South Bristol Link
Major Scheme Business Case

0
Executive Summary

A Summary of the South Bristol Link

0 Executive Summary

0.1 INTRODUCTION

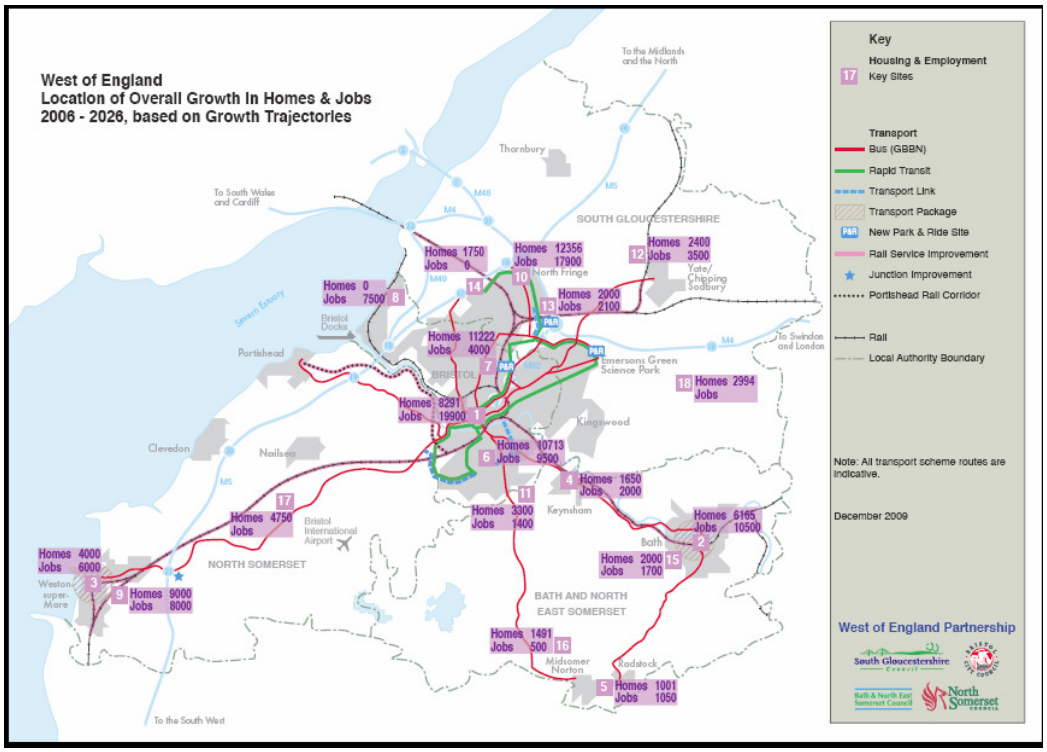
This Chapter gives an Executive Summary of the South Bristol Link. It includes: -

- An introduction to **The West of England and South Bristol**;
- An introduction to **The Scheme**;
- A summary of **The Strategic Case;**
- A summary of **The Value for Money and Appraisal Case;**
- A summary of **The Delivery Case;**
- A summary of **The Commercial Case;**
- A summary of **The Financial Case;**
- Conclusion
- The **Appraisal Summary Table**

0.2 THE WEST OF ENGLAND AND SOUTH BRISTOL

The West of England sub-region, which covers the four unitary authorities of Bristol, North Somerset, Bath & North East Somerset and South Gloucestershire, is the economic hub of the South West. The strong economy is set to continue to grow with currently emerging Core Strategies planning to deliver some 86,500 homes and 95,500 jobs up to 2026 in the context of the Draft South West of England Regional Spatial Strategy (RSS), which is yet to be finalised. Figure 0.1 shows the West of England, its major cities and towns and principal transport links.

Figure 0.1 – The West of England



The West of England also faces significant transport challenges. Large scale housing growth and economic development over a number of years has not been accompanied by sufficient investment in transport infrastructure and this low level of investment, compounded by an unreliable public transport system, has resulted in high levels of congestion.

The latest version of the government's English Indices of Multiple Deprivation Index (2007) shows that much of South Bristol is amongst the 10% most deprived in the country and two areas are in the most deprived 1%.

South Bristol is also characterised by poor transport links and congestion. Whilst bus service frequencies in South Bristol are very good, journey times are relatively poor largely due to congestion. Congestion in the City reduces the average peak hour speeds to 17.5mph (National Congestion Indicator 2008/09, DfT).

A more detailed description of the West of England and South Bristol is included in Chapter 1

0.3 SCHEME DESCRIPTION

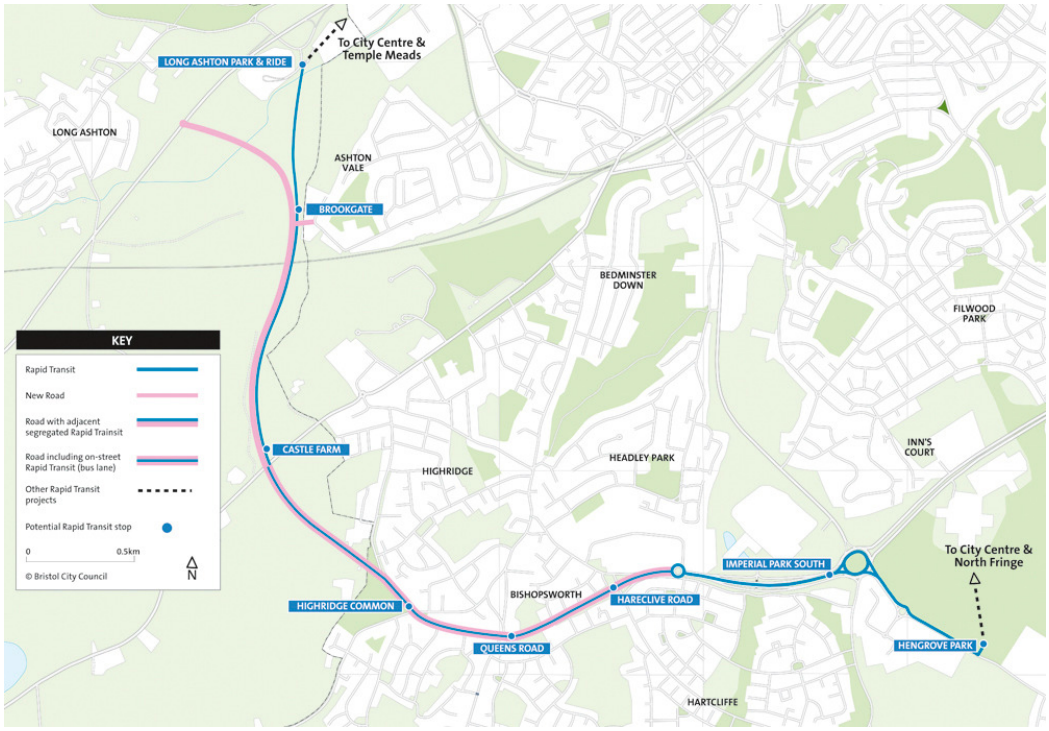
0.3.1 Preferred Scheme

The Preferred Scheme has evolved through a comprehensive appraisal process as described in Chapter 2. It provides a solution that best meets national and local requirements and accords with DfT appraisal criteria. The scheme is approximately 5 km overall and comprises four distinct elements, each of which is needed in order to meet the objectives effectively:-

- extending rapid transit from Long Ashton Park & Ride site (Ashton Vale to Temple Meads Rapid Transit line) to the new Community Hospital, Campus and Leisure Centre at Hengrove Park in South Bristol
- a single carriageway highway between the A370, the A38 and the existing A4174 at the Cater Road Roundabout.
- Cycling and pedestrian facilities parallel to the rapid transit and highway elements that will link to existing facilities.
- Traffic management measures on surrounding highways to maximise the benefits of the Scheme by discouraging traffic from using less appropriate routes

The rapid transit, highway and cycle and pedestrian elements will be constructed adjacent to one another, within the same corridor, except near the A370 where the highway and rapid transit elements diverge.

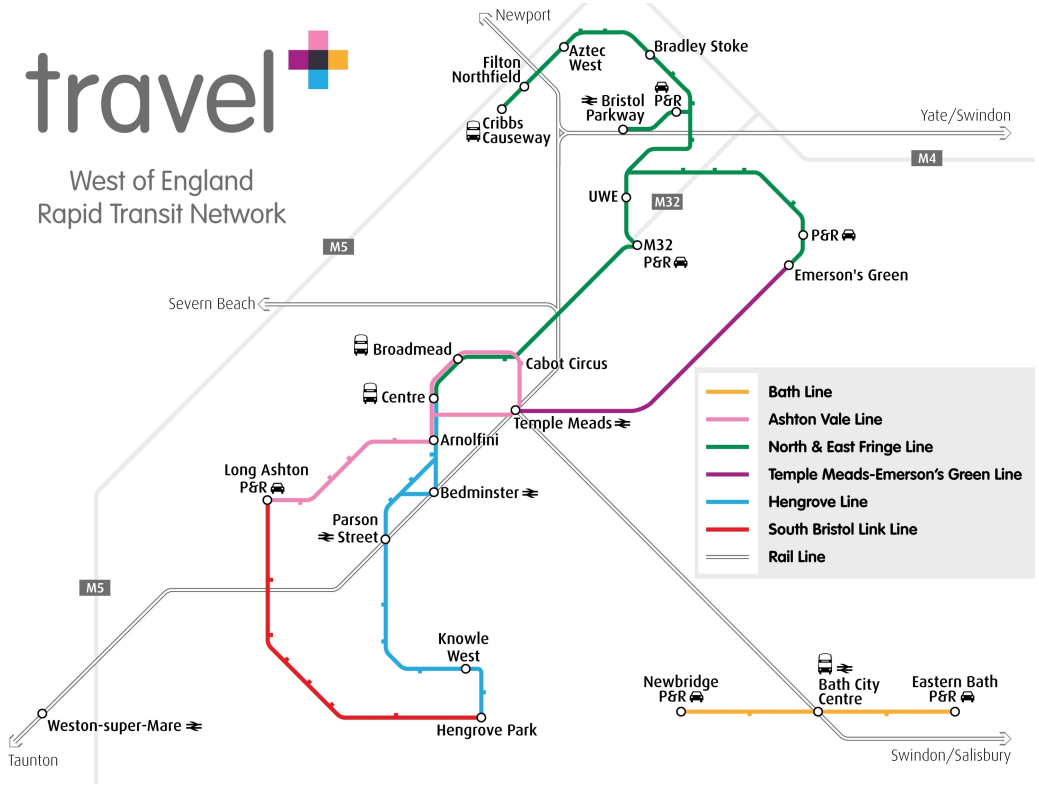
Figure 0.2 - Overview of the South Bristol Link – Preferred Scheme



0.3.2 Rapid Transit

A comprehensive network of Rapid Transit routes radiating across the city is identified in the Joint Local Transport Plan and in the Regional Programme (RFA2). The Rapid Transit element of South Bristol Link extends the Ashton Vale to Temple Meads line from the Long Ashton Park & Ride site to the A38 (for Bristol International Airport), onward to South Bristol and Hengrove Park.

Figure 0.3 - West of England RFA Prioritised Rapid Transit Network



The Rapid Transit element of the South Bristol Link (red in figure 0.3) will consist of a segregated guided busway section and a segregated on-street section.

The segregated busway section will extend the Ashton Vale to Temple Meads Rapid Transit line (pink in figure 0.3), which has recently been granted Programme Entry, from the Long Ashton Park & Ride site, to the A38. From the A38 the opportunity exists to extend Rapid Transit westwards to Bristol International Airport. This extension is not included in this bid, although Airport Flyer bus services will utilise this section of segregated busway and continue on to the Airport using the A38, gaining improved journey reliability.

The segregated on-street section will head eastwards linking the A38 to the new development of a Community Hospital, Campus and Leisure Centre at Hengrove Park. This section will utilise bus lanes with central running within the highway element. Stops will be provided at appropriate locations.

It should be noted that North & East Fringe line (green in figure 0.3) and the Hengrove Line (blue in Figure 0.3) are being submitted for Programme Entry at the same time as South Bristol Link, as part of the North Fringe to Hengrove Package.

0.3.3 Highway

A new roundabout junction will be constructed on the A370 near Long Ashton. From there, a single carriageway 40mph road will run southeast for approximately 1.5km to meet the A38, where a further roundabout will be constructed.

Between the A370 and A38 a highway connection will be made to the existing industrial area of South Liberty Lane.

From the A38 a single carriageway 30/40 mph highway will continue eastwards for approximately 2.5km; across Highridge Common and along King George's Road; before passing through a reserved corridor and joining the existing 'Bristol ring road' at Cater Road roundabout. Construction of the highway element will reduce traffic on several residential rat-run routes in the surrounding area. Traffic management measures on some of these routes will maximise benefits by discouraging through traffic.

0.3.4 Cycling and Pedestrian Infrastructure

A segregated, 4m wide, tarmaced, Cycle and Pedestrian path will be constructed parallel to the Highway and Rapid Transit elements along the total length of the scheme with connections to existing adjacent footways and cycleways.

0.3.5 Lower Cost Option

A Lower Cost Option has been developed following wide-reaching consideration of possible variations to the Preferred Scheme. A single alternative to the Preferred Scheme, rather than a Next Best and Lower Cost Option, has been identified as explained in Chapter 1. The Lower Cost Option comprises:

- Replacing the segregated Rapid Transit busway between the Long Ashton Park & Ride site and the A38 with conventional bus lanes within the highway;
- Replacing the central running bus lanes between the A38 and Hartcliffe Roundabout with conventional bus lanes;
- Removal of the eastbound climbing lane between the A370 and A38;
- Removal of signalisation and dedicated slips from the A38 and A370 roundabouts;
- Procurement of conventional bus services rather than high specification Rapid Transit Vehicles;

0.3.6 Phasing

The proposed phasing of the project to full operation is as follows:-

- September 2010 Programme Entry
- September 2010 – June 2012 Preparation for Statutory Process
- June 2012 – December 2013 Statutory Process
  including public enquiry, planning consent and compulsory land purchase.
- March 2013 – July 2014 Design & Build contractor procurement
- December 2013 bid for Conditional Approval
- January 2014 Conditional Approval
- July 2014 Full Approval
- January 2015 Construction start
- January 2017 Programme Complete

A more detailed description of the Scheme can be found in Chapter 1 and the scheme drawings are presented in Appendix 1.2.

0.4 STRATEGIC CASE

The Scheme's local objectives were considered carefully at project inception, following preparation of an initial review of historic projects that were seen as relevant to the South Bristol Link. The link will contribute towards a number of national, regional and local objectives in terms of transport and wider economic and environmental purposes. The local objectives are to: -

- facilitate regeneration and growth in South Bristol;
- reduce congestion in South Bristol and adjacent areas of North Somerset;
- improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.

DaSTS – Delivering a Sustainable Transport System	
To **support** national **economic competitiveness and growth**, by delivering reliable and efficient transport networks	The project specifically supports regeneration and growth by contributing to a reliable and efficient transport network, assisting creation of up to 5,600 new jobs
To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of **tackling climate change**	The project assists regeneration and growth, potentially reducing the need for travel.
To **contribute to better safety security and health** and longer life-expectancy by reducing the risk of death, injury or illness arising from transport and by promoting travel modes that are beneficial to health	The project assists regeneration and growth giving greater opportunities for prosperous, healthy communities. The project offers more sustainable transport choices, potentially improving personal fitness.
To **promote** greater **equality of opportunity** for all citizens, with the desired outcome of achieving a fairer society;	Improved rapid transit, cycling and walking links give greater transport choice when accessing education, employment, healthcare and leisure particularly for those who do not, or choose not, to own a car. Regeneration and growth gives greater opportunities for a prosperous, fairer society.
To **improve quality of life** for transport users and non-transport users, and to promote a **healthy natural environment**	The project assists regeneration and growth giving greater opportunities for a prosperous community with an improved quality of life.

Draft Regional Spatial Strategy for the South West	
Development Policy A Development of Strategically Significant Cities and Towns (SSCTs)	The project specifically assists the regeneration and development of South Bristol in accordance with the policy, contributing to some 5,600 new jobs
Development Policy D Infrastructure for Development	The project specifically provides infrastructure to aid regeneration and development in accordance with the policy.
Sub-Regional Strategy for Bristol Improvements to the roads in South Bristol, including the South Bristol Ring Road, improving access to the Airport and facilitating investment for regeneration of south Bristol	The project specifically improves accessibility to the city centre and to strategic links, including the trunk road network and Bristol International Airport in accordance with the sub-regional strategy for Bristol

Joint Local Transport Plan	
To tackle congestion	The project reduces traffic flows on some key routes within the city.

Joint Local Transport Plan	
To improve air quality	The project assists regeneration potentially reducing the need to travel
To increase the number of cycle trips	The project includes substantial cycling and walking infrastructure

Bristol & North Somerset Core Strategies	
Develop South Bristol's social economic & physical regeneration. Transport & development proposals will be integrated (BCC)	The project specifically provides the transport infrastructure to assist the regeneration and development of South Bristol.
Integrate transport networks to allow a wide choice of modes to jobs, homes, services & facilities. (NSC)	The project supports access to jobs, homes, services and facilities (facilitating regeneration and growth), offering a wide choice of transport modes.

Regional support

The West of England sub-region is the promoter of the South Bristol Link and local authorities and other key stakeholders attend regular meetings of the Project Board. The South Bristol Link is identified in the Regional Funding Allocation.

A full description of the Strategic Case is set out in Chapter 2.

0.5 VALUE FOR MONEY AND APPRAISAL CASE

The appraisal demonstrates the strength of the case for the Scheme with a Benefit-Cost Ratio (BCR) of around 5.8, meeting the Department for Transport's (DfT) criteria for high value for money schemes (BCR>2:1).

0.5.1 Transport Modelling

The South Bristol Link (SBL) has been assessed using a specifically updated version of the Greater Bristol Transport Study model (G-BATS3). This is a multi-modal transport model, consisting of a highway assignment model, a public transport assignment model and a demand model.

The G-BATS3 model has been developed in consultation with the DfT and its advisers, and was used for the Rapid Transit Ashton Vale to Temple Meads MSBC submitted to the DfT in March 2009. The SBL methodology adopts a two-stage modelling process combining the strengths of the existing G-BATS3 demand model (the 'higher stage') and new, more detailed assignment models (G-BATS3 SBL) for the SBL local area (the 'lower stage'). The new

lower stage model has been validated to a 2009 base year. It includes updated highway and public transport networks, and new demand matrices using recently collected highway and public transport survey data.

The SBL model has been developed by the Councils' modelling and appraisal term consultant, Atkins, in consultation with The Denvil Coombe Practice.

0.5.2 Model Forcasting

Transport forecasting is a three-stage process. The first stage requires the generation of future year travel demand and is referred to as the 'reference case'. The second stage requires known changes in the supply of transport to be incorporated into the model, and is referred to as the 'without-intervention' case'. The final stage is to add the transport intervention under consideration, and this is referred to as the 'with-intervention case'.

The Preferred Scheme and Lower Cost Option with-intervention cases have been assessed in two forecast years (2016 and 2031) against the without-intervention case. In addition a number of sensitivity tests have been carried out.

0.5.3 Scheme Impacts

The Preferred Scheme gives significant reductions in total vehicle delay, particularly in the evening peak. There is a small increase in the total distance travelled.

The link provides reductions in traffic on the B3103 Barrow Gurney, A3029 Winterstoke Road, A38 through Bedminster and on local roads to the north of the scheme. Increased traffic flows are predicted on the A370 east of the scheme.

There are a total of 79 passengers boarding the SBL Rapid Transit service on the new section between Hengrove Park and the Long Ashton Park & Ride site in the AM peak hour in 2016, rising to 130 by 2031.

0.5.4 Cost Benefit Analysis

The headline figures for the Preferred Scheme are:-

- The scheme outturn cost (present value of cost) is £59.6m
- The modelled scheme benefits (Net Present Value) are £285.9m.
- The resultant Benefit Cost Ratio is 5.79 and represents 'very high' value for money.

0.5.5 Risk Assessment and Optimism Bias

A Quantified Risk Assessment (QRA) has been undertaken for the Preferred Scheme and the Lower Cost Option to support this bid for Programme Entry.

An allowance for the additional cost of mitigating the risks identified has been included in the overall scheme costs.

DfT recommend the level of optimism bias for highway schemes at Programme Entry should be 44%. Therefore a 44% uplift has been applied to all applicable costs.

0.5.6 NATA Assessment

The Appraisal Summary Tables [ASTs] 1 and 2 at the end of this summary show the main impacts of the scheme. The main issues related to the Preferred Scheme are:-

- Environmental – The impact on Landscape and Townscape elements have been appraised as Moderate Adverse; impacts on Biodiversity are appraised as Slight Adverse; impacts upon Historical Heritage are considered Slight Adverse; impacts on the Water Environment are assessed as Slight Adverse; impacts of Physical Fitness are considered Moderate Beneficial; impacts upon Noise is Negligible; a Decrease in Carbon is predicted in the opening year.

- Safety – An Increase in Personal Injury Accidents is expected due to the increase in overall vehicle kilometres travelled. The scheme has a Moderate Positive effect in terms of improvements to security;

- Economic – the scheme would underpin the regeneration of South Bristol and facilitate the proposals in the emerging Core Strategies.

- Accessibility – the scheme would improve accessibility in terms of option values, severance and access to the transport system;

- Integration – the scheme would contribute to a wide range of local, regional and national objectives, with some local adverse impacts as discussed in Environmental (above).

0.5.7 Sensitivity and Scenario Analysis

Sensitivity tests have been undertaken on Low Growth (without-intervention and with intervention) and Highway Model Sensitivity Tests. No public transport sensitivity tests have been undertaken at this stage.

0.5.8 Supporting Information

An analysis of **Distribution and Equity** issues has been undertaken. The main impacts of the South Bristol Link are:-

- improving access to the transport system by non-car modes,

- promoting social inclusion by improving access to key services and new employment opportunities for all social groups.

An **Affordability and Financial** review of the scheme shows that it could be delivered using a combination of council capital funding, developer contributions and RFA funding. Highway and Rapid Transit maintenance costs would be funded by the councils and potentially by access fees payable by commercial bus service operators.

An assessment has been made of the project's **Practicality and Public Acceptability**. The project is deliverable technically, legality, politically and in terms of funding and phasing. The project could be influenced by progress with complementary projects such as Ashton Vale to Temple Meads and Hengrove Park to North Fringe. Public views of the scheme are split; despite local support there is opposition from environmental groups and households adjacent to the scheme. Key stakeholders including business and local transport operators are supportive.

The project fits well with the **Ten Year Plan Targets.**

0.5.9 Overall Value for Money Conclusion

The overall scheme Benefit Cost Ratio (BCR) compares the monetised present value benefits with the present value cost of the scheme. The Overall BCR for the scheme at 5.8 represent high value for money according to the DfT guidance Moreover, the Appraisal Summary Table showed that the scheme contributes strongly to other non quantified objectives and does not have any severe adverse environmental impacts.

A full description of the Value for Money and Appraisal Case is set out in Chapter 3.

0.6 DELIVERY CASE

0.6.1 Governance

The West of England authorities have joint working arrangements as summarised below.

<u>West of England Partnership Board</u>

The Board (the Partnership) is a cross-party member and strategic partner board. The role of the Partnership is to realise improvements in The West of England's economy, public infrastructure, environment and quality of life. It sets the long-term direction to support the development and the delivery of key strategies. It ensures appropriate delivery arrangements and performance management frameworks are in place.

Joint Transport Executive Committee

The Joint Transport Executive Committee has been established comprising the four Executive Members of the Unitary Authorities with responsibility for transport. This arrangement has been legally constituted via a Joint Working Agreement. Committee Members exercise their executive powers collectively. The committee is responsible for developing and recommending sub-regional policy. It is the political decision making body. It ensures the delivery of the transport elements of the Multi-Area Agreement.

Joint Scrutiny Committee

The Joint Scrutiny Committee supplements the cross-party member and strategic partner engagement and contribution made at the Partnership. The committee provides specialist advice and recommendations to the Partnership and scrutinises proposals under consideration and the implementation of proposals approved.

Proposed Joint Delivery Vehicle

It is the West of England's intention to establish a Joint Delivery Vehicle, and this would be the preferred option for delivery of major transport schemes in the sub-region. However, pending its introduction, the proposed governance for delivery of the South Bristol Link is set out below.

South Bristol Link Governance Structure

North Somerset would be the lead authority, working in a close contractual relationship with Bristol City Council and with support from the sub-region; both at Project Board and Delivery Team levels (discussed below). North Somerset's Project Management Method is based on the Office of Government Commerce's (OGC's) project management method PRINCE2 (PRojects IN Controlled Environments 2) which forms the basis of management methods used by all the West of England Authorities.

Project Board

The Project Board guides and steers the progress of the scheme and is responsible for its delivery. The Board authorises the project plan and will authorise strategic decisions or seek the authority of the JTEC. It includes representatives of the West of England authorities, the Government Office for the South West (GOSW), South West Regional Development Agency (SWRDA) and the West of England Partnership Office (WEPO) and the Highways Agency (HA). The Board was formed at the start of the project in October 2006 and has met approximately every three months.

Senior Responsible Owner

The Senior Responsible Owner [SRO] for the South Bristol Link is the North Somerset Council Assistant Director, Development and Environment, Karuna Tharmananthar. The SRO has overall responsibility for ensuring that the project meets it objectives and delivers the projected benefits within the time, cost and quality parameters. The SRO is the Chair of the Project Board.

The Project Manager

The Project Manager is responsible for delivering the Project in line with the agreed controls and procedures set out in the Project Initiation Document. The PM is responsible for the highest possible level of compliance with the relevant investment and project management approaches including third parties' processes. The primary focus of the PM is to ensure that the Project is delivered on time, within specification and budget.

Project Delivery Team

The PM would be supported by a Project Delivery Team, which includes the requisite range of experience required to take the South Bristol Link to Full Approval and then to implement it. The Team would consist of Bristol and North Somerset Council officers and term transport planning and design consultants

0.6.2 Risk Management

Risk management is the process of identifying risks, evaluating their potential consequences and determining the most effective methods of controlling and/or responding to them.

Three risk workshops have been held for the Scheme to date. Each has involved a range of expertise, including representatives of consultants, other authorities and the Highways Agency. At these workshops the evolving Risk Log was reviewed. Quantified Risk Assessments were then undertaken for the Preferred Scheme and Lower Cost Option to support this bid for Programme Entry.

The risk log and register will be used throughout the preparation and delivery of the Scheme to manage project risks and mitigate them wherever possible. It will be regularly reviewed and updated in order to ensure actions necessary to mitigate risks are being implemented.

0.6.3 Stakeholders

A Communication Plan was prepared at the outset of the project and has been maintained as preparation work has progressed. A wide range of stakeholders have participated in the development of South Bristol Link to-date, including residents, council members, officers, town and parish councils,

local businesses, transport operators, statutory consultees, interest groups, developers and land owners.

Two public consultations on the South Bristol Link were undertaken: in Autumn/Winter 2008/2009 and at the end of 2009. Further consultation will be an integral part of project preparation as scheme designs are worked up and the requisite permissions sought.

0.6.4 Scheme Monitoring and Evaluation

An impact evaluation will be carried out to measure both the positive and negative impacts of the scheme. The aim of the evaluation would be to assess the performance of the scheme in achieving the original objectives as set out in 0.4 above. The monitoring methods will be determined based on these objectives and will be a mix of existing proxy indicators and new indicators using bespoke surveys.

0.6.5 Assurance

An arrangement has been established across the West of England sub-region to provide Quality Assurance. The approach for South Bristol Link Quality Assurance arrangements will operate in the form of:

- Individual investigation by the Project Board's QA nominee.
- A Strategic Review Group reporting to the Joint Transport Executive Committee;
- An internal 'challenge' by a Peer Review Group;
- External Quality Reviews convened at the discretion of the Project Board.

The Joint Scrutiny Committee has also been presented with regular progress reports and scrutinised the draft report that was submitted to the Joint Transport Executive Members. The scrutiny function ensured that additional detail was provided for Executive Members prior to their recommending that the bid should be taken forward.

DfT guidance recommends that a Gateway Review be undertaken for schemes with a total cost of £50m or more and the councils recognise Gateway Review as a good project management practice. Four Gateway Reviews are programmed throughout the project's life at key milestones. The first Gateway Review is planned to take place after submission of this bid in early summer 2010. The timetabling of the remaining Reviews is included in the project programme included in Appendix 4.1

A full description of the Delivery Case is set out in Chapter 4

0.7 COMMERCIAL CASE

0.7.1 Outline Procurement Strategy

The procurement of the scheme involves the following major work streams:-

- Infrastructure (e.g. rapid transit busway; carriageway, structures)
- Hardware systems (e.g. ticket machines);
- Rapid Transit services (e.g. vehicles and operation of vehicles);
- Client-side management of the Rapid Transit operation.

Infrastructure

Procurement of the civil engineering elements of the project will be under a Design and Build model with a single contract anticipated as covering all the main works. The details of our selection of Design and Build model in favour of other models, such as Early Contractor Involvement, are set out in Chapter 5.

The authorities are currently exploring the advantages of a Joint Delivery Vehicle as described above. Given a situation where Programme Entry is confirmed and the JDV is not in place the authorities have a proven record of delivering cross-boundary civil engineering projects and similar arrangements would be put in place. For South Bristol Link, North Somerset Council would be the lead authority with the project team including officers from Bristol City Council. A contract between the local authorities will be put in place to define roles and responsibilities.

Hardware, rapid transit services and client-side management

The proposed Rapid Transit link between Long Ashton Park & Ride and Temple Meads is well advanced, a bid having been submitted in 2009 and work proceeding with Transport & Works Act documentation. The Rapid Transit element of South Bristol Link is effectively the extension of this service and, in practice it will be operated as an integral part of it.

Subsequent to submission of the Ashton Vale to Temple Meads Major Scheme Business Case, work on that project has continued to examine options and define the preferred methods of procurement for vehicles and associated hardware and services. Also, work has continued to define the most appropriate way to manage the route and arrangements for providing access to the route for existing public service buses. The Ashton Vale to Temple Meads Rapid Transit scheme is thus establishing the groundwork for the most suitable procurement and operational standards for the whole network, of which the South Bristol Link will form a part.

A full description of the Commercial Case is set out in Chapter 5

0.8 FINANCIAL CASE

0.8.1 Cost Estimates

Estimates of works costs have been prepared for the Preferred Scheme and Lower Cost Option based on widespread experience of similar works, using item rates and preliminary estimates of quantities. The capital cost estimate has been calculated using Q3 2009 prices.

The total capital cost estimate for the Preferred Scheme including risk is £41.156 million at current prices (2009).

The total capital cost estimate for the Lower Cost Option is £37.602 million at current prices.

The capital cost estimates have been independently reviewed.

0.8.2 Quantified Risk Assessment

Quantified Risk Assessments have been undertaken for both the Preferred Scheme and Lower Cost Option. These assessments have predicted the likely level of confidence that funding will be sufficient to cover the construction of the Scheme with due allowance made for risks. The QRAs are confined to the capital cost elements of the scheme and the construction programme from the present day to the Scheme opening. Risks to operational revenues, costs or performance have not been quantified at this stage.

0.8.3 Treatment of Inflation

Following discussions with the DfT an inflation figure of 2.7% has been assumed for construction and all other costs up to and including 2014/15. After that and for 30 years 6% is assumed for construction costs with all other costs at 2.7%. It is not considered that inflation assumptions would differ between the Preferred Scheme and the Lower Cost Option.

These inflation rates have been applied to the current cost estimate assuming start of construction early in 2015 and lasting 2 years. The resulting out-turn costs are set out in the following table.

0.8.4 Preparatory Costs

Preparatory costs have been prepared on the basis of known costs for existing arrangements, estimates from the project manager on likely costs and benchmarking with other major schemes to understand the relative level of investment in scheme development. It is not considered that preparation costs would differ significantly between the Preferred Scheme and the Lower Cost Option.

0.8.5 Total Quantified Cost Estimate

The breakdown of the Quantified Cost Estimate (total capital cost and preparatory cost estimates) for the Preferred Scheme is provided in Table 0.1

Table 0.1 Total Quantified Cost Estimate (outturn prices, £m) Preferred Scheme

Costs	Total (All Costs)	Total (Only Eligible Costs)	Local Contribution (non-eligible Costs)	Local Contribution (Eligible Costs)	Local Contribution (All Costs)	DfT Contribution	Total Local Contribution (All Costs)	DfT Contribution
	£m	£m	£m	£m	£m	£m	%	%
Preparatory Costs	6.920	5.910	1.010	2.955	3.965	2.955	57.30%	42.70%
Capital Costs	50.466	50.466	0	3.104	3.104	47.362	6.15%	93.85%
Total QCE	57.386	56.376	1.010	6.059	7.069	50..317		
% QCE (Eligible Costs)				10.75%		89.25%		
% QCE (All Costs)					12.32%	87.68%		

The breakdown of the Quantified Cost Estimate (total capital cost and preparatory cost estimates) for the Lower Cost Option is provided in Table 0.2

Table 0.2 Total Quantified Cost Estimate (outturn prices, £m) Lower Cost Option

Costs	Total (All Costs)	Total (Only Eligible Costs)	Local Contribution (non-eligible Costs)	Local Contribution (Eligible Costs)	Local Contribution (All Costs)	DfT Contribution	Total Local Contribution (All Costs)	DfT Contribution
	£m	£m	£m	£m	£m	£m	%	%
Preparatory Costs	6.920	5.910	1.010	2.955	3.965	2.955	57.30%	42.70%
Capital Costs	43.372	43.372	0.000	2.668	2.668	40.705	6.15%	93.85%

Costs	Total (All Costs)	Total (Only Eligible Costs)	Local Contribution (non-eligible Costs)	Local Contribution (Eligible Costs)	Local Contribution (All Costs)	DfT Contribution	Total Local Contribution (All Costs)	DfT Contribution
	£m	£m	£m	£m	£m	£m	%	%
Total QCE	50.292	49.282	1.010	5.623	6.633	43.660		
% QCE (Eligible Costs)				11.41%		88.59%		
% QCE (All Costs)					13.19%	86.81%		

0.8.6 Ongoing Financial Sustainability, Maintenance and Operating Costs

Forecast operating costs have been calculated based on modeled service running times and distances, with unit costs such as drivers' time, fuel and engineering costs accounted for. The size, composition and cost of extra vehicle fleets required for the provision of the services were also generated using this operating cost model.

The service extension from the Ashton Vale to Temple Meads line, to include the SBL rapid transit line, while providing an improved service for the user, was not anticipated to produce high revenues in proportion to the level of operating cost involved. Therefore analysis was undertaken to determine whether the SBL RT line might require any subsidy payments to be made to the operators in order to make it in their interests to run the service.

In isolation, the Rapid Transit Ashton Vale to Temple Meads line (RT2) is forecast to generate high levels of revenue for a relatively modest expenditure on operating costs. This demonstrates that on opening, the demand for the Ashton Vale to Temple Meads service will generate sufficient revenue to make running the service beneficial to the operator.

With the introduction of the SBL line as an extension to RT2, both services together generate enough revenue to be profitable to the operator, even in the SBL opening year.

The Authorities will pay for the infrastructure maintenance costs. Additional maintenance costs are £0.32 million per year (in the opening year, 2009 Q3

prices, without allowance for real inflation or optimism bias). These are related to the upkeep of the track, ITS and RTPI systems, bus stops and bridges.

0.8.7 Funding Sources

The South West Councils have approved £50.1million funding – £47.3 million towards capital construction costs and £2.8 million preparatory costs (outturn prices).

There are a number of anticipated developments in Bristol and North Somerset where contributions to the project would be appropriate and the Authorities are in discussion with relevant developers regarding potential contributions for infrastructure and /or services. Bristol International Airport have submitted a planning application to extend their operation, although not currently approved, it is anticipated that a significant contribution to the project will be made. At this Programme Entry stage, funding for the scheme does not presume Section 106 contributions will be available.

Bristol City Council and North Somerset Council have agreed to underwrite the £7.07million local contribution. As the scheme development work continues, the opportunities for meeting this local contribution will be explored and agreed with possibilities including LTP capital, Council Non Earmarked Capital and / or future Section 106 developer contributions.

0.8.8 Section 151 Sign-off

In accordance with DfT guidance for local authorities, the cost estimates for the scheme have been considered by each authority's Section 151 Officer.

The cost estimates for the scheme and the capacity of the authorities to meet expected and potential financial liabilities for the scheme have been confirmed. The signed declaration to this effect is included with the bid.

The full Financial Case is set out in Chapter 6.

0.9 CONLUSION

The South Bristol Link has a strong strategic case with its roots in the Greater Bristol Strategic Transport Study, which identified both Rapid Transit and Highway improvements as necessary to ensure the continued growth and development of South Bristol and the West of England.

The South Bristol Link is strongly placed to contribute to the 5 DaSTS Goals whilst meeting the objectives set out in the emerging Core Strategies. It is a regional priority for the South West and is endorsed by South West Councils and the Regional Development Agency.

With an opening date of early 2017, the South Bristol Link will contribute to the regeneration and growth of South Bristol, whilst reducing congestion on key

routes and improving accessibility to the City Centre and to Bristol International Airport.

0.10 APPRAISAL SUMMARY TABLE – PREFERRED SCHEME

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
ENVIRONMENT	**Noise**	At a relatively small number of properties there is a large noise disbenefit by the introduction of a new noise source. This is outweighed by a small noise benefit at a relatively large number of houses.	Estimated Population Annoyed Do-Minimum: 2415 Do-Something: 2359	Net population win / lose: -56 NPV: +£1,542,051
	Local Air Quality	There would be an overall improvement in local air quality with the Scheme in place within the Opening Year for both nitrogen dioxide and particulate matter. This improvement would remain unchanged within the Design Year. The variations in population exposure however for both assessment years, are predicted to be extremely small.	Assessment scores: NO_2: Opening Year = -1770; Design Year = -1559 PM_{10}: Opening Year = -461; Design Year = -287	Change in population exposure: NO_2: Opening Year = -0.07; Design Year = -0.08 PM_{10}: Opening Year = -0.02; Design Year = -0.01

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Greenhouse Gases	The Preferred Scheme leads to a decrease in Carbon emissions compared to the Do-Minimum (without South Bristol Link). Emissions decrease over time due to changes in the speed of vehicles and reduced travel times.	2018 – decrease in emissions due to the Scheme of 0.01%	Change in tonnes of C: 2018 = tonnes 78
	Landscape	Despite the existing baseline conditions and presence of local A roads, this relatively open landscape currently considered as typical rural urban fringe would be further fragmented and degraded with the addition of the Scheme.		Moderate Adverse
	Townscape	The strong 19th and 20th century suburban townscape would be likely to be adversely affected by the proposals, with changes to the scale, density and appearance of the area as a result of the Scheme. The proposals would be a prominent feature within the townscape affecting both character and visual amenity within the local area.		Moderate Adverse

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Heritage of Historic Resources	No direct effects to any designated heritage assets. Some minor changes to the setting of Castle Farm Grade II Listed Building may result from operation. Construction could result in physical loss of the potential archaeological resource, which are unlikely to be of substantial quantity or of greater than local importance. Construction would also result in changes to the form, pattern and character of a section of the historic landscape which is of low value. Adequate mitigation to prevent and/or reduce the significance of the predicted effects can be specified using standard techniques.		Slight Adverse
	Biodiversity	Direct habitat loss from a number of locally designated sites and impacts to nationally and internationally protected species including badgers, reptiles, breeding birds, otter, great crested newts and bats likely. Appropriate mitigation would reduce potential adverse impacts. Compensatory habitat as mitigation should be considered where the Scheme is likely to directly impact designated sites.		Slight Adverse

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Water Environment	Would cross several watercourses which would require culverting/bridging which may result in disruption/alterations to surface water flows and quality. Discharge of road drainage to surface water may also adversely impact quality. The Scheme would pass through several EA designated flood zones and the underlying soils predominantly have impeded drainage, so that additional runoff may exacerbate flooding in these areas. Potential impact to surface water flows and groundwater sustained habitats at construction. Groundwater quality may be adversely impacted through the infiltration of road runoff and from leachates from landfill.		Slight Adverse
	Physical Fitness	Increase of Physical Fitness by encouraging pedestrian and cycle journeys both over and under 30 minutes from the implementation of a cycleway and pedestrian route. In addition, the provision of lighting along the route would create a safe atmosphere so would appeal to a larger section of the public.		Moderate Beneficial

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Journey Ambience	Improvement in journey quality by improvements in Traveller Care, Views and Stress. The appraisal assumes that between 500 and 10,000 people would benefit from the Scheme on a daily basis. Improvements in Traveller Care by the provision of more facilities and cleaner services, and stress and route uncertainty are expected to diminish due to integrated design.		Moderate Beneficial
SAFETY	**Accidents**	Whilst the Preferred Scheme provides a new optimally designed alternative route, presenting a lower associated accident risk than the surrounding roads, an increase in PIAs and associated costs is expected. This is due to the increase in overall vehicle kilometres travelled within the study area and the expected accident increase is the result of very small incremental increases in accidents across many links.		PVB: - £22.2
	Security	High quality public transport infrastructure will provide a safer environment for passengers		Moderate Positive

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
ECONOMY	**Public Accounts**	The public sector experiences costs associated with construction, ongoing maintenance and loss of indirect taxation. The amount of indirect tax paid by road users decreases as a result of the reduction in vehicle operating costs. As the level of bus patronage increases with the scheme in place, there is further loss of tax income as no tax is payable on bus fares.		PVC = £59.637m PVB = £345.539m BCR = 5.77 (including accidents) NPV = £285.902m
	TEE: Business Users & Transport Providers	Users of all modes of transport receive timesavings as a result of the scheme. Savings in vehicle operating costs are also received for each class of highway user. Additional benefits will also be experienced as a result of the priority measures and improved crossing facilities and by cyclists through the construction of the cycle route.		PVB = £192.598m
	TEE: Consumers	Benefits are primarily received by highway users with over 90% of total being from road trips.		PVB = £174.623m

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Reliability	The RT priority measures and segregated route will provide improved reliability for bus /RT journeys. Reduced traffic on show-case routes will assist in improved reliability for other bus services.		Slight Positive
	Wider Economic Impacts	Contribution to the creation of some 5,600 FTE jobs close to the Scheme in Regeneration Area.		Moderate Beneficial
ACCESSIBILITY	**Option Values**	The scheme will increase the transport options available in the south west of Bristol		Moderate Beneficial
	Severance	The provision of walking and cycling routes along the alignment will offset any increase in severance caused by the route itself		Slight beneficial
	Access to the Transport System	The Rapid Transit element will improve accessibility to key facilities from an area characterised by low levels of car ownership		Moderate positive

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
INTEGRATION	**Transport Interchange**	The Rapid Transit element provides access to the greater Rapid Transit Network for those who do not, or choose not, to have access to a car. The Rapid Transit element improves sustainable access between the City Centre, South Bristol and Bristol International Airport. The highway element improves connectivity of the Primary Road Network, improving access between the city and Bristol International Airport. The cycling and pedestrian element improves access to the existing cycling and walking network, improving sustainable access between South Bristol and the City Centre for those who do not, or choose not, to have access to a car.		Moderate Positive
	Land Use Policy	The Draft Regional Spatial Strategy and Draft Bristol Core Strategy identify land within South Bristol for employment and housing use. SBL supports these land use policies by improving sustainable travel and highway access to these sites. The alignment of SBL is reserved in the Bristol City and North Somerset Local Plans.		Beneficial

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Other Government Policies	Communities & Local Government; Aids regeneration & sustainable economic development. Possible localised negative impacts on protection of the environment. Environment, Food & Rural Affairs; Possible localised negative impacts on protection of the environment. Health; Improved access to health facilities. Potential contribution to increase physical activity. Business, Enterprise & Regulatory Reform; Aids regeneration & sustainable economic development. Children, schools & Families; Increasing opportunities for access to education Innovation, Universities & Skills; Increase opportunities for access to education		Moderate Beneficial

South Bristol Link
Major Scheme Business Case

1
Scheme Description

The components of the South Bristol Link

1 Scheme Description

1.1 INTRODUCTION

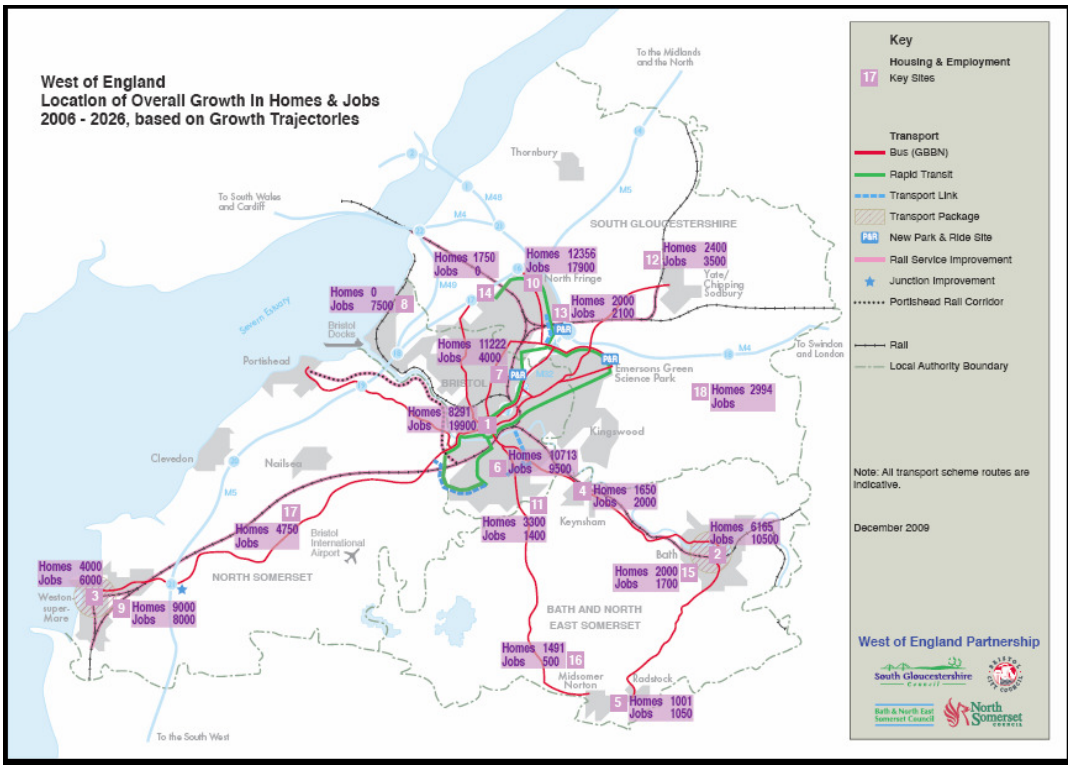
This Chapter gives an introduction to the South Bristol Link. It includes:-

- an introduction to **the West of England Partnership (WEP)**;
- an introduction to **South Bristol**;
- an introduction to **the Scheme**.

