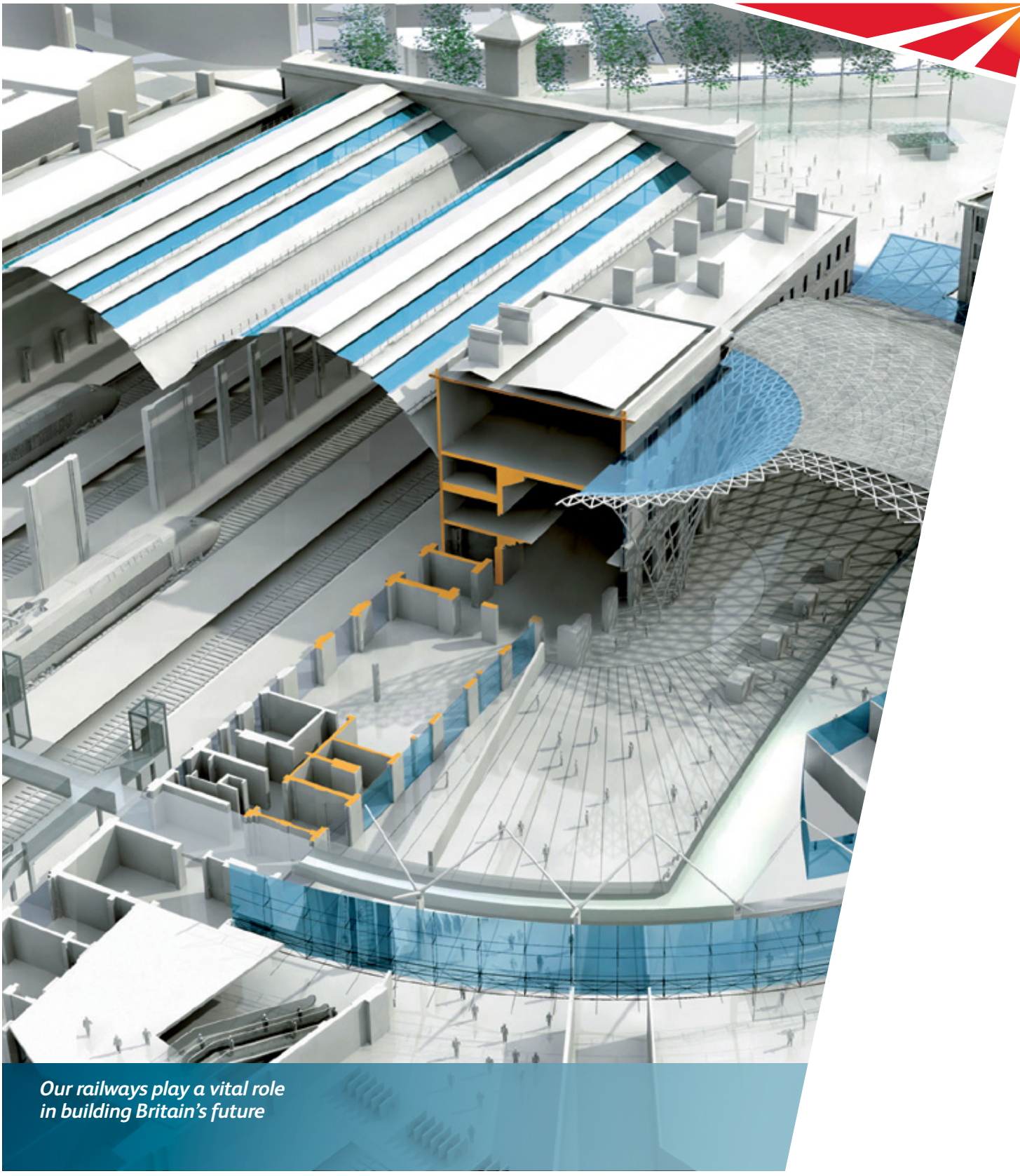
Moving ahead
Planning tomorrow's railways

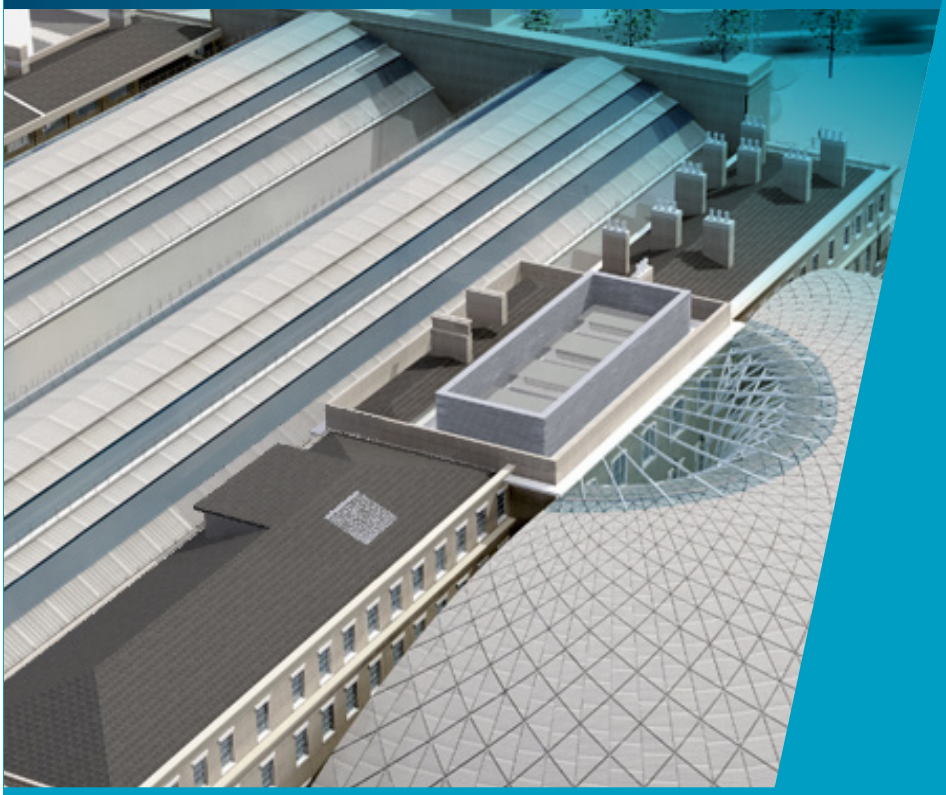
NetworkRail



Our railways play a vital role in building Britain's future

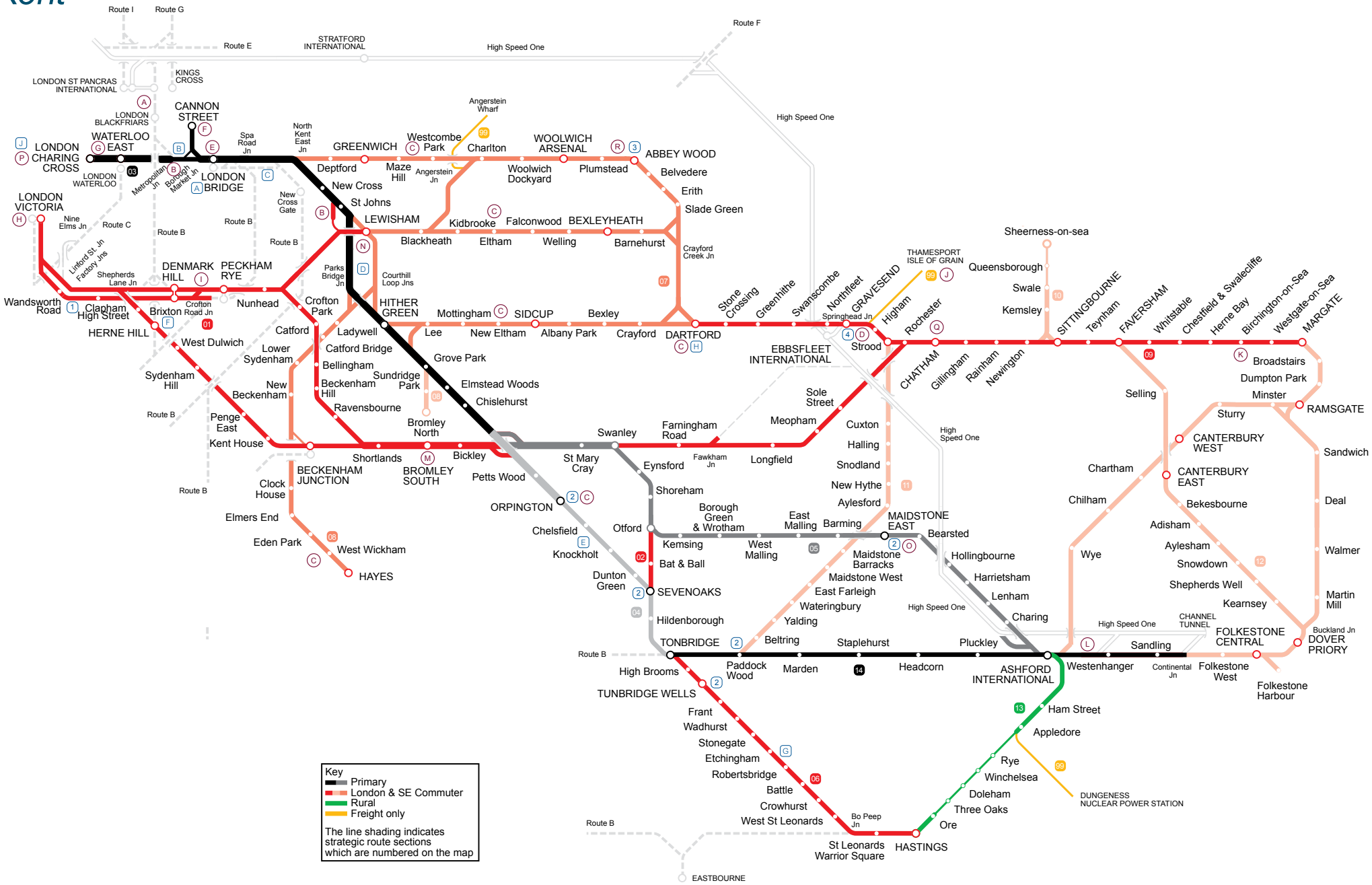
Planning tomorrow's railways

Our £500 million investment in King's Cross station will transform the experience of passengers using the station. We are delivering hundreds of projects across the network to build a bigger, better railway for passengers, freight and the whole of Britain.

