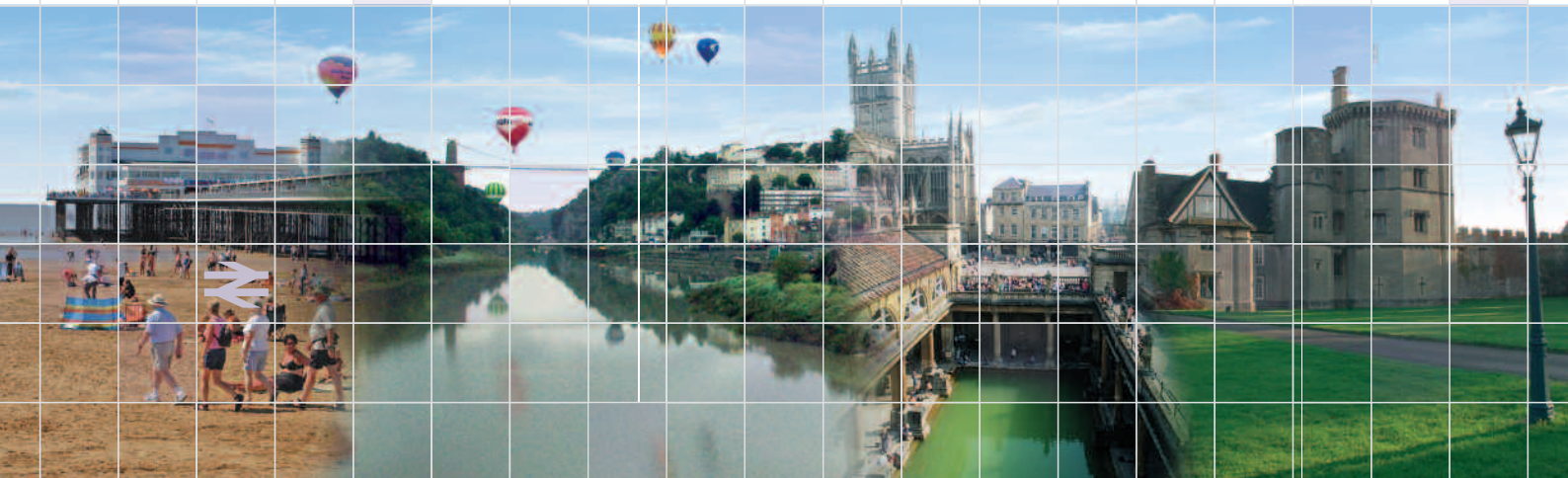




BATH & NORTH EAST SOMERSET



Final Joint Local Transport Plan

Strategic Environment Assessment: Environmental Report



2006/07 - 2010/11

Final Joint Local Transport Plan 2006/07 - 2010/11

If you would like this information in a different format, for example Braille, audiotape, large print or computer disc, or community languages, please contact:

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Strategic Environmental Assessment: Environmental Report

Contents

paragraphs

Non-Technical Summary

i- viii

Introduction

Background	1-4
Purposes of the SEA	5
SEA Process	6
Scope of the SEA	7
Consultation	8

Joint Local Transport Plan

JLTP Aims and Objectives	9
Links to Other Plans and Programmes	10-12
Links between the SEA, JLTP and RSS	13-15

Baseline Environment Data

Environmental Problems and Opportunities	16
SEA Objectives	17
Air Quality and Dirt	18-21
Noise and Vibration	22-23
Road Accidents	24--25
Security	26
Physical Fitness	27
Community Severance	28
Mobility	29
Congestion	30-32
Landscape	33
Biodiversity and Heritage	34-35
Greenhouse Gases	36

Assessment of Alternatives

NATA Categories	37-39
Alternative Strategies	39-49
Conclusions	50-51

Final Joint Local Transport Plan 2006/07 - 2010/11

Analysis of JLTP Effects

Overall Effects	52
Air Quality and Dirt	53-55
Noise and Vibration	56
Road Accidents	57-58
Security	59
Physical Fitness	60-61
Community Severance	62
Mobility	63
Congestion	64-65
Landscape, Biodiversity and Heritage	66-69
Climate Change	70

Implementation

Environmental Consideration of Transport Proposals	71-72
Land Use Changes	73-74
Monitoring	75

Strategic Environmental Assessment: Environmental Report

Non-Technical Summary

- i. The four Councils are required to carry out a Strategic Environmental Assessment (SEA) to pinpoint any significant effects the Joint Local Transport Plan (JLTP) is likely to have on the environment. This Environmental Report has been produced to show the results of the SEA. JLTP/ SEA consultations took place in the Spring and Winter 2005.
- ii. The SEA and the JLTP are linked with the Government's Shared Priorities of congestion/bus patronage; accessibility; road safety; and air quality. They also link with the Regional Spatial Strategy and Regional Transport Strategy.
- iii. The Environmental Report outlines environmental problems and opportunities. Transport affects the area in a variety of ways and the SEA has looked at a range of topics from air quality to traffic congestion, landscape to biodiversity.
- iv. Alternative transport strategies have been investigated as part of the SEA:
 - Strategy A: no major schemes (i.e. costing over £5m);
 - Strategy B: including Greater Bristol Bus Network and Bath Package major schemes;
 - Strategy C: comprising Strategy B plus major 'demand management' major scheme.
- v. Strategy C was found to have more environmental benefits than B; and B more than A. On the basis of this, and the results of feedback from the public and stakeholders, the four Councils decided to go ahead with Strategy B whilst carrying out further consultation on Strategy C.
- vi. The SEA analysed the likely effects of pursuing Strategy B, assessed against the wide-ranging SEA topics. The overall effect of the JLTP, based on Strategy B, was found to be beneficial to the environment. No significant adverse impacts were identified.
- vii. The GBBN and Bath Package major schemes have to be supported by Environmental Impact Assessments (EIA). The EIA for the GBBN highlighted the need to undertake further detailed work on likely impacts and ways and means of offsetting them. The costs and benefits of all future significant transport proposals will have to be carefully looked at.
- viii. A number of SEA indicators are put forward to monitor the environmental effects of the JLTP schemes and measures as they are implemented in the next 5 years.

Strategic Environmental Assessment: Environmental Report

Introduction

Background

1. The high quality of the environment in the Joint Local Transport Plan (JLTP) area is one of the main factors in its attractiveness for inward investment and growth. This applies to both the natural environment, with its Cotswold and Mendips Hills Areas of Outstanding Natural Beauty; the Ramsar rated Severn Estuary, and the Avon Gorge; and to the built environment with its rich Georgian, Victorian and Edwardian heritage, including the World Heritage Site of Bath.
2. The area's transport system, while an essential element in people's quality of life, has a significant impact on the environment. Road traffic flows are generally high resulting in noise, disturbance and air pollution. Congestion, an endemic feature during peak periods, not only exacerbates these effects, but worsens access to jobs and facilities for large sections of the population, and unnecessarily wastes resources of fuel, time, vehicle materials and infrastructure.
3. This Environmental Report has been prepared in line with the Environmental Assessment of Plans and Programmes Regulations 2004, Statutory Instrument No. 1633. The report is the major output from the Strategic Environmental Assessment (SEA) of the final JLTP prepared by the four Councils of Bath and North East Somerset, Bristol City, North Somerset and South Gloucestershire and to be submitted to the Department for Transport by the end of March 2006. As well as the 2004 Regulations the SEA takes into account:
 - A Practical Guide to the Strategic Environmental Assessment Directive (ODPM 2004)
 - Strategic Environmental Assessment Guidance for Transport Plans and Programmes, DfT Transport Analysis Guidance Unit 2.11 April 2004.
4. This SEA was produced by the JLTP Team in consultation with Council environmental officers and representatives of:
 - Countryside Agency;
 - English Heritage;
 - English Nature;
 - Environment Agency.

Purposes of the SEA

5. This SEA aims to
 - identify the main environmental effects of transport in the area;
 - estimate the spread of such effects across the area, and their severity;
 - test the performance of alternative strategies for their environmental effects;
 - adopt a strategy that integrates the objectives of the SEA with JLTP objectives; and
 - carry out consultations.

SEA Process

6. Government guidance and European Union good practice suggest 5 stages in the SEA process. Table 1 shows how this Environmental Report follows the recommended SEA process.

