Transport for London

A rail strategy for London's future

Statement of case

2007

MAYOR OF LONDON

Transport for London

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Foreword

Next year will be significant for the strategic direction of London's railways. The Government will be publishing a High Level Output Specification (HLOS) covering the period 2009-2014 and an associated Statement of Funds Available (SOFA). This specification will define and fund what Government wants the industry to deliver in terms of:

- Passenger rail capacity
- Performance (train reliability)
- Safety

At the same time a Government White Paper will be published. This will address a wider range of strategic needs such as the environment and broader passenger interests over the next 20 to 30 years, and as such it can be expected to guide future policy and investment decisions for the foreseeable future.

The purpose of this document is to set out the passenger rail capacity Transport for London (TfL) believes is required to meet the London Plan. This is particularly important for London as:

- Londoners rely on rail more than any other area of the country and London's rail system is under greatest stress, experiencing greater overcrowding for longer periods than in other regions
- Growth in population and employment of about one million apiece will add further stress on our transport network

The future of our economy, communities and environment is inextricably linked to the ability of the transport network to respond to London's growth. Improving London's rail transport will play a crucial role in supporting the contribution that the Capital and the wider South East makes to the UK economy.

The work described is one component of TfL's overall transport strategy as encapsulated in the Transport 2025 programme. This document presents the challenges in the rail sector and a set of strategic proposals to meet them. Our proposals are consistent with the Transport 2025 programme and are the product of extensive consultation with industry and stakeholders, careful examination of existing transport provision and a detailed analysis of the implications of rising demand. This has enabled pragmatic, flexible and affordable solutions to be identified. The solutions provide major benefits to the London and UK economies. They contribute positively to the environment and sustainability through reduced emissions, increase accessibility and help tackle deprivation, and improve regeneration.

Our analysis is not set in stone; circumstances and technology change, demand evolves and solutions must vary with them. However, we hope that our work will help drive forward the agenda and direction for what the rail industry can deliver for London.

Ian Brown,
Managing Director, TfL London Rail

Section S

Summary report

S1 TfL's strategic thinking

TfL has started a process of engagement under the banner of Transport 2025 to identify long-term challenges facing London's transport network in the context of overall transport objectives, consistent with the Mayor's vision as set out in the London Plan:

- Supporting sustainable economic development
- Improving social inclusion
- Tackling climate change and enhancing the environment

This document focuses on National Rail and the role it can play in meeting these objectives.

S2 London and the wider South East is vital to the UK economy

London and the wider South East are critical to the success of the UK economy. London is a world-leading financial centre, it has more corporate headquarters than any other European city, it provides many major tourist attractions and it acts as a global centre for cultural and creative industries. As such it competes with other global centres such as New York, Paris and Frankfurt. London's success in the global marketplace brings substantial benefits to the nation, with the South East region generating a third of the UK's total GDP. London is 30 per cent more productive than the rest of the UK[4] and makes a net contribution of £9 -£15bn to the national Exchequer.

Conclusion: Investments that make a demonstrable improvement to London's economy will have a significant impact on the UK as a whole.

S3 Rail is critically important to the region

Rail is vital to London as it provides the only effective solution to transporting large numbers of people, relatively quickly, from the suburbs and the wider South East of England into central London. Research shows that 43 per cent of peak time trips into central London involve rail. No other regions are as dependent on rail as London, where rail travel per capita is six times greater than in the other metropolitan areas.

Conclusion: Improvements to London's rail system will affect more people and have greater economic impact than elsewhere.

S4 The quality of London's railways is poor

Rail's strong position in the market is not because of its current high quality. London's railways are under great stress, with passenger satisfaction lower and crowding substantially worse than other UK regions.

There is also a growing gap in quality compared with other modes of travel in London. Buses have improved substantially over the last few years in terms of reliability and capacity, and this is reflected in levels of customer satisfaction. On the roads, congestion is down, at least in the central

4 As measured by GVA per capita; source: Regional trends 2006

area. There is a programme in place for London Underground, which is already resulting in improved performance and capacity enhancements, for example the longer trains on the Jubilee line introduced in December 2005. On the Docklands Light Railway (DLR), the City airport extension opened in 2005, with others to Woolwich Arsenal and Stratford planned for the next four years.

With the exception of the upgrade of the North London line and the extension of the East London line, there is no long-term funded programme for London's railways. This is despite the fact that passengers in the region rely so heavily on them, reflected in the fact that the railways largely cover their cost of operations. Subsidy is less than 1p per passenger mile, while regional Train Operating Companies (TOCs) receive closer to 10p per mile. In absolute terms the regional TOCs receive 3.5 times London and the South East's subsidy, yet carry less than a third of its passenger miles.

Conclusion: Given the scale of the transport task they face, railways are the poor relation of transport in London. Improvements to London's rail system are more necessary than anywhere else.

S5 The challenge of catering for London's rapid growth is significant

The London Plan forecasts the Capital's population will grow by one million by 2025, while the number of jobs is forecast to increase by 900,000. Most of the growth in jobs will be located in central London, reflecting the importance of the financial and business services sector.

This sets London's key transport challenge as delivering people swiftly from their homes in the London suburbs or the wider South East, to a geographically concentrated central business district. The effectiveness of the Capital's transport infrastructure will be critical to cater for this growth. Rail will be the dominant mode of transport in this.

If TfL's transport improvements, particularly rail, do not materialise then this will have an adverse impact on companies deciding to locate to central London. These companies are unlikely to move to other areas of London or the UK as they tend to cluster around central London to gain efficiencies arising from the co-location of other similar businesses (for example, in the financial services sectors). If these companies do not locate to London, the UK economy could lose billions of pounds of tax revenue, income and investment. Businesses are more likely to relocate to other international centres such as New York, Paris and Frankfurt.

Conclusion: If the challenge is not met, the UK will lose billions of pounds in investment, income and tax revenue and face reduced employment, accessibility and urban regeneration opportunities.

S6 London's growth will increase pressure on rail

Projections show that rail passenger demand will increase over the next 20 years by 30-40 per cent. Currently funded rail projects will not be sufficient to meet the forecast growth in rail demand, which will add to the already widespread over-crowding. Overcrowding is most severe on routes such as Thameslink and at termini including Liverpool Street, London Bridge, Waterloo and Victoria. Network Rail predicts that, left unchecked, the number of people standing on trains into central London will nearly double between now and 2014.

TfL does not believe that demand management techniques alone can solve the worsening overcrowding problems. There is already a degree of peak pricing built into the fares structure, for example with the off-peak Travelcard, cheap day returns and Oyster pay as you go, and its extension to other ticket types can make a further contribution to meeting the challenge of growth in demand by encouraging people to travel at quieter times of day. New working patterns such as tele-working also offer opportunities to reduce the need to travel, while TfL's programme of 'smart measures' should reduce pressures on public transport to some degree. However, these do not provide a panacea, and TfL estimates that growth in the peak periods will still be substantial.

The immediate impact on passengers is obvious, but there are a number of other consequences, such as delays and longer journey times, which ultimately affect the business efficiency of central London.

Conclusion: There is an urgent need to reduce overcrowding and providing more capacity for the peak period is a top priority for TfL.

S7 Rail 2025 fits with TfL's strategic planning process and Mayoral objectives

Rail 2025 is a component of TfL's overall strategic planning process (Transport 2025), which will provide input into revisions of the London Plan and, in due course, a revised Mayor's Transport Strategy.

To support the Strategy the transport system must not just get people to work, it must do so in the context of helping to deliver the other Mayoral objectives of improving:

- Liveability, including providing a safer, more accessible city for London's citizens
- Social inclusion, ensuring regeneration and tackling deprivation
- Urban environment, creating an attractive, well-designed, green city

The implementation of the strategy will complement plans set out for the shorter term in TfL's Investment Programme, and beyond in Transport 2025 for other elements of London's integrated public transport system, including:

- Renewal and upgrade of the London Underground, including links with heavy rail
- Expansion of the DLR
- The development of key interchanges such as Stratford and Clapham Junction
- Continuous improvement to London's bus services
- A fair and easy-to-use ticketing system covering bus, Tube and rail
- A city that is welcoming to cyclists and pedestrians
- Programmes such as the Low Emission Zone (LEZ) that ensure that transport minimises its impact on the environment

Conclusion: The proposals support liveability, social inclusion and the urban environment, as well as providing key transport benefits integrated with change elsewhere in the system.

S8 The strategy aims to play a key role in the national rail policy context

The Rail 2025 strategy not only represents TfL's vision of the future but also provides input to the Government's current work on:

- The HLOS which covers the period 2009-2014 and will define what Government wants Network Rail to deliver in terms of the provision of rail capacity, performance (train reliability) and safety
- An associated White Paper, which will cover longer-term strategy through to 2025 and beyond
- The comprehensive spending review, which will determine the resources available to transport more widely

Conclusion: Rail 2025 represents TfL's strategic thinking on railways that not only fits well with national transport objectives, but also represents an input into key Government processes that reach a conclusion in 2007.

S9 The Rail 2025 solutions meet the needs of London's key corridors

TfL believes that meeting growing rail demand in London and the wider South East can be achieved most effectively via a combination of solutions, and has undertaken detailed examination of each rail corridor. The analysis has resulted in a series of route-specific proposals. These include increasing the length of trains and platforms, increasing the frequencies of some services and, in some cases, redesigning carriage interiors to enable more passengers to travel on each train.

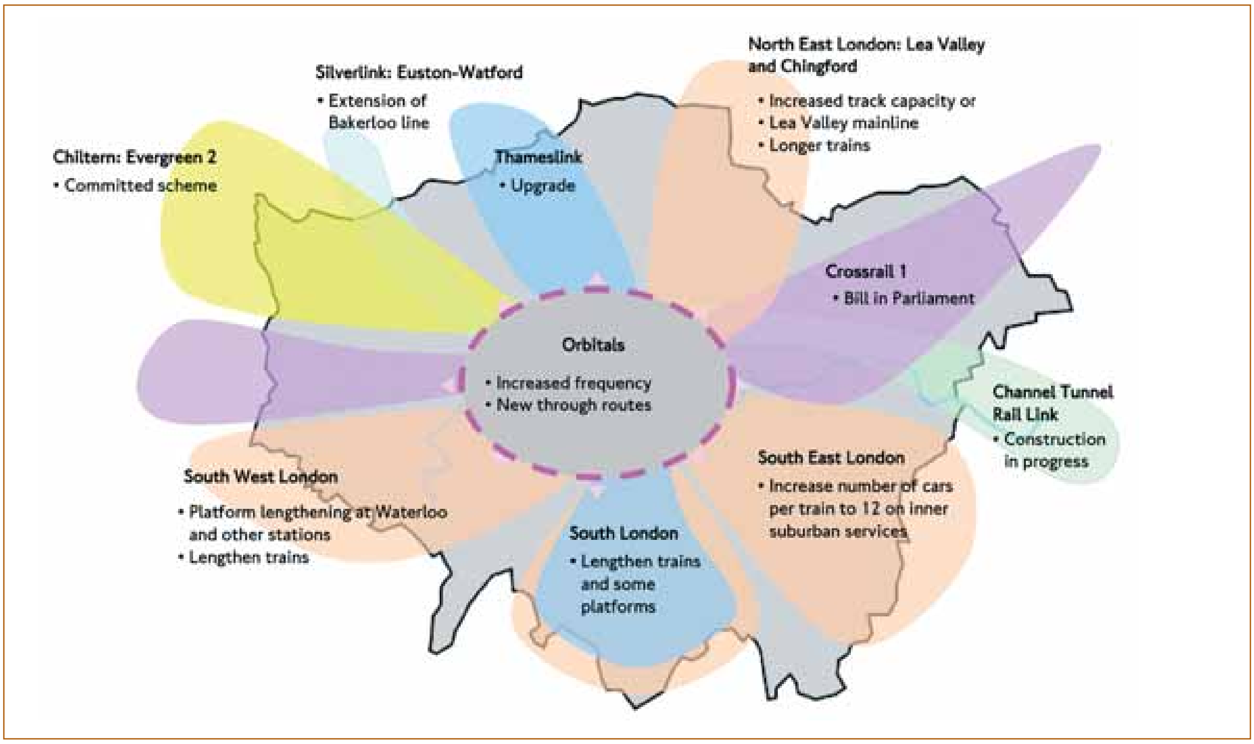
Rail 2025 proposes a new east-west rail link, Crossrail Line 1, the value of which lies not just in providing additional capacity from east and west London, but also in that it links the three main areas of the central activity zone, that is the West End, City of London and Docklands. This is anticipated to generate huge agglomeration benefits for the UK economy and to be the source of about half of the estimated GDP benefits.

Rail 2025 also includes an upgraded main north-south route – the Thameslink programme – required to meet the pressures on what is currently a heavily over-loaded set of services. It requires the comprehensive upgrade of a major London terminus, Waterloo, to enable it to accept longer trains. It also contains a package of individual, relatively straightforward and cost-effective measures, including:

- Longer trains and platforms on West Anglia services and, in the longer term, increasing the number of tracks on the Lea Valley line between Cheshunt and Tottenham Hale
- Longer trains and where necessary, platform lengthening on Southern and South-eastern
- Conversion of the North London Railway Watford to Euston DC service to Bakerloo line operation between Watford Junction and Queen's Park
- Increased frequencies and new through orbital routes to 'join-up' the west, north, east and south London lines
- Purchase of additional rolling stock and in some cases reconfiguration and refurbishment of existing stock to make best use of infrastructure
- Enhancement of all day frequencies so at least four trains per hour operate on most routes

Over a longer period, Crossrail Line 2 may also be necessary, as projections show the Victoria and Piccadilly lines remaining heavily congested between northeast London and the West End.

The map shows the proposals, route by route, across London.



Conclusion: The proposed strategy provides a combination of solutions most appropriate to the needs of the corridors and areas served.

S10 Rail 2025 will cost around £500m per annum

TfL recognises the financial pressures faced by Government and its proposals take this into account. The delivery of the proposed elements of Rail 2025 to provide capacity enhancements would require an investment of about £500m per annum for the next 20 years (excluding the cost of Crossrail Line 1). This includes the purchase of new rail cars and incremental operating costs, so it represents a complete package. In return, this yields a capacity increase approaching 40 per cent, enough to meet the projected increase in demand.

TfL believes that the proposals make best use of existing National Rail infrastructure in London. This approach will ensure that growth is managed in as sustainable a way as possible, and at a lower cost than building further new rail links.

Rail 2025 is not an 'all or nothing' project as it is possible to sequence the works required so that the most urgent and/or easiest projects are completed first. It is also possible to deliver the larger-scale projects in segments to ensure minimal disruption. Most proposals are split into a series of phases over time and being modular gives the strategy flexibility. Demand may evolve differently from forecast outcomes, or technology may allow different solutions or operating characteristics; the strategy can adapt to these circumstances. There are also potential savings by planning elements of the package in conjunction with Network Rail's ongoing renewal works and the construction of Crossrail Line 1.

Conclusion: Costs can be phased to account for resource and funding constraints, while the strategy is modular and so flexible to changing circumstances.

S11 Proposals address the needs of freight, inter-city users and railway performance

Without the extra capacity, there will be a gradual paralysis of the system as over-full trains take longer to load and unload at key stations. This would become significant on heavily loaded routes with many stops and large numbers of boarders and alighters, such as the North London line. The proposals also articulate TfL's view on the best rolling stock for the future, notably the need for design features such as wider doors that will help to speed up boarding and alighting to reduce journey times.

The proposals ensure that there is sufficient capacity for freight traffic. Freight is expected to increase both as a result of London's growth and also as east coast container ports expand. Hence, TfL's proposals for improved passenger services on orbital routes such as the North London line take account of demand for freight paths. More detail will be provided in the forthcoming London rail freight strategy.

Nor do the proposals conflict with the requirements of inter-city and long-distance users. Where there are capacity issues, such as some longer-distance Southern, Southwestern and Great Eastern routes, TfL has identified solutions for these in the same way as it has for the inner suburban routes.

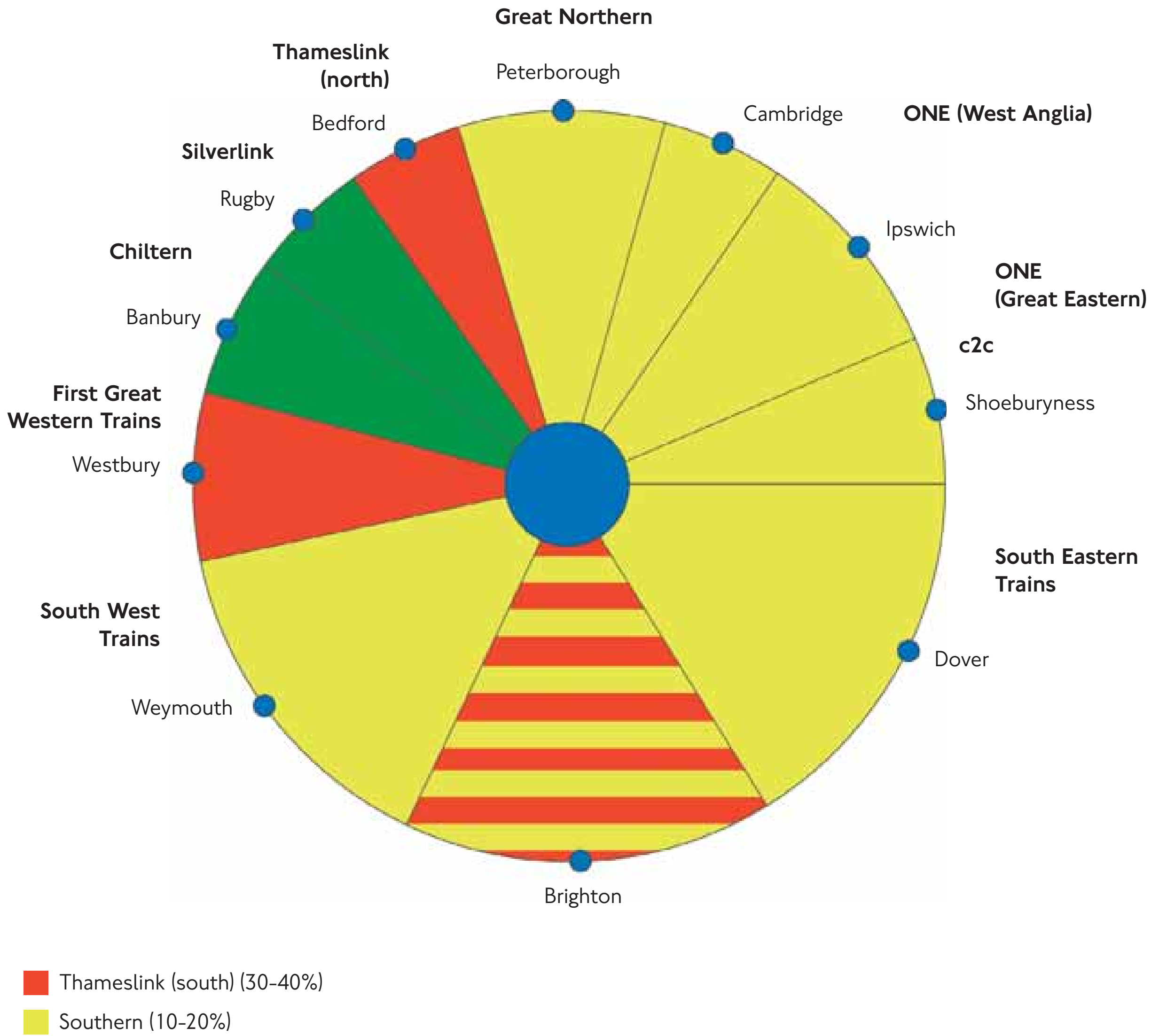
Conclusion: The proposals provide comprehensive coverage of London and the wider South East's needs without affecting rail's other functions.

S12 Rail 2025 has a positive impact on passengers' experiences

Rail 2025 would transform the railways in London and the wider South East, with faster and more reliable journeys alongside more comfortable travelling conditions. The diagrams below show the contrast in overcrowding with and without implementation of the Rail 2025 schemes.

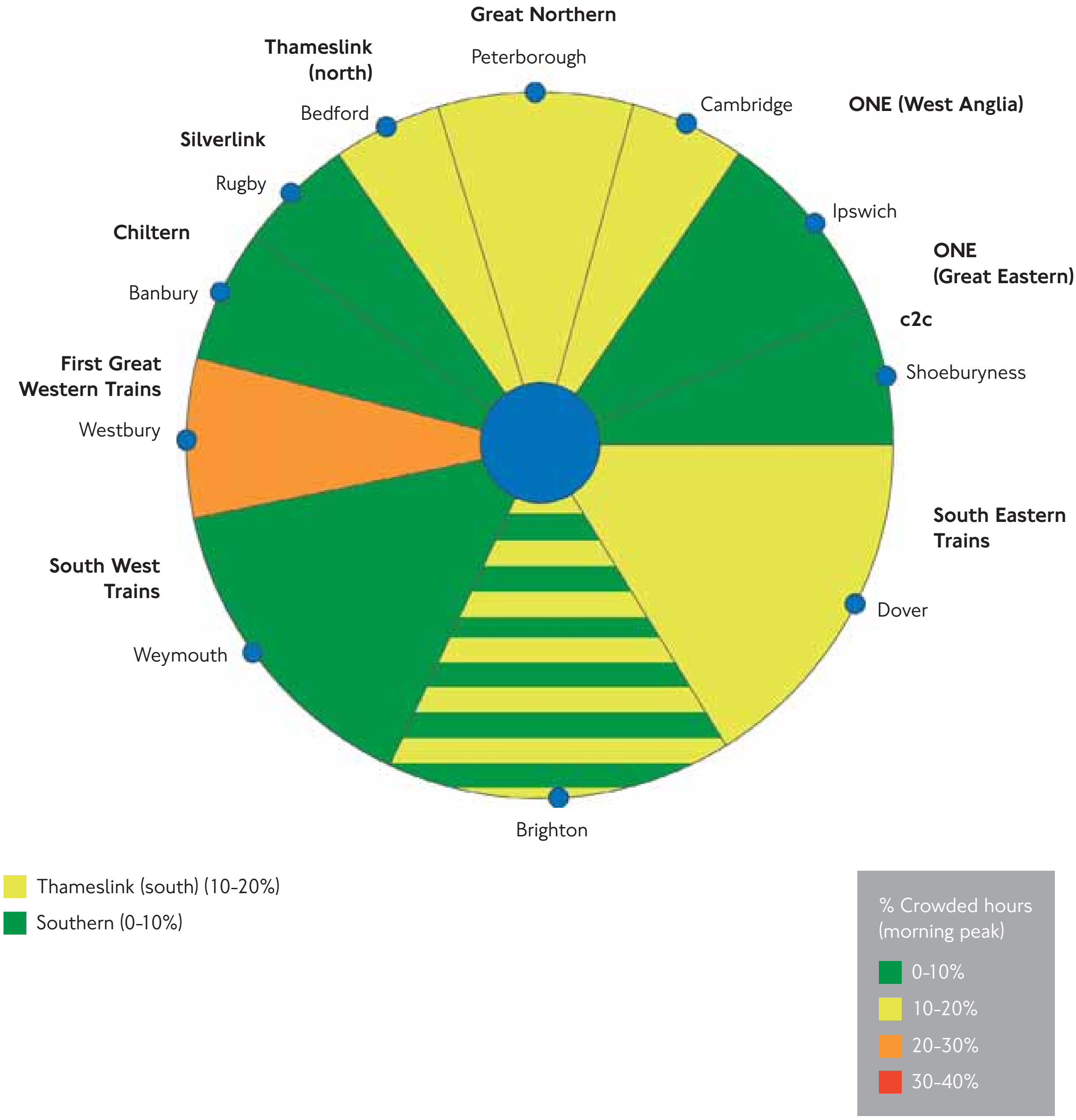
Projected overcrowding 2025

Morning peak – % crowded hours



Conclusion: Our proposals are accurately targeted at the most overcrowded parts of the network and will bring real improvements to London's businesses and people.

