

Government Office for the South West

London to South West and South Wales

Multi Modal Study

Greater Bristol Area Plan

Final Report

May 2002



Government Office for the South West
London to South West and South Wales
Multi Modal Study
Greater Bristol Area Plan
Final Report
May 2002



Halcrow Group Limited
Burderop Park Swindon Wiltshire SN4 0QD
Tel +44 (0)1793 812479 Fax +44 (0)1793 812089
www.halcrow.com

Halcrow Group Limited has prepared this report in accordance with the instructions of their client, Government Office for the South West, for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

© Halcrow Group Limited 2002

Halcrow Group Limited
Burderop Park Swindon Wiltshire SN4 0QD
Tel +44 (0)1793 812479 Fax +44 (0)1793 812089
www.halcrow.com

Government Office for the South West

London to South West and South Wales

Multi Modal Study

Greater Bristol Area Plan

Final Report

Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Signed
20	0	Greater Bristol Area Plan - Draft	Mar'02	MBr
20	1	Greater Bristol Area Plan – Final Draft	Mar'02	MBr
20	2	Greater Bristol Area Plan – Final Report	May '02	MBr

The Preferred Strategy will go to the Regional Assemblies for the South West and South East of England, and the Welsh Assembly Government, to consider their recommendations and as an input to the revision of the Regional Transport Strategies in Regional Planning Guidance for the South West and the South East.

These bodies will consider whether they wish to support the strategy. They will then, in turn, make recommendations to Ministers. Only then will any decisions be taken on the addition of schemes to investment programmes.

The study has been taken forward in an open and consultative manner and the possible options discussed publicly. Many of the proposals are at an early stage in the planning process and if the recommendations were accepted, further work would be required to prepare and consult on detailed designs and route alignments. This will allow specific impacts to be identified.

Contents

Executive Summary: Greater Bristol Area Plan	i
1 Introduction	1
1.1 Context	1
1.2 Purpose of the Report	2
1.3 Interaction with other Plans	3
2 Context	4
2.1 Introduction	4
2.2 Characteristics of Plan Area	4
2.3 Existing Transport Networks	6
2.4 Travel Data	7
2.5 Land Use Patterns	8
2.6 Problems and Issues	11
2.7 Structure of the Preferred Strategy	12
2.8 Links to Other Studies	13
3 Rail Measures	16
3.1 Introduction	16
3.2 Role of Rail Services and Key Rail Issues	16
3.3 Service Proposals	18
3.4 Station Proposals	20
3.5 Previous studies	21
3.6 Infrastructure Requirements	22
3.7 Costs	24
3.8 Patronage and Revenue Forecasts	25
3.9 Summary of Key Benefits and Costs of Rail Measures	26
4 Other Public Transport Measures	28
4.1 Introduction	28
4.2 Coach & Express Bus Network	28
4.3 Interchanges	37
4.4 Park and Ride Sites Adjacent to Strategic Highway Network	42
4.5 Local Public Transport	43
4.6 Costs	44
5 Highway Measures	45

5.1	<i>Introduction</i>	45
5.2	<i>Characteristics of the Highway Network</i>	45
5.3	<i>M4 Junction 18 (A46)</i>	49
5.4	<i>M4 Junction 18 (A46) to Junction 19 (M32)</i>	49
5.5	<i>M4 Junction 19 (M32)</i>	49
5.6	<i>M4 Junction 19 (M32) to Junction 20 (Almondsbury)</i>	50
5.7	<i>M4 Junction 20 (Almondsbury) to Junction 21 (M48)</i>	50
5.8	<i>M5 Junction 15 (Almondsbury) to Junction 16 (A38)</i>	51
5.9	<i>M5 Junction 16</i>	51
5.10	<i>M5 Junction 16 (A38) to Junction 17 (B4005)</i>	52
5.11	<i>M5 Junction 17 (B4005)</i>	52
5.12	<i>M5 Junction 17 (B4005) to M5 Junction 18 (M49/A4)</i>	53
5.13	<i>M5 Junction 18/18A (M49/A4)</i>	53
5.14	<i>M5 Junction 18 (M49/A4) to Junction 19(A369)</i>	54
5.15	<i>M5 Junction 19(A369)</i>	54
5.16	<i>M5 Junction 19 (A369) to Junction 20 (Clevedon)</i>	54
5.17	<i>M5 Junction 20 (Clevedon)</i>	55
5.18	<i>M5 Junction 20 (Clevedon) to Junction 21 (A370)</i>	55
5.19	<i>M5 Junction 21 (A370)</i>	55
5.20	<i>Traffic Control (ITS)</i>	56
5.21	<i>Forecast Traffic Flows</i>	58
5.22	<i>Costs</i>	60
5.23	<i>Rejected Options</i>	60
6	Other Measures	62
6.1	<i>Introduction</i>	62
6.2	<i>Land Use Issues</i>	62
6.3	<i>Access to Bristol International Airport</i>	63
6.4	<i>Traffic Restraint</i>	65
7	Summary of Findings	67
7.1	<i>Conclusions</i>	67

Executive Summary: Greater Bristol Area Plan

Context

E.1 The Greater Bristol Area Plan covers the motorway network from M4 Junction 18 to Almondsbury, and south to M5 Junction 21 plus the equivalent rail routes on the Great Western Main Line (GWML). It also includes discussion of road and rail issues on corridors feeding these strategic routes, in as far as they influence the operation and conditions on the strategic network. Due to the nature of the transport corridors examined in this Plan, there are close links between the content of this Plan and those for London to Bristol/Severn Estuary and Bristol to Exeter.

E.2 The key transport-related problems pertinent to this Plan are:

- The M4/M5 around Bristol experiences significant congestion at peak times;
- Both the road and rail networks are under severe pressure at peak times such that minor incidents can cause a significant breakdown in operational performance;
- There are difficulties in achieving 'seamless' interchange between different modes; and
- Land use patterns accentuate dependence upon the car.

The Preferred Strategy

E.3 The Preferred Strategy is summarised in Figure 1.

E.4 The Greater Bristol Area Plan contains a Preferred Strategy which includes investment across all modes on the M4/M5, GWML and other rail corridors. The Plan also recognises the important role that land use issues play in influencing travel demand within the Greater Bristol area and how this might be developed in the future to improve the sustainability of travel patterns. The Plan also identifies the important role which local public transport can have in reducing pressure on the strategic transport networks, although accepting that further study is required to better understand this relationship.

E.5 The Preferred Strategy incorporates substantial increases in frequencies of both long-distance and local train services to provide greater opportunities to use rail as an alternative to the private car. The strategy recognises the existing capacity

constraints within the Greater Bristol area and therefore recommends infrastructure works to increase rail capacity. These capacity improvements are recommended to enable increased rail service frequencies to be operated but more importantly to create the increased flexibility in rail operations to improve service reliability.

- E.6* The Preferred Strategy also includes a significant upgrade to the existing coach services operating in the Greater Bristol area. Two new Coachways are proposed, at Weston-super-Mare and Cribbs Causeway, which will significantly improve the attractiveness of coach travel, both in terms of offering new, accessible locations for interchange and reducing some existing journey times.
- E.7* A comprehensive programme of upgrading existing public transport interchanges (both rail and coach/bus) is also proposed. A first class transport system demands that travellers have levels of comfort, security and information which are above those that currently exist in many locations. The upgrading of interchanges can have a major impact on people's perception of public transport and is a central part of the Preferred Strategy.
- E.8* Highway measures in the Plan, include a package of motorway junction improvements and a selection of additional schemes aimed at improving the traffic operation of the motorway network. The Preferred Strategy also includes the introduction of a 'Controlled Motorway' management system on the M4/M5 around Bristol which will assist in better management of traffic flow at busy times, providing higher standards of information to the travelling public and reducing the adverse impacts of incidents along the corridor.
- E.9* A series of Park & Ride sites and services have been recommended close to the strategic highway network within the Greater Bristol area. These facilities have been proposed to provide effective sustainable links between the motorway network and key activities within the area.
- E.10* The Plan has also identified the importance of implementing a range of other measures as part of an overall strategy for the Greater Bristol area including:
- Enhancement of local public transport including the implementation of LRT proposals;
 - Recommendations regarding land use issues in the Greater Bristol area;

- Pursuing traffic restraint measures both within town/city centres but also to examine how the volumes of traffic generated by edge-of-town/out-of-town developments might be moderated; and
- Improvement of public transport access to Bristol International Airport.

E.11

Within the Greater Bristol area, there are complex interactions between local and strategic transport networks, as well as those between land use issues and transport demand. It has not been possible within the context of this strategic study to undertake the necessary detailed analysis to fully understand these relationships. It is therefore recommended that a further more detailed study is undertaken to fully explore these issues for the Greater Bristol area.

Highway Measures

Controlled Motorway

M5

- > Auxilliary lane to be added between junctions 16 & 17
- > New climbing lanes between junctions 19 & 20
- > 3 new climbing lanes between junctions 17 & 20

M4

- > Almondsbury Interchange (M4/M5) proposals by Highways Agency are supported
- > Auxilliary lanes to be added between junctions 19 & 20
- > New climbing lane on approach to junction 18

Coach service enhancements:

- > Coach services to include 2 coaches per hour between London-Bristol, London-South Wales, Heathrow-Bristol, Heathrow-South Wales, Bristol-Taunton-Exeter
- > Improved integration of local bus and coach services and higher quality vehicles

Proposed combined service rail frequencies:

- > Taunton - Bristol Temple Meads: 4/5 trains per hour (tph)
- > Exeter St Davids - Bristol Temple Meads: 3/4 tph
- > London Paddington - South Wales: 3 tph
- > London Paddington - Bristol Temple Meads: 3 tph
- > Bristol Temple Meads - Oxford: 2 tph

Study Corridors

Motorways

'A' Roads

Railways

Other Rail Lines

Stations

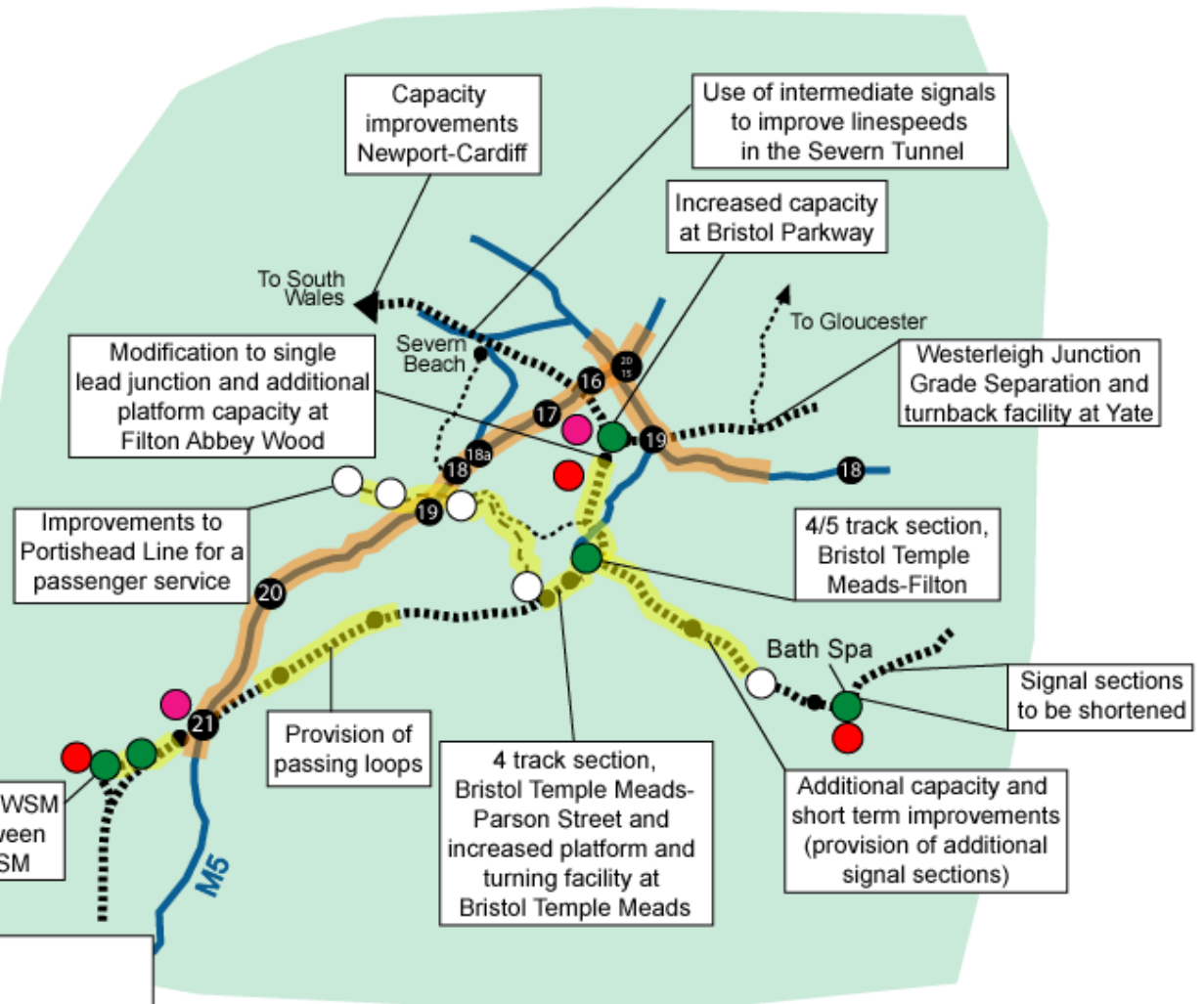
New Coachways

Interchange facilities (with rail) to be improved

Interchange facilities (bus/coach) to be improved

New stations to be constructed

Rail infrastructure enhancements



Bristol Area Recommendations

Figure 1

1 Introduction

1.1

Context

1.1.1

Halcrow was appointed by the Government Office for the South West (GOSW) in March 2000 to undertake the London to South West and South Wales Multi-Modal Study ('SWARMMS' – South West Area Multi-Modal Study). The overall aim of the study is to make recommendations for a long-term strategy to address passenger and freight transport needs within the key transport corridors between London and the South West of England and South Wales (M3, M4, M5, A303, A30, A38 and the parallel rail routes). The SWARMMS study area is shown in Figure 1.1.

Figure 1.1: Map of the SWARMMS Study Area



1.1.2

This will include, as and where appropriate, plans of specific interventions to address existing and predicted strategic transport problems in the study area, looking in particular at opportunities for reducing congestion by better management and modal shift, as well as options for taking forward focused improvements.

1.1.3

This Plan is one of ten being produced for SWARMMS. The ten plans comprise:

Four Multi-Modal Transport Corridor Plans

- (London) Reading-Bristol/Severn Estuary (including the Great Western rail line and the M4)
- (London) Reading/Basingstoke-Exeter (including the Berks & Hants and Waterloo-Exeter rail lines and the M3/A303/A30)
- Bristol-Exeter (including the Bristol-Exeter railway and the M5)
- Exeter-Penzance (including the Exeter-Penzance railway, the A30 and the A38)

Two Principal Urban Area (PUA) Plans

- Greater Bristol
- Swindon

Four Study-Wide Theme Plans

- Reducing the growth in travel demand
- Tourism
- Inter-modal freight
- Rural access to the transport system

1.2

Purpose of the Report

1.2.1

This report details the findings of the Greater Bristol Area Plan. Work on the Plan has generated a series of specific recommendations for the strategy in terms of:

- Rail measures (see Chapter 3);
- Other public transport measures (including express bus and coach and strategic park & ride sites – see Chapter 4);
- Highway measures (including road schemes – see Chapter 5);
- Traffic control measures (also see Chapter 5); and
- Other measures including those relating to land use, access to Bristol International Airport and traffic restraint.

1.2.2

Chapter 2 sets the context for the Plan. Chapters 3-6 describe the derivation of measures described above. Chapter 7 provides a Summary of Findings.

