-modal studies being undertaken by the Department for Transport (DfT). Multi-modal studies examine problems of congestion on the strategic road network and seek solutions drawn from all modes of transport. The central objective of the study is to reduce congestion on the motorways and A1 in South and West Yorkshire. Conclusions are summarised in Box 3.2. Recommended actions relevant to this study for the period 2002-2006 are:

- Widen the M1 between Junctions 31 and 34 to generally dual four lanes, with improvements to Junction 33 and operate Tinsley Viaduct in its original dual three lanes mode (note, however, the important caveats concerning area charging and motorway tolls referred to in Box 3.2).

- Construct the Sheffield to Rotherham Link Road.

- Include ramp metering on the above sections of motorway.

- Review current controls on land-use development adjacent to the trunk road and motorway system (see Box 3.2).

3.1.6 European Structural Funds

European Structural Funds are a key resource. The region is benefiting from over £l billion of European funding up to 2006 through the Objective 1 Programme in South Yorkshire, the Objective 2 Programme in parts of the rest of the region and Objective 3 resources across the whole region. Brief details of the Objective 1 programme and relevant documents follow.

The Objective 1 programme is a partnership between the European Union, the UK Government, Yorkshire Forward and the South Yorkshire Forum. The programme was launched in July 2000, funds must be committed by the end of 2006 and spent by the end of 2008. The Single Programme Document sets out an analysis of South Yorkshire’s economic problems and what needs to be done. It identifies the broad types of activity that will be supported under Objective 1 funding and how these activities will contribute to the regeneration and fundamental restructuring of the economy of South Yorkshire. It is strongly linked to the Regional Economic Strategy.

The rationale for the Objective 1 programme stems from an analysis of the root causes of the steep and relentless decline of South Yorkshire's economy from 1979 to 1995. The twin drivers of economic prosperity, total earnings (a function of number of jobs and average earnings) and company profits (number of firms and their quality in terms of gross value added), have both been well below the UK average. Furthermore, the proportion of employment in 'emerging' and 'strong' sectors is well below the UK average (28% compared to a UK average of 78%).

A grant of £700 million from the European Union together with funds from the UK Government and private sector finance bring the total funds available under the Programme to £1.8 billion. Economic activity stimulated through the investment of these funds is expected to create 35,000 jobs and increase GDP by 4% over the period to 2006. Spending is expected to lay the foundations for further economic growth in the longer term.

The focus of investments on three broad fronts:

- *Business and Enterprise* (targeting new and high technology business sectors; modernising businesses). £203 million of structural funds are available to support existing business sectors and to bring in new investment. Reflecting a key objective of the RES, economic regeneration is based on cluster developments[25] that target the advanced manufacturing and metals, bioscience, and creative and digital industries; environmental and energy technologies; and business, professional and financial services. Initiatives to increase competitiveness of the food and tourism sectors are also being developed.

- *Development and Infrastructure* (funding for strategic sites and urban centres; removing barriers to growth due to poor transport links and poorly functioning financial markets). £176 million of structural funds are available to bring forward property and development sites to accommodate economic growth and to tackle transport bottlenecks that constrain economic development. Development support is targeted at three Strategic Economic Zones along the M1 corridor (between Junctions 33 and 37), the M18 corridor and in the Dearne Valley, at Sheffield City Centre and at the town centres of Rotherham, Doncaster and Barnsley. Solutions to identified transport bottlenecks include measures to improve traffic movement along the M1, extending the Supertram network, a new road link from Sheffield to Rotherham and improvements to the Sheffield-Barnsley-Leeds rail service. These reflect priorities established through the Regional Transport Strategy.

- *People, Communities and Skills* (building a world leading learning region; providing economic opportunities for targeted communities). £287 million of structural funds are available to provide additional education and training to raise skill levels, increase educational attainment and tackle disadvantage in the labour market so that local people can access new jobs. The funds will also assist the economic development of South Yorkshire's most disadvantaged communities.

Key objectives of the programme include (i) increasing business competitiveness through improved environmental performance, and (ii) strengthening competitive advantage through improvements in, and protection of, environmental quality and the promotion of good practice in environmental planning and management.

[25] A cluster is a group of organisations that buy or sell from each other, have customers in common or use the same infrastructure or skills.

Integrated Development Plans have been prepared under the Development and Infrastructure component for each of the SEZs, for Sheffield city centre, and for Rotherham, Barnsley and Doncaster town centres. These plans, prepared by a partnership of relevant interests, provide an integrated and long-term context for the strategic planning and development of SEZs and urban centres. They cover all aspects of site preparation, development and business operation. Those for Sheffield and the M1 Corridor SEZ are of most relevance to this study.

Current funding for transport infrastructure projects includes: £87,000 for feasibility work on extension to Sheffield's Supertram system, £42,000 to fund initial investigations into improving the Sheffield to Leeds via Barnsley rail service; £343,000 towards funding design work on the Sheffield to Rotherham road link; £1.89 million for design work on proposals to improve the M1 junctions and links between Junctions 31 and 37; and £420,000 for commissioning design work for the section between junctions 33 and 34. Cluster Development Plans are being prepared under the Business and Enterprise component, and are referred to further in Section 3.3 with respect to Sheffield's economic development plans.

3.2 Sub-Regional (South Yorkshire) Economic Development Framework

The significance of Objective 1 status for South Yorkshire and the documents related to it have been referred to in Section 3.1. Other documents of relevance to this study are the South Yorkshire Sub-Regional Action Plan and the South Yorkshire Local Transport Plan (including the South Yorkshire Bus Strategy).

3.2.1 The South Yorkshire Action Plan

The need to plan strategically for the EU Objective 1 Programme led to the creation of the South Yorkshire Forum, a partnership of local authorities, businesses, educational institutions, Health Authorities, the Police, the Regional Development Agency, other statutory agencies and various community groups. It is the established partnership providing leadership on issues of sub-regional significance. As well as the Forum, South Yorkshire has partnerships between the four Local Authorities and specialist forums covering Transport, Planning and Economic Development. There is now strong vertical alignment between the key objectives of the four district-level strategic partnerships, the South Yorkshire Forum and the RES.

The Action Plan has a remit that is in line with the Regional Economic Strategy but which is broader than both the Objective 1 Single Planning Document and the corporate objectives of Yorkshire Forward. It has adopted six core themes as the basis for building the integrated action plan:

Theme 1: Enabling a radical restructuring of the South Yorkshire economic base.

Theme 2: Unlocking the potential of all South Yorkshire's communities and ensuring the inclusion of all parties in the region's economic growth.

Theme 3: Substantially enhancing the competitiveness of businesses in the region, positively stimulating new activity and removing barriers to change.

Theme 4: Achieving a major step change in South Yorkshire's education, training and skills base.

Theme 5: Ensuring that South Yorkshire develops the strategic transport communications and ICT infrastructures required by an internationally competitive region.

Theme 6: Creating built and green sustainable environments in urban and rural areas that meet the expectations of a modern high value economy and provide a distinctive quality of life for residents and visitors alike.

Actions under Theme 1 include the implementation of the cluster development plans listed in Section 3.1.6. The physical manifestation of the cluster development plans is to be achieved largely by capital investment in the three strategic economic zones and the four urban centres. The Integrated Development Plans (Sections 3.1 and 3.3) also aim to create distinctive business investment districts through the development of new commercial and retail floor-space, leisure and cultural facilities and transport improvements.

Actions under Theme 5 include a Transport Manifesto for the sub-region which embraces:

- Improved links between South Yorkshire and West Yorkshire (road and rail)
- Improved Trans-Pennine links to the North West removing key bottlenecks
- Transport interchange developments in Doncaster, Barnsley and Sheffield as part of urban centre Integrated Development Plans and contributing to cluster developments.

3.2.2 The South Yorkshire Local Transport Plan

The analysis of issues in the Objective 1 SPD identified poor public transport links as an issue to be addressed as part of the overall strategy to regenerate the economy.

The LTP sets out a long-term strategy for the development of an integrated transport system in South Yorkshire. It was prepared by a partnership of the four South Yorkshire local authorities and the South Yorkshire Passenger Transport Authority. Many other interest groups were also involved, including community, cycle and pedestrian organisations and bus, tram, train and

haulage companies. It covers all forms of transport, with the aim of co-ordinating and improving local transport policy and provision. The LTP has been prepared in accordance with Regional Planning Guidance, Regional Transport Policy, the Regional Economic Strategy and the South Yorkshire Objective 1 regime. The Plan's objectives are listed in Box 3.3.