2025 overcrowding – Rail 2025 proposals



S13 Rail 2025 positively affects the economy, jobs and public sector finances

Crossrail Line 1 would increase employment potential in London's finance and business service sector by 20,000 jobs and £15bn (present value) of additional GDP benefits. On top of this, the benefits of congestion relief and other time savings from the rest of Rail 2025 are over twice the net financial costs, that is the benefit cost ratio is over 2:1. This rises to nearly 7:1 if wider economic benefits are taken into account, enabling a further 15,000 jobs to be supported in central London and £14bn (present value) of additional GDP benefits.

Conclusion: The proposals will not only bring significant increases in the railway's ability to carry more passengers, but will also ensure transport is not a constraint to London's growth, benefiting the UK economy in terms of improved productivity, GDP and tax revenues.

S14 Rail 2025 enables regeneration and improves the environment

The strategy improves the attractiveness of London's suburbs by bringing another 100,000 people within 45 minutes of their jobs. It aids regeneration and tackles deprivation: 11 of the 13 biggest redevelopment sites are adjacent to main National Rail stations, while many of the proposals affect the most deprived wards in London.

The strategy also leads to a 1per cent transport mode shift from cars. This would bring a material reduction in greenhouse gas emissions of about 1per cent, a positive step towards the UK's targets. Potentially much more could be done on top of this to 'green' the railways through initiatives such as enabling regenerative braking, and reducing energy consumption through use of lighter and more 'intelligent' trains.

Conclusion: The proposals will bring wider benefits in terms of tackling deprivation and pollution, and supporting regeneration.

S15 Next steps – Network Rail and TOCs would deliver the majority of the Rail 2025 proposals but this requires a long-term commitment to funding

Close partnership and agreement with Government, the rail industry and other stakeholders is essential for the timely and effective implementation of Rail 2025 as 2007 will be significant for decisions on the funding and strategic direction of London's railways.

The Railways Act 2005 has made planning and delivery more effective, and given the Department for Transport (DfT) a clear role in setting a framework for what it wants from the rail industry. There is already a successful planning process in place for Greater London that is beginning to deliver positive changes to London's transport, most notably buses and the Underground. In support of this, Rail 2025 provides the rail element; a unifying and integrated vision for all the Capital's railways across what could otherwise be a fragmented set of train franchises and Network Rail routes.

TfL hopes that the Government's HLOS will include a summary of London and the wider South East's needs. It is also working with new industry arrangements, such as Network Rail's Route Utilisation Strategies[5]. The ideas in Rail 2025 will also inform its contribution to the rail re-franchising process managed by the DfT. Rail 2025 also forms part of Transport 2025, which will inform TfL's longer-term strategic thinking.

Conclusion: Network Rail and the TOCs will deliver Rail 2025. The task is to work with central government and the rail industry to ensure that adequate funds are available.

S16 Overall, the proposals provide an affordable transport solution that meets the objectives of the London Plan for sustainable economic development

TfL's proposals:

- Demonstrate the case for appropriate recognition of the region's rail needs in terms of Government investment decisions
- Articulate and quantify how appropriate investment and policy decisions support the Mayor's vision to develop London as a sustainable world city based on strong economic growth and social inclusion, alongside improvements to its environment and use of resources
- Deliver superior economic performance at both national and regional level
- Support national government and the rail industry in shaping short -and longer-term strategies
- Are affordable

Conclusion: The strategy will cater for London's rail requirements over the next 20 to 30 years, enabling London to continue its role as a major world city and a dynamo of UK economic growth.

5 Route Utilisation Strategies: identify present and future problems and opportunities for change on a route (such as the southwest route) and are produced by Network Rail.

Section 1

Context

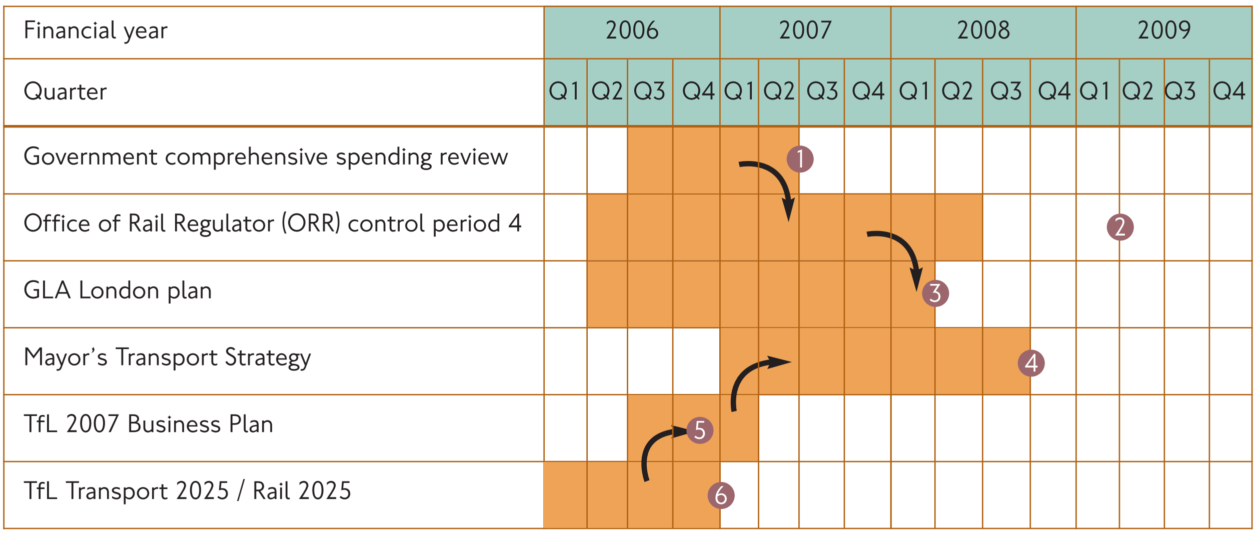
1.1 London's rail strategy in the context of TfL's transport 2025 strategy

The year 2007 will be important for transport in the UK, with significant decisions needing to be made in relation to the Comprehensive Spending Review. To support this decision-making, TfL is undertaking a strategic analysis (Transport 2025) embracing all of London's travel needs. Transport 2025 aims to identify London's future transport needs by understanding the challenges of the next 20 years and identifying the policies and key investment decisions needed to meet those challenges.

National Rail is a key component of London's transport system, and has to deal with other funding issues such as the current planning for Control Period 4 spending (whereby the Rail Regulator sets Network Rail's budget for the period 2009-2014) and the Government's announcement that it is examining a new 30-year strategy for the railways to be published next year.

In response, London Rail has developed a strategy (Rail 2025) both to support Transport 2025 and to inform central government in their planning of London's rail needs.

Figure 1: Rail 2025 in the context of Transport 2025 and the London Plan



1 Announcement by HMT
2 Control period 4 starts
3 Published by Mayor
4 Published by Mayor
5 Published by TfL
6 'Vision' document published

Rail 2025 plays its role in this wider process by identifying the key challenges facing the mainline rail network in London and the wider South East, both now and in the future. It identifies a range of schemes to ensure these challenges are met. These have been selected not only within the context of the region's railways but also within the wider transport policy framework as encapsulated by Transport 2025, ensuring a holistic approach to scheme development and alignment with the London Plan.

1.2 London's rail strategy in London's policy context – The London Plan

The Mayor's London Plan sets out how his vision will drive policy across London through six objectives, which are to:

- Accommodate London's growth within its boundaries without encroaching on open spaces
- Make London a better city for people to live in
- Make London a more prosperous city with strong economic growth
- Promote social inclusion and tackle deprivation and discrimination
- Improve London's accessibility
- Make London a more attractive, well-designed and greener city

Transport will play a critical role in achieving these objectives and in supporting them. Most fundamentally, rail must provide sufficient capacity to meet London's future growth. This will also help to satisfy other objectives, such as a rail system that is fast, reliable, accessible and safe.

1.3 London's rail strategy in the National Rail policy context

As noted above, Rail 2025 also plays a key role in a national policy context. Government is currently defining a HLOS for the mainline railways for the period 2009-2014. This specification will define at national and sector level what the Government wants to buy in terms of:

- Capacity as defined by the network's ability to cater for projected journeys and throughput (passenger kilometres, journeys and throughput in the peak periods into London and levels of overcrowding over key routes and section)
- Performance in terms of how many trains will arrive at their destinations on time (the public performance measure by peak and off-peak periods for London and the South East)
- Safety as defined by levels of risk faced by passengers and workers (levels of risk for passengers and workers in accident-equivalent fatalities).

The HLOS will be published alongside a Government White Paper that will provide a longer-term (30-year) strategy for the railways and which will also cover areas not directly included in the HLOS such as the environment and 'passenger interests'. The latter will include, for example, station and train facilities, Disability Discrimination Act (DDA) compliance, accessibility and integration, many of which are key to TfL's objectives.

Like TfL, the DfT views the provision of capacity for growth as an important objective. This document represents TfL's contribution to this process.

1.4 What does Rail 2025 cover?

The Rail 2025 proposals:

- Demonstrate the case for appropriate recognition of the region's rail needs in terms of London and the South East's transport problems and Government investment decisions
- Articulate and quantify how appropriate investment and policy decisions support the Mayor's vision to develop London as a sustainable world city based on strong economic growth and social inclusion, alongside improvements to its environment and use of resources
- Provide a programme of schemes that meet mayoral and national criteria upon which stakeholders have been consulted
- Cost and appraise appropriate shortlisted investments in schemes designed to meet the region's needs
- Demonstrate that these schemes represent excellent value for money and deliver superior economic performance at both national and regional level
- Support TfL, national government and the wider rail industry in shaping short – and longer-term strategies, by taking account of affordability, process and practical implementation issues (the timing of schemes against the Olympics, network renewal programmes, the re-franchising process, etc)

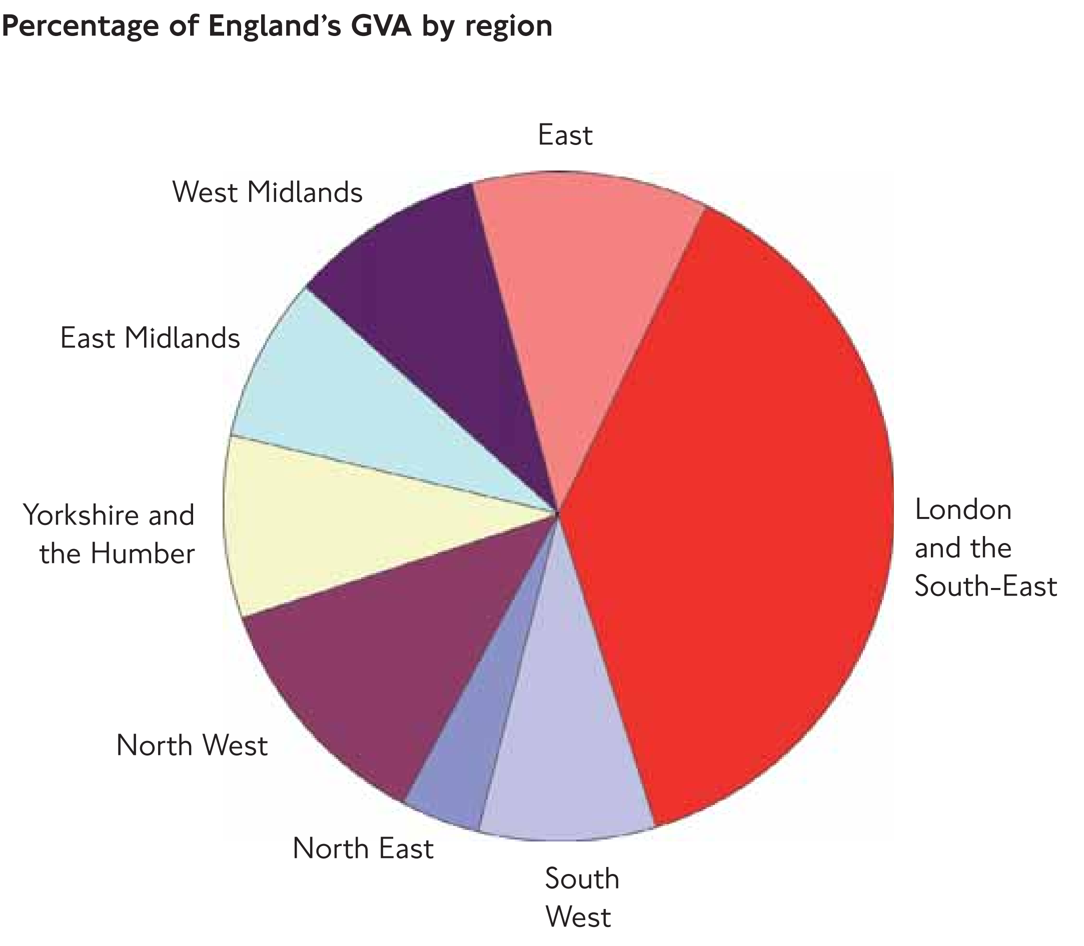
Section 2

London and the South East's importance to the UK economy

2.1 London's role in the UK economy

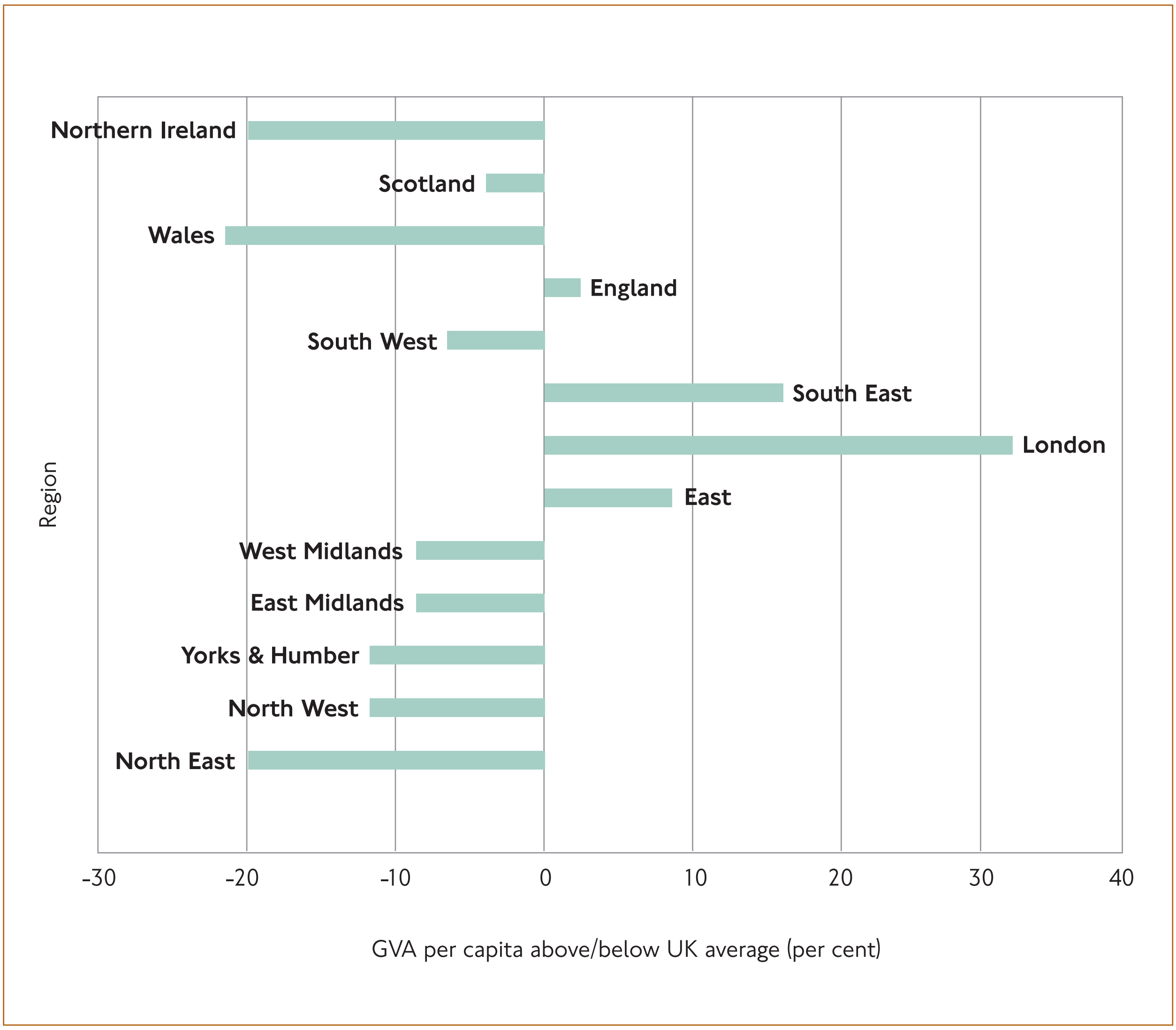
London has a unique role within the UK both as a global financial centre and as a leading centre for cultural and creative industries. It is the most productive region in the UK (30 per cent above the UK average as measured by gross value added (GVA) per capita) and, together with its immediate hinterland of South East England, contributes over a third of UK GDP.

Figure 2: London's economic impact, regional GDP and productivity measures



Source: Regional Trends 2006

Figure 3: Productivity per capita by region relative to the UK



Source: Regional Trends 2006

The high level of London's productivity benefits the rest of the UK, with London paying significantly more in taxes than it receives in services from the national government.

London, and indeed the UK's, long-term success is clearly linked to the need to preserve and enhance London's global competitiveness.

2.2 Reasons underlying London's economic success – job density and agglomeration

Central London has some of the highest job densities in the world. There are only five local authority areas in the UK, all in central London, with employment densities of more than 5,000 jobs per square kilometre. The City of London has a density of 130,000 jobs per square kilometre.

Businesses tend to group closely together, which gives advantages such as:

- A larger, more specialised labour market
- More competing and complementary businesses and institutions
- A larger, more specialised client market
- Greater potential for contact and knowledge sharing

For example, insurance firms locate in the east of the City of London, investment banks cluster together in the City and Canary Wharf. Agglomeration exists in London's major competitors, notably finance and business services companies in New York, Tokyo and Paris.

This density and the resulting agglomeration is a key factor in London's relatively high productivity. Research undertaken for the DfT[6] shows that increasing the size and density of an economic cluster improves the productivity of that cluster. Estimates of the impacts of agglomeration across the UK show that a doubling of city size could lead to an increase in productivity of about 5 per cent. Services sectors, particularly of the kind located in central London where face-to-face contact is more prevalent, derive much higher benefits from agglomeration. It is estimated that a doubling in city size with the economic mix of activities in London could lead to a 20 per cent increase in productivity[7].

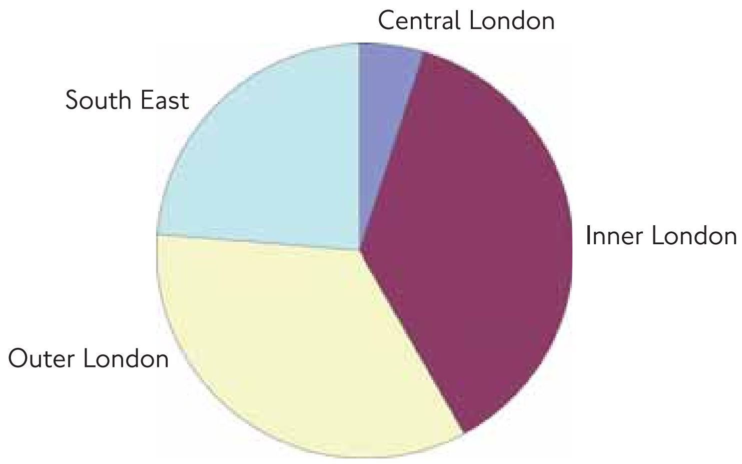
2.3 Critical dependencies

The success of central London's businesses is dependent on the success of the rest of the region. Of the people who work in Central London, 95 per cent do not live there (37 per cent live in inner London, 34 per cent in Greater London and 23 per cent in the rest of the South East). These residential areas are critical in providing a high quality of life for people who live there but who work in central London. The service needs of these people – education, health, other essential services, retail and leisure, recreation – are met in town centres or on a more dispersed basis. Providing the transport necessary for people living in all of London to access jobs and services is essential if the full potential of London's labour force is to be realised.

London's international gateways – Heathrow and other airports and Eurostar stations – help attract multinational businesses to London. The high concentration of these businesses acts as a magnet for talented, productive, ambitious and mobile people, not only from the rest of the UK but from all over the world. This in turn feeds London's competitive advantage.

