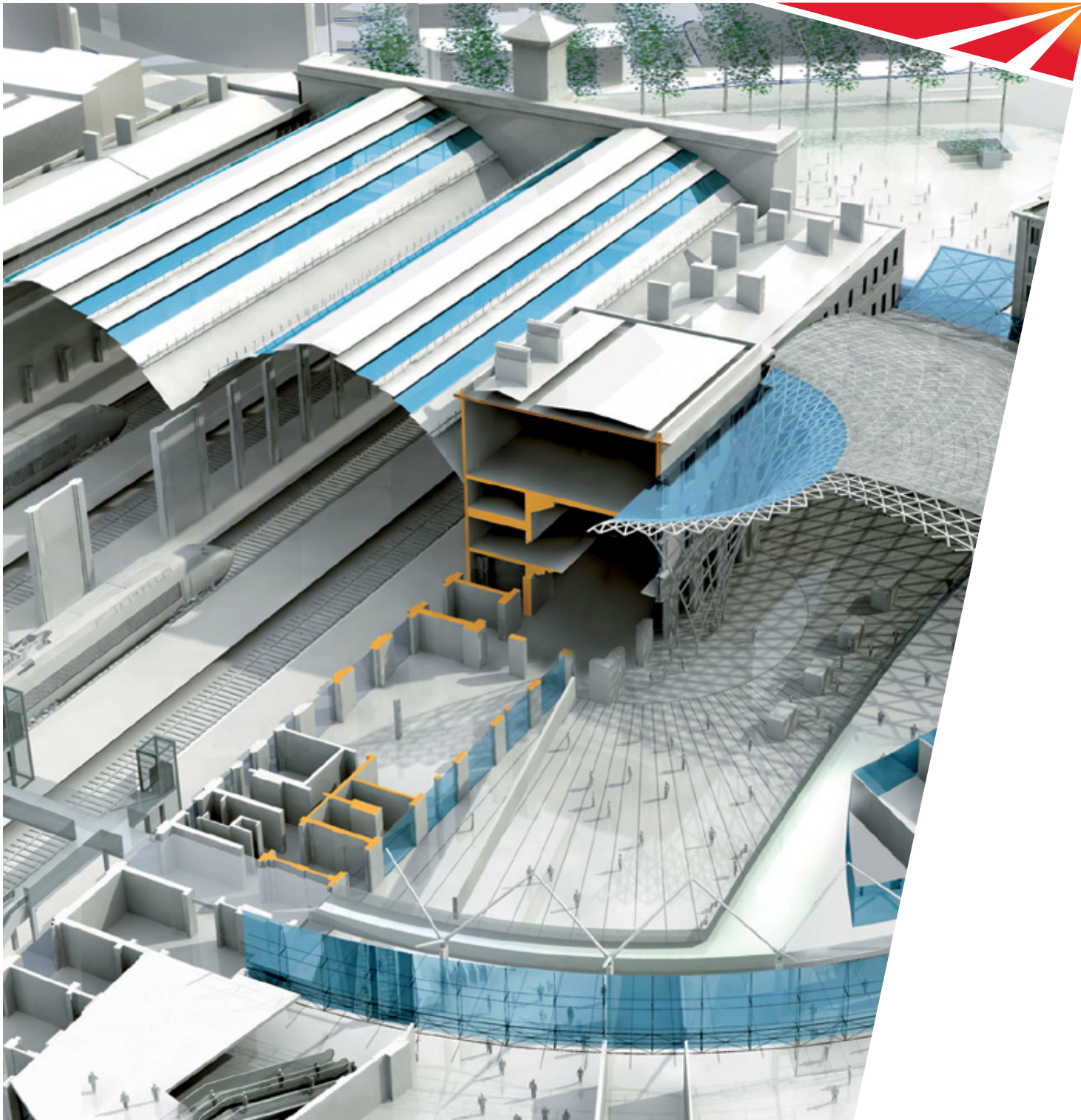


Moving ahead Planning tomorrow's railways

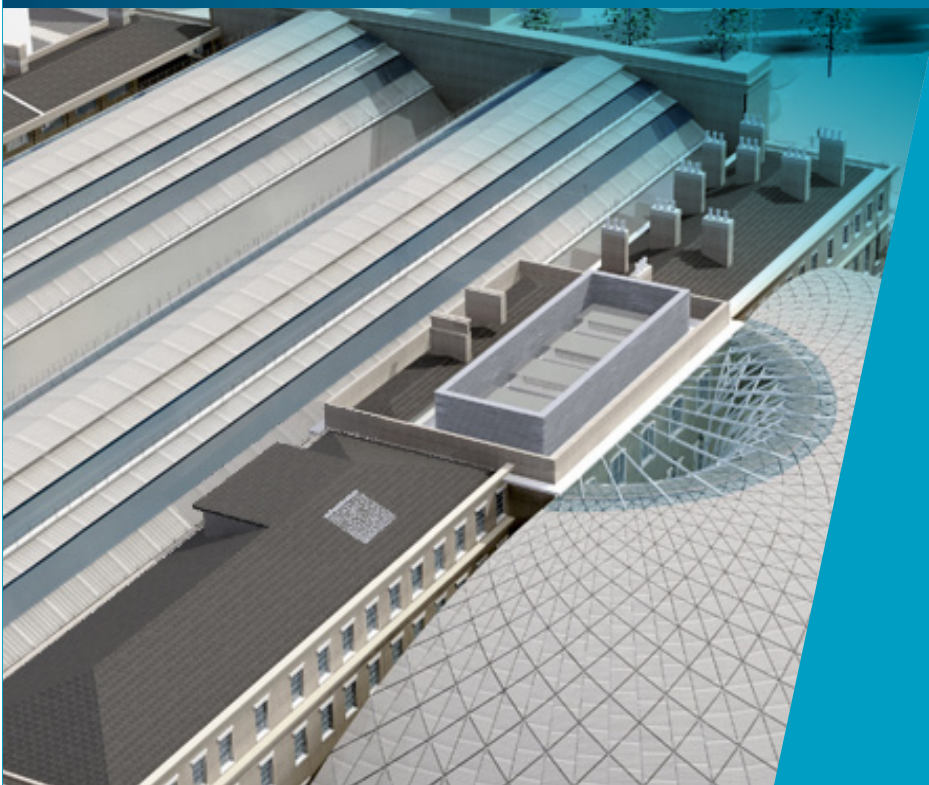
NetworkRail



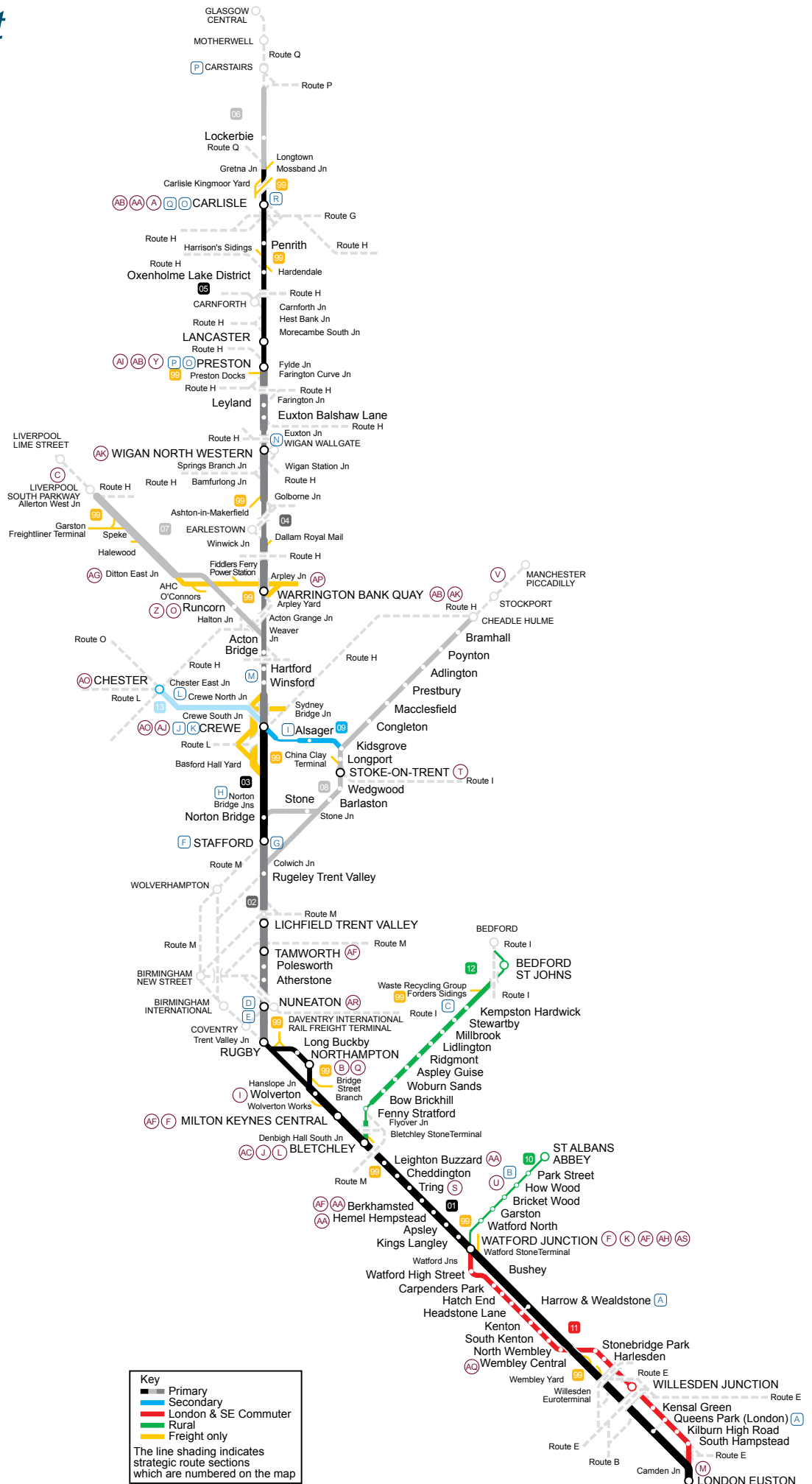
*Our railways play a vital role
in building Britain's future*

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 N West Coast



Section 1: Today's railway

Route context

The West Coast Main Line (WCML) is recognised as a strategic transport corridor linking Europe (through the Channel Tunnel) via London and South East England to the West Midlands, North West England and Scotland, and is one of the busiest freight routes in Europe. Its international importance is reflected in its designation, as a priority Trans European Network (TEN) route. In a domestic context, the WCML is the busiest mixed traffic route in the United Kingdom (UK). It is central to the business of many UK and international passenger and freight operators.

Passenger

Virgin Trains provide fast long distance InterCity passenger services between London, the West Midlands, the North West, North Wales, Glasgow and Edinburgh. These services are operated by Class 390 Electrical Multiple Units (EMU – Pendolino's), or Class 221 DMUs (Super Voyager). Both types of rolling stock are capable of tilting speeds of up to 125mph.

CrossCountry is the main provider of long distance high speed services outside of London. Geographically, it is also the most extensive operator of passenger services in the UK covering around 1,500 route miles and calls at over 100 stations. CrossCountry provide services on the WCML north, between Manchester to Bristol, Manchester to Bournemouth via Birmingham.

London Midland operates interurban services between Birmingham, Northampton, Milton Keynes and intermediate stations to Euston. London Midland also operates services between Euston and Crewe via Northampton and Stoke-on-Trent and between Birmingham New Street and Liverpool using 100mph, Class 350 EMUs (Desiro). The southern section of the WCML plays a crucial role in providing commuter rail services into London, with Transport for London – London Overground Rail Operations Ltd (LOROL) operating inner urban services between Watford and London.

The North West section of WCML provides vital connections between major cities and towns such as Manchester, Liverpool, Preston and further beyond. Interurban and rural rail services operate between these destinations are primarily operated by Northern Trains and First TransPennine Express (TPE).

Freight

The WCML is one of the busiest freight routes in Europe and is the principal rail freight corridor between the European mainland (via the Channel Tunnel) and London and South East England and onto the West Midlands, North West England and Scotland. 43 percent of all UK rail freight uses the WCML at some stage in its journey and all the main UK freight operators run trains over the route (some over its entire length).

There are a number of freight companies that operate over the route and a variety of commodities conveyed including intermodal, coal and aggregates traffic. Flows have either arrived in the UK via maritime intermodal ports, or are transported between domestic terminals.

There are also significant infrastructure services throughout the route, which are centred on Crewe.

West Coast Route Modernisation (WCRM)

The WCML route saw little investment once electrification was completed in stages between 1960 and 1974. However, over the last six years there has been significant investment (£8.8billion) on the route, as part of the West Coast Route Modernisation (WCRM) programme, which reached completion in December 2008. The WCRM project team has successfully completed a large number of infrastructure improvements, including line speed improvements (providing 125 mph for the majority of the route in tilt mode), renewal of signalling over large sections of the southern end of the line, increased power supply arrangements and improved track and junction configurations. The key infrastructure schemes and outputs of the WCRM project are listed in the Current Capacity section.

Today's route

The principal elements of the route are described below with the relevant Strategic Route Section (SRS) shown in brackets:

- the WCML from London Euston to Carstairs via Trent Valley and Crewe for approximately 600km (N.01 – N.06) with diverging routes at Rugby for Birmingham, at Colwich Junction/Norton Bridge to Cheadle Hulme (Manchester) (N.08) at Weaver Junction to Liverpool South Parkway (N.07) and at Crewe to Chester (N13);
- the Camden Junction to Watford Junction DC electric lines (N.11);
- the branch from Watford Junction to St Albans Abbey (N.10) is designated as a 'Community Rail' line (and the DfT is presently consulting on the route being converted to possible tram operation).
- the branch from Bletchley to Bedford excl. (N.12); (the passenger service run on this branch line is designated as a Community Rail service by the DfT);
- the Kidsgrove to Crewe line (N.09);
- Other Freight lines (N99)

Full SRS details are shown in Figure 22.

Figure 1 Current train service level (peak trains per hour)

Route section	Fast lines	Slow lines	DC lines
Euston – Watford Junction	13	9	14
Milton Keynes – Rugby (south of Hanslope Junction)	11	6	n/a
Rugby – Stafford (south of Colwich Junction)	8	4	n/a
Stafford – Crewe (south of Norton Bridge)	7	5	n/a

Current passenger demand **Long Distance**

Despite the recent recession, passenger journeys are continuing to grow on the long distance intercity services operated by Virgin Trains by between five and six percent per annum. The annual growth up to March 2009 was 5.2 percent (ORR National Rail trends yearbook 2008-2009). This is in contrast to the low growth seen on many other rail routes.

