

**BRISTOL CITY COUNCIL
CABINET**

2 February 2009

Report of: Strategic Director – City Development

Title: Rapid Transit (RT) – Ashton Vale to Temple Meads

Ward: Cabot, Lawrence Hill, Southville, Bedminster

Officer Presenting Report: Colin Knight, Service Director – Transport
City Development

Contact Telephone Number: (0117) 922 2940

RECOMMENDATION

It is recommended that the Cabinet endorse the proposals contained in this report, and that the submission of a Major Scheme Bid for the Rapid Transit route between Ashton Vale and Temple Meads, for Department of Transport Programme Entry, be approved.

Summary

The future transport system for the sub-region, being promoted by the four local authorities, contains at its core 4 rapid transit corridors within the West of England. Three of these routes were subsequently included in the regional priority list, for which some Regional Funding Allocation (RFA) has been earmarked, and in the Joint Local Transport Plan.

The first section of these routes for which major scheme funding is sought is the 7km line from Ashton Vale to Temple Meads (including a loop around the city centre). The majority of the route lies within Bristol.

Studies into the choice of technology have been undertaken, and have concluded that a rubber tyred mode offers the most affordable, flexible and deliverable solution for this route. The Ashton Vale to Temple Meads route comprises a mixture of kerb guidance and bus way through the suburbs and bus lane running in the city centre. The RT service will link with Greater Bristol Bus Network (GBBN) services, other bus services, rail, walking and cycling facilities as well as providing a strong link to Long Ashton Park and Ride

The total estimated cost of this route is £47.3M; this is based on the out-turn costs assuming that construction takes place between 2011 and 2013. Of this, 90% will be sought from the Department for Transport (DfT) with the remainder comprising local developer contributions.

There is a positive business case for this proposal with a forecast benefits to cost ratio (BCR) of 4; this meets the DfT's minimum requirement for a minimum BCR of 2. Public Consultation about the broad principles was positive with around two thirds of respondents in favour of the proposals. The proposals received cross party support at a recent meeting of the Sustainable Development and Transport Scrutiny Commission. This will be followed by statutory consultation with a strong emphasis on community engagement.

It is expected that if the bid for Programme Entry is successful then the route could be operational by 2013.

The significant issues in the report are:

- External consultation outcome (paras 3-10)
- Policy context and links to wider network (paras 11-14)
- Route alignment and engineering proposals (para 19)
- The opportunity to bring forward development proposals for Redcliffe Way in parallel (para.19).
- Links to walking and cycling facilities (paras 14&19)
- Positive business case (para 21)
- Costs and requirement for £4.7 local contribution (paras 20-21)
- Procurement of rapid transit services (paras 23-24)
- Need to obtain powers through a Transport and Works Act Order (para 27)

•Timescales (para 29)

Policy

1.Our City - Ambitious Together: RT will provide an effective transport system offering a real alternative to the car, reducing congestion and supporting the city's dynamic and growing economy. It will also support the green capital initiative by promoting public transport and through the use of environmentally friendly vehicles.

Our City - Making a Difference: RT will improve accessibility to services, jobs and facilities.

Our City - Safer and Healthier: As well as encouraging use of public transport, the parallel provision of walking and cycling facilities will encourage healthier lifestyles. Reduced congestion will improve air quality.

Our City - Better Neighbourhoods: Reduced congestion will improve the quality of life and the implementation of the scheme is an opportunity to improve the public realm.

Consultation

Internal

2.

- Public Transport and Park and Ride
- Traffic Management
- Planning
- Urban Design
- Parking Services
- Parks and Leisure
- Cycle City project team
- City Docks (including Bristol Living Rivers Project)
- Museums
- Land and Property
- Legal
- Finance
- Corporate Communications
- Sustainable Development and Transport Scrutiny Commission: the Commission discussed RT on 15th January 2009; the Commission voted unanimously to support the bid and the minute of this discussion is attached as Appendix A.

External

3. Public Consultation: 36,000 invitation flyers were sent out to households within all wards along the proposed corridor. A series of exhibitions were held and attended by approximately 900 people. A number of ad-hoc meetings have also been held with interested groups in response to the exhibitions (eg Ashton Vale residents). In total, 112 paper questionnaires and 169 on-line responses were received. Of these 65% were in favour, 20% against with 15% undecided. The most common concern is that RT is not rail based. When asked to choose and rank their top 5 features of the proposed system, the following issues were selected.

1. Segregated route and priority measures
2. Integration with other modes
3. Integration with new and existing developments
4. Walking and cycling
5. Environmentally friendly vehicles.

4. Business Community: GWE Business West, Broadmead Board and Bristol Alliance are all supportive. GWE Business West, who represent over 2,300 businesses in the West of England, stated that “improving transport systems across the west of England is the top priority for business.” The Broadmead Board and Alliance are keen to see the removal of general traffic from around Broadmead.

5. Developers: A number of developers have been contacted and are supportive in principle. Their issues tend to relate to specific areas. South West Regional Development Agency (SWRDA) are a keen advocate of the scheme.

6. Transport Groups: Transport operators (including First Group, Wessex Connect as well as Network Rail) are supportive. Network Rail are keen on integration at Temple Meads. Sustrans have also been contacted and there has been a constructive dialogue regarding the impact on existing cycling facilities and in relation to the provision of new and enhanced walking and cycling facilities as part of the project. This includes improved links to the Connect 2 route, the provision of greater separation between the Rapid Transit route and cycleway where feasible and repairs to the Chocolate Path. Groups promoting rail-based solutions are generally opposed to the scheme on the basis that the existing rail sections should either be converted to tramways or included as part of the suburban rail network.

7. Environment Groups: The following groups have been consulted:

- Avon Wildlife Trust

- Environment Agency
- Natural England
- Bristol Environmental Records Centre
- English Heritage

No adverse comments have been received. English Heritage have expressed concerns about potential impacts on Prince Street Bridge and the area around the Cenotaph.

8. Community Interest Groups: Redcliffe Futures support the principle of Rapid Transit as long as it follows an anti-clockwise route, via Redcliffe Way, around the city centre. They would welcome the development of these proposals in conjunction with the progression of the reshaping of Redcliffe Way, as outlined in the Supplementary Planning Document adopted by the City Council. They would prefer a rail based mode. The Friends of Avon New Cut have expressed concerns about the impact on Cumberland Road. Other groups consulted include the Harbourside Forum and Redcliffe Parade Environmental Association. Two meetings have been held with the Greater Bedminster Community Partnership where a wide variety of views were expressed. There was support for improvement to public transport, but concerns over impact on the New Cut and Chocolate Path, parking on Cumberland Road and traffic management in the city centre and aspirations of a rail based alternative. The Ashton Vale Heritage Group is concerned about the impact on the fields to the north of Ashton Vale including wildlife and biodiversity, open space and green belt issues and increased flood risk.

9. There have been a number of briefings of members of both North Somerset and Bristol City Councils along with affected parish councils. Barrow Gurney and Dundry Parish Councils have written in support of the scheme. A summary of consultation responses are attached as Appendix B.

10. Visit of 'Streetcar' vehicle: On 3rd December 2008, a Wrights 'Streetcar' vehicle, destined for a rapid transit system in Las Vegas, visited Bristol. A number of stakeholders and the media were invited to view the vehicle and to ride on it. The vehicle is of a type that could operate the RT service and overall reaction was favourable. There has been recent positive press coverage of RT demonstrating further support for the scheme.

Context

11. The Greater Bristol Strategic Transport Study (GBSTS) set out a strategy for meeting the transport needs of the West of England sub-region up to 2031 and this has been developed into the Joint Local Transport Plan and our West of England Transport vision documentation. The underlying principles included reducing reliance on the private car and meeting future growth needs sustainably. The sub-region's transport intentions are outlined in figure 1.

12. They include four core Rapid Transit corridors, and these routes have been included in the five year Joint Local Transport Plan as part of an integrated package of transport measures designed to meet the sub-region's transport needs. The hope then being that wider expansion beyond the core Rapid Transit network would be delivered via the separate Transport Innovation Fund (TIF) project later on. £71M was earmarked in the South West Regional Funding Programme for the three routes. This bid covers the first phase of the first route, Ashton Vale to Temple Meads (see Figure 2); the potential for an extension to the airport should be noted.

13. To acquire this funding, schemes have to go through the major scheme bidding process which comprises 3 stages: programme entry (the stage being sought here); conditional approval and full approval. To achieve programme entry schemes have to demonstrate that they meet DfT appraisal criteria including value for money, risk and deliverability.