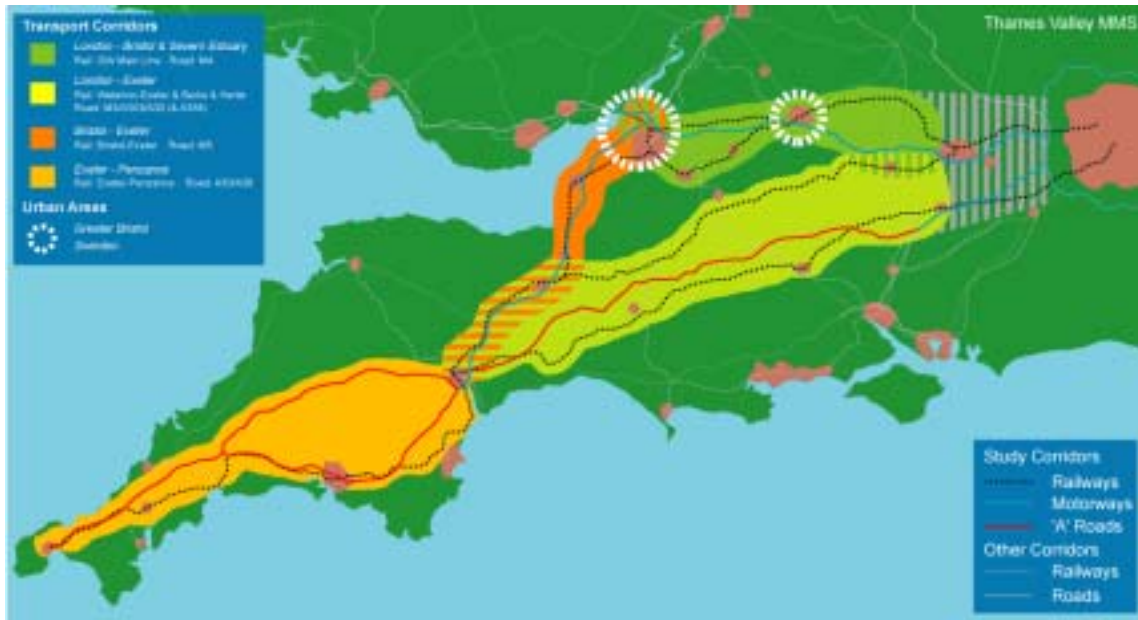
1.3

Interaction with other Plans

1.3.1

There is a degree of interaction between all ten Plans being produced by SWARMMS. By definition, the four corridor plans interact by reason of geography as shown in Figure 1.2, and specific links are referenced throughout each Plan.

Figure 1.2: Coverage of Geographic Plans



1.3.2

This Plan interacts particularly with the London-Bristol/Severn Estuary Plan and the Bristol - Exeter Plan.

1.3.3

The four study-wide theme Plans also interact, both with each other and with the geographic-based Plans. This Greater Bristol Plan is particularly influenced by the Plan to reduce the growth in travel demand, as indeed are all Plans.

2 Context

2.1

Introduction

2.1.1

This chapter sets the context for the Greater Bristol Plan. It begins by describing the characteristics of the Plan area, the existing transport networks and some basic travel data, and goes on to describe land use patterns in the area. It then lists the 16 key problems and issues identified at an earlier stage in the study which apply to the whole SWARMMS area, going on to explain those of greatest relevance to this Plan. The chapter continues by summarising the findings of earlier work, which led Halcrow to pursue the general structure of the Preferred Strategy. It concludes by describing the particular relevance to the Greater Bristol Plan of the on-going and future studies, both in the Greater Bristol area itself and further afield.

2.2

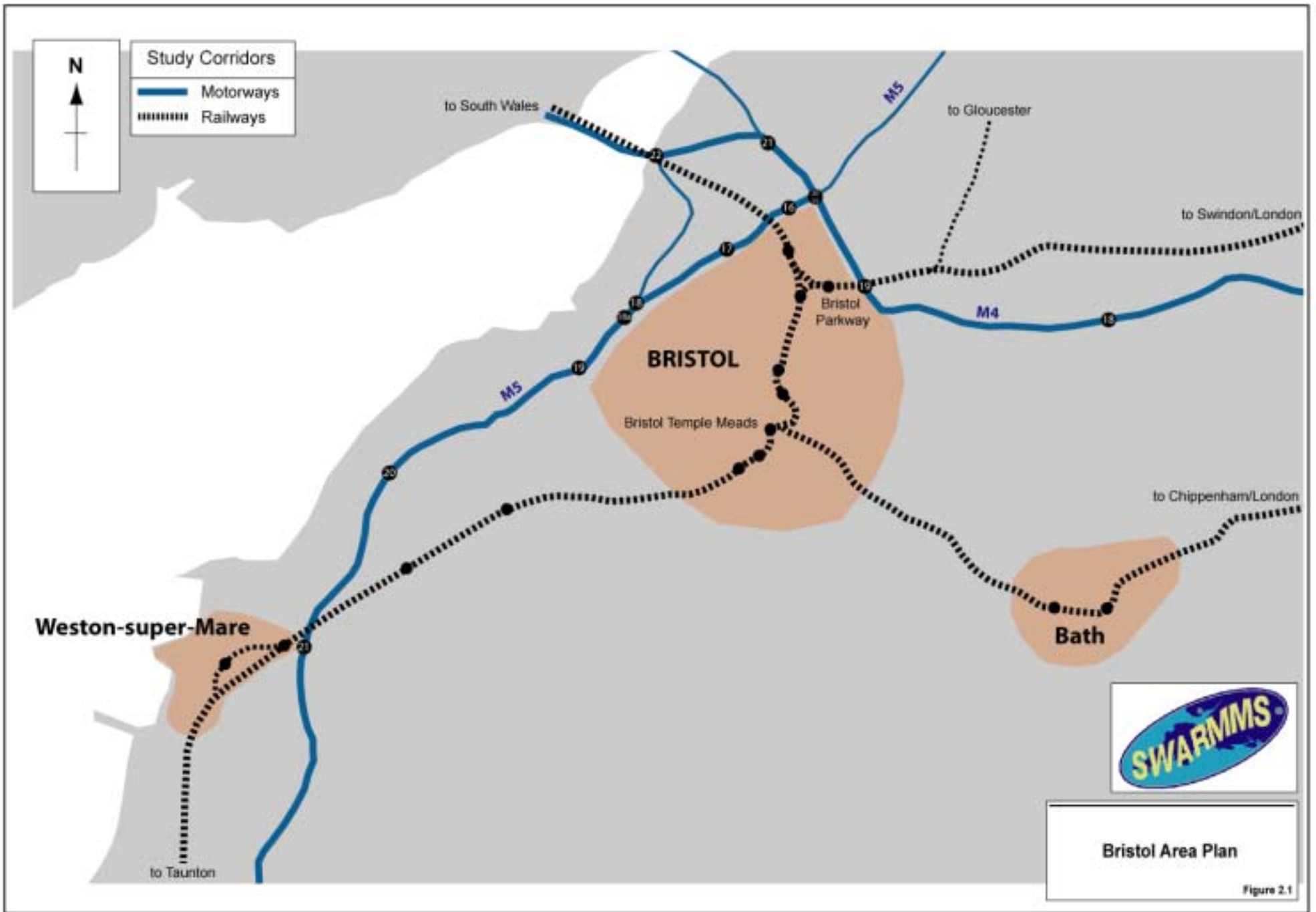
Characteristics of Plan Area

2.2.1

This Plan is focussed on the Greater Bristol area which largely coincides with the former County of Avon, now comprising four unitary authorities City of Bristol, North Somerset, South Gloucestershire and Bath & North East Somerset. Whilst in population terms, it is dominated by the Bristol urban area, it also includes two other major urban centres which are designated as PUAs, Weston-super-Mare and Bath. The Plan area is illustrated in Figure 2.1.

2.2.2

As the largest conurbation within the SWARMMS study area, Bristol is the most important regional centre in the South West of England. Over the past decade Bristol has developed into a modern vibrant city, with expanding financial services and technology sectors bringing employment. Bristol is now the largest employment base for banking, finance and insurance outside the City of London. Other developments have seen the increasing importance of locations outside the centre of Bristol, such as the continued development of the Bristol North Fringe for employment with major financial and technology sector companies choosing to locate in the area. In addition, the development of Cribbs Causeway as a major regional shopping centre has caused a re-distribution of retailing activity in the Greater Bristol area. As such, the Greater Bristol Area can be viewed as the 'engine room' of the South West region's economy, and transport in the area plays a vital role in maintaining the region's prosperity.



2.2.3 In tandem with the establishment of new employment and retailing in the North Fringe and Cribbs Causeway, there has been substantial residential development in areas such as Yate and Bradley Stoke, and also in North Somerset, particularly around Weston-super-Mare. The juxtaposition between substantial residential development in North Somerset and employment in the North Fringe has generated substantial travel demand in the area.

2.3 ***Existing Transport Networks***

2.3.1 Existing travel within the Plan area is predominantly by private car and a network of major roads has developed to serve this transport demand. In particular the M4 and M5 corridors perform a critical function in linking parts of the Plan area. Whilst these motorway corridors generally operate efficiently outside peak periods, increasing traffic volumes result in more frequent congestion problems which are exacerbated in the summer months by significant volumes of holiday traffic particularly on the M5.

2.3.2 The motorway corridors through the Greater Bristol area not only serve in linking up parts of the sub-region but serve a wider role as part of the trunk road network connecting much of the South West of England to South Wales, the Midlands, London and the South East. It is a widely held view that congestion problems on the motorway network in the Greater Bristol area are considered to be problems for the whole South West.

2.3.3 In addition, there are other trunk roads and primary roads within the Plan area performing a strategic function including:

- A46/A36 - linking M4 to Bath;
- A4174 – Avon Ring Road;
- A4 – linking Bristol to Avonmouth;
- A38 – running south-west from Bristol linking to Somerset;
- A37 linking Somerset and Dorset to the Bristol area; and
- A371 linking the A38 to Weston-super-Mare.

2.3.4 Most of these highway corridors operate satisfactorily at present outside the peak periods but during peak periods congestion results in unreliable journey times and associated environmental problems. The unreliable journey times affect both private cars and bus services operating along these corridors although at certain locations priority measures assist in reducing the impact of congestion on public transport. The peaks currently last approximately 2 hours during the morning and

evening on a typical weekday, although there is evidence that the durations of peak periods are extending. At weekends, the peaks are less clearly defined but during holiday periods, particularly July and August, there are extended peak periods on Friday evenings, Saturdays (all-day) and Sunday afternoons/evenings.

- 2.3.5 The rail network within the Greater Bristol area is centred on the Great Western mainlines linking the sub-region to London, although there are extra links to facilitate north-south movements, access to the Severn Tunnel and Wales. Whilst existing service frequencies and patterns for inter-city services are reasonably attractive, local services are generally more limited.
- 2.3.6 Over recent years there have been increasing demands on the rail network in the Greater Bristol area, with the result that many track sections and junctions are operating close to capacity. This is further exacerbated by the mixture of stopping local services and long-distance express services operating over essentially a two-track railway. This reduces flexibility in rail operations with consequent impacts on the reliability of services. In addition, the potential for scheduling freight services is often very restricted due to the demand for passenger services. Future planned increases in Virgin rail services passing through the Greater Bristol area will further increase the pressures on the rail network.
- 2.3.7 As with the road network, Bristol is at a critical node in the rail network serving both north-south and east-west long-distance movements as well as more local movements. Once again, rail capacity constraints in the Bristol area are considered to be an issue for the South West as a whole and not simply a local or sub-regional matter.
- 2.3.8 Plans to develop Light Rapid Transit (LRT) in the Bristol area are at an advanced stage. Part of these plans involves operating LRT over the heavy rail network and will require an expansion of capacity. In the future, as the LRT network expands, it is anticipated that some existing heavy rail branch lines/suburban services might best be operated as LRT services. This would make use of LRT's ability to operate in a more flexible manner, running beyond the existing rail corridors such as into the Central Area of Bristol.

2.4

Travel Data

2.4.1

Previous studies undertaken by the former Avon County Council have identified the general travel patterns in the Greater Bristol area. A selection of these statistics is presented in Table 2.1. This demonstrates that travel is dominated by private car

movements with public transport only accounting for approximately 7-8% of travel within the Study area and cycling/walking accounting for a similar proportion of daily travel.

Table 2.1: Greater Bristol Area Travel Statistics – BRITES 2001

	Daily Person Trips	%	Daily Person-kms	%
Car	1.9M	68%	35M	85%
Public Transport	0.2M	7%	3M	7.5%
Cycle/Walk	0.7M	25%	3M	7.5%

2.4.2

Looking at some of the detail behind these figures, it is evident that rail only accounts for approximately 1% of trips within the Study area, demonstrating the relatively small role that rail currently plays in the Greater Bristol area. This is also borne out by the SWARMMS strategic transport model which does not represent local public transport trips but suggests that rail accounts for less than 2% of trips within the Greater Bristol area. This corresponds to about 5% of passenger-kms reflecting the relatively long average trip length for rail journeys.

2.5

Land Use Patterns

2.5.1

Land use patterns over the past 20-30 years in the Greater Bristol area have seen four locations absorb substantial amounts of new development:

- Weston-super-Mare, in particular the Worle area in the east of the town, where there has been a substantial growth in the number of residential properties;
- Bristol Urban Development Area promoted by Bristol Development Corporation – development of the inner Bristol area east of the City Centre through St Philips: largely employment and retail development;
- Bristol North Fringe with the creation of large amounts of employment principally in the finance and technology sectors, combined with some residential development in areas such as Bradley Stoke; and
- Cribbs Causeway – development of a regional shopping centre.

2.5.2

Three out of the four growth nodes (excluding the Bristol Urban Development Area) have placed substantial strain on the highway infrastructure due to a number of factors. The following sections describe these issues.

Weston-super-Mare

- 2.5.3 Growth in the residential population of the Weston-super-Mare area over more than 30 years has not been matched by employment growth, with the result that there is currently a large imbalance. Indeed, employment in Weston-super-Mare has been falling over recent years due to a loss of traditional industries such as Clarkes (shoe manufacturing) and Westlands (helicopter industry). In addition, there has been a steady decline in the tourist market served by Weston-super-Mare. As a result of these factors and the large imbalance, there is substantial outward commuting from Weston-super-Mare to employment in the Bristol area.
- 2.5.4 With much of the new employment in the Bristol area being located in areas such as the North Fringe away from the central areas of the City, it is not easily accessed by public transport from Weston-super-Mare. Hence a large amount of car borne commuting has been generated which places particular pressure on the M5 motorway. Of particular note are the problems at M5 Junction 21 (discussed further in Chapter 5) which is now operating at or above capacity for much of the morning and evening peak periods with substantial outbound queuing in the morning and inbound queuing in the evening. This has resulted in the Highways Agency placing a veto on all further residential development in the Weston-super-Mare area without improvements to M5 Junction 21.
- 2.5.5 In common with many other areas, the local authorities in the Greater Bristol area are required to accommodate substantial numbers of new dwellings by 2011 based on Structure Plan allocations for the period 1996 –2011. Of this allocation just under a third falls to North Somerset of which a substantial proportion is earmarked to be provided in the Weston-super-Mare area. In fact, the revised PPG3 makes it clear that new residential development should be focussed on PUAs and as Weston-super-Mare is the only PUA in North Somerset this implies that a substantial proportion of the outstanding housing allocation should be located in the town.
- 2.5.6 This clearly poses a problem, where highway transport infrastructure is already stretched to capacity and new development is proposed that would exacerbate the situation. The Highways Agency has specified a series of improvements which might take place at M5 Junction 21 to allow further tranches of residential development to take place. However, these improvements would not accommodate all of the allocated residential development in the Weston-super-Mare area to 2011.

2.5.7 North Somerset Council is currently undertaking a visioning study which is intended to bring forward recommendations regarding the future form of Weston-super-Mare, its residential population, economy, employment and tourism.

Cribbs Causeway

2.5.8 The development of a regional shopping centre at Cribbs Causeway on the edge of the Bristol urban area close to the motorway network, in a location which is difficult to serve by public transport, has placed considerable strain on the strategic highway network. The completion of additional committed retail developments at Cribbs Causeway will further increase the pressure on the motorway network.

Bristol North Fringe

2.5.9 The major employment and residential developments which have occurred over the past 20 years in the North Fringe of Bristol have contributed to a major redistribution of trip patterns within the sub-region. The success of this area in attracting major employers has been considerable and as a result there are pressures to expand the employment still further.