1.2 THE WEST OF ENGLAND

The West of England Partnership sub-region, which covers the four unitary authorities of Bristol, North Somerset, Bath & North East Somerset and South Gloucestershire, is the economic hub of the South West. The strong economy is set to continue to grow with currently emerging Core Strategies planning to deliver some 86,500 homes and 95,500 jobs up to 2026 in the context of the Draft South West of England Regional Spatial Strategy, which is yet to be finalised. Figure 1.1 shows the West of England, its major cities and towns and principal transport links.

Figure 1.1 – The West of England



The West of England faces significant transport challenges. Large scale housing growth and economic development over a number of years has not been accompanied by sufficient investment in transport infrastructure and this low level of investment, compounded by an unreliable public transport system, has resulted in high levels of congestion.

The West of England Partnership authorities are working together to deliver high quality transport infrastructure to reduce congestion and provide alternatives to the car, that are a realistic choice for the majority of trips. This will help meet the area's growing needs whilst safeguarding its environmental and economic future.

The West of England Partnership authorities are therefore promoting a series of Major Transport Schemes that, when delivered as a package, will improve public transport and reduce congestion whilst facilitating housing growth and economic development. These Major Transport Schemes are:-

- The Greater Bristol Bus Network
- The Bath Public Transport Package
- The Weston Package
- Rapid Transit – Ashton Vale to Temple Meads
- North Fringe to Hengrove Package
- **The South Bristol Link**
- Portishead Rail Corridor
- Bristol Metro Rail
- M5 Junction 21 bypass
- Callington Road Link
- Rapid Transit – Emersons Green to Temple Meads

These Major Transport Schemes are identified as priorities in the Regional Funding Allocation2 (RFA2). The South Bristol Link is one of these schemes.

1.3 SOUTH BRISTOL

For the purposes of this Bid, South Bristol is defined as the area shown below in Figure 1.2. The latest version of the Government's English Indices of Multiple Deprivation Index (2007) shows that much of South Bristol is amongst the 10% most deprived in the country and two areas are in the most deprived 1%.

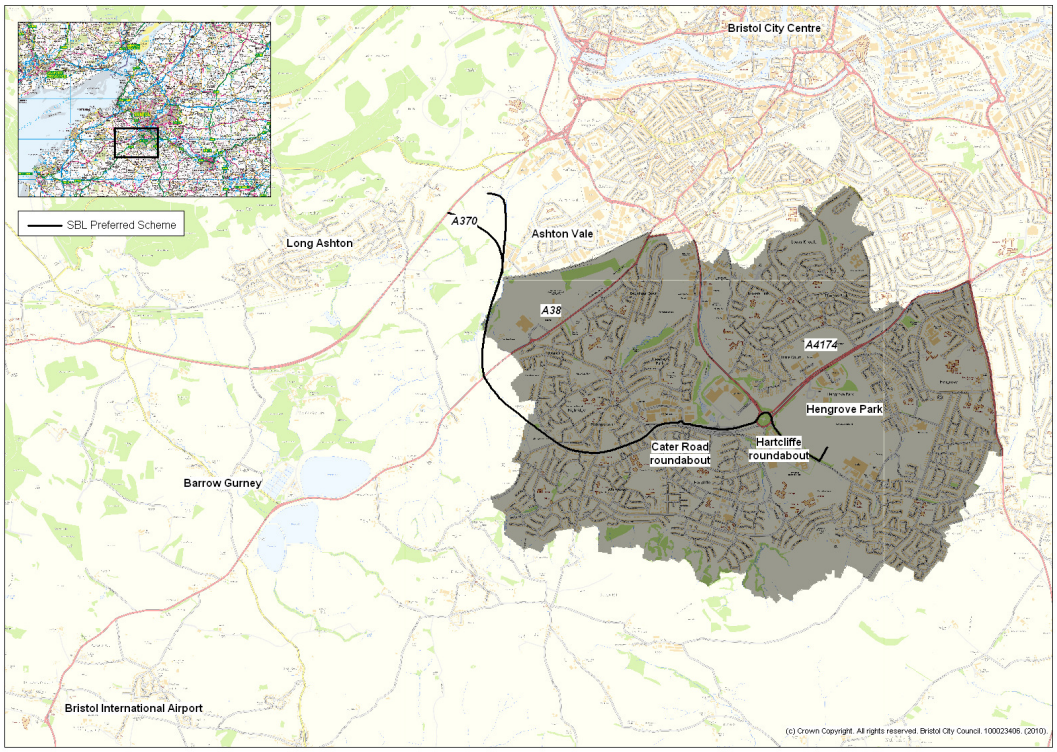
There are however a number of development and regeneration projects underway in and around South Bristol with the potential to create over 5,000 FTE jobs over the next two decades including a major development at Hengrove Park comprising:-

- a new campus including secondary school, college and skills academy;
- a new 60 bed community hospital;

- Leisure Centre.

South Bristol is also characterised by poor transport links and congestion. Whilst bus service frequencies between South Bristol and the city centre are very good, journey times are relatively poor largely due to congestion. For example, congestion in the city reduces the average peak hour speeds to 17.5mph (National Congestion Indicator 2008/09, DfT).

Figure 1.2 - South Bristol



The desire to overcome deprivation and stimulate regeneration in South Bristol has been a local authority ambition for decades. The 2006 Greater Bristol Strategic Transport Study (GBSTS) identified the requirement for a highway link between the A370 and the A38 and between the A38 and the A4174, all within South Bristol.

GBSTS informed the Joint Local Transport Plan, such that the scheme was included in the programme of major transport schemes. In turn, the then South West Regional Assembly identified the scheme as a regional priority for implementation before 2016 through the Regional Funding Allocation. This priority was further confirmed by the publication of RFA2, with construction between 2014 and 2017.

1.4 SCHEME DESCRIPTION

The South Bristol Link provides a transport link approximately 5km long between the A370 Long Ashton bypass west of Bristol and Hengrove Park in South Bristol. The link includes new and existing highway, new rapid transit and

adjacent segregated cycle and pedestrian route. The route follows an alignment that has been safeguarded in local plans for many years. Further detailed description is included in the following sections.

1.4.1 Scheme Objectives

The Scheme's local objectives were considered carefully at project inception, following preparation of an initial review of historic projects that were seen as relevant to the South Bristol Link. The objectives are:-

- to facilitate regeneration and growth in South Bristol;
- to reduce congestion in South Bristol and adjacent areas of North Somerset;
- to improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.

1.4.2 Preferred Scheme

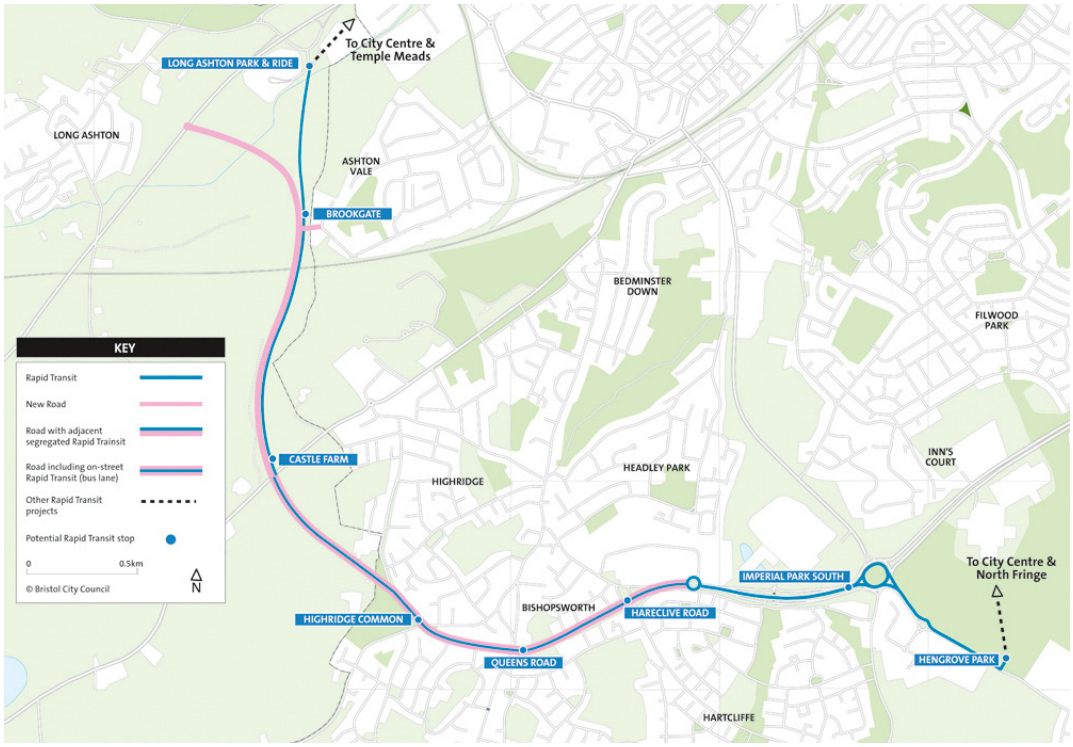
The Preferred Scheme has evolved through a comprehensive appraisal process as described in Chapter 2. It provides a solution that best meets national and local requirements and accords with DfT appraisal criteria. The scheme comprises four distinct elements each of which is needed in order to meet the objectives effectively:-

- extending rapid transit from Long Ashton Park & Ride site (Ashton Vale to Temple Meads Rapid Transit line) to the new Community Hospital, Campus and Leisure Centre at Hengrove Park in South Bristol;
- a single carriageway highway between the A370, the A38 and the existing A4174 at the Cater Road Roundabout;
- Cycling and pedestrian facilities parallel to the rapid transit and highway elements that will link to existing facilities;
- Traffic management measures on surrounding highways to maximise the benefits of the Scheme, by discouraging traffic from using less appropriate routes, and to accommodate increases in traffic predicted at key points in the network.

The rapid transit, highway and cycle and pedestrian elements will be constructed adjacent to one another, within the same corridor, except near the A370 where the highway and rapid transit elements diverge.

The scheme overview is shown in Figure 1.3. Detailed scheme drawings are attached in Appendix 1.2

Figure 1.3 - Overview of the South Bristol Link - Preferred Scheme



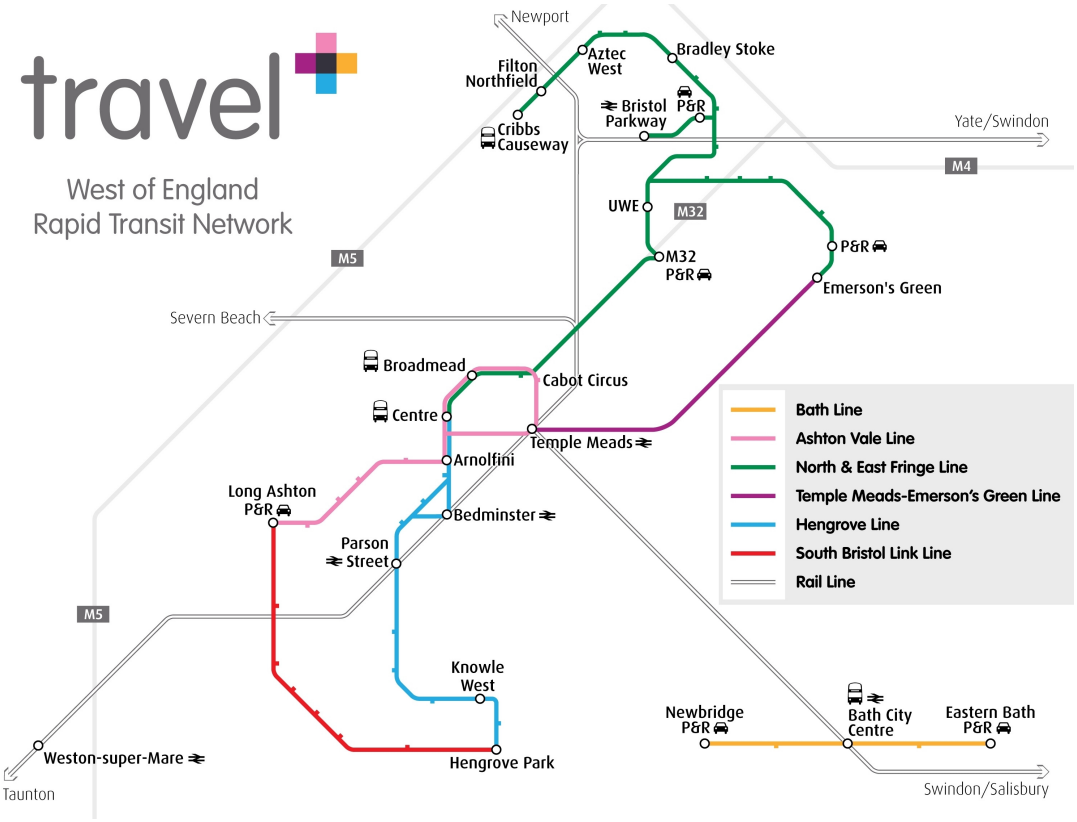
1.4.3 Rapid Transit - overview

In 2008 the West of England Partnership undertook a review of current mass transit technologies (tram, bus, etc) to establish which form is most appropriate for the Greater Bristol area. This concluded that for schemes in the Greater Bristol area a bus-based Rapid Transit system is most suitable. The executive summary of this review is included in Appendix 1.1.

Bus-based Rapid Transit as described in the GBSTS Final Report includes "the use of modern, spacious, low floor, articulated vehicles". It will provide a rapid, reliable, frequent and punctual form of public transport that will feature segregated 'busways', bus lanes and bus priority measures. Designed for long and short distance passengers, it will be easily accessible for all, with 'off-vehicle' ticketing that integrates with other forms of public transport in the area. Vehicles will be modern, low emission, and sustainable, designed for use on segregated routes for reliability and on road for longer distances.

A comprehensive network of Rapid Transit routes covering large areas of the city was identified in the west of England's Joint Local Transport Plan (2006/07-2010/11) and is included in the Regional Programme (RFA2). It consists of a number of corridors running via the city centre, connecting residential and employment areas with the shopping, leisure and transport hubs of the city centre.

Figure 1.4 - West of England RFA Prioritised Rapid Transit Network



In March 2009 the West of England authorities submitted a Major Scheme Business Case for the first of these Rapid Transit routes from Ashton Vale to Temple Meads via the city centre (pink in Figure 1.4). This route was recently granted Programme Entry. It should be noted that 'Temple Meads' is the main railway station within the city, offering services to London, the Midlands and the South West.

The Rapid Transit element of South Bristol Link (red in Figure 1.4) is the extension of the Ashton Vale to Temple Meads line.

It should also be noted that North & East Fringe line (green in Figure 1.4) and the Hengrove Line (blue in Figure 1.4) is being submitted for Programme Entry at the same time as South Bristol Link, as part of the North Fringe to Hengrove Package.

1.4.4 Rapid Transit – The South Bristol Link

The rapid transit element of South Bristol Link is segregated throughout. It includes both guided and unguided (on-street) sections. In operational terms it provides an extension of the service between Temple Meads and Long Ashton Park & Ride, with one in every three vehicles from the city centre continuing on to South Bristol.

The segregated guided "busway" section, running between Long Ashton Park & Ride and the A38, consists of two parallel concrete tracks (one in each direction). Within the busway the vehicles will be guided by concrete kerbs. This allows for a structure that is narrower than a conventional construction, it also

improves ride quality. This section will follow a route defined in the North Somerset Replacement Local Plan.

The segregated on-street section of rapid transit will continue eastwards linking the A38 to Hengrove Park, which is the focus of recent and proposed new development in South Bristol, as summarised under Section 1.3 and including new Community Hospital, Leisure Centre and education campus. It will also pass through some of the most disadvantaged areas of the city where levels of car ownership are well below average Bristol levels. The on-street section will use high profile central running bus lanes designed as part of the new highway construction, illustrated in Figure 1.5 below.

Figure 1.5 – Artist's impression of Rapid Transit central running within South Bristol.

The extension of the Ashton Vale to Temple Meads line will facilitate a new Rapid Transit service between the City Centre, Ashton Vale and Hengrove Park, running every 18 minutes during peak periods and every 24 minutes off-peak.

High quality Rapid Transit stops will be provided at the following locations, which will bring access to South Bristol Link services within 600m of approximately 4,700 households (1,600 without access to a car):

- Long Ashton Park & Ride (existing)
- Brookgate (for Ashton Vale and South Liberty Lane);

- Castle Farm (interchange with the Airport Flyer);
- Highridge Common;
- Queens Road;
- Hareclive Road;
- Imperial Park South;
- Hengrove Park (Hospital, Campus and Leisure Centre).

Whilst in early years the patronage on parts of this orbital service are forecast to be low (as described in Chapter 3), it is important to recognise the scheme as forming the outer extension to a Rapid Transit service that will be very busy as it approaches the City Centre. Also as new development proceeds in South Bristol it is essential that good public transport provision is in place at the outset, so that new residents, workers and visitors have a realistic alternative to using cars. As Rapid Transit patronage grows in response to new development and changes in travel choices, this element of the South Bristol Link will be viewed as a necessary component of the wider public transport network.

In addition to the above service which forms the basis of the Rapid Transit service proposed within this bid, it is anticipated that a Rapid Transit service will continue westwards, along the A38, to Bristol International Airport (BIA), just 6km away. This extension is not included as part of this bid but is identified as an aspiration in the JLTP. Furthermore BIA has clearly indicated that it would find the route attractive in order for it to provide a superior public transport service between the airport, the City Centre and Temple Meads station.

The current 'Airport Flyer' coach service is an existing service between the airport and Bristol city centre, which is delayed at peak times on congested urban roads. With the proposed rapid transit network, it is anticipated that a new fleet of high quality Rapid Transit type vehicles will operate from the airport joining the segregated guided section of the South Bristol Link at the A38 junction and travel into the city centre via the Link and Ashton Vale to Temple Meads routes, gaining considerable improvements in journey time reliability.

This extension of the South Bristol Link is given added credence because Bristol International Airport has recently submitted a planning application to North Somerset Council to increase its passenger numbers to 10 million passengers per year. The application includes for increased frequency of the Airport Flyer service and, if approved, as passenger numbers approach this level, the Airport Flyer will increase its frequency to a service every 10 minutes between the Airport and city centre, running via the South Bristol Link and Ashton Vale to Temple Meads route.

There will be a Rapid Transit stop at Castle Farm at the junction of the South Bristol Link and the A38. This stop is important because it allows passengers to interchange between Rapid Transit services (from South Bristol) and the Airport Flyer, thereby bringing an additional 9,800 households within a 40-minute public transport journey of the Airport, compared to current provision. With the Airport expected to expand over the next few years this offers an improved and sustainable transport link between new jobs and the high unemployment areas

of South Bristol, as well as for air passengers travelling to and from areas south of Bristol.

1.4.5 Highway

A new roundabout junction, with dedicated slips for dominant traffic movements, will be constructed on the A370 near Long Ashton. From this roundabout, a single-carriageway, two-way, 40 mph, highway will run south-eastwards for approximately 1.5km to meet the A38 at another roundabout, which will be constructed with partial signal control to enable priority for Rapid Transit vehicles. This alignment will follow a route defined in the North Somerset Replacement Local Plan.

Between the A370 and the mainline railway (discussed below) a signal controlled junction will give access to Ashton Vale, an area that includes both residential areas and industrial premises along South Liberty Lane. This connection is important in improving vehicular access to this area, thereby facilitating regeneration, and providing an alternative to the unsuitable junction currently providing access from Winterstoke Road.

Between the A370 and A38 the highway element (together with the rapid transit, cycle and pedestrian elements) will pass beneath the Bristol to West Country main railway line, where a new underpass structure will be built to carry the South Bristol Link under the railway embankment.

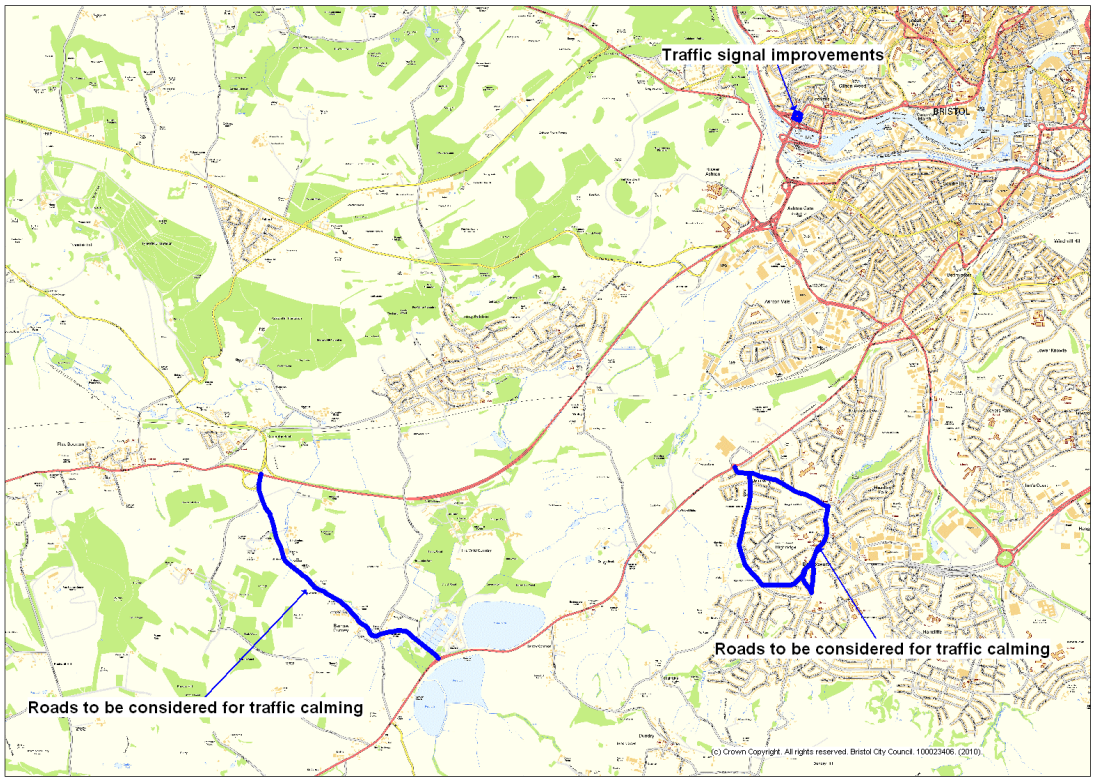
Between the railway and the A38 the new road will climb the Colliter's Brook Valley, where a separate southbound climbing lane will be provided.

From the A38 a single carriageway, two-way, 30 mph, highway will continue eastwards for approximately 2.5km; crossing the northern edge of Highridge Common and then following King George's Road before entering a reserved corridor to join the existing A4174 at Cater Road Roundabout. This alignment is defined in both the North Somerset Replacement Local Plan and the Bristol City Local Plan. Traffic signal junctions will be provided at the junctions with:-

- Highridge Green / Highridge Road / King George's Road;
- Queen's Road;
- Hareclive Road.

Construction of the highway element will reduce traffic flows on several key routes in the surrounding area. Traffic management measures will be installed on surrounding highways to maximise the benefits of the Scheme, by discouraging traffic from using less appropriate routes. The routes where these measures are proposed are shown on Figure 1.6. As the project moves towards Conditional Approval the councils will develop designs and undertake further consultation with residents and businesses in the vicinity of these routes to devise appropriate measures. Given anticipated growth in traffic flows on the southwest approach to Bristol over the Cumberland Basin, it is also expected that complementary traffic management will be necessary to enhance local capacity. This will be in the form of more up-to-date traffic signal control, better to manage the conflicting demands at junctions on this approach to the city.

Figure 1.6 – Locations of complementary traffic management measures



1.4.6 Cycling and Pedestrian Infrastructure

A segregated, 4m wide, surfaced, cycle and pedestrian path will be constructed parallel to the highway and rapid transit elements along the full length of the scheme. At the northern end of the Link near the A370, where the highway and rapid transit elements diverge, the cycle and pedestrian paths will split and follow both alignments. Cyclists and walkers heading for Bristol will be able to continue on and into the city using the dedicated pedestrian and cycle route that will be a part of the Ashton Vale to Temple Meads Rapid Transit scheme.

At the A370 the new infrastructure will connect with the Nailsea – Long Ashton – Bristol cycle and pedestrian route, programmed for construction in the summer of 2010. Connection will be via an existing Public Right of Way (PROW) crossing an agricultural bridge, avoiding the need for an at-grade crossing of the A370. Other PROW in Ashton Vale that cross the line of South Bristol Link will do so via uncontrolled crossings, with minor diversions where appropriate; for example to maintain DDA compliant gradients.

At South Liberty Lane a connection will be made to the existing highway infrastructure.

At the A38 roundabout a signalised crossing facility will be provided.

Within the urban area of South Bristol the cycle and pedestrian path will continue along the north side of the alignment, with connections to existing nearby footways and cycleways.

1.4.7 Lower Cost Option

Selection of the Lower Cost Option

The Lower Cost Option has been developed following wide-reaching consideration of possible variations to the Preferred Scheme.

A single alternative to the Preferred Scheme, rather than both a Next Best and Lower Cost options, as referred to in guidance, has been identified. This follows discussion with DfT where it was agreed that, given the topographic and other constraints and issues of deliverability, a single alternative to the Preferred Scheme was considered to be sufficient, provided clear reasoning was presented to explain its development.

The process of selecting the Preferred Scheme has followed DfT guidance, starting from a set of considered objectives and production of a long-list of possible schemes, with subsequent short-listing through workshops, public and stakeholder consultation and a series of political endorsements. This process is described fully in Chapter 2

To be credible and acceptable, any alternative scheme must both meet the scheme objectives and be deliverable. However, less than complete satisfaction of the scheme objectives might be acceptable, if the cost saving was significant and better value for money was achieved. This principle has been adopted in seeking to identify a viable Lower Cost Option.

A radically lower cost scheme, such as not building part of it, would fail because it would fail to meet key objectives. For example, not building the section between A38 and A370, or not building new highway between A38 and Cater Road roundabout would fail to deliver the regeneration or accessibility objectives of the project. Indeed, a scheme that delivered only a new highway linking A38 and A370 was submitted to DfT in 2002, but was rejected partly because it was considered not to help local regeneration and development requirements.

Significant cost savings and potential improvement of Benefit-Cost Ratio might also arise if the rapid transit component were dropped from either or both sections of the scheme. At first sight this may seem an attractive means of reducing cost, given generally lower public transport patronage on orbital rather than radial services. Three main factors have influenced the decision not to remove public transport from all or any part of the route:-

- Firstly the relatively low levels of car ownership in communities nearest the scheme means that a road on its own would not provide good access, and would thereby limit employment opportunities for some of those who are intended beneficiaries.
- Secondly, in order to provide an alternative to car use, which meets one of the scheme's key objectives of reducing congestion, it is essential that non-car options are available.

- Finally, it has become clear through the consultation process that a scheme that does not include comprehensive provision of high quality public transport will not be acceptable; i.e. it would not be deliverable.

The option of downgrading from Rapid Transit vehicles to conventional buses has been considered and, because there is considerable cost-saving, it has been assumed that the Lower Cost scheme would employ conventional, albeit high specification, vehicles. These can link satisfactorily to the Rapid Transit scheme being developed to run from Ashton Vale to Temple Meads and from the North Fringe to Hengrove Park, in the same way as other conventional buses will be able to use RT corridors, subject to meeting operational criteria.

It is apparent from the above that the radical cost-saving measures of either abandoning part of the route or dropping the rapid transit component are not considered to be viable options.

Turning to the question of a lower cost alternative on a different alignment: for the sections between A370 and A38, and between the A38, Cater Road roundabout and Hengrove Park, numerous alternative routes have been considered for this project and previous similar studies, as reported in section 2. The two route options that came out of the short-listing process were further developed and considered in recent studies before ultimately being reduced to one preferred route (a marginally more expensive one) because of issues of planning risk, and the need for linkages to the existing urban area and existing development sites. In short, the route alignment is essentially fixed because there are environmental and topographic constraints, and risks associated with other routes that rule them out. Short-listing and confirmation of the route has effectively ruled out variants on alternative alignments.

The lower cost option is thus defined in terms of its length, its route and the modes that are catered for. Options for reducing costs are severely curtailed, and are limited to details such as relatively localised variations to the route and its junctions, and variations to the form of Rapid Transit.

Description of the Lower Cost Option

This section sets out the differences between the Preferred and Lower Cost options.

At the junction with the A370 a roundabout will be constructed, however it will not include dedicated slip roads. This will reduce cost but also potentially affect journey time reliability, particularly during periods of peak demand.

The primary cost difference is derived from the removal of the guided Rapid Transit busway between Long Ashton Park & Ride and the A38. It would be replaced with conventional nearside running bus lanes on the highway alignment. The consequence is the removal of the direct link to the Ashton Vale to Temple Meads Rapid Transit line. This would lead to bus services needing to negotiate the South Bristol Link/A370 roundabout; join the existing A370 for approximately 1km; and then negotiate the existing A370/B3128/Park & Ride gyratory in order to access the Ashton Vale to Temple Meads line. This would be likely to incur additional journey times and loss of journey time reliability.

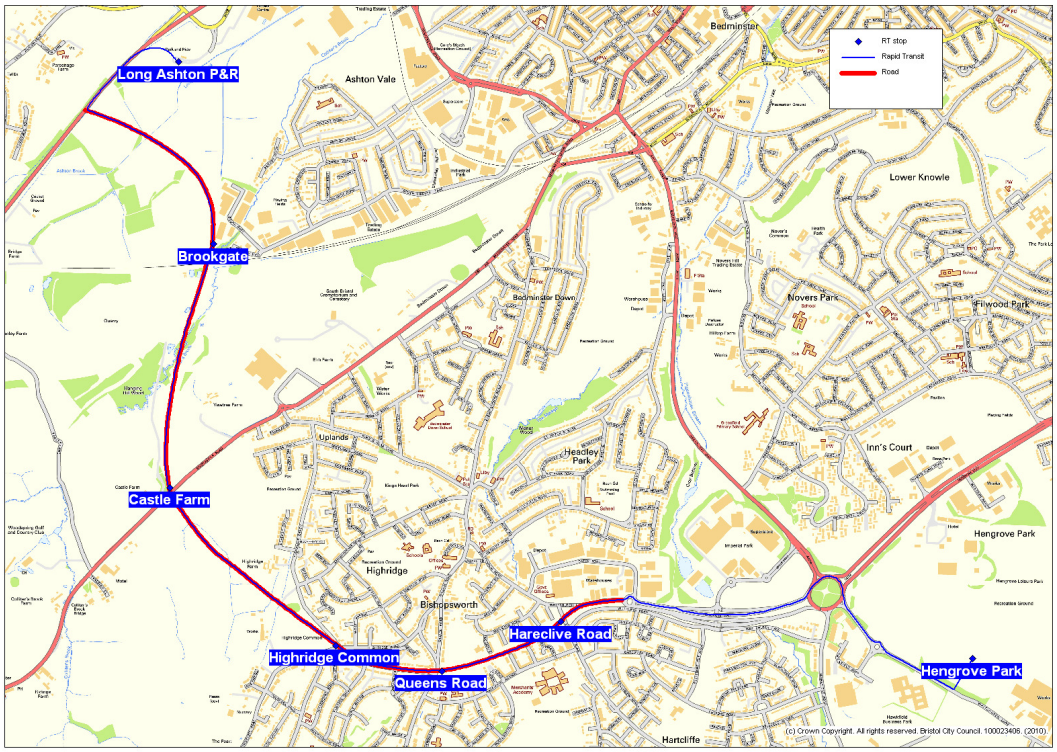
Between the A370 and A38 the southeast bound climbing lane through the Colliter's Brook valley would be removed. This will reduce cost but may also affect journey time reliability.

At the junction with the A38 the Preferred Scheme roundabout would be retained. However, the traffic signal control that gives Rapid Transit priority would be removed. This would reduce cost, but there is the risk of reduced journey time reliability.

Between the A38 and the Hartcliffe roundabout the high-profile Rapid Transit central running lanes would be replaced with traditional nearside bus lanes. This would allow stops to be constructed adjacent to the highway, rather than in the centre. This in itself would give a cost saving; and the stops themselves would also be constructed to a lower specification.

Conventional buses, similar to those proposed for the North Somerset bus services that are already intended to use the Aston Vale to Temple Meads RT Link, would be procured to operate the SBL RT element. This would give an operational costs saving.

Figure 1.7 – Lower Cost Option Layout



A full set of Lower Cost Option drawings is included in Appendix 1.3

1.4.8 Phasing

The proposed phasing of the project to full operation is as follows:-

- September 2010 Programme Entry
- September 2010 – June 2012 Preparation for Statutory Process
- June 2012 – December 2013 Statutory Process
  including public enquiry, planning consent and compulsory land purchase.
- March 2013 – July 2014 Design & Build contractor procurement
- December 2013 bid for Conditional Approval
- January 2014 Conditional Approval
- July 2014 Full Approval
- January 2015 Construction start
- January 2017 Programme Complete

The full detailed project programme is included in Chapter 4, Appendix 4.1.

1.4.9 Procurement and Operation

The authorities, working closely as part of the West of England Partnership, have established a robust project governance structure, which is set out in

chapter 4. This structure establishes clear lines of responsibility with decision-making, scrutiny and advisory roles properly defined.

The procurement of the scheme involves the following major work streams:-

- Infrastructure (e.g. rapid transit busway; carriageway, structures)
- Hardware systems (e.g. ticket machines);
- Rapid Transit services (e.g. vehicles and operation of vehicles);
- Client-side management of the Rapid Transit operation.

Infrastructure

Procurement of the civil engineering elements of the project will be under a Design and Build model with a single contract anticipated as covering all the main works. The details of our selection of Design and Build model in favour of other models, such as Early Contractor Involvement, are set out in chapter 5.

The authorities are currently exploring the advantages of a 'Joint Delivery Vehicle' [JDV]. The purpose of the JDV is:-

- to provide consultancy services to the West of England authorities on the best means of specifying individual major infrastructure projects - transport, municipal waste management and homes and communities - once they are financed and approved;
- once specified, to ensure the delivery of major infrastructure projects within the agreed timescales, specification and budget, by effective commissioning; and
- to ensure high quality project management.

The move to a JDV would be a significant step in the evolving shared governance arrangements in the West of England. This vehicle would become the preferred option for delivery of major transport schemes in the sub-region. However, the JDV is not yet in place.

Given a situation where Programme Entry is confirmed and the JDV is not in place the authorities have a proven record of delivering cross-boundary civil engineering projects and similar arrangements would be put in place. For example, the Greater Bristol Bus Network is currently delivering infrastructure across the sub-region with legal arrangements in place to allow South Gloucestershire Council to act as the lead authority. For South Bristol Link, North Somerset Council would be the lead authority with the project team including officers from Bristol City Council. A contract between the local authorities will be put in place to define roles and responsibilities.

Hardware, services and client-side management

The proposed Rapid Transit link between Long Ashton Park & Ride and Temple Meads is well advanced, a bid having been submitted in 2009 and work proceeding with Transport & Works Act documentation. The Rapid Transit element of South Bristol Link is effectively the extension of this service and, in practice, it will be operated as an integral part of it. Thus, although this bid, and all the supporting work that accompanies it, is for the South Bristol Link as a standalone scheme, in reality the rapid transit part of it is seen as a development of the first route. In other words, the Ashton Vale to Temple Meads route will be the first Rapid Transit route in an integrated and comprehensive network of routes planned across the greater Bristol area.

Subsequent to submission of the Ashton Vale to Temple Meads Major Scheme Business Case, work on that project has continued to examine options and define the preferred methods of procurement for vehicles and associated hardware and services. Also, work has continued to define the most appropriate way to manage the route and arrangements for providing access to the route for existing public service buses. The Ashton Vale to Temple Meads Rapid Transit scheme is thus establishing the groundwork for the most suitable procurement and operational standards for the whole network, of which the South Bristol Link will form a part.

In developing the procurement and business model for the Ashton Vale to Temple Meads service it is anticipated that the extension via the South Bristol Link becomes an integral element of the former scheme. Further detail is contained in Chapter 5.

1.5 APPENDICES TO CHAPTER 1

Appendix 1.1 Rapid Transport Technology Review – Executive Summary; Steer Davies Gleave; Sept 08.

Appendix 1.2 Preferred Scheme Drawings; 23 drawings at A3

Appendix 1.3 Lower Cost Scheme Drawings; 23 drawings at A3

South Bristol Link
Major Scheme Business Case

2
The Strategic Case

How the scheme fits with national and regional strategies and priorities.

West of England Partnership

Bath & North East Somerset Council

Bristol City Council

North Somerset Council

South Gloucestershire Council

2 The Strategic Case

2.1 INTRODUCTION

This Chapter sets out the strategic case for the South Bristol Link. It includes:

- **Background:** - why investment is needed in the scheme.
- **Scheme Objectives:** - what the scheme will achieve.
- **History of Scheme Development**: - how the scheme has evolved.
- **Strategic Fit**: - how the scheme assists the delivery of national, regional and local priorities.

2.2 BACKGROUND

2.2.1 Introduction

The West of England is a prosperous area with an excellent quality of life. The travel demands that accompany this prosperity and growth are increasing pressure on infrastructure, particularly transport. Large scale housing growth and economic development over a number of years has not been accompanied by sufficient investment in transport infrastructure, and this low level of investment, compounded by an unreliable public transport system, has resulted in high levels of car use.

About a million people live in the West of England and it provides around half a million jobs. Most of these people live in the major urban areas of Bristol, Bath and Weston-super-Mare and in the area's towns. One in six lives in villages and the wider countryside. The economy of the South West contributes nearly 8% towards National Gross Value Added with the West of England contributing one quarter of this.

The strong economy is set to continue to grow with currently emerging Core Strategies planning to deliver some 86,500 homes and 95,500 jobs up to 2026 in the context of the Draft South West of England Regional Spatial Strategy (RSS), which is yet to be finalised.

2.2.2 Socio-economic characteristics

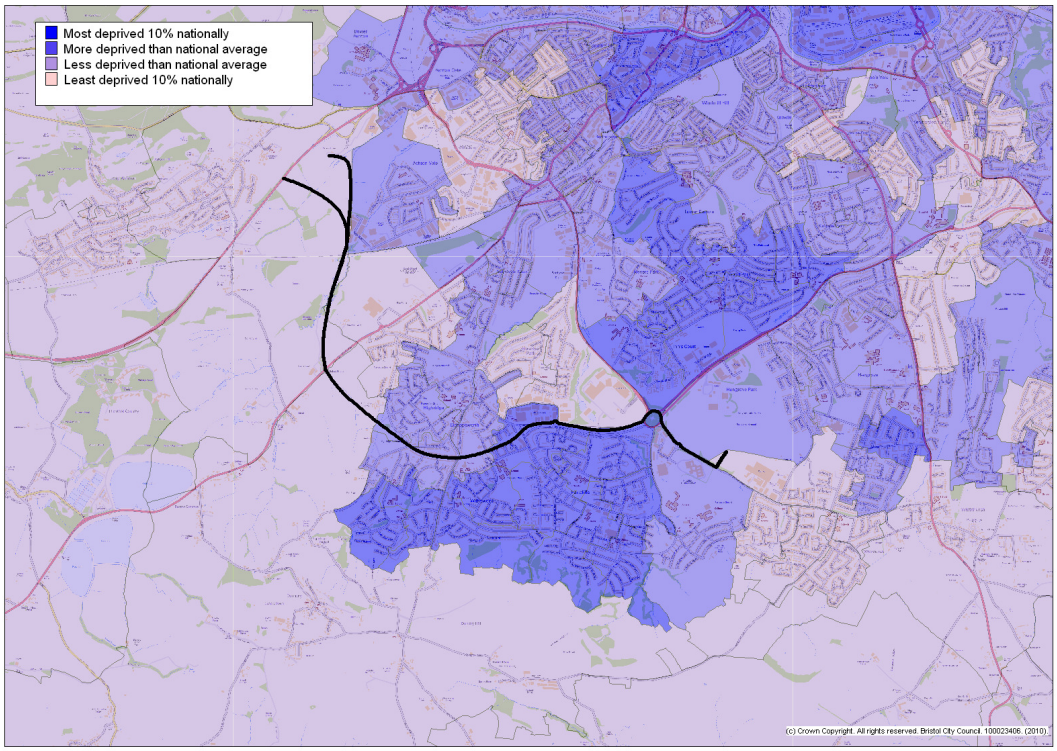
In economic terms, Bristol is a prosperous city nationally and internationally. In 2006 Bristol's Gross Value Added (GVA) per head was £25,345; some 30% above the national average. This makes it the fifth-highest per-capita GVA of any English city or town outside of London. Bristol's current unemployment rate of 6.4% remains lower than the Great Britain average of 6.9% (June 2009).

Bristol's prosperity is built on a wide and varied industrial base, including high-tech industries, business services, banking and finance, distribution and retail and the creative industries. It is a beautiful city with an international reputation as a good place to live and do business, a thriving arts scene and a modern city centre.

However, Bristol faces a number of significant challenges. It is a city of contrasts. For example, the city has two very successful and popular universities and a highly educated and skilled workforce, with some 36% of the working age population educated to degree level. At the same time educational attainment, at all Key Stages, particularly Key Stage 4, is far below what it should be.

Bristol's prosperity is not shared by all its citizens. Many areas of the city suffer from multiple deprivation. Some of the most prosperous areas in the UK sit side by side with some of the most deprived. The statistical evidence for this is provided by the Government's English Indices of Deprivation which measure deprivation in 7 categories - income, employment, health, education, skills and training, barriers to housing and services, crime, and environment. These categories are then combined in order to identify areas suffering from multiple deprivation. The latest version of the index (2007) shows that much of South Bristol is amongst the 10% most deprived in the country and two areas are in the most deprived 1%.

Figure 2.1 Areas of Multiple Deprivation



The South Bristol Link will provide improved transport through and close to some of these most deprived areas. Through inclusion of improved public transport and dedicated cycle and pedestrian provision it will also give greater transport choices for those who do not have access to a car or choose not to drive.

2.2.3 Quality of Life

One of the biggest problems faced in local urban areas is traffic congestion, particularly at junctions and on busy radial routes. Yet work carried out in Bristol on the Showcase Bus Corridors (as part of the Greater Bristol Bus Network)

illustrates how transport schemes not only bring about benefits associated with the scheme itself, but also can contribute to the improvement of the communities they pass through. Rather than concentrating solely on improvements to the buses and bus stops, the Showcase scheme along the A420, for example, also included significant improvements to the streetscape and walking environment. For South Bristol Link it is intended to incorporate dedicated crossing facilities for cyclists and pedestrians at junctions, as well as regular pedestrian crossing points in the urban areas.

Encouraging active lifestyles is one of the ways that healthy communities can be promoted. Using methods such as Personalised Travel Planning, individuals and households are encouraged to walk and cycle more as part of their everyday routines – for work, education, shopping and leisure purposes.

The Rapid Transit element of the scheme, as part of the wider integrated JLTP and major schemes programme, will provide a more sustainable transport option and assist in shifting travel away from private cars. Some 4,700 households are within 600 metres walking distance of the Rapid Transit route; some 1,600 of these do not have access to a car. Further, the pedestrian and cycle paths will bring a positive impact by improving access to facilities by walking and cycling.

2.2.4 Accessibility and Integration

Up to 55% of residents in South Bristol do not have access to a car (Super Output Areas, 2001 census). While bus service frequencies in South Bristol are very good, journey times can be long and unreliable largely because of congestion. The highway element of the South Bristol Link will help contain congestion on key routes, and thus help to improve journey time reliability on the existing bus services.

The South Bristol Link will improve the links between the key activity centres of employment, education and health with homes. The Rapid Transit element will extend the Ashton Vale to Temple Meads Rapid Transit line from its termination at the Long Ashton Park & Ride Site to a recently opened school and college campus and a proposed 60-bed Community Hospital and Leisure Centre at Hengrove Park.

It will also provide a public transport link between South Bristol and Bristol International Airport, via the interchange at Castle Farm, without the need to travel into the city centre.

<u>Vehicular Parking</u>

Parking control and restraint has a role to play in the success of the South Bristol Link, both in terms of how vehicle parking will be controlled on the route itself and in terms of how parking policy make Rapid Transit even more attractive. The parking policies for the West of England are set out in the current Joint Local Transport Plan. The next JLTP, currently being drafted, sets out some key parking principles that support the South Bristol Link:-

- A proportionate reduction of public long stay parking in off-street car parks and in the availability of on-street parking. Thereby, long stay commuters and other users will be encouraged to use alternative modes such as Rapid Transit, Bus or Park & Ride, or walk and cycle.

- Parking enforcement along major public transport corridors to ensure best use of resources and maximum benefits from investment in Rapid Transit, Showcase Bus Routes and Park & Ride. In turn this will reduce delays and journey times for buses and enhance the attractiveness of public transport.