14. The vision for the RT system is a network of fast, reliable services with an emphasis on segregation from traffic, new vehicles offering low emissions and a ride quality and experience similar to a tram, high quality accessible interchanges and clear information/marketing. It will also be important to ensure the authorities can control frequencies, maximum fares and ticketing options. The RT routes are complementary to the GBBN corridors and are integral to providing the West of England with a comprehensive public transport network. The routes also include, where possible, significant improvements to parallel walking and cycling infrastructure.

15. The choice of technology has been hotly debated. In 2006 GBSTS concluded that:

“further work is required to identify the type of vehicle used to operate the service but modern, low-floor, articulated buses are likely to be the most appropriate, flexible and cost effective vehicles to satisfy the requirements of the service.”

16. A review of technologies was first undertaken in 2007 which looked at a wide range of options from monorail, ULTRA and light rail to conventional buses, as well as considering rubber-tyred RT technologies. A subsequent study was commissioned in 2008 in response to concerns from groups promoting rail solutions to specifically look at opportunities provided by newer RT technologies, focusing on Tramtrain, Light Weight Rail or Ultra Light Rail as well as rubber-tyred RT. There has been close liaison with the promoters of Ultra Light Rail.

17. The report concluded that the rubber-tyred rapid transit mode, particularly if all elements of the system were delivered (segregation, fast/frequent services, direct access to destinations), met the scheme objectives, would meet DfT appraisal criteria and could be delivered within the current regional funding allocation programme. The risks associated with delivering rubber-tyred rapid transit were considered to be *“considerably lower than the other*

two technologies". The report does not discount these technologies for possible future routes, but considers them unlikely to be deliverable within the regional funding programme for the Ashton Vale – Temple Meads route. An executive summary of the 2008 report is attached as Appendix C.

18. The governance arrangements for the project include a Project Board comprising heads of transport from the 4 UAs, SWRDA and the Highways Agency. The Senior Responsible Owner is Colin Knight (BCC) and the Project Manager is Sharon Daly (Steer Davies Gleave). The board reports to the sub-regional Executive Programme Board (soon to be Joint Transport Committee). As the route lies within Bristol and North Somerset, there is close working between officers of those authorities and the West of England Partnership to ensure a smooth process.

Proposal

19. The alignment and significant engineering features of the RT route are shown in figure 2. The features to note are:

- Bridge over Portbury freight Railway Line (this replaced an earlier proposed level crossing following consultation with Network Rail) and proposed stop adjacent to the railway to provide for future integration with Portishead passenger rail services.
- New structure over the New Cut for pedestrians and cyclists parallel to the Old Ashton Avenue Swing Bridge which will be refurbished for RT.
- Shared use of Harbourside Railway formation to ensure steam services can run on Sundays (response to consultation); this proposal has been discussed with the Office of the Rail Regulator who raised no objections in principle.
- Shuttle working under Cumberland Road Bridge to accommodate the parallel pedestrian and cyclepath link to the Chocolate Path; this is being modelled to ensure no adverse impact on services.
- Prince Street Bridge: The existing bridge will need to be modified or replaced to provide a crossing for Rapid Transit whilst retaining local access.
- New interchange at Temple Meads: this lies to the west of Temple Way and will be located on land released by the conversion of Temple Circus roundabout to a signalised crossroads. The interchange, which will also be used by park and ride and other bus service vehicles, will be connected to the station via a high quality underpass and walkway through plot 6. This is a response to consultation with a number of community interest groups, members and Network Rail. An RT reservation through plot 6 should, nevertheless, continue to be protected to safeguard future route options.
- Anti-clockwise loop around city centre: this has emerged as the preferred option following the consultation process. Despite most passengers wanting to get to the Centre in the morning, rather than Temple Quay, this loop will now provide quick enough circuit times because of the new interchange location west of Temple Way and the time benefits this brings. Issues include Traffic Management measures along Temple Way, Haymarket, Rupert Street

and the Centre to create a dedicated bus lane to ensure fast reliable running around the city centre. The measures are also designed to benefit park and ride and other bus services. Wider city centre issues are being considered as part of these proposals including further pedestrianisation within Broadmead.

- The anti clockwise loop will run along Redcliffe Way, and the precise alignment will dovetail with the proposals for reshaping the Redcliffe Way area to deliver the aspirations of Bristol City Council and Redcliffe Futures for that area as contained in the SPD. It is proposed that the project officers for Redcliffe Way work closely with the Rapid Transit team and bring forward their development plans in tandem such that they are ready to be implemented as soon as land values make them viable. This will ensure the earliest contributions of S106 monies from these developments to the Rapid Transit project costs.

- The new walking and cycling infrastructure between Long Ashton and the Create Centre linking into the Connect2 cycle project. This has been designed following consultation with and comments from Sustrans.

- Significant sections of the route would operate using kerb guidance between Long Ashton and the Create Centre. This method of operation is illustrated in figure 3.

- Stop locations: additional stops are being assessed at Create and SS Great Britain following consultation. The other locations are Long Ashton Park and Ride, Silbury Road, Winterstoke Road, Spike Island, Museum of Bristol, the Centre, Temple Meads/Redcliffe Way, Cabot/Broadmead and the Centre. (see figure 2).

- The potential to link, and improve accessibility to, a number of Bristol's major tourist attractions.

- The number of development sites (proposed and in progress) that are served; the potential for an extension to serve any new community in the Ashton Vale area and the Airport should be noted.

20. The estimated cost of the route is £47.3M with contingencies at out turn prices. A costed risk log is being maintained as further design work and investigations are undertaken and a full Quantified Risk Assessment has been undertaken. Of this, £4.73M (10%) has to be funded locally. Originally this was envisaged to be entirely achievable through S106 contributions, but the economic downturn may impact on the timing of some developments. A pragmatic approach would be to agree to underwrite any shortfall through the JLTP integrated transport allocation. Currently £2.5M per annum (approximately) is being allocated to the Greater Bristol Bus Network, and this project will be complete by the time this BRT route is under construction, hence there will be the flexibility to underwrite.

21. The remaining 90% will be obtained through the DfT's major scheme bidding process. To achieve Programme Entry it is necessary to achieve a benefit to cost ratio (BCR) of over 2. The estimated BCR for the Ashton Vale to Temple Meads route is 4 which comfortably meets DfT criteria. The methodology and modelling has all been subject to DfT scrutiny throughout the process. Benefits and costs are assessed over a period of 60 years and

include time savings or increases to both public transport and road users.

22. It should be noted that the specification and scope of the project has changed markedly since the original Regional Funding Allocation (RFA) funding was earmarked. The increased costs and reasons for them have been reported to the Regional Assembly and their support is being sought for the proposed bid as set out in this report. Furthermore, an increased level of RFA funding to support the RT routes from Hengrove to the North Fringe and city centre to Emersons Green is being sought through 'RFA2.'

23. Another important consideration is the procurement of services to operate the route. It is proposed that there should be a core Rapid Transit service of every 5 minutes (peak) operating between Ashton Vale and the city centre. It will be important to ensure competition is encouraged and to take advantage of the powers under the new Local Transport Act to specify maximum fares, frequencies and ticketing options. Options for procurement are being explored with finance officers.

24. In addition to the core service it is anticipated that services from North Somerset, such as the X1 from Weston-super-Mare, will use the Rapid Transit route into Bristol as a means of avoiding delays entering the city. These services will be subject to strict quality standards covering vehicle standard, emissions, accessibility and so forth. This demonstrates a major advantage of opting for rubber-tyred technology: the benefits can be enjoyed by a much greater number of people as bus journeys from North Somerset will become more reliable and car dependency further reduced.

25. The type of vehicle has yet to be determined. The visit of the 'Streetcar' (para 10) was a useful test of public reaction, which was largely positive, although many comments were received on aspects of the vehicle that could be improved. One of the vehicle's key features was that it is a diesel hybrid which provides a smoother and quieter ride than conventional buses. Cambridgeshire County Council's guided busway is proposed to be used by vehicles powered by bio-diesel derived from food waste and it is proposed that the vehicles in Bristol should seek to use similar innovative technology. Concern has been expressed about the accident record of articulated buses; however, data supporting this concern in the media has been shown to be inconsistent, and more comparative assessments from experience in London show no significant difference in the safety performance of articulated vehicles. The operating conditions in Bristol will be very different to London with vehicles operating either on segregated track or dedicated 24 hour bus lanes which should improve safety.

