1. INTRODUCTION

Britain’s South Western Main Line runs out of the London terminus of Waterloo, and covers a large expanse of the area to the south and south west of London, to places such as Woking, Guildford and Richmond and further afield, to Portsmouth, Southampton, and eventually, Exeter. It provides a dense network of rail services, especially in the London suburban area, and generally runs through affluent areas of the country. A large proportion of people who use these trains are commuters: connections from London Waterloo to the City (the financial centre of London), Westminster (where the majority of government offices are located), the Docklands (a relatively new and rapidly growing business district) and the West End (in addition to being theatre land, an important business district) are good.

In the London area, there are today very significant issues concerning the ability of the train service to serve, in the widest sense, the needs of passengers travelling into, out of, and within, London. In particular, the current level of overcrowding and the predicted levels of growth in patronage in the next two decades are aspects which need to be addressed. Other issues, such as the accessibility of the rail network – for instance through the provision of high-quality interchange facilities, and, given the current security issues, the ever-increasing importance of a safe rail network, are other topics which merit examination.

Transport for London (TfL) has examined these issues, and others, in its Rail Corridor Plan for the South Western area. This was a study for which TfL commissioned the services of MVA, whose project director was John Segal, to undertake the transport planning analysis and project management. This paper therefore presents an amalgam of two views on this piece of work: that of the client and that of the consultant. The map below shows the South Western area of London which is the subject of the paper.
2.  INDUSTRY STRUCTURE

It is important before examining the process and conclusions of the Rail Corridor Plan to understand how TfL fits into the rail industry structure. TfL’s role on its formal establishment in 2000 (and it shared these features with its predecessors including London Transport) was running the London Underground, London’s buses and managing the road network - but crucially its role in heavy rail services was peripheral. It is within the last few years that its role in rail has been growing.

The current structure of Britain’s railways is a complicated one. It was decided, after much debate over ten years ago, to proceed with rail privatisation by the separation of the rail infrastructure from train operations. The operation and maintenance of the permanent way, signalling and some stations became the responsibility of Railtrack (which was soon floated on the stock market), whilst train operation was franchised to twenty-five passenger train operating companies (TOCs). Each of these operators was given a geographical area of the country to operate: in most cases, train operators were not directly competing with each other. The train operators were private companies, in many cases under the auspices of an important transport business, such as Stagecoach, National Express or First Group.
Subsequently, the number of franchises has increased and decreased, according either to private-sector decisions or by the desire of the government organisations controlling the railway to reduce the number of franchises.

Railtrack as a company has also ceased to exist: it was a private sector company operating in a monopoly environment, and in one where it performed an essential public service. As a result of huge financial problems, largely created by its mis-management of the railway over a number of years, but magnified greatly by its handling of the situation following the Hatfield accident in October 2000, it was plunged into administration and subsequently re-emerged as Network Rail, a company limited by guarantee. Network Rail is a private-sector company without shareholders and is backed by very substantial government money. The intention is that profits that Network Rail makes are re-invested in the railway; thus far, very significant progress has been made to reduce the amount of backlog maintenance and renewal over many years.

There have been many changes made to the way that government (or public-sector bodies established by the original rail privatisation) play a role in the railway. It is ironic that one of the underlying reasons for the desire of the then Conservative government to proceed with privatisation was to reduce the burden on public funds: it was believed that private sector funding could be injected into a railway, which had been closely managed according to annual government spending reviews, to spearhead much-needed improvements. Ten years later, there is a greater-than-ever specification of, and investment in, the railway by the public sector.

Originally, in 1996, the Office of Passenger Rail Franchising (OPRAF) was established as the body responsible for assessing and granting the franchises. It received different and varied bids from potential operators, and then had to assess which of them was deemed to be able to provide the best deal, in terms of the financial burden on government, on the service to be offered to passengers and on the operator’s development plans for the length of its franchise. A large proportion of the early franchises granted were for a period of 7 years.

On the election of the Labour Party to power in 1997 – a party whose leader, even a year before his elevation to Prime Minister was claiming that Labour would deliver ‘a publicly-owned and publicly-accountable railway’ - a strategic planning responsibility was added to OPRAF, and it was renamed the shadow Strategic Rail Authority (sSRA), to lose its shadow status on the passing of the Railways Act of 2000, but the railway remained privatised. This gave the government more control of the direction of the railway without the financial and administrative burdens to the Treasury that full renationalisation would have brought. During its five-year existence, the SRA enhanced greatly its role in the specification of franchises, in an attempt to provide the best service for the customer within the financial constraints which were set for it by the Department for Transport, and by extension, the Treasury. The SRA has since defined a new franchise specification process which sees a much closer stipulation of what franchises should deliver, in terms of train service, quality,
performance, customer service and station facilities. This has been driven partly by the need to control the costs of the rail industry – ensuring that taxpayers’ money is used in the most effective way possible. It has also been driven by the need to improve performance generally across the industry. Franchises were closely specified, in some instances down to the level of the length and precise timing of each train, often to the annoyance of local politicians who believed that a central government organisation was not sufficiently well informed about local issues to make such decisions.

The SRA also made very significant progress towards developing a coherent strategic planning function for the railway, something which had eluded the railway in the fragmentation of privatisation. The SRA embarked upon a programme of Route Utilisation Strategies (RUS) to examine the medium-term strategic direction that specific routes should take, and in so doing, rectify some of the deficiencies created or provoked by privatisation.

