

Route Plans 2008
Route 1
Kent



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Route 1 Kent



Section 1: Today's railway

Route context

The Kent route is made up of a complex network of interconnected lines linking central London with the major towns beyond, reaching to outlying areas along the Kent and East Sussex coast. It also includes the new high speed line to the Channel Tunnel, which opened recently.

The route also provides an extensive suburban overground network throughout much of South East London, providing frequent metro services to a large part of the capital. Links are provided from most areas to both the West End and to the City of London.

There are significant overcrowding problems on both main line and suburban services and

tackling these has now become our highest priority for future.

The HLOS included Government commitment to fund the implementation of the Thameslink Programme, with work commencing in 2008. This will provide significant additional capacity in the central London area when work is completed by around 2015. Prior to this time major construction works will be required in critical parts of the network, potentially reducing capacity whilst work is in progress.

Southeastern's franchise commitments include a major timetable recast of all their services, coinciding with new domestic services on High Speed One, from December 2009. Capacity on other services is expected to be maintained at broadly current levels.

The South London Route Utilisation Strategy (RUS), published in March 2008, recommended a programme of train and platform lengthening on suburban routes into Charing Cross and Cannon Street. The RUS recommended that peak services on these routes should be lengthened from 10-car to 12-car by 2011. This is entirely consistent with HLOS requirements.

Work has now commenced on the Kent RUS, which will be finalised by the end of 2009. This will provide a longer term strategy for future development of the Kent route.

The Kent route connects the UK freight network to Europe via the Channel Tunnel, to Thamesport on the Isle of Grain and contains a variety of other freight terminals.

Today's route

The principal elements of the Kent route are described below. The relevant Strategic Route Section is shown in brackets:

- the main line from Victoria/Blackfriars to Swanley (01.01) (two tracks via Herne Hill and two via Catford), where this splits into separate lines to Ramsgate via Medway (01.10) and Ashford via Maidstone East (01.06), with a connection via Bat and Ball to Sevenoaks (01.02);
- the main line from Cannon Street/Charing Cross to Tonbridge (01.03, 01.04, 01.05), where this splits into routes to Hastings (01.07) and Ashford (01.17);
- suburban lines into Victoria/Blackfriars (01.01) via Herne Hill, Catford and Lewisham (via Nunhead). These share tracks with main line services;
- suburban lines into Cannon Street/Charing Cross. Suburban services are mainly routed through Greenwich or Lewisham (01.08), which has lines to Hayes, Dartford (via Woolwich), Dartford (via Bexleyheath) and Dartford (via Sidcup). At Dartford these lines merge and continue on to join the main Medway line near Rochester (01.10);
- lines east of Ashford to Ramsgate (via Dover) and Ramsgate (via Canterbury West), and the Faversham to Dover line (01.14);
- connections to High Speed One;
- freight only lines to the Isle of Grain and Dungeness (01.16);
- the Redhill to Tonbridge line (01.11);
- the Sheerness-on-Sea branch (01.12), the Medway Valley line (01.13) and Hastings to Ashford line (01.15); and
- the branch line between Grove Park and Bromley North (01.09).

Current passenger and freight demand

Passenger demand predominates throughout the major areas of the Kent network. The principal feature is commuter flows to central London from the major population centres, leading to widespread peak period overcrowding.

A significant portion of demand is for the sizeable short distance commuting flows on main line services to London from stations such as Lewisham, Dartford, Orpington, Sevenoaks and Bromley South.

Services are in competition with the highway network, especially the main A2/M2, A20/M20 and A21 roads, all of which can be severely congested.

Demand for non-London services is focussed on the major towns, including the Medway towns, Maidstone, Ashford, Canterbury, Tunbridge Wells, Ramsgate and Dover.

Many of the current travel patterns require passengers to interchange onto other rail, underground, Docklands Light Railway (DLR) or bus routes to complete their journey. Many of these also have limited capacity, currently suppressing journeys on certain routes. Key interchanges are Victoria (Victoria and District/Circle lines), London Bridge (Jubilee, Northern lines, Southern and First Capital Connect), Charing Cross (Bakerloo and Northern lines), Waterloo East (South West Trains and Jubilee line), Lewisham (DLR), Greenwich (DLR) and Bromley South (bus).

Volumes of Channel Tunnel freight are now starting to recover but remain at a level significantly below

the allocation of paths that are reserved for this purpose. Freight services from other locations are generally showing some modest growth, particularly in aggregates. Aggregates termini at Battersea/Stewarts Lane and Angerstein serve the market for central London construction materials, in addition to there being a number of terminals in Kent. Ports and heavy industry in the Thames/Medway corridors are the other main generators of freight demand.

Current services

Figure 1 and Figure 2 show the current level of service to London from principal stations.

The main operator on the Kent route is Southeastern. Passenger services are also operated on the route by First Capital Connect, Eurostar and Southern Railway.

The passenger service structure is complicated by the complexity of the network, the different stopping patterns and the existence of several London termini. The main lines via Swanley and Orpington can, to some extent, be considered separately though there are linkages between them:

- main line services via Swanley generally run to Victoria (via Herne Hill), though there are also some services to Blackfriars, Cannon Street and Charing Cross;
- stopping suburban services via West Dulwich generally run from Orpington to Victoria;
- suburban services via Catford generally run from Sevenoaks (via Swanley) to Blackfriars;
- main line services via Orpington all run to a mixture of Charing Cross and Cannon Street;

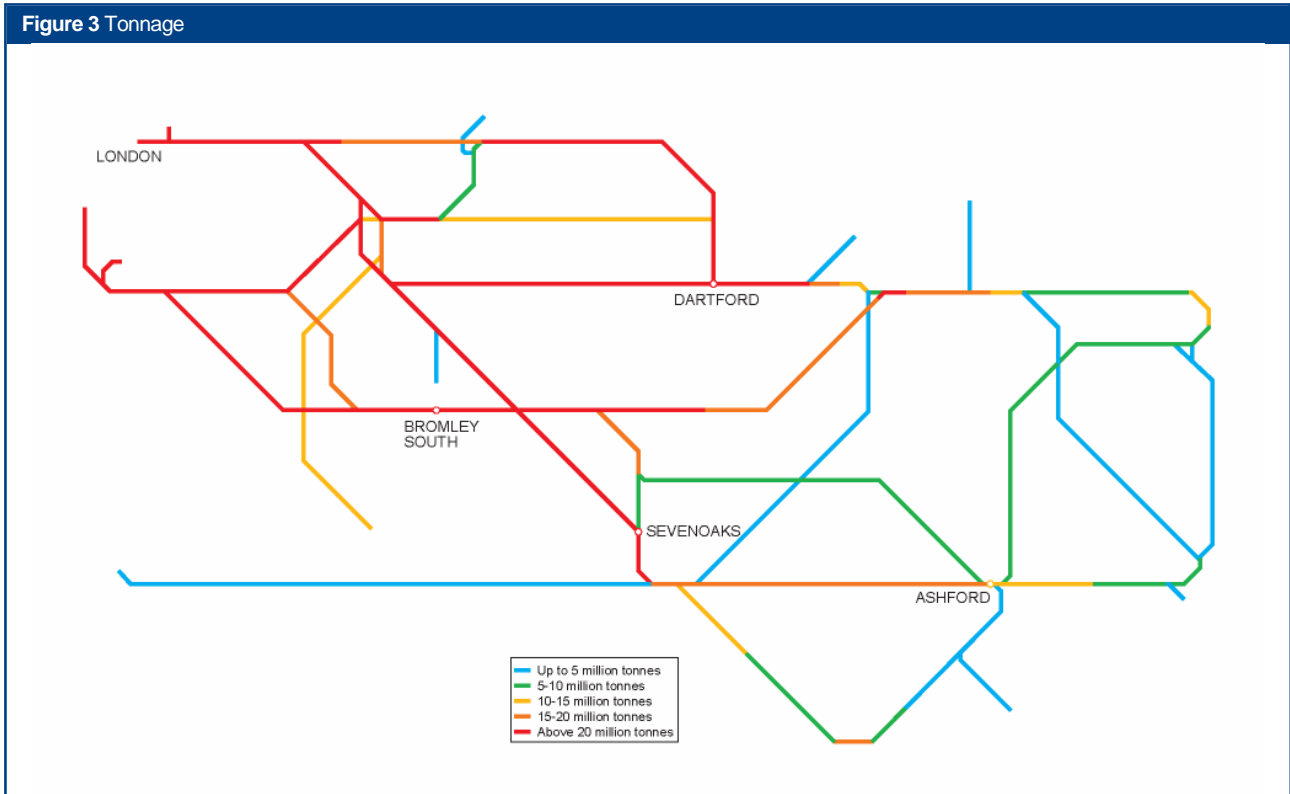
Figure 1 Chatham Lines – current train service level (trains per hour)