Box 3.3: Objectives of the South Yorkshire Local Transport Plan

- Improve and protect the environment
- Improve safety and security for all travellers
- Improve transport to areas of poor accessibility and job creation as an integral part of regeneration
- Meet the needs of the socially and physically disadvantaged
- Provide genuine choices of travel mode
- Reduce the need to travel while improving the efficiency of the transport system and sustaining a vibrant economy
- Maintain transport facilities to ensure the safe and efficient movement of goods and people

New projects that require a balance between different travellers and transport users have been planned using a 'hierarchy' of transport users, with priority being given in the following order: pedestrians, people with disabilities, cyclists and public transport users, commercial vehicles and private cars.

The preferred strategy for urban centres is:

- Progressive changes in local communities to favour walking and cycling.
- Major improvements in public transport.
- Re-prioritise use of road space according to the order of consideration of transport users.
- Concentrate development on town/city centres and main public transport corridors.
- Significant transfer of long to short stay car parking.

Key proposals with particular relevance to economic development and the air quality action plans are:

- Continue via the Strategic Quality Partnership to identify and introduce further Quality Bus Corridors. A rolling programme of 13 corridors to be implemented over the 5-year programme.

- Increase opportunities for interchange through Park and Ride, particularly linking facilities to Quality Corridors, rail and tram and improving facilities for cyclists.

- Manage the supply of on and off street parking places to maximise short-stay parking opportunities; reduce the supply of long-stay commuter parking places; enforce existing waiting and loading restrictions and parking orders more effectively; improve road signing.

- Major road improvements on priority corridors to include the A61 Sheffield Inner Ring Road Phase 2 and the A631 West Bawtry Road, Rotherham.

3.2.3 The South Yorkshire Bus Strategy

The South Yorkshire Bus Strategy forms part of the LTP. Elements of the strategy most relevant to the AQAP relate to quality bus corridors, bus priority measures and park and ride schemes:

- The provisional quality bus corridor programme for 2000-2006 lists four corridors for development, implementation or operation: Abbeydale Road/Chesterfield Road, S10 Quadrant, Ecclesall Road and Sheffield-Hillsborough.

- Bus priority measures include identifying traffic 'hotspots' and implementing adequate and consistent measures as part of the quality corridor programme; investigating the potential for high occupancy vehicle lanes, guided bus and bus-only roads; and enforcing bus priority measures, including consideration of using cameras and greater self-enforcement.

- Actions on Park and Ride schemes include a review of parking in each district; producing a parking master plan for the county, including park and ride; carrying out a study of park and ride to establish the benefits it can bring.

3.3 Local Economic Development Framework

3.3.1 Sheffield City Centre

The Sheffield City Air Action Zone covers the City Centre Masterplan area. Sheffield city centre has been the focus of intensive study in recent years aimed at transforming it into a dynamic sub-regional hub. Significant change has already been realised or is in the process of implementation; much more is planned. Objective 1 recognises the importance of Sheffield City Centre as an economic driver for the sub-region, with a total of £35m having been ring-fenced for the City Centre to assist in the creation of a strong and sustainable economy.

The key strategy documents relevant to the city's economic development are:

- The Sheffield Unitary Development Plan (1998)
- Sheffield City Centre Master Plan (2001)
- Sheffield City Centre Integrated Development Plan (2001)
- Sheffield City Council Corporate Plan (2002)
- Sheffield City Strategy (2002)

The Unitary Development Plan (UDP) is the statutory basis for the future development of the city. It seeks to integrate future land use planning with protection of the environment and the promotion of sustainable development and transport. It describes how Sheffield's environment can be improved or conserved whilst securing the development the city needs. It notes that planning is not about stopping things, but about enabling change and shaping the future whilst respecting the city's environment and heritage. It recognises that environmental quality, economic development and transport policy are all inextricably linked. In particular:

- Improving the environment will help attract the new businesses and investment needed to achieve a more thriving city.
- More use of public transport will help reduce pollution and contribute to a better environment.
- A thriving economy will provide resources needed for improving the environment.
- A higher quality environment is used in a positive way to encourage higher quality, value-added economic activities.
- Sheffield's long-term competitive position is improved by making it an attractive city that is sustainable in both economic and environmental terms.

Key aims of the plan are that:

- Pollution and the impact of traffic are reduced.
- Innovation and economic development are promoted, opportunities are created for new jobs, and environment and infrastructure are improved to attract investment.
- Public transport is improved and its fuller use by all encouraged.
- Appropriate parking is provided.

The Sheffield City Centre Masterplan was prepared by Sheffield One[26] in 2000. It was built on a detailed baseline analysis of the City Centre's strengths and weaknesses, an economic development strategy, a transportation analysis, a retail assessment and a programme of extensive public consultation. Priorities for public funding are to be projects that contribute most directly to economic development. Public funding will be used to lever the maximum private sector investment by creating the right conditions and to pump prime key projects. The Masterplan focuses on four strategic objectives central to the transformation of the City:

- Building a new high technology based economy in the City Centre. This includes the flagship e-campus project in the Sheaf Valley; further development of the Cultural Industries Quarter; building the knowledge economy; and measures which will help accelerate company formation and growth.

- Creating a Vibrant City. Projects include the creation of a new, high quality retail quarter and new office provision; reinforcing the cultural and leisure offer; completing the Heart of the City project; and encouraging the continuing growth of the housing market.

- Improving Accessibility. Actions include measures to radically improve public transport with new bus services and better interchange facilities at Midland Station. Car access, parking and signage are to be improved as part of a package to provide a more integrated and user-friendly transport system.

- Celebrating the Public Realm. This programme includes upgrading existing public spaces, creating new ones and celebrating the City's green heritage. Key projects are a new Station Square and the Howard Street Link.

The Sheffield City Council Corporate Plan recognises that, to be successful, Sheffield needs to be a well-functioning place with a good infrastructure and a high quality environment in which to live and work. Sheffield needs to excel in those areas where the application of knowledge, innovation and design is central to the production process, advanced manufacturing, information and communication technology, environmental industries, healthcare services and creative industries. The major development to create an Advanced Manufacturing Research Centre between Sheffield and Rotherham – and home to a new R&D centre for Boeing – is an example. The Council is working with both universities and the Objective 1 Programme to enhance economic performance by spinning out new business-based research. The Plan recognises that the council had an anti-car image in the past which was

[26] The *Sheffield First Partnership* is the overarching, umbrella, partnership for Sheffield. It is responsible for developing the integrated economic, social and environmental strategy for the city. It comprises the City Council, statutory agencies, business, voluntary community and faith sectors. *Sheffield One* is a Partnership of Sheffield City Council, Yorkshire Forward and English Partnerships, and is one of only three pilot Urban Regeneration Companies in England. It comes under the umbrella of Sheffield First, and is responsible for championing the revitalisation of the city centre as an economic driver for the sub-region.

unhelpful to people's perception of Sheffield and to job creation efforts. Its new approach is to look for a balance of provision that improves choices for all road users.

The Sheffield City Strategy 2002-2005 was prepared by Sheffield First[27] and published in draft form in July 2002. It brings together Sheffield's strategic city-wide plans, some statutory and some developed in response to clear need. It relates strongly to national, regional and sub-regional plans, notably the National Strategy for Neighbourhood Renewal, the Regional Economic Strategy, the South Yorkshire Regional Action Plan and the South Yorkshire Objective One Programme. Implementing the Sheffield City Centre Master Plan is an important component of the strategy.

A key aim is to attract and develop important 'clusters' of industries to drive Sheffield's transformation. These have been identified as: advanced manufacturing and metals, bioscience and technology, environmental and energy technologies, creative and digital industries, and business, professional and financial services. Plans have recently been approved to deploy Objective 1 regeneration funds and money from the Regional Development Agency's Single Pot to stimulate growth in these clusters, which are envisaged as becoming the new economic drivers for the Sheffield economy.