26. From the extensive modelling undertaken in the development of Rapid Transit, it is expected that all services that use the route will operate commercially. These services will also replace the existing 903 Long Ashton Park and Ride Service, which is subsidised by Bristol City Council. In the short term it is envisaged that maintenance costs for track and stop infrastructure could fall on the City Council, although these costs will be in line

with maintenance costs for existing highway infrastructure. However, modelling suggests that there will be opportunities for revenue sharing in the future as patronage grows and the procurement mechanism will need to reflect this.

27. The powers to construct the segregated section are likely to be obtained through a Transport and Works Act (TWA) Order. This provides both powers to acquire land and planning permission to construct and operate. Although a lengthy process requiring a public inquiry, it is an effective way of avoiding two separate processes. It may also provide greater opportunities for control over operators if that is needed. Within the city centre, Traffic Regulation Orders will be required along with planning approval for the proposed Temple Meads interchange.

28. Delivery of the segregated section of the route will be through a design and build process, potentially handled through the proposed joint delivery vehicle for the sub-region. The West of England Partnership (WEP) are suggesting that BCC should be identified as promoter at this stage until Joint Delivery is established. The city centre section will be delivered through the city council's term contractors.

29. Subject to approval, it is proposed to submit the bid in February 2009. It is expected that the DfT may take up to 24 months to consider the bid, together with the use of further 'Gateway Review' appraisal processes to assist in clarifying supporting information to robustly demonstrate the value for money and effectiveness of the scheme to the DfT. This time will also be used to further consult on the scheme and achieve the necessary powers to implement. It is envisaged that full approval will be granted by Summer 2011, with construction commencing shortly afterwards and the route opening in 2013.

Other options considered

30. Other technologies have been extensively considered as discussed in paragraphs 15 - 17).

31. Other route options have included 4 on road routes through the Cumberland Basin and along Hotwell Road; these were the subject of a study by consultants. The best of these options will be included as the 'Low Cost Alternative' in the bid. However all of these options demonstrate a poorer business case as there are either major disbenefits to traffic or low benefits to RT users (depending on the configuration of the bus lanes necessary for this option).

32. Two options for the city centre have been considered - a 2 way route via the Centre, Broadmead and Cabot Circus to Temple Meads and the anti clockwise loop. The latter has been selected on the basis of consultation responses.

Risk Assessment

33. A risk assessment has been completed for this project and a summary of the major risks is detailed below.

A fully Quantified Risk Assessment has been undertaken.

Main identified risks are:

Authorities unwilling or unable to progress further stages

Uncertainty in formation of the Joint Delivery Vehicle

DfT delay in programme entry decision

Delay in approval of draft TWA Order

Tender process extended

Service operators not ready by opening date

34. The main risks of not agreeing to this course of action are as follows:-

- Failure to secure RFA funding with subsequent reputational issues for the City Council and sub-region which could damage future funding bids.
- Failure to deliver the transport infrastructure needed to support the growth of the sub-region.
- Failure to contribute to Our City objectives as set out in paragraph 1.

35. The main risks of agreeing to this course of action are as follows:-

- The need to fund the local contribution and the potential for reduced S106 income due to the recession.
- The ability to procure sufficient skills to deliver Rapid Transit.
- Obtaining the Transport and Works Act Order.
- Ongoing opposition in respect of mode choice.
- Cost overruns.

36. The action taken to mitigate these risks is:-

- Underwriting the local contribution using LTP money (see para. 20).
- Use of a number of consultancies and development of the West of England Joint delivery vehicle.
- Employment of experienced consultants.
- To pursue technological advances in engine drive and fuel development to ensure the most environmentally advanced motive power system that delivers affordability and reliability is procured.

- Project governance (see para.18.)

Equalities Impact Assessment

37. The creation of a viable new Rapid Transit public transport system will undoubtedly have overarching equalities benefits, providing greater accessibility, and enabling journeys by all elements of society, particularly to those who do not have access to a car, or existing public transport routes, or who have difficulty getting around the city by walking or cycling. Further detailed EIA work will be undertaken as the project progresses.

Environmental Impact Assessment

38. The creation of a new efficient transport mass movement system has clear environmental benefits over the present congested car orientated transport system, allowing more people to travel in sustainably powered vehicles at peak times. Carbon consumption and associated air quality/road safety problems will undoubtedly be reduced by these proposals. The development of clean technologies and renewable fuel sources will be closely monitored to ensure the most appropriate power source is adopted.

Legal and Resource Implications

Legal

The legal implications arising from the subject matter of this report are wide-ranging, complex and will require careful management and co-ordination to ensure that when the project timetable is set it can be delivered on time and on budget.

The City Council as the relevant highway authority and traffic authority for its area and it has numerous statutory duties and powers in respect of highway generally and traffic management particularly in the wake of the Traffic Management Act 2004 in terms of tackling congestion etc. In this connection, it has policy objectives set out in the JLTP. Any joint working with other authorities and/or bodies may need to be regularised by way of a joint arrangement.

Where the Secretary of State for Transport has prescribed a particular mode of guided transport, it will be necessary for the Secretary of State to make an order under the Transport & Works Act 1992. Orders can deal with rail and tramway systems also. Such orders can relate to the construction and operation of such transport systems and involve the council making formal application for an order. Orders can also cater for ancillary matters such as compulsory acquisition for any required land and planning permission. It should be appreciated that the procedure for making orders is strictly

prescribed and if objections are received may involve a public inquiry.

To secure delivery of the scheme the council the Transport Act 2000 allows the council to enter into a Quality Partnership with bus operators. These partnerships may be statutory or non-statutory. Statutory schemes are made under the 2000 Act. A statutory partnership will involve a commitment on the part of the council to provide certain facilities to improve local bus services and to maintain them throughout the life of the scheme and an obligation on the part of the bus operators who wish to participate to meet prescribed quality standards for customers using the facilities in question and these may include giving an undertaking to the traffic commissioner that the specified services will be provided. The scope of statutory schemes will be enhanced when the Local Transport Act 2008 is fully in force to include such matters as frequencies, timings and maximum fares as standards of service. A non statutory scheme is not made under the Act and does not involve the traffic commissioner and associated commitments/binding undertakings.

Any works in the vicinity of the harbour require a harbour revision order under the Harbours Act 1964 in accordance with the associated regulations. There is reference in this report to the construction or alteration of certain bridges. It should be noted that there are special rules in connection with bridges carrying highways across railways (such as the Portbury Freight Railways Line) and it will be necessary to liaise with the relevant railways authorities in this connection.

With respect to the park and ride service which operates from Long Ashton, it should be appreciated that this is subject to the terms and conditions of a contract between the City Council and the service operator. Any discontinuation of this contract will have to be in accordance with the contract's term/termination provisions in order to ensure that the Council's interests are fully safeguarded.

The project will involve a significant amount of work to the existing road infrastructure so consideration will need to be given to the timely and correct procurement route for these works. In addition, where the Council considers it expedient to restrict or regulate traffic (eg by designating dedicated/segregated bus lanes), it will be necessary to progress traffic regulation orders (TROs). The promotion of such orders is also prescribed by the relevant procedure regulations. These regulations include the need to advertise proposals and to consider any objections received before the relevant decision-maker can decide on whether the Council can proceed. In association with TROs, the council has general powers to realign the carriageway and footways as well as roundabouts/traffic signalling/'shuttle working' etc.

Legal advice given by: P Malarby Senior Solicitor (Highways & Transport)

Financial

Revenue It is expected that all services that use the route will operate commercially. Therefore the only revenue costs falling upon the City Council will be maintenance costs for track and stop infrastructure, which will either be met from existing budgets. or, depending on the procurement model adopted, could be defrayed through, for example, an operators access charge.

Capital The total estimated cost of the scheme is £47.3m, 90% of which will come from the DfT's Regional Funding Allocation (RFA). The balance will be funded from S106 .

If the local contribution cannot be achieved through S106 , it will be met from the LTP allocation. Currently £2.5m per annum is being allocated to the Greater Bristol Bus Network, and this project will be complete by the time this BRT route is under construction.

The Council is expected to fund 50% of any increase in the total scheme costs between Programme Entry and the final Approved Scheme Cost. Furthermore the Council is expected to fund 100% of any increase in costs above the final Approved Scheme Cost. To mitigate this risk, there is a contingency of £4.4m included within the total funding available.