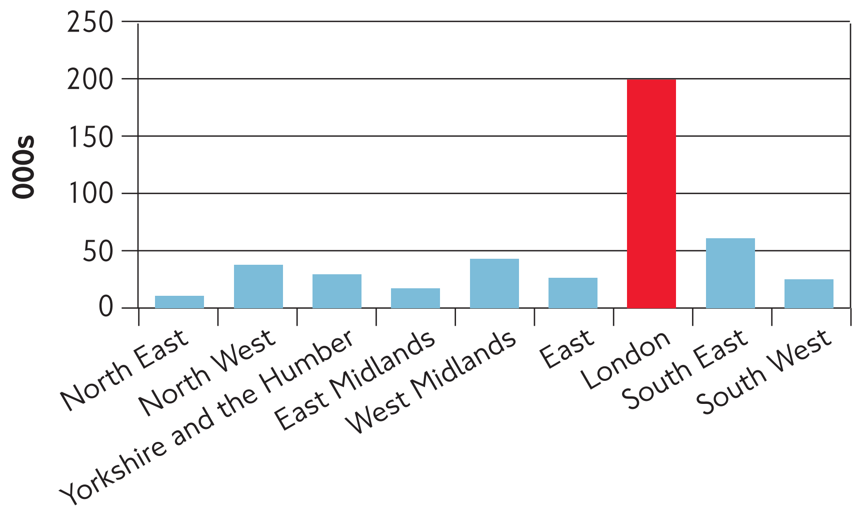
6 As referenced in http://www.dft.gov.uk/stellent/groups/dft_econappr/documents/page/dft_econappr_038893.pdf
7 Transport 2025: London's Future Transport Policy Options and Challenges, TfL, 2006

Figure 4: Transport needs where central London's workers live



Source: Transport 2025 and Regional Trends 2006

Figure 5: Attracting international workers: destination of people settling from overseas



Source: Transport 2025 and Regional Trends 2006

2.4 **Conclusions**

London is critically important to the UK economy and together with the rest of the South East, it contributes a third of UK GDP. Its productivity levels rival those of the US and are significantly higher than anywhere else in the UK. These productivity levels ensure that London is able to contribute more in taxes than it receives in Government spending, providing a mechanism for spreading the benefits to the rest of the UK. The critical reason behind London's success is the density of employment, which creates a virtuous circle of companies, attracted by specialised and concentrated staff and client markets. These firms in turn attract more staff and clients. The higher this concentration, the greater the productivity benefit.

However, there are a variety of critical dependencies, of which providing the transport necessary for people living in all of London to access jobs and services is essential if the full potential of London's labour force is to be realised.

From the above it is clear that London's ability to transport people quickly and easily to the most wealth-producing sectors of the economy is critical to UK productivity and therefore GDP and Government revenue.

Section 3

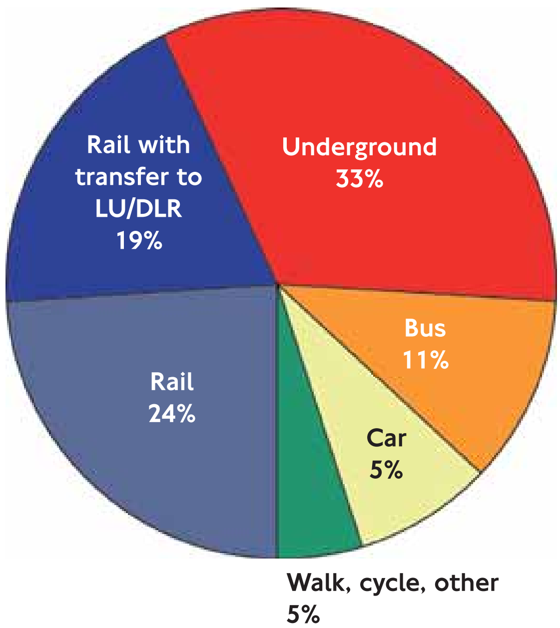
Rail's importance to the region

3.1 Rail's role and market share in London

London's transport system is a complex integrated network of rail, road and bus services. The rail network, consisting of National Rail, Underground and DLR, predominantly provides access to central London, where it plays a dominant role.

Figure 6: Rail shares to central London

43 per cent of trips to central London involve National Rail



Source: TfL central area peak count

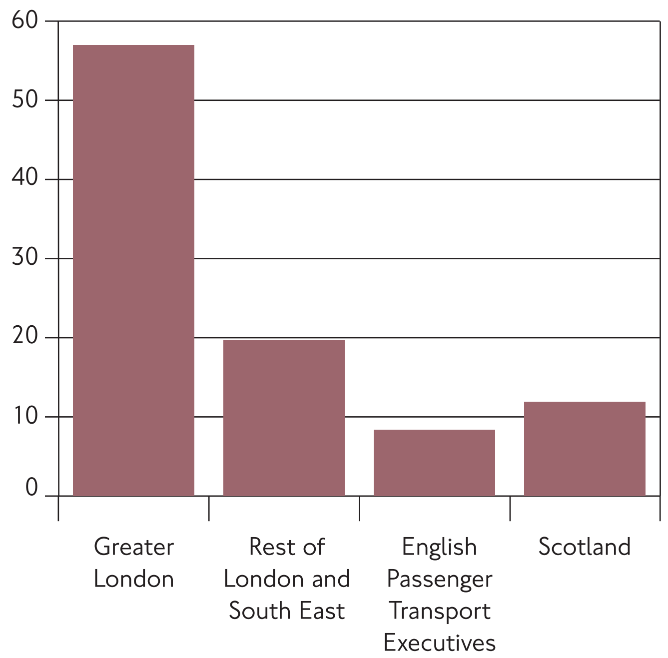
Within this National Rail provides radial routes into London's main termini, providing the only effective solution to transporting large numbers of people, relatively quickly and directly, from the outer suburbs and the wider South East into central London.

3.2 **London's dependency on Rail in the national context**

No other region of the UK is as dependent on rail as London. London's per capita level of rail travel is some seven times greater than in the other English metropolitan areas (excluding the London Underground).

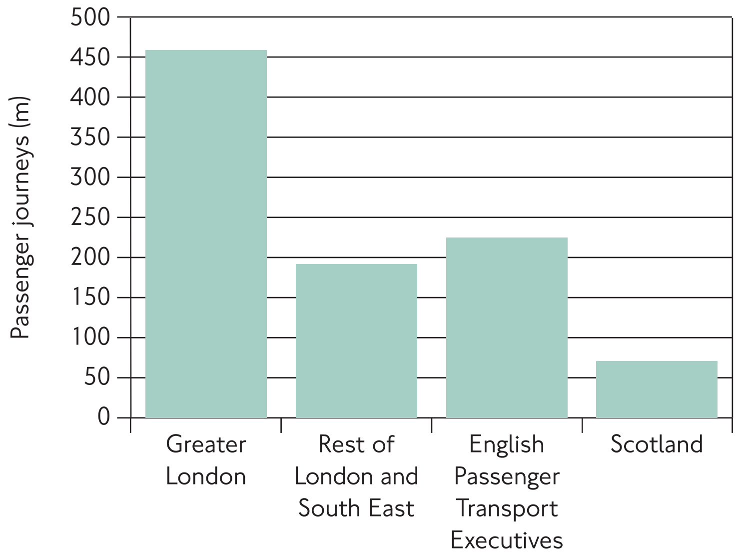
London's dependency on National Rail is demonstrated in the dominance of London in National Rail trips. Some 75 per cent of all UK National Rail passengers have an origin or destination in London.

Figure 7: Rail trips per capita London and the regions



Source: London Rail 'A Statement of Case 2003'

Figure 8: Passenger journeys numbers in different areas of the UK



Source London Rail 'A Statement of Case 2003'. Nb:'South-East' includes relevant East counties

3.3 Conclusion

Rail's market share in London is higher than any other area of the UK. Its role as the dominant mode in transporting people into central London means that London's economy is critically dependent on rail's success in transporting people into work. As such, improvements to London's rail system will affect more people and have a greater impact on its economy than improvements elsewhere and indeed (given London's dominant role in national rail travel) these improvements will have a greater impact on the National Rail network than elsewhere in the country.

Section 4

The quality of London's rail travel

4.1 Rail quality in London

London's rapid growth in population and employment over the last 10 years has placed rail in London under stress. The volume of passenger kilometres in London and the greater South East is up 60 per cent since 1994-95[8], more than any other passenger sector. In contrast, the volume of service has only increased by about a quarter, rather less in the peak periods. One symptom of this is overcrowding; another is the resulting slower journey times as trains take ever longer to load and unload passengers at key stations.

Indeed, it was reported in March 2006 that the 10 most crowded trains in the UK are all in the London and greater South East region. The table shows these results, based on count data for a particular autumn day. While any individual day may not represent the typical situation, it nonetheless makes the point that railways in and around London are the most heavily used and where overcrowding is most severe.

Figure 9: The UK's top 10 most overcrowded trains 2005

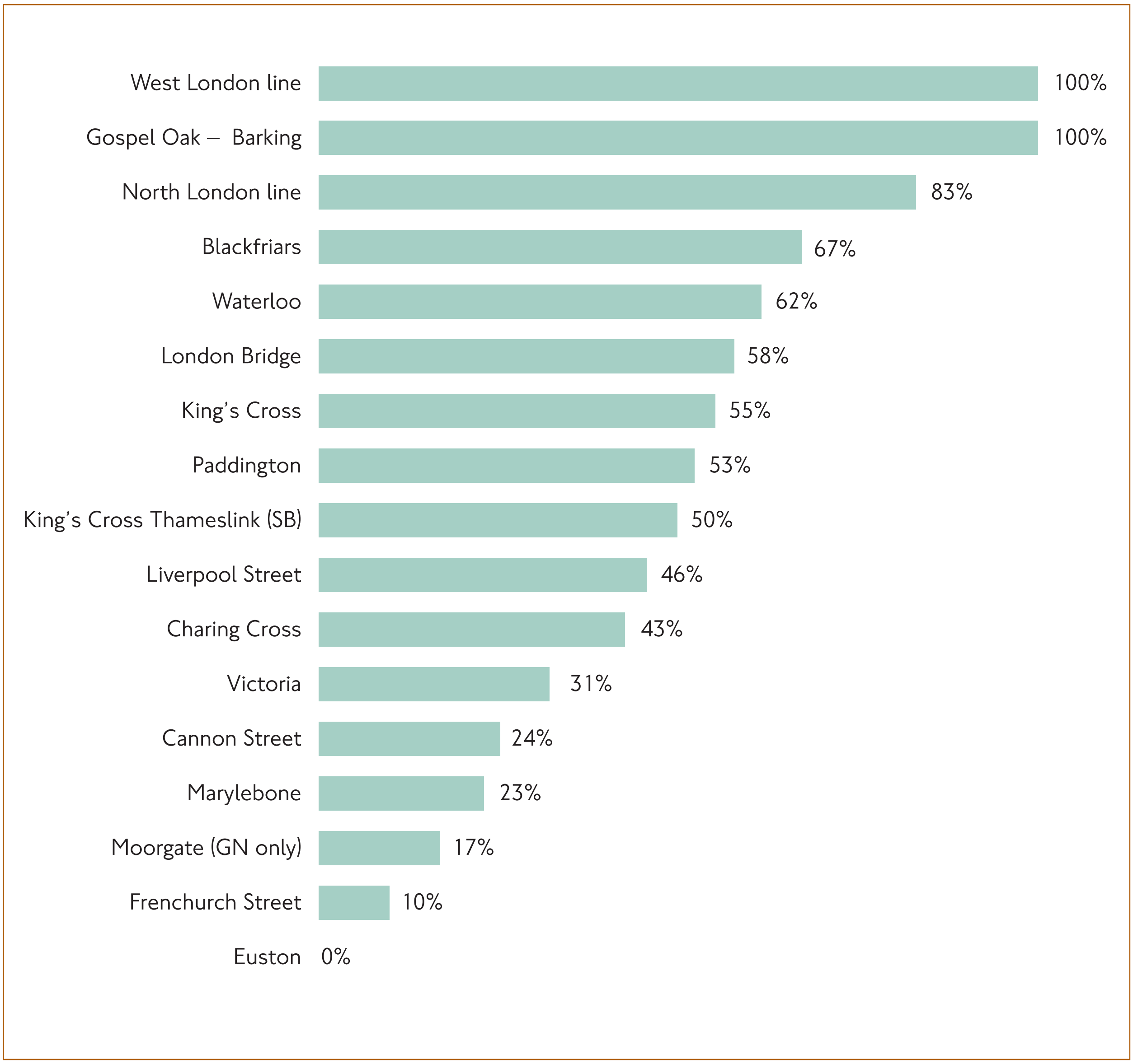
Train operator	Departs	From	To	Overcrowding
One	08:02	Cambridge	Liverpool Street	85 per cent
Thameslink	16:33	Sutton	Luton	50 per cent
Southern	07:51	Crystal Palace	London Bridge	49 per cent
One	18:15	King's Cross	Cambridge	44 per cent
South West Trains	08:04	Isleworth	Waterloo	44 per cent
South-Western	18:06	Paddington	Oxford	43 per cent
South-Eastern	06:38	Margate	Cannon Street	42 per cent
South West Trains	06:42	Haslemere	Waterloo	41 per cent
South-Eastern	17:50	Victoria	Rochester	38 per cent
South West Trains	07:03	Weybridge	Waterloo	37 per cent

Source: Answer to freedom of information question, reported in newspapers March 2006

8 National Rail Yearbook 2005/06, table 1.1a

In fact, over a third of services arriving at London terminals exceed guideline capacity requirements[9]. The chart below shows that this is most severe on routes such as Thameslink and at termini including London Bridge, Waterloo and Victoria.

Figure 10: Crowding on trains at main London terminals



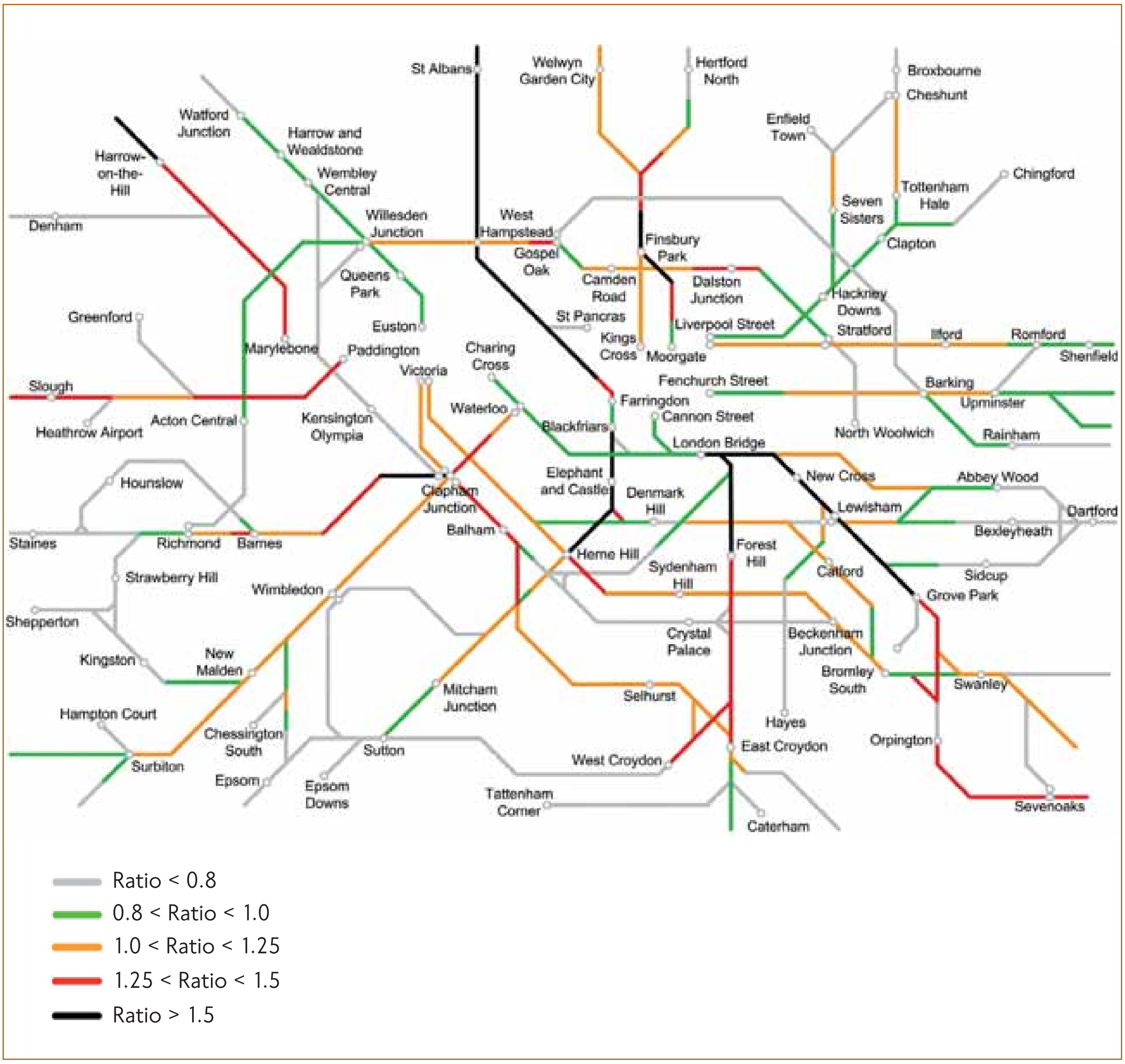
Source: PIXC data, SRA 2005.

Notes: The measure is the percentage of trains with passengers in excess of capacity in the morning peak hour. This is a function of the guideline capacity, which varies according to service type.

9 Guideline capacity varies according to the type of service

The map gives further detail, and also shows that this is not just a phenomenon associated with the last mile to the terminus but something that extends in some cases well beyond London's boundary.

Figure 11: Crowding hotspots route by route 2006

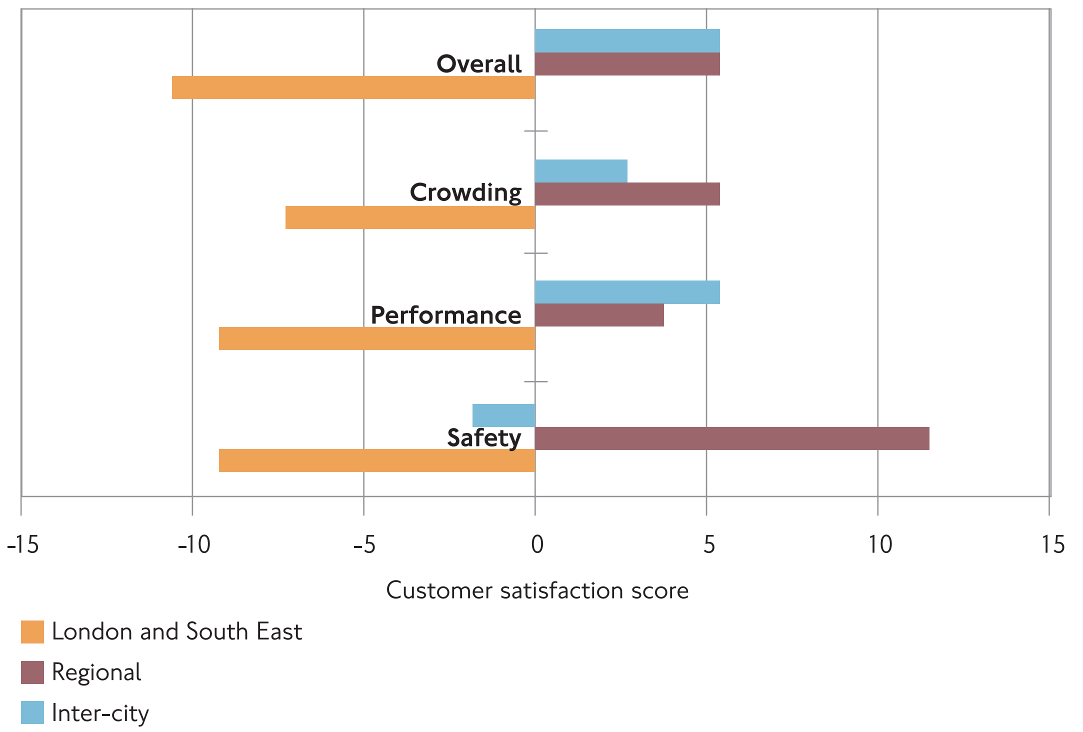


Source: TfL analysis from RailPlan model output

4.2 **Passenger perspectives**

Against such a backdrop, it is not surprising that passengers in London and the South East have significantly below average satisfaction levels with their rail services compared with those using regional rail and Intercity services. This holds true not only for passenger satisfaction with the overall quality of rail service, but also with the other key DfT metrics of overcrowding, performance and safety (as measured by passenger perceptions of personal safety at stations and on trains).

Figure 12: Difference from mean satisfaction levels by rail sector



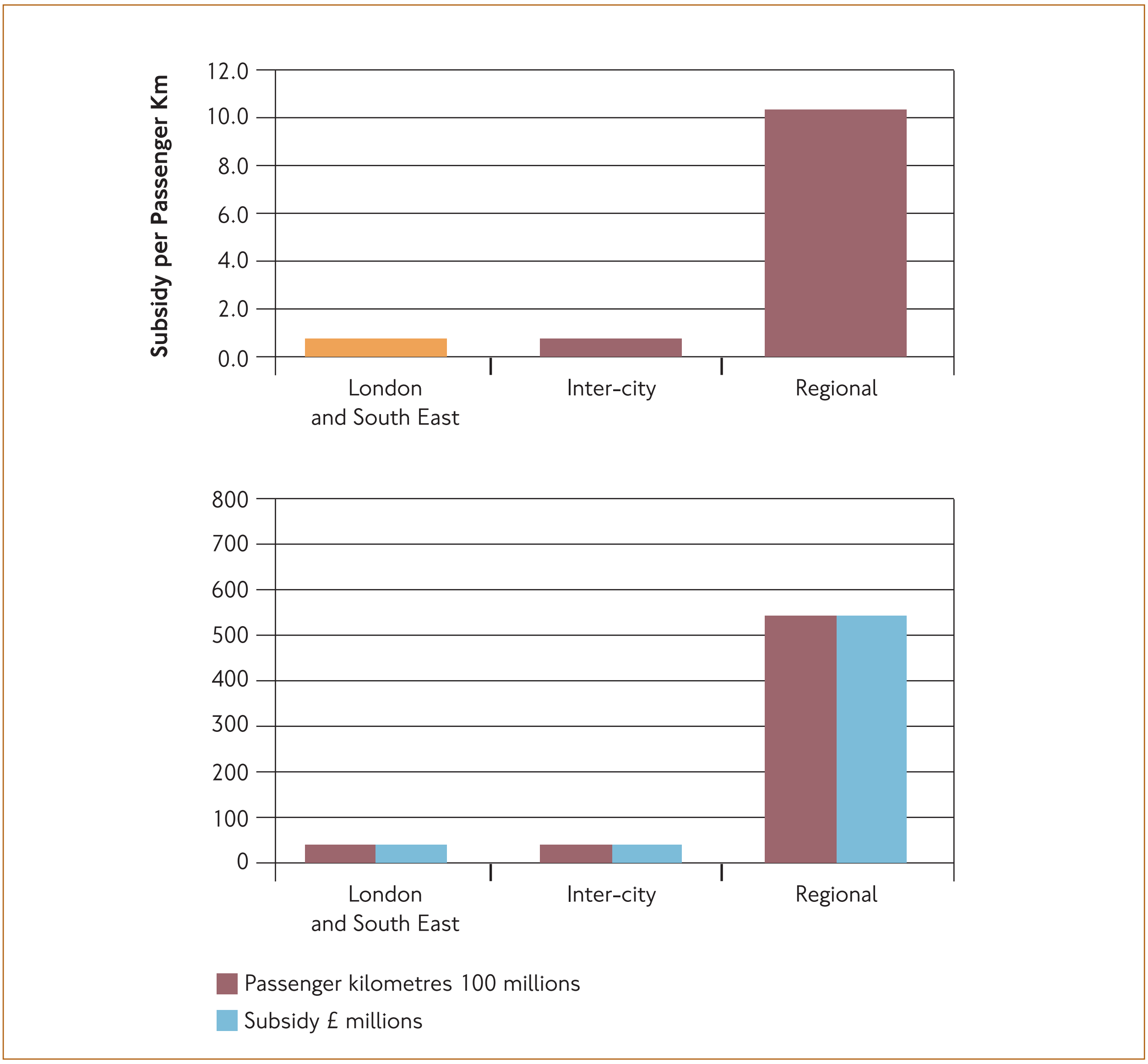
Source: Spring 2006 Passenger Monitor

4.3 **The contrast with other public transport modes**

There is also a growing gap compared to other modes of transport in London. Buses have improved substantially over the last few years in terms of reliability and capacity, and this is reflected in their levels of customer satisfaction. There is a programme in place for London Underground, which is already resulting in improved performance and capacity enhancements, for example the longer trains on the Jubilee line introduced in December 2006. Each of the other lines have upgrades planned over the next 15 years, which should see an increase in capacity of 15 per cent.