- In those residential areas which suffer badly from the effects of on-street commuter parking investigate expanding residents' parking schemes. Initial efforts will be focussed on residents' parking surrounding Bath and Bristol city centres.

- Work closely with private sector providers of public parking to ensure consistency in the management and supply of parking spaces.

Smarter Choices

The promotion and encouragement of more sustainable travel choices has a role to play in the success of the South Bristol Link. The West of England's policies on Smarter Choices are laid out in the current Joint Local Transport Plan. The next JLTP, now being prepared, presents a significant increased commitment to promotion of sustainable travel. The overall objectives are, in many complementary ways, to improve access for more people to high quality, intelligent and more understandable information, and to increase opportunities for people to experience and try more sustainable travel. The emerging headlines are to:-

- Continue to secure Travel Plans for all new developments meeting or exceeding Transport Assessment thresholds.

- Improve the quality of both mandatory and voluntary Travel Plans through advice, and networking groups for employers.

- Continue to offer grants to employers developing voluntary Travel Plans.

- Provide travel planning forums for businesses to develop best practice.

- Focus on implementing and reviewing School Travel Plan targets to maintain continued progression beyond the current targets (which have largely already been achieved).

- Influence behaviour to minimise the transport impacts of new residential developments through strengthened Residential Travel Plans.

- Offer relevant up-to-date travel information (ideally through Personalised Travel Planning) to all residents within new developments.

- Make Car Club vehicle/s available from the outset where it is feasible to introduce these.

- Continue to offer Personalised Travel Planning as opportunities arise, particularly when funded by developers for new housing developments as part of Residential Travel Plans.

- Use a wide range of Smarter Choices initiatives, including maps, journey planners, websites and personalised travel planning, to encourage more sustainable travel choices.

2.2.5 Housing and Economic Growth

Forecasts show that in the West of England by 2026 the economy could support an additional 95,500 jobs (RSS). The area's population could grow by some 200,000 people. The emerging Core Strategies propose large-scale housing development with construction of some 86,500 new dwellings. Development and land use changes will continue to have a significant impact on travel behaviour, use of the car and increasing congestion.

Bristol is continuing to experience major growth with a number of major regeneration and development schemes. Recently completed schemes include Broadmead Shopping centre in central Bristol (Cabot Circus), and the Bus Station/Magistrates Court site. Work continues to develop Temple Quay 2, and Courage Brewery site and Harbourside. These are of course in addition to the very large number of relatively small-scale commercial and residential developments that have been completed in the past few years.

For the short-term future there are a number of significant regeneration projects currently underway or proposed in South Bristol and the adjacent area of North Somerset:

- Hengrove Park, Imperial Park and Symes Avenue are developments that will create up to 1,000 new jobs.

- Bristol International Airport's expansion promises new jobs and opportunities with an increase in full time employees from 2,300 currently to 5,700 in 2030.

- Hartcliffe Campus has recently opened creating a new secondary school, college and skills academy, and further development of the site is anticipated.

- A new 60-bed community hospital with day surgery, outpatients and dental teaching department is planned in Hengrove Park.

- Leisure centre with ten-lane 50-metre swimming pool, sports hall and fitness suite.

- A new 30,000 seater, £92m, stadium for Bristol City Football Club.

- The City Council's Priority Stock Team is delivering the redevelopment of 330 post-war prefabs spread over 15 sites across the City, seven of which are in South Bristol.

The South Bristol Link will have transport benefits for all of these projects. The Rapid Transit element will link directly into the Hengrove Park, Imperial Park and the Hospital developments with the Hartcliffe Campus being within 600m of the Rapid Transit route.

Bristol International Airport's existing flyer service, between the Airport and the City Centre, will use the Rapid Transit route from the A38 to the Long Ashton Park & Ride where it will join the Ashton Vale to Temple Meads Rapid Transit Route, giving better journey reliability and thus improving access to employment at the Airport.

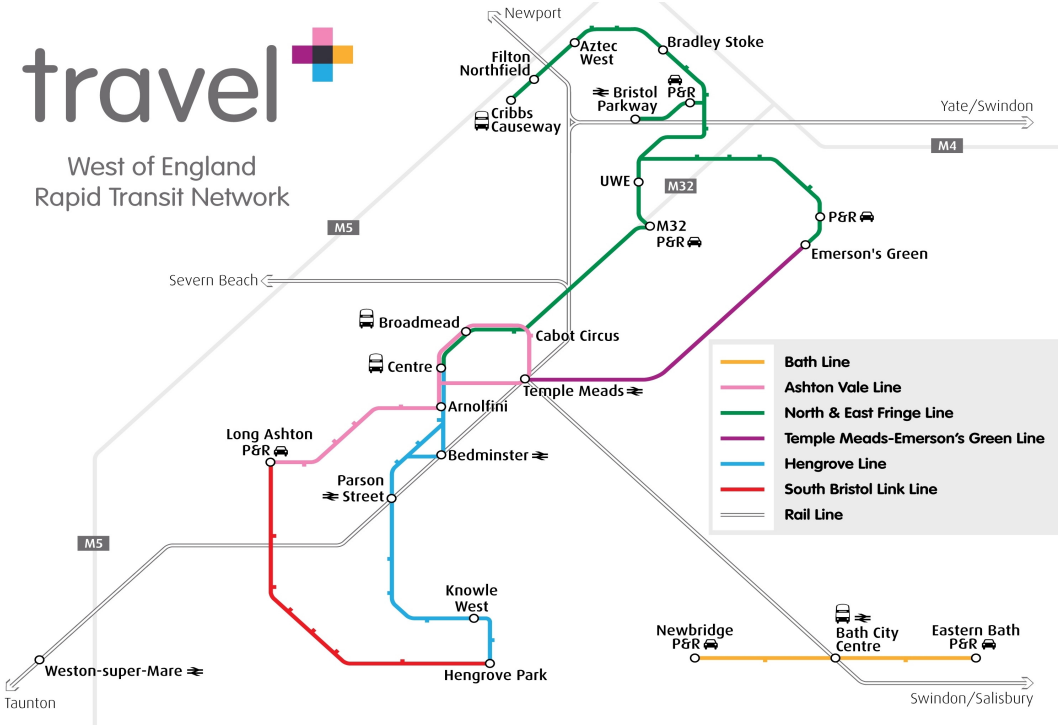
2.2.6 Existing transport networks and problems

Description of the existing Rapid Transit network

The West of England authorities have developed proposals for a comprehensive network of Rapid Transit lines radiating from the city centre. Figure 2.2 illustrates this proposed network. The business case for the first of these lines and the circular routes in the heart of the city was recently granted Programme Entry (pink in Figure 2.2). This first line runs from the existing Long Ashton Park & Ride site to Temple Meads Railway Station via the City Centre providing a service every six minutes in the peak between the Park & Ride site and the City Centre. It is anticipated that this line will be open in 2013.

The Rapid Transit element of South Bristol Link (red on Figure 2.2) provides an extension of the Ashton Vale to Temple Meads line from the Long Ashton Park & Ride site to the A38 (for Bristol International Airport) to South Bristol and Hengrove Park.

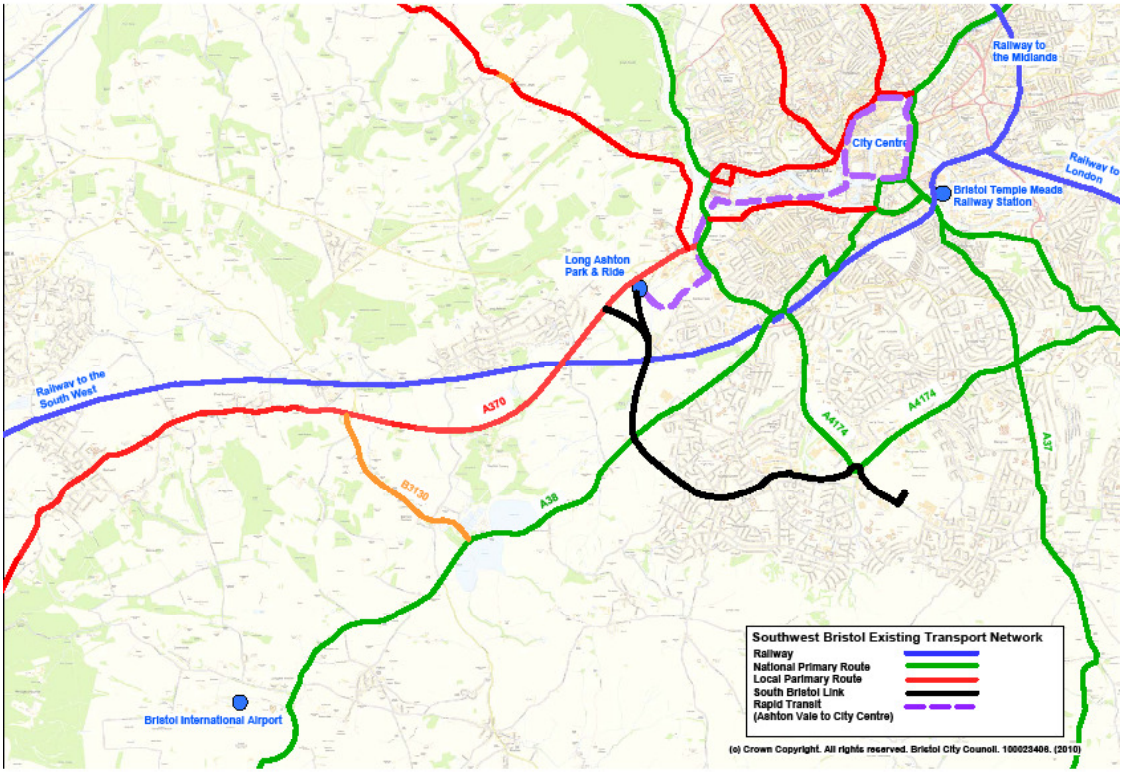
Figure 2.2 – West of England RFA Prioritised Rapid Transit Network



Description of the existing Highway network

The existing highway network in South West Bristol is indicated on Figure 2.3. The main radial routes from the west into the city are the A370 from Weston-super-Mare and the A38 from Bridgwater and Bristol International Airport. The A37 forms the radial route into Bristol from Shepton Mallet in the south. The main orbital routes are the A4174 in South Bristol and the B3130 in North Somerset.

Figure 2.3 - Existing Southwest Bristol Transport Network



The A370 west of Flax Bourton is a single 2-lane carriageway, but the road widens to 3 lanes east of the junction with the B3130 with two lanes inbound into Bristol and one lane outbound. The road then widens further into a dual 2-lane carriageway on the Long Ashton bypass before reverting back to a 3-lane single carriageway from the end of the dual-carriageway section over Yanley Viaduct, with 1 inbound and 2 outbound lanes. There is an inbound AM peak High Occupancy Vehicle lane on part of the Long Ashton Bypass.

The A38, which provides the main access from the city to Bristol International Airport, is a single 2-lane carriageway throughout with local widening at junctions. It is also a prime diversionary route for the M5 motorway during closures of the motorway south and west of Bristol.

The A37 to the south of Bristol is a single 2-lane carriageway road for the majority of its length, widening to a dual 2-lane carriageway north of Whitchurch as it approaches the city. The single lane road section through Hursley Hill is separated by a wide hatched central reservation.

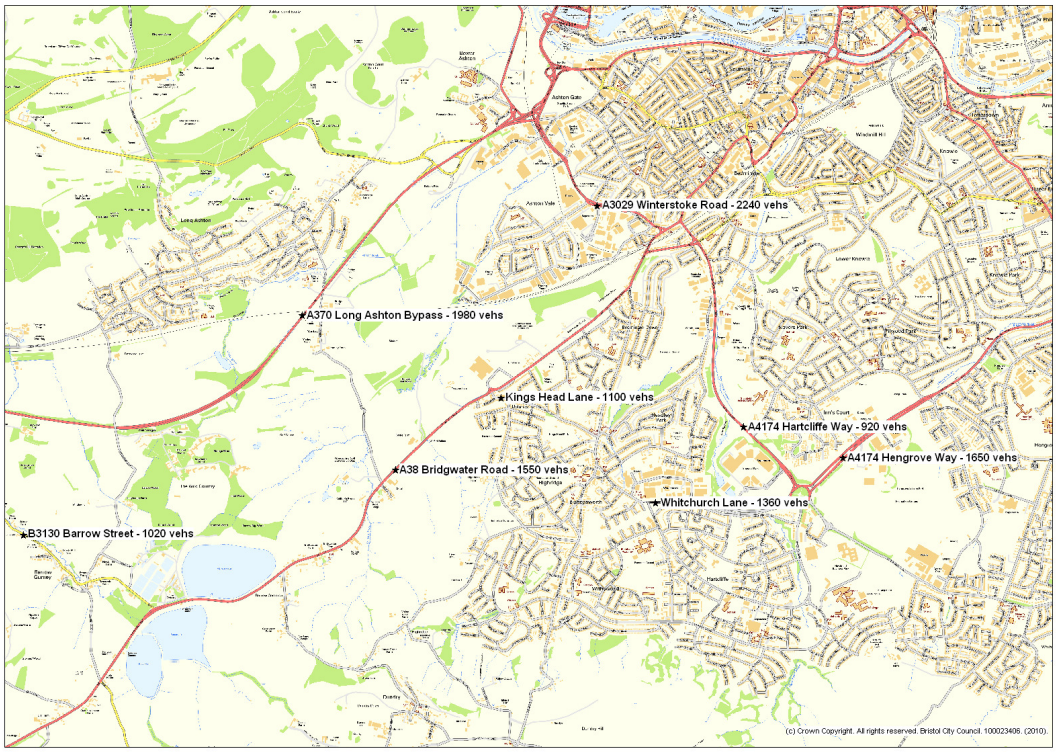
The A4174 is mostly an urban single carriageway but with a section of dual carriageway through Hengrove Park.

The B3130 is a rural, narrow, single carriageway with sections of shuttle-working through Barrow Gurney.

Description of observed highway traffic flows

Highway traffic flows were observed in 2008 and 2009. Where available 5-day average flows, AM peak, all vehicles, are shown on Figure 2.4. In the morning peak hour (0800-0900) the twin radial routes into Bristol from the southwest carry around 1980 vehicles on the A370 and 1550 on the A38. The B3130 link between these routes through Barrow Gurney carries 1020 vehicles. In Bristol, the A3029 Winterstoke Road link between the radial routes carries 2240 vehicles. At the eastern end of the scheme proposals, Hengrove Way carries 1650 vehicles.

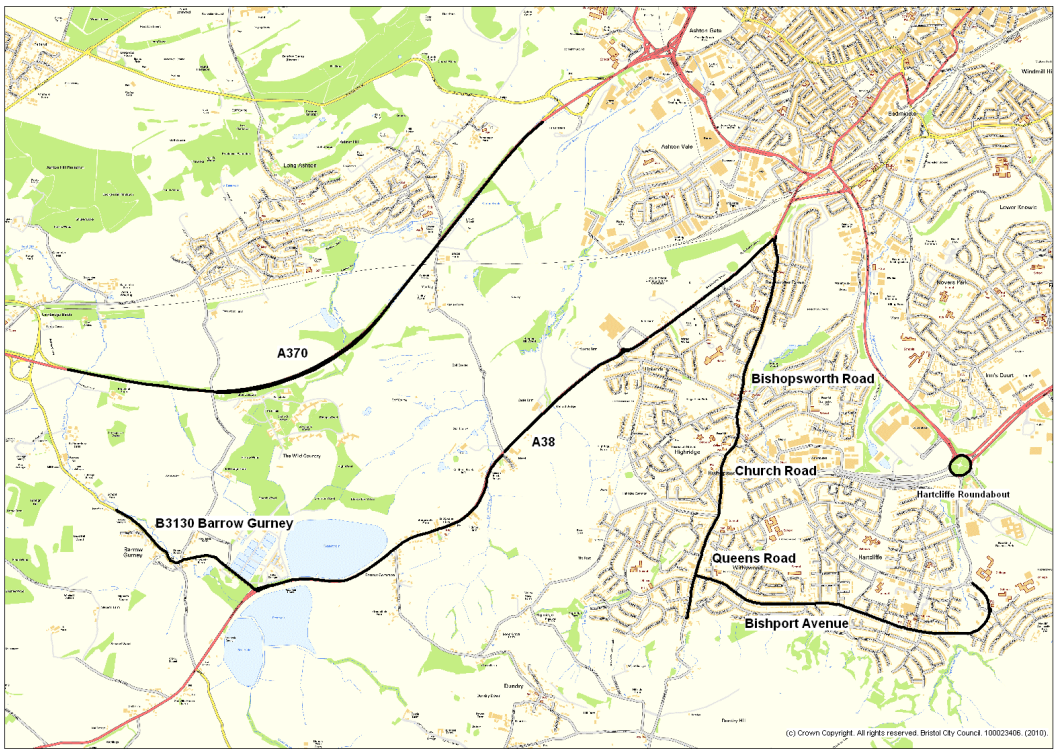
Figure 2.4 – Observed highway flows – 2-way AM peak, 08/09



Description of existing Road Traffic Accidents

Statistics for road accidents in the study area for the five-year period from 2003 to 2007 have been examined and indicate that the majority of accidents in the vicinity of the scheme in Bristol (but not all) occur on Queens Road, Church Road, Bishopworth Road, Hartcliffe Roundabout and Bishport Avenue. In North Somerset, the majority of accidents (but not all) occur on the primary routes (A370 and A38) and on the B3130 in Barrow Gurney.

Figure 2.5 – Summary of accident locations



Description of existing Rail services

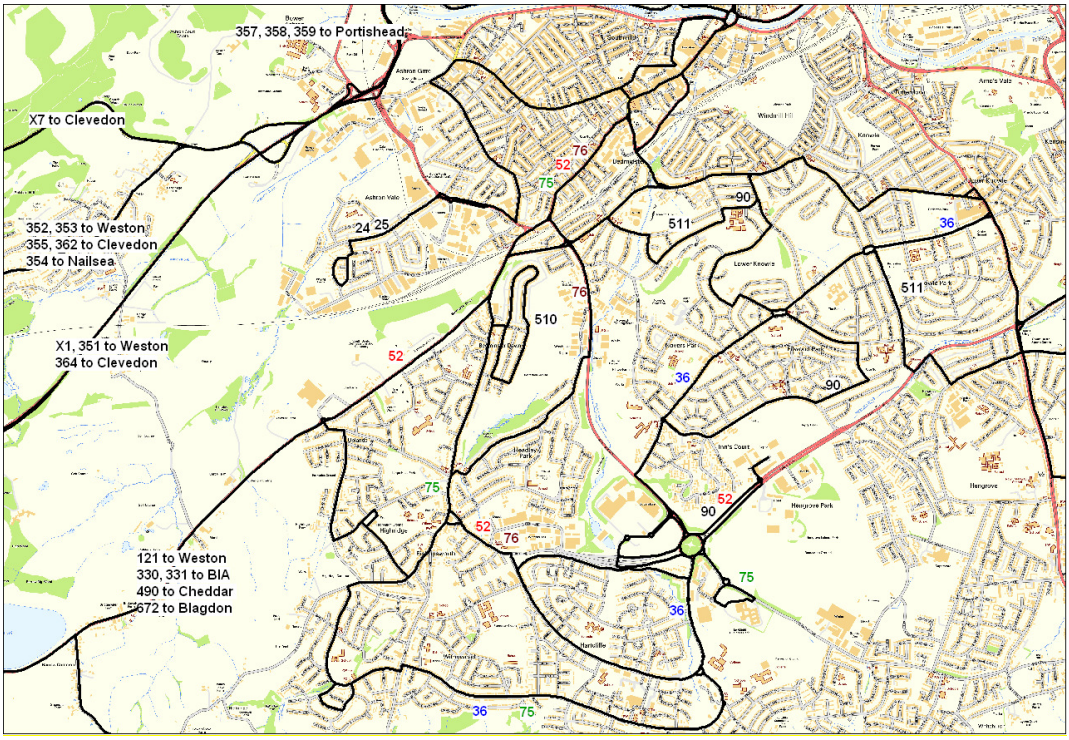
The mainline railway within the area is the Great Western line linking Bristol Temple Meads to the south-west. First Great Western services pass through Bedminster, Parson Street and stations to Weston-super-Mare with some continuing on to Taunton and the south-west. Only local rail services stop at Parson Street and Bedminster stations, both of which are in South Bristol.

Bristol is important as a rail hub, with services radiating out to the North, London and the South East, the West Country and South Wales. There is also a local service from Bristol to Avonmouth and Severn Beach. Freight-only lines run to Avonmouth and Portbury Docks.

Description of existing Bus services

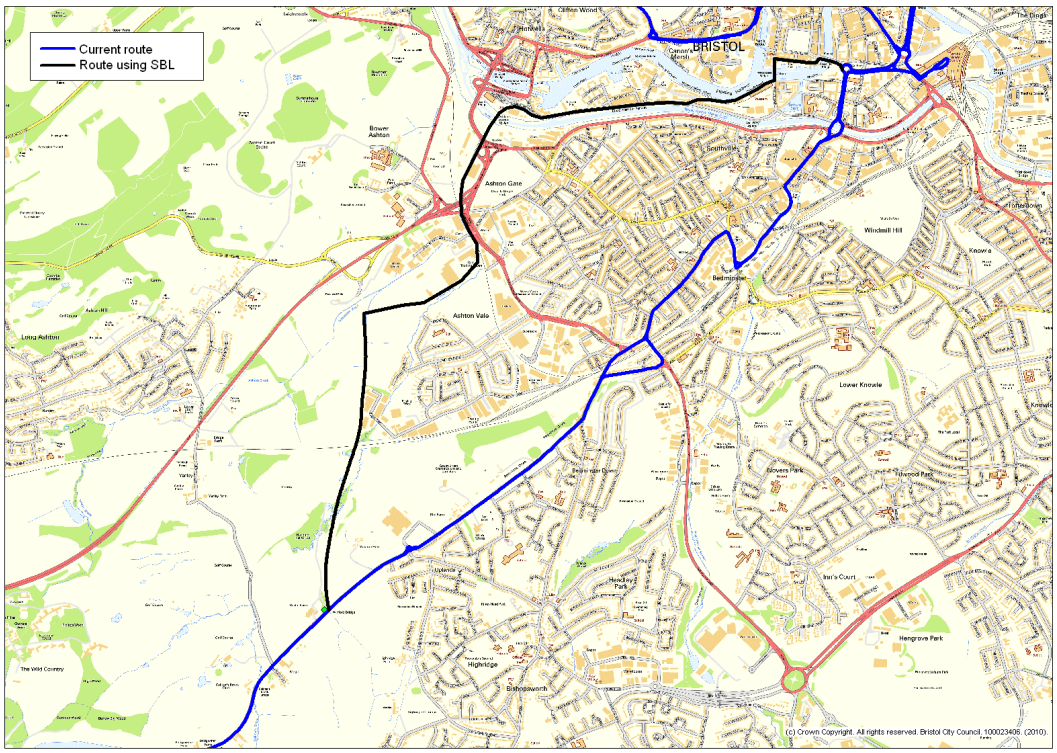
Existing bus services connect the South Bristol areas of Bedminster, Bishopsworth, Hartcliffe, Highridge and Hengrove with the City Centre. The long distance services from the city centre to Weston-super-Mare, Clevedon and Nailsea via the A370 each run every 30 or 60 minutes. The service to Weston-super-Mare via the A38 runs every two hours, while the limited-stop Airport Flyer from the city centre to Bristol International Airport currently has a 15-minute frequency. The local services connecting South Bristol to the City Centre also generally run at approximately 15-minute intervals. The Long Ashton Park and Ride site is situated just off the A370 with Park and Ride buses operating every 10 to 20 minutes. Several intra-urban and country bus services also converge on the A370 into the city centre.

Figure 2.6 – Existing bus routes



The Airport Flyer operates a limited stop coach service between Bristol International Airport and the City Centre and vice-versa. Currently the service has a 15-minute frequency. The Airport has recently applied to North Somerset Council to increase its passenger numbers to 10million per annum. If passenger numbers approach this level the Airport plan to introduce a 10-minute frequency service. When the South Bristol Link is open the Airport have indicated that the Airport Flyer will use the A38 to A370 Rapid Transit busway to access the Ashton Vale to Temple Meads Rapid Transit line, giving a greater reliability in journey times and bringing 9,800 homes within a 40 minute public transport service of the Airport.

Figure 2.7 – Airport Flyer routes

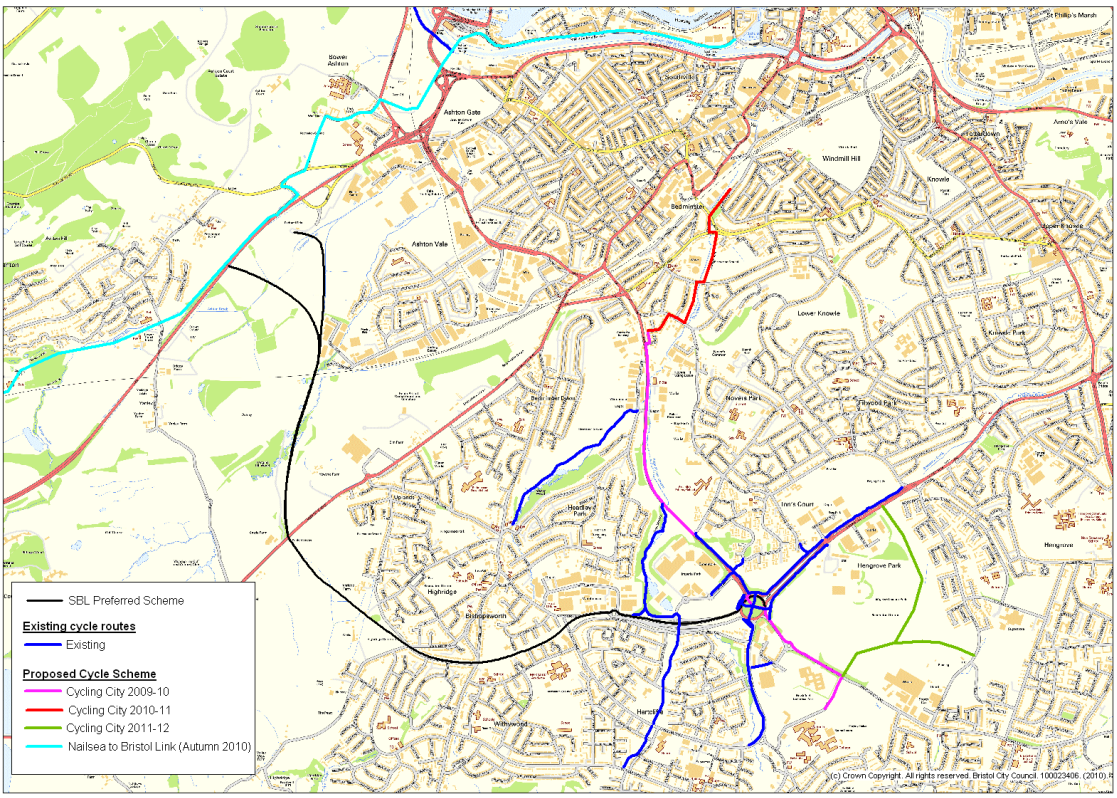


Description of existing walking and cycling provision

Existing cycle routes between Long Ashton and Bristol city centre are poor due to the Cumberland Basin road system being particularly unattractive to most cyclists because of high volumes of relatively fast motor traffic. There are however planned improvements through the Bristol Cycling City project, combined with the Sustrans Connect2 project, which will result in an attractive route being developed between Bristol city centre and North Somerset by 2012.

Various cycle routes and paths are available in South Bristol, which supplement the existing highway network, providing attractive links towards Bristol city centre. Much of the existing highway network is however unattractive to cyclists due to some heavily trafficked routes which create a barrier to cycling, particularly for inexperienced cyclists.

Figure 2.8 – Existing cycling infrastructure



Description of existing transport problems

Congestion

The urban area of Bristol suffers from severe traffic congestion, with average peak hour speeds on core routes in the city being 17.5mph (National Congestion Indicator 2008/9, DfT). The main areas of traffic congestion are focused on the city centre and the radial and orbital corridors that serve it.

Stakeholders and the wider public frequently highlight congestion as a major issue. Time lost due to traffic congestion is estimated to cost the local economy up to £350m per annum. It is estimated that 21% of peak period travel in Bristol is spent stationary in traffic queues.

Bus services are often held up in congestion such that bus journeys in peak periods are often considerably longer than at other times. The number of motor vehicle kilometres travelled in the West of England grew by 18% between 1997 and 2008, with Bristol experiencing 8% growth.

Journey times to Bristol International Airport by car can be unreliable. Figure 2.9 shows average AM peak (07:00-09:00) vehicle speeds on the current route from Hengrove roundabout to the Airport. It highlights a number of sections in South Bristol where speeds are less than 20 mph. The majority of these congested sections will be bypassed by the SBL, improving journey times for car drivers from South Bristol and locations to the south-east of the city.

Figure 2.9 - Journey speeds: Hartcliffe to Bristol International Airport

Without intervention this congestion is forecast to get worse. In the Joint Local Transport Plan it has been estimated that, by 2016, there will be another 12% growth in traffic and the annual cost of congestion will increase to some £0.6bn. These levels of traffic congestion result in large variations in journey time on the highway network affecting the service reliability of public transport.

Congestion has resulted in poor air quality, delays, unreliable journey times and unsustainable pressure on existing infrastructure and services. The continued growth of congestion, with its undesirable effects, threatens the quality of the environment and the quality of life for people who live within it.

The South Bristol Link, as part of the wider integrated JLTP and major schemes programme, is directly related to some of the most congested routes in the city. The Rapid Transit element will provide a system that is segregated from general traffic, greatly increasing the reliability of services.

Safety

Around 400 people are killed or seriously injured on the West of England's roads every year. Accidents involving cars accounted for around 60% of casualties (killed, seriously or slightly injured) in 2007; those involving public transport are significantly lower at 12%. Built-up areas account for the greatest proportion of road casualties. Traffic flows are high; there are more turning movements, and the greatest potential for conflict between motor vehicles and other vulnerable road users occurs here. Many people continue to drive at inappropriately high speeds. Conditions for pedestrians and cyclists are often unattractive. It can be difficult to cross the road safely, and cyclists often have to share space with other vehicles. Both groups can feel intimidated by the high volumes of traffic. Evidence also shows there to be a strong link between social

deprivation (widespread in some in South Bristol Wards), and road casualty numbers.

The Rapid Transit element of the scheme will facilitate journeys being made on safer public transport. The highway element has the potential to reduce casualties at a range of current cluster sites, including in the City Centre and on the A38 into South Bristol, which could be reinforced by complementary traffic management measures. Pedestrians and cyclists will also experience additional benefits as a result of dedicated facilities running parallel to the whole route.

2.3 SCHEME OBJECTIVES

2.3.1 National Objectives

The Government's objectives for all transport schemes are defined in WebTAG under the five categories of Environment, Safety, Economy, Accessibility and Integration. These objectives are further supported by Delivering a Sustainable Transport System (DaSTS):-

- To support national economic competitiveness and growth, by delivering reliable and efficient transport networks
- To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change
- To contribute to better safety security and health and longer life-expectancy by reducing the risk of death, injury or illness arising from transport and by promoting travel modes that are beneficial to health
- To promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society;
- To improve quality of life for transport users and non-transport users, and to promote a healthy natural environment

2.3.2 Regional Objectives

There are a number of documents in which objectives for the region and sub-region are set out, including the Joint Replacement Structure Plan, the Joint Local Transport Plan (2006/07 – 2010/11), Draft Regional Spatial Strategy and the emerging Core Strategies. These objectives can be summarised as:

- To tackle congestion
- To improve accessibility
- To improve road safety for all road users
- To improve the quality of life, including the need for economic regeneration
- To improve air quality

2.3.3 Local Objectives (the Scheme Objectives)

Soon after project inception the following set of local objectives for the scheme were identified by Bristol City and North Somerset Councils, and have subsequently been endorsed by the Project Board and West of England:-

- To facilitate regeneration and growth in South Bristol;
- To reduce congestion in South Bristol and adjacent areas of North Somerset;
- To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.

A detailed analysis of how the Scheme Objectives align with National and Regional objectives is set out in the Strategic Fit section of this Chapter.

2.4 HISTORY OF SCHEME DEVELOPMENT

2.4.1 Distant History

Proposals for a "South Bristol Ring Road", “Avon Ring Road” or “Inner Ring” date back to the 1950s. Even before that, when King George’s Road was built in the 1930’s, the houses were set back to allow for a dual-carriageway to be constructed. Since 1992, a number of studies have been carried out on a range of alternative routes, as indicated below.

Avon Ring Road Options Report, MVA 1992 - This study looked at alternative routes for the Avon Ring Road between the A4 at Hicks Gate and the A370 Long Ashton bypass. Seven alternatives were compared in terms of traffic and economics but no environmental appraisal was included in the report.

Transport Plan for the Avon Area 1994-2013, Avon County Council, 1995 – The South Bristol Ring Road was proposed for construction between 2004 and 2013

South Bristol Transport Study – Review of Schemes, Halcrow Fox 1997 - The aim of this work was to review four schemes with safeguarded routes to determine whether the safeguarding should be maintained.

2.4.2 Recent History

A38 – A370 Link Road Study, JMP 2002 - The study examined a long list of eleven routes plus a public transport option; it excluded possible development in the Green Belt. Of the main alternative alignments considered, the report recommended the ‘Orange Route’, which runs between the A370 and the A38 close to Barrow Gurney, as the most appropriate to take forward. A bid for funding was subsequently made to DfT within the North Somerset Local Transport Plan, but this was unsuccessful because it did not address wider strategic objectives. These were later considered by GBSTS, below.

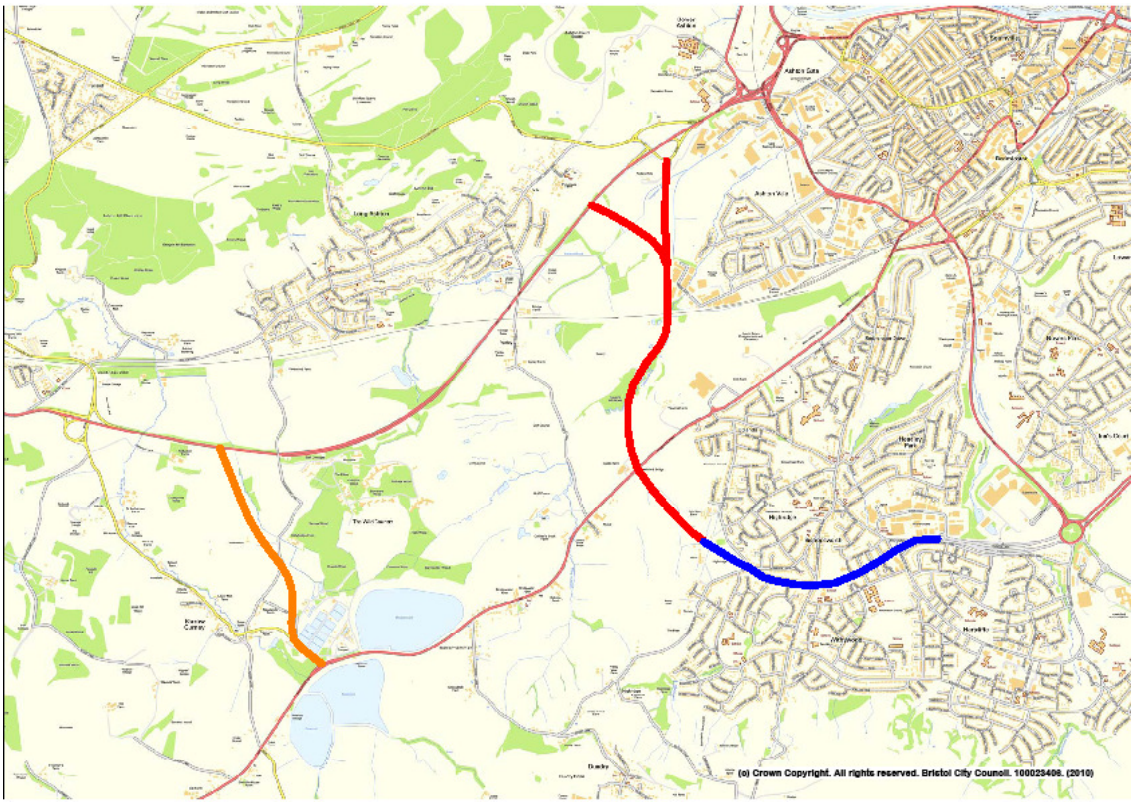
Greater Bristol Strategic Transport Study (GBSTS), Atkins 2006 – This was a wide-ranging strategic transport study for Greater Bristol that aimed to produce an effective strategy to support the future development of the sub-region in the

period up to 2031. The approach adopted by the study was to develop a strategy for public transport and demand management and only then to consider highway improvements. The proposed highway improvements included the A370 to A38 Link (what GBSTS termed SBL Phase 1) and A38 to A4 Hicks Gate (SBL Phases 2 and 3), however the 3 phases were not appraised separately as individual schemes. It should be noted that this Major Scheme Bid is only for the sections that GBSTS termed 'phases 1 and 2'.

GBSTS informed the Joint Local Transport Plan, such that all phases were included in the programme of major transport schemes; in turn, the South West Regional Assembly identified Phases 1 and 2 as regional priorities for implementation before 2016 through the Regional Funding Allocation. This priority was further confirmed by the publication of the second RFA for construction between 2014 and 2017.

The North Somerset Replacement Local Plan (2007) safeguards alignments for the South Bristol Link shown in red below and another shown in orange near Barrow Gurney. The Bristol Local Plan (1997) safeguards the route indicated in blue below. This safeguarding is retained in the 2003 Proposed Alterations to the Local Plan.

Figure 2.10 – Local Plan safeguarded routes



Project Initiation Document; North Somerset Council (NSC)/Bristol City Council (BCC); October 2006. Work towards a Major Scheme Business Case began in earnest with the development of the Project Initiation Document and with the commissioning of consultants to carry out a review of all existing studies to

identify whether sufficient work had been carried out to form a basis on which to develop a MSBC for Department of Transport (DfT) funding.

Initial Review Report; Mott MacDonald; June 2007. The review was to focus on Phases 1 and 2 and determine the additional work required after GBSTS. The conclusion of this review was that further work would be required to fulfil the requirements of current DfT guidance as set out in its Transport Analysis Guidance (WebTAG) for the following reasons:

- Local objectives for the project would need to be more clearly defined.
- The scopes of the previous studies had all been limited in some respects.
- Current appraisal methodology had changed since the earlier studies had been carried out.

Consultants were commissioned to carry out further work to help identify appropriate local objectives, confirm scheme options and appraise them against current DfT guidance.

1st Options Appraisal Workshop; 17th January 2008. This workshop confirmed an Options Long List and identified a draft Options Short List. It was a significant opportunity for stakeholder involvement.

1st Options Appraisal Workshop Report; Mott MacDonald; February 2008. This report sets out the process and outcomes of the workshop on the 17th January 2008.

2nd Options Appraisal Workshop; 5th March 2008. This workshop confirmed the Options Short List, which in turn was distilled into 5 options to be taken forward. It was a further significant opportunity for stakeholder involvement.

2nd Options Appraisal Workshop Report; Mott MacDonald; May 2008. This report set out the process and outcomes of the workshop on the 5th March 2008.

Over the winter of 2008 and 2009 the councils held a public consultation exercise on the principles of the 5 shortlisted options. This public consultation is discussed in detail in Chapter 4 of this document.

Options Appraisal Report; Mott MacDonald; February 2009. This report evaluated each of the 5 options in the Short List. Attached in Appendix 2.1

Report to Joint Transport Executive Committee; October 2009. This report took the evaluation of the 5 options and reduced them to 2; namely a Rapid Transit link between Hartcliffe and Ashton Vale with a parallel highway on either an 'inner' or 'outer' alignment. Attached in Appendix 2.2

Briefings to Executive Members for Transport (NSC & BCC); October 2009; These reports reduced the two options to one and identified the Preferred Scheme. Attached in Appendix 2.3

In the autumn of 2009 the councils held a public consultation on the Preferred Scheme. This consultation is discussed in detail in Chapter 4 of this document.

2.5 STRATEGIC FIT

The South Bristol Link will contribute towards a number of national, regional and local objectives both in terms of transport and wider economic and environmental factors. The South Bristol Link is included in the Regional Funding Allocation for the South West of England.

The objectives for the South Bristol link have been assessed against the objectives from a range of national, regional and local strategies. These are listed in Table 2.1 below.

Table 2.1 – Contribution to National, Regional and Local Objectives

Table Number	National and Regional Strategies
2.2	Delivering a Sustainable Transport System - DaSTS - DfT; November 2008
2.3	Draft Regional Spatial Strategy for the South West; South West Regional Assembly; 2006
2.4	South West Regional Economic Strategy 2006-2015; South West of England Regional Development Agency; 2009
2.5	Joint Local Transport Plan for the West of England 2006-2011; West of England Partnership; March 2006
2.6	Bristol Core Strategy; Bristol City Council; November 2009
2.7	North Somerset Core Strategy; North Somerset Council; November 2009
2.8	Bristol City Council Corporate Plan 2008-2011; Bristol City Council
2.9	North Somerset Council Corporate Plan 2008-2011; North Somerset Council

The review of the objectives for the South Bristol Link against these national, regional and local strategies is provided in the following tables. This clearly demonstrates a strong and clear fit with national, regional and local policy.

Table 2.2 : Strategic Fit – Delivering a Sustainable Transport System – DaSTS – November 2008

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
To **support** national **economic competitiveness and growth**, by delivering reliable and efficient transport networks	The project specifically supports regeneration and growth by contributing to a reliable and efficient transport network that could contribute to the creation of an additional 5,600 jobs.	Business representatives are unanimous in describing the proposed scheme as a crucial infrastructure investment. The present inaccessibility of South Bristol is considered to be the single greatest deterrent to firms locating in South Bristol.	Improved strategic transport links assist economic competitiveness and growth whilst contributing to a reliable and efficient transport network.
To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of **tackling climate change**	The project assists regeneration, potentially reducing the need for travel. Increasing the number of local jobs will potentially reduce the need for travel and thereby reduce fuel consumption and levels of greenhouse gas emission	The predicted slight reduction in congestion will assist in reducing fuel consumption and levels of greenhouse gas emissions.	Improved accessibility by Rapid Transit, cycling and waking help reduce carbon emissions
To **contribute to better safety security and health** and longer life-expectancy by reducing the risk of death, injury or illness arising from transport and by promoting travel modes that are beneficial to health	The project assists regeneration and growth giving greater opportunities for prosperous, healthy communities. Increasing the number of local jobs will potentially reduce the need for travel	The predicted slight reduction in congestion will assist in reducing fuel consumption and levels of greenhouse gas emissions.	Improved accessibility by Rapid Transit, cycling and walking gives greater transport choice when accessing education, employment, healthcare and leisure particularly for those who do not, or choose not, to own a car.
To **promote** greater **equality of opportunity** for all citizens, with the desired outcome of achieving a fairer society;	The project assists regeneration and growth giving greater opportunities for a prosperous, fairer society.		Improved accessibility by Rapid Transit, cycling and walking gives greater transport choice for those who do not, or choose not, to own a car.
To **improve quality of life** for transport users and non-transport users, and to promote a **healthy natural environment**	The project supports regeneration and growth giving greater opportunities for a prosperous, healthier society with a higher quality of life.	The predicted slight reduction in congestion will assist in reducing fuel consumption and levels of greenhouse gas emissions	Improved accessibility by Rapid Transit, cycling and walking gives greater transport choice for those who do not, or choose not, to own a car.

Table 2.3 : Strategic Fit – Draft Regional Spatial Strategy for the South West; 2006

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
SD1. The region's Ecological Footprint will be stabilised and then reduced.	The project assists regeneration and growth. Increasing the number of local jobs will potentially reduce the need for travel and thereby reduce fuel consumption and levels of greenhouse gas emission. Overall, a reduction in carbon production is predicted	The predicted slight reduction in congestion will assist in reducing fuel consumption and levels of greenhouse gas emissions.	Improved access to rapid transit, cycling and walking offers choices to reduce fuel consumption and reduce greenhouse gas emissions.
SD2. The region's contribution to climate change will be reduced.	The project assists regeneration and growth. Increasing the number of local jobs will potentially reduce the need for travel and thereby reduce fuel consumption and levels of greenhouse gas emission.	The predicted slight reduction in congestion will assist in reducing fuel consumption and levels of greenhouse gas emissions.	Improved access to rapid transit, cycling and walking offers choices to reduce fuel consumption and reduce greenhouse gas emissions.
SD3. The region's environment and natural resources will be protected and enhanced.	The project assists regeneration and growth. Increasing the number of local jobs will potentially reduce the need for travel and thereby reduce fuel consumption and levels of greenhouse gas emission. Overall traffic movement will be more efficient when compared with the Do Minimum.		
SD4. Growth and development will be planned for and managed positively to create and maintain sustainable communities.	The project assists the regeneration and growth of South Bristol in a sustainable manner.		Improved transport links assists a prosperous economy.
Development Policy A. Development of Strategically Significant Cities and Towns (SSCTs)	**The project specifically assists the regeneration and development of South Bristol in accordance with the policy. – estimated 5,600 jobs created**	Reduced congestion assists the regeneration and development of South Bristol in accordance with the policy.	Improved strategic transport links assist the regeneration and development of South Bristol in accordance with the policy.