The total preparatory costs are estimated to be £2.8m from 2009 to commencement of construction in 2011. This excludes funding from SWRDA and will be met 50% from the DfT with the remaining 50% split 80/20 between Bristol City Council and North Somerset Council. The major cost element is the preparation of the Transport and Works Act Order and subsequent public inquiry. It is anticipated these costs will be met from LTP monies

Financial advice given by – Mike Harding –

Head of Finance - 23281

Land The majority of land is in BCC ownership. Power to acquire land will be obtained through the Transport and Works Order.

Personnel <Type Personnel Implications here>

Appendices:

Appendix A - Extract from Scrutiny Commission Minutes

Appendix B - Summary of Consultation and Actions

Appendix C - Summary of Technology Report

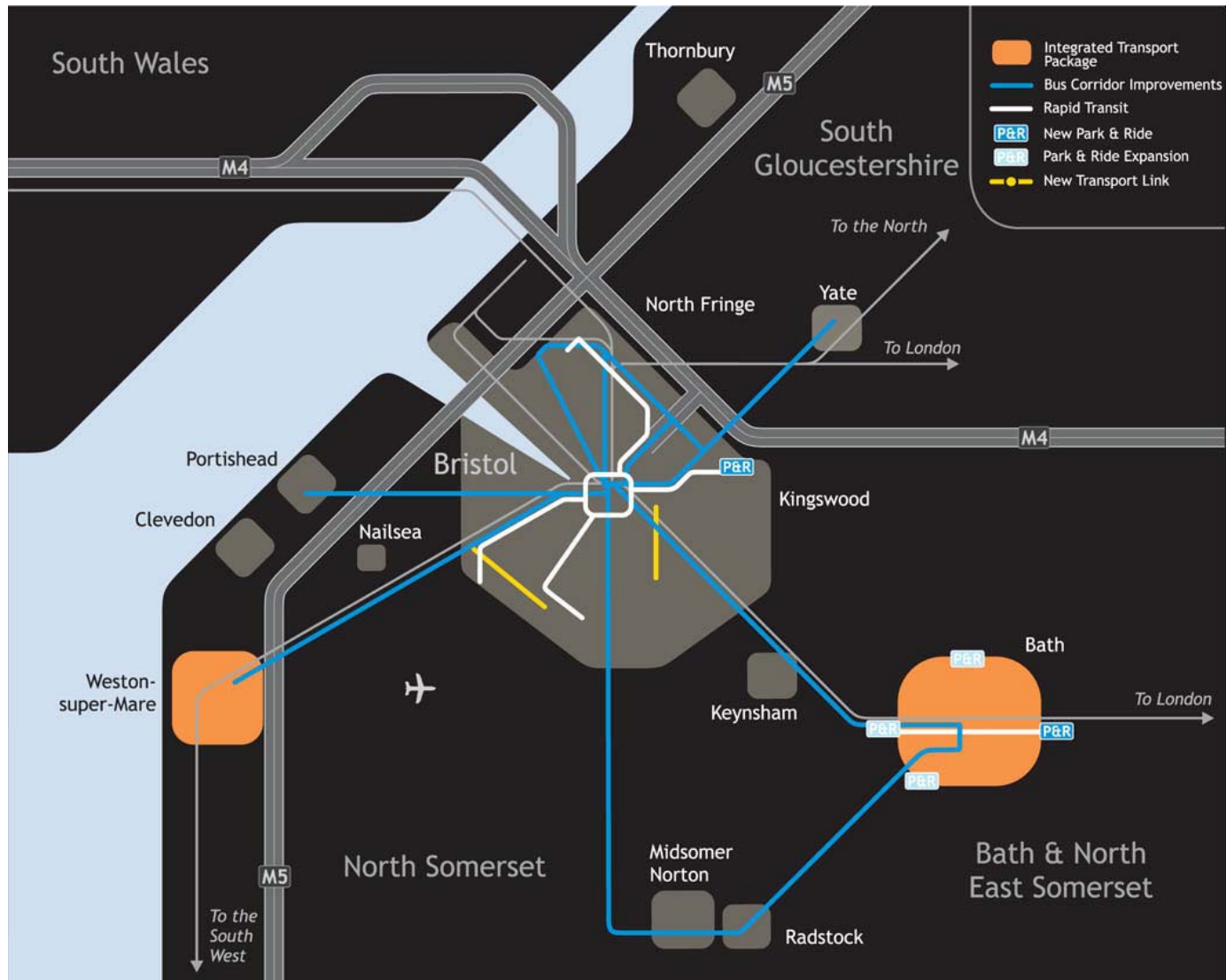
ACCESS TO INFORMATION

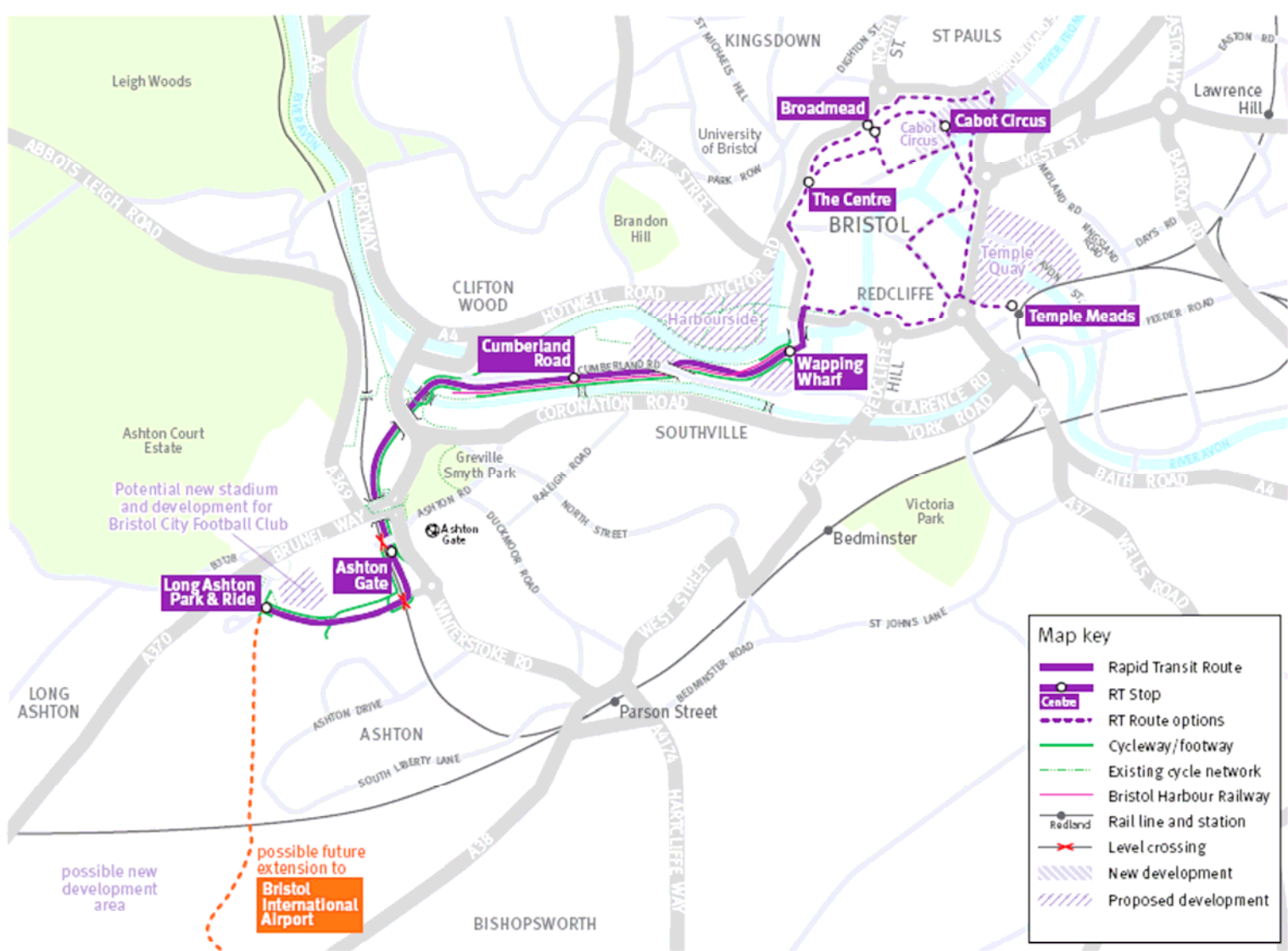
Background Papers:

