

# Section I

## Executive summary

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# Executive summary

The purpose of our route plans is to describe the way in which we intend to deliver our relevant licence obligations on a route-by-route basis and enable our customers, funders and other stakeholders to plan their activities. It is based around 26 Strategic Routes which are aligned as closely as possible to the relevant traffic flows, the SRA's route definitions and our own delivery units.

Each individual route plan contains a description of the route – including a physical description and a summary of route capability and current and expected future utilisation. Tables of forecast expenditure and activity levels are presented. We outline the plans for delivering the baseline outputs for each of our major assets on the route and specific local performance initiatives. Current route development work – funded by our stakeholders – is summarised. Finally there is a short section outlining emerging issues on the route.

The document outlines enhancement schemes that we are committed to deliver. It also describes those schemes, such as the West Coast Route Modernisation, the Southern Region New Trains Programme and TPWS+, which we are developing for the SRA and others, including the Scottish Executive and the Welsh Assembly Government, for delivery during the next few years. We also include Safety Plan enhancements and increases in passenger capacity at some of our Managed Stations.

We provide further information that will enable the reader to understand the plans more fully. It contains a description of significant bottlenecks in our capacity as identified through our route capacity utilisation work described in Section 6 of the Technical Plan. A glossary of terms used in the document, a table identifying stations to routes and a description of Project Development Phases are also included.

At this stage the plans represent an articulation of our bottom up delivery plans, presented on a route-by-route basis. It is our intention to strengthen route based planning significantly to align delivery more closely to our customers' requirements. EU Directive 2001/14 reinforces our role in identifying capacity constraints and carrying out capacity studies to address the issues. The Strategic Route plans will play a key role in making trade-offs to ensure that our outputs are delivered within a constrained budgetary framework.

2004 Route Plans

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# Section 2

## Strategic Routes

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## Introduction to route plans

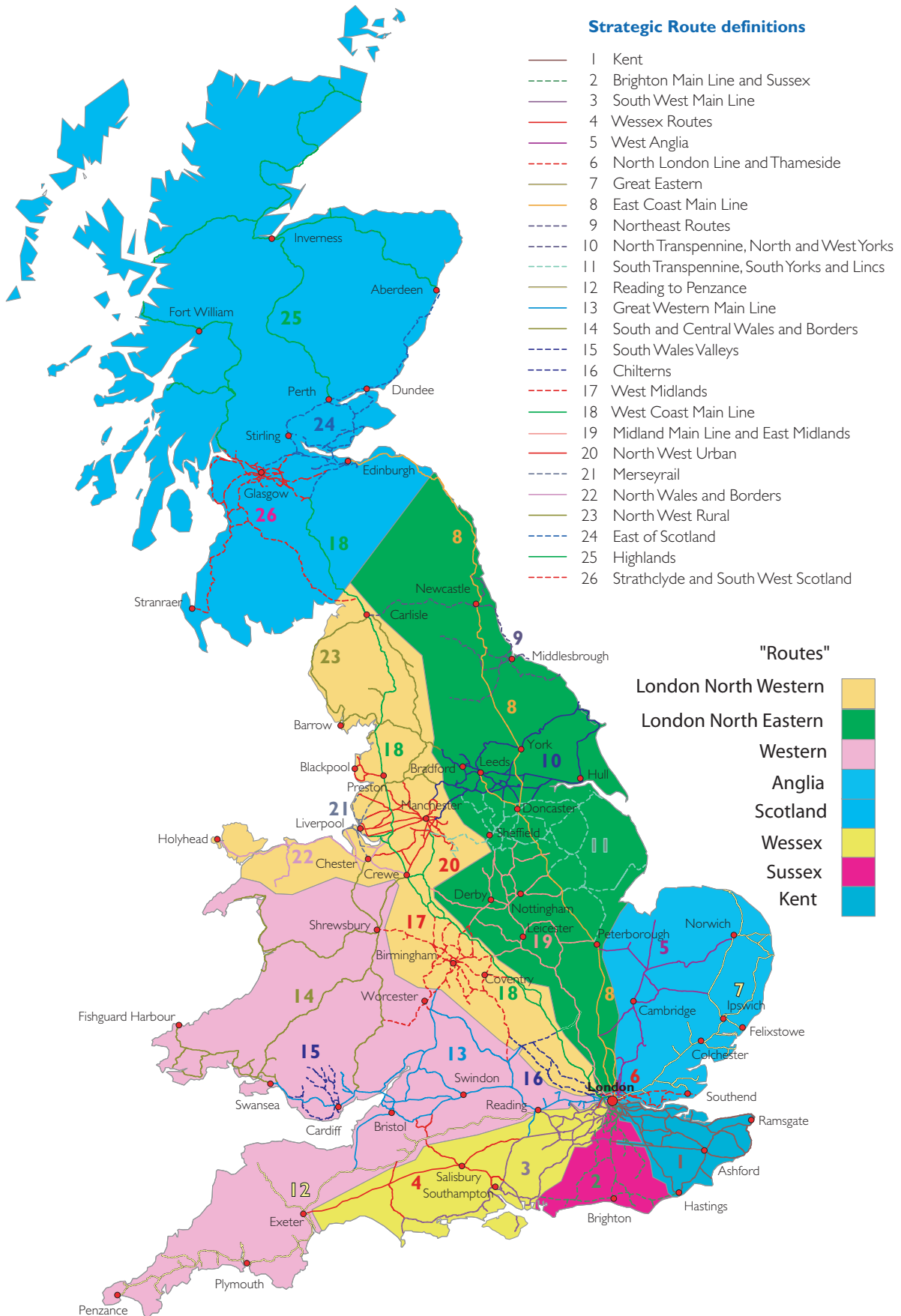
The Route Plans document is produced in accordance with Network Rail's network licence condition 7 and is one of a suite of business plan documents that are produced on an annual basis. In this volume we set out how we intend to achieve our network stewardship objectives on individual routes. It outlines performance initiatives and outlines our stakeholders aspirations for development of the network. The document is designed to:

- provide our customers and funders with details of how we intend to deliver our relevant licence obligations on a route-by-route basis; and
- enable stakeholders and customers to plan their future financial and service requirements.

The Technical Plan outlines the mechanisms by which we intend to achieve our network stewardship objectives through the safe day-to-day operation of the network, and the asset maintenance and renewal activities that underpin the delivery of train services. The Route Plans show in more detail how the strategies set out in the Technical Plan will be delivered at a route level across the network, and how we are working with our customers, the Strategic Rail Authority (SRA) and other stakeholders to improve the performance and utilisation of the network. It also shows a portfolio of activities to develop the network.

Figure 1.1 shows how the 26 Strategic Routes map to the 8 Routes that will be used going forward to plan the efficient delivery of our business to our customers. The 26 routes align closely to the traffic flows in the planning areas. The 26 routes, which were first introduced in the 2003 Business Plan, are aligned with the SRA's route definitions used for its Route Utilisation Strategies (RUSs). They also broadly align to the 18 Areas to enable direct use of route plans for delivery.

**Figure I.1 26 Strategic Routes and 8 Routes**



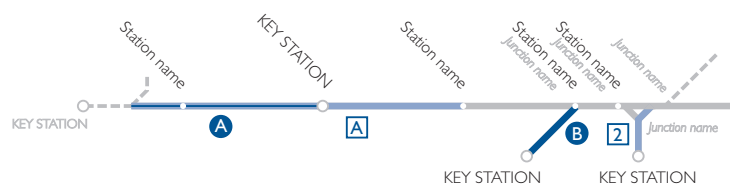
The document is organised as follows:

- Section 2 contains the individual route plans for each Strategic Route. The individual route plans outline specific issues related to deliver of our baseline outputs and performance on each route;
- Section 3 relates to enhancements. It outlines enhancement schemes that we are committed to deliver, as well as those we are developing for the SRA and others such as the Scottish Executive and the Welsh Assembly, for delivery during the next few years. We also include Safety Plan enhancements and increases in passenger capacity at some of our Managed Stations; and
- Section 4 contains a description of significant bottlenecks in our capacity, as identified through our route capacity utilisation work described in Section 6 of the Technical Plan. A glossary of terms used in the document, a table identifying stations to routes and a description of Project Development Phases are presented.

We set out below how route plans in Section 2 are structured, and specify what information they contain. The headings below refer to headings in each route plan.

### Route diagram

We include route diagrams to show the geography of routes, including all stations, major junctions, capacity constraints and other issues. The locations of key renewal and enhancement projects planned for the next three years (2004/05 - 2006/07) are also shown on the diagrams. The key to these projects is shown at the end of each route plan, in the form of key project summary and diagram key tables. The diagrams are schematic and not to scale.



#### Capacity and operational constraints

- A** Location: Capacity or operational constraint
- B** Location from - Location to: Capacity or operational constraint

#### Issues on the route

- 1** Location: Capacity or operational constraint
- 2** Location from - Location to: Capacity or operational constraint

#### Key planned projects

- A** Location: Capacity or operational constraint
- B** Location from - Location to: Capacity or operational constraint

#### Other symbols

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

#### Junction indication

- Junction on route
- Junction off route
- Connection severed
- Route finishes some way before junction

#### Track descriptions

- Passenger line on the route
- Passenger line off route
- Freight only line
- Non Network Rail infrastructure, where we run
- Channel Tunnel Link - under construction
- Mothballed

## Route description

This section contains a description of each route. We divide the description into two sections: a physical description of the route and the markets served. The physical description section lists the major components of the route, together with predominant line speeds, number of tracks, signalling and, where applicable, electrification. The route classification is also shown. The classification is explained in more detail in the Technical Plan. The markets served section outlines the nature of the principal markets served.

## Current utilisation

This section lists the train operators which run services on the route, with an outline of the type of service provided. Tables show the overall level of traffic on the route, as well as the five busiest sections. For each of these sections, we show the total number of daily trains (passenger and freight) in both directions, averaged over the year. Where the section has multiple tracks, trains on all lines are included. Where the number of trains varies along the section, the number for the busiest part of the section is shown. Short sections of route at station throats are not included.

## Projected utilisation

This section notes expected changes in utilisation of the route.

## Strategic framework for the route

This section describes strategic studies produced by the SRA, Scottish Executive and Welsh Assembly which are relevant to the route. In particular, we note the plans for the SRA to carry out a Route Utilisation Strategy or Regional Planning Assessment (or both).

## Route baseline outputs

The route capability tables show key journey times and forecast linespeed, gauge and axle weight data for 1 April 2004. We are currently carrying out an exercise as part of our asset register development process to confirm historic data on which route capability tables are based. When the exercise is complete, it will result in re-basing of data. Route Availability (RA) figures show the maximum axle weight of trains. Vehicles heavier than the route's rating can sometimes be accommodated provided that special dispensation, which may for example require travelling at reduced speed over certain structures, is in place. The RA values quoted in route plans assume such dispensation where appropriate. They can, therefore, be greater than the actual capability of the routes at their normal operating speeds.

Where changes to route capability are either expected to occur as a result of committed enhancement schemes, or may occur as a result of potential enhancements not yet committed to implementation, then a table is included to show such changes. The current level of commitment to schemes is shown in the tables.

## Delivering baseline outputs

This section describes the actions planned under each asset category to deliver the baseline output. It also shows the engineering access required, including major possessions. Actions to address performance issues are also included in this section, as are planned and committed enhancement schemes. Those projects whose geographical extent spans more than one route are described in Section 3.

Tables of forecast expenditure & volumes are shown in this section.

These tables show forecast expenditure on the route. Renewal expenditure is also broken down by asset type and enhancement expenditure is sub divided by project.

Although we show forecast expenditure and renewal rates for rail, sleepers, ballast and S&C units, it should be noted that some of this work is of a reactive nature, which clearly cannot be planned at a route level. The breakdown by route therefore contains an element of approximation. The figures are shown nationally and by business unit in the Technical Plan.

Figures shown are in 2003/04 prices and are rounded to the nearest £1 million. An entry of £0, therefore, indicates spend of less than £0.5 million.

## Route development

This section describes potential enhancement schemes currently under development on the route, covered by existing development agreements.

## Emerging issues

This section describes issues relating to asset stewardship, performance, or capacity constraints which we have identified but where no solution is currently funded. Where appropriate, we suggest potential solutions to these issues.

## Planned projects summary & diagram key

The tables list projects planned for the next three years (2004/05-2006/07). They serve as a key to the diagrams, but they additionally contain route wide projects, which do not have a diagram reference. The column to the right of the project description indicates the type of work, according to the following categories:

R: Renewal

E: Enhancements

Large items of maintenance work may be shown (M), but routine maintenance is not. For enhancements, the current development level is shown, based on the project development matrix shown in the Technical Plan.

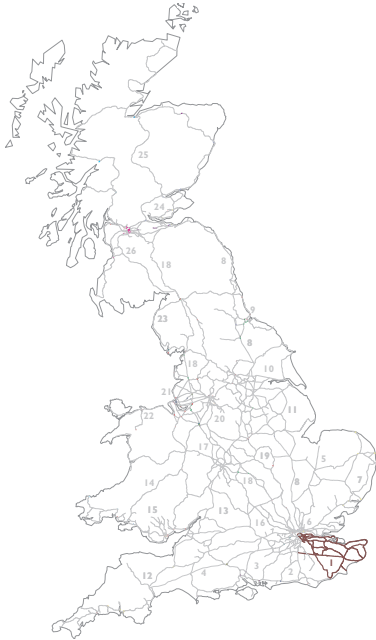


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# Route I: Kent

## Route description



### Physical description

This route comprises all railway lines within Kent and parts of East Sussex, together with many lines in south-east London that connect these lines with central London terminals at Victoria, Charing Cross and Cannon Street.

There are two main lines covered by the route: one from Victoria to Ramsgate and Ashford via Swanley, with associated lines running from Faversham to Dover Priory via Canterbury East and, from Ashford to Ramsgate via Canterbury West; the other main line runs from Charing Cross and Cannon Street to Dover Priory and Ramsgate via Tonbridge. The route also includes a number of other significant lines including those to Dartford and Rochester, the links to the Channel Tunnel, the line from Tonbridge to Hastings, and the North Downs line between Tonbridge and Redhill.

The principal characteristics of main lines from Victoria are as follows:

- Victoria - Swanley: four-track (two-tracks via Herne Hill and two via Catford Loop) with a predominant linespeed of 60mph;
- Swanley - Ashford via Maidstone East: two-track with speeds between 70mph and 80mph;
- Swanley - Faversham - Ramsgate: two-track with a speed of 60mph to Rainham and 90mph to Ramsgate;
- Ashford - Ramsgate via Canterbury West: two-track with linespeeds of 70mph; and
- Faversham - Dover via Canterbury East: two-track with a maximum speed of 90mph.

The principal characteristics of main lines from Charing Cross/Cannon Street are:

- Charing Cross and Cannon Street - Orpington comprise four-tracks with a 60mph linespeed, rising to 70mph beyond Hither Green;
- Orpington - Ashford via Tonbridge: primarily two-track, with linespeed varying between 80mph and 100mph; and
- Ashford - Ramsgate via Dover: two-track with maximum linespeeds in the range 75-100mph to Dover and 70mph to Ramsgate.

The principal characteristics of other lines include:

- from Charing Cross and Cannon Street lines towards Rochester split into three separate lines serving Dartford, where they merge again and continue to Rochester to join the Swanley - Ramsgate line. Two-track, with a linespeed of 60mph as far as Dartford, then 70mph to Strood, 60mph to Rochester;
- Tonbridge - Hastings: two-track with speeds between 50mph and 90mph;

- Redhill - Tonbridge: two-track with speeds between 60mph and 85 mph;
- Hastings - Ashford: two-track with a single track section between Ore and Appledore and a linespeed of 60mph; and
- there are a number of branch lines on the route, including Lewisham - Hayes, Strood - Paddock Wood, Sittingbourne - Sheerness, all with two-tracks throughout, with the exception of a short single-track section on the Sheerness Branch.

With the exception of the Ore-Ashford section, all passenger lines are electrified.

Capacity constraints on the route include the following:

- Charing Cross through London Bridge to Dartford and Orpington, with a large number of flat junctions;
- the two-track section between Rochester Bridge Junction and Gillingham is intensively used, with three stations over two miles;
- train performance between Hastings and Tonbridge is heavily constrained by the four single-line tunnel sections;
- single-line sections, particularly between Ore and Appledore; and
- other capacity constraints are described in the 'Emerging issues' section.

The geology and physical features of the route influence asset strategy and performance of the route in a number of key areas including:

- many weak clay embankments and steep chalk cuttings; and
- the route between Folkestone and Dover is prone to coastal erosion and geological instability with consequent problems for many structures on the section including the Martello, Abbotscliff and Shakespeare tunnels.

With the exception of a number of key renewals and major junction improvements that have taken place over recent years in advance of the opening of Section 1 of the CTRL and as part of the post-Hatfield track programme, many of the assets on the route are relatively old with some components dating back to electrification and resignalling schemes undertaken in the 1960s and 1970s.

Broadly, two-thirds of the route is classified as either primary or London and south-eastern, the remainder split between secondary and freight only, with a small portion of rural.

## Market served

In conjunction with Section 1 of the Channel Tunnel Rail Link (CTRL) this route carries passenger traffic between London, the Channel Tunnel and mainland Europe and all freight trains to the tunnel use the route. High-density London commuter services to south-east London and much lower-density rural services in Kent are also carried.

Freight traffic on Route 1 principally consists of international traffic from the Channel Tunnel, aggregates traffic from Angerstein Wharf and Grain, and steel traffic from Sheerness. Freight terminals are mainly located on or near the Kent coast with freight paths traversing the main routes within Kent until converging at Nunhead and Brixton Junction and onto Route 2 and the West London Lines. Nuclear trains also use Route 1 from Dungeness. Tonbridge to Redhill (Route 2) can be used as a diversionary route for CTRL and aggregates traffic.

## Growth

The high volume of demand for peak commuter services to London is expected to continue, and to grow in line with increasing employment in London. Our analysis suggests that growth of peak London commuter services will continue to be constrained by the available capacity, unless enhancement works are undertaken to allow longer trains to run, as there is no space in the timetable to run additional trains. Services to rural east Kent are lightly used. It is expected that CTRL domestic services, with improved journey times to London, will stimulate commuter demand in these areas. This is being assessed by the SRA as a part of its plans for the Integrated Kent Franchise (IKF). In addition, growth is expected as a result of the announcement from the Office of the Deputy Prime Minister (ODPM) on proposals for areas of significant housing growth, including Thames Gateway (encompassing the Medway Towns) and Ashford, that are to be accelerated. With the opening of Section 1 of the CTRL, Eurostar services have seen significant increase in demand and market share, despite continued fierce competition from airlines.

European freight to and from the CTRL is currently running at approximately 30-40% of available paths despite resolution of the refugee problems that have disrupted flows over the past couple of years. As a result, traffic levels are significantly lower than they were three years ago. Nevertheless, we anticipate that there is still potential for significant long-term growth in freight given suitable conditions.

## Current use

### Current traffic

South Eastern Trains has been established as an interim train operator by the SRA to run the majority of passenger services over the route pending the establishment, within the next 12-18 months, of a new IKF, possibly incorporating new domestic services running on the CTRL alongside those on existing infrastructure. Eurostar uses the Waterloo International - Fawkham Junction route before joining Section 1 of the CTRL and continuing towards Calais, Lille, Paris, Brussels, Mame La Vallee and Avignon. Some Eurostar services rejoin the Network Rail infrastructure to call at Ashford International station. Eurostar services are permitted to use Network Rail routes to Waterloo. EWS and Freightliner carry freight on the route.

When Section 1 of the Channel Tunnel Rail Link (CTRL) opened in October 2003 some capacity on the existing route was released and modifications were made to the timetable to reshape the off peak Kent coast services that operate via Tonbridge. This was undertaken along with implementing a series of measures to improve the performance of South Eastern Trains and produce a more robust timetable.

Route 1	Current use		
	Passenger	Freight	Total
Train km per day	83,786	4,910	88,696
Train tonne km per year (millions)	8,878	1,301	10,179
Average no of train km per track km per day			91
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
London Bridge - North Kent Junction			890
North Kent Junction - St Johns			760
Metropolitan Junction - London Bridge			750
London Charing Cross - Metropolitan Junction			650
Courthill Loop Junction - Hither Green			480

## Projected use

The introduction of the new rolling stock through the Southern Region New Trains Programme (SRNTP) is making necessary the enhancement of the power supply network to meet the higher electrical demands of the new vehicles, the installation of depot facilities for servicing new trains, and requires the issue of short platforms at a number of stations to be addressed.

Critical works for the Power Supply Upgrade (PSU) to allow operation of the new fleet are scheduled for delivery in two tranches, completing between April and December 2004. The remaining works to provide operational resilience will follow in the first half of 2005. The current scope of works agreed with the SRA is limited to replication of existing levels of train running capability. However, a period of trial running and monitoring following completion of PSU works may suggest further opportunities for performance improvements.

The introduction of new rolling stock and CTRL Document Services (CTRL DS) operations will be accompanied by significant revisions to the timetable. The revisions will take into account the operating characteristics of the new trains following the power supply upgrade incorporating issues such as revised station dwell times.

## Strategic framework for the route

The SRA has launched its Regional Planning Assessment (RPA) programme, which is intended to provide a forward view with a planning horizon of between five and 20 years. The Kent/South East RPA will provide the pathfinder study commencing in September 2003 with completion programmed by Summer 2004. Kent is not included within the SRA's current RUS programme but we anticipate that the work due on Cross London Routes, which is planned for publication during Autumn 2004, may have some significance for this route.

Strategic planning of services in Kent is currently dominated by the opportunities offered by the CTRL to run domestic services, the SRA's plans for the IKF, and new rolling stock. It is proposed that the new domestic services will commence after Section 2 of the CTRL opens in 2007 with services from the CTRL running onto the north and east Kent routes, possibly substituting services, where, appropriate from the current timetable. We are currently assisting the SRA to establish a realistic service specification, which will form the basis of offers to operate the IKF.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 1</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
London Charing Cross - Sevenoaks		30min
London Charing Cross - Tunbridge Wells		47min
London Cannon Street - Ashford International (via Maidstone East)		65min
London Charing Cross - Ashford International (via Tonbridge)		67min
London Charing Cross - Dover Priory (via Tonbridge)		96min
Ashford International - Ramsgate (via Dover)		62min
Waterloo International - Fawkham Junction		29min
London Victoria - Bromley South		15min
London Victoria - Chatham		41min
London Victoria - Canterbury East		88min
London Victoria - Dover Priory (via Faversham)		101min
London Victoria - Ramsgate (via Faversham)		104min
London Charing Cross - Dartford		34min
Hastings - Ashford		44min
<b>Linespeed (km of track)</b>		
Up to 35mph		63
40-75mph		775
80-105mph		806
110-25mph		-
<b>Gauge (km of route)</b>		
W6A		763
W7		392
W8		307
W9		188
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		25
20.4 tonnes - 24.1 tonnes (RA 7-9)		1619
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>1644</b>
<b>Total km of route</b>		<b>776</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 1</b>	<b>Forecast expenditure</b>		
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	35	30	28
Structures	34	24	21
Signalling	21	15	23
Electrification	4	12	10
Plant & machinery	2	2	2
Telecoms	0	1	2
Network Rail managed stations (London Charing Cross, London Victoria, London Cannon Street)	7	3	3
Stations	8	10	10
Depots	1	1	2
Lineside	1	2	2
<b>Total renewals</b>	<b>113</b>	<b>99</b>	<b>104</b>
<b>Committed and planned enhancements</b>			
All managed stations Commercial Investment	0	1	1
Carriage Machine Upgrade (CSE)	1	-	-
CSE Buffer Stop Modifications	3	-	-
CSE Depot Security Enhancements (Excl Grove Park)	1	-	-
DLR Extension to Woolwich Arsenal	0	1	0
Slade Green Depot	1	-	-
Tonbridge and Victoria CET/CWM	4	-	-
Holborough Cement Works	0	3	3
Charing, Harriesham, Hollingbourne Platform Extensions	3	-	-
Medway Valley AWS	10	0	-
Other	0	0	-
<b>Total committed and planned enhancements</b>	<b>25</b>	<b>5</b>	<b>5</b>
<b>Route 1</b>	<b>Forecast activity volumes</b>		
	2004/05	2005/06	2006/07
Rail renewal (km per year)	37	40	39
Sleeper renewal (km per year)	26	30	30
Ballast renewal (km per year)	28	31	31
S&C renewal (units per year)	4	16	14



## Engineering access

The density of service and predominant two-track layout restricts arrangements for engineering access on this route. The layout of the inner sections from London out as far as Dartford and Sevenoaks offers a number of diversionary alternatives such as the three parallel North Kent Lines between Dartford and Lewisham. However, use of alternatives relies on replacement bus services to connect affected stations. The multi-track approaches to London Bridge (shared with Route 2), which extend over about two miles, present a number of particular practical problems due to the difficulty of obtaining physical access given the intensive use of capacity. The main lines have four-tracks between London and Orpington and between Shortlands Junction and Swanley. These intrinsically offer a degree of diversionary flexibility denied on other parts of the route. The two Channel Tunnel routes provide alternative means of serving Ashford. Most destinations on the Kent coast can be served from alternative directions though this can add significant time to journeys.

Particular restrictions are placed on the lines from Fawkham Junction to Waterloo International where undertakings have been agreed with Eurostar to limit the amount of engineering restrictions of use following the opening of Section I of the CTRL.

Planned cyclical maintenance is carried out during weeknight (where freight movements allow) and weekend possessions. A pattern of activities based on a 6-week cycle of weeknights, frequently modified in response to renewal projects, has evolved in response to timetable limitations. This provides a variety of different possession periods varying across the route from as little as 2 hour 30min on the Nunhead to Factory Junction section to 5hrs on some branch and country lines. All such periods are sub-optimal in terms of delivery efficiency and cost. On the line between Tonbridge and Hastings for the Winter 2004 timetable we have negotiated an 8hr access period on Saturday nights. In response to customer comment we are seeking to agree an access regime based on a 7hr period in future timetables.

Weeknight works are not practical on a number of sections including Dartford to Hoo Junction, Dollands Moor to Ashford and Dover to Tonbridge due to freight path obligations.

The following specific significant access requirements for renewal works have been identified for this route:

- East Kent resignalling in 2005/06 and 2006/07 - Possession strategies for this work are currently under discussion with key stakeholders;
- closure of Strood and Higham Tunnels for relining works commencing January 2004 - continuous blockade between Higham and Strood stations for one year;
- Sheerness resignalling - a strategy is being developed for the works, which will involve a series of 52hr possessions on the branch;
- we are planning a four-month blockade of the line between Folkestone and Dover commencing in June 2005 to allow work in the tunnels along this section. The opportunity will also be taken to undertake track renewals; and
- works to Blackheath Tunnel planned for 2005/06 are likely to require a number of 52hr possessions.

Works to upgrade the power supply continue to have significant access requirements but the impact has been reduced by the degree of access integration with other projects. Possession requirements have been applied for in connection with all Tranche I works within Kent, including three substation sites requiring rail delivery.

A programme of overhauls to the mechanical interlocking will continue during 2004 and 2005. Whilst we will endeavour to minimise the disruption to the train service, the nature of the works will mean that some service alterations will be inevitable. The interlockings at Hastings and Bo-Peep Junction will fall due for maintenance in 2006/07.

We have been working with the SRA and other industry partners to develop a new engineering access strategy for introduction in 2006 as a part of the SRA's Integrated Kent Franchise. As a part of this, a sequence of weekend possessions for critical locations/junctions has also been developed which typically provides four 28hr possessions per year. We seek to run the four-track sections between London-Orpington and Swanley-Shortlands as two-track railways to facilitate this access.

## Maintenance and renewal

### Overview

Across the Kent area the average age of plain line rail is 21 years. On primary sections (containing 28% of track assets) the average rail age is 17 years, on London south-east commuter sections (containing 48% of track assets) the average age is 22 years, while the average age across all other lines is 25 years. The average age of S&C is 18 years.

Within Kent 15% of signalling assets cover a quarter of the route km and are controlled by mechanical signalling technology, some of which date back to the 1880s and 1890s. Colour light signalling systems based on Route Relay Interlocking technology installed during the 1950s and 1960s control 18% of functions serving a fifth of the route km. Signal control systems installed during the 1970s and 1980s account for 26% of functions along a fifth of the route km. SSI control technology installed during the 1990s accounts for 41% of functions covering a third of the route km.

The average age of the bridge stock is approximately 120 years.

### Track

The London to Sevenoaks and Dartford routes suffer from extensive rolling contact fatigue (RCF). The track renewals programme continues to address severe sites and ongoing measurements are taking place to monitor crack growth. Rail grinding is the main tool for managing RCF and we will continue to implement an extensive rail-grinding programme on both plain line and S&C.

The impact of introducing Class 375/6 rolling stock on track renewal and maintenance requirements is being assessed taking into account the higher tonnages of the new trains. It is anticipated that the suspension characteristics of new trains will lead to a significant growth in RCF propagation with consequent impact on track maintenance activity to mitigate this. Renewal and maintenance volumes will be reviewed as the fleet is introduced and its true impact is understood. The current rail-grinding programme will need further enhancement to tackle any potential RCF increase, especially around the numerous S&C layouts on the route. We have purchased a new switch and crossing grinder that will be fully operational during 2004/05, supplementing the plain line-grinding machine already operational. Efficient use of rail grinding machinery requires 6-7hr possessions and we seek the cooperation of operators in enabling delivery of this programme. The rail-grinding programme also has the benefit of helping to manage other rail defect issues, such as wheel burns and corrugations, and also has the added benefit of improving railhead condition.

The track renewal programme will also continue to address replacement of life-expired components, in particular Pan8 fixings (to reduce derailment risk), jointed track (to reduce rail break risk) and rail manufactured prior to 1975 (to reduce rail break risk). High priority is also given to locations with poor ballast conditions and poor track drainage.

The opportunity will be taken to undertake track renewals in Higham Tunnel and Strood Tunnel during the relining works blockade in 2004/05.

Corrosion in wet tunnels requires regular rerailing to overcome the problem. We are planning to introduce mitigation measures, including coated rails, at a number of such locations to minimise the effect of corrosion. Rerailing within Blackheath tunnel is programmed to take place during 2004/05.

