



South West
Regional Network Report

November 2006

Foreword

As Network Strategy's Regional Manager for the South West I am delighted to present this second Regional Network Report.

The Government wishes to promote better integration of regional strategies for economic development, transport, planning and housing. This Regional Network Report and the model that underpins it provide a means by which the Region can assess how its spatial planning could affect the performance of the Trunk Road Network.

I hope that our partners in the Region will find it useful and would encourage them to work with us to test alternative investment scenarios and develop a fuller understanding of how their plans could affect network performance.

This report is a live document and addenda and further revisions will be issued from time to time. I would therefore welcome your views on how the document could be improved in the future and would be grateful if these could be sent to me at networkstrategysw@highways.gsi.gov.uk.

David Wright

Regional Manager (South West)

Contents

Foreword	3
Introduction	6
The Regional Network Report	6
1: Sustainable Development in the South West	8
1.1 Integrated Regional Strategy (IRS)	8
1.2 The Regional Spatial Strategy	8
1.3 The Regional Transport Strategy	8
1.4 The Regional Economic Strategy	9
1.5 The Highways Agency's Involvement in the Spatial Planning Process	9
2: The South West Region	10
2.1 Introduction	10
2.2 Key economic features of the South West Region	12
2.2.1 <i>Relative Wealth</i>	12
2.2.2 <i>Economy</i>	12
2.2.3 <i>Environment</i>	12
2.2.4 <i>Tourism</i>	13
2.2.5 <i>Growth Areas</i>	13
Figure 2.1 The Draft Spatial Strategy for the South West Region	13
2.3 Development Pressures on the Network	14
2.3.1 <i>Air Transport</i>	14
2.3.2 <i>Freight Transport</i>	14
2.3.3 <i>Significant development proposals in the South West Region</i>	15
2.4 Key transport issues in the South West Region	15
2.4.1 <i>General</i>	15
2.4.2 <i>Road</i>	15
2.4.3 <i>Rail</i>	16
2.4.4 <i>Public Transport</i>	17
2.4.5 <i>Freight</i>	17
2.4.6 <i>Air</i>	17
3: The Trunk Road and Motorway Network in the South West	18
3.1 Trunk Road Categories	18
3.2 Non-Core Roads	18
3.3 Transportation Studies	18
3.3.1 <i>Multi-Modal Studies</i>	18
3.3.2 <i>Greater Bristol Strategic Transportation Study</i>	18
3.3.3 <i>Integrated Traffic Management</i>	19
3.3.4 <i>Bristol Bath to South Coast Study</i>	19
3.3.5 <i>Route Management Strategies</i>	19

3.4 Schemes in the Targeted Programme of Improvements (TPI) and Emerging Schemes	19
Figure 3.2 Trunk Roads in the South West	20
Figure 3.2 Multi Modal Study Areas	20
Figure 3.2 Multi Modal Study Areas	20
3.5 South West Motorways and Trunk Roads	22
4: Trunk Road Performance	26
4.1 Introduction	26
4.2 Improving Reliability	26
4.2.1 Total Vehicle Hours Delay	26
4.3 Improving Safety	27
Figure 4.1 - Regional picture of total vehicle hours delay per year	28
Figure 4.2 - Coverage of ASTIS	29
Figure 4.3 - Observed accident densities in South West Region (KSI per km per year)	30
Figure 4.4 - Observed accident rates in South West per million veh/km - All roads	31
4.4 Respecting the Environment	32
4.4.2 Air Quality	32
4.4.1 Environmental Management	32
4.4.3 Noise	32
4.4.4 Water	33
Figure 4.5 - Quieter surfacing on the Trunk Road Network in the South West Region	34
Figure 4.6 - Concrete surfacing on the Trunk Road Network in the South West	35
5: Impact of Future Development on the Trunk Road Network	36
5.1 Introduction	36
5.2 The Basis For Appraisal	36
5.3 Forecast Impacts	37
5.4 Impact of Transport Schemes	37
5.4.2 Programmed Road Schemes Included in Forecast Impacts:	37
5.5 Treatment of Development	37
5.6 Future State of the Network	38
Figure 5.1 - Current observed network stress	39
Figure 5.2 - Forecast network stress 2026	40
Glossary Of Terms	42
Annex A - Effect of Major Schemes in the TPI	43
Annex B - Treatment of Developments	44
Figure B.1: Land-Use Changes Considered	45
Figure B.2: TEMPRO & Calculated Growth Factor Comparison based on Local Planning Data	46
Annex C - Changes made since last version of this report	47

Introduction

The Regional Network Report

In its Regional Spatial Strategy, each of the English regions sets out its priorities for transport, housing and economic development, showing how these relate to each other and how they align with the resources that are likely to be available.

The final version of the draft Regional Spatial Strategy for the South West has now been submitted to the Secretary of State and formal 12 week public consultation period started in June 2006.

The primary objective of this Regional Network Report (RNR) is to support and inform this process. It provides a strategic assessment of the current performance of the motorway and all-purpose Trunk Road Network against a range of indicators for safety and congestion and assesses the impact on Trunk Road performance of a range of investment decisions. The model upon which it is based will also allow the

Region to test different investment scenarios and compare their outcomes.

The RNR conforms to a national framework which has been developed to ensure that regional reports can be compared across the country. A spreadsheet-based model has been developed by collating information from various sources to allow the Highways Agency and its regional partners to assess various infrastructure interventions and gauge the way the Trunk Road Network would perform at a range of future dates based on current planning assumptions. This approach is comparatively simple and generally only reflects the major investments that could be made. In practice the Agency will also be carrying out other programmes of work such as smaller scale safety and congestion schemes, demand restraint initiatives and the roll-out of Traffic Officers. None of these initiatives are reflected in the model. As such it is best used to compare alternative scenarios rather than to provide a definitive assessment of performance.

Structure of the Regional Network Report

The Report consists of five broad sections:

- A summary of sustainable development in the South West Region.
- A summary of the key economic and transport issues in the South West together with details of growth areas and development pressures.
- A picture of the Trunk Road Network in the South West together with details of major road-based improvement schemes which are currently planned or subject to regional prioritisation.
- A high-level summary of the Highways Agency's targets and objectives as they affect the South West.
- An introduction to the workbook model which can be used for scenario testing.

The RNR is a live document, which will be updated whenever appropriate. The changes made to this document since the last version was published are summarised in **Annex C**.



1: Sustainable Development in the South West

1.1 Integrated Regional Strategy (IRS)

Just Connect!, The Integrated Regional Strategy for the South West (IRS) lies at the heart of the South West Regional Assembly's (SWRA's) work in promoting a successful, sustainable region and provides the overarching framework for all development strategies in the South West.

Through the Regional Economic Strategy (RES) the IRS encourages sustainable economic development within the Region and it uses the Regional Spatial Strategy (RSS) to promote a long-term planning framework to achieve this aim. The RSS in turn incorporates the Regional Transport Strategy (RTS).

1.2 The Regional Spatial Strategy

The Regional Spatial Strategy (RSS) for the South West provides a long-term land-use and spatial planning framework within which local authority Development Plan Documents (DPDs) and Local Transport Plans (LTPs) can be prepared up to 2026. It identifies the scale and distribution of new housing and priorities for the environment, transport, infrastructure, economic development, agriculture, energy, minerals and waste treatment and disposal.

The current RSS (which will replace Regional Planning Guidance RPG10 when it is adopted), has been submitted to the Secretary of State and formal consultation commenced in June 2006. It is anticipated that a Public Examination will take place in Spring 2007 and that RSS will be adopted in 2008.

The Regional Spatial Strategy has adopted the same aims as the IRS. They are as follows:

1. To harness the benefits of population growth and manage the implications of population change.
2. To enhance the Region's distinctive environment and the quality of its cultural life.
3. To enhance the Region's economic prosperity and quality of employment opportunity.
4. To address deprivation and disadvantage to reduce significant intra-regional inequalities.
5. To make sure that people are treated fairly and can participate fully in society.

1.3 The Regional Transport Strategy

As in other Regions, pressure is growing on transport infrastructure as travel demand increases. The main road routes are increasingly congested and additional investment is required in rail and other forms of public transport.

The Regional Transport Strategy (RTS) aims to reduce the need to travel and the rate of traffic growth, promote a 'step change' in the quantity and quality of public transport, and to promote additional highway capacity only when all other options have been exhausted. It also aims to manage the demand for travel as a means of reducing dependence on car-based trips.

1.4 The Regional Economic Strategy

The Regional Economic Strategy (RES) has been produced by the South West Regional Development Agency (SWDRA) and covers the period to 2009. It recognises the importance of high quality transport infrastructure in meeting economic growth and regeneration objectives. It also recognises that accessibility and connectivity are significant issues within the Region to sustain existing economic growth and attract inward investment.

The RES sits alongside RSS to provide the strategic framework for policy action and investment in the Region. If the Region is to deliver the RES, it is essential that transport systems are reliable and efficient.

Not only is the RES committed to promoting the continued economic well-being of the Region's more successful areas, it also encourages the enhancement and regeneration of those which have been less successful in recent years. It recognises the importance of the Objective 1* status currently afforded to a significant proportion of the western part of the Region. These aims have direct implications for land-use and transport demands.

1.5 The Highways Agency's Involvement in the Spatial Planning Process

The spatial planning process seeks to ensure that choices and decisions on, for example, transport, planning, housing and economic development, are not taken in isolation. It is, therefore, crucial that the Agency fully engages in the process at the regional, sub-regional and local levels. This will help

to ensure that the strategic road network plays an appropriate role in the promotion of sustainable development, whilst at the same time recognising the importance of economic growth and environmental protection. It will also ensure that appropriate emphasis is given to the Agency's role in shaping Regional Transport Strategies and Local Transport Plans.

In line with the principles of the spatial planning process, the Agency is committed to facilitating the delivery of conforming development in conjunction with its key partners. It is therefore important that there is compatibility between the RNR, the RSS, the RTS and Local Development Documents. To help achieve this the Agency will continue to fully engage in the plan-making process, ensuring that its consequences are understood, the effects of adopted allocations are properly assessed and that the management and improvement of the strategic road network are planned accordingly.

In considering planning applications the Agency has adopted a hierarchy of preferred means of dealing with the impact of development on the strategic road network. Firstly developers should seek to minimise the impact of their development on the network (e.g. by prioritizing sites which are readily accessible by public transport, walking and cycling and by implementing a travel plan). Where this does not completely mitigate the associated impact, the second approach is to utilise technology and/or intelligent transport systems, which may include access control measures. Only as a last resort would the Agency wish to see physical improvements to the highway network.

*Objective 1 funding through the European Structural Funds aims to promote the development and structural adjustment of regions whose development is lagging behind the European average.

2: The South West Region

2.1 Introduction

The South West Region consists of Cornwall, Devon, Dorset, Gloucestershire, Somerset, Wiltshire, and the four unitary authorities of Bristol City, Bath & North East Somerset, South Gloucestershire and North Somerset which make up the Greater Bristol area (now known as the 'West of England') and the unitary authorities of Bournemouth, Isles of Scilly, Plymouth, Poole, Swindon and Torbay.

There is no single urban focus to the Region, but there are a number of major centres, designated Strategically Significant Cities and Towns (SSCTs) by the RSS, of which Bristol is the largest, followed by Bournemouth/Poole and then Plymouth and Exeter. A diagram showing the South West RSS can be found at **Figure 2.1**.

The South West is one of the more rural Regions in England and is also characterised by a wide range of contrasting environmental, social and economic conditions. It has a population of 5.75 million, half of whom live in rural areas or towns with populations of less than 20,000. Nevertheless, about a third of the population live in towns and cities of over 100,000.

Environmental matters are a major factor in the South West Region. Twelve Areas of Outstanding Natural Beauty (AONBs) and three National Parks are sited wholly or partly within its boundaries. These AONBs and National Parks contribute to the Region's outstanding landscape quality and are very important to the local tourist industry. However, as they occupy about a third of its land-mass, these features severely constrain local

development. The Regional Spatial Strategy divides the South West into three geographic Sub-regions, the North and Centre, the South East and the Western Peninsula. It proposes different development strategies for each of these areas and identifies a series of Strategically Significant Cities and Towns (SSCTs) which are intended to be the primary focus for the Region's future growth. The settlements falling under this heading as defined by Table 3.1 of the Regional Spatial Strategy are as follows:

Strategically Significant Cities & Towns		
Northern & Central Sub-region	South Eastern Sub-region	Western Sub-region
Bath	Bournemouth	Barnstaple
Bridgwater	Dorchester	Camborne/Pool/Redruth
Bristol	Poole	Falmouth-Penryn
Cheltenham	Salisbury	Plymouth
Chippenham	Weymouth	Torbay
Exeter		Truro
Gloucester		
Swindon		
Taunton		
Trowbridge		
Weston-super-Mare		
Yeovil		

The development proposals contained in the Regional Spatial Strategy and their potential impact upon the Trunk Road Network is investigated in more detail later in this report.