Rail now accounts for 80 percent modal share for the Manchester to London market and is still growing. Passenger journeys to and from the West Midlands have seen growth of 15 percent. Virgin Train's biggest area of growth has been at weekends, with passengers now experiencing a service that broadly matches that of weekdays in terms of speed and efficiency.

The timetable introduced in December 2008 was a major change, and is still in its infancy. We would expect passenger trends to be inconsistent for a year or two before the market fully settles down.

To improve journey opportunities for CrossCountry services, the stopping patterns on the Birmingham to Manchester services were changed in 2009. This has further improved passenger growth.

Commuter

Growth on peak London commuter rail services operated by Transport for London – London Overground (LOROL) also continues to increase steadily. Economic growth can be expected to generate further increases in the off-peak travel market, especially to central London where rail competes strongly with other modes.

The SRA published a Route Utilisation Strategy (RUS) for the West Midlands in July 2005. This covered the period up to 2011 and set out scenarios of continuing growth of commuter traffic to the centre of Birmingham. Demand on West Midlands' suburban services has been steady at a yearly growth rate of 4.5 percent. This includes the interurban services to Northampton, Coventry and Birmingham exceeding the trajectory of the RUS middle-scenario of 3.9 percent.

As part of the West Midlands and Chilterns Route Utilisation Strategy (RUS) boundaries overlap with the WCML route. 20 'busiest' stations were identified in the RUS area: with Tamworth and Stafford being two of these stations.

Of the 20 'least used' stations, six were also identified along this route. These were Atherstone, Polesworth, Rugeley Trent Valley, Norton Bridge, Barlaston and Wedgwood. Polesworth was noted as averaging less than one passenger per train. The RUS will be monitoring the effect of the new London Midland service via these stations to establish if demand has been stimulated by the new trains and journey opportunities.

Current services

Figure 1 represents the numbers of trains in the morning peak hour.

Passenger **Virgin Trains**

Virgin Trains are the predominant long distance passenger operator on the route, providing services between London and the West Midlands, the North West, North Wales, Glasgow and Edinburgh. The majority of the services are operated by Class 390 electric tilting trains, with services to Chester and Holyhead, and between Birmingham and Scotland provided by tilting Class 221 diesels. Typical off-peak weekday frequency is three trains per hour between London Euston and Birmingham; three trains per hour between London Euston and Manchester; and hourly services between London Euston, Liverpool, Chester and Preston, with a slightly lower frequency operating further north to Scotland. Virgin operates 2,180 trains per week on the route.

CrossCountry

CrossCountry operates long distance intercity services which generally operate on a clock face timetable radiating from Birmingham New Street. While principal service flows are between Manchester and Birmingham, services which go beyond Birmingham (e.g. to Bristol and Bournemouth) are highly significant. The Birmingham – Stansted Airport/Nottingham services operate on an hourly pattern and provide

opportunities for interchanges at Tamworth and Nuneaton.

As CrossCountry's services traverse many strategic routes, planning has to be considered across route boundaries in order to deliver maximum industry benefits. During 2009, CrossCountry added additional station calls (at Stafford and Stockport) to improve direct links for intermediate markets on the Manchester to Bristol route.

London Midland

London Midland operates inter-urban services between London Euston, and Birmingham via Milton Keynes and Northampton, and onward to Crewe and Liverpool.

As part of the December 2008 timetable enhancements, London Midland introduced an hourly service from Crewe to London Euston via Stoke-on-Trent and stations on the Trent Valley between Stafford and Rugby. As a consequence several locations saw new direct train services to Euston. These included Alsager, Atherstone, Kidsgrove, Stone and Rugeley Trent Valley.

London Midland also operates the branches from Watford Junction to St Albans Abbey and Bletchley to Bedford.

For the December 2009 timetable, and supported by the DfT, London Midland introduced further peak time services for passengers commuting to and from London, creating an additional 2,080 seats during peak commuting times and offering a ten minute frequency service between Watford Junction and Euston in the high peak hour.

On the southern end of the WCML route the following train operators run services:

London Overground Rail Operations Limited (LOROL)

LOROL provide an 'all stations' service on the DC lines between London and Watford Junction.

London Underground Limited

London Underground Bakerloo line services link Central London via Queens Park to all stations to Harrow and Wealdstone.

Southern

Southern provides an hourly service linking East Croydon (via Clapham Junction) to Milton Keynes Central, providing new journey opportunities to and from the south of England. There are also opportunities to interchange at Watford Junction and Milton Keynes Central stations without changing in London.

On the Northern end of the WCML route, five train operators operate an extensive range of rural and interurban services that connect various intermediate stations on the route. These services link long distance intercity services to numerous communities in the Midlands, North West, North East England, Wales and Scotland. The five operators are:

East Midlands Trains

East Midlands Trains run services over the route from Stoke-on-Trent to Crewe, via Kidsgrove.

First TransPennine Express (TPE)

TPE run services between Manchester Airport and Blackpool, Barrow and Windermere, Glasgow and Edinburgh.

TPE services are showing even higher levels of growth, especially between Manchester and Scotland where passenger numbers have increased by 50 percent since TPE became responsible for these services in December 2007.

TPE is competing with road and air in both the business and leisure markets. To meet and further stimulate this growth, the initial service of seven trains per day in each direction was increased to nine in December 2008 and further increased to 11 each way from December 2009 (Seven Manchester Airport to Edinburgh and four Manchester Airport to Glasgow). Reductions in the number of flights between Manchester and the Central Belt of Scotland and the introduction of these well spaced rail services indicate the success rail is having in business market. The additional trains together with reductions in the number of long weekend blockages for engineering work north of Preston, and the concentration of most of the remaining blocks into a lunchtime Saturday to early afternoon Sunday timeframe, are helping to stimulate growth in leisure travel and meet significant increased demand between the North West of England and Scotland.

Arriva Trains Wales (ATW)

ATW provide services originating from North Wales which serve Manchester via Warrington Bank Quay and from South Wales to Manchester via Crewe. ATW also provide an hourly service on the Crewe to Chester line.

Northern Rail

Northern Rail provides services that utilise parts of the WCML including between Wigan and Carnforth and also serve Manchester Airport via Stockport and Crewe. Northern Rail also provides services between Manchester and Stoke-on-Trent.

First ScotRail

First ScotRail operates the Caledonian overnight sleeper services between London Euston and Edinburgh, Glasgow, Inverness, Aberdeen and Fort William.

Figure 2 shows the total annual tonnage levels on the route.

Current Freight Demand

Demand for freight is particularly focused on growth in intermodal traffic and terminals growth. Demand for freight is nationwide and therefore affects the whole WCML route. Of particular importance is the West Midlands area as it is a key 'cross roads' for this demand.

There is currently high demand for freight paths along the route driven by both intermodal traffic and coal traffic.

Terminal expansions including those as at Birch Coppice and Daventry are helping to build on the current demand for freight services. This is also significant transiting traffic that passes through together with freight traffic to the terminals.

Current Freight Services

Freight services over this route are provided by DB Schenker, Freightliner Limited, Freightliner Heavy Haul Limited, Fastline Freight, First GBRf, Direct Rail Services and Colas Rail.

There is an assortment of freight traffic operating over the route, transporting a variety of products. This mix of freight traffic makes the route critical to the success of freight in the UK rail market and we recognise that a significant amount of this traffic is very time sensitive and needs fast transits in order to be competitive.

The route also plays a key role in distributing the traffic that has arrived in the UK via the Channel Tunnel and deep sea ports. Traffic moves to key terminals at Daventry, Trafford Park and Hams Hall.

The commodities conveyed are dominated by coal, aggregates and intermodal traffic (deep sea, domestic and European).

Intermodal

Intermodal traffic, by its nature, can be more time sensitive than other freight traffic flows. Traffic via the Channel Tunnel has to meet very tight windows to ensure connections are maintained, as does traffic to and from the docks, which is required to connect with ships that cannot miss their slots or tidal flows.

Figure 2 Tonnage



There are maritime intermodal flows originating at Southampton, Felixstowe and Tilbury docks, which use the WCML to the destinations of inland terminals including Trafford Park (Manchester), Hams Hall, Lawley Street (Birmingham), Ditton and Garston (Liverpool).

There has also been a substantial increase in domestic intermodal traffic moving products (e.g. for supermarkets) between Daventry and Scotland.

Coal

Anglo – Scottish coal is diverted away from the WCML by day due to the passenger timetable pattern (via Settle and Carlisle and then Hellifield - Blackburn) and returns to the West Coast at Farington Junction, near Preston. This traffic continues to travel on the route to Fiddlers Ferry, Rugeley and Ironbridge power stations.

Coal also moves from Liverpool Docks and Ellesmere Port to Fiddlers Ferry and utilizes the WCML between Winwick Junction and Warrington.

Coal also moves from Scotland to Ironbridge and Rugeley power stations. Rugeley and Fiddlers Ferry also receive coal from Portbury.

Aggregates

Aggregate flows traverse the route and operate to terminals at Northampton, Bletchley, Watford and Willesden. Further north, quarried materials from the various Shap quarries are transported to Teeside, Manchester and Sheffield.

Other flows

These include:

- MOD flows to and from Carlisle;
- china clay flows via the Channel Tunnel to Scotland; and to Cliffe Vale at Stoke from the south west;
- scrap movements from Mossend to Liverpool;
- automotive traffic from Halewood (Liverpool) to Southampton and Wembley, both imports and exports;
- Royal Mail traffic between Willesden, Warrington, and Shieldmuir (substantially busy in the run up to Christmas).

The route also plays a critical role in accommodating our infrastructure services which convey ballast supplies from virtual quarries located across the route including Carlisle Kingmoor and Bescot. Considerable infrastructure activities are centred around Crewe as the main depot. It is vital to the railway that these flows arrive on site, within a given time frame so as not to disrupt any planned possessions.

Freight traffic volumes are summarised in Figure 3.

Figure 3 Current use			
	Passenger	Freight	Total
Train km per year (millions)	42	11	53
Train tonne km per year (millions)	15,079	9,234	24,313

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.

Current capability is shown in the Network Rail Sectional Appendix.

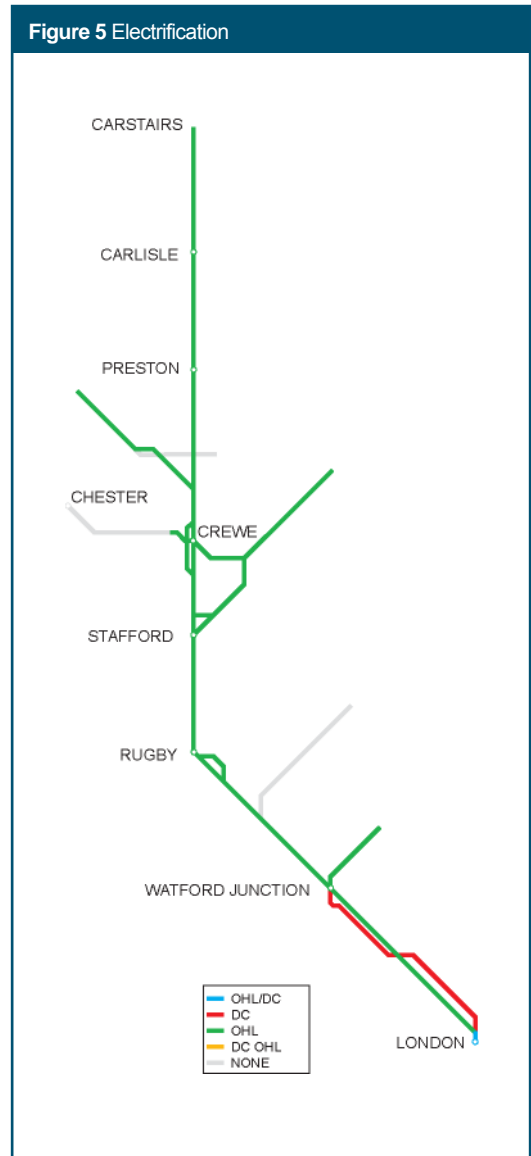
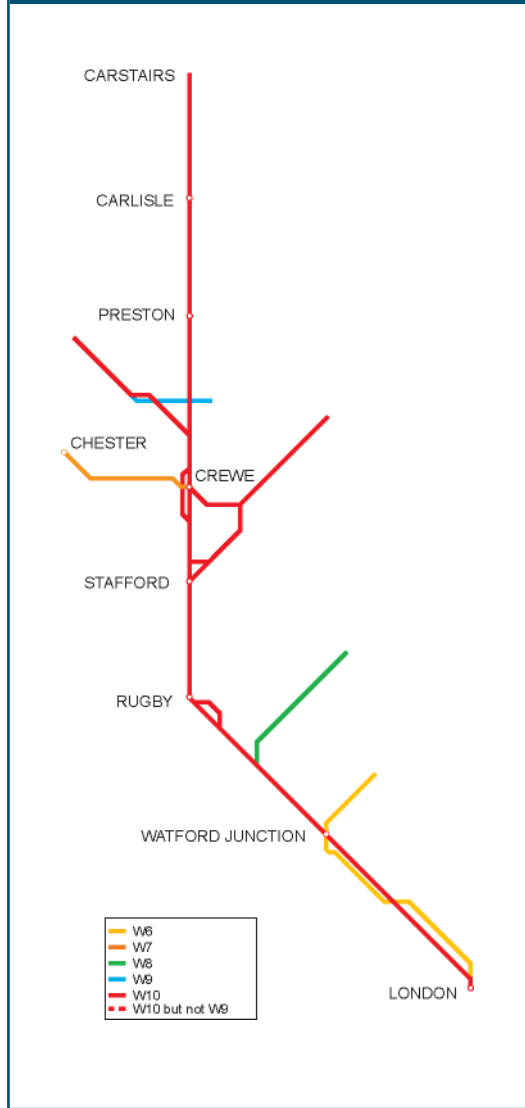


Figure 6 Route availability



Figure 7 Gauge



Current capacity

Additional capacity was created in December 2008 upon completion of a number of major enhancement schemes such as Trent Valley corridor, Nuneaton, Rugby, and Milton Keynes remodelling.