With the exception of the upgrade to the North London line and the extended East London line there is no long-term funded programme of investment for London's railways. This is despite the fact that passengers in the region rely so heavily on them, use them so heavily, and receive a subsidy of less than 1p per passenger mile, while regional TOCs receive closer to 10p per mile. In absolute terms the regional TOCs receive 3.5 times London and the South East's subsidy, yet carry less than a third of its passenger miles.

Figure 13: TOC subsidy in passenger miles and absolute terms by sector



Source: ORR website 2005/06 data, Strategic Rail Authority (SRA) accounts 2005, and TfL aggregations

4.4 Conclusions

In short, railways have no systematic programme of investment yet they face a massive challenge already given the growth in patronage they have experienced over the last two decades.

As a result, rail transport could become a serious constraint holding back London's further development. The severe problems of rail transport in London (allied with its high relative importance as a travel mode) mean improvements to London's rail system are more important than elsewhere and will have a greater impact on the UK's economy than anywhere else.

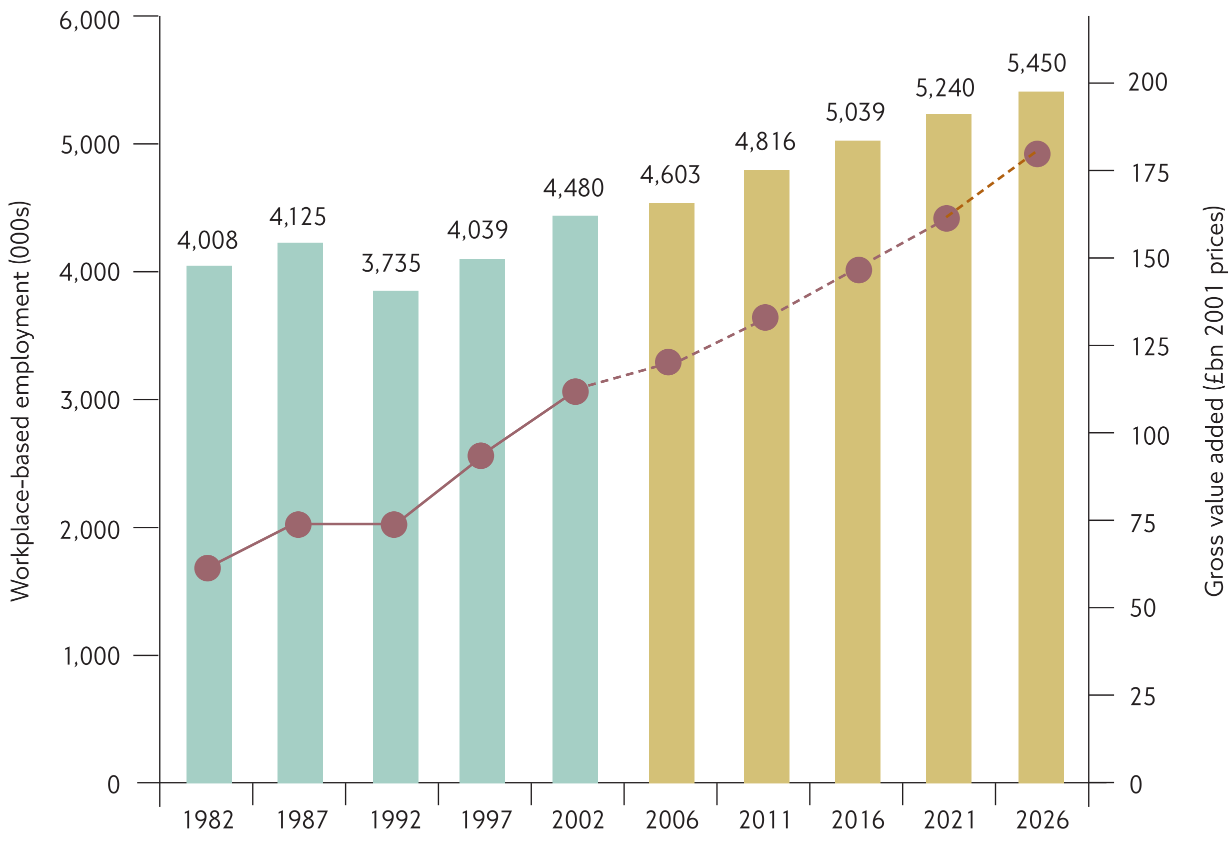
Section 5

London's projected growth

5.1 Employment and population growth

London is in the midst of a long-term economic expansion with a sustained increase in the size and intensity of the services sector. Employment is expected to grow by 18 per cent by 2026, from 4.6 million to 5.5 million jobs, an increase of 900,000 jobs.

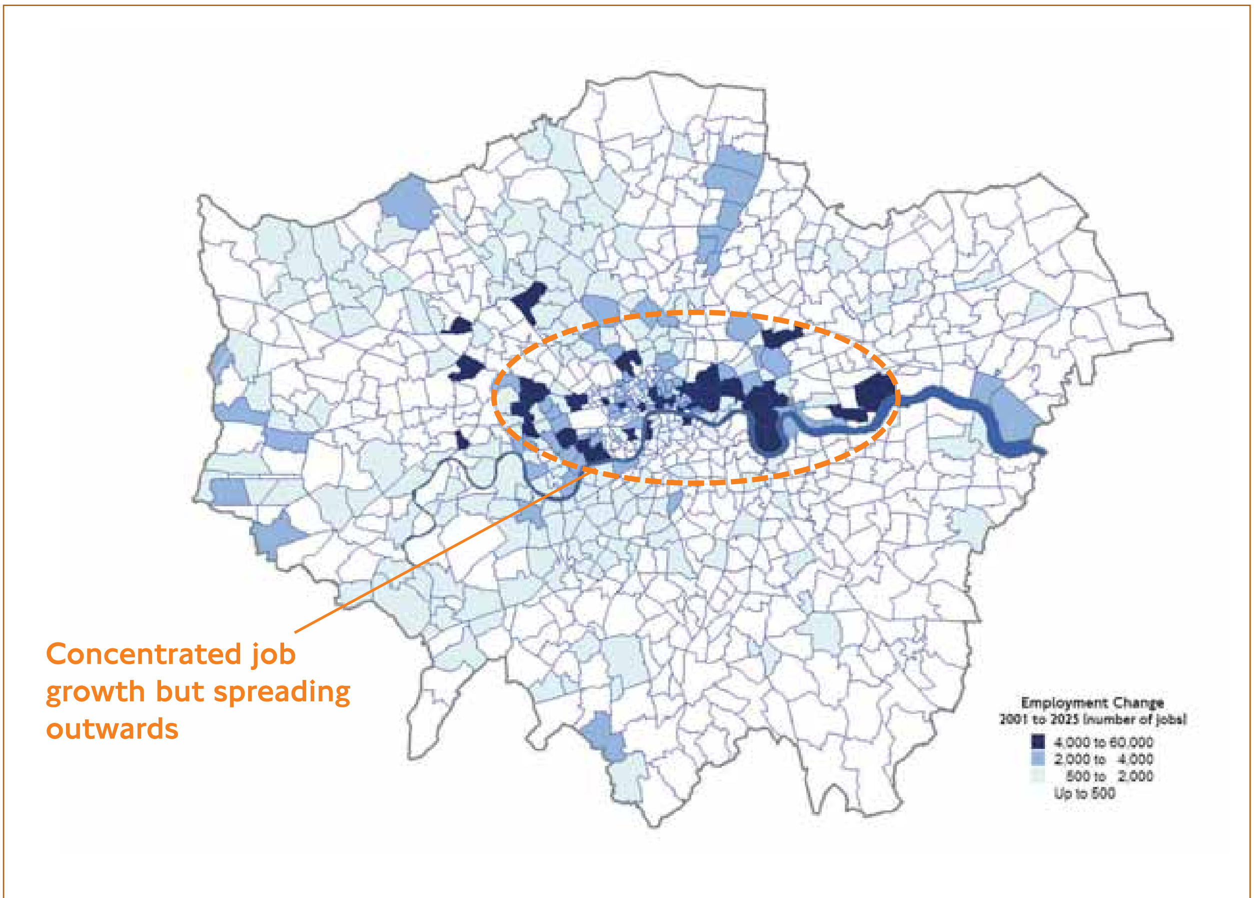
Figure 14: London's employment growth



Source: TfL analysis, Transport 2025

The bulk of these new jobs will be located in the West End, the City and the Isle of Dogs. The significance of the latter will grow further with the regeneration of the Thames Gateway, Stratford and the Lower Lea Valley. Growth will be concentrated in an east-west corridor stretching from White City through the City to the Isle of Dogs and Thames Gateway, also including Paddington and King's Cross. Outside these areas, employment growth will remain concentrated in the town centres and around Heathrow airport. Important employment nodes potentially benefiting from growth of 10,000 jobs or more include Cricklewood/Brent Cross, Park Royal, the Lower Lea Valley and White City.

Figure 15: Employment growth by borough

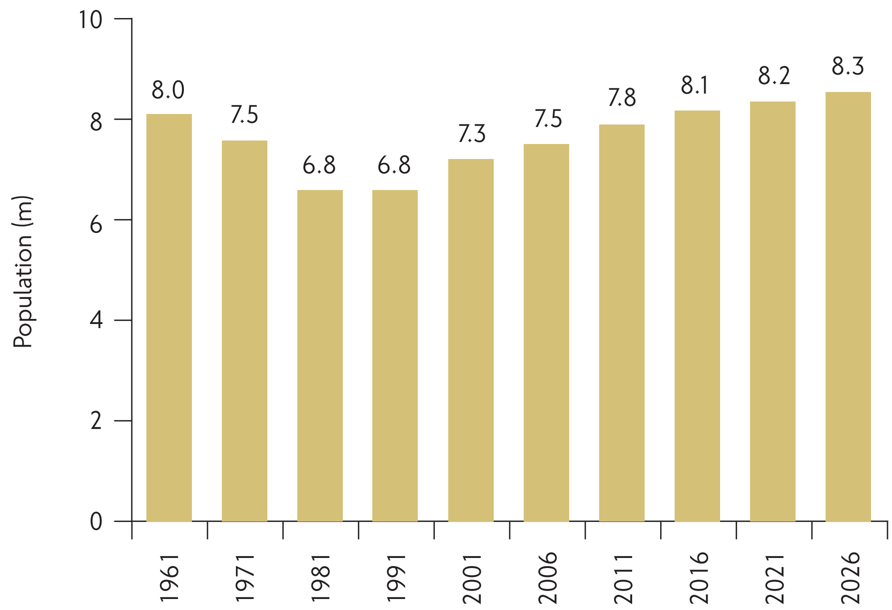


Source: TfL analysis, Transport 2025

In contrast to employment, housing and population growth is more evenly distributed across London. London's population is projected to grow from 7.4 million in 2004 to 8.3 million by 2026. The biggest increases are expected to be in east London, while other major areas for expansion include the Thames Gateway area, Lower Lea Valley (Stratford and Canning town), Isle of Dogs, Greenwich peninsula, Royal Docks and Woolwich, Lewisham and Barking town centres.

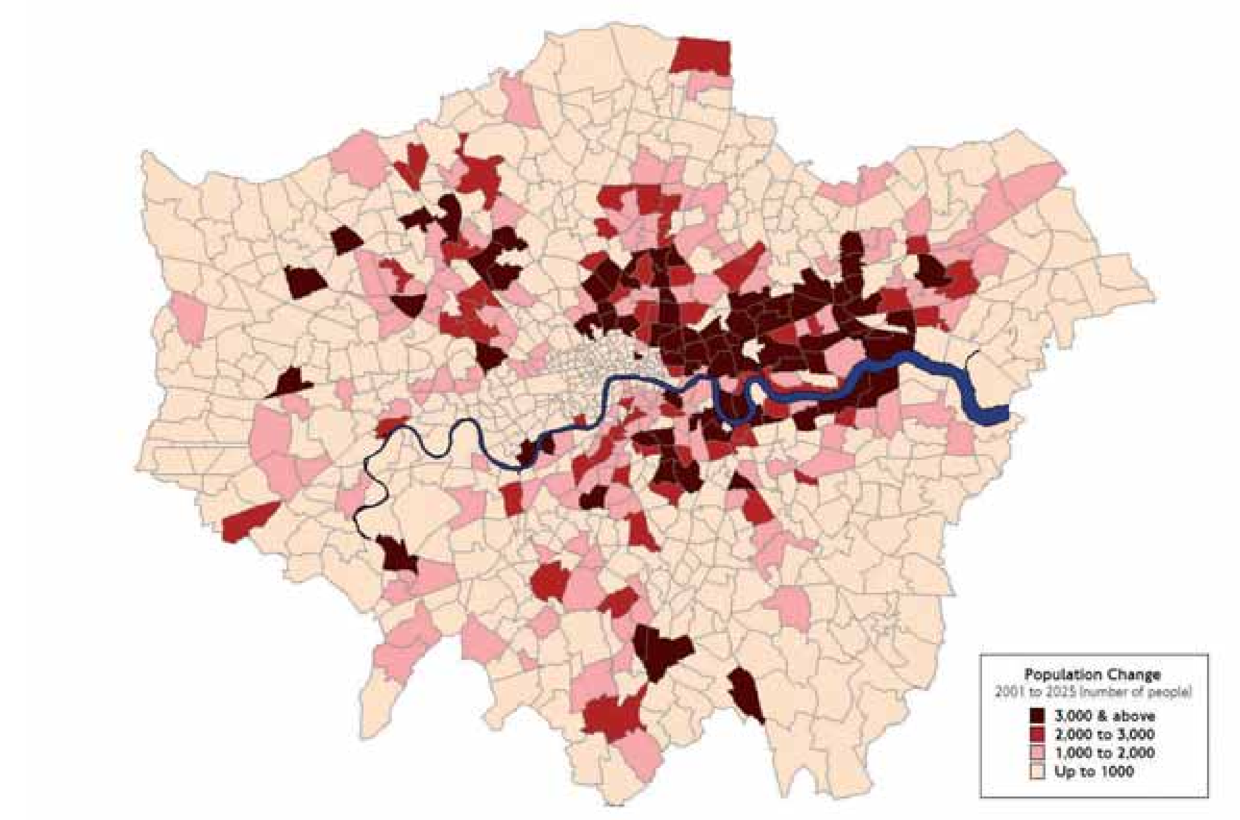
Each of London's sub-regions will face significant growth of at least 100,000 people by 2025. However, there will be local hotspots where growth will place great pressure on already congested networks. Specific locations outside east London that will have an increase of 10,000 homes or more include Colindale, Heathrow, Cricklewood/Brent Cross and the Lower Lea Valley. In addition to the growth predicted within London, the Government's Sustainable Communities Plan projects nearly half a million additional homes in the South East by 2020. Many of these new housing areas are within London's catchment including Ashford, the wider Thames Gateway, the East Midlands and the London-Stansted-Cambridge-Peterborough growth areas.

Figure 16: Population growth in London



Source: TfL Analysis, Transport 2025

Figure 17: Distribution of London's population growth



Source: TfL Analysis, Transport 2025

5.2 **Policy alternatives**

Policies that seek to spread the job growth more evenly across London and the UK at the expense of central London are not considered viable given market trends and could risk losing both productivity benefits and overall employment growth. This is because many of London's businesses such as headquarters of global corporations and international banking are internationally mobile and if they were to leave London they would be unlikely to re-locate elsewhere in the UK.

5.3 **Conclusion**

Population growth is an established trend from the 1980s onwards, while employment has been growing from the early 1990s. However, the level of growth will be constrained if the basic infrastructure needed to support it is not in place. This is a critical factor for London's future economic success.

Indeed, if London is to capitalise upon its opportunities and retain its key role within the global marketplace, transport investment is a critical requirement as it is a key consideration for businesses when considering cities in which to locate.

Faced with continued transport constraints, the new jobs are unlikely to disperse to other areas of London or the UK, as they tend to cluster around central London to gain efficiencies arising from co-location. However, the jobs could relocate to other international centres such as Frankfurt, New York or Paris.

Section 6

Implications of population and employment growth for rail

6.1 Growth in rail demand

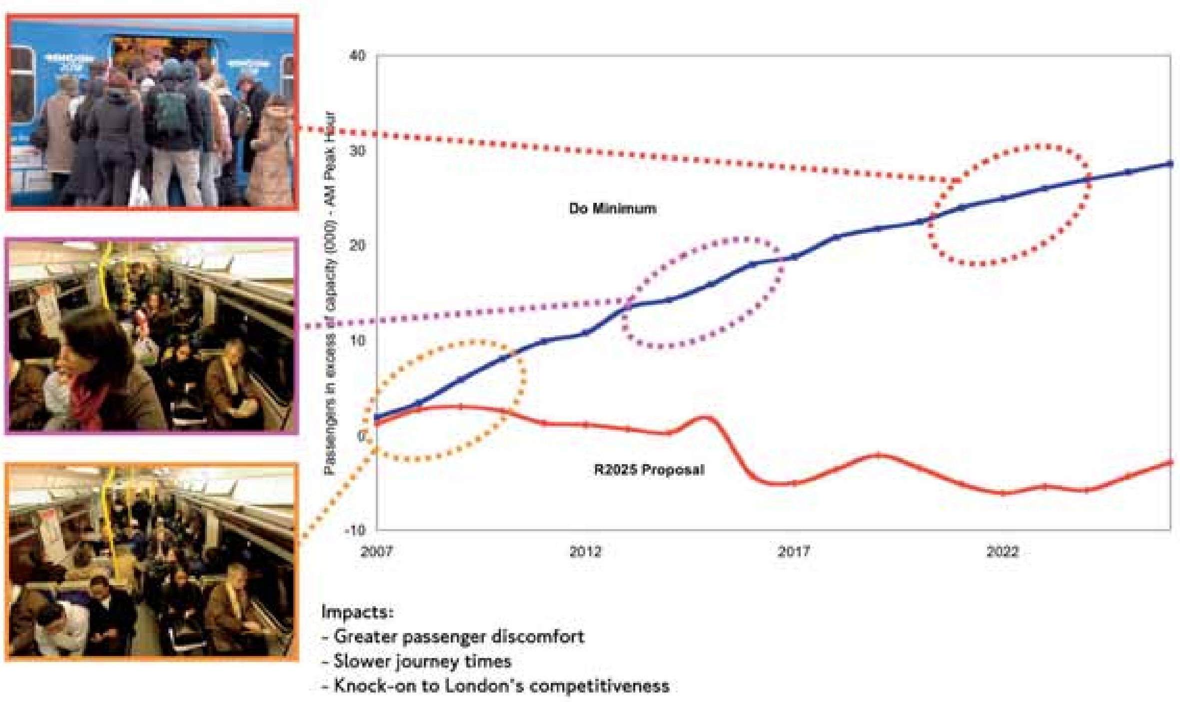
The combination of concentrated employment growth in central London and dispersed housing growth across inner and greater London, as well as the wider South East, will increase the already large commuting task. The previous section described the scale of the challenge.

TfL's projections suggest that rail passenger demand will increase over the next 20 years by 30-40 per cent. These projections can be regarded as conservative when set against the 25 per cent growth experienced since 1997/98. Current planned and funded rail projects will not be sufficient to meet the forecast growth for rail demand.

6.2 Implications for overcrowding

As a result, TfL believes that meeting the growing demand for travel, particularly at peak times, is the greatest challenge to be faced over the next 20 to 30 years. Demand growth of 30 to 40 per cent through to 2025 would lead to a significant worsening of overcrowding, with many trains in the peak hour experiencing four people standing per square metre of space as they approach the London terminus, compared to about one person per square metre currently.