The economic vision is of Sheffield becoming *'the core city of a balanced diverse and sustainable high growth economy in South Yorkshire by 2010, recognised as a growing European Centre of high technology manufacturing and knowledge-based services and offering opportunities for the whole community'*. The key policy challenges and critical initiatives involved in achieving this economic vision are listed in Box 3.4. Priority projects in the transport sector are summarised in Box 3.5. Policy to reduce substantially the environmental impacts of travel and transport is to be achieved through implementing the Local Transport Plan and by designating the two air quality action zones and to prepare action plans for their improvement.

[27] See earlier note.

Box 3.4: Sheffield City Economic Strategy

- *Creating a city centre of European excellence*
  - Developing the Master Plan
  - Improving accessibility to the city centre
  - Creating a modern retail quarter
  - Creating a quality portfolio of commercial sites and premises
  - Creating and managing a high quality public realm
  - Creating a vibrant cultural, leisure, living offer

- *Harnessing the strengths of knowledge institutions*
  - Spinning out new businesses based on intellectual capital
  - Systematic graduate retention and attraction strategy

- *Developing dynamic business clusters*
  - Advanced manufacturing and metals
  - Environmental and energy technologies
  - Biosciences and biotechnology
  - Creative and digital industries
  - Banking, professional and financial services

- *Providing the skills a modern economy requires*
  - JOB Match service
  - Plan for the skills that a modern economy requires
  - E-Learning project

- *Making the best use of Sheffield's assets*
  - Creating the image of a desirable and investor friendly city
  - Creating City Council economic delivery capacity
  - Investment services that meet Sheffield's requirements
  - Develop the South Yorkshire Technology Corridor
  - Develop the E-Campus
  - Improve City Gateways
  - Create and sustain cultural assets of European distinction

- *Connecting Sheffield to the world economy*
  - Ensuring good access to international air services for Sheffield businesses.
  - Upgrading Sheffield Midland station
  - Upgrading rail links to London, Leeds and Manchester
  - Developing state of the art telecoms infrastructure

Box 3.5: Sheffield City Strategy Priority Projects in the Transport Sector

- Developing multi-modal solutions to reduce congestion at the major M1 junctions and their approaches in order to allow economic growth plans to be realised
- Complete the Northern Section of the Inner Relief Road
- Implement work on the Midland Station and surrounds to produce a gateway fit for a city of European distinction
- Improve access for business ~ travellers to international air services, focusing on routes to Manchester in the medium-term
- Significantly improve travel to work by bus in the most deprived neighbourhoods where this is a barrier to prosperity
- Secure faster, more frequent and more reliable rail services to London and Leeds
- Make getting round the city centre by vehicle or on foot simpler and more enjoyable by making the city centre more legible and managing the flow of traffic better

3.3.2 The M1 Corridor – Junctions 33 to 34

The M1 Corridor SEZ has the potential to develop as a Technology Corridor, by attracting high technology based firms and establishing a high profile for firms in key growth sectors through cluster development. The M1 AAZ lies within the central section of the zone, straddling the M1 between Junctions 33 and 34. This section includes eleven groups of strategic sites, each of which has been allocated for employment uses in the current UDP. Major development sites include those by Junction 34 at Meadowhall and Waterside, in and around the Airport Business Park, and at Smithywood and Parkway Markets. Key sites in Rotherham are at Waverley/Orgreave, Templeborough/Magna, Dinnington and Waleswood. There is currently a shortage of fully serviced sites and speculative premises in many of these prime locations. Details of specific sites in close proximity to Junctions 33 and 34 are shown in Figure 3 of the main report and are listed in Annex 3[28].

The Babtie Report[29] concluded that there was potential for up to 20,000 new jobs within the M1 SEZ over the next decade, but warned that the current transport systems would not cope with the longer-term growth without improvement. Major investment was needed, particularly in public transport systems, traffic management and Green Travel Plans. Minimum intervention was not considered to be an option - simply managing traffic differently and improving bus services would not be enough to carry the traffic generated by the development required under Objective 1. Even with major public transport improvements some further highway investment was unavoidable, particularly

[28] A number of these sites fall within the M1 AAZ.
[29] The Rotherham/Sheffield Motorway Corridor Study, Babtie Group, 2000.

in the vicinity of Junction 33 in Rotherham District, but also including a new fixed link between Meadowhall and Templeborough to take some pressure off the congested Junction 34. However, even with this assessment, the report concluded that the employment potential of the Lower Don Valley was still likely to be constrained unless there was a radical shift to public transport.

The report also recognised a need to minimise adverse environmental impacts from proposed new developments. It concluded that improvements in vehicle and fuel technology would offset the effects of additional traffic but that, even so, two problem areas would remain around Brinsworth and Tinsley (both within the M1 AAZ). Although it noted that excesses of air pollution would reflect overall traffic levels and would not be the result of economic regeneration, it found that a package of measures would need to be agreed with the Highways Agency to reduce pollution levels. Without this, regeneration of the area would be made more difficult if developers had to demonstrate that they were not worsening air quality[30].

With respect to Highways Agency planning for the M1 it is noted that the recent Interim Report of the 'Core Cities' Working Group on Cities, Regions and Competitiveness found that creating internationally competitive regional cities would add significantly to the UK's economic growth potential. Of specific relevance, the report identifies a key goal as being a reduction in congestion pressures on London and its surrounding regions. Given the regional growth potential of the Sheffield/Rotherham M1 corridor it would be particularly unfortunate if environmental and congestion pressures were to result in this potential development being constrained at a time when London's economy is overheating and congestion pressures are intense. A new approach to motorway and trunk road planning and financing might therefore be to assess the costs and benefits of new proposals relative to their capacity to achieve nation-wide rather than local strategic goals. Such an approach would have the effect of assessing potential improvements in the M1 Sheffield/Rotherham corridor in a manner that takes account of their significance not only for local/regional economic strategies but also for the incremental benefit such measures would bring in relieving congestion pressures in the London region.

The potential scale of developments in the central section of the M1 corridor, the implications these have for the transport system and related traffic, congestion and air pollution, all support the need for (1) air pollution control measures to be flexible enough to be able to respond to rapidly changing conditions and (2) for the Environmental Protection Service to have a more centrally involved in future deliberations on development policy.

[30] It is noted that in a Memorandum of Understanding between South Yorkshire local authorities and the Highways Agency development policy in South Yorkshire will be more flexibly applied to allow some developments that contribute to Objective 1 outcomes to proceed in advance of the provision of the necessary motorway or trunk road infrastructure improvements required to support them.

4. Assessment of the Air Quality Action Plan

4.1 Introductory Comments

The two previous chapters summarise the draft AQAP and the economic development context within which it is to be implemented. This chapter considers whether the plan has any potentially adverse implications for economic development strategy. It is divided into two parts. The first part looks specifically at the individual pollution control measures that have been proposed by the plan. The second part takes a broader view, looking at the implications of the plan for Sheffield's overall economic development philosophy and assesses the extent to which the plan may either enhance or undermine this philosophy. In doing so, it endeavours to place the plan in the context of the future and the rapidly evolving socio-economic conditions of which it is part.

4.2 Assessment of Individual Measures

Table 4.1 lists the six packages and seventeen measures that are proposed to achieve the air pollution control objectives within the City Centre Air Action Zone (CCAAZ). Table 4.2 lists the four measures proposed in the combined Sheffield M1AAZ and Rotherham M1 AQMA. Assessments for the two zones are presented separately below.

4.2.1 Sheffield City Centre Air Action Zone

The causes of projected NOx exceedences in the city centre are attributable in almost equal parts to traffic and area sources - commercial and domestic combustion. The draft AQAP therefore proposes a mix of seventeen transport and non-transport related measures to address the problem. Table 4.1 lists each measure, giving details of possible economic and cost implications. Key points from this assessment are briefly summarised below.

- All measures relating to ***public transport improvements*** – quality bus corridors, park and ride schemes, strict enforcement of priority schemes, effective linkage of priority schemes – reinforce or extend existing policies and strategies towards public transport. None has any significant adverse impact on economic development policy.

- The practicality of ***expanding the pedestrian*** area in the City Centre beyond existing proposals depends on the scope for and the time frame within which such expansion could be implemented. The potential economic impact of such measures would depend on how businesses are affected and on the availability or otherwise of alternative routes to accommodate diverted traffic flows.

