Route Plans 2009
Route 18
West Coast Main Line

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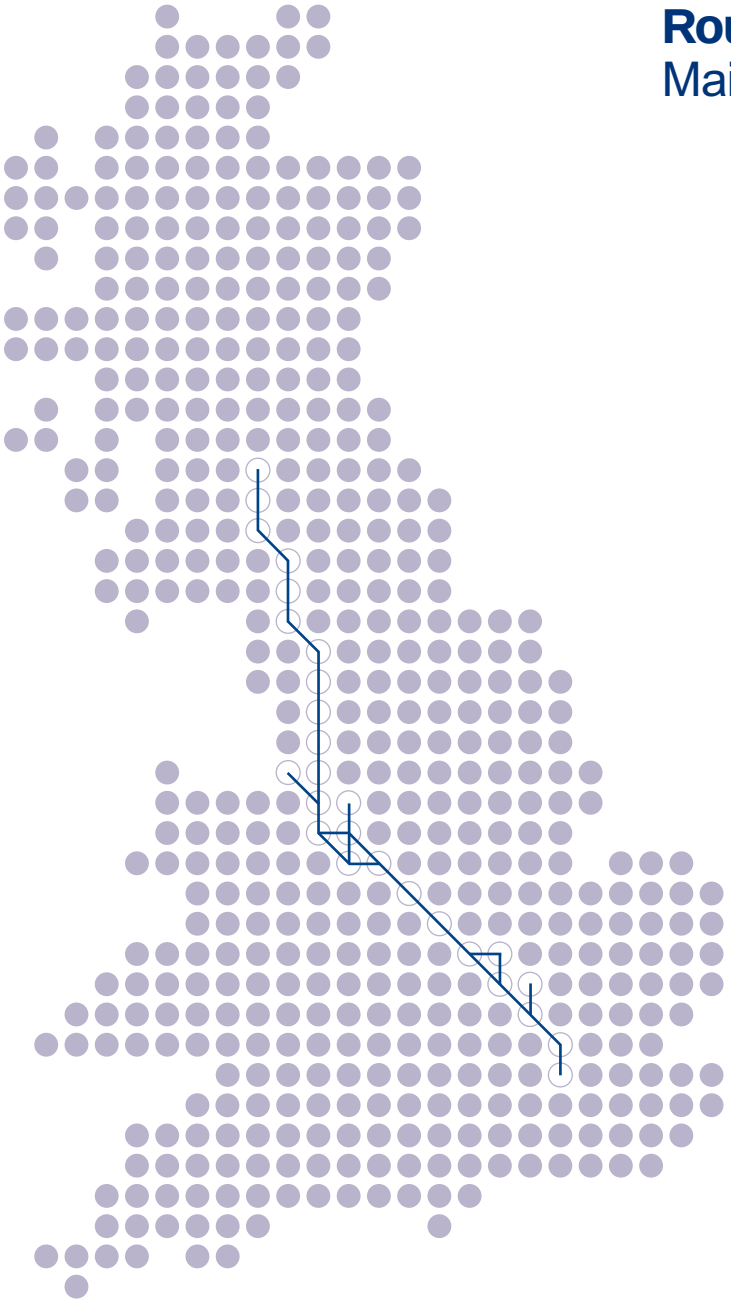


Route 18 West Coast Main Line

Section 1: Today's railway

Route context

The The West Coast Main Line (WCML) is recognised as a strategic transport corridor linking Europe (via 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 UK. It is central to the business of many UK and international passenger and freight operators.

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 primarily operated by Class 390 EMUs (Pendolino), and Class 221 DEMUs (Super Voyager). Both types of rolling stock are capable of tilting speeds of up to 125mph.

CrossCountry is one of the main providers of InterCity high speed services outside of London, and, geographically, is the most extensive operator of passenger services in the UK. It covers around 1,500 route miles and calls at over 100 stations.

London Midland operates interurban services between Birmingham, Northampton, Milton Keynes and stations to London. London Midland also operates services between Euston and Crewe via Northampton and Stoke-on-Trent. It also operates 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 and are primarily operated by Northern Trains and First TransPennine Express (TPE).

The WCML is the principal rail freight corridor linking the European mainland 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.

The WCML plays a key role in distributing the freight traffic that has arrived in the UK via the Channel Tunnel. There are also substantial maritime intermodal flows operating from Southampton, Felixstowe and Tilbury docks, which use the WCML to access inland terminals at Trafford Park (Manchester), Hams Hall, Lawley Street (Birmingham), Ditton and Garston (Liverpool).

There are also significant flows of coal on the WCML from Scotland, Ellesmere Port and Liverpool to Warrington Fiddlers Ferry, Ironbridge and Rugeley power stations.

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).

West Coast Route Modernisation (WCRM)

The WCML route saw little investment since its staged electrification 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 significant amount of infrastructure improvements, including linespeed 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.

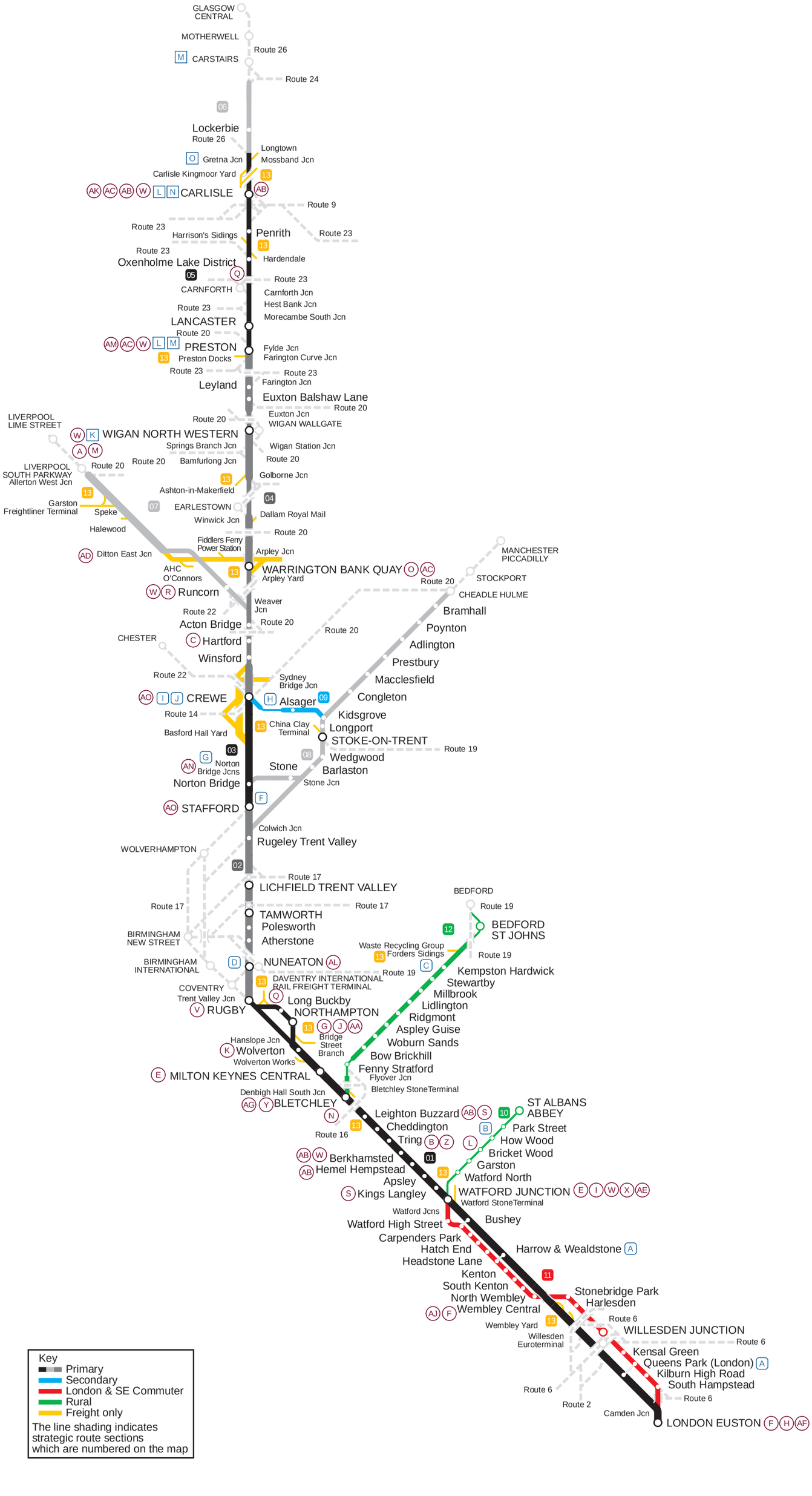
During 2008 there was significant disruption to passengers and freight operators both at weekends and during the numerous weekday blockades that were necessary to deliver the project. This work was necessary in order to deliver the infrastructure required to implement the Very High Frequency (VHF) timetable introduced on 14th December 2008, with full implementation operating from 16th February 2009. The key infrastructure schemes and outputs of the WCRM project are listed in detail in the current capacity section.