2.5.10 The major challenge associated with the North Fringe is the ability to provide access to the area by public transport of sufficient quality to make it attractive to a substantial proportion of employees and residents. Existing bus links to other parts of the sub-region are not sufficiently fast or frequent to carry a significant proportion of employees. Whilst rail has the potential to provide the quality of public transport service which is required and is well used for some locations (Filton Abbeywood), the locations of the rail network and existing stations in relation to much of the development makes rail use an unattractive proposition.

2.5.11 Attracting people to use public transport is also made more difficult by earlier decisions regarding parking standards at new developments in the North Fringe which have allowed large amounts of parking to be provided at a number of key employment sites.

2.5.12 The main opportunity which exists to increase public transport usage to/from the North Fringe is the development of Line 1 of the proposed LRT system which would provide direct access from Central Bristol.

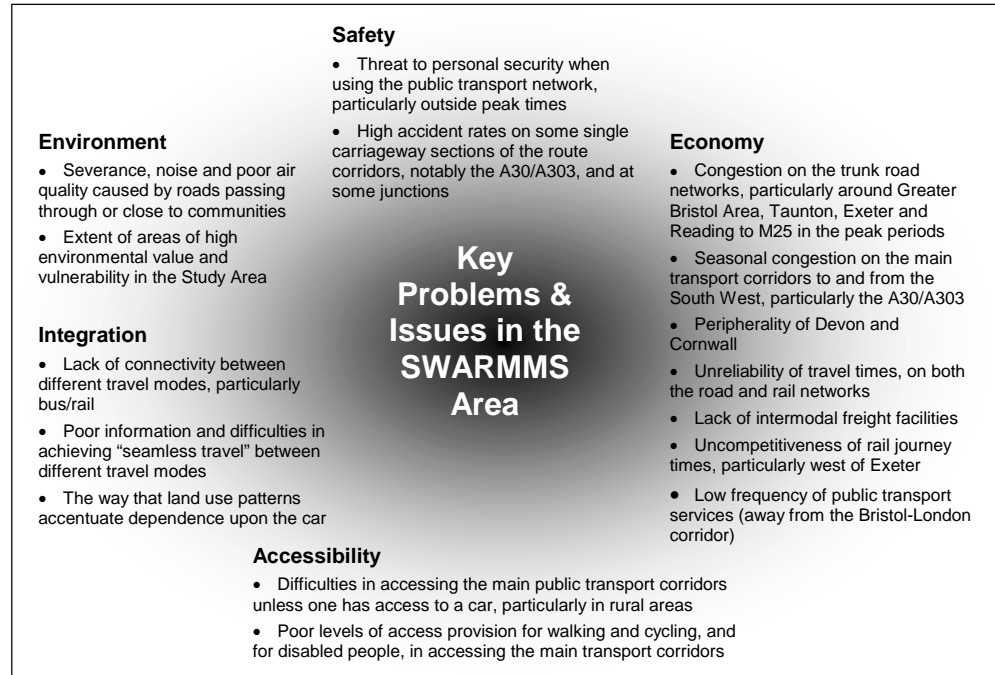
2.6

2.6.1

Problems and Issues

The key problems and issues identified earlier in the study, which apply to the whole of the SWARMMS study area are shown in Figure 2.2.

Figure 2.2: Key Problems and Issues in the SWARMMS Area



2.6.2

Those of particular relevance to the Greater Bristol Plan are as follows:

Environment

- The severance, noise and poor air quality caused by roads passing through or close to local communities – Previous work showed how the local air quality of the Greater Bristol area could be improved by investment in local public transport measures;

Safety

- The threat to personal security when using the public transport network, particularly outside peak times – Previous work showed significant potential to improve personal security via better interchange design;

Economy

- The congestion on the trunk road network, particularly around the Greater Bristol Area, Taunton, Exeter and Reading to M25 in the peak periods – The M4/M5 around Bristol experiences significant congestion at peak times;
- The unreliability of travel times, on both the road and rail networks – Both networks are under severe pressure at peak times such that minor incidents can cause a severe breakdown in operational performance;

Accessibility

- The poor levels of access provision for walking and cycling, and for disabled people, in accessing the main transport corridors – Again, better interchange design and adjacent links can help to address these problems;

Integration

- Poor information and difficulties in achieving ‘seamless’ travel between different travel modes – This is as acute in the Greater Bristol Area as anywhere in the SWARMMS area; and
- The way that land use patterns accentuate dependence upon car - development of employment and retailing in north/north west Bristol with residential development in North Somerset has generated substantial travel demand for movements which are not easily made by public transport.

2.7

2.7.1

Structure of the Preferred Strategy

Various scheme and strategy tests were carried out earlier in the study to establish the extent to which the key problems and issues would be addressed by different approaches. Although accepting that more detailed work was required at the Plan stage, these tests led Halcrow to conclude that the Greater Bristol Plan should have:

- significant investment in rail capacity and services, addressing the needs of both local and longer-distance movement (see Chapter 3);
- a significantly enhanced network of express bus and coach services, upgraded interchanges and Park and Ride (see Chapter 4);
- local capacity and safety improvements on the M4/M5 motorway network (see Chapter 5);

- smarter use of the M4/M5 motorway network using enhanced Intelligent Transport Systems (ITS) (also see Chapter 5); and
- all the above to be nested within a proactive strategy to reduce the growth in travel demand.

2.7.2

An important feature of the Plan is the degree to which it lends support to the Greater Bristol area developing an effective and efficient transport network for dealing with ‘its own’ transport movements. To encourage such movements to be made by sustainable transport means will, providing such capacity and services are in place, improve the operation of longer distance journeys through the Greater Bristol area.

2.8

Links to Other Studies

2.8.1

The use of the strategic transport networks in the Greater Bristol area is highly complex with significant elements of both local and long-distance movements using the same infrastructure, both on road and rail. As a result, measures and schemes on these networks affect both local and long-distance travel conditions and opportunities. Likewise, local transport measures within the Greater Bristol area have significant potential for influencing travel conditions on the strategic networks.

2.8.2

A number of existing studies are taking place in parallel with the SWARMMS study examining some of these issues including:

- Bristol Rail Capacity Study – being undertaken by consultants on behalf of the SRA examining the current levels of rail capacity in the Greater Bristol area and identifying whether future rail service aspirations, including the proposed LRT services, can be accommodated. Where a capacity shortfall is identified, the study is providing an outline of the necessary infrastructure required to overcome these difficulties. Of critical importance is the operation of the track section known as Filton Bank and the junctions at each end, between Bristol Temple Meads and Filton Junction (near Bristol Parkway station).
- Filton Bank Schemes Engineering Feasibility Study – being undertaken by consultants on behalf of Railtrack to examine the engineering feasibility of upgrading rail infrastructure on Filton Bank to accommodate the proposed Bristol LRT Line 1 proposals and heavy rail service aspirations.
- Bristol Road User Charging Model Development – being undertaken by consultants on behalf of Bristol City Council. This model is being

developed by Bristol City Council in conjunction with the Highways Agency to appraise the impact of implementing road user charging in Central Bristol and appraise the effect of introducing LRT lines in Bristol.

- Great Western Economic Study – being undertaken by consultants for the SRA examining the economic case for upgrading elements of the Great Western mainlines.

2.8.3 These studies are still on-going and their progress has been monitored by the SWARMMS study team.

2.8.4 In addition, there are two neighbouring multi-modal studies, the Thames Valley Multi Modal Study (TVMMS) and the ORBIT study. Although TVMMS is primarily focussed on the Reading/Basingstoke to London area and ORBIT is focussed on the M25 corridor around London, both studies have the potential to influence the viability and performance of proposed measures within the Greater Bristol Area Plan. This is particularly evident in the allocation of rail capacity in the Reading to London corridor needing to balance the aspirations for both local and long-distance rail services.

Bristol Road User Charging (RUC) Model

2.8.5 The work being undertaken by Bristol City Council in constructing the Bristol Road User Charging (RUC) Model is particularly relevant to the approach adopted in developing this Plan. When finalised, the RUC Model is expected to be the best analytical tool for assessing the impacts of the various proposed schemes and measures contained in this Plan. However, it is not expected to be available in its final form until later in 2002.

2.8.6 The timetable for SWARMMS has dictated that the Plan stage work must be completed before the RUC Model is available for testing. Hence, whilst this Plan has been developed using a variety of analytical and modelling techniques (as explained in later chapters), it has not been possible to test robustly the relationship between the different elements of the Preferred Strategy. That is, whilst we are confident in our analysis on a mode-by-mode basis, it has not been possible to embark upon a process of iteration whereby the proposals were refined. The RUC Model would enable this work to be undertaken, and we would support its use in this way.

2.8.7 Perhaps most importantly, the RUC Model will also facilitate the testing of options in the peak periods. In contrast, the absence of such a model has meant that most

of the analyses presented in this report have been undertaken on an 'average day' basis. Whilst this is acceptable in overall strategy terms across the whole SWARMMS study area, it fails to address some of the specific issues relevant to the Greater Bristol area. In particular, it has not been possible to assess with certainty the extent to which 'local' transport schemes away from the main transport corridors can assist in improving conditions on the strategic corridors themselves, although we believe that such potential exists. Again, we would advocate the future use of the RUC Model to address these important issues.

3 Rail Measures

3.1

Introduction

3.1.1

This section of the Plan draws together the key issues for the development of rail services in the Greater Bristol area and sets out proposals for future services and associated infrastructure requirements. The structure of the document follows the format of the Rail Passenger Partnership (RPP) bid process.

3.2

Role of Rail Services and Key Rail Issues

3.2.1

The development of rail usage in the Greater Bristol area during recent years has occurred as a result of the growth of employment, residential development and traffic congestion particularly during peak periods. However, as a major regional employment centre, the scale of rail-based commuting is relatively low and car-based commuting is predominant. Bristol's rail services have focussed on long-distance travel, particularly to London. Long-distance commuting to London from Bristol has been an established travel pattern since the advent of the HST services in the late seventies. Morning peak train services in Bristol are orientated around this important market. In addition, Virgin Trains also operate peak hour services through the Bristol area although they tend to make few local stops normally only calling at Bristol Temple Meads and Bristol Parkway. Local services, where they exist, tend to be ad-hoc and generally infrequent. In the morning peak the long distance services perform a dual function providing significant seat capacity for local rail movements in addition to those movements to Reading and London. However, in the evening peak on certain corridors, such as that between Bristol Temple Meads and Weston-super-Mare, the long distance services from London do not arrive in Bristol until well after the traditional evening peak period. As a result the full commuting demand has to be served by local services which results in significant over-crowding.

3.2.2

The mix of local stopping trains and inter-city express services places considerable constraints on the capacity of much of the rail network in the Greater Bristol area. In addition, Bristol, like other UK cities, has developed advanced plans for a light rail system (LRT). The proposals for Line 1 would have a significant impact on rail operation on the line between Bristol Temple Meads and Filton Abbeywood, although recent work has shown that by expanding the corridor to 4/5 track formation these problems can be overcome. It is also noted that rail operations in this area are generally constrained by junction capacities at Filton Junction and the

eastern approach to Bristol Temple Meads station. Both of these issues are the subject of ongoing work in the SRA's Bristol Rail Capacity Study and Railtrack's Filton Bank engineering feasibility study.

3.2.3 The most recent rail developments in Bristol have been the reopening of the Portbury branch for rail freight traffic and the reinstatement of platforms 13 and 15 at Bristol Temple Meads to create extra platform capacity.

3.2.4 In reviewing Greater Bristol's rail services in the context of the SWARMMS study a number of key issues emerge:

- **Acute shortage of rail capacity.** Routes through the main Bristol stations of Temple Meads and Parkway are predominantly two-track. Unlike other major urban centres there are no significant four-track sections. In addition all major junctions in the Bristol areas are at-grade rather than grade-separated. There is also a lack of spare platform/access capacity at both Temple Meads and Parkway. Capacity from Bristol to (and through) the Severn Tunnel is similarly restricted by limited track and long signal sections. To the south of Bristol, the single-track loopline serving Weston-super-Mare causes significant operational constraints.
- **Routeing Conflicts.** Both Temple Meads and Parkway stations are at (or near) major key junctions or regulating points. These not only restrict movements in east/west flows but are compounded by increasingly frequent north/south flows. Given the proposed increase in service frequency along all routes, notably increases in Virgin services, allowing sufficient route and station capacity become even more important, particularly if service and timetable reliability are to be improved.
- **Broad Traffic Mix.** Alongside the long distance and local passenger services, a significant amount of freight traffic originates/terminates in the Bristol area. At key locations this is also restricted through existing track layouts (for example, Bristol Parkway to/from Avonmouth). With the development of Portbury, indications are this 'mix' will continue to increase and the number of freight services passing through Temple Meads itself will rise.
- **Asset Replacement.** Much of the rail infrastructure serving the Greater Bristol area will need to be replaced within the time frame of the

SWARMMS study (10-15 years); this includes signalling systems, infrastructure and replacement of rolling stock. The existing poor quality of rolling stock has previously been identified as a constraint to modal switch from car to rail.

- **Passenger Franchise Replacement.** Local services within the Bristol area are now operated by Wessex Trains, with longer distance services provided by First Great Western and Virgin. Development of local services will be important to the overall strategy of encouraging rail travel within the Bristol area.

3.3

Service Proposals

3.3.1

In developing the SWARMMS strategy consideration has been given to developing a long-term vision for rail services in the Greater Bristol area which recognises the importance of enhancing local rail services in order to provide an attractive alternative to the private car.

3.3.2

An analysis has been carried out of the potential for expanding existing service frequencies and making them more reliable. This work has had to be carried out in parallel with the development of proposals for expanding long-distance rail services set out in the Corridor Plans. The work has been based on an examination of network operation, rail demand modelling and costing. From this analysis the following levels of local services are proposed:

- **2tph Weston-super-Mare – Bristol – Yate.** This route has the highest potential and should be treated as a priority scheme. This has recently been the subject of a separate study carried out by consultants for the Joint Strategic Planning and Transportation Unit (JSPTU) of the ex-Avon authorities. Details are provided in Section 3.5. The service could not be operated without additional capacity at key locations;
- **1tph Taunton – Gloucester.** Consultants have reviewed the feasibility of a service between Taunton and Gloucester. Additional infrastructure and station capacity would be required to support this service. From an examination of service operation and the travel market, it has been identified that certain services might be extended to Exeter and that from Filton Abbeywood, certain services might be diverted to Cardiff rather than Gloucester. This provides an attractive 3tph frequency over the core

route between Weston-super-Mare and Filton Abbeywood but provides a greater range of direct travel opportunities.

- **1/2tph Portishead – Bristol.** Freight services have recently begun operating over this route between Portbury and the mainline at Parson Street, with the assistance of a freight facilities grant. Consultants have done detailed feasibility work into the reinstatement of passenger services. This would require an upgrade of the signalling, some track works, new stations and an extension of the line from Portbury to Portishead. New stations are envisaged at Portishead, Portbury, Pill and Ashton Gate.

3.3.3 These services would be in addition to the proposals for inter city services set out within the Corridor plans.

3.3.4 The key service frequencies would be as follows. Table 3.1 shows long-distance services in the Greater Bristol area. :

Table 3.1: Proposed Enhancements to Long-Distance Rail Services Serving the Greater Bristol Area (services per hour)

Rail Movement	Existing Direct Service Frequency	Proposed Direct Service Frequency
Bristol Temple Meads & Bath to London Paddington	2	3 / 4
Bristol Parkway to London Paddington	2	3
Bristol (TM & PW) to Birmingham	1	2
Bristol Parkway to Cardiff	2	3
Bristol (TM & PW) to Plymouth (express)	1	1.5
Bristol Temple Meads to Plymouth/Penzance (stopper)	0.75	1
Bristol Temple Meads to Southampton	1.5	2

3.3.5 Table 3.2 provides details of the resulting overall rail service frequencies between locations within the Greater Bristol area, as a result of both the local and long-distance service proposals.

