



LIGHT RAIL (AND OTHER RAPID TRANSIT SOLUTIONS)

Opportunities Available to Introduce New Light Rail Systems or Other Rapid Transit Solutions into Towns and Cities in England.

Response by Smart Growth UK

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Smart Growth UK

Smart Growth UK is an informal coalition of organisations and individuals who support the Smart Growth approach to planning, transport and regeneration.

The organisations supporting the coalition adopted a set of principles in 2013 to guide future work:-

- Urban areas work best when they are compact, with densities appropriate to local circumstances but generally significantly higher than low-density suburbia and avoiding high-rise. In addition to higher density, layouts are needed that prioritize walking, cycling and public transport so that they become the norm.
- We need to reduce our dependence on private motor vehicles by improving public transport, rail-based where possible, and concentrating development in urban areas.
- We should protect the countryside, farmland, natural beauty, open space, soil and biodiversity, avoiding urban sprawl and out-of-town development.
- We should protect and promote local distinctiveness and character and our heritage, respecting and making best use of historic buildings, street forms and settlement patterns.
- We should prioritize regeneration in urban areas and regions where it is needed, emphasising brownfield-first and promoting town centres with a healthy mix of facilities.
- Civic involvement and local economic activity improve the health of communities.

Question 1 *What is the potential scale of the opportunity for further light rail (or other rapid transit) systems to be introduced in England?*

Almost two decades have now passed since the Government's *Transport Ten Year Transport Plan 2000*¹ proposed "up to 25 new rapid transit lines in major cities and conurbations, more than doubling light rail use" as well as new tram systems in London. It cited the success of the four schemes operating at that time and noted that around 20% of Manchester Metrolink's passengers previously used a car for the same journey. "We will fund a substantial increase in the role of light rail in our larger cities and conurbations over the next ten years, backing schemes that offer good value for money as part of integrated transport strategies," it promised.

The *Plan*, which was expected to be in operation by 2010, included three new extensions for Manchester Metrolink, two extensions for Sheffield Supertram, the Docklands Light Railway (DLR) extension to London City Airport, the Tyne & Wear extension to Sunderland, the first Nottingham line and lines in Bristol/South Gloucestershire, Portsmouth/South Hampshire and many more. Meeting its objective of 25 new lines by 2010 would have required development – and construction – of around twice as many new schemes as were then in the pipeline, an indication of what central government can do if it put its mind to it.

After some initial progress which saw the most advanced schemes opening, the Government switched its enthusiasm for light rail to forthright opposition. In 2004, following a National Audit Office report critical of the process, it axed nearly all current light rail projects, several of them already at the point where preliminary works were taking place and tens of millions of pounds of public money had been spent. For this and other reasons (including disagreements between local authorities), schemes were abandoned in south Hampshire, Leeds, Liverpool and Bristol. Greater Manchester's big expansion was initially halted too, but later it was allowed to recommence, albeit somewhat trimmed (although most of it was eventually restarted after a funding agreement had been agreed). In London the West London and Cross River schemes were dropped as was the Tramlink extension to Crystal Palace. In Scotland only one line of the Edinburgh light rail scheme was built.

"The economic success of the nation will depend increasingly on service-sector earnings from companies based in the major cities," according to a Government white paper, *Delivering a Sustainable Railway*² in 2007. The paper noted the increasing problems of overcrowding etc. on urban rail networks and the need for more sustainable transport. Its suggested solutions included longer trains and, possibly in the longer-term in London, double-deck trains. Despite this paucity of ambition, the document noted improvements to the rail network can relieve pressure on tube or light rail lines and vice versa, but it was remarkably cool about building new rail lines, light or heavy. In south-east England, it noted forthcoming new services on CTRL and Crossrail but, in the rest of England, it said there was "less need for investment in infrastructure" to accommodate growth in city demand. Outside urban areas, the Government saw no need to justify opening or developing new regional lines. And it had a warning for those local or regional authorities that had safeguarded rail alignments in their planning documents. "The Government does not propose a blanket approach to safeguarding all potential alignments or disused lines," said the white paper. "This would be disproportionate and blight homes and properties."

However, the years that followed did see some softening of this Government hostility and local authorities began promoting schemes again. The Government approved Phases 3a and 3b of Manchester Metrolink in the late 2000s, two extensions to the Nottingham system in 2009 and the city centre extension of West Midlands Metro was finally approved in 2012.

The thaw in Government hostility continued in 2011 when the Department for Transport published a new report, *Green Light for Light Rail*³, which examined recent experience and made recommendations for implementing new designs, for lower cost schemes and to set up a centre of procurement excellence. The report said UK light rail schemes had been expensive and high capital costs had deterred local authorities from promoting them. But, it said, work was underway to allow local authorities to retain growth in business rates via tax increment financing. It expressed the Government's hope that, from 2015, decisions on major local transport schemes would be taken at a more local level.

The report analysed the capital costs of UK schemes and the reasons for them in some detail, and admitted this was far from being solely a UK phenomenon (and high initial capital costs are most certainly not a uniquely light rail phenomenon as they are almost universal in transport infrastructure projects). It made extensive recommendations for reducing the costs of light rail in the UK and said the DfT would discuss the issues and recommendations to develop a sector-led implementation plan "for getting light rail on the right track".

The eight years since that time have seen a number of light rail lines opening in Greater Manchester, the West Midlands and Nottingham, together with the first line in Edinburgh. There are many proposals for new light rail lines around the country, not just extensions to existing systems but new systems too. The scope is enormous. Until recently it was believed in the UK it was not economically viable to provide light rail in conurbations with significantly less than 250,000 inhabitants. Modern techniques make such assumptions redundant.

Yet several English conurbations with populations significantly greater than that still lack light rail. Some have relatively dense networks of heavy rail, like Greater London; others, like West Yorkshire, do not. But there is a demonstrable need for light rail even within those that have. There are always substantial gaps in any rail network and there are areas which, for physical reasons or for reasons of potential patronage, are unsuitable for heavy rail.