Today's route

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

- the WCML from London Euston to Carstairs via Trent Valley and Crewe for approximately 600km (18.01 – 18.06) with diverging routes at Rugby for Birmingham, at Colwich Junction/Norton Bridge to Cheadle Hulme (Manchester) (18.08) and at Weaver Junction to Allerton (Liverpool) (18.07);
- the Camden Junction to Watford Junction DC electric lines (18.11);
- the branch from Watford Junction to St Albans Abbey (18.10) which was designated as a 'Community Rail' pilot by the former Strategic Rail Authority;
- the branch from Bletchley to Bedford excl. (18.12); (the passenger service run on this branch line has been designated as a community rail service by the DfT);
- the Kidsgrove to Crewe line (18.09); and various freight-only lines (18.13)

Route 18 West Coast Main Line



Current passenger and freight demand

Passenger journeys are continuing to grow on the long distance intercity services operated by Virgin Trains by between eight percent and nine percent per annum. The rail share of the Manchester to London market is now 66 percent and growing.

Growth on peak London commuter rail services operated by Transport for London – London Overground (LOROL) also continues to increase steadily. It is believed the demand has been partly driven by increased employment opportunities within the central London area and improved journey times. Continued 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.

The West Midlands and Chilterns Route Utilisation Strategy (RUS) identified the 20 'busiest' stations in the RUS area: this included Stafford and Tamworth on this route. 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.

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.

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 an opportunity for interchange 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.

London Midland

London Midland operates inter-urban services between London Euston, and Birmingham via Milton Keynes and Northampton, and onward to Crewe and Liverpool. It also operates an hourly service to Crewe via intermediate stations on the Trent Valley (between Rugby and Stafford) and Stoke-on-Trent.

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

As part of the December 2008 timetable, several London Midland stations have seen new direct train services to London Euston. These include Alsager, Atherstone, Kidsgrove, Stone, Rugeley Trent Valley and Long Buckby.

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

Route section	Fast lines	Slow lines	DC lines
Euston – Watford Junction	14	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

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.

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

On the Northern end of the WCML route, three 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 three operators are:

TransPennine Express (TPE)
TPE run services between Manchester Airport and Barrow and Windermere together with nine trains per day along the WCML to Scotland, serving both Edinburgh and Glasgow.

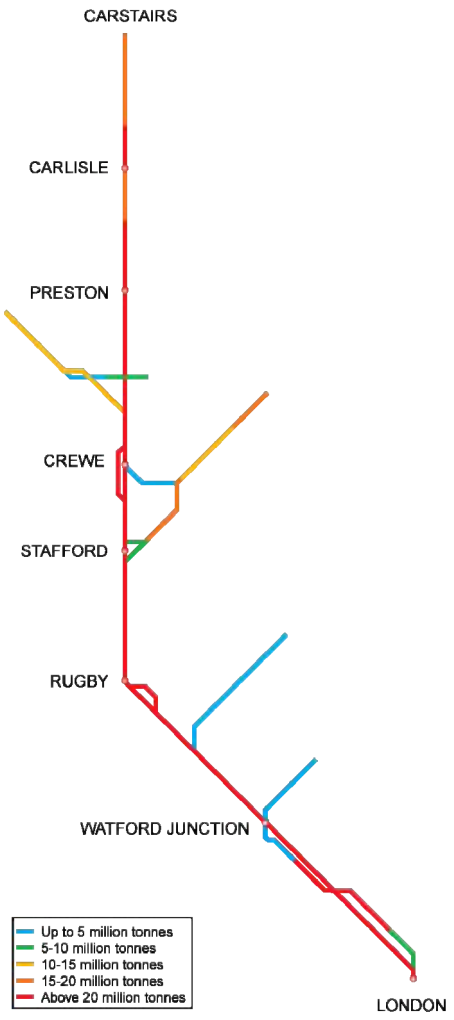
Arriva Trains Wales (ATW)
ATW provide services originating from Wales which serve Manchester via Warrington Bank Quay.

Northern Rail
Northern also provide services that utilise parts of the WCML including between Wigan and Carnforth and also serve Manchester Airport via Stockport and Crewe.

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.

Figure 2 Tonnage



Freight

The freight operators are DB Schenker, Freightliner Limited, Freightliner Heavy Haul Limited, Fastline Freight, First GBRf, Direct Rail Services, Colas Rail and Cotswold Rail provide freight services over the route.

The route has an assortment of freight traffic operating on it, 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. Traffic moves to key terminals at Daventry, Prologis Park near Coventry and Hams Hall.

The freight conveyed is dominated by coal, aggregates and intermodal traffic (deep sea, domestic and European). There are maritime intermodal flows coming from Southampton, Felixstowe and Tilbury docks, which use the WCML to get to inland terminals at Trafford Park (Manchester – Route 20), Hams Hall, Lawley Street (Birmingham – Route 17), Ditton and Garston.

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.

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

Coal

Due to the passenger timetable pattern Anglo – Scottish coal is diverted off the WCML by day (via Settle and Carlisle and then Hellifield - Blackburn) and returns to the West Coast at Farington Jn, near Preston. This traffic continues to travel on the route to Fiddlers Ferry, Rugeley and Ironbridge power stations. Coal also moves from Liverpool and Ellesmere Port to Fiddlers Ferry and crosses the WCML between Winwick Junction and Warrington.

Aggregates

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

Other flows include:

- MOD flows around 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: Carlisle Kingmoor, Bescot and Forders. It is vital to our business that these flows arrive on site, within a given time frame, as to not disrupt any planned possessions.

Traffic volumes are summarised in Figure 3.