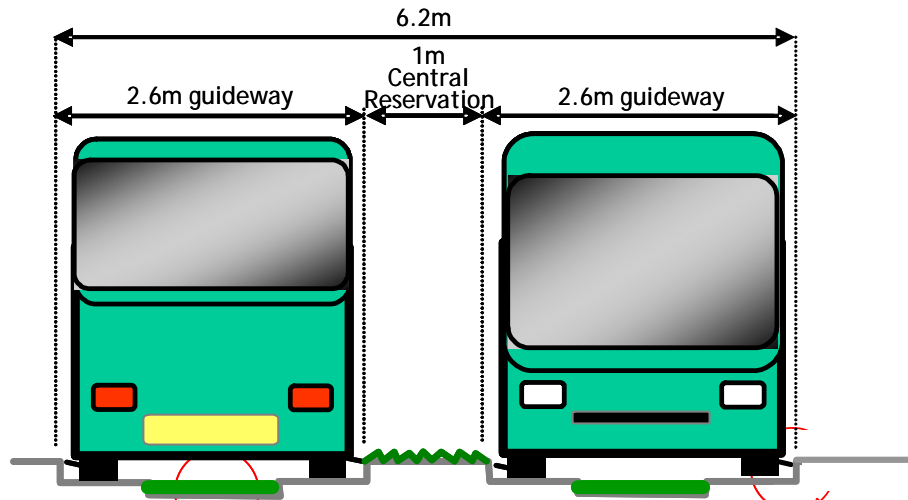
- Technology Studies (Halcrow 2007 and SDG 2008)
- Joint Local Transport Plan
- GBSTS

Our Future Transport – West of England Sub-Region

October 2007 (updated March 2008)







APPENDIX A - DRAFT EXTRACT MINUTE - SD&T SCRUTINY COMMISSION - 15 JANUARY 2009.

**SDT
.1/09**

RAPID TRANSIT (RT) - ASHTON VALE TO TEMPLE MEADS

The commission considered a report of the Strategic Director - City Development (agenda item no 9) on the proposals for a rapid transit scheme from Ashton Vale to Temple Meads.

Colin Knight, Head of Transport operations introduced the item.

The following points were made as a result of discussion:-

- Colin Smith accepted the principle of rapid transit but was aware that there was huge sensitivity regarding the environmental impact through Ashton Vale. He asked that this be taken into account when route planning through Ashton Vale and felt it was important to strike a balance between public transport improvements and sustaining the environment;
- Councillor Beynon congratulated officers on the quality of the consultation event which recently took place. He felt that officers were very knowledgeable and helpful;
- Councillor Rogers agreed with the comments of Colin Smith regarding the environment. He accepted that there was evidence that a rail option would be difficult to progress, but felt that the report did not explain that this option had been considered but it was decided not to be the solution. He believed this undermined the work of the Council on this matter. He pointed out that several transport groups opposed this scheme and the strongest criticism on the proposals was consistently that it was not a rail based solution. However, he noted the proposals for an interchange at Temple Meads and felt this was a very exciting, innovative element of the scheme;
- Colin Knight stated that the rail debate had taken place on numerous occasions and this report detailed the proposals to be sent to the DfT for funding, though there was reference to the rail option within Appendix A. He added that the proposals before the Commission were an opportunity to design something very different

which met the needs of Bristol's citizens by providing a robust, resilient and reliable service. He noted that a rail scheme did not always bring about a greater modal transfer, and that although the Council was very interested in Ultra Light Rail, the vehicles used had a significantly higher floor which did not meet DDA requirements for level boarding. He stressed that a great deal of work had gone in to the proposals as outlined;

- it was noted that the scheme was 'guided' as the vehicle was driven through electronics which provided perfect docking and a higher quality ride than a conventional bus. This also provided a fixed infrastructure which gave a sense of permanence;
- Councillor Eddy supported the proposals as a practical and deliverable way of addressing the City's traffic congestion. He referred particularly to the area to the west of the route with the link road to the A38 which would provide a good opportunity for drivers to get out of their cars. It was noted that North Somerset vehicles using the route would have to meet quality standards and would have to fit in with access arrangements and not impede the core services. It was also noted that the case for remodelling the City Centre would be tested to destruction by the DfT by a largely economic appraisal with financial modelling. It was possible to provide supplementary information to the DfT after the original bid submission;
- it was noted that there would be continual improvements and reworking of routes over a ten-year period. The earliest date work could start was 2011;
- the cost of the scheme was as accurate as it could be. Although it was not possible to give a guarantee that costs would not increase, it was reported that the DfT had strict rules on cost estimates and would analyse all figures in great depth. The DfT set constraints through various 'gateways' and the Council was given 18 months from submission to refine the detail in order to be risk confident. With respect to an overspend, it was reported that the DfT had a pain/gain share arrangement with the Council to share the overspend;
- it was confirmed that in the future, other routes could be appropriate for an Ultra Light Rail scheme if the technology was at the right level of development;
- it was reported that the business model was currently revenue neutral, however, officers were mindful that

private services may wish to use the lines and thus there was potential for income. It was crucial that if this was to be the case, any external services would have to meet very strict qualitative standards;

- Councillor Bradshaw, the Executive Member for Sustainable Development, acknowledged the huge amount of work undertaken by officers on these proposals. He reported that there was support from the Council's sub-regional partners and it was therefore important to start delivering. He added that the proposals were competing with other areas in the region that wanted a slice of the funding and from other regions who believed the SW region was not delivering on funded projects. Finally, he stated that the Council had moved on from promising to deliver a metro scheme that was not possible and had produced a set of proposals that were highly deliverable, he was pleased there appeared to be support from Commission members.

Councillor Beynon moved to support the scheme as set out in the report and this was seconded by Councillor Rogers. On being put to the vote, all were in favour, there were no abstentions.

RESOLVED -

(1) that the Commission unanimously support the proposals as outlined in the report.

(2) that the comments as set out above be considered by Cabinet at its meeting on 2 February.

	Stakeholder	Comments	Actions
Members	Barrow Gurney Parish Council	<ul style="list-style-type: none"> - Strongly supportive of proposals - Essential facility to serve the proposed Stadium, proposed urban extension and Bristol Airport - Requested rapid transit upgrade for A370, urban extension and A38 upgrade to Bristol Airport 	<ul style="list-style-type: none"> - Regular briefing on project progress
	Dundry Parish Council	<ul style="list-style-type: none"> - Very necessary and needed urgently - Support parallel walking and cycle routes - Should provide access to BRI, Airport and rural communities 	<ul style="list-style-type: none"> - Regular briefing on project progress
	Neighbourhood Planning Network		<ul style="list-style-type: none"> - Establish Steering Group for ongoing engagement with groups of the Neighbourhood Partnership network
Neighbourhood Groups	Ashton Vale Heritage Group	<ul style="list-style-type: none"> - Concerns over environmental impact on fields north of Ashton Vale - Against a stop at the end of Silbury Road - The current bus service from Ashton Vale is adequate - Concerned over a proposed stop for Bristol City Supporters 	<ul style="list-style-type: none"> - Ongoing engagement with Group. - Review of concerns through next stage of design. - Consideration impacts at EIA and further design stage including any required mitigation. - Consider design in relation to potential BCFC stadium.
Community Interest Groups	Redcliffe Futures	<ul style="list-style-type: none"> - Supportive of proposals - Supports early introduction - Supports replacement of Temple Circus gyratory - Prefer a light rail system - Concerns over 'bendy buses' - Concerns over type of fuel used - Should serve the Redcliffe area, with stops located near St Mary Redcliffe and Redcliffe Wharf - Should not compromise any existing rail network 	<ul style="list-style-type: none"> - Development of city centre route via Redcliffe - Ongoing engagement with the group
	Redcliffe Parade Environmental Association	<ul style="list-style-type: none"> - Supportive of proposals - Supports early introduction - Prefer a route along Redcliffe Way 	<ul style="list-style-type: none"> - Offered a meeting - Development of city centre route via Redcliffe
	Redcliffe Community Forum		<ul style="list-style-type: none"> - Offered a meeting
	Bristol Harbourside	<ul style="list-style-type: none"> - Supportive of proposals - Concerns over location of stops - Concerns over impact on the heritage railway - Concerns over pedestrian safety around the harbourside area - Concerns over Prince Street Bridge and affect on traffic - Route should pass through harbourside - Requested a stop at SS Great Britain - Route could avoid Prince Street Bridge by using Merchant's Quay 	<ul style="list-style-type: none"> - Evaluation and route option for Prince Street Bridge - Incorporation of Heritage Railway into design
	The Greater Bristol Alliance	<ul style="list-style-type: none"> - Would prefer light rail technology - Concerns about capital cost estimate - Insufficient information provided in the consultation material - Map of city centre options did not provide choice of indication of route - No information about whether the system is guided - How will bus be given priority in city centre? - Requested a stop at CREATE Centre - Requested a public meeting to explain bid to Government 	<ul style="list-style-type: none"> - Full technology review undertaken - Stop at Create under consideration
	Bristol Urban Design Forum	<ul style="list-style-type: none"> - Supportive of proposals - Welcomes opportunities for urban renewal - Concerns over visual impact of vehicles - Concerns over Prince Street Bridge - Good quality information and timetables needed on route - Bus service information should also be provided for on route services 	<ul style="list-style-type: none"> - Presentation of the scheme given in November 2008 - Evaluation of route options for Prince Street Bridge
Bristol City Council	Planning Arboriculturalist	<ul style="list-style-type: none"> - Loss of trees near Spike Island, Cenotaph, and Temple Circus would be a significant issue - Landscape plan would be required as part of any Planning Application 	<ul style="list-style-type: none"> - Ongoing consultation
	Planning City Urban Design Team	<ul style="list-style-type: none"> - Highlighted sensitivity of Prince Street Bridge alterations - Remodelling of Cenotaph area potentially contentious 	<ul style="list-style-type: none"> - Ongoing consultation
	Harbour Master	<ul style="list-style-type: none"> - Favoured retention of existing Prince Street Bridge - A stop close to Prince Street Bridge could be linked with new ferry stop at the Mud Dock 	<ul style="list-style-type: none"> - Ongoing consultation
	Bristol Museum development team	<ul style="list-style-type: none"> - Consultation on integration with Wapping Wharf area with the refurbished museum 	<ul style="list-style-type: none"> - Ongoing consultation
	Bristol Living Rivers Project	<ul style="list-style-type: none"> - Concerns over waterways impact, particularly Colliters Brook - Concerns over potential impact on butterflies, and suggested Cumberland Road to avoid this - Suggested alternative alignment along Longmoor Brook and via industrial estate - Suggested incorporation of turbines in crossing of Avon New Cut 	<ul style="list-style-type: none"> - Consideration impacts at EIA and further design stage including any required mitigation

