

for Town Planning Review Special Issue 'Has Rail Saved the City ?'

Crossrail: the slow route to London's regional express railway

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bio

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abstract

The Crossrail project was inaugurated in 2010 and is due for completion in 2018, allowing regional trains to run through rail tunnels deep under London and out the other side instead of terminating their journeys at one of the city's nineteenth-century termini. The long-established S-Bahn systems of German cities and the Parisian RER have proved the value of regional urban express networks as infrastructures that facilitate compact, polycentric metropolitan development. London is a very late comer to the RER concept, yet the potential for joining up its radial routes was recognized more than a century ago. Many different combinations have been promoted, none until now has left the drawing-board. The paper explores the long, unsuccessful history of cross-London rail planning, highlighting the significance of comparison with Paris, and drawing lessons for the contribution of rail to 'save the city'.

At the time of writing, Europe's largest civil engineering project is taking place under London. Conspicuous in their fluorescent orange overalls, an army of more than 10,000 is working continuously across forty construction sites to construct 42 kilometres of tunnels and subterranean ventilation shafts and stations for the new cross-London railway. Like the well-established Réseau Express Régional of Paris, Crossrail will have a transformative effect, boosting London's rail capacity by 10%, creating express connections between Docklands, the City, the West End and Heathrow, and alleviating the daily routine of commuters who alight and board trains at the busy terminal stations of Paddington, Liverpool Street, London Bridge, Cannon Street and Charing Cross. When it opens in 2018 the line is expected to carry half a million passengers a day, and Londoners will wonder how they ever managed without it.

Yet Crossrail was a precarious project that had lurked for decades on the margins of transport policy and was regarded by decision-makers as too difficult to deliver. The decision to proceed was reached only hesitantly and after multiple set-backs. The present paper explores the long history of abortive proposals for cross-London rail links on a variety of alignments. Much has been written about this project as a civil engineering achievement. In the historical perspective we may also see it as a policy-making accomplishment - an example of transport planning eventually made good.

No Grand Central - London's railway termini

The problem Crossrail sets out to solve was already visible in the railway map of mid-nineteenth century London. Each of the private companies operated its own railway terminus. Though they were brought as close as possible to the geographical centre, they were held in check by high land values and the resistance of the Crown and other large-scale estate owners to railway intrusion, a factor particularly evident on the north and western sides of town. So London's railway stations took shape in a wide quadrilateral pattern around the central area, as shown in Figure 1.

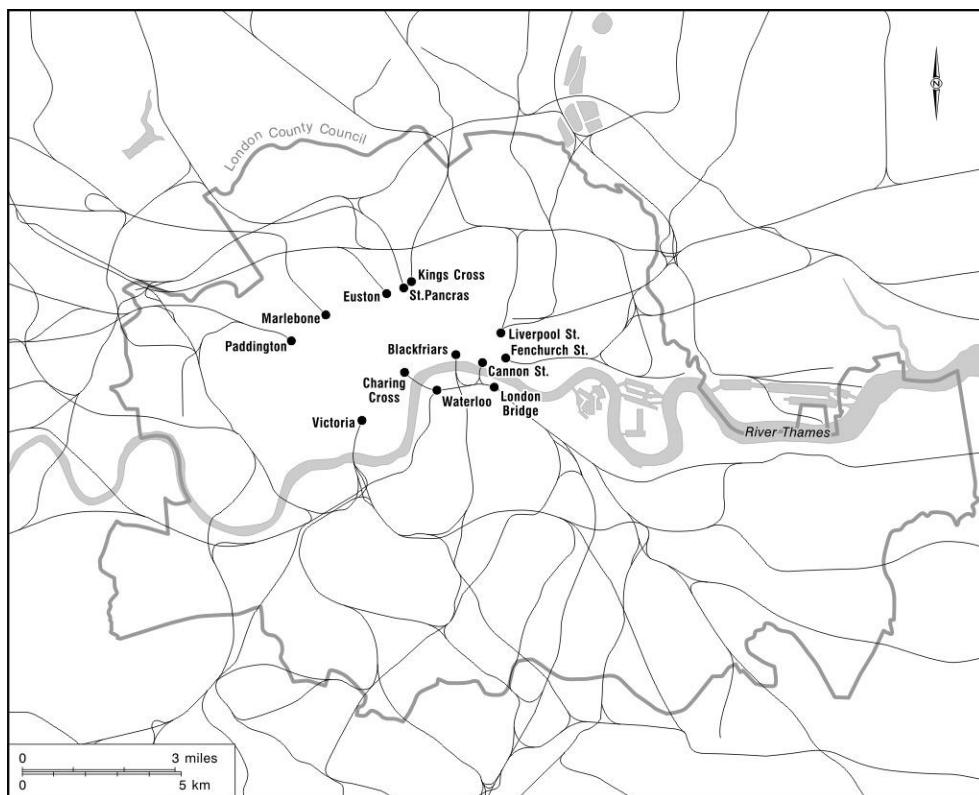


Fig.1 London rail termini, legacy of nineteenth century rivalries

(source: University of Manchester Cartographic Unit)

The original terminals of the early railway age had been even more widely spaced, but companies managed to edge closer: the London and North Western Railway from Chalk Farm down the previously rope-operated slope to Euston ; the Great Eastern from Shoreditch to Liverpool Street; the London & South Western Railway from Nine Elms to Waterloo. Companies with terminals south of the river bridged the Thames to bring them north: the London, Chatham and Dover Railway to Blackfriars and then up to Holborn, the London Brighton & South Coast Railway from London Bridge Station over the river to Cannon Street; the South Eastern Railway to its Charing Cross terminus (those iron bridges would play an important role in subsequent Crossrail history). Meanwhile, in an alternative strategy of penetration, the Great Western collaborated with the Metropolitan Railway in a cut-and-cover excavation to create London's first underground line, opening services from Paddington to Farringdon in January 1863. For all such modifications the spacing of railway termini remained awkward for passengers, especially those whose journeys did not happen to terminate in central London.

In German cities, where dismantled fortifications offered more room for manoeuvre and state coordination of enterprise was better accepted, railway lines could be made to converge onto a *Hauptbahnhof*. Reformers urged that London too needed a Grand Central Station, possibly at Charing Cross. The issue was investigated at length by the House of Lords *Committee on London Railways* but its final report of 1863 went against the 'objectionable' notion of a single unified terminus. Instead the committee seized on the precedents of the newly-opened Metropolitan Line and the soon-to be opened District Line, proposing they be extended to form an Inner Circuit linking nearly all the principal railway termini

together by a separate and independent underground system. (1863 para 11). A Joint Committee of the Lords and Commons returned to this idea the following year, confirming the importance of the Inner Circle and the need for a complementary Outer Circle Railway with ‘sorting stations’ to facilitate passenger transfer at the intersections with main lines (PP 1864, Galviz 2013).