Table 2.3 Continued: Strategic Fit – Draft Regional Spatial Strategy for the South West; 2006

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
Development Policy D Infrastructure for Development	**The project specifically provides infrastructure to aid regeneration and development in accordance with the policy.**	Reduced congestion helps to ensure that existing infrastructure is used most effectively in accordance with the policy.	**The project specifically provides improved transport links in accordance with the policy.**
Sub-Regional Strategy for Bristol Improvements to the roads in South Bristol, including the South Bristol Ring Road, improving access to the Airport and facilitating investment for regeneration of South Bristol	**The project specifically facilitates regeneration and growth in accordance with the sub-regional strategy for Bristol.**	The project reduces congestion on key routes in the city in accordance with the sub-regional strategy for Bristol.	**The project specifically improves accessibility to the city centre and to strategic links, including the trunk road network and Bristol International Airport in accordance with the sub-regional strategy for Bristol**

Table 2.4 : Strategic Fit – The South West Regional Economic Strategy; 2006-2015; updated 2009; South West Regional Development Agency

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
Successful and Competitive Businesses **1A Supporting Business Productivity** **1B Encouraging New Enterprise** **1C Delivering skills for the economy** **1D Competing in the Global Economy** **1E Promoting Innovation**	The project assists regeneration and growth giving greater opportunities for business growth, prosperous communities whilst potentially reducing the need to travel. Estimated jobs created – 5,600	Reduced congestion has the economic benefits of assisting regeneration and growth.	Improved strategic transport links have economic benefits, assisting regeneration, growth, productivity and prosperity.
Strong and Inclusive Communities **2A Improve participation in economy** **2B Regenerate most disadvantaged areas** **2C Plan sustainable and successful communities**	The project assists regeneration and growth in the disadvantaged areas of South Bristol giving greater opportunities for prosperous communities whilst potentially reducing the need to travel.	Reduced congestion assists regeneration and growth giving greater opportunities for prosperous successful communities.	Improved strategic transport links assist regeneration, growth and prosperity in the disadvantaged areas of South Bristol.
An Effective and Confident Region **3A Improve Transport Networks** **3B Promote and Enhance what is best about the region** **3C Improve Leadership, Influence and Partnership**	Improved public transport provision – particularly Rapid Transit – is seen as facilitating regeneration and development in an innovative and best practice way.	Reduced congestion improves the reliability of the transport network	Improved strategic transport links assist regeneration, growth and prosperity, helping create an effective region. Rapid Transit is seen as innovative and best practice.

Table 2.5 : Strategic Fit – Joint Local Transport Plan for the West of England 2006 – 2011

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
To tackle congestion	The project assists regeneration and growth whilst potentially reducing the need to travel.	The project reduces congestion on key routes within the city	Improved transport links help distribute traffic flows, helping to reduce congestion whilst Rapid Transit, cycling and walking infrastructure offers choices to help reduce congestion.
To improve road safety for all road users	There will be a slight overall increase in road traffic accidents		
To improve air quality	The project assists regeneration and growth. Increasing the number of local jobs will potentially reduce the need for travel and thereby reduce fuel consumption and levels of greenhouse gas emission.	The predicted slight reduction in congestion will assist in reducing fuel consumption and levels of greenhouse gas emissions.	Improved Rapid Transit, cycling and walking links offer choices that help improve air quality.
To improve accessibility			Improved accessibility by Rapid Transit, cycling and walking gives greater transport choices for those who do not, or choose not, to own a car.
To improve the quality of life	The project assists regeneration and growth giving greater opportunities for prosperous, healthy communities with an improved quality of life.	The predicted slight reduction in congestion will assist in improving the quality of life for those living adjacent to currently congested routes.	Improved accessibility by Rapid Transit, cycling and walking gives greater transport choices for those who do not, or choose not, to own a car.
To reduce the number killed and seriously injured and ensure no increase in slight injuries on roads	There will be a slight overall increase in road traffic accidents		
To increase bus patronage, punctuality and satisfaction	The project supports regeneration and development with sustainable transport choices, increasing public transport patronage.	Reduced congestion assists better bus punctuality potentially leading to improved patronage & satisfaction.	Improved transport links improve bus punctuality whilst Rapid Transit provides a high quality, fast reliable service
To increase access to health facilities and employment sites by public transport			Improved Rapid Transit, cycling and walking infrastructure improves opportunities to access education, employment, healthcare and leisure by public transport.

Table 2.5 Continued. Strategic Fit – Joint Local Transport Plan for the West of England 2006 – 2011

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
To restrict traffic growth across the sub-region and to limit journey time increase on the network	The project assists regeneration and growth potentially reducing the need to travel.	Reduced congestion assists improving journey times.	
To increase the number of cycling trips			The project includes substantial segregated cycling and walking facilities that link existing communities together giving greater opportunities for cycling away from road traffic.
To ensure there is no increase in peak period flow to Bristol city centre	The project assists regeneration and growth potentially reducing the need to travel.		

Table 2.6 : Strategic Fit – Bristol Core Strategy – Publication Version; Bristol City Council; November 2009

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
Spatial Vision for South Bristol South Bristol will be developed as a counterpoint to the rapidly developing north, and transformed through a comprehensive approach to social economic and physical regeneration, together with significant new employment uses, including offices, new homes and a potential new centre.	The project specifically facilitates regeneration, economic growth, and new employment in South Bristol	The project reduces congestion on key routes within the city aiding regeneration and new employment.	Improved access to the strategic transport networks aids regeneration and economic growth.
Vision for a city of Sustainable Travel Transport and development proposals will be integrated, with improved accessibility throughout Bristol. The transport vision for the West of England will be delivered; • A system of rapid transit will be implemented to serve the city and support its areas of growth and regeneration. • Cycle and pedestrian facilities will be developed to contribute to reducing car dependence.	The Rapid Transit and Cycling & Pedestrian elements facilitate regeneration, economic growth, and new employment in a sustainable manner as envisioned in the policy.		Improved accessibility to the Rapid Transit, cycling and pedestrian networks offers greater choices for sustainable travel.
Policy BCS1 – South Bristol South Bristol will be a priority focus for development and comprehensive regeneration. Development will occur across South Bristol with major regeneration particularly focused on the area at Knowle West and Hengrove Park. Development in South Bristol will primarily occur on previously developed land. Major improvements to transport infrastructure will be made to enhance links between existing communities within South Bristol and the city centre and the north of the city. Improvements will have an emphasis on pedestrian, cycling and public transport facilities.	The project specifically facilitates regeneration in the Hengrove Park area in support of regeneration and development set out in the policy.	The project reduces congestion on key routes within the city aiding regeneration and new employment.	Improved access to strategic transport networks aids regeneration and development in South Bristol.
Policy BCS10 The council will support the delivery of significant improvements to transport infrastructure to provide an integrated transport system, which improves accessibility within Bristol and supports the proposed levels of development. In particular it will support, subject to environmental impact assessment where appropriate: • South Bristol Link;	The project specifically supports the proposed levels of development set out in the policy.	The project reduces congestion on key routes within the city aiding the proposed levels of development.	Improved access to strategic transport networks support the proposed levels of development.

Table 2.7 : Strategic Fit – North Somerset Core Strategy – Consultation Draft; North Somerset Council; November 2009

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
CS6: North Somerset's Green Belt Within North Somerset the boundaries of the Bristol – Bath Green Belt will remain unchanged during the plan period.	The project supports regeneration and development in South Bristol without the need for new development in the green belt.		
CS10: Transportation and Movement Travel management policies and development proposals that encourage an improved and integrated transport network and allow for a wide choice of modes of transport as a means of access to jobs, homes, services and facilities will be encouraged and supported. Transport schemes should: • enhance the facilities for pedestrians, including those with reduced mobility, and other users such as cyclists; • deliver better local bus and rail services in partnership with operators; • develop innovative and adaptable approaches to public transport in the rural • improve road and personal safety and environmental conditions; reduce the adverse environmental impacts of transport; reduce congestion; • improve connectivity within and between major towns both within and beyond North Somerset. The following schemes have been programmed in the Regional Funding Allocation (2009) and will be promoted: 3) South Bristol Link;	The project supports access to jobs, homes, services and facilities (facilitating regeneration and growth), offering a wide choice of transport modes.	The project reduces congestion on key routes within the city aiding access to jobs, homes services and facilities, whilst offering other transport choices.	Improvements to the Rapid Transit, highway and cycle & pedestrian networks allow wider choices of transport modes to jobs, homes, services and facilities as envisioned by the policy.

Table 2.8 : Strategic Fit – Bristol City Council Corporate Plan 2008-11; Bristol City Council

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
Going for growth that we all can contribute to and benefit from.	The project assists regeneration and growth that benefits the residents & businesses of South Bristol.	Reduced congestion assists regeneration and growth that benefits the residents & businesses of South Bristol.	Improved transport links assist regeneration and growth that benefits the residents & businesses of Bristol and North Somerset.
Achieving lasting improvements in the key services we provide that we need to improve: – For efficient, responsive services – For children and young people. – For older people and disabled people.	The project assists regeneration and growth in the disadvantaged areas of South Bristol and assists equality of opportunity for children, young people, older people and the disabled.	Reduced congestion assists regeneration and growth in the disadvantaged areas of South Bristol and assists equality of opportunity for children, young people, older people and the disabled.	Improved access to the Rapid Transit, cycling and walking networks improve access to education, employment, healthcare and leisure, and assists equality of opportunity for children, young people, older people and disabled people.
Ensuring that citizens feel safe from crime and anti-social behaviour and can enjoy a healthy lifestyle.	The project assists regeneration and growth giving greater opportunities for prosperous, healthy communities.		Improved access to the cycling and walking network offers choices for a healthier lifestyle.
Ensuring that Bristol residents experience significant change in the physical quality of their neighbourhoods and have opportunities to shape improvements at this level.	The project assists regeneration and growth giving greater opportunities for prosperous inclusive communities.	Reduced congestion assists regeneration and growth giving greater opportunities for prosperous inclusive communities.	Improved transport links improve access to education, employment, healthcare and leisure thus assisting more prosperous and healthier communities.

Table 2.9 : Strategic Fit – North Somerset Council Corporate Plan 2008 – 2011; North Somerset Council

	South Bristol Link – Scheme Objectives		
	To facilitate regeneration and growth in South Bristol.	**To Reduce congestion in South Bristol and adjacent areas of North Somerset.**	**To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport.**
Promoting lifelong learning opportunities	The project assists regeneration and growth giving greater opportunities for prosperity and lifelong learning		Improved accessibility by Rapid Transit, cycling and walking gives greater transport choice when accessing education, employment, healthcare and leisure particularly for those who do not, or choose not, to own a car.
Enhancing health and well-being	The project assists regeneration and growth giving greater opportunities for prosperous, healthy communities.	Reduced congestion improves air quality, enhancing health and well-being.	Improved accessibility by Rapid Transit, cycling and walking gives greater transport choice when accessing education, employment, healthcare and leisure particularly for those who do not, or choose not, to own a car.
Protecting and improving the environment	The project assists regeneration, potentially reducing the need for travel, reducing fuel consumption and levels of greenhouse gas emission.	Reducing congestion assists reduced fuel consumption and levels of greenhouse gas emissions	
Building safer and stronger communities	The project assists regeneration and growth giving greater opportunities for prosperous, safer, stronger communities.	Reduced congestion assists regeneration and growth giving greater opportunities for prosperous, safer, stronger communities.	Improved transport links assist regeneration and growth giving greater opportunities for prosperous, safer, stronger communities.
Increasing prosperity	The project assists regeneration and growth giving greater opportunities for prosperous businesses and communities.	Reduced congestion assists regeneration and growth giving greater opportunities for prosperous businesses and communities.	Improved transport links assist regeneration and growth giving greater opportunities for prosperous businesses and communities.
Improving the way we work	The project assists local regeneration, potentially reducing the need to travel to work.		

2.6 REGIONAL SUPPORT

The South Bristol Link is identified in the Regional Funding Allocation, profiled to start in 2014/15. A letter confirming this has been received from the Strategic Leader's Board and is included as Appendix 2.4.

The South Bristol Link sits within the sub-regional major scheme strategy as part of an integrated suite of transport improvements for the West of England, which also includes:

- The Greater Bristol Bus Network (GBBN): includes bus priority and other improvements on ten sub-regional corridors. Implementation of GBBN began in late spring 2008.

- The Bath Package: A range of measures aimed at improving alternatives to the car by providing a modern, integrated and easy-to-use public transport system. The scheme received first stage approval from the DfT in early October 2007

- Rapid Transit Ashton Vale to Temple Meads and Bristol City: A pre-requisite for the South Bristol Link Rapid Transit, the scheme is anticipated to receive Programme Entry shortly.

- Weston Package Phase 1: A series of improvements to the transport infrastructure of Weston-super-Mare, the scheme is anticipated to receive Programme Entry shortly.

- North Fringe to Hengrove : A package of improvements aimed at linking housing with business and tackling current traffic and congestion issues. A Bid for Programme Entry is scheduled for March 2010.

Schemes in the second half of the RFA period also comprise:

- Portishead Rail corridor.
- Greater Bristol Metro Rail project.
- M5 Junction 21 bypass.
- Callington Road link/Bath Road improvements.
- Rapid Transit - Temple Meads to Emersons Green.

The West of England sub-region is the promoter of the South Bristol Link and authorities and other key stakeholders attend regular meetings of the Project Board.

2.7 APPENDICES TO CHAPTER 2

Appendix 2.1: Options Appraisal Report; Mott MacDonald; Feb 09.

Appendix 2.1a: Options Appraisal Report – Figs 3.3-3.4

Appendix 2.1b: Options Appraisal Report – Figs 5.1-5.2

Appendix 2.1c: Options Appraisal Report – Figs 6.1-6.3

Appendix 2.1d: Options Appraisal Report – Figs 6.4-6.6

Appendix 2.1e: Options Appraisal Report – Figs 6.4-6.6

Appendix 2.2: Report to Joint Transport Executive Committee; NSC / BCC; Oct 09

Appendix 2.3 Briefing Note to Executive Members for Transport; NSC and BCC; Oct 09

Appendix 2.4 South West Councils – Confirmation Letter

South Bristol Link

Major Scheme Business Case

3

The Value for Money Case

An explanation of the transport modelling, economic appraisal and NATA

West of England Partnership

Bath & North East Somerset Council

Bristol City Council

North Somerset Council

South Gloucestershire Council

3 The Value for Money Case

3.1 INTRODUCTION

This Chapter presents the appraisal and value for money assessment for the South Bristol Link.

The appraisal demonstrates the strength of the case for the Scheme with a Benefit-Cost Ratio (BCR) of 5.8, meeting the Department for Transport's (DfT) criteria for high value for money schemes (BCR greater than 2).

The scheme appraisal is presented in the following sections:-

- **Transport Modelling and Model Forecasting** - the approach adopted to forecasting the demand for the Rapid Transit and highway elements of the scheme.
- **Scheme Impacts** - a summary of the patronage forecasts and highway flows for the Preferred and Lower Cost schemes.
- **Cost Benefit Analysis** - a summary of the scheme capital and operating costs and the results of the economic analysis for the Preferred and Lower Cost Options.
- **Risk Assessment and Optimism Bias** - the outcome of the Quantified Risk Assessment and the assumptions about Optimism Bias used in the appraisal.
- **NATA assessment** - an assessment of the scheme against the Government's objectives for transport: Environment; Safety; Economy; Accessibility; and Integration.
- **Appraisal Summary Table** - a summary of the overall benefits and costs of the scheme, identifying in turn the impacts on each of the criteria within the standard Appraisal Summary Table format
- **Sensitivity and Scenario Analysis** - description of the sensitivity tests that have been undertaken to explore the robustness of the appraisal of the SBL.
- **Supporting Information:**
    - Distribution and Equity Analysis - summary of the distribution of the costs and benefits

- Affordability and Financial Sustainability - summary of the profile of costs and revenues
- Practicality and Public Acceptability - identification of the implications for the implementation of the RT scheme.
- Treatment of Ten Year Plan Targets

- **Overall Value for Money Conclusions**: - summary of the conclusions from the appraisal of the scheme.

As appropriate, detailed descriptions and analyses are presented in the Appendices which are listed at the end of this Chapter.

3.2 TRANSPORT MODELLING

3.2.1 Introduction

The South Bristol Link (SBL) has been assessed using a specifically updated version of the Greater Bristol Transport Study model (G-BATS3). This is a multi-modal transport model, consisting of three elements:

- a highway assignment model representing vehicle-based movements across the Greater Bristol area for; a typical 2009 AM peak hour (08:00 – 09:00), an average Interpeak hour (10:00 – 12:00) and a PM peak hour (17:00 – 18:00);

- a public transport assignment model representing bus and rail movements across the same area and time periods;

- a five-stage multi-modal incremental demand model that considers the impact of changes in generalised transport costs across a 24-hour period (07:00 – 07:00) on choice of frequency, main mode, time period, destination, and sub-mode.

The G-BATS3 model has been developed in consultation with the DfT and its advisers, and was used for the Rapid Transit Ashton Vale to Temple Meads MSBC submitted to the DfT in March 2009.

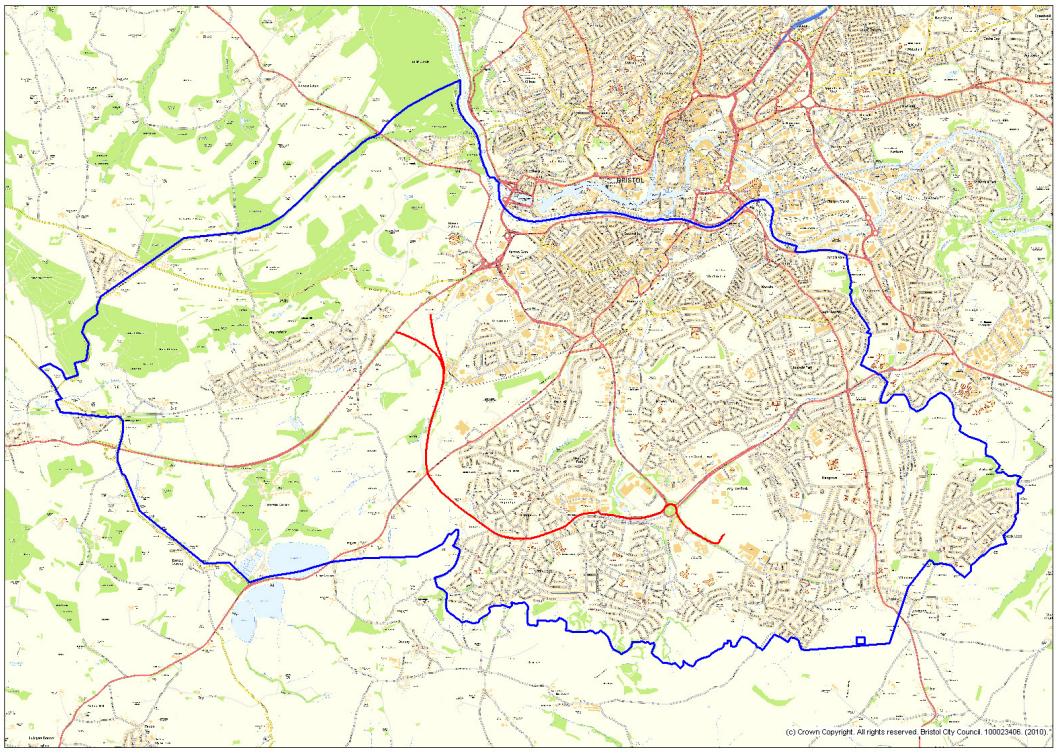
For SBL, with the scheme located on the edge of the urban area, it was considered that the G-BATS3 zoning and network coding is not sufficiently detailed to accurately represent local highway flow patterns or to distinguish between alternative stops on the proposed SBL Rapid Transit route.

In view of this, and the requirements for collection of new data, costs and time implications, the SBL methodology adopts a two-stage modelling process combining the strengths of the existing G-BATS3 demand model (the ‘higher

stage') and new, more detailed assignment models (G-BATS3 SBL) for the SBL local area (the 'lower stage').

The lower stage SBL highway and public transport assignment models use a finer zoning system increased to give a sufficient level of detail around SBL Rapid Transit stops and alternative bus stops in the SBL corridor and a more detailed network representation in the core modeling area shown in Figure 3.1 The core area was determined from the earlier SBL Option Identification Study which showed the extent to which the introduction of the proposed SBL scheme influenced the flows within the full G-BATS3 modelled area. .

Figure 3.1: SBL Core Modelling Area



The new lower stage model (G-BATS3 SBL) has been validated to a 2009 base year. It includes updated highway and public transport networks, and new demand matrices using recently collected highway and public transport survey data. The demand model has been updated to use costs from the G-BATS3 SBL model within the study area, and from the existing higher stage G-BATS3 model outside. The realism tests have been updated in accordance with WebTag Unit 3.10.4.

The changes made to the G-BATS3 model for the SBL core area are summarised below:

- enhancing the zoning system for the assignment models;
- enhancing the highway network;
- updating bus service representation to the 2009 timetable;
- updating the highway and public transport demand matrices to incorporate newly-collected survey data;
- revalidating the highway and public transport assignment models to a 2009 base year; and
- changes to trip end modelling processes to be consistent with current WebTAG guidance.

The SBL model has been developed by the Councils' modelling and appraisal term consultant, Atkins, in consultation with The Denvil Coombe Practice. Details of the modeling methodology are set out in Appendix 3.1

The G-BATS3 SBL model is summarised in the sections below, with full details set out in :-

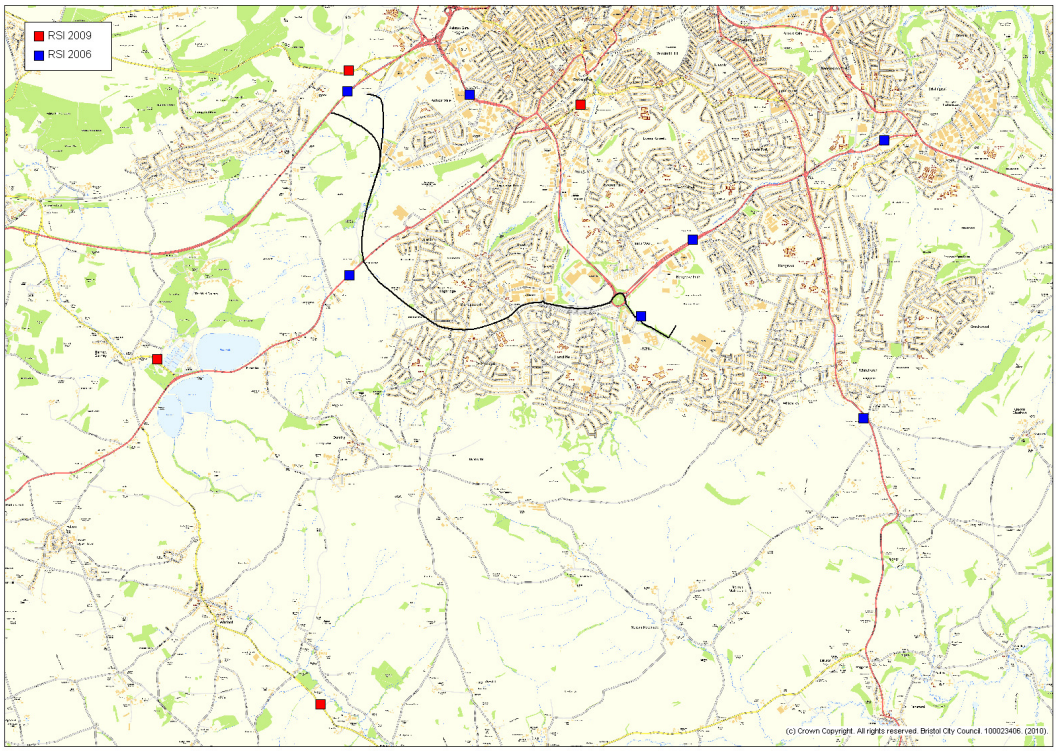
- Appendix 3.2: Highway Assignment Model Development Report
- Appendix 3.3: Public Transport Assignment Model Development Report
- Appendix 3.4: Demand Model Development Report

3.2.2 Data collection

Data for calibration and validation of the G-BATS3 SBL model has been taken from the Councils' ongoing monitoring programmes, along with additional surveys undertaken specifically for the development of this Bid.

Four new Roadside Interview Surveys were carried out in 2009, which supplement surveys undertaken in 2006. The locations of these surveys are shown in Figure 3.2

Figure 3.2: RSI Surveys



New highway count data has been collected and new journey time surveys on six routes have been undertaken to supplement data collected in 2007.

Public transport data collection has taken the form of on-board bus occupancy and origin-destination surveys. On-board bus origin-destination surveys have taken place in November 2008, July 2009 and November 2009 covering all the main bus routes in the SBL corridor. On-board bus occupancy counts have been undertaken in July and November 2009.

Full details of the data collection is set out in Appendix 3.13 Data Collection Report

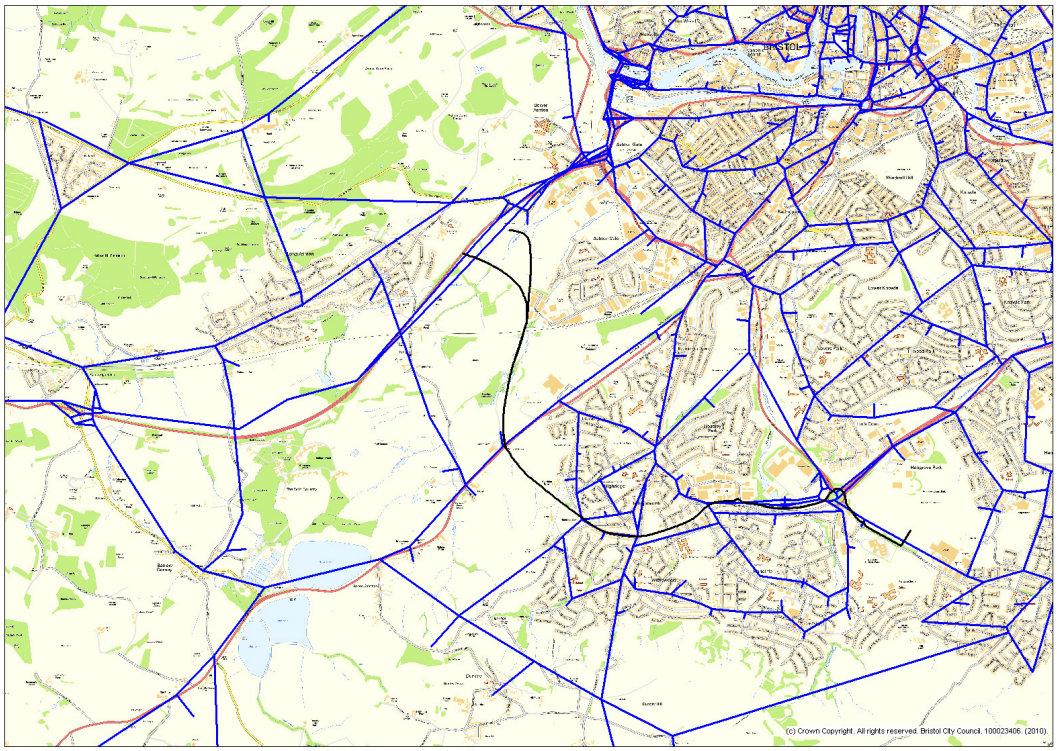
3.2.3 Highway model

The Saturn-based G-BATS3 highway model covers the whole of the West of England Partnership area, but with a detailed simulation area focused on the urban area of Bristol, South Gloucestershire and its fringe.

The G-BATS3 Highway Assignment Model (HAM) has been enhanced to provide an updated 2009 base model for testing the South Bristol Link MSBC. A more detailed model was created for the core modelling area, which serves as a supply model providing cost skims to the strategic G-BATS3 model.

The model network shown in Figure 3.3 below, is common to both the highway and, with the addition of the rail network, the public transport models.

Figure 3.3: G-BATS3 SBL model network



The model enhancement covers the main SBL area south-west of central Bristol, where finer zoning was adopted and the network was further refined. Trip patterns were updated from the 2006 G-BATS3 base model to 2009 and merged with new roadside interview data for 2009 on key SBL routes. This provides greater certainty regarding the nature of the demand in the HAM, one of the key previous concerns of the DfT

Separate models were developed to represent the AM peak, Interpeak and PM peak hours.

The updates to the G-BATS3 SBL highway model are summarised below:

- more detailed zoning in the SBL area;
- updating the movements in the existing highway demand matrix within the SBL area to a 2009 base year, using new data collected for the study;
- updating the highway network in the SBL area;

- updating coding of bus routes to the November 2009 timetable; and
- re-validating the HAM using new traffic counts and journey time data.

The DMRB Vol 12 describes the standards against which HAM should be judged. The results can be summarised as follows:

- the AM Peak HAM meets acceptability guidelines for screenline flow validation as nearly all of the screenlines meet DMRB criteria;
- the Inter-Peak HAM meets acceptability guidelines for screenline flow validation as all of the screenlines meet DMRB criteria; and
- the PM Peak HAM meets acceptability guidelines for screenline flow validation for nearly all of the screenlines against the DMRB GEH criteria but just fails to meet the DMRB flow criteria.

To demonstrate the fitness of purpose of the Base Year model for testing the SBL scheme, an analysis of the traffic using the SBL has been undertaken. The aim of the test is to determine the proportion of traffic that comes from observed and estimated sources. The test used the SATRAP function of SATURN to assign selected matrices to the paths from a particular assignment. In this case, the test assigns the following base year matrices to the 2016 AM peak paths:

- Pre-RSI trip matrix
- RSI trip matrix
- Matrix estimated (ME2) trip matrix

The analysis shows that in the eastbound direction approximately 5% of trips would come from the pre-RSI matrix, almost 75% of trips would come from the RSI matrix and 20% would come from matrix estimation. In the westbound direction approximately 25% of trips would come from the pre-RSI matrix, almost 60% of trips would come from the RSI matrix and 15% would come from matrix estimation.

From this analysis it has been concluded that the source of data for the majority of trips using the SBL is observed data and that the model is fit for assessing the SBL scheme.

It is concluded that G-BATS3 SBL provides an improved representation of existing traffic conditions in the core modelling area and can therefore be used to forecast the likely traffic impacts of the SBL scheme.

Full details are set out in Appendix 3.2 Highway Assignment Model Development Report.

3.2.4 Public Transport Assignment model

The public transport assignment model (PTAM) has been developed to represent bus, rail and bus-based Park & Ride. It uses the same network and zoning as the highway model, with the addition of rail and, in the forecast models, allows the addition of new modes such as Bus Rapid Transit. The public transport and demand models both use Emme software.

The highway and public transport models are linked to ensure that bus travel times are sensitive to changes in highway travel times and are calibrated to match observed times.

For G-BATS3 SBL the following revisions have been made to the public transport assignment model:

- more detailed zoning in the SBL area;
- updating the movements in the existing bus demand matrix within the SBL area to a 2009 base year, using new data collected for the study;
- updating coding of bus routes to the November 2009 timetable;
- controlling end-end bus journey times to match travel times in the November 2009 timetable;
- revalidating the bus network and matrices on the basis of newly collected on-board bus occupancy counts;
- upgrading rail demand to a 2009 forecast year; and
- updating bus and rail fares to 2009 values and prices

The SBL PTAM has been validated to newly collected onboard bus counts, and a high standard of validation has been achieved, as detailed in Appendix 3.3. In particular, validation was achieved on 100% of the bus link counts within the south Bristol area in each of the three time periods.

Full details are set out in Appendix 3.3 Public Transport Assignment Model Development Report.

3.2.5 Demand model

The WebTAG compliant G-BATS3 demand model represents travel choices across a typical 24-hour weekday period explicitly representing an AM peak period (07:00–10:00), an Interpeak period (10:00–16:00), a PM Peak period (16:00–19:00), and an Off-peak period (19:00–07:00).

It uses an incremental hierarchical form, pivoting off the base year. The hierarchy of responses included is; trip frequency, main mode choice, macro time period choice, destination choice and sub-mode choice. The model is segmented by car availability, trip purpose and income.

A Production–Attraction (PA) formulation is used, compliant with WebTAG guidance. The PA formulation with time period choice was specifically developed for the G-BATS3 demand model in consultation with the DfT. The methodology adopted allows the demand and costs arising from the return leg of home-based trip to be estimated, when the timing of the return leg is dependent on the outward journey.

The G-BATS3 demand model functions at a slightly more aggregate zoning level (600 zones) than that of the G-BATS3 SBL highway and public transport assignment models (650 zones). The assignment model zones are sub-divisions of demand model zones, ensuring that the consistency between costs and demand at each stage of the G-BATS3 SBL model is maintained.

The demand model iterates between the hourly-based AM, IP and PM supply models and the 24-hour demand model. Two convergence algorithms were implemented to achieve convergence in the demand/supply interactions with the average algorithm selected based on its performance following testing. The demand model achieves the required levels of convergence stipulated by WebTAG.

Value of time variation with trip length has been introduced into the demand model for car available Home-based Other and Non-Home-based Other trips, and non-car available non-work purposes including Home-based Work. This technique has helped in achieving WebTAG required elasticities especially for longer distance trips due to the nature of the logit-based demand modelling framework.

The validity of the demand model has been assessed by undertaking a series of realism tests. The main purpose of realism tests is to demonstrate that the chosen model parameters replicate long-term elasticities derived from best practice. As locally calibrated demand parameters are not available G-BATS3 uses sensitivity parameters provided in WebTAG Unit 3.10.3.

The realism tests were undertaken assuming:

- a 10% increase of fuel prices for the car fuel cost elasticity test; and
- a 10% increase of bus and rail fare for the public transport fare elasticity test.

The parameters adopted were all within the range of illustrative WebTAG values, and mostly at or around median values. The realism tests undertaken

have successfully identified a set of demand response parameters that replicated both the local conditions and conformed to the hierarchical tree structure recommended by WebTAG: Frequency, Mode, Time period, and Destination choice.

The derived car fuel cost elasticity, car journey time elasticity and PT fare elasticity, established through the realism tests, have been reported by purpose, person type (household income), time period and spatial locations in Appendix 3.4.

All outturn elasticity values by purpose are within WebTAG required ranges. PT fare elasticites for employer's business are quite small although WebTAG does not provide elasticity by purpose for comparison. The realism tests also showed that, as expected, discretionary trips exhibited higher elasticities than non-discretionary trips.

On this basis, the G-BATS3_SBL demand model is considered to be 'fit for purpose'. It is robust, as demonstrated through the realism tests, and can therefore be used with confidence to forecast the demand responses of the South Bristol Link.

3.3 MODEL FORECASTING

3.3.1 Introduction

Transport forecasting is a three-stage process. The first stage requires the generation of future year travel demand and is referred to as the 'reference case'. The second stage requires known changes in the supply of transport to be incorporated into the model, and is referred to as the 'without-intervention' case'. The final stage is to add the transport intervention under consideration, and this is referred to as the 'with-intervention case'.

The Preferred Scheme and Lower Cost Option with-intervention cases have been assessed in two forecast years (2016 and 2031) against the without-intervention case. In addition a number of sensitivity tests have been carried out, as set out in Section 3.9. The full set of model option and sensitivity tests are set out in Table 3.1.

Table 3.1: Option and Sensitivity tests

Option	2009	2016	2031
Base	✓		
Without-intervention		✓	✓

Option	2009	2016	2031
Preferred Scheme		✓	✓
Lower Cost Option		✓	✓
Low Growth sensitivity test		✓	✓
Highway model sensitivity tests		✓	✓

Full details are set out in Appendix 3.5 Forecasting Report.

3.3.2 Demand forecasting

The DfT's TEMPRO software (v6.1) provides estimates for the growth of population, employment and trip ends for future years by mode (bus, car and rail for this model) and trip purpose. The TEMPRO projections for the WEP area detailed in Appendix 3.5, were used to forecast travel growth across the whole of the sub-region for G-BATS3.

While the TEMPRO projections forecast overall growth across the West of England Partnership area, in order to match projected land-use changes more realistically at a local level, travel demand growth has been distributed using more detailed planning projections based on emerging Core Strategies, in the context of the draft South West Regional Spatial Strategy.

In addition, the site locations for planned developments provided the basis for allocating the total number of new houses and jobs to the appropriate model zones.

Trip rates for new development sites were taken from the TRICS2008 database and, in the main, distributed using the original distribution of trips in the base year model. For 'greenfield' sites the base year demand matrices did not provide a sound basis for the incremental choice modelling. In these cases the base year trip matrices were "seeded" with a synthetic trip distribution taking account of the cost of travel between zones and the relative attractiveness of each destination zone.

3.3.3 Supply forecasts

The without-intervention case includes the following schemes, added to the 2009 base year network.

Table 3.2: Without-intervention Supply Specification

Scheme	2016	2031
Greater Bristol Bus Network	✓	✓
Recent highway improvements (e.g. Hartcliffe Roundabout signalisation, Jacobs Well roundabout signalisation)	✓	✓
A38 to Cribbs Causeway distributor	✓	✓
HA M4/M5 Managed Motorway	✓	✓
Ashton Vale to Temple Meads Rapid Transit	✓	✓

Rapid Transit is modelled alongside bus in the Demand Model hierarchy. However, there is evidence to suggest that Rapid Transit has a higher degree of attractiveness compared to other public transport modes. 'Attractiveness' in this context means the propensity for travellers to choose Rapid Transit over other options, other things such as time and cost, being equal.

The relative attractiveness of Rapid Transit is modelled using a modal constant of, on average, 9 minutes, added to the in-vehicle time. The actual constant applied for each journey depends on the time spent on the Rapid Transit service (passengers spending more time on the service(s) will incur a higher modal constant) but the modal constant is calculated such that the average reduction in generalised cost for all Rapid Transit passengers is 9 minutes.

The West of England authorities have also submitted a Major Scheme Business Case for the North Fringe to Hengrove Package, which includes bus-based Rapid Transit routes serving the North Fringe, East Fringe and South Bristol via Bristol City Centre and new bus-based park and ride facilities for the M32 Motorway. A further model sensitivity test including the North Fringe to Hengrove Package is proposed.

3.3.4 Other Forecasting Assumptions

There are a number of key forecasting assumptions, in addition to changes in supply and demand, that affect model forecasting. The Forecasting Report (Appendix 3.5) describes the assumptions regarding; LGV and HGV growth, vehicle occupancy, vehicle operating costs, values of time, bus & rail fares, and parking charges.

3.4 SCHEME IMPACTS

This section provides a summary of forecast results for the Preferred Scheme

The Forecasting Report provides full details of these results including the following key indicators at 2016 and 2031:-

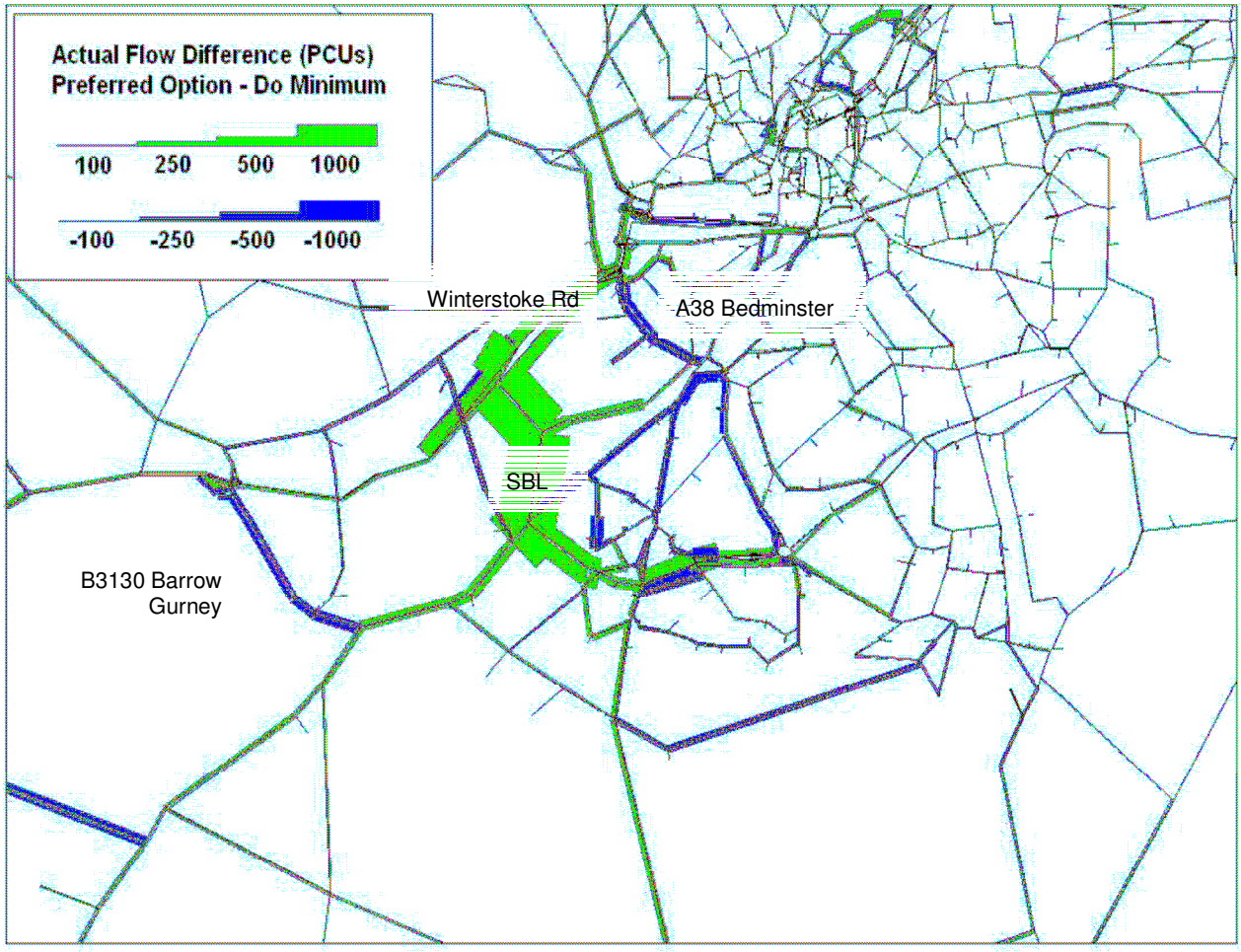
- model convergence;
- demand response;
- highway network performance; and
- public transport network performance.

The Preferred Scheme gives significant reductions in total vehicle delay, particularly in the PM peak where delays across the whole urban area are cut by over 2%. This feeds through to reductions in travel time and increases in average network speeds of approximately 0.6% in the morning peak and over 1% in the PM peak by 2031. There is a small increase in the total distance travelled.

Changes in flow as a result of the SBL are shown in Figure 3.4 for the 2031 AM Peak. It can be seen that the SBL provides reductions in traffic (shown in blue) on B3103 Barrow Gurney, A3029 Winterstoke Road, A38 through Bedminster and on local roads to the north of the scheme.

There are a total of 79 passengers boarding the SBL Rapid Transit service on the new section between Hengrove Park and the Long Ashton Park & Ride site in the AM peak hour in 2016, rising to 130 by 2031. In addition, the new route is expected to enable a better service for community transport, and private bus and coach services.

Figure 3.4: SBL highway impacts - AM Peak 2031



3.5 COST BENEFIT ANALYSIS

3.5.1 Introduction

This section reports on the economic assessments of the Preferred Scheme and the Lower Cost Option, undertaken in accordance with the latest DfT guidance, as set out in WebTAG.

Economic benefits of the scheme have been quantified using the DfTs Transport User Benefit Appraisal (TUBA v1.7C) software. Outputs from the SATURN and EMME/2 models were provided, giving details of demand, journey times, trip distances and charges or fares applicable to those trips. These were generated as matrices with average figures for each origin-destination pair and were provided for both modelled years, 2016 and 2031, and for three time periods, AM, inter-peak and PM in each year.

As the scheme opening was delayed until 2017, the 2016 modelled year has been used as a proxy in accordance with WebTAG guidance (the difference not being more than 2 years).

Annualisation factors, calculated using traffic count data recorded within and around Bristol, were used to convert hourly/daily benefits to annual benefits, based on the assumption of benefits being evenly accrued for 253 working days a year.

Further details of technical specifications applied in the calculation of scheme benefits, such as the treatment of new modes and park and ride journeys are discussed in Appendix 3.6. Economics Report

3.5.2 Underlying Assumptions

In developing the cost benefit analysis a series of assumptions is required throughout. The following sections report on the assumptions made and outturn results of the Cost Benefit Analysis.

The underlying assumptions behind the cost benefit analysis are:

- Full scheme opening year is 2017 for both the Preferred Scheme and the Lower Cost Option;
- Price Base and discount for the economic appraisal is 2002;
- Appraisal period is 60 years; and
- Discount Rate is 30 years @ 3.5% and 30 years @ 3.0%.

3.5.3 Summary of scheme costs

Scheme Costs for Appraisal

This section provides a summary of the principal elements comprising the scheme costs of the South Bristol Link. These include:-

- public accounts (including construction and land costs);
- private operator investment costs; and
- maintenance and operating costs.

Full details are set out in the Financial Case in Chapter 6.

Public Accounts

The investment costs as used in this appraisal comprise:-

- construction costs (design and build assumed),
- land costs,
- provision of new bus stops and shelters and installation of Real Time Passenger Information (RTPI) at the stops.

The estimated investment cost for each of the above items is summarised in Table 3.3 with details provided in Appendix 6.1.

Table 3.3 – Summary of Preferred Scheme Investment Costs to Public Accounts (2009 prices)

Item	Full Approval Scheme Costs (£million)
Engineering Works	34.263
Land Costs (including compensation and environmental works)	1.600
Sub-total	**35.863**
Preparation	6.362
Supervision	0.400
Quantified Risk Assessment	5.293

Item	Full Approval Scheme Costs (£million)
Total	**47.918**

Private Operator Investment Costs

The scheme costs for appraisal also include the provision of new buses for the Rapid Transit service. This is equivalent to a cost of £679,000 in the opening year with subsequent replacement costs over the appraisal period. It is assumed at this stage that these costs will be borne by the private operators. See Appendix 6.1 for further details.