Station	Victoria	Blackfriars	Cannon Street or Charing Cross
Chatham fast (via Sole Street - not calling)	3 peak/2 off peak	None	3 peak/0 off peak
Chatham slow (via Sole Street)	2 peak/2 off peak	1 peak/0 off peak	None
Maidstone East	3 peak/2 off peak	1 peak/0 off peak	0 peak/1 off peak
Sevenoaks (via Swanley)	None	3 peak/2 off peak	None
Bromley South	9 peak/6 off peak	7 peak/2 off peak	None
Herne Hill (excluding FCC services)	6 peak/3 off peak	2 peak/0 off peak	Not applicable
Catford	None	4 peak/2 off peak	Not applicable

Figure 2 Tonbridge/Dartford Lines – current train service level (trains per hour)

Station	Charing Cross	Cannon Street	Victoria
Tunbridge Wells	4 peak/2 off peak	1 peak/0 off peak	None
Chislehurst	4 peak/2 off peak	3 peak/0 off peak	None
Sidcup	6 peak/2 off peak	3 peak/2 off peak	None
Bexleyheath	5 peak/2 off peak	3 peak/0 off peak	3 peak/2 off peak
Greenwich	3 peak/2 off peak	3 peak/4 off peak	Not applicable
Hayes	3 peak/2 off peak	3 peak/2 off peak	None

Figure 3 Tonnage



- suburban services via Lewisham mostly run to a mixture of Charing Cross and Cannon Street, though there is also a service to Victoria via Nunhead; and
- suburban services via Greenwich generally run to a mixture of Charing Cross and Cannon Street.

The Kent domestic passenger routes are mainly served by a mixture of new and midlife electric multiple units, with varying characteristics.

The London suburban area train fleet is designed to maximise overall carrying capacity. Most vehicles have high density seating configurations, some have had the seats located nearest the doorways removed to maximise standing space.

The Ashford to Hastings line is served by modern diesel multiple units, with services running through to Brighton.

Freight services are operated by English Welsh and Scottish Railway, Freightliner, First GBRf, Fastline Freight and Direct Rail Services. The main freight flows in Kent are operated mostly by a mixture of class 66 diesel and class 92 electric locomotives.

The main freight markets are to the Channel Tunnel (around 10 trains per day), Isle of Grain (7-8 tpd), Hoo Junction (4-5 tpd), Angerstein (3 tpd), Battersea/Stewarts Lane (2-3 tpd), Medway/Isle of Sheppey (2 tpd) and Mountfield (1-2 tpd).

The line via Maidstone East, Catford and the West London Line (on Route 2) is the major route for Channel Tunnel freight across London, connecting into the major lines beyond. Approximately 30-40 percent of this traffic is W9 gauge (3-4 tpd).

Figure 3 shows the total annual tonnage levels on the route.

Traffic volumes are summarised in Figure 4.

Figure 4 Current use

	Passenger	Freight	Total
Train km per year (millions)	31	2	32
Train tonne km per year (millions)	8,544	1,140	9,684

Current infrastructure capability

The following maps set out the capability of the current network.