The outer orbital would not materialize until the twenty-first century but the inner circle subterranean railway connecting terminal stations was an immediate practical possibility which successfully laid the basis for the modern London Underground. These early lines were built by cut-and-cover excavation, allowing highway and rail improvements to be accomplished in one stroke (LCC 1892 4). The tunnels were designed to the gauge of the lines they connected and could be used by standard railway carriages and locomotives, especially once the problem of steam had been resolved by electrification. So the main railway companies saw the new system as a means to extend their penetration. At the turn of the twentieth century Moorgate Station not only had Metropolitan and District Underground services but also suburban trains operated by the Great Northern, Midland and Great Western companies (on widened lines) and direct connection with the Chatham and Dover lines (PP 1901 Q 2917). In an early assertion of metropolitan transport policy, the London County Council established a contrary principle with support from the select Parliamentary committees responsible for deciding upon railway schemes, namely that the ‘internal’ system of electric underground trains should be kept distinct from ‘external’ railways, just as it was in Paris (Galviz 2009, 2013). This position was reinforced by the development of tunnel boring techniques that took the next generation of lines deep into London’s thick stratum

of grey clay. The earliest tube line - now the Bank branch of the Northern Line - had a diameter as tight at 10 foot 2 inches (3.1 metres), and though later tunnels were slightly wider (approximately 3.6 metres) they still defined the tube as categorically distinct from the heavy rail system. In 1905 the Royal Commission on London Traffic concluded from a detailed empirical investigation of passenger flows that the new tube system was working well, confirming the case for keeping the main railway companies outside the central precinct defined by their terminals (PP 1905 63-9).

However, the idea of joining up the heavy rail network persisted. It was high on the agenda of the London Society, founded in 1912 and one of Britain's earliest amenity groups. When concerns about metropolitan transport resurfaced after the First World War, the Society submitted to the Advisory Committee on London Traffic [PP 1920] an independent scheme to widen the tunnels of the underground network so all suburban trains could transfer onto an electrified cross-town system:

‘The trains would continue through to some place just the other side of London, the northern systems interlocking with the south, the east with the west, and vice versa. . .Central suburban termini create unnecessary congestion and they involve changes which cannot of course be avoided altogether at transfer stations, but they can be reduced to a minimum by through services. Very few passengers arrive at present termini who do not continue their journey to some other point’ (Leaning 1921 79-80).

The London Society saw a double benefit here. On the one hand, if railway termini served only long distance trunk-lines their number could be reduced to four:

Paddington, Euston, 'City' (Liverpool Street) and Waterloo. And secondly, putting the railways underground would enable demolition of those iron bridges across the river, which were - as David Gilbert explained in his Banister Fletcher Lecture of 2010 - the amenity society's particular *bête noire* (Gilbert 2011). Sir Aston Webb, eminent architect of the Victoria and Albert Museum and the Admiralty Arch, said of Vauxhall, Hungerford, Blackfriars and Cannon Street bridges that 'none are worthy to remain a moment longer than absolutely necessary while Charing Cross [i.e. Hungerford] Bridge is not worthy to remain at all' (Webb 1921).

For the time being, the London Society's vision fell on stony ground. Despite the amalgamation of competing railway companies into regional monopolies the operators had other priorities in the 1930s than to rationalize their terminal stations. Greater London's network of deep tubes continued to develop and expand under the inspired aegis of the London Passenger Transport Board (LPTB), while the London County Council, to its frustration, was left without powers to coordinate or initiate transport in the central area (LCC 1922). However, as soon as the Second World War revived the opportunity to rethink the railway map, the County Architect J. H. Forshaw and eminent consultant Sir Patrick Abercrombie returned to the agenda of bridge and viaduct removal.

The discussion of railways in the *County of London Plan 1943* is brief but pointed. It focusses on the multiple levels of the network: a grey-scale plate hints at an impressive cartographic analysis by L.F. Richards and Kathleen Smith of overhead lines, embankments, surface level, cuttings, tunnels and tubes. In the central area

the planners' principal concern was with viaducts and river bridges as a hindrance obstructing rational surface development and road and water transport (1943 66). In the suburbs, the plan challenged LPTB's promotion of peripheral tube extensions and the 'pendulum travel' mode of suburban commuting. Its larger vision for the London region implied a shift towards electrification of the main-line rail network and improved cross-platform interchanges between the rail companies and the Underground network. It was noted that the railway companies had already been investigating 'working connections between the surface systems and new deep tubes taking normal gauge rolling stock' (1943 65). Forshaw and Abercrombie underlined the potential of such tunnels to allow demolition of viaducts and removal of cross-river bridges (1943 69-70). They offered a list of railway suggestions including the conversion of the northern half of the Circle Line into a freight route and the transfer of the District Line from LPTB to the Southern Railway. However, the 1943 plan's main recommendation was for a specialist investigation - and this arguably marks the starting point for the history of modern Crossrail.