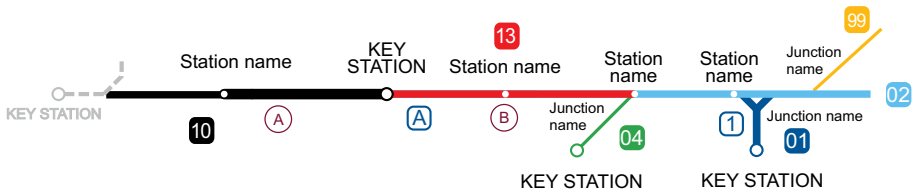


Route Plan A
Kent

Route Plan A
Kent



Key to route diagrams



Capacity and operational constraints

A

Location: capacity or operational constraint

Issues on the route

1

Location: issue on the route

Key planned projects

A

Location: planned project on the route

Strategic route sections

01

Listed in the appendix of the route plan

Other symbols

Key station location

KEY STATION — Key station on this route

KEY STATION — Key station on another route

Other station location

Station name — Other station on this route

Junction name — Junction / other landmark

Track descriptions

The colour of the line denotes the route classification

- Primary
- London and South East commuter
- Secondary
- Rural
- Freight only

The line shading indicates strategic route sections which are numbered on the map

The width of the line denotes the number of tracks

- Multiple track
- Double track
- Single track

Other lines are shown as follows:

- Line on other route
- Non Network Rail infrastructure
- Non operational line

Section 1: Today's railway

Route context

The Kent route is a complex network of interconnected lines linking central London and its south-eastern suburbs with the Kent coast, parts of East Sussex and the Channel Tunnel. It has recently benefited from a major enhancement to services associated with the introduction of domestic trains on High Speed One (HS1).

Services from the network run to London Victoria, Charing Cross, Cannon Street, through central London Thameslink stations to St Pancras (low level) and beyond, plus now to St Pancras International via HS1. Most passenger journeys involve one of these busy central London stations.

Construction works are now well underway on the Thameslink Programme, currently focussing on the Blackfriars and Farringdon station areas, plus the off-railway works at Borough Market. These are proceeding without disruption to peak time train services, though there is currently no cross-London service late in the evenings and most weekends.

Future stages will involve the major construction works in the London Bridge area. Delivering this will reduce the capacity of the approach tracks and station concourse areas for an extended period. During this time there will be restrictions in which services can call at London Bridge and a reduction in peak throughout to Charing Cross.

There is significant overcrowding on peak trains at present. Tackling this issue, whilst providing a robust service during London Bridge reconstruction and other works, will be the major challenge for the remainder of Control Period 4 (CP4). This is further complicated by significant remodelling being planned in CP4 at Gravesend and for the Crossrail works in the Plumstead/Abbey Wood area.

The key mitigation for the London Bridge works will be lengthening of suburban trains to Charing Cross and Cannon Street to 12-car. This will allow services to carry extra passengers, balancing out any reductions in train throughput. Platform lengthening works to allow 12-car Class 465 Networker operations will commence by 2011.

In the longer term 12-car suburban trains will provide capacity in response to rising demand. Linked to this, our current expectation is that 72 extra vehicles will be available in CP4, comprising an allocation of six new 12-car trains in advance of eventual use on the Thameslink network.

The Kent Route Utilisation Strategy (RUS) was published in January 2010 and recommended a further 100 vehicles beyond the above, to enable train lengthening to be continued as an ongoing programme. After this the RUS recommended providing extra capacity on domestic services using HS1 to accommodate further growth.

The Kent lines are an important part of the national rail freight network, with the Channel Tunnel routes connecting the UK to railways in mainland Europe. There are also important freight links to Thamesport on the Isle of Grain and many smaller terminals. The industry strategy for increasing freight in this area is based on capturing a greater modal share of cross-Channel traffic, timetable solutions and alleviating capability constraints to maximise productivity.

Today's route

The Strategic Route Sections (as shown in brackets) which make up the Kent route are below:

- Lines to/from Victoria (A.01). This comprises the main line via Herne Hill, as well as the South London Line and the Catford Loop;
- the link via Bat and Ball (A.02), connecting Victoria routes and the Tonbridge main line;
- the main line and suburban route from Cannon Street / Charing Cross towards Orpington (A.03)
- the continuation of the above to Tonbridge (A.04);
- the Maidstone East line to Ashford (A.05);
- the Hastings via Tunbridge Wells line (A.06);
- suburban lines from Cannon Street/Charing Cross, comprising the Hayes route and those to Gravesend via Greenwich/Woolwich, Bexleyheath and Sidcup (A.07);
- the Bromley North branch (A.08);
- Medway routes from Gravesend and the Sole Street corridor (A.09), continuing to Ramsgate;
- the Sheerness-on-Sea branch (A.10);
- the Medway Valley line (A.11);
- East Kent routes comprising Ashford – Dover – Ramsgate, Ashford – Canterbury – Ramsgate and Faversham – Canterbury – Dover (A.12);
- the Hastings to Ashford "Marshlink" route (A.13);
- Tonbridge to the Channel Tunnel (A.14);
- freight only lines to the Isle of Grain, Dungeness and Angerstein Wharf (A.99).

Other key features of the route are:

- links to Route B towards Elephant & Castle, Blackfriars (B.14) and the Thameslink network;
- links to HS1 at Ashford and near Gravesend;
- links for freight to Dollands Moor yard and into the Channel Tunnel.

Current passenger and freight demand

Recent demand for both passenger and freight services has stood up well, despite tough economic conditions. The new St Pancras services, offering significantly reduced journey times, have proved popular and initial evidence suggests that new travel patterns are already being generated.

In common with much of the rest of the railway network in the South East, the principal feature of passenger demand is commuting during the weekday morning and evening peaks into and out of central London, from the suburbs and other major population centres.

A sizeable portion of journeys on this network are therefore contained wholly within the London suburbs and peripheral areas. This includes the busy routes to Dartford (via Sidcup, Bexleyheath and Greenwich/Woolwich), the Hayes line, local stopping services via Grove Park and local lines to Victoria via Herne Hill and Thameslink via Catford. There are significant suburban flows on fast main line services to London from Bromley South, Orpington and Sevenoaks.

Main line demand is also heavily characterised by travel to London, but to a lesser extent for journeys to major population centres such as Chatham, Maidstone, Sevenoaks, Ashford, Canterbury, Tonbridge, Tunbridge Wells, Dover, Folkestone and Sevenoaks. There is also travel to locations in Sussex, for example Gatwick Airport and Brighton.

Current travel patterns are influenced by the routeings of trains into the central London stations. From these, many passengers change onto other modes of transport to complete their journey within Zone 1. 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), Cannon Street (District/Circle lines), Waterloo East (South West Trains and Jubilee line) and St Pancras International (Eurostar, First Capital Connect and East Midlands Trains). The interchange to the District/Circle lines at Blackfriars is closed at present due to the Thameslink works.

There are also interchanges with the Docklands Light Railway, providing access to the Canary Wharf area from Lewisham, Greenwich and Woolwich. The interchange with the East London Line at New Cross will reopen by May 2010.

Most passengers heading to the north, west or east of London currently need to travel across the capital by other modes before continuing their rail journey. However, both Southeastern high speed services and Thameslink route trains from the Catford line provide easy access to Kings Cross and St Pancras which are well located for onward travel.

The tonnage of rail freight carried through the Channel Tunnel rose during 2008 for the first time in four years; 124 million tonnes were carried in 2008, compared to 121 million tonnes in 2007. This increase is especially notable given the economic conditions during the period.

Ports and heavy industry in the Thames/Medway corridors are the other main generators of freight demand, with traffic showing signs of growth from areas such as the Isle of Grain.

Freight services from other locations are generally also showing some modest growth, particularly in 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. There is a terminal at Tonbridge for Metronet traffic, used for LUL maintenance work.

Current services

The principal passenger operator on the Kent route is Southeastern. Other TOCs with limited operations on this route are First Capital Connect (FCC) and Southern Railway. The Kent route to Thameslink service is a joint Southeastern/FCC operation. Eurostar operate over HS1. There are also occasional charter train operations.

The timetable structure is complicated by multiple London termini. In general services run as follows:

- high speed services to St Pancras run from Medway via Gravesend and Dover/Ramsgate via Ashford
- main line services via Tonbridge mostly run to Charing Cross, with additional trains at peak times to Cannon Street
- main line services via Swanley generally run to Victoria (mostly via Herne Hill), plus peak trains to the Thameslink network and Cannon Street
- stopping suburban services via West Dulwich generally run from Orpington to Victoria, with a limited peak Thameslink service
- suburban services via Catford generally run from Sevenoaks (via Swanley) to Thameslink
- suburban services via Lewisham mostly run to Charing Cross or Cannon Street, though some trains also run to Victoria via Denmark Hill
- services via Greenwich normally run to Cannon Street, but there are also trains to Charing Cross at peak times, evenings and weekends.

Figures 1 to 3 show the current passenger service to London from selected stations.

The new Class 395 high speed trains operate services to St Pancras. With 140mph running able to be utilised on HS1, these are the fastest commuter trains in the UK.

Main line "classic" services are mostly operated by Class 375 vehicles, though Class 465/9 Weald units are also used, which are not equipped with Selective Door Opening (SDO) and therefore restricted to certain routes. All main line trains benefit from toilets and first class facilities.

The London suburban area train fleet is made up of a mixture of Class 465/466 Networkers and newer Class 376 vehicles. The Catford Loop, and other trains operating north of Blackfriars, are operated by dual voltage Class 319 or 377 vehicles.

Eurostar only now run on the Kent route through Ashford International station, otherwise operating solely over HS1 infrastructure. These vehicles no longer have third rail equipment fitted so are not capable of operating over DC electrified routes.

Southern's Ashford to Brighton service, running over the non-electrified 'Marshlink' line, is operated using modern Class 171 diesel multiple units.

Freight services are operated by DB Schenker, Freightliner Ltd, Freightliner Heavy Haul Ltd, First GBRf, Fastline Freight and Direct Rail Services. Most traffic is hauled by class 66 diesel or class 92 electric locos.

Most freight travels via the busy South London Line, then to Europe via Catford & Maidstone East or to the Thames Gateway via Lewisham & Dartford.

The major freight flows are to/from the Isle of Grain (5-10 trains per day), the Channel Tunnel (8-10 tpd), Hoo (2-5 tpd), Angerstein (3 tpd), Stewarts Lane/Battersea (2-3 tpd), the Sheerness branch (1 tpd) and Mountfield (1-2 tpd). Bulk aggregate railheads receiving intermittent traffic include Hothfield and Sevington. Metronet traffic runs from Tonbridge to Barking, Gunnersbury and Amersham.