- Of the three ***traffic control measures*** – altering delivery times, improving co-ordination of road works, exploring the potential for further traffic control measures – only the proposal to alter delivery times might

have potentially adverse economic impact, and then only if restrictions are to be mandatory rather than voluntary. A voluntary scheme, backed by an information and awareness raising campaign, might be the most appropriate approach.

- The two '***cleaner vehicle' measures*** are particularly significant insofar as they alone among the 17 measures have as their sole objective air pollution control. Setting emission standards for vehicles used by the Council and its contractors would show a commitment by the Council to attaining the vision to which it and its partners aspires. This is not expected to have any regional economic impact. Direct financial impact on contractors would be minimised by giving advance notice of the policy, prior to it becoming a condition of contract. Setting vehicle standards for buses, taxis, delivery vehicles, etc. will have no regional economic impact but may have cost implications for operating companies. This will depend on: (1) whether or not vehicle standards are to be made mandatory and (2) the time frame over which the policy is to be implemented. A mandatory scheme, announced in advance to allow for an appropriate adjustment period, might be the preferred option.

- No adverse regional or other economic consequences are associated with the two ***industry measures***.

- No adverse regional economic consequences are associated with the five ***efficiency and planning measures***. Implementing a 'green' procurement policy across the public sector will require resources to assess the environmental credentials of potential contractors. Expanding the use of Sheffield's existing district heating system raises issues of 'ways and means' and competition policy.

4.2.2 M1 Air Action Zone/Air Quality Management Area

The causes of projected NOx exceedences in the M1 AAZ/AQMA are attributable almost entirely to traffic, with motorway traffic being the principal contributor. The Air Quality Action Plan proposes four traffic-related measures to address the problem. Table 4.2 lists these measures, giving details of possible economic and cost implications. Key points are briefly summarised below.

- The principal measure is to ***slow traffic on the M1 to a speed optimal for NOx emissions***. The Highways Agency argues that the measure will penalise motorists by extending their journey times during non-congested periods. This may be true, but given the high levels of congestion experienced on the M1 between J33 and J34 it is possible that the lower speed limit could result in a better flow and higher average speeds. Any costs incurred by motorists in additional journey time have to be seen within the context of the health impacts on people living within the air quality zones and of the polluter-pays principle – given that motorway traffic is responsible for the bulk of the air pollution

concerns in this area the measures being proposed are benign. The Babtie Report found that a package of measures would need to be agreed with the Highways Agency to reduce pollution levels and that, without this, regeneration of the area would be made more difficult if developers had to demonstrate that they were not worsening air quality. The proposed action would appear to be the 'least worse' solution.

- The other three measures – the use of variable message signing, changes to the road system around Tinsley and Brinsworth, and the development of an action plan to reduce traffic impacts on the community – are not expected to have any adverse economic consequences (although costs would be incurred in implementing the first two measures and possibly the third, depending on the outcome of the action plan).

4.3 Broader Observations

South Yorkshire is going through a period of fundamental and unprecedented socioeconomic change, moving through a difficult transition from its heavy industrial and coal mining past to a future based, if its vision is to be realised, on clusters of highly skilled, knowledge-based industries developed and attracted to the region on account of its physical characteristics and competitive advantages. Funds mobilised through the sub-region's Objective One status will play a major role in facilitating this change over the next five years. A high quality, clean environment, together with a well functioning, reliable and efficient transport system, are important prerequisites and key selling points in the achievement of this goal.

Sheffield is recognised as being a critical motor for growth and improved prosperity for the sub-region as a whole. In response to this, Sheffield has produced a comprehensive integrated strategy setting out how its vision of becoming

'the core city of a balanced, diverse and sustainable high growth economy in South Yorkshire, recognised as a growing European Centre of high technology manufacturing and knowledge-based services and offering opportunities for the whole community'

is to be achieved. The strategy is entirely consistent with those for the wider regional and sub-regional areas, and is drawing upon funds made available as a result of Objective 1 to stimulate economic regeneration in the five 'cluster' areas seen as being of particularly crucial importance to the region's future. The implementation of a small number of priority projects is also expected to improve significantly the city's transport systems in a manner that is consistent with the Local Transport Plan and the Strategic Transport Priorities for the region.

Sheffield is one of the eight English Core Cities that came together in the mid-1990s to develop the distinctive roles they are expected to play in national and regional life in the future to help achieve Britain's goals of sustainable

growth and greater social equity. A key factor in attracting high-value, knowledge-based businesses is environmental sustainability, and a reputation for environmental excellence and responsibility. A high-quality environment is vital to Sheffield's earning a reputation for being a premier business and lifestyle location. It is widely recognised (e.g., Environment Agency, 2002[31]) that a 'high quality environment has a powerful capacity to generate jobs and tackle social inequality'. The UDP strongly emphasises the importance of environmental quality in sustaining a high value economy, and a key aim of the Objective 1 Programme is to strengthen competitive advantage through improvements in, and protection of, environmental quality.

As the principal single cause of air quality problems in the two zones is traffic, solutions to these problems depend heavily on developing measures to provide appropriate transport choices and traffic management. In this respect, although air quality is rightly seen as being a problem, it is in fact the effect of the more deep-seated problem of high traffic flows and congestion. One solution to this problem would be to bring in measures that constrain the use of motor vehicles – such as user charges or road closures; it is noted that options such as these were addressed during the development of the AQAP but rejected on the grounds that they were too prescriptive, heavy handed and economically inefficient. Instead, options were identified that complemented Sheffield's wider economic and transport priorities. In particular, options for widening transport choice were seen as being preferable to options that narrowed it, an approach consistent with Sheffield's philosophy of enabling opportunity rather than restricting choice. That is why many of the measures set out in the AQAP address the problem of air pollution indirectly by focusing on transport systems and traffic management, and why only two are directed specifically towards bringing about an absolute reduction in emissions from motor vehicles – those listed under 'cleaner vehicles'.

The review presented in Chapter 3 indicates that economic and transport policies are consistent at regional, sub-regional and local levels. The pollution control measures proposed in the AQAP also appear to be consistent with this framework, both in terms of their focus on achieving environmental excellence and on improving public transport quality and choice, both prerequisites for sustainable economic policy. The public transport-related measures basically call for a step-change in the urgency and priority given to the implementation of existing public transport proposals and an expansion of their scope.

The scale of the changes occurring in Sheffield and along the M1 corridor attests to the difficulty in predicting future air quality under existing development proposals. Much of this change – redeveloping the city centre, controlling vehicle access, facilitating knowledge-based industries – will have a beneficial impact on air quality. The seemingly inexorable rise in motor vehicle usage is likely to remain the key problem, both in the city and on the motorway. Congestion on the M1 between Junctions 33 and 34 is seen as a major constraint on the amount of economic activity and job creation in the M1 corridor, and traffic numbers are projected to continue to increase over the

[31] Our Urban Future, Putting the Environment at the heart of urban renewal, Environment Agency, 2002.

next decade. Management of traffic and a shift to alternative forms of transport are therefore fundamental to the long-term economic and environmental sustainability of the area.

The measures are not confined to transport: those proposed for the City AAZ also focus on the area sources – mainly domestic and commercial combustion – that continue to make a significant contribution to air pollution[32]. Many are 'soft' insofar as they are not legally enforceable – their success will depend on effective promotion of their benefits. Broad measures, such as using energy efficiently, have an important role to play in improving both environmental conditions and economic competitiveness. The vision of Sheffield forging a step-change in its social and economic structure, how this can be achieved and what businesses and individuals can do to help achieve this goal, must be promoted strongly through public awareness and other campaigns if these opportunities are to taken up.

Problems are different for the M1 AAP/AQMA, where motorway users who have no business to conduct in Sheffield or Rotherham cause much of the problem. The polluter-pays-principle recognises that those who create pollution should compensate society for the damage this causes. The Babtie Report found that unless a package of measures to reduce pollution from the motorway was agreed with the Highways Authority the prospects for economic regeneration along the M33/M34 corridor would be diminished[33]. The SWYMMS study recommended widening the motorway to ease congestion, but only on the understanding that area charging or tolls would also be introduced to keep traffic flows at levels projected in the absence of widening[34]. The AQAP makes the very reasonable proposal that the

[32] The AQAP notes that manufacturing industry is no longer a major source of this – many of the traditional smoke stack industries have now closed and remaining firms are largely in compliance with environmental legislation.