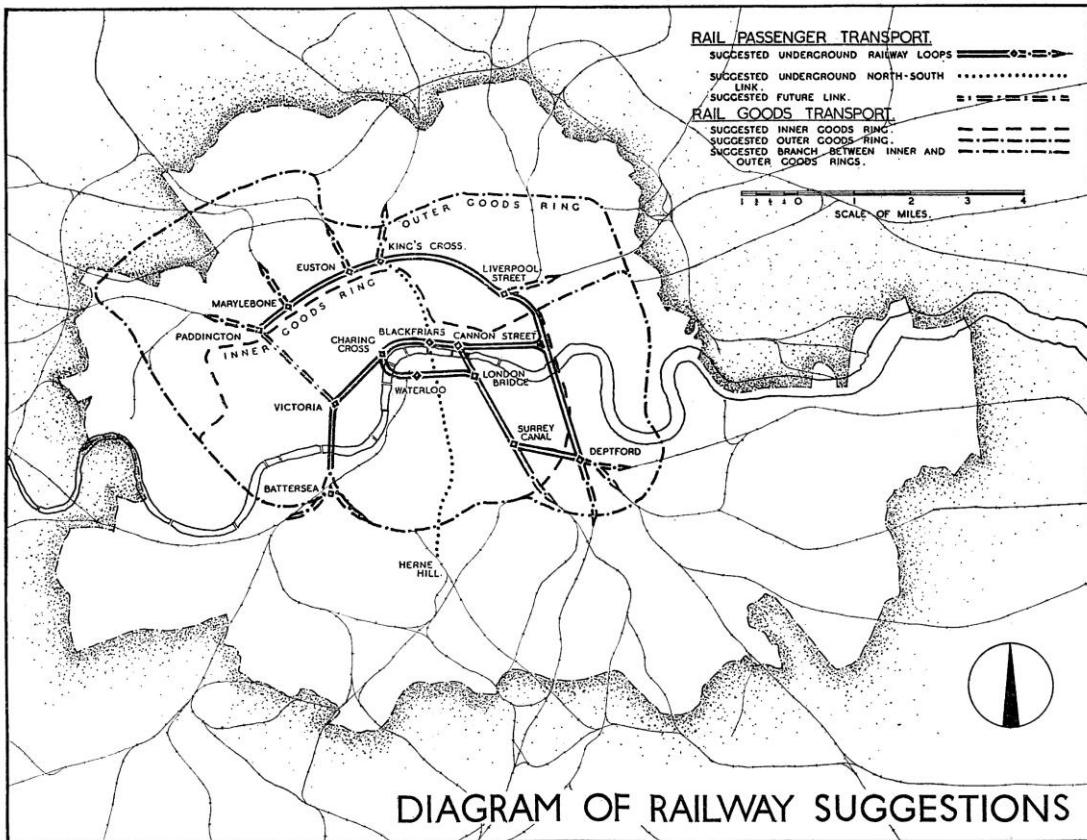


Fig.2 1943 County of London Plan 'Diagram of Railway Suggestions'

(source: Forshaw & Abercrombie, 1943, 68)

The Railway (London Plan) Committee

On February 22nd 1944 the Minister of War Transport set up a Railway (London Plan) Committee, who made a first report to the Minister of Transport in January 1946. Their second, in March 1948, fell into the lap of the British Transport Commission (BTC), tasked by the Attlee Government with national coordination of rail, road and water transport. A Working Party chaired by V. M Barrington-Ward, was asked to review the London railway plan in the light of BTC priorities and postwar data. A combined report of the Committee and the Working Party was submitted to the Minister of Transport in 1949, and subsequently published as a White Paper.

The 1949 analysis takes us into the realm of modern transport planning. Railways are approached from the point of view not of surface obstruction but of trip potential linked to the strategic land use objectives and population redistribution targets of the reconstruction plans. The report prefigures Crossrail, though it doesn't use the word, in its advocacy of 17' (5.2m) diameter railway tunnels, compatible with the loading gauge of most surface lines, and of trains unlike standard suburban stock or London Transport tubes, designed to run through London and out the other side, with 10-carriage units, high passenger capacity, comfortable seating, and sliding doors for rapid discharge and loading.

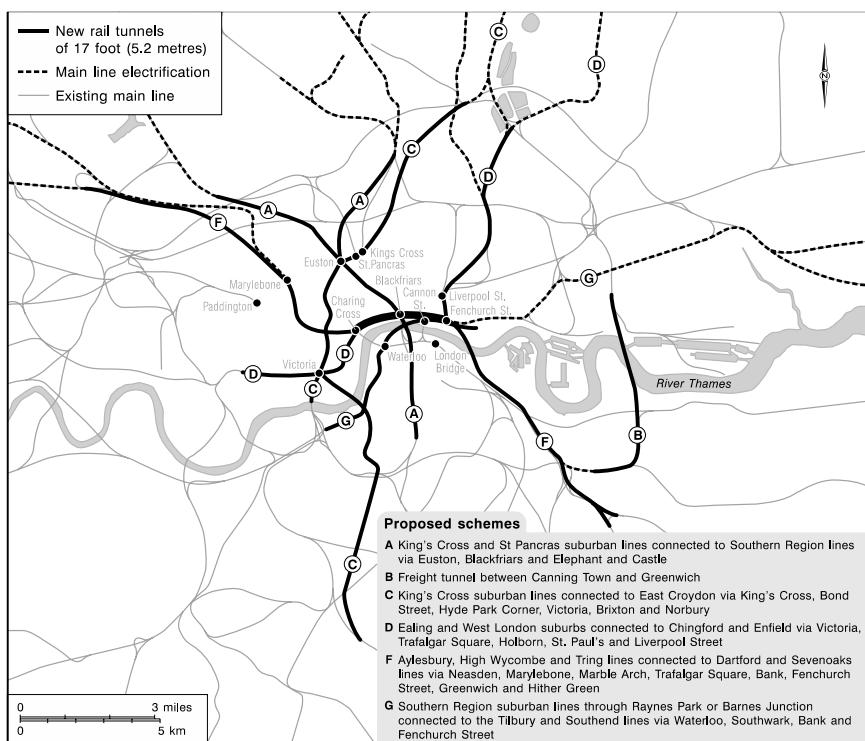


Fig.3 1948 London Rail Plan & 1949 London Plan Working Party, 'Proposed New Routes' [source: BTC 1949 Map 1, redrawn by University of Manchester Cartographic Unit]

The route proposals were complex, with 'first priority' and 'lower priority' lines each subdivided into 'firm' and 'tentative' categories, and a further complication in the differences between the original report of the Railway (London Plan) Committee of 1948 and the Working Party of 1949. Figure 3 summarizes the key recommendations for 17' cross-London lines :

A - a cross-London connection from King's Cross and St Pancras suburban lines to Southern Region lines via Euston and Blackfriars;

C - a line linking Hornsey to East Croydon via King's Cross, Euston Bond Street, Hyde Park Corner, Victoria, Brixton and Norbury - [the Working Party downgraded this to a 12' deep tube, rerouted via Oxford Circus];

D - a line connecting the Chingford and Enfield branches to Raynes Park via Liverpool St, St Paul's, Holborn, Trafalgar Square and Vauxhall - [also downgraded by the Working Party on grounds of economy];

F - [a Working Party recommendation] a through connection from Aylesbury, High Wycombe and Tring, north-west of London, to Dartford and Sevenoaks to the south-east, via Neasden, Marylebone, Marble Arch, Trafalgar Square, Bank, Fenchurch St and Hither Green;

G - [another Working Party addition] connecting the Southern Region at Barnes or Raynes Park eastward to the Tilbury and Southend lines via a tunnel under Waterloo, Southwark St, Bank and Fenchurch St.