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

Station	Victoria	Thameslink via Blackfriars	Cannon Street
Chatham fast	2 peak/2 off-peak	None	3 peak/0 off-peak
Chatham stopping	3 peak/1 off-peak	1 peak/0 off-peak	None
Maidstone East	3 peak/2 off-peak	1 peak/0 off-peak	None
Bromley South	8 peak/5 off-peak	7 peak/2 off-peak	Not applicable
Herne Hill	5 peak/4 off-peak	5 peak/4 off-peak	Not applicable
Catford	2 after 9pm only	5 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	5 peak/4 off-peak	1 peak/0 off-peak	None
Chislehurst	5 peak/2 off-peak	3 peak/2 off-peak	None
Sidcup	5 peak/2 off-peak	3 peak/2 off-peak	None
Bexleyheath	5 peak/2 off-peak	3 peak/2 off-peak	3 peak/2 off-peak
Greenwich	3 peak/0 off-peak	6 peak/6 off-peak	Not applicable
Hayes	3 peak/2 off-peak	3 peak/2 off-peak	None
Ashford (via Tonbridge)	3 peak/2 off-peak	3 peak/0 off-peak	None

Figure 3 High Speed services – current train service level (trains per hour)

Station	St Pancras International
Medway route	4 peak (2 Rochester, 2 Broadstairs) / 2 off-peak (Faversham)
Ashford and East Kent	2 peak (Dover & Canterbury line portions) / 2 off-peak (1 Dover, 1 Canterbury line)
Ebbsfleet shuttle	2 peak / 0 off-peak

Figure 4 Tonnage

Figure 4 shows the total annual tonnage levels on the route.

Traffic volumes are summarised in Figure 5.

Current capability is shown in the Network Rail Sectional Appendix.

Figure 5 Current use

	Passenger	Freight	Total
Train km per year (millions)	30	2	32
Train tonne km per year (millions)	8,099	1,037	9,136

Current infrastructure capability

The following maps provide an indication of the predominant capability on each section of the route.

As part of the Infrastructure Capability Programme a number of Network Changes to Route Availability and Gauge, which may affect some of the detail of these maps, have been issued for consultation. Details of the Network Changes being consulted can be found on the Network Rail website and details of Network Changes established can be found on the Network Rail website.

Figure 6 Linespeed

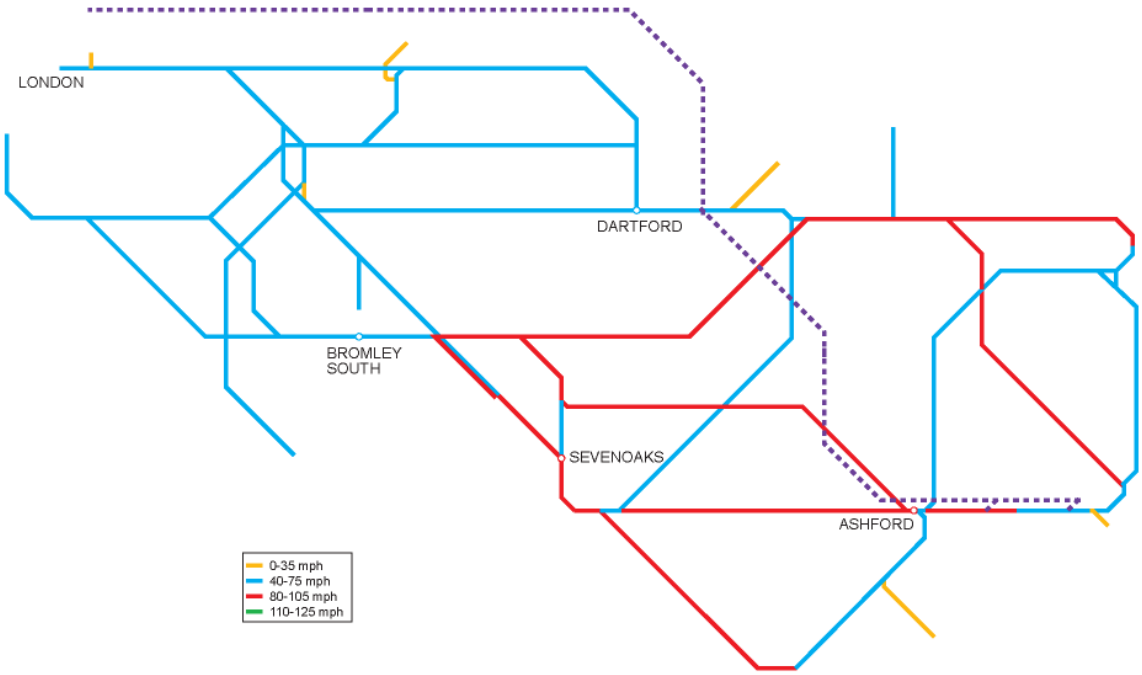


Figure 7 Electrification

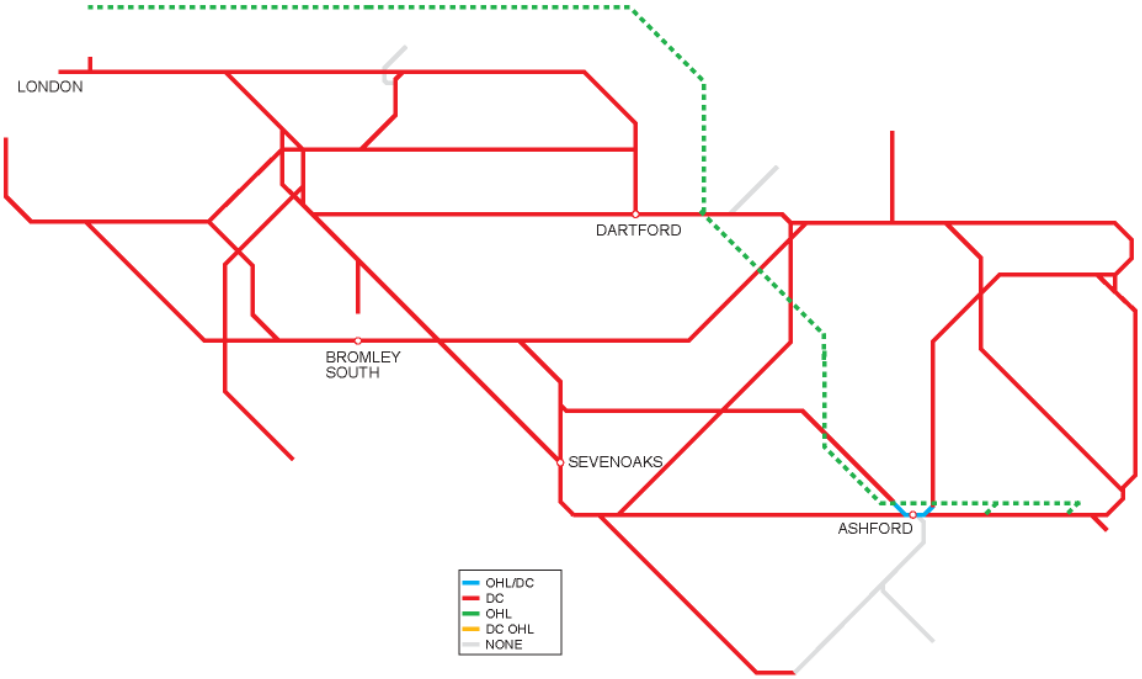


Figure 8 Route availability

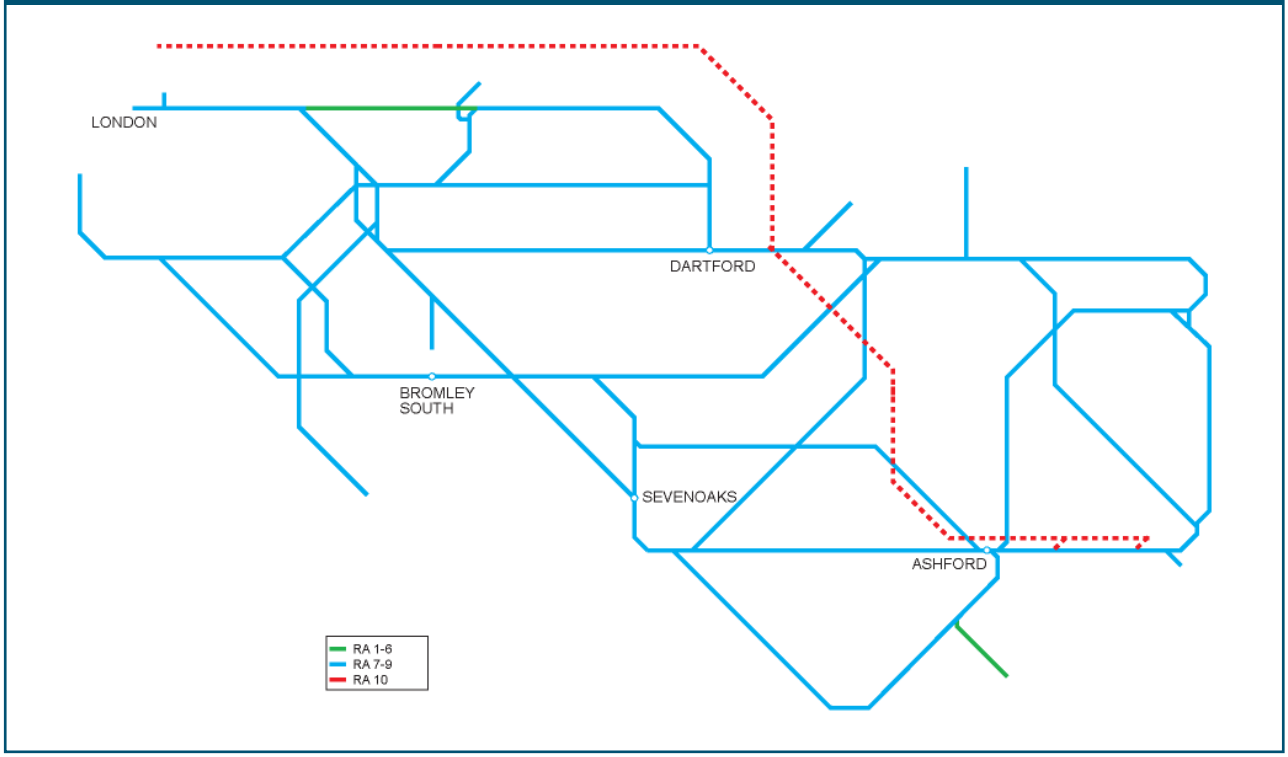
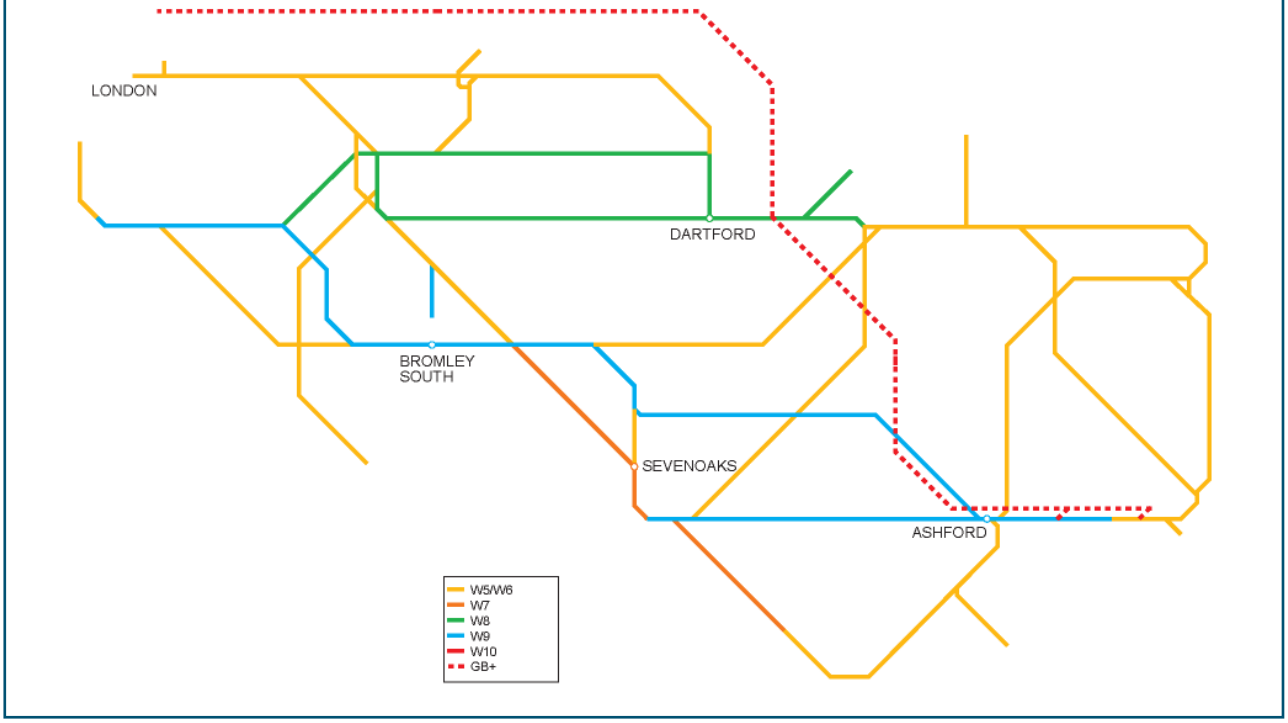


