



## **Delivering the Mayor's Transport Strategy: National Rail in London**

Transport for London's recommendations for the High Level Output Specification (2014 – 2019)

**3 August 2011**

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# 1. Summary

## 1.1 The importance of rail in London

- 1.1.1 The months through to July 2012 are important ones for the strategic planning of the railways. The purpose of this document is to set out Transport for London's recommendations for rail schemes to address London's transport needs in the period to 2019 to inform the up-coming *Initial Industry Plan* in September 2011 and subsequent DfT *high level output specification*.
- 1.1.2 These plans will determine the level and nature of investment in London's railways. This matters not just because railways carry so many people; Londoners make six times as many trips per head compared to any other area in England. Rather, investment in the Capital's transport makes a crucial contribution to the realisation of the Government's economic growth strategies for the UK as a whole. It is the quality and quantity of rail transport that enables the UK's biggest agglomeration of its most productive and high-value industries in central London. One outcome of this is that London and the South East provides 43 per cent of all tax revenues in the UK. In 2007/08 it is estimated that the Capital contributed between £14bn and £19bn to the rest of the country via a tax export, a figure which is forecast to rise to £27bn by 2015/16.
- 1.1.3 The importance of transport to the economy is now widely appreciated. The East London railway and the Docklands Light Railway (DLR) have both been extended recently – these projects are ready for the London 2012 Olympic and Paralympic Games. Transport for London (TfL) is delivering a wholesale upgrade of the London Underground (LU) system. Crossrail is under construction. This investment, together with the DfT-funded Thameslink Programme and improvements to National Rail through the current High Level Output Specification, will increase the capacity of the city's rail system by nearly a third. It will also enable London to retain its position as the pre-eminent world city for international financial services, retail and the creative industries. Crossrail and the Tube upgrades add £78bn to the UK's wealth<sup>1</sup>, an overwhelming long-term economic case for investment in London's transport.
- 1.1.4 Continuing planned investment in London's transport network will ensure that the UK is not at a global competitive disadvantage and will support the economic recovery. By 2031 there will be 1.25 million more Londoners and 750,000 new jobs in the Capital. Alongside population growth outside London, this is forecast result in a significant increase in rail demand of 67% by 2031. Without ongoing investment in rail capacity London will not be able to cope. The impact on passenger crowding is obvious, but the volume of passenger numbers will adversely affect reliability and journey times, ultimately affecting the business efficiency of central London.

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<sup>1</sup> London's transport upgrade – Britain's future growth, page 2

1.1.5 Nor would larger and/or more extensive use of peak pricing solve the problem. There is already a degree of peak pricing built into the fares structure, for example with Oyster pay-as-you-go. Research shows that its extension to season tickets could make a further contribution but that the premium would have to be large. Average fares would need to be 25% greater in the peak to reduce demand by just 4%, that is just two year's growth. Technology such as tele-working also offers opportunities for people to work more flexibly, and TfL's programme of targeted smart measures should reduce pressures on public transport to some degree. However, none provide a panacea, and TfL estimate that growth in the peaks will still be substantial.

## **1.2 A rail strategy for London for 2014 to 2019**

1.2.1 The next High Level Output Specification presents a series of challenges in the medium term, following the current investment in the transport network by DfT and TfL. In line with the policies set out in the Mayor's Transport Strategy, TfL believes that the focus for investment and indeed management resources in the period 2014-19 should be on a series of 'in-fill' schemes that would complement the major projects set out above:

- Targeted additional passenger capacity
- Freight capacity and capability, to reduce mutual capacity conflicts
- Station congestion relief and improved interchange between the transport networks in London
- Station accessibility schemes, to improve equality of opportunity for all
- Improving the railway's level of service quality, to provide a more consistent customer proposition across the transport networks
- Reduction in carbon emissions

1.2.2 This is anticipated to have an average capital cost of £220 million over the five years 2014-19, with a net ongoing annual operating cost of £30 million (gross cost of £57 million per annum), in 2007 prices. The benefit cost ratio of the package as a whole is 4.3 : 1.

1.2.3 Given public finances, it is more necessary than ever for the rail industry to make the most of the available investment, and the McNulty study is examining the means to achieve this. TfL believes this can more readily be met by giving the Mayor greater powers of integration in order to maximise revenues and reduce whole (public transport) industry costs. For example, a simpler customer proposition in terms of facilities, fares and ticketing has time and again been shown to lead to more demand and higher revenues. A budget to operate London's rail network would enable the Mayor to balance London's transport needs and service standards across the capital. It would also enable a more cost effective means to procure rail services for urban areas, with gross cost contracts. This is because the drivers of revenue risk are beyond the control of private sector train operating companies, so they necessarily charge a substantial risk premium. The net savings from gross costs contracts could more than offset the cost of improved service levels, enabling London railways to deliver more for less.

## 2. Context of TfL's strategy for rail

### 2.1 The planning process for the railways

- 2.1.1 The rail industry in England and Wales benefits from a five yearly specification by the government of the outputs it requires from the railway, together with a funding settlement necessary to deliver those outputs. This welcome process gives an industry with unusually long planning horizons greater clarity over its deliverables and certainty of funds over a sufficient period.
- 2.1.2 The next five year settlement is for the period from 2014 to 2019. The government is expected to announce the High Level Output Specification for this period, and the Statement of Funds Available, in summer 2012.
- 2.1.3 The funding settlement covers the maintenance of existing infrastructure and its enhancement, both delivered by Network Rail, and also a budget for net subsidies paid through the franchising process, managed by the Department for Transport.
- 2.1.4 Network Rail's funding settlement for a five year control period is agreed by the Office of Rail Regulation, following an iterative process that examines issues such as cost efficiency. The control period from 2014 to 2019 will be fifth since rail privatisation in 1994, and hence is called Control Period 5. However, this will only be the second High Level Output Specification by the government. The two year period between the government's High Level Output Specification in 2012 and the start of Control Period 5 in 2014 is necessary for the Office of Rail Regulation to determine the detailed budget for Network Rail, and for Network Rail to undertake planning work in advance of works on site from the start of the Control Period.
- 2.1.5 There is clearly a considerable amount of planning work required to determine the appropriate High Level Output Specification and Statement of Funds Available. Input to this from the rail industry takes the form of a joint *Initial Industry Plan* in autumn 2011.
- 2.1.6 The *Initial Industry Plan* will draw upon Network Rail's route utilisation strategies (RUSes) to evidence its proposals. RUSes are produced by Network Rail to fulfil its licence conditions, as specified by the Office of Rail Regulation, in conjunction with the wider rail industry. These have now been produced for all corridors across the UK. Network Rail has also recently produced a new London and South East RUS; this is a 'second generation' RUS, which builds on, and updates, some earlier RUSes.
- 2.1.7 TfL has worked closely with Network Rail on the London and South East RUS. Its modelling approach is broadly similar, though it has a longer look-ahead to the year 2031. The London and South East RUS and this document both draw broadly the same conclusions as to the scope and nature of enhancements required.

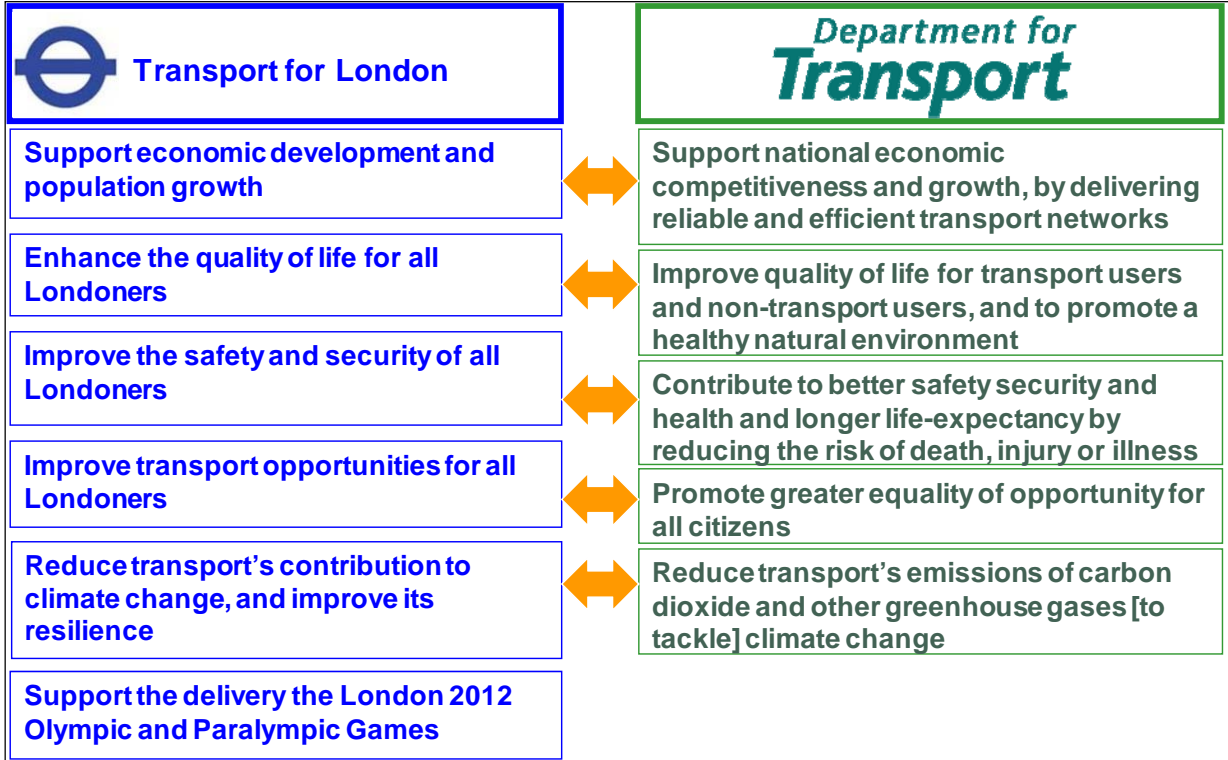
2.1.8 The purpose of this document therefore is to set out Transport for London’s recommendations for rail schemes to address London’s transport needs in the period to 2019 to inform both the *Initial Industry Plan* and subsequent government planning for the HLOS itself. It also informs London’s many stakeholders of our plans for rail. This follows an extensive period of analysis and discussion with stakeholders.

**2.2 The London Plan, the Mayor’s Transport Strategy and the Government’s transport objectives**

2.2.1 The Mayor’s London Plan sets out his vision for the capital and its spatial development to 2031. It includes forecasts of increases in population and employment, which are the main drivers of transport demand growth, including rail. The forecasts are described further in Section 4 below.

2.2.2 The London Plan is supported by the Mayor’s Transport Strategy. Deriving from the London Plan policies and growth forecasts, the Mayor’s Transport Strategy sets 6 goals which are closely aligned with the national transport objectives set out in the DfT’s 2008 publication *Delivering a Sustainable Transport System*, as shown in figure 1.

**Figure 1: Mayor’s Transport Strategy goals and DfT’s national transport objectives**



2.2.3 Transport for London’s strategy for rail identifies the schemes, train service requirements and policies necessary for the period 2014 to 2019 to meet the Mayor’s Transport Strategy goals and therefore the DfT’s national objectives.

Section 10 describes the analysis that demonstrates their fit with these overall transport strategies.

## **2.3 Rail industry reform**

- 2.3.1 There is widespread concern at the relatively high cost of Britain's railways. Combined with the government's measures to reduce the UK budget deficit, there is an imperative to achieve greater value for money in Control Period 5. The government therefore commissioned an investigation into rail value for money, which was undertaken by Sir Roy McNulty. Separately, though closely related, the government also consulted on reforming rail franchising.
- 2.3.2 This document considers these issues in more detail in Sections 10 and 11 below, and presents TfL's proposals to achieve better value from London's railways and offset the cost of the recommended enhancements.

# **3 The importance of rail to London and of London to the UK**

## **3.1 The importance of rail to London**

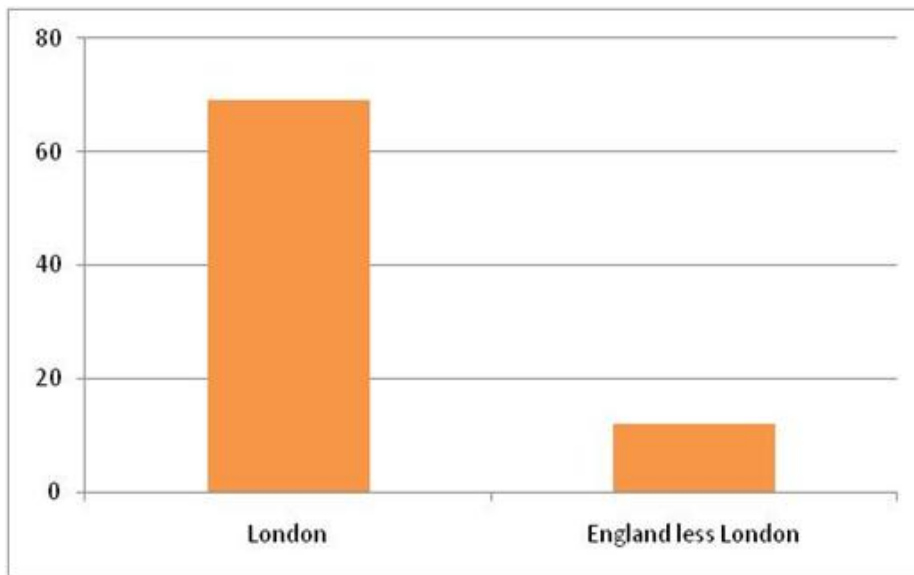
- 3.1.1 London's transport system is a complex integrated network of rail, road, tram and bus services. The rail network, consisting of National Rail, Underground and DLR, predominantly provides access to central London. Together, its share of such journeys is 78%<sup>2</sup>. Of the people who work in Central London, the vast majority do not live there, and therefore have to make commuting journeys.
- 3.1.2 No other region of the UK is as dependent on rail as London. London's per capita level of rail travel is some six times greater than in the other English metropolitan areas (excluding the London Underground). Indeed, 60 per cent of all UK National Rail passengers have an origin or destination in London<sup>3</sup>.

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<sup>2</sup> Travel in London, Report 3, Figure 2.13

<sup>3</sup> ORR National Rail yearbook, 2009/10, table 1.3c and table 7.1, ONS population data

**Figure 2: Average number of National Rail trips per capita**



- 3.1.3 In short, rail's market share in London is higher than any other area of the UK<sup>4</sup>. 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. The capacity and quality of London's rail system affects more people than anywhere else in the UK.
- 3.1.4 Furthermore, study after study has found that transport matters to the UK economy in general and London most especially. The heavy snow falls in 2010 showed that when London's transport is disrupted, even for short periods, the economy suffers<sup>5</sup>. The business case for Crossrail<sup>6</sup> demonstrated how transport has a direct impact upon the UK's competitiveness, its prosperity, its GDP, and by extension its people's quality of life. Without doubt, investments that make a demonstrable improvement to London's economy will have a significant impact upon the UK as a whole.
- 3.1.5 This is further supported by the *Eddington Transport Study*, published in December 2006, which recognizes transport's role as a key enabler of productivity and competitiveness, and stresses the need for Government action to avoid transport constraints hampering the economic growth of the UK. Section 4 below identifies the constraints facing the rail network, and Section 5 recommends specific capacity solutions.

## **3.2 The importance of London to the UK**

- 3.2.1 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 (60 per cent above the UK average as measured by 2008 headline workplace gross value added per capita) and, together with

<sup>4</sup> Source: Labour Force Survey, Office for National Statistics

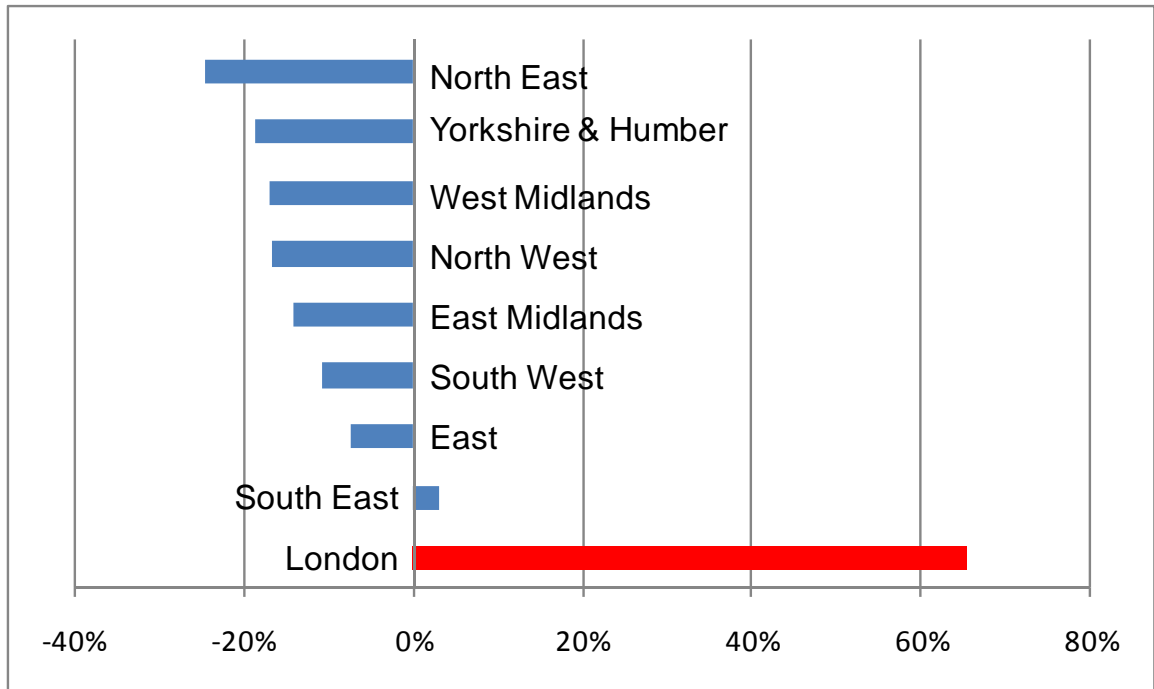
<sup>5</sup> For example, <http://transportwinterresilience.independent.gov.uk/>

<sup>6</sup> <http://www.tfl.gov.uk/assets/downloads/corporate/Crossrail-business-case-2010.pdf>



its immediate hinterland of South East England, contributes over a third of UK GDP<sup>7</sup>.

**Figure 3: Productivity per capita by region relative to England**



Source: <http://www.statistics.gov.uk/pdfdir/gva1209.pdf>

3.2.2 The high level of London's productivity benefits the rest of the UK. London has historically paid more in taxes to the Exchequer than it receives in services from the national government, and it is the only UK region to do so. This surplus is forecast to rise to £27billion by 2015/16<sup>8</sup>. The UK's long term success is clearly linked to the need to preserve and enhance London's global competitiveness. The OECD has also demonstrated positive long-term impact of infrastructure spending on economic growth.

3.2.3 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<sup>9</sup>. This is no coincidence. Businesses of a similar nature often tend to group closely together geographically, which gives rise to a virtuous circle of advantages such as:

- A larger, more specialised labour market
- More competing and complementary businesses and institutions

<sup>7</sup> ONS statistical bulletin, Regional, sub-regional and local gross value added, 2009  
<http://www.statistics.gov.uk/pdfdir/gva1209.pdf>

<sup>8</sup> London's Competitive Place in the UK and Global Economies, page 61, Oxford Economics,  
[http://217.154.230.218/NR/ronlyres/8EFCB97E-F905-45BE-89F9-01AEEBD6AE67/0/BC\\_RS\\_LondonsCompetitivePlaceintheUKandGlobalEconomies.pdf](http://217.154.230.218/NR/ronlyres/8EFCB97E-F905-45BE-89F9-01AEEBD6AE67/0/BC_RS_LondonsCompetitivePlaceintheUKandGlobalEconomies.pdf)

<sup>9</sup> Mayor of London, Invest in London: Invest in Britain, December 2006

- A larger, more specialised client market
  - Greater potential for contact and knowledge sharing
- 3.2.4 This so-called ‘agglomeration’ is a powerful motor for productivity and hence general economic growth. An analysis of a sample of 17 transport projects by London First shows the wider economic benefits are four times higher in London than in any other part of the UK<sup>10</sup>.
- 3.2.5 However, the existence of agglomeration is not a feature unique to the UK. It exists in London’s major competitors as well, notably finance and business services companies in New York, Tokyo, Paris and other emerging cities. This is the real threat to London as these are the cities against which London competes rather than other cities in the UK with which the relationship is complementary. Investment in London’s transport can enable this concentration of productive industries to both get bigger and denser, the better to maintain the UK’s competitiveness. Research undertaken for the DfT shows that increasing the size and density of an economic cluster improves its productivity still further<sup>11</sup>.
- 3.2.6 This investment in transport links to central London is of significant benefit to outer London suburbs. These residential areas provide 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. However, it is good quality public transport of sufficient capacity that gives access to the wealth-creating jobs and services that are the engine of the UK’s growth.

## 4 Demand growth forecasts and crowding

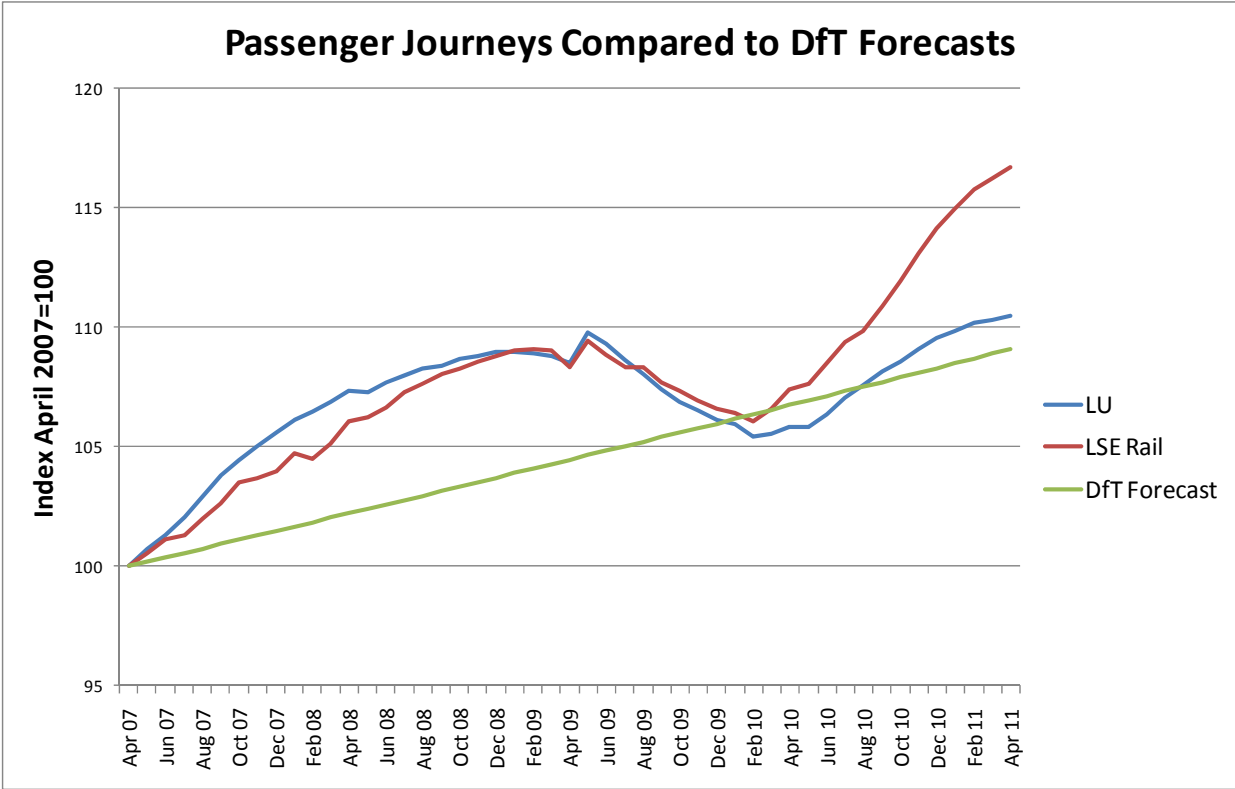
### 4.1 Demand forecasts

- 4.1.1 National Rail demand in London grew almost continuously from 1994 until the recession of 2009. This trend was particularly marked from 2001 to the end of 2008. Journey numbers briefly declined in 2009 and spring 2010, and have since grown extremely strongly, such that demand is now at an all-time high. Figure 4 shows the trends since the beginning of 2007, making a comparison to the forecast contained in the *Delivering a sustainable railway*, the DfT strategy document that contains the current HLOS. It shows that demand is currently somewhat above that anticipated then, despite a notable recession. In demand terms, the case for enhancement therefore remains. It also shows that it is perfectly possible to forecast London’s mature travel market. The long-term projections are therefore robust and are far from speculative.