The hot dry summer of 2003 had an adverse effect on track alignment in those locations where the track bed runs over areas of clay due to the exceptional degree of shrinkage. This has resulted in a significant increase in maintenance volumes, particularly tamping.

### Structures

Weak clay embankments and steep chalk cuttings characterise the route in Kent. The properties of the clays are such that the embankments creep sideways in wet weather and settle through desiccation in the dry weather. We have a 2004/05 programme of embankment and cutting stabilisation works and schemes are being developed for South Bermondsey; Petts Wood; West Wickham; Nunhead Station; Wiltling near Hastings; and East Farleigh near Maidstone.

The route between Folkestone and Dover is prone to coastal erosion and geological instability with consequent problems for many structures on the section including the Abbotscliff and Shakespeare tunnels. Despite undertaking extensive stabilisation works and significant investment in drainage and tunnel works, maintenance and operational costs are high. Given the high rate of coastal erosion and landslide processes we are monitoring the condition of the infrastructure to evaluate options for this section. We are planning to undertake an extensive programme of lining repairs to all tunnels along this section during 2005/06, and are investigating the feasibility of options to manage water ingress into the Abbotscliff tunnel in the vicinity of the Lyddon Spout.

We have commenced major repairs to the chalk tunnels at Strood and Higham, with a lining and stabilisation scheme scheduled for completion in 2005. We are also addressing problems with the Ore tunnel lining with reinforcement works commencing in 2004/05.

Of the remaining tunnels on the route, seven (including Sevenoaks, Bletchingly, Blackheath and Selling) require particular monitoring and maintenance due to the impact of high water levels and their general condition. During 2004/05 we are repairing shaft linings and shaft drainage systems in Sevenoaks tunnel. At Blackheath tunnel, in 2004/05 we will address surface subsidence and in 2005/06 rectify lining defects. Investigations into surface subsidence associated with hidden shafts are to take place at a number of other tunnels in Kent during 2004/05.

We will continue to focus on major structures, which would bring significant disruption to the railway if they failed. This programme in 2004/05 includes works to refurbish and strengthen bridges at Crucifix Lane outside London Bridge, an intersection bridge at Brockley and at Hospital Road, Hollingbourne. A multi-span brick arch viaduct at Crayford will be refurbished in 2004/05 and another at Darenth in 2005/06.

We continue structural reassessment and scheme development work on overbridges in partnership with local authorities in connection with the Bridgeguard 3 project. This will give rise to a number of significant construction projects on the route, mainly during 2005/06 and 2006/07.

We will continue a programme of cyclical renewals of fencing throughout the region, taking the opportunity to enhance fencing where necessary to combat route crime.

## Signalling

Over the next 10 years it is currently anticipated that approximately 50% of the route mileage will require the signalling renewed. The condition of many housings and cable routes is poor over many areas leading to an increasing maintenance burden.

We have started to work on plans for the East Kent resignalling project. This is a major scheme to resignal the route from Longfield to Deal and Shepherds Well replacing 1950s colour light signals with modern equipment. Phase 1 from Margate to Ramsgate and beyond to Minster South Junction will be commissioned in 2007 with the remainder of the scheme following in the next decade.

Plans to replace signalling in the London Bridge area, in advance of condition driven renewal, have been developed as part of the Thameslink 2000 project which reflect the significant alterations proposed to track and junction layouts and the multiple staged construction sequence. These plans will need to be reviewed once the overall scope and programme for the project is agreed with the SRA.

Work on the Sheerness resignalling scheme is now planned to be carried out in 2004/05 and will renew life expired equipment on the branch in advance of the larger East Kent resignalling scheme.

Completion of the AWS on the Medway Valley between Strood and Paddock Wood will conclude a programme of implementation across the region. This scheme is currently scheduled to be finished in 2005.

We are considering the feasibility of making improvements to the automatic route setting (ARS) system at Ashford IECC. It is anticipated that this may help improve performance, incident recovery and operational flexibility.

A programme of work will be undertaken during 2004/05 to replace all remaining oil-lit signals in Kent which will bring safety benefits to staff (by avoiding the need for regular high level access) and train operations (through improved signal sighting characteristics).

Periodic heavy maintenance of signalling equipment required at the mechanical interlocking sites at Gillingham (Kent), Margate, Ramsgate, Canterbury East, Hastings and Bo-Peep Junction will continue to cause disruption through the requirement for long periods of restricted service. The resignalling scheme for East Kent will reduce the current requirement for these long service disruptions.

## Electrification and plant

System design for the Power Supply Upgrade (PSU) required to facilitate introduction of new rolling stock has now been completed. All electrification equipment for Tranche 1 of the PSU project has been ordered including long lead items. Product acceptance for the equipment has been achieved and elements of the region's renewals programme have been incorporated within the PSU works.

As part of the PSU we will be carrying out work on the SCADA systems at the Electrical Control Rooms to allow the new or amended power supply equipment to be monitored and controlled. The extent of changes at ECRs on this route is generally simple modifications and extensions of control systems, with associated changes to the telecoms network between the substations, TP huts and ECRs. In some cases this may require laying links over property outside our boundaries. This exercise will include work at Lewisham, Paddock Wood and Canterbury.

In 2005/06 we are planning to renew 25kV distribution assets at Dollands Moor that are either life expired (due to increased loadings and inadequacies in initial designs) or are incapable of meeting the new fault levels being introduced with the commissioning of the Eurotunnel feeder station upgrade.

## Telecoms

Work has continued during the past year to develop the renewal strategy for all DOO CCTV assets on the route, which will be undertaken over the next four years with an estimated completion of 2007/08. This will provide each location with a robust system for train despatch that will improve passenger safety and operational performance.

The continuing programme of PETS renewals at level crossings with the latest variants is progressing with renewal of all systems on the route to be completed by 2006/07. This programme will maintain public safety and reduce the potential for train delays.

The ongoing renewal of batteries and power supplies supporting telecoms equipment continues to maintain system availability and reliability.

## Network Rail managed stations

### *London Charing Cross*

The station is becoming overcrowded, especially in the peak. Our short-term focus will be on updating the station risk assessments and emergency plans so that management actions can be taken to limit to safe levels the numbers of passengers in critical parts of the station. In the longer term we shall seek enhancement funding for improvements to passenger capacity.

### *London Cannon Street*

London Cannon Street came under We's management in January 2003. At present there are no specific issues to address.

### *London Victoria*

We await the study by Transport for London (TfL) into transport integration issues within the overall Victoria area before we undertake any major studies into possible station upgrade options to respond to forecast growth in train and passenger demand.

## Other stations

During 2004/05 we will continue with the reconstruction of Hastings station incorporating modern facilities and including work to the platforms and footbridge. The scheme also includes the reconfiguration of the approach road, car park and bus interchange facilities, which is being part funded by the South East England Development Agency (SEEDA). Electrical rewiring will be undertaken at a number of locations including Bromley North; Charlton; Maidstone West; and Rye.

In 2005/06 we are planning to carry out repairs at Aylesford, Chestfield and Swalecliffe, Grove Park and Chislehurst, extensive electrical at Tonbridge; and a lift renewal at Ramsgate. During 2006/07 we are planning to undertake lift renewals at Margate and Rochester and electrical works at Tunbridge Wells.

## Depots

We are planning a programme of depot plant renewals, which in 2005/06 includes refurbishment of the wheel lathe at Slade Green and the carriage washer at Grove Park. Expenditure at depots will also be focused on improving depot security.

Works to support the introduction of new rolling stock are described in SRNTP part of the enhancement section.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

There is a risk that performance, measured in terms of PPM, may suffer if, as it is introduced, the new rolling stock has a rate of vehicle failures per mile significantly worse than the current stock.

One of the principal objectives of the service specification, which has been developed to underpin the new IKF, is to provide a basis for a more robust timetable that will allow a better level of industry performance. We are currently working with the SRA to optimise the specification to achieve this aim.

We currently support the Kent Rail Partnership, which is a joint industry initiative intended to improve performance and increase the appeal of rail travel in the area.

Significant levels of route crime continue to have a performance impact in addition to risks to safety. Company wide measures to combat these problems are described in the Technical Plan.

There is a BTP home beat officer posted to the Dartford line of route. This enforcement initiative has impacted positively on route crime although problems still occur with stone-throwing and objects placed on the tracks, particularly at New Eltham and adjoining stations. Route crime continues in the outer London areas and we are currently having objects thrown at trains from bridges at Hither Green. Where caging work is likely to mitigate against this Hastings, West St Leonard's, Kemsley, Faversham, Westgate on Sea, Abbey Wood, Grove Park and Sittingbourne continue to feature as regular locations for trespass, level crossings misuse and vandalism.

## Enhancements

As part of the works to facilitate the introduction of new trains a package of works to address short platforms will be undertaken at Hollingbourne, Harrietsham and Charing on the Maidstone East Line where extensions will be completed by September 2004. At other locations with short platforms we are exploring the implications of Selective Door Operation (SDO) with South Eastern Trains and the SRA to establish whether this technology might provide acceptable mitigation.

## Land implications

Although the PSU team are developing new substations, in addition to extending existing sites, no additional land is required in Tranche 1 for the Kent area. All development is taking place under permitted development rights. There may be a need for new wayleaves in relation to feeder routes and site access points.

We expect possible changes in travel patterns triggered by the introduction of domestic services on the CTRL. This may generate greater demand for station car parking at a number of locations with consequent impact on land disposal policy and acquisition requirements.

## Other committed enhancements

Major refurbishment funded by South Eastern Trains and the SRA is being undertaken at Slade Green depot on the repair shed to enable new rolling stock to be maintained. Modifications will be completed during 2004/05 at Ramsgate depot to allow maintenance of new rolling stock; we are discussing options for other maintenance facilities with the SRA.

## Route development

The Crossrail development team has consulted us about current proposals for works on the operational railway in Kent to allow Crossrail services to run between Plumstead and Northfleet. We will continue to liaise with the project about key issues as their plans develop.

At Tunbridge Wells we are assessing a number of options to provide turnback facilities for 12-car trains.

We have had preliminary discussions with Kent County Council and the SRA concerning proposed transport interchange facilities at Greenhithe and Dartford stations to improve links with the Bluewater shopping centre.

## Emerging issues

Strategic planning of Kent services is currently dominated by the opportunities offered by CTRL DS, the decision by the SRA to integrate operational provision of these new services with the existing service pattern, and the introduction of new rolling stock to replace the Mk1 slam door fleet. We are currently working with the SRA to develop plans for the new Integrated Kent Franchise (IKF), which is likely to include timetable modifications that substitute new CTRL DS operations for some services in the current timetable. We are also working with the SRA to develop a depot strategy. There may also be a requirement to develop a number of minor enhancement schemes to enable CTRL DS to operate, which following evaluation of power supply requirements may include further enhancement of the power supply network.

There are a number of capacity constraints between Charing Cross and London Bridge, the two-track section between Borough Market Junction and Metropolitan Junction being the most notable example, preventing additional suburban trains from operating into London from the Dartford and Orpington lines. Proposals that have been developed by the Thameslink 2000 project might provide a solution to many of these.

In the area between Charing Cross and Hither Green, there are a number of flat junctions that involve numerous possible conflicting moves and therefore restrict available capacity. We welcome current work being undertaken by the SRA through the IKF to optimise the timetable by limiting the quantum of crossing moves required on these junctions.

The track layout in the Lewisham area is very complex, with a high frequency passenger service and less frequent freight trains. The DLR interchange has significantly increased passenger demand for stopping services with attendant risks of extended dwell times and resulting potential to act as a bottleneck, as a consequence we are seeking to ensure adequate dwell time is built into future timetables. The current timetable cannot accommodate any additional stopping services at Lewisham due to junction capacity constraints; however this may be mitigated by the work currently being undertaken to develop the new IKF timetable, which through rationalization of the service pattern, might enable more trains to stop.

The impact that the introduction of new rolling stock may have on track renewal and maintenance volumes is being considered since it is anticipated that the new trains will lead to accelerated rail wear and a significant growth in RCF.

Considerable reliance is placed on the key Hoo-Dartford section for all commercial freight and rail logistics movements by the Strood tunnel closure during 2004 (see Structures section) with a consequential risk to performance.

The Thameslink 2000 proposals include significant infrastructure enhancements and service changes affecting locations on this route. The current status of the project is described in detail within the major projects Section 3.

We continue to cooperate with the freight and logistics industry to develop existing freight terminal sites and facilitate new freight connections. In particular we are aware of interest at the following sites:

- Holborough - a proposal exists for Lafarge Cement UK to operate a cement works site at Holborough, and take circa 350,000 tonnes pa (one train in/out per day) to North West and North London terminals. Planning permission has been granted and it is intended that the plant will be operational from 2007. We are currently considering how the project can be progressed including looking for possible synergies with the Medway Valley AWS signalling scheme; and
- Howbury Park - a developer is promoting a scheme using land alongside Slade Green depot for freight purposes. We are currently considering the implications of this proposal and its impact on the operation of the depot.



## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 1 Capacity and operational constraints

<b>A</b>	London - Dartford/Orpington: capacity constrained by Charing Cross - London Bridge bottleneck
<b>B</b>	Borough Market - Metropolitan Junction: short two-track section
<b>C</b>	Charing Cross - Hither Green: flat junctions
<b>D</b>	Rochester Bridge junction - Gillingham: intensively used two-track section contains three stations on a three mile section
<b>E</b>	Ore - Appledore: single track section
<b>F</b>	Havant - Ashford: lack of passing places for fast services

### Route 1 Other issues on the route

<b>1</b>	Tonbridge - Hastings: performance impact of four single track tunnel sections
<b>2</b>	Folkestone Warren and Abbotsciff Tunnel: geological and coastal erosion issues

### Route 1 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 Strood Tunnel and Higham Tunnel, lining of unlined sections, drainage renewal, filling of shafts and rerailing	R	
<b>B</b>	2004/05 The track renewals programme; some of the larger sections are shown on the map between Martin Mill and Walmer, and between Charlton and Woolwich Dockyard	R	

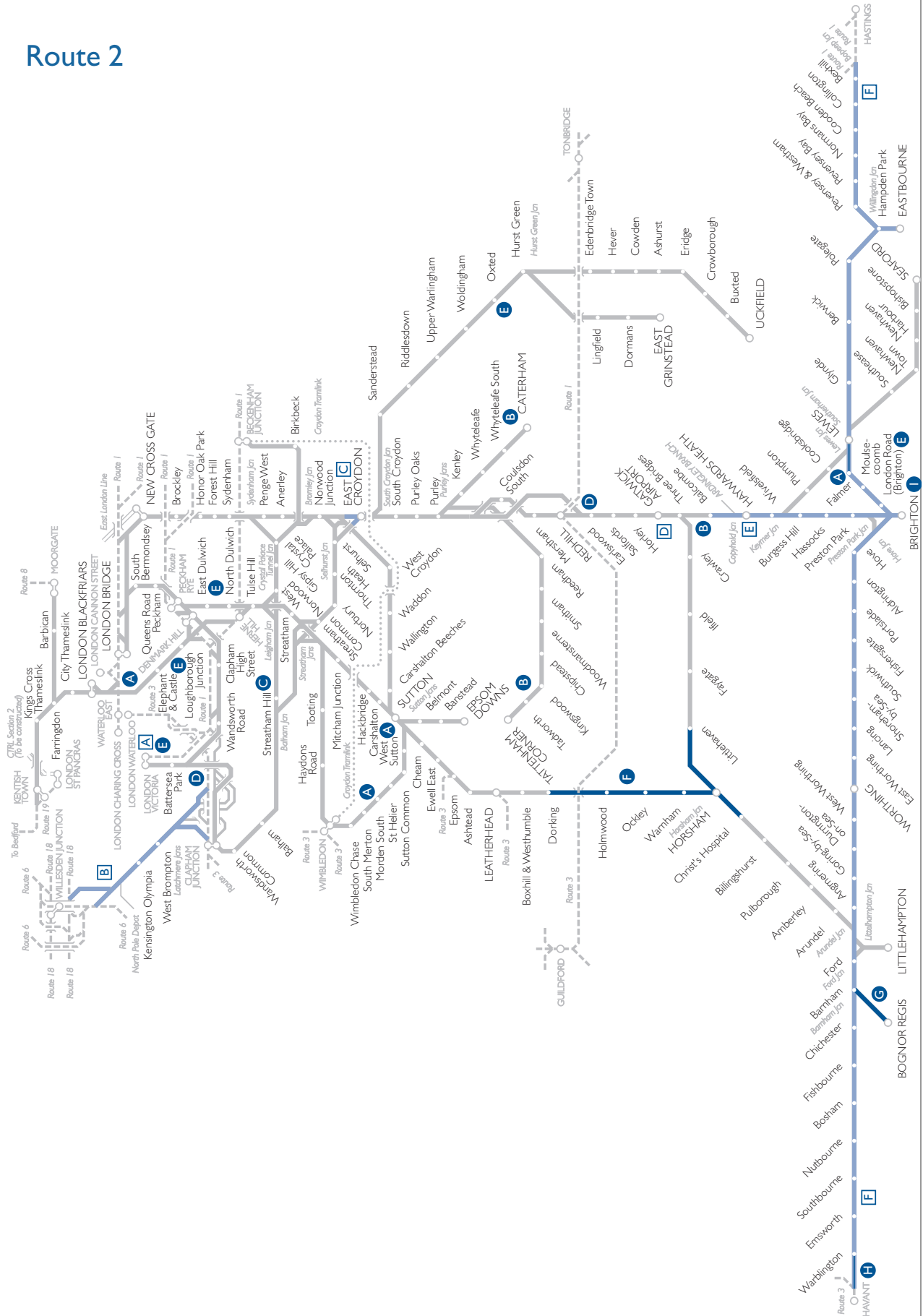
## Network Rail

### Route 1 Planned projects

	Project description	Type of work	Dev. Level
<b>C</b>	2005/06 The track renewals programme; some of the larger sections are shown on the map between Watlington and East Farleigh, Paddock Wood and Marden and between West St Leonards and Hastings including Bo-Peep Tunnel and Hastings Tunnel	R	
<b>D</b>	2004/05 Under the track renewals programme we are planning to renew a number of S&C units including a large site at Herne Bay	R	
<b>E</b>	2005/06 Under the track renewals programme we are planning to renew a number of S&C units including large sites at Rochester and Bo Peep Junction	R	
<b>F</b>	2004/05 The ongoing structures renewal programme of work includes a large number of sites. Major refurbishment and strengthening schemes at Crucifix Lane, Brockley, Hollingbourne and Crayford are shown on the map	R	
<b>G</b>	2005/06 Martello, Abbotsciff and Shakespeare Tunnels; extensive repairs to tunnel linings and track renewal	R	
<b>H</b>	2004/5-2006/07 East Kent resigalling scheme Phase I	R	
<b>I</b>	2004/05 Folkestone East renewal of interlocking	R	
<b>J</b>	2006/07 Canterbury West renewal of interlocking	R	
<b>K</b>	Vital frequency division multiplexer; work to upgrade the signalling control system between Beckenham Junction and Kent House will be completed in 2006/07 and between Tonbridge and Wadhurst in 2005/06	R	
<b>L</b>	2004/05 Automatic warning system (AWS) and signalling improvements on the Medway Valley line between Strood and Paddock Wood	R	
<b>M</b>	2004/05 Electrical control room upgrade of SCADA system at Lewisham, Paddock Wood and Canterbury	R	
<b>N</b>	2005/06 Upgrade of 25kV distribution equipment at Dollands Moor	R	
<b>O</b>	2005/06 Depot plant renewal programme includes refurbishment works at Slade Green wheel lathe	R	

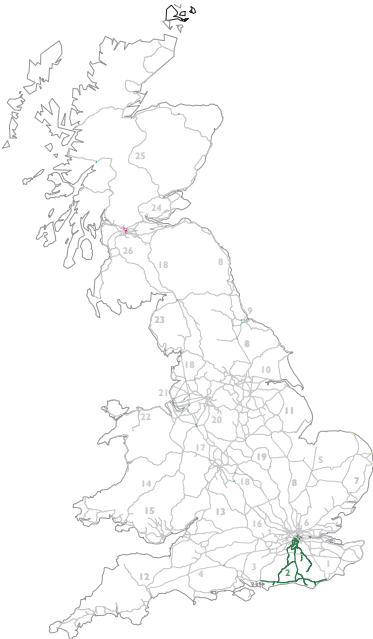
## 2004 Route Plans

# Route 2



# Route 2: Brighton Main Line and Sussex

## Route Description



### Physical description

The railway lines of this route are mainly located in south London, Surrey, Sussex, and parts of Hampshire. The route links south London and the south coast with London's West End (at Victoria) and the City (via London Bridge or Blackfriars).

The core route is the main line to Brighton from Victoria and London Bridge. The inner London sections form a complex network with numerous intersections with lines on Routes 1 and 3 and include the line from Victoria to London Bridge, the lines between Kentish Town, Blackfriars and Tulse Hill including the Moorgate branch, the Wimbledon Loop, and lines between Sutton and West Croydon. The route also includes a number of other significant lines including the West London Line, the coastal route between Hastings and Havant and the Mid-Sussex line between Three Bridges and Arundel via Horsham.

The principal characteristics of the Brighton Main Line are:

- from Victoria and London Bridge two separate four-track lines run through the south London network to East Croydon. The predominant linespeed is between 60mph and 70mph;
- between East Croydon and Balcombe tunnel the line has four-tracks including the separate fast 'Quarry Line' between Stoats Nest Junction, south of Purley, and Earslwood. The predominant linespeed is 70mph on slow lines and 90mph on fast lines with two short stretches of 100mph;
- south of Balcombe Tunnel the line is two-track for much of the remainder of its length, the maximum linespeed varies between 75mph and 90mph; and
- the associated two-track line from Keymer Junction, south of Wivelsfield, to Lewes has a maximum linespeed of 90mph.

The principal characteristics of other lines include:

- the maximum speed on lines within London does not generally exceed 60mph
- the West London Line links the south London network at Clapham Junction with the West Coast Main Line, North London Line and the Great Western Main Line in the Willesden area. This line has a predominant linespeed of 40mph with a short section of 60mph and flat, low-speed entry and exit junctions;
- the coastal route is almost entirely two-track, although the Newhaven Harbour to Seaford section is single track. Linespeed is predominantly 75mph with notable exception being 90mph from Southerham Junction to Willingdon Junction;
- the line running from Kentish Town to Moorgate and Blackfriars forms part of the Thameslink network linking south London with the Midland Main Line;

- the Mid-Sussex Line is two-track with a maximum linespeed of 85mph. On the associated two-track line between Sutton and Horsham the predominant linespeed varies between 60mph and 75mph; and
- further from central London the route also includes a number of branch lines serving Epsom Downs, Tattenham Corner, Caterham, East Grinstead and Uckfield. These are two-track with the exception of the single track line from Sutton to Epsom Downs and the majority of the Uckfield line south of Hever.

With the exception of the line between Hurst Green and Uckfield, the route is electrified throughout.

The physical features of the route are heavily influenced by the geology of the Weald and North and South Downs, over which it passes. These give rise to many weak clay embankments and steep chalk cuttings that frequently affect performance and influence asset strategy on the route.

The route has several points at which capacity is constrained with a subsequent impact on performance; a number of these conflicts are dependent upon operation of the timetable. Currently work being undertaken to support the Southern Region New Trains programme (SRNTP) and the Brighton Main Line Route Utilisation Strategy (BML RUS) seeks to develop a more robust timetable avoiding some of the conflicts that have occurred for a number of years. A number of these conflict points are listed in the emerging issues section, below.

With the exception of a number of key renewals on the BML that have taken place over recent years and as part of the post-Hatfield track programme, many of the assets on the route are relatively old with some components dating back to electrification and resignalling schemes undertaken in the 1960s and 1980s.

Broadly, about two thirds of the route is London and south-east commuter, the remainder primary, with a small proportion of secondary and freight only.

## Market served

This route serves the London commuter market between London and the South Coast. Over the busiest section, between Victoria and Balham, the route carries over 900 trains per day, making it one of the most heavily used routes in Great Britain. In addition to being a very heavily used commuter route a large leisure market is also catered for, providing access to Gatwick Airport, central London and the resorts of the Sussex Coast.

The freight market can be summarised as comprising flows from Kent and originating within Route 2 to destinations north of London via the West London Line. The most significant of these flows are bulk aggregate flows from a number of terminals on the Brighton main line (the most southerly being at Ardingly); bulk aggregate, steel flows and nuclear waste containers from the Kent area which join this route at Tulse Hill; and CTRL international traffic (conventional and intermodal) joining the route at Tulse Hill or via the North Downs Line and Redhill.

## Growth

The high volume of demand for peak commuter services to London is expected to continue, and to grow in line with increasing employment in London. We expect continued growth in the leisure market to London, Gatwick Airport and the coastal resorts. Our analysis suggests that growth of peak London commuter services will continue to be constrained by the available capacity, unless enhancement works are undertaken to allow longer trains to run, as there is no space in the timetable to run additional trains. However there may be some growth opportunities for off-peak services.

Although freight makes a relatively minor contribution to traffic carried on the route, some growth is anticipated with the opening of an aggregates distribution facility at Chichester.

## Current use

### Current traffic

The predominant train operator over the route is South Central Trains. The other operators on the route are Thameslink, Gatwick Express, South Eastern Trains, Silverlink, Thames Trains, Virgin Cross Country, Eurostar, South West Trains and Wessex Trains. EWS and Freightliner carry out freight operations on the route.

The West London Line has particular strategic importance as a key freight route connecting the CTRL with the WCML.

<b>Route 2</b>		<b>Current use</b>		
		<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day		92,591	1,787	94,379
Train tonne km per year (millions)		7,765	329	8,094
Average no of train km per track km per day				124
<b>Top five busiest route sections</b>				<b>No of trains per day</b>
London Victoria - Balham				920
East Croydon - Purley				810
Balham - Selhurst				750
Purley - Gatwick Airport				640
Gatwick Airport - Three Bridges				510

### Projected use

The introduction of the new rolling stock through the Southern Region New Trains Programme (SRNTP) is making necessary the enhancement of the power supply network to meet the higher electrical demands of the new vehicles, the installation of depot facilities for servicing new trains, and requires the issue of short platforms at a number of stations to be addressed.

Critical works for the Power Supply Upgrade (PSU) to allow operation of the new fleet are scheduled for delivery in two tranches, completing between April and December 2004. The remaining works to provide operational resilience will follow in the first half of 2005. The current scope of works agreed with the SRA is limited to replication of existing levels of train running capability. However a period of trial running and monitoring following completion of PSU works may suggest opportunities for performance improvements.

The introduction of new rolling stock will be accompanied by some revisions to the timetable. The revisions will take into account the operating characteristics of the new trains following the power supply upgrade incorporating issues such as revised station dwell times and the limitations of passenger capacity at stations.

## Strategic framework for the route

The SRA is currently working on the BML RUS covering London (Victoria/London Bridge/Blackfriars) to Gatwick, Brighton and Sussex Coast which is due to be published in Spring 2004. We are currently supporting this workstream.

We have also been working closely with the SRA on the Midland Mainline RUS, the recommendations of which are currently being implemented, including some affecting Thameslink services.

In addition we anticipate that the work due on Cross London Routes (planned publication date Autumn 2004) and Cross Country Routes (planned publication date Winter 2004/05) may have some significance for this route.

The Southern RPA will cover this route and is due in Spring 2005.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 2</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
London Victoria - East Croydon		13min
London Victoria - Gatwick Airport		30min
London Bridge - Gatwick Airport		28min
London Victoria - Brighton		49min
London Bridge - Brighton		56min
London Victoria - Eastbourne		85min
London Victoria - Havant (via Worthing)		111min
Portsmouth & Southsea - Brighton		1 hr 22min
Havant - Brighton		52min
Brighton - Hastings		63min
<b>Linespeed (km of track)</b>		
Up to 35mph		46
40-75mph		835
80-105mph		371
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		495
W7		265
W8		173
W9		60
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		160
20.4 tonnes - 24.1 tonnes (RA 7-9)		1091
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>1252</b>
<b>Total km of route</b>		<b>563</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 2 Forecast expenditure</b>				
<b>£m in 2003/04 prices</b>		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
<b>Renewals</b>				
Track		34	25	28
Structures		16	19	22
Signalling		22	19	14
Electrification		4	5	16
Plant & machinery		2	1	2
Telecoms		1	2	2
Network Rail managed stations (London Bridge, Gatwick Airport)		3	2	8
Stations		5	8	8
Depots		1	1	1
Lineside		1	1	2
<b>Total renewals</b>		<b>88</b>	<b>84</b>	<b>102</b>
<b>Committed and planned enhancements</b>				
Other		1	1	1
<b>Total committed and planned enhancements</b>		<b>2</b>	<b>1</b>	<b>1</b>
<b>Route 2 Forecast activity volumes</b>				
		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
Rail renewal (km per year)		49	28	27
Sleeper renewal (km per year)		37	21	21
Ballast renewal (km per year)		35	21	21
S&C renewal (units per year)		12	20	14

## Engineering access

The density of service and predominant two-track layout restricts arrangements for engineering access on this route. The layout of the inner sections from London out to East Croydon and Sutton offer a number of diversionary alternatives. However, use of alternatives relies on replacement bus services to connect stations that are affected. The multi-track approaches to London Bridge (shared with Route 1), which extend over about two miles, present a number of particular problems due to the difficulty of obtaining physical access and the intensity of services. The Brighton Main Line has four-tracks between London and Balcombe Tunnel, including the separate fast 'Quarry Line' between Stoats Nest Junction, south of Purley, and Earlswood. This offers diversionary flexibility largely denied south of Balcombe Tunnel. Alternative routes are available for destinations west of Littlehampton but few alternatives are available for serving many other destinations on the Sussex coast.

Planned cyclical maintenance is carried out during weeknight (where passenger and freight movements allow) and weekend possessions. A pattern of activities based on access over four weeknights once every 12 weeks, frequently modified in response to renewal projects, has evolved in response to timetable limitations. This provides a variety of different possession periods across the route from as little as 3hr 30min, on parts of the inner London network, to as much as 6hr on a number of branch and country lines. On the main line 4hrs are available on slow lines and between 5hr & 5hr 45min on fast lines north of Balcombe during weeknight possessions, 3hr 45min are available on the southernmost section. All such periods are sub-optimal in terms of delivery efficiency and cost.

