

Bus Rapid Transit & Guided Bus Schemes

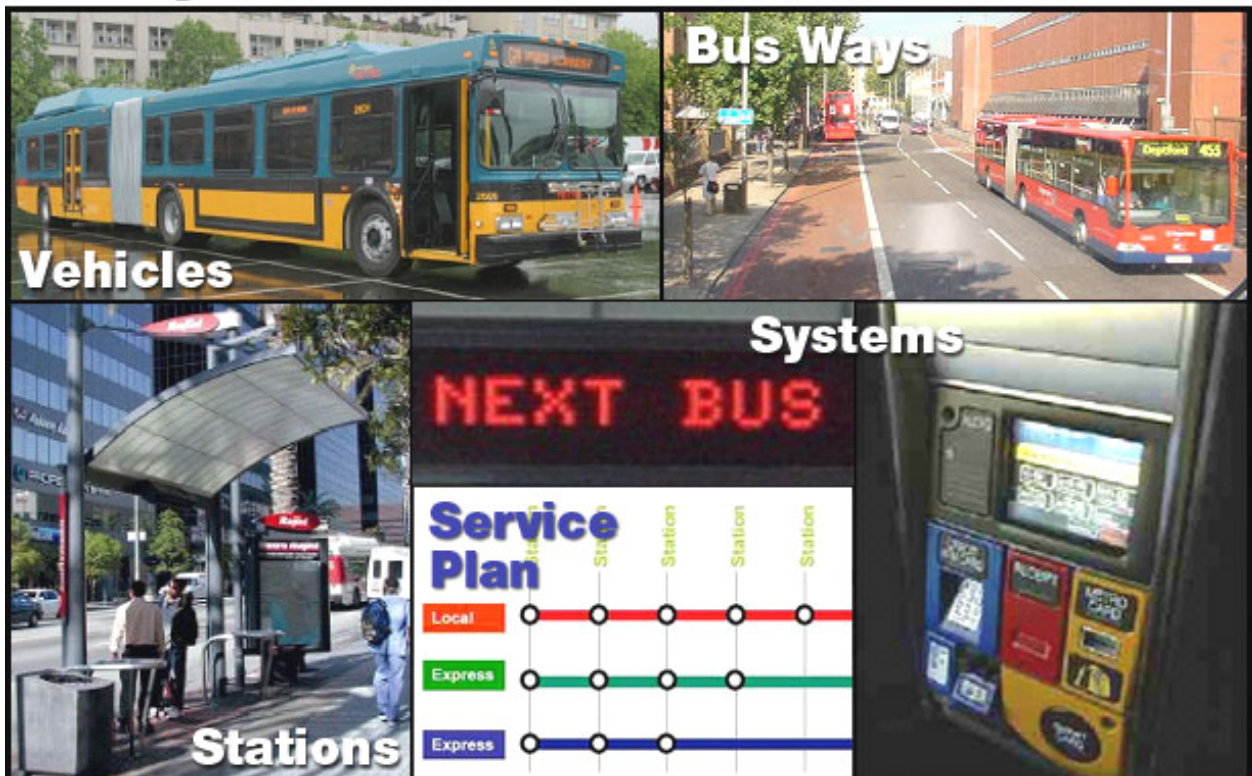
The demise in 2005 of light rail projects in Liverpool, Leeds and South Hampshire gave more urgency to the question of what the future looks like for mass urban transit in the UK.¹ A new group, BRT-UK has now been formed to champion the concept of Bus Rapid Transit (BRT).

As traffic congestion threatens to choke many of our cities, there is a perception that guided bus schemes might offer an alternative to bus travel which traditional car users might consider to be closer to tram or light rail, encouraging them to switch transport modes. BRT mixes the advantages of segregated track-based schemes, requiring more substantial works than a normal bus priority scheme.