Figure 5 Linespeed

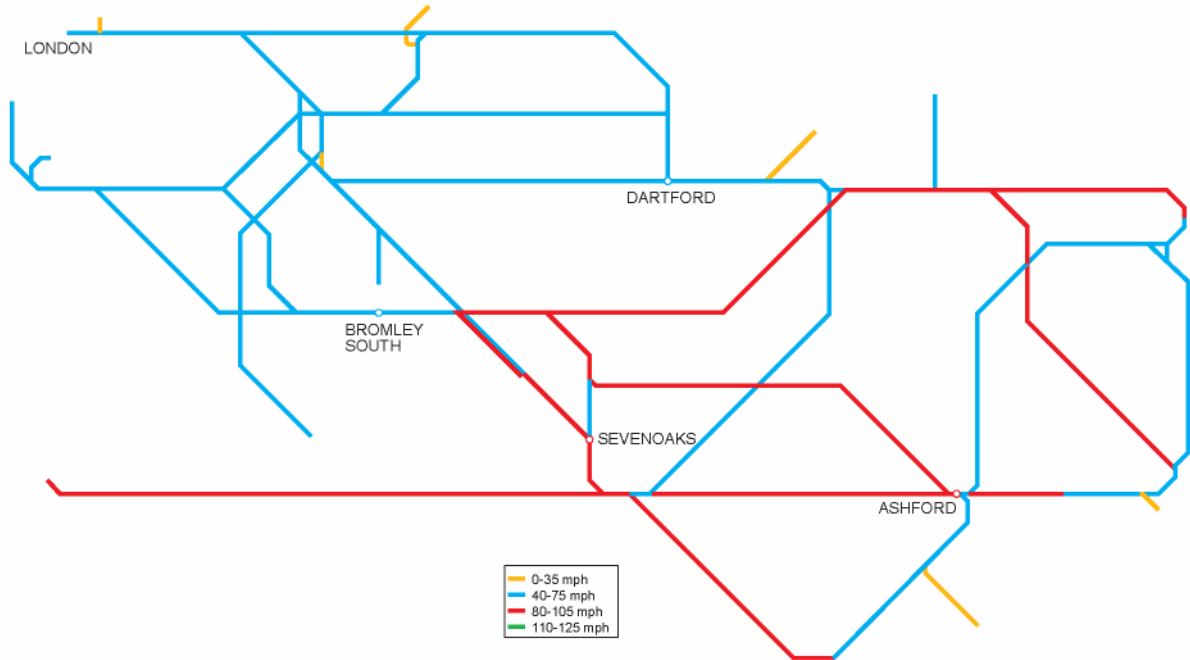


Figure 6 Electrification

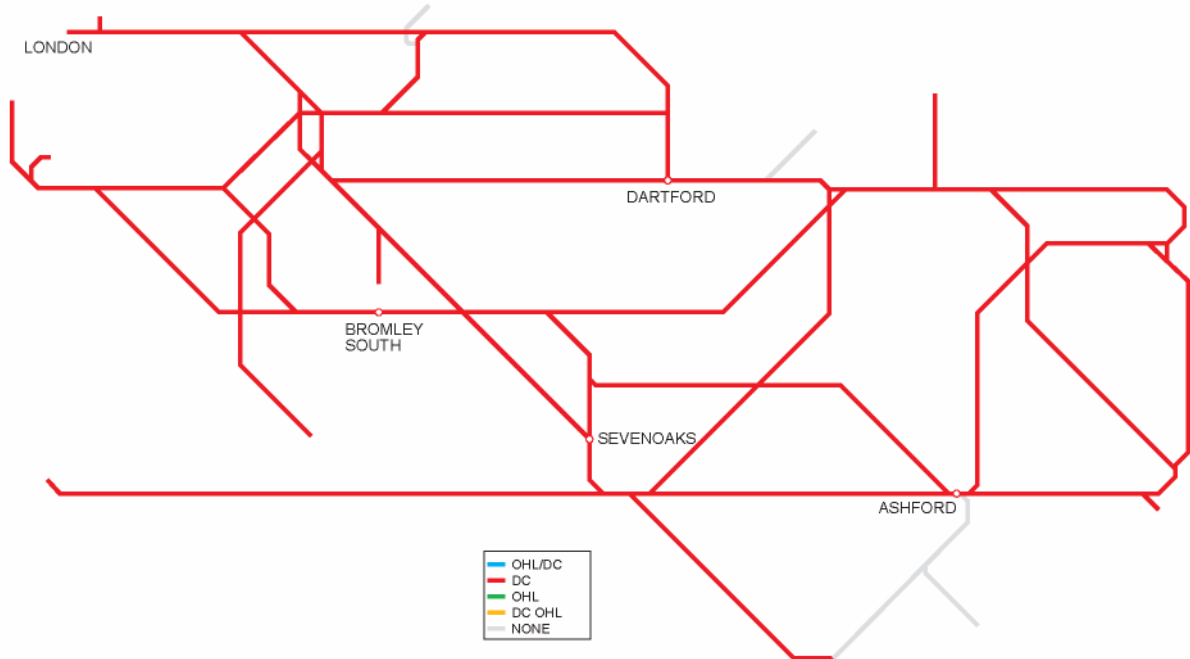


Figure 7 Route availability

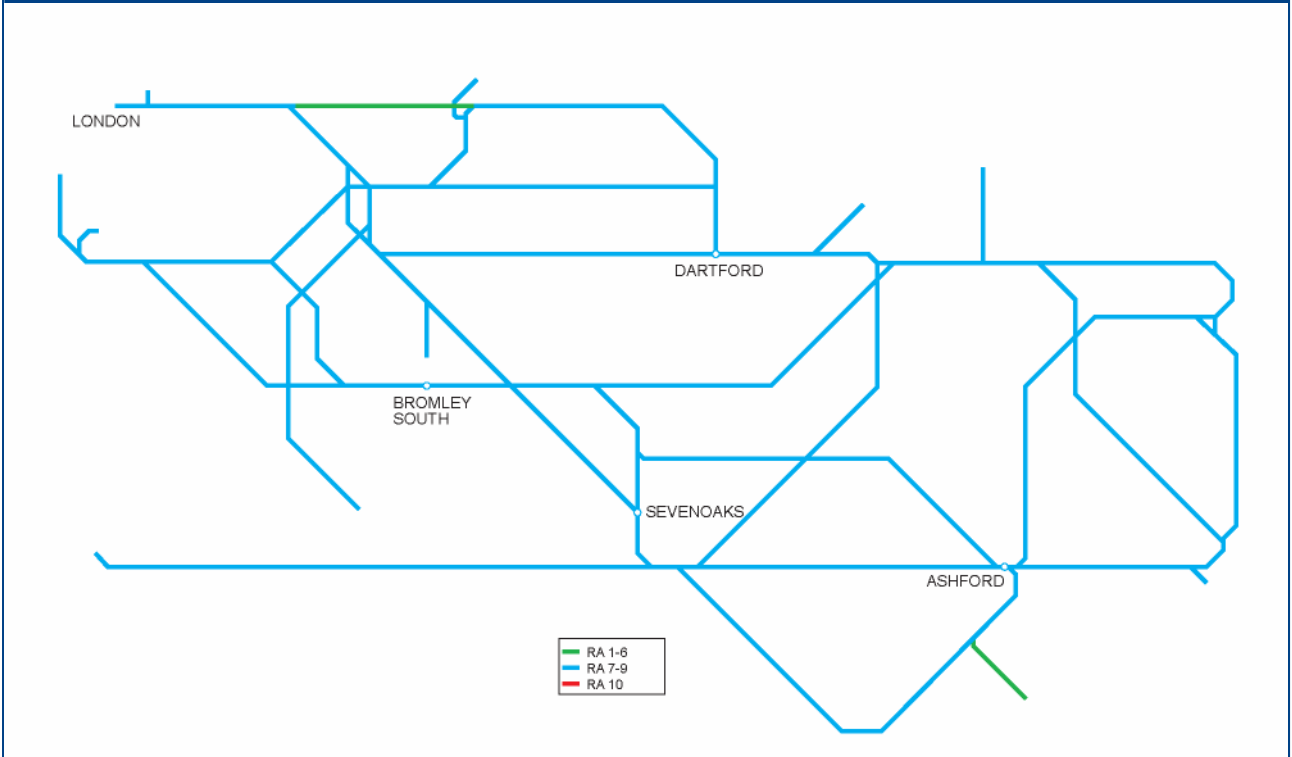
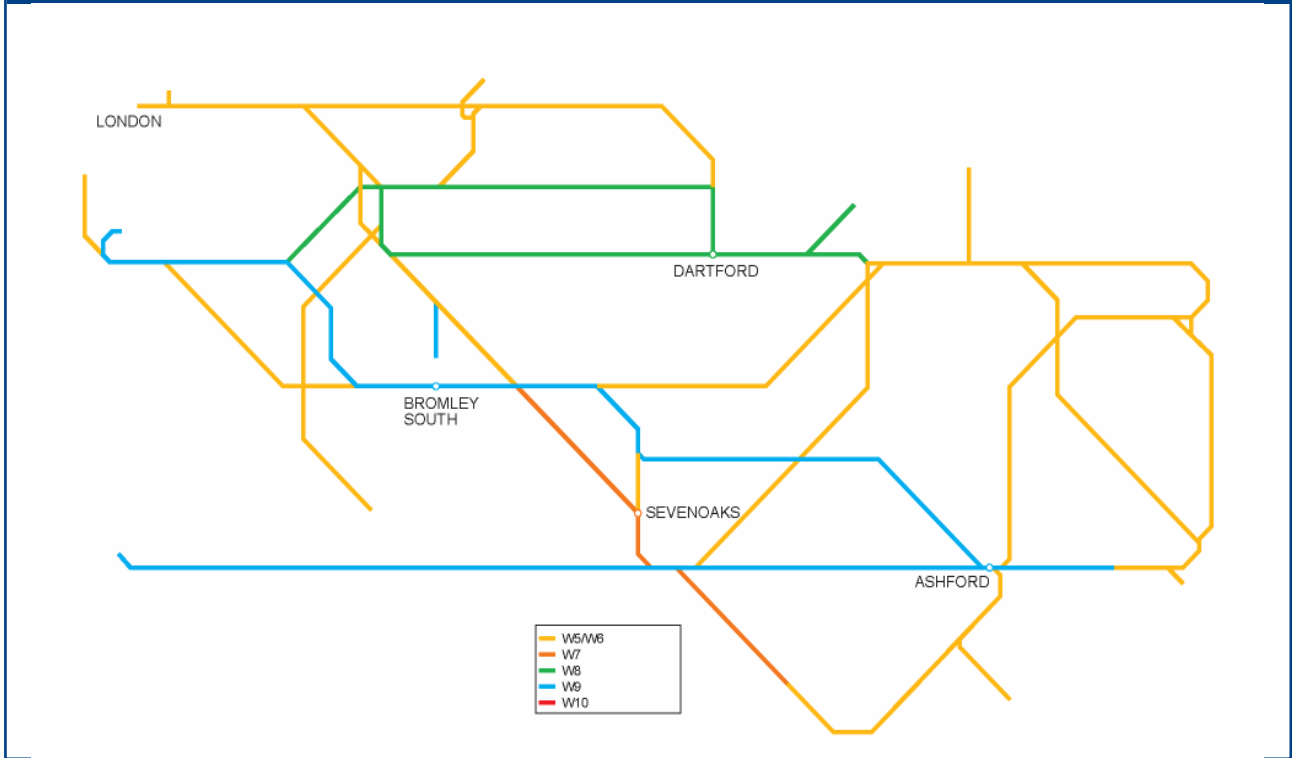


Figure 8 Gauge



Current capacity

The critical sections of the Kent route are operating near capacity for several hours each day. This is governed by a mixture of constraints, primarily limited capacity in the central London area.

Key constraints for passenger services are highlighted below. Those at the start of this list apply to both Kent route and First Capital Connect services (on the Sussex route) as these share tracks through the critical London Bridge area:

- the restrictive layout of the approaches to London Bridge, with numerous conflicting moves between the different service groups across a series of flat junctions;
- the limited number of through platforms at London Bridge, especially on the Charing Cross line where all stopping London bound trains have to be timetabled through Platform 6, the busiest railway platform in Europe;
- the two track low speed section from London Bridge to Metropolitan Junction;
- a mix of fast and stopping services on the two track section in the Herne Hill area, exacerbated by the flat crossing with the north – south Thameslink route;
- the flat junctions in the Lewisham and Hither Green areas;
- the limited number of platforms at Charing Cross;
- a mix of fast and stopping services on the mainly two track section between Orpington and Tonbridge;
- limited overall stabling capacity on the route, especially near London terminals;
- power supply restrictions on the Hastings line, requiring trains to attach and detach at Tunbridge Wells or Tonbridge. This is exacerbated by the track layout on the route with several single track sections through gauge restricted tunnels;

- ten car platforms on suburban services from Charing Cross and Cannon Street, together with power supply limitations preventing train lengthening;
- eight car platforms on suburban services from Victoria and Blackfriars;
- four car platforms at Clapham High Street and Wandsworth Road, restricting which services can call at these stations; and
- passenger congestion at key stations such as Charing Cross, Waterloo East, Victoria, London Bridge, Bromley South and Lewisham.