Final Joint Local Transport Plan 2006/07 - 2010/11

Table 1 Environment Report and the SEA Process

SEA Stage in this Report	Process	Paragraphs
A Context and Baseline	i. identify other relevant plans and programmes	11
	ii. identify their environmental objectives	12, 13, 14
	iii. show how they relate to the JLTP	Figures 1, 2
	iv. establish appropriate SEA objectives for the JLTP.	Figure 2
	v. collate baseline information	16- 36
	vi. assemble data on likely future trends	16- 36
	vii. establish indicators and targets	16- 36, 75
B Scope and Alternatives	i. identify relevant alternative strategies for dealing with the issues identified from Stage A	37- 51
	ii. scope the likely significant effects of the JLTP and the alternatives	37- 51
	iii. write a Scoping Report	September 2004
	iv. consult with the designated Environmental authorities on the scope and content of the Environmental Report	October 2004 to date
C Assessment and Mitigation	i. assess the likely significant effects of the plan against the SEA objectives, including potential cumulative impacts.	52- 71
	ii. outline the reasons for selecting the alternatives	39- 41
	iii. propose mitigation measures: costs and deliverability	Section not required
D Environmental Report and Consultation	i. prepare the Environmental Report, plus a non-technical summary	All
	ii. show the likely significant effects on the environment of implementing the JLTP	52- 71
	iii. show the likely significant effects of the alternatives	37- 51
	iv. take account of the plan's objectives and geographical scope	All
	v. show proposals for monitoring	75
	vi. consult widely with environmental authorities and the public with ample response time	8
	vii. take account of the results of consultation	50
	viii. give reasons for adopting the preferred approach	50
	ix. show how environmental considerations and the results of consultation have been taken into account	50
E Monitoring	i. firm up and introduce monitoring programme	75
	ii. establish a programme of remedial action to mitigate adverse effects of the JLTP	Dependent on development of major scheme bids

Strategic Environmental Assessment: Environmental Report

Scope of the SEA

7. The SEA concerns schemes and measures contained within the Final JLTP and likely to be implemented in the 5 year period to 2011. These comprise mainstream integrated transport and maintenance programmes together with the Greater Bristol Bus Network and Bath Package major schemes. It does not cover other major schemes for which bids may be made in the JLTP period including those recommended by the Greater Bristol Strategic Transport Study (GBSTS). The final report of the GBSTS (expected spring 2006) was not produced in time for the SEA. Likewise it does not cover schemes likely to be implemented by rail companies, Bristol International Airport, or the Port of Bristol, which are beyond the control of the local authorities and subject to their own environmental appraisals.

Consultation

8. Extensive JLTP/ SEA consultation was undertaken in Spring and Winter 2005.

Joint Local Transport Plan

JLTP Aims and Objectives

9. The aims and objectives of the JLTP are set out in Table 2.

Links to Other Plans and Programmes

10. The Government's Shared Priorities commit the four JLTP authorities to improving
- Congestion and bus patronage;
 - Accessibility;
 - Road safety; and
 - Air quality.

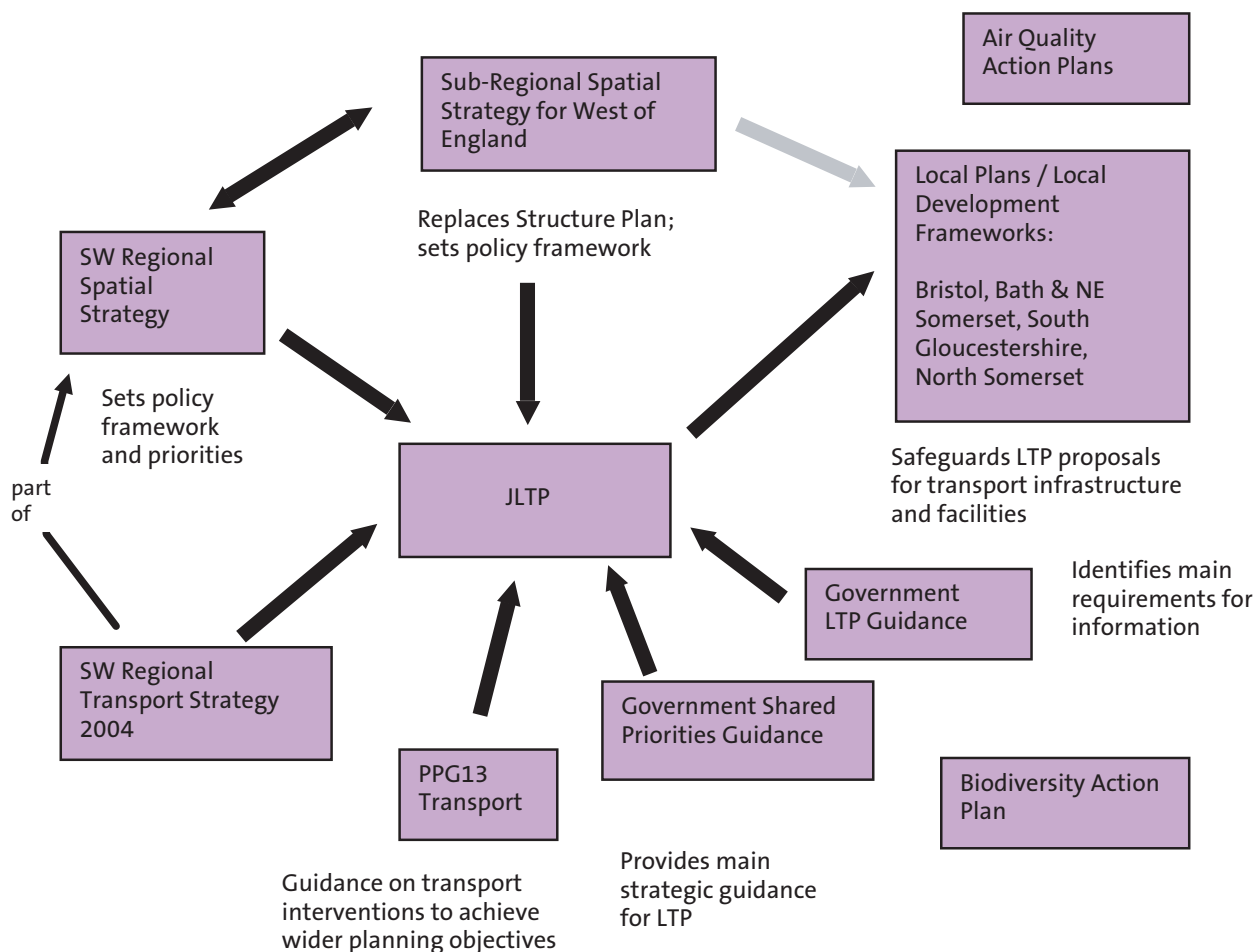
Table 2 - Aims and Objectives of the JLTP

Aims	Objectives
To tackle congestion	<ul style="list-style-type: none"> • Promote use of alternatives to the private car • Encourage more sustainable patterns of travel behaviour • Manage the demand for travel by the private car
To improve road safety for all road users	<ul style="list-style-type: none"> • Ensure significant reductions in the number of the most serious road casualties • Achieve improvements for road safety for the most vulnerable sections of the community
To improve air quality	<ul style="list-style-type: none"> • Improve air quality in the Air Quality Management Areas • Ensure air quality in all other areas remains better than the national standards
To improve accessibility	<ul style="list-style-type: none"> • Improve accessibility for all residents to educational services • Improve accessibility for all residents to health services • Improve accessibility for all residents to employment
To improve the quality of life	<ul style="list-style-type: none"> • Ensure quality of life is improved through the other Shared Priority objectives, contributing towards the enhancement of public spaces and of community safety, neighbourhood renewal and regeneration, healthier communities, tackling noise and protecting landscape and biodiversity. • Achieve balanced and sustainable communities.