[33] As noted in Section 3.3.2, the Interim Report of the 'Core Cities' Working Group identified a key goal as being the reduction in congestion pressures on London and its surrounding regions. Given the regional growth potential of the Sheffield/Rotherham M1 corridor it would be particularly unfortunate if environmental and congestion pressures were to result in this development being constrained at a time when London's economy is overheating and congestion pressures are intense. A new approach to motorway and trunk road planning and financing might therefore be to assess the costs and benefits of new proposals not in isolation but relative to their capacity to achieve nation-wide rather than local strategic goals. Such an approach would have the effect of assessing potential improvements in the M1 Sheffield/Rotherham corridor in a way that takes account of their significance not only for local/regional economic strategies but also for the incremental benefit such measures would bring in relieving congestion pressures in the London region.

[34] Recent press coverage has highlighted the problem of worsening congestion throughout the country, and it is probable that pricing controls will progressively be adopted by cities in the UK in the future, although the experience of London's experiment with area charging is awaited first. Recent government reports from the Commission for Integrated Transport (Congestion Charging, CfIT, December, 2002; Paying for Road Use, CfIT, February, 2002) point to worsening congestion problems and the role of road charging in addressing them. In addition, the Commission has proposed subsidising certain classes of bus users over and above existing concessionary schemes (Public Subsidy for the Bus Industry ,CfIT, December 2002). The potential for using receipts from road charging schemes to invest in new public transport facilities or to extend subsidies to a wider class of public transport users may yet emerge as an important area for public debate in the future.

maximum speed limit on the motorway along this corridor should be reduced to a level at which NOx emissions are optimised.

In conclusion, the AQAP is considered to be entirely consistent with regional, sub-regional and local economic and transport strategies, in many cases urging greater urgency in the identification and provision of new and improved public transport services. This is seen as a step-change in the ambition for what can be achieved. Streamlined bus corridors and the strategic location of park and ride facilities at points of modal change, coupled with the balanced use of local government's discretionary powers to restrict traffic, are likely to be crucial to achieving this wider ambition.

It is felt that the Environmental Services Department should have a higher profile in areas of policy formulation and strategy development that have a significant environmental dimension. The requirements of air quality legislation, for example, should feature more proactively in the planning process itself rather than being left until circumstances have either changed or deliberations on strategy development are already well advanced.

Table 4.1 – Economic assessment of measures proposed for improving air quality in Sheffield City Centre Air Action Zone

Measure	Option	Comments
PACKAGE 1: IMPROVING PUBLIC TRANSPORT		
1 (*Option 1a in this plan*)	Advance the quality bus corridor programme to develop more routes and to bring schemes into operation more quickly; increase periods when bus priority schemes are operational	This proposal is consistent with the South Yorkshire Local Transport Plan proposal to continue to identify and introduce further Quality Bus Corridors and with the South Yorkshire Bus Strategy (Section 3.2) and is not expected to have adverse regional economic consequences. To the contrary, expanding the programme may well improve the feasibility of new developments planned under Objective 1 and other programmes, as well as reducing congestion. The proposal re-emphasises improved public transport as a major contributor to solving both congestion and air pollution problems. A critical review of the existing programme may be justified to establish priorities that take air quality priorities into account and possibly to bring about a step-change in the urgency with which the programme is implemented and additional routes identified. Needs to be carefully tied into the park and ride schemes (below). The proposal to increase periods when bus priority schemes are operational complements LTP proposals to enforce bus priority measures, including consideration of using cameras and greater self-enforcement, as well as the SYBS proposals to identify traffic 'hotspots' and implement adequate and consistent measures as part of the quality corridor programme. It is also consistent with the hierarchy of transport users priorities set out in the LTP. This will have no regional economic consequences, although local concerns may be raised about impacts on other road users and on local businesses if parking is further constrained.
2 (*Option 1b in this plan*)	Major expansion of Park and Ride provision	This programme is consistent with the Strategic Transport Priority to investigate further options for park and ride facilities and with the LTP proposals to increase opportunities for interchange through Park and Ride, particularly linking facilities to Quality Corridors, rail and tram. The proposal is consistent with the SYBS proposal to review parking in each district, to produce a parking master plan for the county that will include P&R and to carry out a study of the benefits of P&R. This is not expected to have adverse economic consequences. To the contrary, expanding the programme may well improve the feasibility of new developments planned under Objective 1 and other programmes. The concept of modal change and the location of P&R facilities is important in this context. A distinct modal shift occurs between driving a car on a motorway and driving it on urban streets – offering P&R services at this point of change may be a significant factor in 'capturing' more car users. Again, the urgency with which new facilities are introduced and the scope for identifying additional ones is critical. Given the potential problems associated with access to the Lower Don area and to the city centre it would be surprising if such opportunities have not already been analysed in detail, but the need to take air pollution control imperatives into account when determining priorities should be stressed.

Table 4.1 (continued)

Measure	Option	Comments
PACKAGE 1: IMPROVING PUBLIC TRANSPORT (CONTINUED)		
3 (*Option 1c*)	Strict enforcement of priority schemes, such as bus lanes	The objective of enforcing bus priority measures is set out in the SYBS. The measure is not expected to have adverse economic consequences
4 (*Covered under options 1a and 7d in this plan)*	Ensure effective linkage of public transport systems in Sheffield City Centre	Transport in the Sheffield City Centre is addressed in the Masterplan, where significant improvements to existing arrangements and routes are proposed. A series of mini bus interchanges located around and within the city centre, a new inner-city bus service and regeneration of Midland Station into an integrated transport facility are proposed. Any additional measures identified would need to be integrated into the overall transport development plan for the city centre. Any additional measures would be unlikely to have adverse impacts on the economy, although this aspect would need to be addressed at the time the feasibility of such measures is addressed.
PACKAGE 2: TRANSPORT INFRASTRUCTURE		
5 (*Option 2a in this plan*)	Further pedestrianisation in Sheffield City Centre	The practicality of this proposal depends on the scope in the short to medium term of extending the level of pedestrianisation currently planned for the city centre. Key elements of the Sheffield City Master Plan are to 'create a high quality, safe and pedestrian-dominated city core', to 'enhance connectivity by linking public spaces to form a pedestrian environment that pervades the city centre and connects it to the surrounding residential communities' and to 'ensure access to all, through the promotion of a highly 'permeable' pedestrian-friendly centre which is fully accessible and integrated with a strong public transport system'. The potential economic impact of the measure will depend on its impact on businesses operating in the affected areas and on traffic flows. Given the emphasis on developing Sheffield city centre as a quality place to live and work - focussing on green space - opportunities for additional pedestrianisation could be expected to add value to the area.
PACKAGE 3: TRAFFIC CONTROL		
6 (*Option 3a in this plan*)	Alter delivery times to Sheffield City Centre and other congested locations to avoid the most congested periods	Most delivery companies would want to minimise the time involved in making deliveries and avoiding periods of high congestion is a rational response. Some may not have the flexibility to do this whereas deliveries for others may be time-critical. The plan doesn't indicate how the measure would be introduced. A constraint policy (such as banning access in specified periods) would be costly to implement and enforce and could have negative economic impacts on delivery companies and their clients. Perhaps a better approach would be to introduce a voluntary system initially, backed up by an information and awareness raising campaign directed at businesses and deliverers. Some companies might incur additional operational costs, but this is likely to be confined to an initial period as businesses adapt to the changed circumstances. Before any steps are taken to implement this policy a more detailed assessment involving all relevant interests should be undertaken to establish the issues involved and to weigh potential benefits against the costs.