<sup>10</sup> Greater returns: Transport priorities for economic growth, London First. [http://www.london-first.co.uk/documents/TRANSPORT\\_DOC\\_FINAL\\_SPREADS.pdf](http://www.london-first.co.uk/documents/TRANSPORT_DOC_FINAL_SPREADS.pdf)

<sup>11</sup> <http://www.dft.gov.uk/pgr/economics/>

**Figure 4: Rail demand growth since 2007**



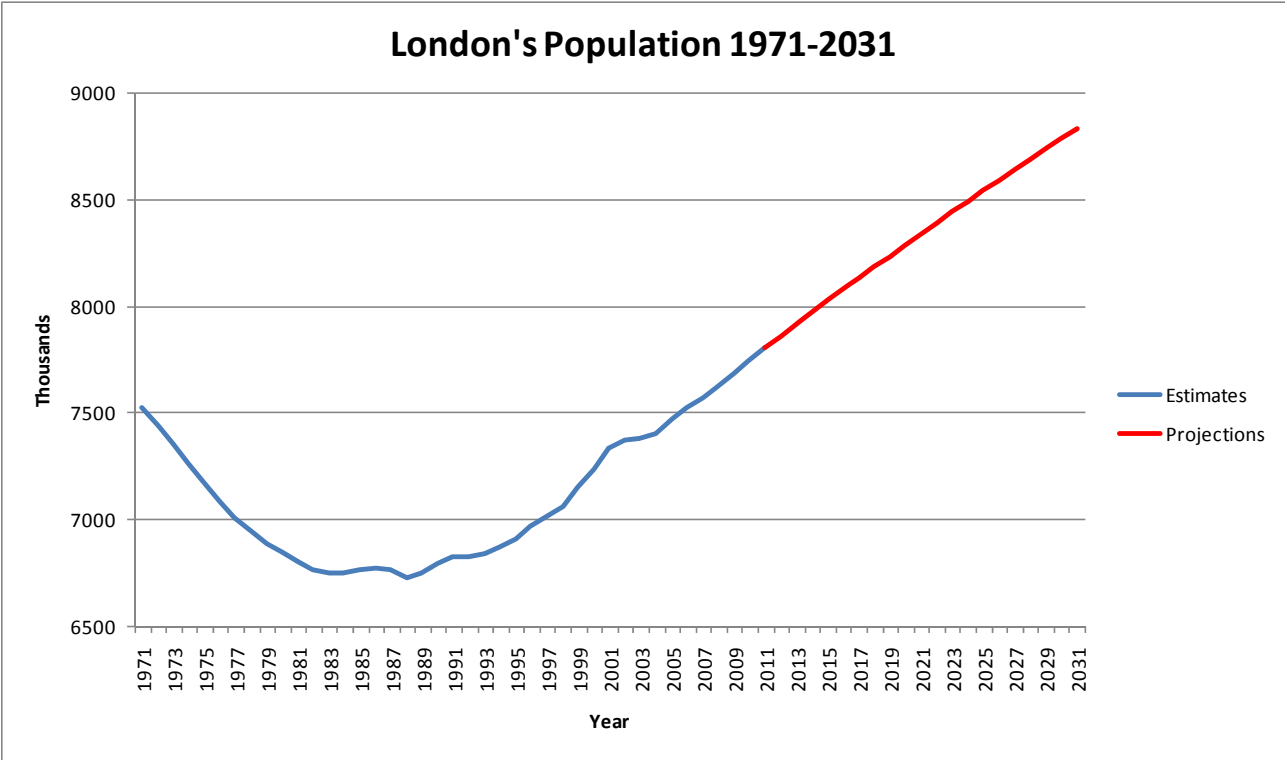
DfT forecasts from Delivering a Sustainable Railway, July 2007, fig 5.5

4.1.2 Further to this, the London Plan forecasts continued population and employment growth up to 2031. Population is forecast to increase by 1.25 million people from 2007 to 2031, and employment by 750,000 jobs over the same period; this growth is strikingly large has been likened, numerically, to the size of South Yorkshire<sup>12</sup>. The population and employment forecasts are the main drivers of peak rail demand growth, and as such are explored further here.

4.1.3 Figure 5 shows estimates of the population of Greater London going back to 1971, and projections up to 2031. It shows very clearly the decline to the low point of 1988, and the continuous growth up to 2011, with a slight 'levelling' in the early 2000's. The forecasts continue the linear growth between 2004 and 2011 at the same rate up to 2031.

<sup>12</sup> Mayor's Transport Strategy, paragraph E8

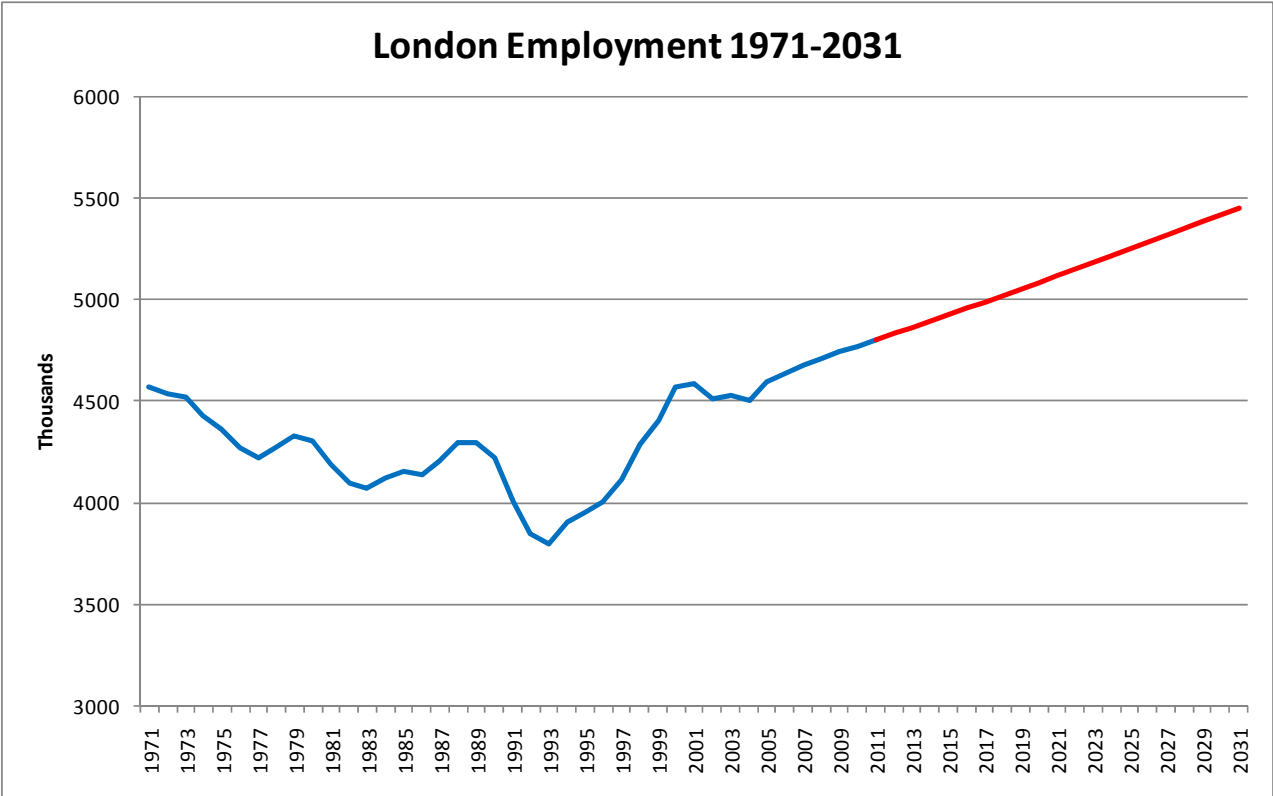
**Figure 5: Population growth and forecasts**



Source: The London Plan, October 2009, Figure 1.2

4.1.4 Employment shows a similar pattern to population, with a low point reached in the early 1990's (slightly later than the population dip) and the steady growth between 2005 and 2009 projected up to 2031. In practice there will be short term fluctuations around this longer term trend.

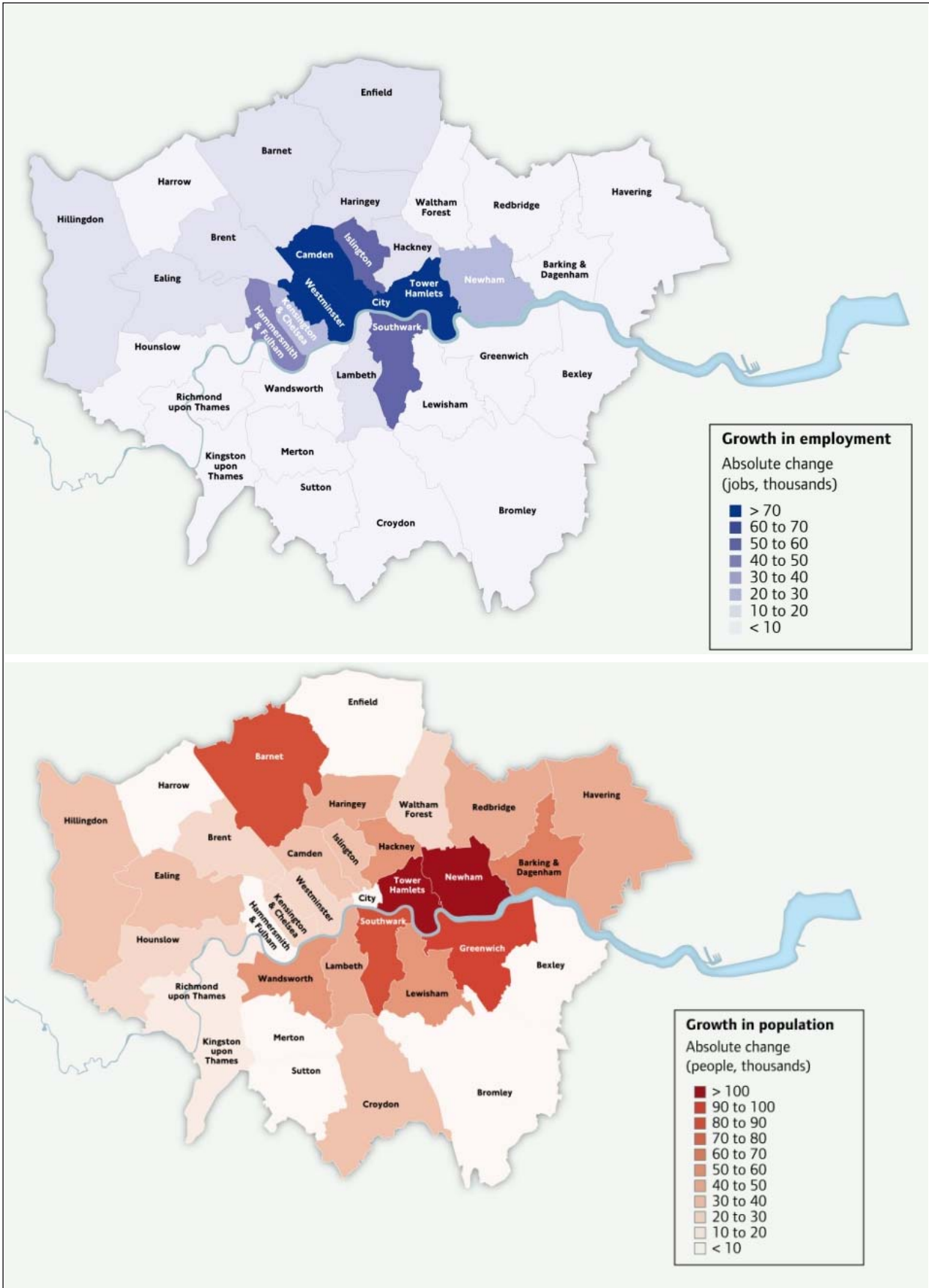
Figure 6: Employment growth and forecasts



Source: The London Plan, October 2009, Figure 1.5

4.1.5 The spatial distribution of the population and employment growth is shown in figure 7. Population growth is generally strongest in inner London and east London, but is also fairly widespread across the capital. Employment growth has two main features: there is fairly even growth across most of London, and very strong growth in the central area.

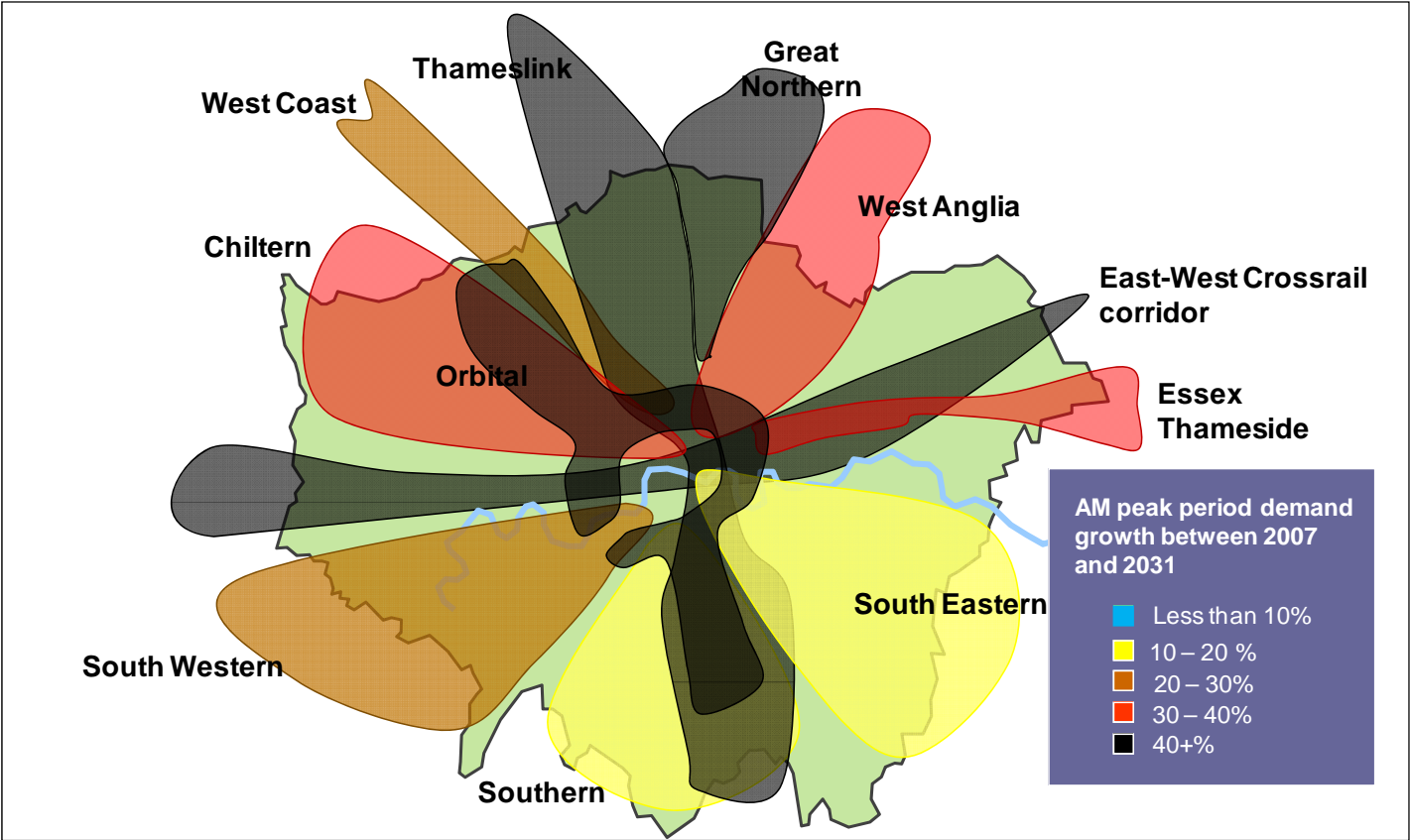
Figure 7: Spatial distribution of population and employment growth



4.1.6 Central London employment growth is of particular significance for rail. As described above in section 3, rail modes (including the Underground) have nearly 80% of trips into central London<sup>13</sup>, so whilst the Mayor’s Transport Strategy shows an increase in trips by all modes of 25% by 2031, rail demand is forecast to grow by 67%. The implications of enabling this central London employment growth are discussed below in section 10.

4.1.7 Figure 8 below translates the London plan forecasts into corridor-by-corridor rail demand growth, including the Overground orbital network. This analysis includes the impact on demand of the committed rail schemes described below. Whilst this document primarily makes recommendations for peak capacity, it should also be noted that inter-peak demand is forecast to grow significantly.

**Figure 8: AM peak demand growth by corridor**



Source: TfL London Rail Railplan model

**4.2 Committed rail schemes**

4.2.1 Currently committed rail schemes represent a substantial amount of new rail capacity. More detail is provided in Appendix A, but in summary, TfL’s modelling assumes the following committed major rail schemes:

<sup>13</sup> Travel in London, report 3, table 2.11, pp 61

- Crossrail, whose peak service in summary consists of 24 trains per hour in the central tunnel section of ten car length
- The Thameslink programme with phased introduction of 24 trains per hour through the core section (termed Key Output 2)
- East London Line extension to Clapham Junction at four trains per hour
- Control Period 4 train lengthening schemes for West Anglia (120 more vehicles), Great Eastern (68 more vehicles), Southern (60 more vehicles), Southeastern (48 more vehicles), London Midland (28 more vehicles), Chiltern (8 more vehicles), Great Northern (41 more vehicles) and South Western<sup>14</sup> (105 more vehicles expected)
- London Underground line upgrade programme, and congestion relief schemes

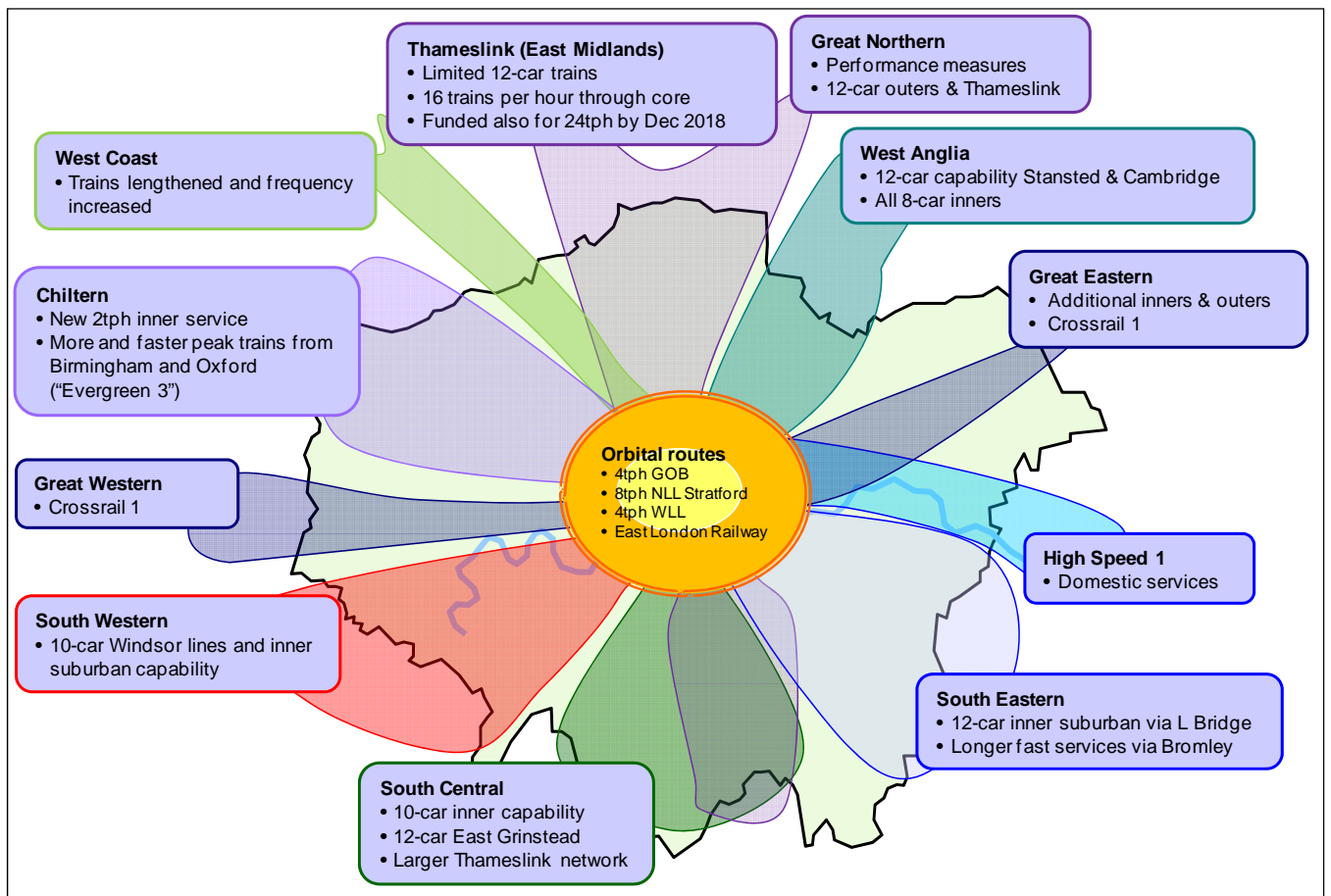
4.2.2 Other recently completed rail schemes include the East London Line extensions to Dalston Junction, Highbury & Islington, West Croydon and Crystal Palace, the North London Railway Infrastructure Project, which has enabled 4-car operations on the London Overground network comprised of brand new trains, including significant frequency increases, and the introduction of High Speed domestic services from Kent to St Pancras (using 174 new vehicles). Figure 9 summarises the committed and recently completed schemes by corridor.

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<sup>14</sup> Not yet confirmed, but anticipated from Parliamentary answers from the Minister of State



**Figure 9: Summary of committed rail schemes by corridor**



### 4.3 Crowding

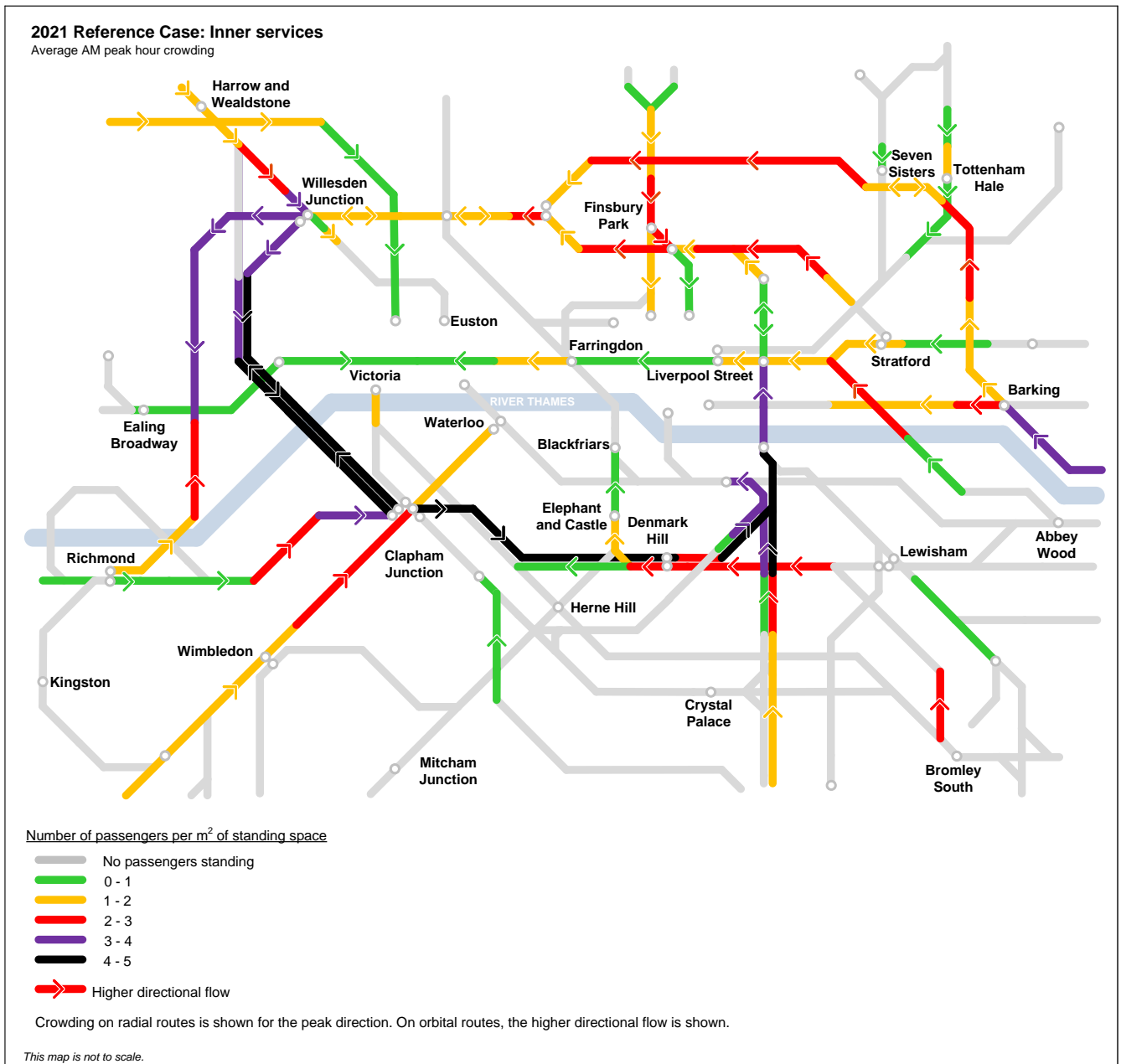
4.3.1 The current level of demand, the demand forecasts, and the committed rail capacity have been combined in the models to produce forecasts of the levels of rail crowding in future years.