Light rail can carry out many functions which heavy rail cannot. It can carry passengers over shorter distances than heavy rail, more smoothly and comfortably, more rapidly and more capaciously than buses, using far less energy, with virtually none of the atmospheric emissions of fossil-powered, pneumatic-tyred vehicles. It is also far better at getting people out of cars than buses, even buses dressed up pretending to be trams.

Smart Growth UK believes that all conurbations in the UK with over 250,000 people, and many with smaller populations, can and should be provided with comprehensive light rail networks. This is central to improving the well-being of cities and our fight against climate change. It could and should have begun 19 years ago; it urgently needs to begin now.

Question 2 *Is there an appetite for new systems to be introduced in our cities and towns?*

The experience of the first two decades of the 21st century shows that what is holding light rail back in England is not lack of appetite among local authorities, but central government hostility.

As we shall see in the response to Question 3, there has been sustained and practical interest from local authorities in developing light rail schemes since the 1980s. The only real barriers to this have been central government hostility and lack of funds.

Many councils are still pursuing light rail and it is incontrovertible that some of those where interest is currently stalled are constrained by the acute shortage of funds faced by England's councils. But this has not precluded many community-based proposals coming forward.

Question 3 *Is there evidence to support this appetite?*

The evidence for a local government appetite for light rail emerged in our unpublished 2013 report which looked particularly at the major conurbations in the UK. It was surprising how many had responded to the call for new schemes in the Ten Year Transport Plan in 2000. This brief summary is based on our findings with regard to the larger (250,000+) English conurbations six years ago:-

Bournemouth

Bournemouth's electric tramway closed in 1936. Bournemouth Borough Council's 1998 local transport plan proposed promotion of a light rail system which would have formed part of the Dorset Area Rapid Transit System with single-ticketing across mainline rail, light rail and bus services. Light rail lines would have extended from Bournemouth to New Milton and possible later extensions would have taken it to Wareham, Hamworthy, Wimborne, Tower Park and Christchurch. The schemes were not proceeded with.

Brighton/Worthing/Littlehampton

Brighton lost its electric trams in 1939.

Bristol/Avon

Bristol's extensive tramway closed in 1941 and Bath's in 1939. In the late 1980s an extensive privately promoted light rail network was proposed for the county of Avon. Advanced Transport for Avon would have created a network in and around Bristol, including sections in tunnels. Powers were obtained for routes to Portishead, Bradley Stoke and the city centre but political support was lacking. A subsequent rapid transit study proposed a six line network with trams going from central Bristol to Bradley Stoke, south Bristol etc., but this one fell foul of abolition of Avon County Council. A business case was prepared for a line

from the city centre to Bradley Stoke (running on former rail alignment between Temple Meads and Abbey Wood) but Government support was lacking.

Following work on Bristol's *Local Transport Plan* which showed widespread support for light rail, a Supertram proposal was put forward by Bristol City Council and South Gloucestershire Council for a new light rail scheme around the city centre and running north to Parkway, Bradley Stoke and Almondsbury.

In 2000 Bristol was included in the "fast track" scheme for road pricing which could have helped fund the scheme – effectively support in principle from the Government - but decisions on light rail were deferred. In 2001 the Government announced the scheme had passed Treasury/DETR economic and technical criteria and should receive funding (then given as £194m). Possible future extensions were identified to south Bristol and to Yate via Emersons Green, plus conversion of the heavy rail routes from Bristol to Severn Beach and Portishead. The Citylink consortium which had been developing the proposals was dismissed and retendering ordered.

During 2002 a number of obstacles arose including calls to extend the route to the Cribbs Causeway shopping centre (which South Gloucestershire supported) and the realisation that plans to take it across the M5 to a park and ride site (which Bristol supported) would need an expensive tunnel. After much discussion the Councils agreed to support both routes, although in 2003 the Cribbs Causeway route was judged impracticable. But disagreements continued, especially once there was a change of control at the Council. Eventually, in 2004, Bristol agreed to spend the funds set aside for the tramway on keeping its council tax down. For want of central support for light rail, Bristol has pursued a "bus rapid transit" bus route to Ashton Vale, south west of the city and elsewhere. But the West of England Combined Authority has now allocated £1.95m for a mass transit study to develop feasibility and business cases for a system in Bristol, with a line extending to Bath

Greater London

London once had a vast tramway network but the last tram ran in 1952. It also has its huge underground railway network, the 31km Docklands Light Railway metro (with a further extension to Stratford International at an advanced stage) and a very large suburban rail network, most of it electrified. The 28km Croydon Tramlink system taking trams from Croydon to New Addington, Wimbledon, Elmers End and Beckenham Junction opened in 2000. Over the years, serious consideration has been given to proposals to take Tramlink to Tooting, Sutton, Streatham, Purley and Crystal Palace and a large number of other extensions have been proposed including Bromley, Lewisham, Coulsdon, Brixton and Kingston-upon-Thames. Transport for London undertook a pre-feasibility study on Tramlink extensions in 2002 including routes from Wimbledon to Sutton via Morden, Sutton to Tooting Broadway via Mitcham and Purley to Streatham via Croydon.

Proposals were also mooted for an East London Transit scheme which somehow became a "bus rapid transit" scheme which was supposed to be convertible to trams later.

The success of the Croydon scheme was followed by proposals by the mayor/Greater London Assembly for a Cross River Transit from Camden Town and Kings Cross to Peckham

and Brixton (later it was suggested extending it to Streatham), a 20km West London Transit from Uxbridge to Shepherds Bush, a Croydon Tramlink extension to Crystal Palace and for trams in Docklands.

The West London Transit was abandoned by mayor Ken Livingstone in 2007 after opposition from Ealing Borough Council and extraordinary claims that Crossrail would free up enough road capacity to improve local bus services. The Cross River Tram got much further down the tracks but was abandoned by mayor Boris Johnson in 2008 on cost grounds, although he admitted it had “much merit”. He later abandoned the Tramlink Crystal Palace extension for the same reason and suggested there would be no Tramlink extensions for 10 years.