Transport Groups	South West Regional Development Agency		<ul style="list-style-type: none"> - Members of project board and contributor to scheme development - Consultation on integrated design for north west side of Temple Meads station
	Highways Agency		<ul style="list-style-type: none"> - Members of project board
	First Group		<ul style="list-style-type: none"> - Ongoing consultation
	Wessex Connect (Long Ashton Park and Ride operators)	<ul style="list-style-type: none"> - Supportive of proposals 	<ul style="list-style-type: none"> - Ongoing consultation - Meeting held in November 2008
	Network Rail	<ul style="list-style-type: none"> - BRT project is part of steering group for enhancement of Temple Meads 	<ul style="list-style-type: none"> - Ongoing consultation, with particular regard to crossing of Portbury freight line and replacement of additional level crossing with bridge
	Office Rail Regulator		<ul style="list-style-type: none"> - Ongoing consultation, with particular regard to crossing of Portbury freight line and replacement of additional level crossing with bridge
	Sustrans	<ul style="list-style-type: none"> - Many of their issues incorporated into scheme revisions, particularly Connect2 proposals 	<ul style="list-style-type: none"> - Ongoing consultation - Provided with plans in Spring 2008, and many of their issues incorporated in to scheme revision with particular attention to Connect2 proposals
	CTC	<ul style="list-style-type: none"> - Concerns over 'bendy buses' - Concerns over traffic and parking on Cumberland Road - Stressed need for integration with Connect2 proposals 	<ul style="list-style-type: none"> - Integration of Connect2 proposals
	Joint officer group of four UAs	<ul style="list-style-type: none"> - Sought feedback on appraisal of the impact on cycling and pedestrian facilities 	<ul style="list-style-type: none"> - Ongoing consultation
	Sustraco (promoters of Ultra Light Rail Technology)	<ul style="list-style-type: none"> - Against bus-based proposals. Would prefer their Ultra Light Rail technology 	<ul style="list-style-type: none"> - Several meetings held, particularly in relation to technology review in Summer 2008
	Bristol Industrial Museum (Harbour Railway operators)	<ul style="list-style-type: none"> - Concern pressure would mount for 7 day operation on Harbour Railway line 	<ul style="list-style-type: none"> - Ongoing consultation
Utility Companies	Tram Forward	<ul style="list-style-type: none"> - Have grave misgivings on the scheme - Believe a tramway is in the best interests 	<ul style="list-style-type: none"> - Full technology review undertaken
	New Roads and Street Works Act Co-ordination Group	<ul style="list-style-type: none"> - Bus based option avoids diversion costs - Concerns fixed track would have impact on access to services 	<ul style="list-style-type: none"> - Ongoing consultation (quarterly meetings)
Business Community	Avon and Somerset Police	<ul style="list-style-type: none"> - Concerns over safe access and crossing points - Concerns over road closures - Concerns over severance of local police patrol routes 	<ul style="list-style-type: none"> - Ongoing consultation
	GWE Business West	<ul style="list-style-type: none"> - Supportive of the scheme - Bus based option is fully supported 	<ul style="list-style-type: none"> - Ongoing consultation
	Broadmead Board	<ul style="list-style-type: none"> - Supportive of proposals of whatever type - Prefer anti-clockwise loop for city centre - Would like traffic removed along The Cut, including Prince Street Bridge 	<ul style="list-style-type: none"> - Re-route preferred alignment away from Penn Street/Horsefair - Ongoing consultation
Developers	Bristol Alliance	<ul style="list-style-type: none"> - Supportive of proposals - Would like removal of traffic within shopping areas and prefer to see use of the outer roads 	<ul style="list-style-type: none"> - Ongoing consultation
	Ashton Park		<ul style="list-style-type: none"> - Initial advice given regarding design requirements for a rapid transit proposal through possible new development
	Bristol City Football Club		<ul style="list-style-type: none"> - Consider design in relation to potential BCFC stadium
	Carlyle Group	<ul style="list-style-type: none"> - Supportive of proposals - Support for a stop in Redcliffe Way 	<ul style="list-style-type: none"> - Development of city centre route via Redcliffe
Environment Groups	Ashton Vale Trading Estate	<ul style="list-style-type: none"> - Supportive of scheme in principle - Like to see increased benefit to wider Ashton Vale area 	<ul style="list-style-type: none"> - Stop provided to serve Ashton Vale
	English Heritage	<ul style="list-style-type: none"> - Concerns over alterations to Prince Street Bridge - Concerns over alterations to Cenotaph area 	<ul style="list-style-type: none"> - Ongoing consultation - Meeting held in October 2008 - Evaluation of route options for Prince Street Bridge
Environment Groups	Avon Wildlife Trust, Environment Agency, Natural England, GOSW, SWRDA, North Somerset, Bristol City Council, South Glos Council, BANES, BRERC, West of England Partnership	<ul style="list-style-type: none"> - No major concerns - Concern over NNRs, SACs, SSSIs, SNCIs, RIGS; within 5km of the proposed route - Concern over Great Crested Newts in adjoining gardens - Concern over foraging corridors for bats - Suitable habitats for bats and crossing points for mammals needed - Concern over removal of trees and loss of pedestrian walkways, particularly around Cenotaph - Concern over impact on Butterfly junction - Ashton Avenue Bridge, whilst not being listed has important value locally - Concerns over flood risks, particularly in Flood Zone 3 - Concerns over Japanese Knotweed during construction - Concerns over removal or significant alterations to Prince Street Bridge 	<ul style="list-style-type: none"> - Ongoing consultation - Third issue of Environmental Scoping Report sent in September 2008 - Protected species survey to follow and full EIA

WEST OF ENGLAND RAPID TRANSIT

Technology Review

Executive Summary

September 2008

Prepared for:

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EXECUTIVE SUMMARY

Introduction

1. The four Unitary Authorities of the West of England, Bath and North East Somerset, the City of Bristol, North Somerset and South Gloucestershire, are currently undertaking a programme of work to develop a rapid transit system for the West of England area.
2. In 2006 the Greater Bristol Strategic Transport Study (GBSTS) identified the need to progress a rapid transit network for the sub-region, as part of a package to successfully and appropriately accommodate additional transport movements arising from predicted residential and employment development over the next 20 years. The study concluded that