Key constraints for freight services are:

- there are very few locations between freight terminals in Kent and the Wembley area where it is possible for freight services to be looped or regulated;
- freight services generally have to cross from the Atlantic lines to the Catford Loop lines at Crofton Road Junction. This is a low speed move which introduces performance risk;
- the type of traffic that can be accommodated by freight services is restricted by the loading gauge, for example with numerous bridges and structures limiting the routes to the Grain branch to W8 capability;
- freight services are restricted by trailing load limits, with longer freight trains not being compatible with existing infrastructure; and
- the absence of any suitable diversionary route, avoiding the Catford/Maidstone East areas, which can be used for electrically hauled W9 gauge Channel Tunnel freight services.

Figure 9 shows the current train service level in key sections of the route.

Figure 9 Current train service level (peak trains per hour)

Route Section	Number of trains
London Bridge – Metropolitan Junction	28
London Bridge – Cannon Street	25
Sevenoaks – Orpington	14
all trains via Lewisham	21
all trains via Herne Hill	18

Figure 10 Current all day PPM MAA (2007/08)

TOC	MAA	As at period
Southeastern	90.4%	12
First Capital Connect	90.4%	12
Southern	89.4%	12

Current performance

Figure 10 shows recent PPM figures for the main TOCs running along the Route.

Train performance on the Kent Route is currently running at around equal to the national average, with Southeastern achieving a further year of performance improvement.

The reliability of assets under direct Network Rail control has continued to improve. The improving condition of signalling infrastructure has produced particular benefits, with a significant and ongoing reduction in points failures, track circuit failures and signal failures. Kent has also experienced its lowest ever total of broken rails in the past 18 months, which has manifested itself in a reduction in the number of high impact performance incidents involving track related defects.

The Kent route has been significantly affected by many adverse weather events throughout the last year. Particular incidents have occurred in connection with heavy rain (which has flooded lines and – as a result of continuing over sustained periods – led to embankments becoming saturated and destabilised), ice and snow (both of which cause traction current problems and can overwhelm points heating systems) and high winds (which has led to many occasions of lines being blocked by fallen trees). Kent has also been affected by the high winds, which led to the line being blocked by several fallen trees.

The critical London Bridge approaches have experienced several extremely disruptive events in recent times, over which the rail industry has only a limited influence. The worst of these incidents have involved complete closure of all lines for extended periods following fires adjacent to, or in arches beneath, the railway due to explosive risks resulting from acetylene cylinders.

The route has implemented measures to ensure improved service recovery and has refined its contingency plans based on the experience of previous incidents in order to mitigate the effect of these when they occur.

Section 2: Tomorrow's railway

HLOS output requirements

Figure 11 Total demand to be accommodated by Strategic Route

Routes	Annual passenger km forecast in 2008/09 (millions)	Additional passenger km to be accommodated by 2013/14 (millions)
Kent	3,350	333

Figure 12 Peak hour arrivals to be accommodated by Strategic Route

London Terminals	Peak three hours			High peak hours		
	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)
Blackfriars (via Elephant & Castle only)	21,900	3,500	67	11,200	1,200	76
London Bridge (includes Charing Cross/Cannon Street /Blackfriars and terminating services)	127,600	12,600		65,200	7,800	
St. Pancras (includes MML services)	25,900	10,900		13,100	5,700	
Victoria (includes Sussex services)	58,700	5,300		29,300	2,800	

Future demand

The DfT's South Eastern Regional Planning Assessment (RPA) for the railway, published in January 2007, provided an assessment of the future demand growth on the route. Total peak period passenger demand was forecast to grow by 17 percent to 2016 and 24 percent to 2024 over the 2002/03 level.

For the London suburban area, a detailed assessment of future demand patterns was carried out as part of the South London RUS. This work highlighted that passenger numbers on these services will grow at around 15 percent within the RUS period. However it identified that existing demand is suppressed by typically 10 percent (due to current overcrowding levels), leading to a potential overall growth rate of 25 percent.

For main line services our understanding of demand is based on the RPA and assessments that were undertaken during the SRA's Integrated Kent Franchise process. These will be updated as we develop the Kent RUS.

Demand from the Thames Gateway, Ashford and parts of east Kent is expected to grow very quickly, in line with considerable housing growth recommended by the South East Plan. It is expected that the new fast services to St Pancras International will accelerate this effect significantly.

On the classic main line network strong London commuter growth is particularly evident in the Tunbridge Wells area.

The morning and evening peak commuter periods into London have historically dominated the Kent railway network and will continue to do so. However there is also ongoing strong growth at off-peak times, for example in shopping and leisure trips on Sundays. Non-London flows are also growing, for example there has been a rise in the demand for travel between Ashford and Canterbury West.

The planned major increases in capacity at Victoria underground station and on the Victoria Line are likely to encourage additional peak period demand on services into the main line station. At present, some journeys are made via alternative routes to avoid the underground.

The planned construction of several new high rise developments in the City of London, with the tallest at London Bridge station itself, is likely to lead to a significant increase in demand for services to London Bridge, Cannon Street and the Thameslink core stations.

The continued development of the Docklands area and London Olympics site is also likely to lead to an increased interchange to the DLR at both Lewisham and Greenwich and to passengers interchanging to the Jubilee Line at London Bridge. The DLR extension to Woolwich will lead to interchange for services to the developing Royal Docks and to London City Airport.

The planned northern extension to the East London Line is likely to lead to an increase in demand for interchange to ELL services at New Cross. The potential western extension to Clapham Junction would lead to significant new journey opportunities from parts of the Kent route.

With implementation of the Crossrail project now a committed scheme (subject to planning approval), Abbey Wood will eventually become a significant interchange. There could therefore be a reduction in demand from this point eastwards for services running via London Bridge.

The growth in passenger numbers is likely to result in increased car parking capacity becoming necessary at certain stations. This will have interfaces with the land use and transport policies of the relevant local authorities.

The Freight Route Utilisation Strategy was published by Network Rail in March 2007 and established by the Office of Rail Regulation in May 2007. A key input was a set of demand forecasts that were agreed by the industry through the RUS Stakeholder Management Group. The actual rate of growth will depend on economic growth, transport policy, the pricing structure for Channel Tunnel freight and the success of railways in France and beyond in attracting long distance freight flows.

There are well developed plans, recently granted planning approval, for the development of a new freight terminal at Howbury Park (near Dartford). This has potential to encourage new freight flows onto the rail network. There is also a proposal at an earlier stage of development for a terminal at Hollingbourne (on the Maidstone East line).

Provision of suitable freight paths over the South and West London Lines, connecting the Kent network with the rest of the UK, are a critical factor in facilitating future freight growth.

There may be demand for freight services to Europe via High Speed One at some stage, since this route is the only European Gauge (UIC GB+) route in the UK and is also the only crossing of the river Thames usable by freight services east of the West London Line.

Section 3: Proposed strategy

Figure 13 summaries the key milestones in delivering the proposed strategy for the route.

Further explanation of the key service changes and infrastructure enhancements are set out in the following sections.

Figure 13 Summary of proposed strategy milestones

Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
March 2009	Thameslink Programme Key Output 0	Closure of Blackfriars bay platforms to permit Thameslink construction works to proceed	Services currently terminating at Blackfriars will be extended through the Thameslink core, taking over the paths of FCC services which currently run from Moorgate. Detailed planning is in progress. This will seek to ensure robust operations and to mitigate against any potential adverse performance impacts that are identified.
December 2009	New Southeastern timetable	Completion of route clearance and depot works to allow domestic services to use the High Speed line. Tunbridge Wells 12-car turnback Shakespeare Tunnel clearance	Implementation of a completely new timetable for the Kent route to meet Southeastern's updated SLC2 franchise commitments, maintaining broadly existing levels of capacity into established London terminals.
December 2011	12-car suburban operations (first phase)	New Cross track layout changes Dartford track layout changes Stabling capacity and depot modifications Several other minor infrastructure enhancement schemes	12-car services on suburban routes into Charing Cross and Cannon Street
December 2011	Thameslink Programme Key Output 1	Blackfriars remodelling Farringdon remodelling Herne Hill 12-car turnback	12-car services through the Thameslink core
December 2011	South London Line service changes	None	Implementation of a Victoria Eastern to Bellingham service Extension of ELL services to Clapham Junction (subject to funding)
December 2012	12-car suburban operations (second phase)	Gravesend remodelling Rochester 12-car turnback Stabling capacity and depot modifications Clapham High Street and Wandsworth Road platform lengthening	12-car services on additional routes into Charing Cross 8-car services between Victoria Eastern and Bellingham

Figure 13 Summary of proposed strategy milestones

Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
December 2012	Start of London Bridge remodelling	Reduction in capacity through London Bridge to allow construction works to proceed.	Potential temporary service reductions to facilitate long term works to re-configure the station
2011-2013	Kent outer train lengthening	8-car platform extensions on the Maidstone East line 12-car platform extensions on the route via Sole Street	Longer trains into London
December 2015	Thameslink Programme Key Output 2	Completion of the Thameslink Programme.	Increase in through capacity via London Bridge
December 2015	Frequency increase on Herne Hill route	None required. Would be facilitated by rerouting Brighton – Bedford services via London Bridge upon completion of the Thameslink Programme.	Increase in fast or stopping services on the route via Herne Hill

Strategic direction

The Kent route will undergo a significant period of change over the next 10 years. The most obvious of these will be domestic services operating on High Speed One and the commencement and completion of construction works for the Thameslink Programme.