Asked by Minister to rank its priorities the British Transport Commission selected routes F, A and G - adding a crucial financial proviso:

'If the planning needs of the metropolis make such facilities essential, the labour and material which will be required must be found from sources additional to those which are available to the Commission, and the cost could not be met from their financial resources' (1949 31).

The Long Wait

While other aspects of the postwar reconstruction plans made gradual progress within austerity budgets, the railway component was shelved indefinitely. In the words of the Ministry of Town and Country Planning's stock-taking report of 1951 : 'it seems clear that most of the major rail improvements will have to wait a long time and there can be no urgency about the more radical proposals in the Railway Plan' (MTCP 1951, 79). Even its modest 'Route H' extension of the Bakerloo Line underground to Camberwell, approved in 1948, fell victim to rising construction costs and was abandoned (BTC 1951). Eventually, the only piece of the London Rail Plan to see the light of day was a modified version of 'Route D', realigned as a deep tube from Walthamstow to Brixton (Barker & Robbins 1974) . The Government instructed the London Transport Executive to begin preliminary work on this route in 1953 (BTC 1954 31), and it opened for service as the Victoria Line sixteen years later.

The Victoria Line was a solitary addition in a bleak period for railway planning. The mood was captured in one the most cited papers ever published in this journal, Colin Clark's 'Transport : Maker and Breaker of Cities' (1958). In a brilliant historical sweep, Clark argued that the 19C railway age had created the compact high-density city and the 20C age of road transport would as surely break it, as industry, housing shopping and services moved out in response to falling transport costs and rising personal mobility: 'universal car ownership will come sooner or later, and the prudent planner must make his plans accordingly' (1958, 249). The planner's task should be to manage the disintegration of the city - and even of the conurbation - shaping the coming diffusion into compact small towns rather than sprawl. The notion that such an end could be accomplished through regional express rail systems was absent from British thinking though it already underpinned the design of S-Bahn networks in postwar Germany. Even such a rail enthusiast as the young Birkbeck geographer Peter Hall saw London's transport future in terms of a penetrative motorway network providing direct road access from a dispersed urban region to the heart of the metropolis, with just minor rail improvements to improve platform connections between inter-city and local services (Hall 1963). Urban motorway-building was intended to be a first priority of the Greater London Council (GLC) created to replace the LCC under the 1963 London Government Act.

The GLC era

The newly-formed GLC did indeed pursue motorway boxes and radials as the basis of its draft *Greater London Development Plan* of 1969, but the process of strategic thinking on London's transport needs also revived interest in rail-based solutions.

The 1965 *Railway Plan for London* by a joint working party of British Rail and London Transport highlighted the outward spread of commuting since 1951, and the need for extra capacity in the capital - extensions to the Victoria, Piccadilly and Northern Lines, and a new Fleet Line tube between Baker St and New Cross (BR 1965). The GLC's own *London Transportation Study* of 1968 went further, reviving the concept of cross-London main line connections.

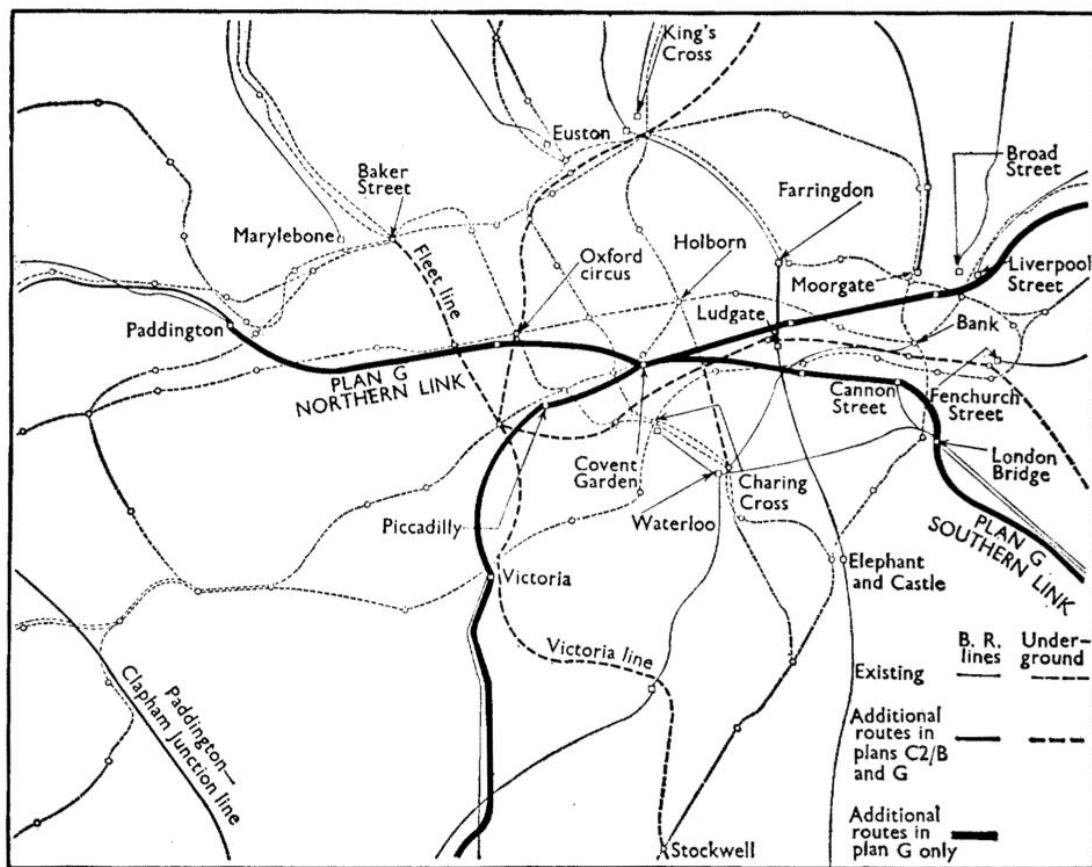


Fig.4 1968 *London Transportation Study* 'Plan G'

[source: Ridley & Tresidder 1970 figure 2]

Its 'Plan G' was based on two high-capacity lines, a Northern Link between Reading/High Wycombe and Southend/Chelmsford, and Southern Link connecting London Bridge and Victoria Stations, carrying 28 and 24 trains per

hours respectively. These Crossrals were to meet at a major interchange at the former central market site in Covent Garden - an exact equivalent of the RER interchange planned for Châtelet-Les Halles (fig.4). 'Plan G' scored poorly within the transportation study's innovative forecasting and evaluation methodologies - only a 2% annual rate of return against the Motorway Box's 8.8%, - and was never officially released: nevertheless it helped to bring cross-London railways back onto the agenda (Bayliss 1970).