Maintenance and operating costs

Maintenance costs of the scheme have been assessed for the highway and Rapid Transit infrastructure on the basis of routine annual maintenance and longer term regular renewal

The Rapid Transit will impose on the local authorities, additional maintenance costs of £0.32 million p.a. (in the opening year, 2009 prices, without allowance for real cost increases or optimism bias). These costs, relate to the upkeep of the alignment, ITS and RTPI systems and bus stops.

The Rapid Transit operating costs will be borne by the private operator/s, serving the Rapid Transit corridor. Forecast operating costs have been calculated based on modeled service running times and distances, with unit costs such as drivers' time, fuel and engineering costs accounted for. Full details of these cost calculations are provided in Appendix 6.1. The size, composition and cost of extra vehicles required for the provision of the services were also generated using this operating cost model.

With the SBL service in place alongside the Rapid Transit Ashton Vale to Temple Meads line, the Rapid Transit service can be considered as two distinct elements. Between the two services, a bus frequency of one vehicle every six minutes is provided. Of these, two out of every three are on the Rapid Transit Ashton Vale to Temple Meads line terminating at Ashton Vale. The third covers the same route as the Rapid Transit Ashton Vale to Temple Meads vehicles, but continues on the SBL to Hengrove Park.

In isolation, the Rapid Transit Ashton Vale to Temple Meads line is forecast to generate high levels of revenue for a relatively modest expenditure on operating costs. Both Rapid Transit Ashton Vale to Temple Meads and SBL services, together generate enough revenue to be profitable to the operator, even in the opening year. However, when considering the SBL line as an addition to the Rapid Transit Ashton Vale to Temple Meads service, the incremental level of

profit generated becomes less attractive. This is explained in more detail in Section 6.6.

3.5.4 Cost Benefit Analysis Outputs: Preferred Scheme

Key outputs from the economic appraisal of the Preferred Scheme are set out in Table 3.4. These values include both the direct benefits of the transport scheme itself and changes resulting from changes in accident numbers. Improvements to reliability and wider economic benefits are not included.

Values shown are for the full 60-year appraisal period and are presented in 2002 prices discounted to 2002.

Table 3.4 – Key Economic Outputs: Preferred Scheme

Item	Benefit/Costs (£m))
Users & Providers Benefits (Consumers)	174.6
Users & Providers Benefits (Business)	198.4
Private Sector Provider Impacts	-5.8
Present Value of TEE Benefits (PVB)	345.5
Total Present Value of Costs (PVC)	59.6
Net Present Value (NPV)	285.9
Benefit to Cost Ratio (BCR)	**5.79**

The BCR of 5.8 represents “Very High” value for money (VfM) according to the DfT’s categorisation. This is without consideration of other elements that the DfT would include in its overall VfM consideration, including additional benefits shown in the Analysis of Monetised Benefits and Costs, set out in Appendix 3.6.

3.5.5 Cost Benefit Analysis Outputs: Lower Cost Option

Table 3.5 shows the equivalent economic output figures for the Lower Cost Option.

Table 3.5 – Key Economic Outputs: Lower Cost Option

Item	Benefit/Costs (£m))
Users & Providers Benefits (Consumers)	168.3
Users & Providers Benefits (Business)	190.9

Item	Benefit/Costs (£m))
Private Sector Provider Impacts	-9.2
Present Value of TEE Benefits (PVB)	332.2
Total Present Value of Costs (PVC)	56.5
Net Present Value (NPV)	275.7
Benefit to Cost Ratio (BCR)	**5.88**

The BCR for the Lower Cost Option of 5.9 also represents “Very High” Value for Money (on the basis of the BCR alone, without considering all other elements of a value for money assessment).

The outputs show that the Preferred Scheme offers very similar value for money to the Lower Cost Option. The Preferred Scheme has a slightly lower BCR, but gives the larger NPV, indicating both higher costs and benefits.

These lower costs of the Lower Cost Option however include an adjustment to the vehicle type used to the less attractive double-decker with guide wheels, rather than the articulated vehicles used in the Preferred Scheme. The decision to adjust the vehicle type was made subsequently to completion of the modelling, so benefits generated for this option are based on the attractiveness factor of the more expensive vehicle type.

This comparison between options is without consideration of other appraisal elements that the DfT also account for in its overall VfM consideration.

3.6 RISK ASSESSMENT AND OPTIMISM BIAS

3.6.1 Risk Assessment

A Quantified Risk Assessment (QRA) has been undertaken for the Preferred Scheme and the Lower Cost Option to support this bid for Programme Entry. An allowance for the additional cost of mitigating the risks identified has been included in the overall scheme costs.

These QRAs are based on direct cost elements to the project and the financial consequences of delay to the construction programme from the present day to the opening year. The QRAs are confined to capital cost elements of the project and the construction programme, and exclude risks to operational costs or revenues. The Risk Registers with QRA costs are included in Appendix 4.2

The risks have been analysed as a group to determine the consequences and likelihood of more than one risk event taking place during the scheme programme. The output of this analysis gives a construction risk value for given

confidence limits. For the Preferred Scheme, the following risk exposure(s) was calculated:

- 50% Confidence Level (without Inflation) - £5.293m
- 80% Confidence Level (without Inflation) - £6.779m

For the Lower Cost Option, the following risk exposure(s) was calculated:

- 50% Confidence Level (without Inflation) - £5.673m
- 80% Confidence Level (without Inflation) - £7.152m

The 50% Confidence Risk exposure has been included within the total scheme costs for this Programme Entry MSBC. Further details of the QRA exercise are provided in Chapter 4 and Appendix 4.2.

The economic appraisal cost (Table 3.6), including an allowance for risks and real cost increases but excluding optimism bias adjustments, is estimated at £49.5m.

Table 3.6 Summary of Preferred Scheme Costs to Public Accounts: Undiscounted 'Base' Scheme Costs for Appraisal (£,000)

Item	2010	2011	2012	2013	2014	2015	2016	Total
Investment Costs excluding Risk (Without inflation)					5,333	17,331	13,599	36,263
Investment Costs including Risk (Without inflation) "A"					5.994	19.978	15,583	41,556
Preparation Costs without inflation) "B"	701	1,612	1,546	1,155	1,348			6,362
Total Investment Costs without inflation ("A" + "B")	701	1,612	1,546	1,155	7,342	19,978	15,583	47,918
Assumed Annual Construction Cost Inflation (CCI) "D"	2.7%	2.7%	2.7%	2.7%	2.7%	6.0%	6.0%	
Assumed Annual General Inflation (GI) "E"	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	

Item	2010	2011	2012	2013	2014	2015	2016	Total
Annual Real Increase (RI) ("D"/"E")	1.00%	1.00%	1.00%	1.00%	1.00%	1.03%	1.03%	
Cumulative Real Increase "F" factor	1.00	1.00	1.00	1.00	1.00	1.03	1.06	
Total Investment Costs (Contribution due to real cost increases) ("A" +"B" x "F"	701	1,612	1,546	1,155	7,342	20,577	16,518	49,451

3.6.2 Optimism Bias

Optimism bias is the tendency of appraisers to underestimate costs and time needed for implementation programmes. The DfT has therefore established the necessary uplifts to apply to cost estimates to ensure that the risk of cost overrun is below certain pre-defined levels.

The recommended level of optimism bias for highway schemes at Programme Entry is 44%. There are no elements of this scheme for which other rates are applicable and no clear evidence is currently available to suggest a reduction of this level of optimism bias is necessary. Therefore a 44% uplift has been applied to all applicable costs.

3.7 NATA ASSESSMENT

3.7.1 Introduction

The Scheme proposals have been assessed against the Government's overarching objectives for transport, as embodied in the NATA assessment framework, namely: Environment; Safety; Economy; Accessibility; and Integration.

A commentary on the extent to which the Preferred and Lower Cost schemes achieve the above objectives and associated Sub-objectives is provided and summarised in the Appraisal Summary Table (AST).

3.7.2 Environmental

Introduction

This section presents a summary of the NATA assessment for Environment Impact. The methodology for assessment is taken from the DfT's website for guidance on the conduct of transport studies (WebTAG).

WebTAG requires the appraisal of transport options against 10 environmental Sub-objectives. The 10 Sub-objectives assess impacts on the built and natural environment, and on people. They are:-

- Landscape;
- Townscape;
- Biodiversity;
- Heritage of Historic Resources;
- Water Environment;
- Physical Fitness;
- Journey Ambience;
- Noise;
- Local Air Quality;
- Greenhouse Gases;

Full details are set out in the Environmental Impact Reports in Appendix 3.7 for the Preferred Scheme, and Appendix 3.8 for the Lower Cost Option. These Appendices include a map showing environmental constraints within a 2km study area of the Scheme

Environmental Assessment: Preferred Scheme

The impact on Landscape and Townscape elements as a result of the Scheme have been appraised as **Moderate Adverse**. Despite the presence of existing local A roads, this relatively open landscape currently considered as typical rural urban fringe would be further fragmented and degraded with the addition of the Scheme. In addition, the strong 19th and 20th century suburban townscape would be likely to be adversely affected by the proposals, with changes to the scale, density and appearance of the area as a result of the Scheme. The proposals would be a prominent feature within the townscape affecting both character and visual amenity within the local area.

For Biodiversity features, the Scheme would potentially result in a **Slight Adverse** impact. This is due to direct habitat loss to locally designated sites. In addition, there would potentially be impacts to nationally and internationally protected species including badgers, reptiles, breeding birds, otter, great crested newts and bats. Appropriate mitigation would reduce potential adverse impacts and should include an ecological watching brief with works undertaken

under appropriate licenses. Compensatory habitat as mitigation should be considered where the Scheme is likely to directly impact designated sites.

There would be no direct effects to any designated heritage assets as a result of the Scheme. However, there may be some minor changes to the setting of Castle Farm Grade II Listed Building at operation, and construction could result in physical loss of the potential archaeological resource. Construction would also result in changes to the form, pattern and character of a section of the historic landscape which is of low value. As such, and with mitigation using best practice methodologies, the impact of the Scheme upon the Historical Heritage resource is considered to be **Slight Adverse**.

Overall, the impact of the Scheme upon the water environment is also assessed as **Slight Adverse**. The Scheme would cross several water courses which would require culverting/bridging. This may result in disruption/alterations to surface water flows and quality. In addition, the discharge of road drainage to surface water bodies may also adversely impact quality. The Scheme would pass through several EA designated flood zones and the underlying soils predominantly have impeded drainage so that additional runoff may exacerbate flooding in these areas. Groundwater quality may also be adversely impacted through the infiltration of road runoff, and from potential leachates from several landfills that the Scheme would cross. Further information regarding geotechnical issues is included in Appendix 3.7b.

The WebTAG appraisals undertaken here have concluded that the Scheme would result in a **Moderate Beneficial** impact for Physical Fitness and Journey Ambience. An increase in Physical Fitness is anticipated from the implementation of a cycleway and pedestrian route associated with the Scheme. The Scheme would also result in an improvement in journey quality by improvements in Traveller Care, Views and Stress. There would be significant improvements in Traveller Care by the provision of more facilities and cleaner services, and stress and route uncertainty are expected to diminish due to the integrated design of the Scheme.

For noise impacts, the WebTAG assessment shows that a relatively small number of properties are predicted to experience a large noise disbenefit through the introduction of a new noise source, and a relatively large number of properties are predicted to experience a small noise benefit. The overall assessment score shows a net benefit both in terms of the net present value of noise of the Scheme and change in population annoyed by noise.

The assessment undertaken here indicates that there would be an overall improvement in local air quality with the Scheme in place within the Opening Year for both nitrogen dioxide and particulate matter. This improvement would remain unchanged within the Design Year. The variations in population exposure however for both assessment years, are predicted to be extremely

small. The impact of the Scheme is therefore considered likely to be of **Negligible** significance.

The WebTag appraisal shows that the Scheme would have a **Positive** impact on Greenhouse Gases. In 2018, the Preferred Option would result in an overall reduction in carbon emissions between the Do-Minimum and Do-Something scenarios. A small decrease of 78 tonnes of carbon is predicted in the Opening Year as a result of changes to the speed of vehicles and reductions in travel times.

Environmental Assessment: Lower Cost Option

This report presents the NATA assessment for Environment Impact for the Lower Cost Option. The Scheme has been appraised using the principles contained in the DfT's website for guidance on the conduct of transport studies (WebTAG).

The impact on Landscape and Townscape elements as a result of the Scheme has been appraised as **Moderate Adverse**. Despite the presence of existing local A roads, this relatively open landscape currently considered as typical rural urban fringe would be further fragmented and degraded with the addition of the Scheme. In addition, the strong 19th and 20th century suburban townscape would be likely to be adversely affected by the proposals, with changes to the scale, density and appearance of the area as a result of the Scheme. The proposals would be a prominent feature within the townscape affecting both character and visual amenity within the local area.

The only variation with regards to landscape and visual impact between the Lower Cost Option and the Preferred Scheme relates to the most northerly end of the Scheme at the link with the Long Ashton Park and Ride. Under the Lower Cost Option, there would be a slight decrease in severity of landscape and visual impact with the removal of the segregated Rapid Transit link at this location. However, given the context of the Scheme as a whole, it is not felt that this change would warrant an alteration in the overall **Moderate Adverse** assessment score for Landscape. The impacts for Townscape would remain unchanged.

For Biodiversity features, the Scheme would potentially result in a **Slight Adverse** impact. This is due to direct habitat loss to locally designated sites. In addition, there would potentially be impacts to nationally and internationally protected species including badgers, reptiles, breeding birds, otter, great crested newts and bats. Appropriate mitigation would reduce potential adverse impacts and should include an ecological watching brief with works undertaken under appropriate licences. Compensatory habitat as mitigation should be considered where the Scheme is likely to directly impact designated sites.

The impacts to individual ecological receptors and the overall assessment score would remain the same as Slight Adverse for both the Preferred Scheme and the Lower Cost Option. An additional area of species rich grassland habitat would be impacted upon for the Lower Cost Option, although this impact could feasibly be reduced to **Slight Adverse** with mitigation.

Overall, the differences between the Lower Cost option and the Preferred Scheme are considered to be negligible for Heritage impacts. There would be no direct effects to any designated heritage assets as a result of the Scheme. However, there may be some minor changes to the setting of Castle Farm Grade II Listed Building at operation, and construction could result in physical loss of the potential archaeological resource. Construction would also result in changes to the form, pattern and character of a section of the historic landscape which is of low value. As such, and with mitigation using best practice methodologies, the impact of the Scheme upon the Historical Heritage resource is considered to be **Slight Adverse**.

The impact of the Lower Cost Option upon the water environment is also assessed as **Slight Adverse**. The Scheme would cross several watercourses which would require culverting/bridging. This may result in disruption/alterations to surface water flows and quality. In addition, the discharge of road drainage to surface water bodies may also adversely impact quality. The Scheme would pass through several EA designated flood zones. In the vicinity of the Long Ashton Park and Ride - an area of moderate-significant flood risk and where both Scheme options would pass over a landfill - the Lower Cost Option would be slightly preferential as a result of the marginally lower landtake associated with the Scheme as compared to the Preferred Scheme. In areas such as this, the lower the land take, the lower the associated risks in terms of both flooding and groundwater contamination. However, the overall reduction in land take between the Lower Cost Option and the Preferred Scheme is negligible when considering the Scheme as a whole, and therefore, the overall assessment score for the water environment remains unchanged as **Slight Adverse**.

The WebTAG appraisals undertaken here have concluded that the Scheme would result in a **Moderate Beneficial** impact for Physical Fitness and Journey Ambience for both the Lower Cost Option and the Preferred Scheme. An increase in Physical Fitness is anticipated from the implementation of a cycleway and pedestrian route associated with the Scheme. The only applicable difference for Physical Fitness would be through the removal of the segregated Rapid Transit section that would connect to the Long Ashton Park and Ride with the Preferred Scheme. Since the Lower Cost Option would include provision of a shared cycle and footway at this location, the differences between the two Scheme options are negligible.

The Scheme would also result in an improvement in journey quality by improvements in Traveller Care, Views and Stress. There would be significant improvements in Traveller Care by the provision of more facilities and cleaner

services, and stress and route uncertainty are expected to diminish due to the integrated design of the Scheme. There is unlikely to be a distinction between the Preferred Route and the Lower Cost option for Journey Ambience, so that the assessment remains the same as **Moderate Beneficial**.

At the time of assessment, traffic forecasts were not available for the Lower Cost Option for Noise and Air Quality assessment. As the two Options are broadly similar, the appraisal was based on the Preferred Scheme appraisal with a qualitative assessment of the differences between the two options. It was not possible to produce the Net Present Value of the Lower Cost Option for Noise, or the Net Noise Annoyance Change. However, a comparison of noise levels at properties directly adjacent to the scheme corridor has been undertaken. It is concluded that at these properties noise levels with the Lower Cost Option would be marginally lower, however this would be unlikely to change the assessment score significantly.

It has also not been possible to produce the Net Present Value of the Lower Cost Option for Air Quality. However, a comparison of air quality levels at properties directly adjacent to the scheme corridor has been undertaken. It is concluded that at these properties air quality levels with the Lower Cost Option would be marginally lower. However, this would be unlikely to change the assessment score significantly, and it is anticipated that the scores for the Lower Cost Options would be broadly similar to that of the Preferred Scheme should the scheme achieve the same objectives for the South Bristol road network.

The Carbon Assessment undertaken for the Lower Cost Option states that in 2018, the Lower Cost Scheme Option would result in a small overall decrease in carbon emissions between the Do-Minimum and Do-Something scenarios. A decrease of 102 tonnes of carbon is predicted in the Opening Year as a result of changes to the speed of vehicles and reductions in travel times

3.7.3 Safety

The safety criteria in NATA have been assessed in accordance with the latest guidance and the relevant information, including quantitative data where available, is summarised in the AST Tables and described below.

Security Sub-objective.

Particular attention and importance is attributed to the security of Rapid Transit passengers while making their way to and from the stops, waiting for services and travelling on the vehicle. The location of the stops, often at junctions, has been selected to enable safe and secure access to the stops including dedicated crossing facilities with convenient, well-lit and safe pedestrian links.

Good design of stops, interchanges and passenger facilities is fundamental to the public transport element of the Scheme. With quality facilities such as CCTV, real time passenger information, and high standard of lighting, security is central to the design of the stops.

The vehicles themselves will be planned to support the image of the Rapid Transit system, providing good levels of accessibility, security, information and comfort. They will be equipped with CCTV throughout the vehicle such that the driver can see CCTV images of all passenger areas.

Overall assessment of security impact – **Moderate Positive**

Safety Sub-objective

The impact of the Preferred Scheme and Lower Cost Option on the number of accidents has been assessed using guidance in WebTAG 3.4.1. The potential impact on the accidents in the study area has been estimated using an Atkins spreadsheet model based on the COBA11 recommended methodology for calculating accident frequency and costs, using combined link and junction accident rates.

The calculations use a combination of local accident data and default COBA accident rates, which are defined rates in terms of accidents per million vehicle kilometres and casualties per accident. A general decline in the incidence and severity of accidents through time is assumed, in line with recent trends in and policies for road safety.

The methodology requires :

- Collection and processing of existing local accident data records;
- Allocation of accidents to links in the do-minimum (DM) network;
- Defining existing accident rates (local accident data and default values); and
- Calculation of Monetary Values.

Full details of the methodology adopted are set out in Appendix 3.11 Accident Assessment

Table 3.7 shows the expected accident and casualty increase of the Preferred Scheme compared to the DM for the two modelled years 2017 and 2031. The difference between options is very slight in terms of number of resulting number of accidents and casualties. In 2017 there would be an overall slight increase of 8.3 PIAs per year, increasing to 9.4 by 2031 compared to the DM. The accident increase reflects a gradual increase in traffic flows, caused by the scheme.

Table 3.7: Change in Accidents / Casualties – Preferred scheme

	DM		Preferred Scheme		Difference	
	2017	2031	2017	2031	2017	2031
Fatalities	35.1	42.9	35.2	43.0	-0.1	-0.1
Serious injuries	345.5	417.1	346.6	418.3	-1.1	-1.2
Slight injuries	4437.6	5,346.7	4,447.7	5,358.1	-10.2	-11.4
Total casualties	4,818.2	5,806.7	4,829.5	5,819.4	-11.3	-12.7
PIAs	3,227.7	3,878.0	3,236.1	3,887.3	-8.3	-9.4
Damage only	43,272.8	51,368.2	43,398.6	51,513.4	-125.8	-145.2
Total accidents	46,500.5	55,246.1	46,634.6	55,400.7	-134.1	-154.6

60-year monetary changes in accidents, as predicted from the COBA assessment, are indicated in Table 3.8. Prices are 2002 (Discounted to 2002 at 3.5% p.a. to 2046, 3% p.a. 2047 onwards). Over the appraisal period, the total cost of the scheme would be -£22.2m compared to the DM.

Table 3.8 – Undiscounted cost (£m) – Preferred scheme

	DM			Preferred Scheme			Difference		
	2017	2031	60 years	2017	2031	60 years	2017	2031	60 years
Casualty costs (£m)	191.5	297.7	5,611.1	192.0	298.5	5,625.6	-0.5	-0.8	-14.4
Accident Costs (£m)	106.8	164.1	3,098.7	107.1	164.5	3,106.5	-0.3	-0.4	-7.8

	DM			Preferred Scheme			Difference		
	2017	2031	60 years	2017	2031	60 years	2017	2031	60 years
Total Costs (£m)			8,709.9			8,732.1			-22.2

Results for the Lower Cost Option (set out in Appendix 3.11) are very similar to the Preferred Scheme, with a total cost of -£22.4m

Whilst the Preferred Scheme and Lower Cost Option itself provides a new optimally designed alternative route, presenting a lower associated accident risk than the surrounding roads, an increase in PIAs and associated costs is expected. This is due to the increase in overall vehicle kilometres travelled within the study area and the expected accident increase is the result of very small incremental increases in accidents across many links.

As might be anticipated, the scale of difference between the Preferred Scheme and Lower Cost Option in terms of accidents is very small considering the scale of the study area and the period of analysis. Nevertheless the Lower Cost Option would incur slightly more accident costs.

3.7.4 Economy

Public Accounts, TEE Business Users & Transport Providers and Consumers

As described in Section 3.5 the Preferred Scheme and Lower Cost Options have been subjected to a detailed economic assessment according to the requirements set out in the DfT's WebTAG guidance using the Transport User Benefit Appraisal (TUBA) software.

The analysis shows that both the Preferred Scheme and The Lower Cost Option represent "Very High" value for money with Benefit to Cost Ratios of 5.8 and 5.9 respectively

The detailed Transport Economic Efficiency (TEE) is presented in Table 3.9 below. The Public Accounts and Analysis of Monetised Costs and Benefits (AMCB) tables and the corresponding tables for the Lower Cost Option are presented in Appendix 3.6.

Table 3.9: Economic Efficiency of the Transport System (TEE): Preferred Scheme

Consumers	**ALL MODES**		**ROAD**	**Bus & Coach**	**RAIL**
User benefits	**TOTAL**		**Private Cars and LGVs**	**Passengers**	**Passengers**
Travel time	167629		150746	16102	782
Vehicle operating costs	7423		7423	0	0
User charges	-429		0	0	-429
During Construction & Maintenance	0		0	0	0
NET CONSUMER BENEFITS	174623	-1	158169	16102	352

Business

User benefits			**Goods Vehicles**	**Business Cars & LGVs**	**Passengers**	**Freight**	**Passengers**
Travel time	185697		119140	63882	2198	0	477
Vehicle operating costs	12571		4909	7662	0	0	0
User charges	169		0	0	0	0	169
During Construction & Maintenance	0		0	0	0	0	0
Subtotal	198437	-2	124049	71544	2198	0	646
Private sector provider impacts					**Passengers**	**Freight**	**Passengers**
Revenue	1044			0	2582	0	-1538
Operating costs	-6883			0	-6883	0	0
Investment costs	0			0	0	0	0
Grant/subsidy	0			0	0	0	0

Subtotal	-5839	-3	0	-4301	0	-1538
Other business impacts						
Developer contributions	-	-4	-	-	-	-
NET BUSINESS IMPACT	192598	*(5) = (2) + (3) + (4)*				
TOTAL						
Present Value of Transport Economic Efficiency Benefits	367221	*(6) = (1) + (5)*				

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.

All entries are discounted present values, in 2002 prices and values

Reliability – Preferred Option

Public Transport

The provision of the segregated Rapid Transit section and bus priority measures elsewhere in the Preferred Scheme will ensure the journey time reliability of the SBL Rapid Transit system and improve the reliability of the Bristol International Airport Flyer service.

For existing bus services the transfer of general traffic from a number of radial routes into the city should improve journey time reliability and affords the opportunity to introduce new bus priority measures where possible. These improvements relative to the Without Intervention case will be moderate.

A qualitative assessment of the impact of the scheme has been undertaken as the local bus operator was not able to provide the information necessary to carry out a quantitative assessment of reliability impacts in line with WebTAG guidance.

Highway

The forecast impact of the Preferred Scheme on highway reliability has been calculated based on the methodology set out in WebTAG 3.5.7.

This calculation was carried out for each modelled year and time period and benefits were annualised and interpolated/extrapolated over the 60 year appraisal period and discounted to 2002 prices, to generate a value of benefit comparable to the values displayed in the TEEs and AMCBs produced by TUBA.

Overall, the impact of the Preferred Scheme on reliability is: £56m. Adding this value of reliability to the overall scheme benefits, increases the BCR from 5.79 to 6.74.. Further details are set out Appendix 3.6

Overall assessment of reliability impact – **Slight Positive**

Reliability – Lower Cost Option

Public Transport

In the case of the Lower Cost Option the lack of a segregated Rapid Transit link will reduce the journey time savings and the consequential public transport benefits.

Highway

The forecast impact of the Preferred Scheme on highway reliability has been calculated based on the methodology set out in WebTAG 3.5.7.

This calculation was carried out for each modelled year and time period and benefits were annualised and interpolated/extrapolated over the 60 year appraisal period and discounted to 2002 prices, to generate a value of benefit comparable to the values displayed in the TEEs and AMCBs produced by TUBA.

Overall, the impact of the Lower Cost Option on reliability is: £55m. Adding this value of reliability to the overall scheme benefits, increases the BCR from 5.88 to 6.86. Further details are set out Appendix 3.6

In view of this the overall assessment of reliability impact is considered to be – **Neutral.**

Wider Economic Impacts

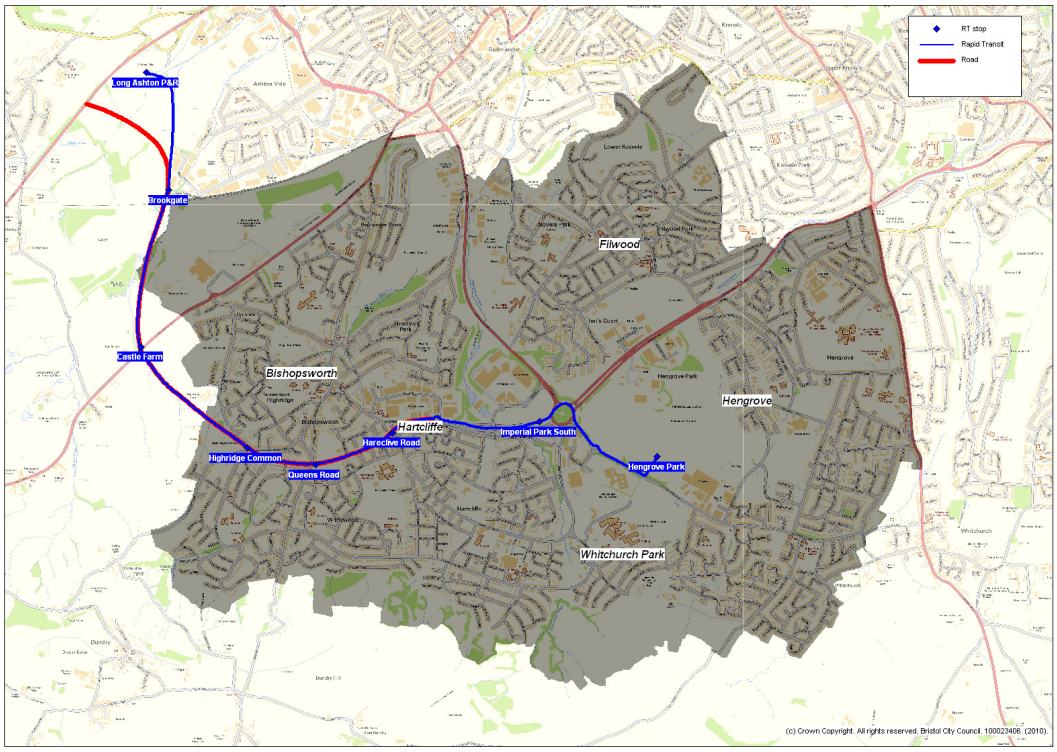
The purpose of this section of the SBL submission is to identify the location and indicate the potential level of additional employment that could be generated in

the Hengrove Park area of South Bristol, focusing on sites in the vicinity of the Hartcliffe Roundabout (the South Bristol end of the scheme).

This document supports the Transport Economic Efficiency appraisal by identifying areas of potentially increased employment with the implementation of the SBL together with indicative estimates of additional employment generated if the sites identified are developed/redeveloped and occupied.

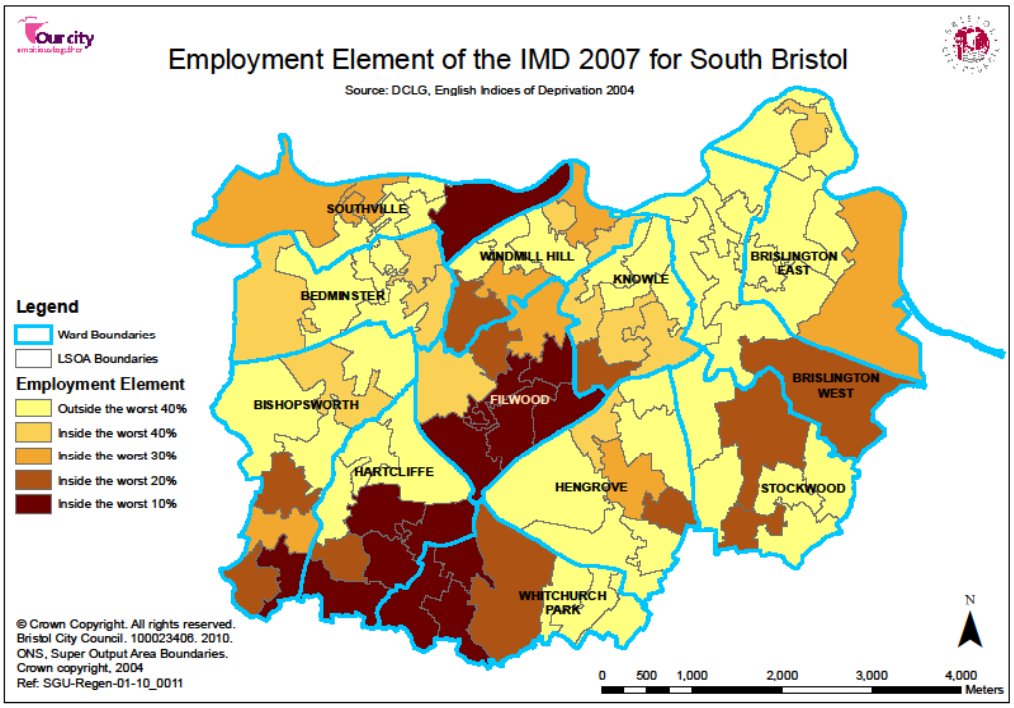
The need for economic and social regeneration in South Bristol is not in doubt and has been investigated and reported in a number of recent studies. For the purpose of this study the concerns are unemployment and worklessness - particularly in Filwood, Whitchurch Park and Hartcliffe wards in the Hengrove Park area of South Bristol. These wards plus Hengrove ward are the four wards expected to receive the greatest impact from the SBL.

Figure 3.5: Wards in South Bristol



The current levels of unemployment (particularly male unemployment) in Filwood, Whitchurch Park and Hartcliffe are very high by city and regional standards. At the wider measure of Worklessness (includes all those receiving out of work benefits) a majority of LSOAs in Filwood, Whitchurch Park and Hartcliffe have Worklessness rates of 25% or more (compared with Bristol as a whole at 14%) and this Worklessness is extremely persistent having been a feature of these local areas for ten years or more. At a national level, these high unemployment areas in the three wards are within the worst 10% of LSOAs in the country.

Figure 3.6: Employment element of the IMD 2007 for South Bristol



The Bristol City Council Economic Development Team has identified 11 sites in the Hengrove Park area and a further 3 sites in Novers Hill/Vale Lane, South Liberty Lane and on Winterstoke Road that are suitable and available for development/redevelopment for employment use. These sites are expected to be the sites most benefited by the SBL.

The potential development/redevelopment sites are estimated to offer some 18.2ha of developable land plus some 90,000m2 of redevelopment/unoccupied space available for use/reuse in new office and light industrial uses. The total employment generated when these sites/buildings are developed/redeveloped and occupied is estimated to be some 5,600 FTE jobs.

In preparing this report we have contacted and spoken with 13 commercial property agents active in the Bristol area, 6 developers/owners (2 with sites in the area), one ex-occupier and the managers of the Cater Business Park. We have spoken also with Bristol International Airport.

The agents are unanimous that the South Bristol Link is a critical and crucial infrastructure investment absolutely necessary to increase private sector developer interest in South Bristol and contribute to its regeneration.

The present inaccessibility of South Bristol particularly from the city centre via the Winterstoke Road, Parson Street gyratory and Hartcliffe Way is considered to be the single greatest deterrent to firms locating in South Bristol. In the absence of commercial tenant interest there will be no developer interest.

If the relative inaccessibility of South Bristol can be overcome many of the agents indicate reasonable to strong underlying demand for smaller sized light industrial units attractive to SME employers attracted by the availability of labour in South Bristol. There will be demand also from smaller distributors and home delivery firms for which South Bristol will be an attractive location.

A number of agents referred to recent high profile departures from South Bristol (Somerfield from both its Head Office on Whitchurch Lane and its warehouse on Cater Business Park, Matthew Clark also from Whitchurch Lane) and the extreme difficulty expected in trying to fill/relet at these locations.

The six commercial developers expressed a similar view that the SBL is vitally important to generating developer interest in South Bristol. In addition there need to be good sites available for commercial development. There is very little industrial space in central or east Bristol. For the regional market, South Bristol is an excellent location (with better accessibility).

The new western access from the SBL into the South Liberty Lane industrial area will reinvigorate the area as a good location for regional distribution and light industrial uses.

Bristol International Airport strongly supports the South Bristol Link as it will improve accessibility to the City Centre and to the M5 (via the A38 – A370 link), and to the Hengrove Park area of South Bristol.

Improved accessibility to commercial locations in South Bristol is important to BIA as the airport site is very constrained and not able to accommodate the growing range of support services and airport related activities that are accompanying the airport's growth in passenger volumes and aircraft movements. South Bristol will be the most convenient location for these support and other airport related activities when the SBL improves access to the Hengrove Park area.

In addition to attracting BIA support services and airport-related activities, improved accessibility between BIA and the Hengrove Park area will also increase the accessibility of on-airport employment to Hengrove Park area residents. On-airport employment is expected to grow substantially to 2030 (and is likely to continue to grow beyond 2030) providing increasing job opportunities to local residents including those in South Bristol.

Full details are set out in Appendix 3.9 Economic Development Impact

3.7.5 Accessibility

Option Values Sub-objective

Option Values refer to the benefits people experience from the knowledge that an additional transport option is available to them even if they do not intend to use it on a regular basis.

The Rapid Transit element of both the Preferred and Lower Cost schemes provides an additional transport option for residents in South Bristol. As shown in the Access to the Transport System Sub-objective an additional 400 households will have access to a public transport service with a frequency of least 4 an hour with the construction of SBL Rapid Transit.

Overall assessment of option value impact – **Moderate Beneficial**

Severance Sub-objective

This Sub-objective is concerned with severance as it affects those using non-motorised modes, especially pedestrians. Severance changes are important where the transport scheme either creates barriers to pedestrians or removes barriers.

The A370 to A38 section of SBL crosses principally rural land providing a new pedestrian and cycle route between these two routes, linking Long Ashton with South Bristol.

The A38 to Hengrove section through the residential areas of South Bristol is likely to have a more negative impact on pedestrian and cycle movements between communities north and south of the new link. However, this will be ameliorated by crossing facilities for pedestrians and cyclists. The issue of severance was raised during public consultation and the scheme design has been altered in response to provide better crossing facilities.

East-west movements, between, for example, Hartcliffe and Bishopsworth, will be improved by additional pedestrian and cycle facilities parallel to the scheme.

Overall assessment of Severance Sub-objective – **Slight Beneficial**

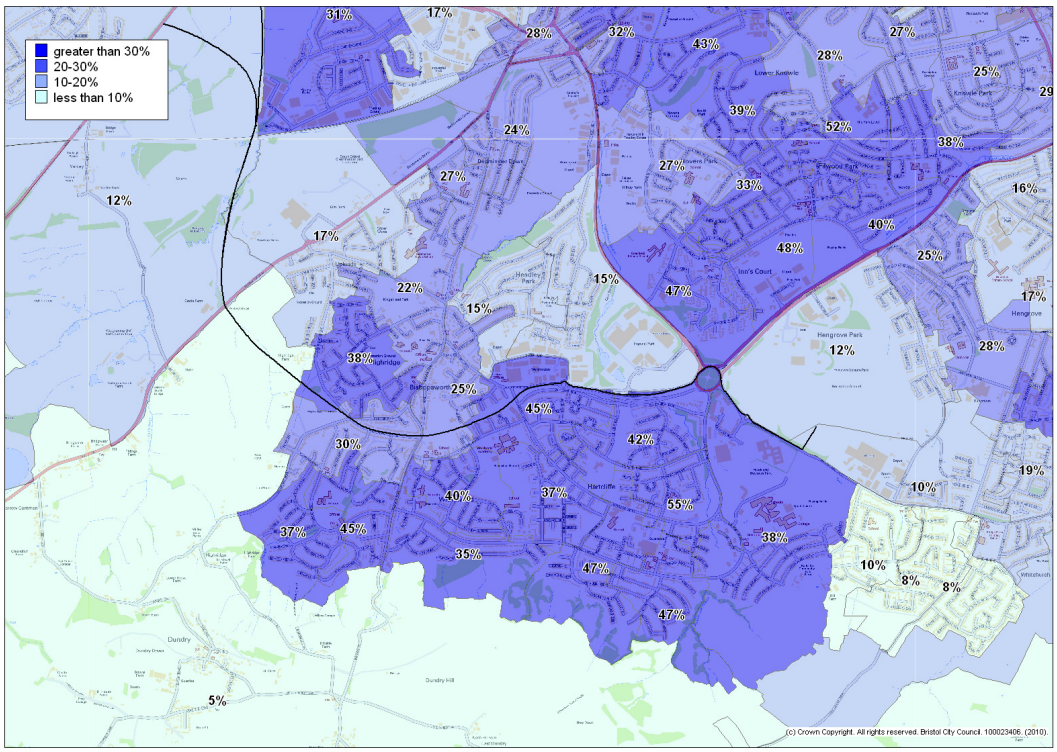
Access to the Transport System Sub-objective

A key objective of the South Bristol Link is to improve accessibility from South Bristol to the City Centre and to strategic transport links, including the trunk road network, and to Bristol International Airport

To achieve this the SBL will provide an improved public transport service to and from South Bristol and also enhance facilities for walking and cycling.

As shown in Figure 3.7 the scheme serves an area characterised by low levels of car ownership. In some Super Output Areas (SOA) over half of the households do not have access to a car so improvements in public transport, walking and cycling are particularly important to improve accessibility to employment and other key facilities.

Figure 3.7: Percent of households without access to a car (2001 Census)



The Councils' Accession-based accessibility model has been used to quantify accessibility and the results are summarised in the table below. These results use demographic data from the 2001 Census, but it should be noted that between 2001 and 2008 the population of South Bristol grew by 2.6%, while the overall population of Bristol increased by around 8%. The results are for the AM peak period (07:00-09:00) for households within the core modeling area as defined in Figure 3.1.

Table 3.10: Accessibility benefits

Local accessibility	400 households (160 without access to a car) will have access to a public transport service with a frequency of least 4 an hour with the construction of SBL RT. This is in addition to the benefits of the Rapid Transit Ashton Vale to Temple Meads scheme
Access to central Bristol	The SBL RT scheme will provide a faster journey time into central Bristol than current bus services, of around 30 minutes, with a headway of 18 minutes in the AM Peak. Around 30% of the route will be segregated from other traffic, providing a more reliable journey time than typical bus routes.
	The SBL RT scheme puts an additional 470 households (150 households without access to a car) within a 20 minutes public transport journey of central Bristol.
Access to Bristol International Airport (BIA)	The interchange between the SBL RT and the Airport Flyer will improve access to the BIA from east Bristol. An additional 9,800 households will be within 40 minutes public transport journey of the BIA
Access to employment	The Scheme improves access from the south Bristol area to employment opportunities compared with RT2

Full details of the accessibility modeling work is set out in Appendix 3.10

Overall assessment of Access to the Transport System Sub-objective – **Moderate Positive**

3.7.6 Integration

The examination of the impacts of the scheme on the integration issues in the study area, considers the following three aspects:

- transport interchange;

- integration with local, regional and national land-use policy; and
- integration with other government policies.

Transport Interchange Sub-objective

The main benefits to interchange that will be provided by the public transport element of the Preferred Scheme include connection with existing local bus services, the Bristol Airport Flyer and other proposed Rapid Transit services as well as significant improvements to the facilities and environment for passengers.

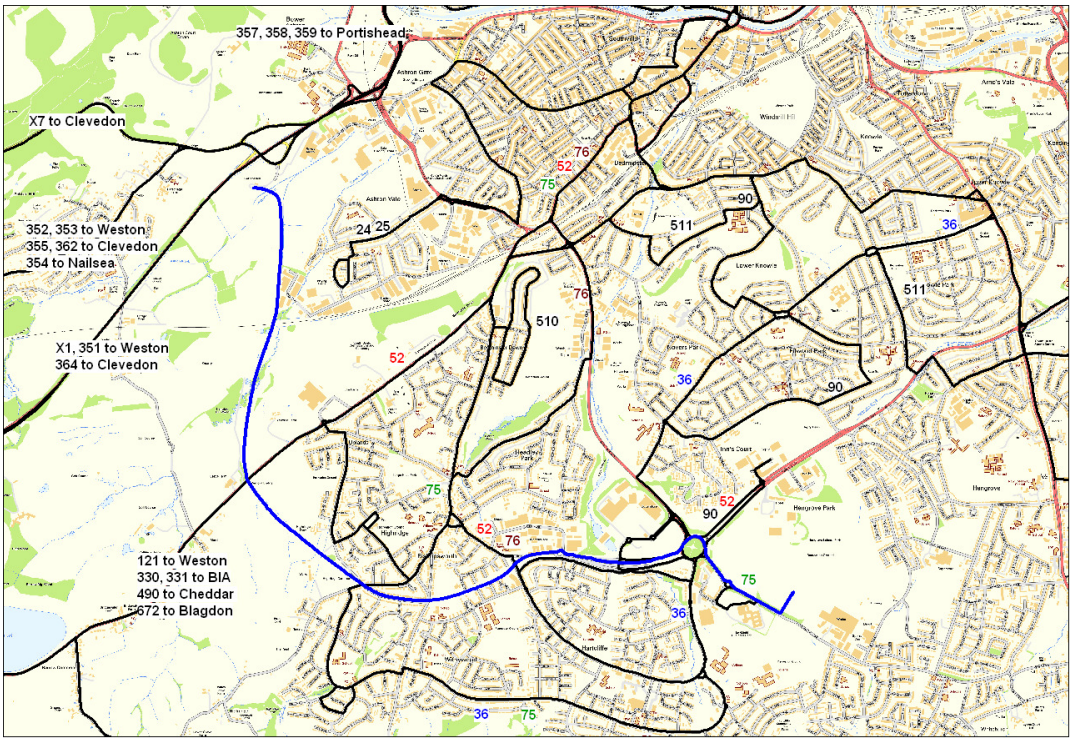
The SBL follows an orbital alignment to the south west of Bristol and crosses a number of key radial routes into the city. These radial routes carry a significant number of the local bus services. The public transport element of the SBL therefore introduces the possibility of connecting between services as well as providing an alternative route. The potential connectivity is set out in Table 3.11 below.

Table 3.11 Potential connectivity with existing bus services.

Proposed Rapid Transit Stop	**Adjacent Existing Bus Services**	**Areas Served**	**Existing Stop Proximity**
Ashton Vale (Rapid Transit Ashton Vale to Temple Meads)	X1, X7, 354.	Bristol, Weston–super-Mare, Nailsea and Clevedon.	Proposed shared stop.
Long Ashton Park and Ride	n/a	n/a	n/a
Brookgate	n/a	n/a	n/a
Castle Farm	121, 490, 330, 331, 672,	Bristol Airport, Bristol, Weston-super-Mare, Cheddar and Blagdon	Proposed shared stop for Bristol Flyer, otherwise, over 250m – new stops to be considered.
Highridge Common	75	Withywood and Bedminster Down	Less than 50m
Queens Road	n/a	n/a	Over 250m
Hareclive Road	52,76	Hartcliffe and Bishopsworth	Less than 50m
Imperial Park South	36,52,75, 90	Filwood Park, Hartcliffe and Hengrove	Over 250m – new stops to be considered.

Proposed Rapid Transit Stop	Adjacent Existing Bus Services	Areas Served	Existing Stop Proximity
Hengrove Park	75	Hartcliffe	Less than 250m

Figure 3.8: Current bus routes



Local bus services currently take 40/50-minutes in the peak hours (Hartcliffe to the City Centre), but with frequencies of 10/12-minutes, average waiting time is around 5/6 minutes. The Rapid Transit link would take around 30 minutes from Hartcliffe to central Bristol, but service frequency is expected to be every 18-minutes, so average wait time would be 9 minutes. Hence, passengers from Hartcliffe/Bishopsworth with access to the Rapid Transit link would have a choice between Rapid Transit (faster, better quality, more reliable but less frequent) and local bus (slower and less reliable but with higher frequency).