As part of the Strategic Freight Network, there is provision in CP4 for the development of an alternative route enabling Channel Tunnel freight traffic to run via Redhill and Reading and beyond. The scheme will offer a route from the Channel Tunnel to the Midlands and the North West which avoids congested routes in the London area.

In parallel with these major projects, significant timetable changes will be required to implement Southeastern's franchise commitments, to facilitate Thameslink Programme construction works and to implement the RUS strategy.

The South London RUS identified that train and platform lengthening will be the major means of delivering growth in the London suburban area. Whilst work on the Kent RUS has only just commenced it is envisaged that a similar strategy will be recommended for at least some of the main line routes.

The most significant infrastructure enhancement requirements for CP4 are therefore:

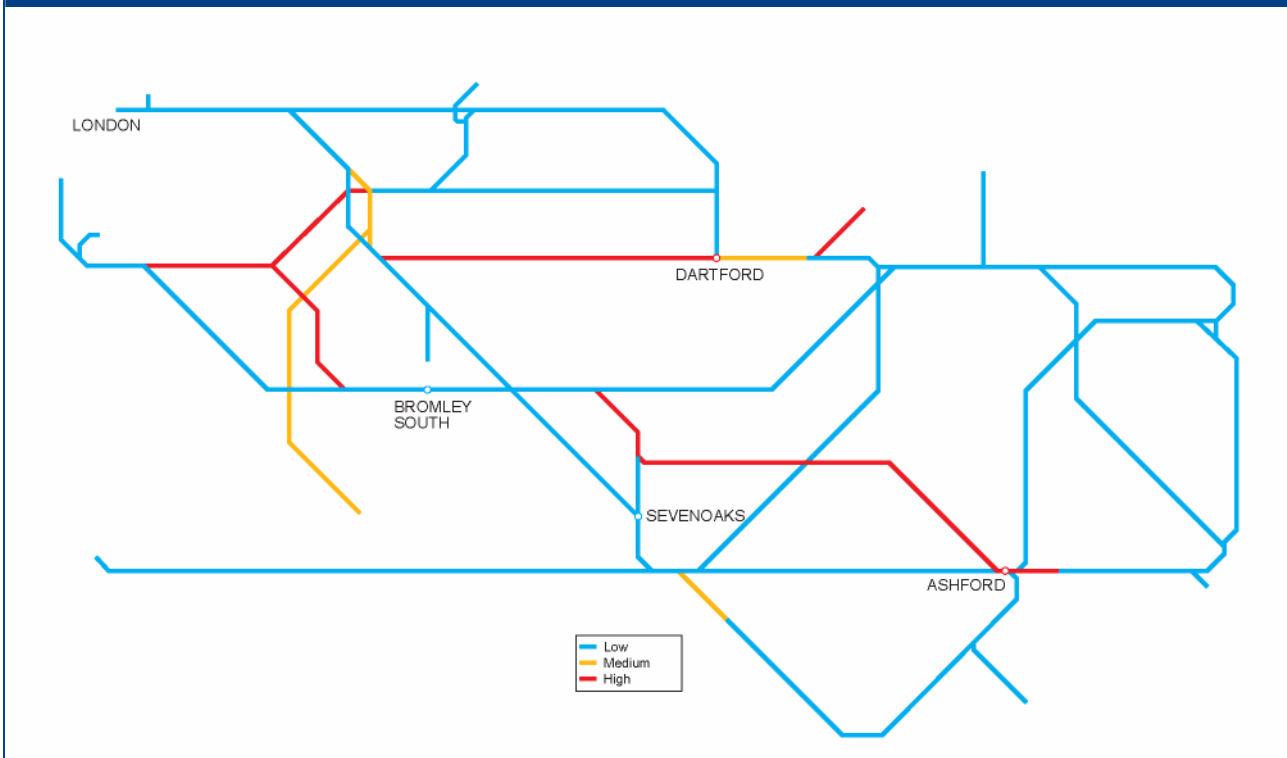
- implementation of the Thameslink Programme;
- 12-car suburban services on the Sidcup, Bexleyheath, Hayes, Greenwich/Woolwich and Sevenoaks (via Chislehurst) lines, as recommended by the RUS;
- additional eight and 12-car operations on Kent main line services.

The lengthening of services via London Bridge needs to be complete prior to construction works affecting the through platforms to help mitigate against any loss in train paths during the works.

The key timetable changes required on the route will be driven by the following:

- modifications in March 2009 to permit the closure of the Blackfriars bay platforms;
- a new timetable has been specified from December 2009 for the whole of the Kent route, incorporating the commencement of services to the Medway and East Kent areas via the High Speed Line;
- changes and possible reductions in service levels will be necessary post-2011 to facilitate remodelling works at London Bridge. This issue will present a very serious challenge for the route;
- a new timetable will be required in 2015 to allow the final 24 tph Thameslink service to operate.

Figure 14 Tonnage growth



Future train service proposals

Figure 14 indicates the forecast percentage change in tonnage to 2017.

The domestic services on the High Speed line to St Pancras International and the construction works for and subsequent completion of the Thameslink Programme will lead to opportunities for new train routeings.

High speed services will operate from the Medway and East Kent areas to St Pancras International. These will offer new journey opportunities from these areas. Services will be operated by advanced units, designed for operation over both the High Speed line and rural routes.

Services from the Thameslink core will operate to various suburban and longer distance destinations on the Kent route. The precise destinations are likely to be driven by operational practicability as much as passenger demand, especially until the final works are complete. The need to minimise station dwell times in the Thameslink core will be a critical factor. These trains will operate both south and north of the Thames and will therefore be both AC and DC equipped.

Future capability

The key infrastructure capability issues are related to train lengthening requirements. Much of the platform lengthening works will require minor associated works such as relocation of Driver Only

Operation equipment and signals. Certain sites will require more significant work such as track layout changes or bridge reconstruction.

Any 12-car services operating into Charing Cross will need to have at least some Selective Door Opening capability, to enable use of platforms 3 to 6 where only 11 cars can be accommodated in the platforms. Increased SDO capability may be required elsewhere on the Kent route.

Despite the recent completion of significant power supply upgrade work, there remain a number of outstanding power supply issues in the Kent area where further investigation is required. Regenerative braking remains a key aspiration of passenger and freight train operators, and a project is under development to provide this capability.

Increasing linespeeds is not an immediate priority for the route, since journey times in general are more affected by stopping patterns than maximum speeds. However, increasing the speeds at which St Pancras services can operate once they leave the high speed line is a key aspiration. Some minor linespeed improvements along the Kent Coast are being provided by the East Kent resignalling scheme. Further opportunities will be explored as other renewals become due.

Operational procedures have been developed for the narrow bore Shakespeare Tunnels (located between Folkestone and Dover). Together with

some minor physical works this will enable Dover to be served by High Speed Line services.

Plans are being developed to close the Folkestone Harbour branch in CP3. This is in poor condition and does not receive a timetabled train service.

The following capability issues have been identified regarding Channel Tunnel freight routes:

- the route via Redhill (on Route 2) is not cleared for the operation of class 92 electric freight locomotives. This route provides the only W9 gauge diversionary route to the Channel Tunnel when the route via Wandsworth Road and Maidstone East is unavailable, so diesel locomotives need to be used on such occasions at present. Allowing class 92 hauled freight to operate via Redhill would require works to the signalling system, together with some power supply reinforcement. It is envisaged that the work necessary would be delivered in conjunction with appropriate renewals at some stage; and
- the route via Sevenoaks is cleared for class 92 locomotives but is not cleared for W9 gauge traffic. Increasing the gauge on this route would require very expensive and disruptive works, including track lowering in Sevenoaks tunnel. The business case for this scheme currently looks weak due to the high level of costs involved and the more efficient alternative described in the bullet point above.