In 1973 the Labour Party won control of the GLC on an anti-motorway platform and jettisoned the highway proposals of the draft *Greater London Development Plan*. At once the prospects for rail were transformed. A new plan was needed. The *London Rail Study* (DoT 1974), chaired by Sir David Barron, was commissioned jointly by the Department of Transport, GLC, British Rail and London Transport Executive. David Bayliss led a technical team at the frontier of computer-based land use/transportation modelling and evaluation. In a context of falling demand for rail travel to Central London (an 8% drop since 1966) the Study acknowledged continuing decline as one scenario: but it also tested scenarios based on new rail investment, road congestion-charging and revival of the London economy. Its long list of projects included three cross-London rail links. The simplest, using existing infrastructure, was to reopen the Snow Hill tunnel connecting King's Cross to Blackfriars and London Bridge, closed to passenger traffic since 1914 and subsequently abandoned altogether. This was the genesis of Thameslink, which would open as a through service between Brighton and Bedford in 1988, though without the frequency and express quality of an RER line or a German S-Bahn. More ambitiously, LRS considered two new east-west lines derived from 'Plan G'

(figure 5). With their major new interchange stations at Covent Garden and Ludgate/Blackfriars, these proposals were again clearly inspired by the soon-to-be-opened Parisian RER. Though Sir David Barron was circumspect about proposing new investment, main-line rail connections under Central London were described as ‘an imaginative and exciting solution to the problems of overcrowded public transport’ and the Barron report recommended safeguarding the tunnel alignments so feasibility studies could be undertaken.

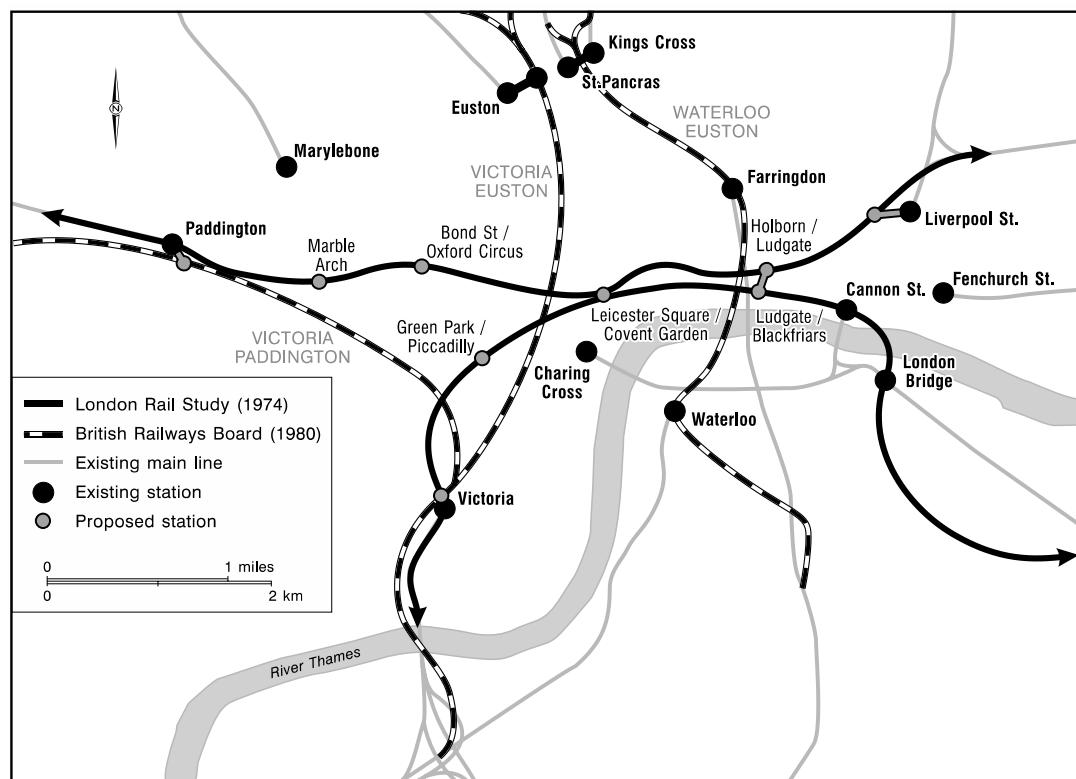


Fig.5 1974 *London Rail Study* ‘British Rail Crossrail Suggested Route’ and 1980 *British Rail* ‘Possible Through London Routes’ [source: DoT 1974 fig 15.7 and BRB 1980 11, redrawn by University of Manchester Cartographic Unit]

Meanwhile British Railway's Strategic Planning Office was pursuing a different path. From 1977-80 it worked up a scheme for *A Cross-London Rail Link* based on

one of three options: 'Victoria-Paddington', 'Victoria-Euston' or 'Waterloo-Euston' (also shown in figure 5). Introducing the report, British Railways Chairman Sir Peter Parker said it

'demonstrates that B.R. is capable of innovative thinking and can reason expansively, constructively and at a high technical level in bad times as well as good. It forms a valuable addition to B.R.'s set of strategic options, joining the quiver of glittering opportunities presented by our proposals for electrification, and for a Channel Tunnel' (BRB 1980)

In fact, British Railways and its glittering quiver were already doomed by the 1979 election outcome: Mrs Thatcher's arrival ensured that cross-London rail proposals would go no further. When the House of Commons Transport Committee reviewed London's rail situation in 1981 the contrast with Paris was paramount. There, a well-subsidized public transport system was expanding, with 16 new stations under construction and buoyant ridership: here, there was only stagnation and decline. Giving evidence on March 3rd 1981, Sir Peter Parker was asked 'is there any prospect at all that you will ever have any money to put into new schemes which may be desirable but which are not your first priority?' He replied that while in the medium term the upgrade of signalling and rolling stock must have total priority, we should continue to think about the long term needs of a civilized public transport system for London and the South East:

'I would first, if I may, take the north-south Cross-London Link as something which is a long way ahead. It is a blue sky piece of vision, but necessary to do because, first of all, we have done the work and know the possibilities are there' (PP 1980-1 78).