The broad characteristics of the three Sub-areas defined in the RSS are as follows:

Northern and Central Sub-area. The northern part of this Sub-area consists of the West of England (the former Avon area), Gloucestershire and northern Wiltshire, including Swindon. Much of this Sub-area is heavily populated and it contains over 1.8 million people. It accounts for almost 40% of the Region's population but only about 20% of its land area.

This Sub-area benefits from good inter-regional communications and strong relationships with adjoining Regions. The Central section consists of east Devon and eastern Somerset and is predominantly rural with a number of scattered towns, many of which have industrial as well as market town economies. The main urban area in this Sub-area is the 'West of England' which consists of Greater Bristol (population 551,000), Bath (pop 90,000) and Weston-super-Mare (pop 80,000), which together form the economic hub of the Region. Bristol is a national 'Core City' and Bath is a World Heritage Site. The important economic centre of Swindon (pop 155,000), together with its associated town of Cirencester, are located in this Sub-area. Gloucester/Cheltenham are also located in this Sub-area (pop 109,900 and 110,300 respectively) and exert a major influence on the associated towns in the Forest of Dean together with Stroud and Tewkesbury. The other SSCTs in the northern part of the Sub-area are much smaller in size. They are Trowbridge (pop 34,000) and Chippenham (pop 33,000). Further south the Sub-area also includes Exeter (pop 107,000), together with Taunton/Bridgwater and the associated town of Wellington (pop 58,000, 36,000 and 13,000 respectively) and Yeovil (pop 41,000).

South-Eastern Sub-area. This Sub-area consists of Dorset and southern Wiltshire. It includes the South East Dorset Conurbation which consists of Bournemouth, Poole, Christchurch and associated towns and has a population of over 400,000 people. It is the second largest urban area in the Region. Here there is a need to sustain economic growth, particularly in more disadvantaged parts (for example in Weymouth and Portland), but this needs to be balanced by recognition of the international protection afforded to its environmental assets. The SSCTs in this Sub-area are the South East Dorset Conurbation, Weymouth (pop 56,000), Dorchester (pop 16,000) and Salisbury (pop 43,000). However, a significant proportion of the population also lives in numerous smaller towns and villages scattered across the area.

Western Sub-area. This Sub-area comprises of Cornwall, northern and western Devon, western Somerset and the Isles of Scilly. The basic geography of this Sub-area has a significant effect on communications and economic development. Key factors in this Sub-area are its relative remoteness and its dispersed settlement pattern, so only Plymouth (pop 244,000), because of its size and potential for sound economic growth, is large enough to act as a focus for future development. Both Devon and Cornwall have an outstanding natural environment and are culturally distinctive, but this Sub-area would benefit greatly from the diversification of its economy. In addition to Plymouth, the other SSCTs in the northern part of this Sub-area are Torbay (collectively Torquay, Paignton and Brixham (combined pop 111,000)) and the associated town of Newton Abbot (pop 24,000) together with Barnstaple and the

associated town Bideford/Northam (pop 31,000 and 24,000 respectively). The SSCTs located further west are the Cornish Towns of Camborne-Pool-Redruth (combined pop 40,000), Falmouth/Penryn (combined pop 29,000), Truro (pop 21,000) and the associated towns of Penzance, Newquay and St Austell each with around 20,000 residents.

2.2 Key economic features of the South West Region

The key economic features of the Region are as follows:

2.2.1 Relative Wealth

- The Region's wages are below the national average.
- The north and east of the Region are more prosperous than the far south west.
- There are some areas of deprivation in some of the Strategically Significant Town and Cities, in particular, parts of Bristol.
- A major concern to the Region is peripherality, especially in the far South West.

2.2.2 Economy

- The Region's main centres of economic activity are the Greater Bristol area (the 'West of England') and Swindon.
- Much of the Region is rural and employment in agrarian occupations is twice the national average.
- The far south west has the weakest economy in the Region.
- The main commercial centres are in the north and east of the Region.

- The manufacturing industries which formerly played a small but significant part in the Region's economy, have declined markedly in recent years. This is particularly true in the defence sector. However, industrial activity still generates 15% of the Region's income. Industries such as car production in Swindon and aircraft production in north Bristol and Yeovil are particularly important.
- The growth of office/call centre based activities, which are concentrated in a relatively small number of locations, often out-of-town, has been partially responsible for a significant growth in medium and long-distance commuting within the Region.
- Until 31 December 2006, Cornwall has Objective 1 and Devon has Objective 2 status.
- The ports of Avonmouth, Poole and Weymouth are important to the Region's economic success.
- Tourism and leisure based employment make a significant contribution to the Region's economy.

2.2.3 Environment

- Green Belts are present around Cheltenham and Gloucester, the South East Dorset Conurbation and the West of England (Greater Bristol and Bath). The South West's Green Belts are currently proposed for review in the draft RSS.
- There are 12 AONBs and three National Parks (Exmoor, Dartmoor and the New Forest) wholly/or partly within the Region's boundaries which contribute to its outstanding landscape quality. They occupy one third of its land mass.

- Stonehenge, Avebury and their associated sites, the Jurassic Coast (Dorset and east Devon) and the City of Bath are designated as World Heritage Sites.

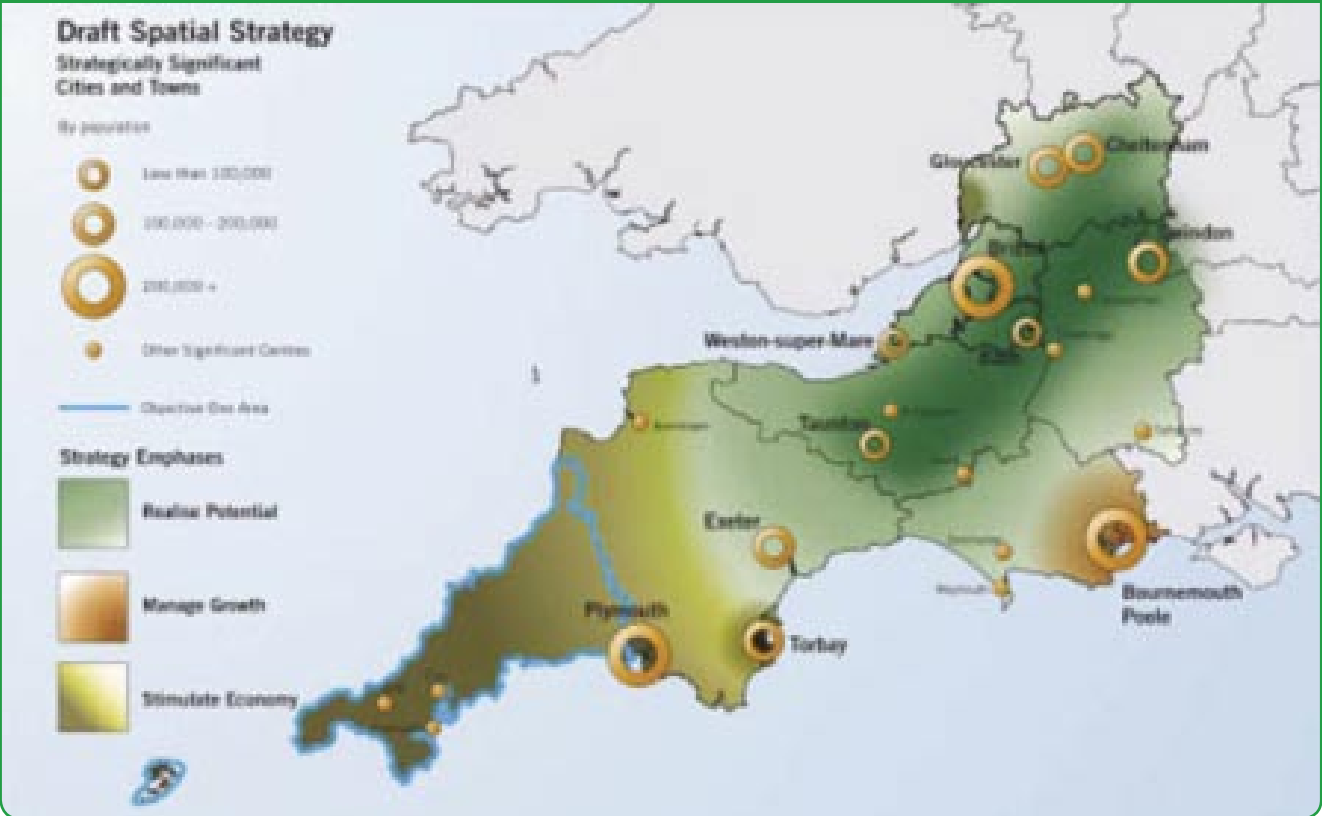
2.2.4 Tourism

- Tourism remains one of the Region’s principal economic sectors and is particularly important in the far South West.
- The Region’s three World Heritage Sites and its three National Parks attract many visitors, as do the twelve AONBs and careful management is required to protect these valuable environments.
- The Eden Project, Tate Gallery at St Ives and @Bristol make a major contribution to the tourism industry.

2.2.5 Growth Areas

- Considerable economic growth has been experienced in the north of the Region in recent years, especially in Bristol and Swindon. These two areas have now been designated ‘New Growth Points’ as a result of the Barker Review of housing supply.

Figure 2.1 The Draft Spatial Strategy for the South West Region



2.3 Development Pressures on the Network

Development in the vicinity of the Trunk Roads will generate new demands for travel, leading to additional vehicular trips which will, in-turn, create increased pressure on the Trunk Road Network. The major proposals which could impact upon the roads in the South West are described below, within the respective transport modes.

2.3.1 Air Transport

The White Paper 'The Future of Air Transport', published on 16 December 2003, set out a strategic framework for the development of airport capacity in the UK over the next 30 years, against the wider context of the air transport sector.

Relevant local airport expansions in the South West that will affect the level of traffic on the Trunk Road Network are as follows:

- **Bristol International Airport** - The White Paper supports the development of Bristol International Airport, including a runway extension and a new terminal when needed. The airport currently caters for 4 million passengers per annum (mppa) and there is support to extend this to 12 million passengers per annum by 2030.
- **Bournemouth International Airport** - The White Paper supports plans to add capacity to the airport's existing terminal. This airport currently serves approximately 0.5 mppa. Forecasts expect this to expand to between 3mppa and 4mppa depending on airport provision within the South East.

- **Exeter International Airport** - This airport is expected to expand, but at present no strategic cap has been placed on the level of development. The White Paper suggests that this could be decided locally. The airport is anticipated to grow from 2.0 to 2.5mppa by 2030.
- **Newquay Airport** - Plans to develop this airport are supported by the White Paper but no further details are provided.

2.3.2 Freight Transport

The main freight transport activity within the Region is associated with the industrial hub at Avonmouth//Sevenside, which benefits from good road, rail and sea communications. The motor industry in Swindon and aircraft production in north Bristol and Yeovil generate significant numbers of road-based freight movements. There is a major rail-borne freight movement of aggregates from the Mendips to South East England and a more localised movement of road borne aggregates from the Cotswolds.

The need for a study into freight movements was highlighted in the previous RTS for the South West. Consequently, the London to South West and South Wales Multi Modal Study (SWARMMS) was charged with looking at the movement of freight and made recommendations for this area of policy. It concluded that there was scope for new and improved inter-modal freight facilities within its study area to support the Government's transport policy to encourage freight to move from road to rail.

The Government's Ten Year Plan targeted an 80% increase in tonne-km carried on rail by 2010. SWARMMS concluded that rail's

strengths were in carrying large volumes of goods over long distances, but that rail is constrained by high terminal costs, the additional road transport costs and restrictions preventing the carriage of tall or wide loads.

A number of inter-modal terminals have been proposed by developers and councils in the SWARMMS study area. Some are already in place such as those in Avonmouth and South Marston, Swindon. SWARMMS highlighted a number of potential sites for future inter-modal freight but concluded that the best potential existed for a site near Exeter Airport.

2.3.3 Significant development proposals in the South West Region

Significant pressures on the Trunk Road Network will arise from future commercial or residential development within the Region. To meet the Region's economic and housing growth targets major development is needed in many of its urban areas (the SSCTs) before 2026. For example, developments which have been identified during this exercise are:

- The continued development of the Greater Bristol area (including commercial development at Avonmouth/Sevenside) and Gloucester/Cheltenham.
- The Eastern and Southern Development areas, The Triangle, Coate (Commonhead) and other sites in Swindon.
- The new settlements at Sherford (east of Plymouth) and close to Clyst Honiton (east of Exeter).
- The development and regeneration measures promoted in Weston-super-Mare by the Weston Vision.

2.4 Key transport issues in the South West Region

The key transport issues in the South West Region are as follows:

2.4.1 General

- High quality transport infrastructure is needed to meet travel demand, economic growth and regeneration objectives.
- Additional investment is required in rail and other forms of public transport.
- Peripherality is an issue, particularly in the far South West and continued transport investment is required to ensure that it is addressed.
- Much of the Region is rural and is poorly served by public transport. The scope for walking and cycling trips in these areas is also limited and so residents are heavily dependent on their cars.