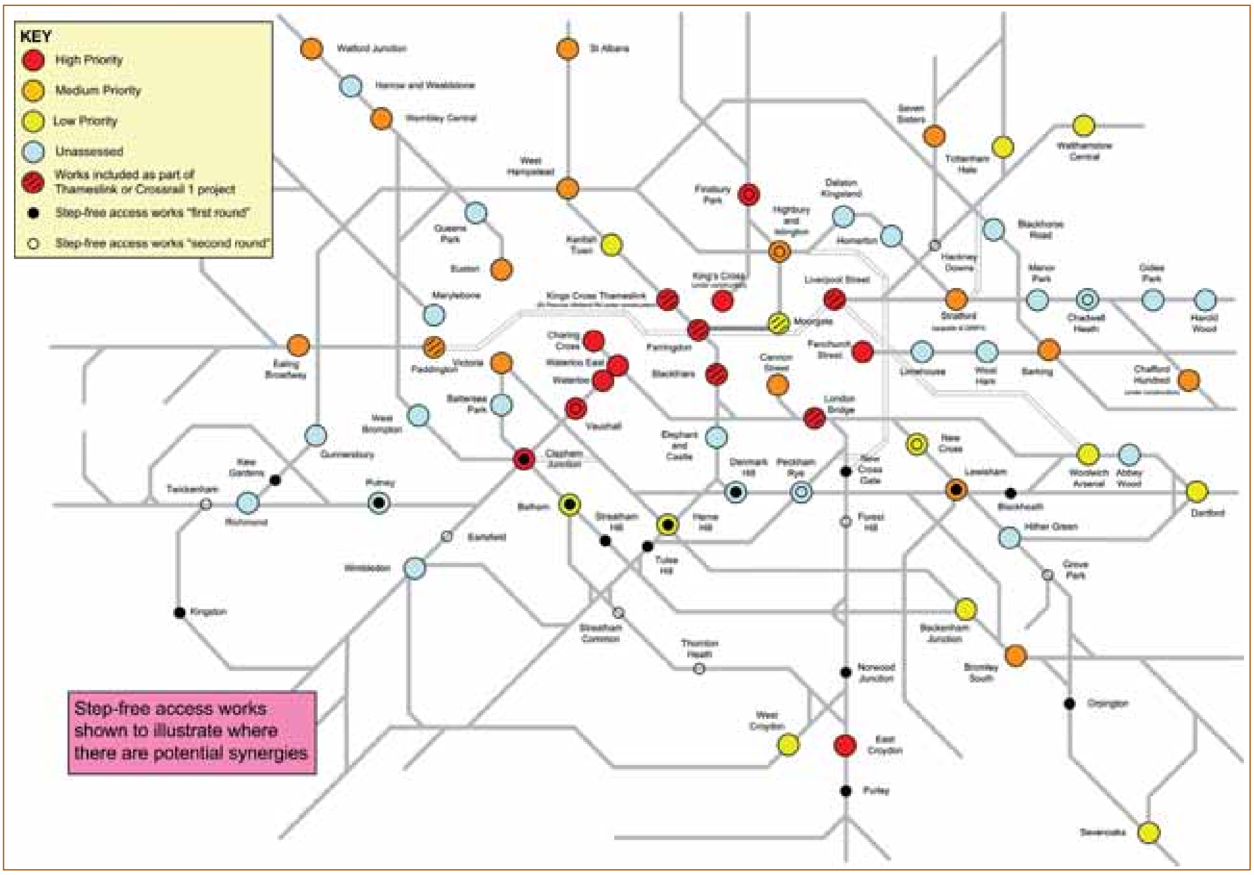
Figure 18: Indicative impacts of increased on-train overcrowding



Source: TfL analysis

In addition, the growth in demand will lead to unsustainable pressure at stations. Stations currently under severe pressure have been identified and are shown in the schematic map below.

Figure 19: Stations with overcrowding problems



Source: TfL London Rail analysis, DfT Railways for All

TfL does not believe that demand management techniques alone can solve the crowding problems. There is already a degree of peak pricing built into the fares structure, for example with the off-peak Travelcard, cheap day returns and Oyster pay as you go, and its extension to other ticket types can make a further contribution to meeting the challenge of growth in demand by encouraging people to travel at quieter times of the day. New working patterns such as tele-working too offer opportunities to reduce the need to travel, while TfL's programme of smart measures should reduce pressures on public transport to some degree. However, these do not provide a panacea, and TfL estimates that growth in the peak periods will still be substantial even under the most optimistic scenarios.

6.3 Consequences and conclusions

Currently funded rail projects will not be sufficient to meet the forecast growth in rail demand and the obvious effect will be ever greater passenger discomfort, delays and slower journeys. However, research has also demonstrated that there are serious consequent knock-on impacts on London's competitiveness by degrading central London's business efficiency. It will become more and more difficult for London to attract the brightest and most ambitious people to its world-class companies. Under these circumstances, companies may be tempted to relocate elsewhere, either in Europe, North America or Asia. Taken together, this would result in a range of significant economic and social consequences.

The challenge of reducing overcrowding by providing more capacity in the morning peak is urgent. This includes the need not just for additional infrastructure, station capacity and rolling stock, but also the support for this, such as maintenance depots, power supply and stabling.

Section 7

Rail 2025's role and its approach to providing solutions

7.1 Definition and role

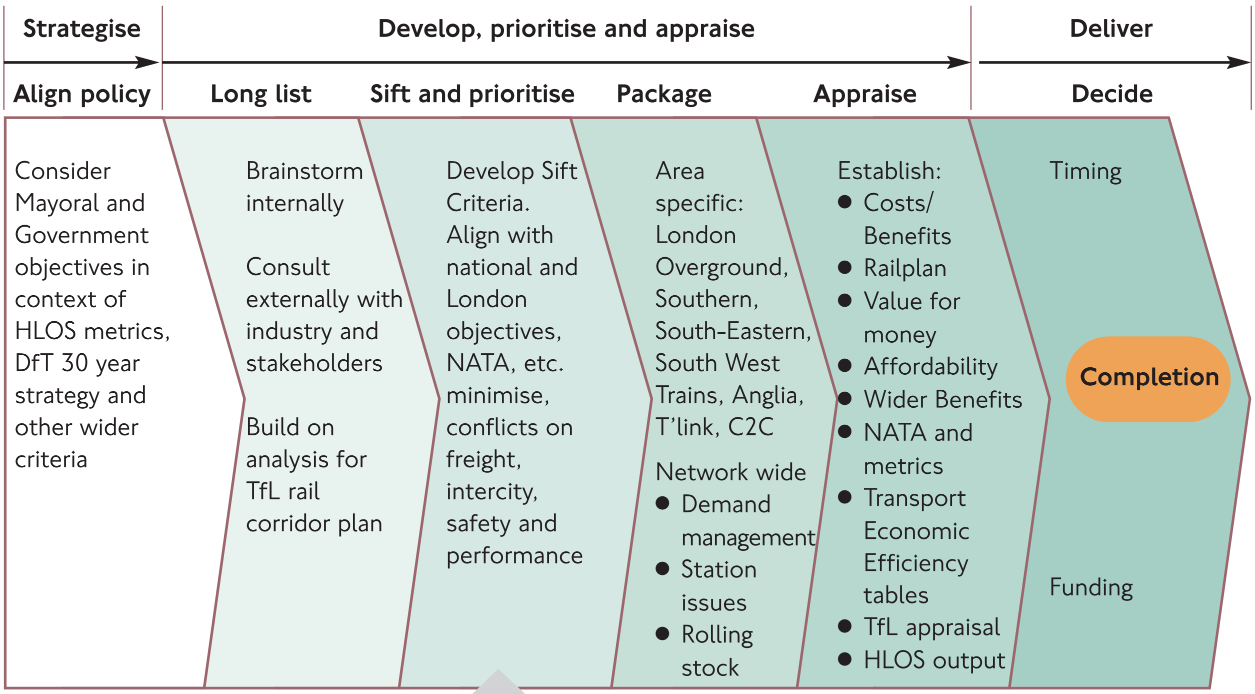
TfL's strategic analysis identifies not only a vision for the future but also provides input to the Government's current work on:

- The HLOS, covering the period 2009-2014 which will define what Government wants Network Rail to deliver in terms of the provision of rail capacity, performance (train reliability) and safety
- The associated SOFA which will define the funding available
- An accompanying White Paper, which will cover a longer-term 30-year strategy through to 2025 and beyond

7.2 Approach

TfL's overall process is summarised in the diagram below, though there is, of course, two-way feedback between each stage of the process.

Figure 20: TfL Rail 2025 development process



TfL's approach satisfies DfT's NATA criteria (environment, safety, accessibility, integration), the Mayor's objectives for London and other criteria relating to deliverability, affordability value for money and wider economic benefits.

7.3 **Policy alignment**

TfL set out to ensure that the schemes aligned with the objective of improving capacity, and that they were aligned with the Mayor's objectives as
set out in the London Plan, i.e that they would enhance:

- Liveability, providing a safer, more accessible city for London's citizens
- Social inclusion, ensuring regeneration and tackling deprivation
- Urban environment, creating an attractive, well-designed, green city

It was also important that the proposals provided a good fit to the HLOS and longer-term strategy requirements. These DfT requirements have a particular focus on overcrowding, performance and safety, as well as affordability and value for money criteria.

7.4 **Long list and prioritisation**

To ensure delivery of appropriate capacity solutions, a detailed route by route analysis was undertaken. This work examined the most appropriate of a variety of alternative solutions, ranging from:

- The reconfiguration of rolling stock to provide more internal capacity with standing room, enabling increased loadings to be achieved
- More carriages per train, requiring the procurement of additional rolling stock and the lengthening of some platforms
- Increasing frequencies of trains, which delivers large benefits to passengers but at some expense, as it involves more rolling stock, more track capacity, improved signalling and some potential impacts on train reliability

There is also a range of site-specific schemes to provide station capacity relief, which is a necessary complement to improving train capacity.

With these criteria and approaches in mind, TfL then developed a long list of schemes through discussion and brainstorming, both internally and with partners in the industry (Network Rail, representatives of train operating companies, etc). This was then carefully sifted and prioritised.

The sifting criteria were based on TfL's assessment of schemes' impact on overcrowding, their likely affordability and value for money, their impact on overall rail performance (train reliability) and their likely impact on other rail operations such as freight and long distance passenger travel.

7.5 **Packaging and appraisal**

Promising schemes were then aggregated into a coherent package of investments on which TfL undertook detailed appraisal in terms of their contribution to key metrics (particularly overcrowding, but also qualitative appraisals of their impacts on performance and safety), as well as more standard criteria of value for money and affordability.

Section 8

Schemes taken forward for detailed appraisal

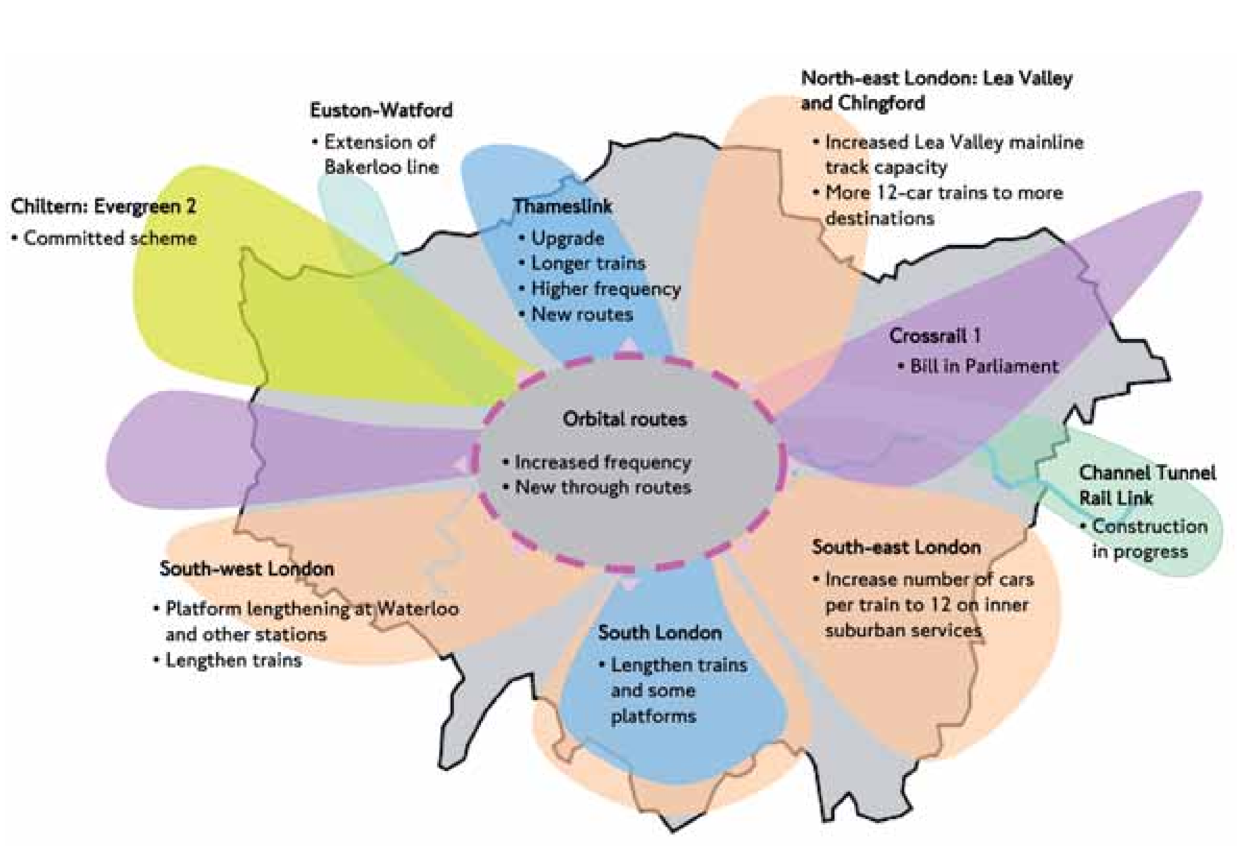
8.1 Philosophy

TfL's sifting and prioritisation processes showed that meeting growing rail demand in London and the greater South East, can be best achieved through a combination of solutions most appropriate to the needs of the individual corridors and areas served.

8.2 Proposed solutions

The map below summarises TfL's solutions, route by route, across London. Each is designed to avoid adverse impacts on freight or intercity services while also maintaining reliability despite, in some cases, higher frequencies. Indeed, analysis shows that reliability is improved as without the extra capacity, there will be a gradual paralysis of the system as overcrowded trains take longer to load and unload at key stations.

Figure 21: Map of Rail 2025 solutions



TfL believes that meeting growing rail demand in London and the South East can be achieved most effectively via a combination of solutions that together will increase capacity by nearly 40 per cent, enough to meet the growth in demand. The single most significant part of this is a new east to west rail link, Crossrail Line 1, from Heathrow in the west right across the capital into Essex and Kent in the east. It travels underground through the city centre between Paddington and east London. Delivering a step-change in capacity to support job growth in central London and the Isle of Dogs, this would bring both longer and more frequent trains to railways otherwise heavily constrained by existing termini at Liverpool Street and Paddington. It will support the development of new areas such as the Thames Gateway and provide major congestion relief on the Underground.

The next most substantial element is a programme to upgrade a main northsouth route, Thameslink, significantly increasing capacity through longer trains and increased frequencies on the overground railway to and through London, via St Pancras in the north and Blackfriars and London Bridge in the south. It would also allow more through journeys by linking in trains that currently terminate at King's Cross, the benefit of which is to reduce pressure on two of the Underground system's most congested lines, the Victoria and Piccadilly.

A third element is the comprehensive upgrade of a major London terminus, Waterloo, that allows longer trains to operate on the dense and heavily crowded network of lines that run through southwest London, Surrey and Hampshire.

There is then a package of individual, relatively straightforward and cost-effective measures, including:

- Longer trains and platforms on West Anglia services and, later, increasing the number of tracks from two to four on the Lea Valley line between Cheshunt and Tottenham Hale
- Longer trains and where necessary, platform lengthening on Southern and Southeastern
- Provide increased frequencies and new through orbital routes to 'join up' the west, north, east and south London lines
- Conversion of the North London Railway Watford to Euston DC service to the Bakerloo line between Watford Junction and Queens Park
- Purchase of additional rolling stock and/or reconfiguration and refurbishment of existing stock to make best use of infrastructure on Silverlink, C2C and South West Trains
- TOC franchise – costed options including improving service frequency across London so that service frequency of four trains per hour operates on most TOCs
- Smaller-scale schemes to make improvements in station security, accessibility and ambience

This is not, however, a definitive plan, though it is backed by analysis. Other ways of implementation may emerge that could achieve the same aim, especially as technology evolves. For example, there may be a greater potential role for selective door opening rather than platform lengthening at lightly used stations, or regenerative braking or 'intelligent trains' rather than boosting power supply. The scope of the proposals is also flexible, so if demand materialises in a different way to the base projection, then the amount of additional capacity can be altered by bringing forward or delaying implementation.

Notwithstanding the many uncertainties, TfL's best current projection of what schemes are required and how they could be sequenced is provided below.

Figure 22: Scheme summary

Scheme	Phase	Activity
South West London	Phase 1	Works to lengthen first Windsor line trains from 8 to 10 or 12-car using Waterloo International platforms
	Phase 2	Works to lengthen inner suburban trains from 8 to 10 or 12-car, with additional stock and power supply works. Platforms 1 to 5 lengthened, with Waterloo's throat remodelled appropriately
	Phase 3	Works to lengthen some longer-distance trains from 10 to 15-car (23 metre) with a flyover between Clapham Junction and Waterloo to allow these services to use Waterloo International
Southern	Phase 1	Selected longer 10-car trains on inner suburban trains, requiring additional rolling stock and platform extensions and possibly power supply upgrade
	Phase 2	Additional 12-car trains on some additional outer suburban routes such as East Grinstead
	Phase 3	Additional 10-car trains on inner suburban trains
South Eastern	Phase 1	Selected longer 12-car trains on Dartford via Sidcup/Bexleyheath and Orpington inner suburban trains, requiring platform extensions
C2C	Phase 1	Selected 8-car trains on main line lengthened to 12-car
	Phase 2	Further 8-car trains on main line lengthened to 12-car
London Rail concession (London Overground)	"service level commitment 2"	West Croydon - Dalston Junction, 4 trains per hour (tph) Crystal Palace - Highbury & Islington, 4-tph New Cross - Highbury & Islington, 4-tph Additional peak services to/from Dalston Junction Stratford to Richmond, 4-tph Stratford to Clapham Junction, 2-tph Stratford to Camden Road, 2-tph Barking to Gospel Oak, 4-tph Willesden Junction to Clapham Junction, 2-tph
	Potential future enchancement	extend 2-tph Barking to Gospel Oak to Clapham Junction extend 2-tph Stratford to Camden Road to Queen's Park via Primrose Hill Harrow & Wealdstone to Watford Junction converted to Bakerloo line operation Dalston Junction to Clapham Junction a 4-tph
Great Western	-	Crossrail line 1: increased frequencies and train lengths
Great Eastern	Phase 1	Possibly reconfigured inner suburban rolling stock layout, and scope for additional fast train Shenfield to Stratford and Liverpool Street
	Phase 2	Crossrail line 1: increased frequencies and train lengths
West Anglia (Liverpool St - Lea Valley)	Phase 1	Run 2 extra peak hour trains into Liverpool Street to provide 4 tph at most inner suburban stations. Lengthen some 8-car outer suburban trains to 12-car, requiring additional rolling stock, power supply upgrade and longer platforms at selected sites. Inner suburban rolling stock with high density layout. Lengthen all inner suburban trains to 8-car.
	Phase 2	Four tracking in Lea Valley, with 4 tph at every inner suburban station. Run 4 extra tph Broxbourne to Stratford.
	Phase 3	Grade separate at Clapton to remove conflicting train movements. Gives capacity to increase frequencies to intermediate stations on mainline, Stansted and Cambridge. Diversion of Chingford trains to run via Stratford to Liverpool Street.

Over a longer period, Crossrail Line 2 may also be necessary, as the projections show the Victoria and Piccadilly lines remaining heavily congested between northeast London to the West End.

These initiatives are complemented by a comprehensive station investment programme ensuring London's major stations can accommodate the increased passenger flows, with other initiatives focusing on improved station security, issues around Disability Discrimination Act compliance, and raising off-peak service frequencies.

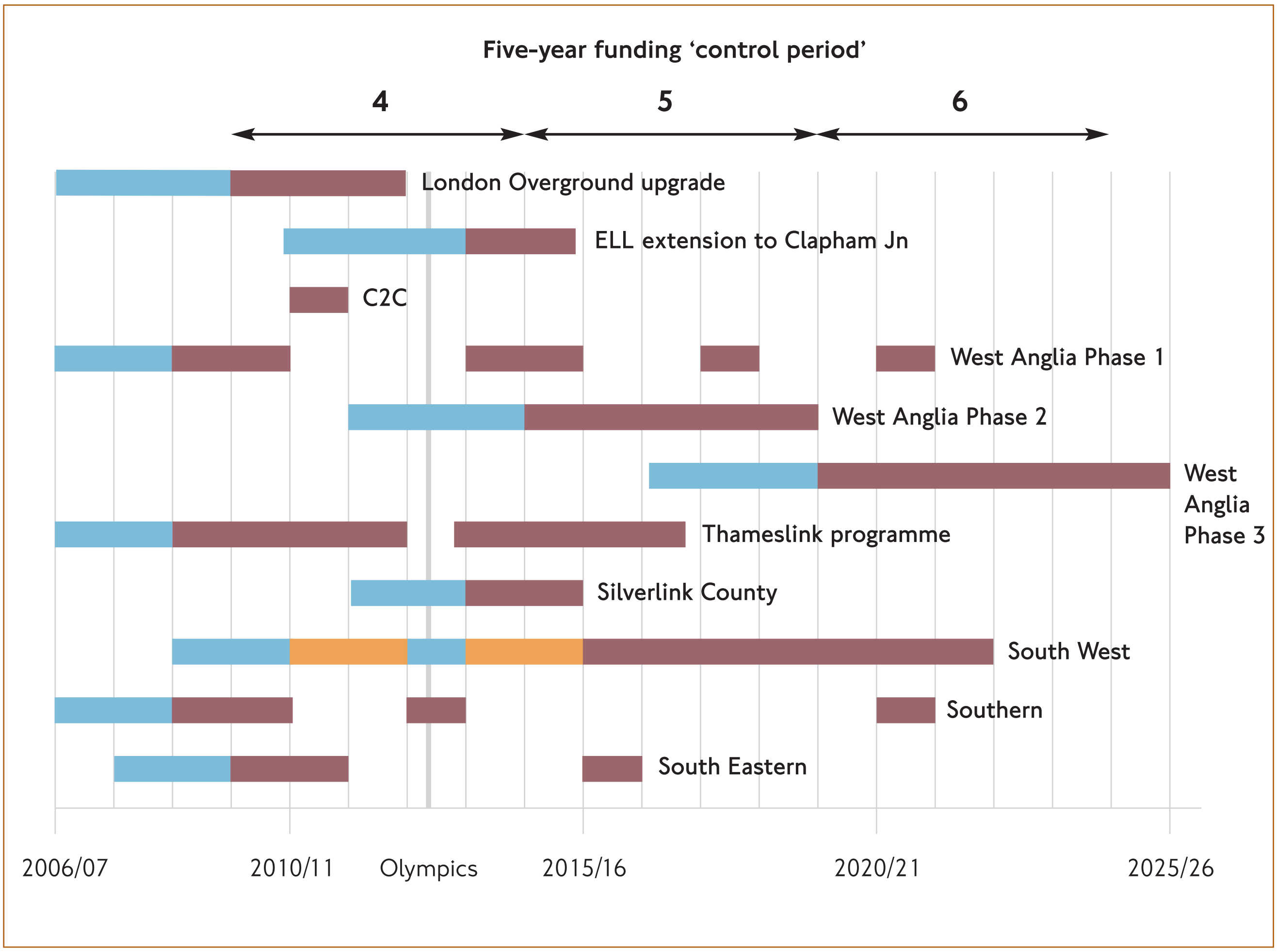
The implementation of these rail schemes will also complement plans for other elements of London's integrated public transport system, including:

- LU renewals and upgrades including links with heavy rail
- Expansion of the DLR
- The development of key interchanges such as Stratford and Clapham Junction
- Continuous improvement to London bus services
- A fair and easy-to-use ticketing system covering bus, LU and rail
- A city that is welcoming to cyclists and pedestrians

8.3 Timing of the solutions

The timing of implementation depends on issues such as coordination with the re-franchising process and currently planned works such as Network Rail's renewal program, as well as likely availability of resources. The programme also attempts to keep disruption manageable, so for example there is minimal infrastructure work during the Olympics year.