Table 3.2: Proposed Enhancements to Local Rail Services Serving the Greater Bristol Area (services per hour)

Rail Movement	Existing Direct Service Frequency	Proposed Direct Service Frequency
Weston-S-Mare – Bristol TM	2/3	5.5
Worle – Bristol TM	1	5
Weston-S-Mare – Filton Abbeywood	peaks only ⁽¹⁾	3
Bristol TM – Bath Spa	5	8
Bristol TM – Oldfield Park	1	2
Bristol TM – Bristol Parkway	1 ⁽²⁾	5 (plus LRT)
Bristol TM – Filton Abbeywood	1 (2 peaks)	5 (plus LRT)
Bristol TM – Yate	<1	3

Notes

(1) Through services – change at Bristol TM most of the day

(2) Irregular pattern – minimum headway <10 mins, maximum >60 mins

3.4

3.4.1

Station Proposals

In examining the opportunities for making rail travel more attractive within the Greater Bristol area, consideration has been given to providing new stations which would make rail travel more convenient for those living/working in the vicinity of those stations. In reviewing these opportunities a number of factors have had to be taken into account:

- Are the new station locations already well served by existing stations?
- What are the operational implications of stopping trains at the proposed location, particularly in terms of line capacity?
- Is there sufficient population/market to produce a viable passenger market?
- Are there significant highway implications associated with the new stations?

3.4.2

It is also important to recognise that stopping trains at stations normally has significant cost implications for train operators and therefore can seriously affect the economic operation of a service. As a result, stopping trains at stations for small numbers of additional passengers can be difficult to justify in terms of ‘Value for Money’.

3.4.3

As a result of these considerations only two new stations are proposed in the Greater Bristol area – one of which is essentially a major upgrade of an existing station:

- **Worle Parkway Station.** Expansion of the existing Worle station into a Parkway to accommodate 8 and 9 car trains, to allow HSTs and other longer trains to call at the station. It is anticipated that almost all services that are proposed to call at Weston-super-Mare would also call at Worle Parkway. This would include one train per hour to London (the Paignton –Paddington service via Bristol Temple Meads). The station should be improved in conjunction with enhancements to other public transport services operating from the station and development of car parking facilities. These might include bus/coach links to Bristol International Airport, enhanced bus links into Weston-super-Mare and coach/express bus stops. Given its strategic location adjacent to the M5, there is also the potential for its promotion as a strategic railhead with appropriate information and signing on the motorway.
- **Newton Station.** A new station west of Bath between Oldfield Park and Keynsham. This is a longer term proposal which is unlikely to be viable without significant upgrading of rail capacity between Bristol Temple Meads and Bath Spa. This station is primarily proposed in order to promote more sustainable travel patterns to/from the Bath and Bristol PUAs.

3.4.4 In addition, the Portishead line proposals described in Section 3.3.2 also assumes the development of four new stations at Ashton Gate, Pill, Portbury and Portishead. Proposals to develop a new station at Charfield in South Gloucestershire have not been reviewed as part of this study, as it was considered peripheral to the Greater Bristol Area. However, the proposals for Taunton-Gloucester rail services might provide a suitable rail service to serve such a new station, if it were to be progressed.

3.5 ***Previous studies***

Gloucester – Bristol – Weston-super-Mare Rail Study, November 2001.

3.5.1 This study assessed different areas for the development of services within the region and also identified some constraints that restrict such development. In addition to these infrastructure constraints, availability and operation of rolling stock have been identified as constraints to the development of rail users along with inadequate train frequencies. Failure to achieve appropriate levels of train frequency would inevitably constrain the modal switch from car to rail.

Portishead Branch: conversion for passenger service, June 2001.

3.5.2

This study for North Somerset Council considered the options for the re-introduction of passenger services to Portishead and the requirement for new stations along this route. Pivotal to this are the time-tabling of the existing freight service and integration with other services on the main lines between Parson Street and Temple Meads. To deliver the preferred service of 2 trains per hour, the passenger scheme is likely to require re-laid track from Pill Junction to Portishead, up to two new loops between Parson Street and Pill, new stations as previously indicated and probably four tracks between Parson Street and Temple Meads. The service offers through opportunities from Temple Meads, but consideration would be needed to ensure sufficient capacity was available.

3.6

Infrastructure Requirements

3.6.1

The rail infrastructure improvements required to accommodate the proposed services and new stations are set out in Table 3.3 These requirements take account of other demands placed on each route section as a result of the proposals for inter-city rail services set out in the relevant corridor plans:

- Bristol – Exeter;
- London – Bristol/Severn Estuary.

Table 3.3: Rail Infrastructure required in Greater Bristol Area

Route/Service Pattern	Constraint	Proposed Solution
<i>Portishead – Bristol</i>	Platform capacity at Temple Meads	Requires conversion of redundant south facing platform, or linkage with through service, dependent on service assumptions
	Conflicting move onto main line at Parson Street and single lead junction.	Reinstatement of four-tracking; would also facilitate WSM – Yate service.
	Signalling capacity on Portishead route, currently designed to accommodate 1 freight train per hour	Requires some double-tracking and more sophisticated signalling system to increase capacity
<i>WSM – Bristol – Yate</i>	Pathing problems between Worle Junction and WSM over single line section	Requires double-tracking between Worle Junction and WSM

Route/Service Pattern	Constraint	Proposed Solution
	<p>Platform capacity and occupation at WSM</p> <p>Pathing problems on approach to Bristol TM from Parson Street</p> <p>Platform capacity at Bristol Parkway</p> <p>Facility to turn around off main line at Yate</p> <p>Capacity problems at Filton Abbey Wood</p> <p>Capacity problems Temple Meads– Filton Junction</p>	<p>Requires reinstatement of north-facing bay platform at WSM</p> <p>Requires four-tracking from Temple Meads to Parson Street, dependent on service assumptions</p> <p>Additional platform in down direction at Parkway to allow trains to stand concurrently</p> <p>Creation of turn back facility at Yate</p> <p>Modification to single lead junction and additional platform at Filton Abbey Wood station</p> <p>4 track section from Bristol Temple Meads – Filton to allow for additional capacity and separate routes to Cardiff/ Bristol Parkway</p>
Taunton – Gloucester	Infrastructure requirements as per WSM – Yate service	Westerleigh Junction Grade Separation (see London – Bristol Plan)
Bristol – Bath	Capacity problems Bathampton Junction – Temple Meads	Provision of additional signal sections to increase capacity

3.6.2

This table does not include the following:

- Additional requirements for rail infrastructure associated with LRT Line 1 proposals besides the 4/5 track -scheme for Filton Bank.
- Additional requirements for rail infrastructure associated with future LRT proposals arising from the development of additional lines eg linking Severn Beach line to Cribbs Causeway (See Section 4.5)
- Potential longer-term proposals:
 - development of 4-track line Bristol – Bathampton Junction
 - a new station at Flax Bourton/Long Ashton to serve local communities and as a railhead for Bristol International Airport
 - a new station at Ashton Gate to serve as a railhead to Bristol International Airport

3.6.3 All of these potential schemes would appear to have merits but have not been fully appraised as they are seen as longer term proposals. It has been identified, however, that the airport railheads may be of limited attraction as most passengers will be required to interchange at least twice to reach the airport, once at Bristol Temple Meads and once at the railhead station.

3.7 **Costs**

3.7.1 The rail proposals for the Greater Bristol area have essentially four cost implications:

- Operating costs of running new or revised rail services;
- Capital costs of constructing the necessary track and signalling infrastructure;
- Capital costs of developing new stations; and
- Cost of operating/maintaining new infrastructure.

3.7.2 The final item has been included in the service operating costs through track access charges.

3.7.3 The following table provides some broad estimates of the additional costs of each of these elements in relation to the Do Minimum situation. It should be noted that the largest single cost is associated with additional track capacity on Filton Bank. This cost is required to permit the operation of additional heavy rail and new light rail services. As such, this cost should be shared with the light rail project. Furthermore this cost is based on one of the options proposed by the recent Engineering Feasibility Study by the SRA. This should be viewed as provisional at this stage pending review by the SRA and relevant authorities.

3.7.4 It should also be stressed that the much of the infrastructure that is proposed in the Bristol area is required to run the full set of proposed rail services, local and long-distance. It is therefore important to recognise that although this Plan focuses on the provision of local/regional rail services within the Greater Bristol area the infrastructure costs are those required to allow both local and long-distance services to be accommodated on the network.

Infrastructure	Capital Cost (£M)
Additional platform capacity and signalling Bristol Temple Meads	12
Removal of Parson St junction conflict (single lead)	8
Upgrade track and signalling on Portishead Line for	7

Infrastructure	Capital Cost (£M)
passenger use	
Four-tracking Parson St – Bristol Temple Meads	7
Double tracking Worle Junction – Weston-s-Mare	12
Reinstatement of bay platform at Weston-s-Mare	1
Additional platform capacity at Bristol Parkway	2
Provision of passing loops Yatton/Worle	5
Yate turnback	1
Worle Parkway station	1
4/5 tracking Filton Bank	100
Bristol – Bath Signalling Improvements	3
TOTAL Capital Costs	159

Service Improvements	Additional Operating Cost (£M) per annum
Local services – Bristol area	9
TOTAL Additional Operating Costs	9

Costs are at current (2002) prices

3.7.5 In considering the rail infrastructure requirements within the Bristol area, it is important to note other elements of infrastructure included within the London – Bristol/Severn Estuary plan including :

- Grade separation of Westerleigh Junction; and
- Upgrade of Filton/Bristol North junction.

3.7.6 It is also important to recognise that these costs represent the full cost of implementing the complete package of rail measures within this Plan. In practice it is anticipated that improvements will be made on a staged basis.

3.8 ***Patronage and Revenue Forecasts***

3.8.1 The SWARMMS strategic transport model has been used to forecast likely changes in rail patronage in the Greater Bristol area as a result of the proposed service patterns.

3.8.2 The following table presents the key forecasts:

Service Change	Increase in Rail Patronage (%)	Overall Increase in Fare Revenue £(M) per annum
Bristol Local Services	15	4

Forecasts relate to changes in rail patronage on route sections where service levels have changed

3.8.3 The forecasts indicate that the service enhancements would result in significantly increased rail patronage in the Greater Bristol area and that this would result in additional fare revenue. This revenue is anticipated to cover approximately 50% of the additional service operating cost.

3.8.4 It should be stressed that these patronage and revenue forecasts have been produced by the SWARMMS strategic model which does not represent peak period travel conditions and that more accurate peak period modelling is required to further develop the business case and assess the non-user benefits from these service enhancements. This should be a key consideration of the proposed subsequent study.

3.9 ***Summary of Key Benefits and Costs of Rail Measures***

3.9.1 The key benefits of the rail measures proposed in this Plan are as follows:

- To permit increased service frequencies to operate, thereby reducing waiting times for rail passengers and making services more attractive;
- To facilitate the development of clockface timetables;
- To reduce overcrowding on rail services in the Greater Bristol area, particularly during peak periods;
- To improve the reliability of rail services through the creation of more flexible infrastructure;
- To promote the development of more sustainable travel patterns in the Greater Bristol Area particularly to provide more attractive public transport links between the Weston-super-Mare area and Bristol North Fringe; and
- To improve accessibility to rail services through the development of new / enhanced stations.

3.9.2 Taken together the above improvements will make rail a more attractive alternative to the private car, producing some transfer of journeys from road to rail. Overall the measures are required to reverse the on-going decline in public perceptions of rail as an alternative to the private car and the ability of rail to play a key role in accommodating future growth in travel demand, up to and beyond the timeframe of the SWARMMS study.

3.9.3 Beyond these direct improvements to passenger services, there are other benefits associated with the rail improvements in the area, in enabling additional freight train paths to be accommodated and improving the reliability of freight services.

3.9.4 To deliver these benefits it is estimated that the infrastructure improvements will require capital expenditure of £159M of which, a significant proportion is required to permit LRT operation on Filton Bank and would therefore be joint investment with the Bristol LRT Line 1 project. The proposals would also require net additional operating costs of approximately £5M per annum.

4 Other Public Transport Measures

4.1 ***Introduction***

4.1.1

This section of the Plan sets out a number of other public transport measures that are proposed in the Greater Bristol area. The measures can be grouped into four main categories:

- Improvements to the coach & express bus network, in terms of both services and facilities;
- Improvements to transport interchanges;
- Development of park & ride sites adjacent to the strategic highway network; and
- Improvements to local public transport services within the Greater Bristol area.

4.1.2

The following sections describe the measures that are proposed within each of these categories.

4.2 ***Coach & Express Bus Network***

4.2.1

During the early stages of SWARMMS information was gathered on the problems faced by the scheduled coach and express bus users and operators. Of greatest relevance to this Plan, the key problems were:

- adverse impact of traffic congestion on the reliability and journey times of scheduled coach and express bus services, in particular along the M4 and M5 corridors; and
- scheduled coach service and express bus service patterns biased towards needs of the leisure markets making services relatively unattractive for journeys to work.

4.2.2

These problems have been used in combination with consultation with operators and feedback from public workshops to help develop a series of options, which provide a high quality network of coach and inter-urban express bus services. The aim has been to provide an integrated public transport network that will offer a realistic alternative to the car for a range of journey purposes in the SWARMMS area. The key features of the express bus and coach services which are proposed have been defined in terms of:

- Route patterns;
- Service frequencies;
- Journey times, including variations;
- Operating costs;
- Passenger demand necessary to cover operating costs;
- The priority measures necessary to enable coach and express bus services to achieve the target journey times and reliability; and
- Catchment area assessment (Coachways Only).

Characteristics of the Bristol Area

4.2.3 Bristol is a strategic hub within the existing coach network being served by a range of services travelling in the following corridors:

- Bristol – Heathrow/London;
- South West – Heathrow/London;
- South West – Midlands/North; and
- South Wales – Heathrow/London.

4.2.4 A significant proportion of these coach services are long distance routes between London/Heathrow/the North and the South West. These have few if any stops over the section of the M5 between Bristol and Exeter and the M4 between Heathrow and Bristol. This results in low levels of scheduled coach service to/from some intermediate locations.

4.2.5 The quality of coach services serving Bristol is heavily influenced by traffic/operating conditions on the M4 and M5 corridors. Measures to improve coach operating conditions on these corridors are described further in the London to Bristol/Severn Estuary Plan and the Bristol to Exeter Plan.

4.2.6 Coach scheduled journey times over these corridors vary between periods due to congestion. Scheduled average speeds are usually less than 50mph and sometimes less than 40mph. While these extended journey times enable the majority of coach services to operate to the schedule, it means that it is difficult for coaches to offer an attractive service to the time sensitive travel market.

4.2.7 Coach user surveys undertaken previously in the SWARMMS study have shown that a small but significant number of coach passengers along this corridor have work journey purposes. There is potential for scheduled coach services to grow

this market if it can improve overall journey times and increase the quality of the vehicles and on-board facilities for passengers.

4.2.8 Better protection of coaches from the journey time and reliability effects of traffic congestion would also help long distance coach services operating between the South West and London/Heathrow. The provision of new Coachway coach stops, strategically located to increase the catchment area of the coach network and aimed in particular at the Park & Ride and 'Meeters & Greeters' market segments could, in conjunction with reduced journey times and increased levels of service, encourage mode switching from car to coach.

4.2.9 The SWARMMS strategy for the Greater Bristol area involves:

- Enhanced level of coach and express bus services to provide increased opportunities to use these modes for journeys to/from the Greater Bristol area;
- Introducing new Coachways at Cribbs Causeway and Weston-super-Mare on the M5 to increase the catchment area of and improve access to the scheduled coach network. The Cribbs Causeway Coachway would form part of a public transport hub on the edge of Bristol and will enable a proportion of long distance coach services to serve Bristol without diverting via the city centre. The Weston-super-Mare Coachway would perform a similar role enabling the town to be served without significant diversion of trunk haul coach services away from the motorway network; and
- Reducing journey times through the provision of priority measures.

4.2.10 These proposals and their costs are discussed below.

Coachway Catchment Assessment

4.2.11 The Coachway Catchment Assessment is based on analysis of coach user surveys undertaken for SWARMMS and other Halcrow studies. This data has provided an understanding of the characteristics of passengers who use a Coachway, in particular their access mode and access time which allows the potential scale of the coach network catchment along the corridor to be estimated.

4.2.12 This is based on the surveys showing that the access time profile for Coachways differs from those of coach stations in urban areas. Nearly 35% of those accessing Coachways by car travel more than 30 minutes to access the facility compared with

20% or less for urban coach stations. Similarly, over 60% of Coachway users travel for more than 20 minutes to access their coach service in comparison with approximately 40% for coach stations located in urban areas. The longer access times are consistent with a wider geographical spread of users than traditional urban centre coach stations.