The West Coast Route Modernisation project included:

- **Bletchley** – The line speed on the Up Fast line was successfully raised in January 2010 to 125 Enhanced Permissible Speed.
- **Milton Keynes** – re-signalling and re-modelling of the layout and platforms to provide additional capacity through turn-back and overtaking facilities.
- **Northampton** – signalling renewal giving additional functionality, together with the extension of the bay platforms 4 and 5.
- **Rugby** station area re-modelling and re-signalling – a new track layout, additional platforms, improved line speeds, reinstatement of the fourth track from Rugby Trent Valley Junction to Brinklow, and the replacement of the passenger subway at the station.
- **Nuneaton** – re-signalling of the area and junction re-configuration, allowing higher through speeds.
- **Trent Valley** – between Tamworth and Armitage – additional two tracks installed to make a four track railway (two fast and two slow lines), with line speed increases and added bi-directional functionality for maintenance and perturbation purposes between Rugby and Lichfield. Signalling control was transferred to Rugby Signalling Control Centre.

Upgrade works have also continued on the route since the introduction of the Very High Frequency (VHF) timetable. Work has focused on increasing the Enhanced Permissible Speed (EPS) line speeds at numerous locations including around the Queens Park and Shap areas and at key junctions/locations.

- **Colwich** – remodelled to allow a higher line speed for northbound trains.
- **Crewe to Weaver Junction** – remodelling of life expired infrastructure, improving line capacity between Hartford and Acton Bridge, and increasing turnout speeds at Weaver and Winsford junctions.

- **Stoke on Trent** – Stoke station signalling rationalisation saw Platform 1 re-aligned and partly reconstructed. This allowed higher line speeds in the area.

- **Traction power supply upgrade** – Reinforcement of the overhead power supply system to meet increasing demand.

Ongoing trials are taking place to increase the maximum current on the 25kv AC overhead electrified lines to bring into line with European Standards on Interoperability. Possible benefits include improved voltage regulation due to increased power, reduced energy consumption, reduced CO2 emissions and a reduced requirement for National Grid supply points.

In addition to WCRM, the Gretna to Annan project was completed in 2008, where the track was doubled, together with additional signalling, improving capacity and performance for freight at the north end of the route.

These works helped to provide increased capacity, through line speed increases at stations and reduced conflicting moves at key junctions. It enabled the VHF timetable to be introduced which has delivered enhanced passenger service frequency and further journey time improvements. Line speeds have also been increased on numerous sections of this route.

Key outputs of winter 2008 timetable

The key outputs delivered by the new timetable from 16th February 2009 were:

- Over 1,000 extra services introduced.
- London to West Midlands services every 20 minutes, with a standard journey time of 1 hour 23 minutes to Birmingham New Street.
- London to Manchester frequency increases to a train every 20 minutes, and end to end journey times of around two hours.
- London to Liverpool accelerated by 20 minutes with additional peak hour trains.
- A new hourly service between London Euston and Chester, with some services extended through to North Wales.
- Increased frequencies between London, Lancashire, Cumbria and Scotland, with considerable journey time improvements and Glasgow trains being up to fifty minutes quicker.
- Quickest Euston to Glasgow service is now four hours and ten minutes.
- A new hourly semi-fast service between London Euston and Crewe, via Northampton, Trent Valley stations and Stoke-on-Trent.

- A standard pattern CrossCountry timetable with hourly Manchester to Bristol and Bournemouth services via Birmingham.
- Substantial increase in route capacity for further growth in freight traffic.

The number of weekday passenger services operated by Virgin Trains increased by 32 percent to 335 trains per day. With a significant reduction in weekend disruption over much of the route, passenger services operated on the WCML on Sunday's rose from 155 to 230 trains.

However, certain key constraints remain. These include the three track section from Brinklow to Attleborough South, the two track section through Shugborough Tunnel together with the junction layouts north and south of Stafford. Further north the two track mixed traffic railway north of Preston together with the limited length and position of passing loops also restrict capacity.

The current junction configurations and track layouts at Crewe are sub-optimal, placing operational limitations on movements while at the same time reducing through line speeds (for example Manchester – Cardiff services traverse the entire junction). The constrained layout at Crewe (including the Independent lines) and the limited number of tracks north of Crewe, also restricts freight capacity and growth.

Towards the southern end of the route where four or more tracks are available, the mix of fast and slow traffic is less of an issue. There are, however, only three freight train paths per hour available on the four track section, which restricts capacity.

The section of line between Watford Junction and St Albans Abbey is capacity constrained as it is single track. The Bletchley to Bedford line also contains single track sections at both ends of the line.

Platforms

The majority of the stations between London Euston and Northampton have benefited from platform extensions, enabling London Midland 12-car services to call. Further platform extensions are currently being proposed, for example on the slow line platforms at Wembley Central. However, the slow line platforms 3 and 4 at Bletchley will not be lengthened until completion of the remodelling/resignalling project in 2013. This will cater for 12 car Class 350 trains.

In July 2009 St Albans Abbey station saw a new modular structure installed which raises the platform height making access to and from trains easier.

Stations

London Euston

At London Euston station improvements have taken place on the concourse under our 'clean concourse' policy. £9 million has been invested with the scheme completed in January. This has created more room by moving retail units off the central concourse. New information points have been provided, toilets have been upgraded and extended, the piazza has received a facelift and other improvements have taken place to the taxi ranks. Manned ticket barriers have also been added to improve security and control access to trains. Two new lifts from the station concourse to the London Underground booking office were installed in January 2010, with a funding contribution from the DfT's 'Access for All' programme. A scheme to upgrade the ticket office has been implemented by Virgin Trains.

London Midland will renew automatic ticket barriers at Euston and increase their number on Platforms 8 – 11 by December 2010. This will reduce queues that build when trains arrive at these platforms during the morning peak.

Work at other stations includes Wembley Central, which has introduced stadium access and crowding controls. This has helped to improve performance and passenger circulation.

The upgrade of passenger facilities at Runcorn station has been part completed with a new booking office and retail area.

Timetabling

The complex mix of services represents a major challenge in terms of maintaining performance levels and pathing of services. The limited route capacity, particularly north of Preston, where long distance passenger services (operating at speeds of 100mph and above) mix with freight flows on a two track railway, create significant pathing constraints. Diesel hauled freight services are slower climbing the steep gradients north of Preston than electrically hauled freight services, yet many long distance freight services are diesel hauled for various reasons. Timetabling of these important freight flows (e.g. coal traffic) via the Settle – Carlisle and Blackburn – Hellifield routes, is one solution to alleviate route congestion and release further capacity.

In the longer term, interventions to enable additional, longer freight services will be necessary to continue to grow Anglo-Scottish freight volumes.

Rolling stock and depots

Virgin Trains

The current fleet of Class 390 (Pendolino) trains has revolutionised train travel on the WCML, as well as reducing journey times. The trains can travel at up to 125mph safely leaning around curves up to 20 percent faster than non-tilting designs, whilst retaining passenger comfort levels. The Pendolino trains use regenerative braking which return power to the National Grid. The carbon footprint of a Pendolino has been measured and is up to 76 percent less than domestic airlines. This is helping travellers make an informed decision to use less polluting forms of transport.

Virgin Trains also operate 21 Class 221 'Super Voyager' units (18 are in five-car formation and three are in four-car formation). These trains also operate in 'tilt' mode to allow them to run at Enhanced Permissible Speeds.

Class 390 pendolino lengthening – 11 cars

The DfT has committed to proceed with the lengthening of the Pendolino vehicle fleet, with a further 106 Class 390 vehicles being built. Four 11-car train sets are planned to enter service in 2011/12, and 31 existing nine-car sets will each have two vehicles inserted, to create 35 (31+4) 11-car trains.

The first of the new trains will arrive by late 2010 to commence testing and will be available for service by mid 2011. All the new vehicles are planned to be in full service by December 2012.

Alstom were awarded the contract for these new vehicles, which are being built at their Savigliano plant in Italy. Virgin Rail Projects Ltd are supporting the DfT as the 'Service Provider' for this contract.

In order for the sets to operate, platform work is required at 15 stations on the route. The work involves platform extensions at eight stations (14 platforms). Five stations (six platforms) where platforms cannot be physically extended will have to be resolved through Selective Door Opening (SDO). Minor works (such as de-cluttering of platforms ends and erection of fences) are required at four stations (five platforms).

Work is continuing at all five railway maintenance depots (Manchester Longsight, Liverpool Edge Hill, Glasgow Polmadie, Wolverhampton (Oxley) and

Wembley) to further improve the overall rolling stock availability of the Pendolino fleet. Examples of works included removal of existing roads and their replacement with new longer sidings which have concrete aprons, are straighter and parallel, and have a fully electrified 25kv AC overhead supply. New walkways and new lighting facilities have been installed together with new Controlled Emission Toilet (CET) and watering facilities.

As part of this programme, the £5.6 million enhancement scheme at Longsight depot in Manchester has delivered much improved facilities.

Liverpool Edge Hill Depot

Work on the new £15 million building at Edge Hill (Liverpool) was successfully completed in June 2009. The building can take two Pendolino trains in its electrified sidings, increasing the depot's overall servicing capacity to service seven Pendolino's nightly from its previous four trains. The building provides new 'state-of-the-art' technology including a 'rail removal' system that enables train wheel sets to be swapped out and the major underside mounted equipment to be removed and refitted. Other new investment includes overhead cranes, a high-level platform allowing roof access for maintenance staff, new power supply arrangements and electrified areas.

Edge Hill depot will play a significant part in the programme to lengthen 31 nine car Pendolino trains to 11 car formations. This will help cope with rising demand for train travel on the West Coast.

During June 2009 Virgin and Alstom introduced a new 'pit stop' initiative at all of their depots which is helping to reduce the amount of time (up to 30 percent) a Pendolino is at the depot for maintenance and repairs.

London Midland

The new fleet of Class 350 trains utilised by London Midland has proven to be critical in delivering improved passenger standards and expectations. The Class 350s have enabled London Midland to provide additional capacity on the Euston to Birmingham via Northampton corridor, facilitating the increased number of eight and 12-car formations. More peak services operate as 12-car formations and eight-cars are provided for evening and Saturday services. Furthermore, the new rolling stock has led to improved acceleration and enabled suburban services within the West Midlands to be strengthened.

The Siemens maintenance depot at Northampton undertakes significant heavy maintenance activities for London Midland's Class 321 and Class 350 fleets. A second rail connection was provided in 2008 to improve the movement of rolling stock on and off the depot.

CrossCountry

Additional capacity in the form of High Speed Trains as well as additional seating on Class 220/221 and Class 170s has been introduced.

First TransPennine Express

First TransPennine Express operate Class 185 units which have delivered the necessary increases in passenger capacity whilst improving industry performance and reliability levels. The superior power, acceleration and comfort of the Class 185 units over the previously used Class 175s, have allowed the units to be used on the TPE services between Manchester Airport and Scotland, replacing the previous less frequent Virgin Trains service on this route.

LOROL

LOROL currently utilise a fleet of 23 Class 313 three-car units running on the DC network between Watford Junction and London Euston. Units are serviced at Willesden maintenance depot. The new fleet of Class 378 vehicles are gradually being introduced into service.

Southern

Southern operates their East Croydon to Milton Keynes Central services with Class 377 dual voltage units which are maintained off this route.

Car parking

The limited car parking facilities at smaller stations could be suppressing further passenger growth. It is anticipated that many passengers wish to drive to the station and this will put additional strain on the car parks. A national car park programme was established to improve key car parks and £90 million has been committed to transform parking at many of the stations on the route. Numerous new car parks have now been built as part of this programme creating valuable additional car spaces to meet demand.

The Virgin car park upgrade project will deliver over 3,800 extra spaces and car park schemes have already been successfully completed at the following stations:

Carlisle, Oxenholme, Preston, Lancaster, Runcorn, Wigan North West, Crewe, Stoke-On-Trent and Rugby.

Other Virgin Trains stations where car parks have been completed include Coventry, Birmingham International and Wolverhampton (on Route M) and at Stockport (on Route H).

Arriva Trains Wales have completed a scheme to increase the number of car parking spaces to the west side of Chester station.

Level crossings

Level crossings are the number one safety risk on the railway. Our policy is to continue to reduce risks at all level crossings, and if possible, close them. Work continues to review safety at footpath and user worked crossings. Two footpath crossings have recently closed at Tebay and Haybank (near Preston). There is a National User Worked Crossing Closure programme underway to reduce and eliminate crossing risks.

As part of the WCML Trent Valley four tracking scheme, there have been three level crossings closed during the course of the project. Following the closure of Hademore level crossing by WCRM in 2008, there are no longer any major level crossings on the WCML route between Euston and Hest Bank near Lancaster.

Plans are being progressed to close Bodsbury level crossing (north of Lockerbie) which is one of the highest risk level crossings that exist.

We will continue to review the operation of all level crossings on the route.

Figure 8 2009/10 PPM

TOC	MMA	As at period
Arriva Trains Wales	94.7%	11
London Midland	89.4%	11
Northern Rail	91.3%	11
London Overground	93.0%	11
First TransPennine Express	91.9%	11
CrossCountry	90.4%	11
Virgin Trains	84.4%	11
First ScotRail	90.5%	11
Southern	90.6%	11

Current performance

Figure 8 shows the current PPM for the principal train operators running along the route.

The WCRM project was completed in December 2008. During the first five months of 2009 there was significant disruption to passenger and freight operators and train punctuality over the route was not as good as expected.

The main causes of disruption have been problems faced with signalling equipment problems (axle counter and track circuit failures), point's failures, rail defects, together with incidents of vandalism and fatalities. There were also four train de-wirements and power supply problems on the Trent Valley section between Stafford and Rugby.

Signalling power supply problems in the Wembley area hampered performance further with two incidents affecting the 650volt power supply on the main line causing major disruption.

Cable theft also became a significant risk to West Coast performance, with several incidents effecting multiple locations such as Nuneaton, Bletchley, and Brandon (near Coventry).

The autumn of 2009 brought severe weather problems, including high winds and flooding. In November, in the north, a land slide near Carlisle affected services, while in the south, overhead wire damage at Hemel Hempstead caused train delays.

An overall recovery plan was compiled. A Joint Performance Improvement Plan (JPIP) was introduced between Network Rail and TOC/FOCs and agreed with the ORR. The primary objective is to work closely together to achieve a sustained improvement in performance over the route.