“further work is required to identify the type of vehicle used to operate the service but modern, low-floor, articulated buses are likely to be the most appropriate, flexible and cost effective vehicles to satisfy the requirements of the service”.
3. GBSTS identified four Bus Rapid Transit (BRT) corridors, three of which have been included in the Joint Local Transport Plan (JLTP) and have a current financial allocation in the South West Regional Funding programme to 2016 totalling £71 million (2006 prices) with operation of the first route targeted to commence in 2013. To obtain this funding, the West of England Authorities are required to submit a Major Scheme Bid for the first part of this network at the end of 2008. The route identified for this application is from Ashton Vale to Temple Meads via Bristol City Centre.
4. As part of the programme of work to develop a rapid transit system, the West of England Authorities have considered different types of rapid transit technologies. A review of technologies was first undertaken in 2007, this looked at a range of options from monorail and light rail through to conventional buses. Work from this review has been incorporated in to this report.
5. The West of England Authorities wish to ensure that the most appropriate technology is identified for its rapid transit network and further work is being undertaken specifically to look at the opportunities provided by newer rapid transit technologies. As a result, Steer Davies Gleave has been commissioned to undertake a further review of appropriate technologies that could be used to deliver the Ashton Vale to Temple Meads via Bristol City Centre route but also the wider proposed rapid transit network.
6. For the purposes of this report and the comparison of different technologies, the following details on the Ashton Vale to Temple Meads route were used:
 - The Ashton Vale to Temple Meads route is approximately 7km long, with around 3km of this being proposed as a segregated corridor and 4km running on-street in Bristol City Centre.
 - The route is proposed to run from the existing Long Ashton Park and Ride site via an alignment through the proposed development at Ashton Park, crossing the Portishead railway line at Ashton Gate, to run alongside the Portishead railway

line until it crosses the existing Ashton Avenue Bridge to connect with the alignment of the Bristol Harbour Railway line. The route continues running along the south side of the Floating Harbour adjacent to Cumberland Road to connect through to the proposed development at Wapping Wharf and the Bristol Industrial Museum.

- There are still options for the on-street sections in Bristol City Centre but the route will connect Broad Quay, The Centre, Broadmead, Cabots Circus, Old Market and Bristol Temple Meads Railway Station.
- The system will be required to provide a maximum capacity in the order of 3,000 passengers per direction per hour.

Study Process

7. This technology review has followed professional guidance documents and accepted industry practice¹. In assessing the appropriateness of different technology options these advocate a process of:
 - Assessment at increasing levels of detail in a step-wise or iterative manner to progressively eliminate those options that are not likely to provide an appropriate or affordable solution to the identified need and objectives. To this end a staged process of firstly looking at a high level strategic assessment of the alternative technology options followed by a more detailed review of the most appropriate technologies.
 - Assessment against a set of criteria which includes:
 - Goals and objectives including policy objectives,
 - Current problems and future challenges, including issues of local context within which the transit system will be implemented and operated,
 - Physical opportunities and constraints that will influence the design or technology choice,
 - Deliverability.

Public Transport Technologies

8. The consideration of all the different public transport options for a transit network in the West of England has previously been undertaken firstly by GBSTS and further as part of the rapid transit scheme development. These range from high capacity, high cost mass transit systems such as Heavy Metro (London Underground) to lower capacity and lower cost systems such as automated people movers and conventional bus systems.
9. A high level review of capacities and costs and previous assessment work undertaken, concluded that the technology options of mass rapid transit, heavy rail, light rail, conventional bus and automated people movers² are, in our opinion, not appropriate technologies for the proposed rapid transit network. This does not mean that these

¹ For example: *Affordable Mass Transit Guidance: Helping you choose the best technology for your Area*, Commission for Integrated Transport, 2005 and *Bus Rapid Transit – Planning Guide 2007*, Institute for Transportation and Development Policy, June 2007.

² Reference should be made to the Section 3 of the full report for an explanation of these.

technologies are not appropriate in specific circumstances but they fit less well with the proposed objectives of the rapid transit scheme and they are less likely to provide a successful case for government funding for this particular scheme.

10. This technology review therefore concentrates on the rapid transit technologies of Tramtrain, Light Weight Rail and Bus Rapid Transit.

Technical Review

Tramtrain

11. Tramtrain was developed in Germany to enable tram style services to be developed over the wider suburban heavy rail network, making use of improved proximity and connectivity of existing tram networks within the urban centres. Tramtrain is a vehicle solution not an independent mode such as bus or tram. The vehicles are capable of operating on both the heavy rail network and on urban low floor tram networks, which depending on the location and application, requires the ability to work on differing overhead line power supplies and possibly independently through the use of on board diesel generators.
12. There are currently no Tramtrain schemes within the UK. The Tyne and Wear Metro extension to Sunderland does incorporate some aspects of Tramtrain in that it runs on the heavy rail network in conjunction with rail services. A trial of Tramtrain in the UK is to be undertaken by Network Rail on the 37-mile Penistone Line between Huddersfield and Sheffield. The current service will be replaced using five Tramtrain vehicles between 2010 and 2012 and will look at the environmental, operational, passenger and lifecycle benefits along with the technical suitability of the technology. The vehicles may then be trialled on the Sheffield Supertram network to assess the suitability to a UK tram network.
13. The key benefit of Tramtrain is the ability to use existing rail infrastructure to operate on, using tram infrastructure to provide improved connection to city centres. In the case of the rapid transit scheme, a city centre network would need to be constructed out to the main rail termini. As a result it has many of the same issues that light rail options present. Alternatively, Tramtrain in the UK may have more of a focus on better utilising branch lines on the existing national rail network with an aim of improving frequencies and reducing cost of provision and operation.
14. Tramtrain vehicles provide the highest capacity of the modes reviewed. It is though, also the most expensive. Vehicles cost in the order of £2.8 million to £3.2 million each. The estimated cost of delivering the infrastructure on the Ashton Vale to Temple Meads via Bristol City Centre route is in the range of £90 million to £110 million (for the equivalent route as the proposed BRT route)³. The total scheme cost would be in the range of £118 million to £142 million including vehicles at 2007 prices. This excludes costs such as land, environmental works and contingency.

³ It is important to note that this is a desktop study and therefore has not involved site inspection or an engineering review of the feasibility of this technology. Please see Section 4 of the main report for a description of the cost estimate.

Light Weight Rail or Ultra Light Rail

15. Light Weight Rail has been developed by Parry People Movers (PPM) as an intermediate mode between bus and tram and is also being promoted by Sustraco/Ultralight Rail. The aim is to provide a lower cost intermediate mode which could run in place of branch line services on the national rail network or as a lower cost alternative to tram technology.
16. The PPM system has been trialled on a number of segregated routes and will operate a two vehicle branch line service in Stourbridge from December 2008. The vehicles will have a capacity of 50/60 people and will be powered predominantly utilising a flywheel charged by an LPG engine. The PPM system has successfully managed to obtain dispensation from Network Rail's Railway Group Standards (which facilitates its operation) mainly due the route's ability to be disconnected from the remainder of the rail network.
17. The proposals for Hybrid Ultra Light Rail (HULTS) for a system between Bristol and Long Ashton Park and Ride are at a concept stage and could use a similar vehicle to the Stourbridge scheme. Vehicles would cost in the order of £300,000 to £350,000 each.
18. The key benefits of this technology are its proposals to run on lower emission fuels and provision of a fixed rail system at a lower cost than a light rail systems. The HULTS report states that fuel consumption could be up to 40% below that of a standard diesel bus.
19. Deliverability is a significant concern with this technology as, to date, only development vehicles have been produced and trialled on a number of short rail routes, where the vehicle's operation can be segregated from other uses. Some of the operating issues that would need significant investigation to determine the cost and risk include:
 - System capacity – single unit vehicles do not have sufficient capacity to carry the required number of passengers on the proposed rapid transit system. The promoters state that vehicles can be coupled together but the PPM bogie technology upon which the vehicle would rely is also currently a concept and has not been developed. The development of this vehicle would require a radical redesign of the current PPM vehicles. Without the ability to run two vehicles together, or build a higher capacity vehicle, this system would have insufficient capacity to deliver the rapid transit service. Therefore development of an appropriate vehicle would be essential.
 - Utility diversion – the main issue with utilities is their ongoing access and serviceability. In order to prevent disruption to service and expensive works, utilities are usually moved out of the path of fixed rail systems. This can add significantly to the capital costs (in the order of 20% of total costs). HULTS promoters state that utility diversions would not be necessary and that HULTS services would be diverted when access or work were required. The proposed ULR track was discussed with local Utility Companies at a meeting in July 2008. The representatives of the Utility Companies were not in principle against the concept of a track which could run on top of their assets within the highway but raised a number of issues including the need for planned and emergency access to

utilities and the different requirements for different types of utilities. In addition it is likely that the Utility Companies would be looking to the owner of the track, the Local Authorities, to be responsible for undertaking and paying for any reinstatement works creating an ongoing cost for the Local Authorities.