Next year, 1982, rail passenger numbers fell to an all-time low. The Government commissioned Sir David Serpell to undertake a review of railway finances. The Serpell Report addressed means of retrenchment to reduce the burden of rail on the public purse: its options were all for more or less savage reductions of network miles, staffing and services, none for investment in new lines (DoT 1983). Sir Peter Parker resigned the chairmanship of British Railways in 1983. In 1986 the Government abolished the Greater London Council. The policy environment was truly bleak for railway planning. Yet a hidden hand was at work. Thatcherism's market boom boosted employment in London and caused a remarkably sharp turnaround in rail and Underground passenger numbers after 1982. Ticketing innovations - LT's TravelCard in 1983 and BR's CapitalCard in 1985 - reinforced the upswing. The climatic moment - deregulation of financial services on 'Big Bang' day, October 27th 1986 - caused the London economy to soar, so overcrowding and congestion did too. These demand-side pressures reopened the case for cross-London rail.

The False Start

In 1988, two years after Big Bang, one year after GLC abolition, Peter Hall was watching London's turbulence at a distance, from Berkeley, California. His book *London 2001* (1989) revisited the futurology challenge first attempted a quarter of a century earlier in *London 2000* (Hall, 1963, 1989). The greatest contrast between the earlier and later scenarios lay in the perception of rail transport. (Hebbert 2013). Where *London 2000* had promised freedom of the city to the private motorist, *London 2001* achieved 'a choice of transport from any A to any B' through rail investment and road congestion charging. Its transport vision

reflected Hall's familiarity with European cross-town rail innovations such as the German *Stadtschnellbahn* (S-Bahn) systems, and the polycentric spatial planning typologies they promoted. He particularly admired the vision of the RER, integrating land use and transport on a 45-mile radius and doing for Paris what tube extensions had done for London in the 1930s - 'but on a huge scale . . . one of the most awe-inspiring programmes of urban restructuring in the world' (1984, 83). *London 2001* portrayed the newly-completed Thameslink project (Luton to Gatwick via Blackfriars) as the first step towards such a *Réseau Express Régional*, and predicted further connections east-west and diagonally by 2001:

Brunel Line: Heathrow, Paddington, Circle Line, Fenchurch Street

Kingsway Line: Basingstoke, Waterloo, Euston, Milton Keynes, Northampton

Garden City Line: Welwyn, Moorgate, London Bridge, Sevenoaks/Sidcup

That same year, 1988, two other research groups were arriving at similar conclusions from analysis of London's rising travel demand. One was a desk study from Colin Buchanan & Partners, commissioned with MVA Consultancy by the joint planning committee of the 33 boroughs to advise on London-wide transport measures in the aftermath of GLC abolition. The report *Capital Investment in London's Railways* (Project No 6123) had no official status but made a forceful case for rail as strategic planning instrument. The consultants contrasted the cautious approach of the Department of Transport since the 1974 *London Rail Study*, with the 'brilliant opportunism' of Michael Heseltine's Docklands Light Railway:

The DLR has been a dramatic demonstration not only of the way in which a rail investment can trigger major development in the right sort of area

but also of the fact that this is something developers are prepared to pay for. Today when the stub end of the elevated DLR is to be extended down beneath the City only 3000 metres from the stub end of the Jubilee Line, the conclusion that rail planners and Transport Ministers were too timid is inescapable (LPAC 1989 248).

Using the now-familiar term ‘Crossrail’, Buchanan & Partners considered five new options in addition to Thameslink. (figure 6). Most ambitious was the Padderloopool Line, a ‘catch-all’ connection between Liverpool Street and Paddington by way of Waterloo and Victoria. A seven-week desk study offered no opportunity to evaluate these options, but the larger point was clear: the logic of ridership trends and land use planning pointed equally to the need for fast new cross-London links, not duplicating existing connections but creating significant new ones (1989 253).

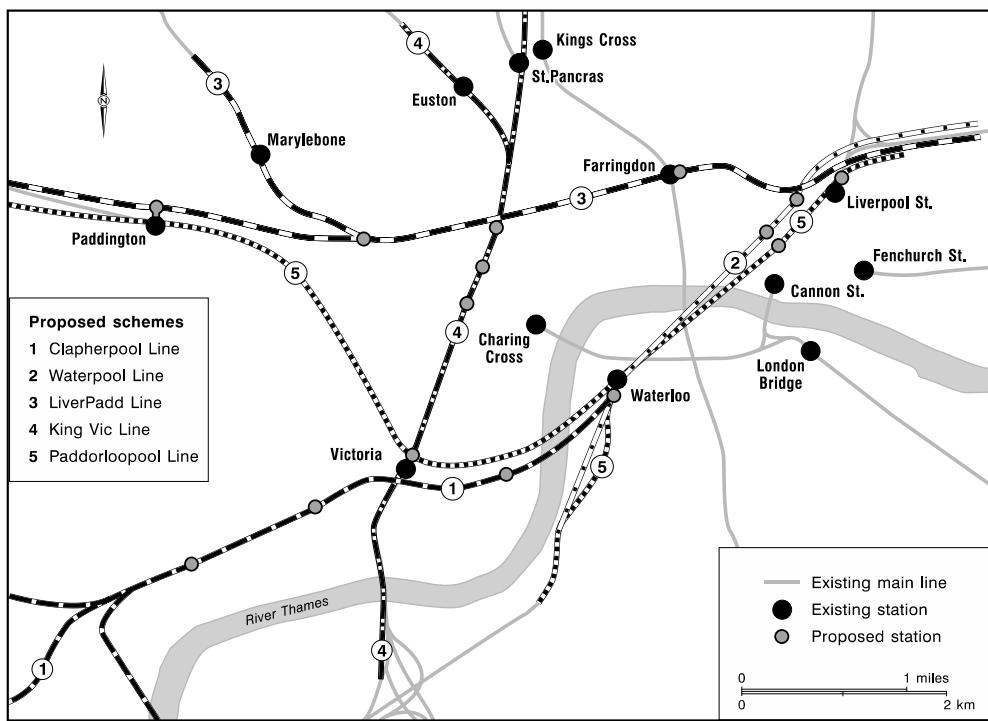


Fig.6 1989 *Colin Buchanan & Partners 'Crossrail Schemes'* [source: LPAC 1989 figs

3.7 and 3.8 redrawn by University of Manchester Cartographic Unit]

Meanwhile, in the spring of 1988, Secretary of State Paul Channon acknowledged the growing problem of overcrowding and congestion on London's railways and commissioned a joint working group of the Department of Transport, British Rail Network SouthEast, London Regional Transport and London Underground to prepare a *Central London Rail Study* (DoT 1989). The study by no means confined itself to the problems of the central area, but the existence of a separate *East London Rail Study* linked to Docklands meant that it did not properly consider the momentous developments on the Isle of Dogs. Its analysis demonstrated a strong case for investment in new capacity on grounds of congestion relief. On the Underground network it discussed extensions to the Victoria, Jubilee, Bakerloo and Central Lines as well as a revived proposal for a Chelsea-Hackney tube line. For the main railway system it considered the four Crossrail route options shown in Figure 7: North-South, East-West City, and an enhanced Thameslink Metro. This long list of CLRS options was whittled down to two alternatives - East-West Crossrail and the Chelsea-Hackney Tube - for detailed evaluation by a working party of officials chaired by David Bayliss. They recommended East-West Crossrail linking Paddington and Marylebone to Liverpool Street via Bond Street, Tottenham Court Rd and Farringdon. The cost was estimated at £1.4bn, the cost-benefit ratio at 1.32.