The first public kerb guided busway (KGB) opened in Essen, Germany in 1980. The first kerb-guided bus initiative in the UK was Tracline 65, operating along a former tramline in Birmingham from 1984 to 1987. The route saw an increase in patronage of 26% compared to other services in the city. Ipswich was the next city to launch its own guided bus service, in 1995. The Ipswich Kesgrave guided bus scheme is a 200m two-way guideway operating between two housing estates.²

BRT schemes have been built or are under construction in Crawley, Leeds, Bradford, Edinburgh and South Essex. Others are under design in Cambridge and Luton, both making extensive use of former railway alignments, and are also being planned in Salford, Hull, Oxford and Coventry.

BRT System Elements



¹ Bus rapid transit moves into the ascendancy as light rail dream fades – Matthew Ledbury, Local Transport Today, 23rd March 2006, p.9

² Kerb guided bus: is this affordable LRT? – Robert Bain, TEC, February 2002, pp.51-55

The most successful bus schemes have been those with features that closely replicate those of light rail schemes³. Design features that have been found to be particularly important include:

- A system which largely operates on exclusive rights-of-way
- Attractive “stations” rather than stops
- High quality timetabling and real time information
- Clearly and distinctively branded buses
- Off-vehicle fare collection
- Quiet, easily accessible modern multi-door vehicles
- A frequent all day “turn-up-and-go” service
- Dedicated routes, including guided busways, improved signalling, priority at congestion points and integrated priority bus lanes

Quality Bus and Light Rail – Summary of Perceived Benefits

Light Rail	Quality Bus
<ul style="list-style-type: none"> ▪ Perceived by the public as a more attractive mode than the bus ▪ Proven to deliver greater and more sustained modal shift than bus priority measures ▪ Offers a fixed asset which has a greater perception of permanence than bus options, giving confidence to potential investors ▪ Better suited to the medieval street layouts of European centres which inhibit penetration by bus ▪ More publicly acceptable in urban areas than high frequency bus services ▪ High vehicle capacity means that passengers can be carried more efficiently than by bus and best use can be made of junction priority ▪ A high quality ride can be offered throughout the journey length ▪ The environmental impact of light rail in urban areas is lower than bus 	<ul style="list-style-type: none"> ▪ Infrastructure capital costs per kilometre are generally lower than light rail ▪ Design standards can be altered in accordance with capacity needs ▪ Quality Bus offers greater flexibility than light rail ▪ Services can be extended into areas of low population density without the need for a transfer between vehicles ▪ Systems can be implemented quickly ▪ Quality Bus can offer a comparative level of ride experience to light rail if the quality features of light rail are incorporated into system design

Source: DfT Atkins Report, 2005

Kerb guided bus or bus rapid transit schemes have a number of key benefits, some of these are highlighted in the above comparison table for Quality Bus with LRT. Research suggests that passengers have no particular preference for rail over bus when service characteristics are equal (Bain 2002). In addition, the following are now seen as important motivators in the move towards guided bus schemes in the UK:

1. **Costs** are said to be significantly cheaper: construction costs per km of LRT in the UK range from £7m to £25m, BRT schemes completed or proposed in the UK range from £1.3m per km in Edinburgh to £3.4m in Cambridge.⁴

³ Study of High Quality Buses in Leeds, Final Report – Atkins for the Department for Transport, November 2005

⁴ Bus rapid transit moves into the ascendancy as light rail dream fades – Matthew Ledbury, Local Transport Today, 23rd March 2006, p.9

2. **Limited Land Take** – traditional bus lanes are 3.75m or 4m wide (to allow for lateral movement), using guided systems means you can reduce the width to 2.6m (bus width is 2.5m). This means you can locate guided busways in places where bus lanes would be impractical (Bain 2002).
3. **Self Enforcement** – guided busways with twin running strips precisely the width of a bus axle do not suffer from the same kind of obstruction that bus lanes do, they physically deter other traffic
4. **Accessibility** – at bus stops or “stations” the guide wheel allows the driver to dock against the stop enabling easy, level boarding.

Bristol & the West of England

The approach in Bristol had previously focussed on an LRT scheme but in June 2004, Bristol City Council finally decided to suspend promotion of a light rail rapid transit or 'tram' based system, reflecting a change in the Government's approach to such schemes and the slow progress being made to even implement the first stage of the route. The focus is now on the development of a quality bus service through Showcase Bus Routes.