4.2.13

The geographic area covered by the proposed Coachways on the Bristol to Exeter corridor is extensive. Indeed, the catchment areas of the Cribbs Causeway and Weston-super-Mare Coachways cover the majority of the M5 corridor between Bridgwater to the south and Gloucester to the north. In theory the catchment extends into South Wales and towards Bath, but the availability of alternative coach boarding points means that these Coachways are unlikely to attract significant demand from these areas.

Proposed Service Patterns

4.2.14

Based on the experience of operating successful coach services elsewhere in the UK, the proposed service pattern for the Bristol area has been developed based on the following principles:

- Increased service frequencies (minimum of 2cph) for key movements including:
 - London – Swindon – Chippenham – Bath – Bristol;
 - Heathrow – Swindon – Chippenham – Bath – Bristol;
 - London/Heathrow – Swindon – Cheltenham – Gloucester;
 - Bristol – Taunton – Exeter;
 - Taunton – Bristol; and
 - Weston-super-Mare – Bristol.
- Closer integration between local bus services and the coach network, with local bus schedules arranged to minimise waiting times for passengers and to ensure reliable connections;
- Improved coach services to Bristol International Airport to meet travel demand generated by the introduction of low cost carrier services and the general growth in air travel; and
- Higher quality coaches with air conditioning, increased legroom and luggage space, and with capacity for at least 70 passengers (will require double-deck and/or articulated coaches).

4.2.15

The proposals involve a significant reworking of the existing service pattern; the key changes include:

- A new Exeter – Bristol (– Bristol Airport) Express Coach Shuttle service operating every 30 minutes through the core part of the day. This service will call at the Taunton and Western-super-Mare Coachways only, with alternate journeys extended to Bristol International Airport and Cribbs Causeway Coachway. The Taunton Coachway is described in the Bristol – Exeter Plan; and
- The majority of South West – London coach services are routed via Cribbs Causeway Coachway to minimise the journey time penalty which would otherwise occur by serving Bristol Marlborough Street Bus Station.

4.2.16 The service pattern has been developed such that the long distance coach services between the South West/South Wales and Heathrow/London continue to operate largely non-stop along the M4 east of Bristol. The intermediate stops between Bristol and London would be served by a combination of existing and additional Bristol/Bath – Heathrow/London coach services.

Proposed Service Frequencies

4.2.17 In developing the service frequencies, the aim has been to have a minimum of 2cph between key locations along the corridors passing through Bristol. These key locations have been identified through examination of travel demand across all modes. At key public transport hubs such as Bristol, the combined service frequency will be significant.

4.2.18 The existing and proposed levels of service are summarised in Table 4.1.

Table 4.1: Existing and Proposed Levels of Coach Services (key locations)

Location	Coaches per Day per Direction	
	Existing	Proposed
Bristol Bus Station	50	113
Cribbs Causeway Coachway	-	70
Bristol International Airport	-	22
Bath	11	32
Weston-super-Mare Coachway	-	31
Weston-super-Mare	7	7

4.2.19 Cribbs Causeway Coachway would be served by long distance coach services operating between the South West and M4 corridor destinations for which serving Bristol Bus Station would cause significant increases in journey times to through

passengers. It would also serve a number of long distance coach services which operate from the South West and travel northbound on the M5 towards the Midlands and North. These services currently bypass Bristol due to the significant journey time penalty associated with serving Bristol Marlborough Street Coach Station. The proposed combined service frequencies to Bristol via Cribbs Causeway Coachway or Bristol Marlborough Street would be considerable.

4.2.20

The strategy for the Bristol to Exeter corridor also develops coach services to Bristol International Airport. Proposed service patterns will provide an hourly Exeter – Bristol International Airport – Bristol shuttle service and divert a number of long distance coach services which operate between the South West and the Midlands/Northern England to the Airport. The proposed service pattern is shown in Table 4.2.

Table 4.2: Indicative Levels of Service and destinations served from Weston-super-Mare and Cribbs Causeway Coachways

Weston-SM Coachway		Cribbs Causeway Coachway	
Service	Services (per day)		Services (per day)
Manchester	1	Glasgow	1
Nottingham	1	Manchester	3
Birmingham	2	Nott'm/York/Newcastle	1
Cribbs Causeway	22	Birmingham	7
Bristol	22	Gloucester	3
Bristol Airport	17	Swindon Coachway	4
Calcot Coachway	4	Chieveley Coachway	4
Heathrow	8	Calcot Coachway	13
London	10	Heathrow	28
Barnstaple	3	London	19
Taunton (& Coachway)	13	Bristol Airport	15
Exeter	23	WSM (& Coachway)	24
Plymouth	4	Barnstaple	4
Penzance	2	Taunton (& Coachway)	34
		Exeter	28
		Plymouth	12
		Penzance	7
		Cardiff/Swansea/Newport	19

Proposed Coach Journey Times

4.2.21

Earlier work in SWARMMS highlighted the impact of traffic congestion on coach journey times. It also highlighted that, in terms of total journey times, coach travel is significantly slower than car to and from Bristol. Table 4.3 summarises the existing and estimated future scheduled coach journey times between Bristol and other locations.

Table 4.3: Existing and Proposed Coach Journey Times

Location	Typical Journey Times from Bristol (Minutes)	
	Existing	Proposed
Bristol Cribbs Causeway	-	24
Bristol International Airport	-	21
Weston-super-Mare Coachway	-	36
Weston-super-Mare	60	48
Bath	45	29
Chippenham	75	59
Swindon Bus Station	110	94
Swindon Coachway	-	43
Chieveley Coachway	-	67
Calcot Coachway	75	75
Heathrow	120	110
London Victoria	150	130
Bridgwater	85	91
Taunton Coachway	n/a	62
Taunton Bus Station	70	75
Exeter Bus Station	118	102

4.2.22

The future journey times have been developed on the basis of the proposed stopping pattern and assuming that priority measures are introduced to protect coaches and buses from the impacts of traffic congestion. These times have been used to develop indicative timetables for scheduled coach services passing through the Greater Bristol area which show that it would be possible to develop a regular clockface coach service between the majority of the key locations along this corridor. If reliably maintained this timetable would significantly improve the quality of the service and the ability to attract more time sensitive passengers from car to coach.

4.2.23

There is an issue of whether this level of service will complement or compete with rail along this corridor. Table 4.4 compares the coach and rail journey times between the major towns and cities along the London – Bristol corridor.

Table 4.4: Existing Rail and Proposed Coach Journey Times

Location	Typical Journey Times from Bristol (mins)	
	Rail	Coach
Bath	11	29
Chippenham	23	59
Swindon	39	94
Heathrow	130	110
London Victoria	98	130
Weston-super-Mare	30	48
Bridgwater	45	91
Taunton	43	75
Exeter	63	102

4.2.24

Despite the forecast reduction in journey times and increase in service frequencies of coaches, rail will retain its significant advantage over coach in terms of journey times for all destinations other than Heathrow Airport where coach journey time competitiveness against rail will be strengthened. However, coach may become the more attractive mode for some time sensitive travellers if the coach station is closer than the rail station to their destination. In addition, it is likely that coach will remain the favoured public transport mode of price sensitive market segments.

4.2.25

On the basis of the above, the effect of improving the quality of coach services will be to increase the public transport choice for car users rather than abstracting a significant amount of rail demand. This is consistent with the current policy of improving the quality of sustainable transport modes and increasing public transport accessibility.

Coach Operating Costs

4.2.26

The suggested improvements in coach levels of service will lead to increases in operating costs. These have been assessed using the Halcrow OpCost model that employs unit costs agreed with National Express. Details of these costs can be found in the specific corridor Plans through which the services operate, namely the London to Bristol/Severn Estuary and Bristol to Exeter Plans. In addition, those

Plans also identify the levels of passenger demand on coach services necessary to cover operating costs.

4.2.27 Overall, it is clear that the proposed services will need substantial additional patronage for them to be run on a commercial basis. Whilst such an increase is unlikely to occur immediately, evidence suggests that there is clear potential for significant growth in coach patronage in the area, and the proposals provide a step-change in services in many instances (eg new Coachways, growth in Airport). The improvements, however, will almost certainly be implemented on a staged basis over time.

4.2.28 Moreover, the necessary scale of growth will require changes in the methods of promoting coach travel, improving public perceptions of it as a viable alternative to car travel. There are a number of examples of best practice where services are effectively promoted as a real alternative to the car. These include frequent shuttle-type coach services such as the Oxford Tube (Oxford-London) and the National Express Airlink services to major airports and high quality express bus services such as those operated by Trent Buses between Sheffield, Chesterfield and Derby and between Nottingham and Derby. The frequency and reliability, and relatively low cost, combine to make such services a success. All are run on a commercial basis.

Priority Measures

4.2.29 An assessment has been made of the locations within the Greater Bristol area where priority measures will be required to protect coaches from the effects of traffic congestion. The following corridors are considered particularly important in terms of coach operation:

- A4 Portway : Avonmouth M5J18 – City Centre
- A4018: Cribbs Causeway M5J17 – City Centre
- M32: M4 – City Centre
- A4 : Keynsham – City Centre
- A38 Bedminster – City Centre

4.2.30 Systematic bus and coach priority measures are currently proposed on a number of these corridors, namely between Henbury and Hartcliffe on the A38, on the A4 eastbound between Portway and Hotwells Road and on the A4 westbound between Keynsham and the City Centre. Preliminary coach and express bus priority measures have also been identified for the M32. Furthermore, the Local

Transport Plan for Bristol has allocated funds to examine possible priority measures on the A4018 at Whiteladies Road and Westbury Road.

4.2.31

It is envisaged that the current proposed and potential priority measures will improve coach and express bus speeds on the identified corridors in Bristol. However, we would recommend the assessment of the feasibility of developing more priority measures on the A4018 corridor that provides an important link from the proposed Cribbs Causeway Coachway.

4.3

Interchanges

4.3.1

An essential component of the public transport strategy is the development of high quality transport interchanges where seamless passenger transfers can occur between the local bus/express bus/coach and rail network. In addition, key interchange locations also represent primary nodal points in the network, and as such, enhancement of their facilities would also improve the start and/or end of journeys that do not involve interchange. Consequently, improvements to interchange facilities are required at key locations in the Greater Bristol area, including:

- Bristol Bus Station
- Bristol Temple Meads Railway Station
- Bristol Parkway Railway Station
- Bath Bus and Coach Station
- Bath Railway Station
- Weston-super-Mare Railway Station
- Worle Railway Station
- Weston-super-Mare Bus Terminus
- Cribbs Causeway Bus Terminus

4.3.2

From a review of the existing form and facilities at these interchanges packages of improvements have been identified for each location. The improvements have been defined under five main headings:

- Waiting environment
- Levels of facilities
- Level of information
- Visible staff presence
- Physical linkage for next stage of journey

4.3.3

The following sections describe the packages of improvements required at each of the interchanges.

Bristol Bus and Coach Station

- Waiting Environment:
 - Add extra seating
 - Improve lighting
 - Build new waiting room – well lit, well heated, with information boards/screens
- Levels of Facilities
 - Ensure ticket offices are staffed at all times the station is open
 - Ensure all facilities have full disabled access
- Level of Information
 - Provide timetable information at relevant stops and in waiting areas
 - Provide audible announcements
 - Install information screens for arrivals/departures
- Visible Staff Presence
 - Station supervisor and ticket office attendants should be present at all busy times
- Physical Linkage for Next Stage of Journey
 - Install taxi rank outside main entrance

Bristol Temple Meads Railway Station

- Waiting Environment
 - No measures identified
- Levels of Facilities
 - Ensure facilities are well signed
 - Ensure all facilities have full disabled access
- Level of Information
 - Add additional real time information screens
- Visible Staff Presence
 - Ensure that station is staffed at all times it is open
- Physical Linkage for Next Stage of Journey
 - Improve pedestrian access to Temple Quay.

Bristol Parkway Railway Station

- Waiting Environment
 - No measures identified

- Levels of Facilities
 - No measures identified
- Level of Information
 - Add additional real time information screens
- Visible Staff Presence
 - Ensure that station is staffed at all times it is open
- Physical Linkage for Next Stage of Journey
 - No measures identified

Bath Bus and Coach Station

- Waiting Environment
 - Replace benches and provide cover and good lighting
 - Add extra seating
 - Install small waiting room with adequate heating, seating, lighting, passenger information and toilets
- Levels of Facilities
 - Install toilets with full disabled access
 - Upgrade to modern eating area with good buffet facilities
 - CCTV and payphone should be installed
- Level of Information
 - Install full timetable information at stops
 - Install an information office
 - Provide audible announcements
 - Screens should be installed with real time information on services
- Visible Staff Presence
 - Ensure that station is staffed at all times it is open
- Physical Linkage for Next Stage of Journey
 - No measures identified

Bath Railway Station

- Waiting Environment
 - Improve seating areas and upgrade lighting
 - Make sure benches are covered and well lit
 - Add extra benches for seating at peak times
- Levels of Facilities
 - Upgrade toilets, ensure they have full disabled access and are well signed
 - Upgrade buffet facilities and eating areas

- Expand capacity of car park, if possible
- Promote access to the station by modes other than private car
- Level of Information
 - Add additional real time information screens
- Visible Staff Presence
 - Ensure that station is staffed at all times it is open
- Physical Linkage for Next Stage of Journey
 - No measures identified

Weston-super-Mare Railway Station

- Waiting Environment
 - Provide adequate seating for number of passengers, even in peak hours
- Levels of Facilities
 - Ensure facilities are well signed
 - Ensure all facilities have full disabled access
 - Extend range of buffet facilities and quality of eating areas
 - Need to install CCTV
 - Increase number of cycle stands and ensure they are well lit and covered
- Level of Information
 - No measures identified
- Visible Staff Presence
 - No measures identified
- Physical Linkage for Next Stage of Journey
 - No measures identified

Worle Railway Station – proposed to be upgraded to Worle Parkway

- Waiting Environment
 - Install small waiting room with adequate heating, seating, lighting, passenger information and toilets
 - Replace or renovate old shelters
- Levels of Facilities
 - Install payphone on platform or in waiting area
 - Install a small ticket office or automated ticketing machine
 - Provide a small cafe serving hot and cold food/drinks
- Level of Information
 - Add full timetable information in waiting areas

- Provide audible announcements
- Visible Staff Presence
 - Station supervisor and ticket office attendant should to present during busy times of day
- Physical Linkage for Next Stage of Journey
 - Provide shuttle bus to serve areas of the town through to main Weston-super-Mare rail station
 - Provide taxi rank outside station or taxi information
 - Ensure cycle facilities are well lit and covered

Weston-super-Mare Bus Terminus

- Waiting Environment
 - Install small waiting room with adequate heating, seating, lighting, passenger information and toilets
 - Shelters should be concentrated around a waiting and information area
- Levels of Facilities
 - New toilets should be located in the waiting area
 - Provide a small cafe serving hot and cold food/drinks
 - Install a small ticket office or automated ticketing machine
- Level of Information
 - Provide full timetable information in waiting areas
 - Provide audible announcements
 - National timetables should be provided in the waiting/information area
- Visible Staff Presence
 - Staff should be present during busy times of day/year
- Physical Linkage for Next Stage of Journey
 - Provide small number of cycle stands that are well lit and covered

Cribbs Causeway Bus Terminus

- Waiting Environment
 - Install waiting room with adequate heating, seating, lighting, passenger information and toilets
- Levels of Facilities
 - New toilets should be located in the waiting area
 - Provide a small cafe serving hot and cold food/drinks
 - Install a ticket office or automated ticketing machine

- Install a payphone in the waiting area or on platforms
- Level of Information
 - Provide full timetable information in waiting areas
 - Provide audible announcements
 - Ensure full timetable information is provided as well as local information.
- Visible Staff Presence
 - Staff should be present during busy times of day/year
- Physical Linkage for Next Stage of Journey
 - Provide small number of cycle stands that are well lit and covered

4.4

Park and Ride Sites Adjacent to Strategic Highway Network

4.4.1

Whilst the SWARMMS strategy is targetted at making it more attractive to use public transport for complete journeys, it is recognised that for many journeys to or within the Greater Bristol area solely using public transport is never going to be attractive, and that using a car for at least part of the journey is almost inevitable. However, the problems of traffic congestion and the associated environmental problems within each of the main urban centres within the Greater Bristol area are ever-increasing and as a result we recognise the benefits of providing Park and Ride links from the strategic highway network into these areas.