Figure 3 Current use

	Passenger	Freight	Total
Train km per year (millions)	38	10	48
Train tonne km per year (millions)	13,755	8,708	22,463

Current infrastructure capability

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

Figure 4 Linespeed

Figure 5 Electrification

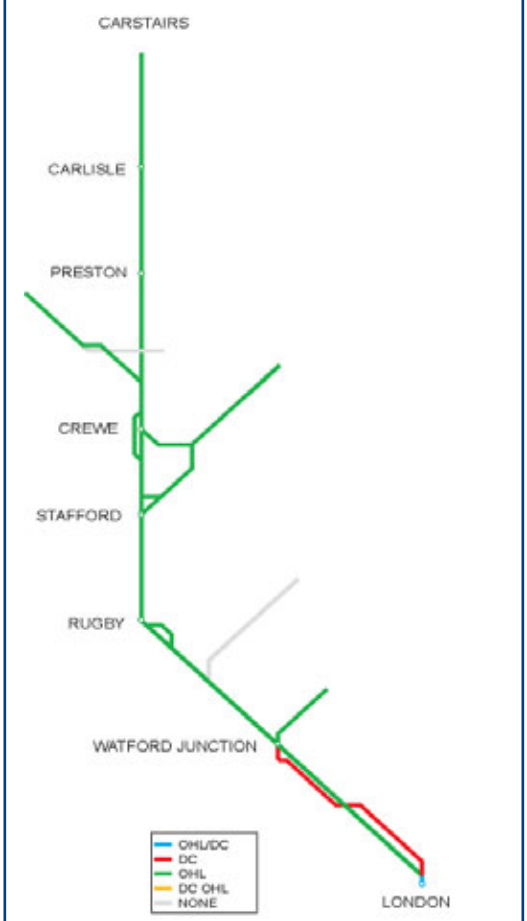


Figure 6 Route availability

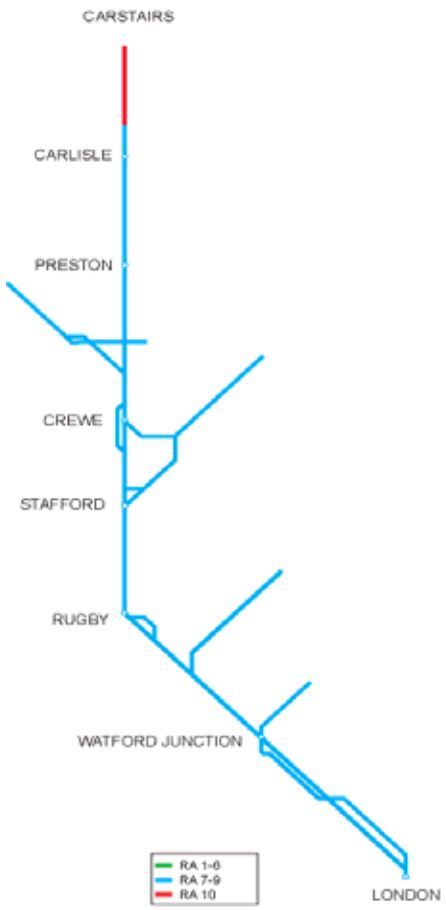


Figure 7 Gauge

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 WCRM project included:

- **Rugby** station area re-modelling and re-signalling - a new track layout, additional platforms, improved linespeeds, reinstatement of the fourth track from Rugby Trent Valley Junction to Brinklow, and the replacement of the passenger subway at the station.
- **Northampton** – signalling renewal giving additional functionality, together with the extension of the bay platform 4, and platform 5.
- **Nuneaton** – re-signalling of the area and junction re-configuration, allowing higher through speeds.
- **Milton Keynes** – re-signalling and re-modelling of the layout and platforms to provide additional capacity through turn-back and overtaking facilities.
- **Trent Valley** – between Tamworth and Armitage – additional two tracks installed to make a four track railway (two fast and two slow lines), with linespeed increases and added bidirectional functionality for maintenance and perturbation purposes between Rugby and Lichfield. This included the closure of three signalboxes at Tamworth, Lichfield Trent Valley and Nuneaton with signalling control transferred to Rugby signalling control centre.
- **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.
- **Traction power supply upgrade** – on-going reinforcement of the overhead power supply system to meet increasing demand.

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

These works have helped to provide increased capacity, through line speed increases at stations and reduced conflicting moves at key junctions. It has enabled the new VHF timetable to be introduced which has delivers enhanced passenger service frequency and further journey time improvements. Linespeeds have also been increased on numerous sections of the 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% 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, some of the key constraints remain and these are further north at the three track section from Brinklow to Attleborough South, the junction layouts north and south of Stafford, and the two track mixed traffic railway north of Preston.

We recognise that the current junction configurations and track layouts at Crewe are sub-optimal, placing operational limitations on manoeuvres while at the same time reducing through linespeeds (for example Manchester – Cardiff services traverse the entire junction throat). The constrained layout at Crewe (including the Independent lines) also restricts freight capacity and growth.

Towards the southern end where four or more tracks are available, the issue of fast and slow traffic mix is less acute. However, there are only three freight train paths per hour available on the four track section, which is restricting 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.

Station capacity

The majority of the stations between London Euston and Northampton have benefited from platform extensions, enabling peak London Midland 12-car services to call. Further platform extensions are currently being reviewed, for example the slow line platform at Wembley. However, the up slow line platform at Bletchley will not be lengthened until completion of remodelling/resignalling in 2012/13.

Wembley Central station now has stadium access and crowding controls introduced which has helped to improve performance and passenger circulation.

At London Euston station improvements have taken place on the concourse under our 'clean concourse' policy. 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 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. It is planned to install two new lifts from the station concourse to the London Underground during 2009. A scheme to upgrade the ticket office is being implemented by Virgin Trains.

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) intermix 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.

Rolling stock and depots

The current fleet of Class 390 (Pendolino) trains have 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.

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 include 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. Work on the £5.6million scheme at Manchester Longsight depot was successfully completed in December 2008.

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 the Enhanced Permissible Speeds (EPS).

The new fleet of Class 350 trains utilised by London Midland have 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 additional new rolling stock has led to improved acceleration in services 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 rolling stock. There has recently been a second rail 'access' provided to improve the operational movement of rolling stock on and off the depot.

TransPennine Express introduced their new diesel Class 185 fleet in 2006. The arrival of this rolling stock has allowed them to supplement their existing

fleet and cascade their Class 158s to other train operating companies. The Class 185 unit has delivered the necessary increases in passenger capacity whilst improving industry performance and reliability levels. The superior maximum speed, acceleration and comfort of the Class 185 units over the Class 158s have allowed the units to be used on the new TPE services between Manchester Airport and Scotland, replacing the previous less frequent Virgin Trains service on this route.

LOROL currently utilise a fleet of 23 Class 313 three-car units and two Class 508 (also three-car) DC units running on their DC network between Watford Junction and London Euston. Units are serviced at Willesden maintenance depot.

In the short-term, Southern will operate their East Croydon to Milton Keynes Central services with Class 350/1 units, while their Class 377 units are utilised to cover other First Capital Connect services.

Stations

The upgrade of passenger facilities at Runcorn station has been part completed with a new booking office and retail area. Further improvements (e.g. waiting shelter) are planned through the NSIP programme.

Car parking

We recognise that the limited car parking facilities at smaller stations could be suppressing further passenger growth. It is anticipated that many of the extra passengers wishing to travel will drive to the stations, putting more strain on the car parks. We are in discussion with train operators and local authorities to consider how improved car park facilities can be provided and funded. A national car park programme was put in place to improve key car parks. £90million has been committed (over the next 18 months) to transform parking at many of the stations on the route.

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.

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, there are no longer any major level crossings on the WCML route between Euston and Hest Bank near Lancaster.

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

Figure 8 2008/09 PPM

TOC	MMA	As at period
Arriva Trains Wales	92.7%	10
London Midland	86.5%	10
Northern Rail	89.4%	10
London Overground	92.7%	10
TransPennine Express	90.2%	10
CrossCountry	89.8%	10
Virgin Trains	81.3%	10
First ScotRail	90.7%	10
Southern	90.0%	10

Current performance

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

Over the past 12 months, performance levels throughout the route were affected by the planned WCRM projects taking place at locations such as at Milton Keynes, Rugby, Nuneaton, Trent Valley, and Crewe to Preston and Carlisle to allow the work to be completed for the December 2008 timetable.