The Bristol Airport Flyer will be running every 10-minutes by the time of the programmed scheme opening. Currently the Airport Flyer follows the A38 into the centre of Bristol. On scheme completion and with new vehicles, BIA Managers have indicated that the service will divert from its existing route to take advantage of the segregated, more reliable route via Ashton Vale to the city centre. A stop adjacent the A38 at Castle Farm will allow interchange with

the Rapid Transit service and other local bus services assuming additional stops for these services are provided on the A38.

At the north-west end of the SBL it is proposed that the segregated Rapid Transit link will connect to the proposed Rapid Transit link between Ashton Vale Park and Ride and the City Centre. At the south-east end of the SBL the Rapid Transit service will interchange with, or continue onto, the proposed Rapid Transit link between Hengrove and the North Fringe. This connectivity will increase the potential patronage of the three public transport schemes by more than the sum of their parts and form the basis of a Rapid Transit Network that can be expanded in the future.

The improvements to the facilities and environment for passengers will include better "real time" information for passengers at stops and on vehicles, high quality stop facilities including CCTV, and off-board ticketing.

The SBL incorporates a dedicated cycle and pedestrian way, which will intersect with other parts of the cycle and pedestrian network in Bristol and North Somerset. This will allow the option of walking and cycling to one of the Rapid Transit stops and continuing on to the City Centre or other destinations served by the network.

Table 3.12 summarises the principal impacts.

Table 3.12: Assessment of Integration – Passenger Interchange

Passenger Interchange Indictor	**Without Scheme**	**With Scheme**
Waiting Environment	Low - Minimal with limited shelter provision	High – Significant improvement to waiting environment with high quality stops and real-time passenger information
Level of Facilities	Low - Minimal with limited shelter provision and no real-time information	High – Significant improvement to waiting environment with high quality stops and real-time passenger information
Level of Information	Low - Minimal with no real-time information	High – Significant improvement to waiting environment with high quality stops and real-time passenger information
Visible Staff Presence	Low – Minimal, driver only bus services	Moderate – Driver only vehicles continued but CCTV supervision of stops.

Passenger Interchange Indictor	Without Scheme	With Scheme
Physical Linkage for Next Stage of Journey	Moderate – Some existing provision for transfer ticketing.	High – Additional choice for customers and integration with other public transport services.
Connection Time and Risk of Missing a Connection	Moderate – Service monitoring influences timing of bus journeys with timetables.	High – Real-time passenger information and additional choice for customers and integration with other public transport services.

Rapid Transit passengers and those travelling on intersecting local bus routes will benefit from the better waiting environment and other facilities

Overall assessment of Transport Interchange impact – **Moderate Positive**

Land Use Policy Sub-objective

In line with guidance in WebTAG Unit 3.7.2, this section contains an assessment of the extent to which the scheme is integrated with the land use policies and proposals at the three different levels;-

- Local (concentrating on the policies of Bristol City Council, North Somerset Council and the West of England Partnership);
- Regional; and
- National.

The analysis examines the range of policy documents and reviews the characteristics of the Preferred Scheme against the objectives in the policy documents. It builds on the strategic fit tables in Chapter 2 (Strategic Case).. Table 3.13 contains a summary of the main trends in the Land Use Policy Sub-objective worksheet.

Table 3.13: Integration: Land-Use Policy

Level	Policies helped	Policies hindered
Local	A wide range of local policies are helped to varying extents including sustainable growth and development, better health and wellbeing, safer travel, improved accessibility and connectivity, assistance to disabled, tackling congestion, modal split, and better quality of life.	Localised impacts are possible through increases in traffic levels (notably King George's Road) e.g. noise and air quality, but extent will be dependant on remedial measures. Individual environmental designations may be affected (heritage, landscape and ecology) but extent will depend on remedial measures.
Regional	The Preferred Scheme is likely to make a positive contribution to planning and managing growth (especially 'Bristol Urban Area' and 'Area of search B' in the draft RSS and policies in the emerging Core Strategies). Also benefits through enhancing economic prosperity, addressing deprivation, social inclusion, aiding successful and competitive business, promoting sustainable transport, supporting Strategically Significant Towns and Cities through improved public transport, improving reliability and resilience.	No direct impact
National	Contributes to policies including improving competitiveness and productivity, raising equality of opportunity, providing gains in health & safety and improvements to the overall quality of life.	No direct impact

Reference Sources:–

- Joint Replacement Structure Plan; Weston of England Partnership; 2002
- Bristol City Development Framework - Draft Core Strategy; Bristol City Council; 2009

- North Somerset Development Framework - Draft Core Strategy; North Somerset Council; 2009
- Bristol Local Plan; Bristol City Council; 1997 / 2003
- North Somerset Replacement Local plan; North Somerset Council; 2007
- Draft South West Regional Spatial Strategy; South West Councils; 2006 / 2008.
- Delivering a Sustainable Transport System; DfT; 2008.

Overall assessment of Land Use Policy impact – **Beneficial**

Qualitative Comments - Local

Joint Replacement Structure Plan

The Joint Replacement Structure Plan covers the West of England area and was adopted in September 2002. Its policies form the main strategic context for preparation of the Bristol and North Somerset Local Plans.

Policy 11 relates specifically to the regeneration of South Bristol. 'In South Bristol, the regeneration of the local economy will be progressed by an integrated and comprehensive strategy towards community development, which will include business development, employment retention and creation, education, training and better access to jobs, improved local facilities and public transport, enhancing the quality of life in general whilst maintaining adequate and accessible provision of open space for amenity and recreational use'.

Policy 11 recognises the need to improve South Bristol's transport links 'with the construction of a road between the A38 and the A370, primarily to improve access to Bristol International Airport, may also benefit South Bristol by helping to relieve traffic congestion, providing better access to existing industrial estates in Ashton Vale, and in the longer term allowing the release of further potential employment sites in the area.

The benefits of increased accessibility will need to be weighed against possible environmental impacts. Since Policy 11 was agreed for adoption in 2000, studies have been undertaken which have considered route options further west than that originally proposed. The final alignment of such a link road is to be determined, if necessary following a public inquiry.

It is essential that opportunities are taken to improve South Bristol's public transport links with the main employment areas in the city centre and the North

Fringe through better bus and rail links, as well as improving public transport connections between employment and housing areas within South Bristol itself.

A Rapid Transit loop through the area will be considered in the longer term, and route reservations need to be made as part of the development of the area'.

Bristol City Development Framework - Draft Core Strategy

The Draft Core Strategy was published in November 2009. Within the Local Development Framework it sets out the Council's vision of the city to 2026

Policy BCS1 relates to the vision for South Bristol;

'South Bristol will be a priority focus for development and comprehensive regeneration. Development will be for a mix of uses to include:

- 50,000m² of new office floorspace;
- 5-10 hectares of new industrial and warehousing land at Nover's Hill / Vale Lane;
- A minimum of 10,000 new homes of a mix of type, size and tenure.

Development will occur across South Bristol with major regeneration particularly focused on the area at Knowle West and Hengrove Park. Regeneration in this area will require redevelopment of poor quality urban form in some locations to support the creation of higher quality environments.

Development in South Bristol will primarily occur on previously developed land. However, the delivery of new homes and regeneration will require the planned release of some open space sites which do not need to be retained as part of the area's green infrastructure provision. Development will be supported by a range of improvements to key public services and infrastructure, which will include provision of:

- Community hospital, Skills Academy, Healthplex, leisure facilities and outdoor recreation located at Hengrove Park;
- Improvements in the quality of open space and to the green infrastructure network as a whole.

A new centre, either on a new site or at an enhanced existing centre, may be appropriate in South Bristol, acting as a new focus for the area and helping to improve provision of shops, services, employment and community facilities.

Major improvements to transport infrastructure will be made to enhance links between existing communities within South Bristol, and between South Bristol,

the city centre and the north of the city. Improvements will have an emphasis on pedestrian, cycling and public transport facilities….'

Policy BCS10 states; 'The council will support the delivery of significant improvements to transport infrastructure to provide an integrated transport system, which improve accessibility within Bristol and supports the proposed levels of development. In particular it will support, subject to environmental impact assessment where appropriate;…….The delivery of transport infrastructure improvements including…..South Bristol link'.

North Somerset Development Framework - Draft Core Strategy

As in Bristol, North Somerset's Core Strategy is one document of a suite that makes up the Local Development Framework, looking to 2026. The Draft Strategy was published in November 2009.

Within the South West the emerging Regional Spatial Strategy provides the regional context for the Core Strategy. At this time there is no date for the final approval of the Draft Regional Spatial Strategy and the Council has objected to key elements of the Spatial Strategy (particularly the proposed Green Belt urban extension at SW Bristol), and it is anticipated that there may be changes to regional guidance introduced following the general election in 2010.

Although the Core Strategy seeks to protect the green belt in North Somerset to the SW of Bristol the Strategy recognises the importance of the South Bristol Link. Policy CS10 [Transport and Movement] states; 'the following schemes have been programmed in the Regional Funding Allocation (2009) and will be promoted; …..South Bristol Link'.

Bristol Local Plan

The Bristol Local Plan was adopted in December 1997 and defined a reserved route of the South Bristol Link within the unitary authority's boundaries. The reserved route is that proposed to be use within this MSBC.

In 2003 the City Council undertook a review of the Local Plan. Consultation on the key issues confirmed that the Local Plan remained an effective policy document. It was clear that only selected alteration to the policy were required to bring it up-to-date and roll the Plan forward to cover the period to 2011. It was therefore proposed that the Plan be statutorily 'altered' rather than 'replaced'. The reserved alignment of the South Bristol Link remains unaffected by these alterations.

The Local Plan contains a chapter that specifically identifies the need for regeneration of South Bristol. It sets out a number of policies that directly relate to the objectives of this MSBC.

North Somerset Replacement Local Plan

The North Somerset Replacement Local Plan was adopted in March 2007, superseding the previous Local Plan. The green belt to the south west of Bristol is defined on the proposals map. Various policies, most notable RD3 and RD4 define what development is appropriate and inappropriate within the green belt.

The Replacement Local Plan also reserves an alignment for the South Bristol Link within the unitary authority's boundaries. In the area of the A370 it reserves two alignments, one joining direct to the A370 and one joining to the B3128 / A370 / Park & Ride junction. Both alignments are utilised by this MSBC, one for the highway element, one for the Rapid Transit element.

It should be noted that the alignments reserved in both the Bristol and North Somerset Local Plans correspond where they cross the unitary boundaries.

Qualitative Comments - Regional

Draft South West Regional Spatial Strategy

The Draft Regional Spatial Strategy [RSS] seeks to set the development framework for the south-west to 2026. It outlines what goes where, what the scale of development will be, and describes the need integrated infrastructure such as healthcare, education and transport.

The South West Regional Assembly (now South West Councils) approved the Draft Regional Spatial Strategy in March 2006, and submitted it to Government in April 2006. Following examination in public the government published proposed changes and announced that further sustainable appraisal work was required. The outcomes of this further work are awaited. At this time the Strategy remains in draft.

The Strategy identifies Bristol as one of the Strategically Significant Cities and Towns [Development Policy A]. For South West Bristol the Strategy sets out a number of land use and transport proposals specifically related to the South Bristol Link:-

- 'Bristol Urban Area' - 1,975 new homes are identified in the 'Bristol Urban Area' The South Bristol Link will improve public transport and vehicular access to these sites within South Bristol.

- 'Area of search A' - Of the 10,500 homes identified in 'Area of Search A' 900 would be within North Somerset and 1,500 would be within the Bristol City Boundary. It should be noted that both Bristol City and North Somerset Councils are opposed to the Southwest urban extension as defined in the draft RSS. Both Core Strategies specifically protect the green belt from the SW Bristol urban extension.

- 'Area of search B' - The South Bristol Link will offer improved transport links to the west, including Bristol International Airport, for the 6000 new homes proposed in the 'Area of Search B, which is to the south east of the existing urban development.

- 'Transport improvements South Bristol' were identified by the Greater Bristol Strategic Transport Study [GBSTS]. It should be noted that GBSTS concentrated on examining and promoting alternatives to the private car before considering improvements to the highway network. This was designed to ensure that highway measures are only considered after all other possibilities have been explored. The study noted that the 'South Bristol Ring Road between A4 and A38 produces significant benefits through reduced delays across south Bristol, creating major new connections between south Bristol and the major employment areas' [this MSBC does not complete the link to the A4]. The study also noted the 'extension of the South Bristol Ring Road from A38 through to the A370, with the study's preferred alignment following the path of the earlier Red route. The scheme provides relief to the congestion on the B3130 through Barrow Gurney and produces a strong economic performance'.

Qualitative Comments - National

Land use policy is devolved to the regions, in this case the South West Region. Assessment of the project against the Draft Southwest Regional Spatial Strategy is discussed above. Assessment against other government policies is discussed below.

Other Government Policies Sub-objective

In line with WebTAG Unit 3.7.3, an assessment has been made for the likely impact of the Preferred Scheme proposals on the policies of other Government departments. Table 3.14 summarises the principal impacts.

Table 3.14: Integration: Other Government Policy

Government Department	Policies helped	Policies hindered
Communities and Local Government	Aids regeneration and sustainable economic development.	Possible localised negative impacts on protection of the environment (with respect to landscape, heritage, biodiversity)

Government Department	Policies helped	Policies hindered
Environment, Food and Rural Affairs	No direct impact	Possible localised negative impacts on protection of the environment (with respect to landscape, heritage, biodiversity)
Health	Improved access to health facilities. Potential for contribution to increased physical activity through improved walking and cycling facilities.	No direct impact
Business, Enterprise and Regulatory Reform	Aids regeneration and sustainable economic development.	No direct impact
Children, Schools and Families	Increasing opportunities for access to education	No direct impact
Innovation, Universities and Skills	Increasing opportunities for access to education	No direct impact

Overall assessment of Other Government Policies Sub-objective – **Moderate Positive**

3.8 APPRAISAL SUMMARY TABLES

3.8.1 Introduction

The NATA assessments for both the Preferred Scheme and the Lower Cost Option are summarised in the relevant ASTs in Table 3.15 and Table 3.16. The ASTs demonstrate that both options provide economic and environmental benefits, although the Preferred Scheme provides a greater degree of benefit. Whilst there are safety benefits on local streets, there is a small overall reduction in safety due to the increased total vehicle kilometers. Adverse impacts on landscape, biodiversity and heritage are slightly greater for the Preferred Scheme than the Lower Cost Option

3.8.2 Appraisal Summary Table: Preferred Scheme

Table 3.15: AST Preferred Scheme

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
ENVIRONMENT	**Noise**	At a relatively small number of properties there is a large noise disbenefit by the introduction of a new noise source. This is outweighed by a small noise benefit at a relatively large number of houses.	Estimated Population Annoyed Do-Minimum: 2415 Do-something: 2359	Net population win / lose: -56 NPV: +£1,542,051

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Local Air Quality	There would be an overall improvement in local air quality with the Scheme in place within the Opening Year for both nitrogen dioxide and particulate matter. This improvement would remain unchanged within the Design Year. The variations in population exposure however for both assessment years, are predicted to be extremely small.	Assessment scores: NO_2: Opening Year = -1770; Design Year = -1559 PM_{10}: Opening Year = -461; Design Year = -287	Change in population exposure: NO_2: Opening Year = -0.07; Design Year = -0.08 PM_{10}: Opening Year = -0.02; Design Year = -0.01
	Greenhouse Gases	The Preferred Scheme leads to a decrease in Carbon emissions compared to the Do-Minimum (without South Bristol Link). Emissions decrease over time due to changes in the speed of vehicles and reduced travel times.	2018 – decrease in emissions due to the Scheme of 0.01%	Change in tonnes of C: 2018 = - tonnes 78

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Landscape	Despite the existing baseline conditions and presence of local A roads, this relatively open landscape currently considered as typical rural urban fringe would be further fragmented and degraded with the addition of the Scheme.		Moderate Adverse
	Townscape	The strong 19th and 20th century suburban townscape would be likely to be adversely affected by the proposals, with changes to the scale, density and appearance of the area as a result of the Scheme. The proposals would be a prominent feature within the townscape affecting both character and visual amenity within the local area.		Moderate Adverse
	Heritage of Historic Resources	No direct effects to any designated heritage assets. Some minor changes to the setting of Castle Farm Grade II Listed Building may result from operation. Construction could result in physical loss of the potential archaeological resource, which are unlikely to be of substantial quantity or of greater than local importance. Construction would also result in changes to the form, pattern and character of a section of the historic landscape which is of low value. Adequate mitigation to prevent and/or reduce the significance of the predicted effects can be specified using standard techniques.		Slight Adverse

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Biodiversity	Direct habitat loss from a number of locally designated sites and impacts to nationally and internationally protected species including badgers, reptiles, breeding birds, otter, great crested newts and bats likely. Appropriate mitigation would reduce potential adverse impacts. Compensatory habitat as mitigation should be considered where the Scheme is likely to directly impact designated sites.		Slight Adverse
	Water Environment	Would cross several water courses which would require culverting/bridging which may result in disruption/alterations to surface water flows and quality. Discharge of road drainage to surface water may also adversely impact quality. The Scheme would pass through several EA designated flood zones and the underlying soils predominantly have impeded drainage, so that additional runoff may exacerbate flooding in these areas. Potential impact to surface water flows and groundwater sustained habitats at construction. Groundwater quality may be adversely impacted through the infiltration of road runoff and from leachates from landfill.		Slight Adverse

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Physical Fitness	Increase of Physical Fitness by encouraging pedestrian and cycle journeys both over and under 30 minutes from the implementation of a cycleway and pedestrian route. In addition, the provision of lighting along the route would create a safe atmosphere so would appeal to a larger section of the public.		Moderate Beneficial
	Journey Ambience	Improvement in journey quality by improvements in Traveller Care, Views and Stress. The appraisal assumes that between 500 and 10,000 people would benefit from the Scheme on a daily basis. Improvements in Traveller Care by the provision of more facilities and cleaner services, and stress and route uncertainty are expected to diminish due to integrated design.		Moderate Beneficial
SAFETY	**Accidents**	Whilst the Preferred Scheme provides a new optimally designed alternative route, presenting a lower associated accident risk than the surrounding roads, an increase in PIAs and associated costs is expected. This is due to the increase in overall vehicle kilometres travelled within the study area and the expected accident increase is the result of very small incremental increases in accidents across many links.		PVB: - £22.2

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Security	High quality public transport infrastructure will provide a safer environment for passengers		Moderate Positive
ECONOMY	**Public Accounts**	The public sector experiences costs associated with construction, ongoing maintenance and loss of indirect taxation. The amount of indirect tax paid by road users decreases as a result of the reduction in vehicle operating costs. As the level of bus patronage increases with the scheme in place, there is further loss of tax income as no tax is payable on bus fares.		PVC = £59.637m PVB = £345.539m BCR = 5.77 (including accidents) NPV = £285.902m
	TEE: Business Users & Transport Providers	Users of all modes of transport receive time-savings as a result of the scheme. Savings in vehicle operating costs are also received for each class of highway user. Additional benefits will also be experienced as a result of the priority measures and improved crossing facilities and by cyclists through the construction of the cycle route.		PVB = £192.598m
	TEE: Consumers	Benefits are primarily received by highway users with over 90% of total being from road trips.		PVB = £174.623m

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Reliability	The RT priority measures and segregated route will provide improved reliability for bus /RT journeys. Reduced traffic on show-case routes will assist in improved reliability for other bus services.		Slight Positive
	Wider Economic Impacts	Contribution to the creation of some 5,600 FTE jobs close to the Scheme in Regeneration Area.		Moderate Beneficial
ACCESSIBILITY	**Option Values**	The scheme will increase the transport options available in the south west of Bristol		Moderate Beneficial
	Severance	The provision of walking and cycling routes along the alignment will offset any increase in severance caused by the route itself		Slight beneficial
	Access to the Transport System	The Rapid Transit element will improve accessibility to key facilities from an area characterised by low levels of car ownership		Moderate positive

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
INTEGRATION	**Transport Interchange**	The Rapid Transit element provides access to the greater Rapid Transit Network for those who do not, or choose not, to have access to a car. The Rapid Transit element improves sustainable access between the City Centre, South Bristol and Bristol International Airport. The highway element improves connectivity of the Primary Road Network, improving access between the city and Bristol International Airport. The cycling and pedestrian element improves access to the existing cycling and walking network, improving sustainable access between South Bristol and the City Centre for those who do not, or choose not, to have access to a car.		Moderate Positive
	Land Use Policy	The Draft Regional Spatial Strategy and Draft Bristol Core Strategy identify land within South Bristol for employment and housing use. SBL supports these land use policies by improving sustainable travel and highway access to these sites. The alignment of SBL is reserved in the Bristol City and North Somerset Local Plans.		Beneficial

Option: Preferred Scheme South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option includes a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £59.637m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Other Government Policies	Communities & Local Government; Aids regeneration & sustainable economic development. Possible localised negative impacts on protection of the environment. Environment, Food & Rural Affairs; Possible localised negative impacts on protection of the environment. Health; Improved access to health facilities. Potential contribution to increase physical activity. Business, Enterprise & Regulatory Reform; Aids regeneration & sustainable economic development. Children, schools & Families; Increasing opportunities for access to education Innovation, Universities & Skills; Increase opportunities for access to education		Moderate Beneficial

3.8.3 Appraisal Summary Table: Lower Costs Option

Table 3.16: AST Lower Cost Option

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
ENVIRONMENT	**Noise**	The impact of Scheme itself have been quantified and compared to that of the Preferred Scheme. Noise impacts were found to be similar to that of the Preferred Scheme with marginally lower levels at properties directly adjacent to the Scheme due to the main noise source (the all-vehicle carriageway) being slightly further from the properties.	No traffic data was available at the time of assessment so no quantitative assessment was carried out.	Net population win / lose and NPV likely to broadly similar to Preferred Scheme and show an overall beneficial impact
	Local Air Quality	The Lower Cost Option is likely to result in an overall improvement in air quality with a reduction in the Opening Year in concentration for both nitrogen dioxide and particulate matter. This improvement is likely to remain unchanged within the Design Year similar to that of the Preferred Scheme. The variations in population exposure for both assessment years, would be unlikely to change so would probably be extremely small.	No traffic data was available at the time of assessment so no quantitative assessment was carried out.	-

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Greenhouse Gases	The Lower Cost Option leads to a decrease in Carbon emissions compared to the Do-Minimum (without South Bristol Link). Emissions decrease over time due to changes in the speed of vehicles and reduced travel times.	2018 – decrease in emissions due to the Scheme of 0.01%	Change in tonnes of C: 2018 = - tonnes 102
	Landscape	Despite the existing baseline conditions and presence of local A roads, this relatively open landscape currently considered as typical rural urban fringe would be further fragmented and degraded with the addition of the Scheme.	N/A	Moderate Adverse
	Townscape	The strong 19th and 20th century suburban townscape would be likely to be adversely affected by the proposals, with changes to the scale, density and appearance of the area as a result of the Scheme. The proposals would be a prominent feature within the townscape affecting both character and visual amenity within the local area.	N/A	Moderate Adverse

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Heritage of Historic Resources	No direct effects to any designated heritage assets. Some minor changes to the setting of Castle Farm Grade II Listed Building may result from operation. Construction could result in physical loss of the potential archaeological resource, which are unlikely to be of substantial quantity or of greater than local importance. Construction would also result in changes to the form, pattern and character of a section of the historic landscape which is of low value. Adequate mitigation to prevent and/or reduce the significance of the predicted effects can be specified using standard techniques.	N/A	Slight Adverse
	Biodiversity	Direct habitat loss from a number of locally designated sites and impacts to nationally and internationally protected species including badgers, reptiles, breeding birds, otter, great crested newts and bats likely. Appropriate mitigation would reduce potential adverse impacts. Compensatory habitat as mitigation should be considered where the Scheme is likely to directly impact designated sites.	N/A	Slight Adverse
	Water Environment	Would cross several water courses which would require culverting/bridging which may result in disruption/alterations to surface water flows and quality. Discharge of road drainage to surface water may also adversely impact quality. The Scheme would pass through several EA designated flood zones and the underlying soils predominantly have	N/A	Would cross several water courses which would require culverting/bridging which may result in

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
		impeded drainage, so that additional runoff may exacerbate flooding in these areas. Potential impact to surface water flows and groundwater sustained habitats at construction. Groundwater quality may be adversely impacted through the infiltration of road runoff and from leachates from landfill.		disruption/alterations to surface water flows and quality. Discharge of road drainage to surface water may also adversely impact quality. The Scheme would pass through several EA designated flood zones and the underlying soils predominantly have impeded drainage, so that additional runoff may exacerbate flooding in these areas. Potential impact to surface water flows and groundwater sustained habitats at construction. Groundwater quality may be adversely

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
				impacted through the infiltration of road runoff and from leachates from landfill.
	Physical Fitness	Increase of Physical Fitness by encouraging pedestrian and cycle journeys both over and under 30 minutes from the implementation of a cycleway and pedestrian route. In addition, the provision of lighting along the route would create a safe atmosphere so would appeal to a larger section of the public.	N/A	Moderate Beneficial
	Journey Ambience	Improvement in journey quality by improvements in Traveller Care, Views and Stress. The appraisal assumes that between 500 and 10,000 people would benefit from the Scheme on a daily basis. Improvements in Traveller Care by the provision of more facilities and cleaner services, and stress and route uncertainty are expected to diminish due to integrated design.	N/A	Moderate Beneficial

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
SAFETY	**Accidents**	Whilst the Lower Cost Option itself provides a new optimally designed alternative route, presenting a lower associated accident risk than the surrounding roads, an increase in PIAs and associated costs is expected. This is due to the increase in overall vehicle kilometres travelled within the study area and the expected accident increase is the result of very small incremental increases in accidents across many links. As might be anticipated, the scale of difference between the Preferred Scheme and Lower Cost Option in terms of accidents is very small considering the scale of the study area and the period of analysis. Nevertheless the Lower Cost Option would incur slightly more accident costs.		PVB = -£22.4m
	Security	Minimum investment in public transport infrastructure. No change to general security.		Neutral

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
ECONOMY	**Public Accounts**	The public sector experiences costs associated with construction, ongoing maintenance and loss of indirect taxation. The amount of indirect tax paid by road users decreases as a result of the reduction in vehicle operating costs. As the level of bus patronage increases with the scheme in place, there is further loss of tax income as no tax is payable on bus fares.		PVC = £56.478m PVB = £332.210m BCR = 5.88 (including accidents) NPV = £275.732m
	TEE: Business Users & Transport Providers	Users of all modes of transport receive time-savings as a result of the scheme. Savings in vehicle operating costs are also received for each class of highway user. Additional benefits will also be experienced as a result of the priority measures and improved crossing facilities and by cyclists through the construction of the cycle route.		PVB = £185.841m
	TEE: Consumers	Benefits are primarily received by highway users. Bus users continue to receive benefits.		PVB = £168.309m
	Reliability	The reduced RT priority measures and lack of a segregated route will provide lower reliability for bus /RT journeys. Reduced traffic on showcase routes will assist in improved reliability for other bus services.		Neutral

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Wider Economic Impacts	Contribution to the creation of some 5,600 FTE jobs close to the Scheme in Regeneration Area.		Moderate Beneficial
ACCESSIBILITY	**Option Values**	The scheme will increase the transport options available in the south west of Bristol		Moderate Beneficial
	Severance	The provision of walking and cycling routes along the alignment will offset any increase in severance caused by the route itself		Slight beneficial
	Access to the Transport System	The Rapid Transit element will improve accessibility to key facilities from an area characterised by low levels of car ownership		Moderate positive
INTEGRATION	**Transport Interchange**	Bus lanes provide access to the greater Rapid Transit Network for those who do not, or choose not, to have access to a car. Bus lanes improve sustainable access between the City Centre, South Bristol and Bristol International Airport. The highway element improves connectivity of the Primary Road Network, improving access between the city and Bristol International Airport. The cycling and pedestrian element improves access to the existing cycling and walking network, improving sustainable access between South Bristol and the City Centre for those who do not, or choose not, to have access to a car.		Beneficial

Option: Lower Cost Option South Bristol Link		**Description:** Implementation of an Integrated Transport Link (Road, Cycling and Rapid Transit) between A4174 Hartcliffe Roundabout to A370 Long Ashton Bypass. This Option does not include a direct link with the proposed Ashton Vale to Temple Meads Rapid Transit Scheme.	**Problems:** Localised deprivation; congestion on major transport corridors resulting in traffic on residential roads; unreliable bus journeys	**Present Value of Costs to Public Accounts £56.478m**
OBJECTIVE	**SUB-OBJECTIVE**	**QUALITATIVE IMPACTS**	**QUANTITATIVE ASSESSMENT**	**ASSESSMENT**
	Land Use Policy	The Draft Regional Spatial Strategy and Draft Bristol Core Strategy identify land within South Bristol for employment and housing use. SBL supports these land use policies by improving sustainable travel and highway access to these sites. The alignment of SBL is reserved in the Bristol City and North Somerset Local Plans.		Beneficial
	Other Government Policies	Communities & Local Government; Aids regeneration & sustainable economic development. Possible localised negative impacts on protection of the environment. Environment, Food & Rural Affairs; Possible localised negative impacts on protection of the environment. Health; Improved access to health facilities. Potential contribution to increase physical activity. Business, Enterprise & Regulatory Reform; Aids regeneration & sustainable economic development. Children, schools & Families; Increasing opportunities for access to education Innovation, Universities & Skills; Increase opportunities for access to education		Moderate Beneficial

3.9 SENSITIVITY TESTING

3.9.1 Introduction

This section describes the performance of a range of sensitivity tests undertaken as part of the scheme appraisal. The following investigations and tests were undertaken:

- Low Growth (without-intervention and with intervention)
- Highway Model Sensitivity Tests

No public transport sensitivity tests have been undertaken at this stage. The benefits from public transport are approximately 10% of the total benefits. As the public transport benefits are a small component of the total scheme benefits, any sensitivity tests will have a limited impact on total benefits.

Full details are set out in Appendix 3.5 Section 9.

3.9.2 Low Growth Sensitivity test

The low growth test reflects uncertainty regarding economic growth and fuel prices and is based upon a sensitivity test suggested in WebTAG (Unit 3.15.3) where reference case demand growth is reduced by 2.5% per annum for car, 2.0% per annum for rail and 1.5% per annum for bus, rising with the square root of the number of years. This is equivalent to a reduction in growth of:

- 4.0% (Bus), 5.3% (Rail) and 6.6% (Car) for 2016; and
- corresponding values of 7.0%, 9.4% and 11.7% respectively for 2031.

The test returns a BCR 5.63 indicating that, with low economic growth, the Scheme still provides significant benefits. The TEE table and other details of this test are set out in Appendix 3.5 Section 9

3.9.3 Highway Model Sensitivity Tests

Origin and Destination of SBL Traffic

To demonstrate the fitness of purpose of the Base Year model for testing the SBL scheme, an analysis has been undertaken of the traffic using the SBL. Further details are set out in Section 3.2.3 above, and Appendix 3.5 Section 9.

Highway Network Speed Sensitivity Test

This sensitivity test was undertaken to determine some of the uncertainty regarding the highway model validation. The test makes adjustments to the highway network speeds to reflect the variation in model and observed journey times. The test undertaken increased the highway network speeds to reflect the greatest differences between modelled and observed journey times.

The TEE table for this test, presented in Appendix 3.5, shows a slightly higher BCR of 6.14 for the Preferred Scheme, confirming that the highway model, the source of most of the benefits, has provided robust forecasts.

3.10 SUPPORTING INFORMATION

3.10.1 Distribution & equality

An analysis of distribution and equity issues has been undertaken in accordance with the advice given in TAG Unit 2.5 and 2.7.

Noise and local air quality: As part of the NATA process air quality and noise assessments have been undertaken, and the Preferred Scheme shows a net benefit both in terms of the net present value of noise of the Scheme and an overall benefit in air quality. These have been described in the sections above.

Landscape, townscape, biodiversity, heritage and water environment: As part of the NATA process assessments on landscape, townscape, biodiversity, heritage and water environment have been undertaken, and these are also described in the sections above.

Accident benefits: An assessment of the accident benefits of the scheme has been undertaken, and is summarised in Section 3.5 above. More information is set out in Appendix 3.11. The PVBs are -£22.2m for the Preferred Scheme and -£22.4m for the Lower Cost Option.

Access to the transport system: A key element of the Preferred Scheme and Lower Cost Option is to improve access to the transport system by non-car modes. Improvements made to public transport, walking and cycling links as well as the provision of new links to regeneration areas would provide increased access to employment and services. This would include areas of deprivation where car ownership levels are low and unemployment high.

Wider economic impacts are addressed in Section 3.7.4 above.

Social Inclusion: Government policy requires that the needs of different social groups are taken into account in policy development and service delivery in order to ensure that there are no disproportionate effects on different groups of people.

Social inclusion needs to be examined when looking at the distribution and equity effects of the Proposed Scheme and the Lower Cost Option.

Table 3.17 considers the impact that the South Bristol Link would have on various social groups. The conclusion is that neither the Preferred Scheme nor the Lower Cost Option have a negative impact on the social groups considered but would provide a number of benefits

Table 3.17 – Summary of Appraisal of Options: Social Inclusion

Social Group	Preferred Scheme	Lower Cost Option
Children and young people	The Preferred Scheme will create a safer road environment for children and young people in the areas where traffic flows will reduce. A reduction in emissions of traffic related pollution in these areas would improve air quality and would benefit children and young people's health. Making improvements to infrastructure for non-car modes will enable children and young people to access services and leisure facilities.	As Preferred Scheme
Minority ethnic and faith communities	The Preferred Scheme would improve access to key services and facilities by non-car modes, which would benefit all communities.	As Preferred Scheme

Social Group	Preferred Scheme	Lower Cost Option
Older people	The Preferred Scheme would benefit older people by improving access by public transport to key services and facilities. New bus stops and crossing points would be DDA compliant. However for central running, it will be necessary to cross one lane of general traffic walking to and walking from the RT stop. This may be perceived as a deterrent.	The proposed investment in public transport infrastructure will be less and therefore the stops will appear less attractive to potential customers. However the stops will be in a more familiar arrangement and it should be possible to access them without crossing a road on at least one leg of the journey.
People with disabilities	The Preferred Scheme would benefit people with disabilities by improving access by public transport to key services and facilities. New bus stops and crossing points would be DDA compliant.	The proposed investment in public transport infrastructure will be less and therefore the stops will appear less attractive to potential customers. However the stops will be in a more familiar arrangement and it should be possible to access them without crossing a road on at least one leg of the journey.

Social Group	Preferred Scheme	Lower Cost Option
Socially excluded people	The Preferred Scheme would benefit socially excluded people by improving access by non-car mode to key services and facilities. The scheme would also provide transport links between areas of deprivation and regeneration areas providing new employment opportunities. The RT Stops will have high quality provision including CCTV which should increase security and make traveling by public transport more attractive.	The proposed investment in public transport infrastructure will be less and therefore the stops will appear less attractive to potential customers. The stops may not appear as safe for vulnerable people
Women	The Preferred Scheme benefits are applicable to all users with no distinction on the basis of gender. The RT Stops will have high quality provision including CCTV which should increase security and make traveling by public transport more attractive.	The proposed investment in public transport infrastructure will be less and therefore the stops will appear less attractive to potential customers. The stops may not appear as safe for women

3.10.2 Affordability & Financial Sustainability

Methodology

This Affordability and Financial Sustainability section has been prepared in accordance with WebTAG Unit 3.8.1 and associated references, making use of the following data:

- investment and operating costs as input to the TUBA model; and

- operator revenues and indirect taxation figures from TUBA output.

In line with the WebTAG Unit guidance the figures used are:

- in market prices unit of account;
- net of QRA and optimism bias allowances;
- in outturn cash prices, calculated using the following inflation assumptions:
  - General inflation of 2.7% p.a. between 2002 and 2044,
  - Construction inflation of 2.7% to 2014 and 6.0% from 2015 to 2044;
  - Operating cost inflation of 2.7% to 2044.

AFS tables have been prepared for Local Government, Central Government and Private Sector respectively. These are presented in Appendix 3.12. The following key points can be made in relation to the table for each of these sectors:

- **Local government** tables show the local contribution to preparation and construction costs in the years up to opening and the ongoing local commitment to infrastructure maintenance (track and stops). Notwithstanding potential developer contributions (which are yet to be determined) and further work on procurement options, for the purpose of the AFS analysis it is assumed that these costs are borne in full by the local authority.
- **Central government** tables show the DfT funding for the scheme in the years before opening and the loss of indirect taxation (over the full 60 year appraisal period) occurring as a result of the increase in expenditure on public transport fares (which does not incur taxation) and the reduction in car use and associated fuel duty receipt by the government.
- **Private sector** tables show the costs to the operator required to renew the Rapid Transit fleet every 15 years throughout the appraisal timescale, and the change in revenues accruing to bus and rail throughout the scheme operational life.

Preferred Scheme

Tables 3.12.1 to 3.12.3, in Appendix 3.12, show the AFS tables for the Local Government, Central Government and Private Sector respectively for the Preferred Scheme. These tables show the following impacts:

- **Local:** the net investment cost to local government is £12.8m. There are also significant maintenance costs in Year 15 (2031) due to major infrastructure refurbishment No revenues are assumed to accrue to local government in the AFS analysis.

- **Central:** central government grant to local authority for construction amounts to £59.1m in outturn prices. Overall loss of indirect taxation revenues over the appraisal period amounts to £48.3m, resulting in a totals cost to central government of £107.4m. The majority of lost taxation revenue comes from reduced fuel duty resulting from lower levels of car use. Over time the overall loss in indirect taxation revenue becomes greater, however tax revenue from rail increases over time.

- **Private:** there are no investment costs in the construction period accruing to private operators. Investment from operators comes in the form of new vehicle fleet, provided in year 1 of operations and replaced every 15 years thereafter. In Year 1 bus revenues do not cover costs partly due to the initial fleet purchase, in Year 8 costs continue to exceed revenue but by Year 15 revenues marginally exceed costs. (Note that first round of vehicle replacement is scheduled in Year 16 of the operational period.) Rail revenues reduce over time.

Lower Cost Option

Tables 3.12.4 to 3.12.6, in Appendix 3.12, show the AFS tables for the Local Government, Central Government and Private Sector respectively for the Lower Cost Option. These tables show the following impacts:

- **Local**: the net investment cost to local government is £12.0m, which is £0.8m less than the Preferred Scheme.

- **Central:** central government grant to local authority for construction amounts to £53.6m in outturn prices, some £5.5m less than the Preferred Scheme. Overall loss of indirect taxation revenues amounts to £50.7m, resulting in a total cost to central government of £104.3m, some £3.1m less than for the Preferred Scheme. The majority of lost taxation revenue comes from reduced fuel duty resulting from lower levels of car use. Over time pattern of change in direct taxation is similar to the Preferred Scheme, though at a lower level of loss from highways and bus and a greater gain from rail.

- **Private:** the assumptions on private sector investment are the same as for the Preferred Scheme. Unlike the Preferred Scheme, the Lower Cost Option does not cover costs with revenues by Year 15. Operating costs are generally higher than for the Preferred Scheme due to the longer distance traveled by buses where the segregated guideway is not

implemented. The loss in rail revenues over time is greater than for the Preferred Scheme.

3.10.3 Practicality and Public Acceptability

DfT's guidance includes a checklist (TAG Unit 2.5) to help consider whether a plan is practicable. This poses questions regarding a number of issues not covered in the economic assessment, in particular:

- Technical (complex or simple?), legal (unusual powers needed?), political (cross-party support?) and funding (RFA support, developer contributions needed?) issues;
- Phasing (timescales? could the scheme be split-up?) and complementarity (is it dependent on another scheme?); and
- Acceptability (is there public support and key stakeholder support?).

Development of the scheme has considered these issues at various stages of scheme development. The Table 3.18 below summarises the current position:

Table 3.18: Practicality and Public Acceptability

Element	Preferred Scheme
Technical	As with all major projects, there are numerous technical issues that need to be tackled as the project progresses, including engineering design, issues associated with crossing under mainline railway, passing over or close to former landfill and traversing part of a flood plain. None of these are considered particularly more complex than in other major projects of this nature. Items have been included in the risk register to cover potential engineering and environmental challenges. The engineering complexities surrounding a bridge under the railway embankment have been carefully considered and early discussions were held with Network Rail, culminating in their issuing the necessary approvals for the current stage of work.

Element	Preferred Scheme
Legal	In addition to normal legal issues surrounding the planning approvals required to progress the Link, it is anticipated that specific consideration will be needed to deal properly with crossing Highridge Common, where it is known that specific legislation governs the treatment of Common Land. The plan also includes for time and costs that may arise should Compulsory Purchase powers be needed to acquire land not currently in either authority's ownership.
Funding	DfT funding for the South Bristol Link is identified in the Region's submitted RFA2, and local contributions will be required to meet both the preparatory costs and a proportion of the total scheme costs. The amount of the local contribution will depend on the scheme option taken forward, but it is anticipated that as a proportion of the total costs, the local contribution would be in excess of the minimum requirement (10%). The bulk of the local contribution is expected to come from developer contributions and, even taking into account the current recession, it is considered that this is still a reasonable assumption.
Phasing and Partitioning	Early consideration was given to phasing the scheme in two parts but it was agreed that there were considerable advantages to be gained through progressing the scheme as a single major project. Advantages included: - recognition that scheme objectives were more effectively delivered with a single scheme; and cost savings that would arise with progressing a single scheme with one set of preparatory works, public inquiry and a single contract covering all construction works. Nonetheless, a scheme that includes both Rapid Transit and new highway for two physically separate parts lends itself to phasing, in that sections and modes could be delivered sequentially, should issues arise that make this expedient. For example, the phase 1 highway link between the A370 and A38 could be delivered first, followed by the full Rapid Transit and then the phase 2 highway, or vice –versa.

Element	Preferred Scheme
Complementarity	The phasing of the South Bristol Link project could be influenced by progress with complementary projects such as Rapid Transit on radial routes (e.g. between Long Ashton Park & Ride and Temple Meads (BRT line 2), and Hengrove Park North Fringe Package (BRT line 3)) and by the pace of developments in the area. The base case assumes that the BRT line form Temple Meads to Ashton Vale will be in place before SBL. A sensitivity test is being carried out to assess the situation with the North Fringe-Hengrove Park package in place. A further sensitivity test has considered the situation should development take place more slowly that anticipated.
Political view	The South Bristol Link project has been supported by elected decision-makers in the West of England authorities through its inclusion in the JLTP and its reaffirmation in RFA2. Executive Members holding transport portfolios receive regular updates through the newly formed (and legally constituted) West of England Joint Executive Transport Committee, which receives advice from the Joint Scrutiny Board. Elected representatives have continued to support the scheme through a series of meetings including: Joint Scrutiny and Joint Transport Executive Member meetings, Scrutiny and Executive Member/Cabinet meetings held by both Bristol and North Somerset Councils.

Element	Preferred Scheme
Public acceptability	There have been two rounds of public consultation (reported fully in Chapter 4 and associated Appendices). It is clear that views regarding the scheme remain polarised with one set of opinion firmly supportive of the Link, seeing it as essential infrastructure for the regeneration and accessibility of South Bristol, and an opposite view that sees it as damaging to the environment and unnecessary. Many of those opposed to a link are also opposed to new development and tend to see both as a linked and unacceptable intrusion on the Green Belt. Between these extremes there is a fairly even balance of opinion among members of the public who have responded. Considering the large population who may be affected by the scheme, albeit not in a major way, it is clear that the overwhelming majority of people have expressed no views, either for or against the link. Key stakeholders, especially the business community, are firmly supportive of the scheme, with businesses in South Bristol often pointing to the relative inaccessibility of the area. Local transport operators, First and Wessex Connect , support the scheme. The Environment Agency and Natural England have pointed out details that will be sought as the scheme proceeds, but have raised no show-stopping concerns.

3.10.4 Treatment of Ten Year Plan Targets

NATA guidance requires consideration of the scheme in relation to the Ten Year Plan published by Government in 2000 (Transport 2010, the Ten Year Plan, DETR 2000). More recent policy has largely superseded this plan including the paper “Delivering a Sustainable Transport System” (DfT 2008). The Scheme’s contribution towards this more recent policy is set out in Table 2.2 of Chapter 2 The Strategic Case.

Table 3.19 below shows how the South Bristol Link would contribute towards targets set in the Ten Year Plan for both the Preferred Scheme and the Lower Cost Option.

Table 3.19 Summary of contribution to the Ten Year Plan Targets

Ten Year Plan Target Assessment	Preferred Scheme	Lower Cost Option -
To reduce road congestion on the inter-urban network and in large urban areas by promoting integrated transport solutions and investing in public transport and the road network	The proposed scheme is an integrated transport scheme that will potentially build upon the proposed first link in a city-wide Rapid Transit network for Bristol and will contribute to reducing congestion in a large urban area by promoting car users to travel by public transport.	The lower investment in public transport will have a correspondingly lower impact on mode shift as it will be a less attractive alternative for car-users.
To increase rail use with investment in infrastructure and capacity, while at the same time securing improvements in punctuality and reliability	Not Applicable	Not Applicable
To increase bus use while at the same time securing improvements in punctuality and reliability	Reduced congestion and the provision of the off line Rapid Transit route section and on-line bus priority will substantially improve the journey time reliability of bus services operating in the Rapid Transit corridor, improving journey time reliability between the south west of the sub-region and Bristol City Centre. The proposed scheme represents an excellent value for money investment.	The lower investment in public transport provision will slightly reduce the potential contribution to this target.
To double light rail use	Not Applicable	Not Applicable
To cut journey times on London Underground	Not Applicable	Not Applicable

Ten Year Plan Target Assessment	Preferred Scheme	Lower Cost Option -
To improve air quality	There will be an overall improvement in air quality, although very slight.	It is considered that the air quality benefits will be broadly similar for the Lower Cost Option.
To reduce greenhouse gas emissions by 12.5% from 1990 levels and move towards a 20% reduction in carbon dioxide emissions by 2010	The scheme will result in a reduction in greenhouse gas emissions due to changes in vehicle speed and reduced journey times.	It is considered that the greenhouse gas emissions benefits will be lower for the Lower Cost Option.
To reduce the number of people killed or seriously injured in road accidents by 40% by 2010 and the number of children killed or seriously injured by 50% compared with the average for 1994-1998	The Scheme will have a slight negative impact on this target due to a predicted increase in PIAs and associated costs due to the network wide gradual increase in traffic flows, caused by the scheme.	The Lower Cost Option would result in slightly more accidents.