At complex locations, such as Tulse Hill with five routes to block, use of the short available weeknights is impractical. Therefore maintenance of such sites tends to rely solely on weekend access opportunities.

A sequence of weekend possessions for most critical locations/junctions has also been developed which typically provides two 24-28hr possessions per year. The Brighton Station throat is available for maintenance during three weekend possessions and the Purley to Redhill section receives four weekend possessions. The current winter 2004 timetable includes arrangements for running the four-track section between Stoats Nest Junction and Balcombe Tunnel Junction as a 'two-track railway' between the hours of 00.05-12.00 on Sundays to facilitate maintenance, particularly to the fast lines. We are seeking to introduce this arrangement into all future timetables and extend the concept to include slow lines and some intermediate stations.

The following specific significant access requirements have been identified for this route:

- we have developed a scheme for complete renewal of track on the Wimbledon loop which will require a blockade between Sutton and Wimbledon of 24 days during August 2004;
- of the S&C renewal schemes on the route those at Earlswood (2005/06), Longhedge (2005/06) and Redhill South (2006/07) are likely to require possessions in excess of 52hrs;
- Barnham and Bognor Area resignalling in 2006/07. Possession strategies for this work are currently under discussion with key stakeholders;
- Horsham area resignalling scheme in 2004/05 and 2005/06. Possession strategies for this work are currently under discussion with key stakeholders; and
- there will be a blockade between King's Cross and Kentish Town between September 2004 and Christmas 2004 to enable relocation of King's Cross Thameslink station at St Pancras Midland Road (see also CTRL references within the major projects Section 3).

Works to upgrade the power supply continue to have significant access and isolation requirements but it is hoped that the impact can be reduced by access integration with other projects. Approximately 450 possessions are required for sites on this route, of which 300 have been applied for and agreed. The majority of possessions are for cable route works. The need for possessions for substation and track paralleling huts is limited except at a few sites that are rail-locked.

A programme of overhauls to the mechanical interlocking will continue during 2004 and 2005. Whilst we will endeavour to minimise the disruption to the train service the nature of the works will mean that some service alterations will be inevitable.

## Maintenance and renewal

Across the Sussex area the average age of plain line rail is 24 years old. On primary sections (containing 23% of track assets) the average rail age is 19 years, on London and south-east commuter sections (containing 63% of track assets) the average age is 25 years old while the average age across the remaining lines is 26 years. The average age of S&C is 22 years.

Within the Sussex area approximately 13% of signalling assets along a quarter of the route km are controlled by mechanical signalling technology some of which date back to the 1880s and 1890s. Colour light signalling systems based on route relay interlocking technology installed during the 1950s and 1960s control approximately 36% of functions serving a third of the route km. Signal control systems installed during the 1970s and 1980s account for about 46% of functions along a quarter of the route km. SSI control technology installed during the 1990s account for 5% of functions covering a sixth of the route km.



The average age of the bridge stock is approximately 120 years.

### Track

As rolling contact fatigue (RCF) has affected this route extensively we are planning further rerailing and S&C replacement. This continues through 2004 and beyond with ongoing measurements to monitor crack growth. Rail grinding is the main tool for managing RCF and we will continue to implement an extensive rail-grinding programme on both plain line and S&C.

The impact of the introduction of Class 377 rolling stock on track renewal and maintenance requirements is being assessed taking into account the higher tonnages of the new trains. It is anticipated that the suspension characteristics of new trains will lead to a significant growth in RCF propagation with consequent impact on track maintenance activity to mitigate this. Renewal and maintenance volumes will be reviewed as the fleet is introduced and its true impact is understood. The current rail-grinding programme will need further enhancement to tackle any RCF potential increase, especially around the numerous S&C layouts on the route. We have purchased a new switch and crossing grinder that will be fully operational during 2004/05, supplementing the plain line-grinding machine already operational on Southern Region. Efficient use of rail grinding machinery requires 6-7hr possessions and we seek the cooperation of operators in enabling delivery of this programme. The rail-grinding programme also has the benefit of helping to manage other rail defect issues such as wheel burns and corrugations. It also has the added benefit of improving railhead condition.

The track renewal programme will also continue to address replacement of life-expired components due to condition, in particular Pan8 fixings (to reduce derailment risk), jointed track (to reduce rail break risk) and rail manufactured prior to 1975 (to reduce rail break risk). High priority is also given to locations with poor ballast conditions and poor track drainage.

Over the next five years we are planning to carry out extensive renewals and rerailing on the Brighton Main Line between Victoria and Purley, including the Tattenham, Uckfield and Caterham branches, and between Earlswood and Hassocks to replace older sections of rail. We have also developed plans to remove jointed rail on the Wimbledon loop and install CWR bringing maintenance and performance benefits to this section of the route during 2004/05. In future years, significant renewals are also planned on the line between Tulse Hill and Mitcham.

During 2004/05 a number of S&C units will be renewed at Streatham. A major S&C renewal scheme at Earlswood is planned during 2005/06 to improve track geometry and remove the risk of TSRs. We are currently reviewing our plans for the S&C at Redhill, which will be implemented in future years.

The hot dry summer of 2003 had an adverse effect on track alignment in those locations where the track bed runs over areas of clay due to the exceptional degree of shrinkage. This has resulted in a significant increase in maintenance volumes, particularly tamping.

### Structures

These lines traverse the Wealden Anticline passing through the steep chalk cuttings of the North and South Downs and over lengthy clay embankments over the Weald Clay. Work will continue in 2004/05 on the stabilisation of the cutting face south of Balcombe Tunnel and schemes are being developed for improvements to weak clay embankments north of Oxted, and between Burgess Hill and Hassocks.

A number of the tunnels on this route, including Balcombe, Haywards Heath and Crowborough, require constant attention and water management. Investigations into surface subsidence associated with hidden shafts are to take place at a number of tunnels in Sussex during 2004/05.

We will continue to focus on major structures which would bring significant disruption to the railway if they failed. Prominent amongst these is the Grosvenor River Bridge, which carries lines from Victoria Station across the Thames, where we will rectify latent design/construction defects on the spandrel posts. The programme in 2004/05 also includes works to refurbish and strengthen bridges at Hinton Road, south of Loughborough Junction, and at Sutherland Square, south of the Elephant and Castle. Both these schemes will enable locomotive restrictions to be lifted thus making it easier to maintain the railway through use of engineering trains. In 2005/06 a similar scheme will take place at Rockingham Street, also near the Elephant and Castle.

Major works are planned on a number of important viaducts in the area including Oxted, and London Road, Brighton in 2004/05, and Riddlesdown in 2005/06. Refurbishment work on the Arun River Bridge planned for 2005/06 will include some strengthening work to enable a long-standing locomotive speed restriction to be lifted.

During 2004/05 footbridges will be reconstructed at Littlehampton Depot and Coulsdon North.

We continue structural reassessment and scheme development work on overbridges in partnership with local authorities in connection with the Bridgeguard 3 project. This will give rise to a number of significant construction projects on the route mainly during 2005/06 and 2006/07.

We will continue to implement a programme of cyclical renewals of fencing throughout the region, taking the opportunity to enhance fencing where necessary to combat route crime.

### **Signalling**

Over the next 10 years it is currently anticipated that nearly a third of the route will require signalling renewal.

We anticipate that the Horsham resignalling scheme will be commissioned during 2005. Proposals are being developed for fitting colour light signal heads (replacing semaphores) at a number of locations along the Arun Valley between Horsham and Arundel. It is expected that this work, currently scheduled to be completed in 2005, would bring some minor headway improvements in addition to the safety benefits derived from removing oil lit signals.

Signal renewals between Bognor Regis and Barnham will be commissioned in 2007.

### **Electrification and plant**

System design for the power supply upgrade required to facilitate introduction of new rolling stock has now been completed. All electrification equipment for Tranche 1 of the Power Supply Upgrade (PSU) project has been ordered including long lead items. Product acceptance for the equipment has been achieved and elements of the renewals programme have been incorporated within the PSU works.

As part of the PSU we will be carrying out work on the SCADA systems at the Electrical Control Rooms (ECR) to allow the new or amended power supply equipment to be monitored and controlled. The extent of change at ECRs on this route is generally simple modifications and extensions of control systems, with associated changes to the telecoms network between the substations, TP huts and ECRs. In some cases this may require laying links over property outside Network Rail boundaries. This exercise will include work at Selhurst and Brighton.

## Telecoms

Work has continued during the past year to develop the renewal strategy for all DOO CCTV assets on the route, which will be undertaken over the next four years with an estimated completion of 2007/08. This will provide each location with a robust system for train despatch that will improve passenger safety and operational performance.

The continuing programme of public emerging telephone system renewals at level crossings with the latest variants is progressing with renewal of all systems on the route to be completed by 2006/07. This programme will maintain public safety and reduce the potential for train delays.

The ongoing renewal of batteries and power supplies supporting telecoms equipment continues to maintain system availability and reliability.

## Network Rail managed stations

### *London Bridge*

During 2003/04 the SRA elected to incorporate the already approved masterplan scheme as a substitution for its own proposals for the station. This substitution together with revised proposals at two other locations will enable the Thameslink 2000 TWA Inquiry to reopen during 2004 and if subsequently approved and subject to the availability of funding, for work to start in 2006/07. We continue to work with the owners of Southwark Tower at the station who have secured consent for a comprehensive redevelopment of that property.

### *Gatwick Airport*

An SRA study is underway to examine ways in which to improve the route utilisation that could impact upon the passenger capacity of the station.

## Other stations

During 2004/05 we will be refurbishing the access ramps and station overbridge at Bexhill. We are also planning to undertake station rewiring works at Preston Park and Collington, and to replace a lift at Brighton.

In 2005/06 we are planning building and platform repairs at Battersea Park, canopy roof and car park surface repairs at Epsom, electrical works at Brighton, and lift renewals at Chichester and Hove.

During 2006/07 we are planning extensive works at Horsham, including repairs to canopy roofs and the footbridge together with electrical renewals. Roof repairs will also be undertaken at Purley Oaks, Selhurst and Worthing, and an escalator overhaul will be undertaken at City Thameslink.

## Depots

We are constructing a new depot at Norwood Junction for servicing our own rail fleet multi purpose vehicles (MPVs). It is anticipated that this facility will be completed by September 2004.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

There is a risk that performance, measured in terms of PPM, may suffer if, as it is introduced, the new rolling stock has a rate of vehicle failures per mile significantly worse than the current stock.

One of the principal objectives of the BML RUS is to provide a basis for a more robust timetable that will allow a better level of industry performance. We are currently working with the SRA to optimise the service specification to achieve this aim. The views of the Sussex Timetable Group and findings of a number of earlier studies on a variety of performance issues have been shared with the RUS steering group.

We currently support the '0<5' programme, which is a joint industry initiative, intended to improve performance and increase the appeal of rail travel in the area.

It is expected that the significant S&C renewals that are planned at Earlswood, Redhill and Streattham will bring performance benefits due to improved asset reliability (see track sections).

Significant levels of route crime continue to have a performance impact in addition to risks to safety. Company wide measures to combat these problems are described in the Technical Plan.

Trespass by young males continues to be a problem at Norwood Junction; Ifield and Bewbush; Crawley; and Horley. Mitcham Junction has experienced stone throwing at trains from the station footbridge, whilst Clapham Junction, despite increased policing, continues to have incidents of graffiti, vandalism and trespass.

The coastal routes between Hastings, Brighton and Eastbourne have shown a rise in trespass by fare evaders and misuse of level crossings by local residents. The stations along the route are generally unstaffed and South Central Trains have deployed security guards while BTP have increased their uniformed patrols. Local high profile media campaigns are ongoing in these areas.

## Enhancements

As part of the works to facilitate the introduction of new trains a package of works to address short platforms will be undertaken at nine locations, including East Croydon, London Bridge and Three Bridges, between 2005 and 2007. This package will predominantly comprise either platform extensions or installation of coaching signals. At other locations with short platforms we are exploring the implications of selective door operation (SDO) with South Central Trains and the SRA to establish whether this technology might provide acceptable mitigation.

## Land implications

To support the PSU we have identified three sites where access rights are required across third party land with all other works being carried out within Network Rail's boundary. The majority of work is being carried out using Network Rail's permitted development rights, but a limited number of sites will require planning permission from the relevant local authority. There may be a need for new wayleaves in relation to feeder routes and site access points.

We expect the BML RUS to make recommendations about future car parking requirements at a number of stations on the route - a number of these will have implications for land disposal and acquisition requirements.

## Other committed enhancements

A programme of major refurbishment work at depots is currently being undertaken by South Central Trains combining maintenance and renewal activities with enhancements and depot reorganisation to support the servicing of new rolling stock. The programme includes the introduction of new controlled emission toilet (CET) facilities at Eastbourne; Littlehampton; Streatham Hill; Bognor and providing additional CET facilities at Brighton and Selhurst. Bognor sidings will become a light maintenance depot). West Worthing Shed has been brought back into use for stabling trains and may be leased to South Central Trains. Four new sidings have also been constructed at Hove Yard by South Central Trains for stabling and cleaning purposes.

## Route development

We have few significant signalling renewal plans on this route, so there are relatively few opportunities over the next 10 years for enhancement schemes based upon core renewals.

We continue to provide support for the development of the SRA sponsored East London Line Project, described in detail within the major projects Section 3, which would have an impact on the pattern of local services operating over the inner London sections of this route.

Section 2 of the CTRL project includes works to relocate King's Cross Thameslink station at St Pancras Midland Road (see also CTRL references within the major projects Section 3).

New stations have been promoted at Shepherds Bush and Imperial Wharf on the West London Line by private developers to discharge planning obligations and are supported by the SRA. We are working closely with the developers to progress these schemes.

## Emerging issues

The route has several points where capacity is constrained, with a subsequent impact on performance, due to the operation of the timetable. We anticipate that the RUS will develop work undertaken during recent timetable studies and the findings of the Sussex Timetable Review Group, which identified areas where section running times, junction margins and station dwell times are now inadequate, and produce a new timetable that will optimise use of the existing infrastructure. These areas of constraint include the following:

- at Victoria station the 19 platforms are operating close to capacity at the busiest periods of the day and 8 are primarily used for Kent services. There is a limited opportunity to create further capacity by timetable alterations but in the longer term the competing demands of Routes 1 and 2 will put increasing pressure on Victoria's platform capacity;
- platform lengths are a capacity constraint in the suburban area, where most platforms can only accommodate eight-car trains, making train lengthening difficult;
- the series of complex junctions in the Croydon area are a severe constraint with the current mix of services and frequently become performance bottlenecks;
- trains from Tonbridge and Guildford join the Brighton Main Line at Redhill and those continuing south must reverse in on Platforms 1 or 2. The high level of occupation of these platforms and the number of movements across the track layout restricts capacity;
- Gatwick Express currently runs a 15min frequency service with a train always waiting in one of the platforms at Gatwick Airport. Consequently utilisation of existing capacity is sub-optimal. In addition, crossing moves from the platforms to the fast lines worsens the capacity constraint;

- between Balcombe Tunnel Junction and Brighton, the line is generally two-track and is near capacity throughout the day. Different stopping patterns and rolling stock characteristics compound the position;
- capacity on the West London Line is constrained by complex flat junctions at each end of the route, low linespeed across Chelsea Bridge and the pattern and mix of freight and passenger trains; and
- along the coastal route section the principal capacity constraint is the lack of places where fast trains can overtake slower services. The route between Havant and Brighton carries a mix of fast, semi-fast and stopping services with only one point in each direction where services may overtake each other.

The impact that the introduction of new rolling stock may have on track renewal and maintenance volumes is being considered since it is anticipated that the new trains will lead to accelerated rail wear and a significant growth in rolling contact fatigue.

East Sussex County Council is promoting proposals for waste disposal facilities on the coast involving transport of refuse from the Brighton area by rail.

The Thameslink 2000 proposals include very significant infrastructure enhancements and service changes affecting many locations on this route. The current status and short-term objectives of the project are described in detail within the major projects Section 3.

A new station has been proposed by a developer on a site west of Horsham on the mid Sussex line. We are working with the SRA to understand the implications of this scheme.

We continue to cooperate with the freight and logistics industry to develop existing freight terminal sites and facilitate new freight connections. In particular we are aware of interest in the site at Chichester where EWS are developing a proposal for an aggregate handling terminal, operating from Summer 2004.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 2 Capacity and operational constraints

<b>A</b>	Victoria Station: all platforms operate close to capacity
<b>B</b>	West London Line: complex flat junctions. Low linespeed and traffic mix
<b>C</b>	Windmill Bridge Junction: London Bridge and Victoria lines converge
<b>D</b>	Gatwick Airport Station: platform usage and track layout inefficiently utilised
<b>E</b>	Balcombe Tunnel Junction - Brighton: mainly two-track operates close to capacity all day
<b>F</b>	Havant - Ashford: lack of passing places for fast services

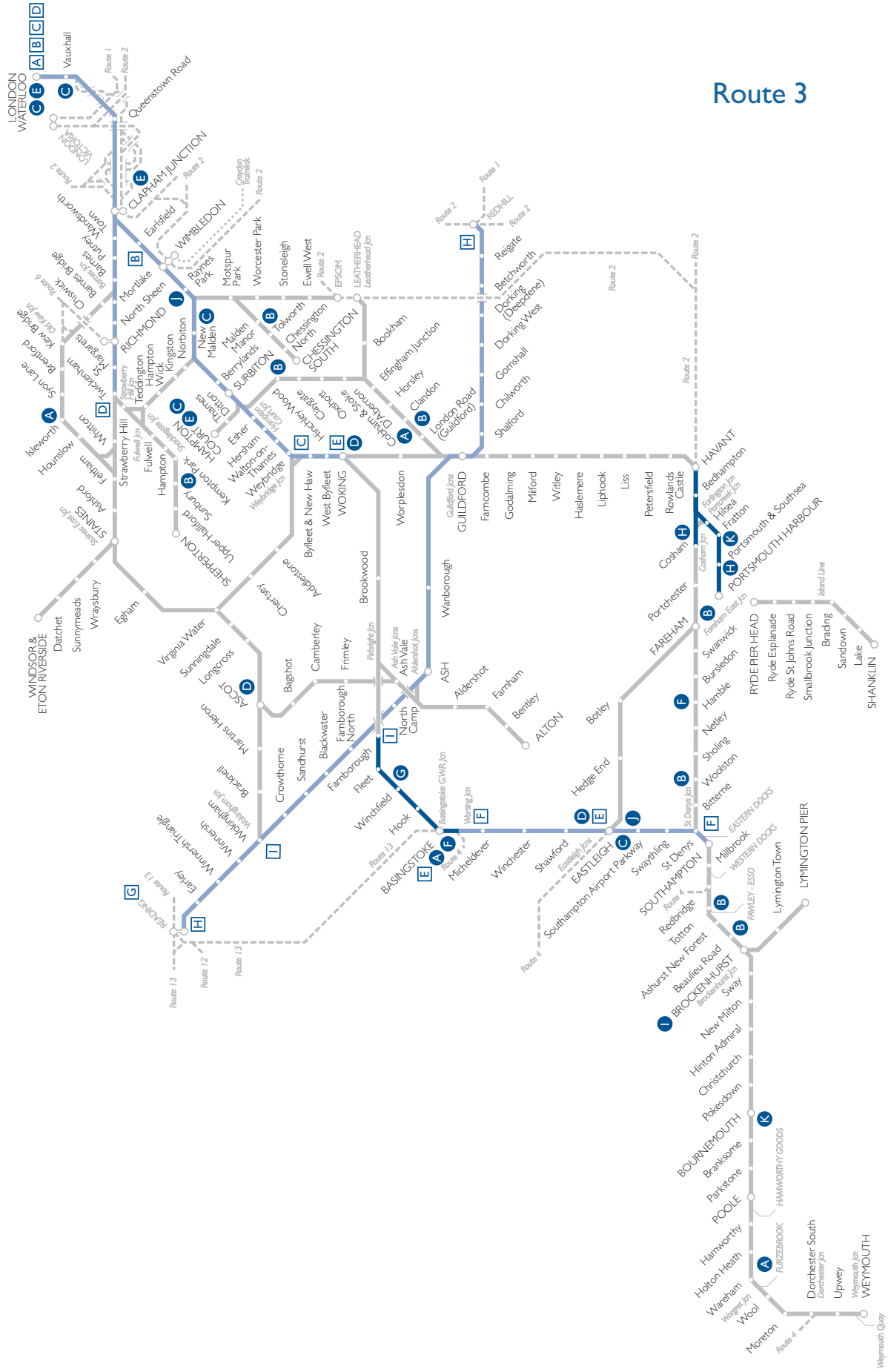
### Route 2 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 The track renewals programme; some of the larger sections are shown on the map between Wimbledon Chase and Sutton, Carshalton and Sutton, south of Blackfriars and on the coastal section between Falmer and Lewes	R	R
<b>B</b>	2005/06 The track renewals programme; some of the larger sections are shown on the map between Whyteleafe South and Caterham, Kingswood and Tadworth including the Kingswood and Hoppity tunnels and at Balcombe Tunnel	R	R
<b>C</b>	2004/05 Under the track renewals programme we are planning to renew a number of S&C units including a large site at Streatham Hill	R	R
<b>D</b>	2005/06 Under the track renewals programme we are planning to renew a number of S&C units including large site at Earlswood Junction and at Longhedge Junction	R	R

## Network Rail

### Route 2 Planned projects

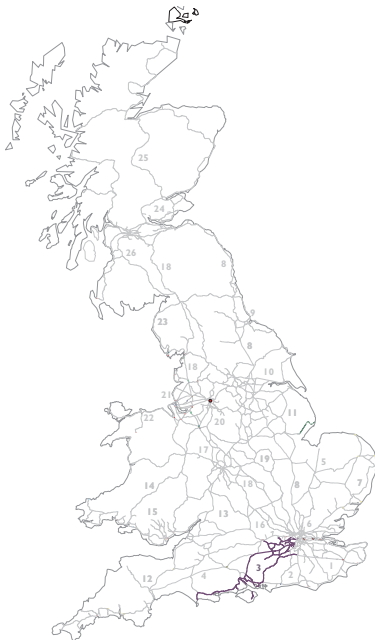
<b>E</b>	2004/05 The ongoing structures renewal programme of work includes a large number of sites major refurbishment schemes. Major refurbishment and strengthening schemes on the Grosvenor River Bridge at Hinton Road, Sutherland Square, London Road Brighton and Oxted are shown on the map	R
<b>F</b>	The Horsham resignalling scheme is now expected to be completed in 2005	R
<b>G</b>	The Bognor Regis and Barnham area resignalling scheme is now expected to be completed in 2007	R
<b>H</b>	The Portsmouth area resignalling will replace life expired equipment at the western extremity of the route and is expected to be completed in 2007 (see also Route 3)	R
<b>I</b>	2004/05 ECR upgrade of SCADA system at Brighton	R





# Route 3: South West Main Line

## Route description



### Physical description

This route comprises rail lines within west Surrey, Hampshire and parts of Dorset, together with many lines within south-west London that connect these lines with central London termini. The route also includes the line from Waterloo to Reading and the Isle of Wight lines.

The core route is the main line from Waterloo to Southampton and Portsmouth, with the associated line from Southampton to Weymouth. The south-west London sections form a tight network serving many busy commuter stations in the London Boroughs of Wandsworth, Richmond upon Thames, Kingston upon Thames, and Hounslow, centred on the line from Waterloo to Reading. The route encompasses a number of other lines including the Redhill to Guildford and Wokingham line, (where it joins the line to Reading), and the Netley and Botley lines which extend the coastal route west of Havant.

The principal characteristics of the main line from Waterloo to Southampton and Portsmouth are:

- Waterloo - Clapham Junction: eight-tracks, maximum speed is 60mph, at Clapham the lines diverge towards Reading and Basingstoke;
- Clapham - Woking - Worting Junction: four-tracks, paired by direction west of Wimbledon, maximum linespeeds vary between 90-100mph;
- Worting Junction - Southampton - Bournemouth - Weymouth: the route is generally two-track, although east of Dorchester there is a short section of single-line, maximum linespeed between 90-100mph as far as Eastleigh beyond which speeds are more restricted except some sections where 85mph is possible; and
- Woking - Guildford and Portsmouth Harbour: two-track and linespeeds vary due to severe curves and gradients, the maximum speed is 90mph.

The principal characteristics of other lines include:

- from Clapham Junction to Feltham there are four-tracks (two via Richmond, and two via Hounslow) with a maximum linespeed of 60mph;
- from Feltham to Reading the route is two-track with a maximum linespeed of 70mph;
- there are a number of branch lines on the route that serve Shepperton; Kingston; Windsor and Eton Riverside; Hampton Court; Chessington South; Epsom; Guildford via Cobham; and Alton. These are two-track throughout with a predominant maximum linespeed of 60mph;
- the North Downs Line links Reading and Redhill via Wokingham, Ash and Guildford, generally the maximum linespeed is 70mph; and

- the Isle of Wight (IoW) Line links Ryde Pier Head with Shanklin. It is double track from Ryde Pier Head to Smallbrook Junction and single track between Smallbrook Junction and Shanklin. There is a passing loop at Sandown.

With the exception of the Wokingham - Aldershot South Junction and Shalford Junction - Reigate sections of the North Downs line, the route is electrified throughout.

The physical features of the route are influenced by the varying geology over which it passes. Towards the east the Weald and North and South Downs affect the Portsmouth Harbour line in much the same way as they influence the railway in Sussex, with a number of weak clay embankments and steep chalk cuttings. However the line towards Southampton is built across chalk downlands, which provides a more stable underlying geology.

The North Downs Line is composed almost entirely of two-tracks without passing loops to allow trains to overtake. This reduces the ability to operate faster services.

At Reading, only two platforms are available for electric trains and there is also a restriction of a short section of single track at the entrance to the electrified platforms. Longer-distance trains (such as Virgin Cross Country) require access to other platforms and must cross the Great Western Main Line, on which capacity is constrained. Turnaround times at Reading and Waterloo are critical to minimising the consequential delay; this means that there is a significant amount of recovery time within the timetable.

Between Worting Junction and Shawford the railway converges from four-track to two-track, with only one short passing loop section at Waller's Ash. The variety of traffic along this corridor reduces the ability to recover from delays.

With the exception of a number of key renewals on the main lines that have taken place over recent years and as part of the post-Hatfield track programme, many of the assets on the route are relatively old with some components dating back to electrification and resignalling schemes undertaken in the 1960s and 1970s.

Broadly about half the route is classified as London and south-east, about a quarter secondary, a fifth primary and the remainder a mix of rural and freight only.

## Market served

The mainline portions of the route are primarily passenger railways but with some freight on many of the lines.

The line from Waterloo to Reading via Staines is primarily a suburban commuter route with limited variation in stopping patterns and train speeds.

The North Downs Line connects Reading and Guildford with the Brighton Main Line at Redhill (and thence Gatwick Airport). Despite being less busy than other sections of this route, this line has a greater variety of traffic including short, medium and long-distance passenger trains and a small number of freight trains, but there are few passing places. Between Wokingham and North Camp, long two-aspect signal sections result in large headways with restricted capacity.

The railway infrastructure on the Isle of Wight is leased to Island Line from us. Train operations are run under franchise by Stagecoach Limited. These arrangements make the organisation of rail services on the island different from those on the mainland.

The Southampton - Basingstoke section is part of an important freight route to the North West and Scotland. The major freight flows are along the South West Main Line, via Basingstoke and onto Reading, some traffic continues on the main line through Woking and Virginia Water and into London. Freight traffic from the South Coast to Bristol and Wales is carried onto Route 4 via Redbridge Junction near Southampton, and Eastleigh East Junction. Clapham Junction - Old Kew Junction on the Hounslow loop is a diversionary route for freight traffic into North London from Routes 1 and 2.

## Growth

The high volume of demand for peak commuter services to London is expected to continue, and to grow in line with increasing employment in London. Our analysis suggests that growth of peak London commuter services will continue to be constrained by the available capacity, unless enhancement works are undertaken to allow longer trains to run, as there is no space in the timetable to run additional trains. However, there may be some growth opportunities for off-peak services.

The high demand for commuter services to London, particularly from locations out as far as Woking, Ascot, Havant and Southampton, is expected to continue, as is the demand for leisure services to both London and coastal destinations.

Waterloo has been cited in the Mayor's London Plan for intensification of commercial development around the transport node, which could focus considerable employment growth in the area.

Freight demand is expected to remain broadly at current levels, subject to economic fluctuations, with possible increases if plans for new facilities are realised. Current proposals for new facilities include schemes at Fratton and Dibden Bay which could give rise to significant growth in container traffic, with the possible consequential need for a number of key capacity and capability enhancements on the Southampton main line (including at Basingstoke), and at Reading. If this occurs, we also need to consider suitable diversionary arrangements.

## Current use

### Current traffic

The predominant operator on this route is South West Trains. Other operators are South Central Trains, Thames Trains, Virgin Cross Country, Wessex Trains, Arriva Trains Wales (ATW) (until May 2004) and Island Line. EWS, Freightliner and GB Railfreight carry out freight operations.

Despite having some sections with high levels of capability there are a number of significant capacity and performance constraints on the route. Recent timetable changes, and continuing initiatives to develop the timetable, seek to provide a more robust service within the constraints of the existing infrastructure, (see also emerging issues below). The timetable for the Portsmouth and Weymouth lines hinges on the flat junction at Woking, where any delay has an impact on both main lines. Similarly, at Guildford, crossing moves from the North Downs line must also be timetabled over flat junctions. The Winter 2003 timetable change sought to provide a degree of robustness by providing in the timetable train-free gaps at key bottlenecks such as Woking Junction and Eastleigh Junctions.

During peak periods the fast lines between Woking and Waterloo and the slow lines between Wimbledon and Waterloo are operating at capacity and no additional train movements can be accommodated. The route between Twickenham and Waterloo is also operating at or near capacity during peak periods and this reduces short-term options to relieve overcrowding. Waterloo has 19 platforms available for domestic traffic and these are also very close to capacity at peak times. During the off-peak, the approaches to Waterloo are still operating close to capacity and additional train movements would have a severe impact on performance.