As well as the project related incidents, which included issues with the existing signalling control systems, the route has also suffered as a result of external incidents such as the security incident at Rugby in October last year, numerous fatalities and a number of locomotive fires. The route has also seen impact on weather related issues including problems with flooding (particularly at the north end of the route Preston to Scotland) as well as blanket speed restrictions imposed during very high winds.

In 2008, in addition to the incidents described above, poor underlying performance was also experienced which highlighted the under performance of the network. These two factors together have resulted in significant performance issues against both PPM and delay minute targets set out in the 08/09 Joint Performance Improvement Plans.

To enable the route to recover, a cable recovery plan and maintenance recovery plan were put in place to mitigate against future cable problems and help the underlying performance of the infrastructure. The area is now seeing the benefit of these plans, which has included robust actions focused on points, track circuits, axle counters, and power issues.

In preparation for the December 2008 timetable, there was extensive work undertaken, with improvements in infrastructure as well as new contingency plans for all areas. In particular, a new style of contingency plan has been adopted south of Rugby that is pre-agreed by all parties and implemented immediately when service recovery begins. Extra staff for both the operations and maintenance departments are put in place to improve response times as well as improving the ability to maintain the infrastructure.

Just after the introduction of the VHF timetable there was a particularly poor period of performance between Christmas 2008 and early January 2009, although this was not related to the WCRM project. A light aircraft crashed near Stafford on 2nd January causing disruption for several days. This was followed by several major OLE and power supply incidents at Rugby, Bletchley, Atherstone and Wembley, together with points failures at Ledburn junction, which, cumulatively, continued disruption over the route for around one week.

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 proposed re-signalling scheme for the Watford area is being 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 points 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 operation of freight services on the main route is a key issue for overall performance, and the timely running of services to all freight operators, and their end customers, is very important. Most depots and terminals are off the WCML itself, so the route is reliant upon prompt presentation of services onto the route. It should be noted that the 'right time' presentation of freight services from the WCML onto other routes is also important for national performance.

Section 2: Tomorrow's railway: requirements

HLOS output requirements

Figure 9 Total demand to be accommodated by Strategic Route

Routes	Annual passenger km (millions) forecast 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		
	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)
Euston	23,800	3,400	67% (assumes all major London Terminals)	10,600	1,600	76% (assumes all major London Terminals)

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

Future demand in CP4

Passenger

It is recognised that 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 8 - 9 percent p.a. and they anticipate 100 percent growth by the end of their franchise. To cater for the anticipated future increase in demand, the Department for Transport (DfT) has now authorised the building of 106 extra Class 390 vehicles which will be delivered during 2011/12. This will see 35 of the 56 Class 390 Pendolino sets increased to 11-car formations.

Virgin Trains continues to experience a modal shift of travelling 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 9 percent in 2005). Virgin Trains anticipate that, by the end of their current franchise, it will have increased to 30 percent. We believe that one of the factors behind this is the increased security measures for customers at airports, while train travel is far less restrictive, together with the transit time between the city centres and airports.

As part of their franchise commitment, London Midland intend to replace all the Class 321 units with a new build of 37 four-car Class 350s, accommodating further increases in passenger and operational capacity. However, in the shorter-term, seven Class 321 units have been retained to cater for the significant growth in passenger demand on its services.

London Midland's market growth in the Milton Keynes area is eight percent p.a, 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 improvements within the December 2008 timetable is accelerating growth further.

The most recent passenger counts on CrossCountry services indicated an overall growth rate of eight percent p.a. In particular, CrossCountry are experiencing steady growth on their Edinburgh to Plymouth (via West Yorkshire and Birmingham), and their Manchester to Thames Valley services. Additionally, CrossCountry anticipates further growth on the flows between Manchester and Bristol hence the new direct service becoming established. Through rolling stock internal reconfiguration and service extensions,

CrossCountry have plans to increase passenger capacity by 35 percent by the end of their franchise.

TransPennine Express services are also showing healthy levels of growth, especially between Manchester and Scotland. The initial service of seven trains each way per day introduced in December 2007 has been increased to nine in the December 2008 timetable. Further service enhancements are possible as TPE seeks to compete with air and road for the business market as well as serving the leisure market better. The reduction in the amount of long weekend blockages for engineering work north of Preston will also stimulate leisure travel growth. Recent reductions in the number of flights between Manchester Airport and the central belt of Scotland indicate the success that rail is having in this market.

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 route will also face a sharp increase in passengers in 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 up to 30 percent during CP4.

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

Nuneaton area

The W10 gauge clearance work between Peterborough and Nuneaton South junction should be completed by March 2011. Within this project is the proposed new Nuneaton North chord which is planned to deliver 8 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).

During late CP4 and early CP5, 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.

In general terms, the freight growth forecasts indicate that the majority 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.

- **Aggregates/construction**:
  One additional train per day is projected from the Mendip quarries to terminals in the Wolverton area.

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 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)
- Ditton to Garston
  (extra 5 to 10 trains per day each way).

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

Numerous power stations are securing a long term future by becoming a Flue-Gas Desulphurisation (FGD) plant, with equipment being fully installed during the next 12 months. This means that regular coal traffic will be coming form multiple sources

around the country to FGD plants at Fiddlers Ferry and Rugeley.

A good example of potential freight growth is the ongoing development of the facilities at Daventry International Freight Terminal, where a phase two project is being progressed to expand the infrastructure facilities at the depot. As part of the potential growth in the Daventry area, there is a freight study currently being undertaken in the Northampton area (replacing facilities for Ransome Road (former CMD) and Castle Yard sites).

DB Schenker are seeking authority for 2000 tonne trains between Wembley to Warrington and Wigan utilising Class 92 electric traction locomotives.

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.

The West Coast RUS will need to consider a multitude of 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 linespeed improvements and significant maintenance savings.
- higher linespeed – both at key locations and sections of the route
- additional infrastructure at emerging pinch-points
- electrification infill – keys sections of the network (in line with Network RUS) are electrified to cater for electric traction and rolling stock and providing a new/diversionary route
- further rerouteing of long distance flows
- enhancing the network by proposing short lengths of new lines to connect non rail communities
- new diversionary routes – examination of additional routes for strategic diversions for both passenger and freight traffic.

The concept of the Seven Day Railway is very important to 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.

As a longer term strategy, the broader issue of whether there is merit in a providing a completely new railway, unconstrained by historic limitations, is already being evaluated.

The West Coast RUS will also need to evaluate various short term and 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 resignalling, notably at Crewe and Stafford, and life-extension works at a number of other signal boxes further north.

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 the following sections.