In 2004, a review was undertaken into the rail industry structure, particularly in the wake of the transfer from Railtrack to Network Rail. The aim was to create a single accountable body for everything in the rail industry, rather than the diaspora of organisations, each of which was not responsible for more than a specific aspect. The ensuing legislation - the Railways Act 2005 - abolished the SRA and made various consequent changes to other organisations, especially Network Rail. The franchising functions (specification and management) of the SRA passed to the newly-expanded Department for Transport, which to a very large extent maintains the strictures and process that the SRA employed. Strategic planning of the industry passed to the DfT and to Network Rail, the DfT retaining control of those aspects where broader government policy (such as housing developments) was in the frame, and Network Rail taking control of the Route Utilisation Strategies, which are focused specifically on the railway and seek to determine solutions for the problems identified. The DfT has continued the programme of Regional Planning Assessments undertaken by the SRA. These consider the role of rail in the overall transport context, and specifically how it meets the needs of the region in terms of ensuring access to jobs, business and leisure activities. They are similar in their role to TfL’s Rail Corridor Plans.

Crucially for the purposes of Transport for London (whose chairman is the Mayor of London) and the partially-devolved governments of Scotland and Wales, the Railways Act (2005) granted more rights of specification of franchises to these bodies. Even in September 2004, when the rail review was announced by the then Secretary of State, Alasdair Darling, the possibility of transferring franchise specification rights to TfL for the North London Line (a heavy rail line wholly within London) was mooted, and this transfer has now been made. Into other franchises which run into London, TfL is expected to provide a detailed assessment of its proposals for inclusion in the planning activities of others, and it also has the rights, with the Secretary of State’s consent, to enter into agreements with the train operators to increase (or, if it wishes, but this is unlikely in the current political framework, decrease) the number of services operated.
3. RAIL PLANNING IN AN URBAN CONTEXT

With the passing of the Railways Act (2005), TfL has become more accountable for the planning of railways in London. In February 2006, responsibility of specifying the new North London Railway franchise was formally passed to TfL, and the new franchise, which will run from November 2007, will deliver a significant range of service frequency, station facility and ticketing enhancements to a railway line which has been neglected for many years, and which has almost been closed on a number of occasions. The North London Railway covers a large suburban area, from Richmond in the west to Stratford in the east, Watford in the north and Clapham in the south: the passenger services running on it are wholly within London. TfL, in return for being granted the right to specify what the future operator will be required to deliver, will inject a significant amount of money into rebuilding the line, and this amount is expected to be supplemented by money coming from the Olympics Delivery Agency as a result of London’s successful bid to host the 2012 Olympic Games.

No other franchise runs solely within London: there are on all lines a combination of shorter-distance services which operate in the suburban area and longer-distance, faster services, which make few, if any, calls within the London area, with the exception of the terminus. TfL’s aim is to bring about, within the industry, the same standard on all heavy rail services and stations within London as will be found on the North London Railway after the infrastructure enhancement programme has been completed. The way in which TfL will seek to fulfil this role is through providing an input into new franchise specifications (now the responsibility of the DfT), into Network Rail’s Route Utilisation Strategies, which set the medium term strategy for a particular route – and, where appropriate, entering into an agreement with an incumbent train operator. For all these activities, TfL needs robust analysis – operational, financial and demand-driven - and it is this which the rail corridor planning process provides. Without such detailed information, there is a risk of flawed thinking, or, especially when financial implications are under discussion, that any agreement will not be the most favourable that can be obtained.

TfL has been given objectives by the London Mayor, Ken Livingstone, other than those purely to do with transport provision. The Mayor sees his responsibilities in transport as being part of a broad spectrum, including reducing deprivation within London, improving the accessibility of the population to centres within the capital, reducing racial intolerance and improving the environmental conditions of the capital. Whilst TfL will, given its nature, concentrate on how an improved transport service may contribute to these targets, there is a need to be complementary with the other policies driven by the Mayor and his advisors. In this regard, TfL’s objectives are different from the bigger players in the rail industry: Network Rail is focused on delivering a reliable and safe railway, and the DfT is focused on delivering the best return on the money invested in the industry in ticket prices and government subsidy. TfL would not disagree that these aspects are clearly of central importance, but recognises the significant societal role that a railway
can play. One has only to cite the Docklands Light Railway, which has played a huge role in rejuvenating the former docks area of London, known for many years as severely depressed and in urgent need of investment. TfL is responsible for the Docklands Light Railway and has repeatedly succeeded in delivering extensions to the network which have been justified on the economic, rather than the financial, effect that they have on the areas which they serve.

TfL’s role in heavy rail is to deliver a programme of investment through influencing the other parties, in the interests of Londoners and those who visit London. TfL is however not funded for making investment in heavy rail, with the exception of the North London Railway. Whilst money has historically been found for station facility investments and some limited additional services, for TfL to invest significantly in the heavy rail network might involve it making difficult decisions about its priorities for investment: the Underground, buses or heavy rail.

TfL is uniquely placed as it controls the bus routes and the Underground – and therefore can examine proposals in a multi-modal context. The Rail Corridor Plan for the South Western area of London was prepared by MVA and provides evidence of TfL’s growing role in heavy rail management in London.