The DLR has been upgraded and the route extended from Canning Town to Stratford International. There have been proposals for an extension from Gallions Reach to Barking Riverside and Dagenham Dock. There have also been long-term suggestions of an in-tunnel extension to the former Jubilee Line platforms at Charing Cross or even to Victoria, Euston or Kings Cross. There was an earlier proposal to extend from Lewisham to Beckenham Junction to give a connection with Tramlink, although this is complicated by the design of Lewisham station. But a possible link from Lewisham to Catford was also mooted and in March 2012 a feasibility study by Greenwich Borough Council estimated an extension to Falconwood, requiring a further Thames tunnel would cost around £1bn.

The mayor of London’s transport strategy in 2009 foresaw the DLR extension to Dagenham Dock as a key component of plans for major regeneration at Barking Riverside and possible future extensions in the Thames Gateway. It also granted the possibility of considering future extensions to Tramlink, to be evaluated by TfL.

In September 2011, Merton and Sutton Borough Councils agreed to support plans for a Tramlink extension from Mitcham Junction to Sutton, via Rosehill, with two possible routes as far as Rosehill. A third option, to extend the route northwards to Mitcham town centre was also supported as a longer-term option. In October 2012 the mayor of London commissioned a feasibility study into a Tramlink extension to Sutton. The Mayor of London’s 2018 *Transport Strategy*⁴ proposes this extension to Sutton and potentially beyond. It also says consideration will be given to extending the network where this would enable the provision of new homes and jobs.

Greater Manchester

Manchester once had a vast tramway network but it closed by 1949 and Stockport followed suit in 1951. Light rail revival was proposed in the 1980s with plans to take over decrepit heavy rail lines to Bury and Altrincham and link them on-street through the centre of Manchester. The first line, from the centre to Bury, opened in 1991 and the central link and line to Altrincham in 1992. A further line from Cornbrook to Salford Quays and Eccles opened in 2000 bringing the system to 37km.

Plans for a third phase £500m “big bang” extension with new lines to Oldham, Rochdale, Ashton-under-Lyme, Wythenshawe and Manchester Airport were announced in 2000.

In 2002, a Government funding package pledged £520m for the extensions to Oldham and Rochdale, Ashton-under-Lyne and Manchester Airport. A great deal of work was done on them before the Treasury pulled the plug on all the extensions in 2004. The subsequent eruption of anger from local government colleagues in Greater Manchester prompted ministers to think again and later that year part of the funding was reapproved.

Part of the extension to the Airport – a loop via Wythenshawe Hospital -was axed in 2005. In 2006, extensions to Oldham and Rochdale (minus the earlier proposed town centre sections), Droylsden and Chorlton were reapproved, although the Ashton-under-Lyne, East Didsbury and Manchester Airport extensions were not.

Phase 3a, opened in 2013, saw trams taking over the Oldham loop line to Oldham and Rochdale, a line to Droylsden and a line to Chorlton-cum-Hardy. Phase 3b, opened in 2014, involved diverting the Oldham-Rochdale line into the two town centres, extending the Droylsden line to Ashton-under-Lyne and the St Werburgh's Road line to East Didsbury and Manchester Airport. The Second City Centre route opened in 2017. A line to the Trafford Park saw work begin in 2017.

Local authorities in the area have supported a number of possible extensions including Stockport, Middleton, Salford and Stalybridge - although a November 2010 report to GMITA suggested there were no further rail lines suitable for conversion to light rail, so tram-trains would be the best option for further extensions; Stockport was mentioned as a possible destination. Early in 2011, Cheshire East Council agreed to investigate whether it would be possible for Metrolink to be extended to the area.

The *Greater Manchester Strategy 2040 Draft Delivery Plan (2020-2025)*⁵ notes the forthcoming completion of the Metrolink Trafford Park line by 2020 and the bid to extend it to the Airport Terminal 2, the first stage of an extension towards HS2 and Wythenshawe Hospital. Metrolink will be repositioned in a new Piccadilly Station and a city centre Metrolink tunnel is being looked at.

GMCA is also looking at tram-train technology on several routes. The *Plan* is, however, weaker than earlier studies for Greater Manchester, as is shown by proposals for “bus rapid transit” on a number of corridors. If they are suitable for BRT, they are suitable for light rail so presumably the consideration here is initial capital cost, even at the cost of a much inferior facility.

Kingston upon Hull

Hull's electric tramway closed in 1945. An extensive light rail scheme for the city was proposed by two BBC Hull presenters in 2003. There was also a proposal for an elevated monorail.

Leicester

Leicester lost its trams in 1949. In 2002, Leicester City Council was awarded funds for a study of a light rail system in the city.

Merseyside

Liverpool lost its recently modernized trams in 1957 and has since seen a number of unsuccessful plans to bring light rail to Merseyside. In 1977 the electrified suburban railways to Southport, Ormskirk and Kirkby were linked to the line to Hunts Cross and the Wirral. In 1994 a private consortium looked at options for new light rail schemes and put forward a proposal to link the city centre with the airport at Speke. This was opposed by the PTE and eventually rejected in 2003.

In 2002, however, Merseytravel promoted a 19km line to Kirkby and was pledged £170m by the Government. By 2004 this had grown to a three-line system with routes to Whiston Hospital and two routes to the airport. TWA approval was given to Line 1 late in 2004. In 2005, however, the Government effectively pulled the financial plug by seeking assurances that local authorities would guarantee cost over-runs and the councils were subsequently unable to agree. Funding was refused at the end of 2005.

In the autumn of 2009, Liverpool City Council once again called for Line 1 to be built and to transfer funds from an unpopular trunk road project. Local authority leaders agreed to seek funding.

Nottingham

The city of Nottingham lost its trams as early as 1932 but plans for a new light rail system led to the opening of its 14km new line from the centre to Phoenix Park and Hucknall in 2004.

Two new lines, to Clifton and Chilwell, were opened in 2014, despite disagreements among the local authorities. In June 2013, the City Council began discussing the idea of a fourth line through Kimberley to Eastwood; this has drawn strong support from local authorities and there have been proposals to extend it to Langley Mill, the HS2 station at Toton, Staveley and Derby.

The Potteries

Stoke-on-Trent's trams closed in 1928. Stoke City Council's 2000 local transport plan proposed a light rail feasibility study.