As part of the Joint Local Transport Plan (JLTP) the councils of Bath & North East Somerset, Bristol City Council, North Somerset and South Gloucestershire Council in partnership with First Group has developed the Greater Bristol Bus Network Major Scheme. The aim of the scheme is to create a comprehensive, integrated public transport system for the Joint Local Transport Plan area that will:

- provide fast and reliable bus journey times along major corridors to compete effectively with the private car;
- enable passengers to make a range of cross-Bristol and other journeys without the need for interchange;
- produce greatly enhanced standards of passenger comfort;
- achieve greater service levels for a range of key destinations;
- connect efficiently with rail and coach services

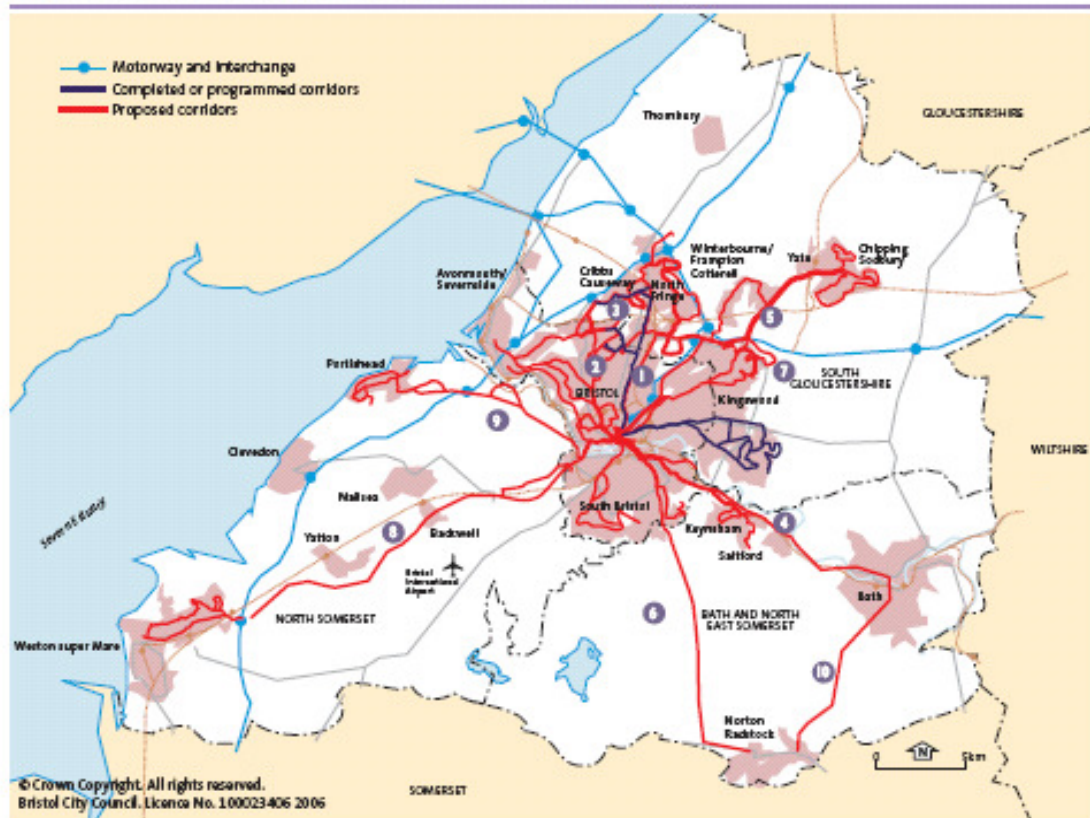
The Greater Bristol Bus Network Major Scheme includes ten corridors as follows (see map below):