Future capacity

The South London RUS highlighted that the route is operating close to the maximum number of trains that can be run in peak periods at present. In the short term services will therefore be maintained at broadly current levels from most areas.

The additional capacity provided by the High Speed line will provide benefits to the wider network, since the re-routing of most fast services from the Medway and East Kent areas onto it will free up capacity closer to London for use by more local services.

We are working to ensure that the December 2009 timetable change is compliant with our operational planning rules (Rules of the Plan), with appropriate junction margins and timings being applied. The potential impact upon capacity through existing infrastructure constraints, such as the London Bridge area, will require consideration as part of this work.

The South London RUS highlighted that up to around 100 additional vehicles would be needed to implement 12-car suburban operations as far as

Dartford. If 12-car operation were extended to beyond Dartford, around a further 20 vehicles could be needed. Additionally, there is potential for some lengthening of main line services in CP4, which could require 20 or more additional vehicles. This is broadly consistent with the DfT's rolling stock strategy, published in January 2008. This highlighted that 110 additional vehicles will be provided to Southeastern and 256 new vehicles – some of which will operate onto the Kent route – will be provided to First Capital Connect.

Increasing train lengths will require an increase in SDO capability, at least for any services into Charing Cross as highlighted above. Implementation of the Thameslink Programme will require an increase in AC/DC dual voltage rolling stock on the route. The final rolling stock strategy will need to take account of similar train lengthening objectives on Routes 2 (Sussex) and 3 (South West Main Line) in order to achieve the most efficient deployment of new and existing rolling stock.

Increasing train lengths will require works in depot facilities, to accommodate both the increased train lengths and the additional units.

In CP5 completion of the Thameslink Programme will provide enhanced capacity, and may allow some additional services to operate, but it is likely that the majority of services will be substitutions of trains to alternative termini. This is because no affordable way has yet been identified to provide extra capacity at critical locations such as Lewisham and over the Orpington to Tonbridge two-track section.

The signalling headways in Kent are generally considered adequate. Headways are rarely the limiting factor on the numbers of trains that can be run on this route, which is primarily governed by the occupancy of junctions and platforms, especially in the London area.

The SL RUS described how certain stations will require works to enable them to cope with the predicted growth in passenger numbers:

- Charing Cross station is very congested with no space available for expansion. It may be necessary to relocate some retail outlets on the concourse to provide an increase in the circulation space. In the longer term development of the Embankment end of the station could potentially provide additional capacity;
- Waterloo East station is very congested and similarly the station site is constrained by the space available. It is not practical to fit ticket barriers unless passenger numbers using the

main station link bridge can be reduced or the available space increased in some way. The South London RUS recommended provision of a new entrance, adjacent to Southwark underground station. This would provide improved access to the local area and remove some passengers from the link bridge;

- Victoria station is very congested, particularly the interchange with London Underground. Options for increasing passenger capacity are under development by the Victoria Masterplan project. This project has a significant interface with plans by London Underground to expand the underground station which will ease the situation;
- London Bridge station is very congested. This will be addressed by the Thameslink programme;
- Blackfriars station is very congested at peak times. This will be addressed by the Thameslink programme;
- Bromley South station is very congested at peak times. Work is currently ongoing to identify an appropriate solution; and
- Lewisham station is very congested at peak times. Work is currently ongoing to identify an appropriate solution.

The Kent RUS will take a longer term view of the capacity on the route needed following the completion of the Thameslink Programme. It will investigate further interventions if needed to meet the predicted demand.

Future performance

Southeastern

Southeastern's train performance is currently 90.4 percent PPM MAA. This figure is forecast to rise to 91.7 percent by April 2009 as an outcome of the 2008/09 Joint Performance Improvement Plan (J-PIP), which focuses on several aspects of railway operations.

The J-PIP is complemented by ongoing elements of the "Project Valentine" initiative, which focuses on the identification of performance problems associated with critical services. This is designed to

improve train service operations through the detailed investigation of problems and implementing corrective actions.

The key performance issues and opportunities for this route have been identified as:

- achieving a reduction of the impact on railway operations of trespass, vandalism and fatalities;
- delivering further improvement to autumn management and that of other seasons;
- the introduction of the high speed domestic service from St Pancras;
- robust management of each of the timetable and service pattern changes over the coming years;
- an improved system for isolation of traction supply to improve possession productivity and delay per incident;
- robust planning for the delivery of Thameslink Programme engineering work;
- upgrading of the signalling system in East Kent; and
- accommodating the increase in cross-route traffic upon completion of the Thameslink programme.

Analysis suggests that Southeastern's performance by April 2014 will be around 93.74 percent PPM. This figure is consistent with Southeastern's franchise commitments but our forecasts exclude any adverse impact from the Thameslink construction works, since this cannot yet be quantified.

The other operators on this route are Southern and First Capital Connect. Their future performance assessments can be found in the Route 2 plan.

Figure 15 sets out the planned PPM for each train operator. Figure 16 sets out the trajectory we propose as local commitments with each operator. These are lower than planned given the need for flexibility in achieving the HLOS targets and to reflect the greater uncertainty and risk associated with projecting performance at a disaggregated level. Reasonable requirements will finally be

Figure 15 Forecast PPM MAA - CP4 plan

	2009/10	2010/11	2011/12	2012/13	2013/14
Southeastern	91.7%	92.2%	92.2%	92.5%	92.8%
FCC	89.9%	90.4%	90.7%	91.1%	91.4%
Southern	90.7%	91.0%	91.2%	91.7%	92.0%

Figure 16 Forecast PPM MAA - proposed local commitments

	2009/10	2010/11	2011/12	2012/13	2013/14
Southeastern	90.4%	91.0%	91.0%	91.3%	91.6%
FCC	88.9%	89.4%	89.6%	90.0%	90.4%
Southern	89.0%	89.3%	89.6%	90.0%	90.4%

established for CP4 in our 2009 Business Plan.

Engineering access

Engineering access on the route is largely managed by a cyclical possessions regime, with two tracks being able to be kept open to traffic for most types of maintenance work on four track sections.

Overnight maintenance opportunities on this route are particularly short, primarily due to the very high passenger demand for trains leaving London late in the evening (rendering the unpopular option of bus substitution impractical in most cases). This results in midweek possessions generally lasting no more than four hours, severely limiting the types of activity that can be carried out on weekdays and significantly increasing overall maintenance costs.

Planned cyclical maintenance is carried out both on weeknights (within the constraints described above and subject to provision for freight traffic) and using weekend possessions. The pattern of weeknight access, which has evolved in response to timetable requirements, seeks to provide maintenance opportunities on the main line based on a rolling 6 to 10 week cycle which is frequently modified in response to renewal projects. This provides a variety of different possession periods across the route from as little as two hours in the Dartford area, to as much as seven hours on the less intensively used lines.

Demand for weekend services, although generally lower than on weekdays for most of the year, is rising quickly. Most major items of engineering work are at present normally scheduled to be carried out on Sundays (or in some cases on Saturdays) as this affects lower numbers of people. The national "Seven Day Railway" initiative is investigating an appropriate balance between weekend engineering work and journey opportunities. It is expected that the Kent RUS will highlight relevant local issues and opportunities.

Long term opportunities and challenges

The route will be affected by some significant and challenging engineering projects over the next few years in order to meet HLOS objectives. Careful planning is underway for these schemes to minimise any adverse impact.

The period between December 2009 and the completion of the Thameslink Programme in 2015 will be a period of significant change on the route. In particular, the London Bridge construction works (commencing shortly after the Olympics) are likely to have major capacity and performance implications. Whilst design work is still ongoing, it is probable that these works will lead to temporary reductions in capacity at a time when passenger demand is higher than at present and continuing to rise. Detailed planning will be necessary to ensure that an appropriate level of train service can be reliably operated. The phasing of work in the London Bridge area will be a critical issue for the route.

Up to the end of CP5, we believe that the solution to passenger growth and future capacity requirements will be met by a combination of several initiatives:

- ensuring timetables are optimised around critical constraints to maximise the number of trains that can be operated;
- ensuring that the High Speed line is fully utilised;
- implementation of a train lengthening programme;
- construction of the Thameslink programme;
- incremental infrastructure capacity enhancement to address other key constraints;
- potential ticket pricing initiatives to spread the peak and smooth the high peak requirements; and
- incremental freight capability.