Final Joint Local Transport Plan 2006/07 - 2010/11

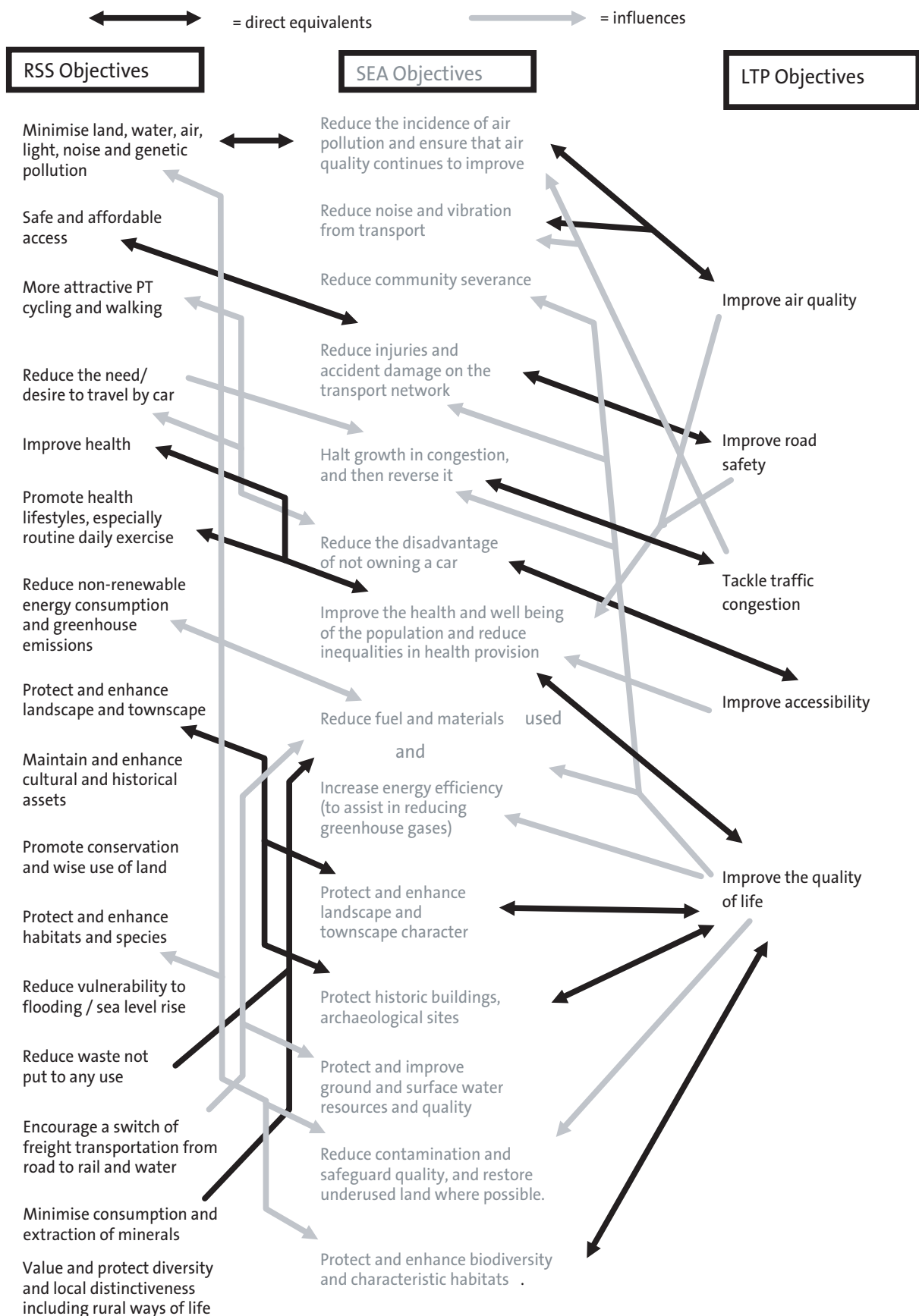
11. The JLTP has to have regard to the Regional Transport Strategy (RTS) which forms part of the Regional Spatial Strategy (RSS) for the South West Region. Relationships with other plans are as shown in Figure 1. It can be seen that the JLTP objectives will interact in complex ways with the other plans that affect it.
12. The RSS has the following high level objectives:
 - A. Improve health
 - B. Support communities that meet people's needs
 - C. Develop the economy in ways that meet people's needs
 - D. Provide access to meet people's needs with least damage to communities and the environment
 - E. Maintain and improve environmental quality and assets
 - F. Minimise consumption of natural resources.

Figure 1 - Other Relevant Plans and Programmes



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Figure 2 - Relationship between the JLTP, SEA and the RSS



Final Joint Local Transport Plan 2006/07 - 2010/11

Links between the SEA, JLTP and RSS

13. Figure 2 shows diagrammatically the relationship between the objectives of the RSS, the JLTP and the SEA. The JLTP objectives are deliberately more concise than those of the SEA, which take account of effects not closely influenced by the JLTP.
14. The current RTS has the following objectives: to
1. help deliver the regional spatial strategy and meet all travel needs
 2. service existing and new development efficiently and in an integrated fashion
 3. meet the demands of a dynamic regional economy and assist the delivery of the Regional Economic Strategy
 4. help overcome regional peripherality and the economy of peripheral parts of the region
 5. reduce the impact of transport on the environment
 6. create a modern, efficient and integrated transport system
 7. improve transport efficiency by reduced congestion, reduced journey times, and increased reliability of journey times
 8. make Principal Urban Areas and other designated centres for growth work well to enable them to maximise their potential for sustainable growth
 9. support regeneration and access to services and facilities
 10. improving the range of alternatives to the private car - public transport, walking and cycling - and secure improved accessibility to work, shopping leisure and services
 11. reduce noise, pollution and the impacts of congestion
 12. introduce measures to encourage behavioural change
 13. locate development at accessible locations with the potential to develop sustainable transport linkages

Table 3 JLTP Links with the Regional Transport Strategy

JLTP Objectives	Congestion	Air quality	Accessibility	Road safety	Quality of Life
1	✓	○	✓	○	✓
2	✓	○	○	○	✓
3	✓	○	○	○	✓
4	✓	○	○	○	○
5	✓	✓	✓	✓	✓
6	✓	✓	✓	○	✓
7	✓	○	○	○	○
8	✓	○	○	○	✓
9	✓	○	✓	○	✓
10	✓	✓	✓	○	✓
11	✓	✓	○	○	✓
12	✓	✓	✓	○	✓
13	✓	✓	✓	○	✓
14	✓	✓	✓	✓	✓
15	✓	✓	✓	✓	✓
16	✓	○	○	✓	✓

✓ indicates a positive correlation, x indicates a conflict, and ○ denotes no identified linkage between Regional Transport Strategy objectives and JLTP / Shared Priority objectives. The main correspondences with each Regional Transport Strategy objective are shown in **bold** type.

Strategic Environmental Assessment: Environmental Report

14. improve cohesion and expand flexibility by better integration between modes and associated facilities
 15. consider the impact of transport decisions on social inclusion
 16. ensure the safe use of the regional transport network and its associated facilities
15. As can be seen in Table 3, the JLTP objectives have close correlation to the RTS objectives.

Baseline Environment and Sustainability Data

Environmental Problems and Opportunities

16. The SEA regulations require baseline data to be set out on the current state of the environment. Table 4 shows the main transport effects for each of the relevant DfT New Appraisal Tables (NATA) categories and their extent/ severity.

SEA Objectives

17. SEA objectives were drawn up at the Baseline and Scoping Report stage flowing from the NATA categories and have been used to assist the assessment process: they are included in the last column of Table 4.

Table 4 - Effects of Transport on the Environment

SEA Topic	NATA Impact Categories	Main Transport Effect	Extent/ Severity	SEA Objective
Human health, population	Air quality; dirt	High traffic flows; traffic speeds; high HGV flows	Widespread, moderate; locally severe	Reduce the incidence of air pollution and ensure that air quality continues to improve
	Noise, vibration	High traffic flows; congestion	Localised, severe	Reduce noise and vibration from transport
	Road accidents	Traffic speeds, traffic flows; driver frustration	Fairly widespread; severe	Reduce injuries and accident damage on the transport network
	Security	Criminal acts in locations not subject to surveillance	Widely perceived but very infrequent; severe	Improve the health and well-being of the population and reduce inequalities in health provision.
	Physical fitness	% of trips on foot or by cycle	Widespread, moderate, worsening	
Population	Community severance	High traffic flows	Widespread, moderate/ severe	Reduce community severance
	Mobility	Low car ownership	Localised; severe	Reduce the disadvantage of not owning a car
Material assets	Transport economic efficiency	Traffic congestion reducing access and operating efficiency	Fairly widespread; moderate to severe	Halt growth in congestion, and then reverse it