2.4.2 Road

- The South West is over-reliant on the M4/M5 as the one high quality strategic link to the Region. This is recognised in the regional bid for funding to upgrade the A358/A303 route to provide a second high quality route into the South West.
- Many of the Region's larger urban areas lie close to the Trunk Road Network. This has the benefit of providing them with high quality strategic highway access, but at the same time, exerts great pressure on these Trunk Roads. Future development in these areas will require very careful management to ensure that journey time reliability is not prejudiced by the significant growth identified within the Regional Spatial Strategy.

- Key junctions on the M4, M5 and A417/A419 in particular will require careful management to ensure that they continue to operate efficiently and that their journey time reliability is not compromised by additional development related traffic.
- The Trunk Road Network provides a significant part of the Region's high-quality strategic road network. Elsewhere much of the highway infrastructure is often of a lower standard.
- The Region possesses only two major east-west routes, the M4/M5/A38 and the A303/A30. East-west links in the south eastern part of the Region are particularly poor.
- The standard of the A303/A30 is much lower than the M4/M5/A38. This is a particular issue within the Region as it threatens the resilience of its strategic highway network.
- With the exception of the M5 and the A417/A419, the Region's north-south road links are also poor.
- The M50 and the two Severn Bridges provide important links to South Wales.
- Congestion is present on the strategic highway network throughout the Region and is expected to increase. Without careful management, this will become a severe problem, particularly in the Greater Bristol area.
- Congestion in the Greater Bristol area is a matter of concern for much of the Region, as heavy traffic flows already create significant access problems for western parts of the Region and could particularly affect business efficiency in the far south west.
- Much of the rest of the Region's highway network performs adequately, but there are many queues in urban areas during peak periods.
- The M50 which runs along the Region's northern border provides an important link between South Wales and the West Midlands.
- The M4, M5 A30/A303 and A38 east of Plymouth form part of the Trans-European Road Network (TERN) providing a major transport link for the movement of freight from Europe and across Britain.

2.4.3 Rail

- Good east-west rail services are available in the north of the Region. They are provided by the 'Great Western Main Line' (London-Swindon-Bristol-Exeter-Plymouth) and the 'South Wales Main Line' (London-Swindon-Newport-Cardiff-West Wales).
- North-south services are of a lower and more variable quality. They are provided by the 'Wessex Main Line' (Cardiff-Bristol-Southampton-Brighton) and the 'Virgin Cross Country Route' (the West Country-the Midlands-the North East). Less frequent services run between Bristol and Weymouth (the Heart of Wessex line).
- The 'West of England Main Line' provides a relatively high level of service between London and Exeter travelling via Salisbury and between London and Weymouth via Southampton and Bournemouth.
- West of Plymouth rail services are poorer and only occasional 'through services' run to Penzance.

- Although a number of branch lines feed this network (especially in the far South West), commuter services within the Region are limited by the capacity of its infrastructure.
- There is significant movement of rail-borne aggregates from the Mendips to south eastern England.

2.4.4 Public Transport

- Except for these rail services, the Region relies wholly on bus-based public transport.
- Most urban areas possess a reasonable network of bus services but as the South West is predominantly rural, bus services are generally infrequent outside its major urban areas. Hence, within the Region public transport usage is below the national average.

2.4.5 Freight

- Major freight movements are associated with Avonmouth/Sevenside and the industrial activities in North Bristol, Yeovil and Swindon, together with the quarrying activities in the Mendips and the Cotswolds.
- HGV traffic is forecast to grow throughout the Region and distribution activity in the north of the Region is likely to grow because of its relatively good motorway links and because of its geographical location.
- Many road freight vehicles are not used to capacity and efficiency is also reduced by congestion and difficulties in delivering to urban areas.

2.4.6 Air

- Bristol International Airport has a key regional role and is used by 71% of the Region's air passengers. However, it has significant impacts on the environment which must be sensitively managed. Passenger traffic to Bristol Airport has, and is continuing to, increase dramatically as a result of low cost services. This has had a major impact on travel patterns in the Region, particularly in and around Greater Bristol. Although, improvements to public transport would undoubtedly contribute to solving the existing surface access issues, the Greater Bristol Study indicates that there would be benefits from a new link to the M5 and south Bristol via Junction 21. However, such a scheme would be likely to have significant environmental impacts and further assessment work will be required.
- The airports at Bournemouth, Exeter, Plymouth and Newquay have smaller impacts but their expansion plans may cause this position to change.

3: The Trunk Road and Motorway Network in the South West

3.1 Trunk Road Categories

The Core Trunk Roads and Motorways in the South West Region are shown on **Figure 3.1** below. The Core Trunk Road and Motorway network consists of two categories of road:

- Roads of predominantly national and international importance - in the South West these are M4 and M5. Funding for improvements on these routes is provided by central Government.
- Roads of predominantly regional rather than national importance – i.e. all other Trunk Roads in South West. Decisions on major Highways Agency (>£5m) schemes starting after 2007/8 will take account of advice from the Region, which will consider these schemes alongside proposed major transport investment by Local Authorities (see below).

In the South West, the Regional Assembly has already submitted its list of regional transport priorities to the Secretary of State as part of the Regional Funding Allocation (RFA) process. This took place in January 2006 and advice from ministers is expected later in 2006. After it has been approved by the Secretary of State, a new major scheme for the improvement of any part of the Trunk Road Network enters the Agency's Targeted Programme of Improvements (TPI) and can generally be expected to be delivered within 7 to 8 years.

3.2 Non-Core Roads

Negotiations between the Highways Agency and Local Highway Authorities to transfer sections of the Non-Core Trunk Road Network

continue. A number of former Trunk Roads have already passed to the control of Local Authorities. The remaining Non-core Trunk Roads in South West are the M32 north of Bristol, A40 west of M5 Junction 10 in Gloucestershire, the A36/A46 between the M4 north of Bath and the M27 near Southampton and the A4 between Bristol and Bath.

3.3 Transportation Studies

3.3.1 Multi-Modal Studies

AA programme of Government Office initiated Multi-Modal Studies (MMS) has been carried out across the Country and across regional boundaries to identify traffic issues and sustainable transport solutions. Only one of these studies (SWARMMS) was located in the South West Region. As shown in **Figure 3.2**, this study examined all land-based transport facilities in the London to Penzance and London to South Wales corridors although it did not include the A31/A35 Corridor. The objective of the study was to examine the scope for reducing congestion by better management and modal shift, as well as options for taking forward focused improvements.

3.3.2 Greater Bristol Strategic Transportation Study

Following on from SWARMMS, the Government Office for the South West (GOSW) commissioned a Strategic Transport Study to address the current and future transport needs within the Greater Bristol area. The Study built upon the conclusions reached in SWARMMS to make recommendations for a range of practical measures aimed at

addressing transport problems and realising Greater Bristol's potential for economic growth. The Study's final report was published in May 2006.

3.3.3 Integrated Traffic Management

Work to develop integrated traffic management measures on the M4/M5 around Bristol to reduce journey times and improve reliability and safety is due to start in June 2006. This work will consider a range of measures, such as High Occupancy Vehicle (HOV) lanes, tolling, controlled motorways and making best use of technology projects already under construction. Potential Local Authority interventions are also to be taken into account in this study.

3.3.4 Bristol Bath to South Coast Study

GOSW also commissioned the Bristol Bath to South Coast Transport Study. The Final Study Report was received in February 2004. The Study Area stretched northwards from Southampton and Poole up to the M4 between Junctions 15 and 19. It was bounded by the A37 in the west and the A34 in the East.

The Study confirmed that the A36/A46 fulfils a local/regional function rather than a national one and, that detrunking is therefore appropriate. It has also identified a number of different options to address the problems of traffic in Bath. It will now be for the relevant Local Authorities to take its recommendations forward through the Local Transport Plan process.

3.3.5 Route Management Strategies

The Agency's Route Management Strategy (RMS) programme was introduced to develop a strategic approach to the maintenance, operation and improvement of the Trunk Road and Motorway Network on a route by route basis. A number of RMSs were commissioned for the routes in the South West and all except those within the Greater Bristol Strategic Transportation Study area have now been completed. The recommendations from the completed studies have been incorporated into the relevant delivery plans. RMSs falling wholly or partly within the South West are as follows:

- A30 Penzance to Exeter.
- A303/A30 (M3 to Honiton).
- A30/A35/A31 (Exeter to Southampton).
- A38 Bodmin to Exeter.
- A417/A419 Swindon to Gloucester.
- M5 Junction 9 to 15.
- M5 South of Junction 21 - Junction 31.

The completed reports are available for viewing on the Highways Agency's web site.

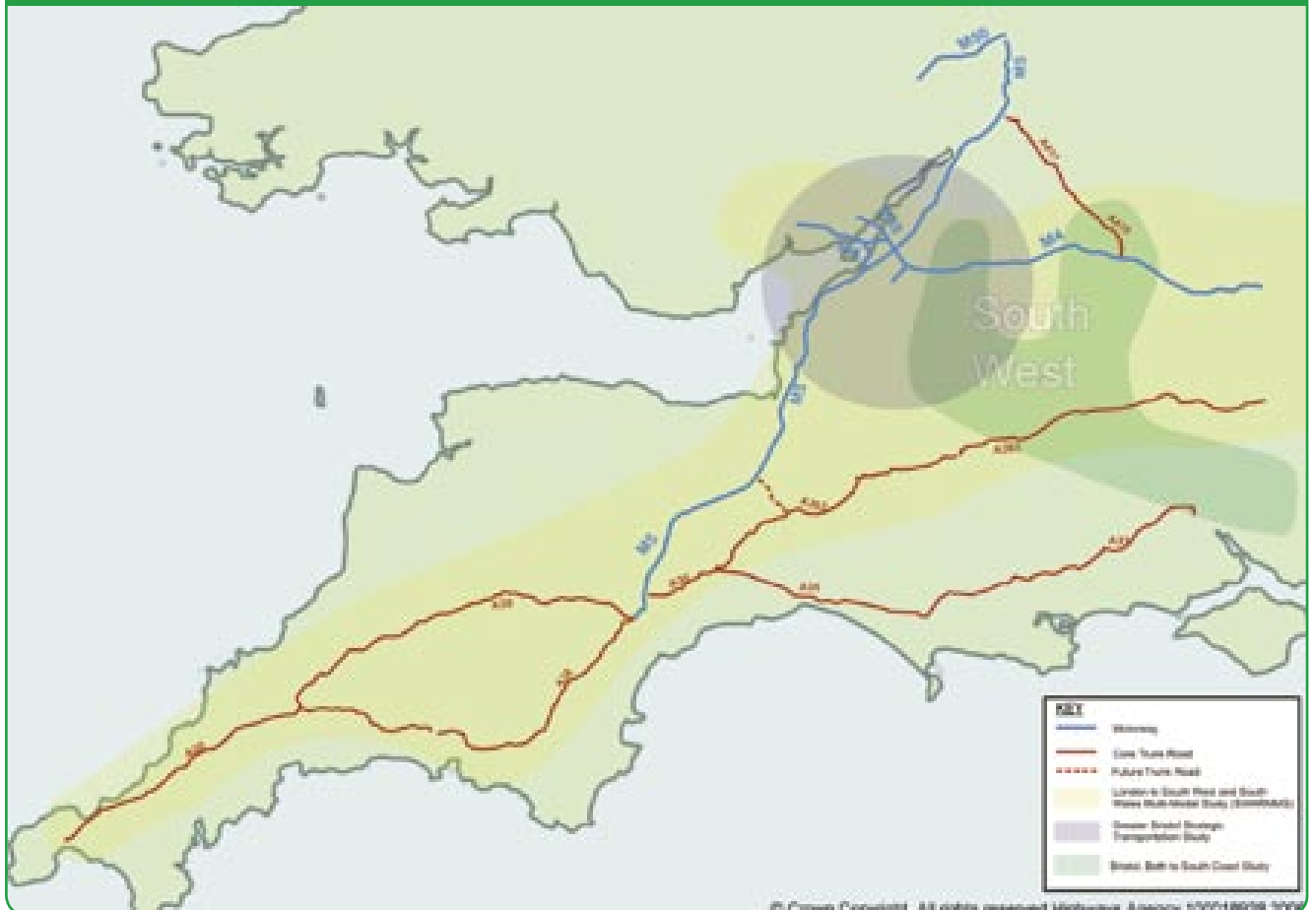
3.4 Schemes in the Targeted Programme of Improvements (TPI) and Emerging Schemes

All schemes in the South West which are in the TPI or are under consideration for TPI entry are shown in Annex A at the rear of this document.