Figure 23: Time line for each proposal



The diagram shows a proposed time line of the projects, while the rationale behind the timing and staging of the projects depends on:

- Minimising peaks in rolling stock and infrastructure spending
- Expected levels of overcrowding on the affected routes
- Value for money and affordability
- Ease of delivery
- Dependencies and imperatives such as the Olympics
- How advanced the projects' development stage is

8.4 Reasoning behind timing of projects

The proposals have been timed on the following basis:

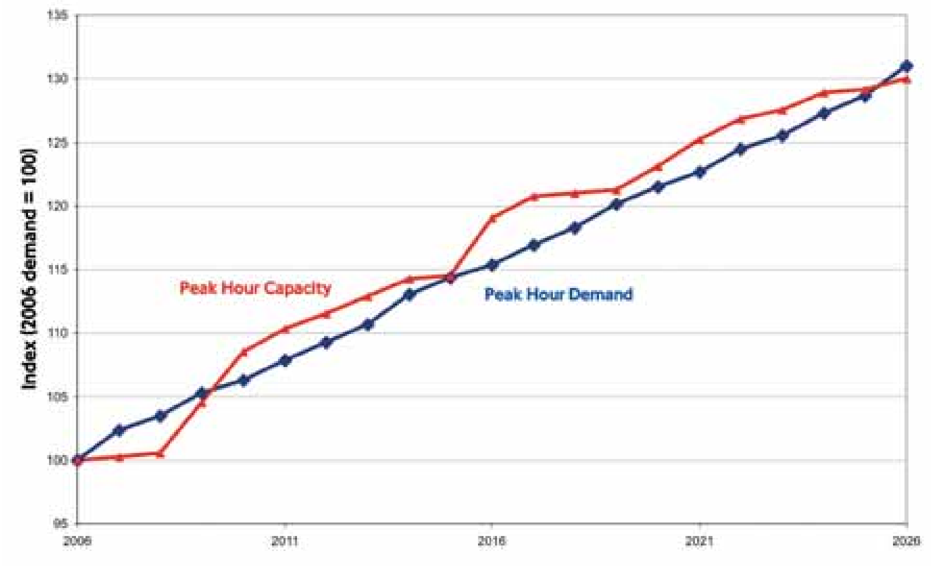
- C2C, projected overcrowding on the mainline is likely to become severe, and the solution involves more rolling stock. The works required are therefore fairly straight-forward and can be implemented in the first five years
- West Anglia is a substantial scheme in total, and it requires a large amount of additional infrastructure, so it is itself phased. The first stage is longer outer suburban trains, which is relatively straightforward, simply requiring longer platforms at 10 stations, additional power supply and additional rolling stock. This could be done within the first five years. Later stages are spread over the remaining 15 years, starting with the four-tracking of the Lea Valley main line and greater use of Stratford as a terminus (assumed to be implemented by 2018). The diversion of Chingford trains to Stratford and the construction of a viaduct to take the Stratford trains into Liverpool Street must necessarily await Crossrail Line 1's implementation. The works are substantial and hence are not programmed to be completed until 2024
- South Eastern projected overcrowding is likely to become severe on the lines from Dartford and Lewisham relatively early. This can be dealt with by more rolling stock and longer platforms at six stations. The works required are fairly straightforward and are planned to be implemented by 2012. There are also synergies with the Thameslink programme, which includes a 12-car service to Dartford
- Southern overcrowding on some inner suburban routes is severe. The solution, which is longer trains and platforms, requires works at more than 20 stations, some of which are quite complex. However, there are synergies with the East London line extension project, and it offers good value for money. It could therefore be implemented by 2013 in three phases (a two-staged roll out of longer trains for inner services and a third phase dealing with the 'outers')
- Silverlink County projected crowding grows steadily and the solution is additional rolling stock to enable more 12-car trains. The work required is the construction or cascading of extra stock so it is fairly straightforward and can be implemented in around five to ten years time

- South West is also a substantial scheme in total, involving around 80 stations, but can be phased as follows:
  - Outer suburban – Design 2008/09 to 2009/10 and implementation 2010/11 to 2011/12, as Windsor line trains can make fairly immediate use of the redundant international terminal platforms at Waterloo
  - Inner suburban – Design 2010/11 to 2012/13 and implementation 2013/14 to 2017/18. Use of the five international terminal platforms by Windsor line trains releases the platform capacity to enable reconstruction of Waterloo's eight-car platforms (1-5) to a smaller number of 12-car platforms for inner suburban services
  - The works to enable longer main line trains are the last element. These are less immediately urgent, and provide poorer value for money given the need for an expensive viaduct. Design would be 2015/16 to 2016/17, with implementation 2018/19 to 2023/24
- Thameslink programme. This well-developed project could start in 2009, subject to funding and the outcome of the Public Inquiry. A single programme with construction sequenced over time is envisaged. Works could start on the Midland Main Line and central core sections first, including station works at Farringdon and Blackfriars, with completion of these elements before the Olympics. The remaining works could start immediately afterwards, and could synergise with renewal works at London Bridge
- The upgrade of the London Overground routes, including the East London line extension between Highbury & Islington and Crystal Palace and West Croydon, has already started. The strategy includes a further East London line extension to Clapham Junction
- Gauging, signalling capacity and electrification of the Barking to Gospel Oak route would also bring significant benefits both in terms of a freight diversionary route in the context of rising demand for paths from deep-sea container ports, the need to improve and maintain network resilience, and opportunities for reducing costs by having a common fleet for TfL's concession. It also allows extended engineering works on the North London line to proceed

8.5 **Phasing the schemes**

The figure below shows that project phasing acts to keep demand and supply in broadly equal balance, ensuring overcrowding does not significantly worsen through time. However, it should be noted that the situation is likely to get worse before it gets better as peak hour capacity will remain relatively flat in the early years.

Figure 24: Demand and capacity growth through time



Source: TfL analysis

Section 9

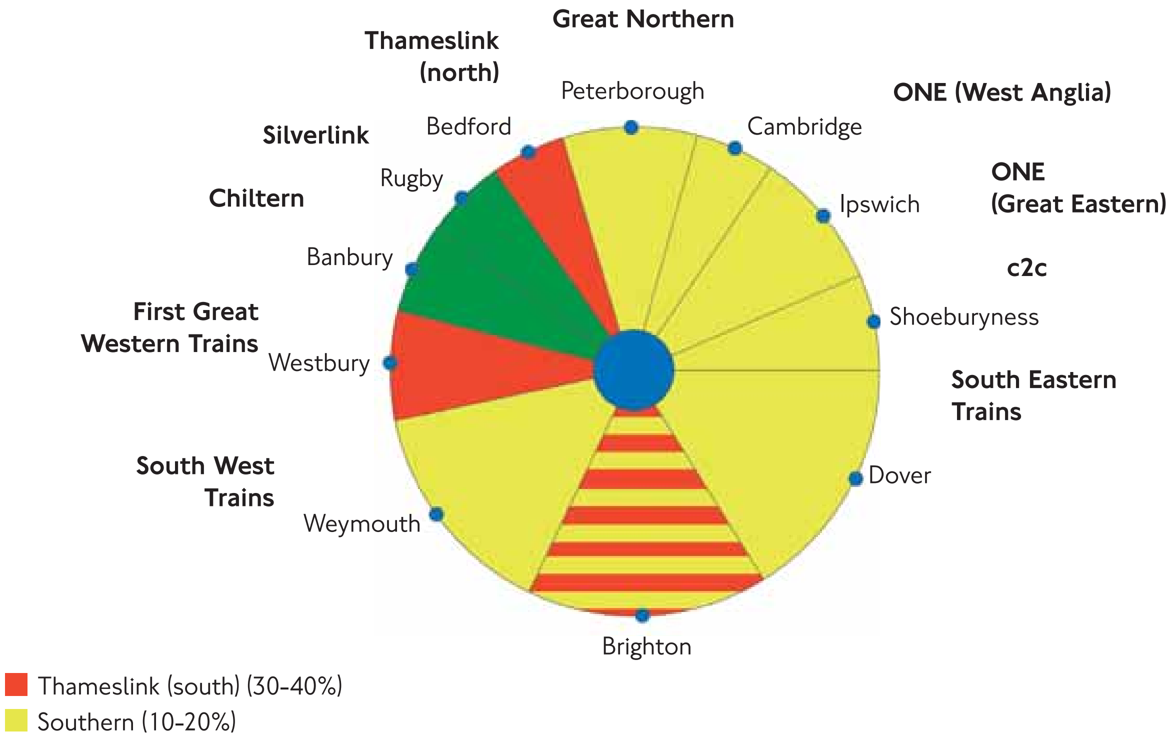
Impacts of the Rail 2025 proposals and case studies

9.1 Overview

TfL's proposal increases peak capacity to meet future demand, reduce crowding on London's radial routes, improve accessibility and 'join-up' these routes with improved orbital rail services (including the East London line extensions). The benefits of Crossrail and Thameslink schemes that add capacity east west and north south into the heart of central London, combined with projects to make best use of existing National Rail infrastructure in London will ensure that growth is managed in a sustainable way, and at relatively lower cost than building further new rail links.

Figure 25: Impact of TfL's strategy on overcrowding

Projected overcrowding 2025
Morning peak – % Crowded hours

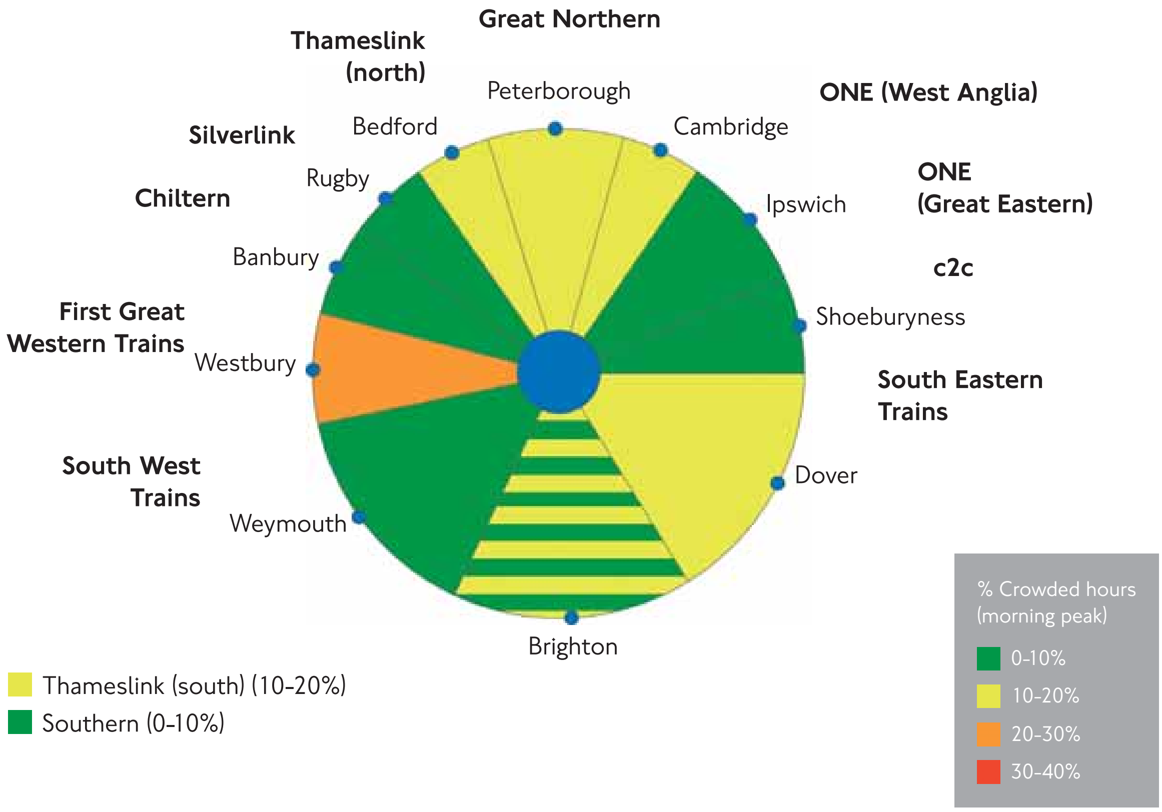


Source: TfL analysis

9.2 Overcrowding

The diagrams below show the contrast in overcrowding with and without implementation of the strategy. Reductions are shown across London with particular relief focused on the core problem TOCs of Thameslink (both north and south of the river) and First Great Western Link, with significant impacts also shown on One/West Anglia, South West and Southern.

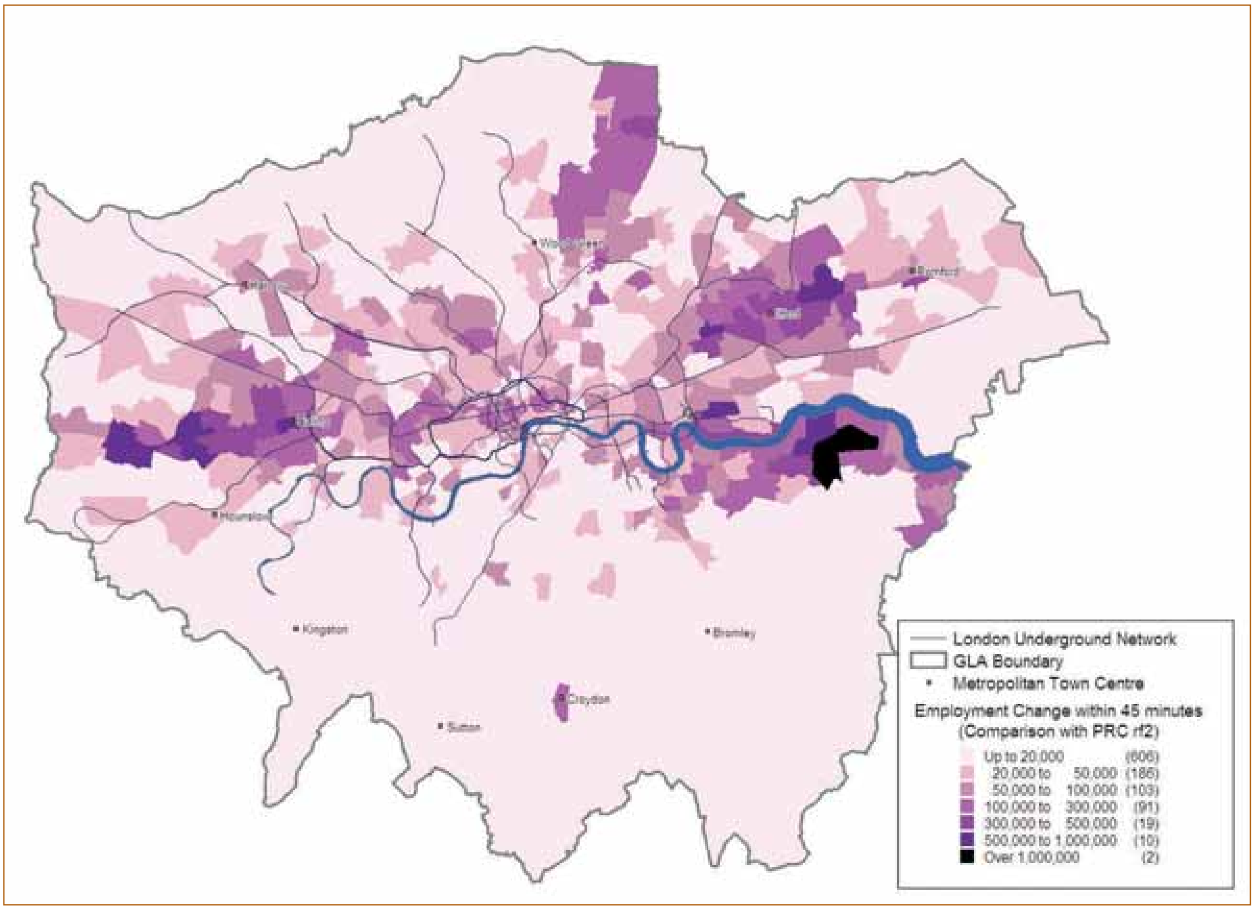
2025 overcrowding – Rail 2025 proposals



9.3 **Journey time reductions and improved access to employment**

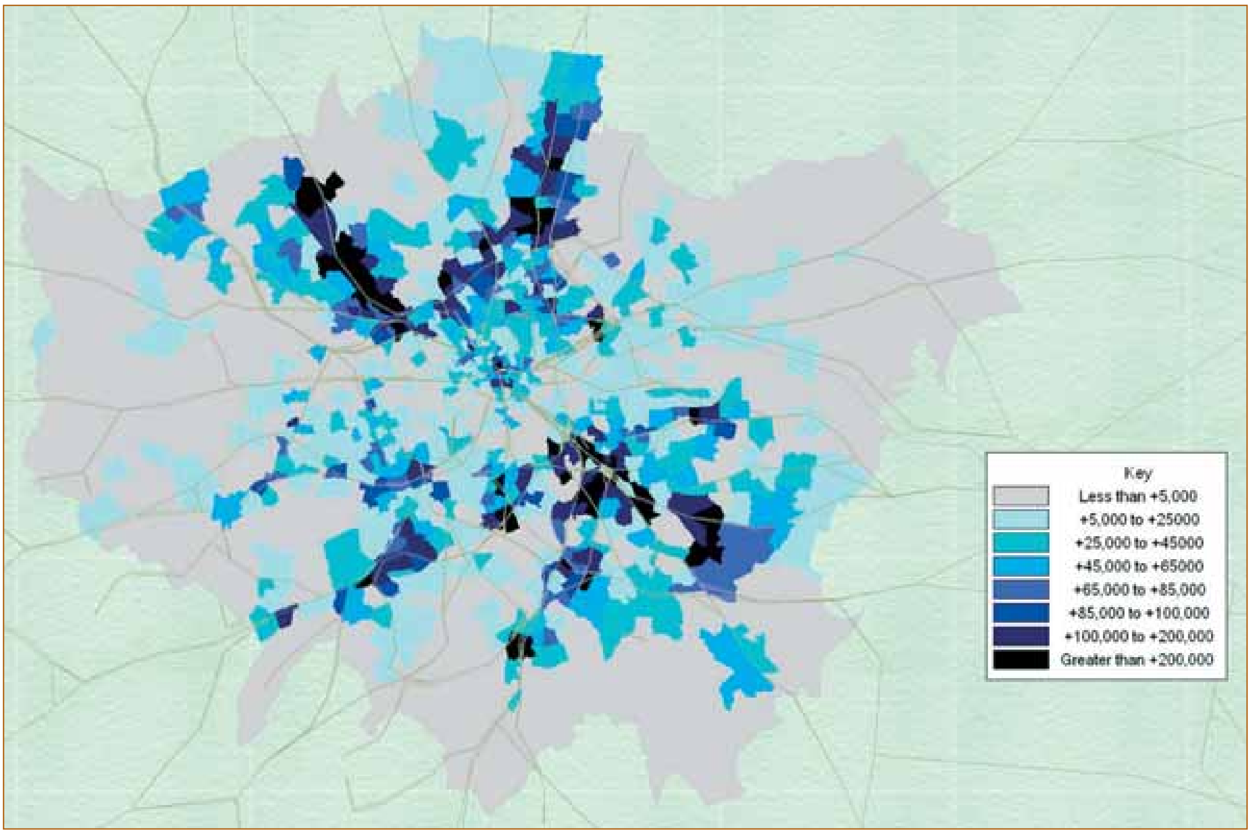
Crossrail Line 1 makes the greatest contribution to improving journey times and improving London's accessibility. The map below shows the areas that gain most. Overall, by 2025 Crossrail brings an additional 90,000 people within 45 minutes of key employment opportunities compared to 2005.

Figure 26: Changes in employment accessibility from Crossrail Line 1



The other proposals yield further reductions in journey times mean that an additional 32,000 people are within 45 minutes of key employment opportunities by 2025 compared to 2005.