Figure 11 Summary of proposed strategy milestones (CP4)

Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
May 2009	Stoke-on-Trent station area	Removal of the middle road at Stoke station, rebuilding of the up platform, and associated signalling	More efficient track layout for the station with linespeed increase
2009/10	Completion of refurbishment of CrossCountry 'Voyager' and 'Turbostar' rolling stock vehicles.	Rolling stock refurbishment	Additional capacity
2010 - 2013	Bletchley/Milton Keynes re-modelling	Areas to be re-modelled	Scope and funding to be 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
2011/12	Watford area resignalling	New signalling equipment to be installed	Reliability of equipment to be improved
2011 – 2012	106 additional vehicles added to Class 390 Pendolino fleet - making sets 35 X 11-car sets in total - (Virgin Trains) (potential for a further order of 42 vehicles – making a total of 56 x 11-car sets)	Platform extensions required at numerous key stations including Preston, Wolverhampton, Wilmslow, Liverpool, and Lancaster. Some stations where platforms cannot be physically extended will have to be resolved through Selective Door Opening (SDO). The WCRM project has already extended platforms to the maximum length possible. Maintenance depot improvements also being undertaken to accommodate longer train sets.	Additional standard seats delivered on mainline intercity services
2009 – 2014	Additional Class 378 vehicles to strengthen the LOROL suburban services	None required	Increased passenger capacity in line with growth in demand
2009 – 2016	WCML Traction Power Supply Upgrade	New auto-transformer system between Wembley and Carstairs and in Scotland	Strengthen system for futue increases in electrically hauled passenger and freight trains
2009 – 2012	Replacement of Class 321 rolling stock (37 units) with new build Class 350s for London Midland	Minor platform extension required at Wembley to meet modern standards	Provision of modern rolling stock

Figure 11 Summary of proposed strategy milestones (CP4)			
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 linespeed enhancement.	Alternative route as part of EEA for passenger and freight traffic. Providing operators with a Seven Day Railway
2012/13	Re-franchising	Both Virgin and interurban re-franchising will take place. This may require further alterations to infrastructure	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 Pendolino strengthening by 2 vehicles	106 (+ possible futher option of 42 vehicles)	Euston	4,400	1,500
London Midland lengthening of services and new Watford to Euston services	52	Euston	8,900	5,400

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

The table below shows 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 Routes 16 and 17.

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	709,800	834,300	64%	207,100	308,100	358,800	74%

* 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 West Coast Main Line 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. The strategic direction of the WCML post 2008 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 still remains the prime freight route in the UK and demand is expected to rise steadily. Aspirations from freight operators are to operate both more and longer services, particularly from the ports, which we will need to accommodate.

A freight aspiration is to see Anglo - Scottish coal traffic returning, or to have more capacity on the diversionary route (Settle to Carlisle and Hellifield to Blackburn).

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.

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

Electrification

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

Examples include Crewe to Chester, Birmingham to Nuneaton and Birmingham to Rugeley. Further north, the possible Chat Moss line electrification (between Liverpool and Manchester) may have a radical effect in terms of electrified diversionary ability and the potential for using electric traction on the Manchester Airport to Scotland services.

Not all freight routes are electrified and if more freight services are planned to be electrically operated, this issue needs to be addressed.

Electrification issues are being considered on a national basis through work being undertaken on the Network RUS.

Stations

Network Rail aims to address 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). This programme is being developed with industry support, and is described in more detail in the future capability section.

Future train service proposals

Figure 14 indicates the forecast percentage changes in tonnage to 2018.

The timetable recast in December 2008 released further capability and capacity, including improved journey times and increased service frequency levels.

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 and Norton Bridge areas.

Virgin Trains could potentially add additional services north of Lancaster to further enhance some of the London to Glasgow services. They also have aspirations to operate direct services from Shrewsbury to London Euston which could run via Walsall (and the Sutton Park line) joining the WCML at Nuneaton.

London Midland

As demand grows, London Midland aspire for both quicker and more frequent services. Plans include a new half hourly Euston to Watford service in 2009, and new non-stop services between Milton Keynes and London.

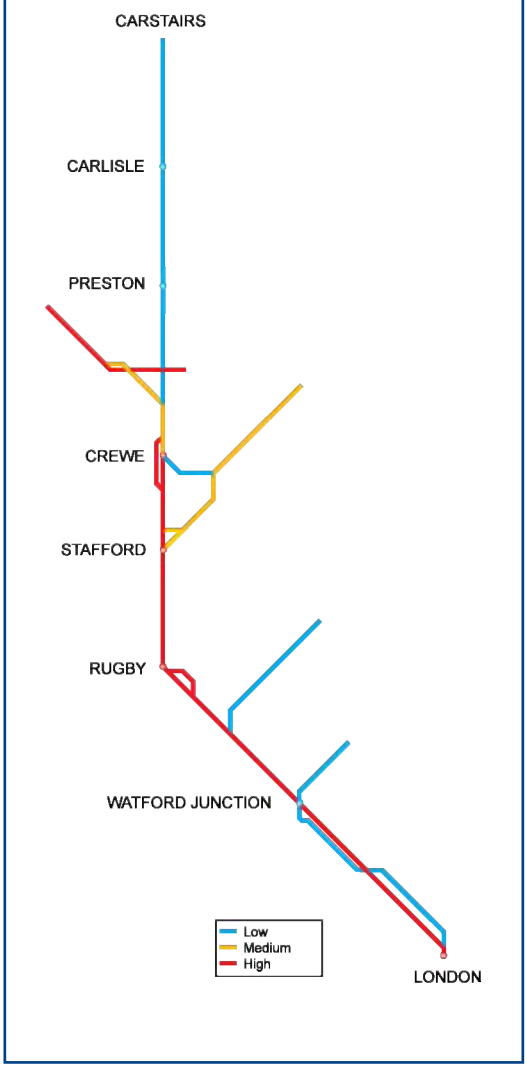
CrossCountry

CrossCountry is planning journey time improvements on their routes, including Birmingham to Manchester on this route, while aspiring to additional services which will provide more journey opportunities between major destinations.

CrossCountry is also considering the possible re-routing of some of its services (although the Manchester to Birmingham trains are not expected to change 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.

Figure 14 Tonnage growth



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.

TransPennine Express (TPE)

TPE have aspirations to further increase the number of Scottish services from nine to eleven trains each way per day.

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

Figure 15 Potential capability changes

Route section or location	Capability measure	Current value	Future value	Date
Alsager – Crewe	Number of tracks	Single Track	Double	2014

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	Bi-directional working	-	-	2009
Nuneaton North Chord New chord to allow access on Down TV Slow			new chord	2011

will drive the requirement for infrastructure enhancements to support longer services.

In the London Mayor's 10-year rail transport plan (issued in 2008) it states that there will be a need for a 10 percent capacity growth to rail services by 2018. London Overground therefore aspire to run more services, and longer trains, on the DC lines into Euston.

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.

Further aspirations include introducing a rapid transit tram-train system between Watford Junction to St Albans Abbey, as an ongoing project being used to examine standards and cost effective delivery methods that are appropriate for a community rail route.

Other

There is a long-term aspiration 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 CrossCountry and First Great Western 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 reinstated route from Oxford to Milton Keynes could also offer useful opportunities for freight, particularly if the line is cleared for W12 gauge.

A proposal has been made for the Silverdale branch (north of Norton Bridge) to be partially re-opened to allow sand to be extracted. If successful this should commence early in CP4.

Future capability

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

Passenger rolling stock

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 the middle of 2011 with all new vehicles planned to be in full service by December 2012. The remaining 21 nine-car sets could be lengthened to 11-car sets by early 2013 if an 'option' is exercised by the DfT (by 2010) to purchase the further 42 extra vehicles.

Alstom has been awarded the contract for these new vehicles, which will be built at their Savigliano plant in Italy. Virgin Rail Projects Ltd will support the DfT as the 'Service Provider' for the contract.

Liverpool Edge Hill depot will play a pivotal role in the programme to bring into service the four new 11-car Pendolino trains and the additional Pendolino vehicles. The £1.5 billion scheme will deliver a significant increase in capacity for passengers on the WCML, providing 7,420 extra seats.

LOROL has ordered new Class 378 'Electrostar' electric multiple units to replace the Class 313 and Class 508 units which currently operate on the North London and Euston to Watford Junction 'DC'

lines. These will feature fully longitudinal seating, similar to that used on London Underground stock, to deal with expected high passenger volumes. Initially, the units will be 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

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 are Watford Junction, Berkhamstead, Carlisle, Preston, Wigan and Runcorn. Some of these schemes are a contribution to a larger scheme.