Two of the principal objectives of an RCP are to enable TfL to give soundly based input to both relevant RUSs and to franchise specifications. The DfT is obliged to consult TfL on the latter, and through the medium of the RCPs, TfL ensures that its advice is based on solid evidence of the appropriate services and other elements (such as station facilities) of the franchise specification.

4. THE RAIL CORRIDOR PLAN PROCESS

The figure below shows the first stages of the process for preparing an RCP. It can be seen that it starts from clear objectives and identifies the extent to which the current rail service meets those objectives, including whether it is likely to continue to do so in the future. The objective is to determine actual and potential gaps, and then identify schemes that meet the gaps; this avoids considering schemes that do not have relevance to the issues.
London Plan Objectives and Requirements

Issues identified from planning, transport network, and travel demand analyses

Identify Gaps – Qualitative, Quantitative, Evidence

Identify Constraints – ie factors inhibiting correction of Gap

Scheme Generation

Figure 2: RCP process

The second figure shows the process for identifying the schemes in more detail. It is important to note that schemes are not necessarily rail – it is a multi-modal solution that is needed to address the gap. The schemes were identified through a joint workshop between MVA and TfL.

Figure 3: RCP shortlisting

Once schemes are identified, they are subject to an initial outline appraisal so that a shortlist can be created. The outline appraisal is qualitative, identifying...
order of magnitude of benefits (as they address the gaps) against approximate cost. Deliverability also plays an important part in this initial appraisal.

The shortlist is thus created, and this is subject to a more formal quantitative appraisal using TfL’s Business Case Development Manual. This assesses the costs, revenue, economic benefits (time savings of passengers, highway decongestion benefits, accident savings) and calculates the NPV and benefit:cost ratio of the scheme. From the appraisal of the individual schemes, those that pass the standard benchmark of a benefit:cost ratio of at least 1.5 (considered as an increment on other potential schemes) are included in an overall package that represents the total Rail Corridor Plan. In reality, minor adjustments are made in the selection of schemes to ensure that the principal gaps are addressed. This particularly relates to the crowding targets.

5. TRANSPORT FOR LONDON’S RAIL CORRIDOR PLAN

There are five overall headings for TfL’s Rail Corridor Plan (prepared by MVA), reflecting the objectives that TfL has been set for the furtherance of its role within heavy rail planning. These headings are: Improving capacity, Improving interchanges, Quick Wins, Access to Heathrow and Improving accessibility and social inclusion.

5.1 IMPROVING CAPACITY

TfL uses its Railplan model to identify forecast levels of overcrowding on the train services: this model is valuable in that it is multi-modal and has a high level of detail for the London and South East area (although further outside London, its usefulness becomes limited). In particular, it can forecast changes in use of Underground or bus services as a result of changes to heavy rail services. TfL has also fairly recently decided to adopt its measure of overcrowding as the number of people standing per square metre of standing space on a trains. This reflects that on most suburban commuter lines into London, it is unrealistic to hope that enough seats can be provided for all the people who wish to travel. It also helps to influence the design of new rolling stock, where the amount of standing space can be made such that it is much larger than older trains.

There is significant peak hour overcrowding on many trains coming into Waterloo, on the fast lines, the slow lines, and on the Windsor lines. TfL’s analysis shows that there are, in the AM peak hour, 4.6 and 6.1 people standing per square metre on the main line slow and Windsor line services respectively, on arrival at Clapham Junction. This is a very high level of loading and one which TfL believes needs to be addressed through network, station and train enhancements.

The following table illustrates the conclusions from Railplan about crowding in the corridor:
### 2005 Overcrowding Analysis

<table>
<thead>
<tr>
<th>Route Group</th>
<th>Passengers standing per square metre</th>
<th>Highest loaded section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windsor Lines</td>
<td>6.1</td>
<td>Arrival at Clapham Junction</td>
</tr>
<tr>
<td>Main line slow lines</td>
<td>4.6</td>
<td>Arrival at Clapham Junction</td>
</tr>
<tr>
<td>Main line fast lines</td>
<td>2.0</td>
<td>Arrival at Waterloo</td>
</tr>
</tbody>
</table>

Source: 2005 modelled demand, Railplan

The information presented above is replicated in a chart form, black representing the highest level of crowding.

![Map showing current crowding on inner suburban services (2005)](image)

### Figure 4: Current crowding on inner suburban services (2005) – Passengers per metre squared

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In terms of crowding standards, the national rail industry has worked to a standard of no passengers standing on longer-distance London commuter services (with the last stop 20 minutes or more from the London terminal) and a broad equivalent of approximately 2 people standing per square metre on shorter distance London commuter services, where the last stop is less than 20 minutes from the terminal. TfL’s analysis is based on these principles.

It is clear therefore that there is very significant overcrowding on these suburban services in the peak hour, today. It is such that additional demand is suppressed because of the inability of extra people to board the trains – an argument which can be tested within the Railplan model by disengaging the capacity limitation function. As such, it is right to examine the predicted levels of growth in population and employment in the area, and see what effect there might be on the rail service, before identifying measures in which the situation may be ameliorated.

Growth

The Mayor’s London Plan is accepted by Government as the basis for the future planning of London, and it is the basis on which TfL undertakes its assessments of future predicted growth on the transport network. The London Plan sets out the expected pattern of growth in terms of population, employment and spatial development. It is planned that by 2016, population will have grown by 9% from 2001 levels and by 14% in employment terms.
Much of the increase in employment will be located in Central London, the city fringes and in East London.