4.3.2 Figure 10 below shows forecast levels of crowding in 2021 on inner suburban services. The figure shows the average crowding across the AM peak hour, and also average crowding across all inner suburban train services on any given link; crowding on some individual trains will be significantly worse than this. Black lines represent very severe levels of crowding, purple lines show severe crowding and red lines show significant crowding. As demand continues to grow after the end of the current programme of committed capacity enhancements, so these conditions worsen. Due to the lead times for providing new rail capacity, it is necessary to act before the levels of crowding become so severe that they choke off employment growth and damage London’s business efficiency and contribution to the UK economy. These economic impacts are discussed further in section 10.

4.3.3 The most severe crowding is on the West London Line between Willesden Junction and Clapham Junction, the extended East London Line to and from Clapham Junction, the East London Line from Brockley and Peckham

northwards, the North London Line from Willesden to Acton, the Windsor Lines into Clapham Junction, services into London Bridge and the Tilbury Loop into Barking. There is also significant crowding on much of the rest of the North London Line and the Gospel Oak to Barking Line.

**Figure 10: AM peak hour crowding on inner suburban train services**

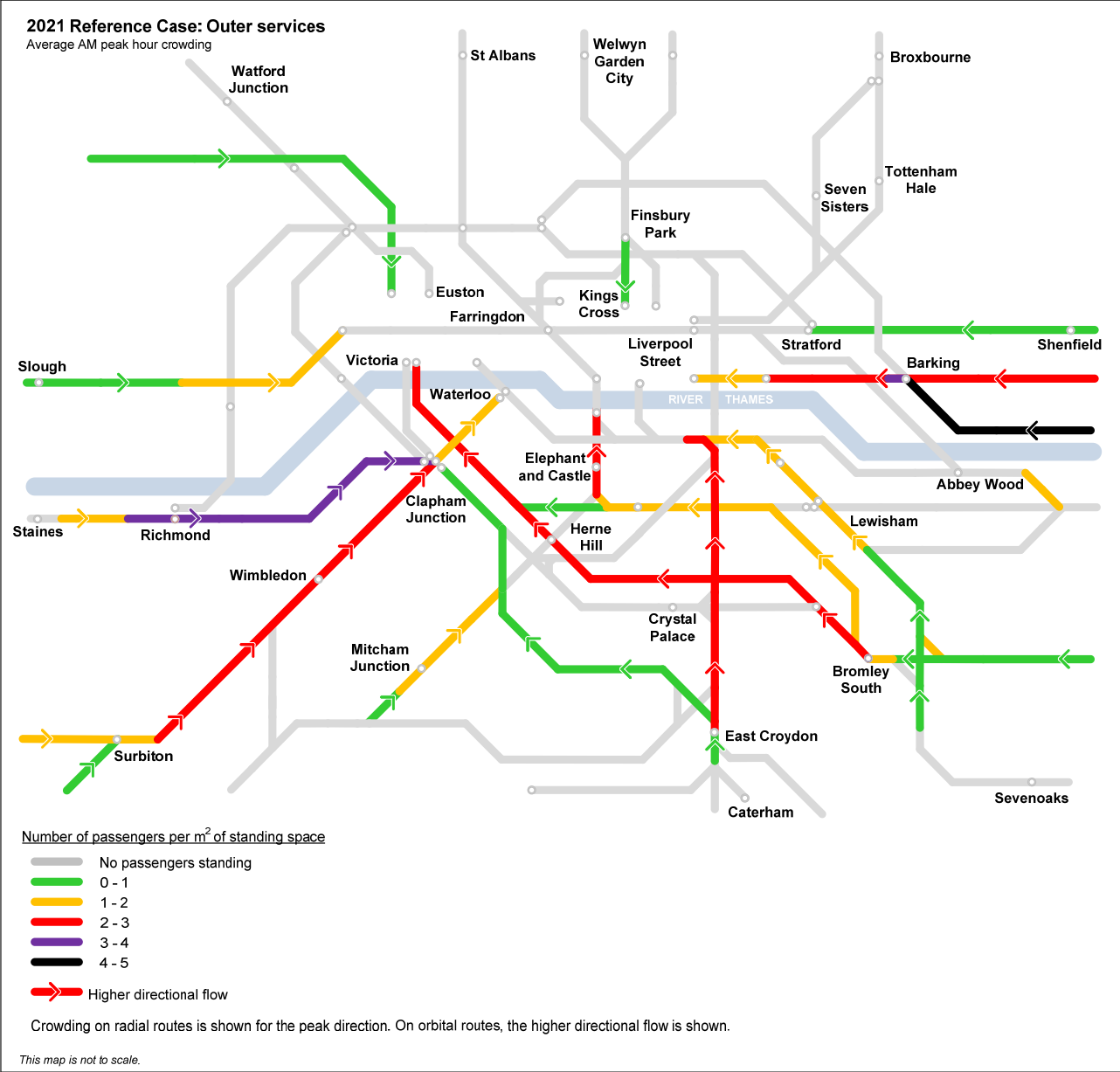


Source: TfL London Rail Railplan model

4.3.4 Figure 11 shows forecast levels of crowding in 2021 on outer suburban services, using the same measures of crowding as on the inner suburban map. However it is worth noting that the longer the crowding is experienced for, the worse that experience will be. That is reflected in the DfT's PIXC target (Passengers In eXcess of Capacity) for longer distance services that no-one should have to stand for more than 20 minutes.

4.3.5 Figure 11 shows severe crowding on the Tilbury Loop specifically and the London, Tilbury and Southend corridor in general, on the Windsor Lines and South West Main Line, on fast service from East Croydon into London Bridge, and on fast services from Bromley South into Victoria.

**Figure 11: AM peak hour crowding on outer suburban train services**



Source: TfL London Rail Railplan model

4.3.6 In short, the committed additional capacity does not provide sufficient capacity in the longer term or on all corridors, given the scale and geography of London’s economic and population growth. Overall, AM peak demand will grow by 60% to 2031 but capacity (seats plus standing spaces) by only 35%, without any further interventions. The London and South East Route Utilisation Strategy (RUS) comes to the same headline conclusion, identifying a significant number of capacity ‘gaps’ not just in Control Period 5 but beyond to 2031.

- 4.3.7 TfL does not believe greater and/or more extensive use of peak pricing would plausibly solve the problem of over-crowding in anything other than the very short-run. There is already a degree of peak pricing built into the fares structure. For example Oyster pay-as-you-go has peak and off peak fares, and some routes a counter-peak fare. Research shows that extension of the principle to, for example, season tickets could make a further contribution but that the peak premium charged would have to be large<sup>15</sup>. Average fares would need to be 25% greater in the peak to reduce demand in the London inner suburban area by just 4%, which is equivalent to just two year's growth. This would be in the context of London's rail fares being already over 30% more expensive per kilometre than elsewhere in the UK<sup>16</sup>. Furthermore, there would still need to be at least some investment in rolling stock capacity in the shoulders of the peak to provide the capacity for demand that does actually switch from the peak hour. Train lengths on many routes often reduce markedly away from the peak hour.
- 4.3.8 Technology such as tele-working also offers opportunities to reduce the need to travel, while TfL's programme of smart measures should reduce pressures on public transport to some degree. Again, however, some initiatives are already funded and underway in London. None would seemingly provide a panacea, given again research shows a substantial number of people already travelling at times that are more than thirty minutes earlier or later from their ideal. TfL estimate that growth in the peaks will still be substantial.
- 4.3.9 Similarly, there is only limited scope to reconfigure and refurbish existing stock to make best use of infrastructure. Many routes now have high capacity stock, though there remain some opportunities such as Great Northern services into Moorgate, where the existing fleet will approach the end of its asset life in Control Period 5.

## **5 Passenger rail capacity schemes**

### **5.1 Development of TfL's recommendations**

- 5.1.1 Section 4 describes the outcome if there is no further programme of enhancements beyond those already committed. The London Plan and the Mayor's Transport Strategy set out the future vision and the transport challenges this implies. This section sets out the set of appropriate and value-for-money National Rail solutions to these challenges that TfL has identified for the period 2014-19. Taken together, the package will enable National Rail to play its part in fulfilling the vision.

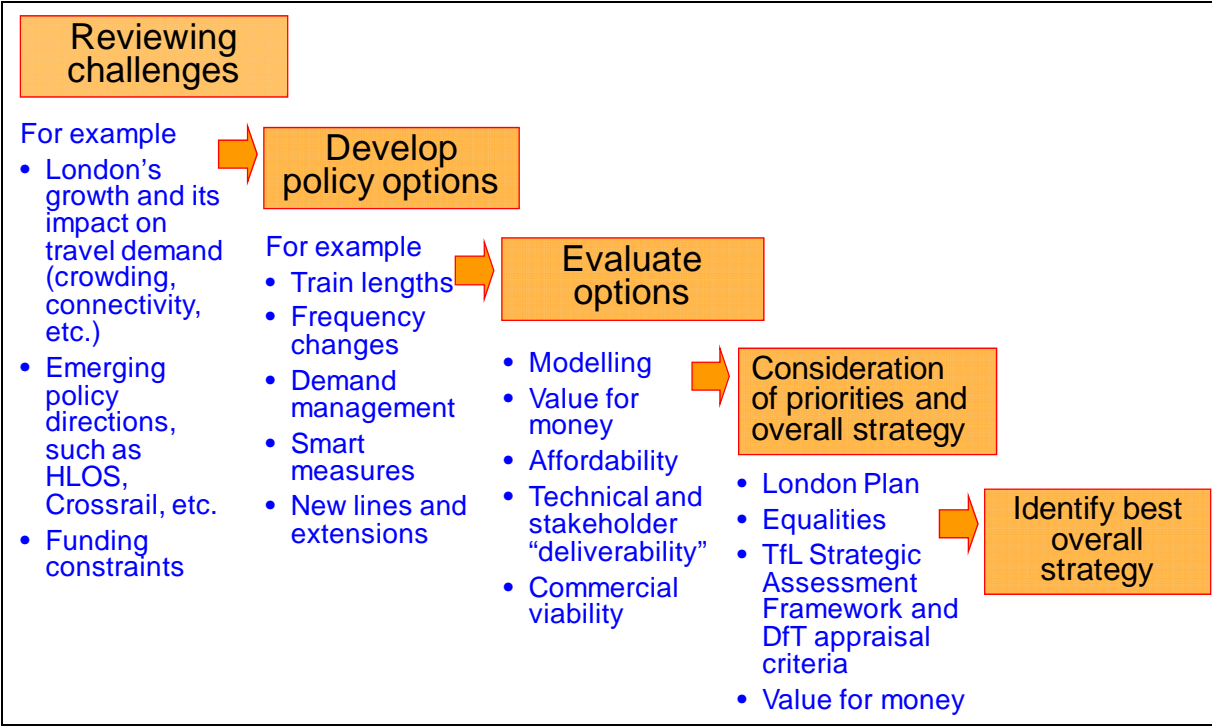
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<sup>15</sup> Faber Maunsell, Demand Management Techniques – Peak Spreading, Department for Transport, Transport for London and Network Rail, March 2007

<sup>16</sup> National Rail Trends 2009/10, Table 1.1b, 1.2b and 1.3b

5.1.2 The process used to identify the schemes that are needed in the next Control Period can be summarised in figure 12 below. The process takes account of the demand growth and crowding challenges that were explained in Section 4.

**Figure 12: Process to identify best overall strategy**



5.1.3 A range of options have been assessed for each corridor in London. On most corridors an initial set of options, specifically designed to address the challenges, were evaluated. An iterative process was then used, taking the elements of each option which deliver the highest benefits for the lowest cost, before the final preferred option on each corridor was decided upon. Over 50 options were evaluated in total from which the best solutions to meet the capacity gap on each corridor, as described in this report, were reached.

5.1.4 The iterative process to enable the wide range of options considered to be reduced to a coherent strategy asked five key questions:

- Is it plausibly affordable – how much would it cost to implement if phased appropriately?
- Is it likely to be value for money – how many passengers will be affected and by how much?
- Is there likely to be a commercially realistic means to implement it – can it be plausibly negotiated with Network Rail, freight operators, train operators, rolling stock leasing companies, and other parties?
- Is it likely to be technically acceptable and acceptable to stakeholders – can it be delivered in operational terms, does it meet stakeholder needs and how many (if any) losers will there be compared to the winners?

- Does it effectively contribute to the goals and outcomes set out in the Mayor's Transport Strategy?

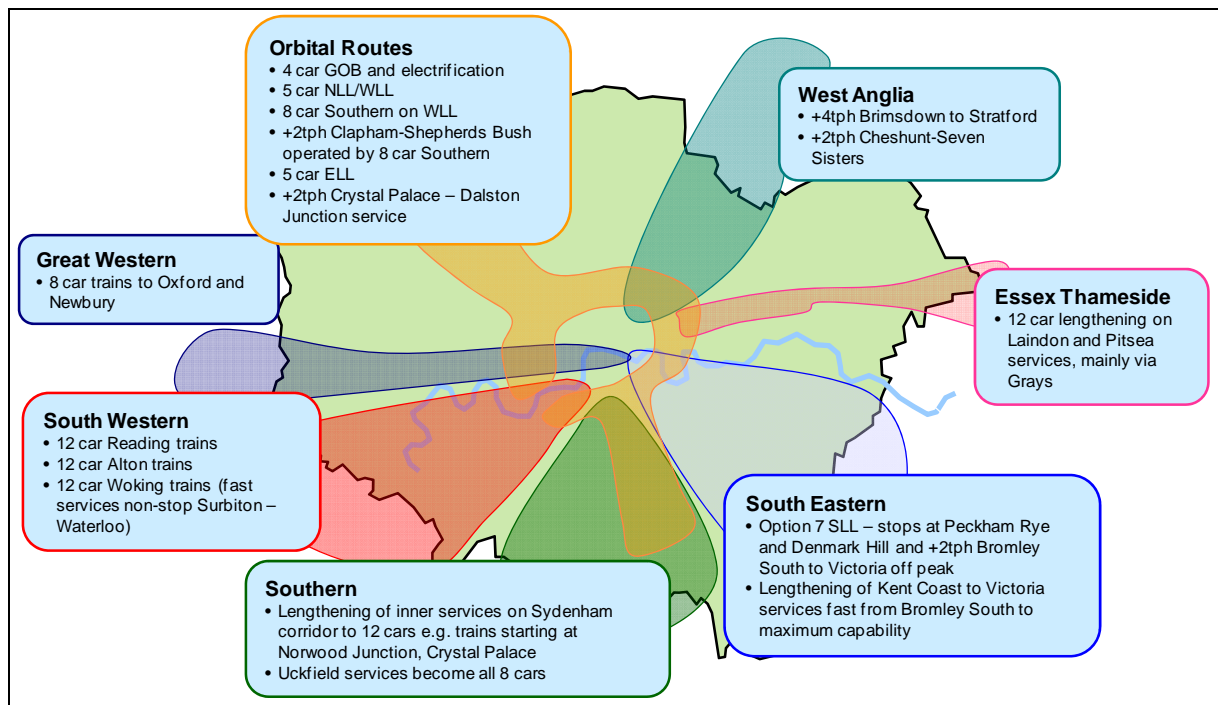
5.1.5 By following this process and answering the key questions, we have identified a package of schemes for London on a corridor by corridor basis.

5.1.6 Having been closely involved in the development of the London and South East RUS, this work has also informed TfL's analysis and vice versa.

## 5.2 TfL's recommended passenger rail capacity schemes

5.2.1 The figure below summarises TfL's recommended train capacity schemes for Control Period 5.

**Figure 13: TfL's recommended train capacity schemes for Control Period 5**



5.2.2 The key features of TfL's recommended strategy for Control Period 5 are:

- To address the high levels of crowding forecast on the orbital London Overground network, a comprehensive package of improvements including train lengthening across much of the network, additional peak services on the West and East London Lines and electrification of the Gospel Oak – Barking Line
- Partial four-tracking of the West Anglia Main Line to allow more frequent all-stations services to operate on segregated tracks between Brimsdown and Stratford, also enabling faster journey times on longer distance services to Liverpool Street
- Lengthening of services that run fast between Bromley South and Victoria to their maximum possible length within the confines of the

current infrastructure, and an enhanced service on the Catford Loop in advance of completion of the Thameslink Programme, also serving Peckham Rye and Denmark Hill

- Train lengthening and platform lengthening (where necessary) on various routes on the Essex Thameside, South Central, South Western and Great Western corridors to address the forecast crowding problems

5.2.3 The recommended package of schemes addresses crowding problems wherever there is a business case to do so, but subject to the criteria set out in 5.1 above, of being affordable and commercially viable etc. More detail of the schemes recommended in each corridor over and above those already committed is provided in the figure below.

**Figure 14: Recommendations by corridor**

Corridor	Route	Time of day	Recommendations
Orbital	North and West London Lines	All day	Train and platform lengthening to 5 cars on all London Overground services
	West London Line	All day	Train and platform lengthening to 8 cars on all South Central services
		All day	Additional 2 tph all day shuttle between Clapham Junction and Shepherds Bush operated by 8-car South Central services
	Gospel Oak – Barking Line	All day	Train and platform lengthening to 4 cars and electrification on all London Overground services
	East London Line	All day	Train and platform lengthening to 5 cars on all London Overground services
Peak only		Additional 2 tph peak service between Crystal Palace and Dalston Junction operated by 5-car London Overground services	
West Anglia	Main Line	All day	Additional segregated tracks to allow new 4 tph all stations service between Brimsdown and Stratford with removal of some station calls from longer distance services to enable faster journey times
	Southbury Loop	Peak only	Enhanced turnback facilities to allow additional 2 tph peak service between Cheshunt and Seven Sisters
Great Eastern	Main Line	n/a	No schemes proposed in advance of Crossrail services commencing
Essex Thameside	Main Line	Peak only	Train lengthening to up to 12 cars on selected peak services to/from Shoeburyness, Southend Central and Laindon
	Tilbury Loop	Peak only	Train lengthening to up to 12 cars on selected peak services to/from Shoeburyness, Thorpe Bay, Southend Central and Pitsea, via both Rainham and Ockendon
South Eastern	Main Line to Victoria	Peak	Train lengthening to up to 12 cars on most peak services that run fast between Bromley South and Victoria that can be lengthened without infrastructure enhancements (services to/from Ramsgate and Gillingham)
	Catford Loop	Inter-peak only	Additional 2 tph off peak all stations service between Bromley South and Victoria with stops in selected peak services at Peckham Rye and Denmark Hill
South Central	Sydenham route	Peak only	Train and platform lengthening to 12 cars on selected peak services between London Bridge and Norwood Junction and Crystal Palace
	Uckfield route	Peak only	Train lengthening to 8 cars on selected peak services between Uckfield and London Bridge
South Western	Main Line	Peak only	Train lengthening to 12 cars on all peak services to/from Woking that run fast between Surbiton and Waterloo

Corridor	Route	Time of day	Recommendations
	Alton route	Peak only	Train and platform lengthening to up to 12 cars on selected peak services to/from Alton, Farnham and Aldershot, via both Woking and Ascot
	Windsor Line	Peak only	Train and platform lengthening to 12 cars on peak services to/from Reading
Great Western	Main Line	Peak only	Train lengthening to 8 cars on selected peak services to/from Oxford, using cascaded class 319s from Thameslink
Chiltern	Main Line and Aylesbury route	n/a	No scheme proposed as franchisee required to supply sufficient capacity to address demand
West Coast	Main Line	n/a	No scheme proposed – although major alterations to services may be required during HS2 construction
Thameslink	Main Line	n/a	No scheme proposed in advance of Thameslink Programme completion
East Coast	Main Line and Hertford Loop	n/a	No scheme proposed in advance of Thameslink Programme completion

5.2.4 These schemes require a total of 386 additional vehicles (that is coaches required, including maintenance spares). However, many of these vehicles would make multiple trips in the AM peak, in the PM peak and in off peak periods. Figure 15 shows the total number of vehicles, plus the number of vehicle-trips made in the ‘peak’ direction, with the exception of the orbital corridor where the vehicle-trips are two-way. On average, each vehicle will make 10 peak-direction trips per day. It should be noted that the figures for the orbital corridor include the West London Line as a whole, incorporating both London Overground and Southern services.

**Figure 15: Additional vehicles and vehicle trips**

Corridor	Additional vehicles required	AM peak vehicle trips	All day vehicle trips
Orbital	130	444	2682
West Anglia	44	120	440
Essex Thameside	79	104	208
South Eastern	16	12	216
Southern	28	42	84
South Western	77	87	174
Great Western	12*	12	24
<b>Total</b>	<b>386</b>	<b>821</b>	<b>3828</b>

\* Note: Additional Great Western vehicles are over and above cascaded electric rolling stock required following electrification



- 5.2.5 These initiatives will need to be complemented by improvements to capacity at certain congested stations. There is little value in enhancing rail services if passengers are not able to make use of them because of congestion within stations. TfL's recommendations for station enhancements are described in Section 7.
- 5.2.6 The rail schemes described are needed to accommodate the additional passenger demand caused by the proposed increases in jobs in central London/Docklands and increases in housing in London and the wider south east. TfL's recommendations in this document result in extra capacity being available on some Underground lines in inner London, principally due to the enhancements to orbital rail services. Notable benefits are seen on the Victoria and District Lines in particular. Enhancements are also being made to the London Underground and DLR networks to accommodate more passengers and this will mean there is increased capacity available for dispersal of rail passengers from the central London terminal stations and strategic interchanges en route. TfL's recommendations for the rail network therefore also complement the increased capacity being provided on other modes of transport in London.
- 5.2.7 Section 10 contains an appraisal of TfL's recommended strategy which demonstrates that the package of measures is affordable and delivers good value for money.
- 5.2.8 The forecasts of TfL and other industry stakeholders indicate that passenger demand will continue to grow beyond the end of the next Control Period after 2019. Whilst this document focuses on the 2014-19 Control Period, the interventions proposed for HLOS2 need to be consistent with the longer term transport strategy for London and the wider South East. This has been fully considered in the development of our proposals and Section 12 considers the longer term requirements in more detail.

## **6 Freight capacity and capability**

### **6.1 Freight capacity**

- 6.1.1 London currently sees a large volume of rail freight movements, with the busiest sections of the network having up to 40 trains per day in the busiest direction<sup>17</sup>. Generally, 10% of all rail freight moved travels via London, however only 3% has London as its destination<sup>18</sup>. The through-traffic is primarily heading for the Midlands, the North West and the North East.
- 6.1.2 Historically London has arisen as the county's leading city because of its geographic position, being located on a major river close to the sea, and near to continental Europe. Much of the rail freight passing through London is

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<sup>17</sup> Network Rail Freight Route Utilisation Strategy, March 2007

<sup>18</sup> Travel in London, Report number 1, section 8.4

container traffic from the deep sea ports; whilst London may be the ultimate market for some of the goods being carried, its close proximity to the ports means that rail is less competitive compared with road for this traffic. London's position in relation to the ports also means that it is 'en route' for container traffic heading for the North and Midlands. The main origins of through freight traffic in London, now and in the future, are:

- the Haven ports (Felixstowe and Bathside Bay)
- Essex Thameside (Tilbury and London Gateway)
- Kent Thameside
- the Channel Tunnel.

6.1.3 Freight traffic is forecast to grow strongly, in particular the intermodal sector (containers). The table below shows the current and forecast number of daily trains (all traffic – not just intermodal) for the four main freight origins above.

**Figure 16: Freight path forecasts**

	2010 average daily trains, each way	2030 average daily trains, each way
Felixstowe/Bathside Bay	28	58
Tilbury/London Gateway	8	50
Kent Thameside	9	24
Channel Tunnel	6	35

Source: draft London and South East Route Utilisation Strategy, Table 9.1

6.1.4 The rail freight that does have London destinations tends to be bulk traffic, such as aggregates from the west country used in construction in the capital, though there are also intermodal flows to London from the UK regions.

6.1.5 It is Mayoral policy, as set out in the London Plan<sup>19</sup>, to encourage mode shift of freight from road to rail. However, there is an increasing capacity conflict on London's rail network, with the orbital routes used by through freight traffic also showing severe passenger crowding in the future. The need for further passenger capacity on the London Overground network is discussed above. Freight and 'metro-style' passenger services have very different operating characteristics; freight trains require a consistent speed, and have very slow acceleration, whereas a metro-style passenger service calls frequently at stations and has high acceleration and deceleration rates. On the North London line the non-stopping freight services would be faster than the stopping passenger services.