Reading/Wokingham

Not everyone identifies this area as a true conurbation, but it is an area of more-or-less continuous urban development stretching from Tilehurst in the west, through Caversham and Reading, via Woodley, Earley and Winnersh to Wokingham and it would certainly fit most definitions of a conurbation. Indeed, it is little separated from Bracknell and the whole area has a huge population. Much of it, however, outside Reading especially, is low-density post-war sprawl and thus difficult to serve economically by sustainable transit. But parts of the area, notably Reading which lost its own trams in 1939, is extremely suitable and,

although no recent rail-based transit schemes for the conurbation have been identified, there are certainly opportunities.

South Hampshire/Portsmouth/Southampton

Portsmouth's trams ceased operations in 1936 while Southampton's survived until 1949. Hampshire County Council and Portsmouth City Council put forward plans in 2004 for linking Portsmouth with Gosport and Fareham by a 14km light rail line passing under Portsmouth Harbour in a tunnel and using a disused rail alignment to Fareham. Powers were obtained and detailed planning commenced. Later extensions were mooted from Fareham to Southampton and Portsmouth to Waterlooville.

The scheme was brought to an abrupt halt when the Government withdrew the offer of funding in 2004. The local authorities submitted a revised bid later that year but were unsuccessful and powers lapsed. The scheme was formally abandoned in 2006. Plans for a "guided busway" along the Fareham-Gosport section pursued instead. In 2011 the possibility of using light rail vehicles on the Portsmouth to Southampton railway line was raised. Heavy rail trains would be diverted via Eastleigh to serve Southampton Airport.

Solent Local Enterprise Partnership initiated a study of a Solent Metro scheme in 2017, following a report that traffic congestion is costing the Hampshire economy £400m a year. Phase one of the "Solent Metro" network would have seen trams run from Eastleigh past the Airport, down to a new station at Southampton St Mary's, on to an interchange at Royal Pier, then back up to Westquay and Southampton Central station. The plan also envisaged the network - which involved tram-trains and light rail - being extended west to Romsey and from there back to Eastleigh, and eastwards to Segensworth. A spur line heading down the Waterside to Marchwood could also have been added. The imaginative scheme failed to secure support, however.

In its place the Three Rivers Rail Partnership, a joint body of local authorities, the community and the rail industry, is proposing new services on the existing heavy rail network, to provide a 30 minute service on a loop between Eastleigh, Southampton and Fareham and back to Fareham. The scheme would obviously be desirable but falls well short of the benefits a comprehensive light rail system could secure.

South Yorkshire/Sheffield

Sheffield lost its 48-mile tramway network by 1960. Plans for light rail began in the 1980s and the Sheffield Supertram network opened in 1994-5. It now has a 29km network with lines from the city centre to Middlewood and Malin Bridge, Halfway and Herdings Park and Meadowhall Interchange.

A number of proposals have been made to extend the system over the years. In 2002, Sheffield City Council proposed doubling the system's route mileage to around 60km, although no specific routes were cited. Extensions to Dore, Ranmoor, Hellaby and

Rotherham were discussed. In 2003 extensions to Deepcar and Stocksbridge were ruled too expensive and local politicians continued to argue over possible extensions.

Routes to Rotherham Parkgate and Dore received public support in 2004, and one to Ranmoor was also proposed. The PTA scaled down the plans in 2004 to a route to Rotherham Parkgate and another to Hallamshire Hospital and Sheffield University. Funding for these was turned down by the Government and, as a result in 2008, two BRT routes were proposed between Sheffield and Rotherham and attracted favourable mention from the Government. The PTE, however, reiterated support for a new tram strategy.

Subsequently, the Department for Transport announced a trial of tram-train services on the Sheffield-Penistone-Huddersfield line and a second phase using Supertram tracks as far as Meadowhall South and then NR tracks from Sheffield to Rotherham. In 2009 it was proposed to drop phase one and proceed with the Rotherham option. Accordingly, in March 2011 the DfT agreed funding for South Yorkshire PTE, Northern Rail and Network Rail for further business-case and project work for the scheme to connect Sheffield's tram system to Rotherham Central Station and the Parkgate Retail Park, with a short connecting line from Meadowhall on to the main line. The scheme uses Supertram tracks from central Sheffield to Meadowhall, then 400m of new track before running on Network Rail lines to Rotherham. It was a UK pioneer of tram-train and saw long delays while technical issues were agreed, before it opened in 2018.

Teesside/Middlesbrough

Middlesbrough lost its electric tramway in 1934. Plans for a light rail system on Teesside go back to the 1980s and a scheme called Cleveland Advanced Transit was dropped in the early 1990s thanks to misguided claims that guided bus could achieve the benefits at lower cost. In 2001 Tees Valley authorities asked consultants to look at light rail and in 2003, the authorities proposed a metro system linking Darlington to Stockton, Middlesbrough and Redcar using existing rail lines, with possible extensions to Hartlepool and Nunthorpe. More recent thinking on the "Tees Valley Metro" project would see rail services between Darlington and Middlesbrough, Saltburn, Hartlepool and Nunthorpe improved, with a possibility of tram-trains in the longer term.

A business plan was submitted to the DfT in 2006 converting the Darlington-Middlesbrough-Saltburn service to tram-train operation. Later extensions to Hartlepool and Nunthorpe were mooted.

Tyne & Wear

Newcastle's trams closed in 1950, Gateshead's in 1951 and Sunderland's in 1954. The Tyne & Wear Metro originally opened in 1980 with lines from the centre of Newcastle to Bank Foot, Whitley Bay via both Benton and Wallsend and South Shields. More recent extensions took it to Newcastle Airport and to Sunderland and South Hylton. In February 2010 the Government announced £580m would be spent on updating the existing system, including track, signalling, communications and stations and subsidy up to 2019.

Considerable work over many years has been done on proposals to convert the heavy rail line to Blyth and Ashington to Metro use. Other proposals suggested converting former lines to Blackhill and Consett via the Derwent Valley or part of the Leamside line as far as Washington.

In 2001 Nexus published a document called *Towards 2016* which recommended new tram lines for the county to supplement the Metro. These would have seen up to 10 new routes, predominantly to the south, west and north-west of the conurbation. A subsequent Project Orpheus identified nine new routes (out of 29 looked at) (as well as a cable car and bus links) and projected the first opening in 2008.