TfL worked closely with NR and the DfT on the demand patterns and on growth on the route, and the results of this suggest that a figure of approximately 20% growth until 2016 on inner services is one on which there appears to be collective agreement.

The table below indicates the comparative growth rates calculated on different service groups; these are based on capacity being available to carry the additional demand.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Windsor Lines</td>
<td>63.8m</td>
<td>19%</td>
<td>25%</td>
</tr>
<tr>
<td>Main line slows</td>
<td>64.1m</td>
<td>24%</td>
<td>25%</td>
</tr>
<tr>
<td>Main line fasts</td>
<td>50.1m</td>
<td>26%**</td>
<td>23%</td>
</tr>
</tbody>
</table>

Source: DfT, TfL
* Railplan 2001 boardings; ** 2005-2013

Growth in the period until 2025 is predicted to be approximately 30% in overall terms (from 2001), with longer-distance patronage growing at a slightly higher rate. The two charts below indicate forecast overcrowding in 2016 – the crowding does not increase as much as might be expected, as some of the additional demand is suppressed.

Figure 6: Forecast crowding on inner suburban services (2016) - Passengers per metre squared
Figure 7: Forecast crowding on outer suburban services (2016) - Passengers per metre squared

By drawing simple comparisons between the two sets of graphs, it is clear that growth is such that much more of the network will become severely overcrowded (the black line representing crowding in excess of 4 people standing per square metre, all the seats having been filled). The next stage of analysis therefore examines what measures might be appropriate to consider to address the overcrowding. They fit into several categories: capacity of the rolling stock, additional train services, longer (or taller) trains and travel demand management – or to be most effective, a combination of several of these possibilities.

Proposals for capacity enhancements on services

It is clear that strong demand growth in the South West corridor will add to existing overcrowding levels and additional capacity including train lengthening will be necessary during the franchise period. TfL’s proposals for increasing capacity within the Rail Corridor Plan include:

i) Internal reconfiguration of a sub-fleet of inner suburban units

A short-term solution to providing additional capacity on inner suburban services is the reconfiguration of rolling stock to increase the number of passengers who can be carried more comfortably in existing vehicles. This
would be the first step in providing extra capacity: it is relatively easy and cheap to do, but is only a short-term measure.

Analysis indicates that reconfiguration of a sub-fleet of 32 Class 450 units to an inner-suburban configuration is a viable option to provide an increase in train capacity in the shorter term. This would involve the removal of the First Class section, the guard’s compartment, toilets, and some tip-up seats.

This proposal has an excellent benefit:cost ratio of 9.6:1, indicating that the range of benefits it brings to passengers in the suburban area, principally additional standing capacity, heavily outweighs the few disbenefits (such as the loss of first class in the suburban area) and the costs needed to redesign the interiors.

ii) Train lengthening to 12 cars

Analysis suggested that 12-car operation is the only scheme sufficient to keep crowding at or below current levels by 2021. Conclusions from testing of the preferred platform lengthening options were:

- The optimum solution on the Windsor lines (including Reading services) is a 12-car high-capacity configuration railway. This would require platform extensions at a number of locations. The Windsor line platforms at Waterloo are not expected to be costly or problematic;
- Additional trains on the Windsor lines are not deemed appropriate unless accompanied by a programme of removing a number of the level crossings along the line of route, something which the topography of the road crossings (generally in town centres) would be prohibitively expensive and disruptive to achieve.
- The optimum solution on the main slow lines is to lengthen this route to 12-car operation. This level of lengthening is the only one sufficient to accommodate future demand properly. 10-car operation could be considered acceptable up until 2021, but the difference in cost and the level of disruption between this option and 12-car is not sufficiently large to justify a phased approach;
- Other 9- and 10-car solutions will not deliver sufficient capacity within the required timescales to make them cost-effective;
- Given the more severe overcrowding experienced on the Windsor lines, it is recommended that priority be given to the programme of works associated with longer trains on the Windsor Lines. The scope of works at Waterloo for Windsor line train lengthening is cheaper and easier in engineering terms than that for the main slow lines;
- The introduction of longer trains on the two routes is discrete: Waterloo platform lengthening can be addressed in two phases (17-
19 for Windsor line trains and 1-6 for main slow line trains). Use of the Eurostar platforms may prove possible and valuable during the engineering programme, to maintain a satisfactory level of service;

- These proposals should not affect performance resilience significantly, as no additional trains are proposed, merely lengthened ones;
- The package of train lengthening proposals – 12 cars on the Windsor Lines and main slows – has a benefit:cost ratio of 2:1, including optimism bias of 40% (it is more for platform lengthening at certain stations).

iii) Train lengthening to 15 cars on a number of main fast services:

TfL undertook analysis to see what measures might be appropriate to increase the capacity of the longer-distance trains (from Southampton, Portsmouth, Winchester and Basingstoke), given their high levels of overcrowding today, the predictions of future growth, and the importance to London’s economy of maintaining and developing these services. The principal findings were as follows:

- Further overcrowding will be a major problem on these main fast line services in the future, and additional paths on the network are not available;
- A scheme in which selected long-distance services would be lengthened to 15 x 23m carriages by selective lengthening of platforms at locations such as Winchester, Guildford and Woking is recommended.
- TfL has included the construction of a single-track flyover north of Clapham Junction, so that lengthened long-distance trains could access Waterloo International. One benefit of this is to ease the programme of construction work for platform lengthening and throat remodelling at Waterloo. The cost of a flyover - £300m – has been included in the business case analysis.
- Despite the significant infrastructure scheme needed to carry the railway over on to the international side of Waterloo, the train lengthening proposal for selected main line fast services has a good business case with a benefit:cost ratio of 3.1:1.

iv) Waterloo International

Waterloo International, located on the west side of the station, was constructed in time for the 1994 opening of the Channel Tunnel, and is the London terminus of Eurostar trains. However, in 2007, the second section of the high-speed Channel Tunnel Rail Link will open, and Eurostar trains will in future use a different London terminal station, St Pancras, on the other side of
London. The five international platforms at Waterloo International will become vacant, and this provides an opportunity to amend the domestic train service and potentially to provide more capacity.