6.1.6 Freight trains are also usually very long, which means that junctions are blocked for longer durations than they are by the relatively short London

<sup>19</sup> Consultation draft replacement London Plan, policy 6.15, page 160

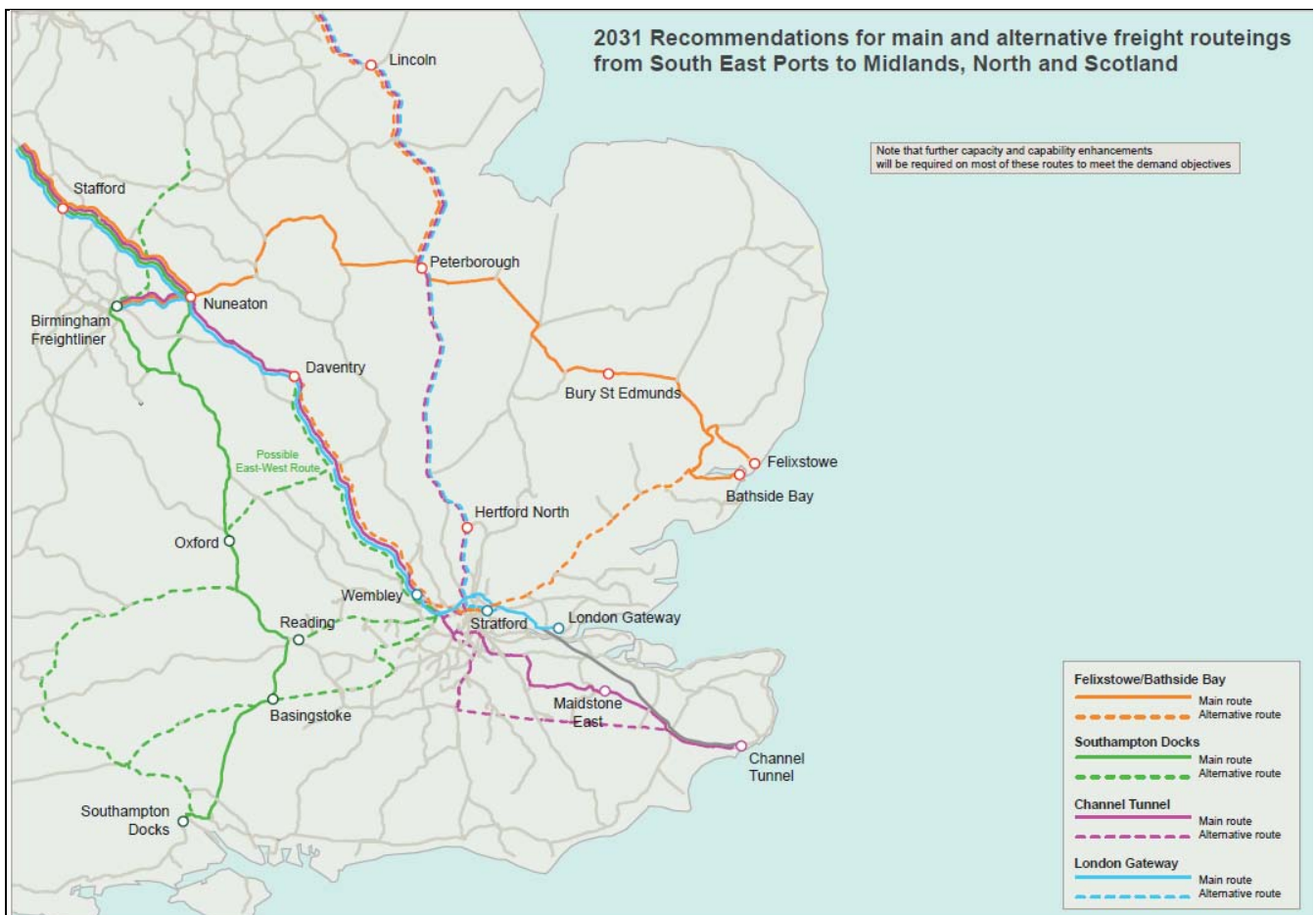
Overground trains, and that signal spacing for long freight trains does not optimise passenger train throughput. Line capacity would be higher if it was used exclusively by either freight or passenger services.

6.1.7 The obvious answer is to route freight with non-London destinations away from the capital wherever possible. This is the policy proposed by the London and South East RUS, which TfL strongly supports. This requires the ‘cross-country’ routes to have sufficient capacity and capability such that they do not impose extra costs on freight operators.

6.1.8 Of the four main origins for through-freight identified above, only the Haven ports traffic has the potential to be routed away from London. However, this is a significant flow, and achieving this is essential given the likely growth in traffic from London Gateway port, which has no choice but to be routed through the capital. A scheme being delivered under Control Period 4 provides some of the capacity required to route trains from Felixstowe to Nuneaton cross-country, but further development of this route is required in Control Period 5. TfL considers this to be a very high priority scheme.

6.1.9 The figure below, taken from the London and South East RUS, shows the recommended freight routing strategy.

**Figure 17: 2031 recommended freight routings**



Source: London and South East Route Utilisation Strategy, Figure 9.2

## **6.2 Freight capability**

- 6.2.1 As discussed in section 6.1, and indicated in figure 17, some freight flows have no alternative routings to those via London. These residual flows must be accommodated in the most efficient manner possible, and infrastructure solutions may be necessary to achieve this.
- 6.2.2 Network Rail has undertaken a study into cross-London freight capability, looking at schemes necessary to achieve speeds of 40mph, 775m long trains, and 'W12' loading gauge, i.e. capable of carrying 9ft 6in high refrigerated containers. The results of this study are not available at the time of writing, but TfL is supportive of the capability concept, and would look to support schemes deemed necessary in Control Period 5.
- 6.2.3 However, TfL believes that the railway must also make the best possible use of the finite number of paths that already exist. Too many freight paths are currently left unused, which would be valuable for passenger traffic in the peak. This is an opportunity cost that cannot be ignored in the short term, in the context of limited funding for Control Period 5 and the need to improve the railway's cost effectiveness. One example that should be explored is whether additional paths could be found for peak passenger services between Stratford and Clapham Junction in order to increase frequency and capacity in Control Period 5.

## **6.3 Freight terminals**

- 6.3.1 Rail freight flows with London destinations are dependent on the availability of terminals in London. The Mayor's policies seek to protect existing London freight terminals, and encourage the development of others necessary to achieve mode shift from road to rail for this traffic.
- 6.3.2 In particular, the combination of the High Speed 1 line, adjacent brownfield sites in the London Riverside area, the A13 and the River Thames, offers great potential for an intermodal terminal capable of handling European high gauge containers, serving London markets.
- 6.3.3 TfL would encourage government support for measures to achieve mode shift from road to rail for London freight markets.

# **7 Stations**

## **7.1 Congestion at stations**

- 7.1.1 Just as with the train service, many National Rail stations are already congested at peak times and enhancements to station capacity are required in order to improve customer service and to enable London's growth in rail demand to be accommodated. This is an area where HLOS1 gave rather less

priority, with some exceptions for example associated with the Thameslink programme. Crossrail will involve the reconstruction of a number of stations as well in the period to 2019.

7.1.2 More generally though, and as identified in the Mayor's Transport Strategy, capacity is now stretched at many locations. Examples are:

- some central London termini such as Charing Cross, Victoria and Fenchurch Street
- Clapham Junction station where the subway, stairways and entrances are regularly overwhelmed by passengers
- A number of other medium sized stations with severe congestion either already or emerging, such as Finsbury Park, Bromley South, Wimbledon, Vauxhall, and Barking.

7.1.3 TfL has estimated the growth in station usage at these and other key stations in order to identify a package of station capacity works. Data has been collected on passenger delay at a sample of stations and demand growth applied to estimate how this changes over time. TfL has identified possible congestion solutions together with capital and operating costs, and hence an outline business case approaching 2:1 has been calculated for the recommended schemes, which are shown in figure 20 below. They are also listed in Appendix C. The recommended schemes have been selected by utilising existing documents which identify station congestion problems, such as RUSs, and also using local knowledge of the issues. This has taken into account factors such as level of demand, extent of congestion, strategic importance, and consultation with Network Rail and the rail industry, in order to give an affordable package. TfL would welcome further investment in station capacity beyond this list.

7.1.4 Some of the solutions at the terminal stations, such as at Fenchurch Street and Charing Cross, involve improvements to secondary entrances in the middle of the station or at the country end. This not only reduces congestion at pinch-points such as gate-lines and entrances / exits, but also helps to even out the passenger loadings along the length of what increasingly are 240 metre long trains. This could also be worthwhile at other locations such as Waterloo.

7.1.5 The proposed schemes are generally modest in scope, and do not include major works to the central London termini. Of the central London termini, most either have existing schemes or will be addressed by major projects such as Thameslink, Crossrail, High Speed 2, or the Intercity Express Programme. The exceptions are Waterloo and Victoria, where major schemes are likely to be required in the long term. A shorter term scheme is underway at Waterloo, and one is proposed here for Victoria. Network Rail are currently working on more expansive options for Victoria than that assumed in this document, and TfL would support any such proposal subject to business case. Some works may also be necessary at Paddington to address any residual issues not covered by Crossrail and the Intercity Express Programme. Should High Speed 2 not go ahead as planned, some works may also be necessary to address capacity concerns at Euston.

7.1.6 The recommendations here relate to National Rail infrastructure only, however TfL is keen to work with Network Rail to ensure there is adequate capacity in the future for the onward dispersal of passengers onto TfL services.

## **7.2 Improved interchange**

7.2.1 46% of rail journeys involve interchange to London Underground or DLR services in central London<sup>20</sup>, and further interchange takes place outside the Central Area. TfL therefore believes that integrated solutions across all modes in London offer the most advantages to customers. It is Mayoral policy to better integrate National Rail services with Overground, Tube, DLR and Tram as well as TfL's extensive bus network to deliver seamless journeys<sup>21</sup>.

7.2.2 The Mayor's Transport Strategy emphasises the role of strategic interchanges to assist orbital movement that not only improves accessibility locally but also relieves pressure in central area. The nature of this covers:

- Improving currently inadequate interchange in terms of quality
- Calling more trains on radial routes to make the interchange more effective
- Increasing frequency on orbital routes
- Physical changes to reduce the time it takes to change from one platform to another and thus to make the interchange
- New stations to allow interchange where none is possible currently

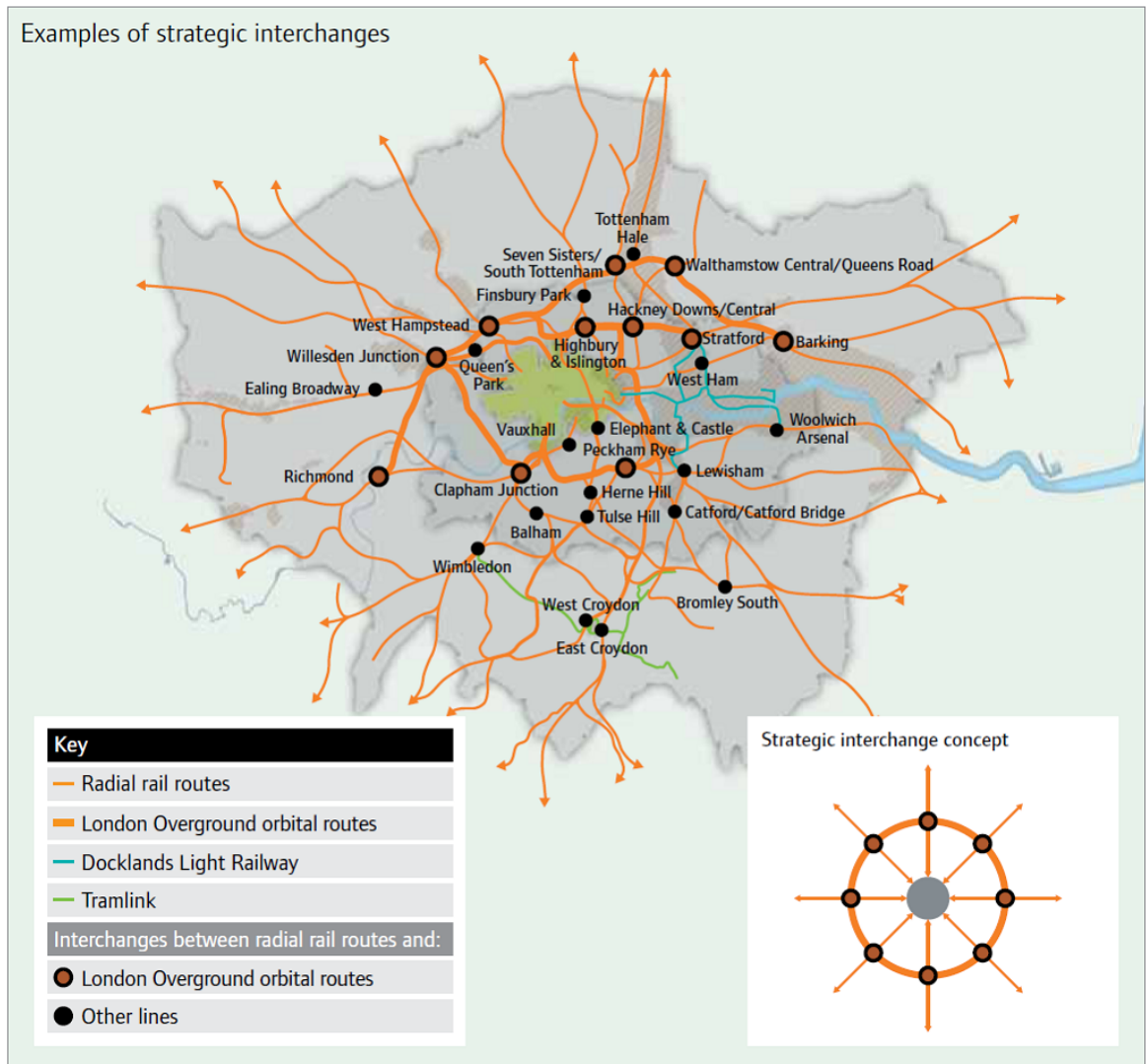
7.2.3 The diagram from the MTS sets out some locations where this might best be prioritised. Appendix C lists the measures proposed at Strategic Interchange stations. The TfL Interchange Best Practice Guidelines should be followed when planning and designing interchange schemes.

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<sup>20</sup> Derived from Travel in London Report 2, 2010, Table 11.1

<sup>21</sup> Mayor's Transport Strategy, Section 5.1 and the London Plan, Policy 6.2

**Figure 18: Strategic interchange outside central London**



Source: Mayor's Transport Strategy, figure 46

### 7.3 Step-free access at stations

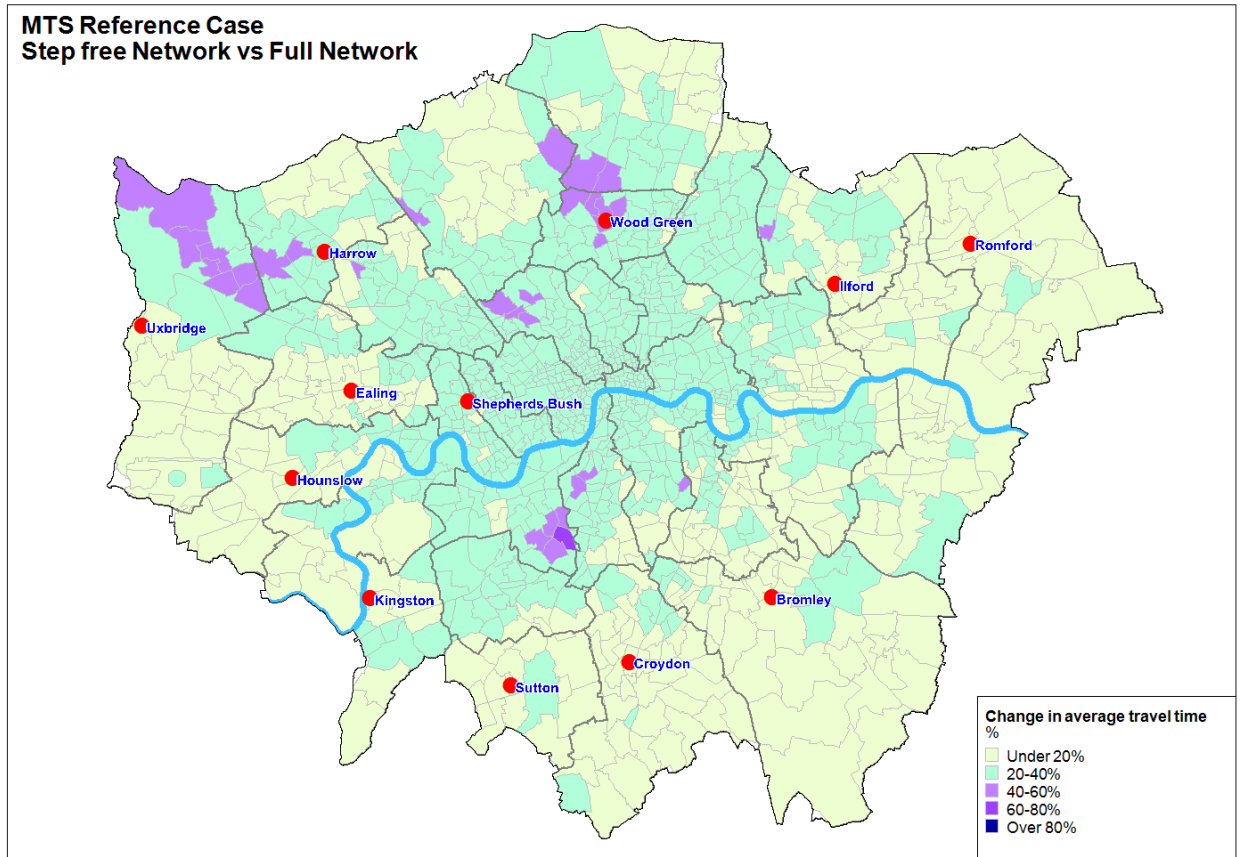
7.3.1 The current programme of works to provide step-free access from street to platform, plus the delivery of major projects such as Crossrail and Thameslink will see the proportion of stations in London that are step-free rise to 48%, though this can vary markedly around London. This is well below the equivalent figures in other English cities where the average is even today 63%<sup>22</sup>.

7.3.2 Expected changes in demographics and hence the London travel market point to the fact that the case remains for further accessible stations. Figure 19 shows the journey time premium that the mobility impaired in some areas of London suffer compared to those able to use non-accessible stations. This averages 24% over London. Programmes to improve accessibility at National

<sup>22</sup> TfL analysis

Rail stations, such as the DfT’s “Access for All”, should therefore continue as part of HLOS2. This programme could readily be part of a wider station enhancements programme to improve opportunities for synergies.

**Figure 19: Journey time penalties for mobility impaired passengers**



Source: TfL analysis

7.3.3 The DfT’s research<sup>23</sup> shows that well-chosen stations have offered good value for money in the past. TfL’s analysis shows that there are more feasible candidate stations that should form part of a programme over the period to 2019. These are also shown in figure 20, and listed in Appendix C.

## 7.4 Possible schemes

7.4.1 TfL’s analysis shows that congestion relief schemes need not always be expensive, and that small scale improvements to remove pinch-points can offer good value to money. The example package shown in figure 20 would cost £68 million over five years and have an indicative benefit cost ratio approaching 2:1. The stations in red are those with the best case for at least some works to enhance capacity.

<sup>23</sup> Access for All Benefits Research, Final Report, August 2010, SDG





preconceptions about the rail network. The need for a common set of standards is referred to in Proposal 13 of the Mayor's Transport Strategy. Currently the standard of service offered can vary considerably between franchises with the TfL managed Overground adhering closely to the required standard whilst many other franchises do not.

8.1.2 TfL has therefore developed a series of standards that it considers should be applied to all stations and services in the London area wherever practicable. These are designed to address the key areas of concern to customers and deliver higher levels of customer satisfaction amongst all users of the service. The main standards are summarised below for reference:

- **Service frequency** – all stations should receive a frequency of service of at least four trains per hour throughout the week, wherever appropriate. Extensive research conducted for London Underground and others has demonstrated that customers and non users alike respond positively to standardised frequencies, as they address preconceptions that frequencies are low and journeys therefore lengthy and inconvenient, particularly during off peak periods;
- **Station ambience** – all stations to achieve a standard for cleanliness and condition that is equivalent to that currently maintained by the Overground. The standard would initially be achieved by a deep clean and sustained by an enhanced regular cleaning programme;
- **Station staffing** – the standard aims to ensure that staff are visible and available to customers, and offer them assistance on a proactive basis whenever possible. The standard also aims to better focus available staffing resources at those times when the actual and perceived risk of anti social behaviour is at its height (after 3pm), through the use of mobile staff patrols at these times;
- **Help Points and CCTV** – All stations should be equipped with Help Points on every platform to enable customers to request information or assistance if they need it. CCTV should be provided offering pictures of a quality sufficient to be used during court proceedings. CCTV and Help Points should be subject to centralised proactive monitoring to maximise their utility to customers and ensure that staff and policing resources are directed effectively to address crime and anti social behaviour, improving customers' actual and perceived levels of personal security;
- **Customer information systems at stations** – All stations should be equipped with state of the art visual and aural customer information systems on platforms and in entrance areas/ticket halls that provide customers with real time information on the train service provided;
- **Cycle parking** – All stations should have cycle parking facilities that match TfL's quantitative and qualitative standard in this area. TfL is keen to promote cycling as a way of accessing the rail network because of the environmental and health benefits that it brings. Providing high quality cycle parking facilities is a good way of accomplishing this objective.

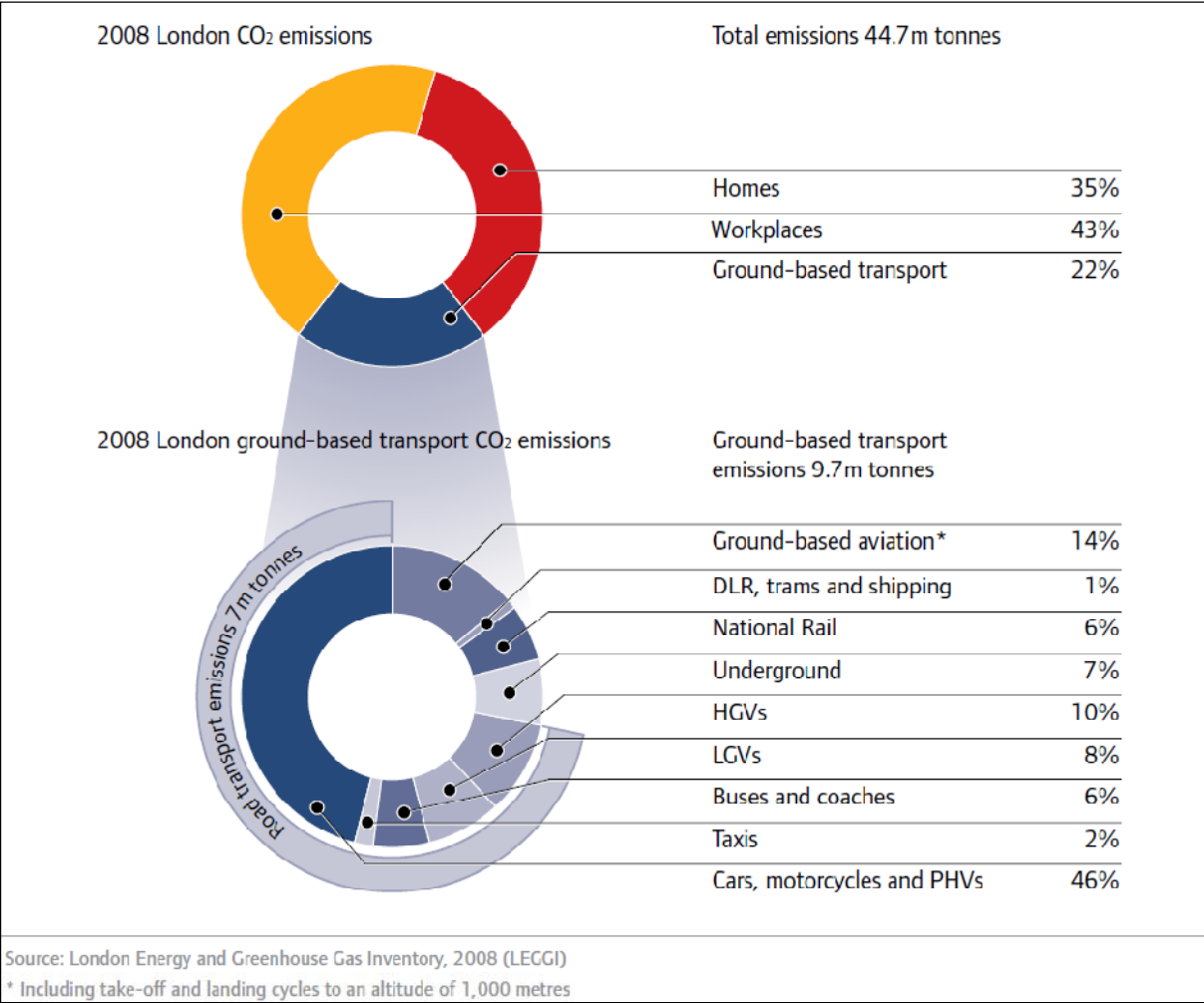
8.1.3 TfL’s analysis shows that application of such standards to relevant train operators would have a capital cost of £27 million, an annual operating cost of £11 million, and have a benefit cost ratio of greater than 2:1.