4.4.2

It is of course accepted that there is mixed evidence regarding the behavioural impact of Park and Ride facilities, but on balance we believe that a series of Park and Ride sites should be developed close to the strategic road network. Based on previous work, the following Park and Ride sites have been identified as having a particular role in providing links from the strategic road network to the urban centres in the Greater Bristol area, with the proposed form of public transport noted:

- M32 close to its junctions with the M4 - bus (see Chapter 5)
- A38 Almondsbury/Aztec West – bus/LRT
- A4018 Cribbs Causeway, in conjunction with the proposed Coachway – bus/LRT
- A4 Avonmouth – bus (also potential for rail/LRT) [Under construction]
- A369 Portbury – bus (also potential for rail with upgrade of freight line)
- A370 Weston-super-Mare, in conjunction with proposed Coachway – bus
- Worle Parkway - rail

4.4.3 All of these sites are anticipated to serve Bristol City Centre, with the exception of the A370 Weston-super-Mare site that serves Weston-super-Mare, and Worle Parkway which provides access to a range of rail destinations. Those sites indicated as being 'bus/LRT' are ones which are likely to be served initially by bus but could be converted to LRT as the LRT lines develop over time.

4.4.4 These proposals are considered to be complementary to the other Park and Ride sites that currently operate or are proposed within the Greater Bristol area serving the major urban areas:

- A4 Brislington – Bristol (bus) [existing]
- A370 Long Ashton – Bristol (bus) [existing]
- A38 Bedminster – Bristol (bus)
- A37 Wells Road – Bristol (bus)
- A4 Newbridge – Bath (bus) [existing]
- A367 Odd Down– Bath (bus) [existing]
- A4 Lambridge – Bath (bus)
- Lansdown – Bath (bus) [existing]

4.5 ***Local Public Transport***

4.5.1 Earlier work within the SWARMMS study identified that local public transport measures had the ability to reduce pressures on the strategic highway networks. This is particularly relevant in the Greater Bristol area where the motorway network is heavily used for local journeys that might be made by public transport if suitably convenient services were available.

4.5.2 Whilst it is not the role of SWARMMS to provide recommendations regarding detailed local public transport schemes, it is considered appropriate to set out some of the key public transport elements which would contribute towards the achievement of the SWARMMS objectives. It is recognised that two particular measures have the potential to reduce pressure on the strategic highway networks, namely:

- Development of a network of LRT services in the Bristol area; and
- Enhancement of local bus services – through Bus Quality Partnerships.

4.5.3 Both of these measures are likely to have a more significant impact on local transport conditions than on the strategic network and therefore the justification for pursuing such measures should primarily be based on local needs whilst

recognising their wider benefits. Indeed, it is recommended that their design should be mindful of the benefits which they could convey to the strategic network. The likely scale of impact of each of these measures on conditions on the motorway network around Bristol has not been evaluated as part of this study but should form a central part of further work in the Greater Bristol area making use of the Bristol RUC model.

4.6
4.6.1

Costs

Table 4.5 provides the indicative costs of implementing the public transport measures described in this chapter.

Table 4.5: Indicative Costs of Other Public Transport Measures

(@2001 prices)

Scheme/Measure	Cost (£m)
Enhanced Coach Network	Commercial
Coachways	2
Interchanges ⁽¹⁾	3
Park and Ride Sites	7
Local Transport Measures	Unknown
Total	12

Notes: ⁽¹⁾ 9 interchanges at averages of £300,000

5 Highway Measures

5.1 *Introduction*

5.1.1 This document covers the M4 and M5 corridor from Junction 18 (A46) to South Wales, and M5 from Junction 15 (Almondsbury) to Junction 21 (Weston-super-Mare). This chapter describes both traditional 'new highway infrastructure that is proposed for this area and the associated ITS proposals. It is these proposals working in combination which will dictate the overall operating characteristics of the network.

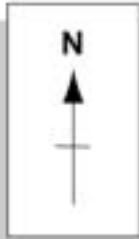
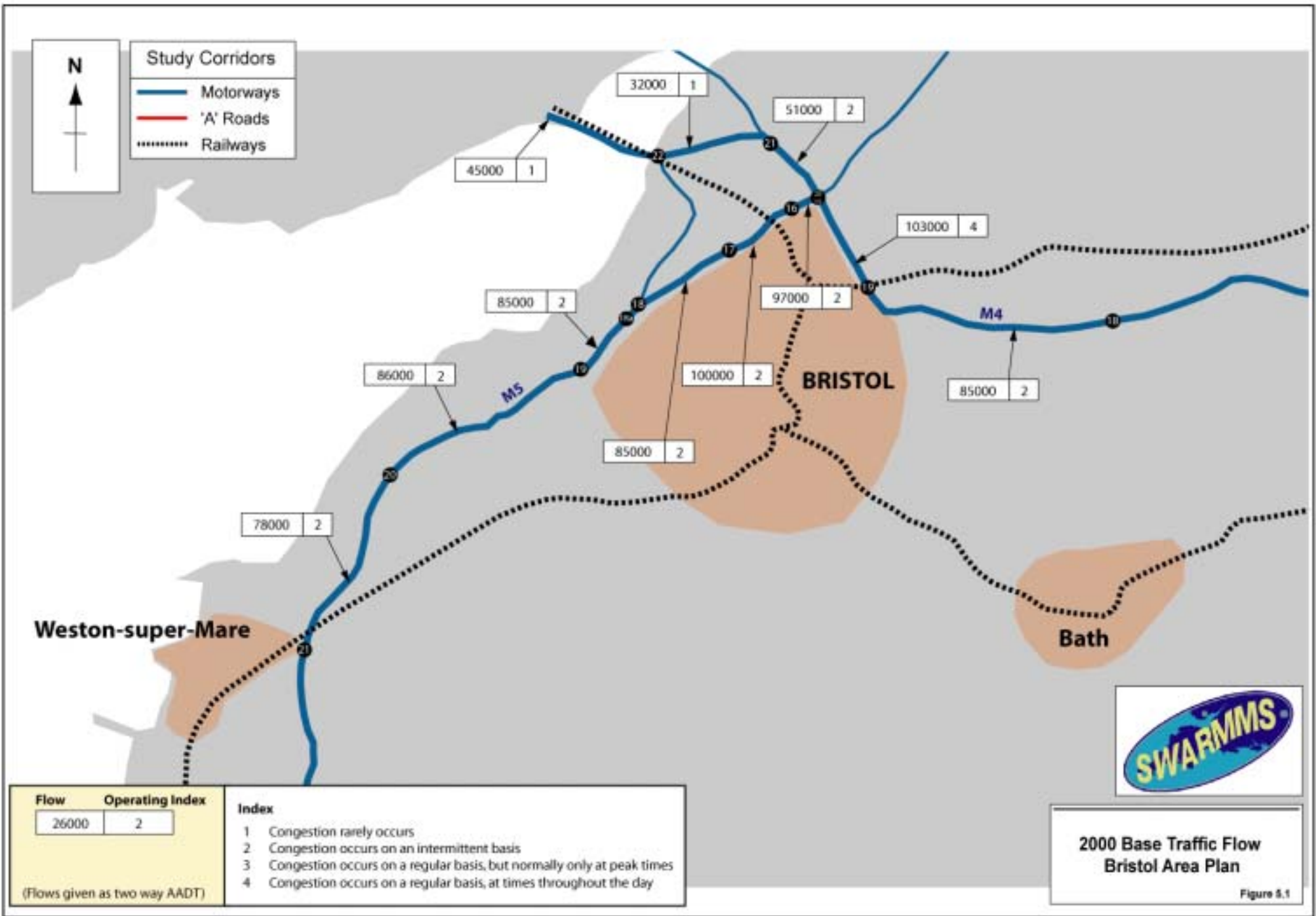
5.2 *Characteristics of the Highway Network*

Congestion

5.2.1 There are existing capacity problems on the M4 and M5 around Bristol where long distance traffic competes for road space with shorter distance commuter traffic, and with traffic accessing the retail and business development areas alongside and accessed off these sections of motorway. In addition there is peak summer congestion, particularly at the M4/M5 interchange (Almondsbury).

5.2.2 The competition for road space on the motorway network in the Greater Bristol area is very marked. In terms of longer distance movements, the M4 provides the primary link from London and the South East into Wales. Likewise, the M5 links the South West to the Midlands and the North, and the M4 and M5 together provide an important link from the South West to London and the South East. This contrasts with the use of the M4 and M5 to travel 'locally' in and around the Greater Bristol area, with traffic often entering the motorway network on one radial, before travelling along the motorway and leaving by another. Whilst SWARMMS essentially has a 'strategic' focus, we recognise the importance of finding an overall Preferred Strategy which covers all aspects of travel in the Greater Bristol area.

5.2.3 As shown on Figure 5.1, traffic flows are highest at about 103,000 vehicles AADT (2000, two-way) on the M4 between Junctions 19(M32) and 20(Almondsbury), and are lowest on the M4 between the M5 (Almondsbury) and South Wales. Flows on the M5 vary between 78,000 and 100,000 vehicles AADT, being highest between Junction 15 (Almondsbury) and Junction 17 (Cribbs Causeway). These levels of traffic flow frequently cause congestion on the motorway network, particularly at the junctions as traffic seeks to join or leave the main carriageway.



Study Corridors

- Motorways
- 'A' Roads
- Railways

45000 1

32000 1

51000 2

103000 4

85000 2

97000 2

85000 2

86000 2

85000 2

100000 2

78000 2

Weston-super-Mare

BRISTOL

Bath



**2000 Base Traffic Flow
Bristol Area Plan**

Figure 6.1

- 5.2.4 However, this congestion is generally limited to the morning and evening peak periods, with the motorway operating satisfactorily for the majority of the day.
- 5.2.5 These sections of motorway also experience congestion at peak holiday times, and August average flows can increase the AADT figures by between 12% and 24%, equating to daily flows of up to 115,000. Reliability of journey times is a major concern at times of peak demand.
- 5.2.6 Looking in the future, traffic flows are expected to grow on both the M4 and M5, and this will place additional pressure on operating conditions. The extent of growth and its impact upon operating conditions will, at least in part, be influenced by the Preferred Strategy. This is discussed later in this chapter.

Road Safety

- 5.2.7 Of all the motorway sections under consideration in the Greater Bristol Plan, only one has a historical accident record, which exceeds the national average for this type of road. All others have accident rates below the national average, and in most cases they are significantly lower.
- 5.2.8 The one exception is the section of M5 between Junction 18 (Avonmouth) and Junction 19 (Portishead). However, the pattern of accidents observed for this section is heavily influenced by the previous strengthening works of the Avonmouth Bridge and the associated traffic management. As such, the historical rates are somewhat misleading.
- 5.2.9 In summary, therefore, road safety on the motorway network in the Greater Bristol area is not a major concern per se. However, even the smallest accidents can have a serious detrimental impact on operating conditions at periods of high demand. The resultant congestion can be significant and, in the most severe cases, can divert traffic onto the local road network, thereby creating congestion over large parts of the road system.

Proposed Measures

- 5.2.10 Before going on to describe the detailed measures proposed over the M4/M5 network in the Greater Bristol area, it is important to understand the overriding philosophy of the approach taken. Earlier work undertaken in the SWARMMS investigated whether conditions could be improved by significant amounts of motorway widening around Bristol. It was found that the existing pressures and

forecast growth of demand on the motorways in the Greater Bristol area are such that to accommodate these by new construction would require wholesale widening of carriageways and massive expansions of junctions. However, this in turn would add further traffic, including the abstraction of more local traffic from the surrounding road network. This would result in disproportionate cost, disruption and environmental damage and so has been rejected as the best way forward in dealing with the problems of this part of the SWARMMS transport network.

5.2.11 The alternative approach adopted comprises measures to reduce the growth in road travel demand and improve public transport alternatives along with selective but substantial improvements to the motorway system - improvements that avoid most of the damage and traffic generation that would arise from the rejected approach. This approach will result in substantially better conditions on the motorway network than would otherwise be the case; however congestion problems will remain. The nature and severity of these are such that a broader range of measures over much of the Greater Bristol area is needed to address them. These include local road improvements, urban traffic restraint, improved local public transport and development policies that reduce the need to travel.

5.2.12 This range of considerations goes beyond the scope of SWARMMS. Therefore we are recommending a comprehensive study of the Greater Bristol area that addresses the transport, and related, problems of the local/regional and national transport systems in the area. The alternative would be to try and solve the problem by costly and damaging actions on the strategic network alone.

5.2.13 Given the above, the Preferred Strategy has been developed on the basis of seeking a 'consistency' of motorway operation through the Greater Bristol area, supported by an enhanced ITS system to better manage the traffic flow at busy times. In detailing the Preferred Strategy below, therefore, increases in capacity are limited to those sections which experience the highest traffic flow and most acute congestion (caused by both 'longer distance' and 'local' traffic) and/or severe gradients.

5.2.14 The following sections describe the range of measures proposed for the M4/M5 in the Greater Bristol area.

5.3 ***M4 Junction 18 (A46)***

Key Problems and Issues

- 5.3.1 This junction is located on the ridge of a hill, with a steep gradient on the eastbound carriageway. Heavy goods vehicles travelling slowly up the hill, and overtaking manoeuvres, conflict with poor lane discipline and traffic exiting the motorway. The circulatory carriageway of the junction also exhibits some peak period congestion.

Proposed Measures

- 5.3.2 The eastbound off-slip should be improved and extended to separate traffic earlier, and improvements should also incorporate the provision of a climbing lane for eastbound through heavy good vehicles.
- 5.3.3 Signalising the junction will improve its operational performance in the longer term, and should be considered as a potential solution.

5.4 ***M4 Junction 18 (A46) to Junction 19 (M32)***

Key Problems and Issues

- 5.4.1 This section carries approximately 85,000 vehicles AADT with average August flows showing increases of around 11-12%. The section generally operates satisfactorily, albeit with congestion on some occasions. There are no particular link-based accident problems and the accident rate is only about 60% of the national average for D3M.

Proposed Measures

- 5.4.2 No specific measures are anticipated in the short to medium term but flows should be monitored as predictions indicate that additional capacity may be required in the longer term.

5.5 ***M4 Junction 19 (M32)***

Key Problems and Issues

- 5.5.1 This junction suffers from heavy peak period congestion and there is interaction with Junction 1 of the M32 which lies just to the south. The Highways Agency recently completed improvements to the westbound off-slip which have improved matters but there is still some queuing back into the motorway in the peak hours.

5.5.2 It is noted that the M32 is to be detrunked south of the Bristol City/South Gloucestershire boundary under Highways Agency proposals for handing over to the local authority. Moreover, the local authorities in the area have previously considered Park and Ride at M32 Junction 1 (Hambrook).

Proposed Measures

5.5.3 No additional measures are proposed to Junction 19. However, strong consideration should be given to provision of a Park and Ride site at Hambrook to encourage modal shift on the M32 corridor. This should be a subject of further analysis in the subsequent study.

5.6 ***M4 Junction 19 (M32) to Junction 20 (Almondsbury)***

Key Problems and Issues

5.6.1 Flows on this section at about 103,000 vehicles AADT with seasonal peaks increasing flows still further. The Highways Agency has recently implemented some local widening and lane demarcation on this section which has assisted operation. The section remains very busy, however, and congestion remains at peak times.

5.6.2 There are no particular link-based accident problems and the accident rate is only just over half of the national average for D3M.

Proposed Measures

5.6.3 In the short term, the Highways Agency's proposals to implement further local widening and lane demarcation are supported, through to M5 Junction 16 (see below). Longer term, we propose that the whole section is widened to four lanes, with the fourth lane acting as an auxiliary lane. This will improve operations further.

5.7 ***M4 Junction 20 (Almondsbury) to Junction 21 (M49)***

Key Problems and Issues

5.7.1 This link connects the Almondsbury junction to both Severn Crossings and to the M49. Flows are about 51,000 vehicles AADT. It generally operates satisfactorily. The accident rate is half the national average.

Proposed Measures

5.7.2 No measures are proposed.

5.8 ***M5 Junction 15 (Almondsbury) to Junction 16 (A38)***

Key Problems and Issues

5.8.1 Almondsbury Interchange provides a free flow facility for vehicle movements between M4 and M5 and is directly connected to M5 Junction 16. Movements between Junctions 15 and 16 occur southbound over a relatively short distance, with successive merges and weaving, and speeds are high. Northbound there are similar problems with successive diverges and weaving. This area suffers both daily congestion and congestion at peak holiday times.