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 within our infrastructure, from at least one station entrance (usually the main one) 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: Berkhampsted, Carlisle, Hemel Hempstead and Leighton Buzzard. We are working with local authorities and industry partners to provide improved station facilities and capacity at Watford, Bletchley, Milton Keynes, Tring, Crewe, and Wembley Central. A number of these are being taken forward as 'Gateway' schemes, to improve interchange opportunities with other modes of transport.

Preston

During the financial year 2012/13, platforms 1 and 2 at Preston are being de-cluttered to create extra platform capacity. This will reduce passenger congestion during peak times and ease the circulation problems currently experienced.

Interchanges

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.

Car parking

Car park upgrades are ongoing at many of the stations on the route.

Virgin Trains is currently investing in improvements at Carlisle, Penrith, Oxenholme, Lancaster, Preston, Wigan North West, Warrington Bank Quay, Runcorn, Crewe, Stoke-on-Trent, Macclesfield and Stafford. Other Virgin Trains stations include Coventry, Birmingham International and Wolverhampton (on Route 17) and at Stockport (on Route 20).

London Midland is investing in car parking at stations along the southern portion of the route including Lichfield, Tamworth, Nuneaton and Milton Keynes.

Platform areas and extensions

To coincide with the introduction of 11-car Pendolino trains, there is also a programme of platform extensions at various stations, so as to allow the longer trains to be able to call. Where platforms cannot be physically extended, a new system of 'selective door opening' will be installed to the Pendolino fleet, so that a safe system of operating at shorter platforms can be deployed.

A significant increase in demand is expected at Wembley Central from London and the North now that the new 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.

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.

Linespeeds

Longer term aspirations have been 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 linespeed improvements on the route include the slow lines north of Stafford and between Hanslope and Rugby via Northampton.

Depots

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

The lengthening of the existing fleet of Pendolino units (to 11-cars) will take place at Edge Hill depot in Liverpool. Significant investment has taken place at Edge Hill depot with new 'state of the art' technology including a 'rail removal' system that will enable 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. As mentioned earlier, Edge Hill depot will play a significant part in the programme to integrate the new 11-car Pendolino trains and in extending the 31 nine-car train sets to 11-car formations.

There has also been investment at the four other depots: Wembley (North London), Oxley (Wolverhampton), Longsight (Manchester), and Polmadie (Glasgow) to accommodate the extra trainsets so as to allow maintenance and stabling activities to take place.

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 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.

Future capacity

Following introduction of the VHF timetable last year, 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.

Sections recognised as restrictive are some of the present junction configurations, particularly in the Stafford and Crewe areas and also north of Preston. Other constraints include areas where four lines are not available, including Brinklow to Attleborough South Junction, and north of Preston.

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. We are currently in discussions with stakeholders regarding the capacity constraints on the DC lines between Harrow and Queens Park. Ways of addressing these constraints are currently being investigated.

Stafford and Colwich area

Discussions with the DfT are ongoing concerning a range of options for providing additional capacity in the Stafford and Colwich areas over the next two control periods.

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.

Integrated Train Planning System

The implementation of Integrated Train Planning System (ITPS) is planned to be phased in during the next two years. The new system allows us to plan at a lower level of granularity, for example it calculates sectional running times to the nearest second. We believe that using a system that has

Figure 17 Forecast MAA

	2009/10	2010/11	2011/12	2012/13	2013/14
Arriva Trains Wales	92.7%	92.9%	93.2%	93.4%	93.5%
London Midland	87.8%	89.1%	89.9%	90.5%	90.6%
Northern Rail	90.1%	90.7%	91.2%	91.7%	91.8%
London Overground	92.5%	93.1%	94.0%	94.4%	94.6%
TransPennine Express	91.7%	92.2%	93.2%	93.8%	94.0%
CrossCountry	90.0%	90.2%	90.6%	90.9%	91.3%
Virgin Trains	85.0%	87.8%	90.3%	90.6%	90.9%
First ScotRail	90.9%	91.3%	91.7%	91.9%	92.0%
Southern	90.7%	90.9%	91.1%	91.6%	91.9%

the ability to plan at this level of detail, may unlock additional capacity and modestly improve some journey times.

Future performance

Figure 17 sets out the forecast PPM MAA for each train operator for CP4.

London Midland

The performance of London Midland is currently 86.5% percent PPM and is forecast to continue through to April 2009 as an outcome of the 2008/09 Joint Performance Improvement Plan (J-PIP). London Midland is working closely with the Network Rail London North Western Route to continue the elimination of consistently small problems which tend to drive down PPM on a daily basis.

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

- West Midlands resignalling;
- increased timetable robustness;
- linespeed improvements;
- eradication of intrusive T2 track patrols;
- reduction in the impact of trespass, vandalism and fatalities;
- fitment of forward facing CCTV and enhanced usage of on train monitoring recording equipment;
- right time railway – reduction in late starts;
- extreme weather mitigation through enhanced drainage; and
- autumn management – increased back to boundary de-vegetation.

The route plan is being developed around these key points and current trends suggest that performance for London Midland by April 2014 will be around 90.6% percent. 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.

CrossCountry

As a long distance operator CrossCountry faces significant performance challenges. Additional capacity in the form of High Speed Trains as well as additional seating on Class 220/221 and Class 170s continue to be introduced. 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

PPM MAA for the remapped franchise at the end of period 10 2008 was 89.8 percent.

Franchise plans developed during bidding based on TOC on Self improvements have a PPM figure of 91.3 percent at the end of the franchise. This was based on a given bid assumption of no improvement from Network Rail in CP4. It is therefore expected by CrossCountry that the further improvement sought in franchise and national PPM will come from Network Rail 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 nationally is developing plans 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 currently in their early stages, 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

The performance of Virgin Trains is currently 81.3 percent PPM. In the last eighteen months Virgin Trains performance has been significantly affected by the works being undertaken by WCRM. Future performance issues will continue to be addressed by such initiative as the Performance Improvement Plan (J-PIP). The J-PIP has been supported by the jointly initiated 'Virgin on 90' Performance drive implemented by Virgin Trains and London North Western Route, focusing on the elimination of consistent small problems which tend to drive down PPM on a daily basis.

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

- enhanced management of the network;
- full implementation of GSM-R;
- axle counter task force developing solutions to improve AC reliability;
- improved asset reliability through the use of maintenance benchmarking and the full installation and deployment of remote condition monitoring;
- reduction in the number of temporary speed restrictions;
- linespeed improvements;
- eradication of intrusive T2 track patrols;
- weather proofing the network through enhanced drainage and upgrade of climate control systems for signalling equipment;
- efficient engineering access and possession planning improvements;
- motorised OLE switching;
- reduction in the impact of trespass, vandalism and fatalities;
- autumn management – increased back to boundary de-vegetation;
- improved incident response;
- Norton Bridge track layout.

The route plan is being developed around these key points and current trends suggest that performance for Virgin Trains by April 2014 will be around 90.9 percent, this includes an allowance for passenger/traffic growth and an increase in engineering work.

Other operators

The other passenger operators on this route are Arriva Train Wales, First ScotRail, TransPennine Express, Northern Rail, Southern and London Overground.

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

Figure 18 Train operators

Arriva Train Wales	Routes 14, 15 and 22
First ScotRail	Routes 24, 25 and 26
TPE	Routes 10, 11 and 20
Northern Rail	Routes 9, 20 and 22
Southern	Route 2
London Overground	Route 6

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.

Efficient Engineering Access (from December 2008)

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.