The majority of freight terminals are located on the South Coast between Wool and Southampton. This includes international container traffic from Southampton Docks and Millbrook, aggregates from Wool, steel from Hamworthy Quay and oil from the refineries at Fawley and Furzebrook. Other freight flows include oil from Alton and aggregates from Woking.

<b>Route 3 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	101,570	3,948	105,518
Train tonne km per year (millions)	9,120	942	10,061
Average no of train km per track km per day			113
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Waterloo - Raynes Park (Main Lines)			940
Raynes Park - New Malden			780
New Malden - Woking			530
Waterloo - Barnes (Windsor Lines)			480
St Denys - Southampton			320

## Projected use

The introduction of the new rolling stock through the Southern Region New Trains Programme (SRNTP) necessitates the enhancement of the power supply network to meet the higher electrical demands of the new vehicles, installation of depot facilities for servicing new trains, and addressing of the issue of short platforms at a number of stations.

Critical works for the Power Supply Upgrade (PSU) to allow operation of the new fleet are scheduled for delivery in two tranches, completing between April 2004 and December 2004. The remaining works to provide operational resilience will follow in the first half of 2005. The current scope of works agreed with the SRA is limited to replication of existing levels of train running capability. However, a period of trial running and monitoring following completion of PSU works may suggest opportunities for performance improvements.

The introduction of new rolling stock will be accompanied by some revisions to the timetable. The revisions will take into account the operating characteristics of the new trains following the power supply upgrade incorporating issues such as revised station dwell times.

## Strategic framework for the route

The South West Main Line is not included within the SRA's current RUS programme although we anticipate that the development of a RUS for the Cross Country Routes (which is planned for publication during Winter 2004/05) may have some significance for this route.

The SRA's Regional Planning Assessment for the area covered by this route is due in Spring 2005.

A number of changes have already been made by the SRA to recent timetables on this route, with the aim of improving performance by relieving demand on capacity constrained sections and thus reducing service disruption. Further more significant changes are proposed to the recast timetable that will come into effect from 2005 (see also emerging issues).

The SRA has granted an extension to the Island Line franchise to 2007. The Island Line is proposed as a pilot route for the SRA's strategy for community railways, which is currently out for consultation.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 3</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
London Waterloo - Woking		23min
London Waterloo - Guildford		32min
London Waterloo - Portsmouth Harbour		86min
London Waterloo - Southampton Airport Parkway		61min
London Waterloo - Bournemouth		1hr 41min
London Waterloo - Weymouth		2hr 38min
Bournemouth - Weymouth		53min
London Waterloo - Reading		1hr 11min
Reading - Gatwick Airport		1hr 15min
Ryde Pier Head - Shanklin		23min
<b>Linespeed (km of track)</b>		
Up to 35mph		32
40-75mph		793
80-105mph		738
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		382
W7		311
W8		107
W9		-
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		21
20.4 tonnes - 24.1 tonnes (RA 7-9)		1543
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>1564</b>
<b>Total km of route</b>		<b>700</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 3 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	51	60	51
Structures	17	20	21
Signalling	26	53	46
Electrification	4	7	12
Plant & machinery	1	1	3
Telecoms	0	0	-
Network Rail managed stations (London Waterloo)	2	1	1
Stations	5	9	9
Depots	1	2	2
Lineside	1	1	2
<b>Total renewals</b>	<b>108</b>	<b>153</b>	<b>146</b>
<b>Committed and planned enhancements</b>			
Platform Extension Programme (Cat 1) feasibility	1	-	-
Platform Extension Programme (Cat 1) implementation	21	4	-
South Hampshire Rapid Transit	0	1	0
Others	0	-	-
<b>Total committed and planned enhancements</b>	<b>23</b>	<b>4</b>	<b>1</b>

<b>Route 3 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	41	73	69
Sleeper renewal (km per year)	37	49	46
Ballast renewal (km per year)	35	48	46
S&C renewal (units per year)	53	64	79

## Engineering access

The density of service and predominant two-track layout restricts arrangements for engineering access on this route. The layout of the inner Reading lines from London out to as far as Teddington and Hounslow offer a number of diversionary alternatives although use of these rely on replacement bus services to connect affected stations. The multi-track layout between Clapham Junction and Waterloo, which extends over approximately 3.5 miles and includes a number of significant overbridges and complex junctions, present a number of particular practical problems due to the difficulty of obtaining physical access and the intensity of services. The South West Main Line has four-tracks between London and Worting Junction (near Basingstoke) but the degree of operational flexibility that this railway provides is severely compromised by the layout paired by direction west of Wimbledon. The Effingham Junction line provides an alternative means of reaching Guildford from Surbiton. From Woking it is possible to reach Southampton and stations further west via the Portsmouth line.

Planned cyclical maintenance is carried out during weeknight (where freight and passenger movements allow) and weekend possessions. The pattern of weeknight access, which has evolved in response to timetable limitations, seeks to provide maintenance opportunities on the main line based on a rolling 6-10 week cycle which is frequently modified in response to renewal projects. This provides a variety of different possession periods across the route from as little as 3hrs in the Portsmouth Harbour area, to as much 7hrs on a number of branch and country lines. On the main line possessions of less than 4hrs are available between Waterloo and New Malden and 5-6hrs on the section between New Malden and Basingstoke. On the Staines to Reading line the operator needs to take out late trains and freight services require diversion to provide possessions in excess of 5hrs access. On the North Downs Line 4hr 30min possessions are available. Most of these periods are sub-optimal in terms of delivery efficiency and cost.

At complex locations use of the short available weeknights is impractical and therefore maintenance of such sites tends to rely solely on weekend access opportunities.

A sequence of weekend 'Golden' possessions for most critical locations/junctions has been developed and agreed with operators. This typically provides fifty five 10-28hr possessions per year. Over the next two years this regime will provide essential access to the entire Wessex network for maintenance work including at the 15 critical junctions.

In addition to the 'Golden' possessions set out above, the following specific significant access requirements have been identified for this route:

- reconstruction and refurbishment of various structures in the Clapham Junction area will require one 100hr possession, affecting South West main lines between Waterloo and Clapham Junction over Easter 2004;
- Portsmouth area resignalling in 2005/06 and 2006/07. Possession strategies for this work have been agreed with stakeholders, which during 2005/06 will include a number of 52hr possessions to allow the remodelling of Havant station;
- Basingstoke area resignalling in 2005/06 and 2006/07. Possession strategies for this work are currently under discussion with key stakeholders;
- the significant programme of S&C renewals is likely to require possessions longer than 52hrs at a number of locations including Eastleigh, Hampton Court, New Malden and Surbiton in 2004/05 and at Farnborough and Weybridge in 2005/06. Also during 2005/06 we are planning major renewals at the country end of Woking station which will require a one week blockade; and
- we are planning a significant track renewal between Basingstoke and Worting Junction which will be installed during a 4-day blockade over Easter 2005.

Works to upgrade the power supply continue to have significant access and isolation requirements. Effective engineering access to all of the sites is key to the successful completion of the works across the route. A strategy for engineering access at each site has been developed and is being refined to suit the current programme. Where site access is restricted, the project is seeking to find alternative methods to approach the site rather than disrupting the train service through taking possessions. Where disruption is necessary, the project is seeking to use the time effectively through grouping the worksites together in large blocks.

A programme of overhauls to the mechanical interlocking will continue during 2004 and 2005. Whilst we will endeavour to minimise the disruption to the train service the nature of the works will mean that some service alterations will be inevitable.

## Maintenance and renewal

Across this route the average age of plain line rail is 26 years. On primary sections (containing 35% of track assets) the average rail age is 23 years; on London and south-east commuter sections (containing 47% of track assets) the average age is 26 years; while the average age across all other lines is 32 years. The average age of S&C is 27 years.

Within this route approximately 12% of signalling assets along a quarter of the route km are controlled by mechanical signalling technology some of which date back to the 1880s and 1890s. Colour light signalling systems based on RRI technology installed during the 1950s and 1960s control 52% of functions serving a half of the route km. Signal control systems installed during the 1970s and 1980s accounts for 6% of functions along a very small portion of the route. SSI technology installed during the 1990s accounts for 30% of functions covering a quarter of the route.

The average age of the bridge stock is approximately 120 years.

### Track

During off-peak times the approaches to Waterloo are operating close to capacity and as a result it is becoming increasingly difficult to undertake track inspections safely in this area, leading to a conflict between the need for train paths and possessions for inspections. We are continuing the development of new track inspection methods to supplement the existing track inspection regime.

The route from Guildford to Havant is sharply curved with steep gradients. This creates an ongoing need for rerailing. Some of the curves have suffered from rolling contact fatigue (RCF). The track renewals programme continues to address severe sites and ongoing measurements are taking place to monitor crack growth. Rail grinding is the main tool for managing RCF and we will continue to implement an extensive rail-grinding programme on both plain line and S&C.

The impact of the introduction of class 444/450 rolling stock on track renewal and maintenance requirements is being assessed taking into account the higher tonnages of the new trains. It is anticipated that the suspension characteristics of new trains will lead to a significant growth in RCF propagation with consequent impact on track maintenance activity to mitigate this. Renewal and maintenance volumes will be reviewed as the fleet is introduced and its true impact is understood. The current rail-grinding programme will need further enhancement to tackle any potential RCF increase, especially around the numerous S&C layouts on the route. We have purchased a new switch and crossing grinder for the region that will be fully operational during 2004/05. Efficient use of rail grinding machinery requires 6-7hr possessions and we are seeking the cooperation of operators in enabling delivery of this programme. The railgrinding programme also has the benefit of helping to manage other rail defect issues, such as wheel burns and corrugations, and improving railhead condition.

The track renewal programme will continue to address replacement of life-expired components due to condition, in particular pan 8 fixings (to reduce derailment risk), jointed track (to reduce rail break risk) and rail manufactured prior to 1975 (to reduce rail break risk). There is a particular problem with the volume of pan 8 fixings on this route with outer areas beyond Basingstoke being especially affected. The pan 8 fixings condition is being mitigated by the maintenance strategy. Work will also be undertaken on drainage and track formation with considerable drainage and rebalasting work programmed for 2006/07. Significant complete renewals are being completed at Holton Heath and Basingstoke - Worting Junction during 2004/05 with Clandon - London Road programmed for work in 2004/05 and 2005/06.



Renewal of the S&C at West Crossings within Waterloo throat will be completed in 2004/05. Track access in these locations is limited and often insufficient for the major maintenance required on a layout of this age. Other significant S&C work programmed for 2004/05 includes Eastleigh, Hampton Court Junction and New Malden.

There will be a major renewal of S&C at the country end of Woking during 2005/06. The operator has requested that this work is completed within one year. Possession strategy has still to be finalised but the scale of work will cause considerable disruption and could require blockades over 52hrs.

Flooding at Fulwell continues to have an impact on performance and some mitigation works have been carried out. A three-phased solution is underway to deal with the route either side of the tunnel. Phase 2, relaying the drainage within the tunnel, has now been completed. Phase 3 of the scheme to improve drainage from Fulwell tunnel to Hampton has yet to be implemented. Flooding at Sway and Botley also has an effect on performance and these issues are being investigated.

The hot dry summer of 2003 had an adverse effect on track alignment in those locations where the track bed runs over areas of clay due to the exceptional degree of shrinkage. This has resulted in a significant increase in maintenance volumes, particularly tamping.

### Structures

We will continue to focus on major structures that would bring significant disruption to the railway if they failed. We are planning major renewal works in 2004/05 on an important rail-over-rail bridge between Battersea and Clapham Junction, which will be reconstructed replacing an under strength wrought iron bridge and allowing a traffic restriction to be removed. During 2004/05 we will continue refurbishment of the flyover at Hampton Court junction and undertake a major strengthening project on Lambeth Road Bridge outside Waterloo.

The programme in 2005/06 incorporates major strengthening and refurbishment of structures at Battledown flyover south of Basingstoke and Hamble viaduct and Barnes River Bridge are programmed to have major work completed in 2006/07.

We will continue structural reassessment and scheme development work on overbridges in partnership with local authorities in connection with the Bridgeguard 3 project. This will result in a number of significant construction projects on the route mainly during 2005/06 and 2006/07, including two on the Isle of Wight.

In 2004/05 we will have completed a feasibility study to investigate lining degradation causing water penetration through retaining walls of Southampton tunnel.

### Signalling

Over the next 10 years it is currently anticipated that 55% of the route mileage will require signalling renewal. Condition of many housings and cable routes is poor over many areas on the route leading to an increasing maintenance burden.

The scheme to resignal the Basingstoke and Farnborough area replacing colour light equipment installed during the 1960s is now in design stage and is planned for completion in 2008.

Work is continuing on the Portsmouth area resignalling scheme, which also includes replacing mechanical interlockings in the Havant area and the reconstruction of Farlington junction. The scheme is in design stage and completion is currently anticipated in 2007.

Brockenhurst area second stage life extension works are due to be completed in 2007.

The project to resignal the Alton Line will commence its design stage during 2004/05 and is programmed for completion in 2008.

The start of design for the Feltham area resignalling scheme is due in 2005/06 with the work due to be undertaken in 2007/08 through to 2009/10. A programme to renew level crossings along the route will take place in the next three years in advance of the resignalling project.

The start of design of the resignalling of the line between Farncombe and Petersfield will be in 2006/07 and with completion due in 2009.

### **Electrification and plant**

System design for the power supply upgrade required to facilitate introduction of new rolling stock has now been completed. All electrification equipment for Tranche I of the SRNTP project has been ordered including long lead items. Product acceptance for the equipment has been achieved and elements of the renewals programme have been incorporated within the PSU works.

As part of the PSU we will be carrying out work on the SCADA systems at the electrical control rooms (ECR) to allow the new or amended power supply equipment to be monitored and controlled. The extent of change at ECRs on this route varies from simple modifications and extensions through to renewal of control systems, with associated changes to the telecoms network between the substations, TP huts and ECRs. In some cases this may require laying links over property outside Network Rail boundaries. This exercise will include work at Eastleigh and Raynes Park.

Within the London area we will be commencing the renewal of DC switchgear at key locations. This is a long-term programme to replace certain types of life expired DC circuit breakers and will be undertaken during 2004/05, 2005/06 and beyond.

The electrification equipment at the IOW's sub-stations is reaching the end of its operational life and will need replacing within the next five years. Feasibility work for the replacement of DC switchgear is underway. It is intended that transformer/rectifier sets will be replaced from 2007/08.

### **Telecoms**

The continuing programme of PETS renewals at level crossings with the latest variants is progressing with renewal of all systems on the route to be completed by 2006/07. This programme will maintain public safety and reduce the potential for train delays.

### **Network Rail managed stations**

#### *London Waterloo*

During 2003/04 the £40m project to renew the train-shed roof over all the platform areas was completed, and studies were undertaken in conjunction with SWT into options for delivering sufficient station passenger capacity to a design year of 2006/07. Waterloo Station is operating close to its maximum passenger capacity, which may lead to station closure at peak times if passenger demand continues to grow. As well as the studies with SWT on the short term, discussions were held with the SRA about the longer-term solution to train and passenger capacity needs at this busy London terminus and also the funding for the short-term solutions with SWT. We have completed improvements to taxi and car pick up areas and improved passenger capacity of the main concourse by the repositioning of customer information arrays.

### Other stations

During 2004/05 we will be replacing the platform superstructures at Isleworth station and completing a full refurbishment of Kingston station building and platform canopies. We will also undertake the rewiring of Portsmouth Harbour station.

In 2005/06 this will include work on the main concourse roof at Clapham Junction and the LUL concourse roof at Richmond. Twickenham station will have a programme of work to the footbridges and platform canopies 2005/06 and 2006/07. Station rewiring work will be undertaken in 2006/07 at a number of locations including Clapham Junction, Staines and Brockenhurst.

### Depots

Depot plant at Bournemouth West has been programmed for refurbishment in 2005/06 and 2006/07. Fratton depot fuel point renewal is scheduled for development in 2005/06 and installation in 2006/07.

Works at depots to support the introduction of new rolling stock are described in the enhancement section.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

There is a risk that performance, measured in terms of PPM, may suffer if, as it is introduced, the new rolling stock has a rate of vehicle failures per mile significantly worse than the current stock.

One of the principal objectives of recent timetable revision has been to provide more robust timetables that will allow a better level of industry performance. We continue to seek further optimisation of the timetable through the Wessex Timetable Group that will be implemented in future revisions.

We currently support the 'One Team Wessex' programme, which is a joint industry initiative intended to improve performance and increase the appeal of rail travel in the area.

The Waterloo to New Malden section is critical to performance on this route, and in conjunction with the section to Barnes, carries approximately 80% of all traffic in the Wessex area. A number of schemes and initiatives are underway or planned, including upgrading switch and crossings along the route and reorganising key teams to ensure faster response to incidents. We are upgrading the bonding at S&C sites on the route, and refurbishing the automatic route setting system (semi-automated signalling) at Wimbledon signalling centre. We are also replacing insulated block joints between track sections, where continuously welded rail has not yet been introduced.

At Portsmouth it is expected that the significant track and S&C renewals, that are planned to accompany the resignalling scheme, will bring performance benefits due to improved asset reliability and operational flexibility.

Significant levels of route crime continue to have a performance impact in addition to risks to safety. Company wide measures to combat these problems are described in the Technical Plan.

Feltham continues to see fare evaders enter at the level crossing and walk onto the platforms. We continue to run local media campaigns and work with BTP to detect and deter offenders. CCTV is to be installed as a deterrent measure.

Trespass and criminal damage occur at Cosham, Portsmouth and Redbridge, due in part to the closeness of schools and local amenities to the line. SWT is reviewing the design of these stations with a view to designing out opportunities for crime by local youths. Travelsafe officers on this route have had a positive effect and will be increased in Spring 2004.

## Enhancements

As part of the works to facilitate the introduction of new trains a package of works to address short platforms will be undertaken at 23 locations including Basingstoke, Farnham, Liphook and Virginia Water during 2004/05. This package will predominantly comprise platform extensions with some repositioning of signals and other minor works.

## Land implications

The power supply upgrade scheme being developed is likely to require a number of additional sub-stations. Towards Portsmouth, Southampton and Bournemouth the amount of existing operational land is minimal and the project is required to purchase additional land. On these sites, full planning permission is being sought from the local planning authorities. Negotiations are currently underway on a number of sites. There may also be a need for new wayleaves in relation to feeder routes and site access points.

## Other committed enhancements

We are working in partnership with SWT on a number of schemes to allow servicing of new rolling stock. SWT has introduced new Controlled Emission Toilet (CET) facilities Basingstoke Barton Mill and this has now become a Light Maintenance Depot (LMD). SWT is also in the process of converting the sidings at Farnham to an LMD with CET facilities as well as providing additional CET facilities at Clapham, Fratton, Wimbledon and Bournemouth depots.

## Route development

As a part of the Southampton - West Coast freight scheme, we have been working with the SRA on studies to assess the ability of the network from Southampton to Manchester and Liverpool to carry 9'6" freight containers. We have carried out a preliminary timetable exercise and are currently completing feasibility studies. There are five tunnels within Southern region affected by this project. Southampton tunnel, Popham tunnels 1 and 2 and Litchfield tunnel will all have the track slewed to improve gauge to W10. St Cross tunnel will have its track lowered to achieve W10 gauge.

The Thameslink 2000 proposals include minor infrastructure enhancements and service changes on this route. The current status of the project is described in detail within the enhancements and major projects Section 3.

Strategic issues facing this route include optimisation of the existing timetable, which is being undertaken to take account of current capacity and performance issues, as well as the introduction of new rolling stock to replace the Mk1 slam door fleet. A number of changes have already been made by the SRA to recent timetables on this route, with the aim of improving performance by relieving demand on capacity constrained sections and thus reducing service disruption. Further more significant changes are proposed to the recast timetable from 2005, and these will affect many departure times from Waterloo. Short-term solutions for reducing passenger overcrowding at Waterloo Station are being developed with SWT.

## Emerging issues

The modifications to the main line and suburban timetable which are being developed for December 2004 will introduce a number of improvements based on analysis of the existing Rules of the Plan, but will also use the standard WCML timetable as the basis allowing cross-country and freight services to be given favourable handover slots. It is expected that this approach will bring a number of tangible benefits due to the optimised sequence of mixed traffic that it will allow. However, it has had far reaching implications to many services across the route. In the long-term, maximisation of the benefits from this comprehensive recast of the timetable depend upon a number of factors outside our control such as the timetable option selected for the new Greater Western franchise and proposed changes in the Bristol area which will impact on the Cardiff to Portsmouth Harbour service.

Suburban route stations are only capable of accepting eight-vehicle trains and this, together with limited capacity of the main lines approaching Waterloo, restricts short-term options to reduce overcrowding on trains at peak times. Feasibility studies have been commissioned to identify where platform-lengthening works will be required to support the introduction of longer trains.

Lack of Waterloo station passenger capacity could prove to be the biggest constraint to growth on the route. At Clapham Junction we expect that similar passenger capacity issues will start to restrict passenger interchange opportunities.

In the new timetable, use will be made of the loop at Haslemere to allow fast trains to overtake local services formed by new Desiro rolling stock. However, since this is the only passing location on the 35-mile stretch between Woking Junction and Portsmouth, this form of operation will be accompanied by a degree of performance risk.

At Portsmouth Harbour, the mix of local and long distance services makes the area particularly sensitive to delay perturbations imported from and impacting upon a wide geographical area. We expect that asset changes which are being introduced at both Portsmouth Harbour and Havant through planned infrastructure renewals schemes will bring performance benefits due to improved asset reliability and operational flexibility.

Single-line sections of the Island Line prevent operation of a more frequent service and the location of the existing single passing loop prevents a regular half-hourly service. Following the landslip at Rowborough, a temporary speed restriction has been introduced. Further deterioration of the track condition here could result in further speed restrictions, having an impact on the timetable.

The impact that the introduction of new rolling stock may have on track renewal and maintenance volumes is being considered since it is anticipated that the new trains will lead to accelerated rail wear and a significant growth in rolling contact fatigue.

Surrey County Council is currently promoting a review of earlier Airtrack proposals to connect Heathrow airport with a number of key locations on the route, and aspire to encourage other partners to develop and implement the scheme. The scheme would require new infrastructure between the airport and Staines, a possible new station and a number of enhancements to the existing infrastructure. Future industry support for the scheme will depend upon sufficient enhancement provision being made to protect performance at current bottlenecks on the route such as Woking Junction.

The Crossrail development team has consulted us about current proposals for works on the operational railway on south-western suburban routes to allow Crossrail services to run between Richmond and Norbiton. We will continue to liaise with the project about key issues as their plans develop.

We have been working with Hampshire County Council assisting them develop plans for Phase 1 of the South Hampshire Rapid Transit (SHRT) scheme which includes running over the currently disused line between Fareham and Gosport. We have also had preliminary discussions about options for SHRT Phase 4, which is proposed to run over the Netley line between Fareham and the Itchen river crossing. This scheme would require a number of enhancements to the existing line between Fareham and Eastleigh to accommodate services currently running via Netley.

The SRA has consulted us about a proposal it has received to reconnect the Swanage railway with the mainline for regular timetabled services. We are working with the SRA and the developer to understand the implications of this scheme.

We have had preliminary discussions with Transport for London and the London Borough of Wandsworth concerning proposed improvements to transport interchange facilities at Clapham Junction station.

We continue to cooperate with the freight and logistics industry to develop existing freight terminal sites and facilitate new freight connections. In particular we are aware of interest at the following sites:

- Dibden Bay - we have been involved with the proposed new container port at Dibden Bay, which would connect into the Network Rail infrastructure at Marchwood. Volume forecasts (dependent upon construction and phasing of works) are from 8 trains per day to various end locations in the north, to 24 trains per day after 10 years. The Transport and Works Act application for the scheme is awaiting a final decision by the Secretary of State for Transport, which is now expected in Spring 2004; and
- Fratton Yard - at this strategic freight site, there is a proposed container interchange serving destinations in the North West, commencing with three trains per week. A new layout would be required within the yard to facilitate a full-length train loading and unloading.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 3 Capacity and operational constraints

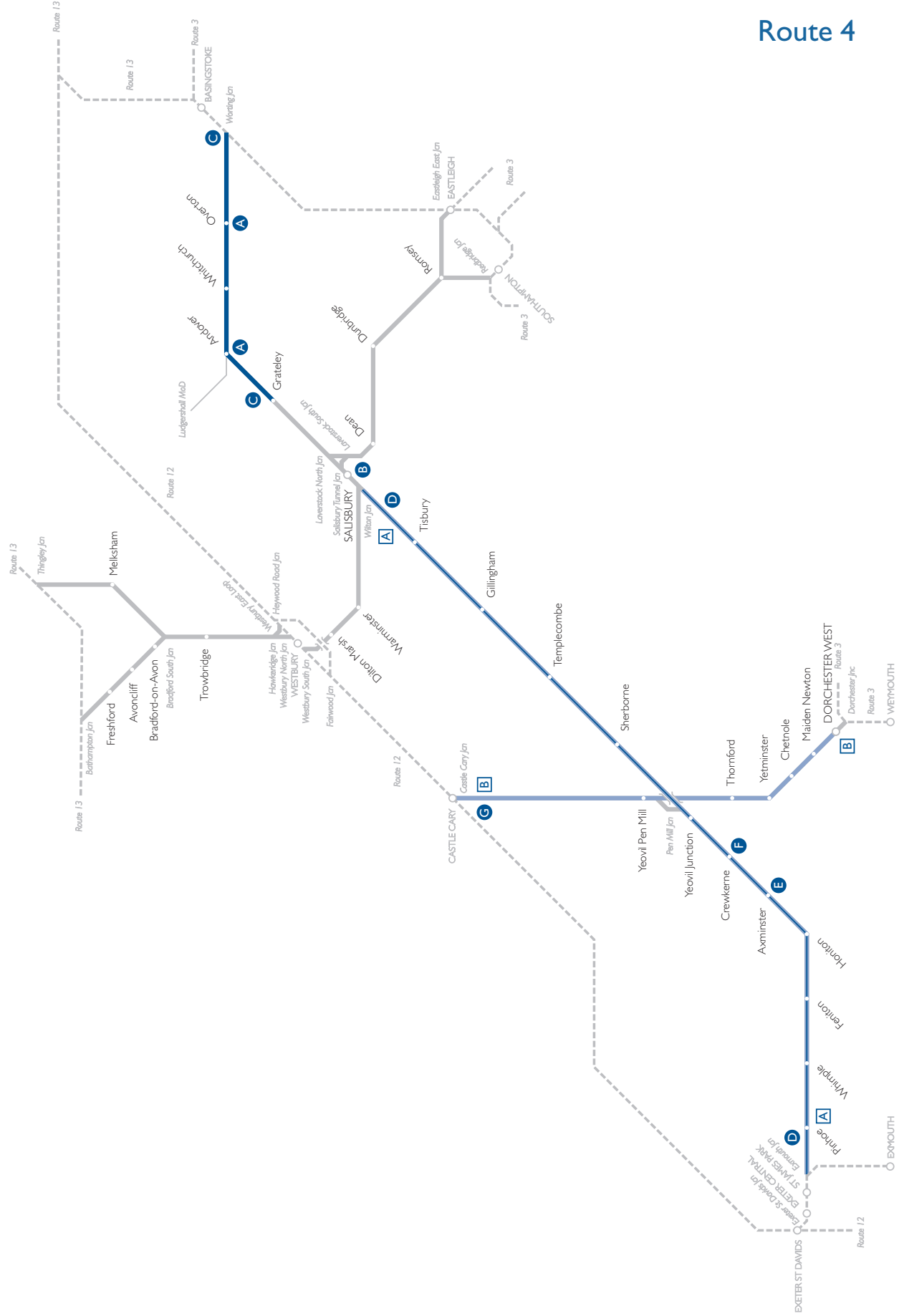
<b>A</b>	Waterloo Station: all domestic platforms operate at capacity during peak, approaches close to capacity all day
<b>B</b>	Waterloo - Wimbledon: slow lines at capacity during peak
<b>C</b>	Waterloo - Woking: fast lines at capacity during peak
<b>D</b>	Waterloo - Twickenham: operates close to capacity with passenger overcrowding
<b>E</b>	Woking, Basingstoke and Eastleigh Junctions: crossing moves over flat junctions restrict capacity
<b>F</b>	Worting Junction - Southampton: traffic mix and two-track sections restrict capacity
<b>G</b>	Reading Station: only two platforms available for electrified trains and short single track section leading to both
<b>H</b>	Reading - Redhill: mix of traffic restricts capacity, predominantly two-track with no passing loops limits ability to run faster services
<b>I</b>	Wokingham - North Camp: signalling headway restricts capacity

### Route 3 Planned projects

Project description	Type of work	Dev. Level
<b>A</b> 2004/05 The track renewals programme; some of the larger sections are shown on the map between Holton Heath and Wareham, Basingstoke and Worting Junction, Clandon Rd and London Road and at Isleworth		R

### Route 3 Planned projects

<b>B</b> 2005/06 The track renewals programme; some of the larger sections are shown on the map between Clandon Rd and London Road, Tolworth and Maiden, Hampton and Sunbury, Swanwick and Fareham and also at Swanwick, Totton, Hinchley Wood, Woolston and Beaulieu Road	R
<b>C</b> 2004/05 Under the track renewals programme we are planning to renew a number of S&C units including large sites at Waterloo West Crossings, Vauxhall, Eastleigh West, Hampton Court and New Malden	R
<b>D</b> 2005/06 Under the track renewals programme we are planning to renew a number of S&C units including large sites at Ascot, Allbrook and Woking	R
<b>E</b> 2004/05 The ongoing structures renewal programme of work includes a large number of major refurbishment and strengthening schemes including Hampton Court, Waterloo and Clapham Junction which are shown	R
<b>F</b> 2005/06 The ongoing structures renewal programme of work includes a large number of major refurbishment schemes. Major refurbishment and strengthening schemes at Battledown flyover and Hamble viaduct are shown	R
<b>G</b> Basingstoke and Farnborough Area resignalling scheme	R
<b>H</b> Portsmouth Area resignalling scheme	R
<b>I</b> Brockenhurst area life extension works	R
<b>J</b> 2004/05 Electrical control room upgrade of SCADA system at Eastleigh and Raynes Park	R
<b>K</b> 2005/06 & 2006/07 Depot plant renewal programme includes works at Boumemouth West and Fratton	R

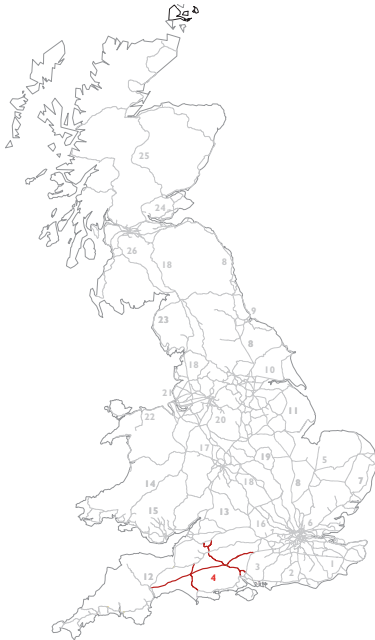


# Route 4



# Route 4: Wessex Routes

## Route description



### Physical description

These lines incorporate an important network of cross-country corridors linking Bristol and Exeter with London, Basingstoke, Southampton and Portsmouth. There are three lines within this route, Worting Junction to Exmouth Junction, Westbury to Redbridge Junction/Eastleigh East Junction and Castle Cary to Dorchester West.