- An on-street version of the system is untested in passenger operation including, importantly, how it integrates and operates with other general traffic. The technology does not currently have a UK Safety Case for this type of operation. This is of course obtainable but introduces an element of risk to costs, delivery and timescales.
20. Light Rail systems are currently costing in the order of £10 to 15 million per kilometre and have increased significantly over the last few schemes developed. A conventional on-street tram scheme therefore has an average cost in the order of £12 million per km. The HULTS promoter notes a cost of £3 million. Removing both the electrification and all the utilities cost from the average tram cost could account for a possible reduction of 33% in the cost of construction producing a track cost of approximately £8 million. The removal of all but the site preparation, highway and trackwork costs results in a cost of £5 million compared to the promoters' quoted £3 million rate.
 21. An estimate of costs has therefore been undertaken on three bases: firstly, the HULTS promoter cost of £3 million per km, secondly, the HULTS promoter cost of £3 million per km plus an allowance for structures and highway works required in the city centre and thirdly, an estimate based on low cost tram costs.
 22. Using HULTS £3 million per km estimate the total scheme costs would be in the order of £38 million (2007 prices). Using the HULTS promoter cost but adding in an allowance for structures and highway works provides a cost in the order of £45 million (2007 prices). Our estimation of costs per kilometre for this system, based on current tram costs but allowing for the proposed reductions proposed by HULTS for track work is in the order of £103 million. These all exclude costs such as land, environmental works and contingency but include vehicles and are at 2007 prices³.

Bus Rapid Transit

23. Bus Rapid Transit aims to deliver the characteristics of fixed rail systems but with bus-based technology. This consists of a variety of physical measures in conjunction with operational and system elements such as a segregated alignment, high quality dedicated vehicles, improved stop infrastructure, on-street priority, improved passenger information and high frequency services.
24. There are still relatively few high quality BRT systems in operation, although this is increasing. Systems to date have applied the suite of different BRT measures, both physical and operational in varied ways. There have also been significant issues with the quality and reliability of bespoke bus technologies developed, which have tried to use innovative technologies such as Phileas, Guided Light Transit etc. There has also been some criticism of the ride quality of slip-form kerb guidance (which is very dependant on the quality of construction).
25. Bus Rapid Transit does have a number of key benefits :

- Flexibility – routes are more easily adaptable to change through the life of the system and changing needs of urban conurbations. Bus services from a wider geographic area can also benefit from the infrastructure investment improving the reach of the system.
 - Value for money – BRT systems cost considerably less than comparable fixed rail systems.
 - Mode shift – BRT systems are delivering good reliable services and as a result showing much higher levels of mode shift than conventional bus systems.
26. Hybrid vehicles can significantly reduce emissions. Evidence from tests in London show a 38% reduction in CO₂ emissions from hybrid buses compared with standard Euro 4 diesel bus. Hybrid bus performance is similar to LRT and LWR/ULR in terms of CO₂ emissions. Hybrid vehicles could be available for around an additional £60,000 per vehicle (current prices) and the technology and market for vehicles continues to evolve, with additional manufacturers providing products into the UK market.
27. The equivalent BRT system cost for the Ashton Vale to Temple Meads via Bristol City Centre route, i.e. one that excludes costs such as land, environmental works and contingency and includes vehicles is in the order of £24 to £26 million (2007 prices) depending on the choice of vehicle.

Fuel Technology

28. Alternative fuel technology is still in its infancy and is continuing to evolve. There are some encouraging developments including work being undertaken by Bath & North East Somerset Council and their partners First Group through the European Commission's CIVITAS Plus Initiative 'Testing Innovative Strategies for Clean Urban Transport for Historic European Cities'. This initiative will include a demonstration project in Bath and trial a 'green' fuel articulated bus, appropriate for a historic city environment. The outcomes of this will be an important consideration for rapid transit scheme development.
29. A key issue is the operational feasibility of alternative technologies for a large scale network, including the infrastructure investment required, maintenance and reliability. This, and the small fleet size, could manifest itself in high vehicle costs.
30. For the present and short to medium term, diesel power is likely to remain the most widely available fuel for local bus based vehicles. The ongoing development and adoption of hybrid drive systems is likely to reduce their cost and increase their capability and reliability. Hybrid vehicles could be a viable alternative in the next few years.

Comparative Assessment

31. Tramtrain would only provide additional benefit over that of a tram route if it were able to be integrated with and operate on the existing rail network in the area. There are significant deliverability issues with the implementation of Tramtrain in the UK, and potentially capacity issues on the existing rail network in the West of England area. A significant amount of work would need to be undertaken to identify the opportunities and constraints for the adoption of the technology in the area.

32. Tramtrain vehicles provide the highest capacity of the modes reviewed. It is though the most expensive and if it were only deliverable on dedicated routes separated from the existing rail network, electrified tram technology would be more appropriate and more deliverable for a similar cost.
33. Light Weight or Ultra Light Rail could provide a lower capacity, environmentally friendly transport system. At this stage of development there are considerable unknowns and in our opinion, the technology would need to be developed and tested further before it could be available to be applied to a rapid transit network of the size and nature proposed in the West of England.
34. Bus Rapid Transit compares favourably both against the technical requirements for the proposed rapid transit system and the scheme's objectives.
35. The BRT mode is the lowest cost of the three options. Tramtrain could be in the order of six to seven times the cost of BRT and ULR could be in the order of 1.5 to 5 times the capital cost of BRT. BRT has the lowest deliverability risk. Vehicles can run on the highway in Bristol city centre and access the areas outside the main urban conurbation. On dedicated corridors the infrastructure could be either an exclusive highway or for guided sections utilise kerb guidance which can be constructed in a number of ways. All of which have been undertaken in the UK.

Summary and Conclusions

36. The Penistone Tramtrain trial on the heavy rail network is planned to conclude in 2012 with a further trial on an LRT network potentially thereafter. The trial will hopefully set the UK vehicle standards for Tramtrain, which, if the manufacturers are able and willing to provide a suitable vehicle depending upon the market demand, could significantly de-risk future Tramtrain projects and potentially provide a competitive market. This is unlikely to happen before 2016 and would therefore fall outside the current regional funding allocation programme. In our opinion costs for Tramtrain are also likely to significantly exceed the current funding available for rapid transit.
37. Tramtrain may provide a future suitable mode as part of a public transport network in the West of England area. It would however need to be compared at that time with electrified tram technology which could be more appropriate and more deliverable for a similar cost, particularly in connecting the city centre destinations. The delivery of rapid transit corridors using bus technology should not preclude the corridors from being changed to Tramtrain in the future should this prove to be deliverable.
38. LWR/ULR is also still in development. Both the vehicles and the track for ULR need to be developed, trials undertaken, required approvals obtained and large scale procurement and construction undertaken. This is unlikely before 2016 and therefore it would fall outside the current regional funding allocation programme. In our opinion costs for LWR/ULR are also likely to significantly exceed the current funding available for rapid transit.
39. ULR may provide a future suitable mode as part of a public transport network in the West of England area. However significant development work is needed on the technology before a major scheme application based on ULR could be put forward.

The delivery of rapid transit corridors using bus technology would not preclude the corridors from being changed to ULR in the future should this prove to be deliverable.

40. A bus rapid transit network, particularly if all the elements of the system are delivered (segregation, fast/frequent services, direct access to destinations), meets the scheme objectives and can be delivered within the current regional funding allocation programme. The risks associated with delivering bus rapid transit are considerably lower than the other two technologies we have reviewed.
41. Whilst Euro V diesel power remains the most practical for now, modern vehicles offering low emissions such as hybrid technology could possibly be a viable alternative in the next few years, subject particularly to reduction in their capital cost. Progress on this technology should be monitored for application to the rapid transit network and reviewed for its appropriateness and viability.
42. In our opinion, Bus Rapid Transit should be pursued for the Ashton Vale to Temple Meads rapid transit route as it best meets the rapid transit scheme objectives; is the most cost effective and flexible; and can be delivered within the current programme and available funding.

CONTROL SHEET

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Document Title: Technology Review

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REVIEW

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