The routes identified were:-

- Four Lane Ends to Killingworth/Cramlington;
- central Newcastle to Denton to Walbottle and/or Metrocentre;
- central Newcastle to Walker;
- Gateshead to Metrocentre;
- Gateshead to Team Valley;
- Gateshead to Washington via Wrekenton;
- South Shields to Sunderland via Boldon;
- Sunderland to Ryhope via Doxford Park;
- Sunderland to Seaham via coast.

The *Metro Strategy 2030* consultation⁶ in 2014 also identified a number of potential extensions, some including on-street running:-

- Sunderland to Seaham;
- South Hylton-Washington-Pelaw;
- Cobalt Link (connecting both arms of the North Tyneside loop);
- Metrocentre and Team Valley;
- West Newcastle;
- South Shields to Doxford Park via Sunderland city centre.

West Midlands/Birmingham

Birmingham and the towns in the West Midlands once had a huge network of tramways but the last to go was Birmingham's in 1953. Plans for a new light rail system in the West Midlands go back to the 1980s and the PTA sought plans for a Birmingham-Wolverhampton route mostly using abandoned rail alignment in 1988. This 20km line eventually opened in 1999.

During this period powers were sought for further lines. One would have run from Birmingham Five Ways (west of the centre) under the centre and out via Aston, the Bromford Estate to the NEC and Airport (with short branches to Castle Vale and Chelmsley Wood). A third line would have run from Wolverhampton to Walsall and Dudley. Funding challenges subsequently reduced these ambitions to an on-street extension from the centre to Edgbaston and a branch from Wednesbury to Merry Hill, plus the proposed Wolverhampton loop.

The 2002 local transport plan committed itself to three new lines, those from Five Ways to Oldbury, from Birmingham city centre to the airport via Coventry Road and from Kingstanding and Great Barr to Selly Oak via Walsall Road. Later that year the PTE applied for TWA approval for the lines from Snow Hill to Five Ways and Wednesbury and Brierley Hill, hoping to begin work in 2005 and complete them in 2007.

In 2003 Centro proposed an £875m Metro expansion scheme including new lines to:-

- the Five Ws Route - Wolverhampton city centre loop via Wednesfield, Willenhall and Walsall connecting with Line One at Wednesbury;
- Birmingham east-west route from Hagley Road via the city centre and the A45 corridor to Birmingham International Airport;
- Bartley Green, from the Hagley Road route via the Queen Elizabeth Hospital and Birmingham University;
- Birmingham city centre to the University of Central England at Perry Barr via the A34 corridor, Scott Arms and the M6;
- the eastside spur from Birmingham city centre past Millennium Point to Duddeston.

There was a dispute as to whether the Five Ways extension should be surface or in tunnel and the Bartley Green line was dropped after public opposition. TWA approval for the extension from Snow Hill to Five Ways (on the surface) was received in 2005.

In 2008, Wolverhampton City Council proposed extending Midland Metro into the suburbs of the city, possibly to Tettenhall, Penn and along the Stafford Road.

In March 2012, Centro announced a memorandum of understanding with Birmingham City Council to facilitate future extensions. The Council expressed the hope that, once the city centre extension was complete, a metro system serving the whole West Midlands could be considered. Centro also announced it was planning an extension through Dudley, part of a line between Wednesbury and Dudley Port with 15 new stops. In April 2013 it announced plans for an extension to Wolverhampton city centre and in June it announced an investigation into converting the Walsall to Wolverhampton railway to allow tram-trains to operate and sought comments on a new city centre line to Centenary Square.

The route from Snow Hill to New Street Station opened in 2016. Other routes still under development are from the centre to Five Ways and Edgbaston and to the international airport and Coventry and the Wolverhampton Loop.

West Yorkshire/Leeds

Leeds lost its tramway in 1959 and, as early as 1977, a study proposed a revival. In the 1990s, plans were laid for a three lines totalling 28km from the city centre to Stourton and Tingley, to Weetwood and to Whinmoor which were intended to be the start of a larger network. Plans were also suggested for lines to Bradford via Armley, Bramley and Stanningley and Alwoodley. Central government funding for preparatory work was approved in 2002 and advance works began in 2003. But rising estimates prompted the plans to be trimmed to the Line 1 route to Stourton. Then the whole scheme was axed by the Treasury in 2004. The promoters showed costs could be reduced and the scheme was

officially relaunched late in 2004, but the Government remained stubbornly opposed and put an end to the scheme at the end of 2005, suggesting buses as an alternative, despite some £40m of public money having already been spent. This went to waste.

The local authorities later considered schemes for trolleybuses or bus improvements but the trolleybus proposal was rejected after a public inquiry in 2016. Following the rejection, the Government allocated £173m to work on transit in Leeds but this was not used for light rail proposals, so the urgent need for more rail-based public transport in West Yorkshire continues to be pressed.

Other cities

As well as the proposals in the major (250,000+) conurbations, a number of smaller towns and cities are considering light rail schemes, some of them involving the local authority and some community groups.

For instance, a local group, Bath Trams, has proposed introduction of four tram routes in Bath, while in Bristol another group has proposed using the Ashton Gate to Temple Meads preserved route as the first section of a rapid transit network for the city.

The West of England Combined Authority has allocated £1.95m for a mass transit study to develop feasibility and business cases for a system in Bristol with a line extending to Bath. A further £450,000 was secured to investigate the Bath mass transit study.

In the Thames Estuary, Thames Gateway Tramlink Ltd is proposing a light rail link between Dartford, Gravesend, Ebbsfleet International and Grays. The proposal would have a north-south link between north Kent and Thurrock involving a 1.2km submerged tunnel and an east-west link between Dartford and Gravesend. Further extensions could be possible to Tilbury, Lakeside etc..