An extra £50 million was invested to improve performance. Such measures introduced included activities as:

- faster replacement of the most unreliable equipment including points, power and signalling cables and track,
- daily performance reviews with train operators,
- managing faults and incidents more closely and reacting faster,
- trouble-shooters at key locations between London and Crewe to keep equipment working reliably,
- a new maintenance team to look after equipment at southern end of route,
- extra critical spares on hand for troubleshooting teams,
- mobile generators to get cut power supplies back quickly,
- installation of covert cameras,
- fencing improvements,
- introduction of new 'remote' monitoring on vital equipment to predict potential problems.
- all 650v power cables are now fitted with equipment to remotely monitor any slow degradation in cables and prevent any future failures,
- on-going cable theft crackdown, with the use of anti-theft cable that is difficult to cut and sheath, and is traceable to Network Rail,
- introduction of 'SAS' teams who visit depots and address key worst performing assets.

These activities have taken time to be implemented and working. However, the rewards have materialised with the significant improvements being made as the year progressed and in Period 7 Virgin Trains achieved their best ever PPM figure of 93.4 percent – (beating their target of 87 percent). This beat Virgin's best previous PPM figure of 91.3 percent in May 2006 by approximately 2 percent.

Period 9 marked the end of the 2009 Autumn period and train punctuality saw a significant improvement compared to the same period last year.

Network Rail is working closely and effectively with train operators to continue improving the level of train performance. Overall, there is a real

determination to ensure that PPM levels are both met and exceeded.

The very cold spell of ice and snow during January 2010 severely affected WCML services and was a temporary setback on performance.

There still remains a certain amount of infrastructure which has not been renewed as part of the WCRM project. As equipment ages over time there is a risk to operational performance on the route. Signalling and cable equipment between Euston and Watford has been raised as a particular issue, together with equipment in the Bletchley and Stafford areas. The re-signalling scheme for the Watford area has been brought forward in CP4 which should help address some of the performance issues.

Constrained capacity at certain locations will continue to be a performance challenge, as will point's failures at key junctions. A key issue for this route is the track layout at Norton Bridge which suffers from poor reliability and is protected by a lower speed.

The route north of Crewe to Scotland is controlled from only four Power Signal boxes (Warrington, Preston, Carlisle and Motherwell). These have been life extended until ERTMS is expected to be made available (around 2030).

The timely operation of freight services on the WCML is very important to freight operators and their end customers; it is also a key issue for overall performance on the route. The 'right time' presentation of freight services onto the WCML and other routes is also important for national performance.

Efficient engineering access

Extensive discussions took place between DfT, train operators and ourselves in relation to the possession regime applying from December 2008. This regime is known as Efficient Engineering Access (EEA). Following agreement with the DfT all our planned engineering work on the WCML is now being undertaken in accordance with EEA. The rationale for introducing this regime is so that the railway will meet both passenger and freight demand seven days a week.

When the 2008 timetable development took place a fundamental review of the allowances (engineering and performance) and overall route management was undertaken to optimise the delivery of sustainable journey time savings, whilst ensuring ongoing sustainable route maintenance.

The EEA project is delivering new technology and processes to enable us to maintain and renew infrastructure more efficiently, while minimising major disruption and contributing to offering operators and end users an improved availability of the network. Some of the continuing work streams in the EEA programme include:

- access points upgrade – to deliver improvements to access points at key locations on the route, including improved lighting. This allows maintenance staff to access the railway faster, to enable them to do work with less disruption to trains. 15 new access points have been created so far and 239 access improvements have been completed.
- fixed warning systems – to deliver fixed warning systems at key locations to enable better patrolling of the track for examination purposes.
- track – to renew rails more efficiently and undertake additional track replacement.
- remote conditioning monitoring – to progress from a 'find and fix' to a 'predict and prevent' maintenance strategy. RCM has been installed on 537 point ends with maintenance staff now trained in install this equipment.
- improved junction lighting – to introduce permanent lighting at key junctions. Four sites have been completed.
- faster possessions – the introduction of more efficient management systems to enable enhanced productivity.
- red zone prohibition areas – removal of areas where work cannot be undertaken in Red zones. This will allow the more flexible approach to inspection and patrolling. So far, 43,600 yards of red zone prohibition have been removed.
- Lookout Operated Warning Systems (LOWS). New equipment that allows mid-week opportunities to access the track.
- integrated planning – better planning procedures that will save time and reduce costs.

There are other initiatives and new products also in early stages of development. These include motorised trolleys, rolling green zones S&C video inspections, fixed earthing points, and new gantry cranes.

One of the most important features of the current timetable is that a weekday train frequency and journey time operates on the routes south of Crewe and Manchester, all day on Saturdays, and from 1200 hours on Sundays. We have, therefore, transformed our infrastructure maintenance strategy, to enable work to be completed in shorter, fewer blocks of the line, principally utilising mid-week night and Sunday morning possessions.

During the 2008 bank holiday all-line blocks south of Rugby, Virgin Trains services were successfully diverted via the Chiltern lines. This strategy continued during similar possessions in 2009.

In December 2008, we saw the full introduction of EEA between Euston and Weaver Junction, and the heavy maintenance plan for WCML has been programmed in accordance with EEA principles.

In December 2009, we saw full EEA introduction between Weaver Junction to Liverpool.

Bi- Directional signalling on the fast lines was commissioned between Lichfield and Hillmorton in December 2009. This will assist in keeping the line open during planned engineering works.

For the first time in many years, the WCML was fully open for train services during the Christmas and New Year bank holiday (2009) periods. Virgin Trains, for example, ran 25 additional services on the London and Glasgow route over the holiday period to help passenger travel. This was supplementing the already planned 26 trains daily in both directions.

This work assists in making the network more available to our customers and network availability is discussed in more detail in section 2.

Modular switches and crossings

In October 2009 we saw a ground breaking project successfully completed which replaced a set of points in record time (21 hours instead of a whole weekend) at a track renewals site in Bamfurlong, Lancashire. The work used a new type of tiling wagon that allows pre-constructed track panels to be brought directly to site and slotted quickly into place. This work forms part of our modular switches and crossings programme which aims to significantly reduce disruption to customers at weekends. The introduction of new technology and the development of better ways of working will enable us to do more of our work at night-time, to help keep the network open.

Section 2: Tomorrow's railway: requirements

Figure 9 below shows the HLOS output requirement for the total demand to be accommodated on the former strategic route which makes up Route N: West Coast.

The detailed plans, and their effect on the HLOS capacity metric, will be subject to change in the light of future decisions on rolling stock deployment.

customers at airports, while train travel is far less restrictive, together with the transit time between the city centres and airports.

London Midland's market growth between Milton Keynes and Euston is some eight percent per annum, and growing, and has now become the company's largest passenger flow (10.5 percent).

Much of the growth is a result of new trains and faster journey times that are proving to be a more powerful stimulus to travel than might have been anticipated. Journey time and service frequency

Figure 9 Total demand to be accommodated by Strategic Route

Routes	Annual passenger km (millions) in 2008/09	Additional passenger km (millions) to be accommodated by 2013/14
West Coast Main Line	5,737	913

Figure 10 Peak hour arrivals to be accommodated at the main London termini by end of CP4

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 (%)
Euston	23,800	3,400	67% (assumes all major London Terminals)	10,600	1,600	76% (assumes all major London Terminals)

HLOS output requirements

Note the load factor requirement in the HLOS applies as an average across 12 London stations.

Future demand in CP4 Passenger

The growth in passenger usage may be greater on the major long distance flows than envisaged in the former SRA West Coast Strategy document. As a result of the WCRM improvements, Virgin Trains is experiencing growth in the region of eight to nine percent per annum and they anticipate 100 percent growth by the end of their franchise. To cater for the anticipated future increase in demand, the DfT has now authorised the building of 106 extra Class 390 vehicles which will be delivered during 2011/12.

Virgin Trains continues to experience a modal shift from air to rail. For example, Glasgow to London has seen rail grow to 18 percent of the overall travel market in the last few years (from nine percent in 2005). Virgin Trains anticipate that, by the end of their current franchise, it will have increased to 30 percent.

It is believed that one of the possible factors behind this is the increased security measures for

improvements within the December 2008 timetable is accelerating growth further.

As part of their franchise commitment, London Midland replaced their Class 321 units with a new build of 37 four-car Class 350s, providing fully air conditioned trains capable of faster acceleration. Since then, seven Class 321 units have been retained to cater for the significant growth in passenger demand on London Midland services.

On CrossCountry services the most recent passenger counts indicated an overall growth rate of eight percent per annum. In particular, CrossCountry are experiencing steady growth on their Edinburgh to Plymouth (via West Yorkshire and Birmingham), and their Manchester to Bournemouth via Thames Valley services.

First TransPennine Express services are expected to continue their impressive growth.

The announcement during the summer of 2009 of the electrification of the Chat Moss route between Manchester and Liverpool will allow services between Manchester Airport and Scotland to be operated using electric multiple units from 2013.

This will provide additional capacity on the Scottish routes as well as allowing the diesel trains currently working Scottish services to be used to provide much-needed additional capacity elsewhere on the TPE network.

However, there is a possibility that in future years, even with these measures, parts of the route will become saturated at peak periods (once all practical options on longer trains have been taken up). This is a key challenge that will be investigated in the West Coast RUS.

The whole West Coast route is expected to face a sharp increase in passengers into London during the July 2012 Olympic Games.

Freight

Key freight depots across the route are forecast to generate increasing traffic, with freight growth predicted to be growing during CP4, despite the current economic climate. Demand for coal and nuclear traffic will depend on future 'energy generation mix'.

In general terms, the freight growth forecasts indicate that the majority of growth will be from two key commodity sectors:

- **Deep sea containers:**
Strong deep sea container growth is forecast to continue now that W10 gauge clearance between the Port of Southampton and the WCML has been funded through the Transport Innovation Fund (TIF). Once delivered in 2011, the forecasts identify growth of six to eight trains per day in each direction to and from the Port by 2014/15.
- **Domestic Intermodal:**
Growth in domestic traffic on the WCML.

Freight RUS

The Freight RUS was published by Network Rail in March 2007 and established by the Office of Rail Regulation in May 2007. A key input to the strategy was a set of 10-year demand forecasts that were developed and agreed by the industry through the RUS Stakeholder Management Group.

The Freight RUS predicted that the number of freight services along the whole route will continue to increase steadily. There is particularly high predicted growth in intermodal traffic from deep sea ports, although any increase in flows may depend on the gauge clearance (W10) of key sections of the route. Key route sections include Felixstowe to Nuneaton (F2N) which includes the

proposed Nuneaton North chord scheme, and also the Southampton to West Midlands W10 works.

The Freight RUS identified that the area around the Crewe Independent lines (which has already experienced growth) is expected to grow to at least 1 million gross tonnes per year by 2014/15. The study also identified the following routes on this route where further significant increases in freight tonnage/ numbers are expected:

- London to Weaver junction
(extra 15 trains per day each way)
- Weaver junction to Liverpool
(extra 5 to 10 trains per day each way)
- Weaver junction to Warrington
(extra 10 to 15 trains per day each way)
- Warrington to Glasgow
(extra 5 to 10 trains per day each way)

Strategic Freight Network (SFN)

During CP4, it is hoped that the Strategic Freight Network project of 'Felixstowe to Nuneaton capacity works' will see work undertaken towards the Nuneaton end of the scheme. The W10 gauge clearance work should be completed by March 2011. This will allow larger containers to reach the WCML at Nuneaton for onward journeys to the West Midlands, North West and Scotland. Within this project is the proposed new Nuneaton North chord which is planned to deliver capacity for eight additional paths per day for trains arriving at Nuneaton South junction (from the Wigston direction) onto the down Trent Valley slow line – heading north along the WCML, thereby not having to cross the flat junction at Nuneaton. This work is due to be completed by December 2011 (subject to TWA).

Other SFN proposals for gauge improvements include W12 gauge for the following routes:

- London to Carstairs via Weedon and Northampton
- Bedford to Bletchley
- Colwich to Cheadle Hulme
- Norton Bridge to Stone
- Crewe to Kidsgrove
- Weaver Junction to Runcorn

Depots and terminals

A number of terminals and depots are experiencing growth higher than envisaged a few years ago both on and off the main route.

There are a number of projects being developed which include:

The Thames Gateway deep sea port development on the north side of the River Thames is expected to commence rail traffic by 2013. Trains will be routed via the North London Line onto the WCML to both the Midlands and North West intermodal sites. The traffic levels expected are projected to rise towards 20 trains per day.

The Mersey Multimodal (3M) Gateway project is investing in new 775m long freight sidings at the new logistics park at Ditton, which is planned for completion towards the end of CP4.

Numerous power stations are securing a long term future by installing Flue-Gas Desulphurisation (FGD) plants. FGD plants require an input of limestone and as a by product produce gypsum, so there may be opportunities for future flows. Fiddlers Ferry and Rugeley power stations have already fitted FGD. This suggests that coal will continue to be of importance to the energy mix in the UK.

Daventry International Freight Terminal is investing in a 'phase two' project to expand the infrastructure facilities at the depot.

Proposals for a new rail waste container handling facility in Runcorn are being developed. The new facility could be in operation by mid 2012.

Timber traffic from Carlisle Kingmoor Yard to Chirk (near Wrexham) is also growing with longer trains required to meet demand. An additional siding at Kingmoor Yard is being created and should be open for operation by Summer 2010.

A planning proposal is being progressed for the Silverdale branch (north of Norton Bridge) to be partially re-opened to support an aggregate extraction scheme. If successful this should commence during CP4.

Plans are being developed to re-open the currently disused line between Stoke-on-Trent to Caldon Low via Leekbrook Junction to allow freight traffic to commence from Cauldon Low quarries.

Class 70 locomotives

The gradual introduction of the new Class 70 freight locomotives should help to address future demand by running both faster and longer freight services. Trials have taken place on both Freightliner Heavyhaul and Intermodal services on the WCML, with an initial fleet of 30 Class 70 locomotives planned for the UK.

Network availability

As discussed earlier in Efficient Engineering Access, the concept of Network Availability is very important to Network Rail and the train and freight operators. Key elements in achieving this capability involve increased sections of bi-directional signalling and the upgrading of key diversionary routes for additional and larger gauged traffic. The train and freight operators and Network Rail will work together during CP4 with the aim of developing and implementing incremental bi-directional signalling and a diversionary route strategy where there is a strong business case and funding to do so.