Beyond the completion of the above, we anticipate that accommodating further peak hour growth would be a significant challenge for the route. The following factors will significantly constrain the route's ability to grow further in the very long term:

- there are several lines where expansion from two to four tracks would be desirable, but there is currently insufficient land available at critical locations;
- there are several flat junctions on the route, but there is insufficient space available for grade separation at many of the locations that would benefit from it;

- there are numerous obstructions that physically limit platform extensions on routes into Charing Cross and Cannon Street to 12-car length; and
- there are numerous obstructions that physically limit platforms on stopping services into Victoria and Blackfriars to eight-car length.

These issues will be considered by the Kent RUS.

Enhancements to be completed by end of CP3

Figure 17 CP3 enhancements

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009	Ⓑ Thameslink Programme Key Output 0	Closure of Blackfriars bay platforms	Permits work to commence on the Thameslink Programme	RAB	3
2009	Ⓒ Tunbridge Wells 12-car turnback	12-car siding to the south of Grove Hill tunnel	Ensures timetable robustness and allows 12-car services to meet demand on the Sevenoaks corridor	Network Rail Discretionary Fund	4
2009	Ⓔ Canterbury West turnback capability	Construction of a new platform at Canterbury West, together with track layout changes Platform extensions at Chilham and Chartham.	Will allow 6-car trains to turn at Canterbury West. Avoids the need for services to detach/attach coaches at Ashford	Network Rail Discretionary Fund	2
2009	Ⓕ Shakespeare Tunnel Class 395 clearance	Operational procedures and minor works	Allows High Speed Line services to Dover	Network Rail Discretionary Fund	2
2009	Ⓖ Waterloo East second entrance	Installation of a new entrance via Southwark underground station ticket hall	Reduces congestion and walk times into station	Network Rail Discretionary Fund	3
2008	Ⓗ Crofton Road junction Removal of approach control	Removal of approach control by a minor PSR reduction	Increases capacity across junction and performance	Network Rail Discretionary Fund	3

Proposed enhancements in CP4

Figure 18 Proposed enhancements in CP4					
Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009	Ⓚ High Speed One domestic services	Commencement of services between St Pancras International and East Kent	Journey time reductions from the Medway and East Kent areas Diversion of some faster trains to St Pancras will free up capacity closer to London for suburban services	Department for Transport	7
2009	Ⓛ Borough Market viaduct	New two track viaduct on western approaches to London Bridge	Early works, making provision for future additional capacity	Periodic Review 2008	
2010	Ⓜ Cannon Street station redevelopment	Station redevelopment scheme	Improved station facilities	Network Rail	3
2011	Ⓝ Victoria station redevelopment	Station redevelopment scheme	Improved station facilities	Network Rail	–
2011	Ⓟ Regenerative braking	To facilitate the return of braking energy into power supply system	Reduction in operational costs for passenger and freight train operators	Periodic Review 2008	–
2011	Ⓠ Suburban train lengthening (phase 1)	(A) 12-car operations on the Bexleyheath, Sidcup, Hayes and Sevenoaks (via Chislehurst) lines (B) 12-car operations on the Greenwich/Woolwich line	Enables train lengthening for most services to Charing Cross / Cannon Street Will allow a 20% capacity increase as existing services are restricted to 10-car maximum	Periodic Review 2008	(A) 3 (B) –
2011	Ⓡ Thameslink Programme Key Output 1	Reconstruction of Blackfriars and Farringdon stations	Allows 12-car services to operate across central London, with timetable enhancements Farringdon and Blackfriars station congestion relief and improved facilities New entrance to Blackfriars station on the South Bank	Periodic Review 2008	
Complete 2011	Ⓢ Power supply upgrade	Power supply strengthening works	Provide sufficient power supply to cope with future levels of train service, including allowing all services operating into/via London Bridge to run as 12-car	Periodic Review 2008	1

Figure 18 Proposed enhancements in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2012	Ⓟ Suburban train lengthening (phase 2)	12-car operations on services terminating at Gravesend 12-car operations on services terminating at Rochester eight-car trains calling at Clapham High Street and Wandsworth Road	Allows further train lengthening, mainly into Charing Cross Remodelling of Gravesend would assist with terminating capacity in the Dartford area Remodelling of Rochester to allow lengthening into St Pancras, Victoria and/or Blackfriars Longer trains could call at South London Line stations (future Victoria to Bellingham service)	Periodic Review 2008	–
2011-2013	Ⓥ Kent outer train lengthening	eight-car platform extensions between Swanley and Ashford (Kemsing, Barming, Hollingbourne, Harrietsham, and Charing) 12-car platform extensions between Swanley and Rochester (Farningham Road and Sole Street) Other extensions to fill capability gaps on Kent outer (Wye, Sturry, Westenhanger and Sandling)	Removes the need for short formation trains to operate into London terminals in peak hours	Periodic Review 2008	–
2012-2015	Ⓣ Thameslink Programme Key Output 2	Reconstruction of London Bridge station and eastern approaches	Allows 24 tph to operate across central London London Bridge station congestion relief and improved facilities	Periodic Review 2008	

NRDF candidate schemes in CP4

Figure 19 Candidate NRDF schemes in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2011	Ⓐ East Kent Resignalling Phase 1 enhancement element	Resignalling scheme including remodelling of Ramsgate, Margate and Faversham areas	Facilitates more efficient operations in these areas to increase capacity	Periodic Review 2008	4
2010	Ⓘ Isle of Grain freight loop	Construction of a section of double track railway on the single line Grain branch. Consideration of track layout improvements at Hoo Junction to improve access to Hoo Yard.	Would increase cross-London timetable opportunities and improve both passenger and freight performance.	Network Rail Discretionary Fund	2
2010	Ⓝ Pluckley platform extensions	12-car platform extensions.	Allows 12-car operations on all Ashford – Tonbridge – London services	Network Rail Discretionary Fund	1
2009	Ⓤ Sole Street motorised crossover	Convert ground frame to signalled crossover	Improved recovery opportunities when lines are blocked in the Medway area	Network Rail Discretionary Fund	–
2013	Ⓡ East Kent resignalling phase 2 enhancement element	Resignalling scheme in the Medway area	Potential capacity enhancements under consideration, principally improved turnback capability	Network Rail Discretionary Fund	–
2012 onwards	Ⓝ Victoria resignalling enhancement elements	Resignalling scheme affecting the whole of the Inner London area.	Potential capacity enhancements under consideration, including track layout changes and optimisation of the track layout on the Victoria Eastern approaches	Network Rail Discretionary Fund	–
2011-2013	Ⓦ Kent outer linespeed increments	Linespeed increases on the Kent main lines, principally east of Gravesend and Ashford	Journey time reductions to maximise the benefit of the high speed line	Network Rail Discretionary Fund	–
2011 onwards	Ⓢ Hastings to Ashford route upgrade	Track and signalling improvements	Journey time reductions and frequency improvements	Network Rail Discretionary Fund	–

Figure 19 Candidate NRDF schemes in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2011-2013	⊗ Bromley South station congestion relief	Wider staircases and other congestion relief measures	Improved passenger circulation	Network Rail Discretionary Fund	–
2011-2013	⊙ Lewisham station congestion relief	Under development	Improved passenger circulation	Network Rail Discretionary Fund	–
2012 onwards	⊗ Charing Cross station congestion relief	Under development	Improved passenger circulation	Network Rail Discretionary Fund	–

Maintenance and renewals activity

Figure 20 shows the estimated maintenance and renewal costs and activity volumes.

The precise timing and scope of renewals will remain subject to review to enable us to meet our overall obligations as efficiently as possible consistent with the reasonable requirements of operators and other stakeholders.

It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of over planning in our work banks. As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small proportion of the activities in these areas will slip to subsequent years.