1. M32 Priorities
2. A4018 Bristol to Cribbs Causeway
3. Bristol to Cribbs Causeway via Parkway and North Fringe
4. A4 Bristol to Bath
5. A432 Bristol to Yate
6. A37 Bristol to Norton Radstock
7. A4174 Avon Ring Road
8. A370 Bristol to Weston-super-Mare
9. A369 Bristol to Portishead
10. A367 Bath to Norton Radstock

The package of measures, which has now secured £42m in Government funding, includes a range of improvements to the bus network as set out below:

- More bus lanes and improvements to junctions
- Ticketing improvements
- Real time information at major stops
- Modern low floor buses
- Enforcement of bus priority measures

Figure 10.1: Greater Bristol Bus Network Key Corridors



Source: Joint Local Transport Plan 2006/07

Alongside proposals for the Greater Bristol Bus Network, the four Unitary Authorities in the West of England are now considering options for bus-based rapid transit, which may follow some or all of the existing tram proposal alignment currently safeguarded by the Joint Local Transport Plan. Implementation of bus rapid transit is programmed from 2011.

The Greater Bristol Strategic Transport Study (GBSTS) assessed the potential for rapid transit and has broadly indicated four cross-Bristol routes, building upon the Showcase Bus Route proposals, to serve many of the new residential and employment developments and to support regeneration aims:

- Hengrove to North Fringe (Phase 1) – this route is seen as crucial to tackling existing transport problems, as well as those caused by future growth;
- Bristol International Airport/Ashton Vale/Emersons Green (Phase 2) – needed to serve an expanded airport, central Bristol and potential urban extensions;
- Bath to Cribbs Causeway (Phase 3) – this route builds on schemes in the Bath Package.

Examples of Guided Bus Schemes

Germany O-Bahn



Schemes in the UK (Leeds, Edinburgh)



Crawley Fastway

The 'Urban Transport Plan' for Crawley produced in June 1996, recognised a primary need for improved public transport provision. A guided bus system emerged as the best solution for the area because it can access residential areas, is not constrained by a costly fixed infrastructure and power supplies, minimises land use without cluttering the street scene and is a flexible option, which can be expanded and adapted to meet local changes and demands.

The Fastway project aims to improve bus services in the Crawley, Gatwick and Horley area. The route consists of 24km, with 9km of bus lane, and 2.5km designated as guided busway. The scheme has been specially designed to speed past congestion hotspots and satellite based global positioning system (GPS) technology enables the Fastway system to give up-to-the-minute timetable information to passengers, track the location of vehicles to help maintain schedules and gain priority at traffic lights if the bus is running behind schedule. It has been developed through a consortium of partner organisations including County and District Councils, BAA Gatwick, British Airways, and Metrobus.

Measures introduced for Fastway to achieve its aims include the following:

- A new fleet of modern, high quality, low emission, low noise buses
- Dedicated bus lanes and guideways to avoid other traffic
- Modification of road junctions to include traffic light control
- Priority at junctions for buses over other traffic
- Well planned phased-in routes between Crawley and Horley via Gatwick Airport and Manor Royal
- Improved journey times and reliability
- Real-time passenger information on board the buses and at stops