Network Rail has worked closely with The Association of Train Operating Companies and, in December 2009, announced an initiative to reduce further the need for replacement buses at weekends and bank holidays. 20 key routes were identified which carry 60 percent of all weekend passengers and trains will be able to operate at weekends and bank holidays, unless exceptional circumstances make it impractical. This commitment will be progressively introduced over the next two years. We have been set a regulated target by the ORR of reducing disruption experienced by passengers because of planned engineering work by at least 37 percent by April 2014. A rail route will always be available between London and Scotland – either the West Coast or East Coast Main Line together with numerous other WC sections of line.

Track renewals

It is planned to introduce 'Campaign Renewals' on certain parts of the route.

Watford Junction to Euston DC Lines

In 2011/12 it is proposed to convert the entire DC Lines route from Watford Junction to Euston to Continuously Welded Rail. This should eliminate the primary cause of track failures and help to improve train performance on the route.

Bedford to Bletchley line

This route is in poor track condition with numerous temporary speed restrictions in place. Freight traffic has recently been introduced to this route and it is therefore planned to upgrade the line to Continuously Welded Rail by 2013/14.

Future demand beyond CP4

Demand growth is expected to continue into CP5 and beyond for both the passenger and freight businesses. The 2007 Government White Paper 'Developing a Sustainable Railway' anticipates a doubling of both passenger and freight demand over the next 30 years. This is discussed in detail in

the 'Long Term Challenges and Opportunities' section.

Longer term forecasts for freight demand up to 2030 have recently been agreed within the railway industry. These show the continued growth in freight beyond CP4.

West Coast Route Utilisation Strategy

The West Coast RUS needs to consider numerous options to meet this expected growth in both passenger and freight demand beyond CP4.

Some of these options may include:

- ERTMS – new signalling technology that will eventually remove lineside equipment and infrastructure and allow an increase in capacity. Potential further line speed improvements and significant maintenance savings.
- higher line speeds – both at key locations and sections of the route
- additional infrastructure at emerging or known pinch-points
- longer freight loops
- electrification infill – key sections of the network (in line with Network electrification RUS) are electrified to cater for electric traction and rolling stock and providing new/diversionary routes for strategic diversions for both passenger and freight traffic.
- further re-routeing of long distance flows
- enhancing the network by proposing short lengths of new lines to connect non rail communities

The West Coast RUS also needs to evaluate longer term strategies (such as those identified here) all of which may be necessary to alleviate congestion, whilst delivering enhanced capacity and performance. The RUS will include an assessment of enhancement opportunities presented by re-signalling, notably at Crewe and Stafford.

It will also consider the aspirations of Scottish Ministers for improved cross-border connectivity, including destinations other than London.

Section 3: Tomorrow's railway: strategy

Figure 11 summarises the key milestones during CP4 in delivering the proposed strategy for the route. Further explanation of the key service changes and infrastructure enhancements are set out in later sections.

Figure 11 Summary of proposed strategy milestones (CP4)			
Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
2010	Completion of refurbishment of CrossCountry 'Voyager' and 'Turbostar' rolling stock vehicles.	Rolling stock refurbishment.	Additional capacity
2011 – 2013	Bletchley re-modelling	Area to be re-modelled providing capacity and capability enhancements in the station area.	Scope and funding agreed, will generate capacity and performance improvements
2011 – 2012	Peterborough to Nuneaton W10 gauge clearance New Nuneaton North Chord	New Chord line at Nuneaton North onto the WCML down Trent Valley slow line (going north)	Extra capacity
2011 – 2012	106 additional vehicles added to Class 390 Pendolino fleet - making sets 35 X 11-car sets in total - (Virgin Trains)	Platform extensions required at numerous key stations. Some stations where platforms cannot be physically extended will have to be resolved through Selective Door Opening (SDO). Maintenance depot improvements also being undertaken to accommodate longer train sets.	Additional standard seats delivered on mainline intercity services
2010 – 2014	Additional Class 378 vehicles to strengthen the LOROL suburban services	None required	Increased passenger capacity in line with growth in demand
2013/14	Watford area resignalling	New signalling equipment to be installed	Reliability of equipment to be improved
2010 – 2012	Increases in fleet size by London Midland over WCML. (74 sets - comprising of 67 Class 350 and 7 Class 321 units retained)	Minor platform extension required at Wembley to meet modern standards	Ability to better serve Wembley on 'event' days
2010 – 2014 +CP5	WCML Traction Power Supply Upgrade	New auto-transformer system between Wembley and Carstairs and in Scotland	Strengthen system for future increases in electrically hauled passenger and freight trains
2010 onwards	Examination of additional routes for strategic diversions (Blackburn-Hellifield & Cannock Chase line)	Blackburn-Hellifield to be gauge cleared for suitable freight traffic. Cannock line to be gauge cleared for W10 freight traffic and line speed enhancement.	Alternative route as part of EEA for passenger and freight traffic increasing network availability.
2012/13	Re-franchising	Virgin, First TransPennine Express and Northern re-franchising will take place. This may generate further alterations to infrastructure in CP5.	Possible change in franchise owning groups and service group re-mapping

Figure 12 Capacity enhancements to meet HLOS peak capacity in CP4

Description	Additional vehicles involved	Station served	0700 – 0959 Capacity Impact	0800 – 0859 Capacity Impact
West Coast - Class 390 Pendolinos to be strengthened by 2 vehicles – to make 35 x 11 car sets	106 vehicles	Euston	4,400	1,500
London Midland lengthening of services and new Watford to Euston services	52 vehicles	Euston	8,900	5,400

Note: the load factor requirement in the HLOS applies as an average across 12 London stations.

Figures 12 and 13 help to show how the HLOS load factor targets for locations on the route are met by the proposed strategy. The measures will allow the total additional passenger km to be accommodated. The total additional passenger km will be accommodated by these actions in conjunction with Route M.

Figure 13 Impact on HLOS peak capacity metric

London Terminals and regional Hubs	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
Euston	27,200	34,200	47,600		12,200	15,900	22,800	
Other London termini	534,700	702,600	798,200	66%	207,100	305,400	351,800	75%

* These figures do not include the additional vehicles for CrossCountry to meet HLOS allocation

Strategic direction

The overall strategy for the route was originally defined in the former SRA's WCML Strategy, dated June 2003. This envisaged that by completion of the WCRM programme in December 2008, an expansion of 80 percent in long distance passenger paths would be achieved compared to the pre-WCRM situation, and capacity for 60 – 70 percent more freight paths and 775 metre freight trains. Five years later, the VHF timetable has been introduced, and has now been in operation for sixteen months.

The strategic direction of the WCML will be addressed by the West Coast RUS.

Passenger

The predicted passenger growth forecasts see a continued steady increase in demand post CP4. Although additional passenger capacity can be accommodated by longer trains, this capacity may well be exploited within CP5.

Through the ongoing West Coast RUS programme, both passenger and freight operators will seek to address train service provision, capacity and journey time issues.

Freight

The WCML remains the prime freight route in the UK and demand is expected to rise steadily. Freight operators have aspirations to operate both more and longer services, particularly from the ports, which we will need to accommodate.

There are key challenges affecting freight, as there needs to be the ability to present trains onto the core route promptly to successfully pass through congested infrastructure areas such as Reading, the Cherwell Valley or Nuneaton.

One key aspiration is to see Anglo – Scottish coal traffic returning to the main West Coast route, and paths for longer and heavier services, ideally pulled by electric traction.

Maximising the restricted freight capacity at numerous inland terminals will also be a key issue to address.

Network RUS – Electrification

Although the main WCML artery is AC electrified, there are various in-fill routes that would benefit from electrification in order to improve reliability through diversionary capability and increased maintenance access opportunities.

The Network RUS published in October 2009 outlined the overall national strategy for Electrification.

The proposed electrification of the line between Liverpool and Manchester (via Chat Moss) announced by the DfT in July 2009 will have a major effect on the route. It will allow the possible conversion of a number of passenger services to electric traction, including the Manchester Airport to Scotland services. It will provide diversionary routes from the WCML to Liverpool, and for a 30 mile section of the WCML from Crewe to Golbourne Junction.

Other routes recommended for further evaluation in this RUS which affect the WCML include:

- Crewe to Chester – (enabling electric traction for Euston to Chester services).
- Ditton – to enable access to Ditton Freight terminal.

A DfT electrification announcement was also made in December 2009 which further extended the electrification programme on more routes in the north west area:

- Huyton (near Liverpool) to Wigan
- Preston (via Bolton) to Manchester
- Blackpool North to Preston

These electrification extensions will assist with the flexibility of electric diversionary routes and also introduces the possibility of through electric services from Blackpool to the south, especially Birmingham and London, and to the north via the WCML.

Other possible extensions that need to be evaluated could include:

- Walsall to Rugeley;
- Birmingham to Nuneaton;
- Nuneaton to Coventry.

These would also bring benefits to the WCML route during times of disruption.

These electrification proposals will offer further benefits if developed further. For example, if the Crewe to Chester line is electrified, consideration should be given to also electrifying Chester to Acton Grange Junction and Frodsham Junction to Halton Junction. This would provide a diversionary route to and from Liverpool and the North when the WCML is blocked between Crewe and Weaver Junction.

Not all freight routes are electrified and if more freight services are planned to be electrically operated, this issue needs to be addressed. Areas that would benefit include the Bootle branch and Liverpool Edge Hill/Olive Mount – Seaforth.

Stations

Network Rail is addressing the station challenges set out in the ‘Developing a Sustainable Railway’ White Paper, in CP4 and beyond, through the development of a National Station Improvement Programme (NSIP) and the ‘Action Stations’ report issued in November 2009. These programmes are being developed with industry support, and are described in more detail in the ‘future capability’ section.

Future train service proposals

Figure 14 indicates the forecast percentage changes in tonnage to 2019.

If the growth trends continue, it would be realistic to anticipate demand for further increases in service frequency on both intercity and interurban services.

Virgin Trains

Typical weekday frequency on intercity services could increase to four trains per hour between London Euston and Birmingham; four trains per hour between London Euston and Manchester; and two services per hour between London Euston and Liverpool/Scotland. It is likely that this will be a peak service requirement, particularly in the Up direction towards London in the morning. However, to achieve such frequencies is likely to require substantial infrastructure enhancements, particularly in the Stafford/Norton Bridge and north of Preston areas.

Virgin Trains have a number of aspirations outlined in their ‘Vision’ document. These include:

- Additional services north of Lancaster to further enhance some of the London to Glasgow services.
- Journey times between Glasgow and London to be less than four hours by 2015.
- New services for stations such as Crewe, Rugby and Stoke-On-Trent.
- New services on the Birmingham to London route, via Nuneaton, would create capacity for a further one million passengers.
- Super Voyagers to be adapted to use electricity by adding one additional vehicle, improving the Chester and North Wales services, by making them greener and faster. These units could become six car ‘hybrid’ sets further increasing their flexibility.

- A new Manchester to London Heathrow Airport service thereby introducing new journey opportunities.

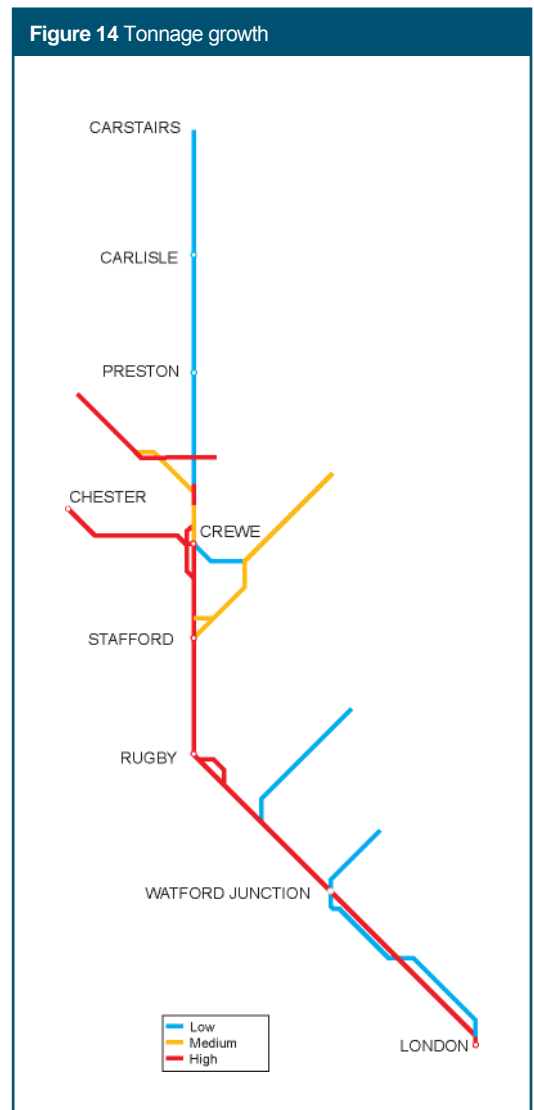
London Midland

As demand grows, London Midland is seeking both faster and more frequent services. Plans include non-stop services between Milton Keynes and London, coupled with the development of new and existing passenger flows, such as the Trent Valley.

CrossCountry

CrossCountry have aspirations to improve overall journey time on their services, including Birmingham to Manchester on this route.

45 percent of CrossCountry passengers change train, usually onto or off other operator services. Connectivity is therefore a key issue for CrossCountry in CP4 and beyond, and needs to be taken into account when formulating any route strategy going forward.



CrossCountry wish to deliver the DfT's specification of a seven day timetable in which it operates in the same paths on a Sunday, as during the rest of the week. CrossCountry will work closely with industry partners to deliver their future timetables.

First TransPennine Express

TPE have aspirations to further increase the number of services between Manchester Airport and Glasgow, and possibly introduce some through services between Liverpool and Scotland.

Southern

Southern have aspirations to increase the frequency of their East Croydon to Milton Keynes service from its current hourly frequency to half hourly.

London Underground Limited and London Overground

As expansion in the London commuter market continues, the present three-car operation of the London Euston to Watford Junction DC services will be insufficient to accommodate the demand. This will drive the requirement for infrastructure enhancements to support longer services.

In the London Mayor's 2008 ten year rail transport plan it stated that there will be a need for a 10 percent capacity growth to rail services by 2018. London Overground therefore aspires to run more services, and longer trains, on the DC lines into London.