Cambridge had the opportunity to reopen the defunct railway between the city and St Ives, with the possibility of extending it along the former track to Huntingdon and Kettering. A very valuable alternative considered subsequently would have been to reopen the Cambridge-St Ives section as the first line in a light rail system for the city. Bizarrely, the local authorities rejected this opportunity in favour of a ruinously expensive and largely pointless guided busway, a technology most other countries rejected long ago. More recently a local community group, Cambridge Connect, proposed a light rail system for the city, with the first phase being a 22km line from Girton Interchange to Granta Park, the second an extension from Girton Interchange to Cambourne, the third to a park & ride on the A14 and a fourth to Histon Road, Cambridge Regional College, the Science Park and Milton Road. Later extensions could have gone to Haverhill, Waterbeach, St Neots, Burwell and Huntingdon. The local authorities, having failed to learn the guided busway lesson are, however, pursuing a fresh, different type of guided bus scheme for the city.

There are a number of other well-thought-out and practicable schemes being put forward by community groups, academics etc., some of which have local authority support. They are

evidence of a strong and fast-growing enthusiasm for light rail in the community, local government, the community and wider society.

So, is there evidence of an appetite to build light rail? Plainly yes.

Question 4 *What would the environmental, economic and congestion benefits be?*

For many decades there has been a widespread and damaging belief in the UK that most (or even, in extreme cases, all) urban public transport need can be met by buses. Buses do provide flexible public transit in a wide range of locations from city centres to sparsely populated countryside and have an important role to play now and in the future in all of them. They can also be provided at a relatively low initial capital cost compared to rail-based alternatives. But rail-based technologies offer substantial advantages both operationally and environmentally for many types of public transport journey, especially in major conurbations.

Rail-based urban transport systems can cater for a wide range of passenger levels and can range from “ultra-light” low cost systems, through tramways and light rail to light and heavy metro. There are no hard and fast distinctions between these various forms and a single system may combine the characteristics of, say, street tramway and light rail or might develop to a higher capacity form over time.

The relative benefits of rail-based urban transit systems include:-

- rail vehicles powered by mains or battery electricity or hydrogen emit no pollution at the point of consumption, improving urban air quality;
- electrically powered rail vehicles can be powered by non-fossil sources;
- steel-wheeled vehicles offer much lower rolling resistance than pneumatic-tyred, significantly reducing energy consumption and carbon emissions;
- steel-wheeled vehicles do not emit harmful micro-particles in the way pneumatic tyres do;
- electrically powered vehicles can recover energy through regenerative braking;
- rail-based vehicles offer a much smoother ride than road-based;
- rail-based transport systems can operate underground, at grade or on elevated alignments whilst trams can additionally operate on streets shared with motor vehicles and/or pedestrians;
- rail systems provide a higher carrying capacity than bus-based systems and can be upgraded if demand increases;
- although rail vehicles generally have a higher capital cost than buses, they have much longer lives and are thus more economical in the long term;
- rail systems are much more effective at getting people out of their cars than any bus-based system;
- rail systems can maintain extremely high timetable reliability;
- rail systems can provide a high level of accessibility.

There is a growing myth that a shift of our road vehicles to electricity will solve the huge environmental impact of petrol or diesel vehicles. But all forms of electricity generation

involve substantial impacts on the environment; renewables may impose much less impact, but they are not without damage. We urgently need to use *less* energy in all sectors, especially transport.

And while a shift of urban passenger movement from cars to buses would be environmentally beneficial, it does not solve all the problems. Diesel powered buses emit air pollutants as well as greenhouse gases (GHGs), but while electric buses could potentially reduce or eliminate GHGs, all pneumatic tyred vehicles emit a level of particulate pollution from their brakes and, especially, their tyres. A steel-wheel-on-steel-rail vehicle will typically consume around one-sixth as much energy as a pneumatic-tyred-on-roadway vehicle, which is the sort of improvement we should be striving for, however the electricity is generated or the hydrogen manufactured.

The USA, like the UK, has invested a lot of its carbon reduction effort on improving the quality of its new buildings. Undoubtedly this will have to form part of any low-carbon strategy, but a US study showed that achieving really big carbon reductions will require urban rail-based transit and that only by providing it more or less universally will we reach the 80% minimum emission reduction by 2050 previously recommended. The peer-reviewed study, *Location Efficiency and Housing Type – Boiling it Down to BTUs*⁷, was commissioned by the US Environmental Protection Agency from Jonathan Rose Companies. It contrasts energy use in conventional, automobile-dependent locations with more location-efficient, transit-oriented locations, multi-family housing construction with single-family detached and semi-detached houses and conventional cars and homes with their energy-efficient counterparts (such as “Energy Star” homes and hybrid cars). The study found that housing type and location, along with energy-use features of homes and vehicles, all have an important role to play in achieving greater energy efficiency – but the biggest advantages were seen in the move from car-dependent locations to transit-oriented ones.

Thus a detached house lacking modern energy-efficiency measures in a car-dependent suburban location would use around 240m BTus (253GW) a year on domestic energy and transportation. That could be reduced to 158m BTus (167GW) by applying energy-efficiency to the building and replacing its cars with hybrids. On the other hand, moving that household to an equally poorly heated and insulated home and leaving it with its gas-guzzlers, but locating it in a better, transit-oriented location can reduce that annual energy consumption to 147m BTus (155GW). Combine the two measures and you reduce its consumption to 110m BTus (116GW). This reduces its energy consumption by 55%.

This is still a long way short of the 100% carbon reduction by 2050 regarded by current science as the minimum necessary to prevent catastrophic climate change. But it clearly demonstrates two things:-

- getting people out of cars and on to transit is an even better way of reducing greenhouse emissions than greening buildings;
- getting everyone who lives in urban and suburban areas out of cars and on to transit will be necessary to meet climate targets.

Question 5 *What impact would it have on jobs?*

The 2011 DfT report accepted that high-quality transit is essential to city prosperity and said: “light rail has the potential to provide high capacity transport into and around major conurbations to reduce congestion, support growth and improve regeneration opportunities”. There are numerous examples of this in the UK and many, many more in the rest of the world. However, the report pointed out this was ill-quantified in the UK, with one scheme being singled out as lacking any established methodology for identifying regeneration benefits or quantifying job creation etc.. But a later study by Steer Davies Gleave on behalf of the Passenger Transport Executive Group suggested that light rail can improve the image of a city and contribute to economic regeneration and that installing a new tram system could provide a visible, permanent way of showing that an area is being invested in for the future.