5.8.2 Traffic flows are currently about 97,000 vehicles AADT. Due to the complexity and proximity of the junctions, there is significant vehicle interaction and this reduces capacity.

5.8.3 Notwithstanding the above, the observed accident rate for this section is very low at less than 30% of the national average.

Proposed Measures

5.8.4 The Highways Agency currently has a proposed package of phased improvements to improve lane discipline and safety. Construction of the first stage has recently been completed. These improvements are designed to make better use of existing road space by improved carriageway markings to reduce conflicts between successive merges and diverges. We are of the view that the phased improvements should be implemented in their entirety, and should, in conjunction with controlled motorway arrangements (see later), greatly enhance safety and journey time reliability.

5.8.5 Due to interaction of the junctions, additional lanes over this section are unlikely to improve operational conditions; however conditions should be monitored after installation of the above to ensure that benefits are realised.

5.9 ***M5 Junction 16***

Key Problems and Issues

5.9.1 This junction serves the A38, adjacent business parks, and is also one of several sites being investigated for the terminus for Line 1 of the proposed Bristol LRT. The north-facing slips interact with Almondsbury Interchange (see above). The junction suffers heavy peak congestion, particularly the northbound off-slip that can result in queues back to the motorway. There have been a large number of

accidents at the junction in recent years, albeit that almost all have caused only minor injury.

Proposed Measures

5.9.2 In the short term improvements to the northbound off-slip should be implemented to improve safety and reduce congestion.

5.9.3 In the longer term, additional capacity will be required, subject to the success of the above, controlled motorway implementation, and auxiliary lanes between junctions (see below). This could be in the form of additional circulatory capacity on the roundabout and/or free-flow link(s) for one or more movements, although site constraints would make the latter difficult to locate. This is clearly an area for the subsequent study; peak period operation of both the strategic and local highway networks will be a key consideration.

5.10 ***M5 Junction 16 (A38) to Junction 17 (B4005)***

Key Problems and Issues

5.10.1 Traffic flows on this section are about 100,000 vehicles AADT and it experiences serious congestion at peak periods and holiday times. Indeed, the average August flows can increase this figure by up to 19%. There are no particular link-based accident problems and the accident rate is below the national average for D3M.

Proposed Measures

5.10.2 Additional capacity is required over this section of motorway in order to provide a consistent level of operation through the area. In order to address requirements of local and strategic movements, it is recommended that an auxiliary lane be implemented in each direction between the junctions. This will also assist in reducing the off-slip problems at Junctions 16 and 17 (see above).

5.11 ***M5 Junction 17 (B4005)***

Key Problems and Issues

5.11.1 This junction provides access to the Cribbs Causeway regional shopping centre. There are congestion problems with the off-slips, including on weekends and holiday periods. The junction operates close to capacity and has experienced a significant number of accidents in recent years. Moreover, it is one of the sites currently being investigated for the terminus for Line 1 of the proposed Bristol LRT.

5.11.2 There are also significant development pressures close to Junction 17. These include the expansion of the Severnside area.

Proposed Measures

5.11.3 In the longer term, additional capacity is likely to be needed at the junction, subject to the success of the controlled motorway implementation and the auxiliary lanes between junctions (see above).

5.12 ***M5 Junction 17 (B4005) to M5 Junction 18 (M49/A4)***

Key Problems and Issues

5.12.1 Traffic flows on this section are about 85,000 vehicles AADT, and average August flows can increase this figure by up to 24%. There are no particular link-based accident problems and the accident rate is less than 60% of the national average for D3M.

5.12.2 A particular problem on this link is that the capacity is reduced by slow overtaking heavy goods vehicles on the steep northbound incline at Hallen Hill. Proposals for provision of a climbing lane have previously been investigated by the Highways Agency, but there are currently no plans for implementation.

Proposed Measures

5.12.3 Additional capacity is required in the longer term to address the delays caused by slow moving vehicles on Hallen Hill. It is therefore recommended that a climbing lane be implemented.

5.13 ***M5 Junction 18/18A (M49/A4)***

Key Problems and Issues

5.13.1 This junction feeds the A403 to Avonmouth, the A4 into Bristol, and the M49 link to the Second Severn Crossing (SSC). It was substantially remodelled and extended when the SSC was constructed and operates well.

Proposed Measures

5.13.2 No measures are proposed.

5.14 ***M5 Junction 18 (M49/A4) to Junction 19(A369)***

Key Problems and Issues

5.14.1 This section was recently widened to four lanes (D4M) as part of the strengthening of Avonmouth Bridge completed in 2000. The additional lane operates as an auxiliary lane between Junctions 18 and 19. Flows are about 85,000 vehicles AADT, which is within the normal flow range for D4M, and this section appears to be operating satisfactorily. As explained earlier, the accident rates for this section relate to previous configurations and are no longer relevant.

Proposed Measures

5.14.2 No measures are proposed.

5.15 ***M5 Junction 19(A369)***

Key Problems and Issues

5.15.1 This junction serves the A369, which is a commuter route into Bristol and a feeder for Portishead and the Royal Portbury Dock. It also provides access to the Easton-in-Gordano service area. As part of the widening to D4M of the section between Junctions 18 and 19, the southbound off-slip was widened in 1999.

5.15.2 There is potential for Junction 19 to be placed under increasing pressure in the future, particularly with the development of Avonmouth and Severnside employment sites, further growth at the Port, and additional housing.

Proposed Measures

5.15.3 No additional measures are proposed in the short term. Instead, it is recommended that the operation of the junction should be monitored post-SWARMMS to reflect the new layout arrangements. Also, the peak operation of Junction 19, allowing for possible future development pressures, should be looked at more closely in the subsequent study.

5.16 ***M5 Junction 19 (A369) to Junction 20 (Clevedon)***

Key Problems and Issues

5.16.1 Traffic flows on this section are about 86,000 vehicles AADT. There are steep uphill gradients at Naish Hill (southbound) and Tickenham Hill (northbound) which serve to reduce capacity and cause congestion at peak times. The Highways Agency has previously investigated provision of climbing lanes at these locations.

5.16.2 There are no particular link-based accident problems and the accident rate is only half the national average for D3M.

Proposed Measures

5.16.3 The climbing lanes at Naish Hill and Tickenham Hill would enable this section of the motorway to operate near to its potential capacity and should be implemented in the longer term.

5.17 ***M5 Junction 20 (Clevedon)***

Key Problems and Issues

5.17.1 This three-arm junction serves Clevedon and generally operates satisfactorily. There is, however, some queuing at the southbound off-slip in the evening peak which can extend to the motorway carriageway. The Highways Agency is investigating possible improvements to address this problem.

Proposed Measures

5.17.2 Improvements to the southbound off-slip should be implemented in the short term. No further measures are proposed.

5.18 ***M5 Junction 20 (Clevedon) to Junction 21 (A370)***

Key Problems and Issues

5.18.1 Traffic flows on this section are about 78,000 vehicles AADT. The section in general operates satisfactorily. Again, there are no particular link-based accident problems and the accident rate is only one third of the national average for D3M.

Proposed Measures

5.18.2 No measures are proposed.

5.19 ***M5 Junction 21 (A370)***

Key Problems and Issues

5.19.1 This junction primarily serves commuters from Weston-super-Mare travelling to (and from) the Bristol conurbation, and development sites on the outskirts of Weston-super-Mare. The junction is severely congested at peak times, vehicles on the southbound off-slip queuing on the motorway in the evening peak.

5.19.2 These pressures, and their relationship to possible land use decisions in the Greater Bristol Area, are discussed further in Chapter 6.

Proposed Measures

5.19.3 Improvements should be implemented in the short term to address the southbound queuing problem.

5.19.4 A number of longer term options are discussed in Chapter 6.

5.20 ***Traffic Control (ITS)***

5.20.1 The purpose of ITS systems is to improve the management of traffic on motorways and trunk roads with the major aim of reducing traffic accidents. The secondary advantages are that by reducing accidents, unnecessary delays are reduced and journey times become more consistent and reliable. Although helping to address safety and reliability, ITS generally has only a limited capability for physically increasing the capacity of the motorway or trunk road. However the collection of 'real time' information and disseminating this to business and the general public will facilitate the ability to undertake meaningful and realistic journey planning. Journey planning will give the option of rescheduling a journey outside periods of congestion, navigating round an incident, taking a different route or using a different mode of transport.

5.20.2 The motorways in the Greater Bristol area currently have an operational motorway communications system comprising emergency telephones and matrix signals. For the majority of this motorway the matrix signals are central reserve signals located at approximately 3km intervals. However there are some gantry mounted signals close to Bristol.

Proposed measures

5.20.3 As detailed above, a number of highway schemes are proposed to improve the configuration of the motorway layout at junctions and additional running lanes to address specific congestion and incident problems. In order to further improve motorway safety and assist with congestion problems, it is proposed that motorway communication and ITS facilities are extended including:

- Introduction of MIDAS through the full length of route;
- Introduction of 'Controlled Motorway' and 'Active Traffic Management';
- Dissemination of the traffic data into the public domain to enable business and the general public to make informed journey/route planning both prior to and during travel; and

- Displaying traffic data, incident and congestion information at public locations in and around the Bristol Area. Suggested sites would be in major shopping centres, Park and Ride sites, and bus/train stations.

MIDAS

5.20.4 We propose a MIDAS system for the full length of the M4/M5 in the Greater Bristol area. The system should include:

- Traffic monitoring every 500 metres; and
- Variable message signs at each junction and at least every 1500 metre spacing between junctions. Signs to be mounted on gantries and verge mounted as appropriate.

5.20.5 The MIDAS system will continuously monitor the traffic flows and automatically set advisory speed limits and queue warning messages on the signs when congestion or incidents on the motorway are detected.

5.20.6 The variable message signing installed as part of the MIDAS would perform supplementary functions giving hazard warnings (such as ice, high winds) and diversion information. Hazard warnings and local diversion requirements would be under the control of the Local Police Control Centre with strategic/wider network diversions being under the control of the Traffic Control Centre (TCC).

Controlled Motorway

5.20.7 We also propose that the MIDAS system is further upgraded to provide 'Controlled Motorway' facilities. This extends the features of the MIDAS system by analysing the traffic flows and prior to congestion forming, reducing the speed limit to achieve constant traffic flow, thus delaying the onset of 'stop / start' traffic flow breakdown. It requires the gantry matrix signs to be changed to incorporate the 'red ring' required for compulsory speed limit definition and the installation of 'Enforcement' equipment.

Active Traffic Management (ATM)

5.20.8 It is also proposed that Active Traffic Management facilities should be introduced by the addition of variable message signs to the gantries and signage, which are able to redefine the lane usage of varying sections of the motorway. Information from the traffic monitoring equipment and the CCTV etc will enable the Police to set this additional signing so that in relevant traffic situations different lanes can be

assigned a different function or be restricted to certain types of traffic. By so managing the lane usage improved traffic merging and diverging can be achieved enabling the 'best use' of the available road network under different traffic conditions.

Traffic Data Dissemination

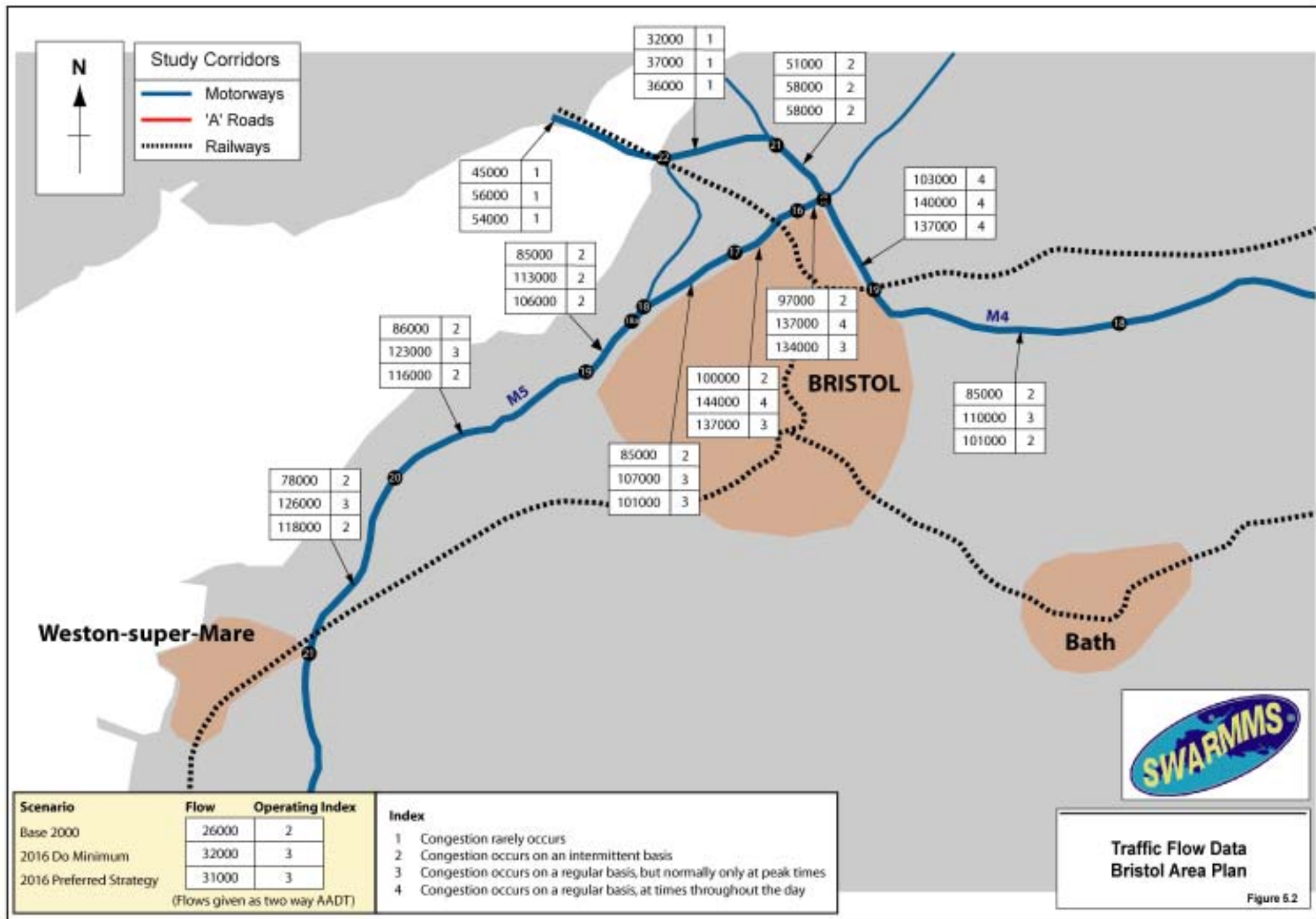
5.20.9 The installation of MIDAS and other traffic monitoring equipment along the motorway will provide a wealth of 'real time' data on the status of the motorway and its junctions. This data is available in the Police Control Centre to enable them to undertake the local incident responses and also be passed on to the TCC, which is currently under development, to make any strategic response. Within the TCC framework this data is to be made available to the traffic organisations, broadcasters, route guidance system operators and the public domain. Development of the data dissemination facilities should be progressed to provide and improve the capabilities for businesses and the general public to make better informed journey planning decisions before and during their journeys.

5.20.10 In addition to the above, 'real time' information displays should be installed in public places such as major shopping centres, bus/train stations, car parks/park & ride sites. This will enable motorists to make decisions on journey timings and route planning before they start their journey.

5.21 ***Forecast Traffic Flows***

5.21.1 Figure 5.2 shows the predicted future traffic volumes and operating conditions for the motorway network in the Greater Bristol area. Along with the Base 2000 traffic flows, two future scenarios are also presented; the '2016 Do Minimum' presents flow estimates if only the committed schemes and interventions (across all modes) were provided and the '2016 Preferred Strategy' present estimates if all parts of the Preferred Strategy (again across all modes) were provided.

5.21.2 The forecast AADT flows presented in Figure 5.2 have been based on 'average hour' traffic flows generated by the SWARMMS Strategic Transport Model, growthed to reflect daily traffic levels. However, this approach necessarily fails to take full account of the congestion levels in the Bristol area, particularly in the morning and evening peaks. The derivation of robust traffic forecasts will be an important part of the subsequent study.