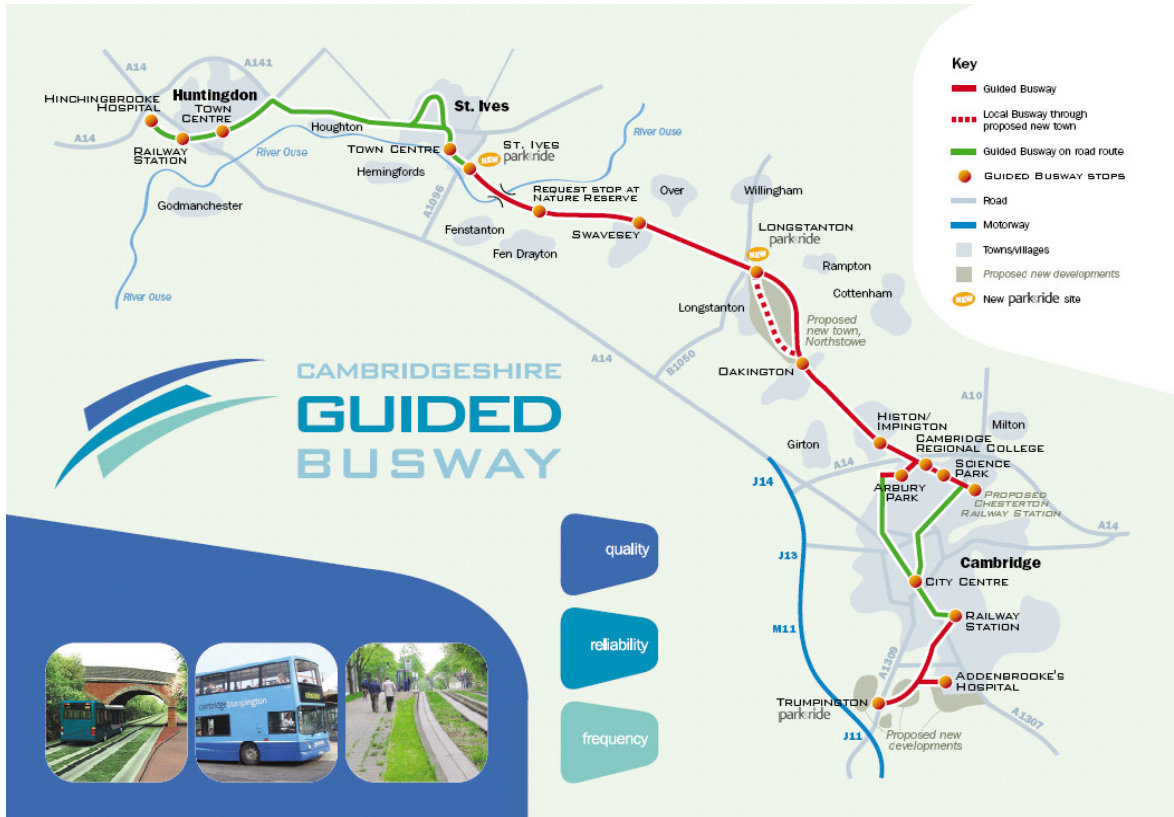


The Fastway project is estimated to cost £32 million. About £29 million of this is for the works needed to modify the junctions and introduce the guideways, bus lanes, shelters and real-time information with a further £3 million for the purchase of the vehicles themselves. Over £18 million has been funded by the private sector, including developers, public transport operators and BAA Gatwick. The Government is supporting Fastway with over £13 million with the other funding provided by the local authority partners to complete the funding package.

Initial forecasts suggested that 10,000 passengers a day would use Fastway, with a third of those going to and from the airport and 24% of those would have switched from the car, with

a 20-30% reduction in journey time along the route.⁵ The Atkins Report (2005) highlighted that actual patronage was 40% above those initial forecasts.

Cambridgeshire Guided Busway



The Cambridgeshire Guided Busway is a 40km route which includes a 25km guideway along the disused rail corridor between Cambridge and St Ives. The £86 million scheme will see the former Cambridge-St Ives railway route concreted over so that buses can ply back and forwards between the two urban centres, and through Cambridge city centre. The first buses should be running in 2007.

The county council believes the busway's biggest assets will be its speed, comfort, and frequency. The council's experts claim a journey from Swavesey to the Cambridge Science Park, which can currently take commuters more than an hour, would be reduced to 13 minutes.



⁵ New guided-bus service goes live in West Sussex – Tony Collins, TEC, Product Review, Third Quarter, 2003, pp.8-10

The approval of the Cambridgeshire scheme is the second rail-to-bus project backed by the Government. Ministers have already said yes to running buses along a disused rail line near Manchester, and a third scheme is under consideration in Bedfordshire, between Dunstable and Luton.

Leeds Super Busway

The Leeds Transport Strategy (1991) set out a range of solutions for the city’s most heavily congested radial corridors. Guided bus was identified for two corridors (A61 & A64). The implementation approach was to identify congestion hot spots along the dual carriageway corridor and focus attention at those points.