A 2011 report by Smart Growth America, *Transportation Funding and Job Creation*⁸, looked at the results of America’s stimulus programme spending on various transport schemes and their employment effects. This compared road maintenance, road building, non-motorized projects including pedestrian, cycling and streetscape, public transport and others, including freight, maritime and aviation. It found that states had spent only 1.7% (\$462.8m) of their stimulus capital on public transport, with the bulk spent repairing roads and bridges and significant sums for road building. But every dollar spent on public transportation yielded 70% more employment than on roads. Road and bridge repair did produce temporary and lower-paid jobs, but public transport produced 16% more jobs per dollar - and 31% more than road building.

A more recent report by the Center for Transit Oriented Development (CTOD), *Transit-Oriented Development and Employment*⁹, charted how employment decentralization in America over the last 60 years had generated both urban sprawl and traffic mileage, as well as swelling infrastructure costs and destroying farmland and biodiversity. It had also, in an era of rising fuel prices, left many American commuters having to devote ever larger proportions of their income to commuting. A second, concurrent, CTOD report, *Transit and Regional Economic Development*, analysed how employers are attracted to transit-rich locations and examines employment clusters near transit.

A 2013 report by Reconnecting America with Urban Habitat showed how transit can link low-income communities with career opportunities through a study in San Francisco’s Bay Area. *Moving to Work in the Bay Area*¹⁰ found that, while low-income people in the area face multiple barriers to career advancement, transit access can help to overcome these barriers.

Question 6 *Does light rail open up new housing or business developments or improve the urban fabric of the area?*

Yes.

Question 7 What can we learn from the experience of other countries in adopting new systems?

Light rail systems are widely installed in cities (and elsewhere) around the world and the UK lags behind many countries in this respect. Where the UK abandoned its extensive tramway networks in the 40 years following the Great War, many other countries retained and modernized them. Many of the cities that lacked them installed systems in the late 20th or early 21st centuries and large numbers of European cities enjoy light rail systems.

Light Rail Systems in Western Europe

Country	Population (millions)	Cities with 1 st Generation Systems	Cities with 2 nd Generation Systems	Cities with Systems under Construction or Detailed Planning
Austria	8.8	5	1	0
Belgium	11.4	5	0	1
Denmark	5.8	0	0	3
Finland	5.5	1		1
France	67.1			
Germany	82.8			
Italy	60.1	4	5	0
Luxembourg	0.6	0	1	0
Netherlands	17.1	3	1	0
Norway	5.3	2	1	
Portugal	10.3	1	2	0
Spain	46.6			
Sweden	10.0	3		
Switzerland	8.4	4	1	0

Excludes heritage systems

Extensive use of light rail and tram technology is most often associated with western European countries. However, a very considerable amount of light rail construction has also taken place in English-speaking countries around the world.

This is particularly notable in the USA. Whilst America is widely perceived as dominated by the private car, with its cities hollowed-out, the Smart Growth movement, incorporating the “transit-oriented development” (TOD) approach has seen the inner-city problems of the late 20th century put into reverse. Light rail has been an essential part of this process in a fast-growing number of US cities and is seen as an essential tool for reducing car dependency and for encouraging urban regeneration.

Light Rail Systems in the English Speaking World

Country	Population (millions)	Cities with Operational 1 st Generation Systems (a)	Cities with Operational Light Metro Systems (b)	Cities with Light Rail/Tram Systems	Cities with Heritage Tram Systems (c)	Cities Constructing Systems or in Detailed Planning
Australia	24.6	2	0	2	0	3
Canada	36.7	1	2	2	0	6(d)
Ireland	4.8	0	0	1	0	0
New Zealand	4.8	0	0	0	1	1
USA	325.7	7	2	26	10	7
England	54.8	1	2	5	1	0
Rest of the UK		0	0	1	0	1(e)

Notes

Some cities have more than one distinct system, but they are not counted separately here.

(a) Systems existing before 1980; most of these have also seen significant extensions in recent years.

(b) Systems without any street-level trackage, e.g. Tyne & Wear Metro or Docklands Light Railway (excludes airport people-movers).

(c) Short-distance (1-10km) new build systems using restored or replica rolling stock in regular public-transport service, typically functioning as city-centre distributors (excludes museum lines).

(d) Excludes Surrey BC, where an authorised new tram system may instead take the form of an extension to the existing Vancouver light metro.

(e) Cardiff Bay tram-train

Question 8 *What issues have helped progress light rail schemes or acted as barriers to their development?*

With the gathering climate and biodiversity emergencies, it is now clear that the 20th century paradigm of development – essentially building low-density development at remote, car-dependent sites - is a major threat to our future well-being and, indeed, our survival.

Happily there are alternatives. The Transit-Oriented-Development (TOD) approach was pioneered in North America in the 1980s and reflects best practice in the rest of the world. The challenges of a world where more people are living in cities, where those cities' environment is being severely degraded by cars and lorries yet where people still need good mobility is well spelled out in Chapter 2 of the consultation paper. However, it doesn't make clear that we need to adopt TOD as the basic paradigm of development in the 21st century if those challenges are to be met.

The Smart Growth approach includes a strong element of Transit-Oriented-Development. It is opposed to sprawl as this destroys the ecosystem services that greenfield land provides and increases pressure for travel by car. It supports appropriate development densities to make best use of our scarce building land. It demands that urban development be suitable for walkers and cyclists. It protects high streets, heritage and biodiversity. Light rail is a key element of it.

Question 9 *What and where are the future opportunities here in England for new light rail systems or alternatives?*

Effectively, no city or conurbation in England with a population above 250,000 should be without a light rail system alongside its heavy rail, metro and buses. For communities of this size there are no barriers except finance, local government disinterest and central government hostility.

For smaller communities there are still many opportunities and the new technologies and equipment becoming available make provision economically and technically viable.

Question 10 *What are the key issues that are preventing light rail schemes from being delivered?*

The greatest obstacle to wider take-up of light rail schemes for most of the past two decades has undoubtedly been central government hostility. As we have seen, in 2000 a Government policy paper proposed: “up to 25 new rapid transit lines in major cities and conurbations, more than doubling light rail use”.