Figure 3.1 Trunk Roads in the South West



Figure 3.2 Multi Modal Study Areas





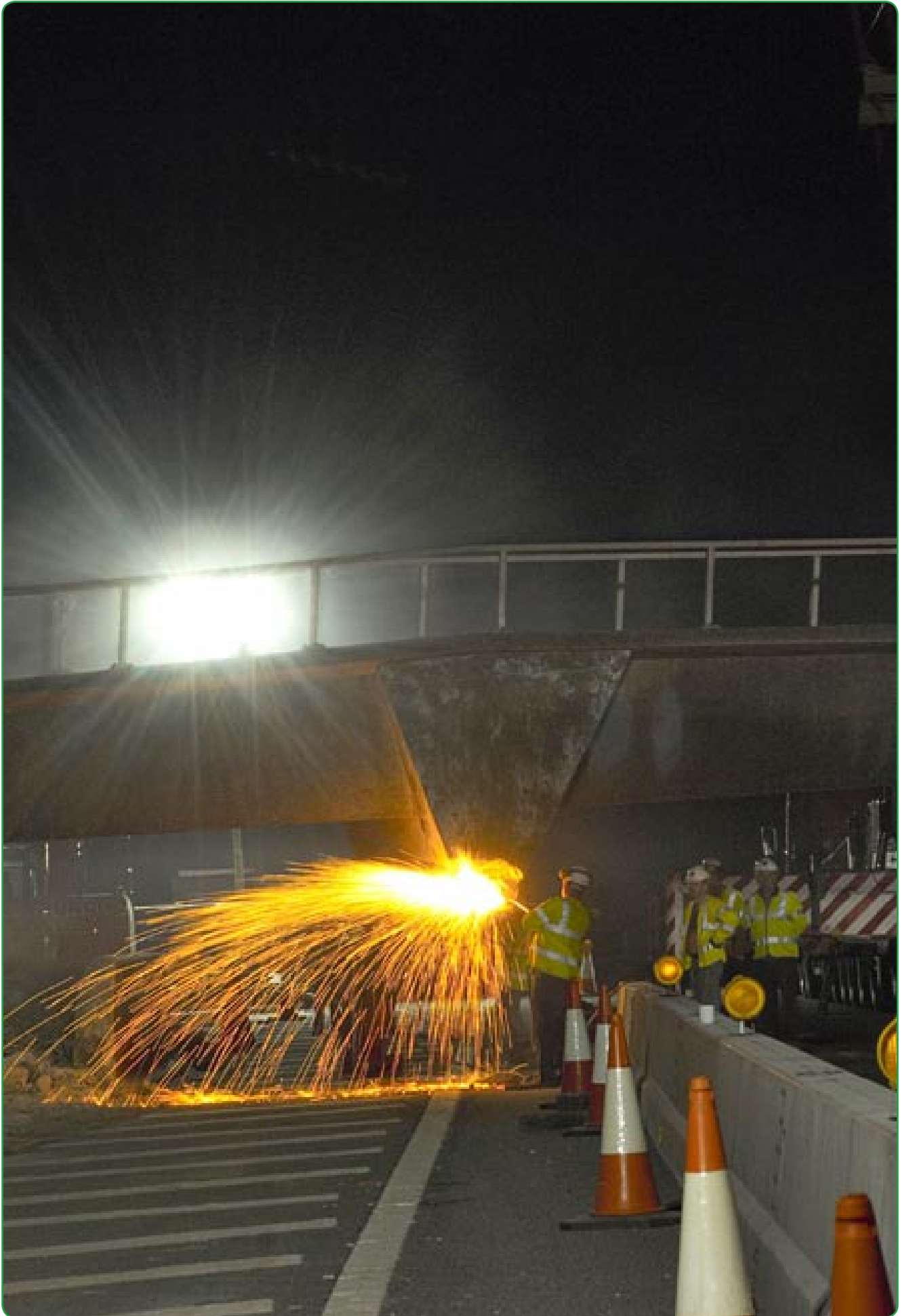
3.5 South West Motorways and Trunk Roads

The following table details the main characteristics and functions of each of the Trunk Roads and Motorways in the South West.

<i>Road</i>	<i>Description and Function</i>
	Nationally Important Routes
M4	<ul style="list-style-type: none"> • Within the South West the M4 runs from Junction 15 at Swindon to the Second Severn Crossing (Junction 22). • The M4 forms part of the major east–west route connecting London to South Wales and provides access to Swindon and the Greater Bristol area. • It consists entirely of dual 3-lane carriageways with the exception of the link roads to the M5 which are two lane and two sections where climbing lanes are present (eastbound to Junctions 18 and 21). • Pressure from significant development related traffic has exacerbated congestion in the Swindon and Greater Bristol areas particularly at peak times, and many junctions are congested during these periods. Long-distance commuting contributes to these problems in the Greater Bristol area. • It is part of the Trans European Road Network (TERN).
M5	<ul style="list-style-type: none"> • Within the Region the M5 runs from Junction 9 near Tewkesbury to its end at Junction 31 close to Exeter. • This section of the M5 forms part of the major north–south route connecting the Midlands to South West and provides access to Gloucester/Cheltenham, Greater Bristol, Weston-super-Mare, Taunton and Exeter. • It is entirely dual 3-lane carriageway in configuration. Climbing lanes are being added to the northbound carriageway between Junctions 18a and 17 and in both directions between Junctions 19 and 20. • Significant levels of development related traffic have exacerbated congestion in the Gloucester/Cheltenham, the Greater Bristol and Taunton areas particularly at peak times, and many junctions are congested during these periods. • Long-distance commuting contributes to these problems in the Greater Bristol area. The relationship between the predominantly residential development in Weston-super-Mare and the employment development in Bristol's North Fringe is particularly problematic. • Junction-hopping is also a problem, particularly important in the Gloucester/Cheltenham, Greater Bristol and Taunton areas. • The Avonmouth Bridge provides the lowest crossing of the River Avon and is one of the most vulnerable sections of the Region's Trunk Road Network. Accidents involving lane closures on the bridge can lead to gridlock within the whole of the Greater Bristol area. • It is part of the TERN network.
M48/ M49	<ul style="list-style-type: none"> • These routes provide connections from the M4 and M5 to the two bridges across the River Severn and form important routes into South Wales. • They both have dual 2-lane carriageways and are lightly trafficked, except during holiday periods.

<i>Road</i>	<i>Description and Function</i>
	Regionally Important Routes
M50	<ul style="list-style-type: none"> • The M50 from the M5 to Ross-on-Wye runs along the northern boundary of the Region and lies partly within the West Midlands. • In conjunction with other routes, it provides an important link between South Wales and the West Midlands/North West England. • It is two lane dual-carriageway throughout.
A4	<ul style="list-style-type: none"> • A very short section of the A4 running from M5 Junction 18 into Avonmouth Docks remains part of the Core Trunk Road Network. • It has a dual-carriageway layout.
A30	<ul style="list-style-type: none"> • There are effectively two sections of the A30, east and west of Exeter. • East of Exeter, the A30 is mainly dual-carriageway except for the unimproved section which runs mainly through the Blackdown Hills (about 12 km) between Honiton and Horton. It links the A303 and A31/A35 with the M5 at Exeter. • West of Exeter the A30 provides the far west of the Region with its most important link to the remainder of the country's road network. This route is about 170 km long, of which 123 km is dual-carriageway. • The remaining single carriageway sections are 11.5 km between Bodmin and Indian Queens (where a new dual carriageway is currently under construction), 6 km between Carland Cross and Chiverton Cross, about 2km between Temple and Higher Carblake and about 20 km westward from Camborne to Longrock.
A31/ A35	<ul style="list-style-type: none"> • Despite being of a relatively low standard the A31/A35 between the Hampshire Boundary and Honiton forms an important east-west route. It also provides the main road access to the South Dorset Conurbation, Weymouth and Dorchester. • Except for the dual-carriageway sections from the Hampshire boundary to Ferndown and Bere Regis and Dorchester, this route is entirely single carriageway. Much of this single carriageway is unimproved and is of a low standard. • This route is particularly congested through the South Dorset Conurbation and around Dorchester. This congestion primarily arises from delays at the many at-grade junctions present along this route. • It is likely that the eastern section of this route (from the Hampshire Border to Dorchester) will form part of the Olympic Route Network, providing access to the sailing venues at Weymouth/Portland. • Pressure from significant development related traffic has exacerbated congestion in the South East Dorset Conurbation, particularly at peak times and many junctions are congested during these periods.

Road	Description and Function
Regionally Important Routes	
A38	<ul style="list-style-type: none"> • Much of the A38 lies outside the Trunk Road Network. However that section which runs from Exeter westward through Plymouth to join the A30 at Bodmin is classified as a Trunk Road. • The A38 provides a major transport link to Plymouth and South Devon from the national motorway network at Exeter. • East of Plymouth this route is dual-carriageway but to the west of the Tamar Bridge it is predominately unimproved single carriageway of a much lower standard. • The Tamar Bridge provides the lowest effective crossing of that River and is congested particularly at peak times. It is also one of the most vulnerable sections of the Region's Strategic Road Network and is managed by the Tamar Bridge and Torpoint Ferry Joint Committee (so is not a Trunk Road). Commuter trips from Cornwall contribute to these problems. • The A38 between Exeter and Plymouth forms part of the TERN network.
A303	<ul style="list-style-type: none"> • The A303 runs south west from Andover to the west of Horton where it joins the A30. • It provides a key route for travellers from the South East to the South West connecting the M3 to the A30 close to Exeter. • East of Ilminster long sections of the route are dual carriageway with mainly at-grade junctions (main roads are not separated by fly-overs or tunnels). The remaining single-carriageway sections are about 10 km from Countess Roundabout to Berwick Down (Stonehenge), 3 km from Wylde to Stockton Wood, about 7 km from Chicklade Bottom to Mere, 6 km from Sparkford to Ilchester and the wide single-carriageway Ilminster Bypass. • To the west of Ilminster the A303 is generally unimproved single-carriageway except for short sections near Horton and Marsh (about 12 km). • In 2004 Ministers decided not to improve the section west of Ilminster but to up-grade the A358 to dual-carriageway Trunk Road standard instead. This will provide part of the second high-quality route into the South West.
A417/ A419	<ul style="list-style-type: none"> • This route has been progressively up-graded to near motorway standard dual-carriageway in recent years. However, around Swindon the route is of a lower standard with the Commonhead and Turnpike Roundabouts presently having at-grade layouts. A short single-carriageway section (about 5 km) also remains between Cowley and Brockworth near Gloucester. • The A417/A419 provides an important connection between M4 Junction 15 at Swindon and M5 Junction 11a at Gloucester and provides a wider strategic connection between the Thames Valley and the West Midlands. • Work is currently underway to improve Commonhead Roundabout to full grade-separated standards. The Blunsdon Bypass is included within the Regional TPI and it is anticipated that construction will start within the next 12 months. This will include full grade-separation of Turnpike Roundabout to the north of Swindon. • The section of the A419 around Swindon is already subject to severe pressure from traffic associated with local development. These pressures will intensify further as a result of the major growth planned to the east of the Trunk Road and elsewhere in the Swindon area. Sustainable transport solutions will need to be found to facilitate large scale growth adjacent to the A419 without adversely impacting upon its junctions.



4: Trunk Road Performance

4.1 Introduction

The Department for Transport's Public Service Agreement (PSA) includes road-based performance targets for:

- Improving Reliability.
- Improving Safety.
- Respecting the Environment.

The Highways Agency's performance indicators are derived from these.

4.2 Improving Reliability

In July 2005 the Secretary of State for Transport announced a new congestion target for the strategic road network based on improving journey time reliability:

By 2007-8 make journeys more reliable on the strategic road network

The PSA target will be achieved if the average vehicle delay on the slowest 10% of journeys is lower in the 2007-08 Business Plan year than it was in the baseline period (August 2004-July 2005).

This target is derived by measuring the 10% slowest journeys on the majority of the Trunk Road Network and uses data for each day of the week (except bank holidays) and for every hour of day between 0600 and 2000 hours. The worst 10% of journey times on each route are then combined to produce a single value which represents the average delay experienced in all journeys in this category. The national target is the aggregate average delay drawn from all the target routes across our network. The target period runs to 2007-08 as it fits with

the Spending Review 2004 Period and accords with the Agency's 3-year Business Plan. Detailed route level data, a network map showing average delay for the slowest 10% of journeys and a detailed explanation of the derivation of this measure can be found at:

http://www.dft.gov.uk/stellent/groups/dft_transstats/documents/downloadable/dft_transstats_611157.pdf

The Highways Agency strategy for delivering this PSA target is set out in its Delivery Plan and comprises a package of work streams encompassing the following:

- Traffic incident management and prevention.
- Better information to customers.
- Improved road works management and co-ordination.
- Completion of major schemes.
- Smarter use of technology.
- Demand management.

4.2.1 Total Vehicle Hours Delay

Figure 4.1 shows total vehicle hours delay per year in the South West at a regional level. Delay information from the Highways Agency's Journey time Database has been used to calculate the total vehicle delay for each link. The delays experienced by each vehicle are multiplied by the number of vehicles per day to determine the total number of hours experienced by the vehicles travelling on a route as a whole. Here delay is defined as a vehicle's actual journey time minus its free flow journey time. These results have been ranked so that those experiencing the most delay (the top 15%)

have been coloured red, the next 15% have been coloured amber and the remaining 70% have been coloured green.

Recurrent delay is defined as expected everyday delay such as that caused by peak hour traffic levels. Measures taken by the Highways Agency to address recurrent delay include:

- Better control at source of the impact on the road network of new development.
- TPI schemes.
- Small congestion and safety schemes.
- Network demand management.