Final Joint Local Transport Plan 2006/07 - 2010/11

SEA Topic	NATA Impact Categories	Main Transport Effect	Extent/ Severity	SEA Objective
Landscape	Landscape	Main roads, railways; port and airport; induced land use change; night light pollution	Localised; can be severe	Protect and enhance landscape and townscape character based on appraisals.
	Townscape	Road vehicles, parking, vehicle-related land uses	Fairly widespread, moderate	Protect individual features – historic buildings, archaeological sites and other important artefacts.
Heritage	Culture	Transport provides access to all related activities	Little impact	Reduce light pollution.
	Architecture			
	Archaeology	Disturbance from new construction	Little impact; few new transport schemes	Increase provision for cycling and walking to increase appreciation of natural environments
Climate	Greenhouse gases	CO ₂ from vehicle exhausts	Main effect is from vehicle technologies	Increase energy efficiency (to assist in reducing greenhouse gases) Encourage shift from car to other modes
Water	Water quality	Highway run-off	Significant only at very few sites	Protect and improve ground and surface water resources and quality
	Flood risk	Risk of inundation	Interference with water-courses by roads & railways	Ensure flood risk not exacerbated by new development
Biodiversity	Soil	Air quality; highway runoff; traffic disturbance and (re fauna) road mortalities	Variable impact; very widespread	Reduce contamination and safeguard quality, and to restore underused land where possible
	Flora Fauna			Protect and enhance biodiversity at ecosystem, species and genetic levels, and preserve and enhance native and characteristic habitats.

Strategic Environmental Assessment: Environmental Report

Air Quality and Dirt

18. The four Councils in conjunction with the University of the West of England have a joint Air Quality Strategy available at www.uwe.ac.uk/aqm/centre/region/index.html. Measurement, analysis and treatment of air quality problems is well advanced due to well-established guidelines and targets and procedures for establishing Air Quality Management Plans. Table 5 is a summary of pollutant levels in locations in the JLTP area known to have poor air quality.
19. It is evident from this data that pollution varies with sundry external factors including weather conditions. Bristol has by far the largest declared Air Quality Management Areas, in which the Government's health-based air quality targets failed to be met in 2005. Road transport accounts for 70% of Bristol's emission of NOx. Figure 3 below shows the Management Area, covering a quarter of the city, including the city centre, much of the inner city, corridors out through the suburbs, and a large area straddling the M5 Motorway through Avonmouth. Some improvement in pollutant levels has occurred in the last 2 years.

Figure 3 - Bristol Air Quality Management Areas



Final Joint Local Transport Plan 2006/07 - 2010/11

Table 5 - Incidence of Main Air Pollutants Against Guideline Levels

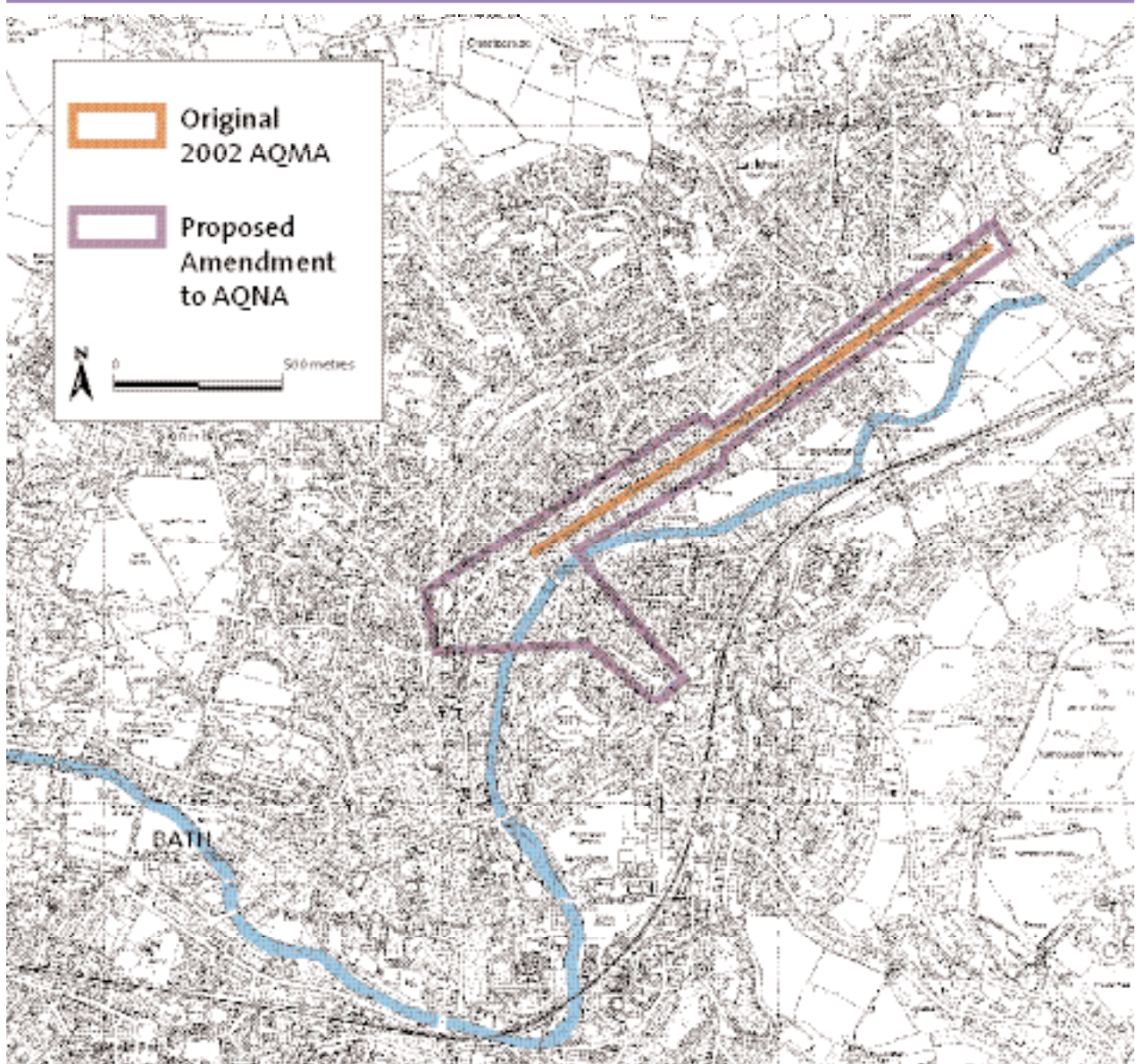
Substance and Objective Level in 2000 Regulations	1997/8	1998/9	1999/00	2000/1	2001/2	2002/3	2003/4	2004/5
NO2 Nitrogen Dioxide NAQS 40 µg/m3 or 21 ppb annual mean. All data µg/m3								
London Road, Bath - AQMA declared 2001			61.0	49.9	56.5	58.4	60.9	53.3
Bristol : whole city average roadside levels			52.1	48.6	49.9	45.9	54.0	48.0
Old Post Office, Banwell	31.3	46.1	36.7	40.6	44.2	34.8	31.9	N/a
The Square, Banwell	43.8	48.3	40.1	44.6	44.7	37.8	39.4	38.7
Ozone at low levels O3 NAQS 100 µg/m3 (50ppb) <10 days as 8-hr mean. No. of days exceeded (not an objective for local authorities under NAQS, but susceptible globally to local action)								
Royal Victoria Park, Bath			19	30	18	0	16	9
Badminton, South Gloucs			25	12	24	12	20	n/a
Benzene NAQS 16.25 µg/m3 annual mean								
Old Post Office, Banwell	9.7	11.7	9.1	4.2	4.3	3.7	3.9	n/a
The Square, Banwell	13.3	12.6	9.7	4.1	4.7	3.4	2.5	2.3
Particulates PM10 NAQS <40 µg/m3 annual, 50 µg/m3 24hr not to be exceeded more than 35 days pa								
No data currently available								
Nitrogen Dioxide, Particulates and Carbon Monoxide together number of days when levels exceed NAQS:								
S Gloucestershire : 4 sites					88	42	114	55

Strategic Environmental Assessment: Environmental Report

20. In Bath, a small Management Area has been declared to the east of the city centre along the A4 London Road (Figure 4). An estimated 72% of NOx emissions are from road traffic.
21. Excessive amounts of dirt, inhaled by humans and deposited on buildings, are known to follow the same pattern as poor air quality, largely from the particulate and soot deposits in road vehicle exhausts. Narrow roads and narrow footways are a factor in the damage done by soot. Areas visually affected include Gloucester Road in North Bristol, West Street in Bedminster, Pensford on the A37, and the A371 through Banwell where air quality is also close to exceeding guidelines. Such effects can depress land values, retail turnover and competitiveness, but little quantified data is available.
22. Relatively little monitoring of noise has been carried out in the area, with the notable exception of areas close to Bristol International Airport. In Bristol, a DEFRA funded study is under way to map levels of traffic noise and it should be possible to develop local indicators from this. The first Bristol Local Transport Plan of July 2000 stated “the overall noise climate in the

Noise and Vibration

Figure 4 - Bath Air Quality Management Area



city is dominated by traffic noise and the background noise in each neighbourhood is dependent on its proximity to busy roads". At that time three Bristol wards had ambient daytime noise levels of over 50dB(A). It is thought that high levels of noise occur at many locations on the road network, but particularly

- along elevated sections of highway where no noise barriers are installed, e.g. the M32 viaduct through Eastville; and
- in housing close to the busiest junctions, e.g. A37/ Airport Road in South Bristol, A38 / A4174 at Filton, and A4/ Cleveland Bridge in Bath.