The sector responded with well-developed and practicable schemes but most of its efforts were wasted, along with tens of millions of pounds which had already been spent, when the Government effectively axed virtually all light rail development in England just four years later.

Since that time there have been brief periods when the hostility – from, it must be said, both HM Treasury and the Department for Transport – has diminished somewhat, and several lines (mostly extensions to existing systems) have been delivered.

However, the suspicion and hostility is still there, even within your apparently more sympathetic consultation paper. The statement in paragraph 2.10 that: “it is now clear that a minimum ridership (>3,000 pass/hour/direction) is necessary to ensure cost-effectiveness” is even contradicted within the same paper by paragraph 5.2 which says: “a ridership of 2,500 to 3,000 passengers per hour in each direction is necessary if a scheme is to be cost-effective”.

Yet both statements are demonstrably false. Such very high ridership needs are very far from being “clear”, as is the other statement in paragraph 2.10 that: “in most contexts, light rail can only be implemented successfully if it is designed from the outset as part of a wider

system which is integrated with other public transport modes". Of course, all public transport schemes should be implemented, as far as possible, with other transport modes. There is nothing unique about light rail in this context; this is simply a statement inserted to support future cases against light rail and evidence of our contention about central government hostility. Taken literally, it would mean light rail would only be viable where there was the certainty of six million passenger journeys a year, on a route currently supporting a packed bus every minute. Clearly this is ridiculous.

The experience of the early 2000s shows there is a powerful appetite for light rail in local government and in city communities. The sector is capable of designing and delivering first-class systems and recent technological advances open new possibilities and reduce costs. But while public money gets poured into highway development and heavy rail, there is no national programme for light rail, despite its huge ability to regenerate cities, to stimulate their economies and to reduce pressure for greenfield development beyond their boundaries.

So Mr Norman's statement that: "It is clear from the evidence that light rail (and other forms of rapid transit system) continues to play a very useful role in many communities, and has the potential to play a still greater role in future"¹¹ is extremely welcome. But we have been here before and the key thing is to ensure central government retains its enthusiasm for light rail and does not switch to what has so often been downright hostility.

Another key issue is the belief in some quarters that bus-based alternatives can deliver some, or even all, of the benefits of light rail at lower cost. Alternatives proposed include "quality bus" – substantial improvements in services and facilities in corridors, "bus rapid transit" (BRT) - articulated buses running mostly on their own reservation and "guided bus" – buses running on (and beyond) specially prepared concrete guideways. How far such alternatives can succeed in securing the modal shift desired by deceiving people into believing they are getting "fixed link" provision is a matter of debate, but there is little or no doubt they lag behind the proven ability of light rail to do so.

Quality bus and bus-rapid-transit will have lower initial capital costs than light rail when they use existing roads, though recent experience with guided bus suggests it is likely to be more expensive. BRT can be used to offer at least the impression of a fixed link and this can later be converted to light rail so long as they are designed with this in mind; so both quality bus and BRT can be a way of rapidly providing moderately improved public transport in the short-term. But where they require a dedicated right of way, the cost can approach, or even exceed, that of light rail. Taken together with shorter vehicle life, the cost over, say, a 50-year period can exceed that of a light rail system. Any pneumatic-tyred vehicle will offer a very much less comfortable ride and consume many times as much energy as a steel-wheeled one.

The *Green Light for Light Rail* report agreed light rail could secure a modal shift from less sustainable modes plus economic growth and regeneration, reduce carbon emissions, traffic congestion and air pollution and increase mobility. Light rail can secure this modal shift because:-

- fixed systems cannot change easily so users can get to know them and understand the system easily.;
- permanence encourages people to plan their lives around the system with confidence - they will make transport choices based on its availability;
- it encourages businesses to develop along the routes, which in turn concentrates development, so it can be more effectively served by public transport;
- the system can be seen and advertises itself.

Question 11 *How can we deliver systems within a budget as has happened?*

There are now numerous examples, both in the UK and overseas, of new systems and extensions being delivered on-time and on-budget. New technology is reducing costs all the time.

Another key issue is certainty of funding. The millions of pounds wasted as a result of abandonment of the Leeds system and the Tramlink extension to Crystal Palace are the most obvious aspect, but it goes much deeper than this.

What is plainly needed is a “light rail pipeline” to match the programme of large projects supported by the National Infrastructure Commission, of highway building supported by Highways England or of heavy rail projects under the National Rail Enhancement Plan. Whitehall opponents of light rail schemes make much of the capital cost of the initial system, but the fact this is considerably higher than many trunk road schemes (which enjoy such a programme) is evidence of the need for a pipeline, not an argument against. Indeed, it is an argument in favour of drastically curbing the trunk road programme.

As it stands, local authorities (already suffering the dire effects of under-funding), professional people or the light rail supply industry can have no confidence in continuity of finance and this is even true at the point preliminary works have begun. Small wonder it is so difficult to get local authorities to commit to schemes. Some sceptics even believe this is the objective; establishment of an ongoing national programme would overcome such doubts.

Lack of national finance means there are never any “shovel ready” schemes prepared when finance is available.

We strongly recommend, therefore, establishment of a rolling national funding programme for light rail schemes, with the objective of eventually securing a light-rail or metro network in every major conurbation.

Question 12 *What are the key lessons from Europe in progressing light rail and in what way are these different to the U.K.?*

The key lesson is a sympathetic central government.

Question 13 *What does the future of light rail look like with new generation transport schemes coming forward?*

The industry is best placed to answer this question.

Question 14 *How do you see light rail aligning with new initiatives such as autonomous vehicles; cycling and walking; and wider Mobility As A Service initiatives?*

Light rail vehicles have been happily and safely mixing with pedestrians and cyclists now for well over a century, and while the hazards for cyclists posed by the rails exist, they are much exaggerated.

It is hard to see why autonomous vehicles should even be a consideration in this context. They wastefully occupy road and parking space in exactly the same way as driven vehicles and create exactly the same levels of pollution, congestion and accidents. A major advantage of light rail is to reduce or eliminate the need for such vehicles.

Question 15 *How can promoters leverage funding from sources beyond central Government?*

No comment.

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