Non-recurrent delay is defined as unexpected delay such as that caused by incidents, road works or 'one off' big events. Measures taken by the Highways Agency to address non-recurrent delay include:

- Use of Traffic Officer patrols for better traffic incident management.
- The opening of a Regional Control Centre at Avonmouth operating round-the-clock answering emergency roadside telephones, setting overhead electronic signs and dispatching motorway patrols.
- Better information to customers.
- Improved road works management and coordination.
- Within the greater Bristol area a driver information system (ASTIS) is being installed between M4 Junction 18 and 20 and the northern end of the M32 (to Junction 2) to improve safety and reduce delays. The area covered by this scheme is shown in **Figure 4.2**.

4.3 Improving Safety

In 2000, the Government launched a new road safety strategy called 'Tomorrows Roads: Safer for Everyone' aimed at reducing the number of road casualties by 2010.

The target for the strategic road network is a 33% reduction in the number of those killed or seriously injured in accidents, and a 10% reduction in the rate of slight casualties based on the average accident figures from 1994 to 1998. The Highways Agency will also contribute to a 50% reduction in the number of children killed or seriously injured on the whole national road network against the 1994-98 national average.

Figure 4.3 shows base (observed) densities of accidents in the South West Region, i.e. numbers of accidents in which people have been killed or seriously injured (KSI) for all roads combined. Accident densities are colour-coded in red to indicate links* with the worst 15% accident density per kilometre per year, amber for the next 15% and green for the lowest 70%.

Figure 4.4 shows accident rates, i.e. numbers of accidents in which people have been killed or seriously injured (KSI) related to the level of traffic flow on a link. Links* are colour-coded green, amber and red for accident rates denoting the best 70%, the next best 15% and the worst 15% respectively.

The Agency is also working to provide safer and more convenient **crossings on the strategic road network for non-motorised road users, e.g. pedestrians, cyclists and horse riders**, thereby improving accessibility and removing severance.

*A link is a section of road between two A-road or motorway junctions.

Figure 4.1 - Regional picture of total vehicle hours delay per year

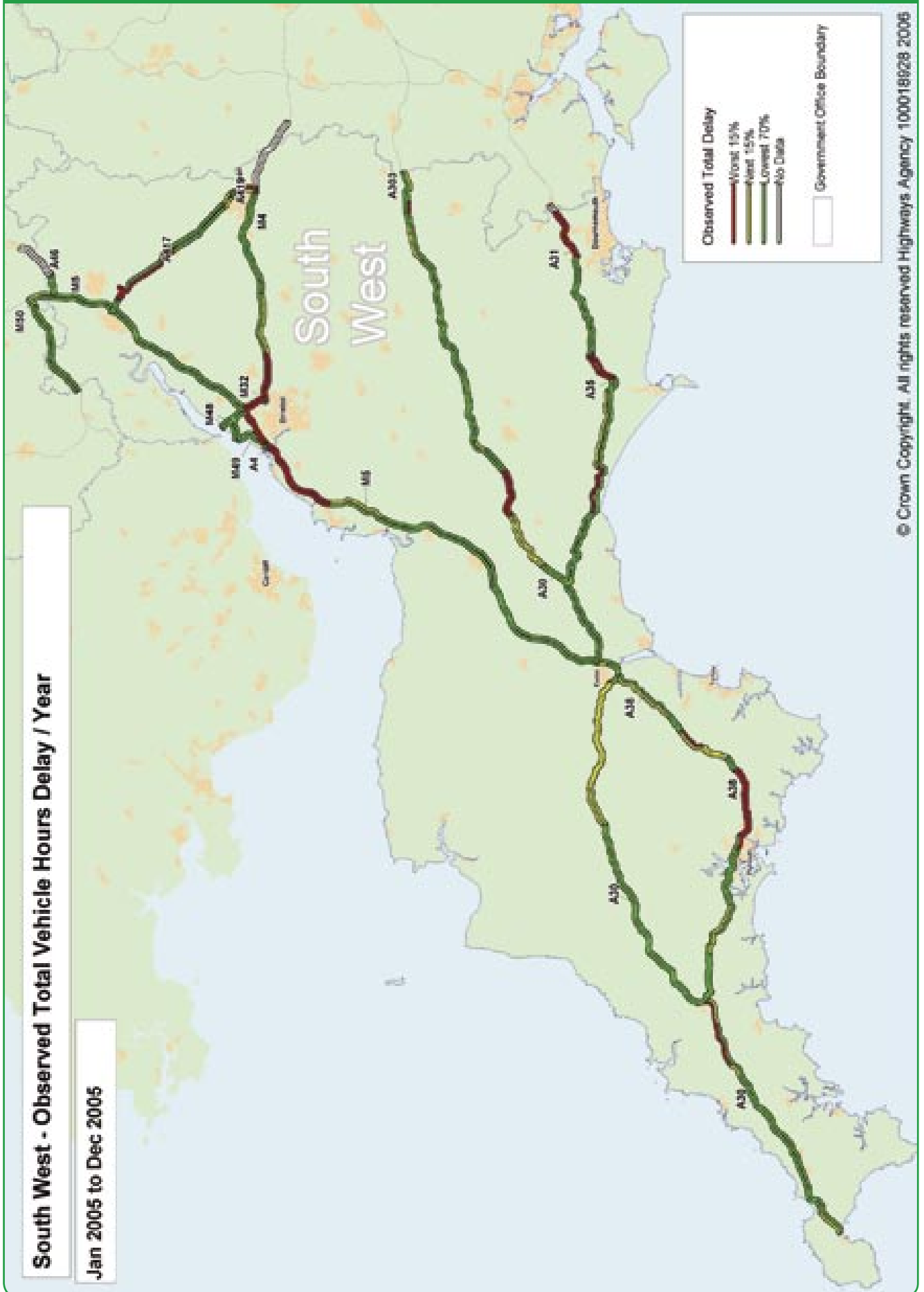
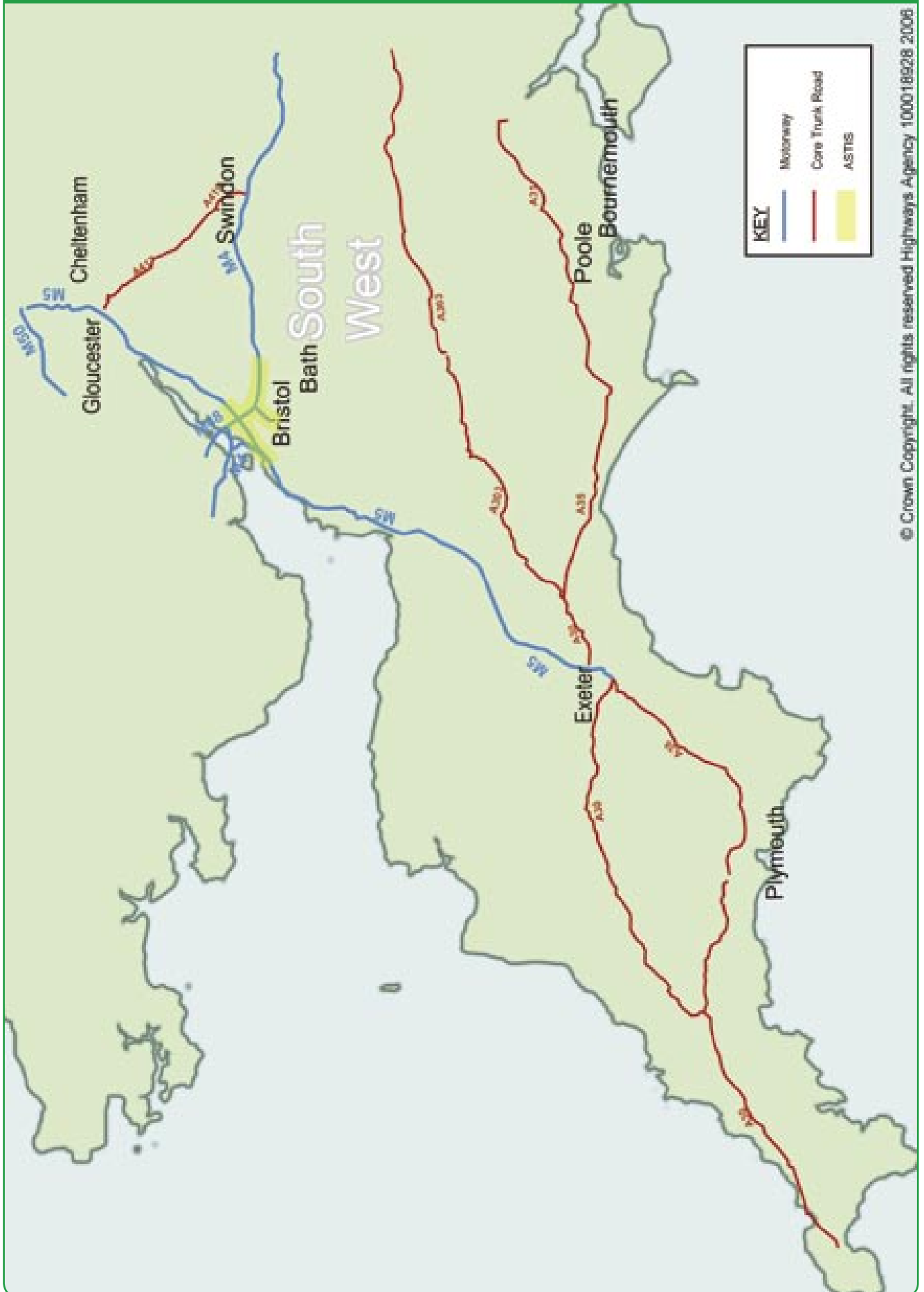


Figure 4.2 - Coverage of ASTIS



© Crown Copyright. All rights reserved Highways Agency 100018528 2006

Figure 4.3 - Observed accident densities in South West Region (KSI per km per year)