Table 4.1 (continued)

Measure	Option	Comments
PACKAGE 3: TRAFFIC CONTROL (CONTINUED)		
7 (*Option 3b in this plan*)	Improve co-ordination of road works and provide more effective signing around them	This will have no adverse regional economic consequences.
8 (*Option 3c in this plan*)	Explore potential for further traffic control measures that would benefit air quality	The economic impact of this measure will depend on the specific actions proposed.
PACKAGE 4: CLEANER VEHICLES		
9 (*Option 4a in this plan*)	Set emission standards for vehicles used by Sheffield City Council and by service providers contracted by the Council	This measure is consistent with Sheffield City Council's wider environmental policy and with the Masterplan's vision of the central area becoming 'a world-class and well managed environment for all users'. Both the Council and its service providers may incur costs in the short-run as adjustments are made, but these are unlikely to be large. A requirement to meet relevant emission standards should become (if it is not already included) a condition of procurement policy. This has relevance to Package 6 (1). This is not expected to have adverse regional economic consequences. Adoption of the policy can be expected to enhance the city's green credentials and attractiveness as a place in which to invest.
10 (*Option 4b in this plan*)	Set vehicle standards for buses, taxis, delivery vehicles, refuse carts, etc operating in the Air Action Zones/AQMA	This is a major policy proposal, and one that is unlikely to have any adverse regional economic impact. A requirement to conform to specified standards may, however, have cost implications for operating companies. The extent of any such costs will depend on two factors: (1) whether or not vehicle standards are to be mandatory and (2) the time frame over which the policy is to be implemented. A voluntary regime may lead to some companies choosing to comply with the standards and others (the free loaders) deciding not to. This would place an unfair financial burden on 'good corporate citizens', possibly putting them at a competitive disadvantage. An alternative – and possibly better – approach could be to announce the policy in advance, giving a specified period (maybe 3-5 years) after which it would become mandatory. This would provide an adjustment period over which firms can adopt vehicle replacement and deployment policies consistent with the plan. Spread over a time frame such as this the financial impact on firms is likely to be small.
PACKAGE 5: INDUSTRY		
11 (*Part of Package 8 in this plan*)	Present environmental information on the performance of specific industrial plant in a more accessible form in the Public Registers	No adverse regional or other economic consequences.
12 (*Option 6a in this plan*)	Encourage operators to adopt accredited environmental management and auditing systems	No adverse regional or other economic consequences. Adoption of such schemes by major firms is likely to raise the environmental profile of the city, thereby improving its overall attractiveness as a place to invest, particularly in the high technology, knowledge-based cluster industries.

Table 4.1 (continued)

Measure	Option	Comments
PACKAGE 6: EFFICIENCY MEASURES IN THE DOMESTIC, INDUSTRIAL, COMMERCIAL AND PUBLIC SECTORS AND PLANNING		
13 (*Option 7a in this plan*)	Implement a green procurement policy across the public sector	No adverse regional economic consequences. To be effective, resources will be needed to assess the environmental credentials of contractors/service providers. Relates to Measure 4.1.
14 (*Option 7b in this plan*)	Increase use of Sheffield's existing district heating system to displace small boilers that release emissions at low level	The effectiveness and practicality of this measure will depend on the economics of small boilers relative to the district heating schemes and on the emissions compliance regime. If small boilers comply with emissions standards then the issue largely becomes one of relative costs, unless other instruments are available to encourage a shift in use patterns. Competition laws may also be relevant in this context. Extension of the district heating scheme might incur capital costs that will need to be underwritten by long-term contracts. An initial scoping study into the practicality of this proposal should be undertaken in the first instance.
15 (*Option 7c in this plan*)	Promote the adoption of travel plans by all significant employers in the area, and others with environmental responsibility	No adverse regional or other economic consequences
16 (*Option 7d in this plan*)	Set up an Environmental Co-ordination Office (ECO) to promote activities that lead to greater environmental efficiency in Sheffield	No adverse regional or other economic consequences. It has been noted elsewhere in this report that the Environmental Protection Service should have a higher profile in areas of policy formulation and strategy development that have a significant environmental dimension. The requirements of air quality legislation, for example, should feature more proactively in the planning process itself rather than being required to react to changed circumstances.
17 (*Included in a revised option 7e in this plan*)	Identify plans where there has been inadequate assessment of air quality effects	No adverse regional or other economic consequences. This measure relates closely to the above – air quality management should be integrated more closely into the decision making framework, and not be expected to react to decisions made in isolation from it.

Table 4.2 – Economic assessment of measures proposed for improving air quality in Sheffield M1 Air Action Zone and Rotherham AQMA

Measure	Option	Comments
1 (*Option 5a in this plan*)	Slow traffic on the M1 to a speed optimal for NOx emissions.	Highways Agency argues that the measure will penalise motorists by extending their journey times during non-congested periods. This may be true, but the significance of any such impact depends on a number of factors: (1) the dynamics of the road system – a fixed speed limit may have the effect of regulating traffic flow and preventing stop-go driving (i.e., ironing out the peaks and the troughs). This may be particularly significant if/when the viaduct is brought back into three-lane operation and traffic joining the motorway south at Junction 34 will need to merge (rather than having a dedicated lane as at present). There are precedents for introducing lower speed limits on major motorways and arterial roads – the main road into Leeds and sections of the M25 are examples. Given the high levels of congestion experienced on the M1 between J33 and J34 it is possible that the lower speed limit could result in a better flow and higher average speeds. In a cost-benefit sense, the costs incurred by motorists in additional journey time have to be seen within the context of the health impacts on people living within the air quality zones and of the polluter-pays principle – given that motorway traffic is responsible for the bulk of the air pollution concerns in this area the measures being proposed are benign. The possible alternatives, including road charging, could involve significantly higher costs to motorists. This is particularly relevant in the context of the SWYMMS report that recommends widening the motorway to ease congestion, but only on the basis that area charging or tolls are introduced to keep traffic flows at levels projected in the absence of widening. The Babtie Report found that a package of measures would need to be agreed with the Highways Agency to reduce pollution levels and that, without this, regeneration of the area would be made more difficult if developers had to demonstrate that they were not worsening air quality.
2 (*Option 5b in this plan*)	Use Variable Message Signing to direct traffic more efficiently	This measure will have no regional or other adverse economic impact.
3 (*Option 5c in this plan*)	Changes to the road system around Tinsley and Brinsworth	This measure will have no regional or other adverse economic impact.
4 (*Option 5d in this plan*)	Sheffield City Council and HGV operators that require access to Tinsley to jointly develop an action plan for reducing the impacts of that traffic on the community.	This measure will have no regional or other adverse economic impact.

Annex 1: Organisations and people visited

Hugh Sharp	Sheffield City Council, Economic Advisor to the Chief Executive, hugh.sharp@sheffield.gov.uk
Nigel Tipple	Development and Infrastructure, Objective 1, Programme Executive, nigeltipple.goyh@go-regions.gov.uk
Dave Custance	Yorkshire Forward, Senior Regeneration Manager, david.custance@yorkshire-forward.com
John Mothersole	Sheffield City Council, Executive Director, Development, Environment & Leisure, John.Mothersole@sheffield.gov.uk
Yunas Ahmed	Sheffield City Council, City Development Unit, Development Officer, yunus.ahmed@sheffield.gov.uk
Jon Baggarley	Rotherham Metropolitan Borough Council, Principal Accountant

Annex 2: Documents reviewed

1. Congestion Charging, CfIT, December 2002
2. Draft Yorkshire and Humber Regional Economic Strategy (RES), Consultation document, November 2002.
3. Health Impact Assessment of the Rotherham Sheffield Motorway Corridor Planning Study, January 2001
4. Integrated Development Plan, M1 Corridor, Part A Strategy Final Report, May 2001
5. Integrated Development Plan, M1 Corridor, Part B Delivery Plan, Draft, April 2001
6. Paying for Road Use, CfIT, February 2002
7. Public Subsidy for the Bus Industry, CfIT, December 2002
8. Regional Action Plan, November 2001
9. Regional Planning Guidance for Yorkshire and the Humber, Government Office for Yorkshire and the Humber, October 2001.
10. Rotherham Urban Centre Integrated Development Plan, February 2001
11. Sheffield City Centre Integrated Development Plan, May 2001
12. Sheffield City Centre Master Plan, Sheffield One, February 2001
13. Sheffield City Council Corporate Plan, 2002-2005, March 2002
14. Sheffield City Master Plan: Transport Improvements, Faber Maunsell, May 2002
15. Sheffield City Strategy 2002-5, Sheffield First Partnership, Draft July 2002
16. Sheffield Unitary Development Plan, Sheffield City Council, March 1998
17. South and West Yorkshire Multi-Modal Study, September 2002
18. South Yorkshire Action Plan, November 2001

19. South Yorkshire Bus Strategy (part of the LTP), September 2001
20. South Yorkshire Local Transport Plan (LTP) 2001-2006, July 2000 plus 2001 and 2002 Annual Progress Reports
21. South Yorkshire Single Programming Document, South Yorkshire Forum, 1999
22. South Yorkshire: Objective 1 – Control of Development Memorandum of Understanding Between South Yorkshire Local authorities and Highways Agency
23. Yorkshire and Humber Strategic Transport Priorities, Yorkshire Forward, undated.