Westbury - Redbridge Junction/Eastleigh East Junction consists of a two-track railway with linespeeds averaging 40mph on the Westbury stretch increasing to 75mph on the approach to Salisbury. After Salisbury speeds increase to around 80-85mph until the track splits at Romsey. The section from Romsey to Eastleigh is mainly single track;

- Worting Junction (south-west of Basingstoke) - Exmouth Junction consists of a two-track line to Salisbury with linespeeds of 85-90mph. After Salisbury the line reduces to a single-line with occasional passing loops and speeds of 75-85mph; and
- the Castle Cary - Dorchester West line is also single track with passing loops and linespeeds varying from 45-75mph.

No tracks within Route 4 are electrified.

Broadly, two thirds of the route is classified as secondary, the remainder is a mix of London and south-east commuter, rural and freight only.

### Market served

The main line is from Worting Junction to Exmouth Junction, which carries passengers from London/Reading/Basingstoke towards Salisbury and on to Exeter and the south-west. This is also used as a diversionary route for the Reading to Penzance line (Route 12).

The other two lines carry passengers and freight cross-country from the south coast towards Bristol and Cardiff. Passenger traffic is increased in the summer months due to leisure travel to the south coast.

EWS, Freightliner and GB Railfreight use the Westbury to Eastleigh East Junction/Redbridge Junction lines as a major freight route from the south coast.

### Growth

We are expecting growth in passenger demand to continue over the coming years although service provision to satisfy this demand will be constrained by the single-line sections of the route.

Potential new freight terminals at Chard and Pinhoe could have a significant affect on demand for freight transport on the Salisbury - Exeter line. The Westbury - Redbridge Junction line could also see an increase in freight traffic with the proposed new freight terminal at Dibden Bay on Route 3.

A proposal for gauge enhancements on the Laverstock Junction (near Salisbury) - Worting Junction line would allow Route 4 to be used as a freight diversionary route for the South West Main Line.

## Current utilisation

### Current traffic

South West Trains is the principal operator with a regular service from London Waterloo to Salisbury with some trains continuing to Gillingham (Dorset), Yeovil Junction, Exeter and Plymouth. Other services run by South West Trains on Route 4 include Romsey to Totton via Chandlers Ford.

Wessex Trains operates Cardiff and Bristol services to Southampton, Portsmouth and Brighton via Westbury and services from Weymouth towards Yeovil, on the Dorchester West to Castle Cary line.

Arriva Trains Wales (ATW) operates a limited service from London Waterloo to Wales but this will cease in May 2004. South West Trains is intending to take over the running of these services from May 2004.

Freight is transported across Route 4 towards Wales and the south-west from freight depots located within Route 3. Container and international traffic is transported from Southampton Docks and Millbrook. Fawley and Furzebrook produces oil freight traffic while Hamworthy Quay, Eastleigh Yard and Wool provide aggregates traffic across Route 4.

<b>Route 4 Current utilisation</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	15,881	1,341	17,222
Train tonne km per year (millions)	888	375	1,264
Average no of train km per track km per day			46
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Tunnel Junction - Wilton Junction (Salisbury)			130
Bath - Westbury			90
Redbridge - Salisbury			70
Westbury - Wilton Junction			70
Worting Junction - Salisbury			60

### Projected use

With the exception of ATW ceasing to operate out of Waterloo, the existing services are expected to continue.

## Strategic framework for the route

Route 4 Lines are not included within the SRA's current RUS programme although we anticipate that the work due on Cross Country Routes (which is planned for publication during Winter 2004/05) and Great Western Route (which is planned for publication during Summer 2004/05) may have some significance for this route.

The SRA's Southern Regional Planning Assessment is due in Spring 2005, and the South West one in Winter 2005, both of which may include this route.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 4</b>		<b>Current route capability</b>	
<b>Journey times</b>			<b>1 April 2004</b>
Portsmouth Harbour - Bristol Temple Meads			2hr 21min
Bath Spa - Portsmouth Harbour			2hr 12min
Westbury - Weymouth			1hr 25min
Basingstoke - Exeter Central			2hr 15min
<b>Linespeed (km of track)</b>			
Up to 35mph			14
40-75mph			213
80-105mph			331
110-125mph			-
<b>Gauge (km of route)</b>			
W6A			378
W7			187
W8			169
W9			-
W10			-
<b>Axle weight (km of track)</b>			
Up to 20.3 tonnes (RA 1-6)			182
20.4 tonnes - 24.1 tonnes (RA 7-9)			376
24.2 tonnes - 25.4 tonnes (RA 10)			-
<b>Total km of track</b>			<b>558</b>
<b>Total km of route</b>			<b>378</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 4 Forecast expenditure</b>				
<b>£m in 2003/04 prices</b>		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
<b>Renewals</b>				
Track		4	3	6
Structures		5	5	3
Signalling		3	3	0
Electrification		-	-	-
Plant & machinery		0	-	0
Telecoms		-	-	-
Stations		0	1	1
Depots		-	-	-
Lineside		0	-	-
<b>Total renewals</b>		<b>12</b>	<b>13</b>	<b>10</b>

<b>Route 4 Forecast activity volumes</b>				
		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
Rail renewal (km per year)		5	8	6
Sleeper renewal (km per year)		4	6	5
Ballast renewal (km per year)		4	6	5
S&C renewal (units per year)		-	-	4

## Engineering access

Route 4 is characterised by the single-line sections on the Salisbury to Exeter and Dorchester to Castle Cary lines, which limit operational flexibility for gaining engineering access. Since the Salisbury to Exeter Line is a diversionary route for the Reading to Penzance line (route 12) engineering access has to be planned in conjunction with this route.

All lines within Route 4 are more heavily used during the summer and planned disruptive access is therefore constrained to the winter period. The 'Golden' possession regime described in Route 3 also operates on these lines; possessions are programmed during 2004/05 for the Worting Junction to Exeter line and the Romsey lines.

To allow the Laverstock Junction to Worting Junction line to be used as a diversionary route for freight, plans are being developed for an improvement in gauge clearance. Implementation of these proposals will probably require disruptive engineering access.

The most significant renewal activities during the next three years will be the Basingstoke to Farnborough resignalling scheme and the signalling life extension works on the Salisbury to Exeter line. These may require disruptive engineering access.

## Maintenance and renewal

Across Route 4 the average age of plain line rail is 32 years. There are no primary sections within Route 4, London and south-east and commuter routes contain 23% of rail assets and have an average age of 31 years. Other category lines contain the remaining 77% of rail assets with an average age of 33 years. The average age of S&C is 31 years.

Within this route approximately 34% of signalling assets along 85 route km are controlled by mechanical signalling technology some of which date back to the 1930s. Colour light signalling systems based on RRI technology installed during the 1960s to early 1980s control approximately 63% of functions serving 111 route km. SSI control technology installed during the 1990s account for 3% of functions covering 13 route km.

### Track

The main focus of projects within 2004/05 and 2005/06 will be steel sleeper relay and rerailing on the Salisbury - Exeter line with the majority of work planned for 2005/06. The programme for 2004/05 will also include the complete renewal of rail, sleeper and ballast at Salisbury. Complete renewals have been provisionally programmed for 2006/07 for sections of the Salisbury - Exeter/Westbury and Salisbury to Redbridge Junction lines due to the condition of the track.

### Structures

The more variable geology towards the western end of the route has given rise to slope failures and remediation of cuttings at Tisbury and Honiton are scheduled for 2004/05.

We will continue to focus on major structures, which would bring significant disruption to the railway if they failed. Steelwork repairs will be made to the Wick overbridge south of Castle Cary during 2004/05 under Bridgeguard 3 improvement works.

The reconstruction of the bridge and flood opening over the River Axe will be completed in 2005/06. This bridge is located west of Axminster and will be replaced with a double track width bridge. This will enable a walking route across the bridge at a lower cost to installing separate walkways and also align with the strategy of providing passive provision for future redoubling of the line from Salisbury to Exeter. This work will enable the removal of a speed restriction at Honiton Bank.

Options to repair major fracturing of the portal of Crewkerne tunnel will be developed during 2005/06 with the work due to be undertaken during 2006/07.

### Signalling

The condition of many housings and cable routes is poor over many areas on this route leading to an increased maintenance burden.

The Basingstoke and Farnborough area resignalling scheme (see also Route 3) includes the replacement of life expired equipment on the line from Basingstoke to Grately and is due for completion in 2008.

Life extension work is being completed at sites on the Salisbury - Exeter line and is due for completion in 2006. Various works will be undertaken during the scheme including converting mechanical points to machine, upgrading track circuits and renewing or moving signal structures.

### Telecoms

The continuing programme of PETS renewals at level crossings with the latest variants is progressing with renewal of all systems on the route to be completed by 2006/07. This programme will maintain public safety and reduce the potential for train delays.

The ongoing renewal of batteries and power supplies supporting telecoms equipment continues to maintain system availability and reliability.

### Stations

During 2004/05 we will be undertaking refurbishment work at Yeovil Junction Station.

Our 2005/06 plans include rewiring of Andover and Salisbury stations. In 2006/07 Romsey and Salisbury are programmed for canopy roof repairs, and Crewkerne station car park will be resurfaced.

### Depots

Salisbury depot has no planned works.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

Fencing is progressively becoming life expired and a renewal programme is in place throughout the region. Performance risks are resulting from livestock gaining access to the line rather than a route crime issue.

## Land implications

Passive provision of land has been undertaken on the Salisbury to Exeter section to enable potential for future redoubling of the line. At Tisbury, with the support of the local authority, we have safeguarded land which could allow future reinstatement of the down platform.

## Emerging issues

Single-line sections are significant capacity constraints particularly on the Salisbury to Exeter section, which is used as a diversionary route for the Great Western Main Line. There has been passive provision of land for the redoubling of this line to increase number of services from Waterloo to Exeter. A feasibility study was conducted in January 2000 to provide infrastructure enhancements that would result in an hourly service. Dorchester West to Castle Cary is also affected by capacity constraints resulting from single-line sections.

The proposed freight terminal at Dibden Bay on Route 3 will have a major effect on tonnage on the route between Romsey, Laverstock and Worting Junction, if these lines continue to be used as a diversionary route away from Route 3. Development continues on work needed to make the route via Laverstock a viable one for diversionary purposes.

A potential freight site at Chard has become available due to the cessation of milk transportation. We are currently investigating several proposals for this site although freight connections to the line lead away from London and towards Exeter.

Exeter Skypark is a proposed new freight intermodal site near to Pinhoe on the Worting Junction to Exeter line. The proposal will require a new private siding connection to allow the interchange of goods from railway to road transportation.

We are aware of local aspirations to redouble the Exeter - Salisbury line. A feasibility study was undertaken in January 2000 and will need updating if it is decided that this is the strategic direction that this line needs to take.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 4 Capacity and operational constraints

- A** Salisbury - Exeter: single-line sections prevent significant increases in train service frequency
- B** Dorchester West - Castle Cary: single-line sections prevent significant increases in train service frequency

### Route 4 Planned projects

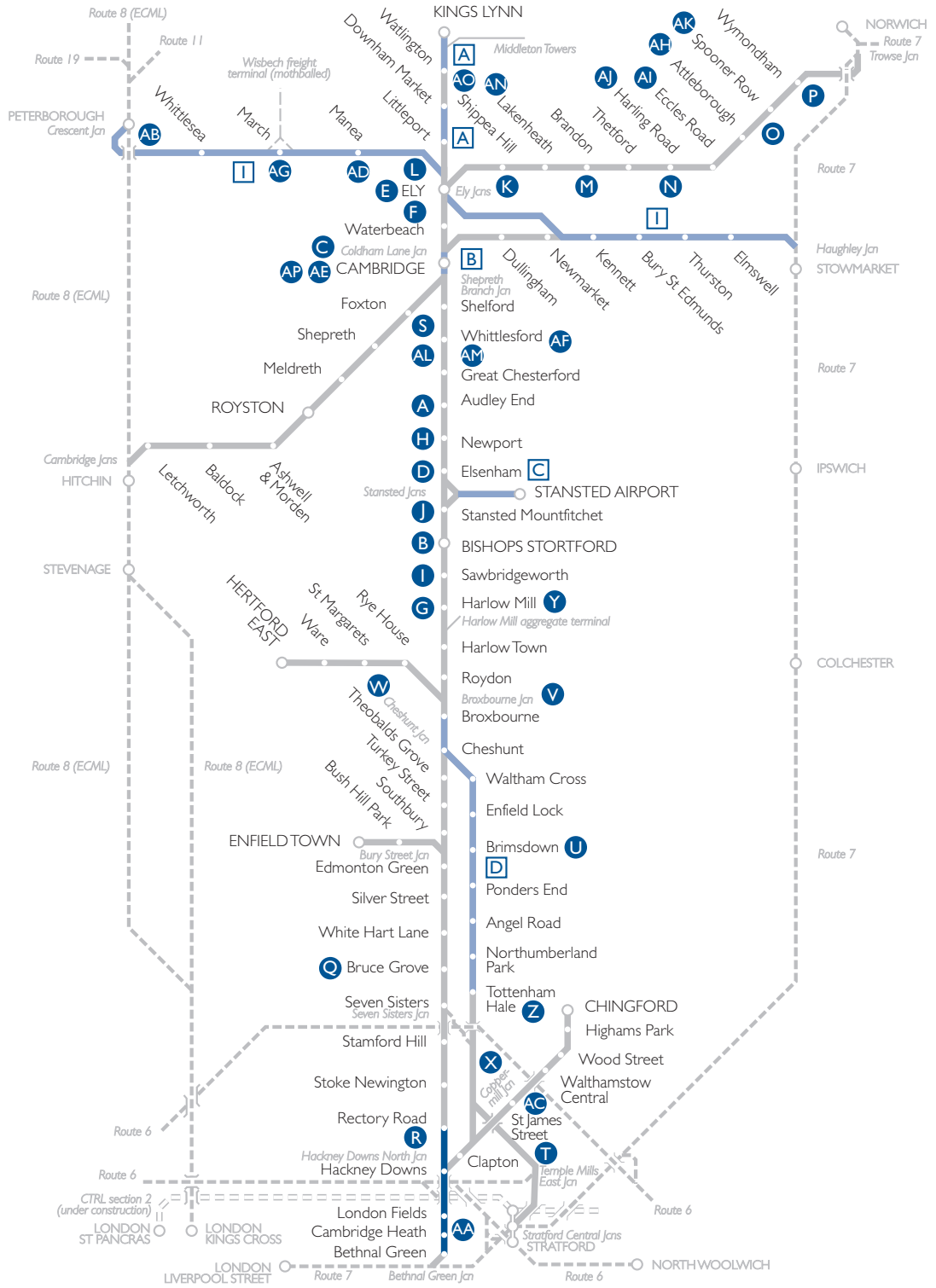
Project description	Type of work	Dev. Level
<b>A</b> 2004/5 & 2005/06 Steel sleeper relay and rerail on the Salisbury to Exeter line. Major sites affected are shown on the map	R	
<b>B</b> 2004/05 Under our track renewals programme, we will undertake a complete renewal of rail, sleeper and ballast at Salisbury	R	
<b>C</b> 2004/05 - 2007/08 Basingstoke and Farnborough Area resignalling scheme that is replacing life expired equipment along 40km of this route	R	
<b>D</b> 2004/05 - 2005/06 Life extension works are being undertaken on signalling equipment at various locations on Salisbury - Exeter line	R	
<b>E</b> 2005/06 Reconstruction of the bridge and flood opening over the River Axe West of Axminster. This bridge will be replaced with a two-track width bridge	R	

### Network Rail

### Route 4 Planned projects

- F** 2005/06 - 2006/07 Options to repair major fracturing of the portal within Crewkerne tunnel will be developed during 2005/06 with the work due to be undertaken during 2006/07
- G** 2004/05 Steelwork repairs at Wick Overbridge

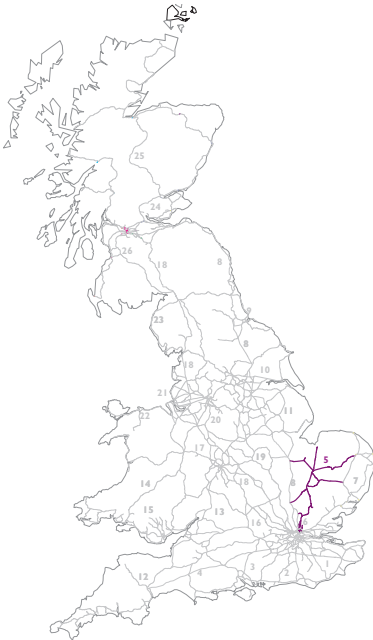
# Route 5





# Route 5: West Anglia

## Route description



### Physical description

The West Anglia main line runs from London Liverpool Street to King's Lynn via Cambridge. It has several suburban branches and a link to Stansted Airport.

The principal components of the route are:

- the main line, which has a maximum speed of 90mph. There are two routes between Liverpool Street and Cheshunt: one via Tottenham Hale (the Lea Valley) and one via Seven Sisters (the Southbury Loop). These lines are 25kV AC electrified;
- the routes from Norwich to Ely and Peterborough, and Haughley Junction (on the Great Eastern route) to Ely and Cambridge, with speeds up to 75mph (90mph for Sprinters in some areas). These routes connect East Anglia to the Midlands, the North and Scotland; and
- the short freight line from King's Lynn to Middleton Towers.

The route is mostly two-track, with a small number of single-line sections.

Much of the southern end of the West Anglia route has been modernised under the West Anglia Route Modernisation (WARM) project, which should deliver much improved reliability and performance.

South of Elsenham the signalling on the route is controlled from Liverpool Street IECC. Between Elsenham and Ely the route is controlled from Cambridge PSB (PSB), which also controls the Shrepeth branch as far as Royston where King's Cross PSB takes over. On the main line north of Ely, together with the Suffolk, Norfolk and Cambridgeshire branches, there is a mixture of mechanical and electro-mechanical signalling technologies.

Broadly, about half of the route is classified as secondary, about a third London and south-east commuter and the remainder a mix of rural and freight only.

### Market served

The West Anglia main line serves one of the fastest growing regions in the country with densely populated areas at its southern end and some key locations at its centre, including Cambridge and Stansted Airport.

## Growth

Passenger demand at peak times is expected to continue growing over the next 10 years, largely driven by growth in the city. In addition, WAGN continues successfully to develop its off peak businesses. Forecasts for employment and population predict growth well above the national average, especially at Cambridge.

Further growth in freight traffic is expected over the coming years, in particular in construction materials traffic.

## Current use

### Current traffic

The route is primarily used by WAGN, with Central Trains operating services from Stansted Airport and Norwich to the Midlands and the North West. Anglia Railways operate local services between Ipswich and Peterborough and have recently introduced services between Cambridge and Norwich via Thetford. However, a new Greater Anglia franchise is due to commence in April 2004. This new franchise will combine the West Anglia part of the current WAGN franchise with the current Anglia Railways and First Great Eastern franchises and will provide a single operator of all passenger train services into Liverpool Street station. The SRA has recently announced that the National Express Group Plc has signed a franchise agreement with the SRA to operate the new Greater Anglia franchise.

EWS, Freightliner and GB Railfreight operate freight services between East Anglia and the Midlands and North.

Inner and outer suburban services use the main line, including 5tph between the morning and evening peaks to Stansted Airport. The cross country routes carry inter-urban passenger trains, as well as some local services.

The suburban lines into Liverpool Street are heavily used and there is little spare capacity to run additional trains.

On the outer sections, especially the Lea Valley route (mix of stopping and fast services), Cambridge (single long platform) and long single-line sections between Ely and King's Lynn as well as that through Stansted Tunnel, there is limited track capacity left to run additional services.

<b>Route 5</b>		<b>Current use</b>		
		<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day		40,518	2,621	43,139
Train tonne km per year (million)		2,664	783	3,449
Average no of train km per track km per day				79
<b>Top five busiest route sections</b>				<b>No of trains per day</b>
Bethnal Green - Hackney Downs				530
Hackney Downs - Clapton				360
Cheshunt - Broxbourne				300
Clapton - Cheshunt				260
Shepreth Branch Junction - Cambridge				230

## Projected use

Our analysis of current peak loadings suggests that there is still available passenger capacity on all current West Anglia services for the immediate future and longer-term growth could be accommodated by filling existing seats and lengthening some trains.

## Strategic framework for the route

The SRA strategic plan includes the introduction of the Greater Anglia franchise. The SRA is planning a Route Utilisation Strategy (RUS) for publication in 2005. The SRA has reviewed capacity enhancements under the Incremental Output Statement (IOS) programme but no work is planned at the present.

The East of England RPA will cover this route and is due in Autumn 2004.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 5</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
London Liverpool St - Stansted Airport		44min
London Liverpool St - Cambridge		71min
London Liverpool St - King's Lynn		1 hr 59min
London King's Cross - Cambridge		45min
London King's Cross - King's Lynn		1 hr 34min
<b>Linespeed (km of track)</b>		
Up to 35mph		41
40-75mph		641
80-105mph		246
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		493
W7		443
W8		443
W9		50
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		12
20.4 tonnes - 24.1 tonnes (RA 7-9)		127
24.2 tonnes - 25.4 tonnes (RA 10)		788
<b>Total km of track</b>		<b>927</b>
<b>Total km of route</b>		<b>493</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 5 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	27	49	47
Structures	7	11	10
Signalling	8	11	5
Electrification	0	0	3
Plant & machinery	1	0	1
Telecoms	2	1	2
Stations	3	6	4
Depots	0	0	0
Lineside	1	2	1
<b>Total renewals</b>	<b>50</b>	<b>81</b>	<b>75</b>
<b>Committed and planned enhancements</b>			
Other	0	-	-
<b>Total committed and planned enhancements</b>	<b>0</b>	<b>-</b>	<b>-</b>

<b>Route 5 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	27	43	32
Sleeper renewal (km per year)	14	36	26
Ballast renewal (km per year)	17	38	26
S&C renewal (units per year)	4	16	10

Our maintenance and renewals plans, including enhanced maintenance in lieu of longer-term planned renewals, are targeted at improving performance and track quality across the route.

Because part of the route is running close to track capacity for most of the day, this has led to difficult performance issues. Although completion of the WARM project should alleviate some of the problems on this route, other performance initiatives, including enhanced maintenance of key assets, and improvements to some of the margins in the timetable, are also being employed to reverse these problems.

In addition we are implementing improved cyclical access to the track for maintenance and a programme for targeted renewals, especially for track (see below).

## Engineering access

Increasing safety requirements, coupled with the difficulty in isolating the overhead line equipment (OLE), make single-line working during maintenance/renewal work impractical on this route.

We are planning around twenty four 27hr possessions per year on the route over the next five years for plain line track renewals.

We are introducing cyclic maintenance on the route with four weeknights (Monday - Thursday) of 6hrs on a 12-week cycle at each location. We are also seeking 12-week cyclical Saturday night/Sunday and eight 12hr possessions over the whole route. Many of the weekend blocks will be two 8hr possessions with 12hr rest periods between to optimise resources. All of these will require some retiming of first and last passenger services and some freight services.

The main items of renewal work requiring more than 54hr possessions are:

- at Broxbourne for S&C renewals (May Day Bank Holiday 2005);
- Cheshunt S&C renewals (2006/07); and
- at Essex Road (near Broxbourne), Hertfordshire County Council are planning for the construction of a new overbridge (a possession is currently planned for 100hrs over Christmas 2004).

## Maintenance and renewal

Much of the West Anglia route has been modernised under the WARM project. The track condition is generally good and the route has not been as badly affected by rolling contact fatigue (RCF) or wet spots as other routes. However, there is an on-going performance impact on services and our maintenance and renewal plans are targeted to improve these areas. We have developed a programme of enhanced maintenance in areas where performance is particularly at risk until long-term planned renewals are undertaken.

### Track

We are planning to mitigate further risk of RCF and wet spots by a combination of track renewals and by rail grinding. It is intended to use the high output renewals train on the route as soon as it becomes available.

The Felixstowe-Nuneaton project is currently clearing the Great Eastern and North London Line and Thameside routes (Routes 6 and 7) to introduce W10 gauge freight traffic from Felixstowe and Harwich via the Great Eastern route and London. However, should the previously proposed cross-country route via Ely go ahead in the future, then increased track maintenance and renewals will be required on the West Anglia route via Bury St Edmunds, Ely, March and Peterborough.

Track renewals and S&C renewals across the route are directed towards specific targets, including the need to address broken rails, track geometry and wet spots, which will reduce the risk of having to impose speed restrictions. In 2006/07 we are rerailing, resleepering and reballasting 2.5 miles of track on the up main at Harlow Mill, which when complete will have replaced worn components and improved track quality. Other significant site-specific items are detailed in the planned projects summary and diagram.

### Structures

We are currently carrying out a risk assessment of our embankments and cuttings with a view to prioritising our earthworks programme. We are carrying out earthworks inspections throughout the route to improve our information on asset condition.

We are planning to undertake numerous structure and earthwork renewals across the route to remove the risk of having to impose speed restrictions and significant site-specific items are detailed in the planned projects summary and diagram.

## Signalling

Resignalling under the WARM project is now complete. Three hundred and forty one new signals have been installed and the control of 16 signal boxes and 11 level crossings have been transferred to our Liverpool Street IECC. A further 19 railway crossings were also upgraded. Signalling assets outside this area range from SSI and relatively modern power signalling equipment to vintage mechanical signalling. The condition of the assets is commensurate with their age and a number of projects have been identified to address asset condition.

We will be renewing the pole route between Ely and Norwich, which carries both signalling and telecoms cables and will reduce the risk of the old equipment failing and causing train delays.

We are planning to undertake numerous signalling and level crossing renewals across the route to reduce the risk of the old equipment failing and causing train delays and significant site-specific items are detailed in the planned projects summary and diagram.

## Electrification and plant

The oldest section of OLE equipment (Liverpool St - Bishops Stortford via Seven Sisters) dates from the 1960s and contact wire renewals that are required over the next seven years have been undertaken as part of the WARM project. North of Bishops Stortford the electrification equipment dates from the 1980s and no problems are foreseen.

We are planning to undertake several electrification and plant renewals across the route to reduce further the risk of the current equipment failing and causing train delays and significant site-specific items are detailed in the planned projects summary and diagram.

## Telecoms

A fixed telecoms network synergy scheme is being implemented on the route between Ely and Norwich to replace the existing pole route. The new route will provide protection for signalling and telecoms cables reducing the potential risk for train delays through asset failures.

Work has continued during the past year to develop the renewal strategy for all DOO CCTV assets on the route, which will be undertaken over the next three years with an estimated completion of 2006/07. This will provide each location with a robust system for train despatch that will improve passenger safety and operational performance.

## Depots

There are no major issues affecting depots on the route, although we await the berthing strategy for the West Anglia area following refranchising.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

## Land implications

Our virtual quarry and track renewals depot is vacating Temple Mills to make way for the Channel Tunnel Rail Link depot. We are currently relocating the depot to Whitemoor, near March (see below).

## Other committed enhancements

The Office of the Deputy Prime Minister has approved our planning application to develop the former marshalling yard at Whitemoor, March to establish a National Logistics Unit (NLU) depot, which is now currently under construction. This will colocate two current depots on a single site. The new depot when complete will feed track components, ballast and other materials around the network.

The Thameslink 2000 proposals include minor infrastructure enhancements and service changes on this route. The current status of the project is described in detail in the major projects Section 3.

## Route development

In conjunction with establishing a new NLU depot at Whitemoor (see above), we are currently developing a number of other sites, including berthing sidings etc., as part of the operational strategy to facilitate the distribution of trains and materials around the network.

We have continued to carry out significant amounts of short-term performance improvement investment work on the route to mitigate failures of the old equipment and much needed renewals have now been completed under the WARM project.

## Emerging issues

The key issue for the route is capacity between Tottenham Hale and Bishops Stortford along the Lea Valley, which is constrained by the mix of fast and stopping services over the two-track railway. Track capacity is also restricted through the single-track airport tunnel at Stansted and through the single main line platform at Cambridge. Sustained growth at Stansted Airport, especially when the new runway is constructed, will require infrastructure improvements to both Stansted Tunnel and the Lea Valley route to London. We have undertaken studies - on behalf of the SRA and British Airports Authority (BAA) - to examine the options for and timing of such enhancements. These will require external funding and, as Stansted grows, they will have to be addressed as part of the surface access strategy for the airport.

We believe that the following could alleviate capacity issues, subject to funding:

- train lengthening;
- extension of Cheshunt Bay platform would allow the operation of 8-car trains on the Southbury Loop;
- major timetable adjustments could achieve better regulation on the Lea Valley, and
- In addition, consideration needs to be given to the long-term case for four-tracking the Lea Valley in conjunction with the Government's airport strategy.

North of Ely flexibility is limited by the single-track sections between Littleport and Downham Market, and between Watlington and King's Lynn.