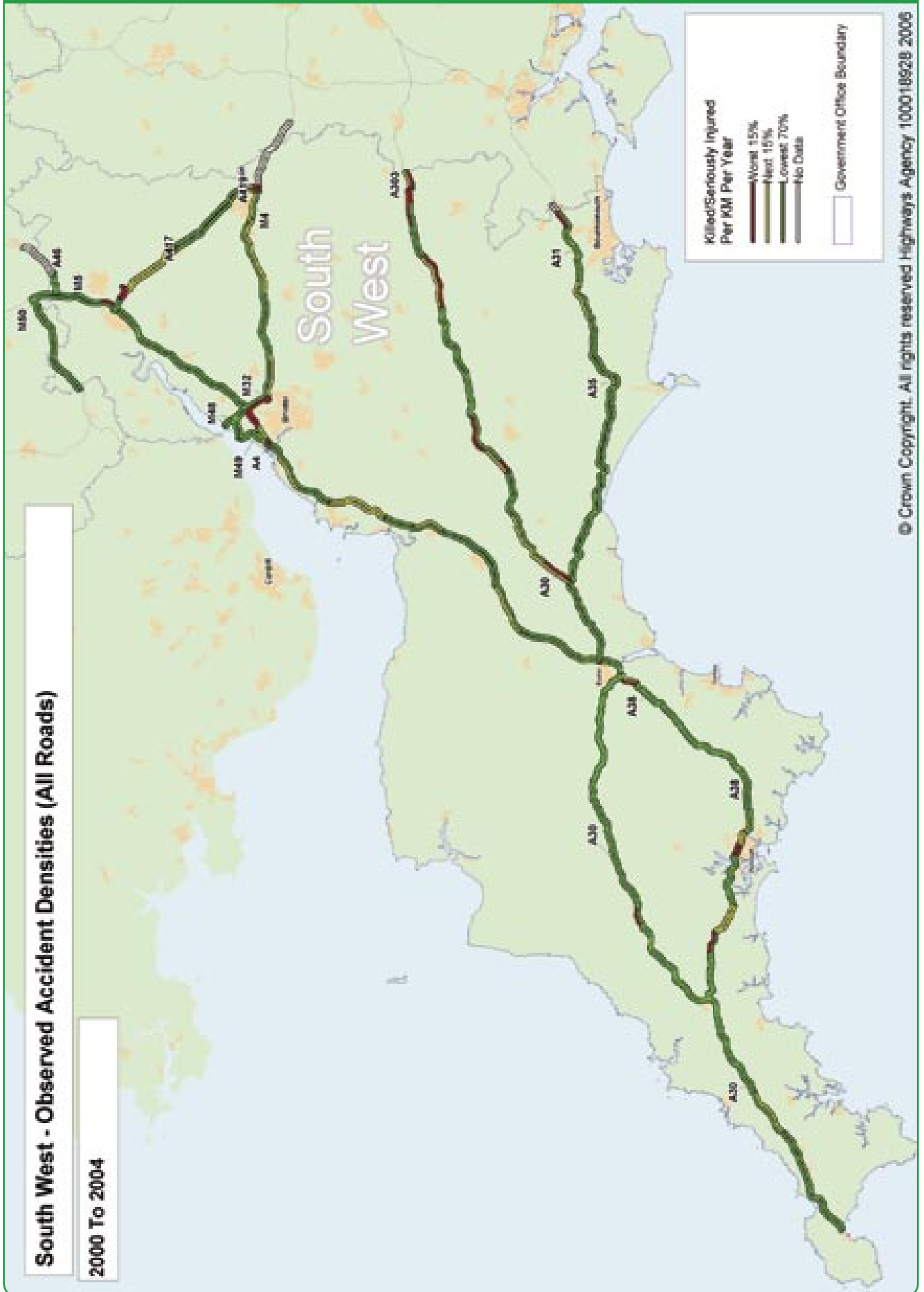
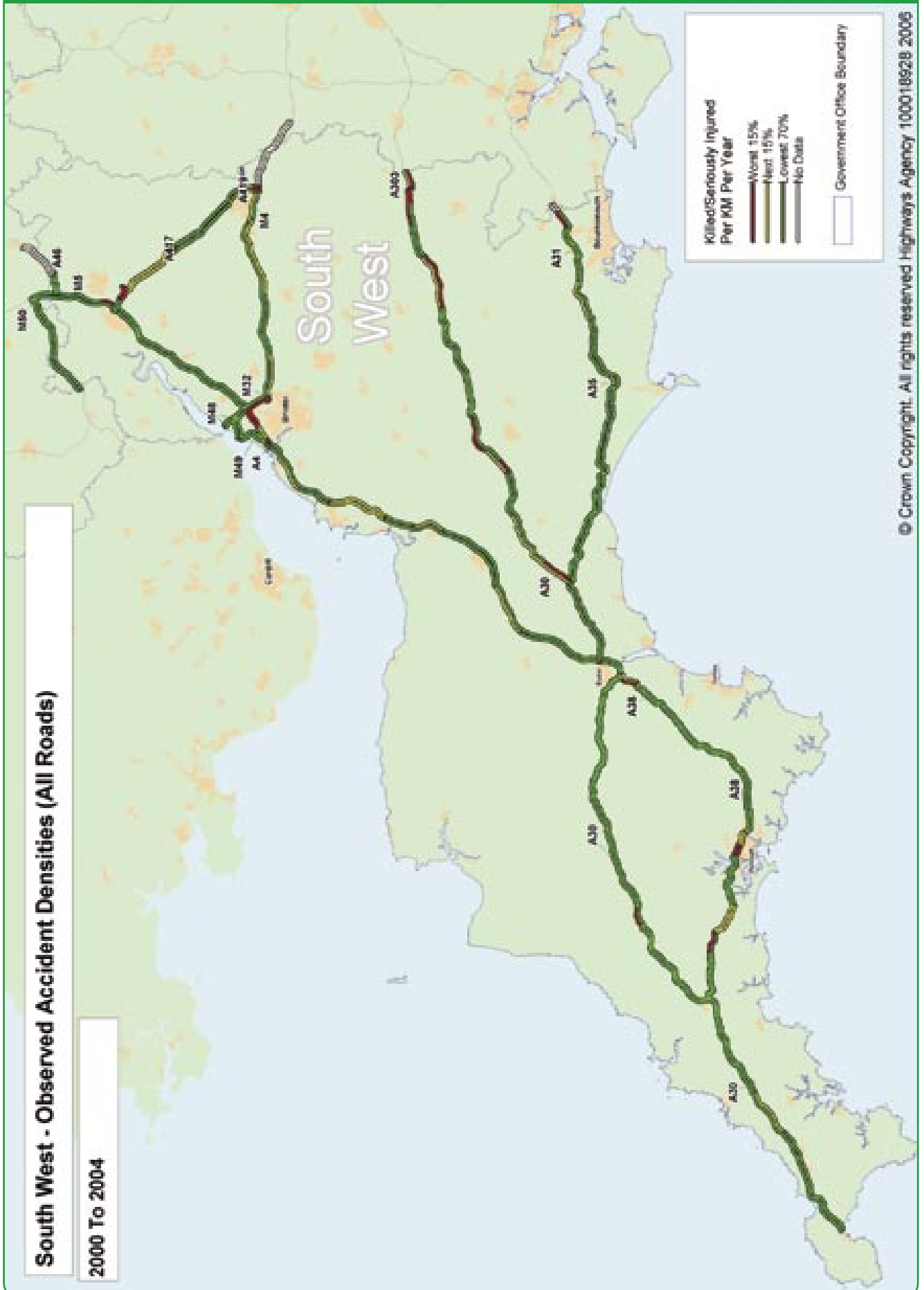


Figure 4.4 - Observed accident rates in South West per million veh/km - All roads



4.4 Respecting the Environment

The Highways Agency is charged with striking a balance between its responsibility to maintain, develop and operate the Trunk Road Network effectively and its responsibilities to the neighbouring communities and the wider environment. This is particularly important in the South West as 3 National Parks, 12 AONBs and 3 World Heritage Sites fall partially or wholly within the Region's Boundaries. Specific objectives to mitigate the potentially adverse impact of roads and enhance the environment include:

- Improving air quality within air quality management areas.
- Maintaining the network in accordance with comprehensive environmental management plans.
- Treating roads, including those with concrete surface, with noise-reducing material.
- Investigating locations with pressing noise problems and taking noise mitigation action where appropriate.
- Treating water outfalls from Trunk Roads identified as presenting a pollution risk to water courses.

4.4.2 Air Quality

As part of a review of air quality conditions in their area Local Authorities are required to identify any properties where pollutant concentrations are likely to exceed Air Quality Strategy objectives. Where this is the case, Air Quality Management Areas (AQMAs) have to be declared and plans developed with stakeholders such as the

Highways Agency to improve air quality. The Agency's annual Business Plan includes a target to implement measures to improve the air quality in AQMAs, prioritising those that have the highest pollutant concentrations and are therefore most at risk of exceeding the mandatory EU limit values.

4.4.1 Environmental Management

The Highways Agency maintains Environmental Management Plans which cover the whole of its network and hold details of all environmental mitigation works required including planting and landscaping schemes and biodiversity improvements.

4.4.3 Noise

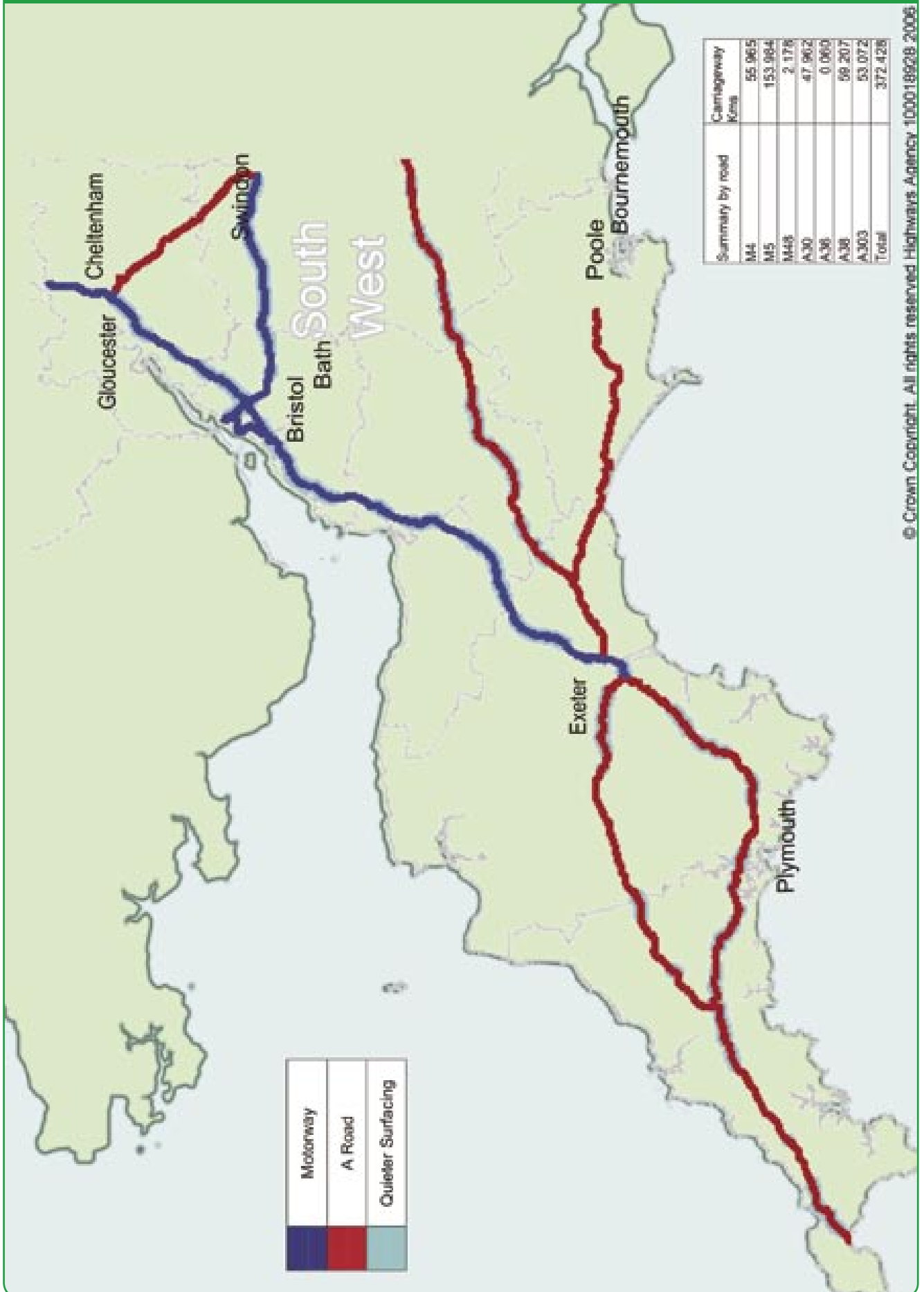
The Agency's noise mitigation policy includes:

- Resurfacing the network progressively with quieter materials whenever there is a need to maintain the structural integrity or skidding performance of the carriageway. Figure 4.5 shows the extent of the network in the South West, which is currently treated with quieter surfacing.
- Resurfacing any remaining concrete trunk roads with quieter materials irrespective of the need for maintenance. Figure 4.6 shows the remaining sections of concrete road in the South West.
- Addressing identified noise problems, which satisfy 'sift' criteria published in Hansard in 1999 and require further investigation to determine whether practicable and cost-effective mitigation can be provided.

4.4.4 Water

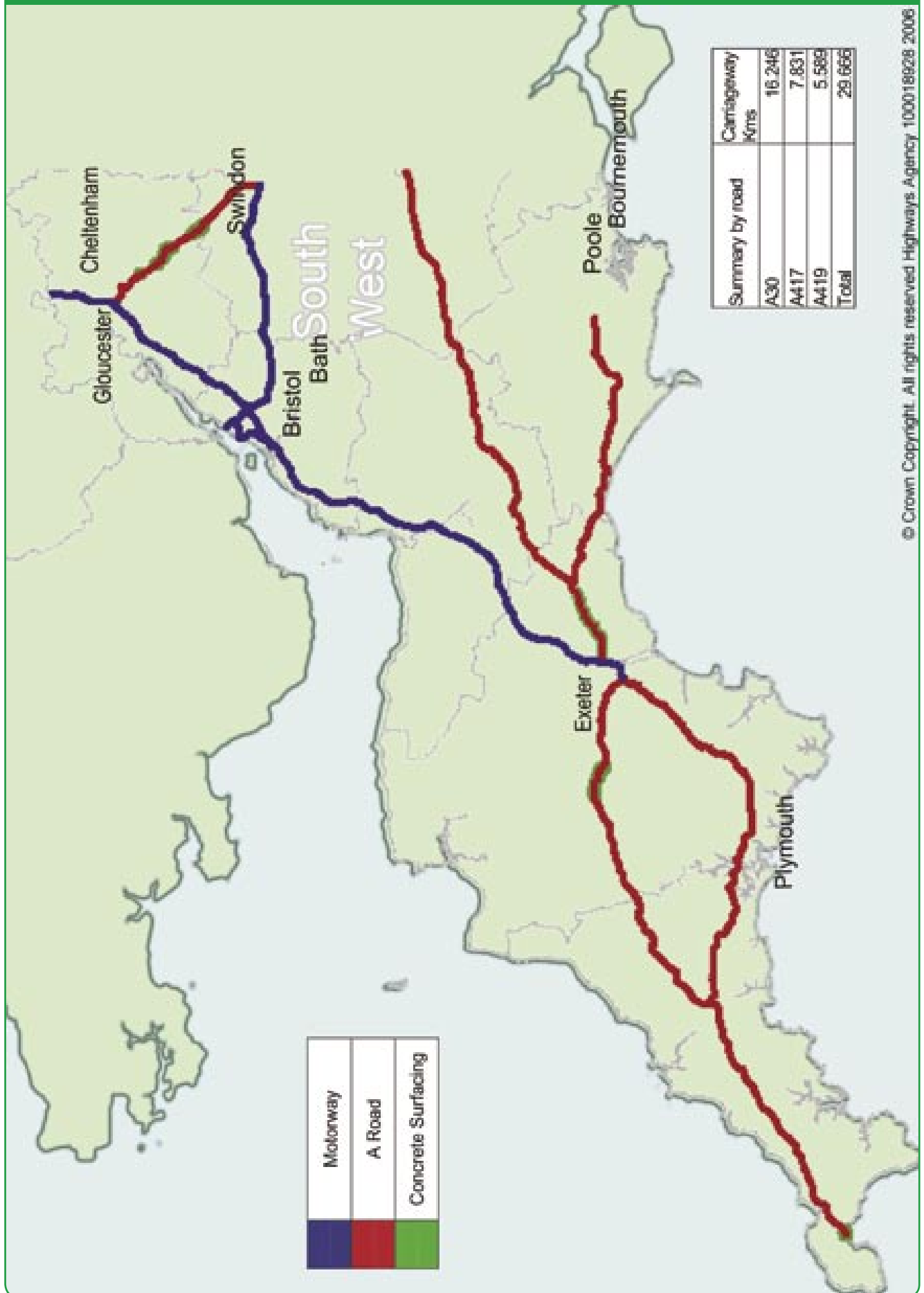
Environmentally sensitive area studies and drainage outfall studies are ongoing to identify all high-risk outfalls, which will be investigated to determine whether improvements are required.