Figure 9 Gauge



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 London area.

Many of the key capacity and performance problems are caused by constraints in the critical London Bridge corridor. The most significant issues in this area are:

- the restrictive layout of the immediate approaches on the east of London Bridge, with numerous conflicting moves being necessary between the different service groups across a series of flat junctions
- slightly further out, flat junctions between the tracks are also a feature in the Lewisham and Hither Green areas
- there are limited 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 two track low speed section from London Bridge to Metropolitan Junction
- the single line connection between London Bridge and Blackfriars, used by all Thameslink route services via London Bridge.

Major constraints elsewhere on the route are:

- the need to accommodate a mix of fast and stopping trains on the mostly two track section between Victoria and Shortlands Junction, exacerbated by the flat crossing at Herne Hill with the north-south Thameslink route
- the limited number of platforms, and their usable lengths, at Charing Cross
- variable platform lengths at Victoria Eastern
- a mix of fast and stopping trains on the mainly two track section between Orpington and Tonbridge, which contains three gauge-constrained tunnels
- limited overall stabling capacity on the route, especially near London terminals
- the capacity of the power supply system, especially in the London area
- ten car platforms on suburban routes from Charing Cross / Cannon Street
- eight car platforms on suburban routes from Victoria and the Thameslink network, with particularly constrained sites such as Elephant & Castle and Herne Hill stations
- four car platforms at Clapham High Street and Wandsworth Road, restricting which services can call at these stations
- platform capacity at Ashford, exacerbated by the HS1 route not being reachable from platforms 1 or 2.
- single track sections and power supply constraints on the Hastings line
- restricted turnback capacity in the Dartford to Gravesend corridor
- passenger congestion at key stations such as Charing Cross, Waterloo East, Blackfriars, Victoria, London Bridge, Bromley South and Lewisham.

Key constraints for freight services are:

- most freight must operate through the congested inner London area, crossing the Thames at Battersea
- there are very limited locations where freight can be regulated between terminals in Kent and the West Coast main line
- the low speed approach control at Crofton Road junction
- once passed this point, freight services to the Thames Gateway must operate through the congested Lewisham station area
- the restricted loading gauge, with numerous lineside structures limiting routes to the Isle of Grain and nearby area to W8 maximum.
- the bigger W9 gauge for Channel Tunnel traffic is less restrictive, but is still significantly smaller than gauges in use in Europe
- restrictions in trailing load limits, especially to terminals in the Thames Gateway.
- the absence of any suitable diversionary route to the Channel Tunnel, avoiding the Catford/Maidstone East lines, for use by electrically hauled W9 gauge freight services

Figure 10 shows the current train service level in key sections of the route.

Figure 10 Current train service level (peak trains per hour)

Route Section	Number of trains
London Bridge – Metropolitan Junction	29
London Bridge – Cannon Street	25
Sevenoaks – Orpington	15
all trains via Lewisham	20
all trains via Herne Hill	18

Figure 11 2009/2010 PPM

TOC	Forecast MAA	As at period
Southeastern	89.7%	11
First Capital Connect	90.6%	11
Southern	89.4%	11

Current performance

Figure 11 shows the forecast 2009/10 PPM for the main TOCs running on the Kent route. Performance reached record highs by summer 2009, but unfortunately the latter part of the year saw several notable issues adversely affecting services, each highlighting the fragility of the route to weather impacts. The dry summer lead to considerable problems with the shrinkage of clay embankments upon which many of the lines on the Kent route are laid. Temporary speed restrictions were imposed as a result which had a detrimental affect on overall service robustness. More significantly, the winter of 2009/10 was particularly cold with the greatest accumulations of snow in the South East for many years. This resulted in corresponding problems with the interface between rolling stock and traction current via the third rail in snow and ice conditions.

The December 2009 timetable, which included the introduction of the full high speed service to St Pancras, was introduced during the period of adverse weather. At the present time it has not been possible to evaluate the performance impact of the new timetable as since its introduction the route has not enjoyed a sustained period of settled weather. However, concerns regarding platform capacity at Ashford International station do appear well-founded as the restricted layout precludes operational flexibility.

The high level of investment occurring on the route has engendered its own problems with service performance. Significant incidents have occurred during possessions, which in turn has lead to late hand-back of running lines.

Section 2: Tomorrow's railway: requirements

HLOS output requirements

Figure 12 below shows the HLOS output requirement for the total demand to be accommodated on the former strategic route which makes up Route A: Kent.

Figure 13 shows the load factor requirements at the relevant London terminals. Note that these numbers include train services on other routes and that the load factor requirement applies as an average across all trains into central London.

The plans for delivery of the HLOS capacity metric on Route A: Kent, remain subject to detailed discussions between DfT and Southeastern through the franchise change process. It is envisaged that this will also include decisions on Thameslink Programme construction works and future rolling stock deployment.

Figure 12 Total demand to be accommodated by Strategic Route

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

Figure 13 Peak hour arrivals to be accommodated by Strategic Route

London Terminals	Peak three hours			High peak hours		
	Assessed demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)	Assessed 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 Midland Main Line services)	25,900	10,900		13,100	5,700	
Victoria (includes Sussex services)	58,700	5,300		29,300	2,800	

Future demand in CP4

The South London RUS identified that the key feature of passenger demand in CP4 will continue to be commuting to central London from the suburbs, with significant suppressed demand and a strong case for additional capacity to be provided to the London boroughs of Greenwich, Lewisham, Bexley and Bromley. This capacity will be provided through the CP4 train and platform lengthening programme.

Growing demand on the recently introduced HS1 services to St Pancras is predicted to create new markets for travel and will encourage people to relocate to areas such as the Medway Towns, Ashford and East Kent.

On the classic network demand in the short term will be heavily influenced by the extent of the economic recovery and potentially by temporary issues relating to the Gravesend, Abbey Wood and London Bridge remodelling works.

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, including a rise in the demand for travel between Ashford and Canterbury West.

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

The continued development of Docklands and the Olympics site is likely to lead to an increased interchange to the DLR at Lewisham, Greenwich & Woolwich. Alternative routes are also available via Stratford International on HS1 services or by using the Jubilee Line.

The imminent re-opening of the East London Line (ELL) will re-introduce interchange opportunities at New Cross. The planned ELL extension to Clapham Junction will lead to new journey opportunities, for example by changing trains at Denmark Hill.

The Freight RUS was published by Network Rail in March 2007. A key input to the strategy was a set of ten year demand forecasts developed and agreed by the industry. This indicated the main issues in Kent will be freight growth from/to the Channel Tunnel and the Thames Gateway.

Channel Tunnel freight is expected to respond to improving economic conditions, transport policies in both the UK and in Europe seeking to reduce lorry miles and Eurotunnel's new pricing structure.

The potential freight growth areas in the Thames Gateway include the potential new terminal near Dartford at Howbury Park (which received planning consent in 2007), sidings at Northfleet, various facilities on the Isle of Grain and locations on the Sheerness branch. New freight flows are therefore expected.

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 any new flow. Our work on recasting passenger timetables has facilitated standard hour freight paths where possible.

It expected that freight flows to Europe via HS1 will become an important development, since this line is the only European Gauge (UIC GC) route available to the capital, connecting to terminals at Ripple Lane/Dagenham.

Future demand beyond CP4

On main line services the Kent RUS, published in January 2010, provided an assessment of demand beyond Southeastern's franchise period. The RUS forecast growth of 30 percent from 2008 to 2022.

Higher than average levels of growth are forecast in the Thames Gateway, Ashford and much of east Kent, due to a combination of new housing developments and new opportunities provided by fast services to St Pancras. Demand from west Kent is more established, but is also forecast to increase over the RUS period, with potential peak Thameslink services via Tonbridge being a factor.

Once Crossrail services commence Abbey Wood will become a significant interchange. This will allow growth at the stations inwards from Abbey Wood for services running towards London Bridge.

Further freight growth is anticipated, notably Thames Gateway and European flows. Freight forecasts to 2030 show continued extra trains beyond CP4. In line with this, the Government's 2007 Rail White Paper predicts a doubling of freight demand over the next 30 years.