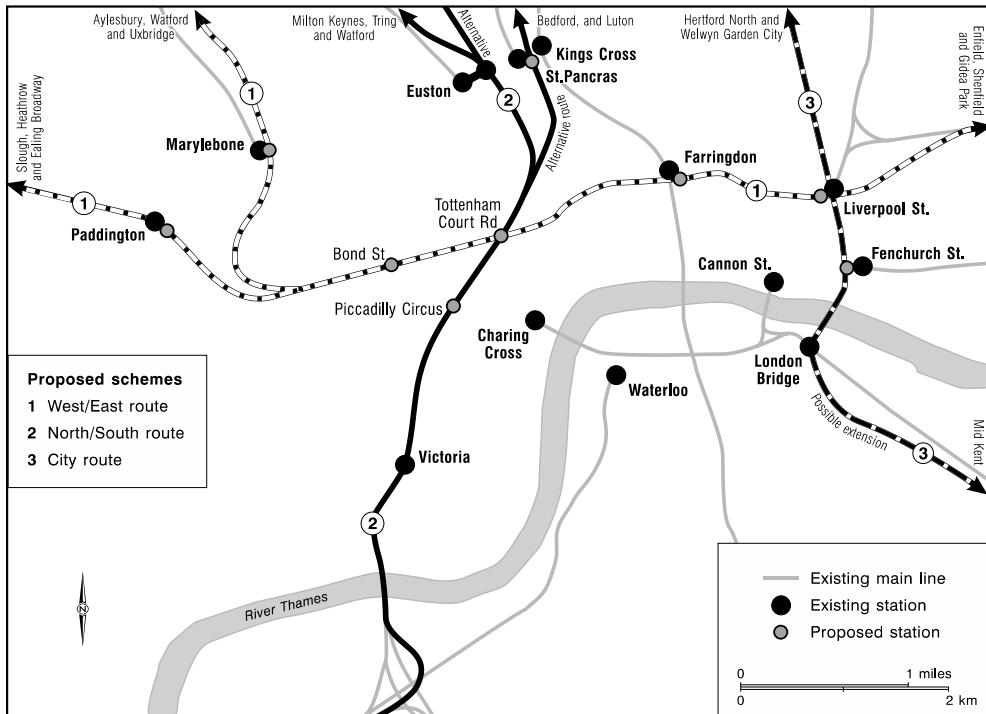


Fig.7 1989 *Central London Rail Study 'Crossrail Schemes'* [source DoT 1989 Map

6 redrawn by University of Manchester Cartographic Unit]

In November 1989 the Secretary of State confirmed in a Parliamentary answer that as the Jubilee Line Extension to Canary Wharf could not provide all the required capacity, he intended to authorise one further railway line. The Government confirmed its policy on October 9th 1990, setting up a joint venture of British Railways and London Transport and a project team that grew to 280 staff. The Crossrail Bill was introduced to Parliament in November 1991. It provided for :

- a) the construction of a new underground railway commencing west of Paddington Station and terminating east of Liverpool Street Station and connecting, on either side, with existing railways of the Board;

- b) the construction of a new railway on the Thames Valley railway at Old Oak Common to connect the new underground railway with the Metropolitan and Chiltern lines; and
- c) the construction of a further connection at Hayes on the Thames Valley railway with the proposed rail link to Heathrow Airport .

The Crossrail Bill, 1991-4

Thus far Crossrail projects had been no more than lines on a map or hypotheses in a transportation model. The 1991 scheme made a leap towards realization through detailed engineering design, legal preparation and planning assessment. Costed at £1.7 billion, it had vociferous backing from the Confederation of British Industry, the Institute of Directors, the City Corporation and London business lobbies, and the personal support of the Prime Minister, John Major. On the other hand, one of its promoters, British Rail was in the throes of privatization. In the antiquated Parliamentary procedure of the Private Bill, the scheme encountered strong objection from amenity groups and property interests. Excluded from the route, the new financial services cluster on the Isle of Dogs had no cause to lobby on its behalf. The local government system, balkanized between 33 boroughs, amplified localist objections. The leading transport consultant Jim Steer, acting on behalf of the London Borough of Tower Hamlets, cast doubt on the underlying demand projections. The Bill's parliamentary progress was slow and wobbly. Its scheduled second reading in February 1993 was cancelled unexpectedly, and reinstated in May only as a paving measure, establishing the power to proceed but leaving the funding basis unspecified. In view of those financial uncertainties the Treasury was dead set against the project and Michael Portillo as Chief Secretary

moved to cut it in January 1994. With the Prime Minister's support it limped on until May 1994 when it was voted out by the four-man committee of MPs responsible for considering the Crossrail Bill. Under Private Bill procedure they were under no obligation to give reasons for their decision, described by the Minister for London Transport, Steven Norris MP, as 'capricious and inexplicable'. It was, nevertheless, irrevocable (Jones 1994, Wolmar 1994).

The collapse of the project was a severe set-back for the Crossrail concept at a time of increasing concern over transport infrastructure as a factor impairing London's global competitiveness. Unfavorable comparison with the Parisian RER was drawn in both the government-commissioned *Four World Cities: a comparative study of London, Paris, New York and Tokyo* (Llewellyn-Davies 1996) and the London Research Centre's *Four World Cities Transport Study* (Focas 1998). But the very word 'Crossrail' had disappeared, and Thameslink - with its 15-minute intervals between trains and its change of traction between different electrical systems north and south of the river - was a poor substitute indeed (Focas 1998 136).