In the longer-term an upgrade of the cross-country route from Haughley Junction to Peterborough via Bury St Edmunds, Ely and March could potentially allow some freight traffic to be diverted away from the Great Eastern main line.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 5 Capacity and operational constraints

<b>A</b>	Littleport - Downham Market & Watlington - King's Lynn: single track sections limit capacity
<b>B</b>	Cambridge station: single through platform
<b>C</b>	Stansted Airport Tunnel: single track
<b>D</b>	Tottenham Hale - Broxbourne: mixed use of fast and slow services constrains capacity and potential journey time reductions

### Route 5 Other issues on the route

<b>I</b>	Potential strategic freight route would require an upgrade to this section
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### Route 5 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2006/07 Audley End track renewal	R	
<b>B</b>	2006/07 Bishops Stortford station track renewal	R	
<b>C</b>	2005/06 Coldham Lane track renewal	R	
<b>D</b>	2005/06 Eisenham track renewal	R	
<b>E</b>	2005/06 Ely track renewal	R	
<b>F</b>	2005/06 Fish and Duck track renewal	R	
<b>G</b>	2006/07 Harlow Mill track renewal	R	
<b>H</b>	2006/07 Newport track renewal	R	
<b>I</b>	2006/07 Sawbridgeworth track renewal	R	
<b>J</b>	2006/07 Stansted track renewal	R	
<b>K</b>	2006/07 Shippea Hill track renewal	R	
<b>L</b>	2006/07 Clayways wet beds track renewal	R	
<b>M</b>	2004/05 Brandon track renewal	R	

## Network Rail

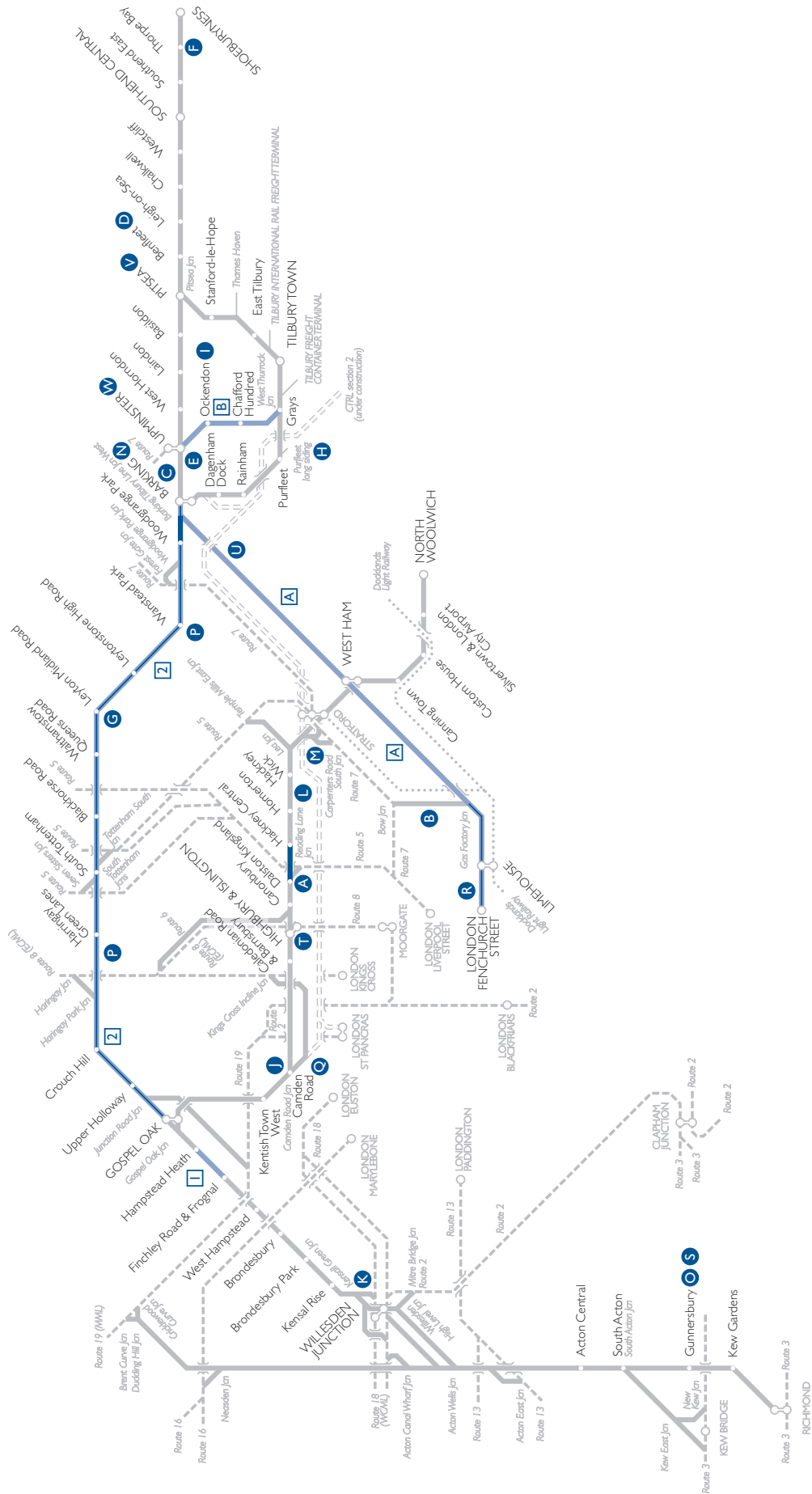
### Route 5 Planned projects

	Project description	Type of work	Dev. Level
<b>N</b>	2004-06 Harling Road track renewal	R	
<b>O</b>	2004/05 Sluts Hole track renewal	R	
<b>P</b>	2005/06 Wymondham track renewal	R	
<b>Q</b>	2005/06 Bruce Grove track renewal	R	
<b>R</b>	2006/07 Hackney Downs to Rectory Road track renewal	R	
<b>S</b>	2004/05 Foxton track renewal	R	
<b>T</b>	2005/06 Temple Mills track renewal	R	
<b>U</b>	2005/06 Brimsdown S&C renewal	R	
<b>V</b>	2005/06 Broxbourne Junction S&C renewal	R	
<b>W</b>	2006/07 Cheshunt Junction S&C renewal	R	
<b>X</b>	2004/05 Coppermill Junction S&C renewal	R	
<b>Y</b>	2005/06 Harlow Mill S&C renewal	R	
<b>Z</b>	2004/05 Tottenham South S&C renewal	R	
<b>AA</b>	2005/06 Bethnal Green to Hackney Downs structures renewals	R	
<b>AB</b>	2004-07 Morton's Leam bridge, between Peterborough and Whittlesea, structure renewal	R	
<b>AC</b>	2004-06 Low Hall Lane structure renewal	R	
<b>AD</b>	2004-06 Manea bridges structure renewals	R	
<b>AE</b>	2004-07 Cambridge signal box CCTV renewal	R	
<b>AF</b>	2004-06 Whittlesford signalling wire renewal	R	
<b>AG</b>	2004-07 March area signal box renewals	R	
<b>AH</b>	2004-06 Attleborough signal box and level crossing renewal	R	
<b>AI</b>	2005-07 Eccles Road signal box and level crossing renewal	R	
<b>AJ</b>	2006/07 Harling Road signal box and level crossing renewal	R	
<b>AK</b>	2006/07 Spooner Row signal box and level crossing renewal	R	
<b>AL</b>	2004-06 Duxford level crossing barrier renewal	R	
<b>AM</b>	2005/06 Hinxton level crossing barrier renewal	R	



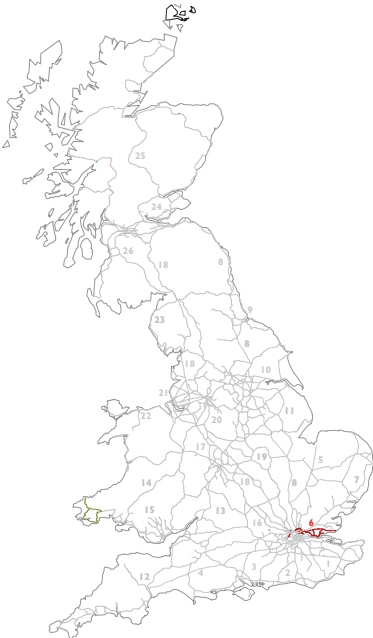
<b>Route 5 Planned projects</b>			
	<b>Project description</b>	<b>Type of work</b>	<b>Dev. Level</b>
<b>AN</b>	2006/07 Lakenheath signal box and level crossing renewal	R	
<b>AC</b>	2006/07 Shippea Hill signal box and level crossing renewal	R	
<b>AP</b>	2004/07 Cambridge excess OLE contact wire stretch removal	R	

# Route 6



# Route 6: North London Line and Thameside

## Route description



### Physical description

The principal components of the route are:

- the North London Line (NLL) which comprises the Richmond to North Woolwich route, the Gospel Oak to Barking route, the Dudding Hill lines (the freight route between Cricklewood, on the Midland main line, and Acton Wells Junction) and associated connections to all of London's main radial routes; and
- the Thameside route, which runs from Fenchurch Street to Shoeburyness, with a loop line between Barking and Pitsea via Tilbury.

The NLL route is two-track except for Camden to Dalston, which has three and four-track sections. The line between Custom House and North Woolwich is single track. Maximum linespeed is 50mph. The core route from Richmond to North Woolwich is electrified with a mixture of 25kV AC and DC third/fourth rail systems. The connections to the Great Eastern main line, West Anglia main line, East Coast main line and West Coast main line (WCML) are also AC electrified. The core route and the Gospel Oak - Barking route are mainly controlled by a mixture of mechanical and electro-mechanical signalling technologies, with the eastern ends being controlled from Liverpool Street and Upminster IECCs. The Dudding Hill branch is controlled from three electro-mechanical/mechanical signal boxes. Our plans are concentrating on improving the flow of services and we are looking to resignal the route in 8-10 years time.

The Thameside route is two-track, with a single-track line connecting Chafford Hundred station (close to the Lakeside shopping complex) with Upminster and Grays. There is also a single-track freight only branch line to Thames Haven. The maximum speed is 75mph on the main line and apart from the Thames Haven branch the route is 25kV AC electrified throughout. The route underwent major modernisation, completed in 1997, making it one of our most modern and reliable routes; it is controlled entirely from Upminster IECC.

Broadly, the route is five-sixths London and south-east commuter and one-sixth freight only.

## Market served

The North London line is a vital part of London's transport infrastructure and a major strategic link between key arterial routes to and from the capital. It is an important freight route, provides a key passenger service around London and enables trains to connect from one main line to another.

The Thameside route carries commuter and leisure traffic, and substantial freight movements from Thames ports.

## Growth

Passenger demand on the North London Line is driven by a combination of work and leisure journeys and is not as dependent upon commuting as London arterial routes. Passenger traffic is forecast to grow further over the next 10 years and recently passenger numbers have been rising rapidly, leading to overcrowding.

On the Thameside route demand is led by central London commuting, which is expected to continue growing, although this is likely to be largely within the capability of existing services.

Further growth of freight traffic is expected over the coming years, in particular in construction materials and intermodal traffic.

## Current use

### Current traffic

The principal train operator on the NLL is Silverlink Trains, but many freight operators also use the route. It is also used for a number of empty passenger stock workings. Passenger services on the Thameside route are operated exclusively by c2c, whilst EWS, Freightliner and GB Railfreight operate freight services.

The North London Line is an important freight route around the capital, linking many main lines to all parts of the country. It is heavily used by a mix of freight and stopping passenger services, which are limited by signalling headways, low speeds and the number of junctions.

The Thameside route operates a mainly commuter based service into London and a number of freight services from the Tilbury Loop to the NLL via Barking. Although the opening of West Ham station, between Barking and Fenchurch Street, has reduced track capacity, some timetable adjustments have addressed this problem in the short-term.

<b>Route 6 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	22,124	1,906	24,030
Train tonne km per year	1,869	486	2,355
Average no of train km per track km per day			101
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
London Fenchurch Street - Barking			290
Barking - Upminster			230
Pitsea - Southend Central			220
Willesden High Level Junction - Kensal Green Junction			210
Camden - Stratford			200

## Projected use

It is anticipated that where required, additional passenger capacity will be provided by lengthening trains. It is also anticipated that freight traffic will grow following route clearance to W10 gauge on parts of the route (see other committed enhancements).

## Strategic framework for the route

The RUS work for cross London routes are planned for publication in 2004.

The SRA has reviewed capacity enhancements under the Incremental Output Statement (IOS) programme and feasibility work is continuing on potential improvements at Benfleet.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 6</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Richmond - Stratford		56min
Willesden - Stratford		40min
Hampstead Heath - Stratford		27min
Stratford - North Woolwich		14min
Barking - Gospel Oak		35min
London Fenchurch St - Barking		13min
London Fenchurch St - Basildon		30min
London Fenchurch St - Southend Central		48min
London Fenchurch St - Chafford Hundred		32min
<b>Linespeed (km of track)</b>		
Up to 35mph		67
40-75mph		359
80-105mph		-
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		197
W7		160
W8		153
W9		64
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		22
20.4 tonnes - 24.1 tonnes (RA 7-9)		82
24.2 tonnes - 25.4 tonnes (RA 10)		321
<b>Total km of track</b>		<b>426</b>
<b>Total km of route</b>		<b>213</b>

<b>Route 6 Baseline route capability changes</b>				
	Year of change	Current value	New value	Reason for change
<b>Gauge (km of route)</b>				
W10	2004/05	-	38	See note 1

Note 1: This change is as a result of the Felixstowe - Nuneaton project, which will increase the gauge on this route between Stratford and the WCML via Primrose Hill and between Tilbury and Forest Gate Junction via Barking to W10.

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 6 Forecast expenditure</b>				
£m in 2003/04 prices	2004/05	2005/06	2006/07	
<b>Renewals</b>				
Track	41	7	13	
Structures	9	10	12	
Signalling	2	3	2	
Electrification	5	6	6	
Plant & machinery	0	0	1	
Telecoms	0	-	1	
Network Rail managed stations (London Fenchurch Street)	2	1	1	
Stations	3	1	2	
Depots	1	0	2	
Lineside	0	0	0	
<b>Total renewals</b>	<b>63</b>	<b>28</b>	<b>40</b>	
<b>Committed and planned enhancements</b>				
CTRL Blockade	6	1	-	
Other	1	0	0	
<b>Total committed and planned enhancements</b>	<b>6</b>	<b>1</b>	<b>0</b>	

<b>Route 6 Forecast activity volumes</b>				
	2004/05	2005/06	2006/07	
Rail renewal (km per year)	27	25	23	
Sleeper renewal (km per year)	18	17	17	
Ballast renewal (km per year)	17	17	15	
S&C renewal (units per year)	19	7	18	

Our maintenance and renewals plans, including enhanced maintenance in lieu of longer-term planned renewals, are targeted at improving performance and quality across the route.

Because a number of factors make the NLL route difficult to operate, there are complex performance issues. Performance initiatives, including enhanced maintenance of key assets, and improvements to some of the margins in the timetable, are being employed to reverse the problems.

In addition, we are implementing improved cyclical access to the track for maintenance and a programme for targeted renewals, especially for track (see below).

## Engineering access

In the past on the North London Line it has not been possible to draw up an adequate cycle of maintenance possessions to maintain the tracks on the heavily congested core route. Historically many planned possessions have been cancelled at short notice due to freight traffic requirements. A compromise solution with some weeknight and additional weekend possessions is currently under discussion with the freight operators.

On the Thameside route, 12-week cyclic maintenance is sustained on weeknights over the direct route between Fenchurch St and Shoeburyness. On the Tilbury Loop maintenance is carried out in twelve 27hr annual possessions over the whole route between Barking and Pitsea.

## Maintenance and renewal

The North London Line was partly modernised in the 1980s and maintenance and renewals are targeted to address specific performance issues such as route structures condition (a large part of the route runs on viaducts and embankments), remedial works to the overhead line structures, track circuit and points failures.

The Thameside route was recently modernised under the London Tilbury and Southend resignalling scheme and thus maintenance and renewals are targeted to address specific performance issues, such as track circuit failures and broken rails.

We are continuing our day-to-day maintenance as before with enhanced maintenance in areas where performance is particularly at risk until long-term planned renewals are undertaken.

### Track

Planned renewals will cover the areas where track geometry needs addressing. Between Gospel Oak and Barking, upgrading the track, drainage and embankments is essential if speeds are to be raised or the route is to carry long-term freight. The work is subject to funding from the SRA.

On the Thameside route the risk of rolling contact fatigue occurring has been mitigated by rail grinding and the installation of lubricators on key curves. This has reduced rail wear and improved track geometry. Track renewals and S&C renewals across the NLL and Thameside routes are directed towards specific targets, including the need to address broken rails, track geometry and wet spots, which will reduce the risk of having to impose speed restrictions. We are completely replacing the track for two miles over the up and down lines at Leyton Midland Road to replace worn components and improve track quality. Other significant site-specific items are detailed in the planned projects summary and diagram.

### Structure

We are currently in the process of risk assessing our embankments and cuttings with a view to prioritising our earthworks programme. To ensure that we have better information on asset condition, we are carrying out earthworks inspections throughout the route.

On NLL whilst we have undertaken some bridge-strengthening works on the Gospel Oak - Barking route in order to remove some of the restrictions for freight, further works will be undertaken to structures and embankments over the period 2004-2007. We are also planning to carry out general refurbishment to Camden viaduct as well as preventative maintenance on the structures between Gospel Oak and Barking.

We will attach ground anchors to the retaining walls at Caledonian Road, which are currently held apart with baulk timbers.

On Thameside general refurbishment is now being carried out on other structures between Fenchurch St and Bow.

We are planning to undertake numerous structure and earthwork renewals across the route to remove the risk of having to impose speed restrictions and significant site-specific items are detailed in the planned projects summary and diagram.

### **Signalling**

On NLL much of the signalling dates from the mid 1980s and thus resignalling is driven by capacity rather than by condition issues. We are, however, undertaking overhaul/renewal of some of the signalling equipment on the route to reduce the risk of train delays caused by equipment failure, with a view to starting full resignalling in 8-10 years time. Site-specific items are detailed in the planned projects summary and diagram.

On Thameside the signalling has recently been completely renewed.

### **Electrification and plant**

The core route on the NLL is electrified with a mixture of third rail, fourth rail and overhead line equipment (OLE). Some of the conductor rail is very old and some renewals have been carried out. The current DC power supply is close to capacity and any proposal to increase the power requirements due to additional or longer trains will need to be thoroughly assessed before increased traffic is permitted to run.

Further renewal of the conductor rail will take place between Camden and Dalston in 2006/07.

We are planning to repair cracked OLE structure foundations on part of the AC electrified section of the route. The cracking has been caused by stray DC currents, which have corroded the holding down bolts in the foundation bases.

The majority of electrification equipment on the Thameside route dates from the 1950s. Following extensive survey work, a continued programme of renewals has been carried out over recent years. However, as some performance issues still remain, we are planning to carry out additional renewals, including alterations to the wire supports, on the main line and Tilbury loop over the next five years, in order to prevent dewirements and speed restrictions.

Our programme of installing secondary insulators to prevent flashovers and damage to the contact wire has been successful.

### **Telecoms**

New cab secure radio base stations are due to be installed to improve coverage on the section of line west of Dalston to provide better operational driver to signaller communication.

Customer information systems renewals are planned across the route, to be implemented in conjunction with the TOC, Silverlink Trains.



## Network Rail managed stations

### *Fenchurch Street*

A concourse enhancement study was completed in 2003/04, intended to improve facilities for passengers and staff. Minor renewals associated with maintaining existing facilities continue.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each strategic route.

## Land implications

There are no land issues currently affecting the North London Lines and the Thameside route and we will be continuing to work closely with Channel Tunnel Rail Link (CTRL) over the use and development of land in the Barking/Ripple Lane and Stratford areas.

We will be involved with the development of the Shellhaven site, located on the Thames Haven branch.

## Other committed enhancements

We have commenced the SRA funded Felixstowe to Nuneaton gauge clearance works along the route from Felixstowe and Harwich to the WCML via Stratford (on the Great Eastern route) and the North London Line (via Primrose Hill). These works will also open up the route from Tilbury and North Thameside, via Forest Gate and Stratford. This work is due to be completed by the end of 2004.

We are working with Union Railways on the enabling works for empty CTRL stock movements over the NLL.

## Route development

We are working with c2c on a replacement ticket office for Pitsea on the Thameside route.

## Emerging issues

The main challenge for the NLL is balancing the competing demands of passenger and freight services in a growing market on a congested route where capacity is severely restricted by signalling headways, low speeds and the number of junctions. As much of the NLL route runs on embankments and viaducts through heavily populated areas, the construction of extra tracks would be both challenging and very expensive. Timetabling options are limited by the current infrastructure, and works to allow the running of longer trains are being considered. Further concerns on this route are the impacts of both the CTRL and East London Line Extension (ELLX) projects.

On the NLL in order to meet growing demand the TOC has recently introduced three additional peak services. In the longer-term, growing demand may lead to an aspiration for the 4tph passenger service to be strengthened from the current 3-cars per train to a formation of four or possibly even 6/8-cars per train. This would require enhancements to the power supply as well as platform extensions.

In order to integrate the proposed ELLX, infrastructure enhancements would be required between Camden and Dalston.

Overall the route continues to perform reasonably well although the traffic mix, signalling headways, low speeds (especially on the Gospel Oak to Barking route) and the number of junctions all make the route difficult to operate.

This is an important freight route and in the longer term freight traffic is expected to double, mainly due to Felixstowe via London traffic and the potential port developments of Bathside Bay on the GE route and Shellhaven on the Thameside route. To achieve this, the signalling system on the NLL would require upgrading, and track and structures on the Gospel Oak to Barking route will also require improvement (see below). Hampstead Heath Tunnel could be regauged for W10 traffic, which would assist in providing a diversionary route to the one currently being cleared via Primrose Hill.

As part of the CTRL project there will be a requirement to allow Eurostar ECS movements between St Pancras (on the Midland Main Line and East Midlands route) and the CTRL North Pole Depot (on the West London Line section of the Brighton Main Line and Sussex route) via the North London Line. We will need to assess the impact these additional moves will have on the existing services.

The opening of a new station at West Ham on the Thameside route caused some reduction in track capacity, because it added a stop on a fast section of line. Whilst options to improve capacity (by respacing signals) have been examined in conjunction with the train operator, the capacity reduction has been addressed in the short term by adjustments to the timetable.

Elsewhere on the route services are limited by the single-track section between Upminster and Grays, which only has one passing loop.

Apart from the peak capacity issue discussed above, key performance issues are the reliability of the OLE, track circuits, broken rails and the effects of vandalism.

As already mentioned above, increased freight traffic between the North London Line and Thameside routes will further impact on the already congested GE route between Forest Gate and Stratford, so freight routeing via Barking - Gospel Oak must remain a strategic option.

In summary, our analysis suggests that the following key steps could be taken to address issues on the route, although some of these will be constrained by available funds:

- in conjunction with SRA, optimise the timetable for passenger and freight services on the NLL;
- develop the Gospel Oak to Barking route to carry more freight services (including W10 gauge traffic);
- extend platforms on the NLL route so the orbital passenger trains can be lengthened to meet rising demand;
- lengthen trains on the c2c route to continue to meet demand within the existing capacity; and
- preserve freight paths on the Tilbury Loop to meet freight demand.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 6 Capacity and operational constraints

- A** Fenchurch Street - Barking: trains stopping at West Ham reduce available capacity
- B** Upminster - Grays: single-line track section with only one passing loop

### Route 6 Other issues on the route

- 1** Hampstead Heath Tunnel Freight gauging issue prevents the use of 9' 6" containers
- 2** Route section would need a major upgrade to allow a diversion of strategic freight flows (to release Forest gate - Stratford capacity, see route 7)

### Route 6 Planned projects

Project description	Type of work	Dev. Level
<b>A</b> 2004/05 Dalston to Hackney track renewal	R	
<b>B</b> 2006/07 Gas Factory branch line track renewal	R	
<b>C</b> 2004/05 Becontree track renewal	R	
<b>D</b> 2004/05 Benfleet track renewal	R	
<b>E</b> 2006/07 Elm Park track renewal	R	
<b>F</b> 2005/06 Thorpe Bay track renewal	R	
<b>G</b> 2005/06 Leyton Midland Road track renewal	R	
<b>H</b> 2004-07 Deep Wharf track and level crossing deck renewal	R	
<b>I</b> 2004/05 Ockendon track renewal	R	
<b>J</b> 2004-07 Camden Road Central and East Junctions S&C renewals	R	
<b>K</b> 2006/07 Kensal Green Junction S&C renewal	R	

## Network Rail

### Route 6 Planned projects

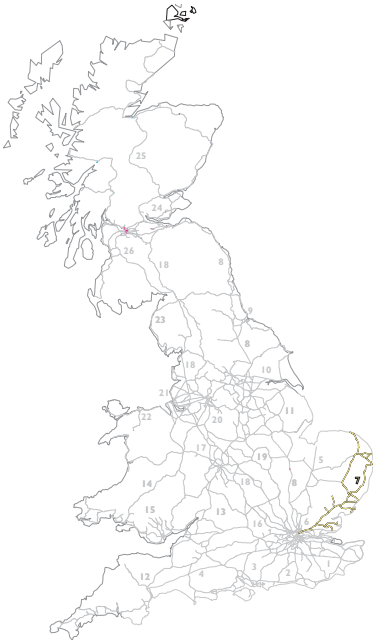
<b>L</b> 2005/06 Victoria Park S&C renewal	R
<b>M</b> 2004/05 Channelsea and Carpenters Road North Junctions S&C renewals	R
<b>N</b> 2004-07 Barking S&C renewals	R
<b>O</b> 2005/06 Gunnersbury Junction S&C renewal	R
<b>P</b> 2006/07 Gospel Oak - Barking embankment renewals	R
<b>Q</b> 2005/06 Camden Viaduct structure renewal	R
<b>R</b> 2005/06 Fenchurch Street to Bow structure renewals	R
<b>S</b> 2004/05 Gunnersbury signalling wire renewal	R
<b>T</b> 2004-07 Highbury rectifier transformer replacement	R
<b>U</b> 2006/07 East Ham EMUD shed heating renewal	R
<b>V</b> 2004/05 Pitsea station Ticket Office renewal and enhancement	R, E 3
<b>W</b> 2006/07 Upminster station rewiring	R
We are commencing the Felixstowe to Nuneaton gauge clearance works along the route from Felixstowe and Harwich to the WCML via Stratford, Camden Road and Primrose Hill, and between Tilbury and Forest Gate Junction via Barking	E 5

# Route 7



# Route 7: Great Eastern

## Route description



### Physical description

The Great Eastern main line runs from London to Norwich and has a number of branches.

The principal components of the route are:

- the main line from London to Norwich. There are four-tracks between London and Shenfield; two-tracks (known as the main lines) have speeds of up to 90mph and two (known as the 'E' lines) have speeds up to 70mph. Beyond Shenfield the line is two-track, with speeds up to 100mph. The main line is 25kV AC electrified;
- branches to Upminster, Southend, Southminster, Braintree, Clacton, Walton and Harwich. The branches to Southend, Clacton and Harwich are double track, the others are single-track. Linespeeds are up to 80mph and these branches are 25kV AC electrified; and
- the Sudbury branch, and the remaining branch lines in Norfolk and Suffolk, including the important freight route between Ipswich and the port of Felixstowe, which is the country's largest container port, and the freight only Sizewell branch. The branches are a mixture of single and double track, with linespeeds up to 60mph.

There is a mixture of signalling technologies on the Great Eastern route ranging from modern SSI, controlled from Liverpool Street IECC at the southern end, to more conventional power signalling between Colchester and Norwich. The rural Norfolk branches are mainly controlled by mechanical or electro-mechanical signalling technologies. The East Suffolk Line is controlled by the radio electronic token block system (RETB) and there is a modified track circuit block system in use on the Norwich - Sheringham branch.

The major modernisation project completed in 1997 created a route capable of delivering up to 24tph during the peak into London from Shenfield over the main lines, and up to 20tph over the 'E' lines between Ilford and London (18tph from Gidea Park). The mix of current stopping patterns and the need to meet the growing demand in commuter traffic uses almost all of the available track capacity.

Due to its age and condition, significant track renewals are needed on the GE main line over the next five years to avoid speed restrictions, which would further impact on the current performance, and more rail grinding is needed to prevent rolling contact fatigue (RCF) from recurring. The signalling on the Clacton branch is nearing the end of its life and resignalling is planned between 2006 and 2009.

Broadly, the route is classified as a third primary, a third rural, a fifth London and south-east and a tenth secondary.

## Market served

The route carries a mixed market of commuters and business and leisure travellers, and substantial freight movements to and from East Coast ports.

## Growth

Passenger demand at peak times is expected to continue growing over the next 10 years and First Great Eastern and Anglia Railways continue successfully to develop their off-peak businesses. Forecasts for employment and population predict growth well above the national average, especially at Southend, Chelmsford, Ipswich and Colchester, and continuing development within Docklands and the future Channel Tunnel Rail Link (CTRL) interchange at Stratford, now under construction, will increase pressure for more services on the route.

Further freight growth is expected over the coming years, in particular in construction materials and inter-modal traffic.

## Current use

### Current traffic

Currently First Great Eastern operates inner and outer suburban services on the southern part of the route, whilst Anglia Railways operate intercity services between London and Norwich, as well as local trains on the branch lines. However, a new Greater Anglia franchise is due to commence in April 2004. This new franchise will combine the current Anglia Railways and First Great Eastern franchises and the West Anglia part of the current WAGN franchise and will provide a single operator of all passenger train services into Liverpool Street station. EWS, Freightliner, GB Railfreight and Direct Rail Services operate freight services on the Great Eastern route.

The number of off-peak train paths available between Shenfield and Colchester is constrained by the mixture of semi-fast, stopping and freight services, such that this part of the route is currently operating at close to track capacity even outside peak hours.