Annex 3: List of specific development sites within the M1 SEZ in close proximity to Junctions 33 and 34

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
1. Templeborough Plot No. 9D (Centurion)	M1 J33 M1 J34 A630 A6178	5.60	UDP Ref: E26 – Owned by Yorkshire Forward. Planning Permission RB02/0211 for Industrial Units for Delma Developments	Site in SYTC SEZ. P5 Applicant Business Plan submitted.	Commencement of Phase 1 part of development anticipated October 2002 and completed in March 03. Phase 2 programmed for commencement late 03. 9,332m² development.
2. Templeborough Plot No. 13 (part of Centenary Riverside)	M1 J33 M1 J 34 A630 A6178	2.15	UDP Ref:E27 - Owned by Corus Plc	Site in SYTC SEZ	On the market. Was included on the RIF & outputs for Centenary Riverside (see site 6 & 7).
3 Templeborough Plot No. 14J (part) and 14L	M1 J33 M1 J34 A630 A6178	1.3	UDP Ref: E28 (part) – Owned by Rotherham MBC	Site in SYTC SEZ	.
4. Templeborough Plot No 14K	M1 J33 M1 J34 A630 A6178	1.15	UDP Ref: E28(part) – Planning Perm granted (2002/667) for erection of 6 offices by Bournston	Site in SYTC SEZ	Private development no funds being sought.
5. Templeborough Plot No 15A Centenary Riverside	M1 J 33 M1 J34 A630 A6178	4.50	UDP Ref: E29(part) – Owned by Hinchcliffe Group plc	Site in SYTC SEZ P5 RIF accepted.	Flood Study to be completed
6. Templeborough Plot No 15B Centenary Riverside	M1 J33 M1 J34 A630 A6178	1.25	UDP Ref: E29(part) – Owned by Hinchcliffe Group plc	Site in SYTC SEZ. P5 RIF accepted	Flood Study to be completed
7. Templeborough Plot No. 30A (Rotherham Main)	M1 J33 M1 J34 A630 A6178	6.65	UDP Ref. E32 – Land adjoining LSM Ltd – Requires site investigation/reclamation-access constraints	Site in SYTC SEZ	Possible EP Coalfield Programme?l

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
8. UES Site Templeborough	M1 J34 A6178	0.93	Priority Sites development on former UES HQ site opposite Magna	Site in SYTC SEZ. RIF approved.	
9. Magna Business Park (comprising 2 areas)	M1 J34 A6178	14.2	43,663m² high quality office/business units for growth sector, 4000m² exhibition centre, 3700m² Business Centre & 3700m² hotel.	Site in SYTC SEZ. RIF submitted – no decision	1 site owned by RMBC/Magna Trust could be developed separately. Redundant Corus steelworks requires reclamation. Site adjoins Magna Science Adventure Centre.
10. Mayer Parry, Magna	M1 J 34 A6178	3.09	Former scrap process area west of Magna Science Adventure Centre	Site in SYTC SEZ.	
11. Poplar Way	J33 A630	6.80	Land adjoining Big W retail outlet. Allocated for retail use in the UDP. Extant permission for a foodstore, however, two further applications received in Outline from CG Property RB2002/624 for residential development and RB2001/1311 for mixed use (retail/hotel/restaurant & residential)	Site in SYTC SEZ	Mixed Use likely with no P5
12. Waverley AMP Phase1 (Plot No. 6)	J33 A630	8.10	UDP Ref: E35 (part) – Proposed Waverley Advanced Manufacturing Park, Phase 1. Outline Planning Application granted with subsequent detailed approval for Corus plot. Yorkshire Forward/UK Coal signed up to Agreement.	SYTC SEZ. P5 Application and Business Plan	Servicing works commenced.
13. Waverley AMP Phase 2/3 (Plot No. 6)	J33 A630	28.25	UDP Ref:E35(part) – Proposed Waverley Advanced Technology Park Phase II. Planning App. Expected Aug 02.	SYTC SEZ. Part of P5 Application above.	

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
14. Orgreave	J33 A630	34.60	Site area on the Plan is the whole Masterplan area of which half is likely to be environment/water area. Half the site will be for mixed use development, boundaries not yet decided.	SYTC SEZ	Reclamation being undertaken by opencasting. Owned by UK Coal. Timetable for opencast is beyond 01 period – although some parts may be released earlier.
15. Moorgate Crofts	J33 A630 J31 A618	1.94	Business to Business Zone 2500m² Managed Workspace. 4800m² Private Sector space. Detailed Planning Application programmed for Autumn 2002.	Urban Centre IDP. RIF Approved. Business Plan – submit end 07 beginning 08/ 02	
16. Westgate	J33 A630 A6178	3.8	**RMBC embarking on a masterplan exercise scheduled for completion in January 2003**	Urban Centre IDP. RIF supported Business Plan being prepared.	
17. New York Riverside	J33 A630 A6178	7.5	**Mixed Use Outline application submitted by Evans/Tesco for 5574m²Food superstore plus other fast food/pub retail and limited Office Space. Planning Application (Outline) also submitted by Finnegan/Gloystarne for 6,968m² Food Superstore & 9,290m² Non-Food retail**.	Contained in Urban Centre IDP.	Planning Decision expected end of August 02. .Linkages between Planning decision on New York Riverside & Westgate Study area tio be made clear.
18. Bailey Bestobell (inc Norfolk Car Park) Potential to be linked to Drummond Street	J33 A630 J35 A629	1.52	**Mixed use 3000m² B1 Hybrid Office, 3000m² Budget Hotel, 2000m² Health/Fitness**	Contained in Urban Centre IDP. RIF approved.	**St Pauls Developments own Bailey Bestobell site – possible joint venture. Development brief and investigations to be undertaken..**
19. St Anns Car Park	A630 A633	1.21	**IDP proposes 5000m² B1. However, Leisure use a possibility.**	Urban Centre IDP	**Swimming Pool proposal by RMBC on this site.**
20. Aldwarke Plot No. 5	A633 A6123	15.26	**UDP Ref E16 – Owned by Stadium Developments**	P4 Measure 23 area.	**Site requires reclamation**
21. Aldwarke Plot No. 7	A633 A6123	13.21	**UDP Ref E17 – owned by E V Waddington**	P4 Measure 23 area	**Site requires reclamation**

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
22. Aldwarke Plot No. 9	A633 A6123	14.51	**UDP Ref: E18/19 Owned by Yorkshire Water plc**	P4 Measure 23 area	**Site requires reclamation.**
23. Parkgate Business Park Plot No.3	A633 A6123	1.58	**UDP Ref E15 – Owned by Stadium Developments – Retained potential coach park.**	P4 Measure 23 area	**QBC proposals to link to development plans?**
24. Thornhill Recreation Ground	A629 A630	1.18	**B1 Office 4900m² or possible Leisure**	Urban Centre IDP	**Access difficulties – Agreement needed with B&Q store adjacent..**
25. Weirside	A630	0.20	**Small entrepreneurial business space**	Urban Centre IDP	**Previous Emporium proposal**
26. British Waterways	A633 B6089	2.80	**B1/B2 development (sustainable business growth hub) 10,000m²**	Urban Centre IDP	
27. Ron Hull, Rotherham Road	A633	3.20	**B1/B2 space 10,240m²**	Urban Centre IDP	**Site now reclaimed**
28. Brinsworth Street	A630	1.66	**2 sites 0.85 and 0.81. Old Planning Permission for Warehouse. UDP allocated Mixed Use.**	Urban Centre IDP	**Comprising 2 sites at 0.8ha – part former scrap yard.**
29. Junction 33 site	J33	4.2	**Planning Permission granted (1997/0572) for hotel and services.**	Site in SYTC SEZ	
30. Meadowbank	J34	5.89	**Tipped land. Planning Applications for hotel, restaurant, leisure use undetermined.**	Site in SYTC SEZ	
31. YEB Site Sheffield Parkway	M1 J33 M1 J34 A57, A630 A6102 A6178	5.4	**Planning Application submitted 01/0383P** 28,650sq m non-food retail warehouse for IKEA Recommendation to Area Board expected in Summer	Site in SYTC SEZ	**Awaiting full response from Highways Agency**