23. At such locations constant braking and acceleration produce continuous noise for more than 18 hours per day. Vibration becomes a particular problem where high flows of heavy goods vehicles pass through dense development. On London Road in Bath such effects may have contributed to structural deterioration in buildings, and in other areas such as A4 Portway in Avonmouth and A37 through south Bristol HGV flows exceed 1000 per day. Where there are no close frontages, noise attenuation at distances from the road can be achieved by fences or appropriate planting. Also, low noise road surfaces are being applied gradually in the area, and will reduce rolling noise, but engine throb and air noise are more pervasive problems. Noise is also a problem in a few areas from rail traffic, and (with much data available) around Bristol International Airport.

Road Accidents

24. Road safety is the area where most effort has been put, over 25 years, into analysis, understanding and mitigation measures. Police accident data show that accidents now occur in a more dispersed pattern than before, largely because of measures already targeted at accident cluster sites.
25. Table 6 shows the number of people killed or seriously injured in road accidents in the four Councils' areas. Government targets are for a 40% reduction 2000 to 2010, which is proving difficult to achieve. Data is quite volatile for reasons not well understood; however, data suffered from changing definitions between 2001 and 2002, and trends over the past year are mostly downward.

Security

26. Security risk is most often perceived greatest to people walking singly during the hours of darkness, and people using little-used buses and trains. In fact, data generally shows that the risk of abuse, theft or personal injury is very small, and much less than the perception, though quite widely distributed. Police records detail the incidence of such crimes. In transport, effective measures range from CCTV cameras to increasing the use of off-peak public transport. No consistent effort has yet been made in the JLTP area to assess risk of harm from criminal acts in transport.

Table 6 - Road Accidents - Number of People Killed or Seriously Injured

	1994-98 average	1999	2000	2001	2002	2003	2004
B&NES	71	83	79	61	67	79	71
Bristol	177	183	177	180	243	197	228
S Glos	122	147	121	129	127	111	115
N Somerset	98	99	85	85	118	111	111
Total	468	512	462	455	555	498	525

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Physical Fitness

27. Low levels of physical fitness and obesity are known to affect large numbers of people in Britain. One factor is the low level of travelling done on foot and on bicycles, which has been falling continuously since the 1950s in most areas. Some health authority data may be available for local levels of obesity. As Table 7 shows, both walking and cycling are growing slowly in the JLTP area. Cycling to work has been growing particularly strongly in Bristol, where better facilities make both modes attractive for some short journeys, together with rising parking prices, rising bus fares, and traffic congestion.

Community Severance

28. This affects not only inner city areas but also suburban areas as well as villages on A roads. Mitigation measures such as frequent pedestrian crossing provision and community transport provision have proved partially effective in some areas. Severance is a particular problem for rural communities on National Primary Routes where long distance traffic flow is prioritised, such as Pensford and Temple Cloud on the A37 and Banwell on the A371.

Mobility

29. A mass of data is available on pockets of social exclusion in parts of all three major urban areas where non-car ownership exceeds 30%. Where these are in inner city areas, good bus services exist on radial routes, but non-radial destinations are less well served, and high and rising bus fares are a problem. The major operator's

bus fares are tapered very sharply so that short journeys are the most costly per mile. The situation is worse still for low income families in outlying former Council estates such as Lawrence Weston, Withywood and Stockwood in Bristol, and Whiteway in Bath. Accessibility modelling with the new Accession software should enable some of these problems to be confronted, developing ideas from the Social Exclusion Unit's 2002 report "Making the Connections". Attitudinal data from the Councils' Citizens Panels may also be of use.

Congestion

30. Congestion is perhaps the single greatest effect of transport on society today. Although traditionally associated with the morning and evening commuting peaks, in the JLTP area these peak periods have spread to the early morning and the inter-peak period. Figure 5 shows that average journey speeds in inner Bristol and Bath are similar to those in London. Peaks for journeys to school and evening leisure activities further exacerbate journey to work congestion, and in suburban locations congestion is now as great a problem at weekends when peaks in shopping occur.
31. Congestion wastes time for the individual on a vast scale, increases driver stress leading to more road accidents, and damages business efficiency through increased time spent on work journeys, and lengthened, unpredictable freight delivery times. Table 8 shows an index of journey times on routes in S Gloucestershire and N Somerset and

Table 7 - Recent Trends in Cycling and Walking in the JLTP Area

	2000/01	2001/02	2002/03	2003/04	2004/05
Cycling	100	104	108	119	125
Walking	100	103	106	107	112

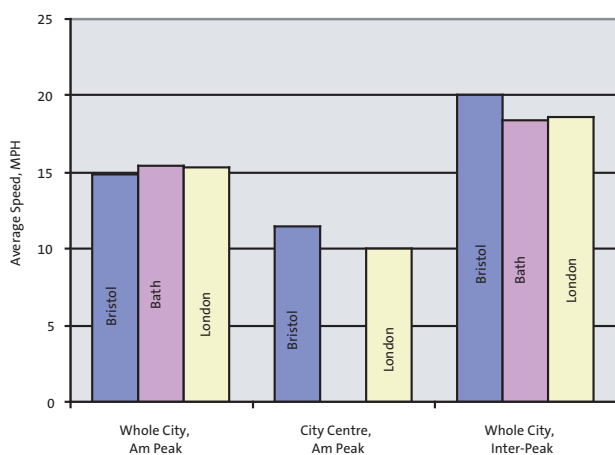
Note:

Based on index of 100 in 2000/01. Figures are totals, weighted by population, of indicator values in Council Annual Progress Reports, converted to indices.

illustrates how journey times change in an unpredictable way on individual routes, as drivers re-route and re-time their journeys while traffic growth continues. On many journeys in the area, 50% of journey time is delay.

32. A whole raft of interventions to control congestion have been the subject of the Councils' first LTP submissions in this area, comprising improvements to the alternative modes, demand management tools, and education to change attitudes. A characteristic of such actions is that we must "run fast to keep still" while rising incomes continuously increase the amount of travel on the network.

Figure 5 - Traffic Speeds in Bristol, Bath and London



Sources:

Bristol Area Congestion Study 1996-97 (Bristol City Council 1998 unpublished) Graph A
Bath Multi-Modal Model – Report of Survey Mar 1999 (B&NES / Oscar Faber unpubl) App G
Transport Statistics Great Britain 1998 (DETR) Table 4.14

Table 8 - Index of Journey Times on Routes in S Gloucestershire and N Somerset

2000	2001	2002	2003	2004
100	119	126	113	122

(100 = year 2000 value) The index aggregates (weighted by kms) minutes spent travelling on multiple peak period runs on 11 routes in Bristol North Fringe (S Gloucestershire) and the routes from Portishead and Long Ashton to Bristol (N Somerset)

Landscape

33. The JLTP area contains parts of the Cotswolds and Mendip Hills Areas of Outstanding Natural Beauty (see Figure 5) and both AONB management plans highlight the adverse impact that traffic and highway-related schemes can have. A variety of local landscape designations have been identified in Local Plans: these areas are all susceptible to change through implementation of local highway schemes and through maintenance regimes such as hedgerow management.