3.11 OVERALL VALUE FOR MONEY CONCLUSIONS

The overall scheme Benefit Cost Ratio (BCR) compares the monetised present value benefits with the present value cost of the scheme. The Overall BCR for the scheme at 5.8 represent high value for money according to the DfT guidance. The Appraisal Summary Tables show that the scheme contributes strongly to other non-quantified objectives and does not have any severe adverse environmental impacts.

3.12 APPENDICES TO CHAPTER 3

Appendix 3.1:Modelling Methodology

Appendix 3.2 : Highway Assignment Model Development Report

Appendix 3.3: Public Transport Assignment Model Development Report

Appendix 3.4: Demand Model Development Report

Appendix 3.5: Forecasting Report

Appendix 3.6: Economics Report

Appendix 3.7: Environmental Impact Report: Preferred Scheme

Appendix 3.7a: Environmental Constraints Map

Appendix 3.7b: Geotechnical input

Appendix 3.8: Environmental Impact Report: Lower Cost Option

Appendix 3.8a: Environmental Constraints Map

Appendix 3.9: Wider Economic Benefits

Appendix 3.10: Accessibility Modelling

Appendix 3.11: Accident Assessment

Appendix 3.12: Affordability & Financial Sustainability Tables

Appendix 3.13: Data Collection Report

Appendix 3.14: TUBA input & output files – supplied on separate CD

South Bristol Link
Major Scheme Business Case

4
The Delivery Case

An explanation of how we propose to deliver the South Bristol Link

4 The Delivery Case

4.1 INTRODUCTION

This Chapter describes how we propose to deliver the South Bristol Link. It covers**:**

- **Governance** – roles and responsibilities for delivering the project, project organisation and decision-making structure;
- **Project Planning**- stages in project delivery with timescales and key dependencies
- **Risk Management** – development of risk register and quantified risk assessment
- **Stakeholder Management** – communications principles and plan, and consultation undertaken to date
- **Evaluation** – evaluation plan and timetabled reports
- **Assurance** – Gateway Review procedures

The South Bristol Link is one of several major transport projects and programmes being progressed in the West of England. The project is a key component of the wider integrated programme of major schemes in the Sub-Region.

The Link combines Rapid Transit and Highway, with a segregated cycle and pedestrian route alongside, connecting the A370 Long Ashton Bypass with Hartcliffe roundabout and Hengrove Park in South Bristol. Its design combines current guidance with best practice and takes on board public and stakeholder views so as to provide a scheme that is deliverable in the local context. The risk register has identified elements of the scheme that may present obstacles to delivery and these are considered below.

The programme for delivery has been drawn up to allow adequate time for completion of activities that lie on the critical path. Activities are generally carried out in sequence rather than in parallel; this allows for some leeway in the event of unplanned delay.

4.1.1 Relevant Local Experience

The West of England authorities have a proven track record in the delivery of transport schemes and major projects. We thus have practical experience of delivering schemes and good understanding of the major pitfalls that can occur and, through risk management, have circumvented these.

Examples of projects delivered and in the pipeline include:

- A4174 Avon Ring Road Stage II – opened to traffic in September 2001. The scheme completed the strategic link between M32 and A4. Cost £33.2 million. Evaluation has shown that the project successfully removed through-traffic, particularly HGVs, from unsuitable routes and

provided opportunities to enhance facilities for pedestrians, cyclists and public transport.

- Greater Bristol Bus Network (GBBN) – comprises a series of Showcase Routes; project granted Full Approval in May 2008 and the ten bus showcase corridors (nine of the ten entering Bristol including two in North Somerset) are now being delivered across the sub-region;
- Portway Park and Ride – Phase 1 of this Park and Ride scheme was opened in April 2002, providing a reliable 10 minute service into Bristol city centre, and including 280 car parking spaces for phase 1 and a further 250 spaces in September 2008
- Cycling City - In June 2008 DfT appointed Bristol as the UK's first official Cycling City, Bristol City and South Gloucestershire Councils are working together to deliver this scheme.
- Weston Sea Defences – an ongoing £30m project to bolster defences along the sea front in Weston
- The Bath Transportation Package has also now secured Programme Entry for a total investment of £54 million.
- A bid for Programme Entry for Rapid Transit Ashton Vale to Temple Meads was submitted to DfT in March 2009; and North Somerset Council submitted a bid in April 2009 for the Weston Package.

4.2 GOVERNANCE

4.2.1 The West of England Joint Governance Arrangements

The West of England authorities have been progressing joint working arrangements, which were strengthened significantly in 2009 and are summarised below.

West of England Partnership Board

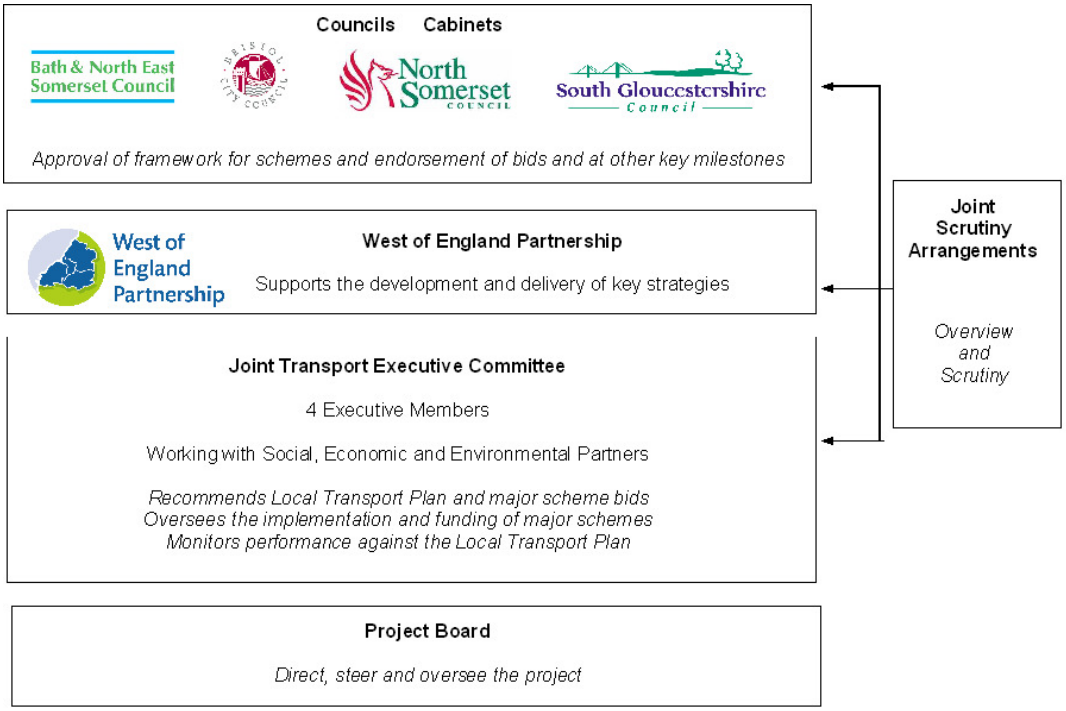
The West of England Partnership Board (the Partnership) is a cross-party member and strategic partner board. The purpose of the Partnership is to:

- Realise the potential of the West of England and improvements in its economy, public infrastructure, environment and quality of life for all its residents;
- Set clear long-term direction to support the development and delivery of key strategies for the West of England;
- Promote the interests of the West of England regionally, nationally and in Europe;
- Add to the confidence that attracts and retains public and private investment;
- Work holistically involving local authorities, public agencies and social, economic and environmental partners;
- Provide the leadership and strategic capacity to secure the well-being of the West of England;

- Ensure appropriate delivery arrangements and vehicles, and a performance management framework.

The Partnership structure is shown in Figure 4.1.

Figure 4.1 West of England Joint Governance Arrangements



Joint Transport Executive Committee

In 2009 a Joint Transport Executive Committee (JTEC) was established comprising the four Executive Members of the Unitary Authorities with responsibility for transport. This arrangement has been legally constituted via a Joint Working Agreement. The JTEC is responsible for:

- developing and recommending sub-regional policy, investment and financial frameworks;
- specific and continuing political decision-making and oversight essential to the successful implementation of major transport strategies and investment Projects;
- seeking authority from Cabinets where any variation to a policy and financial framework is recommended;
- producing periodic progress reports and receiving monitoring reports from major contractors;
- Working with cross-party members and strategic partners serving on the relevant Joint Transport Advisory / Scrutiny Board of the Partnership;
- overseeing relationships with the DfT, bus and rail operators, the Highways Agency and Network Rail; and

- ensuring the delivery of the transport elements of the Multi-Area Agreement.

JTEC Members exercise their executive powers collectively, within the relevant sub-regional policy and financial frameworks determined by individual authorities, subject to any decisions reserved by individual authorities.

For the South Bristol Link, JTEC has considered and endorsed the scheme on two occasions in the past six months. First, in October 2009, when members considered the shortlisting process and endorsed progressing to development of the preferred scheme. Second, in February 2010, when members discussed and unanimously endorsed the scheme that is the subject of this submission.

Joint Scrutiny Committee

The Joint Scrutiny Committee supplements the cross-party member and strategic partner engagement and contribution made at the Partnership. The role of the Joint Scrutiny Board is to:

- provide specialist advice and recommendations to the Partnership; and
- scrutinise proposals under consideration, and the implementation of proposals approved.

The Joint Scrutiny Committee considered the South Bristol Link in January 2010 and made a number of recommendations that were subsequently addressed in the February report to JTEC.

Proposed Joint Delivery Vehicle

With the JTEC now in place it is the West of England's intention to establish a Joint Delivery Vehicle [JDV]. The purpose of the JDV is:

- to provide consultancy services to the West of England authorities on the best means of specifying individual major infrastructure projects - transport, municipal waste management and homes and communities - once they are financed and approved;
- once specified, to ensure the delivery of major infrastructure projects within the agreed timescales, specification and budget, by effective commissioning; and
- to ensure high quality project management.

Independent legal and financial advisers have been advising the authorities on the formation of this vehicle

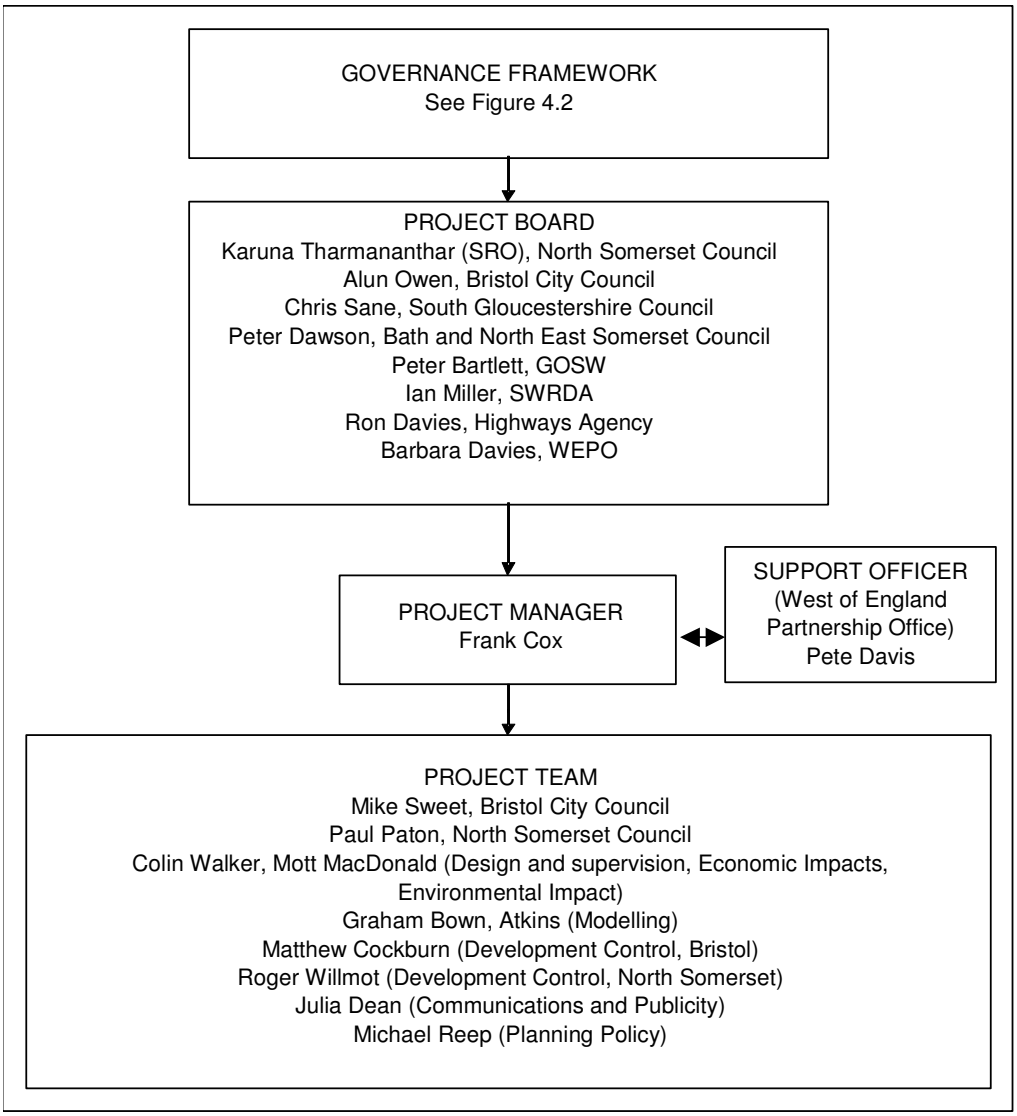
The move to a JDV is a significant step in the evolving shared governance arrangements in the West of England. This vehicle would be the preferred option for delivery of major transport schemes in the sub-region; however, given that the JDV is not yet in existence, the proposed governance for delivery of the South Bristol Link is set out below.

At the highest level governance rests with the councils supported by the challenge and advisory roles provided by the Joint Scrutiny Committee and the West of England Partnership Board

South Bristol Link Governance Structure

North Somerset would be the lead authority, working in a close contractual relationship with Bristol City Council and with support from the sub-region; both at Project Board and Delivery Team level (see Figure 4.2). North Somerset's Project Management Method is based on the Office of Government Commerce's (OGC's) project management method PRINCE2 (PRojects IN Controlled Environments 2) which forms the basis of management methods used by all the West of England Authorities.

Figure 4.2 Project Management Structure for South Bristol



Project Board

The Project Board guides and steers the progress of the scheme and is responsible for its delivery. The Board authorises the project plan and will authorise strategic decisions or seek the authority of the JTEC. It includes representatives of the West of England authorities, the Government Office for the South West (GOSW), South West Regional Development Agency (SWRDA)

and the West of England Partnership Office (WEPO) and the Highways Agency (HA). The Board was formed at the start of the project in October 2006 and has met approximately every three months.

The main responsibilities of the Project Board are as follows:

- approving the Project Initiation Document (including Project Plan);
- agreeing and overseeing the implementation of the necessary actions to secure submission of the required MSBC processes;
- supporting and taking part in, where appropriate, the necessary Gateway Reviews;
- reviewing the Project Plan and approving any changes necessary;
- approving any changes to the risk log and any additional mitigating actions;
- approving periodic Progress Reports for the JTEC, Joint Scrutiny, Directors, DfT and the West of England Partnership;
- approving the budget plan and any changes to this plan via regular highlight reports from the Project Manager;
- approving any changes to the Project Plan recommended by the Project Director via highlight reports;
- considering any exception reports that may arise during the life of the project and requesting exception plans where appropriate;
- approving any exception plans that may arise.

The Project Board would seek authority for strategic decisions from the JTEC when required. Meetings of the Project Board will continue as necessary to meet key milestones.

Senior Responsible Owner

The Senior Responsible Owner [SRO] for the South Bristol Link is the North Somerset Council Assistant Director, Development and Environment, Karuna Tharmananthar. The SRO has overall responsibility for ensuring that the project meets it objectives and delivers the projected benefits within the time, cost and quality parameters. The SRO is the Chair of the Project Board. The SRO is empowered to manage the overall Project to deliver the required products within the constraints agreed with the Project Board and to approve changes to Project, tasks and work packages within the agreed tolerances set by the JTEC. Parts of the project within Bristol will be managed and progressed, in liaison with the SRO, through Bristol's Head of Major Projects, Alun Owen.

The Project Manager (PM)

The PM is responsible for delivering the Project in line with the agreed controls and procedures set out in the Project Initiation Document. The PM is responsible for the highest possible level of compliance with the relevant investment and project management approaches including third parties' processes.

The primary focus of the PM is to define the Project Plan and to ensure that the Project is delivered on time and within specification and budget, seeking additional authorities as necessary. This will involve development, monitoring, progress chasing and co-ordination of the Project as a whole and ensuring that all elements of the Project are delivered with the appropriate technical competency. In particular the role will be:

- to obtain approval from the Project Board for the Project Plan;
- to recommend to the Project Board and then implement the necessary actions to secure the required MSBC processes;
- to plan for and co-ordinate the necessary Gateway Reviews;
- to account for the delivery of the Project, on time and within specification and budget;
- to secure the approval of the JTEC for key strategic decisions;
- to lead a Project Team and ensure adherence to the Project Plan;
- to produce periodic Progress Reports for the JTEC, Joint Scrutiny, Directors, the Department for Transport, and the West of England Partnership;
- to carry out day-to-day communication role between the DfT and the four authorities.

Project Delivery Team

The PM would be supported by a Project Delivery Team, which includes the requisite range of experience required to take the South Bristol Link to Full Approval and then to implement it. The Team would consist of Bristol and North Somerset Council officers and term transport planning and design consultants, selected from Mott MacDonald, Halcrow, Atkins. At the end of the agreements enabling the Authorities to engage these firms, others on the emerging sub-regional consultancy frameworks for major schemes would be employed as necessary. These consultancy frameworks are expected to be in place by May 2010 and cover the following three areas of expertise:-

- Major Transport Scheme Project Management
- Major Transport Scheme Infrastructure Procurement
- Major Transport Scheme Infrastructure Design

The composition of the Project Delivery Team would vary as the scheme moves from preparation to implementation.

4.3 PROJECT PLANNING

4.3.1 Project Plan

The South Bristol Link is managed through the Project Plan, which is updated and reviewed on a regular basis. It includes the following components:-

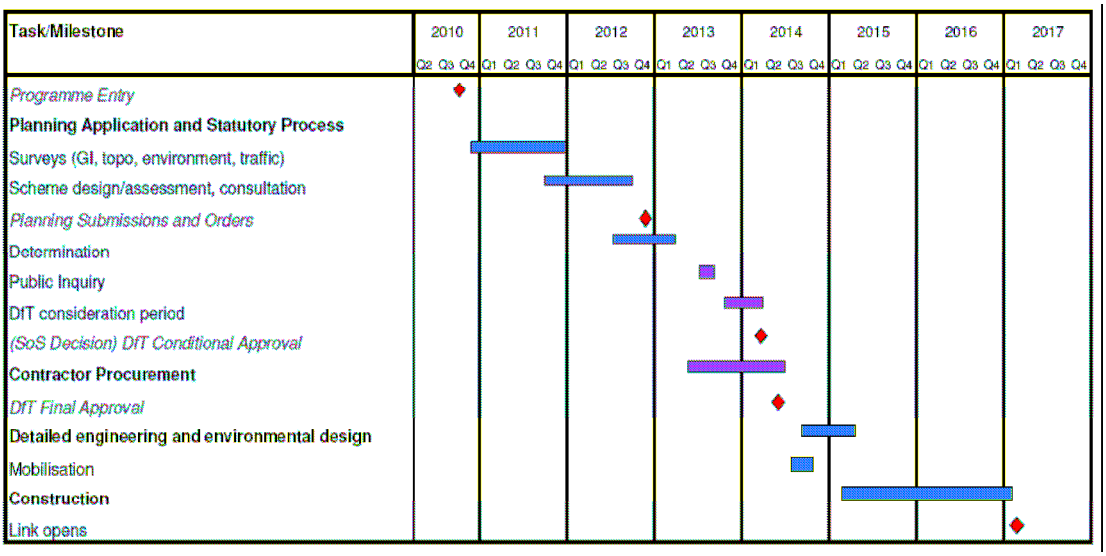
- Scheme description.
- Scheme objectives.

- Project – summary and detailed.
- Team structure and management.
- Risk register.
- Communications strategy.
- Procurement strategy.
- Budget and funding.

4.3.2 Project Programme

The full programme for the South Bristol Link is provided in Appendix 4.1, and a summary of the main stages is shown below. This has been drawn up with advice from consultants with recent relevant experience of other comparable projects. The main stages are based on DfT's approval stages as well as the planning application and approval stage and shown in Figure 4.3.

Figure 4.3 Summary Programme and Key Milestones



Subject to achieving Programme Entry before the end of 2010, work will start on ground investigations, preparation of design, and environmental impact documentation in the current financial year, leading to submission of planning applications to Bristol and North Somerset Councils in 2012 after a further round of public and stakeholder consultation. A Public Inquiry is anticipated and this is programmed for mid-2013, with Inspector's report and Secretary of State decision at the start of 2014. Subject to a favourable decision, a contractor would be appointed and final detailed designs would be carried out in 2014, enabling site clearance and construction to commence at the start of 2015. A two-year construction period, together with award of operating contracts for rapid transit, will lead to scheme opening and operating at the beginning of 2017.

4.3.3 Key Dependencies

Consideration has been given to progressing the scheme using Transport & Works Act powers, partly because this is the approach being adopted for the Temple Meads Ashton Vale rapid transit scheme. There appear to be advantages of TWA in terms of controlling operation of a rapid transit service and possibly speeding the delivery programme. However, after seeking advice from legal advisers and considering that the guided rapid transit element of the scheme forms only a small part of the overall SBL, it is proposed that the South Bristol Link is the subject of planning applications that will be submitted to both Bristol and North Somerset Councils, for consideration under relevant Town & Country Planning Acts. Separate powers will be used to enable use of Common Land on Highridge Common and, should it be necessary, Compulsory Purchase powers may be needed for land currently in private ownership.

Key programme dependencies include:-

- DfT Programme Entry
- Approval of Planning Applications by Bristol and North Somerset Councils
- Acquisition of land needed for scheme
- Secretary of State approval following Public Inquiry, followed by Conditional Approval and release of tenders for construction and operation;
- Final agreements with contractor and service providers and Final Approval submission;
- Final DfT approval and commencement of works; and
- Completion of works and start of operational data collection for scheme evaluation.

Tasks on the Critical Path

- Significant tasks on the critical path include:
- Achievement of Programme Entry from the DfT;
- Achievement of Conditional Approval from the DfT including successfully completing OGC
- Gateway 2; and
- Achievement of Full Approval from the DfT including successful completing OGC Gateway3.

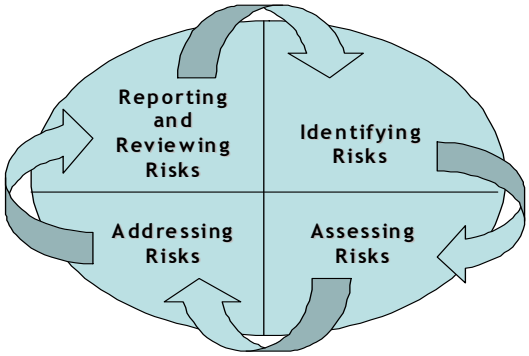
4.4 RISK MANAGEMENT

The strategy adopted for managing risk is described in full in Appendix 4.2. A summary is set out below.

Risk management is the process of identifying risks, evaluating their potential consequences and determining the most effective methods of controlling and/or responding to them. It is not an end in itself. Rather, risk management is a

means of minimising the costs and disruption to the project caused by undesirable events. The risk management process is shown in Figure 4.4 below:

Figure 4.4 Risk Management Process



The aim of risk management is to reduce the frequency of risk events occurring (wherever this is possible) and minimise the severity of their consequences if they do occur. Even when the likelihood of an event occurring cannot be controlled, steps can be taken to minimise the consequences.

The purpose of the risk management is to:-

- ensure risk management is an integral part of project management decision making, planning and implementation;
- ensure risks are managed in accordance with good practice, as part of good project governance;
- respond to risk in a balanced way, mindful of the risk level, risk reduction potential, cost/ benefit and particular resource constraints; and
- provide guidance on the following areas: aims and objectives of Risk Management; roles and responsibilities for managing risk; risk financing; and risk management process.

Risk management includes:-

- identifying and assessing risks;
- reassessing the impact and likelihood after controls have been implemented (the 'residual risks');
- responding to risks through agreed controls; and
- monitoring and reviewing progress.

Three risk workshops have been held for the Scheme to date. Each has involved a range of expertise, including representatives of consultants, other authorities and the Highways Agency. The first of the workshops was held soon after project inception in 2006 when the nature of the scheme was not well defined. It was at this risk workshop that the risk log was first produced. Subsequent workshops have updated the risk log, which is also reviewed at

monthly progress meetings. Key (red) risks are reported to the Project Board quarterly.

In preparation for production of a Quantified Risk Assessment (QRA), a further risk workshop was held for the Preferred Option in September 2009. At this workshop, the risk log was converted to a register that included predicted direct costs and delays. A QRA was then undertaken for the Preferred Scheme to support this bid for Programme Entry. Subsequently, a risk workshop was held for the Lower Cost Option in February 2010 and a QRA prepared.

Each risk was assessed in terms of the potential delay cost and the cost of additional project management associated with the cost of mitigating measures as appropriate. Not all risks have both these elements, and the risk registers describe which do and which do not. The delay costs are derived from the cost of the delay to the scheme as a whole based on the construction inflation cost used in calculating the outturn costs.

These QRAs are therefore based on capital cost elements of the project and the construction programme from the present day to the opening year. The programme for delivery has been carefully developed allowing adequate timescales for completion of statutory processes and construction. The councils are confident that the Preferred Scheme can be delivered on time and within budget and that sufficient work has been carried out to ensure that the costs quoted are robust. The QRAs exclude risks to operational costs or revenues. The Risk Registers with QRA costs are included in Appendix 4.2.

The assessment has resulted in quantified estimates of the potential risks associated with both the Preferred Scheme and the Lower Cost Option. The QRA has resulted in a total risk allowance of £5.29 m for the Preferred Scheme and £5.67 m for the Lower Cost Option, both at the 50% confidence level. The risk exposure has been included in the economic analyses to determine the BCRs for Preferred and Lower Cost Options. These allowances for risk have been added to the base costs as part of the Quantified Cost Estimate (QCE) for each option.

To-date the main risks and mitigation measures are considered to be:

- crossing under mainline railway because of delayed approvals of procedures – early and detailed discussions with Network Rail
- difficulties obtaining funds for initial, pre-construction development costs leading to delay or suspension – securing developer contributions, involvement of council members and other funding sources.
- uncertainty about extent of contaminated ground – site surveys programmed and incorporation into risk assessment.
- need for unanticipated utility diversions (increased cost and potential delay) – increased budget and incorporation into risk assessment;
- adverse weather during track possession Network Rail) leading to penalties – aim to transfer risk to contractor to ensure all sensible mitigation measures are adopted

The risk log and register will be used throughout the preparation and delivery of the Scheme to manage project risks and mitigate them wherever possible. It will be regularly reviewed and updated in order to ensure actions necessary to mitigate risks are being implemented. The risk management process will enable risks to be set to zero when they are no longer a threat, and any new potential risks to be added to the log. Risks that cannot be mitigated will be escalated to the SRO, and if needed, the Project Board for action on whether they can be eliminated, reduced, or accepted by the project team, and if needed the involvement of other parties.

4.5 STAKEHOLDERS

4.5.1 Communication Plan

A Communication Plan was drawn up at the start of the project and this has been developed as the preparation work has progressed. Stakeholders have been identified and the West of England Partnership has developed its communications strategy with an up-to-date website that includes details of all the sub-regional major schemes. The current version of the SBL Communication Plan can be seen in Appendix 4.3.

The objectives of the communications plan are to:

- inform stakeholders, including the public, businesses and other interested parties of the objectives, nature and progress of the South Bristol Link;
- help achieve the support of local people, businesses and others;
- ensure the support of key decision-makers and stakeholders;
- establish ways of providing information in an appropriate and timely way.

4.5.2 Internal Communication

Internal communication within the Project Team is being achieved through regular project team meetings, generally monthly, and presentations to internal staff at meetings of different internal interest groups

The Bristol and North Somerset Executive Members with responsibility for transport are briefed regularly on progress. Regular reports and updates are also provided to the Joint Transport Executive Committee meetings and for regular meetings of the four authority Heads of Transport. Members of both authorities have been briefed prior to public consultation exercises. The submission of the bid was endorsed at the Joint Transport Executive Committee meeting on 4 February who recommended approval to Bristol and North Somerset. This approval of the Major Scheme Bid was provided at a Cabinet meeting of Bristol City Council and an Executive meeting of North Somerset Council both in March 2010.

4.5.3 External Communication

Audiences and stakeholders include: statutory and other partners, parish councils, transport operators, interest groups, businesses and other employers,

and the general public. Current communication methods are summarised in Table 4.1 below.

Table 4.1: Communication methods

Who/how	Presentations/ informal meetings	Formal meeting	Report	Media (via releases)	e-news	Website	Leaflet/ letter
Councils' Executive	✓	✓	✓	✓	✓	✓	
Councils' Scrutiny	✓	✓	✓	✓	✓	✓	
Statutory Stakeholders	✓					✓	✓
Local residents	✓			✓	✓	✓	✓
Community and Environment Groups	✓	✓			✓	✓	
Business Interests	✓				✓	✓	
Transport Operators	✓				✓	✓	
Bristol Partnerships	✓					✓	
Project Board		✓				✓	
Project consultants	✓					✓	

A key part of the Communication Plan is consultation with statutory bodies, particularly the Environment Agency, Natural England and English Heritage. Appendix 4.7 includes responses from these and other external stakeholders.

4.5.4 Establishing a 'brand' for transport in the West of England

The Authorities have developed the 'Travel+' brand to represent the four Authorities working together providing added value and a change in approach to delivering sustainable transport improvements for the future.

The theme approach allows promotion of a vision whilst identifying all parts of the package as building towards the vision of the Joint Local Transport Plan (JLTP) - mode specific improvements within an integrated transport vision. It quickly, easily and simply explains the reason for the works and allows various

schemes to be separate but linked, identifying all schemes as part of the joint vision to demonstrate unity of purpose.

Certain key messages are linked to the Travel+ identification and are repeated at every opportunity. These are:

- Travel+ projects sit at the core of the local authorities' vision for change;
- Together these projects will deliver realistic, integrated, sustainable and equitable travel choices for all our communities across the area;
- Travel+ offers real alternatives to the private car for local journeys and should help encourage us to change our travel behaviour; and
- Travel+ projects will help manage congestion and maintain our quality of life, delivering real choice and supporting future economic growth.

An example of the branding work is included in Appendix 4.4.

4.6 RESPONSES TO CONSULTATION

4.6.1 Public Consultation

There have been two rounds of public consultation prior to preparation of this bid.

The first aimed to engage people in identifying the nature of the scheme. At that time, whilst it was established that a new transport link was needed to address the project objectives, there were no pre-conceptions as to the modes of transport or precise route that should be employed. The consultation took place between November 2008 and March 2009. The report of the consultation was published on the web in June 2009, and is reproduced in Appendix 4.5. One of the important conclusions of the first consultation exercise was that there was significantly more support for a combined rapid transit/highway scheme than for either on its own. This was one factor that was taken on board in moving to develop the Preferred Option.

The second round of public consultation sought people's views on the Preferred Scheme. In particular it sought to understand whether people and businesses would benefit from the scheme and aimed to establish people's concerns, and how they might improve the scheme. Design has since been refined to take account of some of the issues that were raised. This second round of consultation lasted from 2 November to 31 December 2009. The report of the consultation is included as Appendix 4.6.

In summary there is significant support for the scheme from businesses, with over 60 separate companies writing to point out the advantages, perceived as including:-

- improved access for employees and deliveries;
- promotion of South Bristol;
- reduced costs through reduced congestion.

There is further support for the scheme from some community groups and households in the area.

Objection to the link comes mainly from those living in locations that would experience an increase in traffic; and also from groups with environmental reasons for opposing road building in general. There are several well organised groups that harness and organise objection to the scheme, including both local and nationally recognised bodies. Objectors have noted their concerns through the consultation exercises, through statements and questions at council meetings and in various on-line discussion groups.

Further public consultation is included in the project plan as part of the planning process.

4.6.2 Stakeholder Consultation

In addition to public consultation when all stakeholders have been engaged, there has been ongoing consultation with particular parties potentially affected by the proposals.

The views of different stakeholders are outlined below, and letters are included at Appendix 4.7.

4.6.3 Business Community and major Employers

GWE Business West represents over 2,000 businesses in the West of England and is the principal business organisation in the sub-region. GWE Business West "welcomes the preferred South Bristol link option and the progress being made, as a project vital to the future economic development of South Bristol." They have stated that " the business community has been waiting for a South Bristol Link Road to be delivered for years with many doubting it will ever happen…..It is essential that the current preferred option is delivered in some shape or form, sooner rather than later."

The Cater Business Park, which has 'Business Improvement District' status and is located close to the line of the scheme in South Bristol, is representative of businesses in its view that "this Transport Link scheme is an absolute must for the continuing regeneration of our South Bristol locality and a necessity if we are to continue to maintain a healthy environment for business to thrive and provide employment for the area."

The Bristol Primary care Trust operating as NHS Bristol strongly support the development of public transport services and improved infrastructure for walking and cycling, but oppose the building of road infrastructure, which they consider increases Bristol's dependency on individual motorised transport.

4.6.4 Bristol International Airport (BIA)

BIA is the major regional airport for the south west of England and ninth largest in the country. It supports the scheme and considers its delivery will considerably improve the airport's surface accessibility, particularly by public transport. BIA anticipates that the scheme will route passengers away from areas that are currently very congested and enable an improved public transport link, using the rapid transit to provide an enhanced 'Bristol Airport Flyer' service. Links to South Bristol communities and beyond would enhance connectivity for passengers and provide attractive and accessible employment for local residents.

4.6.5 Utilities

Bristol City Council chairs the New Roads and Street Works Act Co-ordination Group which is an existing group of utility companies, service providers and emergency service groups who meet quarterly to co-ordinate works affecting the public highway. The group has been used to inform companies of the South Bristol Link proposals, including plans, timetables and design standards. In addition, as part of the preliminary design and for costing purposes, utilities companies have been contacted to help ascertain the nature of their installations. Further information will be exchanged as the scheme progresses. Bristol Water, whilst supportive of the proposals, has identified major supply pipelines that may need relocation; and initial discussions have been held.

4.6.6 Developers

Potential developers include Bristol Airport and land interests in North Somerset, which have major planning applications under consideration, and landowners in Bristol. These are generally supportive of the scheme in principle but have issues concerning aspects such as the proposed alignment, junction arrangements or potential capacity.

4.6.7 Statutory Stakeholders

Natural England has referred to the environmental appraisal that formed part of the options appraisal process and made a number of recommendations to mitigate the impacts of the scheme. They regard any increase in greenhouse gas emissions as undesirable and seek further investigations to assess the impacts on national and international biodiversity sites. They also recommend further investigations and surveys of aspects such as impact on local sites, notably Highridge Common and Colliter's Brook. Avon Wildlife Trust is opposed to the loss of ecological and green infrastructure value, and repeats Natural England's concerns regarding these sites and Hanging Hill Wood, and recommends further site assessment as the scheme progresses.

The Environment Agency refers to the scheme's potential impact on flooding and will require a Flood Risk Assessment. This will enable better understanding, which will be needed before the Agency would be able to give consent for works or structures within eight metres of the designated 'main rivers', Longmoor Brook, Old Colliters Brook, the Malago and Pigeonhouse Stream. They will also require appropriate investigations of historic landfills.

The Highways Agency is represented on the Project Board and has provided support through the option appraisal process and Preferred Scheme development.

4.6.8 Transport Groups

Discussions have been held with Network Rail as part of the process of promoting a scheme that crosses a mainline railway. They have no objections to the scheme in principle subject to clearing normal Network Rail procedures, and have issued a Certificate of Approval for Territory Clearance.

The Cyclist Touring Club has responded with references to appropriate design standards to ensure the safety and convenience of cyclists and others. CTC

seeks further involvement as the scheme proceeds and more detailed designs are developed. The CTC has subsequently also written to object to the scheme on environmental grounds, regarding is as running counter to policy objectives that seek to reduce congestion and encourage modal shift from car to bicycle.

Bristol International Airport is supportive of the scheme, as summarised in 4.7.4.

The two local bus operators, First and Wessex, have each written in support of the South Bristol Link. First consider that the opening of the scheme would help alleviate traffic congestion issues and open the opportunity for new public transport links, both with rapid transit and also for more conventional networks. Rotala, the parent group of Wessex Connect, who run the Park and Ride site at Long Ashton, consider the link will improve connectivity offering time savings and adding to the attractiveness of Park and Ride.

4.7 MONITORING & EVALUATION

4.7.1 Introduction

Given the long lead-in time up to scheme construction it is considered to be premature to establish a detailed monitoring plan at this stage. This section therefore outlines the proposed approach to monitoring and evaluation, which will be reviewed and finalised following Programme Entry.

Monitoring of the scheme will involve a combination of existing procedures currently undertaken by the Councils, supplemented by specific additional monitoring, established primarily for the South Bristol Link.

The aim of the evaluation will be cover both the positive and negative outcomes and to assess the performance of the scheme in achieving the original objectives. The core evaluation objectives will be to:-

- measure the contribution of the scheme towards regeneration and growth in South Bristol;
- assess changes in congestion in South Bristol and other locations experiencing changes in traffic as a result of the scheme; and
- measure changes in accessibility using accessibility data to compute changes in times for journeys by different modes for journeys along specific routes and corridors.

4.7.2 Local and National Indicators

The current Joint Local Transport Plan (JLTP2) contains a number of relevant indicators and targets for the West of England that focus on various elements of the transport system. The next Joint Local Transport Plan (JLTP3) for 2010/11 – 2015/16 is currently being prepared and it is anticipated that these or similar targets and indicators will be in place when the scheme is constructed.

The indicators currently cover the following:-

- public transport patronage;
- passenger transport user satisfaction;
- changes in peak period traffic flows;

- highway congestion; and
- changes in area wide traffic mileage.

The single set of National Indicators (NI), published as part of the New Performance Framework for Local Authorities, will also be reviewed to establish which of these are most appropriate to act as potential proxy measures against the scheme objectives. These NIs will be utilised within JLTP3 and as such, this work will be undertaken once Programme Entry for the scheme is granted to ensure the timely identification of appropriate indicators.

4.7.3 Scheme Specific Monitoring

An amount equivalent to 0.5% of the capital cost estimate (in accordance with DfT guidance) has been set aside to ensure the scheme can be monitored effectively. Use of existing data from operators and the Councils, as part of the regular data gathering process, will be utilised where possible to ensure the best use of resources.

It is likely that the baseline data will comprise the following:

- environmental data;
- existing patronage on routes that are likely to be affected by the introduction of the scheme;
- traffic levels on key highways;
- junction performance including queues at critical junctions;
- mode choice surveys; and
- safety and accident records.

4.7.4 Outline Evaluation Plan

The Evaluation Plan will present the key stages and timescales covering the range of monitoring and evaluation processes. The Evaluation Plan will follow the guidance contained in “The Evaluation of Major Local Transport Schemes (December 2006)” in terms of the purpose and scope of the evaluation process.

The Evaluation Plan will represent the framework for monitoring and evaluation of the South Bristol Link and, as part of the process, seeks to:-

- identify the elements of the South Bristol Link to be evaluated;
- clearly set out the methodology for evaluation including inter-relationships with existing monitoring activities and contribution to JLTP targets;
- ensure a timely and cost effective process; and
- ensure a process consistent with existing and developing requirements, i.e. taking into account development of emerging assessment frameworks and targets (such as the further development of targets being established for Developing a Sustainable Transport System).

The objectives of the Evaluation Plan will be a combination of the scheme objectives (set out in this MSBC) and key relevant NATA objectives. Other

impacts of significance that will be included in the Evaluation Plan are less suited to quantitative assessment and will therefore be considered qualitatively.

4.7.5 Summary

The following table shows the type of measures and indicators that could be used to assess each of the scheme objectives. Consideration will be required to isolate causes and effects since there are many local initiatives and investments that will also contribute to the scheme objectives.

Table 4.2 Summary of Impacts and Monitoring Proposals

Impacts	Indicator/monitoring
Objective: Facilitating regeneration and growth in South Bristol	
Increased number of jobs in South Bristol	Record number of people employed by businesses in South Bristol before, during and after implementation of the scheme Existing
Increased number or size of businesses in South Bristol	Record number of new businesses that setup in or leave South Bristol each year (Economic Regeneration team) Existing Record the annual change in the area of floorspace allocated for employment purposes (B1, B2, B8) Existing
Increased housing numbers	Record number of new households built in South Bristol Existing
Objective: Reducing congestion in South Bristol and adjacent areas of North Somerset	

Impacts	Indicator/monitoring
Shorter average journey times	Measure changes in person travel times on orbital and radial routes through South Bristol, e.g. Hengrove Park to Parson Street, A38 Castle farm to Parson Street, Winterstoke Road, Bishopsworth Road, A370 Yanley to Brunel Way, Hengrove Way to Castle Farm. (Data received from TrafficMaster and evaluation using Strat-e-gis) Existing and New
Changes in queuing at congested junctions	Measure queue lengths before and after construction of scheme at key junctions including Parson Street gyratory, Bishopsworth Road/A38, Ashton Road/A370 New
Reduction in accidents	Measure change in recorded all injury accidents Existing
Objective: Improving access between South Bristol and the city centre and to strategic transport links	
Improved access between South Bristol and the City Centre by public transport	Measured change in accessibility of Broadmead, Temple Meads station and the bus station by public transport for people in South Bristol Accession
Improved access to Bristol International Airport by public transport	Measure changes in Flyer Journey Times between Bristol International Airport and Temple Meads station New
Improved access by bicycle between South Bristol and the city centre	Automatic counts of cycle numbers on Hartcliffe way, and manual counts of cycle numbers on Hengrove Way corridor New

Impacts	Indicator/monitoring
Improved walking infrastructure	Measure number of pedestrians and cyclists using King George's Road and public rights of way in Ashton Vale New
Reduced traffic on residential rat-runs	Measure numbers of cars and heavy vehicles on Bishopsworth Road and Kings Head Lane New
Negative Impacts	
Increased accidents	Measure changes in number of all injury accidents on routes in and adjacent to South Bristol Existing Measure change in traffic speeds at selected sites in South Bristol Existing and New
Displacement of congestion downstream	Will be reflected in journey time monitoring
Release of latent demand for travel (induced traffic)	Annual traffic growth using selected ATCs in South Bristol Existing
Noise	Record number of complaints received regarding the noise generated following implementation New

4.8 MANAGEMENT AND REPORTING

The management and reporting for the evaluation process will be coordinated by the Project Manager. The timescales for this will be set out following the detailed design stage.

4.9 ASSURANCE

An arrangement has been established across the West of England sub-region to provide Quality Assurance (QA). QA is defined here as a system for ensuring that quality is built into, and being followed by, the project management

processes of the scheme. The approach for SBL Quality Assurance arrangements will operate in the form of:

- Individual investigation by the Project Board's QA nominee. For SBL this is Chris Sane, South Gloucestershire Council;
- A Strategic Review Group reporting to the West of England Partnership Joint Transport Executive Committee;
- An internal 'challenge' by a Peer Review Group convened at the discretion of the Project Board's QA nominee;
- External Quality Reviews convened at the discretion of the Project Board.

More widely, scrutiny in the West of England has been established through a scrutiny body that comprises three non-Executive Members with responsibility for overview and scrutiny for the functions and actions of the West of England Partnership. The group meet in joint session on a regular basis to:

- Scrutinise any relevant proposals from the West of England Partnership in relation to its activities of transport, planning, housing, waste management, skills and employment, economic development and culture and rural affairs
- Review actions taken and decisions made by the Executive Committees and other Executive Bodies
- Make reports or recommendations to the Executive Committees and other Executive bodies as appropriate and/or the constituent Authorities' respective Overview and Scrutiny Committees.

Meetings are open to the public and members of the public have the opportunity to make or present statements. Details of meeting and membership can be found at:

http://www.westofengland.org/meetings/joint-scrutiny-committee.

For the South Bristol Link, the Joint Scrutiny Committee has been presented with regular progress reports and scrutinised the draft report that was submitted to the Joint Transport Executive Members. The scrutiny function ensured that additional detail was provided for Executive Members prior to their recommending that the bid should be taken forward.

The project is also subject to review through the scrutiny procedures that are in place for both Bristol and North Somerset Councils. In these procedures, key decisions made by the Councils are subject to scrutiny by a different set of elected members to those who consider decisions in the executive bodies.

DfT guidance recommends that Gateway Reviews be undertaken for schemes with a total cost of £50m or more. Gateway Reviews will therefore supplement these QA activities as appropriate.

The 4PS Gateway Review 1 is planned to take place after submission of this bid in early summer 2010.