There is an aspiration to re-open the Croxley link line enabling Metropolitan line trains to access the Watford Junction main line interchange and Watford High Street station for Watford's main shopping facility.

Proposals are being formulated to convert the Watford Junction to St Albans Abbey line to a new tram service which would be appropriate for a community rail route. Passenger numbers have increased by 20 percent over the last four years on the 6.5 mile line, reaching 450,000 passenger users in 2009, and a more frequent service is now required to meet local expectations. Full consultation, launched by the DfT in January 2010, is on-going.

Other

There is a long-term aspiration (CP5) by local authorities and other bodies to reopen an 'East-West route' to improve connectivity by linking Oxford, Aylesbury Bletchley, Bedford and Cambridge (known as East West Rail link). This is being driven by the desire to serve growth areas

and connect Oxford and Milton Keynes. Significant upgrading would be necessary on a large portion of the route.

In principle, re-opening the route could accommodate an Oxford – Bletchley – Milton Keynes service and other train service aspirations include diversion of services during the remodelling of Reading. However, any further extensions eastwards from Bedford to Cambridge look far more challenging with the need to construct completely new sections of railway and to cross the intensively utilised East Coast Main Line. It is expected that a re-instated route from Oxford to Milton Keynes could also offer useful opportunities for freight, particularly if the line is cleared for W12 gauge.

Merseytravel

With the various electrification extension proposals being announced, Merseytravel have aspirations for additional services between Liverpool, Wigan and Preston and for the re-introduction of through services between Liverpool and Scotland.

Figure 15 Potential capability changes

Route section or location	Capability measure	Current value	Future value	Date
Alsager – Crewe	Number of tracks	Single Track	Double	CP5

Figure 16 Planned capacity and capability changes

Route section or location	Capability measure	Current value	Future value	Year
Bletchley	Up Slow platform length	8 car	12 car	TBA
Nuneaton North Chord	New chord to allow access on Down TV Slow		new chord	2011

Future capability

Potential and planned capability changes on this route are shown in Figures 15 and 16.

LOROL have ordered new Class 378 'Electrostar' electric multiple units to replace the Class 313 and Class 508 units which operate on the North London and Euston to Watford Junction 'DC' lines. These feature fully longitudinal seating, similar to that used on London Underground stock, to deal with expected high passenger volumes. Initially, the units have already been introduced in 2009, as three-car units and additional carriages will be purchased in 2011 ready to convert the units to four-car operation.

Stations

We are working with local authorities and industry partners to provide improved station facilities and capacity. Examples include Watford, Bletchley, Milton Keynes, Tring, Crewe, and Wembley Central. A number of these stations are being taken forward as 'Gateway' schemes, to improve interchange opportunities with other modes of transport.

As part of a wider commercial property redevelopment scheme, a new transport interchange facility is being developed at Watford. This will provide a new station building with improved station facilities.

National Station Improvement Programme (NSIP)

The Government is funding £150m during CP4 to support the modernisation of a range of stations. The criteria for a station being selected include footfall and current facilities. The NSIP has been established to ensure that this money is invested in the most effective way by leveraging in third party funding. This programme is being developed within the industry through Local Delivery Groups (LDGs). On this route the stations that have been identified for NSIP funding in Tranche One are Watford Junction, Berkhamstead, Carlisle, Preston, Wigan and Runcorn. Some of these schemes are a contribution to a larger scheme.

It is hoped that further funding in 2010 is secured as part of the Tranche 2 process. This funding will include a portion based on the successful delivery of Tranche One schemes.

Programme extension – NSIP

The government is looking at extending both the NSIP and Access for All programmes for ten years from 2014 to 2024 to ensure investment with simpler, modern buildings with better facilities and interchanges. Ideally programmes should be extended into a major station investment programme.

Carlisle – work started in September 2009 on a £500k refurbishment creating new seating areas and improvements to waiting rooms.

Chester Gateway scheme – we have been working with Arriva Trains Wales and Cheshire County Council on a scheme to redevelop Chester station to provide an improved gateway to the city. Improvements have included the adoption of the station forecourt, architectural lighting of station façade, refurbishment of internal brickworks, CIS and roof renewal. At the same time, we are helping facilitate Arriva Trains Wales' proposals to develop the concourse area including a new ticket barrier, booking office and retail outlets. The Gateway team continues to meet and progress potential work streams at Chester including further refurbishment works to other areas of the station.

Access for All

This programme is designed to improve the access to stations. The main output is to achieve an unobstructed and obstacle free 'accessible' route from at least one station entrance and all drop off points associated with that entrance to each platform and between platforms served by passenger trains.

The stations selected by the DfT for this programme of works are: Berkhamstead, Carlisle, Hemel Hempstead and Leighton Buzzard.

Better Rail Stations

The 'Station Champions' report, published in November 2009, is aimed at improving the end to end travelling experience of passengers, and attracting more passengers onto the railways. The report recommends 'Minimum Station Standards' for each station category and that these should be recommended as part of all future franchise specifications.

As an output of this report the DfT announced a new fund of £50 million to spend on improving the ten 'priority' stations in England, identified in the report. Four of these 'priority' stations are on the WCML at: Preston, Wigan North Western, Warrington Bank Quay and Crewe.

Network Rail will work closely with stakeholders to develop a programme of improvements.

Action Stations

Action Stations is a new Network Rail initiative aimed at addressing the future of stations. The initiative includes a ten point guidance plan to help to deliver better stations and facilities for passengers over the next twenty years. The Action Stations document, published in November 2009, aims to gauge passenger views to create and develop the right vision. The document outlines the progress made since 2002 to improve Britain's railway stations, and the outputs will draw upon expertise and experience to inform the vision. The plan going forward is to host a series of focus groups to test the vision, establish priorities and responsibilities and debate how to collectively achieve it. The findings will be compiled and analysed ahead of the publication of the Action Stations report in 2010.

Integrated Station Plans

The Joint Stations Board has developed the Integrated Stations Planning initiative which seeks to improve the planning and delivery of work at stations and to provide greater visibility of investment proposals to all stakeholders in the industry. This cross industry approach will increase the alignment of investment plans and funding streams at stations, improve productivity and develop more efficient ways of working. These principles are supported by Train Operators, Network Rail, the Office of Rail Regulation and the DfT.

Another example of co-ordinated planning is the need for our maintenance and renewals plans to be aligned to works planned by LOROL and TfL on the stations on the DC lines in the London area. This is managed by the Local Delivery Group.

At the same time we are working closely with our stakeholders to secure funding for further station improvements on the DC lines to improve customer facilities. In particular Queen's Park station may see changes to accommodate future North London and East London line LOROL service changes.

Car parking

New car parks are being designed and we continue to discuss with train operators and local authorities to consider how improved car parking facilities can be provided and funded.

New Virgin car parks and extensions are being developed. These include such locations as: Penrith, Warrington Bank Quay and Macclesfield. A new multi-storey car park is under construction at Stafford.

London Midland is also investing in car parking at stations along the southern portion of the route including Tring, Bletchley, Milton Keynes Central and Leighton Buzzard. Development work is underway for improved car parking facilities at Lichfield, Tamworth and Nuneaton stations.

Platform areas and extensions

A significant increase in demand is expected at Wembley Central now that Wembley Stadium is complete. We have been working with the local authority and London Underground to provide improved passenger handling capability at the station. We are also developing a scheme to lengthen platforms to allow additional trains to stop there when there are events.

Line speeds

Longer term aspirations are expressed by Virgin Trains to operate intercity services at speeds in excess of 125mph (e.g. 135mph) across key sections of the route. Other aspirational line speed improvements on the route include the slow lines north of Stafford and between Hanslope and Rugby via Northampton.

CrossCountry also have aspirations to reduce journey times and are seeking line speed improvements during Control Period 4 (CP4) and CP5.

Depots

In order to accommodate the maintenance and servicing of longer rolling stock, key facilities within numerous maintenance depots are being modified and enhanced.

A new 'double headed' wheel lathe is being investigated for operations at Longsight depot which could accommodate 11 car Pendolino's and substantially improve tyre turning times. This would lead to a reduction in vehicle down times, creating improved availability and overall performance. It is hoped that the new wheel lathe is in operation by 2012 and both Virgin Trains & Northern Rail will benefit from this investment.

London Midland has aspirations to stable more units in the London area. This will help to remove unnecessary movement of units and reduce train crew costs.

Nuneaton and Bletchley

Further works are planned at Nuneaton and Bletchley to carry out track and signalling remodelling in order improve functionality and flexibility.

Freight

Aspirations have been expressed by some of the freight companies to gauge clear the route to W12. Longer loop lengths or dynamic loops are required (especially north of Preston) to cater for the demand to run more and longer trains.

Additional capacity for freight traffic may be unlocked through optimal pathing and flighting of freight and passenger services on the route. Freight companies would also like to see higher route availability on the route, moving towards RA11 clearance for aggregate traffic.

Freight companies would also like to see journey time reductions for their services, and freight services not sitting in passing loops.

If the East – West rail link opened, there would be new freight opportunities for traffic such as Southampton to Yorkshire flows.

Future capacity

Following introduction of the VHF timetable, enhanced passenger and freight services has left limited spare capacity across the route where there are only two or three track sections of running lines.

Some of the present junction configurations are recognised as being restrictive, particularly in the Stafford, Crewe and Carlisle areas, together with the approaches to the junctions. Other areas that constrain capacity include the Independent lines around Crewe.

Other constraints include areas where four lines are not available, including Brinklow to Attleborough

South Junction, and locations where only two lines are available (e.g. north of Preston). Steep gradients also restrict future capacity. This presents a performance liability and a cap on future traffic growth, all of which are challenges for the West Coast RUS to consider.

Constraints also exist on commuter services on the London Underground and LOROL. This includes the DC lines between Harrow and Queens Park.

Stafford and Colwich area

Discussions with the DfT are on-going concerning a range of options for providing additional capacity in the Stafford and Colwich areas for possible delivery during CP5.

Crewe area

The CP4 final determination did not secure funding for any improvements to the railway in and around the Crewe area in the next five years. However the Crewe Gateway Project, led by Cheshire County Council, should see the redevelopment and refurbishment of Crewe rail station to form a 21st century transport gateway to Crewe, Cheshire and the North West, and this scheme is supported by Network Rail. Crewe station has been identified as a top 10 'priority' station by Lord Adonis in his 'Better Rail Stations' review for a major upgrade and rationalisation of the existing station, and will, therefore, receive a share of the £50 million fund.

Bedford to Bletchley line

Aspirations for train service and passenger facility enhancements on the line to improve links between rail and the community are being developed (e.g. proposals for a Heritage centre at Ridgmont station.)

Crewe - Chester

A lack of regulating points between Crewe and Chester for services onwards towards Holyhead is a constraint.

Future performance

Figure 17 sets out the forecast PPM MAA for each train operator for CP4. The PPM figure quoted represents the expected contribution of the TOC to the sector-level regulatory outputs in the CP4 delivery plan.

London Midland

The performance of London Midland is currently 87.8 percent PPM MAA for all services. London Midland operations are split into two sectors, London South East and Regional. The performance of London Midland's Regional services is covered in the Route M Plan. London Midland London and

Figure 17 Forecast PPM MAA – CP4 Plan

	2010/11	2011/12	2012/13	2013/14
Arriva Trains Wales	92.9%	93.2%	93.4%	93.5%
London Midland	89.1%	89.9%	90.5%	90.6%
Northern Rail	90.7%	91.2%	91.7%	91.8%
London Overground	93.1%	94.0%	94.4%	94.6%
First TransPennine Express	92.2%	93.2%	93.8%	94.0%
CrossCountry	90.2%	90.6%	90.9%	91.3%
Virgin Trains	87.8%	90.3%	90.6%	90.9%
First ScotRail	91.3%	91.7%	91.9%	92.0%
Southern	90.9%	91.1%	91.6%	91.9%

South East services are currently operating at 83.7 percent PPM MAA, and have been significantly affected by the performance of the WCML over recent months. A significant number of additional improvement works have been, and are still being undertaken in order to drive forward and ultimately sustain a higher level of performance for London Midland.

Going forward, the key performance issues and opportunities for London Midland on this route have been identified as:

- improved asset reliability through full installation and deployment of remote condition monitoring;
- completion of additional improvement works associated with the West Coast Performance Delivery Team;
- increased timetable robustness;
- implementation of further bridge strike prevention and mitigation measures;
- reduction in the impact of cable theft, trespass, vandalism and fatalities;
- right time railway initiatives;
- fitment of forward facing CCTV and enhanced usage of on train monitoring recording equipment;
- extreme weather mitigation through enhanced drainage and flood mitigations;
- autumn management – increased back to boundary de-vegetation; and
- further use of the Performance Fund to develop new improvement initiatives.
- West Midlands resignalling.

The route plan is being developed around these key points and currently suggests that performance for London Midland (all services) by April 2014 will be around 90.6 percent PPM MAA. This includes an allowance for passenger/traffic growth and an increase in engineering work. This figure has been discussed with London Midland and is in line with their aspirations. For London Midland London and South East services, performance is expected to be around 92.0 percent PPM MAA by April 2014.

Future performance issues will continue to be addressed through the JPIP process.

CrossCountry

As a long distance operator CrossCountry faces significant performance challenges. With a tighter timetable structure in place, following the introduction of the December 2008 timetable, there may be congestion issues at key junctions and corridors across the network. Right time arrival at junctions will therefore be critical to meeting the targets for PPM and significant lateness targets set in the HLOS.

Performance levels

CrossCountry performance is currently at 91.0 percent PPM MAA which is significantly exceeding expectations, particularly for a national operator. CrossCountry and Network Rail remain focussed on driving down the levels of cancellations and significant lateness (CaSL). Activity has been centred on understanding the causes of CaSL for CrossCountry, and the parties are now starting to identify particular improvement initiatives specifically aimed at this area. In addition, Network Rail and CrossCountry are taking forward a Right Time Railway initiative on the Bournemouth to Manchester line of Route.

Going forward the key performance issues and opportunities for CrossCountry on this route have been identified as:

- impact of the West Midlands resignalling schemes;
- improved asset reliability through full installation and deployment of remote condition monitoring;
- full implementation of GSMR;
- enhanced management of the network;
- weather proofing the network through enhanced drainage and upgrade of climate control systems for signalling equipment;
- enhanced usage of on train monitoring recording equipment;

- reduction in the impact of cable theft, trespass, vandalism and fatalities;
- quicker incident response
- right time railway initiatives; and
- further use of the Performance Fund to develop new improvement initiatives.