Figure 27: Changes in employment accessibility from rest of the strategy

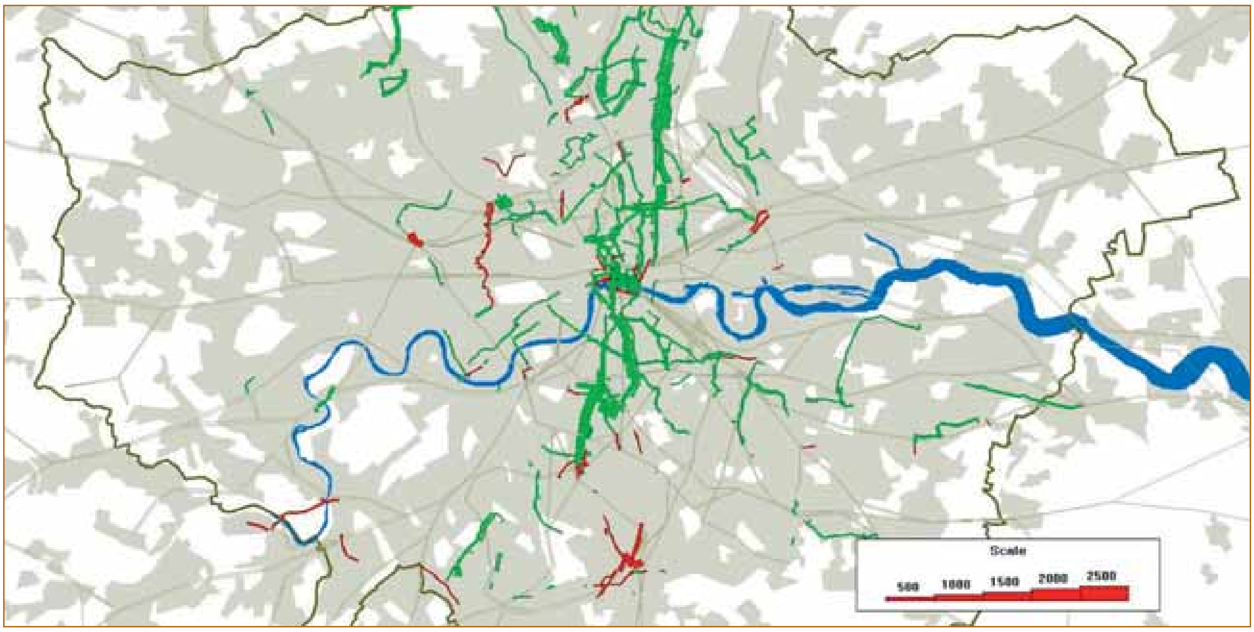


9.4 **Beneficial impacts on other passenger transport modes**

TfL's strategy will result in a small but still significant transfer of demand from car to rail representing a mode shift of about 1 per cent. This will help to reduce road congestion in both central London and the suburbs.

The rail schemes will also have a substantial impact on bus and Underground overcrowding. Excluding the impact of Crossrail Line 1, forecasts indicate an overall 5 per cent reduction in morning peak bus passenger kilometres by 2025. The map below shows the impact of the schemes on bus services, with the green lines indicating reductions in overcrowding and the red ones some increases. The Thameslink and West Anglia schemes are among the most significant in this regard.

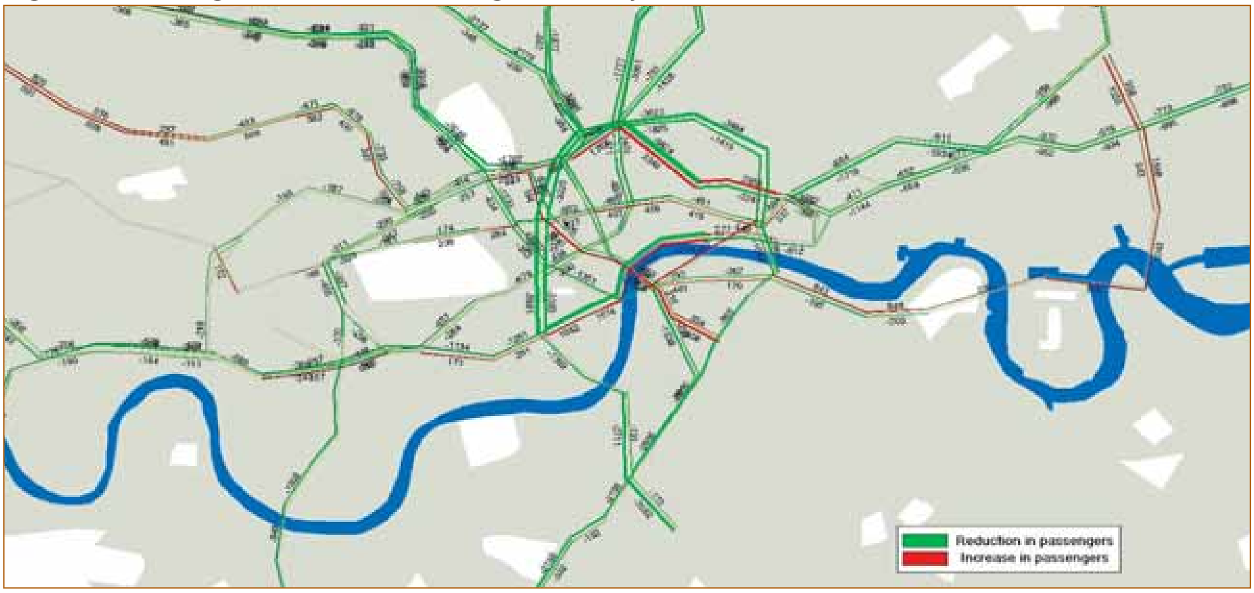
Figure 28: Change in bus overcrowding caused by rail strategy



Notes and source: TfL London Rail, 2026 Vision vs 2026 Base Bus Flow Differences (difference > 200 alighters). Analysis exclude Crossrail line 1, assumed to be included in the 'base case'.

Figure 28 shows that TfL proposals also contribute to a reduction in Underground crowding caused by 2 per cent of passengers transferring to National Rail.

Figure 29: Change in LU overcrowding caused by rail schemes



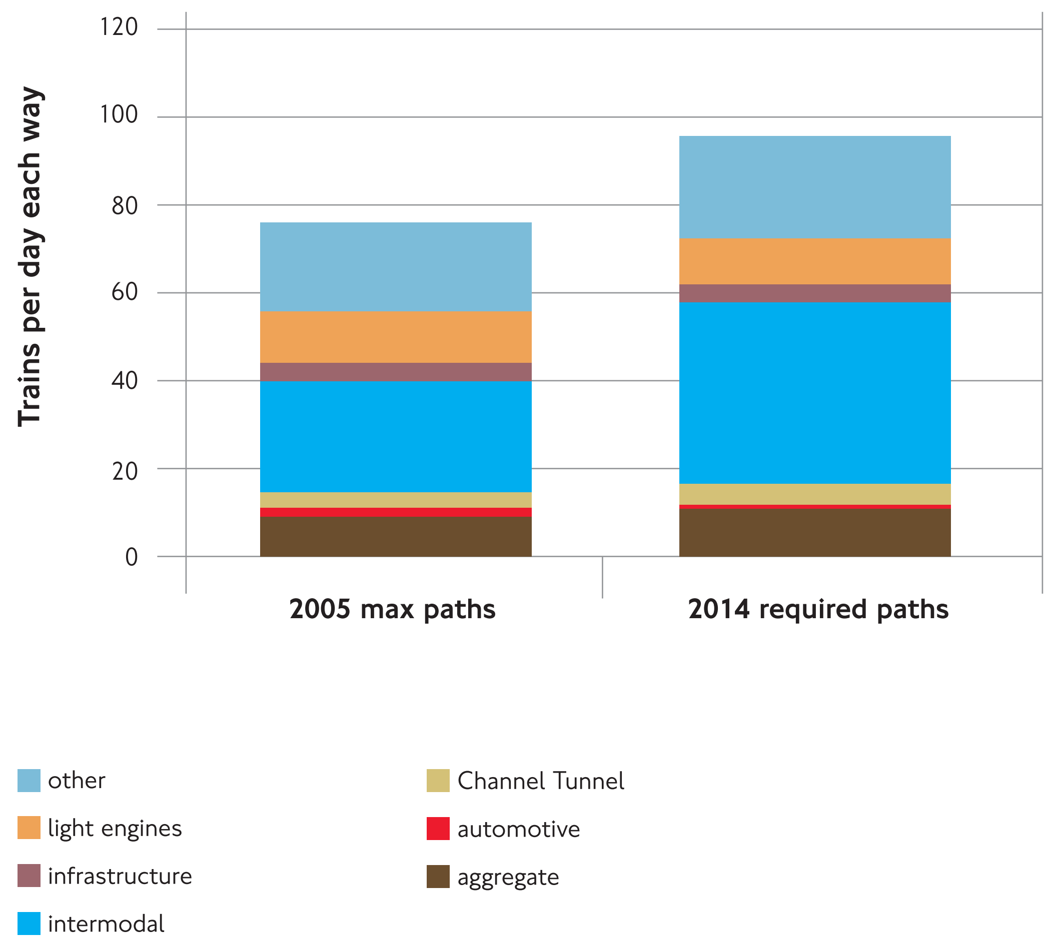
Source: TfL London Rail from RailPlan. Analysis excludes Crossrail line 1, which is assumed to be included in the 'base case'.

9.5 Impact on freight

TfL's rail proposals are designed not to have an adverse impact on freight. TfL is aware that significant growth in freight demand is anticipated, especially in the context of proposed deep-sea container port developments at Felixstowe, Bathside Bay and Shellhaven, which is forecast to increase significantly freight traffic through London.

The need for additional paths is likely to be most acute on, though not limited to, the North London line, along with feeder radial routes such as the Great Eastern and West Coast mainlines.

Figure 30: Forecasts of North London Line freight requirements



Source: Network Rail Cross London Route Utilisation Strategy

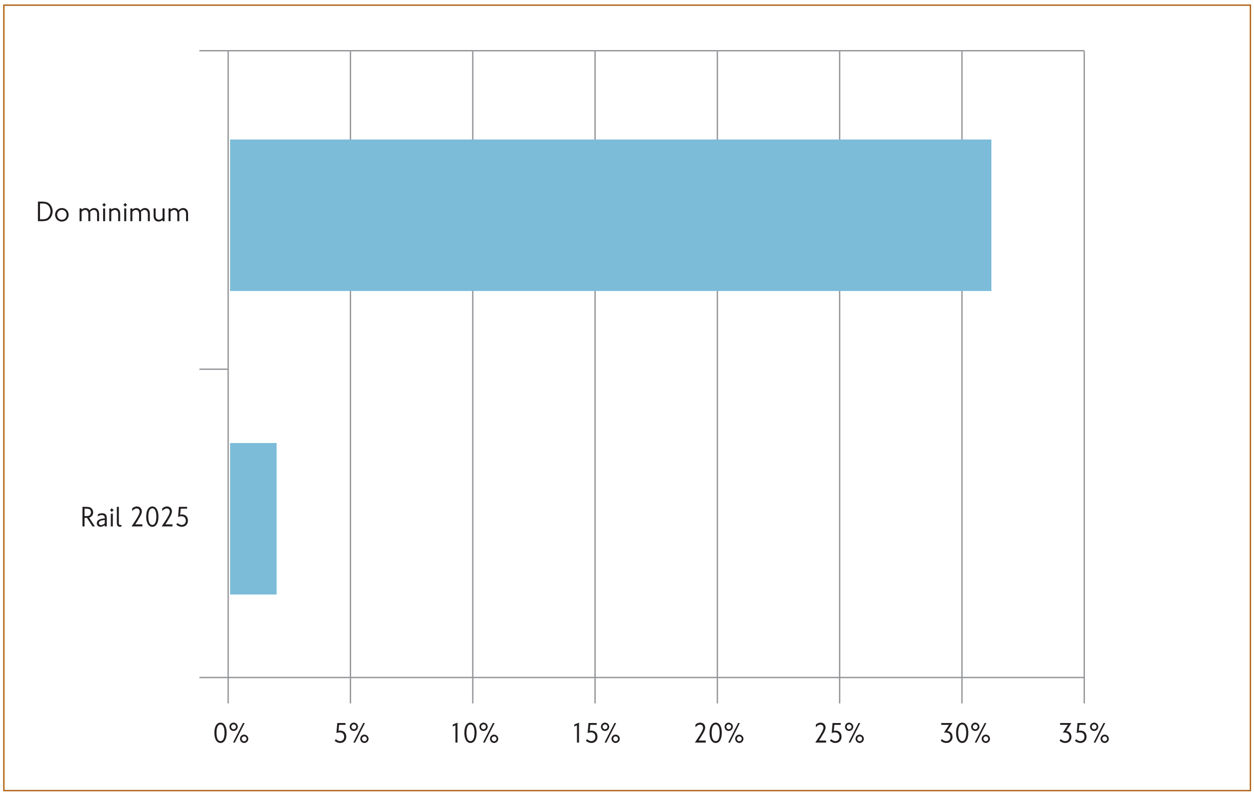
While a detailed description of solutions does not form part of this document, the costs of mitigating any impact upon rail freight from TfL's suggested passenger service proposals are included, for example gauge clearance and capacity enhancement of the Gospel Oak to Barking route. TfL's forthcoming rail freight strategy will contain further detail.

9.6 **Impact of station capacity proposals**

Our station capacity proposals are designed to complement the rail line capacity upgrades. For example, maximising the effectiveness of the southern and southwest upgrades will occur only if Clapham Junction and Waterloo stations can handle the higher flows deposited by the improved train service.

The figure below shows that the station congestion relief proposals will be able to keep delays roughly constant compared with 2006 levels (but still with a slight increase). Not doing anything will lead to significant additional delays in the future.

Figure 31: Impact on station delays caused by passenger congestion



Source: TfL London Rail analysis by comparison with LU stations, LU journey time metric, Business case development manual (BCDM) methodology

The capacity proposals are also designed to improve interchange between rail routes and between modes, thus improving London's strategic links and its connectivity. For example, East Croydon, Clapham Junction, Stratford and Finsbury Park all offer interchange between radial and orbital routes.

The works will also aid local regeneration and land use development, given that many schemes are dependent on commercial development. They would therefore contribute to a higher-quality urban realm and employment opportunities. Where possible, schemes offer synergies and therefore greater cost effectiveness with the Railways for All accessibility programme.

9.7 Case studies

This section demonstrates the practical benefits of the schemes for Londoners on their journey to work.

A trip from Enfield Wash to Stratford City

Mr C, a single parent, regularly makes the seven minute trip from his home at Standard Road to Enfield Lock station, dropping off his children on the way at the local school. His job is at the rapidly developing Stratford City, where he is a project manager for a contractor at the site. There are gaps between trains of up to an hour and, given his child care responsibilities, it is not always convenient to catch a direct train. He therefore travels into Liverpool Street and back out again, trains which are both more crowded and take longer. Altogether, his journey can take up to 76 minutes.

The Rail 2025 solutions deliver more frequent trains to Stratford, reducing overcrowding for those travelling to Tottenham Hale for interchange with the Victoria line, as well as Liverpool Street. It also delivers much greater accessibility to Stratford, a key regeneration site, which is particularly important given the amount of house building expected all along the Lea Valley, including places such as Enfield. Mr C finds this a boon as he is better able to juggle his domestic responsibilities with his professional ones, where he has been promoted to take on later stages of the Stratford City redevelopment. This also takes the pressure off Liverpool Street station, where there is already significant passenger congestion at peak times. His journey time door-to-door is now just 59 minutes.

A trip from Highbury to Canary Wharf

Mrs G, who was born in Germany, journeys from her house at Highbury Crescent in Islington to Canary Wharf, where she runs her successful venture capital company which employs 50 highly skilled staff. This journey takes 55 minutes, involving a walk to Highbury & Islington station, and a change at Moorgate to the Northern line and the again London Bridge to the Jubilee line. Both suffer severe levels of crowding. She finds the journey stressful and tiring, and despite London's business related competitive advantages, such as the highly skilled workforce, and the huge number of clients, she is tempted to close her office in London and take some key staff over to Frankfurt and open a replacement office there.

The rail vision offers Mrs G a faster and less crowded option. She now travels from Highbury & Islington station on the newly extended East London Railway on the London Overground network down to Canada Water station, interchanging there to the Jubilee line, taking just 44 minutes from her house to the office. Frequencies are sufficient to make this attractive, while she no longer suffers train crowding on the rail section as far as Canada Water. The 20% reduction in travel time and reduced crowding means Mrs G's quality of life has improved and she is happy to stay and put down roots in London, focussing on the success of her London business with the aim of continued expansion and the recruitment of more staff.

A trip from Alexandra Palace to the South Bank

Ms A takes the Piccadilly line from Wood Green near her home in Bradley Road to King's Cross, where she changes to the Victoria line to travel to Green Park and then on to Southwark. She then walks to her studio on the South Bank where she works as a researcher for a boutique TV production company specialising in the performing arts. She finds this 60-minute journey is always severely crowded, as is the interchange despite the improvements at King's Cross St Pancras Tube station. Her alternative, via the Great Northern suburban trains from Alexander Palace station is little different. More often, however, she catches a taxi, especially on the journey home in the evening. Her rail journey causes her significant stress and she finds using taxis very expensive.

The rail strategy provides Ms A with a faster and less-crowded option. She now joins the newly extended Thameslink service, which takes just 53 minutes. Quarter-hour frequencies are sufficient to make this attractive – more so, given that she still has the Moorgate option from Alexander Palace, while the train overcrowding she suffers is reduced significantly. She no longer needs to takes taxis, so she saves money as well as time.

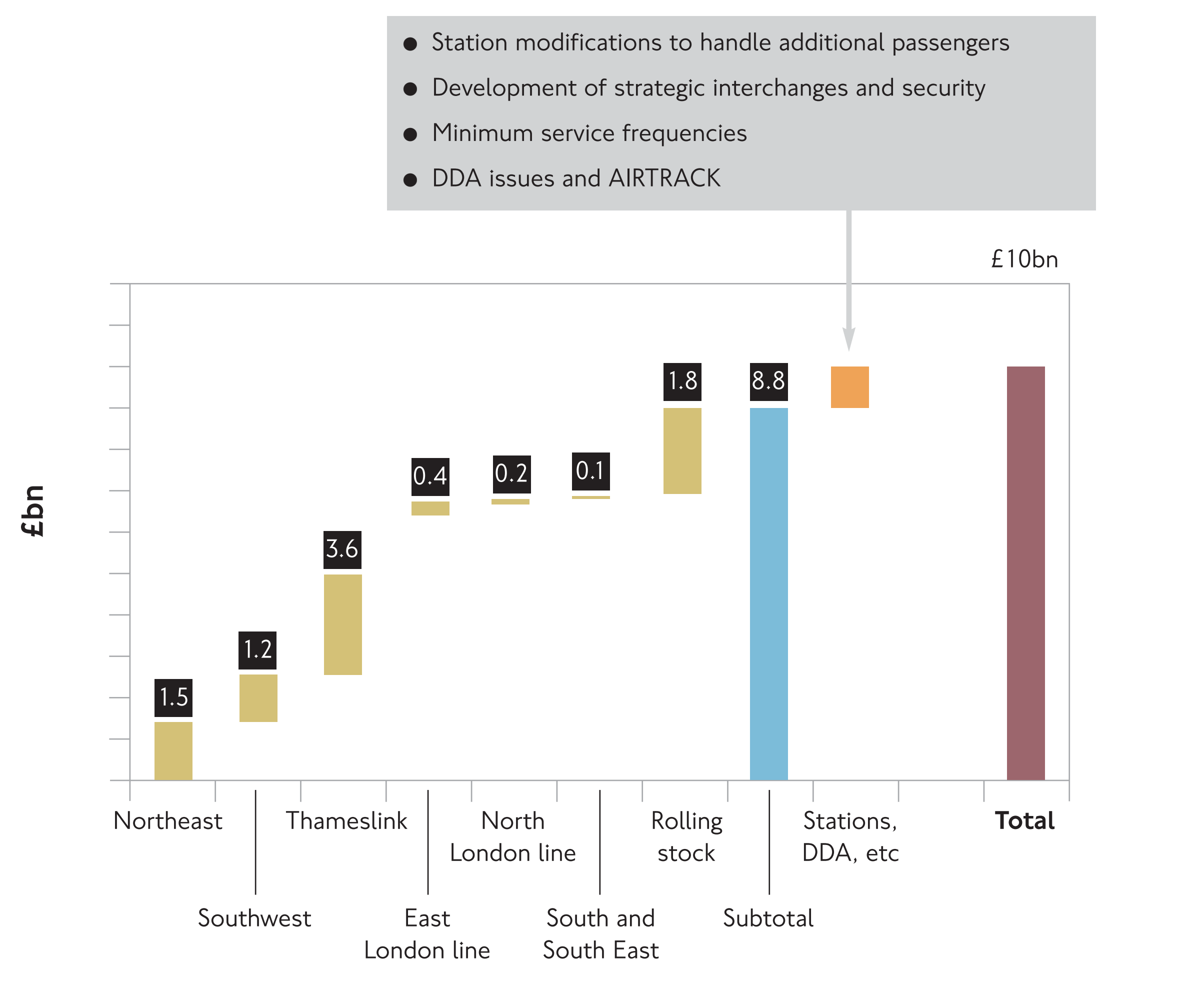
Section 10

Appraisal of the Rail 2025 schemes

10.1 Costs

Capital cost estimates for the schemes amount to some £10bn spread over the next 25-30 years.

Figure 32: Indicative infrastructure costs by project



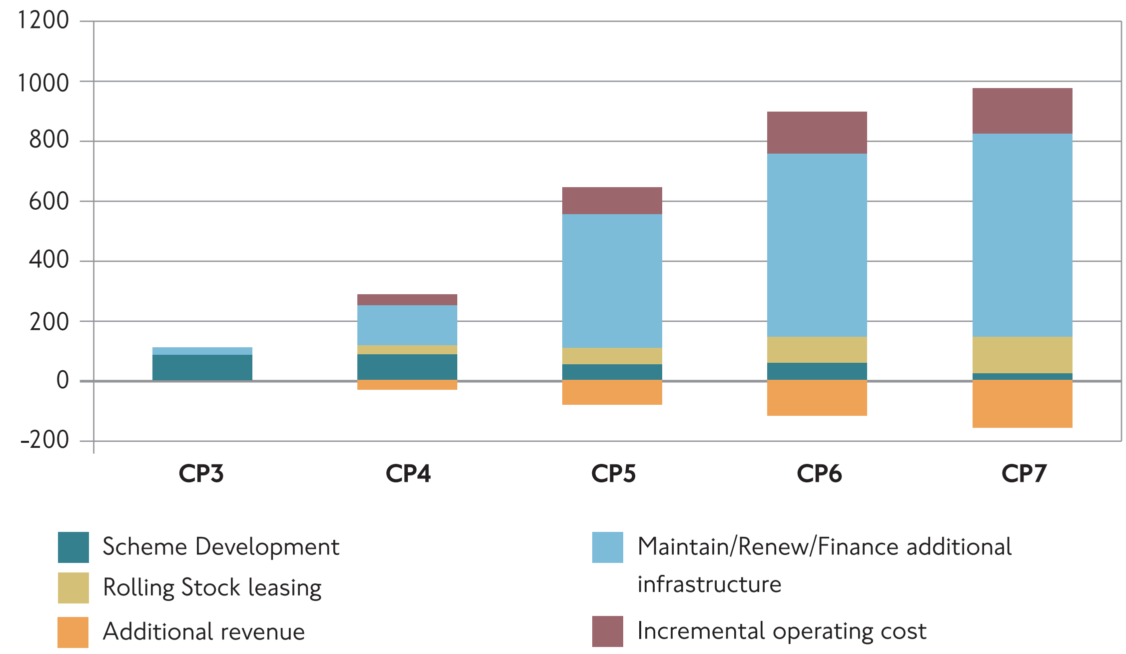
Source: TfL analysis

Infrastructure, rolling stock and associated operating costs have been annualised using a range of assumptions relating to finance costs and TOC profit requirements, as well as salary, power and construction cost inflation levels. The incremental funding in each year represents the whole industry cost net of revenue, that is the cost to the DfT, and therefore includes TOC operating costs and train leasing costs. The incremental funding in each year does not include Crossrail Line 1.