Biodiversity and Heritage

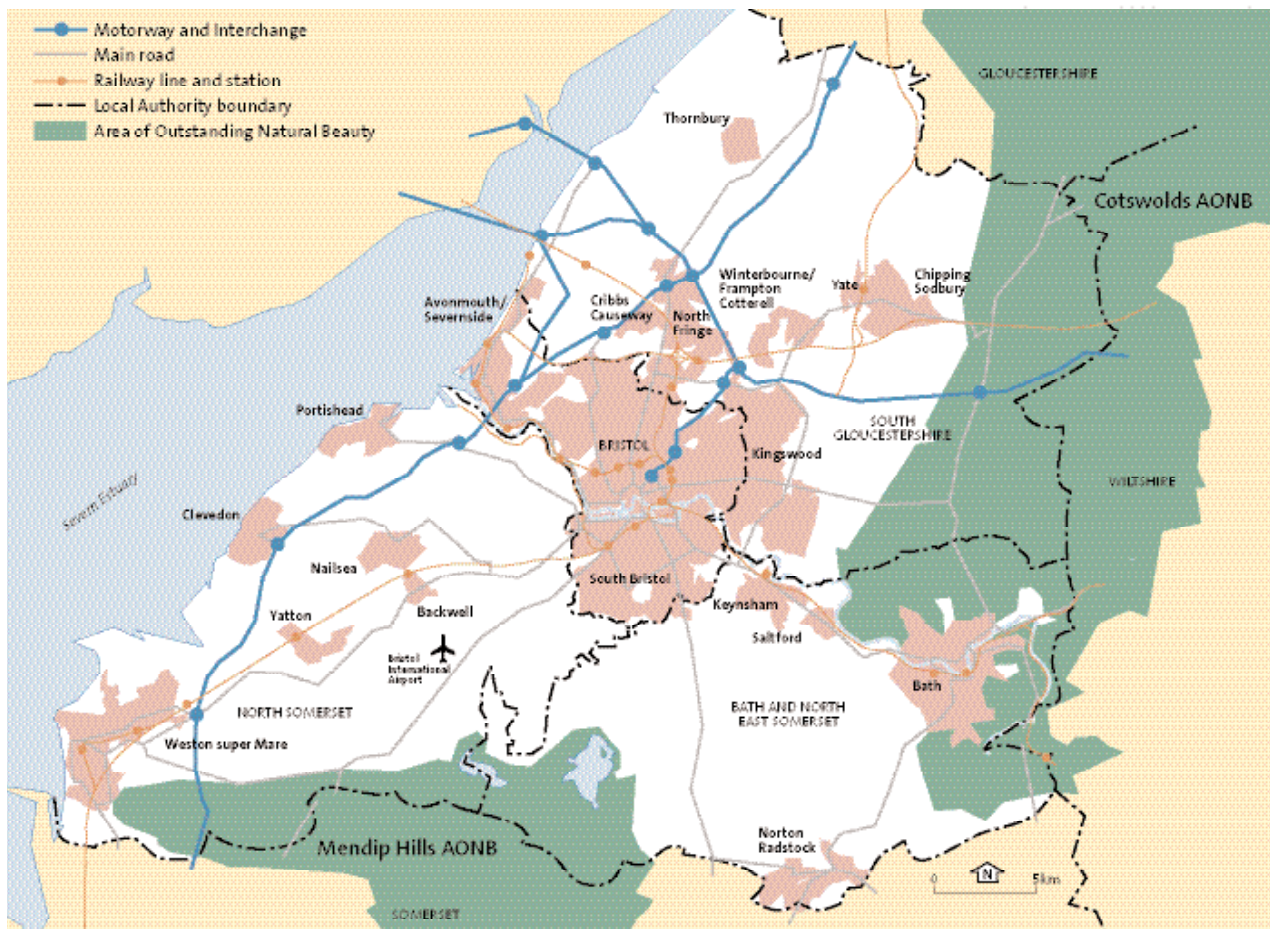
34. The effects of transport infrastructure and traffic on wildlife and heritage are not well known. Figure 6 shows all national and local wildlife sites and ancient monuments which are within 500 metres of a main road. It seems likely from this that roads in the area have significant effects on wildlife and heritage. Many designated wildlife sites fringed by main roads are ancient woodlands, rhyne systems, water resources, and unimproved meadows that support a variety of wildlife. There is remarkably little evidence of the effects of traffic on these ecosystems. Runoff of surface residues from roads, particularly those carrying many HGVs and accessing motorway junctions, may have significant effects on ecology through verge groundwater pollution, damage to aquatic fauna, and effects on predator species. The effects of noise on fauna are also little known.

35. Ancient buildings may also be important ecologically as home to bat roosts and insect populations. Many of the Ancient Monuments shown on Figure 7 are hillforts and other landscape features which are probably affected very little by existing roads and traffic. Some however are ancient manor houses; traffic effects such as dirt and vibration may affect the structural integrity of such buildings.

Greenhouse Gases

36. The CO₂ emissions study carried out for the Councils (Sustainable Transport

Figure 6 - Mendip Hills and Cotswold Areas of Outstanding Natural Beauty



Solutions Ltd October 2005) estimated that CO₂ emissions amounted to 2.25 million tonnes in 2004 and could, without intervention, increase to 2.67 million tonnes by 2011.

Assessment of Alternatives

NATA Categories

37. For some of the NATA categories:
- the impact from transport is not the major agent for change relative to other impacts; or
 - the scope for change in the JLTP period will be limited, either because of the short 5 year timescale or because of the limited resources available; or
 - monitoring might not be cost-effective, or no means of measuring the effect is known.

38. For these reasons, only 7 categories have been used to assess alternative strategies. These cover

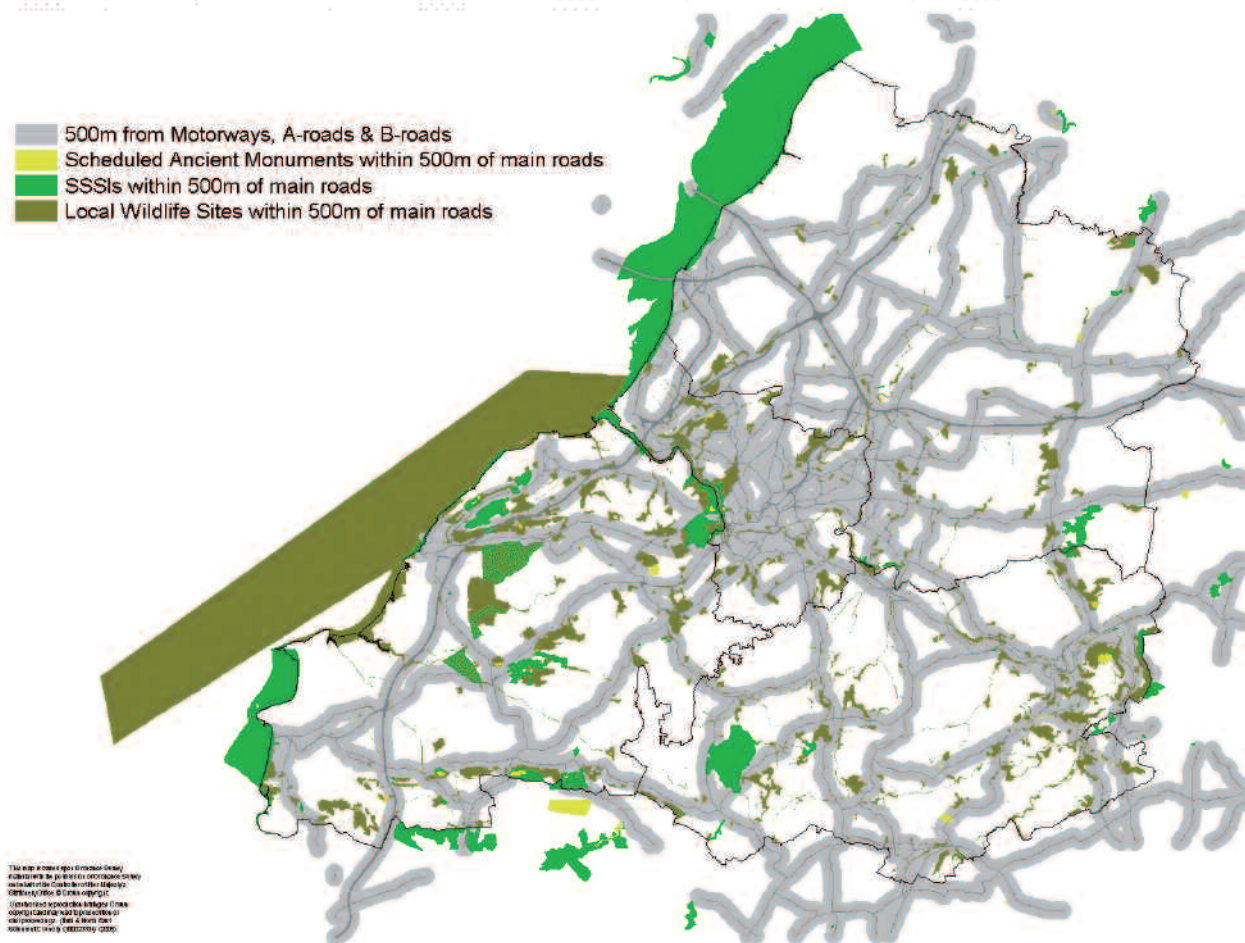
- the four Shared Priorities of traffic congestion, air quality, road safety and accessibility;
- three quality of life issues drawn from priorities identified in Community Strategies.