As part of the 2008 timetable development, 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 a Seven Day Railway. Some of the workstreams in the EEA programme include:

- new access points upgrade – to deliver improvements to access points at key locations on the route. This allows maintenance staff to access the railway faster, to enable them to do work with less disruption to trains.
- 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.
- junction lighting - to introduce permanent lighting at key junctions.
- faster possessions – the introduction of more efficient management systems to enable enhanced productivity.
- integrated planning – better planning procedures that will save time and reduce costs.

One of the most important features of the new timetable is that, for the first time, a weekday train frequency and journey time will operate 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.

Train operators also have aspirations for a Seven Day Railway. For example, CrossCountry are seeking more unrestricted access on Sundays, and when access is restricted, a Seven Day Railway capability 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 Seven Day Railway work, much of the CrossCountry network to the south. This will also benefit other train operators.

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

EEA on the Trent Valley line will take effect in autumn 2009 when the fast line bi-directional signalling between Rugby and Lichfield will be commissioned. During the interim period freight services will be diverted via the Coventry corridor.

By autumn 2009, we will see 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.

Long term opportunities and challenges

West Coast RUS

The various options and opportunities to increase network capacity and capability will be explored by the West Coast RUS, which commenced work in late 2008, and should be completed by 2010. 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.

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

With regard to future 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 Pendolinos.

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 recently announced Agility Trains as being selected as the preferred bidder for a £7.5 billion contract 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 two builds of IEP trains. One build will be 12-car high capacity sets for London to Birmingham and Wolverhampton services. The second build will be six-car sets for London to Milton Keynes/Northampton/Trent Valley Express services which could be used in multiple if necessary. This would displace Pendolinos, which could be utilised to boost longer distance services.

Work will 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. Development work in CP4 will focus on the south end of the route.

New lines

We have commissioned a strategic review into the case for building 'new rail' lines across the national rail network. The review will assess the costs and implications to see if such proposals are desirable, affordable and deliverable. Although work is initially focused on the East Coast and Great Western Mail Line routes, another key contender for a high speed link will be this route.

Any additional capacity created by a new high speed line would also ease congestion on the WCML.

Two sections may see a good business case for 'new line' investment :

(a) based on the biggest capacity relief on the existing network - is a London to Birmingham 'new line'.
(b) based on the greatest number of passengers that would transfer from air travel to rail travel, a 'new line' could be from London to Manchester and potentially onward to Glasgow and Edinburgh.

The government's recently formed new company 'High Speed 2' will work closely with us and consider the case for high speed rail services from London to Scotland and will advise Ministers on the feasibility and credibility of any new lines with specific route options and financing proposals. As a first stage the DfT have asked the company to examine options for an entirely new line between London and the West Midlands.

Work is being progressed on developing the journey time aspiration of London to Glasgow in four hours.

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

London Euston station

Discussions are still 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.

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. Furthermore, population growth is expected in the Milton Keynes/Northamptonshire area (15,000 more homes in Milton Keynes alone by 2016) alongside considerable expansion in London area commuting. Aspirations therefore include more frequent and faster trains to London.

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. Planning permission for these new terminals needs to be sought during CP4, with discussions taking place to decide the best way forward. 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 23.

Combined with the enhancements to lengthen and relocate loops to cater for the additional length of freight services, the increased utilisation of Route 16 (Chiltern Lines) for more freight traffic is an avenue to be explored by the West Midlands and Chilterns and West Coast RUSs.

Journey times and linespeeds

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

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

Infrastructure Investment in CP4

Figure 18 Infrastructure Investment in CP4

Implementation date	Project Name	Project description	Output change	Funding	GRIP stage
2009/10	Ⓐ Edge Hill Depot : New maintenance shed	Provision of a new maintenance shed and staff accommodation for Alstom	Enhanced maintenance facilities	Network Rail	6
2009/10	Ⓑ Tring Station car park	Extension to current car parking	Increased car parking facility	Third party	5-8
2009/10	Ⓒ Hartford Loop	New Freight loop	Increased capacity	Network Rail	4
2009/10	Ⓓ 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
2009/10	Ⓔ 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
2009/10	Ⓕ Telecoms Renewal : PA/VA	Renewal of public address and voice alarm systems at Wembley Central and Euston stations. Euston renewal of system aligns to planned Euston redevelopment scheme.	Telecoms Renewal	Network Rail	5-8
2009/10	Ⓖ Signalling Renewal : Northampton	Resignalling in the Northampton area	Signalling Renewal	Network Rail	5-8
2009/10	Ⓗ Euston station	Platform 11 to be available for 12 car Class 350 vehicles	Increased platform length	Third Party funded	2
2009/10	Ⓘ Watford Junction station	Platform 10 to be available for 8 car Class 321 vehicles	Increased platform length	Third Party funded	2
2009/10	Ⓙ Northampton car park	Car park extension project	Increased car parking facility	Third party	3
2009/10	Ⓚ Wolverton station	New station building	Provision of a new ticket office and waiting area	ODPM grant	4
2009/10	Ⓛ St Albans Abbey Loop	Introduction of a branch loop to increase services on line	Increased capacity	DfT	2
2009/10	Ⓜ Edge Hill Depot : Independent Power Supply	Provision of independent power supply at Edge Hill depot	Increased facilities	TOC	1

Figure 18 Infrastructure Investment in CP4

Implementation date	Project Name	Project description	Output change	Funding	GRIP stage
2009/10	(N) Buildings Renewal : Depots	Renewal of carriage siding walkways and water services at Bletchley TMD	Depot Renewal	Network Rail	3
2009 – 2011	(O) Buildings Renewal : Stations	Platform repairs including new coping stones and tactiles at Warrington Bank Quay	Buildings Renewal	Network Rail	3
2009 – 2011	(P) E&P Renewal	Transformer/Rectifier set renewal Points heating OLE structure remedial works Auxiliary catenary renewal	E&P Renewal	Network Rail	2
2009 – 2011	(Q) Structures Renewal : embankment works	Various earthwork, drainage and rock cutting examinations and works at – • 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
2009 – 2011	(R) Structures Renewal : Major bridgeworks	Major strengthening works to bridge no.25, Runcorn Viaduct	Structures Renewal	Network Rail	2
2009 – 2011	(S) Telecoms Retail Renewal : Various locations	Retail telecoms between Leighton Buzzard and Kings Langley	Telecoms Renewal	Network Rail	1
2009 – 2012	(T) E&P Renewal	Overhead line renewal to auxiliary catenary and existing contact wires	E&P Renewal	Network Rail	2
2009 – 2013	(U) 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	3
2009 – 2013	(V) Telecoms Transmissions Renewal : Various locations	Transmissions renewal planned at Rugby area, between Watford and Bletchley and Norton Bridge	Telecoms Renewal	Network Rail	1