The first section of the guideway on the A61 opened in September 1995 and in the first two months reported a patronage increase of 9%. More than 5 years later, peak hour journey times have nearly halved and patronage has increased by over 75%, estimates suggest that between 10% and 20% of new passengers have shifted from the car (Bain 2002).

Approximate Corridor Run Times (in-vehicle time only)

Corridor	Existing Bus	BRT	Tram
North	25 mins	21 mins	19 mins
East	28 mins	21 mins	19 mins
South (Total)	30 mins	20 mins	19 mins
South (Middleton Road to Balm Road)	15 mins	14 mins	14 mins

Source: DfT Atkins Report, 2005

The second scheme running along the A64 opened in November 2001. This scheme comprises 2.6km of new bus lanes and 2.1km of guideway. The financial arrangements for this scheme have attracted some interest, with half of the £10m infrastructure costs provided by the bus operators (First Leeds and ARRIVA Yorkshire), split to reflect the benefits each would receive from the development of the guideway (particularly notable given that in a deregulated environment any bus operator could take advantage of this enhanced infrastructure).

The ftr by First Group (York)



The UK's first ftr scheme is now operating in York. This is a pilot scheme giving both First and City of York Council the opportunity to be the first to trial this "new" form of public transport. By comparison with the extremely long lead times for light rail projects this trial has been delivered in York extremely quickly and efficiently. It is a little over one year since the launch of the prototype ftr vehicle and two years since the project was given the green light. The partnership between First and City of York Council has delivered an innovative new scheme that is delivering a safe, comfortable and spacious alternative to the private car for journeys into the city centre.

The ftr scheme sees the introduction of state-of-the-art articulated vehicles that look like trams but run on rubber wheels and use normal roads. The ftr route will link the University of York, the city centre, Dringhouses and Acomb. Its design is aimed at making it attractive to people who would not normally use buses, it incorporates new seating arrangements and air conditioning and on board ticket machines. Additional launches are planned in Leeds and Swansea, with Glasgow, Manchester, Bath and Bristol also planning to introduce ftr.⁶

As part of the partnership, City of York Council is introducing a programme of improvements to traffic lights, bus shelters and bus stops that will make sure the ftr vehicles can move people around the city in comfort and without delay. It is not reliant on a guided busway and its aim is more to make the bus more attractive to users in terms of design and style. The fleet of 12 ftrs in York cost First around £4m and the Council invested around £1.3m in traffic management measures to improve bus priority.

Kerb Guided Bus – The Technology

The bus remains a standard vehicle with standard steering. The only modification to the vehicle is the installation of the guidewheel (as illustrated below). This modification adds around £2,000 to the cost of the bus.



⁶ Has ftr survived its baptism of fire? – David Fowler, Transport Times, 8 September 2006, pp18-19

Vehicle Types and Characteristics

Vehicle Type	Example	Description	Passenger Capacity	No of Doors	Fuel Type	Approximate cost
Standard single-deck bus	Optare-Excel		45-63	1	Diesel	£110,000 - £135,000
Standard double-deck bus	Optare – Spectra		78 + standing	1	Diesel	£140,000 - £160,000
Standard single-deck articulated bus	Mercedes Benz-Citaro G		148	3	Diesel	£200,000
Innovative tyred vehicle with guidance	Bombadier – TVR	Double- articulated bus guided by steel guide channel embedded in street. Also capable of normal operation.	143	3	Diesel	£800,000
	Irisbus (MATRA and Renault) - CiViS	Optically guided using stripes painted in a priority lane. Also capable of normal operation.	104	4	Hybrid	£400,000
Innovative tyred vehicle without guidance	Irisbus (MATRA and Renault) - Cristalis	Single-deck articulated. Non-guided version of CiViS.	106	3/4	Hybrid	£350,000 (standard) £500,000 (Artic)
	Wright Bus / First Group – Streetcar (FTR)	Developed to be intermediate mode between bus and tram. Wheels are covered and driver positioning and interior design comparable to tram.	100	2	Diesel	£300,000

Source: DfT Atkins Report, 2005