## 9 Carbon reduction and air quality

9.1 Climate change mitigation is an explicit national and Mayoral goal. Indeed, the Mayor has pledged to reduce the volume of emissions by 60 per cent by 2025 (compared with 1990 levels).<sup>24</sup>

9.2 Private cars and road freight are comfortably the largest contributors of greenhouse gas (GHG) emissions from ground-based transport, with only 6 per cent due to rail operations, as shown in Figure 21.

**Figure 21: Transport’s contribution to London’s CO<sub>2</sub> emissions<sup>25</sup>**



<sup>24</sup> Mayor’s Transport Strategy (2010), page 237

<sup>25</sup> Mayor’s Transport Strategy (2010), Figure 28, page 104

- 9.3 There are nonetheless means to reduce this further, and indeed the recommended package of rail enhancements will act to support this goal through modal shift from high emission modes to rail. Indeed, TfL has calculated that a reduction in emissions of around 6000 tonnes of CO<sub>2</sub> per year will occur due to mode switch to rail.
- 9.4 TfL believes that the Government should increase the incentives on train operators and Network Rail to adopt appropriate and cost effective measures to reduce GHG emissions in the next Control Period. This includes
- improving energy efficiency and reducing consumption
  - encouraging improved behaviours
- 9.5 To help achieve this the rail industry, led by the Rail Safety and Standards Board (RSSB), is currently developing the environmental elements of the Initial Industry Plan. TfL is fully supportive of this work which is likely to recommend the adoption of a rail industry 'carbon management framework'. This will incentivise all parts of the rail industry to reduce carbon emissions and address the barriers to action. Particular areas of focus will be:
- the inclusion of monitoring of energy usage and cost reductions in franchise contracts
  - encouraging operators to install meters on trains to accurately measure energy use
  - a requirement on Network Rail to reduce energy losses
  - consideration of whole life energy and cost savings when making investment decisions
- 9.6 By adopting this framework, the rail industry will be in a better position to make a greater contribution to meeting the national and Mayoral targets on reducing carbon emissions.
- 9.7 Air quality is also a significant issue in London, with some areas of the capital experiencing high levels of nitrogen oxides and particulate matter. Transport is a significant source of poor air quality, with busy roads, diesel-operated rail lines and airports being major contributors. TfL's package of recommendations will help support the improvement of air quality by encouraging modal shift from road to rail, reducing the number of road journeys made. Electrification of the Gospel Oak – Barking line is also proposed, which will make a further contribution to reducing emissions contributing to poor air quality in north east London.

## 10 Appraisal of the TfL strategy

### 10.1 Introduction

10.1.1 The Secretary of State for Transport has recently restated the evidence required for DfT decision-making. This approach takes account of information on:

1. The financial case
2. The economic case
3. The commercial case
4. The management case
5. The strategic case

10.1.2 This section outlines the cases for the recommended package.

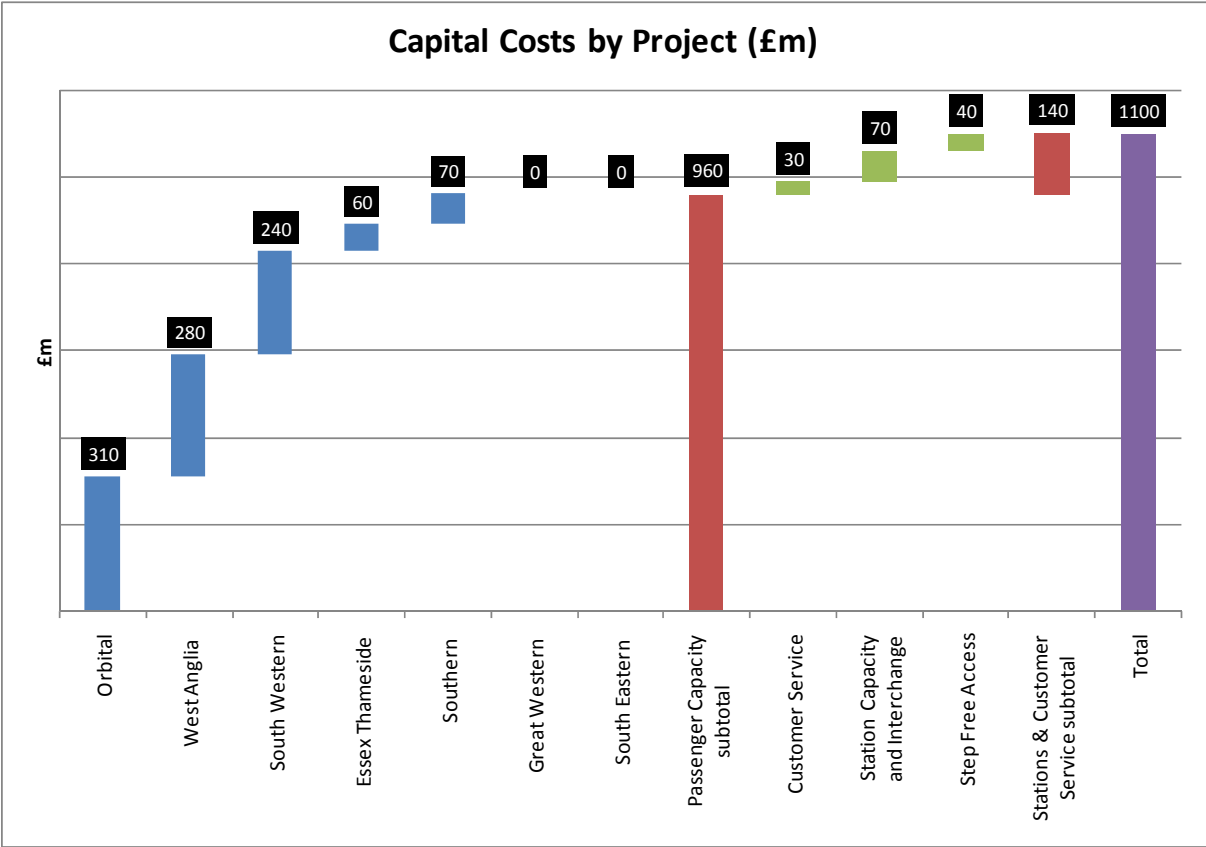
### 10.2 The financial case: costs and affordability

10.2.1 Estimates have been produced for the capital and operating costs of the passenger capacity schemes recommended by TfL. The recommended package for Control Period 5 has been explicitly developed with a view to its affordability as well as its value for money and technical feasibility. Ideally, therefore, TfL would have reduced crowding to lower levels still, but Control Period 5 will inevitably be financially constrained, so only the best possible schemes have been included. Also, some corridors have reached the point where simple solutions to capacity problems no longer exist, and capacity can only be increased through the development of major schemes like High Speed 2. Another example is the proposed Lea Valley 4-tracking to Brimsdown, which delivers much of the benefits of 4-tracking to Cheshunt (for example), but without incurring the significant extra costs associated with replacing the level-crossings north of Brimsdown and Enfield Lock stations.

10.2.2 The capital cost estimates are based on unit rates derived from previous TfL projects, and from rail industry advice; there are around 100 separate cost categories in the costing model. Separate Network Rail estimates have validated the cost basis used here. Capital costs include design costs, contractors' fees, risk and contingency. Rolling stock leasing costs have been treated as an operating cost.

10.2.3 Figure 22 shows the capital costs for the TfL recommended passenger capacity schemes, both individually and cumulatively. It also shows the estimate for station capacity, step-free access and customer service schemes. The passenger capacity schemes are estimated to cost £960m in 2007 prices, with the station and customer service schemes costing a further £140m, giving a total capital expenditure of £1.1bn in Control Period 5.

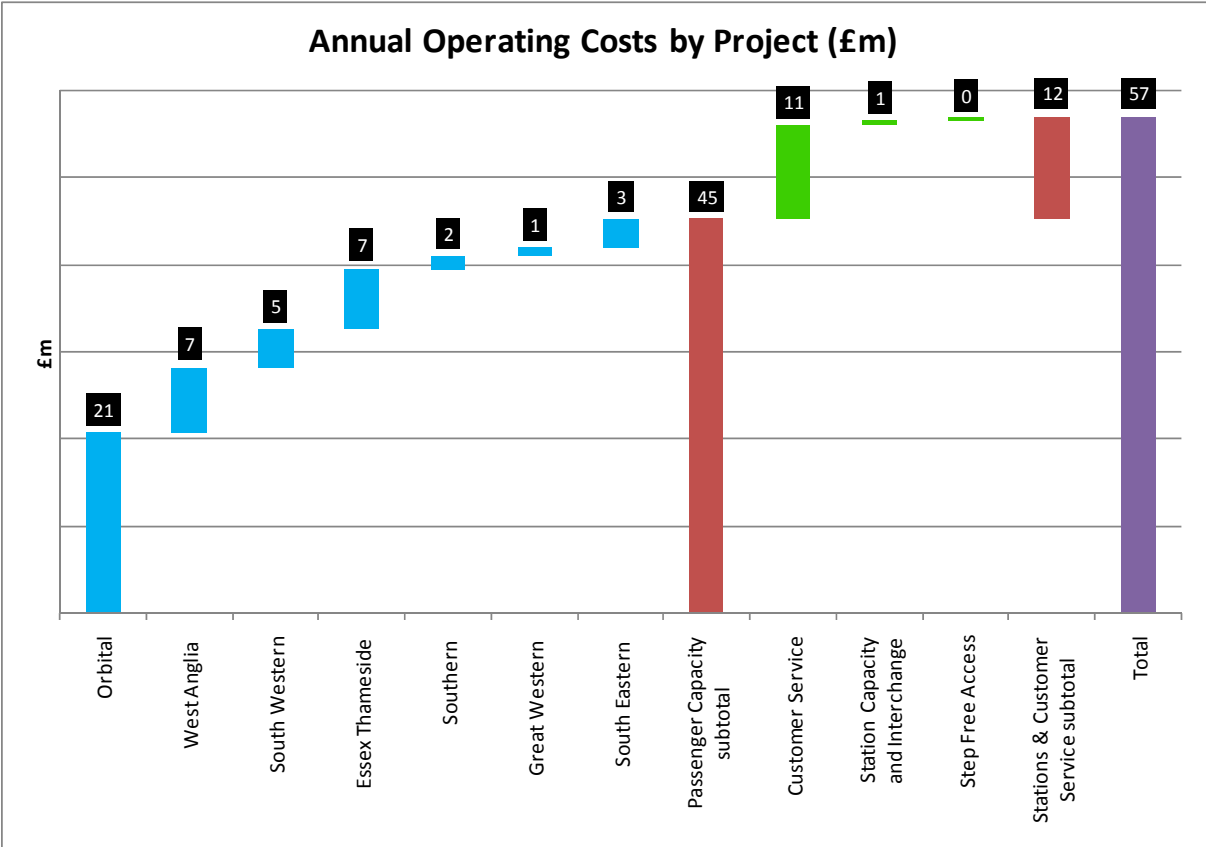
**Figure 22: Capital costs of TfL recommended schemes**



10.2.4 The operating costs have been estimated from a cost model incorporating fixed and variable track access charges, power, rolling stock maintenance and leasing costs, and staff costs. All unit cost rates are either route or vehicle-specific, and are sourced from the Office of Rail Regulation, with the exception of the rolling stock maintenance and leasing costs, and the staff costs, which are taken from the costs of operating the London Overground network.

10.2.5 Figure 23 shows the annual gross operating costs for the recommended passenger capacity schemes, and for the station capacity, step-free access and customer service measures, in 2007 prices.

**Figure 23: Annual gross operating costs of TfL recommended schemes**



10.2.6 The recommended schemes, without any offsetting cost savings (see section 11 for these), would have a capital cost equivalent of around £220 million per annum during Control Period 5, and an annual gross operating cost of £57m. The net annual operating cost after revenue is included is £30m. The appraisal of the package of schemes is very robust to a 10% increase (for example) in operating costs.

10.2.7 TfL considers that this represents an affordable level of capacity growth in moving towards achieving the Government’s policy objectives, and a compromise between meeting those policy aspirations in full and incurring higher levels of cost. A lower level of aspiration would not achieve the Government’s transport and economic objectives.

**10.3 The economic case: benefits and value for money**

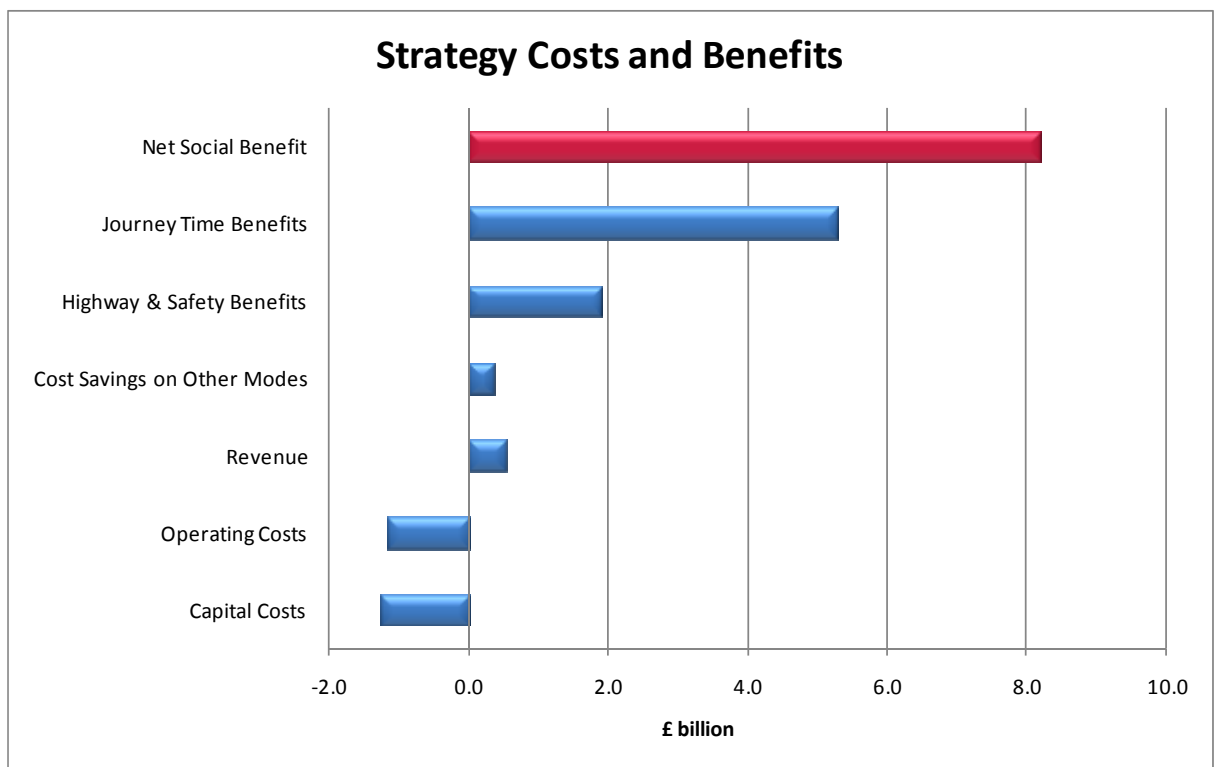
10.3.1 The benefits, revenues and highway benefits of the passenger capacity schemes have been assessed using the TfL Railplan model. This has also been used by Network Rail in the analysis carried out for the London and South East Route Utilisation Strategy.

10.3.2 For appraisal purposes only, 50% optimism bias has been added to the capital costs. The appraisal is robust to a higher figure. The appraisal has been carried out over a 60 year period, using HM Treasury Green Book discount rates. TfL values of time have been used, which reflect the higher earnings

and employment costs in London. The appraisal is robust to the lower national values of time, however it is worth noting that the recent announcement by the Secretary of State stated that he would “keep the issue under review”.

10.3.3 Overall, the TfL recommended package of passenger capacity schemes has a benefit cost ratio of over 4 to 1 (or 3 to 1 using the DfT’s appraisal methodology). This implies the package is high value for money, which reflects the huge numbers of commuters and leisure passengers travelling to central London, Londoner’s high dependency on rail, and the relatively high level of fares in London<sup>26</sup>. Fast projected off peak growth from a relatively high base level also bolsters the case.

**Figure 24: Costs and benefits of the recommended package**



10.3.4 The high value for money of the package is driven by the following forecast impacts:

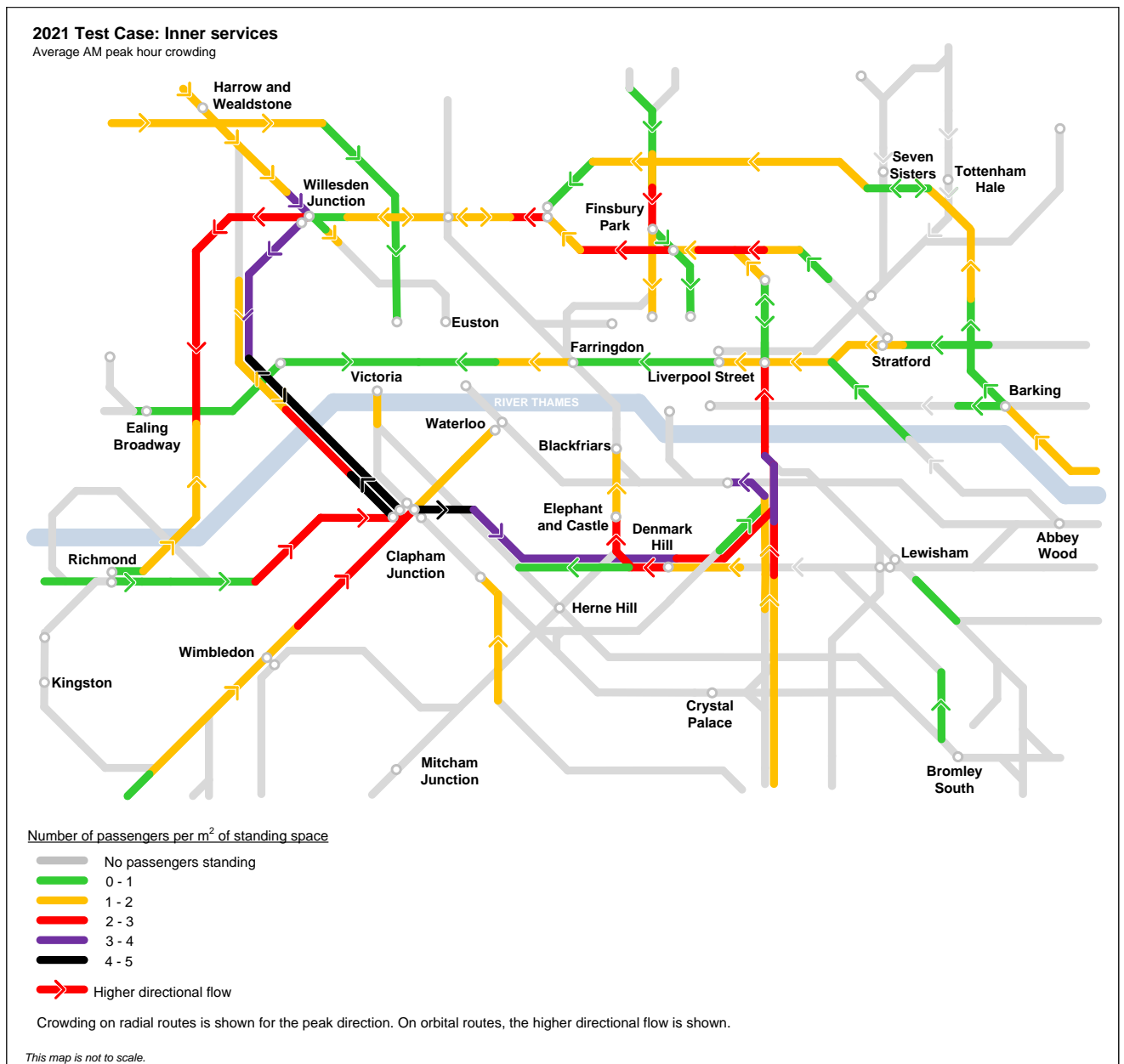
- The overall strategy increases rail demand by 16 million passengers per year
- 2.3 million car journeys per year will be removed from London’s road network
- A total of 1.9 million new leisure, business and commuting trips per year will be generated, allowing people to become more productive
- A reduction in emissions of around 6000 tonnes of CO<sub>2</sub> per year will occur due to mode switch to rail

<sup>26</sup> National Rail trends 2009/10 shows London fares are 30% higher per kilometre than ‘regional’ fares



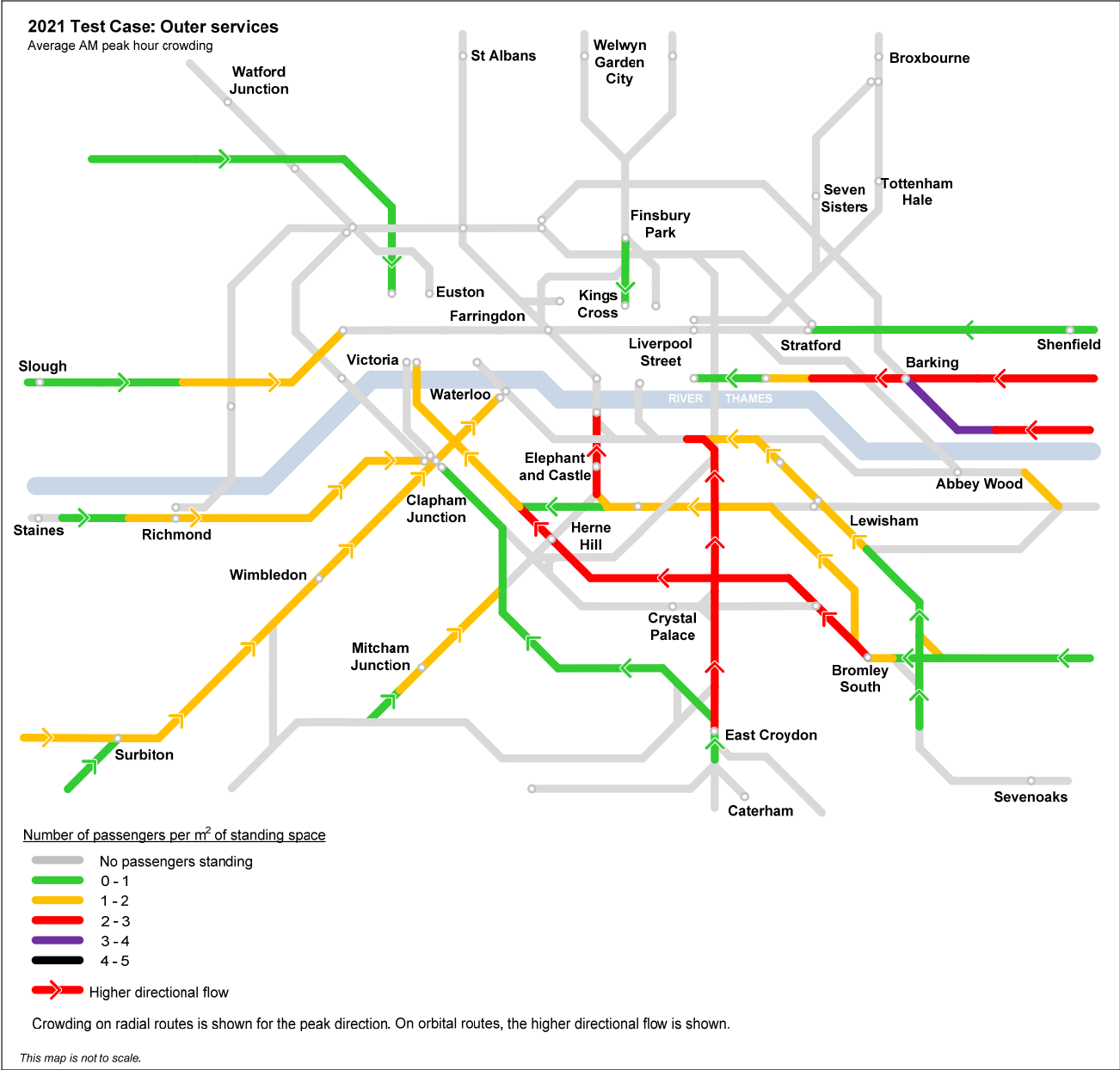
10.3.5 Figures 25 and 26 show the residual crowding on inner and outer suburban services respectively, after the implementation of the recommended schemes. They show a significant reduction in crowding, but that some crowding remains. This reflects TfL's aim of producing an affordable package of schemes that addresses the worst problems, rather than seeking to remove all crowding.