The route plan is being developed around the similar key points mentioned and current trends suggest that performance for CrossCountry by April 2014 will be around 91.3 percent. This includes an allowance for passenger/traffic growth and an increase in engineering work.

Significant lateness

Network Rail is developing plans on a national basis for a 25 percent reduction in trains over 30 minutes late over CP4. These plans include continued work on flooding prevention and joint initiatives being developed between Network Rail and British Transport Police to prevent theft and vandalism. These commitments are consistent with train operators (in particular CrossCountry's) desire to minimise the number of significantly late trains. These are a source of customer complaints, loss of business to rail and cause payments under the delay repay regime. Although plans are still being developed, any actions will benefit the performance of the CrossCountry services given the geographic extent and long distance nature of their business.

Extreme weather

Extreme weather is no longer confined to particular periods of the year. Flooding and high winds can strike at any time with an adverse effect on services. CrossCountry's geographic coverage means that a regional weather event can have a national impact. Of particular concern to CrossCountry are blanket emergency speed restrictions which can severely impact services which operate the length and breadth of the country as well as across Network Rail organisational boundaries.

Virgin Trains

Over recent months Virgin Trains' performance has been heavily affected by infrastructure reliability following the West Coast Upgrade as well as a number of major external incidents, which led to a marked deterioration in the level of PPM experienced by Virgin Trains' passengers. This has resulted in a significant amount of additional improvement works being undertaken and containment measures being introduced in order to drive forward and ultimately sustain a more acceptable level of performance for Virgin Trains. The JPIP is agreed and updated between the parties each March. The current JPIP has a target of 86.3 percent PPM MAA at the end of the financial

year 2009/10. The current level of performance is 83.2 percent PPM MAA.

Going forward, the key performance issues and opportunities for Virgin Trains on this route have been identified as:

- improved asset reliability through full installation and deployment of remote condition monitoring;
- completion of additional improvement works associated with the West Coast Performance Delivery Team;
- full implementation of GSMR;
- enhanced management of the network;
- weather proofing the network through enhanced drainage and upgrade of climate control systems for signalling equipment;
- enhanced usage of on train monitoring recording equipment;
- reduction in the impact of cable theft, trespass, vandalism and fatalities;
- quicker incident response;
- right time railway initiatives; and
- further use of the Performance Fund to develop new improvement initiatives.
- axle counter task force developing solutions to improve AC reliability;
- reduction in the number of temporary speed restrictions;
- line speed improvements;
- efficient engineering access and possession planning improvements;
- motorised OLE switching;
- autumn management – increased back to boundary de-vegetation;

The route plan is being developed around these key points and currently suggests that performance for the long distance route by April 2014 will be around 90.9 percent. This includes an allowance for passenger/traffic growth and an increase in engineering work. Future performance issues will continue to be addressed through the JPIP process.

First TransPennine Express

TPE currently operates services from Manchester to the North (including Scotland since December 2007). The performance of TPE is currently 91.95 percent PPM MAA, an increase of 1.7 percent on the previous year's performance. Recent performance improvements have been driven by fleet improvements and a well managed JPIP process and TPE have achieved some record breaking results during the summer periods.

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

- the ability to maintain a high performing service connecting multiple key transport nodes each with a challenge for delivery in their own right and limited capacity for traffic growth;
- a consequential need to focus on day to day delivery of good operational practice;
- improvements from the remodelling of key junctions on the route;
- management of freight services;
- real ability to manage the impact of the weather and drive down cable theft;

TPE and ourselves have been developing a full five year performance plan around these issues. At present the forecast is that TPE will achieve a PPM MAA of 94.0 percent by the end of 2013/14.

Other operators

The other passenger operators on this route are Arriva Train Wales, First ScotRail, Northern Rail, Southern and London Overground (LOROL) and London Underground Limited.

The future performance section for other key operators on this route can be found as follows:

Figure 18 Train operators	
Arriva Train Wales	Route L
First ScotRail	Routes P and Q
First TransPennine Express	Routes G and H
Northern Rail	Routes G and H
Southern	Route B
London Overground	Route E

Freight Operators utilise the Freight Performance Measurement indices.

Network availability

Our engineering access for the WCML is part of the overall strategy for maintaining routes between England and Scotland, involving the ECML, Glasgow and South West and Newcastle to Carlisle lines, so as to ensure that one route between London and Scotland is always available.

The possibilities for extensive engineering blockades on the WCML have diminished. More opportunities will therefore need to be grasped to undertake the delivery of enhancements in conjunction with renewals schemes as and when the infrastructure is required to be renewed.

The freight companies need to have the gauge, train lengths, Route Availability and journey time issues adequately addressed to ensure alternative routes are open for freight diversions. Freight companies also wish to see improved overnight access to their locations (e.g. Daventry).

Network Rail is working closely with TOCs and FOCs to develop Joint Network Availability Plans (JNAPs).

Efficient engineering access

As discussed earlier, Train operators have aspirations for greater access to the rail network. For example, CrossCountry are seeking better access on Sundays, and when access is restricted, suitable diversionary capability is available for its network. Engineering blocks need to be planned in a co-ordinated fashion that fully reflects cross-route impacts. Relatively few and short sections of the route need to be upgraded to deliver the whole of the core network. Addressing issues at Norton Bridge and Crewe to Alsager will give the Birmingham to Manchester, and in association with other planned Network Availability work, much of the CrossCountry network to the south. This will also benefit other train operators.

Long term opportunities and challenges Delivering a Sustainable Transport System (DaSTS)

The Department for Transport published its formal consultation document 'Delivering a Sustainable Transport System' 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 nearing completion. A list of options should be produced 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, there are nine studies that may affect long term opportunities and challenges. These are:

Access to Birmingham – A joint DfT/regional study considering road and rail access to/around Birmingham for freight and passengers (including addressing M6, M5 and M42 performance issues).

Coventry North South Corridor Study – This study will examine the key travel patterns to, from and within the Coventry north-south corridor linking Nuneaton, Coventry, Kenilworth, Leamington Spa and Warwick. It will assess how transport factors might be inhibiting economic activity and what interventions might help overcome these issues, including their impact on carbon emissions. The work programme will identify possible options over different timescales and at different levels of funding.

Milton Keynes to Aylesbury Vale – The study area comprises Milton Keynes/Aylesbury Vale sub-region plus High Wycombe in the Western Corridor Blackwater Valley sub-region. The emphasis within the study area is on the strategic transport links necessary to support delivery of the substantial planned growth at these key locations. The objective of the study is to understand the deficiencies of the current transport network in delivering the sustainable economic development of Milton Keynes/Aylesbury Vale, including all strategic links to/from MKAV and High Wycombe. Through a process of comparison and sifting, the study will identify the most promising packages of interventions to be taken forward.

Transmodal movements between London and the West Midlands and within the Milton Keynes South Midlands – The study aims to review the precise locations of planned housing and economic growth within Milton Keynes South Midlands (mksm) and consider how variations in either phasing or distribution may reduce the negative impacts of additional transport demand to determine at what rate and to what levels modal shift could be

achieved. The study will identify affordable options to support the balance between the needs of local traffic modes and strategic and regional traffic along and within this corridor. These options will be aimed at delivering an improved outcome in terms of economic growth, housing delivery, transport reliability, reduced carbon emissions and support for people and freight movements, on both the strategic and regional/local networks across Milton Keynes South Midlands.

Access to North Staffordshire – This study will examine the key travel patterns for people and goods around the Stoke-on-Trent journey to work area. It will consider how the transport network and travel conditions inhibit economic activity in this area, and assess various interventions that might help to overcome these issues.

Access to Manchester – A joint DfT/regional study considering road and rail access to/around Manchester for freight and passengers (including addressing M60 performance issues).

Northampton Towns Growth and Connectivity – The key objective of the study will be to help inform strategic transport (and wider land-use and spatial planning) policy decisions and priorities post 2013/14, focusing on: assessing and prioritising the most appropriate and complementary approaches (interventions and policies) for improving transport movements within each of the towns within the Northamptonshire Arc. It will address the challenge of ensuring any actions to encourage or enable increased inter-urban movements and agglomeration impacts within the Northamptonshire Arc and more strategically, would maximise economic productivity benefits and limit the carbon impacts of additional journeys. The recommendations of the study will be firmly rooted in the context of the planned growth, and the key outcomes of the study will be prioritised and appraised transport options (interventions or policy measures) to address these challenges.

City Region Connectivity – The three city regions of Manchester, Liverpool and Central Lancashire will be the key drivers for the future growth of the regional economy. Evidence available to the region identifies a number of issues related to connectivity between the city regions, and this study is intended to assess current and future problems in the three corridors leading to the identification of specific measures for more detailed investigation. These corridors include intermediate towns such as Bolton, Runcorn, St Helens, Warrington, Widnes and Wigan. Reflecting Cheshire's role as a major contributor to national and regional Gross Value Added (GVA), links between the regional gateways

of Chester and Crewe and Manchester/Liverpool will also be a key element of the study. Whilst other studies will include connectivity issues related to the international gateways of Manchester Airport and the Port of Liverpool, there will need to be close interface between the studies to ensure consistency.

Access to the Port of Liverpool - The Port of Liverpool is the North West's key international seaport and is of great importance to both the national and regional economies. Access by road and rail to the port has the potential to become a significant constraint given planned growth. The purpose of this study is to build on previous work undertaken to form a clear understanding of current and future transport requirements, including the potential for modal shift from road to rail for freight.

West Coast RUS

The various options and opportunities to increase network capacity and capability will be explored by the West Coast RUS. This industry wide document will:

- identify key challenges that face the rail industry in the long term
- assess the current and future demand for the route
- identify gaps
- undertake analysis and optioneering
- identify preferred options and interventions for the route.

It will also set the overall strategy for the route for the next 30 years.

Timescales for this RUS have been re-aligned to inform HLOS2, so gap identification and appraisal should take place around Summer 2010 with a published RUS in Summer 2011.

A key element of this work is to understand the issues that cross the RUS boundaries, and this work will then inform planning in CP5 and beyond.

Rolling stock

Beyond CP4, further lengthening of the Pendolino fleet (beyond 11-cars) is not practical, so unless a new high speed line is planned, current service frequencies will have to be examined, possibly using a combination of new 'InterCity Express' (IEP) trains and Pendolino's.

The DfT is embarking on a programme of new IEP trains that may be utilised on major routes in the country, starting with the Great Western and ECML. The WCML may be considered as an option for deployment of the new rolling stock as part of the programme.

The DfT announced Agility Trains as being selected as the preferred bidder to build and maintain a fleet of new Super Express trains. Use of this new rolling stock may provide opportunities for improved frequency of services, more seats, more reliable services and a reduction in journey times.

Initial thoughts are focused on the builds of IEP trains being in 5 car formations which could be used in multiple if necessary. This would displace Pendolino's, which could be utilised to boost longer distance services.

Work continues to take place during CP4 to develop the programme to assess such issues as platform requirements and gauge clearance, selective door opening requirements, bridge resonances and aerodynamic allowances required. Early development work in CP4 is focusing on the south end of the route.

London Euston station

Discussions are ongoing on a strategy to undertake major station improvements at London Euston station through commercial developments. The strategic vision is to make Euston a 'World Class' interchange which, through mixed use development, will provide exceptional customer, operational and retail facilities, within a modern terminus station, fit for the 21st Century. The station could be re-modelled and enlarged with improved links to the London Underground.

Proposals will need to dovetail with High Speed Two plans for wherever the HS2 terminus station is located in the Central London area.

New lines programme

In August 2009, Network Rail published the Strategic Business Case for 'New Lines'. This document proposed the provision of new capacity through a new line itself; and the associated release of capacity on the existing WCML.

The New Lines Programme has demonstrated that there is a good value for money case for New Lines.

High Speed Two

The company formed by the government in late 2008 'High Speed 2' continues to work closely with us and consider the case for high speed rail services from London to the West Midlands and Scotland and have advised Ministers on the feasibility and credibility of any new lines in the UK.

The HS2 report is due to be released in the Spring of 2010. If the Government decides to pursue proposals for high speed rail lines and services, it

will publish a White Paper by April 2010. This should contain specific route options, technical assessments, demand forecasts and financing proposals. Information on the route between London and the West Midlands should also include design specifications, environmental assessments and delivery mechanisms. A full public consultation process will follow. If approved, it is hoped construction work could start as early as 2017, with opening around 2025.

Journey times and line speed improvements

A number of tactical line speed improvements will be pursued where bottlenecks are identified. During the course of planned renewals, options to remodel and improve junctions will be assessed.

CrossCountry have highlighted the need to achieve journey time reductions as a key future objective across all their primary routes.

Capacity

If the forecast growth following the introduction of the December 2008 timetable continues, then accommodating further growth in the peak period on both interurban and intercity services will become increasingly challenging.

Population growth is expected in the Milton Keynes area (15,000 more homes by 2016) alongside considerable expansion in London area commuting. Aspirations therefore include more frequent and faster trains to London, and a wider range of non-London destinations in future, specifically Scotland and the North West. Links between Northampton and the North could also be improved as Northampton continues to grow.

As with all routes, the delicate balance between running more train services and affecting train performance needs to be assessed and optimised.

With regard to long term opportunities and challenges for freight, obtaining additional capacity is the key challenge for the whole route.

To support this growth, it is likely that there will be two or more new freight terminals in the North West and West Midlands constructed and this will generate new traffic both from the south coast ports and the Channel Tunnel, with the majority of the traffic arriving via the WCML. Discussions will need to take place to decide the best way forward, with planning permission for these new terminals a key issue.

The West Midlands and Chiltern RUS is considering ways of rerouting freight traffic via the West Midlands and the West Coast RUS will look at possible diversions around the Carlisle area for this traffic.

Potential freight train speed improvements will help capacity through more effective 'flighted' trains, but additional lines may need to be constructed to allow slower trains to run.

Capability

Challenges still exist in gauge clearing key sections of the route, and in particular, diversionary routes, for example the Settle and Carlisle section on Route H.

Combined with the enhancements to lengthen and relocate loops to cater for the additional length of freight services, the increased utilisation of Route M (Chiltern Lines) for more freight traffic is an avenue to be explored by the West Midlands and Chilterns and West Coast RUSs.