The 4PS Project assessment Spreadsheet has been completed and is included as Appendix 4.8. The SBL has an allocated risk score of 123, putting it clearly in the High Risk category.

4.10 APPENDICES TO CHAPTER 4

Appendix 4.1 Project Programme

Appendix 4.2 Risk Register

Appendix 4.3 Communication Plan

Appendix 4.4 West of England – Developing a system brand

Appendix 4.5 Public Consultation: Scheme Options (a-d)

Appendix 4.6 Public Consultation: Preferred Scheme

Appendix 4.7 Letters from Statutory Bodies & Stakeholders (a-h)

Appendix 4.8 4Ps Project Assessment Spreadsheets

South Bristol Link
Major Scheme Business Case

5
Commercial Case

The procurement strategy and management of commercial risks

5 Commercial Case

5.1 INTRODUCTION

This Chapter sets out how the West of England Authorities ("the Authorities") propose to procure the South Bristol Link (SBL) and manage the associated risks. It includes:

- **Procurement Strategy**: - discussion of the review of procurement options and identifies the preferred procurement routes for the scheme.
- **Commercial Risk Management**: - discussion of the main potential commercial risks, mitigation and management measures.

Major Scheme Business Cases for Programme Entry stage are required to indicate what the preferred procurement route is for the scheme and an explanation of how and why this was identified as the preferred procurement route. The Authorities at this stage have identified a number of potential procurement routes with regard to public transport service provision and this will require further detailed work in preparation for the Conditional Approval stage.

The Scheme has been designed to enable construction, operation and maintenance to be undertaken using established and well known procedures and techniques wherever possible. Where the public transport elements involve more bespoke or innovative approaches, such as open access arrangements to infrastructure and the need to set standards, the Authorities have already established relationships with other scheme promoters to share best practice and learn from experience, thus developing an informed approach to the procurement strategy and commercial risk management.

It is recognised that, with the increased levels of funding coming through this bid, the Authorities will have to ensure that adequate technical capacity, wider resources and risk management processes are available to enable delivery of the commercial aspects of the scheme. The discussion of resources is set out in Chapter 4.

5.2 OUTLINE PROCUREMENT STRATEGY

In assessing procurement options and identifying a preferred approach the following steps have been taken:-

- Identification of the objectives of the procurement process.
- Analysis of strengths, weakness, opportunities and threats (SWOT) of different procurement options and the ability to meet the procurement objectives.
- Assessment of the likelihood or risk of meeting the scheme objectives.
- Consideration of the financial implications of different options.

5.2.1 Procurement Objectives

The objectives of the procurement strategy are to ensure:-

- all scheme elements that require procuring are identified;

- timely and cost effective procurement consistent with the overall delivery programme;
- the process is consistent with all legal requirements; and
- contract requirements can be delivered over the length of the programme.

5.2.2 Scheme Objectives

The local objectives of the SBL are:

- To facilitate regeneration and growth in South Bristol;
- To reduce congestion in South Bristol and adjacent areas of North Somerset;
- To improve accessibility from South Bristol to the city centre and to strategic transport links, including the trunk road network and Bristol International Airport [BIA].

5.2.3 Rapid Transit Objectives

The sub-region's ambition for Rapid Transit is to provide a new transport mode that has the characteristics, levels of service and operational performance of a tram, but without the constraints of fixed rail infrastructure. This will be delivered through the design and specification of service attributes, which meet the scheme objectives. In considering the procurement options available the Authorities will need to have confidence that the rapid transit objectives will be realised and that the scheme will also meet the expectations of service users, the wider public and stakeholders.

The Rapid Transit Objectives are to:-

- Extend choice of transport modes for all, in particular for private car drivers to encourage a shift to public transport.
- Promote sustainable development by providing high quality public transport links.
- Improve access to public transport areas that currently have poor provision.
- Improve integration of the public transport network.
- Promote social inclusion by improving access to employment, retail, community, leisure and educational facilities.
- Improve safety along the corridor by reducing use of private cars.

In order for Rapid Transit to offer an attractive, competitive choice to car drivers the characteristics of rapid transit must include:-

- Stops that are a reasonable walking distance from key origins and destinations.
- A system (vehicles and infrastructure) that is high quality and DDA compliant.

- Services that are reasonably affordable compared with the real costs of other journey options.
- Services that offer comparable or improved journey times and journey time reliability when compared with the private car.
- Services that are reliable and easily understood
- A system that offers simple to understand routing, including interchange opportunities.
- Easily accessible information on routes, service frequencies, first/last services and fares.
- High quality waiting areas.
- A system that is designed to maximise safety and the perception of safety.
- A system that offers high quality information, particularly when things are not running to schedule.

These objectives and system characteristics have resulted in a set of design parameters for the scheme, which include:-

- A high quality service where vehicle, service frequencies and fares are consistent with the vision described by the sub-region;
- Relatively fast journey times through investment in busway infrastructure and priorities measures en route. The measures include bus segregation, bus lanes and signalling priorities.
- A process that is scalable, so that over time, services can be added incrementally and efficiently to allow the extension of the strategic network;
- Affordability – by maximising the investment made by the private sector (developers and transport operators);
- Interoperable ticketing – to facilitate ease of use and interchange;
- Integration – to facilitate the use of extended/connecting services feeding into and from the core network.

The design characteristics, scheme objectives and procurement objectives underpin the procurement option assessment process.

5.3 INFRASTRUCTURE ELEMENTS OF THE SCHEME

5.3.1 Construction

The types of construction work for the Link are described below.

The SBL Rapid Transit starts from the Long Ashton Park & Ride site and links with the planned Rapid Transit Ashton Vale to Temple Meads route into the city centre. The Rapid Transit link incorporates a combined pedestrian and cycleway. Both the cycleway and the concrete construction guided busway would be built on a low embankment to raise it above the flood level.

The single carriageway highway has a separate roundabout junction with the A370 Long Ashton Bypass, south-west of the Park & Ride site. Construction of the roundabout would require appropriate traffic management. The road construction would be a traditional flexible road construction on embankment where it crosses flood plain. Both the new road and guided busway would be served by positive drainage. Flood storage provision would be made between the two arms of the Link. New cycleways would be provided alongside the new road to link with wider provision for cyclists in North Somerset.

In this area there are a number of old waste tips that would be affected by the proposed works. Measures would need to be taken to avoid pollution of the environment.

The Rapid Transit and highway routes head south across Ashton Vale, merging at a junction that would provide access to South Liberty Lane. The junction would be signalized. A Rapid Transit stop would be constructed near the junction with high quality shelters, CCTV and real-time information displays. The combined Rapid Transit/highway then crosses underneath the main railway line, which requires a new bridge structure to permit 2 highways lanes, 2 Rapid Transit lanes and a pedestrian/cycle way.

South from the railway bridge, the SBL climbs the Colliters Brook valley to a new junction with the A38, which requires a southbound highway climbing lane for slow vehicles. As it climbs the side of the valley, the SBL may require earth retaining measures to support the exposed cutting slopes.

The junction with the A38 would be a roundabout with partial signal-control to manage the interaction between general traffic and the Rapid Transit vehicles. A Rapid Transit stop (Castle Farm) would be constructed to the west of the new roundabout. To the east of the new roundabout, the Rapid Transit vehicles would make use of centrally located bus lanes. Construction of this part of the Link would be in traditional flexible road construction with positive drainage.

After crossing Highridge Common the Link would incorporate a new junction of Highridge Green/Highridge Road/King George's Road, which would be signal-controlled and with an adjacent Rapid Transit stop. SBL would follow Kings George's Road, which would be widened to 2-lanes for general traffic and 2-lanes for Rapid Transit with residents' parking and landscaping areas on both sides, a foot/cycle path on the north side and a footway on the south. This layout can be accommodated on highway authority land. Crossing facilities would be provided for pedestrians and cyclists. During construction measures would be required to maintain access for residents.

The SBL junctions with Queen's Road and Hareclive Road would be signal-controlled, with adjacent Rapid Transit Stops; in between, the SBL layout would be similar to that on King George's Road. Beyond the Hareclive Road junction, the SBL joins Hengrove Way at the Caters Road Roundabout. One lane of Hengrove Way would be resurfaced as a bus lane that would extend to the Hengrove Way and Whitchurch Lane Roundabout. A new stop would be provided here to allow interchange with other public transport services. New construction would stop at the roundabout and the Rapid Transit vehicles would

continues to a new terminus at the South Bristol Hospital to be built in Hengrove Park.

Public rights of way would be maintained, with diversions if required.

Construction – Rapid Transit Elements - In addition to the above works there are a number of system wide elements required. These are:-

- Intelligent Transport Systems – bus mounted tracking equipment
- Real Time Public Transport Information (RTPI).
- Rapid Transit Stop furniture and ticketing
- CCTV monitoring at stops and on vehicles.

5.3.2 Construction risk sharing

It is planned that works will be procured through a design and build contract.

Construction involves risk and much effort has been focussed on eliminating such risk. Where risk cannot be eliminated clients may transfer risk to contractors through design and build contracts, in theory giving contractors more control of the project and therefore more opportunity to manage risks directly.

New Engineering Contract (NEC) Options C and D are the most widely used variants in civil engineering. They are both target cost contracts and include a mechanism for sharing risk and opportunity. Whilst the client to the contract retains the cost and time risk linked to contractual changes, the financial effects of cost overruns can be shared between the client, the contractor and his suppliers. By setting the gain / pain mechanism under the contract the client can modulate its exposure to risk. Used effectively, target cost contracts can give the incentive to deliver a project on time and to budget. It is however possible to increase a target during the construction phase through a compensation event process.

This approach is best suited to well defined schemes such as the SBL which has already benefited from a level of feasibility design which would be enhanced prior to going to tender.

5.4 PROCUREMENT OPTIONS

A review of options has been undertaken for the construction of the Link and the system wide elements.

5.4.1 Infrastructure Elements

Construction of the new roads and the segregated Rapid Transit link are additional to the ‘regular’ works delivered though existing tendered contracts. Therefore a review of options has been undertaken using SWOT analysis, a planning method used to evaluate the Strengths, Weaknesses, Opportunities and Threats of the available options.

The options considered are:-

- Build only contract.
- Design and build contract.
- Early contractor involvement.
- PPP/PFI.

The features of the different options are listed below.

Build Only Contracts have the following features:-

- Strengths
    - A competitive price through tendering
- Weaknesses
    - Extended programme to allow for detailed design prior to tender.
    - No input from Contractor – "buildability"
    - Incentive to bid low and claim.
    - Increased risk of failure at public inquiry due to lack of contractor involvement.
    - No linkage between service provision and operation
    - No linkage between construction costs and income streams.
- Opportunities
    - Long experience of contract type.
    - Opportunity to divide works into packages and support emerging local contractors.
- Threats
    - History of claims associated with this procurement method.

Early Contractor Involvement Contracts have the following features:-

- Strengths
    - Co-operation between designer and contractor leading to optimum design
    - Best value achieved through early contractor input
    - Early pricing by the contractor leading to improved cost certainty
    - Robust Orders improving probability of success at Planning and Public Inquiries
    - Incentivisation through pain/gain mechanism
    - Continuity through design and construction
    - Improved CDM through input on buildability
    - Reduced programme through reduced delay between decision making and construction start.
- Weaknesses

- Difficulty in demonstrating value for money
- Lack of price certainty in practice –difficulty in compiling an accurate Employer's Budget and impact of construction and actual costs.
- Higher costs during the planning stage (should be offset by later savings).

Design and Build Contracts have the following features:

- Strengths
  - Greater cost certainty using pain/gain
  - Shorter delivery programme
- Weaknesses
  - The lowest tendered price might exceed budget
  - Risk of confrontation should risks not be correctly allocated or priced
  - Opportunities for the contractor to manipulate the Target Cost through the exclusion of risk
  - Little Opportunity for Contractor to influence construction methodology during the design stage.
  - Greater risk of failure at public inquiry due to lack of early involvement.
  - Contractor will only provide level of quality defined in the Specification

PPP/PFI Contracts have the following features:-

- Strengths
  - Improved efficiency owing to the integration of design, finance and operation.
  - Improved risk management over the life of the project.
  - Stability in service delivery due to length of contract.
- Weaknesses
  - A complex and time-consuming process.
  - Very high initial cost of delivery.
  - Most previous local authority schemes procured through PPP/PFI are still in early stages of service development.
- Opportunities
  - The Contractor arranges for finance for project assets.
- Threats
  - Availability of credit may be restricted.

A summary of the strengths, weaknesses, opportunities and threats are provided in Table 5.1.

Table 5.1 SWOT Analysis of Procurement Options – Infrastructure

Option	Strengths	Weaknesses	Opportunities	Threats
Build Only Contract	Competitive price	Longer Programme No Contractor input Bid low and claim Public Inquiry Risk No Operation link No Costs / Revenue link	Well understood Work in packages	History of claims
Early Contractor Involvement	Optimum Design Contractor input Early pricing Robust Orders Pain / Gain Continuity to works Improved CDM Reduced Delay	Demonstrating Value No Price Certainty Higher preparation costs		
Design and Build Contract	Cost Certainty Shorter Delivery	Budget Risk Allocation of Risks Target manipulation No Early Design Public Inquiry Risk Specification Risk		
PPP/ PFI	Improved efficiency Risk Management Service Delivery	Complex High Cost of Delivery Early stages	Finance arranged	Credit restrictions

A procurement options risk assessment has been undertaken and acts as a sifting process to eliminate options that will not deliver the scheme objectives and to shortlist options that warrant further consideration.

The following scores were used: None = 0, Low = 1, Medium = 2 and High = 3.

The highest possible score was 9 and the risk rating was spread uniformly as follows:

- Low Risk 0 to 3
- Moderate Risk 4 to 6
- High Risk 7 to 9

Table 5.2 shows that the procurement option with the highest likelihood of meeting the procurement objectives is a Design and Build Contract. At this stage a design and build procurement strategy is favoured with a single contract let. This will be reviewed in detail at the next stage of scheme development.

Table 5.2 Procurement Options Risk Assessment

Criteria	Build Only	Design and Build Contract	Early Contractor Involvement	PPP / PFI
Ensure timely and cost effective procurement	High	Low	Medium	High
Consistent with Legal Requirements	Medium	Low	Low	Medium
Ensure Contract requirements delivered over the length of the Programme	Medium	Low	Low	Medium
Aggregate Score	7	3	4	7
Risk rating	High	Low	Moderate	High

5.4.2 Rapid Transit System Elements

For the Rapid Transit system elements, there are already existing contracts in place which have been through a competitive procurement process and therefore assessed to be value for money. Use of existing or extensions to existing contracts will be used to deliver these works where possible.

Real Time Passenger Information (RTPI) will be provided at stops and electronic visual and audio information on board vehicles, such as next stop announcements. There is already an established real time information system in Bristol using GPS and a Private Mobile Radio (PMR) communication system. Rapid Transit vehicles will be fitted with an on-board computer linked to the ticket machine, providing 'real-time' departure times at electronic bus stop displays and via www.nextbusbristol.co.uk.

Bristol City Council (BCC) has an existing RTPI system, provided by ACIS. This is currently being retendered to allow expansion as part of the Greater Bristol Bus Network (GBBN). The technical specification will allow for additional expansion, over and above GBBN, so that the Rapid Transit elements can be linked into the system.

The provision of ITS equipment comprising CCTV cameras, fibre cabling and cabinets, are included within the contract provision of the main works contract as access to the works areas and power provision will be dependent on the main construction works timescales. This will include the communications to link all of the systems together. All of the Power supplies will be provided in this manner including street lighting, shelters, ticket machines, CCTV and traffic signals.

The provision of the electronic equipment, cabling and street furniture for traffic signals is contracted with Siemens until 2013. Bristol City Council (BCC) believes these existing arrangements offer value for money and would seek to continue the arrangement with Siemens or an equivalent after a competitive tendering procurement process. It is suggested that the specialist contractor would be included in the construction contract as a novated sub-contractor. This will be reviewed at conditional approval stage however is likely to be retained given the increased flexibility it will offer. It is proposed to let a specific, traditional contract for stop furniture and ticketing. BCC has established relationships with providers of shelters and ticket machine providers.

5.4.3 Provision of the Rapid Transit Service

It is anticipated that the Rapid Transit Service will be an extension of the service proposed between the Ashton Vale Park and Ride site and the City Centre. Preparation of documentation for that service is currently being prepared and incorporation of appropriate clauses to allow for extension of the service is planned. In view of this, assessment of different procurement options is not considered appropriate for this bid submission.

Currently it is not envisaged that major commercial bus services serving the A38 or other local roads in South Bristol will chose to use the new extended public transport corridor into the city. It is, however considered that the bus service from Bristol International Airport would benefit from the journey time saving without loss of existing patronage. It is envisaged that the operators of the airport bus would pay an access fee to use the new link.

5.5 COMMERCIAL RISKS

The procurement strategy has been developed taking account of the commercial risks identified to date. During the next phase of scheme development for Conditional Approval, the strategy will be developed in further detail, including the process for managing commercial risk. Continued integration with the general risk management process will be maintained and reflected in the Quantified Risk Assessment (QRA) to ensure that all risks are identified and managed and to ensure that no risks fall between the two processes.

The main commercial risks identified are:

- The need to secure appropriate inclusion in the provision of the Rapid Transit service for the Ashton Vale to Temple Meads and City Centre Service
- The need for the Ashton Vale to Temple Meads and City Centre Service to be operational at Scheme opening
- The patronage of the Rapid Transit Service that if insufficient, would require a subsidy to allow it to continue.
- The financial implications for the authorities in respect of the continuity of service provision of the above services and the future development of the Rapid Transit Network in the sub-region.

5.5.1 Analysis of the local market for bus services

Assuming the Ashton Vale to Temple Meads service is operational, the Scheme would extend the Rapid Transit line and increase the potential patronage. The marketplace for bus services is moderately buoyant. There are two large bus operators First and Wessex Connect, with several smaller operators providing commercial and contracted bus services in the area.

There is a good degree of competition for contracted bus services of this type. In the most recent tender rounds for Park and Ride services (including the Long Ashton Park and Ride) an average of three tender bids were received.

Commercial bus service competition is more limited and there is little route competition between bus operators for bus services along corridors between Bristol and North Somerset and none in the suburban areas crossed by the Link.

5.5.2 Marketplace capacity, revenue risk and strategic considerations

Early modeling of potential patronage for a public transport link between the Ashton Vale Park and Ride Site and Hengrove suggested that demand would be low. Since that time the design has been refined and modeling now assumes that the Rapid Transit element of the Scheme would be a continuation of the proposed Ashton Vale to Temple Meads Service. As part of an extended Rapid Transit Service, predicted patronage figures are much improved but this now introduces a requirement that the earlier scheme is in place for the SBL Rapid Transit to be successful.

For the proposed Ashton Vale to Temple Meads Scheme, there are some limited concerns over the capacity and appetite of the marketplace to deliver the Rapid Transit service and corridor bus services. The underlying local factors and dynamics are such that there is an effective marketplace for contracted services while the extent of commercial bus service competition is more limited.

Taking account of this local context in consideration of the procurement options for the Rapid Transit service, it was conclude that the efficiency and effectiveness of the bus service marketplace would not be materially affected whether services are provided on a contracted or a commercial basis.

The main difference between whether services are provided on a contracted or a commercial basis is which party takes the revenue risk (the authorities or the operator). This raises a strategic procurement consideration as the modelling work undertaken for Ashton Vale to Temple Meads indicated that fare revenue was likely, in time, to exceed the operating costs of providing the Rapid Transit service, potentially yielding an operating surplus. This would be influenced by the total patronage of the extended link and any income from access charges. Further work is needed to refine the assumptions and examine the revenue risks in more detail. This work will be undertaken during the next phase of scheme development for Conditional Approval.

For Ashton Vale to Temple Meads three procurement options were short listed as the most practical means for securing the provision of the Rapid Transit service: -

- A Quality Contract

- A TWA / Licensing Approach
- A Contracted Service

As it is assumed that the SBL Rapid Transit service would be provided as an extension of the Ashton Vale to Temple Meads service it is not intended to assess the differences between these procurement options.

5.6 SUMMARY

In summary:-

- The Authorities have established a framework for identifying and assessing procurement options, which includes Procurement Strategy objectives.
- Where the Rapid Transit Scheme involves more bespoke or innovative approaches, such as open access arrangements to infrastructure and the need to set standards, the Authorities have already established relationships with other scheme promoters to share best practice and learn from experience.
- Construction of the road, on street works and the segregated route are additional to the 'regular' works delivered though existing tendered contracts. Therefore a review of options has been undertaken. This shows that a design and build procurement strategy is favoured with a single contract let.
- For Rapid Transit system elements existing contractual relationships exist which have already been assessed for value for money and deliverability. It is proposed that the service provider at the time will be novated to the contractor for the civil works. This will again be reviewed at Conditional Approval stage.
- The Authorities at this stage have identified a number of potential procurement routes for the Ashton Vale to Temple Meads service provision. This will require further detailed work in preparation for the Conditional Approval stage of that scheme. For the SBL it is assumed that whichever option is chosen for Ashton Vale to Temple Meads will be extended for the SBL Rapid Transit service.
- It is recognised that, with the increased levels of funding coming through this bid, the Authorities will have to ensure that adequate technical capacity, wider resources and risk management processes are available to ensure that the delivery of the commercial aspects of the scheme. The costs for this are included in the submission.

South Bristol Link
Major Scheme Business Case

6
The Financial Case

Scheme cost, financial risk and funding sources

6 The Financial Case

6.1 INTRODUCTION

This Chapter sets out how the West of England Authorities ("the Authorities") propose to finance the South Bristol Link (SBL) Scheme. It includes:

- **Capital Cost Estimate**: – estimation of the capital cost of the Scheme.
- **Treatment of Risk and Inflation**: – treatment of inflation and risk in the calculation of the outturn scheme cost estimate.
- **Preparatory Costs Estimate**: – development costs for the Scheme between Programme Entry and Full Approval stages.
- **Ongoing Financial Sustainability, Maintenance and Operating Costs**: – ongoing cost and revenue implications of the Scheme.
- **Sources of Funding**: – associated payment profile and associated funding requirement for the Scheme.

6.2 CAPITAL COSTS

6.2.1 Capital Cost Estimates

Estimates of works costs have been prepared for the Preferred Scheme and Lower Cost Option based on widespread experience of similar works, using item rates and preliminary estimates of quantities. The capital cost estimate has been calculated using Q3 2009 prices. It is assumed that procurement of the infrastructure works will be by means of a design and build contract and therefore an allowance has been made for the cost of the contractor's design costs, supervision costs and profit.

A Quantified Risk Assessment (QRA) has been undertaken which has produced an allowance for the risks associated with the Scheme. This is explained in more detail in Section 6.3.

The total capital cost estimate for the Preferred Scheme including risk is £41.156 million at current prices (2009). The detailed breakdown of the capital cost estimate is provided in Appendix 6.1. A summary is provided below in Table 6.1

The capital cost estimate has been independently reviewed. The report from our advisors is provided at Appendix 6.2. A response to this review is included in Appendix 6.3.

The costs of land acquisition have been estimated by North Somerset Council's Land valuation officers based on their experience in this field. A further allowance has been made for potential compensation costs arising from the project severing agricultural land from the associated farm buildings. Allowance has also been made for environmental enhancements associated with the project.

Almost all the land affected by the scheme within Bristol's boundary is in council ownership. The only exception is the area of land that will be needed to replace land occupied by the Link on Highridge Common. The cost of this is included in the overall assessment of land costs.

Table 6.1 Total Scheme Costs – South Bristol Link: Preferred Scheme

Works Cost: Preferred Scheme Estimate Base: Q3 2009	£ millions
Series 100: Traffic Management (Preliminaries)	5.730
Series 200: Site Clearance	0.043
Series 300: Fencing	0.130
Series 400: Road Restraint Systems	0.011
Series 500: Drainage	0.595
Series 600: Earthworks	3.268
Series 700: Pavements	4.788
Series 1100: Kerbing and Footways	2.461
Series 1200: Traffic Signs and Road Markings	0.927
Series 1300: Street Lighting and Electrical Works	0.561
Series 1700: Structures	5.738
Series 2400: Brickwork, Blockwork and Stone Work	0
Series 2500: Special Structures	0.533
Series 2700: Statutory Undertakers	1.062
Series 3000: Landscape and Ecology	0.004
Rapid Transit Stops	0.480
SUB-TOTAL ENGINEERING WORKS	26.331
Land & Environment	1.600
Design and Build Costs including Profit & Client Supervision	7.932
TOTAL SCHEME WORKS COSTS EXCLUDING RISK and INFLATION	35.863

Table 6.2: Current Prices: Preferred Scheme

Quantified Risk Assessment (Section 6.3)	**50% confidence level**	5.293
	80% confidence level	6.779
TOTAL SCHEME COSTS (50% RISK EXPOSURE)		41.156
TOTAL SCHEME COSTS (80% RISK EXPOSURE)		42.642

The total capital cost estimate for the Lower Cost Option is £37.602 million at current prices. The detailed breakdown of the capital cost estimate is provided in Appendix 6.1. A summary is provided below in Table 6.3

Table 6.3 Total Scheme Costs – South Bristol Link:Lower Cost Option

Works Cost: Lower Cost Option Estimate Base: Q3 2009	£ millions
Series 100: Traffic Management (Preliminaries)	5.116
Series 200: Site Clearance	0.042
Series 300: Fencing	0.131
Series 400: Road Restraint Systems	0.009
Series 500: Drainage	0.553
Series 600: Earthworks	3.233
Series 700: Pavements	4.522
Series 1100: Kerbing and Footways	1.633
Series 1200: Traffic Signs and Road Markings	0.708
Series 1300: Street Lighting and Electrical Works	0.561
Series 1700: Structures	5.164
Series 2400: Brickwork, Blockwork and Stone Work	0.000
Series 2500: Special Structures	0.472
Series 2700: Statutory Undertakers	1.062
Series 3000: Landscape and Ecology	0.005
Rapid Transit Stops	0.030
SUB-TOTAL ENGINEERING WORKS	23.241

Works Cost: Lower Cost Option Estimate Base: Q3 2009	£ millions
Land & Environment	1.600
Design and Build Costs including Client Supervision	7.088
TOTAL SCHEME WORKS COSTS EXCLUDING RISK	31.929

Table 6.4 Current Prices: Lower Cost Option

Quantified Risk Assessment (Section 6.3)	**50% confidence level**	5.673
	80% confidence level	7.152
TOTAL SCHEME COSTS (50% RISK EXPOSURE)		37.602
TOTAL SCHEME COSTS (80% RISK EXPOSURE)		39.081

6.3 TREATMENT OF RISK AND INFLATION

6.3.1 Quantified Risk Assessment

A Quantified Risk Assessment (QRA) has been undertaken to support this Programme Entry submission. This assessment has predicted the likely level of confidence that funding will be sufficient to cover the construction of the Scheme with due allowance made for risks. The QRA is confined to the capital cost elements of the scheme and the construction programme from the present day to the Scheme opening. Risks to operational revenues, costs or performance have not been quantified at this stage. The QRA report is provided in Appendix 4.2.

The risk model uses @Risk for probabilistic modelling. Both cost and time risks have been integrated to produce predictions of outturn cost. The model carries out a Monte Carlo analysis over several thousand iterations, potentially with a different result on each occasion. The distribution of these results is then plotted against the frequency of their occurrence. The principal inputs to the risk analysis are estimates of capital cost and the project programme for the works, the tolerance attached to elements within the estimates and discrete risks where appropriate.

Risk modelling has been carried out for both the Preferred Scheme and the Lower Cost Option. The iterative results from the risk model for the capital cost are represented as a curve indicating the possible range of outcomes against confidence levels.

For the Preferred Scheme, the analysis predicts that at confidence levels of 50%, Scheme costs would be £ 41.156million or below and at 80%, Scheme costs would be £42.642million or below (2009 prices).

For the Lower Cost Option, it predicts that at confidence levels of 50%, Scheme costs would be £37.6million or below and at 80%, Scheme costs would be £39.1 million or below (2009 prices).

As set out in Section 4.5 the QRA identified the key risk areas in achieving the project baseline programme. The QRA report (Appendix 4.2) indicates that for the Preferred Scheme, Risk SBL041 (Network Rail Costs) is the key determinant of programme risk. At this stage in Scheme development, negotiations with Network Rail are at an early stage and the detail of the crossing has not been sufficiently developed to determine the implications to the operation of the railway.

The second key risk is securing sufficient funding to progress the scheme to construction, Risk SBL002. This issue will require forward planning and close liaison with Planning Departments and council members.

The third highest risk, Risk SBL063 is encountering greater than anticipated quantities of tip material. The route passes through and close to old waste tips. Previous works in the area have encountered asbestos waste and it is possible appropriate measures will be required to protect the environment and the public during construction. It is planned to carry out site investigations to reduce the uncertainty around this risk prior to works starting.

With identified mitigation measures in place the Authorities believe that the risk to the programme of the works can be significantly reduced. At this stage, the cost risk is included in the P50 estimate to reflect the current level of detail design but the project programme (as set out in Appendix 4.1) reflects delivery of the scheme by 2016/17 which the project will be managed to.

Key risks for the Lower Cost Option have a slightly differing order of priorities. For the Lower Cost Option the key risk is uncertainty about the extent of the waste tips that will be encountered which is then followed closely by risks associated with the railway crossing.

6.3.2 Treatment of Inflation

DfT major scheme guidance states that:

"An allowance for inflation should be included in the Base Cost. Promoters should consider current and forecast inflation from industry sources appropriate to the scheme and present the assumptions and sources of evidence used. Realistic estimates for construction cost inflation will be crucial, and promoters are encouraged to discuss these with the Department at an early stage".

For some time in the past, construction cost inflation has been above RPI, driven by high demand and global increases in commodity prices, including oil, steel and cement. Current economic conditions are however far less certain. There is relatively little evidence available on potential construction cost inflation given this economic uncertainty. Building materials costs fell sharply in 2009. For example, steel and copper wholesale prices fell by 50% compared with 2008. A general view appears to be that building material prices might pick up slightly in 2010 and longer term demand from China, India and the Middle East could mean commodity inflation will return to relatively high levels at a future date.

Recent DfT guidance states that:

"Promoters should take care to form base cost estimates using realistic assumptions about real cost changes, e.g. cost increases above or below RPI growth. The inflation rates relevant to the delivery of transport schemes were higher than general inflation rates over the period 2006 to 2008. More recently, and related to the world recession, many commodity prices and scheme tenders have been falling, or rising at lower rates. Independent projections suggest immediate change is unlikely, and that significant cost increases may not occur for some time. It is difficult to generalise and suggest inflation rates applicable to all schemes. However, under current circumstances it seems unreasonable to adopt central case projections which include capital costs rising above general inflation. It is therefore suggested that base cost projections should incorporate the most recent relevant actual indexation, and then, as a default, assume no change in real costs up to 2014. This is still consistent with an absolute increase in scheme costs of 14% by 2014, and is, in comparison with industry projections, still relatively high.

In view of the above and following discussions with the DfT an inflation figure of 2.7% has been assumed for construction and all other costs up to and including 2014/15. After that and for 30 years 6% is assumed for construction costs with all other costs at 2.7%. It is not considered that inflation assumptions would differ between the Preferred Scheme and the Lower Cost Option.

These inflation rates have been applied to the current cost estimate assuming start of construction early in 2015 and lasting 2 years. The resulting out-turn costs are set out in the following table.

Table 6.5 Scheme out-turn Costs (£million) Preferred Option

	50% Confidence Level	80% Confidence Level
Total Engineering Works including D&B Costs	41.619	41.619
Client Supervision Costs	0.473	0.473
Land & Environment	1.865	1.865
QRA	6.509	8.241
Total	50.466	52.198

Table 6.6 Scheme out-turn Costs (£million) Lower Cost Option

	50% Confidence Level	80% Confidence Level
Total Engineering Works including D&B Costs	36.841	36.841
Client Supervision Costs	0.473	0.473

	50% Confidence Level	80% Confidence Level
Land & Environment	1.865	1.865
QRA	6.976	8.694
Total	46.155	47.873

6.4 PREPARATORY COSTS

Preparatory costs have been prepared on the basis of known costs for existing arrangements, estimates from the project manager on likely costs and benchmarking with other major schemes to understand the relative level of investment in scheme development. It is not considered that preparation costs would differ significantly between the Preferred Scheme and the Lower Cost Option.

DfT guidance states that:

"Provided that the scheme passes through the necessary approval stages the Department will normally contribute 50% of the eligible preparatory costs incurred between Programme Entry and Full Approval."

Ineligible costs include:-

- early-stage option appraisal and feasibility;
- publication of draft orders and the submission of and publicity for applications;
- the preparation of cases for, and attendance at, Public Inquiries

The total preparatory costs for the scheme (split in to eligible and ineligible) in current prices and outturn prices are shown in Table 6.7 and Table 6.8 respectively.

Table 6.7 Preparatory Costs (Current Prices)

Task	Preparatory Costs £million	Local Contribution £million	DfT Contribution £million
Preliminary Design	3.466	1.733	1.733
Statutory Processes	0.919	0.919	0.000
Detail Design	1.977	0.988	0.989
TOTAL	**6.362**	**3.640**	**2.722**

Table 6.8 Preparatory Costs (Out-turn Prices)

Task	Preparatory Costs £million	Local Contribution £million	DfT Contribution £million
Preliminary Design	3.670	1.835	1.835
Statutory Processes	1.010	1.010	0.000
Detail Design	2.240	1.120	1.120
TOTAL	**6.920**	**3.965**	**2.955**
Eligible Preparatory Costs	5.910	57%	43%
Non-eligible Preparatory Costs	1.010		

Preparatory costs ineligible from the 50% funding from DfT are the works up to Programme Entry, estimated at £1.51 million and considered to be "sunk", works for the anticipated Public Inquiry which are included in the Statutory Processes costs and monitoring costs after Full Approval stage which are estimated at £0.26million (in outturn prices) based on 0.5% of scheme costs in accordance with DfT evaluation guidance.

6.5 TOTAL QUANTIFIED COST ESTIMATE

DfT guidance states that:

"Provided that the scheme passes through the necessary approval stages the Department will normally contribute a maximum of 90% of the estimated total cost of the scheme (including preparatory costs), also known as the Quantified Cost Estimate (QCE), as estimated at Programme Entry. The maximum 90% of the QCE is inclusive of the Department's 50% contribution to Preparatory Costs".

The breakdown of the Quantified Cost Estimate (total capital cost and preparatory cost estimates) for the Preferred Scheme is provided in Table 6.9

Table 6.9 Total Quantified Cost Estimate (outturn prices, £m) Preferred Option

Costs	Total (All Costs)	Total (Only Eligible Costs)	Local Contribution (non-eligible Costs)	Local Contribution (Eligible Costs)	Local Contribution (All Costs)	DfT Contribution	Total Local Contribution (All Costs)	DfT Contribution
	£m	£m	£m	£m	£m	£m	%	%
Preparatory Costs	6.920	5.910	1.010	2.955	3.965	2.955	57.30%	42.70%

Costs	Total (All Costs)	Total (Only Eligible Costs)	Local Contribution (non-eligible Costs)	Local Contribution (Eligible Costs)	Local Contribution (All Costs)	DfT Contribution	Total Local Contribution (All Costs)	DfT Contribution
Capital Costs	50.466	50.466	0	3.104	3.104	47.362	6.15%	93.85%
Total QCE	57.386	56.376	1.010	6.059	7.069	50..317		
% QCE (Eligible Costs)				10.75%		89.25%		
% QCE (All Costs)					12.32%	87.68%		

The breakdown of the Quantified Cost Estimate (total capital cost and preparatory cost estimates) for the Lower Cost Option is provided in Table 6.10.

Table 6.10 Total Quantified Cost Estimate (outturn prices, £m) Lower Cost Option

Costs	Total (All Costs)	Total (Only Eligible Costs)	Local Contribution (non-eligible Costs)	Local Contribution (Eligible Costs)	Local Contribution (All Costs)	DfT Contribution	Total Local Contribution (All Costs)	DfT Contribution
	£m	£m	£m	£m	£m	£m	%	%
Preparatory Costs	6.920	5.910	1.010	2.955	3.965	2.955	57.30%	42.70%
Capital Costs	43.372	43.372	0.000	2.668	2.668	40.705	6.15%	93.85%
Total QCE	50.292	49.282	1.010	5.623	6.633	43.660		
% QCE (Eligible Costs)				11.41%		88.59%		
% QCE (All Costs)					13.19%	86.81%		

6.6 ONGOING FINANCIAL SUSTAINABILITY, MAINTENANCE AND OPERATING COSTS

Whereas at this stage, a number of options for service procurement remain available to the Authorities for the proposed Rapid Transit Ashton Vale to Temple Meads scheme (RT2), it is assumed that whatever choice is made for that scheme, that choice will apply to the SBL Rapid Transit service as set out in Chapter 5.

Forecast operating costs have been calculated based on modeled service running times and distances, with unit costs such as drivers' time, fuel and engineering costs accounted for. Full details of these cost calculations are provided in Appendix 6.1. The size, composition and cost of extra vehicle fleets required for the provision of the services were also generated using this operating cost model.

The service extension from the Ashton Vale to Temple Meads line, to include the SBL rapid transit line, while providing an improved service for the user, was not anticipated to produce high revenues in proportion to the level of operating cost involved. Therefore analysis was undertaken to determine whether the SBL RT line would require any subsidy payments to be made to the operators in order to make it in their interests to run the service.

In isolation, the Rapid Transit Ashton Vale to Temple Meads line is forecast to generate high levels of revenue for a relatively modest expenditure on operating costs, as shown in Table 6.11.

Table 6.11 - Ashton Value to Temple Meads Rapid Transit Costs and Revenues

Annual Operating Costs and Revenues (£000s, 2009 prices)	
Cost	
Operating	539
Fleet Replacement	122
Total	**661**
Revenue	
2017	1,889
2031	4,015
Profit	
2017	1,228
2031	3,354

This demonstrates that at the time of opening, the demand for the Ashton Vale to Temple Meads service should generate sufficient revenue to make running the service beneficial to the operator.

With the SBL service in place as an extension to the Rapid Transit Ashton Vale to Temple Meads line, the rapid transit service can be considered as two distinct elements. Together the two services give a RT frequency of one vehicle every six minutes between Temple Meads and Ashton Vale. Of these, two vehicles out of every three only operate up to Long Ashton Park & Ride. The third continues on the SBL line; i.e. Serving the same route as the Rapid Transit Ashton Vale to Temple Meads vehicle, but continuing on to Hengrove Park.

Examining these two elements independently, the profitability of each can be determined, as shown in Table 6.12.

Table 6.12 - Ashton Value to Temple Meads Rapid Transit (RT2) with SBL Rapid Transit - Costs and Revenues

Annual Operating Costs and Revenues (£000s, 2009 prices)		
Cost		
	RT2	SBL
Operating	359	342
Fleet Replacement	87	70
Total	**446**	**412**
Revenue		
	RT2	SBL
2017	1,217	834
2031	2,447	1,781
Profit		
	RT2	SBL
2017	**770**	**422**
2031	**2,000**	**1,369**

This demonstrates that with the introduction of the SBL line, both Rapid Transit Ashton Vale to Temple Meads and SBL services generate enough revenue to be profitable to the operator, even in the opening year.

However, when considering the SBL line as an addition to the Rapid Transit Ashton Vale to Temple Meads service, the incremental level of profit generated becomes less attractive.

Table 6.13 - Ashton Value to Temple Meads Rapid Transit (RT2) with SBL Rapid Transit: Profit

Annual Profit (£000s, 2009 prices)			
	RT2 only	RT2 + SBL	Benefit of SBL
2017	1,228	1,192	-36
2031	3,354	3,369	15

This negative incremental benefit to the operator of running the SBL service on top of the Rapid Transit Ashton Vale to Temple Meads service in 2016 results from the much lower levels of demand occurring on the Ashton Vale – Hengrove leg. While the benefits to the users in time savings that are generated by the SBL service make it good value for money, it may not prove to be a commercially viable option for the operators at the time of opening. However, demand increases forecast up to the forecast year of 2031 suggest that increases in revenue may be sufficient to provide a level of benefit to the operator. These costs and revenues are finely balanced and so the relationship between them will be sensitive to any variation from the levels of demand forecast in the modeling

The Authorities are expected to pay for the infrastructure maintenance costs. Additional maintenance costs are £0.32 million per year (in the opening year, 2009 Q3 prices, without allowance for real inflation or optimism bias). These are related to the upkeep of the track, ITS and RTPI systems, bus stops and bridges.

The conclusions are:

- Benefit to Cost Ratio (BCR) for the overall scheme is high, and well above the DFT requirement of 2:1.
- Issues raised through the review by either officers or PWC have received satisfactory answers at this stage. A programme of further work has been identified for the next stage of scheme
- development which includes:
    - Financial modelling of the different procurement and delivery models and the effects on any financial return or liability to each of the Authorities.
    - Financial modelling of the effect on the overall budget position of the Authorities (for example potential loss of car parking revenues).
    - Iterative sensitivity modelling and appraisal regularly through scheme development.

6.7 SOURCES OF FUNDING

6.7.1 Regional Funding Allocation

The S W Councils have approved £50.1million – £47.3 million funding contribution to the Scheme plus £2.8 million preparatory costs (outturn prices). Endorsement of the Scheme from the SW Councils is included at Appendix 2.4

6.7.2 Developer Contributions

There are a number of anticipated developments in Bristol and North Somerset where contributions to the project would be appropriate and the Authorities are in discussion with relevant developers regarding potential contributions for infrastructure and /or services. Bristol International Airport have submitted a planning application to extend their operation; although not currently approved, it is anticipated that significant contributions to the project will be made. At this Programme Entry stage there are no confirmed commitments with regard to potential Section 106 Agreement contributions to the Scheme.

6.7.3 Local Contributions

The Scheme is a significant investment for the West of England, not only in terms of the benefits it delivers, but as part of a programme of major schemes contained within the Joint Local Transport Plan (JLTP).

Bristol City Council and North Somerset Council have agreed to underwrite the 11% funding required for the local contribution, a total of £7.07 million. Agreement to underwrite the local contribution was endorsed by Bristol City Council Cabinet on the 25th March 2010 and North Somerset Executive on the 23rd March 2010. As the scheme development work continues, the opportunities for meeting this local contribution will be explored and agreed with possibilities including LTP capital, Council Non Earmarked Capital and / or future Section 106 developer contributions which is the preferred approach.

6.7.4 Payment Profile

Tables 6.14 and 6.15 show the payment profile in outturn prices for the risk-adjusted programme cash flows for the Preferred Scheme and the Lower Cost Option.

Table 6.14 Payment Profile (Outturn prices and Risked Programme at P50) – Preferred Scheme (£ million)

Year	Preparatory Costs	Works Costs	Total	Local Contribution	DfT Contribution
2010/11	0.720	0.000	0.720	0.360	0.360
2011/12	1.700	0.000	1.700	0.860	0.840
2012/13	1.675	0.000	1.675	1.040	0.635
2013/14	1.285	0.000	1.285	0.935	0.350
2014/15	1.540	6.849	8.389	1.191	7.197
2015/16	0.000	24.186	24.186	1.488	22.698
2016/17	0.000	19.431	19.431	1.195	18.236

Year	Preparatory Costs	Works Costs	Total	Local Contribution	DfT Contribution
TOTAL	6.920	50.466	57.386	7.069	50.317

Note: DfT contributions requested at Conditional Approval

Table 6.15 Payment Profile (Outturn prices and Risked Programme at P50) – Lower Cost Option

Year	Preparatory Costs	Works Costs	Total	Local Contribution	DfT Contribution
2010/11	0.720	0	0.720	0.360	0.360
2011/12	1.700	0	1.700	0.860	0.840
2012/13	1.675	0	1.675	1.040	0.635
2013/14	1.285	0	1.285	0.935	0.350
2014/15	1.540	6.341	7.881	1.160	6.721
2015/16	0.000	22.034	22.034	1.355	20.679
2016/17	0.000	17.780	17.780	1.094	16.686
TOTAL	6.920	46.155	53.075	6.804	46.271

Note: DfT contributions requested at Conditional Approval

6.8 SECTION 151 OFFICER INVOLVEMENT

The Chief Finance Officers (s151 officers) of the West of England Authorities meet regularly to discuss and manage issues in relation to the funding, risk and resources of the transport programme. In the case of this Scheme, the Chief Finance Officers from Bristol City and North Somerset Councils are members of the Project Board and have taken an active role in the scheme development, including provision of independent advisors to review the Scheme.

The Project Board has endorsed the submission of the Major Scheme Business Case (MSBC). The s151 officers also provided advice on the recommendations made to Bristol City Council Cabinet and North Somerset Council Executive. Submission of the MSBC was endorsed by both Councils.

6.9 SUMMARY

In Summary:

- The total capital cost estimate is £50.4 million in outturn prices.
- A full Quantified Risk Assessment has been undertaken and has provided for potential variations in cost and programme.

- The total preparatory cost estimate in outurn prices is £6.92 million. This estimate is based on known costs for existing arrangements, estimates from the project manager on likely costs and benchmarking with other major schemes. The eligible cost element of this in outturn prices is £5.91 million.
- The local contribution is £7.1million (£3.1 million capital cost and £4.0 million preparatory costs) in out-turn prices. This has been endorsed by Bristol City Council Cabinet and North Somerset Executive.
- The s151 officers of Bristol City Council and North Somerset Council are members of the Project Team. Their independent advisors have reviewed the modelling work undertaken to date and continue to be involved and provide assurance that the financial modelling is robust.
- The s151 officers of Bristol City Council and North Somerset Council support the submission of this Major Scheme Business Case.

6.10 APPENDICES TO CHAPTER 6

Appendix 6-1 Capital Cost Estimate Details

Appendix 6-2 Independent Check of Costs

Appendix 6-3 Response to Independent Check of Costs

Appendix 6-4 Section 151 Officers Declaration