TfL recognises the financial constraints faced by Government and the Rail 2025 proposals take this into account. The delivery of the proposed elements of Rail 2025 to provide capacity enhancements would require an investment of about £500m per annum for the next 20 years. This includes the purchase of new rail cars and ongoing operating costs, so it represents a complete package. For a capacity increase approaching 40 per cent, this represents good value for money.

The diagram below shows the level of funding required for each control period.

Figure 33: Costs for all projects (except Crossrail Line 1)



Control Period (CP)	CP3	CP4	CP5	CP6	CP7
Development	63	63	28	32	5
Rolling Stock leasing	0	37	86	113	122
Infrastructure Maintain/Renew/Finance	9	147	456	621	697
Opex	0	35	87	134	152
Revenue	0	-35	-83	-114	-132
Annual Average	72	247	574	787	845
Average annuall Spend Over all Years £M					**497**

Source TfL analysis

Rail 2025 is not an 'all or nothing' project and it is possible to sequence the works required so that the most urgent and/or easiest projects are completed first. The programme can also be accelerated or slowed down according to available resources. It is also possible to deliver the larger-scale projects in segments to ensure minimal disruption. There are also potential savings by planning elements of the package in conjunction with Network Rail's ongoing renewal works and Crossrail's construction.

10.2 Value for money

The government sets a number of objectives to which transport policy should contribute, based on:

- Environmental impact – to protect the built and natural environment
- Safety – to improve safety
- Economy – to support economic activity and get good value for money
- Accessibility – improve access to facilities for those with no car and to reduce severance
- Integration – to ensure that all decisions are taken in the context of the Government's integrated transport policy

There are 23 sub-objectives nested under the five objectives. These sub-objectives provide the framework – known as Transport Appraisal Guidance or NATA – for the appraisal of Rail 2025. They are also aligned to the Mayor's objectives for London.

The appraisal requires the calculation of costs and benefits against the five objectives that compares TfL's proposals against a base case or "do minimum" scenario:

- The do minimum contains all the schemes funded in TfL's Business Plan/ investment programme
- This includes the assumption that the London area rail network is brought to, and maintained in, a state of good repair, such that there is no loss of reliability or capacity

Figure 34: Do minimum schemes

National Rail capacity

- Crossrail Line 1, the impact of which is shown separately have given its size
- Improvements from Chiltern Railways 'Evergreen' project
- London Overground improvements, including East London line extension phase 1
- Introduction of Channel Tunnel Rail Link domestic services (Integrated Kent Franchise) and diversion of international trains from Waterloo to St. Pancras

Underground capacity

- LU line upgrades leading to capacity and reliability improvements
- Piccadilly line to T5 and Croxley link
- PPP station refurbishments and funded LUL station congestion relief projects

Improvements in DLR and bus capacity

- DLR extensions to Stratford International and Woolwich Arsenal
- Additional bus service volume as set out in TfL's Business Plan

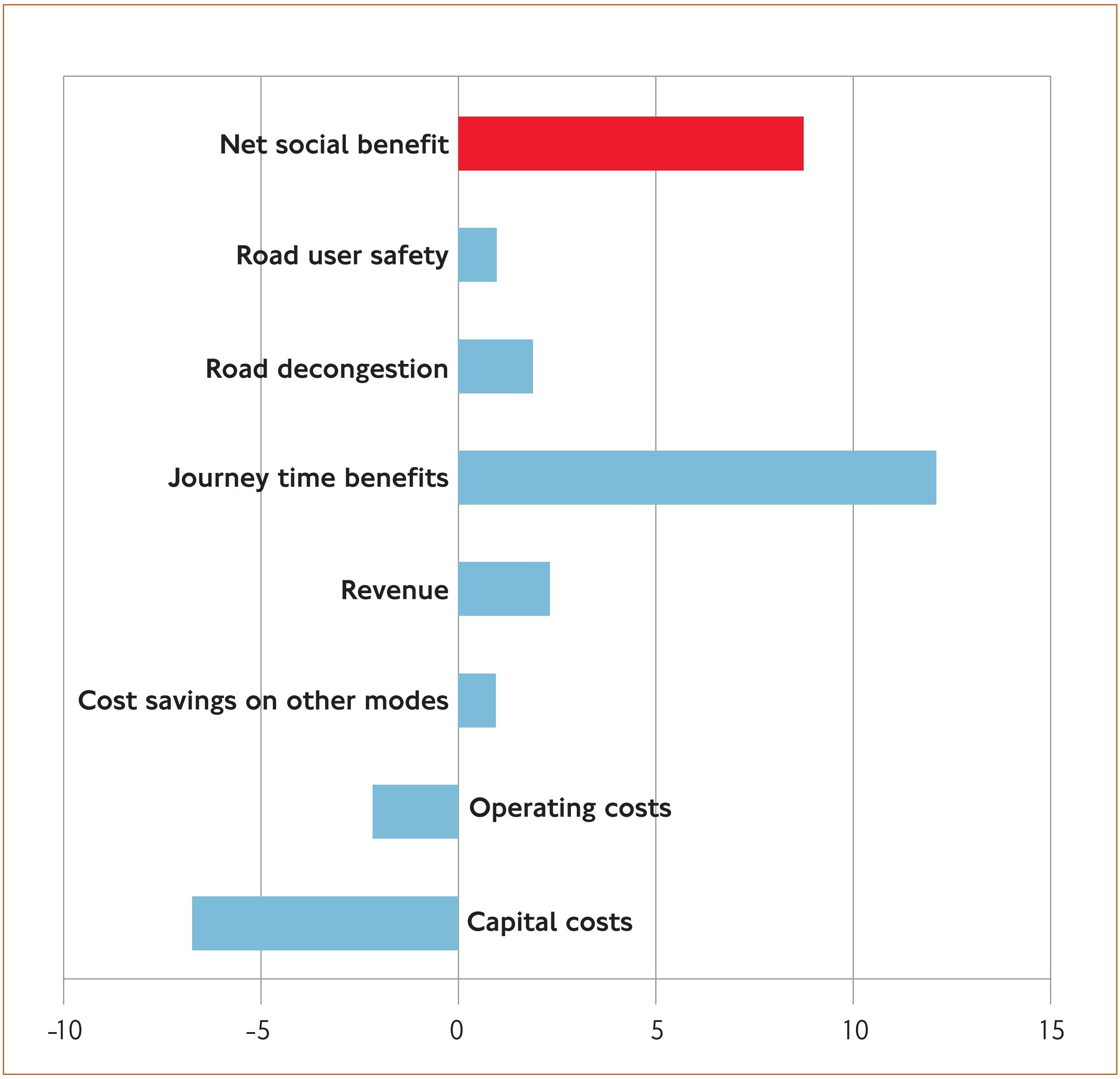
10.3 Value-for-money appraisal results including wider economic benefits

A project may be regarded as worthwhile if its economic benefits exceed its costs. The value is often described in terms of a benefit cost ratio (BCR). When the BCR is greater than 1:1, benefits can be demonstrated to exceed costs.

The appraisals have been undertaken in line with standard TfL guidelines, with projects appraised over a 60-year period using a 3.5 per cent discount rate alongside appropriate assumptions on optimism bias (where estimated capital costs are increased to take account of potential optimism in the estimation procedures).

The Crossrail Line 1 appraisal[10] describes how this alone has a benefit cost ratio of nearly 1.99:1. The figure below shows that the rest of the Rail 2025 schemes demonstrate good value for money too, with an average BCR of over 2:1 excluding the impact of wider economic benefits.

Figure 35: Strategy costs and benefits



Source: TfL analysis

10 The Crossrail Business Case - Summary, CLRC Ltd., September 2003

Including the wider economic benefits involves incorporation of agglomeration benefits and the impacts of consequent changes in employment patterns. The agglomeration benefits include:

- Larger, deeper pool of labour
- More competition between firms
- Larger, deeper client market for firms
- Greater contact and knowledge sharing

The employment pattern benefits are consequent on transport capacity increases allowing employment to continue to grow in central clusters leading to:

- Increases in effective job density as journey times are reduced
- Increased output from the new central London jobs
- Higher tax revenue from those new higher output jobs

The above benefits have been calculated as having a present value of £5.6bn over the 60-year period, in addition to the transport benefits outlined above. Furthermore, there will an extra £2.7bn in tax revenue from the increase in jobs. These benefits act to take the overall Rail 2025 BCR (excluding Crossrail Line 1) to nearly 7:1.

Figure 32 provides additional details of the schemes, costs and benefits and demonstrates the calculations made to derive the BCR with and without the inclusion of the wider economic benefits.

Figure 36: Economic appraisal

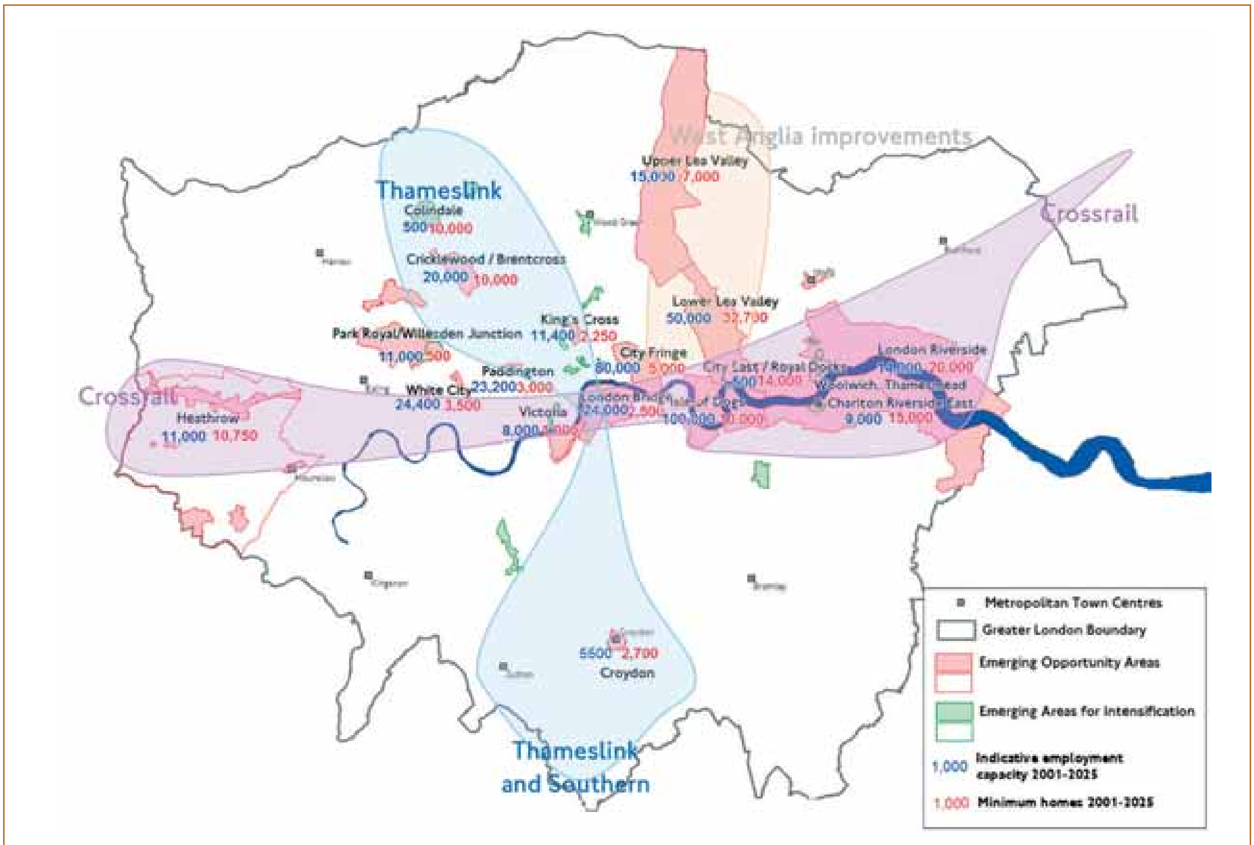
Description		**Transport benefits**	**Transport and wider benefits £b**
Capital costs	A	(6.6)	(6.6)
Operating costs	B	(1.8)	(1.8)
Cost savings on other modes	C	0.7	0.7
Total costs	D=A+B+C	(7.7)	(7.7)
Exchequer tax increase	E	n/a	2.7
Revenue	F	2.1	2.1
Net financial effect	G=D+E+F	(5.6)	(2.8)
Journey time benefits	H	12.2	12.2
Road decongestion	I	1.7	1.7
Road user safety	J	0.6	0.6
Total social benefits	K=h+i+j	14.5	14.5
Wider economic benefits	L	n/a	5.6
Net social benefit	M=j+l+g	8.9	17.3
benefit cost ratio	**N=-(k+l)/g**	**2.6**	**7.2**

Source TfL analysis. Calculated over 60 years at 3.5per cent discount rate

10.4 **Impact on regeneration**

The strategy also aids regeneration and tackles deprivation: 11 of London's 13 biggest redevelopment sites are adjacent to main National Rail stations, while many of the proposals affect the most deprived wards in London. Improved accessibility to jobs is an important enabler in tackling deprivation. The map below shows the three of the most significant schemes in this regard, Crossrail Line 1, the Thameslink programme and the West Anglia upgrade.

Figure 37: Regeneration and suggested rail schemes



Source: GLA London Plan

10.5 **Appraisal conclusions**

TfL's Rail 2025 strategy positively affects the economy and jobs. Hence, there is also a substantial payback for public sector finances as well.

The benefits of congestion relief and other time savings are over twice the net financial costs, i.e. the benefit cost ratio is over 2:1. Including Crossrail 1, the strategy also yields an additional £8bn (present value) of wider economic benefits and tax revenues approaching £6bn. Combing these benefits with the transport benefits and additional revenues gained from fares revenue indicate that overall the strategy has a benefit cost ratio close to 7:1.

In terms of jobs, Crossrail 1 would increase employment potential in London's finance and business service sector by 30,000 jobs and Rail 2025 would add another 15,000. TfL believes Rail 2025 is essential to support London's position as a leading world economic centre.

In addition, the proposals will help to tackle deprivation, support regeneration, and make a small but material reduction in carbon dioxide emissions of 1 per cent, a step towards the UK's targets.

The table overleaf summarises the overall appraisal results, including the economic, environment, safety, accessibility and integration.

Figure 38: Appraisal summary table

Objective	Sub-objective	+/-	Crossrail line 1	Rest of rail 2025
Environment	Noise	✗	Properties adjacent to the overland sections not anticipated to experience significant increase in airborne noise (3dB or more). Nor is there a significant impact from ground-borne noise (40dB or more)	1per cent increase in people within 50metres of rail annoyed by noise from train operations
	Local Air Quality	✓	Slight improvement due to small mode shift from road to rail	Reduces PM10 by 2tonnes and NOx by 94tonnes due to switching from road
	Greenhouse Gases	✓	Reduces greenhouse gases by 0.7per cent of Greater London's road emissions due to switch from road use	Reduces greenhouse gases by 28,0000tonnes or 0.9per cent due to switching from road
	Townscape and landscape	=	Demolition of property, and the presence of portals, ventilation shafts and new station developments have an impact on townscape, but project also facilitates regeneration	Some impact on visual amenity in a limited number of locations, but overall facilitates urban generation
	Heritage of Historic Resources	✗	Effect on one listed building in central London and modifications to listed stations and structures. Impacts on Archaeological Priority Zones within, and adjacent to, route corridor. Potential impacts on listed buildings from settlement and vibration	Slight adverse impact on a few listed buildings and, archaeological sites in a few locations
	Bio-diversity	=	Potential for impacts due to works within, or adjacent to, 40 Sites of Importance for Nature Conservation including Hyde Park, a Site of Metropolitan Importance	Neutral impact, as most works are on existing rail corridors and does not affect protected species or sites
	Water Environment	=	Diversions of culverts, sewers and a river. Minor changes in flow in a shallow aquifer may occur.	Neutral impact, as most works are on existing rail corridors
	Peoples' physical fitness	✓	Crossrail encourages physical fitness via additional cycling and walking	Small improvement due to switch from road with 0.6per cent more trips by walking or cycling to access stations
	Journey Ambience	✓	Clean, reliable service with clear information, a pleasant journey environment and high levels of in-vehicle security and services accessible to mobility impaired.	Trains/stations meet higher standards, improving traveller 'care' and 'stress'. View improved by regeneration

Objective	Sub-objective	+/-	Crossrail line 1	Rest of Rail 2025
Economy	Public accounts (cost to public sector)	✗	Additional capital and operating costs. Base capital cost £10bn including optimism bias at 1st quarter 2002 prices	Additional capital and operating costs, c. £500m pa, see transport appraisal earlier in text
	Time and financial benefits to business users and operators	✔	Crossrail removes transport constraints to Heathrow, West End, City of London and Canary Wharf. The central London financial and business sector clusters have high added value.	Removes transport constraints at range of locations. Generates additional revenues for operators roughly equivalent to additional operating costs
	Time and crowding benefits to passengers	✔	Benefit – Cost ratio: 1.99:1	Less crowding, and faster journey times. Benefit cost ratio in excess of 2:1
	Reliability	✔	-	Dwell times improved 18 per cent and journey times by 2.5per cent. Passenger benefit by £6m pa. Reduced road congestion
	Wider economic impacts	✔	7-10,000 additional jobs in central London by 2016 rising to 20-23,000 by 2027. 20,000 jobs taken up by unemployed and economically inactive residents in regeneration areas	£5.6bn (present value) of wider economic (GDP) benefits, which leads to £2.7bn of additional tax receipts
Integration	Transport interchange	✔	24 major interchanges stations with other National Rail, Underground and/or DLR services. Average number of interchanges per Crossrail trip falls from 1.33 to 1.07	Station works and frequency increases improve interchange
	Land-use policy	✔	Crossrail supports London's world city role by sustaining and developing the Financial and Business Sector (FBS) sector in central London and providing connections to Heathrow, City Airport, and CTRL interchange at Stratford and Ebbsfleet. It serves Thames Gateway and supports development opportunities in East London and the Lower Lea Valley at Isle of Dogs, Stratford and the Royal Docks	Also supports objectives of London Plan, specifically its world city role by sustaining and developing the FBS sector in central London and development opportunities across London
	Other government policies	✔	Demonstrates significant benefits against the policy objectives set out in the government's ten-year transport plan	Demonstrates significant benefits against the policy objectives set out by both national Government and Mayor of London, specifically tackling deprivation and improving social inclusion

Objective	Sub-objective	+/-	Crossrail line 1	Rest of Rail 2025
Safety	Accidents	=	Encourages use of a very safe mode, rail, equipped with many safety measures on trains and at stations	Transfer from road to rail means that there is one less fatality pa at current casualty rates
	Security	✔	Stations works mean major increase in security (CCTV, open design, lighting, landscaping, boundaries)	'Core provision' standardised across network of both trains and stations
Accessibility	Option values (ie value of alternative routes)	✔	Significantly enhanced journey opportunities for trips to many destinations	More choice for users. Mode switch of 1 per cent from car
	Severance	=	Mostly uses existing railway corridors or new tunnels, so there is no significant effect on severance	Neutral, as mostly uses existing railway corridors
	Access to the transport system	✔	60-minute population catchment of City increases by 360,000, Isle of Dogs by 610,000, and the West End by 430,000. Accessible to mobility impaired passengers	Station works improve access. 32,000 more jobs within 45 mins of residence

Section 11

Delivery of Rail 2025 and overall conclusions

11.1 Delivery

TfL believes close partnership and agreement with the rail industry, Government and other stakeholders is essential for the timely and effective implementation of additional rail capacity in London. TfL is considering the necessary roles of each party to ensure this is delivered. This will include a summary of London's needs within the Government's HLOS, which defines the capacity, reliability and safety outputs required from the National Rail network over the next spending period. TfL's Rail 2025 strategy and Network Rail's initial Strategic Business Plan have many areas in common. This is in large part a result of the good working relationship TfL has enjoyed with Network Rail.

TfL is also working within new industry arrangements, such as Network Rail's Route Utilisation Strategies, and will actively contribute to the ongoing rail re-franchising process managed by the DfT.

The Railways Act 2005 has made planning and delivery more effective. There is already a successful planning process in place for Greater London which is beginning to deliver positive changes to London's transport, most notably buses and the Underground. In support of this, Rail 2025 provides the rail element; a unifying and integrated vision for all the Capital's railways across what could otherwise be a fragmented set of train franchises and Network Rail routes.

Network Rail and the Train Operating Companies will physically deliver many of the important elements of Rail 2025 infrastructure. However, TfL will be responsible for the London Overground schemes, rolling out enhanced frequencies (including early/late trains) and various small-scale station enhancement programmes.

TfL's primary task is to work with central government and the industry to ensure that adequate funds are available (through appropriate awards via spending reviews and exploitation of available funding mechanisms such as the Transport Innovation Fund) and that the appropriate delivery of rolling stock and associated timetables can be easily facilitated. This will be achieved by working with Network Rail and influencing the DfT's re-franchising process, as well as via TfL's funding for infrastructure projects and its own concession programme.

11 Route Utilisation Strategies: identify present and future problems and opportunities for change on a route (such as the South West route) and are produced by Network Rail,

11.2 **Conclusions**

Overall Rail 2025:

- Demonstrates the case for appropriate recognition of the region's rail needs in terms of Government investment decisions
- Articulates and quantifies how appropriate investment and policy decisions support the Mayor's vision to develop London as a sustainable world city based on strong economic growth and social inclusion, alongside improvements to its environment and use of resources
- Delivers superior economic performance at both national and regional level
- Supports national government and the rail industry in shaping short- and longer-term strategies
- Is affordable

A 'do nothing' option is very unattractive. Without TfL's Rail 2025 strategy, or something close to it, the continued future economic success of London, the greater South East area and ultimately the UK is at risk, while achieving the Government's social inclusion and environment objectives would become significantly more difficult.