Figure 4.5 - Quieter surfacing on the Trunk Road Network in the South West Region



© Crown Copyright. All rights reserved. Highways Agency 100018928 2006

Figure 4.6 - Concrete surfacing on the Trunk Road Network in the South West



© Crown Copyright. All rights reserved Highways Agency 100018928 2006

5: Impact of Future Development on the Trunk Road Network

5.1 Introduction

A spreadsheet model has been developed by the Highways Agency to estimate future network performance (as measured by a range of indicators). This model takes account of the current performance of the network with existing traffic levels and assesses the ways in which this will change as traffic grows in the future and network improvements are carried out. It has been assumed that this traffic growth will generally be in line with national projections but in some locations these forecasts have been modified to reflect regional planning aspirations. This model is also able to reflect the impact of any major improvements that are carried out on the Trunk Road Network.

The Agency's model is relatively simple and it is comparatively straightforward to undertake further assessments testing different development phasing or other investment scenarios. Hence, interested parties are encouraged to discuss the testing of alternative scenarios with the Highways Agency's Regional Managers.

However, although we acknowledge that smaller scale schemes designed to address safety or congestion issues in the Region are likely to be developed and implemented over the next 20 years, at this stage the model is not able to reflect the impact of these schemes. Nor is it able to reflect the roll-out of the Traffic Officer services or the introduction of demand restraint measures which would also be expected to make a positive contribution to overall network performance. Finally, it does not

cover those parts of the Strategic Road Network which lie outside the Agency's jurisdiction. Therefore, it is necessary to view the model outputs with some caution and recognise that they represent a 'worst case scenario' which the measures noted above may help to alleviate. However, as it is considered that these shortcomings will affect all investment scenarios tested by the model to a similar degree, the results obtained from the model are most suitable for comparing scenarios rather than providing an absolute measure of the performance of any package of measures.

5.2 The Basis For Appraisal

The Motorways and Trunk Roads that constitute the Agency's highway network have been divided into a series of discrete road lengths, or links, based on those used in the Highways Agency's Traffic Information System (HATRIS). Each length of motorway is represented as a separate link between the main junctions. Other Trunk Roads are divided into lengths defined by the main junctions with other A-roads. A separate link is defined for each direction of traffic flow.

There are various sources of data obtained from the databases maintained by and for the Agency. These include information on existing traffic flows, journey times and accident records. This data has been brought together for each directional link so that the key indicators may be summarised and readily accessed. The key indicators represent the relative operating condition of the strategic highway network at a particular point.

5.3 Forecast Impacts

The historic trend is for traffic to grow as a result of increases in car ownership and increases in wealth. Policies are directed to managing this growth so as to ensure journey reliability against a background of increased traffic. The growth in car-based trips up to the year 2036 is calculated by the TEMPRO program (version 4.2), which is issued by DfT. The data for the South West Region is contained within version 1.4 of the dataset (issued May 2002).

The program presents projections of growth in planning data and car ownership, and resultant growth in trip-making by different modes of transport. The number of trips is generally calculated from planning data collected at the district level. For the calculation of traffic growth, factors may be applied to adjust for the effects of increased trip lengths due to income growth and forecasts of fuel costs, however the total growth of car-based trips are constrained to traffic forecasts contained in the National Trip-end Model within Traffic Forecasts (1997)', NRTF97.

5.4 Impact of Transport Schemes

Major transport schemes in the Region will also have an impact upon the operation of the strategic road network. Such schemes may be improvements to rail freight, heavy rail passenger services, bus services, ports, airports or road schemes. The issue for this report is whether such schemes would make a significant difference to the operational performance of the strategic road network in the Region.

5.4.2 Programmed Road Schemes

Included in Forecast Impacts:

The forecasts include only Priority Action Sites and major schemes expected to enter the Targeted Programme for Improvements (TPI) within the planning horizon. If stakeholders wish to test the impacts of schemes other than those committed, then these can also be tested.

The committed strategic road schemes are indicated in Annex A at the rear of this document.

Progress of strategic regional road schemes in the South West is subject to regional priorities, as indicated in Annex A. The majority of these schemes have not been included in the future assessments.

5.5 Treatment of Development

Developments over and above those included in the national trip end growth forecasts contained within the TEMPRO datasets were taken into account using the Regional Network Report (RNR) Workbook. The RNR Workbook also includes adjustments where development is higher than expected growth (over and above TEMPRO) in the national models. The process ensures that the development is not double-counted, that is to say the overall growth in traffic (vehicle kilometres) on the trunk road network is constrained.

Details of the treatment of these developments within the Region can be found in Annex B at the rear of this document.

5.6 Future State of the Network

Comparisons between the current and future state of the network may be drawn from stress maps. These are based on Congestion Reference Flow calculations (as set out in TA46/97) which relate to all-day traffic flows and therefore the effects of peak-hour congestion are diluted somewhat. Conventional wisdom suggests that capacity should be measured hourly. However, stress maps serve to show a 'broad brush' comparison between what the network looks like now and how it would look at a future date.

The stress maps are colour-coded as follows:

- Red - links with 100% or greater stress.
- Amber - links with 90-100% stress.
- Green - links with less than 90% stress.

Figure 5.1 shows current observed stress on the Trunk Road Network in the South West. Roads shown red on the map are those which are 'above or at capacity', i.e. carrying at least the maximum sustainable traffic flow for the road type. Roads shown green are those which are comfortably below

capacity, those shown amber are those which are getting close to it and those in red have already exceeded their capacity.

It should be noted that:

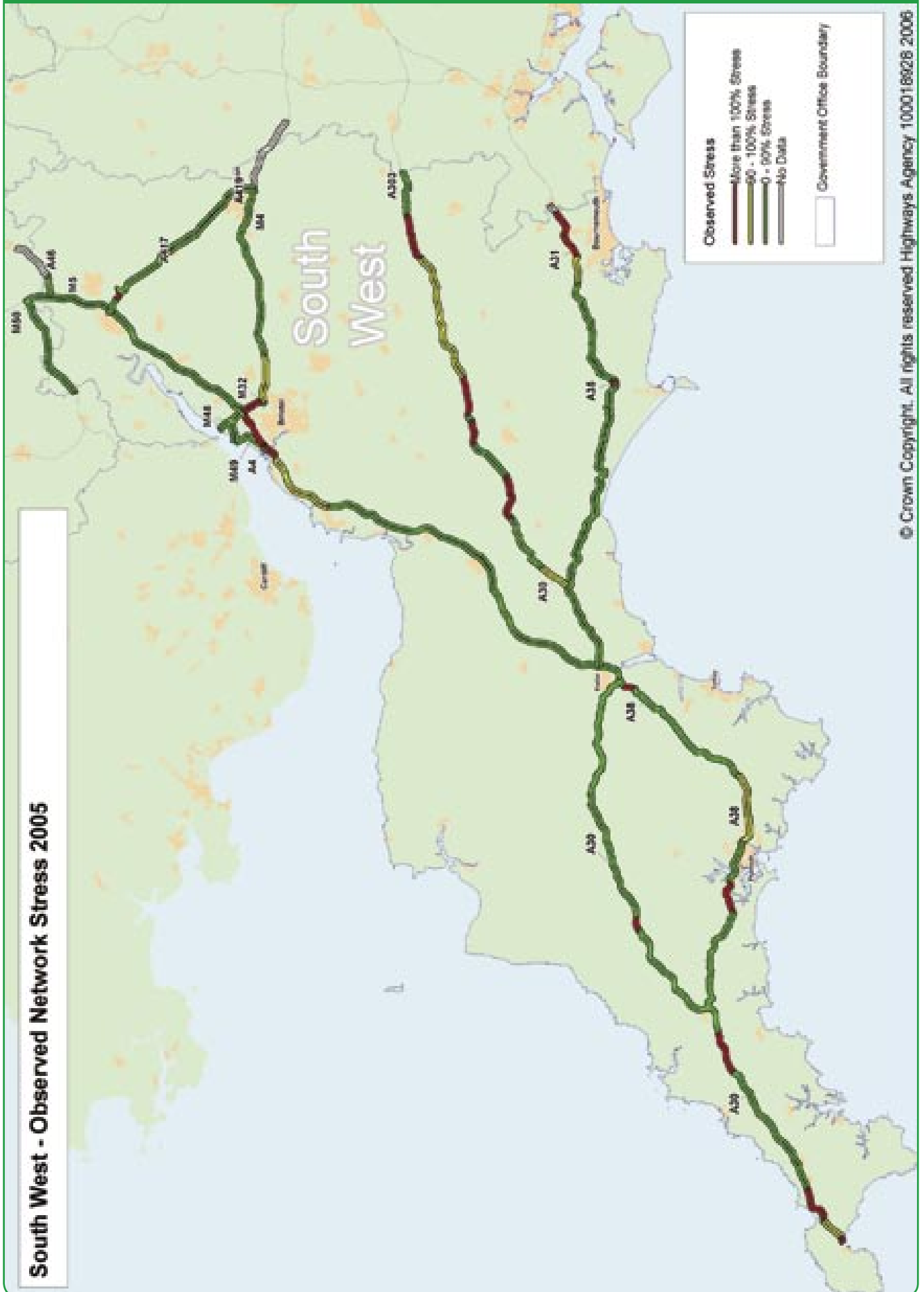
- A measurement of stress for a link*, which is shown as below capacity, may hide the fact that a junction within that link is at or above capacity.
- Stress measurement takes no account of the speed of vehicles.

For illustrative comparison, **Figure 5.2** shows forecast (2025) stress for the South West taking into account expected traffic growth and the impact of the transport schemes and developments outlined within **Annex A** and **B** at the rear of this report.

N.B Local knowledge of the A417/A419 Corridor suggests that there are significant capacity issues on the single carriageway section between Cowley and Brockworth (4.5 km approx.) which are not adequately represented by the model's link system. Consequently, the two links (northbound and southbound) between the A417 Air Balloon junction and the A46 junction near Brockworth should be assumed to be representative of the problems along the entire length of the route between Cowley and Brockworth.