**Figure 25: AM peak hour crowding on inner suburban services following the recommended interventions**



Source: TfL London Rail Railplan model

**Figure 26: AM peak hour crowding on outer suburban services following the recommended interventions**



Source: TfL London Rail Railplan model

10.3.6 The Appraisal Summary Table (figure 27) shows the impacts of the recommended passenger capacity and station schemes against the objectives of environment, economy, integration, safety and accessibility.

**Figure 27: Appraisal summary table**

Objective	Sub-objective	+/-	Impacts
Environment	Noise	✗	As the majority of schemes involve train lengthening only, there will be no significant impact. Minor adverse impact where more or longer trains are proposed, e.g. on the West Anglia route, and where new depots/stabling are needed
	Local Air Quality	✓	Slight improvement due to mode shift from road to rail. Electrification of the Gospel Oak - Barking line will deliver more significant improvements in the local area
	Greenhouse Gases	✓	Small reduction in greenhouse gas emissions due to mode shift from road to rail. This should more than offset the slight increase in emissions due to the increased energy required to operate longer trains.
	Landscape and Townscape	=	No significant impact. Any new tracks are proposed within existing boundaries of railway land. Station schemes will be designed to not adversely affect townscape.
	Heritage of Historic Resources	=	Station schemes will be designed to not adversely affect historic buildings. No impact on archaeological sites expected.
	Bio-diversity	✗	Potential for minor adverse impacts in Coppermill Junction area, where new tracks are required adjacent to Site of Special Scientific Interest, albeit on existing railway land.
	Water Environment	=	Neutral impact, as all works are on existing rail corridors.
	Physical Fitness	✓✓	Slight beneficial impact due to mode switch from road, with more walking and cycling trips to and from stations to access the rail network.
	Journey Ambience	✓✓	Service quality enhancement delivers benefits of £250m. This demonstrates the benefits of improved attractiveness of rail to passengers.

Objective	Sub-objective	+/-	Impacts
Economy	Public accounts (cost to public sector)	✗ ✗	Capital cost of £1100m and net operating cost of £30m p.a. in 2007 prices.
	Time and financial benefits to business users and operators	✓ ✓	Gospel Oak Barking electrification and freight strategy deliver benefits to freight users. Other passenger capacity improvements deliver benefits to business users by reducing crowding.
	Time and crowding benefits to passengers	✓ ✓ ✓	Reduced crowding and more frequent services combined with reduced station congestion. BCR of 4:1 (3:1 using DfT national value of time and appraisal methodology).
	Reliability	✓	Dwell times improved as a result of reduced crowding. Reliability improvements due to segregation of services on additional tracks in the West Anglia corridor. Journey time benefits of £5bn.
	Wider economic impacts	✓ ✓	Significant agglomeration and other wider economic benefits.
Integration	Transport interchange	✓ ✓	Station congestion measures, step free access provision and improved orbital services increase the opportunity to interchange especially outside central London.
	Land-use policy	✓	Supports MTS and London Plan Objectives by enabling sustained economic growth and provision of transport capacity to support opportunity and intensification areas.
	Other government policy	✓ ✓	Achieves objectives of government and Mayor as set out in MTS and DfT objectives with focus on supporting economic development, enhancing quality of life and improving transport opportunities.
Safety	Accidents	✓	Transfer from road to rail means a reduction of accidents valued at £50m NPV.
	Security	✓	Customer service standards including more visible staffing increases perceptions of security.

Objective	Sub-objective	+/-	Impacts
Accessibility	Option values	✓	Increased opportunities for rail users
	Severance	✗	Minor adverse impact on road users due to the closure of one level crossing on the West Anglia route and higher percentage of closed time of level crossings on Windsor Lines
	Access to the transport system	✓✓	Improved accessibility to jobs particularly in the Lea Valley but also in other parts of London. Significant benefits due to step free access provision at 26 stations.

KEY			
✓	Minor beneficial impact	✗	Minor adverse impact
✓✓	Moderate beneficial impact	✗✗	Moderate adverse impact
✓✓✓	Significant beneficial impact	✗✗✗	Significant adverse impact
=	Neutral impact		

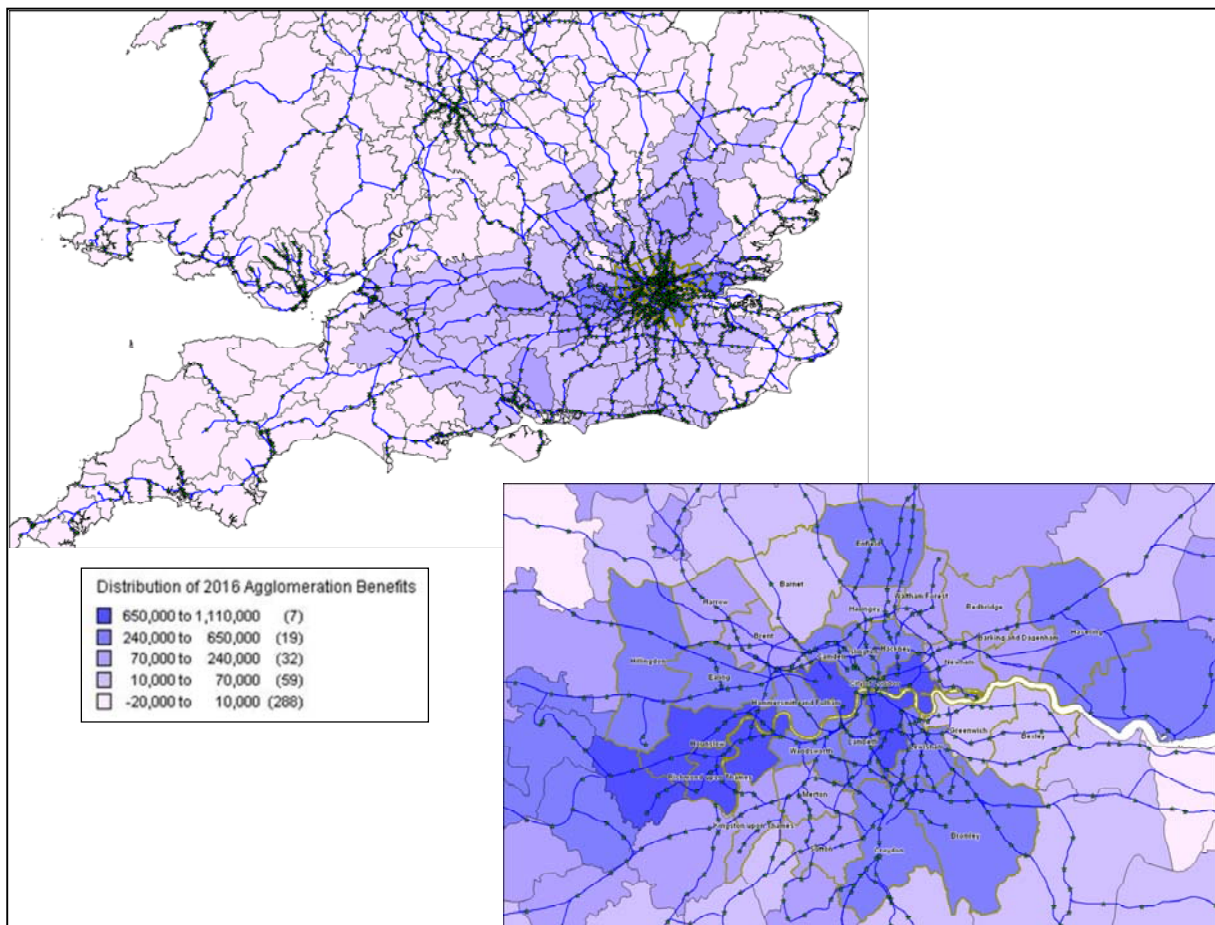
10.3.7 The TfL proposed HLOS2 passenger capacity schemes will also generate wider economic benefits, reflecting the importance of central London productivity to the UK economy, and the dependence of central London commuters on rail. Guidance on the calculation of these wider benefits is given by the DfT in WebTAG, with benefits arising from:

- **Agglomeration** – productivity benefits to firms as a result of economies of scale and scope due to having a proximity to other firms and suppliers
- **Output Change in Imperfectly Competitive Markets** – the benefit that results from lower production costs and higher prices in imperfectly competitive markets
- **Labour Supply Impacts** – how an improved transport network affects the overall costs and benefits of working, and hence the overall level of labour supply to the economy
- **Move to more productive jobs** – a measure of how transport allows workers to be employed in the most productive of locations

10.3.8 A DfT approved methodology (albeit with TfL values of time) has been used to quantify the first three of these wider benefits. The benefits of the TfL recommended HLOS2 package of schemes has been calculated as £1.6bn (present value) over the scheme appraisal period. These benefits when included with the more conventional scheme benefits such as journey time savings, modal shift etc, improve the overall scheme benefit cost ratio from 4.3:1 to 5.2:1, strengthening an already robust case still further.

10.3.9 The HLOS2 package of improvements offers wider benefits across London and the South East. Figure 28 shows where agglomeration benefits are accruing from, with the darker blue colour indicating the areas that see the greatest benefits. 70% of the agglomeration benefits are located within the Greater London area with a large proportion of these coming from the key employment areas of the City, Canary Wharf, Docklands, and Westminster. 40% of the Greater London benefits are attributable to Outer London boroughs, with key areas that benefit being Croydon, Hillingdon, Hounslow and Richmond.

**Figure 28: Distribution of agglomeration benefits (2016)**



Source: AECOM analysis for TfL London Rail

10.3.10 25% of the agglomeration benefits from the TfL HLOS2 proposed enhancements are accruing to areas outside the Greater London boundary. Key areas that benefit include Berkshire, Surrey, Essex, Southend/Thurrock, Hampshire and Sussex.

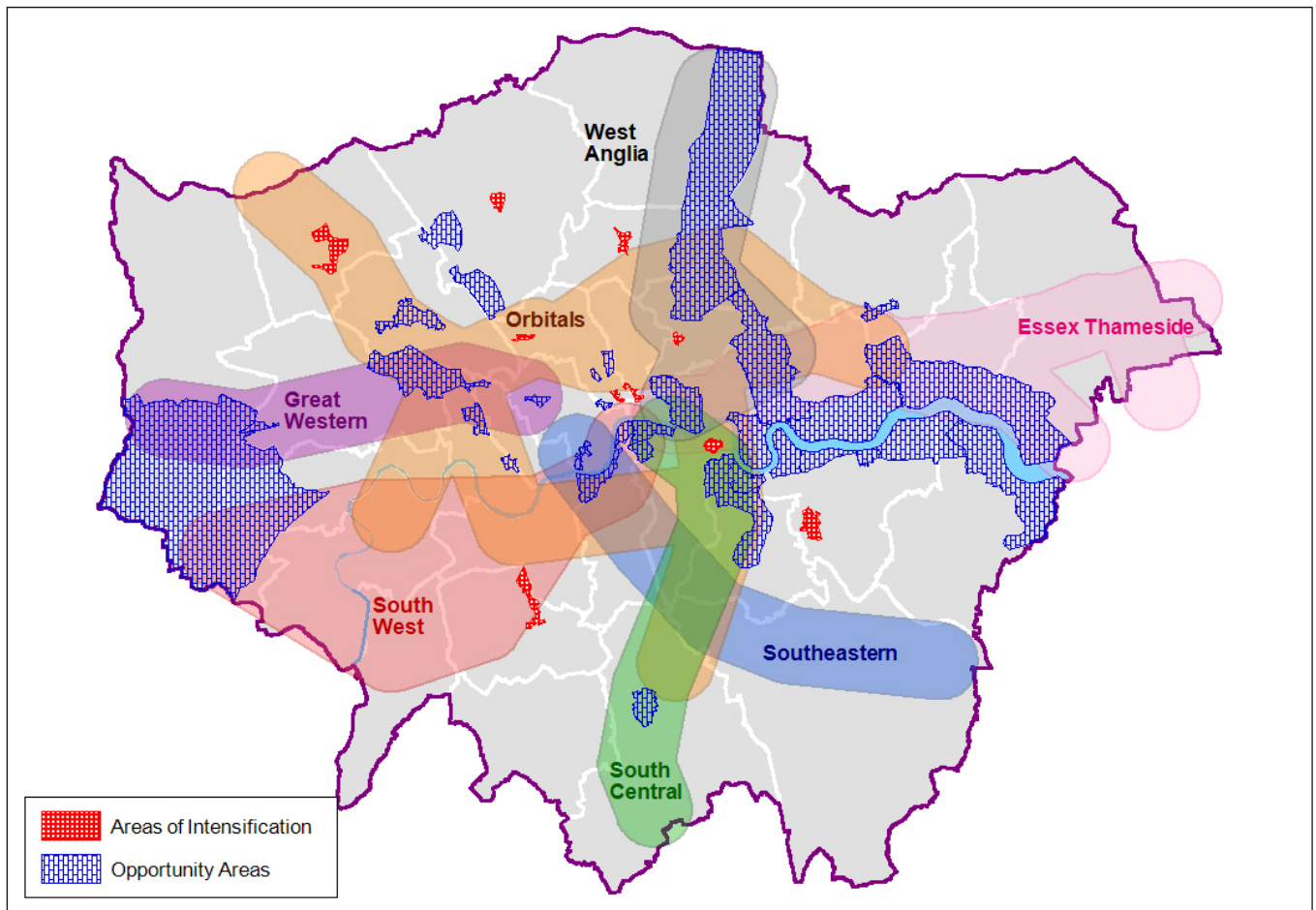
10.3.11 Sensitivity tests have been undertaken on the key assumptions for the wider benefits, which have shown that the estimation of these benefits is robust.

10.3.12 An assessment has also been made of the wider benefits resulting from the move to more productive jobs. This has been based upon an approach developed for the Crossrail project, which TfL considers more appropriate than the DfT WebTAG methodology given the modelling tools available. It is treated here as a sensitivity as recommended by DfT. The methodology produces a very wide range of values, however a central figure could be in the order of £1.5bn (present value). The inclusion of the move to more productive jobs would have the effect of doubling the overall HLOS2 scheme wider benefits.

10.3.13 The recommended schemes will also assist in the development of the London Plan's Opportunity Areas and Areas for Intensification. Figure 29 shows the corridors for which TfL is recommending capacity improvements overlaid on the London Plan opportunity and intensification areas. The corridors shown are 1km wide either side of the rail lines where TfL is

recommending improvements, which represents a standard planning assumption for catchment areas.

**Figure 29: Impact on London Plan opportunity and intensification areas**



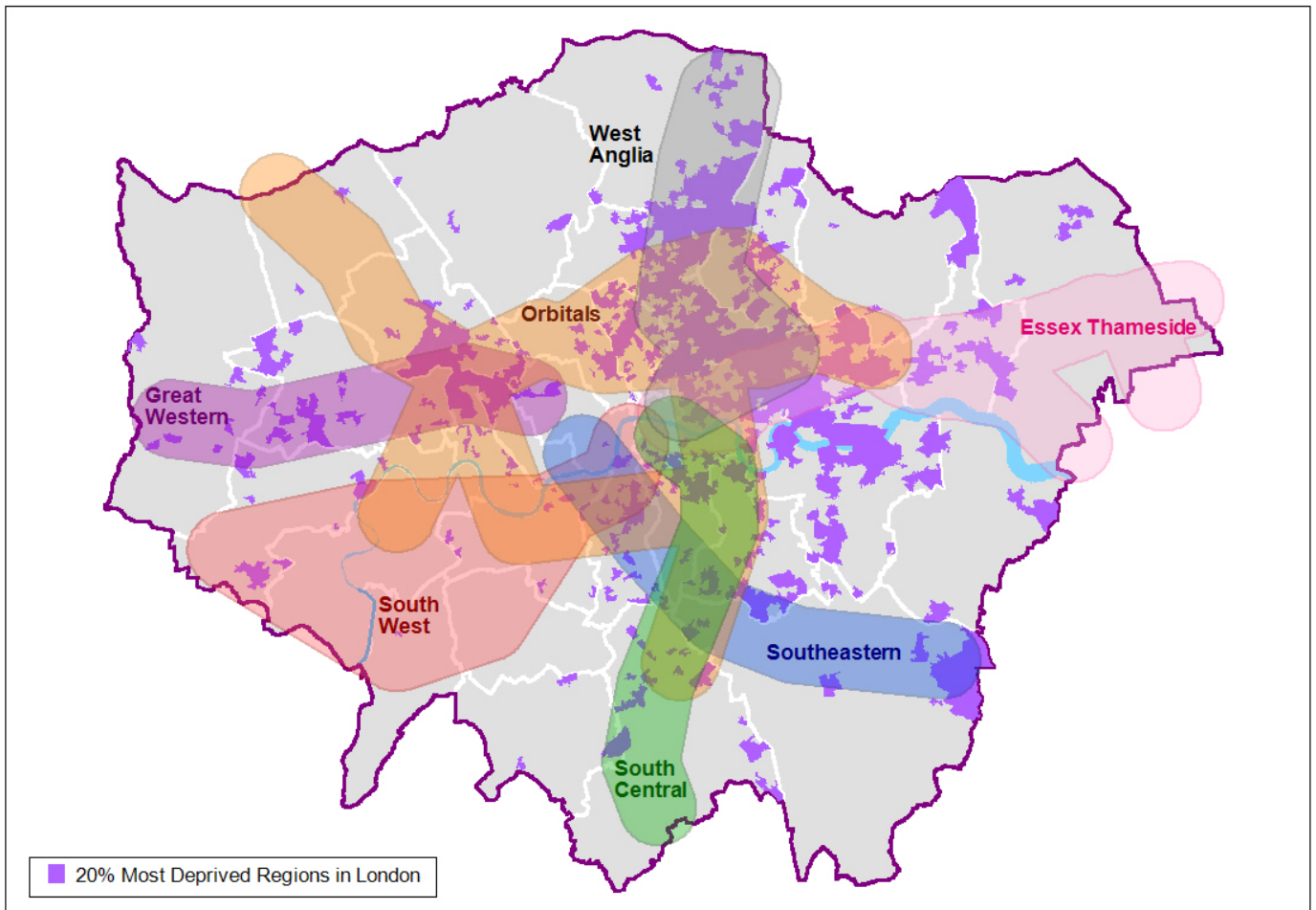
10.3.14 The proposed 4-tracking between Lea Bridge and Brimsdown on the Lea Valley mainline to enable a turn-up-and-go service at the inner London stations will be a significant driver of regeneration in the Upper Lea Valley. The analysis of the proposed schemes uses the employment and population projections from the London Plan, which for the Upper Lea Valley Opportunity Area is an increase of 20,000 people and 15,000 extra jobs by 2031. However there is an aspiration within the Upper Lea Valley Opportunity Area Planning Framework for a population increase of 56,000 people, which further highlights the dependence of regeneration on transport provision.

10.3.15 Similarly, the extra capacity on the London, Tilbury and Southend corridor will benefit the London Riverside Opportunity Area. The longer trains and increased frequency on the West London line will benefit the Wembley, Park Royal/Willesden Junction, White City and Earl's Court & West Kensington Opportunity Areas. Train lengthening on the North London line and East London line will support growth in many other Opportunity Areas, including Dalston, Lower Lea Valley, City Fringe, Isle of Dogs and Croydon.



10.3.16 The schemes will also serve some of the 20% most deprived areas of London. Again, some of the biggest impacts are in the Lea Valley, where the 4tph service will significantly improve connectivity. Figure 30 shows the recommended schemes overlaid on the 20% most deprived census output areas (2001 census). The corridors shown are 1km wide either side of the rail lines where TfL is recommending improvements, which represents a standard planning assumption for catchment areas.

**Figure 30: Deprivation and rail schemes**



## 10.4 The commercial case

10.4.1 The TfL recommended schemes have been developed with a view to their commercial viability. For example, the train lengthening schemes and Lea Valley 4-tracking have been discussed with the rail industry through the RUS process, and their contractual deliverability is reflected in that the London and South East RUS considers them to be viable industry options. Train lengthening on London Overground has been considered in light of possible modifications to the contract TfL has with Bombardier for the class 378 rolling stock.

10.4.2 Part of the commercial case for our package of recommended schemes is our proposal for devolution, set out in section 11 below. This identifies the most cost effective allocation of risk in the procurement of rail services, and quantifies the savings that could be achieved.

10.4.3 Our devolution proposal would help get a better railway for less through a variety of means such as:

- Consistent standards to make rail travel easier and less of an exception compared to other modes, especially for infrequent users
- Reducing costs from parallel systems (be they ticketing, services, customer proposition, passenger information etc)
- Reducing costs from an appropriate contracting structure (i.e. moving to gross cost contracts)

10.4.4 It should be noted that London's railways are not a commercial proposition in the traditional sense across all the dimensions of quality. If the network were to be operated on a purely commercial basis, much of the off peak and station services would be cut, with economic consequences beyond the railway.

## **10.5 The management case**

10.5.1 TfL, in sifting the options to come up with the recommended schemes, has undertaken a high level analysis of their deliverability within the timescales of Control Period 5. This included the following:

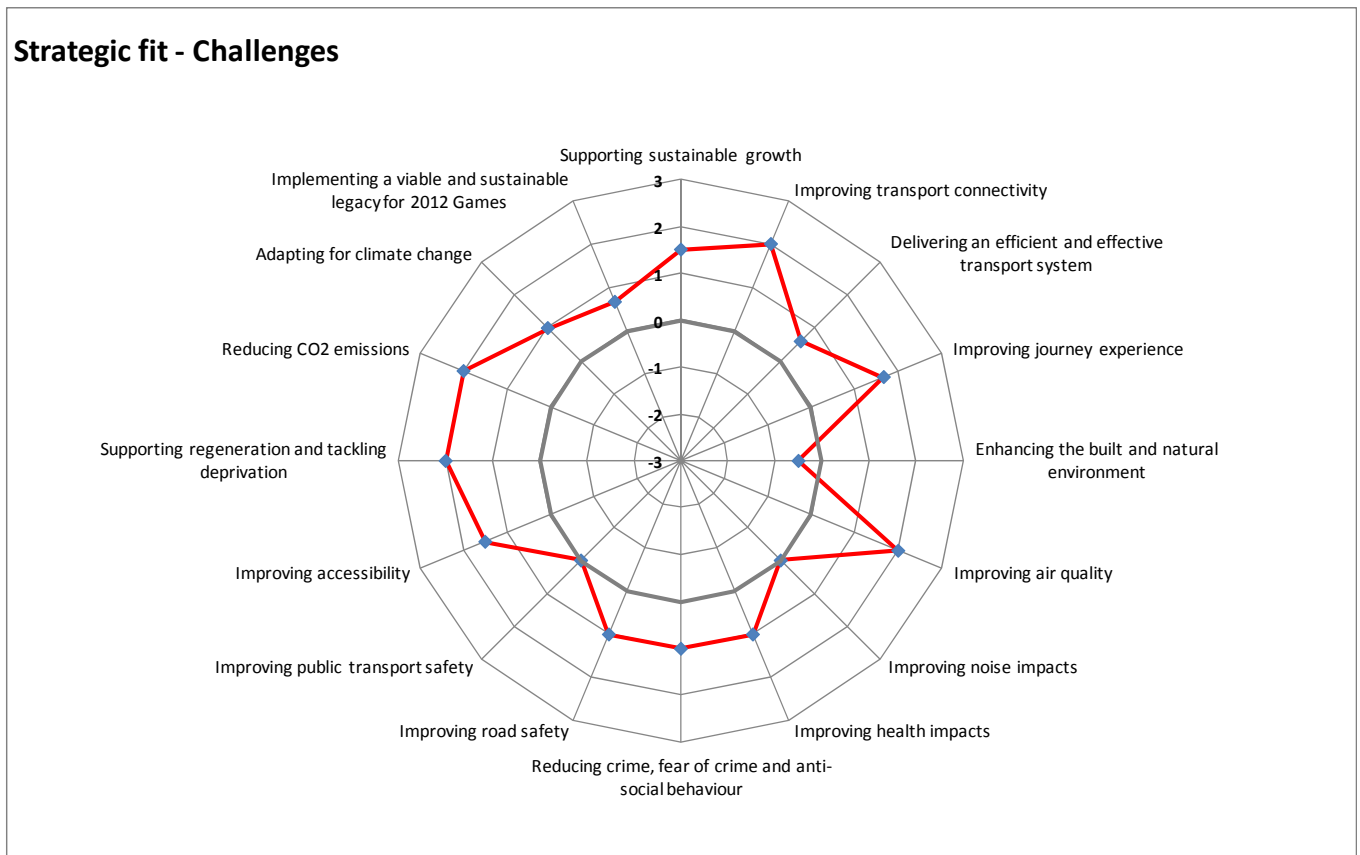
- Identifying whether there have been similar projects delivered recently as a comparison, or if similar projects are envisaged from TfL's knowledge of recent RUSs
- An outline of the scope of the project across the various engineering disciplines, and its impact upon operations
- A high level consideration of the project programmes, based on our own experience of delivering major projects, and in discussion with the rail industry. TfL will continue to work with the rail industry on the deliverability of these schemes.