The track layout on the approach to Waterloo International was designed specifically for long, relatively infrequent trains (the Eurostars), and this means that it is not a simple task to divert other trains from Waterloo domestic into the vacated platforms. TfL in its work believes that it would not be politically acceptable for the platforms to remain unused for a considerable duration.

Firstly, work needs to be done to the terminal so that it is suitable for domestic trains, and this would be consistent with the possible conversion of the current waiting area underneath into retail outlets. This work includes platform regauging, provision of platform repeater signals and minor signalling alterations, provision of direct access from the platforms to the main station concourse (via the proposed rafting over the existing Eurostar concourse), and closure of the existing stairways, travelators, and stairs between the platforms and lower levels. TfL could however not identify more than a few additional paths which could be provided into Waterloo as a result of the platforms becoming available.

TfL’s analysis for the short term centred on providing additional concourse space at the station, made possible by the closure of the international terminal. Measures include extending the existing single escalator from the Underground concourse to the Eurostar concourse up to main concourse level, adding another escalator adjacent to this extended escalator, and rafting over the existing pre check-in Eurostar concourse to be considered for implementation.

In the longer term, TfL’s proposition for the use of the long platforms forms the recommendation above for a small number of 15-car peak-only main line trains. It believes this to be the best strategic use of the capacity created.

The diagram below shows the layout of platforms and tracks at Waterloo.
v) Double–decker trains

There are many thoughts within the British railway industry about the possible merits of double-decker trains, with the frequently-heard observation that Britain should be following the lead of many other urban networks, such as Paris and the Netherlands, in the introduction of double-decker rolling stock. TfL has undertaken some analysis on the benefits which could be delivered through the introduction of double-decker trains on the South Western network. Its conclusion is that there could be a capacity increase of only 10%-15% per 20 metre carriage. This takes into account the amount of space needed for the staircases and the probable inability to stand on the upper deck, and is significantly less than that which might be delivered if longer carriages, as can be found on the Paris RER network, were to be introduced. The loading gauge in Britain, however, precludes serious consideration being given to widespread carriage lengthening. Moreover, expenditure would be necessary to raise bridges in many locations, and whilst this is not the case with the South Western main line, many routes have fairly significant tunnels.
on the approach to London, as a result of London being in a basin. The cost of modification would therefore be likely to be prohibitive. Furthermore, dwell times associated with double-decker trains would have to be longer than today to allow safe ingress and egress of passengers, and this has a consequential detrimental effect on the number of trains that can be run, thereby having the perverse effect of worsening capacity when the thrust of the original proposal was to improve it. Whilst it did examine the issues, TfL did not, and does not, recommend the introduction of double-decker trains on this route.

vi) Travel demand management

Travel demand management covers a range of possible initiatives and strategies that offer the potential to displace some demand from the high peak (generally 0800 – 0900 for national rail) to shoulder peak periods, when some spare capacity exists. It also covers measures aimed at reducing demand for travel as a whole and to shifting demand to more sustainable modes such as walking and cycling. It is a complicated area which is politically charged and is always initially perceived as a means by which prices in the peak hour are raised in a simple ploy to make more money.

Possible measures considered include:

- **cheaper fares in the shoulder peaks** – This measure also requires the technology to charge passengers for travel according to the exact time of the journey (this is likely to be possible with the introduction of Oyster smartcards on the national rail network). It has subsequently been considered that a price differential between the peak hour and the shoulder peak hour of 30% would be necessary to deliver any sizeable shift in patronage to the shoulder peak hours;

- **more frequent trains in the shoulder peaks** – Making shoulder peak travel easier, quicker, and more flexible, although this would require additional rolling stock and may be limited by network capacity in some areas;

- **supporting employment-related measures to enable travel time shift** – This would include flexible working hours for all types of employees and travel plans developed to accommodate flexible working;

- **measures to reduce peak travel overall** – Including home-working and part-time working. This would involve a whole programme of measures being taken with employers and the entire package examined before implementation could be possible.

There would need to be a thorough assessment of the costs and benefits associated with travel demand management initiatives. In particular the impact on the less well paid and London’s economy will need to be carefully
considered, as those who might have more rigid hours of work could be those who are less well-paid. It is a complex area and one which would have to be introduced across London’s transport systems as a whole if it were to be successful.

5.2 IMPROVING INTERCHANGES

TfL’s second principal area for examination within its Rail Corridor Plan was the improvement of interchanges, partly because of their importance in their own right, and partly to relieve pressure, where possible, on central London termini. The programme of interchange improvements encompassed facilities at these locations. TfL saw the need for improvements to:

- Clapham Junction – to increase the number of main line fast services which call there;
- Vauxhall, Clapham Junction, Wimbledon, Putney, Richmond, and Feltham (in terms of station facilities);
- Waterloo station – to handle increased demand and integration of Waterloo International terminal.