<b>Route 7 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	53,958	4,208	58,166
Train tonne km per year (millions)	4,944	1,129	6,073
Average no of train km per track km per day			97
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
London Liverpool St - Shenfield			680
Shenfield - Colchester			270
Colchester - Ipswich			170
Shenfield - Southend			150
Ipswich - Stowmarket			120

### Projected use

Track capacity is already at high levels of utilisation from Liverpool Street through to Colchester.

Analysis of current loadings shows that the main lines have limited capacity for passenger growth over the high peak hour, if all train paths were to be used and all trains were formed of 12-cars, which is the maximum length supported by existing infrastructure. However, overcrowding would still occur at the very height of the morning peak. In the longer-term, additional growth would need to be addressed with more radical infrastructure based solutions.

The SRA's recent decision to upgrade the freight route from Felixstowe to Nuneaton via the Great Eastern route and London before the cross-county route via Bury St Edmunds, Ely and March on the West Anglia route (see below), will need to be assessed in terms of timetabling and performance issues when the Route Utilisation Strategy (RUS) work is done in 2004.

## Strategic framework for the route

The SRA strategic plan includes the introduction of the Greater Anglia franchise. The SRA is committed to freight growth and gauge clearance via London and RUS work will need to examine the effects of increased freight traffic on the already heavily congested Great Eastern route. The RUS is planned for publication in 2004/05.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 7</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
London - Southend		55min
London - Colchester		45min
London - Ipswich		61min
London - Norwich		1 hr 40min
<b>Linespeed (km of track)</b>		
Up to 35mph		61
40-75mph		462
80-105mph		513
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		559
W7		298
W8		298
W9		3
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		39
20.4 tonnes - 24.1 tonnes (RA 7-9)		190
24.2 tonnes - 25.4 tonnes (RA 10)		807
<b>Total km of track</b>		<b>1037</b>
<b>Total km of route</b>		<b>563</b>

<b>Route 7 Baseline route capability changes</b>				
	Year of change	Current value	New value	Reason for change
<b>Gauge (km of route)</b>				
W9	2004/05	3	146	See note 1
W10	2004/05	-	146	See note 1

Note 1: This change is as a result of the Felixstowe - Nuneaton project, which will increase the gauge on this route between Felixstowe/Harwich and Stratford to W10.

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 7 Forecast expenditure</b>				
£m in 2003/04 prices	2004/05	2005/06	2006/07	
<b>Renewals</b>				
Track	20	45	39	
Structures	14	12	13	
Signalling	13	8	17	
Electrification	2	2	2	
Plant & machinery	0	1	2	
Telecoms	1	2	3	
Network Rail managed stations (London Liverpool St.)	3	1	1	
Stations	3	4	6	
Depots	1	1	1	
Lineside	1	2	2	
<b>Total renewals</b>	<b>58</b>	<b>79</b>	<b>86</b>	
<b>Committed and planned enhancements</b>				
Other	2	0	0	
<b>Total committed and planned enhancements</b>	<b>2</b>	<b>0</b>	<b>0</b>	

<b>Route 7 Forecast activity volumes</b>				
	2004/05	2005/06	2006/07	
Rail renewal (km per year)	53	59	51	
Sleeper renewal (km per year)	47	53	51	
Ballast renewal (km per year)	46	50	45	
S&C renewal (units per year)	-	11	17	

The route is running close to track capacity for most of the day which leads to difficult performance issues. Performance initiatives, including enhanced maintenance of key assets, and improvements to some of the margins in the timetable, are being employed to address the problems.

## Engineering access

We are implementing improved cyclical access to the track for maintenance and a programme for targeted renewals, especially for track. We are planning working time equivalent to seventeen 54hr possessions per year in order to carry out the track renewals programme.



Key junctions and locations require weekend maintenance possessions of 8-12hrs on a 12-week cycle, most notably for S&C maintenance. At Liverpool Street a possession is taken of one-third of the station for 27hrs. The route between Liverpool Street and Shenfield has 6-8hr weeknight possessions of varying frequencies. In addition, discussions are continuing on adjusting the Sunday timetable so that we can have a pair of lines to work on each weekend between Liverpool Street and Shenfield.

The main items of renewal work requiring more than 54hr possessions are:

- Ipswich Tunnel blockade in Summer 2004 (11 July - 5 September 2004);
- Sudbury branch blockade for track works in 2006/07;
- the commencement of major track renewal works on rural routes is likely to see an increasing use of week long blockades, for example a 10-day block in November 2004 between Saxmundham and Oulton Broad North, and a five-day block in October 2005 between Reedham and Oulton Broad North;
- S&C renewals at Shenfield will need major possessions to achieve remodelling between 2005 and 2008;
- reconstruction of the swingbridge at Reedham will take a blockade of several days. This is planned to start in 2006/7;
- week long blockades of the East Suffolk Line for track renewals are being taken each year and are likely to continue until 2011 at least; and
- local authority bridge works also require a four-day block at Widford, south of Chelmsford, at Christmas 2004.

## Maintenance and renewal

Much of the Great Eastern route was modernised under the Great Eastern resignalling scheme, which was completed in 1997. However, the Clacton branch and Colchester interlockings are now outdated and are planned to be resignalled.

The clay sub-strata cause persistent and multiple wet spots on the main line, leading to poor track geometry and hence our track renewals have been targeted here. The overhead line system to Colchester and Southend dates to the 1950s and a sustained component replacement programme is underway to address potential performance issues. In particular, we are retensioning the sections which caused delay in the very hot weather last summer.

We are carrying out enhanced maintenance in areas where performance is particularly at risk until long-term planned renewals are undertaken.

### Track

Due to the condition of the track, especially the number of wet spots on the route, we are concentrating our track renewals on the main line, where there will be an extensive programme of renewals over the next five years which will reduce the likelihood of speed restrictions and will improve track geometry. We will also carry out rail grinding on the main line to prevent RCF from recurring.

The track slab in Ipswich Tunnel will be replaced as part of the Felixstowe - Nuneaton project (2004/05).

Track and S&C renewals across the route are directed towards specific targets, including the need to address broken rails, track geometry and wet spots, which will reduce the risk of having to impose speed restrictions. From 2005-2008 we are replacing both the country end and London end junctions at Shenfield, which will reduce the risk of the S&C units failing and causing train delays. Other significant site-specific items are detailed in the planned projects summary and diagram.

### Structures

We are currently carrying out risk assessment of our embankments and cuttings with a view to prioritising our earthworks programme. We are targeting known risk sites on the Southend Victoria and Harwich branches and are also developing schemes for major renewals. To ensure that we have better information on asset condition, we are carrying out earthworks inspections throughout the route.

We are planning to undertake numerous structure and earthwork renewals across the route to remove the risk of having to impose speed restrictions and significant site-specific items are detailed in the planned projects summary and diagram.

### Signalling

The signalling on the route is relatively new, with the area as far as Marks Tey being controlled from Liverpool Street IECC. The area between Colchester and Norwich is controlled from Colchester panel, which was installed in the mid 1980s.

The Clacton branch is due to be resignalled between 2006 and 2009 and in conjunction with this work, we are planning to complete the resignalling of the Great Eastern main line between Marks Tey and Colchester, including extending the simplified bi-directional signalling system.

In order to address problems with signalling power supplies, we have fitted uninterruptible power supplies (UPS) to this equipment. We are also in the process of developing and fitting a new type of hot axle box detector (HABD) on the route, in order to reduce the incidence of false alarms.

We are planning to undertake numerous signalling and level crossing renewals across the route to reduce the risk of the old equipment failing and causing train delays and significant site-specific items are detailed in the planned projects summary and diagram.

### Electrification and plant

Most of the overhead line equipment (OLE) as far as Colchester and Southend dates from the late 1950s. Much of it is compound equipment and, whilst the condition of the contact wire is not currently giving cause for concern, historic maintenance has been generally inadequate and we are continuing with our policy of carrying out component changes via routine maintenance. We intend to carry out retensioning to the OLE wire in order to reduce the risk of de-wirements and delays in hot weather.

We are also finalising the development of our plans for the renewal of the electrical control room (ECR) at Romford.

We are planning to undertake several electrification and plant renewals across the route to further reduce the risk of the current equipment failing and causing train delays and significant site-specific items are detailed in the planned projects summary and diagram.

## Telecoms

A programme is already underway for the renewal for DOO CCTV assets on the route, which will be completed by the end of March 2004. This will provide each location with a robust system for train despatch that will improve passenger safety and operational performance.

We are planning to carry out life extension works in 2005/06 and 2006/07 to the telecoms bearer for the existing East Suffolk RETB system, which is nearing the end of its life. This work will be completed in conjunction with the signalling led renewals strategy.

## Network Rail managed stations

### *London Liverpool Street*

The announcement that the UK is to compete to host the 2012 Olympic Games in East London, and of the proposed expansion of Stansted Airport, could have a significant impact on the station and we shall be working with the SRA to address the implications.

## Depots

The only issue affecting depots concerns removal of and protection against oil contamination.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

## Land implications

Our virtual quarry and track renewals depot is vacating Temple Mills to make way for the Channel Tunnel Rail Link depot. We are currently relocating the depot to Whitemoor, near March.

## Other committed enhancements

We are now carrying out physical works to introduce W10 gauge freight traffic along the route from Felixstowe to the WCML via Ipswich, Stratford and the North London Line via Primrose Hill. These works will also open up the route from Tilbury and North Thameside via Forest Gate and Stratford, to the W10 network. This work, which also involves clearing the route from Harwich to Manningtree to allow W10 access to/from the Bathside Bay port development, is planned for completion in late 2004.

## Route development

We are continuing to develop future use of the congested main line between passenger, and freight services, which will be addressed as part of the SRA's RUS work.

## Emerging issues

The main challenge for the Great Eastern is meeting the aspirations of our stakeholders for growth, driven by Stratford in particular. In the absence of additional tracks in the corridor, longer trains and lengthened platforms would alleviate passenger overcrowding during the peak hours. Increasing demand for off-peak freight paths will continue to affect the route following the commencement of the Greater Anglia Franchise.

Trains on the 'E' Lines between Liverpool Street and Shenfield are typically 8-cars in length and currently have a higher load factor in peak periods than that of trains on the main lines, which are usually 12-cars in length. Scope to run up to 20tph exists inwards of Ilford on the 'E' lines but this would only partially address overcrowding. Useful additional track capacity may be achievable if an additional turnback facility was to be provided in the Goodmayes/Chadwell Heath area. This enhanced capacity would be expected to satisfy passenger growth in the medium-term.

Elsewhere on the route, services are limited by single-track sections on the Braintree branch, Southminster branch and between Halesworth and Oulton Broad. The length of Acle passing loop also restricts capacity. Signalling headways and single-line sections on many of the branch lines mean that additional loops and signalling alterations are required in a number of areas, if service frequencies are to be increased.

Our analysis suggests that the following steps would address issues on the route:

- train lengthening and stopping patterns adjustment to maximise available peak passenger capacity;
- signalling alterations to allow more stops at Stratford on the main line to facilitate interchange with the Docklands services;
- improvements to meet local development, subject to funding and agreement with the SRA and developers. These are currently considered to include the Braintree Branch improvements, a new station and passing loops east of Chelmsford and an additional platform at Colchester Town;
- improvements to the branch lines, which will depend on funding being available; and
- clearing and upgrading the cross-country route (Route 5) from Haughley Junction to Peterborough via Bury St Edmunds, Ely and March, to allow diversion of freight traffic away from the GE main line.

In the long-term, it is possible that slow line track capacity would be enhanced under the Crossrail scheme, which would ease capacity constraints between Stratford and Liverpool Street.

Reliability of older rolling stock types is also an issue on the route, although the recent introduction of class 360 EMUs and class 90 locomotives should improve the situation. However, the higher power requirements of the modern class 360 EMUs leave little spare power capacity in the traction supply system. Therefore, strengthening of power supplies would be required if further class 90 locomotives or class 360 EMUs are deployed on the route in the future.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 7 Capacity and operational constraints

<b>A</b>	Acle: passing loop length restricts capacity
<b>B</b>	Halesworth - Oulton Broad: single-track section with no passing loops
<b>C</b>	Braintree Branch: single-track section with no passing loops
<b>D</b>	Shenfield - Colchester: intensively used track section almost at capacity
<b>E</b>	Southminster Branch: single-line with only one passing loop
<b>F</b>	Forest Gate - Stratford: conflicting routes of passenger and freight trains
<b>G</b>	Liverpool Street - Bethnal Green: lines almost at capacity

### Route 7 Other issues on the route

<b>I</b>	Ipswich - Haughley Junction: would need a major upgrade to facilitate a strategic freight route
<b>J</b>	Ipswich Tunnel: gauging issue for 9' 6" containers

### Route 7 Planned projects

Project description		Type of work	Dev. Level
<b>A</b>	2006/07 Sheringham track renewal	R	
<b>B</b>	2005/06 Beccles - Oulton broad track renewal	R	
<b>C</b>	2005/06 Middleton track renewal	R	
<b>D</b>	2004/05 Weston Curve track renewal	R	
<b>E</b>	2004/05 Willow Marsh track renewal	R	
<b>F</b>	2004-07 Ardleigh track renewal	R	
<b>G</b>	2004-06 Bethnal Green and Bow track renewals	R	
<b>H</b>	2004/06 Shenfield - Chelmsford track renewals	R	
<b>I</b>	2004/05 Crockleford track renewal	R	
<b>J</b>	2006/07 Dunstons track renewal	R	

## Network Rail

### Route 7 Planned projects

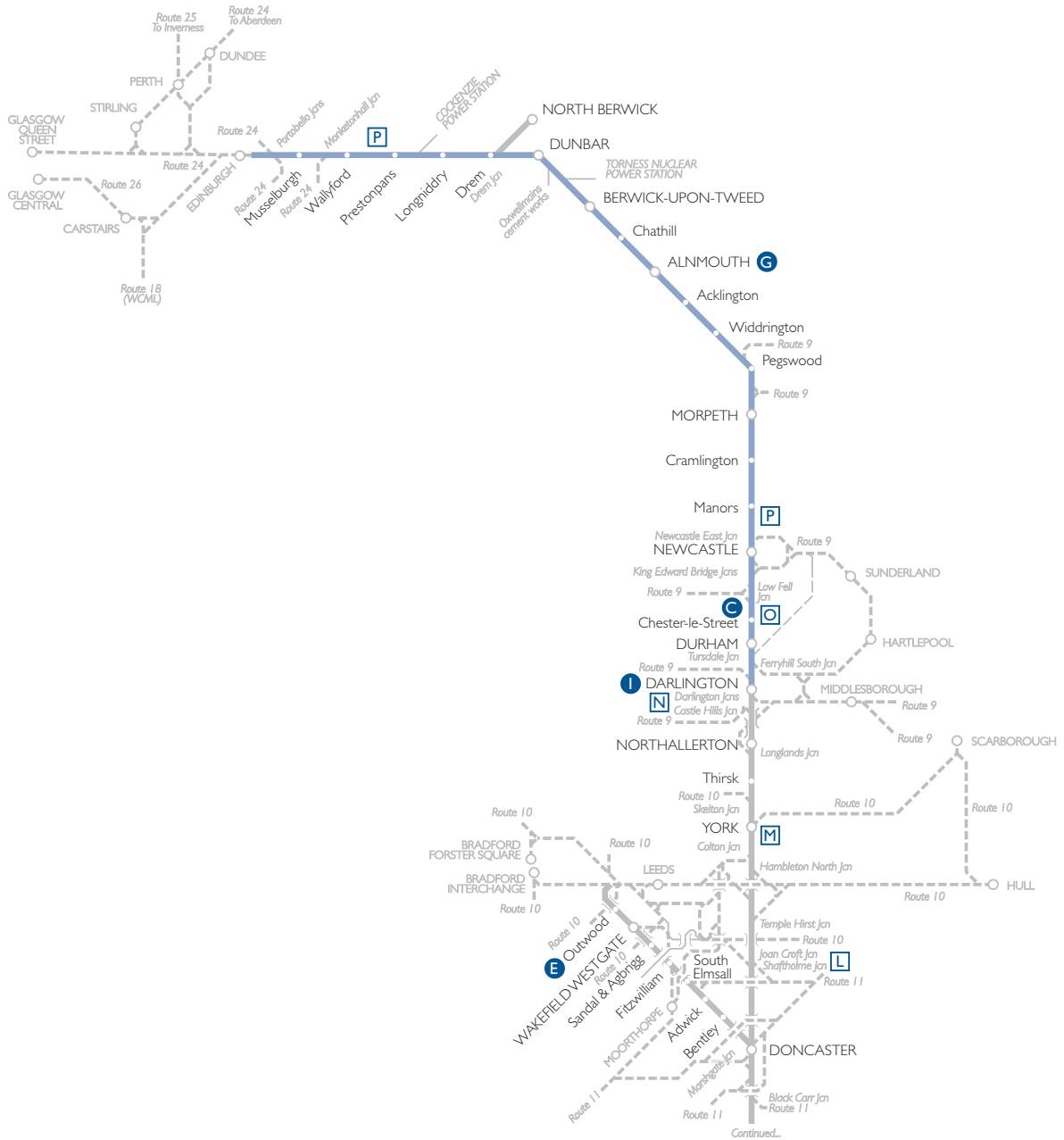
Project description		Type of work	Dev. Level
<b>K</b>	2005/06 Flordon track renewal	R	
<b>L</b>	2005/06 Forest Gate track renewals	R	
<b>M</b>	2004/05 Ipswich Tunnel blockade track renewal	R, E	5
<b>N</b>	2004/05 Marks Tey track renewal	R	
<b>O</b>	2005/06 Marsh Lane track renewals	R	
<b>P</b>	2005/06 Needham Market track renewal	R	
<b>Q</b>	2004-07 Shenfield - Southend Victoria track renewals	R	
<b>R</b>	2005-07 Sudbury branch line track renewals	R	
<b>S</b>	2006/07 Pork Lane track renewal	R	
<b>T</b>	2006/07 Colchester South Junction S&C renewal	R	
<b>U</b>	2005/06 Ilford down avoiding line entry S&C renewal	R	
<b>V</b>	2004-06 Liverpool Street throat S&C renewals	R	
<b>W</b>	2005-07 Shenfield London and country end Junctions S&C renewals	R	
<b>X</b>	2005/06 Southminster station S&C renewals	R	
<b>Y</b>	2004-07 Manningtree earthworks renewal	R	
<b>Z</b>	2004-06 Thrandeston Bog, near Diss, earthworks renewal	R	
<b>AA</b>	2004-07 Ramsden Bellhouse earthworks renewal	R	
<b>AB</b>	2005/06 Victoria Road, Diss structure renewal	R	
<b>AC</b>	2006/07 Somerleyton swingbridge structure renewal	R	
<b>AD</b>	2004-07 Bishopsgate Tunnel structure renewal	R	
<b>AE</b>	2006/07 Wroxham viaduct structure renewal	R	
<b>AF</b>	2004/05 Baylham AHB level crossing renewal	R	
<b>AG</b>	2004-06 Colchester TD & TDM signalling renewal	R	
<b>AH</b>	2004/05 Brundall signal safety works	R	
<b>AI</b>	2004-07 Lowestoft-signalling interlocking renewal	R	
<b>AJ</b>	2005-07 Oulton Broad North signalling interlocking and level crossing renewal	R	
<b>AK</b>	2006-09 Colchester - Clacton branch resigalling	R	
<b>AL</b>	2006/07 Saxmundham signal box renewal and RETB East Suffolk branch renewal	R	
<b>AN</b>	2004/05 Southminster SSI renewal	R	

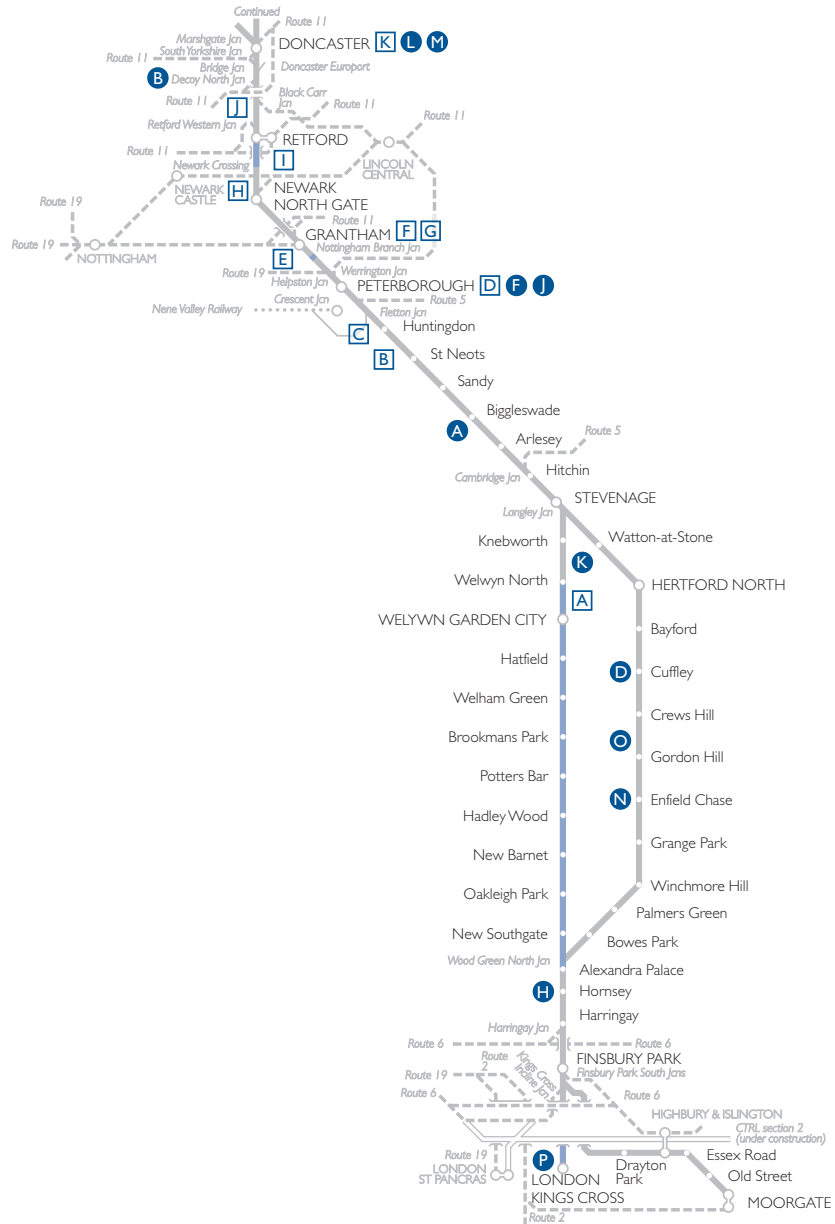
## 2004 Route Plans

### Route 7 Planned projects

	Project description	Type of work	Dev. Level
AN	2004-06 Romford ECRO electrical control location renewal work stream	R	
AP	2005-07 Ilford EMUD shed heating and lighting renewals	R	
	We are continuing the Felixstowe and Harwich to Nuneaton gauge clearance works along the route from Felixstowe to the WCML via Ipswich and Stratford	E	5

# Route 8







# Route 8: East Coast Main Line

## Route description



### Physical description

The East Coast Main Line (ECML) is the high-speed link carrying Britain's fastest domestic train service between London, Yorkshire, the North East and Edinburgh, linking into Scotland's prime routes to Glasgow, Aberdeen and Inverness. It also handles cross-country, commuter and local passenger services and carries considerable freight traffic. The route is therefore important to the economic health of many regions of Great Britain.

The principal components of the route are:

- the main line from Kings Cross to Leeds and Edinburgh, with a branch from Moorgate and a loop via Hertford North. Apart from the Welwyn area and the section south of Peterborough, the southern part of the ECML has four-tracks. From Peterborough to Doncaster 30% of the route contains three or four-tracks, and north of Doncaster the route is primarily two-track except for the section from Colton, south of York to Northallerton. The fast lines generally permit 125mph speeds, with slow lines at 60-80mph; and
- the single-track branch from Drem to North Berwick, with a linespeed of 50mph.

The route is electrified throughout and was last modernised in the late 1980s.

The two-track sections at Welwyn and between Huntingdon and Peterborough and between Northallerton to Newcastle are operating at or just below capacity at peak times during the day.

On this route 90% of the area is controlled by six main PSBs, 10% by smaller PSBs between Morpeth and Tweedmouth. Some level crossings and sidings are controlled locally.

Almost all of the route is classified as primary with the rest a mix of secondary, London and south-east commuter and freight only.

## Market served

This electrified high volume, high-speed link between London, Yorkshire, north-east England and Edinburgh, carries the fastest domestic passenger train services in the UK. These are mixed with cross country, commuter and local passenger traffic as well as a large volume of freight traffic. The latter is particularly prominent over the Yorkshire and north-east part of the route.

## Growth

Over the next 10 years it is anticipated that the growth in passenger numbers using trains on this route will continue, reflecting the travel time advantage of rail over an increasingly congested road network.

## Current use

### Current traffic

The train operating companies who provide services over this route are Great North Eastern Railways, Hull Trains, Virgin Cross Country, Arriva Trains Northern, Central Trains, West Anglia and Great Northern, Anglia Railways, ScotRail, First North Western, Midland Mainline, TransPennine Express, West Coast Railway Co, EWS, Freightliner, Freightliner Heavy Haul, Direct Rail Services GB Railfreight and Advenza Freight.

The normal week-day operation sees long distance trains operating in and out of Kings Cross at the rate of 3/4tph (2tph to/from the north-east and Scotland and 1/2tph to/from Leeds). There are also occasional services to points off the route, including Hull and destinations in West Yorkshire. Overlaid on these trains is an extensive commuter operation south of Peterborough including to/from Cambridge and Kings Lynn via Royston. An inner suburban operation also operates in/out of Moorgate running as far north as Welwyn Garden City, Letchworth and Hertford North.

A number of provincial express and rural passenger services cross the ECML at Peterborough and between Peterborough and Doncaster. North of Doncaster there are two long distance cross-country express services per hour as far as Newcastle with one an hour running to Scotland. PTE and other local services also serve Doncaster, York, Darlington, and Newcastle. The Trans-Pennine inter-urban operation also crosses the ECML at Doncaster and runs along it from York to Middlesbrough and Newcastle.

The leg from Doncaster to Leeds also carries an hourly cross-country express train north of South Kirkby (near Wakefield) as well as the occasional St. Pancras - Leeds train alongside a frequent local PTE train operation.

The ECML has an extensive freight train operation. Little freight runs from end to end of the route. The little that does, tends to carry time sensitive products in premium timetable slots. Less time sensitive bulk commodity traffic runs along various portions of the route, key among these being coal, building materials, steel and aggregates in various flows to Humberside, West Yorkshire, Teesside and Tyneside (and between combinations of these places). Container traffic from Felixstowe is also a growing business.

<b>Route 8 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	99,399	17,877	117,276
Train tonne km per year (millions)	5,072	12,670	17,743
Average no of train km per track km per day			96
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
London Kings Cross - Welwyn Garden City			480
Welwyn Garden City - Hitchin			370
Colton Junction - York			300
Peterborough - Helpston Junction			260
York - Northallerton			210

## Projected use

Passenger demand is expected to increase the most on London suburban and inter-urban regional services. The former will cause the greatest pressure on the system. We anticipate an increased demand for more capacity at peak commuter times (when the system is already working at capacity) as a result of increasing London employment. If the Thameslink upgrade scheme goes ahead it could accommodate much of this increased demand.

On the provincial inter-urban services there is scope to run longer trains. This is a stated objective of First Keolis, the new franchisee for the TransPennine franchise.

It is anticipated that the greatest growth area for freight will be in the time sensitive distribution end of the market and in container traffic. We expect that short-term planned bulk commodity flows will remain an important traffic for the route, particularly in Yorkshire, where the closure of the Selby coalfield and changes in the steel industry will create a change in freight train flows with increased impact on the ECML.

## Strategic framework for the route

We have been working with the SRA, which is producing a strategy for the route. This is planned for public consultation in the spring of 2004 with final publication later in the summer.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 8</b>		<b>Current route capability</b>	
<b>Journey times</b>			<b>1 April 2004</b>
Kings Cross - Peterborough			44min
Kings Cross - Hertford North			41min
Kings Cross - Leeds			2hr 2min
Kings Cross - Doncaster			1hr 26mins
Kings Cross - York			1hr 45mins
Kings Cross - Newcastle			2hr 38min
Kings Cross - Edinburgh			4hr 7min
Moorgate - Hertford North			40min
Moorgate - Welwyn Garden City			31min
<b>Linespeed (km of track)</b>			
Up to 35mph			134
40-75mph			548
80-105mph			482
110-125mph			1013
<b>Gauge (km of route)</b>			
W6A			841
W7			841
W8			841
W9			653
W10			-
<b>Axle weight (km of track)</b>			
Up to 20.3 tonnes (RA 1-6)			1113
20.4 tonnes - 24.1 tonnes (RA 7-9)			832
24.2 tonnes - 25.4 tonnes (RA 10)			232
<b>Total km of track</b>			<b>2177</b>
<b>Total km of route</b>			<b>841</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 8 Forecast expenditure</b>				
<b>£m in 2003/04 prices</b>		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
<b>Renewals</b>				
Track		50	37	55
Structures		5	8	10
Signalling		12	6	6
Electrification		6	7	6
Plant & machinery		3	0	1
Telecoms		0	0	1
Network Rail managed stations (London Kings Cross)		7	7	17
Stations		0	0	-
Depots		1	1	1
Lineside		0	-	-
<b>Total renewals</b>		<b>85</b>	<b>66</b>	<b>97</b>
<b>Committed and planned enhancements</b>				
Doncaster Interchange		1	1	0
ECML Improvement Schemes		9	-	-
ECML Performance Schemes		1	-	-
Other		4	3	1
<b>Total committed and planned enhancements</b>		<b>14</b>	<b>3</b>	<b>1</b>
<b>Route 8 Forecast activity volumes</b>				
		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
Rail renewal (km per year)		58	37	54
Sleeper renewal (km per year)		35	22	37
Ballast renewal (km per year)		38	23	45
S&C renewal (units per year)		26	25	30

## Engineering access

The present day access arrangements on the main line are:

- 4-7hrs midweek nights depending on the location for low-level maintenance. In some places access is less than this;
- 8-14hrs at weekends for heavy maintenance/low-level renewal; and
- recently there has been some move to periods of up to 54hrs for heavy maintenance/low/major renewal, as many stakeholders recognise the savings available and the lesser overall disruption of such an approach.