Alternative Strategies

39. The following alternative strategies were identified in the Baseline and Scoping Report for this SEA:

- A a strategy without any major scheme or demand management scheme
- B a strategy including funding for two major public transport packages, but no major demand management scheme
- C a strategy with a major public transport package, and a major demand management scheme

Figure 7 - West of England Environmental Resources within 500m of Main Road



40. Continuing expenditure on cycling, walking, traffic management, road safety, smaller public transport schemes, and travel awareness will be common to all three strategies. The alternatives were designed to illustrate the changing performance of different sized programmes. The effects of these alternatives have been estimated, using both past study results, and further transport modelling.
41. The alternatives have been chosen to show, in a climate of constrained resources, what could be achieved with different funding levels. Alternative strategies embodying radically different policy approaches have not been considered, because
 - a strategy which fully addresses the infrastructure needs of the area is not fundable in the next 5 years;
 - the JLTP's policy direction is largely determined by Government guidance and the Shared Priorities approach.
42. The likely effects of the three alternative strategies are shown in Table 9.
43. Strategy B embraces the Greater Bristol Bus Network (GBBN) and Bath Package major schemes. The GBBN, with 10 bus showcase corridors, is forecast to increase bus patronage by 12%, of whom some 57% are former car users. It reduces the car mode share, and reduces car km travelled by 0.5%. However, as a result of reduced car traffic on the bus showcase routes, traffic speed increases slightly. Air quality is forecast to improve slightly, due largely to improvements in the performance of road vehicle engines.
44. Strategy C, with an initial demand management scheme such as a Bristol inner charging cordon, is forecast to

Strategic Environmental Assessment: Environmental Report

Table 9 - Transport Effects of the Alternative Options

	Option A No Major Schemes	Option B Major Public Transport Package	Option C Initial Demand Management Scheme
Car Mode Share AM Peak	90.1%	89.3%	89.0%
Bus Mode Share AM Peak	6.8%	7.6%	7.8%
Vehicle Kilometres Cars & Light Goods AM Peak	2.237m	2.226m	2.228m
Average Vehicle Speed Cars and Light Goods AM Peak	37.2km/hr	37.5km/hr	37.4km/hr

Source: based on data from draft Greater Bristol Strategic Transport Study

- further increase the bus mode share, and further reduce the car share. However vehicle km does not reduce quite so much as in Strategy B, as car travellers divert onto more circuitous routes to avoid having to pay the charge. But vehicle speed does not increase quite so much as in Strategy B, either.
45. The impact of Strategy B on most environmental measures is considered likely to be positive, and on Strategy C more so still. However in many cases the amount of change over the JLTP period is likely to be small. This is shown in Table 10, which compares the environmental effects of the three options in 2011 with the expected change without the intervention of the JLTP. It does not include any additional resources that might potentially come forward from, for example, the Transport Innovation Fund which the Government is offering to authorities who commit to demand management policies.
46. The draft Greater Bristol Strategic Transport Study has assessed the effects of a wide range of measures, initially shown as alternative strategies based on public transport, highway measures, and demand management. The forecast situation in 2031 without any intervention showed delays from road congestion at three times today's levels. Delays were predicted to be kept close to current levels by 2031 only with intervention and very high levels of spending across many fronts. Nitrogen dioxide and particulates pollution reduced substantially in all three strategies, but CO₂ emissions continued to rise.
47. Further studies commissioned for the JLTP (Sustainable Transport Solutions Ltd, October 2005) suggested that the rise in CO₂ emissions over the period to 2011 could be
- 18% with current levels of investment continuing;
 - 10% with robust implementation of the JLTP strategy;
 - 8% if the GBBN major scheme bid is implemented, and
 - 2% if, additionally, efficiency improvements occur in the vehicle fleets as a result of the current EU voluntary agreement with motor manufacturers being implemented

Final Joint Local Transport Plan 2006/07 - 2010/11

Table 10 - Expected Effect of Alternative Strategies on Environmental Indicators

Effect	Indicator	Expected Change			
		Without Intervention of JLTP	With Strategy A	With Strategy B	With Strategy C
Air quality; dirt	LTP 8. NO2 emissions		O	++	++
Noise, vibration	Roadside noise	-	O	+	+
Road accidents	BVPI 99x-z. Killed / seriously injured; slight	-	+	+	++
Physical fitness	LTP 3. Cycling trips	-	+	+	++
Community severance	No current indicator	-	-	O	-
Accessibility	LTP 1a-c. Accessibility to health, employment and education	O	+	+	+
Traffic congestion	LTP 2,6,7. Area-wide traffic mileage/ peak flows to Bristol city centre/ congestion	-	O	+	+

Symbols:

o	little change expected		
-	some worsening expected	+	some improvement expected
--	significant worsening expected	++	significant improvement expected

48. On air quality, the worst conditions in the JLTP area are to be found in inner Bristol and Bath. These are the areas on which most of the showcase routes converge, and which are therefore likely to feel the most benefit in terms of air quality from Strategies B and C. On community severance, fast moving traffic, HGVs, and buses, cause considerable severance on some roads in the area. It is considered severance may reduce in Strategy B because more traffic management is expected, whereas in Strategy C a modest increase may occur as car traffic speeds increase marginally. See also Congestion below.

49. On traffic congestion, it appears unlikely that any significant reduction in congestion can be achieved through interventions without the GBBN major scheme in Strategy B. However, forecasts show that the demand management package in Strategy C does not reduce traffic delays to quite the same extent as Strategy B, because the extra mileage caused by cars diverting away from the charging area causes congestion there.

Conclusions

50. Overall Strategy C is considered the most beneficial of the three tested in environmental terms, then Strategy B. The public consultation carried out in Spring

Strategic Environmental Assessment: Environmental Report

2005 corroborated these results, with 62% supporting Strategy C, 54% Strategy B, and 24% Strategy A. On the basis of this and later consultation the four Councils chose to abandon Strategy A and pursue Strategy B. The intention is to continue to consult on Strategy C.

51. The longer term effects of a strategy like C have not been included as the main demand management measures would be unlikely to take effect until the very end of the JLTP period, and the effects would not be fully evident until the next LTP period beyond 2011. These could be, for example
- a significant revenue stream which would create funds for a bigger expenditure programme in future years;
 - a culture change towards non-car modes which could be self-reinforcing as further improvements in public transport are carried out with the increased resources available;
 - further demand management measures which could release larger amounts of funding for more substantial transport improvements.

Analysis of JLTP Effects

Overall Effects

52. Tables 9 and 10 above outline the main effects of the final JLTP, based on Strategy B. More detailed information is set out below.

Air Quality and Dirt

53. Bristol City Council has an Air Quality Management Action Plan which has been subjected to extensive consultation, with measures costing in total more than £1.4m per annum – see www.bristol-city.gov.uk/daqp. An Action Plan is being prepared for the Bath AQMA. Implementation of the GBBN and Bath Package major schemes, combined with the range of other JLTP measures, are likely together to have a positive environmental effect on these AQMAs.

54. It seems possible that emissions of Nitrogen Dioxide and particulates will reduce steadily during the JLTP period with improvements in vehicle engine design. Significant benefits are expected by the upgrading of the Bath and Bristol bus fleets associated with the two major schemes
55. Overall the JLTP is expected to have a significant beneficial effect on air quality and associated problems of dirt.