Clapham Junction

Clapham Junction is an important strategic interchange and the RCP examined the benefits and costs involved in stopping more South Western main line fast services. This has the potential benefit of reducing some overall journey times and increasing capacity on the approach to Waterloo. It is also consistent with providing better orbital access around London – using the West London Line and phase 2 of the East London Line Extension – and providing better access to Gatwick and South London through the availability of interchange options.

The Rail Corridor Plan concluded that main fast services can call at Clapham Junction station in the morning by using platforms 7 and 8 alternately, with the aid of new crossovers, and in the evening using platforms 8 and 9 alternately (with up fast services routed via platform 7 loop), with performance being on a par with that of the current timetable.

The Rail Corridor Plan’s engineering assessment and operational modelling of the scheme has concluded that the required platform extension work (to enable 12-car main line fast trains to stop at platforms 7 and 8) is achievable, but that additional works will be required to increase the line speed through the turnout at the country end. The total cost of these works is estimated at £21m.

The impact of the scheme both on circulating areas within Clapham Junction station and on other services, particularly those to Victoria has been considered. The passenger subway at Clapham Junction will already be very crowded and congested in 2016, and stopping additional trains will worsen the situation, but only slightly. However, the footbridge will still have spare capacity, although the stairways are likely to be congested. A solution to this is to make the subway and staircases uni-directional at peak times.
Concern has also been expressed that this scheme would contribute to overcrowding at Victoria station (both National Rail and Underground), which already suffers from problems at peak times. London Underground is planning an upgrade of its ticket hall, escalators and subways, and access to the National Rail station. These upgrades should be sufficient to accommodate the relatively small increase in passengers as a result of the strategic interchange scheme. There is also likely to be a reduction in moves between Victoria and Waterloo (and vice versa), through interchange at Clapham Junction.

The business case for creating a strategic interchange at Clapham Junction is very strong in economic terms and is financially positive, based on a 30-year appraisal period.

Quality of service: other interchange stations

The Rail Corridor Plan proposes relatively modest station improvement packages at Vauxhall, Clapham Junction, Wimbledon, Putney, Richmond, and Feltham. These are designed to address identified problems with disabled access/step-free provision, provision of information, signage, cycle provision, toilet provision, cleanliness, access to buses, passenger information systems and other facilities. The package of measures is both inside the station, and multi-modal in context.

Outline business cases for improvement packages to facilities at the seven stations have been undertaken. The packages at Waterloo, Clapham Junction, Richmond, Wimbledon and Putney are forecast to be financially positive with significant user benefits from the improved station facilities. The packages at Vauxhall and Feltham have benefit:cost ratios of 7:1 and 1.3:1 respectively.

Waterloo

Waterloo station is owned and managed by Network Rail and it is clearly recognised that passenger congestion on the main concourse and the links to and from the Underground lines are becoming a significant problem at peak times.

The layout and specifically the changes to Waterloo station are fundamental to virtually all the capacity schemes recommended above. Recommendations on the passenger circulation issues are as follows:

- Gating of the station (for which TfL and Stagecoach jointly provided the technical design, and is assumed in the base case for the RCP study) to be implemented;
• Network Rail's proposed short term measures to address current and forecast crowding - the removal of retail outlets from the concourse, changing station access and egress arrangements, and moving the location of the display screens on the concourse, to be implemented;

• Rafting over the Eurostar terminal entrance to provide more domestic concourse space

• The Rail Corridor Plan has concluded that the capacity improvement, identified above, to Waterloo, should be adequate to handle demand levels up until around 2021.

• The package of improvements to the passenger circulation areas of Waterloo is financially positive.

5.3 QUICK WINS

Car parks

The RCP examined a number of areas where improvements could potentially be delivered within a shorter timescale. This has also included consideration of station car parking, which is a concern identified in Network Rail's RUS. TfL’s policy on car parking provision - set within the context of the Mayor’s Transport Strategy - at stations within the GLA area is as follows:

• no new (or substantial increases to existing) permanent park and ride car parks should be considered within zones 1-3 owing to their likely generation effect of additional car vehicle trips;

• proposals for new sites or substantial increases to existing park and ride car parks outside zone 3 can be considered provided they result in shortening of car vehicle trips and an overall reduction in car vehicle kilometres.

Unless a sustainable transport case can be demonstrated, TfL’s policy is that parking demand is managed through user charges at national rail stations within the GLA area.

The main station car park in the corridor within the GLA area is at Surbiton. There are plans to redevelop the surface level car park in the future. Should this include any increase in parking provision, TfL would recommend that a sustainable transport case be prepared as part of any redevelopment of the car park at this location.

Gating of stations

TfL supports a significant increase in gating at stations. The Rail Corridor Plan reviews the case for the gating of New Malden, Raynes Park, Mortlake,
Wandsworth Town, Norbiton, Teddington, St Margarets, Whitton, and Worcester Park stations, to protect revenue and enhance passenger security.

The gating package has a strong business case with a financially positive payback period of 4 years. As such, it is probable that the successful bidder for the franchise would also want to undertake the necessary work. The key benefits are increased ticket revenue from reduced fraudulent travel; cost savings from reduced vandalism at the stations involved; and improved security as a result of the gates and associated increase in staff presence.