Section 3: Tomorrow's railway: strategy

Figure 14 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 14 Summary of proposed strategy milestones

Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
December 2011	Thameslink Programme Key Output 1	12-car platform lengths at Farringdon	Allows 12-car services to operate across central London
		12-car platform lengths at Blackfriars, with new bay platforms	Provides congestion relief at Farringdon, integrated with future Crossrail requirements
			Provides congestion relief and a new South Bank entrance at Blackfriars
May 2012	East London Line extension to Clapham Junction	New junction in the Queens Road Peckham area	Provision of a 4tph ELL service to Clapham Junction
		Clapham Junction platform works and Kensington sidings	
May 2012	12-car suburban operations to Dartford	Greenwich line 12-car platforms	Capability for 12-car operation on most suburban routes into Charing Cross and Cannon Street
		Bexleyheath line 12-car platforms	
		Sidcup line 12-car platforms	
		Hayes line 12-car platforms	
		Grove Park line 12-car platforms	
		Power supply enhancement	
May 2013	12-car suburban operations extended to Gravesend	Gravesend remodelling scheme. To include 12-car platform lengths and an additional bay platform.	Additional capability for 12-car operations into Charing Cross and Cannon Street
			Improved operational flexibility at Gravesend
May 2013 – December 2013	Crossrail Abbey Wood works	New tracks and platforms for Crossrail services	Temporary service changes during the works
		Associated infrastructure at Plumstead and Belvedere to facilitate amended train services during the works	

Figure 14 Summary of proposed strategy milestones

Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
To be confirmed	Commencement of London Bridge area construction works	Construction of new through platforms at London Bridge Track layout modifications on station approaches	Temporary reduction of Charing Cross services from 29tph to approximately 24tph at peak times. Through running – i.e. trains not calling at London Bridge – for all Charing Cross trains. Peak capacity into central London will be maintained by lengthening most services to 12-car
To be confirmed	Completion of Thameslink Programme	Completion of London Bridge station works, with nine through and six terminal platforms Completion of remodelling of approach tracks, including Bermondsey diveunder	Increase in through trains via London Bridge, with all trains calling. 88tph total capacity comprising: 22tph to Cannon Street, 28tph to Charing Cross, 18tph to Thameslink and 20tph terminating
December 2016	12-car suburban operations extended to Gillingham	Strood and Rochester remodelling, potentially to be delivered as part of East Kent Resignalling	Additional flexibility on routes into Charing Cross and Cannon Street, enabling 12-car services to these terminals from the whole suburban area
2017	Crossrail Abbey Wood branch opening	Completion of tunnels and stations in central London	Commencement of services from Abbey Wood to central London via Isle of Dogs
2019	CP5 HS1 interventions	Potential additional domestic platform capacity at Ashford	Lengthening of the Rochester – St Pancras services to 12-car and starting back from Faversham Lengthening of the Ebbsfleet – St Pancras service to 12-car and starting back from Ashford

Figure 15 shows the impact we have assumed on the HLOS metric from each of the interventions, including those recently completed.

For the planned schemes we have assumed 72 additional vehicles will be available, based on 6 of the new 12-car Thameslink trains initially being utilised on services within Kent.

Note that the additional capacity shown in this table is that envisaged after both the train lengthening programme and London Bridge remodelling works are complete, which will be after the end of CP4. In the interim period the train lengthening programme will be used to mitigate the reduction in the number of trains running via London Bridge during the construction period, broadly maintaining current capacity levels.

Figure 15 Capacity enhancements to meet HLOS peak capacity

Description	Additional vehicles involved	Stations served	0700 – 0959 Capacity Impact	0800 – 0859 Capacity Impact
Completed schemes				
St Pancras domestic services as introduced in Southeastern's December 2009 timetable	174	St Pancras	11,000	5,800
Southeastern December 2009 timetable change and train lengthening up to this date (utilising Thameslink Key Output Zero rolling stock)	33	Charing Cross & Cannon Street (London Bridge capacity metric)	5,200	2,800
	3	Victoria	400	200
Planned schemes				
Platform lengthening schemes: 12-car operations Sidcup line to Dartford	12	Charing Cross & Cannon Street (London Bridge capacity metric)	1,400	1,400
Platform lengthening schemes: 12-car operations Bexleyheath line to Dartford	12	Charing Cross & Cannon Street (London Bridge capacity metric)	1,400	1,400
Platform lengthening schemes: 12-car operations Greenwich line to Dartford	10	Charing Cross & Cannon Street (London Bridge capacity metric)	1,200	1,200
Platform lengthening schemes: 12-car operation Sevenoaks (via Hither Green)	10	Charing Cross & Cannon Street (London Bridge capacity metric)	1,200	1,200
Platform lengthening schemes: 12-car operations Hayes line	8	Charing Cross & Cannon Street (London Bridge capacity metric)	800	800
Platform lengthening schemes: 12-car operations East of Dartford to Gravesend	12	Charing Cross & Cannon Street (London Bridge capacity metric)	1,400	1,400
Train lengthening schemes: 12-car Tonbridge main line short formations (SDO assumed)	4	Charing Cross & Cannon Street (London Bridge capacity metric)	400	200
Train lengthening schemes: Victoria services (SDO assumed for 12-car via Rochester)	4	Victoria	400	200

Figure 16 shows how the HLOS load factor targets for London stations would be met by the proposed strategy. The measures would also allow the total additional passenger kilometre to be accommodated.

Note that the temporary impact of construction works at London Bridge for the Thameslink Programme has been excluded from this table. As a result the actual capacity provided at the end of CP4 will potentially be significantly lower than that shown.

Figure 16 Impact on HLOS peak capacity metric

London Terminals	Peak three hours				High peak hours			
	Demand end CP4	Capacity start CP4	Capacity end CP4	Load factor end CP4	Demand end CP4	Capacity start CP4	Capacity end CP4	Load factor end CP4
Blackfriars (via Elephant & Castle only)	25,400	25,800	26,700		12,400	11,000	11,800	
London Bridge (metric includes Charing Cross, Cannon Street and terminating trains, also Blackfriars services not covered by the above)	140,200	174,800	186,100	66%	73,000	79,500	87,400	75%
St. Pancras (includes MML services)	36,800	31,000	62,800		18,800	13,200	26,500	
Victoria (includes Sussex services)	64,000	94,100	99,200		32,100	40,200	43,900	
Other London Termini	295,500	411,100	471,100		146,000	177,400	205,000	

Strategic direction

The Kent route will undergo a significant period of change in the remainder of CP4 and beyond.

The most obvious impacts will be the ongoing of Thameslink construction works, with the remodelling of London Bridge involving some temporary disruptions to passenger journeys. In the longer term, however, alleviating this key bottleneck will provide major passenger benefits. The Crossrail works at Plumstead/Abbey Wood and remodelling works at Gravesend are also significant challenges.

In the medium term the South London RUS identified that train lengthening is the most appropriate means of providing additional capacity for the suburban area. The Kent RUS strategy for main line services is also initially based around train lengthening, though the opportunities available here are more limited. Between these RUSs a total of 172 extra vehicles relative to today is recommended, with 100 of these additional to current expectations.

Following this, as a next step the Kent RUS recommended providing as much capacity as possible via HS1 to St Pancras. This would require between 8 and 13 further six car sets.

In a more immediate timescale the lengthened suburban trains are required as mitigation for the London Bridge works, and potentially also for those at Gravesend and Abbey Wood. The sequencing of works outlined in our CP4 Delivery Plan is designed to allow sufficient overall capacity to be provided.

From late CP4 service levels into Charing Cross will be constrained by a “two track railway” at London Bridge and on the eastern approaches. To maximise the throughput of trains it will, as a result, not be possible for Charing Cross services to call at London Bridge during this period. In addition service levels to Charing Cross will need to be thinned out, with approximately 24tph in operation in the high peak hour (compared to 29tph today).

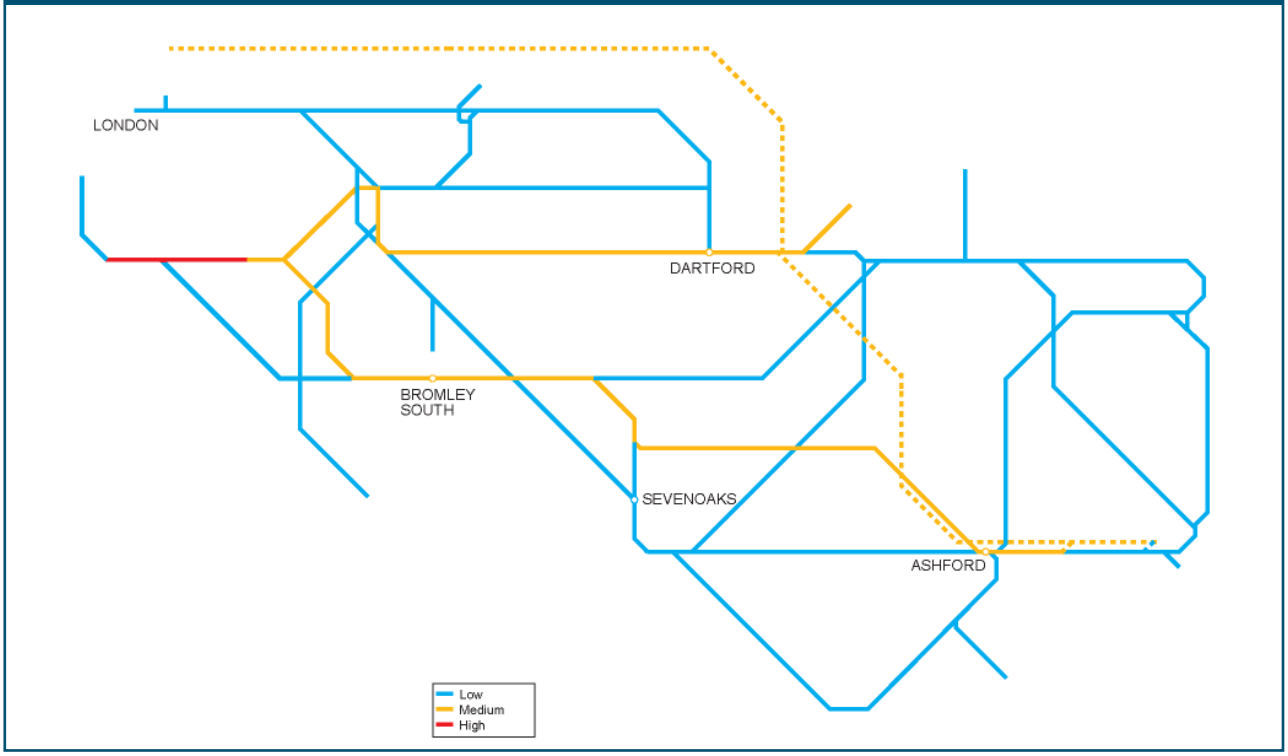
Beyond the completion of Thameslink, the commencement of Crossrail services to Abbey Wood will be the next major development. Subsequent extension to Gravesend, mostly sharing existing tracks, is safeguarded for potential extension at a later date.