The opportunities of new technology being introduced over the coming years (e.g. European Rail Traffic Management System (ERTMS) needs to be fully maximised.

Later phases of the Caldon Low development proposal include plans to re-open the line into Leek (near Uttoxeter) and build a new station. The whole Churnet Valley area should benefit from these proposals, which could have significant tourism benefits.

Infrastructure Investment in CP4

Figure 19 Infrastructure Investment in CP4					
Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010	(A) Carlisle station	Station forecourt improvements works	Improved access and appearance	Third Party	2
2011/12	(B) Northampton Castle Station Re-development	Redevelopment of the station area including extending the car park.	Feasibility study to assess options to develop and enhance the station area. Increase the car parking facilities.	Third party	4
2011	(C) Edge Hill Depot : Independent Power Supply	Provision of independent power supply at Edge Hill depot	Increased facilities	TOC	4
2010/ 11	(D) E&P Renewal	Transformer/Rectifier set renewal Points heating OLE structure remedial works Auxiliary catenary renewal OLE contact wire renewal	E&P Renewal	Network Rail	Various
2010/11	(E) West Coast car park expansion Programme	Car park extensions at various Virgin Trains stations along the route	Increased car park capacity	Third party /Network Rail	On-going
2010/11	(F) Telecoms Renewal : CIS	Renewal of CIS systems at Watford Junction and renewal of CIS and PA systems at Milton Keynes	Telecoms Renewal	Network Rail	5-8
2010/11	(G) Telecoms Renewal : PAVA	Renewal of various public address systems.	Telecoms Renewal	Network Rail	Various
2010/12	(H) Telecoms Renewal : SISS	Renewal of various Station Information and Surveillance Systems (SISS).	Telecoms Renewal	Third Party	Various
2010/11	(I) Wolverton station	New station building	Provision of a new ticket office and waiting area	Third party	4
2010/11	(J) Buildings Renewal : Bletchley Depot	Renewal of carriage siding walkways and water services at Bletchley TMD	Depot Renewal	Network Rail	4
2010/11	(K) Watford Interchange	New access road	Increased passenger access	Third party	3
2010/11	(L) Bletchley station	Station enhancement scheme	Improved station environment	Third party	2

Infrastructure Investment in CP4

Figure 19 Infrastructure Investment in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010/11	(M) Camden Carriage Sidings - Euston	Extend No 4 sidings and re-instate No 7 sidings	Additional stabling for EMU vehicles	TOC	4
2010/11	(N) Structures Renewal : embankment works	Various earthwork, drainage and rock cutting examinations and works at – <ul style="list-style-type: none"> • Carlin Gill embankment (north of Oxenholme) • Church Brampton embankment (between Northampton and Long Buckby) • Althorp (between Northampton and Long Buckby) • Roade Cutting (near Hanslope) 	Earthworks	Network Rail	5 3 1 5
2010/11	(O) Structures Renewal : Major bridgeworks	Major strengthening works to bridge no.25, Runcorn Viaduct	Structures Renewal	Network Rail	2
2010/11	(P) Telecoms Retail Renewal : Various locations	Retail telecoms between Leighton Buzzard and Kings Langley	Telecoms Renewal	Network Rail	1
2010/12	(Q) Signalling Re-control : Northampton	Signalling re-control in the Northampton area	Signalling Re-control	Network Rail	3
2010/11	(R) S&C Track Renewal programme	Switches and Crossings works planned at: numerous key junctions on the route including: Winwick Junction and Stafford No 4 Junction	Track Renewal	Network Rail	4
2011/12	(S) Tring Gateway	Improvements to Tring station facilities and environment	Improved station facilities	Third party	2
2010/13	(T) Stoke-On-Trent station area	Re-generation of the area (Stoke Links)	Re-generation	Third party	1
2011/12	(U) St Albans Abbey Line	Introduction of a tram service to increase capacity on the line	Increased capacity	DfT	1
2011/12	(V) Longsight Depot	New wheel lathe	Increase capacity	TOC/Depot	1
2011/12	(W) S&C Track Renewal programme	Switches and Crossings works planned at: numerous key junctions on the route including: Willesden North Junction, Hest Bank, Shap Summit, Acton Grange Junction, Warrington South Junction, Preston North Junction.	Track Renewal	Network Rail	Various

Infrastructure Investment in CP4

Figure 19 Infrastructure Investment in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010/12	(X) E&P Renewal	Overhead line renewal to auxiliary catenary and existing contact wires	E&P Renewal	Network Rail	Various
2012/13	(Y) Preston station	De-cluttering of platforms 1 and 2	Improved appearance of station	Network Rail Discretionary Fund	3
2012/13	(Z) Runcom	Construction of a new rail waste container handling facility at Western Point	Freight opportunity	Third Party	1
2012/13	(AA) 'Access For All' programme	Station improvements at Berkhamsted, Carlisle, Hemel Hempstead and Leighton Buzzard	Improved station facilities	Access For All	1
2012/13	(AB) Signalling Renewal : Warrington, Preston, Carlisle	Life extension signalling works at Warrington, Preston and Carlisle	Signalling Renewal	Network Rail	6
2013	(AC) Bletchley remodelling	Remodelling of the Bletchley area	Increased capacity	Network Rail	2
2010/13	(AD) Car park expansion scheme at various London Midland stations along the route	Car park expansion scheme at various London Midland stations	Increased car parking	TOC	Various
2010/13	(AE) Telecoms Transmissions Renewal : Various locations	Transmissions renewal planned at Rugby area, between Watford and Bletchley and Norton Bridge	Telecoms Renewal	Network Rail	1
2010/13	(AF) National Stations Improvement Programme (NSIP)	NSIP works planned at various stations along the route including Tamworth, Milton Keynes Central, Berkhamsted and Watford Junction	Improved station facilities and environment	Network Rail	Various
2013/14	(AG) Ditton Freight Terminal	Expansion of existing intermodal freight terminal at Ditton – Three new 775m long sidings	Increased capacity	Third party	4
2013/14	(AH) Signalling Renewal : Watford	Resignalling of Watford area	Signalling Renewal	Network Rail	2
2012/14	(AI) 'Better Rail Stations' Review	New interchange footbridge between all platforms at Preston.	'Better Rail Stations'	Better Rail	1
2012/14	(AJ) 'Better Rail Stations' Review	Major upgrade at Crewe.	'Better Rail Stations'	Better Rail	1

Infrastructure Investment in CP4

Figure 19 Infrastructure Investment in CP4					
Implementation date	Project	Project description	Output change	Funding	GRIP stage
2012/14	(AK) 'Better Rail Stations' Review	Extend ticket hall & general upgrade throughout station at: Warrington Bank Quay, Wigan North Western.	'Better Rail Stations'	Network Rail/GMPTE	3
2012/13	(AL) S&C Track Renewal programme	Switches and Crossings works planned at: numerous key junctions on the route including: Camforth South Junction, Hartford Junction, Morecombe South Junction, Oxenholme.	Track Renewal	Network Rail	Various
2010/14	(AM) Plain Line Track Renewal	Campaign Renewal including: Watford Junction to Euston DC lines – 2011/12 Bedford to Bletchley – 2013/14	Track Renewal	Network Rail	Various
2010/14	(AN) Telecoms Concentrator Renewal : Various locations	Renewal of various telephone concentrators.	Telecoms Renewal	Network Rail	Various
On-going	(AO) Chester 'Gateway' scheme	General station improvements	Buildings	Third Party	1
2014/CP5	(AP) New rail chord at Warrington Arpley	Provision of a new rail chord to connect the Arpley branch lines to the Ditton Goods lines in Warrington	Provision of a new by-pass road scheme	Third Party	1
July 2011	(AQ) Wembley Central platform Extensions	Slow line platform extension to allow 8-car services to call at Wembley during events	Increased capacity	Network Rail Discretionary Fund	5
2011/12	(AR) Peterborough to Nuneaton	W10 Gauge improvements	Increased gauge capacity	Network Rail Discretionary Fund	3

NRDF candidate schemes in CP4

Figure 20 Candidate NRDF schemes in CP4					
Implementation date	Project	Project description	Output change	Funding	GRIP stage
2013/14	(AS) Watford Area Re-signalling	Enhancements to the Watford Junction station area	Increased Functionality	Network Rail Discretionary Fund	2

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

Renewals activity

Figure 21 shows the estimated 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.

The maintenance and renewals activities have been completely transformed for the WCML as mentioned earlier.

From 2010, the new high-tech, high output track renewals and ballast cleaning trains will be operating on the south end of the WCML, with the equipment based at Willesden Eurohub terminal. This will significantly increase both the speed and scale of renewals activities as we continue to move towards carrying out more work at night, reducing disruption and making the network more available.

We will continue to reduce the time required to undertake track switches and crossing (S&C) renewals during possessions with the on-going development of modular S&C renewal activities at numerous junctions along the north end of the WCML route.

Figure 21 Summary of estimated renewals costs and activity volumes

£m (2010/11 prices)	2010/11	2011/12	2012/13	2013/14
Renewals				
Track	38	86	45	37
Signalling	21	26	29	28
Civils	12	6	20	9
Operational property	16	17	15	11
Electrification	10	11	13	14
Telecoms	3	3	3	5
Total renewals	99	148	126	103
Renewals volumes				
Track				
Rail (km)	20	81	44	45
Sleepers (km)	17	76	38	38
Ballast (km)	62	51	46	46
S&C (equivalent units)	11	55	32	32
Signalling				
Conventional (SEU)	0	69	0	223
ERTMS (SEU)	0	0	0	0
Level crossings (no)	0	0	2	0

Appendix

Figure 22 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 (min)	No of Tracks
N.01	Euston – Rugby	LEC1	Primary	DfT	No	W9 & W10	8	125 EPS (75 to 120)	25 kv (both)	TCB	3 (4)	4
N.02	Rugby – Stafford	LEC2	Primary	DfT	No	W9 & W10	8	125 EPS (75 to 120)	25 kv	TCB	3 (5)	4 (3)
N.03	Stafford – Crewe	LEC3, LEC4, LEC5	Primary	DfT	No	W9 & W10	8	125 EPS (75 to 110)	25 kv	TCB	3 (5)	4
N.04	Crewe – Preston	CGJ1, CGJ2, CGJ3, CGJ4, CGJ5, CHW1, CHW2, WOA	Primary	DfT	No	W9 & W10	8	125 EPS (75 to 110)	25 kv	TCB	4	2 (4)
N.05	Preston – Border (nr Gretna Junction)	CGJ6, CGJ7, WCM1	Primary	DfT	No	W9 & W10 (W9)	8	125 EPS (75 to 110)	25 kv	TCB	4	2
N.06	Border (nr Gretna Junction) – Carstairs	WCM1	Primary	Transport Scotland	No	W9 & W10	10	125 EPS (90 to 110)	25 kv	TCB	4	2
N.07	Weaver Junction – Liverpool South Parkway	WJL1, WJL2, WJL3	Primary	DfT	No	W9 & W10	8	(70 to 90)	25 kv	TCB	3	2 (4)
N.08	Norton Bridge/ Colwich Junction – Cheadle Hume	1, CMD2, MCH, NBS	Primary	DfT	No	W12	8	125 EPS (75 to 115)	25 kv	TCB	3 (5)	2
N.09	Crewe – Kidsgrove	KCS1	Secondary	DfT	No	W9 & W10	8	70 (60)	25 kv	TCB	6	1 (2)

Figure 22 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability												
N.10	Watford Junction St Albans Abbey	WSA	Rural	DfT	Yes	W6	7	50 (20)	25 kv	OTW	37	1
N.11	Euston – Watford Junction (DC Lines)	LEC1, CWJ, HNR	London & SE	DfT	No	W6	8	45 (15 to 40)	750 dc (both)	TCB	4 (6) (3)	2
N.12	Bletchley – Bedford	BBM	Rural	DfT	Yes	W8	8	60	none	TCB	4 to 13	2
N13	Crewe – Chester	CHW,CNH,H HHJ	Secondary	DfT	No	W7	8	90	None	TCB AB	3 to 9	2
N.99	Other freight lines	SDJ2, CGJ1,	Freight	DfT	No	Various	8	Various	25 kv (none)	TCB AB	various	2 (1)

Capacity and operational constraints

- (A) Harrow and Wealdstone – Queens Park: Volume of traffic on DC lines with London Underground and London Overground shared working together with traction power supply limitations.
- (B) St Albans Abbey branch: single line with no signalling only allows one train at a time on the section, limiting service frequency to 45 minutes
- (C) Bletchley – Bedford: short single line sections at each end of the route
- (D) Nuneaton – freight trains (coming from Leicester) crossing at Nuneaton – going towards the north or going on to the Coventry branch
- (E) Trent Valley line – Seven mile section of three track railway between Brinklow and Attleborough
- (F) Shugborough Tunnel – Two track section through the 710 metre tunnel
- (G) Stafford station area – North and South junctions at capacity
- (H) Norton Bridge – flat crossings & fixed diamond limit capacity and performance
- (I) Alsager to Crewe – short single line section – restricts arrangements for train diversions for effective contingency arrangements during engineering works and periods of disruption.
- (J) Crewe station: large number of crossing moves north and south of Crewe station and existing signalling infrastructure limits both passenger and freight capacity.
- (K) Crewe independent lines: constraints on freight growth.
- (L) Crewe – Chester – lack of regulating points between Crewe and Chester for services onwards towards Holyhead.
- (M) Winsford to Hartford – 5 miles of two track railway
- (N) Wigan – Euxton: a mix of speed and crossing movements in this section severely limits capacity through Wigan and Euxton Junction
- (O) Preston – Carlisle: limited passing loops which are also restrictive in length – limited freight capacity
- (P) Preston – Carstairs: mixed high speed & freight traffic on two-track lines and low performance trains over steep gradients such as Shap and Beattock summits severely limits capacity. Use of diesel traction instead of electric traction restricts speed.
- (Q) Carlisle station: area – capacity limited by restrictive layout
- (R) Carlisle – Gretna Junction – high usage of available capacity by coal traffic
- (S) General line of route – Restrictive overhead line sectioning and auto switching and critical sections of line where ‘off route’ issues can affect the power supply to electric trains. Key locations are (i) North London line and WCML power supplies (ii) Manchester Longsight area (iii) Birmingham Proof House Junction area.

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