**Additional first and last train services**

An important Mayoral priority is the delivery of four trains everywhere on London’s rail network between the hours of 0600 and 0030. This is particularly the case in south London, where there is a much lower penetration of the Underground, partly as a result of the geological conditions which made tunnelling difficult with 19th century technology, and because of the way in which the city has developed (that north of the Thames traditionally being where most businesses are located). The idea is to provide as near a service in terms of frequency and standard as one would expect on the Underground. It is not an easy task to achieve, because of the conflicting demands of the railway, and especially for first and last trains, because of Network Rail’s maintenance regime.

TfL identified that the first and last services to a number of stations within the corridor, from Waterloo, are not co-ordinated with the opening times of London Underground at Waterloo. The business case for these additional services is good: the revenue from the overall package of services is estimated to cover 82% of the additional costs of running them. The strongest performing services are shown to be those on the Windsor lines to/from or via Hounslow and are financially positive; the extra services to/from Chessington also perform well. The benefit:cost ratio for the combined package is 11.1:1, which indicates excellent value for money.

Initial operational feasibility suggested there are sufficient paths available to run the extra trains. TfL’s view (from early consultation on these proposals) is that engineering access is unlikely to be an issue, as there may be a move towards fewer weekday but more extensive weekend possessions. For operational purposes it would be necessary to run an equal number of additional services in the opposite direction, to reflect rolling stock movements. There is unlikely to be significant demand at these times for people going into London so late or going out of London very early in the morning; however there will be a cost impact which has been taken into account.

**5.4 ACCESS TO HEATHROW**
TfL has examined within the Rail Corridor Plan how rail might be able to be used more effectively to serve Heathrow airport. The airport has a heavy rail link, but to the north (and running into London Paddington). There have been proposals for many years, called Airtrack, for providing a link from the south. Public transport from this corridor to the airport is not good and given the extreme road congestion around Heathrow (both for passengers and airport employees), it is right to contemplate improving public transport provision.

TfL supports the concept of Airtrack serving Heathrow, but has concerns about the substitution of paths on the Windsor line corridor (from inner suburban to airport) and therefore the effect on crowding on commuter trains. TfL would wish to reserve its position pending the completion of a detailed timetabling and performance modelling exercise.

As a possible interim option, TfL has examined an improved Feltham to Heathrow coach link (to provide better public transport provision in advance of any possible construction of the Airtrack infrastructure), but has found this to have a weak business case. There is currently a slow bus service, not well used, and the intention is that this would remain unchanged until such time as the Airtrack scheme may be delivered.

5.5 IMPROVING ACCESSIBILITY AND SOCIAL INCLUSION

Increased accessibility is one of the main ways in which transport can contribute towards facilitating greater social inclusion. Both accessibility and social inclusion are amongst the over-arching objectives of the Mayor’s London Plan.

Accessibility takes two forms: increasing access of the whole population to employment, education and services, particularly by public transport; and making access to the network, at the point of entry, as physically undemanding as possible to the benefit of those with a temporary encumbrance (luggage or small children) and those with a level of permanent disability (up to 11% of London’s population). Ideally, all stations would be accessible to 100% of the population all the time. London’s rail network is some way from this but TfL wishes to move towards this objective.

TfL is keen to address areas where the national rail network may not be as accessible to passengers as it should be. This is particularly for those who may be disabled in some way. The DfT has recently published its Railways for All strategy which outlines a series of stations which it proposes to be made step-free (involving a programme of work to install lifts and additional signage), and Clapham Junction is one of the highest priorities. Other stations on the corridor are also included in this list and TfL welcomes the proposals. It has however identified two stations – Vauxhall and Chessington South - which, if made step-free, would mean that all passengers in the corridor would be within 2 km of a step-free station. It is proposed that work to Vauxhall, as it is an important bus and Underground interchange, should be programmed in...
a co-ordinated way between the three modes; on Chessington South, the proposal is not being pursued at present.

Figure 9: Current availability of step-free access in the South Western area (2km catchments)
Minimum turn-up-and-go service standards: Access to urban centres

Given the capacity problems on the approach to London termini in the peak hours, it is often easy to forget that rail serves other purposes as well, and that it does not, in certain cases, do this as adequately as it might. One way in which its role in society is important is in transporting people to and from urban centres in the London area, both for business and leisure purposes. In the South West corridor, there are a number of such locations – centres in their own right, rather than simply commuter dormitory towns – and the Rail Corridor Plan has examined their level of service.

Those locations which were chosen were Clapham Junction, Wimbledon, Kingston, Richmond and Hounslow. The review examined existing provision, in terms of services, frequencies, and operating hours, for each of the centres, with reference to the local catchment, access to other centres within the South West area, and access to Central London. The review was undertaken at a strategic level, to identify any major gaps in the network, and to examine possible rail-based solutions to these gaps.

For Clapham Junction, the main gap identified is that the Sunday service to Hounslow was poor with only 1 tph, without any bus service alternatives.

No gaps are identified at Wimbledon which has a high frequency of service.

For Kingston, the gap identified is that the train service to Richmond is limited to 2 tph weekdays and Saturdays and 1 tph on Sunday.