With respect to freight services the key issues, for consideration as part of the national Strategic Freight Network programme, are as follows:

- increasing traffic to the Isle of Grain, utilising a new passing loop on the branch. Enhancements at the nearby Hoo junction are also possible.
- a move to bigger gauge and longer freight trains.
- potential development of an alternative route via Redhill and Reading for Channel Tunnel to the West Midlands and South West traffic
- potential use of HS1 for freight

Figure 17 indicates tonnage forecasts to 2019.

Figure 17 Tonnage growth



Future train service proposals

Key issues for the operators on the route are likely to be as follows:

Southeastern

Having successfully introduced a significantly enhanced timetable in recent months the priority for Southeastern is now a period of stability. Their aims during the remainder of their franchise include attracting increasing numbers of passengers, facilitated by further improvements to train performance and customer service.

We therefore recognise that the London Bridge, Abbey Wood and Gravesend reconstruction works will present a significant challenge. All of these will disrupt both weekday and weekend operations and temporary revisions will be required to the franchise agreement between DfT and Southeastern. The industry's priority will be to ensure that sufficient capacity is provided to meet the demand, albeit with some amended journeys.

A challenge for the Kent franchisee in the longer term is that Kent main line and suburban services will need to operate at 15 or 30 minute intervals at peak times – rather than every 20 minutes as at present – to tie into Thameslink services to and from other routes. This will require reconfiguration of the service patterns, with major changes throughout the network, for example modified splits between Charing Cross and Cannon Street services on all suburban routes.

First Capital Connect

FCC will also be affected by the London Bridge works, with both peak and off-peak services required to operate via Herne Hill during much of the construction period. This will have potential implications for rolling stock utilisation, journey times and passenger demand.

Once works are complete a new Thameslink route franchise will be in place. This is envisaged as operating some peak services over the Tonbridge Main line and most services on the Catford Loop.

London Overground

London Overground plan to operate services over the South London Line (SLL) to Clapham Junction in CP4. The main issues to be resolved at present are the interaction between the existing freight service and new passenger services in the Wandsworth Road – Clapham Junction area, and the service levels remaining to Victoria from SLL stations after these services commence.

Freight operators

New freight sidings and terminals are anticipated to be constructed at various locations in the Thames Gateway. This includes those at Howbury Park and Northfleet, both of which are expected to encourage new traffic. In addition reconnection of the Port of Dover to the rail network is anticipated and, in the longer term, there is the potential of a major new terminal in the Maidstone area.

There are potential future uses of HS1 for freight, with the primary benefit likely to be the ability to carry much bigger gauge traffic than conventional routes. In addition there may be certain flows where the journey time saving is important. Suitable terminals, for example at Ripple Lane on Thameside, would be necessary for any services to run. Beyond this, the longer term potential of freight on this route is likely to be linked to the development of a complimentary high gauge route beyond Thameside to the North of England.

Freight operators have expressed concerns regarding the loss of a recessing point in the Battersea area, due to the introduction of East London Line services to Clapham Junction. Ongoing timetable work is seeking to avoid any adverse impacts from this issue.

Trains removing spoil from the Crossrail tunnels are likely to operate on the Kent network over the next few years.

Future capability

The main infrastructure capability changes planned for the route are described below:

New routes

The Kent route will benefit from the Thameslink Programme which will alleviate the congested track layout at London Bridge, as described previously. In addition Crossrail will provide a new line to Abbey Wood and the East London Line will provide a new suburban route towards Islington via the northern part of the City of London.

Platform lengthening

The most significant scheme being completed in CP4 will be infrastructure modifications in the suburban area to enable 12-car trains to operate.

Most stations only require relatively minor works, for example platform extensions, moving signals and/or the relocation of Driver Only Operation equipment. However, at some locations more significant work is necessary, especially at Gravesend where major remodelling is required.

12-car operations at Charing Cross

Running of 12-car suburban services into Charing Cross presents a particular challenge, since this terminal has short and narrow platforms, no space available for expansion and limited operational capacity.

The first problem is the narrow widths of the presently unused sections of the country ends of platforms 1,2 and 3. However our expectation is that we will be able to safely bring this infrastructure into use in CP4.

The second problem is that platforms 4 and 6 are 11-car length and there is no space available to extend, so the doors in the rear vehicle need to be inhibited from opening on 12-car formations. If these platforms are to be used for Class 465 Networker vehicles this will require retrofitting of a system to facilitate this onto these vehicles.

Finally, even with such a system, platform 5 will be unable to accommodate 12-car Class 465 formations, so we have assumed this platform will be used in future for 12-car Class 375 main line services only, since these do fit.

2-car class 466 units will be unable to operate in 12-car formations, since the additional train length this creates results in such trains not being able to fit into Charing Cross and certain other locations.

Turnaround drivers are likely to be required at Charing Cross to enable the same number of trains to run once a sizeable number of trains are made up of 12-car sets.

Power supply

Despite the completion of power supply enhancement work a few years ago, there remains a shortage of capacity in the power supply system, especially in the London area. Further work is planned in CP4 to enable the growth in capacity.

12-car operations south of Tunbridge Wells would only be achievable at high cost and are not planned due to major power supply constraints.

Further implementation of regenerative braking capability remains a key aspiration of passenger and freight train operators, and this is recognised by our power supply schemes in CP4.

Signalling capability

The East Kent Resignalling Programme may provide an opportunity to alleviate capacity constraints in the Medway Towns area in CP5. Our current expectation is that 12-car capability at Rochester will be best undertaken through this scheme, though alternative delivery mechanisms may exist.

With a limited number of specific exceptions in east Kent, the signalling headways on the route are rarely the most limiting factor on the numbers of trains that can be run. More important constraints tend to be the occupancy of flat junctions and station platforms, especially in the London area.

Freight capability

The route via Redhill is planned to be cleared for the operation of Class 92 electric freight locomotives. This will involve works to both the signalling system and power supply and offer a diversionary route when the Catford / Maidstone East route is blocked.

Reducing journey times

The Kent RUS identified a strong case for reducing journey times. Our detailed investigations have shown that several specific sites would benefit from speed restrictions being removed and we are now targeting these where possible.

With respect to freight services it is a key aspiration of freight operators to significantly decrease the portion of journey time spent stationary in loops whilst awaiting passenger traffic. This issue will be investigated in future timetable development workstreams.

Future capacity

Our strategy will result in additional capacity for passenger and freight as outlined below:

More capacity on trains

At peak times infrastructure constraints in critical areas prevent the running of any additional trains. This is the key challenge for the route as large numbers of peak trains are severely crowded at present and ongoing growth is expected.

Completion of the Thameslink Programme will provide enhanced capacity in the London Bridge area, but it is envisaged that the majority of services will be substitutions of trains currently running to alternative termini. This is because no viable way has been identified to provide extra capacity at critical locations such as the New Cross/Lewisham area and over the Orpington to Tonbridge two-track section.

As a result of the above implementation of a train lengthening programme is necessary. In CP4 this will be facilitated by our suburban area platform lengthening programme and by the early delivery of an anticipated 6 x 12-car trains, which are eventually destined for use on the Thameslink network but which are likely to be used to cascade other rolling stock initially.

Train lengthening in the suburban area is complicated by the Class 376 fleet, which are operated in 5 or 10-car sets. If additional vehicles could be procured to enable these to operate in 12-car formations this would be likely to both significantly increase flexibility and provide more standing space than 12-car Class 465 formations.

In CP5 Crossrail will provide services to Abbey Wood and the new station at Woolwich, alleviating overcrowded routes via London Bridge.

Beyond this the Kent RUS recommended approximately a further 100 vehicles for the Kent route, to allow further lengthening. This additional rolling stock would require additional maintenance and berthing facilities to be constructed, possibly at Slade Green.

In CP5 or CP6 the further development of services on HS1 recommended by the Kent RUS would provide significant additional peak capacity. Between 8 and 13 additional 6-car Class 395 or similar trains would be needed.

More capacity at stations

Our analysis indicates that several key stations will require work to enable them to cope with the predicted growth in passenger numbers:

- Charing Cross station is very congested with no space available for expansion. Our strategy for this site will be developed further in the coming months, focussing on potential schemes for CP5 and beyond. Development of the Embankment end of the station to provide additional concourse capacity may become needed in future years.
- Waterloo East station is very congested and the link to Waterloo main station is severely constrained by the space available. We seek to respond to this issue with a new station entrance at the Southwark end, for which we will shortly be seeking planning permission from the local authority.
- Victoria is significantly larger than each of the above but is also congested, particularly the interchange with Underground. Increasing passenger capacity is, together with expansion of the underground station, is planned.
- London Bridge station is very congested and will be addressed by the Thameslink programme;
- Blackfriars station is congested at peak times, as a temporary consequence of construction work currently underway as part of the Thameslink programme
- Bromley South station is congested at peak times. Work is currently ongoing to identify an appropriate solution
- Lewisham station is congested at peak times. Work is currently ongoing to implement mitigating measures.

The expected growth in passenger numbers will result in increased car parking capacity becoming necessary at certain stations, especially to ensure that off-peak users are able to park. This will have interfaces with the land use and transport policies of the relevant local authorities.

Additional freight capacity

The Isle of Grain branch passing loop is anticipated for completion by the end of CP4, however this is subject to funding constraints at present.

The loop would facilitate future growth by increasing the maximum capacity of the branch from around 20 to 25 trains per day, whilst also improving performance and timetable flexibility, and minimising interaction with Southeastern's high speed services.

A potential enhancement scheme at Hoo Junction would involve a new crossover connecting the down

main line with the up sidings. This would reduce the shunting movements needed across the main line at this location.

Future performance

Figure 18 sets out the planned PPM for each passenger operator.

Our analysis has identified the following key performance risks and opportunities during CP4:

- the need to achieve a reduction in both the incidence and impact of trespass, vandalism and fatalities on railway operations
- delivering further improvement to autumn leaf fall management
- implement a range of measures to reduce disruption caused by ice/snow accretion on the third rail
- robust management of timetable and service pattern changes during CP4
- an improved system for the isolation of traction supply to enhance possession productivity and reduce delay per incident
- robust planning of the Gravesend and Abbey Wood remodelling works
- robust planning for the delivery of Thameslink Programme engineering work, especially the remodelling of London Bridge
- delivery and commissioning of East Kent Resignalling project
- the introduction of information systems to support control centre staff in managing the network during normal and degraded working
- investment in the upgrade of Ashford IECC
- re-focussing on the delivery of a "Right Time Railway" through joint objectives between Southeastern and Network Rail
- installation of additional remote condition monitoring and intelligent infrastructure and using the data effectively to reduce failures
- Robust management of the passenger/freight interface in the Gravesend/Isle of Grain area is critical and further additional infrastructure in this area may be beneficial.