10.5.2 Some of the schemes would benefit from early development funding through the Network Rail CP5 development fund.

## **10.6 The strategic case**

10.6.1 The strategic case is described in the sections above. Section 2 shows how the Mayor's transport objectives map against the DfT's national objectives. The analysis in the figure below shows that the package offers a close match against most of the objectives. It uses the same '-3 to +3' scale as the appraisal summary table (see the key to figure 27).

**Figure 31: Mayor’s Transport Strategy Strategic Assessment Framework ‘spider-web diagram’**



## 11 Cost efficiency and devolution

### 11.1 Rail Value for Money Review

11.1.1 There is a pressing need to improve the cost effectiveness of the rail industry, whose costs have increased significantly since privatisation and are higher than in other European countries. The McNulty rail value for money study has identified industry wide savings of up to £700-£1,000 million per year by 2018-19 without cutting the network.

11.1.2 However, ‘Realising the Potential of GB Rail’, the report of the Rail Value for Money study<sup>27</sup> shows that London’s rail services offer relatively good value for money. Net costs in LSE are lower than for the rest of the country at 4.8p per passenger mile compared with 7.3p for long distance TOCs and 31.1p for regional franchises.

11.1.3 The report highlights a number of areas for cost reduction including higher capacity utilisation, more cost effective working practices and improvements in programme management, asset management and supply chain management.

<sup>27</sup> <http://www.dft.gov.uk/pgr/rail/strategyfinance/valueformoney/realising-the-potential-of-gb-rail/>

Research<sup>28</sup> carried out for TfL suggests that effective sponsorship of enhancements projects could lead to savings of 10-30% from adjusting the scope of a project to optimise value for money; and 5-20% from identifying areas where the specification can be reduced without a significant reduction in the benefits from a project.

11.1.4 The Rail Value for Money review also found that there is no single preferred approach to rail services in Great Britain. As a result, there could be benefits from the way franchises are procured and from a greater devolution of decision making and accountability. For example, the long distance operators have quite a different market to urban operators. Such operators compete with the car to a greater extent, and average fares are £20-30 per journey. In contrast, London operators predominantly serve commuters whose journeys are non discretionary and who pay an average fare of £2.30. As a result, there is a limited incentive for London TOCs to improve service standards or to deliver enhanced passenger benefits. There is little point in attempting to find a single model that achieves DfT's transport objectives across both long and short distance operations.

## **11.2 Devolution**

11.2.1 This insight informs TfL's proposal for greater powers over London's suburban rail services. With the notional franchising budget for London transferred from DfT, TfL could take measures to improve integration between rail and other transport modes, could coordinate marketing and branding and introduce more unified ticketing.

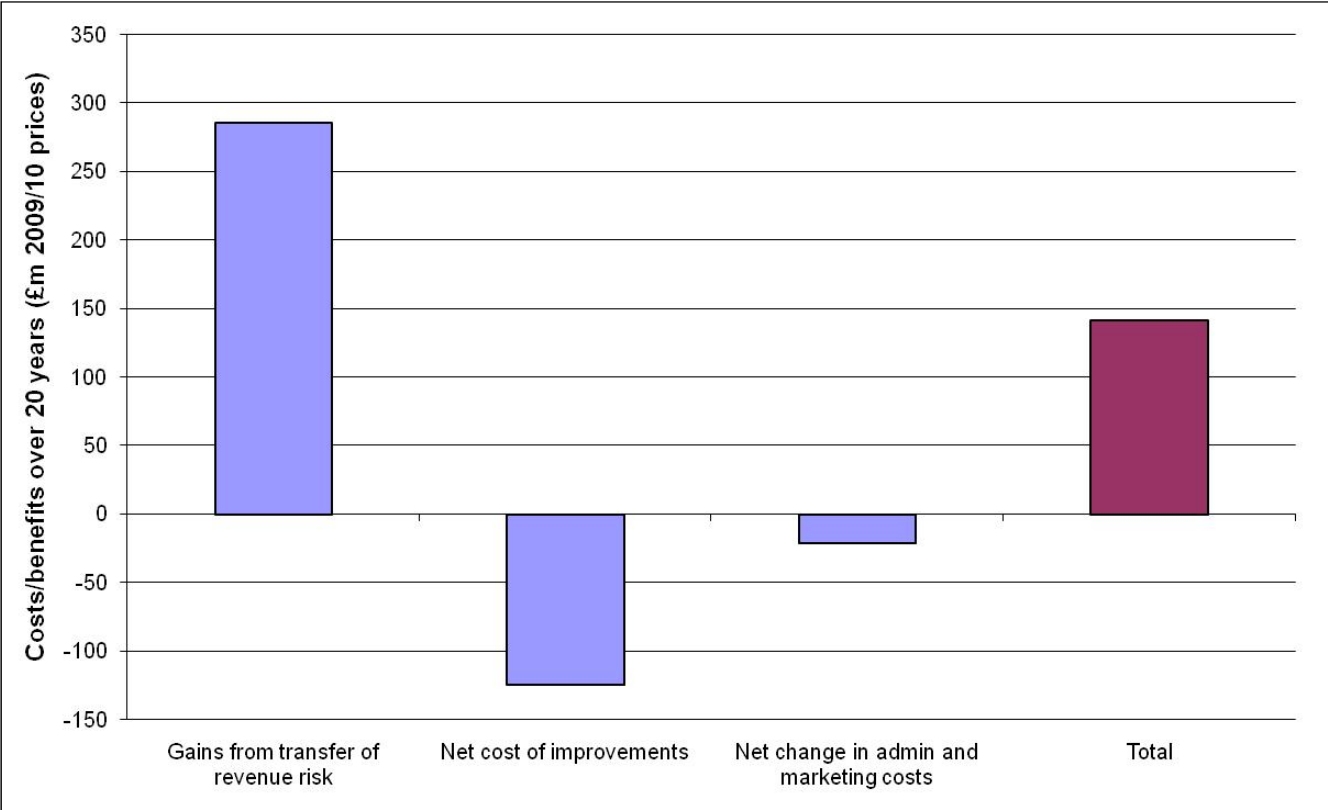
11.2.2 This would also enable TfL to introduce 'gross cost contracts' so that TOCs would no longer bear revenue risk on London services. Passenger demand and revenue in London is heavily dependent on macro economic factors including Central London employment and TOCs have little control over ticket revenue. A switch to gross cost contracts could deliver estimated net savings of £290m through reduced TOC margins could be invested in bringing rail services in London up to a common set of standards as described in section 8. The estimated net cost of these improvements to inner suburban services is £180m over 20 years which could be reduced to £130m by revenue benefits from extra station gates, yet they would deliver passenger benefits of £350m over the same period<sup>29</sup>.

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<sup>28</sup> Jacobs Consultancy: Value for Money improvements to rail projects and standards in London, September 2010

<sup>29</sup> The costs and benefits of devolving responsibility for rail services in London, NERA, 31 March 2011

**Figure 32: Net financial changes from devolution**



**11.3 Options for devolution**

11.3.1 The changes could be implemented without redrawing the franchise map by giving TfL a lead role alongside DfT in procuring and managing franchises for predominantly London TOCs. DfT would still be able to specify services for longer distance services and TOCs might continue to bear revenue risk on these services. For inner suburban services, bidders would specify a cost for providing services specified by TfL. The interests of longer distance passengers would be protected by DfT’s role in specifying longer distance services, by ORR’s role in capacity allocation and by two non executive directors of TfL who are responsible for protecting the interests of rail users outside London.

11.3.2 An alternative approach would be the creation of dedicated concessions, similar to London Overground, providing inner suburban services. TfL would then have sole responsibility for procuring and managing these concessions. With a number of dedicated London concessions, TfL would be able to implement improvements quickly and efficiently bringing services up to a minimum standard across London. Under both options, the net savings from gross costs contracts could more than offset the cost of improved service levels, enabling London railways to deliver more for less.

## 12 Conclusions

### 12.1 Beyond 2020

- 12.1.1 The period from 2014 to 2019 will be one of delivery as major schemes such as the Crossrail project and the Thameslink programme reach completion. Along with the additional schemes recommended by TfL, London's National Rail network will have been substantially transformed helping to meet many of London's transport challenges by that stage.
- 12.1.2 The 2020s will see some new challenges as well as the on-going need to support London's growing economy and population. One major driver of change by then will be the anticipated start of construction of High Speed 2 (HS2) from London initially to the West Midlands and in a second phase further north. This will give rise to the need to disperse many more passengers from HS2's London stations at Old Oak Common and Euston. A Crossrail extension onto the West Coast mainline slow lines to Watford and Hemel Hempstead is an option to help relieve that pressure at Euston as well as providing direct trains from this corridor to the West End, City of London and locations such as Canary Wharf, avoiding the need to change onto the Underground. If there is to be link between High Speed 2 and High Speed 1 in the Camden Road area, an infrastructure solution will be required to accommodate high speed trains in addition to existing London Overground and freight services.
- 12.1.3 TfL will also continue to assess the case for other Crossrail extensions to Reading and Gravesend.
- 12.1.4 There remains a case too for the currently safeguarded alignment of a new cross-London rail tunnel. This would improve connectivity on a South West to North East axis and alleviate London Underground congestion. A potential modification to the safeguarding may be appropriate, so as to provide a connection to the high speed rail network at London Euston.
- 12.1.5 There are also a number of complementary future Underground and Docklands Light Railway schemes. These include a potential southern extension of the Bakerloo line. This would utilise spare line capacity, improve connectivity and journey times, while providing relief to congested National Rail approaches to central London from the south / southeast. Another example is a privately funded extension of the Northern line to Battersea to support the regeneration of the Vauxhall / Nine Elms / Battersea area. They also include the proposed extensions of the Docklands Light Railway to Dagenham Dock and also options south of Lewisham, west of Bank and north of Stratford International.
- 12.1.6 TfL will also continue to work through the RUS and other processes to reduce the difficulty in accessing Heathrow Airport by rail (except from central London) which is recognised as a strategic gap. Part of this is through maximising the benefits of Crossrail, though TfL remains supportive of a southern connection to the airport as well.

## **12.2 Delivery**

- 12.2.1 Given National Rail's huge role in meeting London's transport challenges, close partnership and agreement between Transport for London, Government, the rail industry and other stakeholders is essential for the timely and effective implementation of the rail enhancements set out in this document. TfL works closely with the industry through the route utilisation strategy (RUS) process, and for this reason, many of the ideas in this document are common with the London & South East RUS.
- 12.2.2 The year 2012 is a significant one for decisions on the funding and strategic direction of London's railways with the publication of the next high level output specification. Thereafter, Network Rail and the train operators will deliver against that specification, as they are already for the current specification. The McNulty team has set out ideas to make that delivery more cost effective. TfL believe that greater devolution of powers to the Mayor would be another means to obtain a better railway with higher demand for less whole industry cost, thereby making the most of the investment in the industry.
- 12.2.3 Regardless of the future structure of the industry, TfL will continue to make the case for continued investment through the HLOS and franchising processes.
- 12.2.4 The schemes recommended here are independent of High Speed 2; they address capacity concerns in other corridors, and are required regardless of the outcomes of the High Speed 2 proposal.

## **12.3 Conclusions**

- 12.3.1 Crossrail and Thameslink and the other elements of the current 2009-14 HLOS programme are significant enhancements that are long overdue. As committed schemes, they provide huge benefits. However, on their own, they would leave parts of London struggling to maintain both their competitiveness and their quality of life in the medium term. The option to do nothing more than that is greatly unattractive, and would make it implausible that the Government could achieve its transport and economic objectives.
- 12.3.2 TfL's proposals for the 2014-19 HLOS provide an affordable transport solution that meets the objectives of the London Plan and the goals of the Mayor's Transport Strategy. Taken together, TfL's recommendations:
- Demonstrate the case for appropriate recognition of the region's rail needs in terms of Government investment decisions;
  - Fit well against Government and Mayoral strategy;
  - Deliver superior economic performance at both national and regional level
  - Offer value for money and are affordable; and,
  - Are commercially realistic, are deliverable, and will enjoy significant stakeholder support

# Appendix A – Description of capacity schemes by corridor

## A.1 Introduction

- A.1.1 Section 5 of this report contained a summary of TfL’s recommended package of enhancements to the rail network and services that is required to meet the growing demand and address crowding in Control Period 5. More details of the recommended schemes on each corridor are provided in this Appendix. There is also an ‘evidence pack’ available on request.
- A.1.2 In each corridor, the proposed schemes are designed to address the forecast crowding that was described in Section 4. Therefore no schemes are proposed on corridors which are forecast to have crowding levels within acceptable limits or where no value for money scheme has been identified. The lack of recommended schemes on some corridors is also in recognition that funding for enhancements is likely to be severely restricted in the next Control Period, so schemes must be prioritised where needed most. TfL is also not recommending any alterations to Crossrail or Thameslink services.
- A.1.3 On some of these corridors, interventions may be required soon after the end of the next Control Period. Section 12.1 contains an indication of the schemes that may be required in the longer term.

## A.2 Orbital

A.2.1 As the crowding plots in Section 4 demonstrate, the orbital London Overground network is forecast to experience some of the worst rail crowding in London by 2021. This is a consequence of the huge demand for orbital services that has been unlocked by previous investment, and also the relatively short train lengths operating on these routes. The proposed solutions mostly involve train lengthening, but extra peak services are also proposed on two of the busiest sections of route. TfL’s package of recommendations includes the following measures, all day unless otherwise stated:

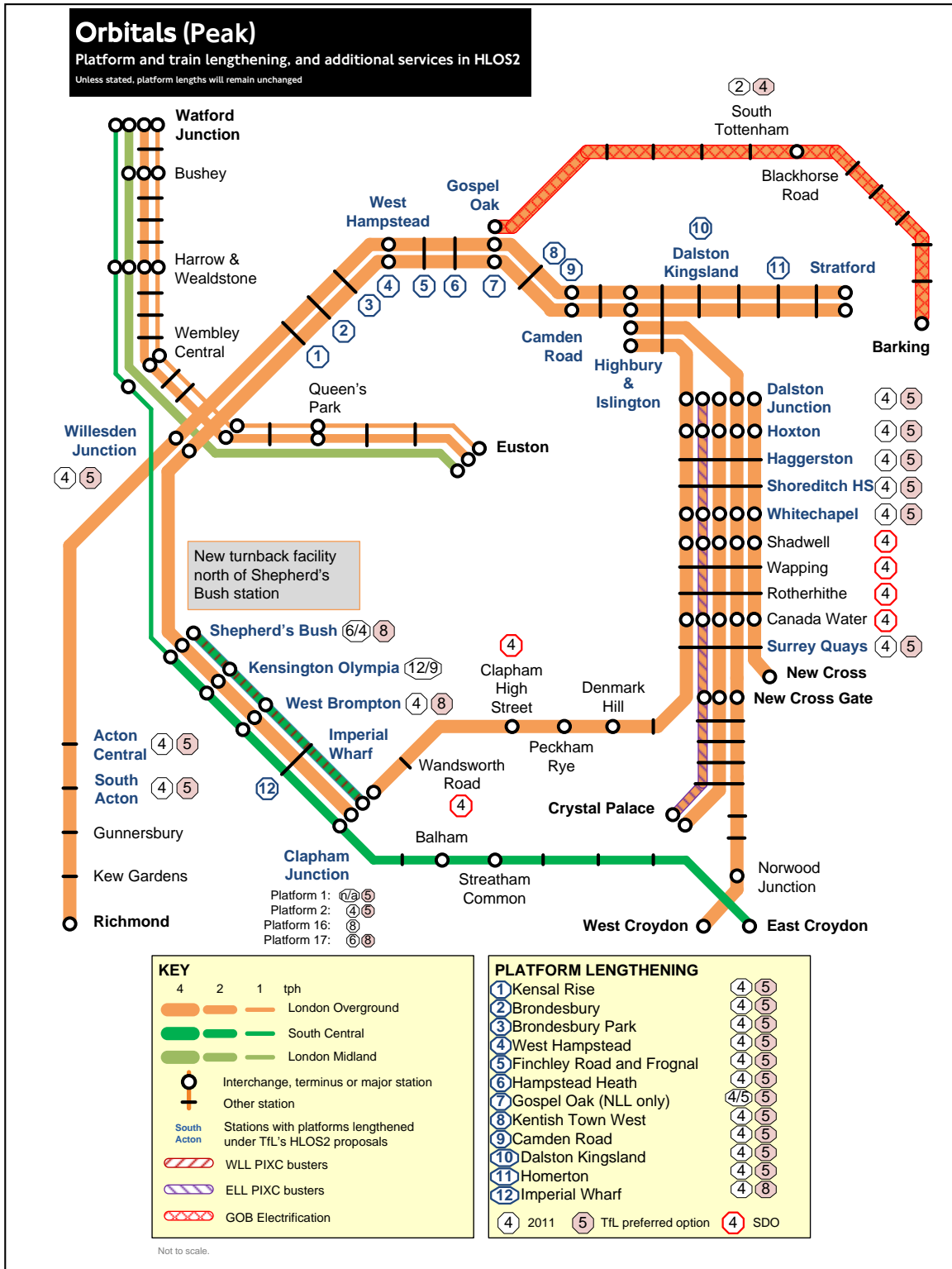
- Electrification of the Gospel Oak to Barking route
- 4-car electric trains on the Gospel Oak to Barking line
- 5-car operations on the North London Line and West London Line
- 8-car Southern services operating on the West London Line
- An extra 2tph from Clapham Junction to Shepherds Bush operated by 8-car Southern trains all day
- 5-car operations on the East London Line



- An extra 2tph from Crystal Palace to Dalston Junction on the East London Line at peak times only

A.2.2 Figure A.1 below shows diagrammatically the proposed enhancements to the London Overground network at peak times.

**Figure A.1 Recommended service patterns and required infrastructure enhancements for orbital network**



A.2.3 The key items of new infrastructure that are required to deliver this package are:

- Electrification of the Gospel Oak – Barking line and platform lengthening at South Tottenham to allow 4-car electric trains to operate
- Platform lengthening to allow 5-car trains to operate on the North and West and London Lines (at a total of 14 stations)
- Platform lengthening to allow 5-car trains to operate on the East London Line (at a total of six stations (with Selective Door Operation used where necessary at the remaining stations)
- Platform lengthening at four stations to allow 8-car Southern services to operate on the West London Line
- Enhanced depot facilities to accommodate the longer and additional trains

### **A.3 West Anglia**

A.3.1 The Lea Valley Main Line suffers from irregular, low frequency inner suburban services, and relatively long journey times on longer distance services due to line capacity constraints. There is also a degree of crowding. Recent attempts to reduce journey times for longer distance passengers have involved diverting some trains onto the Southbury Loop, which in turn has a constrained line capacity.

A.3.2 There is major planned regeneration for the Upper Lea Valley. In total there is an aspiration for an increase in population of around 56,000 as well as around 15,000 extra jobs in the Upper Lea Valley by 2031 (source: GLA, as used in Upper Lea Valley Opportunity Area Planning Framework Transport Study). This level of growth will be very difficult to achieve without the support of a 'turn up and go' train service.

A.3.3 TfL believe the most robust solution to address these problems is to provide more infrastructure. TfL's proposed scheme provides extra tracks that allow an all day 4tph service of 4-car length calling at all stations between Tottenham Hale and Brimsdown, better links to Stratford, and faster journey times for longer distance services and some services originating from Hertford East.

A.3.4 The proposed 'turn up and go' level of service to Stratford enhances the importance of Tottenham Hale as a strategic interchange station. Further enhancements are also planned at this station including the provision of step-free access to the National Rail platforms.

A.3.5 TfL has developed this option as a lower cost, incremental step to full four-tracking of the Lea Valley Main Line. It provides new segregated tracks from the Coppermill Junction area along the east side of the Lea Valley Main Line, adjacent to the existing tracks. Only one additional track is proposed through

Tottenham Hale station and on the approach to Brimsdown to ensure the solution remains affordable.

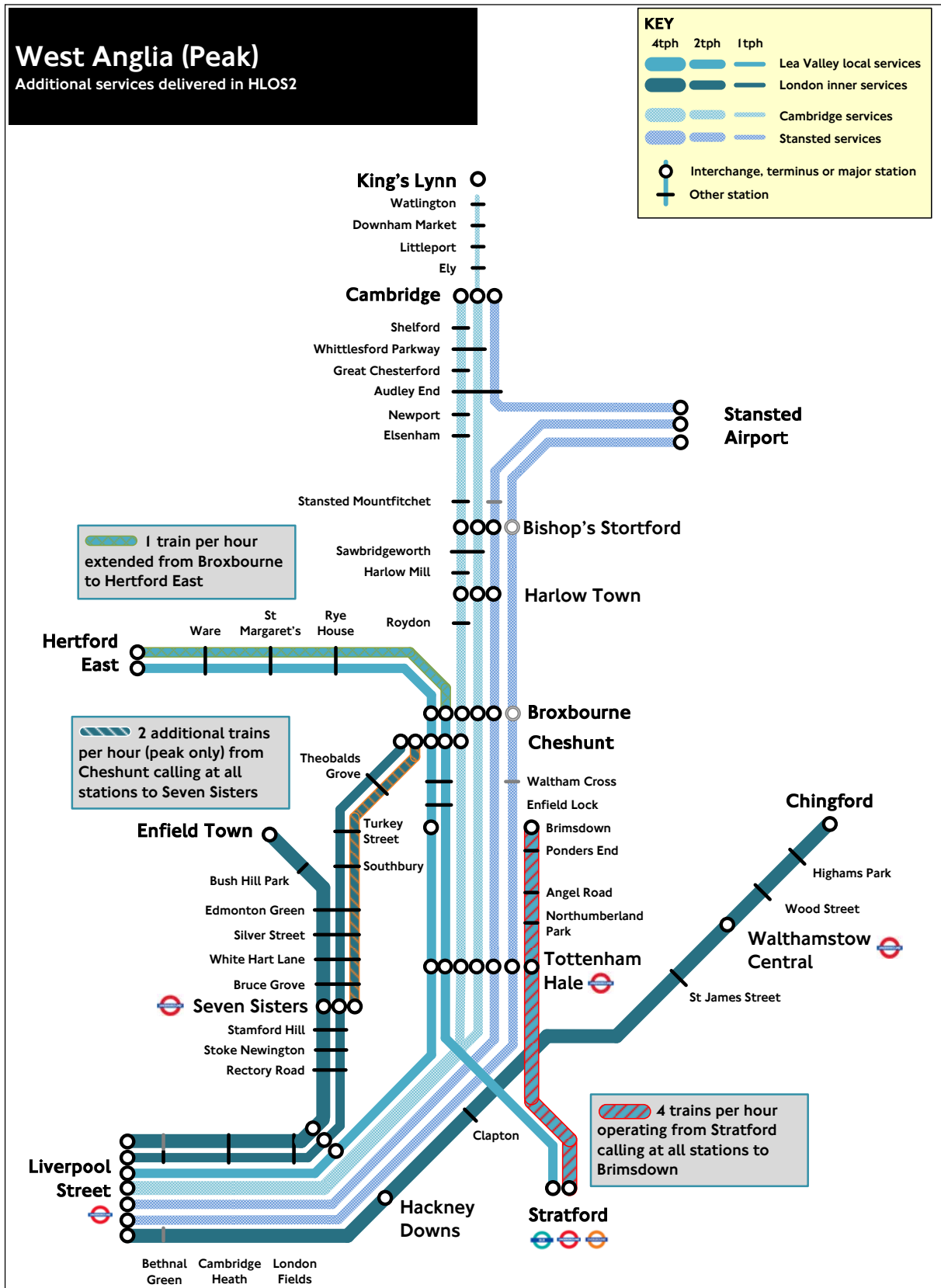
A.3.6 To address crowding issues on the Southbury loop, TfL proposes upgrading the infrastructure at Seven Sisters to allow an 8-car length 2 tph peak Cheshunt – Seven Sisters shuttle service to operate. This scheme was originally planned for delivery in Control Period 4. As more than half of passengers on trains north of Seven Sisters interchange with the Victoria Line at Seven Sisters station, additional capacity is not required between Seven Sisters and Liverpool Street.

A.3.7 In summary, the following infrastructure enhancements are proposed in the overall package for the West Anglia corridor:

- No additional infrastructure at Stratford, with committed investment assumed to allow 6 tph to turn back from the West Anglia route
- New double track from the Temple Mills lines just north of the former Lea Bridge station to south of Tottenham Hale
- New single track through Tottenham Hale station to maintain affordability of scheme by avoiding major bridge and platform works
- New double track from north of Tottenham Hale to south of Brimsdown
- Single track approach to new bay platform at Brimsdown
- Closure of level crossing at Northumberland Park station (Tottenham Hale Gyratory scheme improves road access across the railway nearby as well as the bridge at Leaside Road)
- New pedestrian access to Angel Road station from the south to serve Meridian Water development site
- Enhanced turnback facilities at Seven Sisters to allow extra shuttle service to operate

A.3.8 Figure A.2 shows the proposed service patterns.

Figure A.2 Recommended service patterns for West Anglia corridor



A.3.9 The total capital cost of the infrastructure enhancements for the West Anglia corridor described above is £224m.