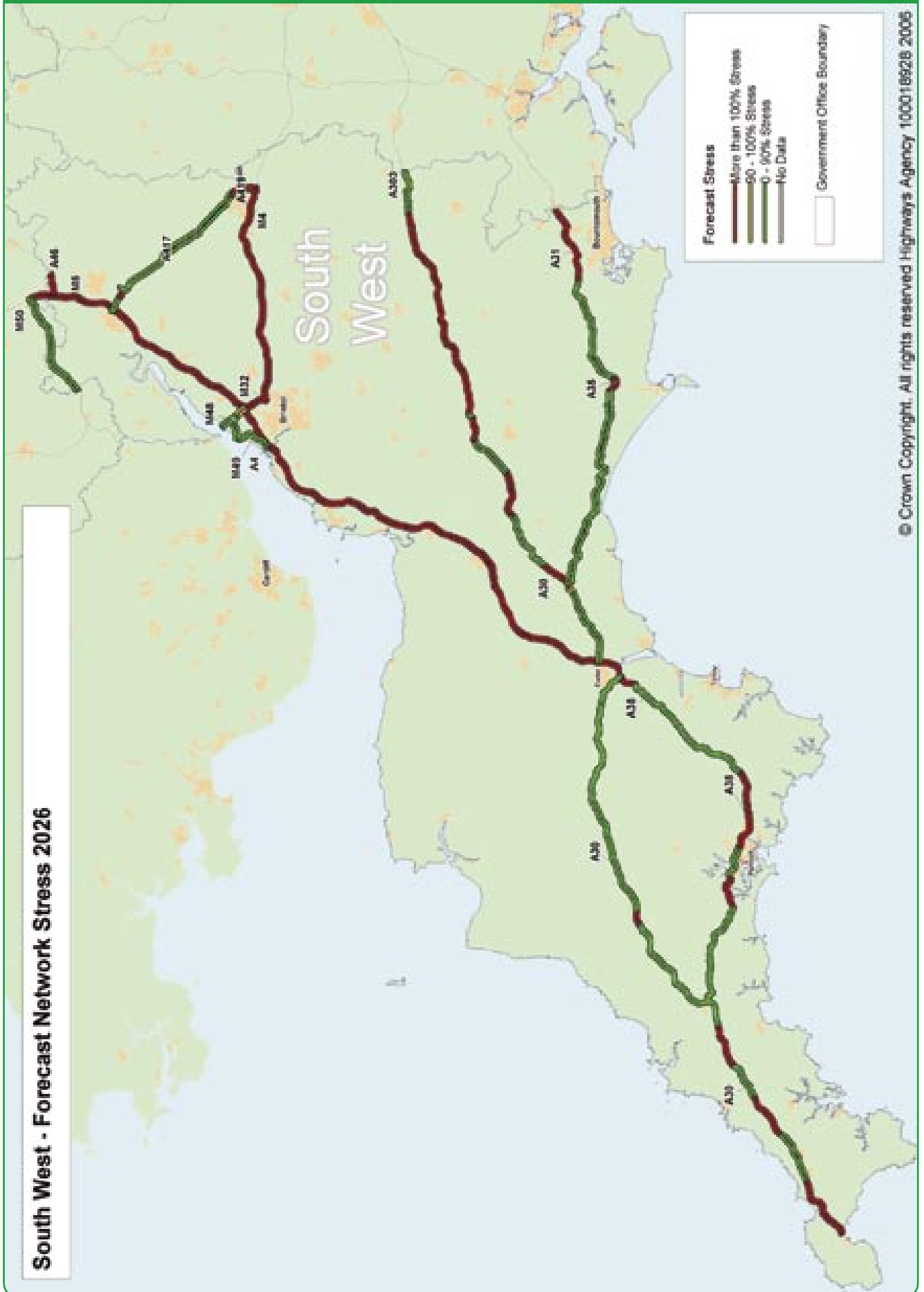
*A link is a section of road between two A-road or motorway junctions.

Figure 5.1 - Current observed network stress



© Crown Copyright. All rights reserved Highways Agency 100018928 2006

Figure 5.2 - Forecast network stress 2026





Glossary Of Terms

Multi Modal Study (MMS)	A strategic, long-term study (typically looking ahead up to 30 years) which considers the roles of, and interaction between, a range of transport modes within a given study area, with recommendations for interventions to ensure the transport network will be able to meet a wide range of objectives.
Road-Based Study (RBS)	A strategic, long-term study (typically looking ahead up to 20 or 30 years) which considers the role of the highway network within a given study area, with recommendations for interventions to ensure the network will be able to meet long-term objectives.
Route Management Strategy (RMS)	A study aimed at producing a 10-year management strategy based on a set of route functions and objectives for a specific route covering maintenance, improvements, development control etc.
Regional Planning Guidance (RPG)	Document produced by the Regional Planning Body which interprets national planning policy for that region and sets broad objectives for inclusion in more local planning documents such as Structure Plans (typically at a county level) or Local Plans (at district, borough, City level).
RSS	A document which provides strategic guidance on the location of development within the Region. The South West RSS 2026 will replace RPG10 which looks forward to 2016. The RSS will be a statutory development plan which sits between national and local policy.
Targeted Programme of Improvements (TPI)	The Government's national programme of major road schemes (typically costing over £5million).
Grade-Separated Junction (GSJ)	A road junction where at least one traffic stream passing through the junction are carried by bridge or tunnel to avoid crossing traffic movements.
Plan-led System	The means by which planning policy at a national level is devolved through regional, strategic and local levels to guide individual planning decisions.
Trans-European Road Network (TERN)	A network of routes of Europe-wide significance especially for the movement of freight.
Trunk Road	A principal road for which the Secretary of State for Transport is the highway authority.
Core/Non-Core Network	Describes trunk roads, which are considered to continue fulfilling a strategic role (core) and those considered best managed by local highway authorities (non-core). The process of reviewing the roles of the trunk road network was initiated in the 1998 government publication "A New Deal for Trunk Roads". Since then control of almost a third of trunk roads have been handed over to local councils, with a small number of routes nearing completion.

Annex A - Effect of Major Schemes in the TPI

Road Schemes For Future Improvement	Description	Assumed Opening Year
Already in progress or firmly planned*		
A419 Commonhead Junction	Grade Separation	2007
A30/A382 Merrymeet Junction	Junction Improvement	2007
A30 Bodmin to Indian Queens Improvement	S2 to D2	2007
A38 Dobwalls Bypass	S2 to D2	2008
A419 Blunsdon Bypass	Upgraded D2	2009
<i>A strong case for inclusion in RFA</i>		
A358 Ilminster to Taunton Trunking	S2 to D2	
A303 Ilminster Bypass	WS2 to D2	
Longer term priorities		
A303 Cartgate Roundabout Improvement	Junction Improvement	
A303 Sparkford to Ilchester Improvement	S2 to D2	
A303 Chicklade Bottom to Mere Improvement	S2 to D2	
A303 Wyllye to Stockton Wood Improvement	S2 to D2	
A303 Stonehenge Improvement	S2 to D2	
A30 Temple to Higher Carblake Improvement	S2 to D2	
A30 Carland Cross to Chiverton Cross Improvement	S2 to D2	
A31 Ferndown to A35 Dualling	S2 to D2	
A417 Cowley to Brockworth Improvement	S2 to D2	

Key

S2 = Single carriageway (Two lane).

WS2 = Wide single carriageway (two lane).

D2 = Dual carriageway (Two lane).

* Committed – funding agreed in principle although detailed design and statutory procedures may be outstanding

Annex B - Treatment of Developments

Some of the development proposals which form the policies described in the RSS have arisen since the planning data contained in TEMPRO Version 4.2 was collected. Hence they are not included within its database. As they will create additional pressures on the Trunk Road Network, over and above those predicted by the background traffic growth factors obtained from TEMPRO datasets, it is essential to examine the impact these changes will have. It is, therefore, necessary to modify the data obtained from TEMPRO to reflect these changes. Hence, any developments over and above those contained within the TEMPRO datasets have been incorporated individually within the RNR Workbook.

The RNR Workbook has also been modified to include adjustments for those developments where higher than expected traffic growth (over and above the national trends) is forecast to take place.

The process used to incorporate these items within the RNR workbook has been designed to ensure that development is not double-counted. Hence, the overall growth in traffic (vehicle kilometres) on the Region's Trunk Road Network is constrained.

Information on these land-use changes was obtained from local planning data and any changes in the major housing and employment development sites allocated in Development Plan Documents which have occurred since TEMPRO was devised have been included directly in the workbook together with appropriate trip generation data. The proposals for large developments identified in this process are shown in **Figure B.2** below.

As the model was also able to assess the impact of changes to the Trunk Road Network within the Region, details of these were also included in its database.

Figure B.1: Land-Use Changes Considered

District	Site	Uses	Area	Housing	Employment	Others
Swindon	The Triangle	B8 (80%) B8 (20%)	43 ha		139,350 sqm	Ancillary offices
Swindon	Coate (Commonhead)		60 ha	1800	23ha	Uni (8, 900 students)
Plymouth	Sherford			4000	80 ha	
Exeter	New Settlement			3500	40 ha	
Exeter	Airport Expansion					Anticipated to grow to between 2.0 and 2.5mppa.
Weston- super-Mare	Vision		800 ha	6,600		10,000 jobs.
Bristol	Airport Expansion					Currently 4 million passengers per annum (mppa). Support to extend this to 12 million passenger per annum by 2030.
Bournemouth	Airport Expansion					Current 0.5 mppa. Forecast to expand to between 3mppa and 4mppa depending on Airport provision in the SE.

Figure B.2: TEMPRO & Calculated Growth Factor Comparison based on Local Planning Data

District	TEMPRO Base 2004		Large Development				Forecast Extra Trips 2016			Growth Factor	
	Origin Trips	Destination Trips	Employment (Ha)	Housing (Dwellings)	University (Students)	Airport (Extra Passengers per year)	Employment 2-way Trips	Housing 2-way Trips	Other 2-way Trips	TEMPRO 2016	Calc 2016
Bath & NE Somerset	258302	258517					0	0	0	1.10	-
Bournemouth	232778	232606				3,500,000	0	0	3241	1.17	-
Caradon	108823	108714					0	0	0	1.14	1.19
Carrick	141183	141193					0	0	0	1.13	1.18
Cheltenham	155099	155025					0	0	0	1.08	-
Christchurch	68077	68299					0	0	0	1.20	-
City of Bristol	573652	572612				8,000,000*	0	0	7407	1.13	-
Cotswold	136718	136530					0	0	0	1.15	1.19
East Devon	173409	173506					0	0	0	1.21	1.62
East Dorset	119813	119605					0	0	0	1.15	1.19
Exeter	177421	176611	40.00	3,500		2,500,000	62240	15365	2315	1.14	-
Forest of Dean	104443	104222					0	0	0	1.02	-
Gloucester	167675	167959					0	0	0	1.14	-
Isles of Scilly	1411	1333					0	0	0	1.06	-
Kennet	111263	110828					0	0	0	1.18	-
Kerrier	117259	117390					0	0	0	1.15	1.20
Mendip	159019	159346					0	0	0	1.16	-
Mid Devon	96094	96050					0	0	0	1.15	-
North Cornwall	121592	121423					0	0	0	1.12	1.17
North Devon	126792	126862					0	0	0	1.07	-
North Dorset	96090	95832					0	0	0	1.12	1.17
North Somerset	242818	243347		600			0	2634	0	1.06	-
North Wiltshire	183794	183906					0	0	0	1.23	1.46
Penwith	71397	71440					0	0	0	1.04	1.11
Plymouth	297923	298183	80.00	4,000			124480	17560	0	1.10	1.26
Poole	206121	206738					0	0	0	1.18	-
Purbeck	66712	66253					0	0	0	1.09	1.16
Restormel	131201	131264					0	0	0	1.16	1.20
Salisbury	161201	161315					0	0	0	1.14	1.19
Sedgemoor	146243	146715					0	0	0	1.17	1.23
South Gloucestershire	367815	367666					0	0	0	1.23	-
South Hams	136596	136436					0	0	0	1.22	1.47
South Somerset	224134	224352					0	0	0	1.14	1.19
Stroud	156363	156595					0	0	0	1.05	-
Swindon	277291	277475	36.94	1800	8900		57479	7902	0	1.18	1.50
Taunton Deane	158728	158897					0	0	0	1.11	-
Teignbridge	173558	173984					0	0	0	1.15	1.21
Tewkesbury	110158	110124					0	0	0	1.20	1.24
Torbay	158102	158433					0	0	0	1.12	-
Torridge	76202	76233					0	0	0	1.11	-

District	TEMPRO Base 2004		Large Development				Forecast Extra Trips 2016			Growth Factor	
	Origin Trips	Destination Trips	Employment (Ha)	Housing (Dwellings)	University (Students)	Airport (Extra Passengers per year)	Employment 2-way Trips	Housing 2-way Trips	Other 2-way Trips	TEMPRO 2016	Calc 2016
West Devon	74848	74857					0	0	0	1.12	1.17
West Dorset	148702	148452					0	0	0	1.13	1.18
West Somerset	44417	44317					0	0	0	1.26	-
West Wiltshire	164177	163792					0	0	0	1.13	1.18
Weymouth & Portland	73128	73161					0	0	0	1.14	-

* note Bristol Airport is located in North Somerset District.

Annex C - Changes made since last version of this report

- Development assumptions were modified to reflect latest version of Regional Spatial Strategy as submitted to Secretary of State.
- The forecast year has been taken as being 2026.
- The TEMPRO growth option has been used, as opposed to NRTF.
- All the links which were split in RNR1 have been re-joined and all the details have been checked.
- There were additional links in the workbook:
- M5 Junctions 9 to 11 (Highways Agency Area 9) have been included within the workbook.
- A417 from the A40 to M5 Junction 11a (Gloucester) has also been included.
- Likewise, the M50 Junction 3 to M5 Junction 8 has been included.
- A46 M5 Junction 9 to A435 has not been included as this short section of Trunk Road is managed by the West Midlands.

FURTHER INFORMATION ON THE HIGHWAYS AGENCY:

For real time traffic information:

08700 660 115

www.highways.gov.uk/trafficinfo

24 hours a day, 365 days a year

(Calls from BT landlines to 0870 numbers will cost no more than 8p per minute; mobile calls usually cost more)

For general Highways Agency information:

08457 50 40 30

email: ha_info@highways.gsi.gov.uk

24 hours a day, 365 days a year

(Calls from BT landlines to 0845 numbers will cost no more than 3p per minute; mobile calls usually cost more)

Highways Agency Publications Code: HA115/06
Highways Agency Publications Group, Birmingham b060078.
© Crown copyright 2005. Printed on recycled paper
containing 75% post consumer waste and 25% ECF Pulp.

Directgov
Straight through to public services
www.direct.gov.uk