Southeastern

Southeastern's Public Performance Measure (PPM) is currently around 90 percent following the dip in performance during the winter months. This is forecast to rise to 92.8 percent by the end of CP4.

Despite these improvements, our analysis of Southeastern's performance trajectory in CP4 is not consistent with their franchise commitments. This is due to performance impacts anticipated during the early years of the Thameslink construction works, which were not accounted for in their franchise agreement. The significant level of investment occurring on the route attracts risks due to the volume and extent of work undertaken, but the potential impacts should be mitigated by performance protection activities.

From late in the Control Period further significant performance challenges are probable, due to the likely impact of the London Bridge remodelling works. However at present the implementation strategy for these works is not finalised so the impact cannot be fully quantified and has not been included in our forecast performance trajectory.

Other passenger operators

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

Freight operators

We would anticipate that freight operators will experience many of the same performance issues on the route as those which are forecast to affect passenger services. Some further key issues are likely to be:

- Ensuring that the anticipated freight growth to the Thames Gateway area can be delivered reliably, especially whilst the Isle of Grain loop remains as single track
- Managing the impact of Crossrail construction work at Abbey Wood, especially any impact on Plumstead sidings and traffic to Angerstein Wharf
- Ensuring that the potential East London Line extension to Clapham Junction does not impact on freight performance

Figure 18 Forecast PPM MAA – CP4 plan

	2010/11	2011/12	2012/13	2013/14
Southeastern	91.9%	92.2%	92.5%	92.8%
FCC	92.1%	92.4%	92.7%	92.9%
Southern	90.9%	91.1%	91.6%	91.9%

Network Availability

Aspirations for the route

The national "Seven Day Railway" initiative is implementing techniques which will minimise the impact on passengers and freight of engineering work. However the Kent route was not identified in the Strategic Business Plan as one of the routes delivering a significant benefit to cost ratio and was therefore not included in that plan as being appropriate for early implementation.

In its Final Determination the Office of Rail Regulation (ORR) asked Network Rail to refine its proposals and optimise the benefits over the whole network. Network Rail is therefore re-evaluating the plans across the network.

The Seven Day Railway initiative is also intended to facilitate the efficient delivery of more engineering work within more restrictive access than exists today. Implementation will require significant process changes and consideration of infrastructure enhancements.

On the Kent route most major items of engineering work are at present normally scheduled to be carried out on Sundays (and in some cases on Saturdays as well) as historically this was thought to affect fewer trains and people. However the demand for weekend services has risen considerably during the last decade and we now need to adapt our working practices to meet this demand.

We have consulted with Southeastern, Passenger Focus and freight operating companies and this has informed our understanding of priorities. In the short term the immediate requirement is to reduce the need for replacement bus services and run as much of the published timetable as practical. Furthermore where freight is diverted the priority must be to divert it onto track with the same gauge, route availability, journey time and track that can accommodate the same train length. Beyond this there are longer term aspirations for additional passenger and freight services at times when trains cannot run at present.

How this will be delivered

Increasing the availability of the network requires that maintenance, renewals and enhancements are delivered together in a cyclical possession pattern.

Integrating these activities into a single coherent programme is intended to result in an overall reduction in the number of disruptive track closures.

One of the key work streams will therefore be improving the planning of engineering works. The strategic aim will be to establish a single cyclical possession strategy that integrates maintenance and 'standard renewals' in a unified and predictable possession pattern. This will also deliver efficiencies in our maintenance and renewals activities.

Further work streams which will deliver improved efficiency include national schemes for disaggregating electrical isolations from track possessions, achieving faster isolations and for the implementation of a modular approach to renewals.

Specific local schemes are being developed. These include track worker protection schemes, access point improvements and provision of lighting at key junctions. These schemes will improve night-time maintenance productivity and will be prioritised on the basis of achieving maximum returns.

Track renewals will be undertaken in line with the national strategy through CP4, resulting in maximum 16 hour possessions for plain line track renewals by 2012/13. Possessions of longer than 16 hours will therefore only be required on an exceptional basis.

The confluence of these work streams will deliver the major part of the reduction in access requirements and will significantly reduce the impact of engineering work on passengers and freight.

Where disruptive work is unavoidable our aim is to provide a through rail journey by seeking to use diversionary routes and/or single line working. The existing diversionary route strategy will be further developed and refined as part of the Seven Day Railway initiative.

The Route Categorisation process supports the Seven Day Railway principles. This process aims to develop a framework to reduce the disruption to rail users from engineering work and assisting Network Rail to deliver its regulatory target to cut disruption by at least 37 percent by 2013/14. The 2012 Rules of the Route will be the first to be developed with full

Figure 19 Seven Day Railway - priority lines

Line of route	Primary intermediate stations
Charing Cross to Ashford	London Bridge, Orpington, Sevenoaks, Tonbridge
Victoria to Gillingham	Bromley South, Rochester, Chatham
Charing Cross to Dartford	London Bridge

visibility of route categorisation principles and thus fully taking them into account. The priority routes are shown in Figure 19.

Next Steps

In support of the Route Categorisation Proposal development we will work with Southeastern to produce a Joint Network Availability Plan that will formalise how the industry will work collaboratively to reduce disruption from engineering works.

Network Availability on the Kent route in CP4 will be complicated by the need for delivery of a number of large and complex projects, all of which will require significant track access at busy sections of the network. In particular the Thameslink Programme, works at London Bridge, Crossrail works at Abbey Wood, Gravesend remodelling scheme and East Kent Resignalling will require careful planning and coordination to minimise their impact.

We will establish a cross-industry Programme Delivery Group during 2010 to maximise and promote synergies between projects, whilst identifying dependencies between them and scheduling infrastructure works and timetable changes as a result of such issues. This will enable the coordination of the above major projects.

The most significant of the schemes is the reconstruction of London Bridge station which will present a particular challenge for weekend services in late CP4 and early CP5. It is likely that significant blockades will be required at weekends during that time. Many alternative routes into London will, however, be available, for example into Victoria, Blackfriars/Thameslink, St Pancras, the East London Line and Docklands Light Railway.

With regard to freight we recognise that we must provide a through path for freight services. Due to limited capacity being available in the daytime significant volumes of freight are moved at night, so are susceptible to track maintenance activities. Our plans seek to ensure that these trains can run in their timetabled paths.

Freight traffic to the Thames Gateway is restricted whenever engineering works takes place in areas such as Factory Junction, Lewisham, Dartford or Gravesend. We will review potential options to minimise the impacts of engineers' possessions on these freight flows in our Seven Day Railway plans.

With respect to Channel Tunnel flows the scheme to allow Class 92 operation via Redhill would allow unrestricted operation of W9 gauge traffic between the West London Line and the Channel Tunnel when the normal route via Catford and Maidstone East is closed.

Long term opportunities and challenges

Up to the end of CP5, we believe that the solution to passenger growth and freight capability requirements will be met by:

- robust timetable planning, optimised around critical capacity constraints
- passenger train lengthening
- construction of the Thameslink Programme
- opening of the Abbey Wood branch of Crossrail
- further development of services using HS1
- longer, higher gauge and faster freight trains with a decreased portion of the journey sitting in loops
- incremental infrastructure enhancements, utilising renewal opportunities where possible.

In the longer term Crossrail services could potentially be extended to Gravesend. This potential extension would require Crossrail services to be operated by dual voltage rolling stock and may require additional tracks in the Dartford area.

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

- there are several lines where expansion from two to four tracks would be desirable, but this is not practical without major construction works on non-railway land 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 major obstructions that physically limit potential platform lengths on routes into Charing Cross and Cannon Street to no more than 12-car, even if trains longer than this were desirable
- there are numerous obstructions that physically limit platform lengths on stopping services into Victoria and stopping services via Elephant & Castle to 8-car length;

The Kent RUS identified a potential long term possibility of converting the Hayes branch to another transport mode. For example if it were to be taken over by a Bakerloo line extension 6tph paths could be freed up for other uses.

In CP5 and beyond it is likely that improving services late in the evenings and at weekends will

become key issues, linked to the long term challenge of minimising the impact of engineering works. However it is noted that implementing the Seven Day Railway will be a significant challenge, especially in the London area.

Extending freight train lengths is expected to be a key aspiration of the freight industry, since this would increase capacity without requiring additional trains. It is envisaged that this will be facilitated incrementally, with specific opportunities investigated as they become available. Beyond this a further long term aspiration is to add W12 strategic freight network gauge to the Channel Tunnel via both Maidstone East and Redhill and, eventually, to the Isle of Grain route.

DaSTS

The Department for Transport published its formal consultation document Delivering a Sustainable Transport System (DaSTS) in November 2008. It sets out long term transport priorities for the period to 2019 and beyond and reflects conclusions from the Eddington Study and the Stern review.

The document sets out five clear transport goals for the network these are:

- To support national economic competitiveness and growth by delivering reliable and efficient transport networks.
- To reduce transports emissions of carbon dioxide (CO2) and other greenhouse gasses, with the desired outcome of tackling climate change.
- To contribute to better safety and health and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health.
- To promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society, and
- To improve quality of life for transport users and non transport users, and to promote a healthy natural environment.

Rail has potential to help meet these objectives and Network Rail will continue to engage with the Regions and Local Authorities at all levels of the process. There are four stages in the process. In stage one each Region was invited to propose a number of strategically relevant studies to take forward which they believe will meet the DaSTS objectives. The DfT then selected the studies that would progress into stage two to generate options for appropriate interventions. All studies are currently in stage two and need to produce a long list of options by the end of March 2010 for further review. Stage three will involve the sifting and packaging of options, while stage four will see the completion of an overall programme, with all studies complete by 2012.

As part of the DaSTS programme there are both National and Regional studies, the national studies are led by the DfT and the local studies are led by the Regions. There are a number of joint studies with the involvement of both the DfT and the Regions.

There is a national Freight Modal Choice study looking to confirm the economic, social and environmental benefits of current freight movements by non-road modes on national network corridors and to identify where changes in future modal choice, from road to rail or water, could address issues on the network and deliver against the five DaSTS goals. This includes consideration of the capacity and capability of the national infrastructure to accommodate these changes in modal choice.