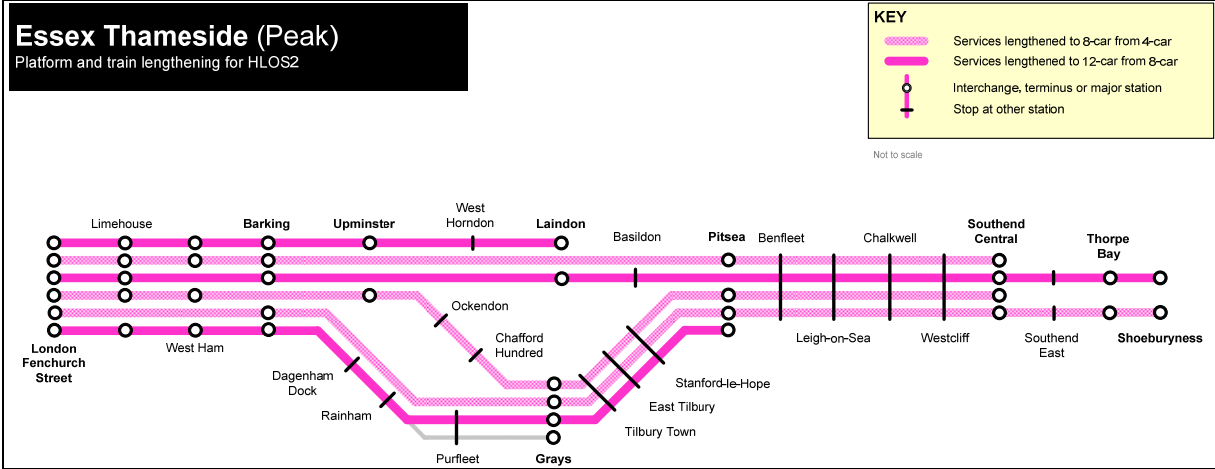
## **A.4 Great Eastern**

- A.4.1 Significant investment is already committed on the Great Eastern route in CP5, with Crossrail scheduled for completion by the end of the Control Period. This will provide extra capacity on suburban services to and from Shenfield.
- A.4.2 Interventions may be required to provide extra capacity on longer distance services, and the London & South East RUS has identified the most appropriate way forward to address crowding problems. Significant infrastructure works may be required, including in the Stratford area, and TfL recommends that any schemes are progressed after 2019 following the completion of Crossrail.

## **A.5 Essex Thameside**

- A.5.1 TfL's demand forecasting shows that the Essex Thameside corridor is forecast to be among the most crowded in London and the South East over the next ten years. One of the original proposals for Control Period 4, under the first High Level Output Specification, was for increased 12-car operations on the Main Line and train and platform lengthening to provide 12-car services on the Tilbury Loop. This document essentially repeats that proposal.
- A.5.2 Whilst Essex Thameside services are not being lengthened in Control Period 4, the platform lengthening works on the Tilbury Loop to enable this are in fact going ahead. This means that the infrastructure cost of the proposal is low, as those costs will have already been incurred, and that train lengthening is necessary in order to capture the value of that investment. Without train lengthening those costs would be abortive.
- A.5.3 Figure A.3 below shows the routes over which TfL is proposing peak train lengthening. Note that more than one train service is represented by some of the lines on the diagram, and services that are not proposed for lengthening are not shown. In total, 27 trains are proposed for lengthening over the morning peak period.

**Figure A.3 Recommended routes for peak train lengthening on the Essex Thameside corridor**



Note: only routes where train lengthening is proposed are shown

A.5.4 A capital cost of £55m is included to deliver this proposal. Whilst no platform lengthening is required due to the works being undertaken in CP4, an allowance for enhanced depot/stabling facilities to accommodate the significant amount of new rolling stock that would be required is included.

A.5.5 The emerging London Riverside Opportunity Area Planning Framework has identified a need for a new station between Dagenham Dock and Rainham, which is being referred to as Beam Park. TfL supports this recommendation, subject to the production of a satisfactory business case.

**A.6 South Eastern**

A.6.1 The crowding analysis described earlier in this report showed that the most significant crowding issue on the South Eastern network was on fast services between Bromley South and Victoria. There is no opportunity to increase train frequencies on this route into Victoria without major infrastructure works. Train lengthening is therefore a more appropriate method for providing extra capacity and the scope of this is limited because most trains are already operating at the maximum length allowed by the infrastructure.

A.6.2 TfL has identified four trains over the course of the morning peak period which can be lengthened so this will make a contribution towards addressing the crowding issues.

A.6.3 In the longer term, a more significant infrastructure solution will be required to provide extra capacity on the South Eastern network, where crowding persists on corridors not receiving extra capacity through the Thameslink Programme. This will need to be investigated for the period beyond 2019.

A.6.4 Previous work undertaken by TfL has demonstrated that there is a gap at off peak times on the Catford Loop and South London Line due to low service frequencies to central London. The South London Line service will be

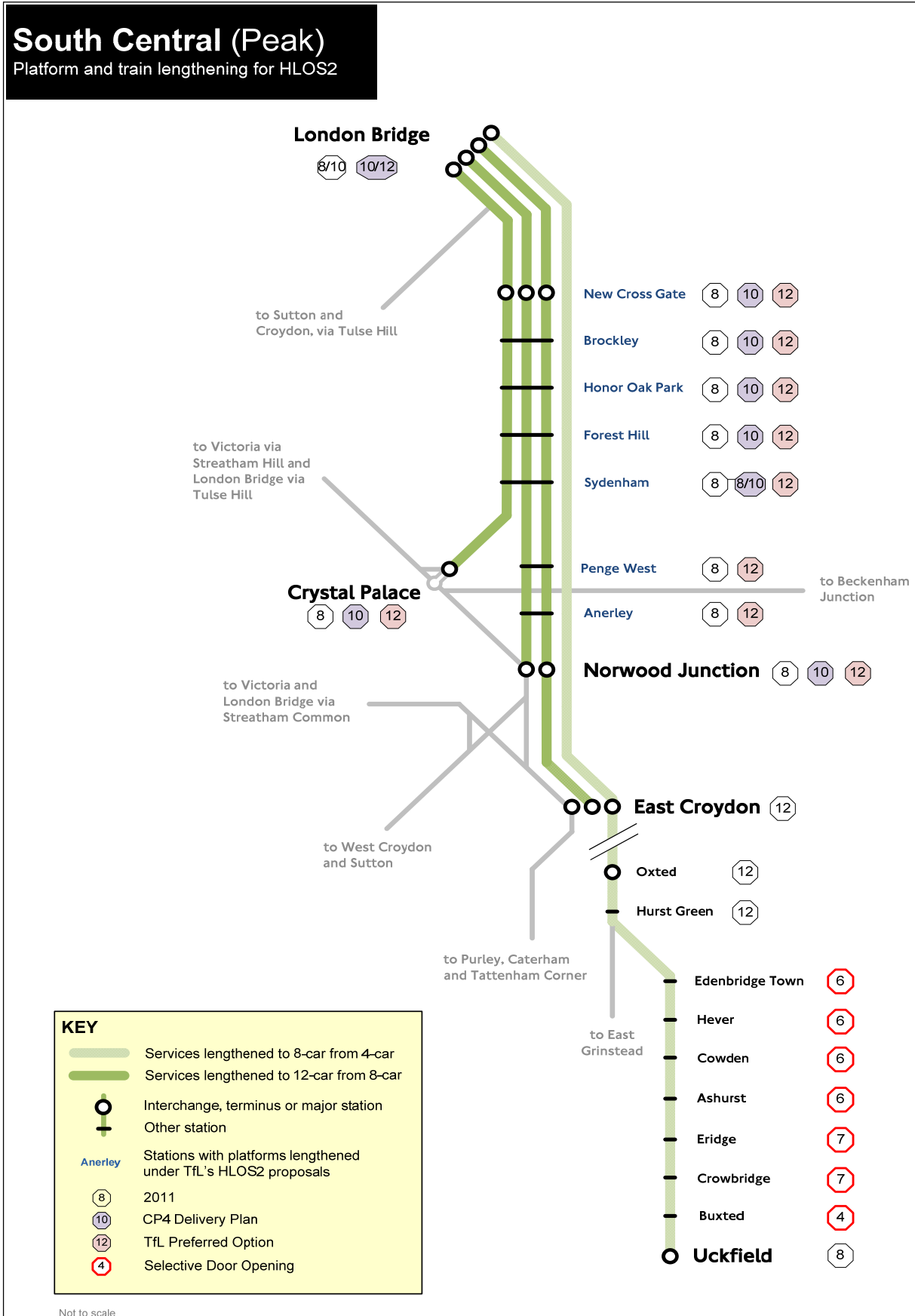
withdrawn at the end of 2012 to allow Thameslink Programme works to commence at London Bridge so Peckham Rye, Denmark Hill, Clapham High Street and Wandsworth Road stations will have a reduced service frequency to Victoria. Some Catford Loop stations have only a half-hourly train frequency at off peak times. TfL therefore recommends the provision of an additional half-hourly 4-car service between Bromley South and Victoria is provided at off peak times calling at all stations. This may only be required until the Thameslink Programme is completed, when a 4 tph service could be provided at most stations (dependent on the final timetable developed).

- A.6.5 There is insufficient line capacity to operate the Bromley South – Victoria service at peak times. A benefit of the service being off peak only is that no additional rolling stock is required, since trains will already be available due to the higher frequencies on other lines operated at peak times. Capital costs for providing increased stabling facilities are therefore not required.

## **A.7 South Central**

- A.7.1 The Sydenham corridor is the focus of the most significant crowding issues on the South Central network, both on stopping and longer distance services.
- A.7.2 Suburban stations on the Sydenham corridor are also served by London Overground services. These trains are very crowded and lengthening to five cars is proposed as described in Section A.2. But further intervention is necessary to reduce the overall levels of crowding on the route. TfL therefore recommends train and platform lengthening to allow 12-car suburban services to operate to and from London Bridge at peak times.
- A.7.3 Only services that start relatively close to central London (from East Croydon, Norwood Junction or Crystal Palace) are proposed for lengthening to 12 cars to avoid the need for widespread platform lengthening elsewhere. In total, ten additional services would operate at 12-car length during the morning peak period, requiring platform lengthening at nine stations. Platforms are already being lengthened to accommodate ten car trains in the current Control Period, at most of these stations so it is important that no work is done that will prevent the provision of 12-car platforms in the next Control Period.
- A.7.4 A further crowding gap exists on fast services between East Croydon and London Bridge. Most of the quick wins that can provide extra capacity on this route have already been delivered or are committed. TfL believes that the only remaining affordable option to provide significant extra capacity is to lengthen peak services between Uckfield and London Bridge to eight cars.
- A.7.5 As the overcrowding is not on the Uckfield line itself, it is proposed that selective door opening would be used at most stations on the line. Platform lengthening is not required north of Hurst Green because East Grinstead services will already be operating at 12-car length by 2012.
- A.7.6 Figure A.4 below shows the routes over which train lengthening is proposed and the infrastructure required.

**Figure A.4 Recommended routes for peak train lengthening on the South Central network and infrastructure required**



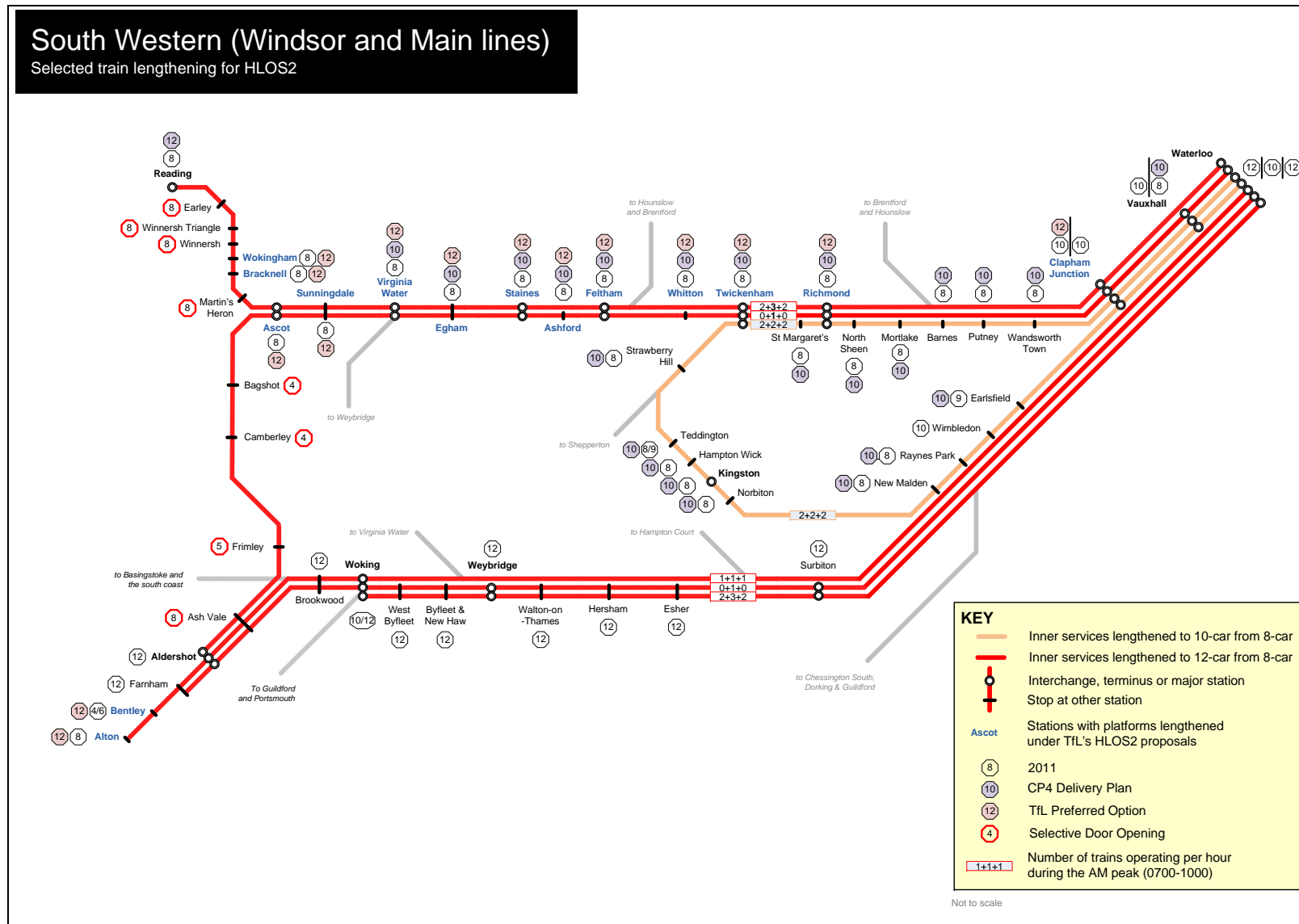


- A.7.7 TfL estimates the total infrastructure cost to deliver these recommendations to be £73m, which covers both the platform lengthening and additional depot/stabling facilities to accommodate the extra vehicles required to lengthen the trains.
- A.7.8 TfL is also developing plans for the extension of Tramlink services to Crystal Palace. This would require the diversion of London Bridge – Beckenham Junction via Tulse Hill services to Norwood Junction instead, which in turn requires the reinstatement of Platform 7 at Norwood Junction. TfL understands that the changes at Norwood Junction may be delivered in advance of CP5 to assist in the optimisation of capacity and performance on Southern services.

## **A.8 South Western**

- A.8.1 Alongside the orbital and West Anglia routes, the South Western network is also a high priority for additional capacity in the next Control Period due to the forecast levels of crowding. Crowding is most prevalent on the longer distance suburban services on the Windsor Line and Main Line.
- A.8.2 TfL believes that the best way of addressing these crowding issues is through a programme of train and platform lengthening beyond that planned in the current Control Period. This would focus on three service groups:
- Reading services via the Windsor Lines
  - Alton branch services via the Main Line and Windsor Lines
  - Woking services that run fast between Surbiton and Waterloo
- A.8.3 In addition, further peak train lengthening from eight to ten cars is proposed on the Kingston Loop, beyond that which is planned for CP4.
- A.8.4 As Figure A.5 shows, platform lengthening will be required at a significant number of stations (17 in total) with SDO being used at some quieter stations to ensure the scheme remains affordable. In total, 19 trains during the morning peak period would be lengthened to 12 cars, with an additional six trains on the Kingston Loop lengthened to ten cars.

Figure A.5 Recommended routes for peak train lengthening on the South Western network and infrastructure required



A.8.5 Not surprisingly, a scheme requiring platform lengthening at this many locations does have a substantial infrastructure cost. But TfL believes that this is still an affordable way of providing sufficient capacity to reduce crowding to acceptable levels in the next Control Period. The total capital cost, including an allowance for enhanced depot/stabling facilities for the extra rolling stock, is £239m.

## **A.9 Great Western**

A.9.1 There are some very major schemes proposed on the Great Western route during this Control Period and the next, including the delivery of Crossrail and electrification. Both these schemes are committed and are therefore included in the base case for the analysis. Significant further intervention is therefore neither required nor appropriate. However, TfL has identified one service group which will be significantly overcrowded if no intervention is made, so it is considered appropriate for some limited targeted investment on this route.

A.9.2 TfL therefore proposes that a small number of Oxford – Paddington services are lengthened to eight cars (three trains in total in the morning peak period). This does not require any platform lengthening and would require only a small number of extra vehicles, which is unlikely to need additional stabling facilities. The scheme will help reduce crowding levels on the busiest section of the route between Reading and Paddington.

## **A.10 Chiltern**

A.10.1 TfL's forecasts indicate that some extra capacity is likely to be required on the Chiltern route in CP5, even after the Evergreen 3 project which is due for completion in 2013. However, as the incumbent franchisee has a requirement to maintain crowding at a specific level, no further investment will need to be directed through the HLOS process. TfL therefore recommends that the train operator provides extra capacity as and when required over the course of the next Control Period. TfL also believes there should be improved frequencies at the Chiltern Main Line stations in Greater London, in both peak and off peak periods, including late evenings and weekends.

## **A.11 West Coast**

A.11.1 TfL's demand forecasting indicates that some services will be severely crowded on the West Coast Main Line over the next Control Period (although other services have spare capacity available). In the longer term, by 2026, the new High Speed line should release a significant amount of extra capacity on the corridor. It would be inappropriate for major infrastructure investment to be made in advance of this. Given that TfL also considers other routes to be in greater need of investment, no specific recommendations are made. If investment is to be allocated to the corridor during the next Control Period then the most appropriate way of providing extra capacity would be further

train lengthening to 12 cars as a significant number of services still operate as shorter formations.

## **A.12 Thameslink**

A.12.1 The Thameslink Programme is providing a significant amount of extra capacity for suburban services on the Midland Main Line. During the course of the next Control Period, an increasing number of 12-car services will operate as new rolling stock is delivered.

A.12.2 Whilst there may be an opportunity for alternative service patterns to ensure that capacity is allocated where most needed, TfL considers that no further investment is needed during CP5. TfL is continuing to work with DfT and Network Rail on Thameslink's final train service and associated calling patterns, to optimise the programme's benefits when it is completed in December 2018. Once completed, the opportunity should be taken to review demand patterns and provide more capacity at this point if necessary.

A.12.3 TfL also considers that a new station should be provided at Brent Cross Cricklewood to serve the new development.

## **A.13 East Coast**

A.13.1 The Thameslink Programme will also facilitate additional capacity on the East Coast Main Line. The London & South East RUS indicates that the current plan for the final Thameslink timetable is for both suburban services from Welwyn Garden City and longer distance services from Cambridge and Peterborough to run through to the Thameslink core section via St Pancras. TfL strongly welcomes the inclusion of suburban services on the East Coast route in the specification because of the greater benefits for London that this will provide.

A.13.2 By transferring some Welwyn Garden City services to the Thameslink route, there will be space for additional trains to operate into Moorgate. Additional services from the Hertford Loop to Moorgate are therefore proposed, with an increase in frequency from seven to ten trains in the peak hour, giving further benefits to London.

A.13.3 Since the Thameslink Programme will deliver significant extra capacity on this route, and since it will not be delivered until December 2018, towards the end of CP5, no further investment is proposed on this corridor until after 2019.

## Appendix B – Summary value for money (economic) case

B.1 The table below shows the appraisal for the main elements of the recommended package.

**Figure B.1: Business case appraisal for TfL’s recommended package**

PV's £m, 2007 Prices	Capital Cost	Operating Costs	Revenues	Social Benefits	Benefit Cost Ratio
<i>Orbital</i>					
- 4car GOB and GOB Electrification	-61	-71	16	346	2.99:1
- 5car ELL and 2tph Crystal Palace to Dalston Peak Only	-64	-194	41	1,380	6.37:1
- 5car NLL and WLL, 8car Southern services on WLL,+2tph 8car Shepherds Bush to Clapham	-175	-238	85	1,839	5.59:1
<i>West Anglia</i>					
- +2tph Cheshunt to Seven Sisters	-2	-27	5	246	10.16:1
- +4tph Brimsdown to Stratford	-245	-125	38	1,490	4.50:1
SWT	-264	-94	42	556	1.76:1
c2c	-61	-141	29	934	5.41:1
Southern	-80	-31	0	254	2.29:1
Great Western	0	-22	2	63	3.13:1
South Eastern	0	-65	27	689	17.95:1
London Wide	-1,055	-916	348	7,718	4.76:1
London Wide with Service Quality, Station Capacity, Step Free Access	-1,268	-1,158	544	8,171	4.34:1
London Wide with Service Quality, Station Capacity, Step Free Access (DfT value of time and appraisal methodology)	-1,268	-1,158	544	6,774	2.97:1

*Note that the capital costs in this table include optimism bias, and are discounted; they are consistent with the values in 2007 prices, excluding optimism bias, quoted elsewhere in the document.*

## Appendix C – Station schemes

C.1 TfL's recommendations for the next tranche of the DfT's Access for All scheme were described in Section 7.3. They are listed in full below:

Alexandra Palace	New Barnet
Barnehurst	Palmers Green
Barnes	Peckham Rye
Battersea Park	Petts Wood
Blackhorse Road	Plumstead
Brondesbury	Queen's Park
Catford	Queen's Road Peckham
Crystal Palace	Raynes Park
East Dulwich	Seven Kings
Edmonton Green	Seven Sisters
Hampstead Heath	South Tottenham
Kensal Rise	Tooting
Mortlake	West Hampstead

C.2 Recommendations for congestion relief measures at stations were also set out earlier in this document, in Section 7.1. Again, the stations where TfL is recommending interventions are listed below:

Barking	Orpington
Bromley South	Peckham Rye
Charing Cross	Putney
Clapham Junction	Surbiton
Fenchurch Street	Sutton
Finsbury Park	Tulse Hill
Hackney Downs/Central	Victoria
Herne Hill	Waterloo East
Marylebone	Wimbledon

C.3 Finally, the table below sets out in more detail the interventions proposed at the Strategic Interchanges, which were described in Section 7.2. The HLOS2 recommendations are shown in the yellow boxes.

**Figure C.1: Summary of recommendations at Strategic Interchanges (National Rail stations)**

Station	Step free access	Train service improvements	Congestion relief and other measures
Balham	Already step free	Longer trains on Croydon – Watford/Milton Keynes services	National Stations Improvement Programme (NSIP) scheme committed
Barking	Already step free	Longer trains on Main Line and Tilbury Loop	Second gateline and removal of some retail
Bromley South	Committed	Longer trains on fast Bromley South – Victoria services	Redeveloped station forecourt to increase size of concourse and gateline, remove some platform buildings and replace overbridge
Clapham Junction	Already step free	Longer trains on Alton branch and Reading services	Expanded Brighton Yard entrance and new entrance to Grant Road from overbridge
East Croydon	Already step free (although steep ramps)	Longer trains on Uckfield – London Bridge services	None recommended (new footbridge committed)
Finsbury Park	Committed	Thameslink Programme	Open up spiral staircases between National Rail platforms, street level and the Underground platforms
Hackney Downs/Central	Hackney Central committed	Longer London Overground services at Hackney Central	Hackney Interchange scheme to provide quicker and easier transfer between stations
Herne Hill	Already step free	None recommended	New entrance doors, remove interior wall, wider stairs to platforms and second station entrance
Peckham Rye	Recommended by TfL	New off peak Bromley South – Victoria service	Additional staircase from Platform 4, removal of some platform buildings
Queen's Park	Recommended by TfL	None recommended although calling London Midland services should be explored	None recommended (already cross-platform interchange)
Seven Sisters/South Tottenham	Recommended by TfL	Cheshunt – Seven Sisters shuttle and longer electric London Overground services at South Tottenham	National Stations Improvement Programme (NSIP) scheme committed at Seven Sisters

Station	Step free access	Train service improvements	Congestion relief and other measures
Tulse Hill	Not step free (very high cost of making step free)	None recommended	New footbridge and enlarged entrance
West Hampstead	Recommended by TfL	Longer London Overground services	None recommended although public realm scheme to improve interchange between stations committed
Wimbledon	Already step free	None recommended beyond CP4 enhancements	Remove some retail to provide additional passenger capacity

*Note: there are some other Strategic Interchanges in the Mayor's Transport Strategy that are not covered by this document.*