Figure 18 Infrastructure Investment in CP4

Implementation date	Project Name	Project description	Output change	Funding	GRIP stage
2009 – 2013	(W) National Stations Improvement Programme (NSIP)	NSIP works planned at various stations along the route including : Runcorn - including new waiting shelter Preston - in alignment with car park work at Preston Carlisle, Wigan, Berkhamsted, Watford Junction	Improved station facilities and environment	Network Rail	Various
2010/11	(X) Watford Interchange	New access road and car parking, improved passenger facilities	Increased car parking to cater for growth	Third party	4
2010/11	(Y) Bletchley station	Station enhancement scheme	Improved station environment	Third party	2
2010/11	(Z) Tring Gateway	Improvements to Tring station facilities and environment	Improved station facilities	Third party	2
2012/13	(AA) Northampton station redevelopme	Northampton station redevelopment and relocation of freight terminal (Castle Yard)	Improved layout at Northampton	Third party	1
2012/13	(AB) Access For All programme	Station improvements at Berkhampsted, Carlisle, Hemel Hempstead and Leighton Buzzard	Improved station facilities	Access For All	1
2012/13	(AC) Signalling Renewal : Warrington, Preston, Carlisle	Life extension signalling works at Warrington, Preston and Carlisle	Signalling Renewal	Network Rail	6
2013/14	(AD) Freight Terminals	Expansion of existing intermodal freight terminal at Ditton	Increased capacity	Third party	4
2011/14	(AE) Signalling Renewal : Watford resignalling	Resignalling of Watford area	Signalling Renewal	Network Rail	1
2010 – 2012	(AF) Buildings Renewal : Stations	Parcel deck roof renewal at London Euston	Buildings	Network Rail	3
2010 -2013	(AG) Bletchley remodelling	Remodelling of the Bletchley area	Increased capacity	Network Rail	2
2010 – 2014	(AH) Telecoms Concentrator Renewal : Various locations	Renewal of telephone concentrators at Stoke (including voice recorder and nodes at Colwich and Norton Bridge), at Crewe Coal Yard, Crewe SCC and Edge Hill, between Euston – Willesden, at Wembley SCC and Watford station (interfacing with re-control at this location)	Telecoms Renewal	Network Rail	1
2009-2014	(AI) Track Renewal programme	Major S&C works planned at: numerous key junctions on the route.	Track Renewal	Network Rail	3

NRDF candidate schemes in CP4

Figure 19 Candidate NRDF schemes in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009/10	(AJ) 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	4
2009/10	(AK) Carlisle Upperby Junction	Linespeed increase from 75mph to 90 mph on the Main line	Higher linespeed across junction	Network Rail Discretionary Fund	2
2011/12	(AL) Peterborough to Nuneaton	W10 Gauge improvements	Increased gauge capacity	Network Rail Discretionary Fund	
2012/13	(AM) Preston Station upgrade	De-cluttering of platforms 1 and 2	Improves passenger circulation and reduces platform congestion	Network Rail Discretionary Fund/National Stations Improvement Programme	3
2013/14	(AN) Norton Bridge Junction Enhancement	Improved reliability, and higher linespeed through junction.	Higher linespeed through junction.	Network Rail Discretionary Fund	0
On-going development	(AO) Linespeed increase between Stafford and Crewe	Linespeed increase to 100 mph on the Up & Down Slow lines between Stafford and Crewe.	Reduce journey times.	Network Rail Discretionary Fund	0

Renewals activity

Figure 20 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 output track renewals and ballast cleaning trains will be operating on the south end of the WCML. This will significantly increase both the speed and scale of renewals activities possible in short overnight and weekend possessions.

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 20 Summary of estimated renewals costs and activity volumes

£m (2009/10 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
Renewals						
Track	138	111	96	54	37	437
Signalling	21	16	13	28	27	106
Civils	17	13	20	19	17	87
Operational property	13	15	17	15	11	69
Electrification	10	13	12	13	13	59
Telecoms	3	5	4	5	3	20
Plant and machinery	4	3	2	4	5	17
Total	**206**	**176**	**164**	**137**	**113**	**795**
Renewals volumes						
Track						
Rail (km)	58					
Sleeper (km)	20					
Ballast (km)	37					
S&C (equivalent units)	61					
Signalling						
SEUs (conventional)	0	0	0	390	108	498
SEUs (ERTMS)	0	0	0	0	0	0
Level crossings (no.)	0	0	0	3	0	0

Appendix

Figure 21 Strategic route sections

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

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (min)	No of Tracks
18.01	Euston – Rugby	LEC1	Primary	DfT	No	W9 & W10	8	125 EPS (75 to 120)	25 kv (both)	TCB	3 (4)	4
18.02	Trent Vallley	LEC2	Primary	DfT	No	W9 & W10	8	125 EPS (75 to 120)	25 kv	TCB	3 (5)	4 (3)
18.03	Stafford – Crewe	LEC3, LEC4, LEC5	Primary	DfT	No	W9 & W10	8	125 EPS (75 to 110)	25 kv	TCB	3 (5)	4
18.04	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)
18.05	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
18.06	Border (nr Gretna Junction) – Carstairs	WCM1	Primary	Transport Scotland	No	W9 & W10	10	125 EPS (90 to 110)	25 kv	TCB	4	2
18.07	Weaver Junction – Allerton	WJL1, WJL2, WJL3	Primary	DfT	No	W9 & W10	8	(70 to 90)	25 kv	TCB	3	2 (4)
18.08	Norton Bridge and Colwich Junction – Cheadle Hume	1, CMD2, MCH, NBS	Primary	DfT	No	W12	8	125 EPS (75 to 115)	25 kv	TCB	3 (5)	2
18.09	Crewe – Kidsgrove	KCS1	Secondary	DfT	No	W9 & W10	8	70 (60)	25 kv	TCB	6	1 (2)
18.10	Watford Junction – St Albans	WSA	Rural	DfT	Yes	W6	7	50 (20)	25 kv	OTW	37	1

Figure 21 Strategic route sections

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

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (min)	No of Tracks
	Abbey											
18.11	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
18.12	Bletchley – Bedford	BBM	Rural	DfT	Yes	W8	8	60	none	TCB	4 to 13	2
18.13	Freight Lines	SDJ2, CGJ1,	Freight	DfT	No	Various	8	Various	25 kv (none)	TCB AB	various	2 (1)

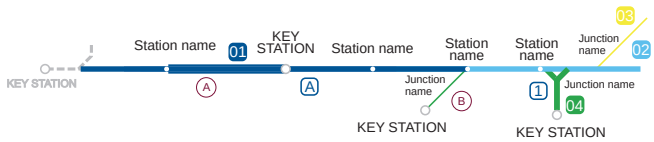
Capacity and operational constraints	
A	Harrow and Wealdstone – Queens Park: Volume of traffic on DC lines with London Underground and London Overground shared working together with traction power supply limitations.
B	St Albans Abbey branch: single line with no signalling only allows one train at a 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 – either going towards the north or to Coventry branch
E	Trent Valley line – restrictions due to three track section between Brinklow to Attleborough
F	Stafford station area – North and South junctions at capacity
G	Norton Bridge - flat crossings & fixed diamond limit capacity and performance
H	Alsager to Crewe – short single line section – restricts arrangements for train diversions for effective contingency arrangements during engineering works and periods of disruption.
I	Crewe station: large number of crossing moves north and south of Crewe station and existing signalling infrastructure limits both passenger and freight capacity.
J	Crewe independent lines: constraints on freight growth.
K	Wigan – Euxton: a mix of speed and crossing movements in this section severely limits capacity through Wigan and Euxton Junction
L	Preston – Carlisle: limited passing loops which are also restrictive in length – limited freight capacity
M	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.
N	Carlisle station: area - capacity limited by restrictive layout
O	Carlisle - Gretna Junction – high usage of available capacity by coal traffic
P	General line of route – Restrictive overhead line sectioning and auto switching – 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.

Note

This Route Plan forms part of the Control Period 4 (CP4) Delivery Plan and supersedes the version published in April 2008.

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

Key to route diagrams



Capacity and operational constraints
Location: capacity or operational constraint

Issues on the route
Location: issue on the route

Key planned projects
Location: planned project on the route

Strategic route sections
Listed in the appendix of the route plan

Other symbols

KEY STATION — Key station location
KEY STATION — Key station on this route
KEY STATION — Key station on another route
Station name — Other station location
Station name — Other station on this route
Junction name — Junction / other landmark

Track descriptions

The colour of the line denotes the route classification
- Primary
- London and South East commuter
- Secondary
- Rural
- Freight only

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

The width of the line denotes the number of tracks
- Multiple track
- Double track
- Single track

Other lines are shown as follows:
- Line on other route
- Non Network Rail infrastructure
- Non operational line

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

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