5.21.3

Notwithstanding the above, it can be seen that there will be significant growth on all parts of the M4/M5 corridor, for both the Do Minimum and the Preferred Strategy. Also shown on Figure 5.2 is an 'operating index' which reflects operating conditions on the highway network. It can be seen from Figure 5.2 that there will be a slight deterioration in operating conditions with the Preferred Strategy in place compared to the present day, although an improvement when compared to the Do Minimum. In general, however, the M4 and M5 are predicted to retain satisfactory operating conditions for the majority of the day. The extent of future peak period congestion, and the detailed measures needed to address this, should be a key component of the subsequent study.

5.22

Costs

5.22.1

Table 5.1 provides the indicative costs of implementing the measures described in this Chapter.

Table 5.1 : Indicative Costs of Highway Measures (@ Q3 2001 prices)

Scheme/Measure	Cost (£m)
M4 Junction 18 slip road and climbing lane	10
M4 Junction 19 to Almondsbury auxilliary lane	15
M4/M5 Almondsbury Interchange (HA proposals)	10
M5 Junction 16 to 17 auxilliary lane	15
M5 Junction 17 to 18 climbing lane	5
M5 Junction 19 to 20 climbing lanes	10
Minor junction improvements	5
ITS Measures	30
Total	100

5.23

Rejected Options

5.23.1

In developing those elements of the Preferred Strategy described above, a number of other approaches have been considered but rejected. These are as follows:

- General motorway widening – As described above, earlier work in SWARMMS showed that general motorway widening along the full length of the M4 and M5 in the Greater Bristol area would attract more traffic to the network, and the resultant levels of congestion would be similar to those existing.

- Motorway tolling – Other work showed that tolling of the motorway around Bristol would encourage traffic to divert to other, less suitable routes.
- Completion of Avon Ring Road – Completing the Avon Ring Road (or ‘Motorway Box’) to the south of Bristol would create significant environmental impact in the local area.
- New motorway junction at Emersons Green (M4 Junction 18a) – It has not been able to carry out analytical testing of different land use options in the Bristol area as part of SWARMMS.

5.23.2

Whilst rejecting the above options in development of the Preferred Strategy it is recognised that SWARMMS has not been able to undertake robust analytical testing in all areas, and particularly in respect of peak period traffic conditions. As such, we recommend that such measures are considered further in the proposed subsequent study.

6 Other Measures

6.1

Introduction

6.1.1

This section describes a range of further transport measures and issues that need to be addressed if the SWARMMS strategy is to achieve its objectives. These are largely measures which are not focussed on the strategic transport networks including:

- Land-use issues particularly in terms of the allocation and accommodation of future housing development in the Greater Bristol Area;
- Access to Bristol International Airport; and
- Traffic restraint within the Greater Bristol Area.

6.1.2

The following sections describe each of these elements of the Greater Bristol Area Plan.

6.2

Land Use Issues

6.2.1

The discussion of land use issues set out in Section 2.5 highlights the importance of an integrated approach to land use and transport planning within the Greater Bristol area. Whilst the transport recommendations set out in Chapters 3-5 will improve the operation of the transport systems and promote more sustainable travel patterns, it is essential that a number of land-use issues are addressed if the underlying causes of transport problems are to be tackled.

6.2.2

From an examination of these existing land-use issues and how they might develop in the future we would make the following recommendations:

- Substantial efforts must be made to attract new employment to Weston-super-Mare to redress the imbalance between residents and employees.
- Further new residential development beyond 2011 in Weston-super-Mare should only take place if the existing imbalance is overcome.
- If the current allocation of residential dwellings to be developed in North Somerset to 2011 is not capable of change, then we have no option (even with a much enhanced public transport system in place) but to recommend either a major upgrade to Junction 21 and/or recommend that a new M5 motorway junction 21a should be constructed. The best location for a new junction would appear to be at Knightcott on the A371.

We would however express our reservations about the scale of development which is proposed in North Somerset and would suggest that it would be more sustainable to locate this development within or adjacent to the Bristol Urban area (also see Section 6.3 for possible role of new Junction 21a in providing improved access to Bristol International Airport).

- The major enhancements to public transport between Weston-super-Mare and the Bristol area proposed in this Plan will need to be supported by appropriate publicity and 'hearts and minds' campaigns to achieve the level of modal switch which is required to make the travel patterns more sustainable.
- The development of Line 1 of the proposed Bristol LRT system should proceed as quickly as possible to facilitate public transport access to the North Fringe accompanied by significant parking restraint both through the application of South Gloucestershire's new parking standards and potentially through measures such as workplace parking levies.
- The prevention of further major new retail development outside traditional town/city centres.
- The development, as a priority, of additional LRT lines/branches to serve the Cribbs Causeway regional shopping centre,

6.3

Access to Bristol International Airport

6.3.1

The major passenger airport within the Greater Bristol area is Bristol International Airport, which is located south west of Bristol on the A38 corridor near the village of Lulsgate. In recent years it has experienced substantial growth in passenger numbers partly due to a thriving charter flight package holiday market, an expanding series of scheduled business services and more recently through the start of operations by Go, the low-fare airline flying to a range of domestic and European destinations.

6.3.2

The location of the airport on a hilltop site makes it very difficult to serve by rail-based public transport; as a result the vast majority of airport users arrive by car (private car and taxi). Current information suggests that less than 5% of passengers arrive by bus/coach. Whilst, the airport is currently served by a frequent shuttle coach service from Bristol Temple Meads and Bristol Bus/Coach station, typical journey times are 30-45 minutes with relatively high fares which limits the attraction of the service.

6.3.3

To improve public transport access to the airport two particular measures are proposed:

- The development of coach services from Exeter to Bristol operating via the airport (see Chapter 4). This would also open up the opportunity for parking at one of the proposed coachways (Weston-super-Mare and Taunton) and travelling on making the onward journey by coach to the airport; and
- The development of a coach link from the upgraded Worle Parkway station to the airport.

In both cases careful consideration would need to be given to the parking capacity implications of these proposals.

6.3.4

Longer term, there is the potential to develop additional rail-based access to the airport with, for example, a new station at Long Ashton/Flax Bourton on the Great Western Main Line accessed from the A370. The development of an additional station on this busy stretch of the line is only likely to be viable if there were to be substantial upgrading of the line between Worle and Parson Street. Whilst it would not be necessary to upgrade to four tracks throughout it would be necessary to consider 4-tracking a significant section. It is recognised that the shorter the four track section, the greater the constraint there would be on rail operations and the less reliable services would be.

6.3.5

There is also the potential to develop airport access from the proposed Ashton Gate Station on the Portbury line.

6.3.6

In terms of highway access to the airport the existing situation is far from ideal for origins to the north and east with drivers either having to negotiate congested parts of inner Bristol or approach along minor rural routes which are not suited to significant traffic volumes. Upgrading highway routes to Bristol Airport is however, very difficult due to major environmental constraints limiting options to create, for example, direct access to the motorway network or through to the Avon Ring Road.

6.3.7

The potential for developing a new motorway junction 21a (see Section 6.2) might be used to provide a closer direct access from the M5 to the airport but the difficulties of achieving bypasses of the existing villages between junction 21a and the A38 should not be underestimated.

6.3.8 The existing airport access from the M5 south is provided from Junction 22, which whilst being over 20 miles from the airport is connected by a good standard road (A38) and generally provides a reliable link.

6.3.9 The current proposals by North Somerset and Bristol City Council to provide a link between the A370 and A38 in Ashton Vale would in principle provide improved access from the M5 Junction 18 to the Airport via The Portway and Ashton Gate. However, it has not been subject to appraisal in SWARMMS and its justification is likely to be founded on more local impacts in the Bristol area.

6.4 ***Traffic Restraint***

6.4.1 Examining the issues facing Greater Bristol and the existing conditions on the highway networks indicates that any transport strategy for the area must include elements of traffic restraint in order to achieve the necessary modal transfer to moderate the level of traffic growth. This finding has been supported by transport forecasting which has also shown that traffic restraint measures play a valuable role in achieving a balance in transport demand.

6.4.2 There is a significant amount of restraint already in existence. The main elements are:

- parking charges both on-street and off-street;
- restrictions in the supply of long-stay parking spaces;
- application of restricted maximum parking standards for new developments;
- application of bus priority measures which generally transfer highway capacity from the private car to public transport; and
- physical restriction of car movements through pedestrianisation schemes or through traffic calming measures.

6.4.3 Most of these measures are applied in such a way as to provide the greatest traffic restraint on activities located within town and city centres. The level of traffic restraint in suburban, edge-of-town and out-of-town locations is generally very low.

6.4.4 Whilst SWARMMS does not intend to prescribe the appropriate forms of traffic restraint at local levels, it has identified the overall importance of increasing levels of traffic restraint. With this in mind, we support the principle of Bristol's proposals for congestion charging in its central area. However, there is also a need

to implement restraint in areas outside urban centres where traditionally there has been little deterrent to use of the private car. Longer term, this might be achieved by some form of satellite-based road-user charging. In the interim, workplace parking levies might be considered as an interim measure to discourage private car use, whilst generating an income stream which might be used to implement other elements of the Preferred Strategy which require revenue/operating support.

6.4.5

It is also important to recognise that traffic restraint measures based on user charging have the potential to create substantial income streams which might be used to fund other elements of the Plan.

7 Summary of Findings

7.1 *Conclusions*

7.1.1 The Preferred Strategy is summarised in Figure 7.1.

7.1.2 This Plan provides an outline blueprint for the development of transport measures within the Greater Bristol area over the next 15-20 years. It emphasises the importance of rehabilitating the rail services and generally providing much more attractive public transport as an alternative to the private car.

7.1.3 In essence, the Plan recognises the importance of the Greater Bristol area to the whole of the South West Region, and that if the economy of the Region is to thrive then efficient transport networks are required in this area. If the future growth in transport demand is solely focussed on the highway network, existing capacity will soon be exhausted. To create substantial additional highway capacity is not only very difficult to achieve due to environmental constraints but also the effectiveness is questionable due to inconsistencies in highway capacity between local and strategic networks.

7.1.4 The Plan proposals are therefore centred on substantial improvement of alternatives to the private car. Nevertheless, highway travel will continue to be very important into the future and cannot therefore be neglected. To this end, measures to improve traffic flow on the motorway network are incorporated in the Plan through a combination of ITS technology and localised highway schemes. It is also necessary to continue to adopt traffic restraint measures throughout the area.

7.1.5 The Plan is therefore based on six main activities:

- Enhancing both Inter-city and local rail services to make rail a more attractive option for both local and long distance journeys;
- Increasing capacity of the rail networks to accommodate the enhanced service frequencies, combined with freight flows, and making rail operations more reliable;
- Improving the operation of the strategic highway networks through comprehensive application of ITS technology and localised capacity improvements;

- Recognising the need to improve local public transport and its contribution to the wider transport networks;
- Recognising the importance of improving public transport access to parts of the Greater Bristol area and the role of future land use decisions; and
- Substantially improving the level of coach services and the facilities for coach passengers.

7.1.6

Many of the detailed issues requiring resolution in the Bristol area are beyond the scope of SWARMMS. As such, we fully endorse the concept of undertaking a subsequent, and more detailed, study of the Greater Bristol area. It should build upon the work undertaken in developing the SWARMMS Preferred Strategy.

Highway Measures

 Controlled Motorway

M5

- > Auxilliary lane to be added between junctions 16 & 17
- > New climbing lanes between junctions 19 & 20
- > 3 new climbing lanes between junctions 17 & 20

M4

- > Almondsbury Interchange (M4/M5) proposals by Highways Agency are supported
- > Auxilliary lanes to be added between junctions 19 & 20
- > New climbing lane on approach to junction 18


Coach service enhancements:

- > Coach services to include 2 coaches per hour between London-Bristol, London-South Wales, Heathrow-Bristol, Heathrow-South Wales, Bristol-Taunton-Exeter
- > Improved integration of local bus and coach services and higher quality vehicles


Proposed combined service rail frequencies:

- > Taunton - Bristol Temple Meads: 4/5 trains per hour (tph)
- > Exeter St Davids - Bristol Temple Meads: 3/4 tph
- > London Paddington - South Wales: 3 tph
- > London Paddington - Bristol Temple Meads: 3 tph
- > Bristol Temple Meads - Oxford: 2 tph


Study Corridors

 Motorways


 'A' Roads


 Railways


 Other Rail Lines


 Stations

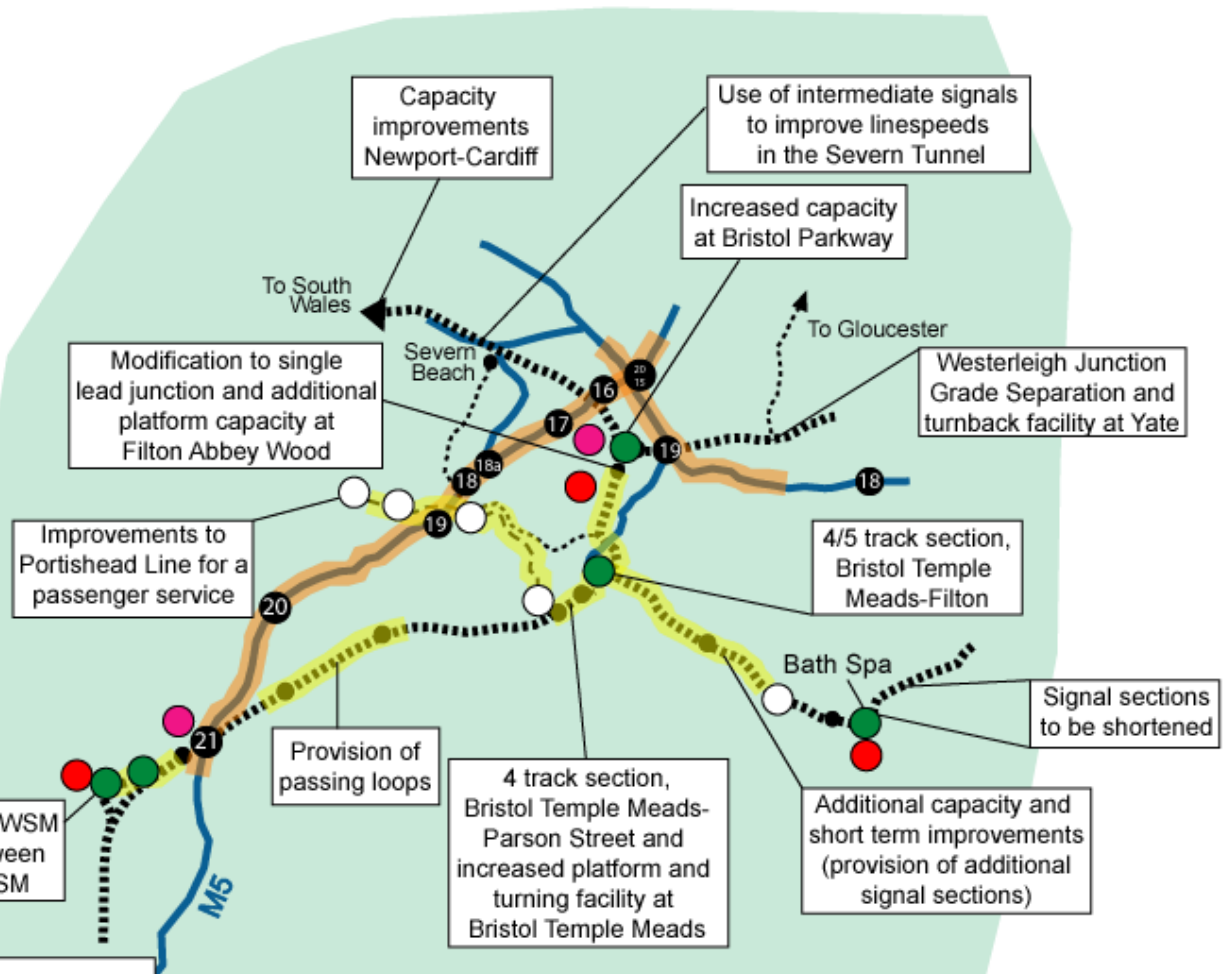
 New Coachways

 Interchange facilities (with rail) to be improved

 Interchange facilities (bus/coach) to be improved

 New stations to be constructed

 Rail infrastructure enhancements



Bristol Area Recommendations

Figure 7.1