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
32. Parkway Business Centre (Parkway Markets) Sheffield Parkway	M1 J33 M1 J34 A57 A630 A6102 A6178	23.0	**Planning Application submitted** 73,500 sq m development of B1/B2/B8 plus possible call centre	Site in SYTC SEZ (identified in IDP) RIF agreed in principle. Discussions ongoing	**Initial phase (northern part) comprising wholesale markets & warehouse/industrial units (6000 sq m) completed. Also includes Parkway BITC**
33. Greenland Road Bus Depot Darnall	A57 A631 A6102 A6178		**Full Planning Application submitted 02/00430.FUL** 10,000 sq m retail warehouse & 929 sq m industrial unit	Site in SYTC SEZ	**In early stages of assessment**
34. Avesta Polarit Shepcote Lane	M1 J34 A631 A6102	20.0	**Planning Application submitted** 65,000 sq m B1/B2/B8 development	Site in SYTC SEZ (identified in IDP) RIF under consideration	
35. Tinsley Marshalling Yard (Helios/EWS) Europa Link	M1 J33 M1 J34 A630 A631 A6102	24.0	**Planning Applications submitted. Sheffield 01/05082/FUL (formerly 9B/0992P). Approved subject to conditions on 1/7/02 and Rotherham 2001/1516 going to board 4/7/02** 96,150 sq m warehousing (and ancillary offices) and railfreight interchange	Site in SYTC SEZ	
36. Airport Business Park	M1 J33 M1 J34 A630 A631	22	**Invalid Planning Application submitted** 9000 sq m B1 office village (plot Z)	Site in SYTC SEZ (identified in IDP) RIF agreed in principle Discussions ongoing.	**Need an overarching strategy from Tinsley Park Ltd. for all land in their control.**
37. Tinsley Park Office Development Airport Business Park Europa Link Phase 2	M1 J33 M1 J34 A630 A631		**Planning Applications submitted** Sheffield 01/10229/OUT Rotherham Outline 2001/1465 (Awaiting transport information D17) 27,900 sq m B1 Offices	Site in SYTC SEZ (identified in IDP)	**Largely in Rotherham**

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
38. Blackburn Meadows Sewage Works Alsing Road	M1 J34 A631 A6109 A6178	12.5	**Outline Planning Application submitted 02/01083/OUT** Mixed B1/B2/B8	Site in SYTC SEZ Identifed in IDP)	**Application submitted by Powergen UK plc** **Site includes 2 cooling towers adjacent to motorway viaduct. Both will be demolished when an acceptable method is identified that will not adversely affect the structure of the viaduct.** **Major problems in developing site before new link road constructed** **(May not affect western end accessed from Alsing Road).**
39. Vantage Park (former Standard Steelworks) Sheffield Road	MJ1 J34 A6178	4.8	**Planning Application for renewal of outline consent awiting decision 95/0053P** 23,225sq m B1 business development	Site in SYTC SEZ (identified in UDP)	**Not determined because of Highways Directive.** **Development affected by proposed fixed link. Applicant has agreed to reserve land required for the link road.**
40. Jessops Riverside Brightside Lane	M1 J34 A6109	2.5	**Planning Permission granted 00/789P** 5,880 sq m industrial, 4,896 sq m offices	Site in SYTC SEZ (identified in IDP)	**Now being built.** **Section 278 required.**
41. National Ice Centre Attercliffe Road	M1 J34 A6102 A6178	3.2	**Planning Permission granted 00/246P** 11,230 sq m leisure, 350 car parking spaces	Site in SYTC SEZ	Now being built. Section 278 required.
42. Don Valley Arena Call Centre Attercliffe Road	M1 J34 A6178 A6102		**Planning Permission granted 00/535P** 7,000sq m office, 3,000sq m storage	Site in SYTC SEZ	**Pulse nightclub presently being converted.** Section 278 required

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
43. Land Adjacent to Mecca Bingo, Cricket Inn Rd	M1 J33 A57 A630		Planning Permission granted 96/271P 6178 sq. m non-food retail. 350 sq. m fast food outlet	Not in Objective 1 Priority 5 area	New Matalan store on site. Section 278 required
44. St Modwens site Europa Link	M1J33 M1 J34 A630 A631		Outline planning permission granted 41,500 sq m B2 and B8	Site in SYTC SEZ	Plots gradually being developed.
45. Airport Business Park Europa Link phase 1	M1 J33 M1 J34 A630 A631		Outline planning permission granted. 13,000 sq.m office	Site in SYTC SEZ	Site virtually developed.
46. Extension to Meadowhall Meadowhall Road	M1 J34 A6109 A6178		No planning application submitted. Up to 4,000 sq.m new retail (includes loss of 250 car parking spaces)	Site in SYTC SEZ	
47. Staybright Works Weedon Street	M1 J34 A6178	2.9	Planning application 02/00447 awaiting decision New car dealership on Sheffield Road frontage. No details for rest of site	Site in SYTC SEZ (Identified in IDP)	Transport Assessment requested.
48. Sheffield Road / Meadowhall Way (Former Stadium Developments)	M1 J34 A6178		No planning application submitted. Leisure park	Site in SYTC SEZ	
49. Weedon Street (Former Stadium Developments)	M1 J34 A6109 A6178		No planning application received. Industry or business	Site in SYTC SEZ (Identified in IDP)	Land recently acquired by British Land from Stadium Developments.
50. Sheffield Forgemasters Sheffield Road	M1 J34 A6178		No planning application received Recent interest in trade warehouse.	Site in SYTC SEZ	

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
51. British Gas site, Upwell Street / Colliery Road	M1 J34 A6109	5.00	No planning application received Industry or business	Initial discussions awaiting RIF	Closure of colliery road to be considered in any planning application
52. Finchwell Road / Quarry Lane Handsworth	M1 J33 A630 B6200		No planning application received 300 plus residential units proposed	Not in Objective 1 Priority 5 area	
53. Darnall Works (Former Sanderson Kayser site) Attercliffe Road	M1 J33 M1 J34 A630 A631 A6102 B6200	10.00 including adjoining land.	Industrial / office	Site in SYTC SEZ Initial discussions awaiting RIF	The major landowners in discussion with the City Council and Yorkshire Forward to undertake a masterplan.
54. Rotherham Road Handsworth	M1 J33 B6066 B6200		No planning application received B1 / B2 Business Park	Non in objective 1 Priority 5 area RIF rejected	Former Asda superstore
55> E-Campus Pond Street	M1 J33 A630, A57	3.60	Outline planning permission approved. Awaiting detailed design. Business / Hi-Tech.	Sheffield City Centre	Teesland Revinon chosen as preferred developer
56. Castlegate	M1 J33 A630, A57 A61			Sheffield City Centre	
57. Saville House Saville Street	M1 J34 A6109 A6178		Urban Property Services Ltd have been working up proposals to refurbish the block to provide approximately 10,750 sq m of B1 floorspace with 200-250 car park spaces on the Union Forge site adjacent.	Site in SYTC SEZ RIF rejected	
58. Staniforth Road	M1, J33 & 34 A6102 B6200		Retail interest	Site in SYTC SEZ	
59. Shepcote Lane	M1 J34 A6131		Office/B2/B8 units	Site in SYTC SEZ	

Site Reference	Principal Routes	Size (Ha)	Development Proposed and Planning Status as at July 2002	Objective 1 Status	Comments
60. Sheffield Business Park West	M1 J34 A631	4.0	Awaiting information from landowners Tinsley Park Ltd and Kilmartin	Site in SYTC SEZ	
61. Sheffield Road (adj. to canal)	M1 J34 A6178		Small office development. Hotel approved.	Site in SYTC SEZ	
62. Rom Site Meadowhall Road	M1 J34 A6109		Office and major car dealership proposed.	Site in SYTC SEZ	