On this route the studies that may affect long term opportunities and challenges are:

- London to Dover/Channel Tunnel

Infrastructure investment in CP4

Figure 20 HLOS enhancements (capacity metric & specified schemes)

Implementation date	Project	Project description	Output change	Funding	GRIP stage
December 2011	(A) Thameslink Programme Key Output 1	12-car platform lengths at Farringdon 12-car platform lengths at Blackfriars, with new bay platforms	Allows 12-car services to operate across central London Provides congestion relief at Farringdon, integrated with future Crossrail requirements Provides congestion relief and a new South Bank entrance at Blackfriars	Periodic Review 2008	6
Mid 2012	(B) Other Thameslink Programme work pre-Olympics	Civil engineering works for Borough Market viaduct Construction of new "flydown" at Tanners Hill Resignalling of Thameslink core route	Provides early infrastructure for Thameslink Key Output 2	Periodic Review 2008	4
June 2012	(C) Suburban 12-car operations (routes to Dartford)	12-car operations west of Dartford. Scheme covers the Hayes, Grove Park, Sidcup, Bexleyheath and Greenwich/Woolwich lines, plus Dartford station itself.	Enables lengthening of certain services to Charing Cross / Cannon Street	Periodic Review 2008	4
May 2013	(D) Extension of 12-car operations to Gravesend	Gravesend remodelling scheme. To include 12-car platform lengths and an additional bay platform.	Additional capability for 12-car operations into Charing Cross and Cannon Street Improved operational flexibility at Gravesend	Periodic Review 2008	4
To be confirmed	(E) Completion of Thameslink Programme	Completion of London Bridge station works, with nine through and six terminal platforms Completion of remodelling of approach tracks, including Bermondsey diveunder	Increase in through trains via London Bridge, with all trains calling. 88tph total capacity comprising: 22tph to Cannon Street, 28tph to Charing Cross, 18tph to Thameslink and 20tph terminating	Periodic Review 2008	3
2011-2014	Power supply upgrade	Power supply strengthening works	Provide sufficient power supply for future levels of service, including allowing all services into/via London Bridge running as 12-car Implementation of regenerative braking to reduce energy consumption	Periodic Review 2008	2

Figure 21 Other enhancements

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010	(F) Cannon Street station redevelopment	Station redevelopment scheme	Improved station facilities	Network Rail	3
2010	(G) 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
2011	(H) Victoria station redevelopment	Station redevelopment scheme	Improved station facilities	Network Rail	3
to 2011	Access for All Programme	Works to improve accessibility at the following: Canterbury West; Blackheath; Bromley South; Forest Hill; Sittingbourne	Provision of a step-free route between station entrance and station platforms at these sites	Department for Transport	1-7
2010	(I) Crofton Road Junction Removal of approach control	Removal of approach control by a minor PSR reduction and signalling changes	Increases capacity across junction and performance	Network Rail Discretionary Fund	4
2012	(I) East London Line extension to Clapham Junction	Connection of East London Line to South London Line and onwards to Clapham Junction as part of London Overground	4tph service ELL to Clapham Junction	Transport for London	4
2012	(J) Isle of Grain passing loop	Construction of a section of double track railway on the single line Isle of Grain branch.	Would increase cross-London timetable opportunities and improve both passenger and freight performance.	Network Rail Discretionary Fund	2
2012	(K) East Kent Resignalling phase 1	Resignalling scheme including remodelling of Ramsgate, Margate and Faversham areas	Facilitates more efficient operations in these areas to increase capacity	Network Rail, including an enhancement element at Faversham	4
to 2012	Car park expansion programme	Works to improve and extend car parking facilities at selected stations: Canterbury West; Chatham; Folkestone West; Gravesend; Marden; Sevenoaks; Sittingbourne; Staplehurst; Tonbridge; Paddock Wood	Enhanced parking facilities at stations with existing or anticipated problems.	Network Rail	1-7
2011-2013	(L) Outer area linespeed increments	Linespeed increases on the Kent main lines, principally east of Ashford	Further journey time reductions for principal locations served by trains using HS1	Network Rail Discretionary Fund	–

Figure 21 Other enhancements

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2011-2013	(M) Bromley South station congestion relief	Wider staircases and other congestion relief measures	Improved passenger circulation	Network Rail Discretionary Fund	–
2011-2013	(N) Lewisham station congestion relief	Station improvements and congestion relief	Improved passenger circulation	Network Rail Discretionary Fund	–
2014	(O) Maidstone East redevelopment	Station redevelopment scheme	Improved station facilities	Network Rail/Kier Property	2
to 2014	National Stations Improvement Programme (NSIP)	Station improvement works at selected stations: Ashford International; Brixton; Bromley South; Canterbury West; Chatham; Crayford; Dartford; Denmark Hill; Deptford; Folkestone Central; Gillingham; Gravesend; Lewisham; Margate; Northfleet; Paddock Wood; Rochester; Sevenoaks; Sittingbourne; Strood; Swanley; Tonbridge; Tunbridge Wells; Waterloo East; Woolwich Arsenal	Improving passenger environment through enhancements to access, egress, security and overall presentation	Network Rail/Third Party	1-7
2015 onwards	(P) Charing Cross station congestion relief	Long term (CP5) requirement. Will require development work in CP4.	Improved passenger circulation	CP5 advance development fund	1
2016	(Q) East Kent Resignalling Phase 2	Resignalling scheme in the Medway area, including the remodelling of the Rochester area	Potentially facilitates more increased headways through Medway corridor and increased turnback capacity in the Gillingham area Potentially an effective means of delivering 12-car capability at Strood and Rochester	Enhancement element through Network Rail Discretionary Fund and Periodic Review 2008	–
2010-2017	(R) Crossrail Abbey Wood branch	Realignment of the North Kent Line between Plumstead and Abbey Wood to accommodate Crossrail route. Potential mitigation works in the Plumstead and Belvedere areas to facilitate any train service amendments at Abbey Wood.	New railway	Department for Transport/Transport for London	3

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

Maintenance and renewals activity

Figure 22 shows the estimated maintenance and renewal costs.

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 22 Summary of estimated maintenance & renewals costs

£m (2010/11 prices)	2010/11	2011/12	2012/13	2013/14
Renewals				
Track	22	14	29	19
Signalling	43	42	15	15
Civils	11	18	13	14
Operational property	29	23	18	17
Electrification	18	21	25	25
Telecoms	4	6	6	5
Total renewals	**127**	**124**	**105**	**95**
Renewals volumes				
Track				
Rail (km)	41	24	36	36
Sleepers (km)	10	10	14	14
Ballast (km)	10	10	14	14
S&C (equivalent units)	7	5	13	12
Signalling				
Conventional (SEU)	0	337	0	0
ERTMS (SEU)	0	0	0	0
Level crossings (no)	0	4	0	3

Appendix

Figure 23 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 (mph)	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
A.01	Victoria Lines	VIR, CAT, NTL, ATL	London & SE	DfT	No	W9 via Catford (W6 elsewhere)	RA8	45 - 60	Third rail	TCB	2½ - 3	2 - 4
A.02	Otford – Sevenoaks	OJS	London & SE	DfT	No	W6	RA8	40	Third rail	TCB	3 - 4	2
A.03	London – Chislehurst	XTD, CBM, CSW	Primary	DfT	No	W6	RA8	60	Third rail	TCB	2 - 3	2 - 4
A.04	Chislehurst – Tonbridge	XTD, TLP	Primary	DfT	No	W6	RA8	70 - 90	Third rail	TCB	2 - 3½	2 - 4
A.05	Chislehurst – Ashford via Maidstone East	VIR, CSM, SBJ	Primary	DfT	No	W9	RA8	70 - 80	Third rail	TCB	3 - 4	2 - 4
A.06	Tonbridge – Hastings	TTH	London & SE	DfT	No	W6	RA8	60 - 80	Third rail	TCB	3 - 5½	1 - 2
A.07	Dartford Lines and Hayes Branch	NKL, BEX, BTC, NCS, HDR, LLL, LCH	London & SE	DfT	No	W8 Sidcup and Bexleyheath lines (W6 elsewhere)	RA6/8	60	Third rail	TCB	2 - 6	2
A.08	Bromley North branch	BNG	London & SE	DfT	No	W6	RA8	40	Third rail	TCB	3	2

Figure 23 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 (mph)	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
A.09	Dartford/Swanley – Margate	VIR,HDR	London & SE	DfT	No	W6	RA8	70 - 90	Third rail	TCB	2 - 4	2
A.10	Sheerness Branch	SEJ	London & SE	DfT	Yes	W6	RA8	30	Third rail	TCB	4	1
A.11	Strood – Paddock Wood	PWS	London & SE	DfT	Yes	W6	RA8	55	Third rail	TCB	7	2
A.12	East Kent Routes	VIR,FDM, ACR,BME, XTD	London & SE	DfT	No	W6	RA8	40 - 70	Third rail	abs block	3 - 14½	2
A.13	Hastings – Ashford	ATH	Rural	DfT	Yes	W6	RA8	40 - 60	none	mixed	13 - 14	1 - 2
A.14	Tonbridge – Channel Tunnel	XTD	Primary	DfT	No	W9	RA8	90 - 100	Third rail	TCB	2½ - 3½	2
N/A	St Pancras – Channel Tunnel (HS1)	--	--	DfT	No	GB+	--	186	OHLE	In-cab	--	2
A.99	Freight Lines (Angerstein, Isle of Grain and Dungeness branches)	AGW,HTG ,APL	Freight only	DfT	No	W8 Isle of Grain branch (W6 elsewhere)	RA6/7	30	none	key token	N/A	1

Capacity and operational constraints
A London Bridge: insufficient platform capacity at peak times for either Thameslink route trains to run via this route or for all existing Charing Cross services to call
B London Bridge west: Borough Market to Metropolitan Junction two track section restricts capacity
C London Bridge east: flat junctions between Tonbridge main line, Greenwich and Brighton lines restrict capacity
D Lewisham/Hither Green area: flat junctions restrict capacity
E Orpington – Tonbridge: mainly two track railway with local stations to serve restricts capacity
F Herne Hill area: Two track railway shared between fast and slow services, plus flat crossing between Sussex and Kent routes is a significant timetable constraint
G Tonbridge – Hastings: limited power supply, turnback capability and single track tunnel sections restrict capacity
H Dartford/Gravesend area: Limited turnback capability for 3 routes to London
J Charing Cross: Limited concourse capacity and narrow platform widths. Platform 5 unable to accommodate 12-car Class 465. Platforms 4 and 6 only have potential to accommodate 12-car Class 465 trains if a Door Opening Inhibit system is fitted to the rear vehicle

Other issues on the route
1 South London line service changes, linked to ELL extension to Clapham Junction, Thameslink works at London Bridge and platform lengthening at Battersea Park
2 Anticipated termination points of future Thameslink services
3 Abbey Wood: planned interchange with Crossrail
4 Abbey Wood to Gravesend: Safeguarding of a potential future Crossrail extension

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March 2010