For Richmond, the gaps identified are:

- Service frequency was limited to 2 tph on Sundays between Richmond and Barnes;
- Service frequency was limited to 2 tph between Kingston and Richmond on Mondays to Saturdays, and 1 tph on Sundays.

For Hounslow, the gaps identified are:

- Service frequency was limited to 2 tph on weekdays and Saturdays to Feltham (and westwards);
- Service frequency was limited on Sundays to 1 tph from Barnes to Feltham via Hounslow;
- Service frequency was limited on Sundays to only 1 tph to Clapham Junction

As a result of the above, it is recommended that:
• Sunday’s rail frequencies to Kingston and Hounslow are reviewed with a view to increasing them to the Mayor’s ‘turn-up-and-go’ four trains per hour standard;

• specifically, consideration should be given to introducing an additional 2 tph off-peak and weekend service from Waterloo to Kingston via Richmond in order to increase the Richmond-Kingston frequency to 4 tph during these periods, as well as providing collateral frequency benefits for passengers to Waterloo. Furthermore, it is recommended that the Kingston Loop frequency between Kingston and Richmond is increased to 2 tph on Sundays to improve access to the major shopping centre of Kingston.

6. CONCLUSIONS

The above analysis provides a wealth of evidence of the detailed approach employed by TfL and MVA to rail planning, concentrating especially on Mayoral objectives. Its purpose has been to provide a detailed input into the DfT’s franchise specification for the new South West Trains franchise (from February 2007), for which the competition process is currently underway, and to provide a similar input into Network Rail’s Route Utilisation Strategy for the period of the next ten years. All three pieces of work are related to the same topic but have different primary purposes.

TfL has been successful in gaining the recognition of the other players that doing nothing to improve capacity in the suburban area is not a sustainable approach. All three parties are in broad agreement about the current level of overcrowding and the predicted growth. Within the context of the franchise specification, the DfT is putting forward the redesign of train interiors as a short term measures, and outside the context of the franchise, a large programme of work is beginning to be established for a grand rebuilding of Waterloo station, and associated platform lengthening along the line of route. TfL, and the mayor, will be involved in the designs for Waterloo, not only from a railway angle, but because of TfL’s responsibilities for land use planning, for the Underground and for street management. The Mayor has the right, for example, to stipulate changes to the design of the station, and withhold planning consent until those amendments have been made.

Network Rail, in its Route Utilisation Strategy, recommends an approach of suburban train lengthening, initially only to 10 cars (in place of the current 8, but not to a 12-car solution which was TfL’s preferred approach). Whilst there are aspects of a 10-car railway which are more easily delivered than a 12-car railway, the growth predictions do support 12 cars, and it is hoped that Network Rail, in its design work, will include passive provision for extension at a later date, to 12 cars. Network Rail does not, however, make any proposals for a capacity enhancement to the longer-distance service, either in terms of additional trains (which do not appear to be able to be accommodated in the timetable) or train lengthening.
A franchise is not considered the appropriate vehicle to deliver significant infrastructure enhancements: many so-called commitments to infrastructure enhancement have been made in franchises since privatisation, only for them (largely) to have not been delivered. The DfT therefore is of the view that it will include within franchises the all-encompassing term that the franchise holder should be co-operative with the project development process, but that it (the DfT) will specify and manage it. There is a stipulation to this effect made within the Invitation to Tender for bidders for the new South West franchise, and it is therefore assumed that project development work on the platform extensions, and associated work such as power supply and signalling, will shortly begin, as a joint team led by the DfT and Network Rail, but with the full participation of the new train operator, TfL, and others.

Many of the other aspects of the Rail Corridor Plan have been included within the specification for the new franchise, for instance gating at stations, improvements to station facilities and the recommendation to introduce the Oyster smart-card within the London area. Other aspects, such as first and last trains, may form part of the successful bidder’s plans for the new franchise, depending, in this instance, on successful discussions with Network Rail on engineering access and on the optimisation of the use of the rolling stock made available. Nevertheless, this will be useful information for TfL, should it wish to pursue other means with the train operator concerned to introduce new services.

An industry where there are many players is clearly a challenging environment in which to seek for a specific set of improvements. In this case, there is a tension between national government priorities – which are largely financial – and local government priorities – which are largely social. By their very nature, longer-distance services are likely to be able to generate more revenue than shorter-distance services, and in a large commuter market, it is a fact of life that large capital expenditure will be associated with rolling stock that is only used in the morning and evening peak hours. And on a railway with many different constraints (unlike the Underground, each of whose lines is largely a self-contained entity, and without exception, running as a suburban railway), a balance has to be struck between different service groups. It is easy to see, however, that two public sector bodies such as the DfT and TfL, with different objectives in transport will not come to the same conclusions. In addition, Network Rail’s rightful insistence on improving performance (which has in some instances involved reducing the number of trains, or lengthening their journey times) has to be balanced against the need to provide as much capacity as possible in the London peak periods.

The Rail Corridor Plan process is a useful tool in a complex political environment such as the British rail industry, where one body with certain responsibilities but little direct control of rail services or infrastructure wishes to influence the strategic direction of a particular route. Through a rigorous process of identifying gaps in capacity, in service provision, and in facilities, TfL has managed to create logical arguments for a series of schemes, and has tested these through its detailed business case procedures. It would not
normally be TfL’s place to fund many of these larger schemes directly (at least under current funding arrangements), but nevertheless it has succeeded in delivering robust evidence for its reasoning in the pursuance of scheme development.
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