Noise and Vibration

56. Some positive improvement is expected in roadside noise as a result of the JLTP. For example, where there are no close frontages, noise attenuation at distances from the road can be achieved by fences or appropriate planting. Also, low noise road surfaces are being applied gradually in the area, and will reduce rolling noise, although engine throb and air noise are more pervasive problems.

Road Accidents

57. The JLTP aims to reduce the number of road accident casualties by 2011 through:
- Extensive education and training programmes, capturing hearts and minds of road users across all age groups.
 - Schemes targeted at improving road safety for children, motorcyclists, cyclists and disadvantaged areas and addressing specific problems in rural and urban areas.
 - Speed management and effective enforcement measures to reduce casualties and improve quality of life where there is evidence of vehicles travelling at inappropriate speeds.
 - Improving quality of life by linking road safety initiatives to neighbourhood renewal and town centre enhancement programmes and promoting 'liveability' by good design and maintenance.
58. Overall, the JLTP is expected to have a positive effect on road safety.

Security

59. No significant change is anticipated in security risks as a result of the JLTP. Improvements in walking, cycling and bus waiting infrastructure, including lighting, should bring benefits.

Physical Fitness

60. A main plank of JLTP strategies is the further promotion of walking and cycling and proposed action covers:
- Provision of infrastructure; and
 - Education, training, publicity and promotion.
61. Through implementation of these measures and associated initiatives, such as school and workplace travel plans, the JLTP is expected to have an overall positive effect on physical fitness.

Community Severance

62. Reductions in traffic in some areas as a result of JLTP measures, combined with improved pedestrian access and crossings, should bring some improvement in community severance. Overall the effect is not however likely to be significant.

Mobility

63. Through modelling with Accession software and extensive partnership working, the Accessibility Strategy and future Action Plans should combine to produce an overall beneficial effect on mobility, accessibility and inequalities.

Congestion

64. The JLTP strategy for tackling traffic congestion focuses on:
- Providing alternatives to the car to make it more attractive to use other modes of travel;
 - Influencing travel behaviour to encourage more people to reduce car use; and
 - Managing demand to optimise use of the road network.

65. The combined effect of the congestion strategy is expected to be beneficial. Many techniques to counter traffic congestion also have other environmental benefits, so as improving air quality. It is important that increased traffic speeds obtained through congestion relief do not worsen severance and the attractiveness of walking and cycling.

Landscape, Biodiversity and Heritage

66. The Environmental Impact Assessments for the GBBN major scheme bid identifies about 30 instances of carriageway widening to achieve bus priorities in areas affected by traffic congestion. Most of these are relatively short, but they have some effects on rural and urban landscapes; the settings of buildings; trees, hedges, walls and grassland on verges; adjacent pedestrian routes; severance due to road width; and archaeology. Remedial actions are proposed in all cases. In five instances some impact is expected on sites protected for wildlife, one of these having a possibly critical effect on habitats. If the bid is accepted, detailed consideration will need to be given to all these sites, including reviewing that element of the scheme in some cases. The bid also involves new bus shelters with lighting at many bus stops, which will have slight effects in increasing light pollution.
67. A new park and ride site at Lambridge site in the Avon Valley east of Bath, included in the Bath Package for which a bid will go forward in Spring 2006, is considered likely to have effects on flood risk and fauna. Briefly, the effects identified are on bat roosting behaviour, and on water flow on the Lam Brook, a tributary of the Avon. Work has been done to establish remedial measures, including holding ponds upstream on Lam Brook, and it is believed these will be effective in ameliorating damage from the scheme.

Strategic Environmental Assessment: Environmental Report

68. Verge maintenance and hedge trimming regimes can have an impact on ecosystems, protecting flower-rich grassland and ancient hedges and controlling invasive species. These are matters for the Transport Asset Management Plan, though again an effective monitoring regime may be difficult to establish. Improvements can be secured through road runoff collection systems.
69. Although JLTP schemes and measures as a whole are not expected to have any significant effects on townscape, maintenance practices can again have an effect, such as practice in maintaining historic road surfaces such as cobbles in towns. Again these issues are matters for the Transport Asset Management Plan.
- ### Climate Change
70. The report commissioned by the Councils indicates that the JLTP (Strategy B) could limit growth in CO₂ emissions to about 8% by 2011 compared to 18% without intervention. Potentially this could be pegged back to 2% with efficiency improvements in vehicles.
- ### Implementation
- #### Processes For Environmental Consideration of Transport Proposals
71. It is characteristic of Local Transport Plans that many of their measures are small, not known more than a year in advance, and not likely to have substantial environmental effects individually. This SEA considers the likely effects of whole packages of schemes in these areas. It assumes that the benefits (e.g. from mode shift or congestion relief) will accrue at a linear rate, while disbenefits will be “lumpy” and hardly ever known at this stage. Normally there is no formal environmental appraisal, at any stage, of small schemes of this type.
72. For larger schemes arising from GBSTS, the costs and benefits of individual proposals will be considered in a much more systematic way. These comprise the stages set out in Table 11:
- ### Land Use Change
73. During the JLTP period, significant amounts of new development are expected at
- Emersons Green on the north east edge of Bristol (housing and employment)
 - eastern Weston-super-Mare including Weston Airfield (housing and employment)
 - Harbourside and other locations near central Bristol (housing, retail, offices, leisure)
74. Detailed plans have not been drawn up for all these proposals, and their needs for transport infrastructure and services are not clear. However, there is no indication as yet that these proposals will entail extensive new road or rail construction. It is essential that all new developments make full provision for non-car modes of transport to and from all parts of the site if transport impacts are not to worsen, and this will need to be secured through Section 106 agreements supported by Transport and Environmental Assessments.
- ### Monitoring
75. Table 12 sets out proposed SEA indicators, put forward to tie in with JLTP targets and indicators to enable efficient and relevant monitoring to be undertaken.

Final Joint Local Transport Plan 2006/07 - 2010/11

Table 11 - Stages in Assessment of Significant Transport Schemes

Process	Scope	Output	Consultations
Feasibility studies	Consideration of alternative options, consultation etc, including transport, ecological and landscape effects	Recommendation to proceed with bid / abandon scheme	Consultation with landscape, ecology and air quality officers, etc, plus wider consultation
Decision to submit bid	Decision on preferred option in the light of studies so far	Decision to proceed with bid / abandon	Appropriate Council officer input
Detailed appraisal	All effects of scheme in detail	Completed NATA tables, Environmental Appraisal	Appropriate officer input; internal consultation
Submit bid to DfT	DfT considers bid	Acceptance / refusal	Report to Council Executive
Detailed design	All details required for construction	Detailed drawings	Council landscape and other officers involved
Land acquisition	Land required for scheme and landscaping, plus additional in some cases	Ownership	If CPO, advertisement will invite submissions
Planning application	Report on benefits and costs, including environmental effects	Planning consent	Landscape and ecology inputs
Invitation to tender	One or more construction contracts	Recommendation of preferred bidder; decision to start construction	---

Strategic Environmental Assessment: Environmental Report

Table 12 - SEA Indicators

SEA Topic	NATA Impact Categories	Indicators
Human health, population	Air quality; dirt	LTP 8 NO ₂ ,
	Noise, vibration	Awaiting Government guidance on noise action plans
	Road accidents	BVPI 99x-z
	Security	LTP4 (mode share of journeys to school)
	Physical fitness	LTP3 cycling trips; LTP4 mode share of journeys to school
Population	Community severance	No transport indicator required
	Mobility	LTP 1 a-c accessibility; LTP5 bus punctuality.
Material assets	Transport economic efficiency (Traffic congestion)	LTP2 area-wide traffic mileage; LTP4 mode share of journeys to school; LTP6 peak period flows to Bristol city centre; LTP7 congestion; BVPI 102 bus patronage; BVPI 104 satisfaction with bus services; Rail local target.
Landscape	Landscape	No transport indicator required
	Townscape	No transport indicator required
Heritage	Culture	No transport indicator required
	Architecture	No transport indicator required
	Archaeology	No transport indicator required
Climate	Greenhouse gases	Indicator to be reviewed in light of consultants' report
Water	Water quality	No transport indicator required
	Flood risk	No transport indicator required
Bio-diversity	Soil	No transport indicators required
	Flora	
	Fauna	



BATH & NORTH EAST SOMERSET



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