Resurrection

Two factors combined to revive the project of cross-London rail. First was the return of metropolitan government under the 1999 London Government Act, with a directly-elected Mayor to provide political leadership. Susan Fainstein, writing up the decision-making history as a pedagogic case-study for the Harvard Kennedy School of Government, defines the election of Mayor Ken Livingstone as the turning point in 'serious consideration' of Crossrail (2008). The second factor,

or necessary condition, was the continuing expansion of employment, retail and housing in and around the Docklands business district. With felt tip pens on a map of London the Mayor and railway planners conceived a new route coming in from north Kent through this hot-spot to join the original Stratford/Shenfield line under Stepney Green (Figure 8). Ken Livingstone's 2004 *Plan for London* justified Crossrail as the only infrastructure capable of binding the West End, City and Docklands into 'a virtual unified economic and business core' (2004 115). Importantly, Docklands developers had already demonstrated their willingness to pay for rail infrastructure, first (as noted above) in the DLR, then in their £400 million contribution to the cost of bringing the Jubilee Line through the Isle of Dogs. From these precedents a financial model was devised for Crossrail that would pass Treasury scrutiny: it combined several mechanisms of value-capture from beneficiaries including Community Infrastructure Levy, Section 106 planning agreements (i.e. developer contributions linked to planning consents), a dedicated Business Rate Supplement, cash contributions (for example from the owners of Heathrow Airport) and in-kind contributions towards the stations at Canary Wharf and Woolwich (Gómez-Ibáñez 2008).

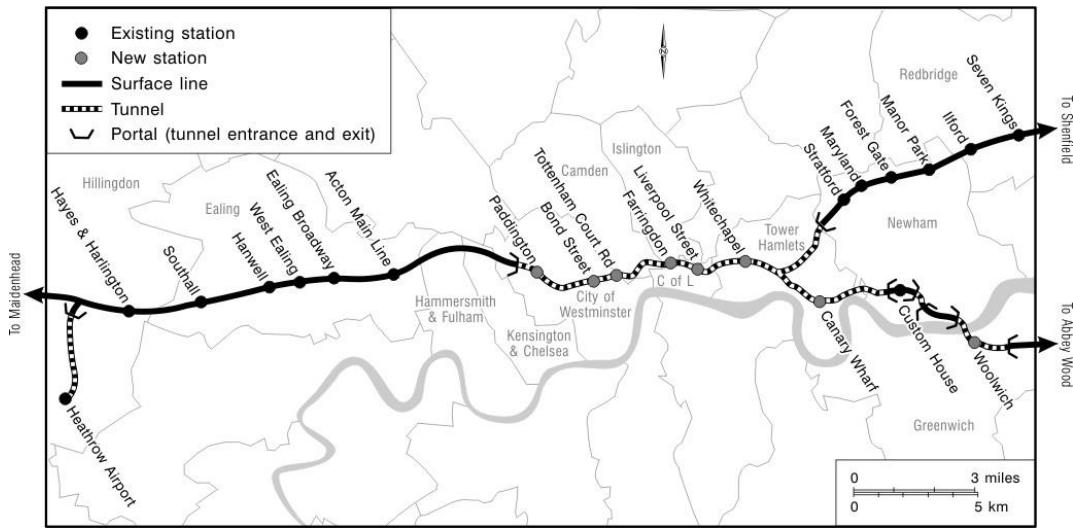


Fig.8 *Crossrail Route Map* as approved and implemented 2010-2018 [map by University of Manchester Cartographic Unit]

Learning from the mistakes of ten years previously, the Crossrail Bill introduced by Government in 2005 was not a Private Bill but ‘hybrid’ legislation involving stronger procedural safeguards and a substantive public stake. The design of Crossrail’s stations and ventilation shafts was carefully contrived to minimize surface disruption - the megastructure was designed as ‘keyhole surgery’ (Hebbert 2012). After three and a half years of Parliamentary scrutiny the Crossrail Bill obtained Royal Assent in 2008.

The project was inaugurated in May 2009 by the new Mayor of London, Boris Johnson, and Prime Minister Gordon Brown. Even at this late stage, it was by no means home and dry. Its launch had coincided disastrously with the market crash and public expenditure crisis of 2009. As a single big-ticket item the railway remained an obvious candidate for cancellation, especially as its benefit would be enjoyed by only Londoners who already had more than their fair territorial share

of investment in the Channel Tunnel rail link, the Jubilee Line Extension, the London Underground upgrades, Thameslink 2000, and the infrastructure for the 2012 Olympic Games. The £15 billion project narrowly survived the axe in Chancellor George Osborne's 2010 Spending Review, but not until the following spring, when tunneling contracts were let and tunnel boring machines procured, could its momentum be safely described as unstoppable.

Conclusion

Today, with construction in full swing, Crossrail is being hailed as a world-leading tunnelling triumph and the talk is all of carrying its momentum forward. Next in line is the Chelsea-Hackney route, now rebranded as Crossrail 2, linking the congested districts of the south west to the 'opportunity areas' in the north east sector of London (LA 2013). North-south connections are already being improved under the Thameslink Programme which by 2018 will bring new, longer, trains through central London at frequencies of up to 2-3 minutes. The Mayor of London has revived discussion of a Euston-Waterloo link, Crossrail 3.

As this new network of cross-town express routes takes shape, it has inevitably revived comparison with the red (A), blue (B), yellow (C), green (D) and purple (E) route map of the Parisian RER. Paris has been the fixed point of comparison in London railway planning ever since the launch of the RER programme. It has been a one-sided affair - the decisive growth vision of the Schéma Directeur of 1965 contrasting markedly with the false starts, ideological switches and abandoned visions described in this paper. In his new book *Good Cities, Better Lives: how Europe discovered the lost art of urbanism* (2013a) Peter Hall makes a point to

which the present issue of *TPR* bears witness, that Britain has everything to learn from the French when it comes to integrating rail investment with land use development.

Yet the progress of Crossrail also prompts a different reflection. Whereas the RER lines have served the tentacular expansion of the Paris agglomeration, London's regional expresses will link the inner metropolis to freestanding settlements beyond the Green Belt. As Peter Hall puts it in a recent revisionist comparison of the two cities (2013b), Crossrail embodies the modern S-Bahn concept of an infrastructure for polycentric growth, whereas the RER has more in common with the London Underground network extensions accomplished by Frank Pick in the 1930s: 'in effect the Paris of 2012 resembles an enlarged version of the London of 1939, not the London mega-city region of 2012' (2012 183). Crossrail as an exemplary spatial planning strategy - it's an unexpectedly positive note to end on.

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