Figure 20 Summary of estimated maintenance & renewals costs and activity volumes

£m (2006/07 prices)						Control Period Totals			
	2009/10	2010/11	2011/12	2012/13	2013/14	CP4	CP5	CP6	CP7
Maintenance expenditure									
Track	23	22	21	21	20	107	96	91	92
Signalling	9	9	8	8	8	42	38	36	36
Electrification	3	3	3	3	3	16	14	13	13
Telecoms	4	4	3	3	3	17	14	14	14
Plant and Machinery	1	1	1	1	1	5	4	4	4
Other (overheads / indirect)	19	19	18	18	17	91	82	78	78
Total	59	57	55	54	53	277	248	237	238
Renewals									
Track	24	23	27	27	29	129	145	167	142
Signalling	31	30	31	38	34	163	86	133	62
Civils	24	23	21	21	20	108	103	99	99
Operational Property	29	24	21	19	18	111	87	86	86
Electrification	14	19	20	21	23	98	93	31	39
Telecoms	18	23	8	8	3	59	25	30	26
Plant and Machinery	8	6	4	4	4	26	26	25	28
Total	148	148	132	137	130	695	565	572	482
Renewals Volumes									
Rail (KM)	23	21	21	21	22	107	157	121	108
Sleepers (KM)	17	17	17	17	17	84	135	270	213
Ballast (KM)	26	26	26	26	26	131	229	412	355
S&C Units	17	20	38	42	51	168	140	81	117
SEUs commissioned	82	85	92	0	306	565	460	573	287

Appendix

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
01.01	Victoria Lines	VIR, CAT, NTL	London & SE	DfT	No	W6/W9	RA8	45-60	Third rail	TCB	2.5 – 3 mins	2-4
01.02	Otford – Sevenoaks	OJS	London & SE	DfT	No	W6	RA8	40	Third rail	TCB	3 – 4	2
01.03	Cannon Street	CBM	London & SE	DfT	No	W6	RA8	20	Third rail	TCB	2 – 2.5	3
01.04	Charing Cross – Chislehurst Junction	XTD	Primary	DfT	No	W6	RA8	60	Third rail	TCB	2 – 3	2-4
01.05	Chislehurst Junction – Tonbridge	XTD	Primary	DfT	No	W6	RA8	70-90	Third rail	TCB	2 – 3.5	2
01.06	Chislehurst Junction – Ashford via Maidstone East	VIR, SBJ	Primary	DfT	No	W9	RA8	70-80	Third rail	TCB	3 – 4	2-4
01.07	Tonbridge – Hastings	TTH	London & SE	DfT	No	W6	RA8	60-80	Third rail	TCB	3 – 5.5	1-2
01.08	Dartford Lines plus Hayes Branch	NKL, BEX, BTC, NCS, HDR, LLL, LCH	London & SE	DfT	No	W6/W8	RA6/8	60	Third rail	TCB	2 – 6	2

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability												
SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
01.09	Bromley North	BNG	London & SE	DfT	No	W6	RA8	40	Third rail	TCB	3	2
01.10	Dartford and Swanley – Margate	VIR,HDR	London & SE	DfT	No	W6	RA8	70-90	Third rail	TCB	2 – 4	2
01.11	Redhill – Tonbridge	RTT	Secondary	DfT	No	W9	RA8	60-85	Third rail	TCB	7 – 9	2
01.12	Sheerness Branch	SEJ	London & SE	DfT	Yes	W6	RA8	30	Third rail	TCB	4	1
01.13	Strood – Paddock Wood	PWS	London & SE	DfT	Yes	W6	RA8	55	Third rail	TCB	7	2
01.14	East Kent Routes	VIR,FDM, ACR,BME, XTD	London & SE	DfT	No	W6	RA8	40-70	Third rail	abs block	3 – 14.5	2
01.15	Hastings – Ashford	ATH	Rural	DfT	No	W6	RA8	40-60	none	mixed	13 – 14	1-2
01.16	Freight lines	Various	Freight only	DfT	No	W8	RA6/7	30	none	key token	N/A	1-2
01.17	Tonbridge – Continental Junction	XTD	Primary	DfT	No	W9	RA8	90-100	Third rail	TCB	2.5 – 3.5	2

Capacity and operational constraints

- A London Bridge: insufficient platform capacity for service growth or for all existing Charing Cross services to call
- B Borough Market – Metropolitan Junction: two track section restricts capacity
- C Spa Road: flat junctions between Tonbridge, Greenwich and Brighton lines restrict capacity
- D Lewisham, Hither Green: flat junctions restrict capacity
- E Orpington – Tonbridge: mainly two track railway with differing stopping patterns restricts capacity
- F Herne Hill: Flat crossing between Sussex and Kent routes restricts capacity
- G Tonbridge – Hastings: four single track tunnel sections restrict capacity
- H Ashford International platforms not available for domestic services
- I Ramsgate: track layout at depot restricts capacity
- J Charing Cross: platform capacity and length constraints with no space for future growth

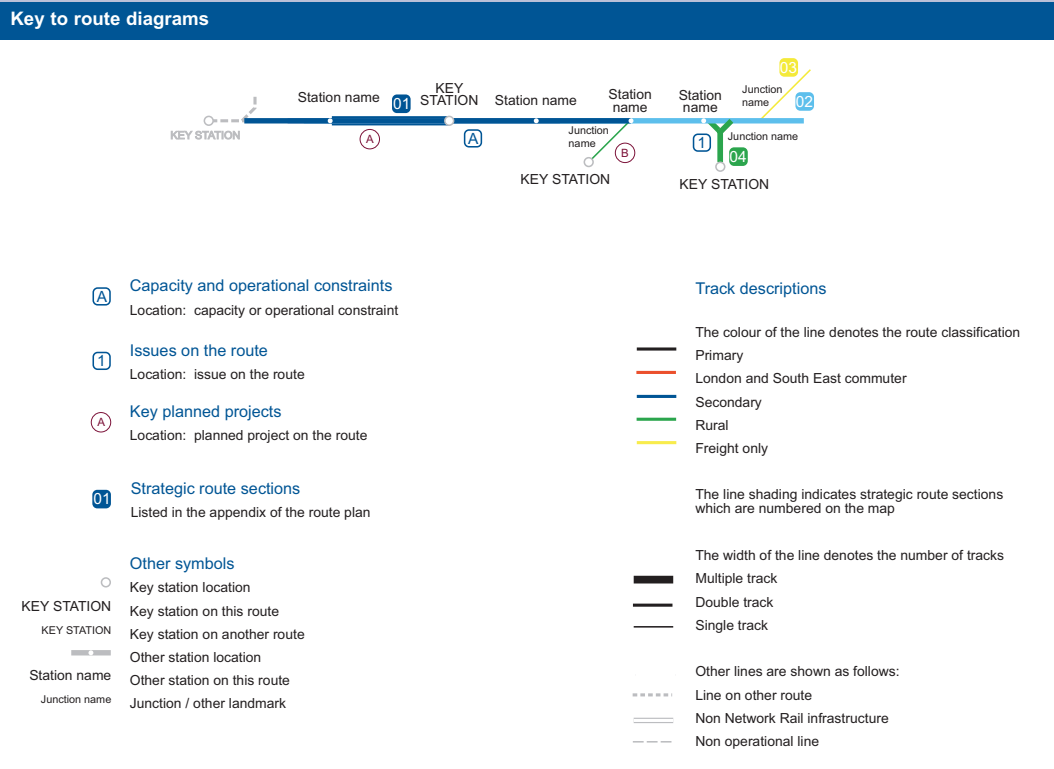
Other issues on the route

- 1 All routes: planned new timetable from December 2009, including new domestic services on High Speed One, to provide additional peak capacity and improve performance
- 2 Borough Market – Metropolitan Junction: four tracking planned by the Thameslink programme will increase capacity, improve performance and should allow less disruptive maintenance opportunities
- 3 London Bridge: remodelling and additional through platforms planned by the Thameslink programme will increase capacity, improve performance and enable all trains to call
- 4 Bermondsey: grade separated junction planned for the Thameslink programme will reduce crossing moves, facilitate new journey opportunities and improve performance
- 5 Lewisham: improvements to Tanners Hill flyover planned for the Thameslink programme will increase capacity and improve performance
- 6 Woolwich Arsenal: interchange with the DLR extension (currently under construction)
- 7 Abbey Wood: interchange with the planned Crossrail line

Note

This Route Plan forms part of the April 2008 update of Network Rail's Strategic Business Plan. The Route Plan supersedes the version published on 1 November 2007.

Other documents in the Strategic Business Plan can be found on the Network Rail website www.networkrail.co.uk



GRIP stages

1	Output definition
2	Pre-feasibility
3	Option selection
4	Single option selection
5	Detailed design
6	Construction, test and commission
7	Scheme hand back
8	Project close out

**This Route Plan is part of a set.
To view or download the others
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