We propose the following for the future:

- 7-9hr cyclical midweek nights for maintenance and low-level renewal;
- 8-16hrs at weekends for heavy maintenance/low-level renewal, with occasional periods of up to 30hrs; and

- fifty four 80hr discrete weekend possessions varying in number by year to accommodate major renewals. This builds on the developing current practice, but the aim will be to minimise the number of interventions by maximising the activity within each long possession.

The two fundamental underlying principles here are:

- cyclical midweek night (Mon/Tue to Thu/Fri or Fri/Sat) access - This recognises a 6-week cycle of access with possession being taken in turn on a weekly basis along stretches of the line with a route through or around retained in most cases. Wherever possible two adjacent tracks will be blocked with, in some cases on two-track sections, the closure of one line and single-line working on the other. However, the policy does not apply on some stretches where adequate diversionary capacity does not exist for the traffic (i.e. Stoke to Newark, Doncaster to Shaftholme, Ferryhill to Newcastle, Berwick Upon Tweed to Edinburgh, and South Kirkby to Hare Park (near Wakefield)). Maintenance here will be confined to weekends (Sunday night/Monday morning), every weekend. This will comprise of closures of up to 7hrs for maintenance and low-level renewals; and
- extended weekend possessions - The efficient engineering access work undertaken by us with ORR and SRA has concluded that, wherever possible, an engineering job should be completed in one go (i.e. one long possession rather than a series of shorter ones). It is cheaper to do it this way and the quality of the final product is more readily assured. It is recognised that there are revenue implications of customer disruption during the works. However, analysis shows that the cost savings outweigh the revenue losses.

There is considerably more scope to combine works along a piece of route in one 54hr possession rather than shorter ones. Hence, there is an associated aim to take fewer possessions but to do more in them.

The main items of renewal work (on the mainline) identified as requiring 54hr (or longer) possessions are:

- renewal of Doncaster Decoy S&C in May 2004;
- renewal of Cuffley ground frame S&C in 2004/05;
- renewal of Biggleswade S&C in 2004/05;
- renewal of Peterborough Interlocking in 2004/05 (Christmas 2004);
- renewal of S&C at Doncaster station 2005/06;
- renewal of S&C at Woolmer Green in 2005/06;
- renewal of S&C at Digswell in 2005/06;
- renewal of an underbridge between Balne Lane and Leeds two 52hr possessions; and
- track renewals between Hitchin and Peterborough requiring three 54hr possessions.

There is a need for the provision of diversions on the Hertford Loop (up to 100hrs) when track renewals are undertaken at Hadley Wood.

Where long occasional 54hr possessions are not appropriate for renewals, we are proposing longer regular weekend closures over Saturday night/Sunday morning. The period of closure varies but is up to 8hrs between Kings Cross and Peterborough, up to 11hrs Peterborough to York, up to 9hrs between Doncaster and Leeds, 16hrs between York and Northallerton (with up to two lines blocked and the remaining lines open) and up to 8hrs from Northallerton to Newcastle and finally 11hrs north of Newcastle to Edinburgh. The proposal includes creating a coordinated pattern of closures to ensure trains can start running on Sunday mornings at similar times to today, albeit with a degree of diversionary operation up until late morning/early afternoon.

In general, the overall proposal requires some early morning and late evening trains to be diesel-hauled and retimed for diversionary purposes. The following diversionary routes would be used; in some cases some work will be required to them to ensure they remain fit for that purpose:

- Newark - Doncaster via Swinderby;
- Shaftholme - Colton;
- Northallerton - Ferryhill (Stillington Branch);
- Darlington - Eaglescliffe;
- Norton - Newcastle via the Durham Coast;
- Newcastle - Carlisle; and
- Doncaster - Leeds/Wakefield container terminals via Shaftholme and Knottingley.

## Maintenance and renewal

### Track

The route is predominantly a two-track railway with sections of four-tracks. The main/fast lines are, with the exception of one length, all CWR, whilst the slow lines still have a small number of jointed track sections.

Track renewals are targeting pre 1970s rail and life expired concrete sleepers together with any remaining sections of hardwood sleepers. Midlife reballasting is being undertaken where track geometry is declining.

The plain line renewals planned will replace worn out components, improve track geometry and performance and reduce the likelihood of TSRs. Major track renewals are planned at Langley Junction near Stevenage, in the St. Neots area and between Darlington and Durham in 2004/05 and at Bytham between Peterborough and Grantham, Newark and at Beningborough (near Thirsk) in 2005/06.

The current age profile of S&C reflects the modernisation programmes that took place during the 1970s and later. Renewals of critical junctions will continue in the coming years.

During 2004/05 key S&C renewals are planned at Biggleswade, Doncaster Decoy, and Cuffley and in 2005/06, at Digswell, Woolmer Green and Doncaster station. S&C renewal at Chevington and Beal, between Newcastle and Berwick is planned for 2006/07.

## Structures

Various locations across the route have been identified for attention as part of our structures renewals plan, including an ongoing programme of preventative maintenance, repairs and strengthening to bridges, culverts, cuttings and embankments. An underbridge between Doncaster and Leeds is planned for renewal in 2004/05. Major repairs and strengthening works are planned to an overbridge between Durham and Newcastle in 2006/07. Major strengthening works are planned to a bridge spanning the River Don near Doncaster and repairs are also planned to an underbridge near Grantham and in Peascliffe Tunnel between Grantham and Newark in 2006/07.

We are continuing with the risk assessment of embankments and a programme of embankment stabilisation is being developed. This includes embankment stabilisation at Overton near York, in 2004/05 and 2005/06, on the Hertford Loop at Enfield and Cuffley in 2005/06, and at Gordon Hill in 2006/07. This will reduce the risk of speed restrictions.

## Signalling

A major project is being implemented at Edinburgh Waverley to renew the wiring in the signal interlocking which will improve the reliability of signalling at this important location.

In order to maintain safety and current network capabilities we are planning to renew elements of the signalling system at Peterborough between 2004 and 2006 and between Kings Cross and Alexandra Palace, and at Doncaster, in 2004/05. Further signalling renewal work is planned at Hitchin in 2005/06.

## Electrification and plant

We are carrying out routine renewal of overhead line electrification equipment (OLE) and standby generators throughout the route. This includes protection relay renewal between Hitchin and North Muskham (near Newark) between 2004 and 2007.

Further works are planned to address performance problems associated with OLE; these are described in the Performance section below.

The installation of switch heaters on the route to prevent freezing of points in cold weather is virtually complete.

Between Kings Cross and Hitchin the pulley wheels and balance weights to maintain OLE tension are being renewed in 2004/05 with completion in early 2005/06. Insulator renewals will be undertaken over a two-year period starting in 2004/05. OLE structure renewal on the Hertford Loop is planned to be undertaken in 2005/06 together with the renewal of the OLE transformer at Queensland Road on the Northern City Line.

Bounds Green depot shore supplies is planned for renewal in 2004/05 and Hornsey depot wheel lathe is planned for renewal in 2005/06.

## Telecoms

A number of telephone concentrators at the major signalling control centres are nearing the end of their operational life and renewals are planned for Peterborough in 2004/05, Doncaster in 2005/06 and Kings Cross in 2006/07. As part of these renewals fixed telecoms network synergy works are being implemented to support the renewal of these assets and provide efficiencies in delivery.



The Great Northern area DOO CCTV system renewal project will be completed in 2004/05. This will provide each location with a robust system for train despatch that will improve passenger safety and operational performance.

### Network Rail managed stations

#### *London - Kings Cross*

Kings Cross will continue to be affected by the adjacent London Underground and Channel Tunnel Rail Link (CTRL) work, which has resulted in disruption to passengers using this important London terminus. We will continue to seek to minimise the impact of these significant construction projects on all users of our facilities at Kings Cross station.

Design work for a new station concourse is continuing. The options for funding the new concourse are under review and when completed would enable a planning and listed building application to be submitted possibly during 2004. The proposed platform Y could be delivered in advance of the new concourse, however, the Borough of Camden require the planning and listed building application to be submitted concurrently. The DfT have recently announced a review of the proposal to provide a new LUL underground concourse and connecting passageways as part of the CTRL project. We are participating in this review which has implications for our own new concourse which was to be located directly above it.

Meanwhile design work on the renewal and refurbishment of the original station structures continues. All work at the station will be coordinated to minimise disruption and could start in 2005/06.

### Other stations

The plan gives greatest priority to maintaining safety and current operational capacity. We are currently planning to carry out a mix of maintenance and renewal across the route. Key works are illustrated below:

- Autumn 2004 will see the completion of the five year programme to refurbish Newcastle staff accommodation in keeping with the building's grade one listed status;
- works at Darlington station will see rationalisation of the heating systems, new lighting and barrel roof repairs in 2004/05 and 2005/06;
- Alnmouth platform rebuild will be completed during 2004/05;
- York station platform 7–9 canopy repairs will be undertaken in 2005/06 followed by the renewal of the waterproofing material to the station barrel roof in 2006/07;
- Wakefield Westgate station platform repairs and lighting renewal is planned for 2005/06; and
- Welwyn Garden City station footbridge will be refurbished and strengthened in 2006/07.

### Depots

Hornsey depot will see the installation of a new heating system in 2004/05.

At Ferme Park, refurbishment is planned to the depot lighting and fuelling point in 2005/06.

At Bounds Green repairs to the maintenance shed are planned to be undertaken in 2006/07.

### Other operational property

Work will continue to refurbish signal boxes to maintain and improve the working environment for employees.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The key performance issue on this route is accommodating the current traffic levels and the mix of high-speed passenger, stopping local passenger services and heavy freight services whilst allowing more engineering access for maintenance and renewal in particularly at those locations where infrastructure is operating at or near to full capacity. As stated above, it is recognised that there is a need for more access to maintain and renew these assets to maintain performance.

A major cause of delay on the route is the failure of the OLE system. There is evidence of localised failure of the wire, possibly initiated by out of range energy flows and potential imbalance between the contact and catenary wire system. The long-term asset strategy for the route is based upon designing out known flaws and targeted replacement of catenary and or contact wire followed up by enhanced maintenance following any remedial works. This repair work will be initially targeted at known trouble spots between North Muskham and Claypole (near Newark) in both directions.

Special six-man asset care teams are being introduced. In particular, these will be trained to inspect OLE and report back emerging issues. They will be based at strategic locations along the ECML and also focused on junction and track circuit maintenance aimed at reducing by up to 20% the level of train delay experienced on the route.

Investigations are underway to seek to match overhead line isolations with possession limits/lockout sections to improve overall maintainability.

As part of a corporate national initiative, called the '100 Critical Junctions Project', we are undertaking a high intensity asset stewardship campaign at 82 critical point ends. This will enable improvements in performance, of about 10,000 minutes for this year (2003/04) together with safety improvements by fixing track geometry alignment problems, which have, in the past, been a factor in the propagation of rolling contact fatigue at S&C.

Regular track tamping and rail grinding will also reduce the risk of track wear and rolling contact fatigue.

The upgrade of the Hertford Loop as a diversionary route aims to improve capacity of the route and make it a more robust alternative in the event of blockages on the East Coast Main Line between Wood Green Junction and Langley Junctions. This includes replacing jointed track with CWR, upgrading certain booster transformers and protection relays, and modifying return conductors on the OLE system. Further work to improve performance includes embankment stabilisation works and embankment reprofiling to reduce or remove the risk of temporary speed restrictions at known high-risk sites and the provision of additional weather/wind monitoring stations. This latter work will allow more localised implementation of speed restrictions, which are imposed in high winds to reduce the risk of overhead line problems.

Our Area Delivery Groups are continuing to work up and carry out their annual programmes of numerous small value targeted performance improvement schemes across the route. This programme includes upgrading and renewing fencing and vegetation clearance to reduce the risk of route crime and train delay and improve performance. Drainage works between York and Thirsk were completed in December 2003 to reduce the risk of further train delays.

## Enhancements

A number of schemes continue to eliminate user worked level crossings along the route. In particular, this includes two level crossings south of York and a number north of Newcastle.

## Land implications

There are no major land issues on the route except in relation to planned developments adjacent to the stations at Peterborough and Wakefield Westgate. In both cases, the industry is seeking to work collaboratively with potential developers of adjacent sites (and in some cases of railway land) in order to secure a solution that is beneficial overall to the development and to the railway itself.

## Other committed enhancements

We are committed to deliver enhancement schemes funded by others as follows:

- Allington Chord - this is an SRA funded scheme scheduled for completion in 2005. Details regarding the scheme can be found in Route 11. It will provide a means for east/west services to/from Skegness to access Grantham station without the current need to occupy slots on the ECML;
- St. Neots car park - facilitation of work by train operator to extend car park;
- Channel Tunnel Rail Link - facilitation of various works in the Kings Cross area to enable this key project to successfully progress to completion;
- Doncaster station Interchange; and
- London suburban stations - customer information systems upgrade.

## Route development

We continue to work with the SRA in developing the proposals to improve capacity and performance of the route. In addition, a number of schemes at stations and elsewhere are being considered with, and funded by, train operators and others (including local authorities). These include:

- Darlington - new interchange facility for coach service to Tees-side Airport;
- York - improvements to station frontage and extension of footbridge to create new access from rear of station;
- Shotton (between Newcastle and Morpeth) - potential new coal loading facility;
- Berwick-upon-Tweed - improvements to station access road;
- Wakefield Westgate - potential redevelopment of station area;
- Morpeth station - improved access;
- Alnmouth - general station improvements; and

- York - new depot to service trains proposed to be introduced as part of the new First Keolis Trans-Pennine franchise.

The Thameslink 2000 proposals include infrastructure enhancements and service changes affecting locations on this route. The current status of the project is described in detail within the major projects Section 3.

## Emerging issues

Much of the route currently operates at or just below capacity for much of the day. This is against a background of steady growth in demand by both passengers and freight. In line with the Capacity Utilisation Policy of the SRA and against a backdrop of limited funding availability the immediate strategic objective is to try to make the route operate more efficiently with minimal enhancement to the infrastructure. There is also evidence that train performance on the route is suffering through an imbalance between train running and access for maintenance and renewal.

The route has capacity constraints at a number of key locations including:

- Kings Cross - the 11 platforms are fully utilised at peak times;
- Holloway - Alexandra Palace - six tracks at full capacity in the peak;
- Welwyn - two-track section constrains capacity and exacerbates delays in perturbed running;
- Hitchin - at grade junction to/from Cambridge line creates capacity constraint and again exacerbates delays;
- Peterborough - Doncaster - with only five platforms at Peterborough, routeing of trains can become constrained and operations can easily become perturbed. In addition, there is little scope to run any further trains. This also applies to the two-track section between Peterborough and Doncaster which sees a mixture of fast and slow passenger services interspersed with occasional freight traffic;
- Doncaster - while there is more flexibility here, there exist similar issues to Peterborough;
- Doncaster - Leeds - on this two-track section a high degree of performance time loss is caused by the combination of fast and stopping trains and the fact that (particularly in the down-northbound - direction) a number of long distance train services join the route and create reactionary delay if they are running late; and
- York – four-tracks reduce to three in the southern approaches to the station.

To enable performance improvement and to allow modest increases in numbers of trains to meet at least some of the anticipated demand, the SRA Route Strategy has identified a number of potential solutions including both timetabling and a series of schemes.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 8 Capacity and operational constraints

<b>A</b>	Alexandra Palace to Welwyn: tunnel aerodynamics and curvature
<b>B</b>	Offord: curvature
<b>C</b>	Stilton Fen Ground Conditions
<b>D</b>	Peterborough: curvature, vertical alignment
<b>E</b>	Stoke Tunnel: tunnel aerodynamics
<b>F</b>	Grantham: curvature
<b>G</b>	Peascliffe Tunnel: tunnel aerodynamics
<b>H</b>	Newark: track alignment at flat crossing
<b>I</b>	Gamston - Retford: curvature and location of S&C
<b>J</b>	Bawtry: curvature
<b>K</b>	Doncaster: sub-standard track intervals and curvature
<b>L</b>	Shaftholme Junction: location of S&C
<b>M</b>	York: sub-standard track intervals and curvature
<b>N</b>	Croft: curvature over Tees Bridge
<b>O</b>	Darlington - King Edward Bridge: curvature of track
<b>P</b>	Newcastle - Edinburgh: curvature of track and level crossings

### Route 8 Planned projects

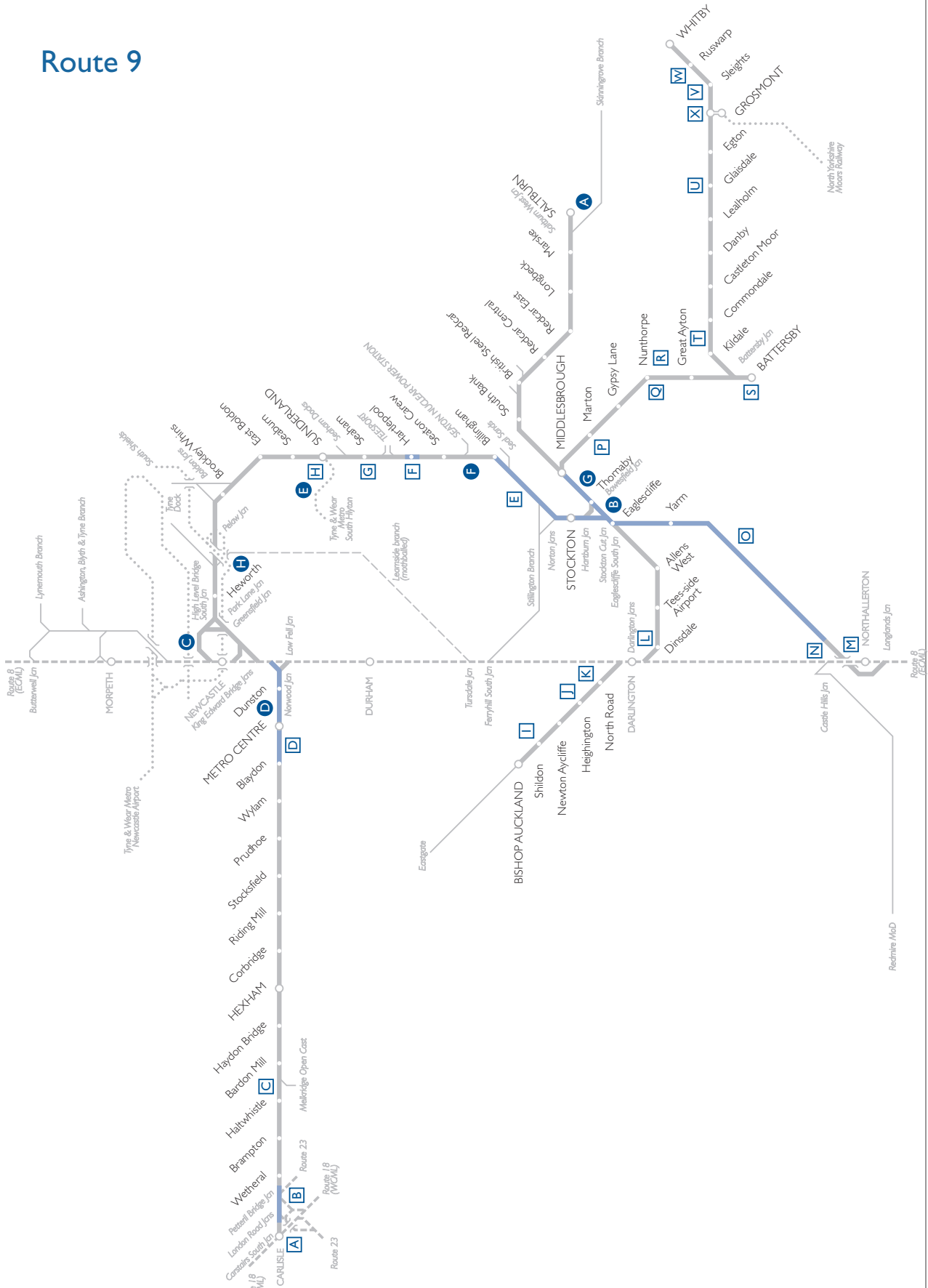
	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 Biggleswade S&C renewal	R	
<b>B</b>	2004/05 Doncaster Decoy S&C renewal	R	
<b>C</b>	2006/07 Strengthening to ECM15/243 overbridge near Newcastle	R	
<b>D</b>	2004/05 Including Cuffley S&C renewal	R	
<b>E</b>	2004/05 DOL2/34 Underbridge renewal (Leeds)	R	

### Network Rail

### Route 8 Planned projects

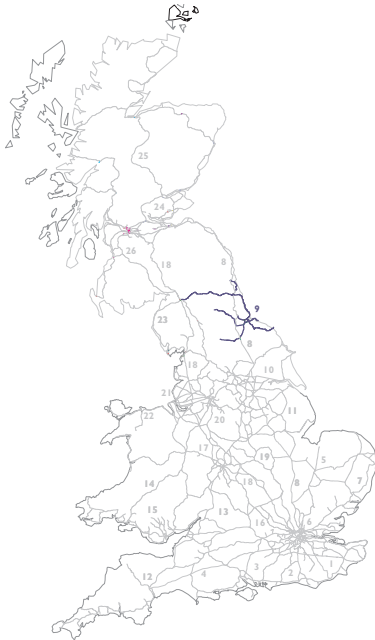
	Project description	Type of work	Dev. Level
<b>F</b>	2004/05 Peterborough Telephone Concentrator renewal	R	
<b>G</b>	2004/05 Alnmouth station platform repairs	R	
<b>H</b>	2004/05 Homsey depot heating system renewal	R	
<b>I</b>	2004/05 & 2005/06 Darlington station roof and lighting repairs	R	
<b>J</b>	2004/05 & 2005/06 Peterborough interlocking	R	
<b>K</b>	2005/06 Digswell and Woolmer Green (Stevenage) S&C renewal	R	
<b>L</b>	2005/06 Doncaster Station, S&C renewal	R	
<b>M</b>	2005/06 Doncaster Telephone Concentrator renewal	R	
<b>N</b>	2005/06 Embankment stabilisation at Enfield	R	
<b>O</b>	2006/07 Embankment stabilisation at Rendlesham near Gordon Hill on the Hertford Loop	R	
<b>P</b>	2006/07 Including Kings Cross telephone concentrator renewal	R	

# Route 9



# Route 9: North East Routes

## Route description



### Physical description

The principal components of the route are:

- lines linking Northallerton/Darlington to Newcastle via the Durham coast and from Newcastle via Hexham to Carlisle, together with branches to Bishop Auckland and Saltburn. These lines are predominantly two-tracks with typical linespeeds of 60mph;
- the single-track Middlesbrough to Whitby branch, with linespeeds of 30-40mph; and
- geographically dispersed groups of lines used almost exclusively by freight services that provide the essential link between traffic originating points, terminals and the rest of the rail network. Linespeeds are generally low.

The signalling is predominantly controlled from traditional manually operated signal boxes.

Broadly, about half the route is classified as secondary, a third freight only, and the rest rural.

## Market served

The route provides passenger links in the conurbations on the rivers Tyne, Wear and Tees with longer distance flows to the West Coast Main Line and Scotland via Carlisle. There is also a substantial volume of freight traffic from Tees-side and Tyneside.

## Growth

We expect passenger numbers to continue to rise over the coming years as further economic growth encourages additional demand for rail travel.

Little overall growth is expected in freight traffic.

## Current use

### Current traffic

The train operating companies who provide services over this route are ScotRail, Arriva Trains Northern, Nexus, TransPennineExpress, EWS, Freightliner, and Direct Rail Services.

Except in the Tees-side and Sunderland areas, much of this route sees traffic at a level of no more than 4tph running at no greater a speed than 60mph or 70mph. The exception to this is the line from Newcastle to Sunderland that carries the Tyne and Wear Metro and on Tees-side and to/from the East Coast Main Line where an extensive and frequent freight train operation exists along side an intensive local train service and some regional inter-urban trains.

Tees-side sees a half-hourly passenger service operating between Darlington and Saltburn. Every 2hrs this extends to/from Bishop Auckland.

Middlesbrough is also served by an hourly TransPennine train that usually runs to or from Manchester Airport. There are 4-5 trains per day to Whitby and an hourly operation to Newcastle via Hartlepool.

The Tyne and Wear Metro runs over Network Rail infrastructure between Pelaw (Gateshead) and South Hylton (Sunderland). This runs five or six times per hour. In addition, two or three conventional trains per hour operate between Newcastle and Sunderland.

From Newcastle, the line to Carlisle sees 4tph as far as Metro Centre with 2tph extended to Hexham and one of these running to Carlisle and beyond.

As regards freight, the lines on Tees-side see intensive activity relating to the ports, Corus, chemical plants and potash traffic from Boulby. The Port of Tyne is served from the Newcastle - Sunderland line. North of Newcastle, the route includes the Blyth and Tyne railway. This sees a very low-level of freight only activity from the Northumberland ports and some manufacturing plants.

Capacity is not a particular issue at current levels of service, although certain places, particularly Middlesbrough and, to a lesser extent, the lines between Hartlepool and Sunderland and between Newcastle and Carlisle, are close to capacity. The current strategy is to maintain the existing capacity, however, minor enhancements would be required were traffic to grow.

<b>Route 9</b>		<b>Current use</b>		
		<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day		14,070	3,943	18,012
Train tonne km per year (millions)		1,175	414	1,588
Average no of train km per track km per day				40
<b>Top five busiest route sections</b>				<b>No of trains per day</b>
Sunderland - Pelaw				270
Eaglescliffe - Thornaby				160
Middlesbrough - South Bank				110
Newcastle - Metro Centre				100
Newcastle - Pelaw				90

## Projected use

No major changes in use are expected.

The proposed engineering access strategy for the East Coast Main Line (Route 8) would lead to increased use of the route (principally on nights and at weekends) at some times of the year to carry diverted freight and passenger trains. This affects the lines from Northallerton to Ferryhill via Eaglescliffe and Norton on Tees and, to a lesser extent, the Durham Coast line from Norton to Newcastle via Hartlepool and Sunderland. In the longer-term it is possible that the ECML engineering access strategy will require more use of the Carlisle to Newcastle line for diversions, principally of freight trains.



## Strategic framework for the route

We will be working with the SRA to produce a Regional Planning Assessment for the route (programmed for summer 2004).

The Esk Valley line is proposed as a pilot route to test a range of the initiatives in the SRA's strategy for Community Railways, which is currently out for consultation.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 9</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Newcastle - Carlisle		1 hr 16 min
Newcastle - Hexham		26 min
Newcastle - Sunderland		19 min
Newcastle - Middlesbrough via Durham		58 min
Sunderland - Middlesbrough		52 min
Northallerton - Middlesbrough		26 min
Middlesbrough - Whitby		1 hr 26 min
<b>Linespeed (km of track)</b>		
Up to 35mph		143
40-75mph		666
80-105mph		-
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		485
W7		221
W8		125
W9		-
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		-
20.4 tonnes - 24.1 tonnes (RA 7-9)		806
24.2 tonnes - 25.4 tonnes (RA 10)		4
<b>Total km of track</b>		<b>810</b>
<b>Total km of route</b>		<b>485</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 9 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	8	8	4
Structures	8	11	2
Signalling	11	7	10
Electrification	-	-	-
Plant & machinery	0	-	-
Telecoms	2	4	4
Stations	-	-	-
Depots	-	-	-
Lineside	-	-	-
<b>Total renewals</b>	<b>30</b>	<b>29</b>	<b>20</b>
<b>Committed and planned enhancements</b>			
Sunderland Tyne & Wear Metro Extension	5	1	-
Jarrow Branch Doubling of Nexus Metro South Shields Line	0	1	1
National Rail Museum Shildon	2	-	-
Other	0	0	0
<b>Total committed and planned enhancements</b>	<b>7</b>	<b>1</b>	<b>1</b>
<b>Route 9 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	13	18	10
Sleeper renewal (km per year)	11	15	9
Ballast renewal (km per year)	9	14	10
S&C renewal (units per year)	6	2	-

This section shows our plans for delivering the baseline outputs for which we are funded by the interim review of track access charges. Other projects are shown in subsequent sections of this route plan if applicable.

## Engineering access

The route between Northallerton and Eaglescliffe is heavily used by freight and has suffered from a large number of temporary speed restrictions. We are working to improve track geometry and reduce the number of speed restrictions. This programme of works requires cyclic double line possessions on a six-weekly basis. The timings of these possessions will be scheduled to minimise disruption to affected operators.

Similarly, the route from Eaglescliffe to Middlesbrough and Saltburn is in need of additional access opportunities to assist in the maintenance of the route and to improve track geometry. Currently, proposals are being discussed with operators in order to achieve the provision of additional midweek access with two lines blocked for 7hrs.

An increase in available overnight midweek possession times is sought for the Tyne Valley route coordinated with the ECML possession regime (see Route 8). This is driven by the use of the route for diversionary purposes (off the ECML) and the increased level of traffic that now uses the line. An increase in midweek overnight possession times to 5hr 30min for the route every night with 9hr possessions every Saturday/Sunday night being sought, except when the route is used for diversionary purposes is.

As the Durham Coast forms a diversionary route for the East Coast and the Tyne Valley forms an alternative route to Scotland, these lines form a key part of our maintenance access strategy. Possessions for maintenance and renewal work (mentioned above) on these routes are coordinated to avoid conflicts with both WCML and ECML closures. In addition on the Newcastle - Carlisle line, due to the increased use of the route and deteriorating track geometry, the coming years are likely to see an annual requirement of twelve 30hr possessions or more to facilitate the completion of track renewal works. The main items of renewal work identified as requiring 54hr possessions are:

- renewal of Eaglescliffe S&C in 2005;
- Crag Hall (between Saltburn and Boulby) S&C in 2004/05; and
- bridge reconstructions on the route between Newcastle and Carlisle will require possessions in 2004/05 and beyond.

A major series of bridge refurbishment and replacement works on the Durham Coast will require a nine day blockade of the route in 2004/05 between Hartlepool and Sunderland.

## Maintenance and renewal

### Track

S&C renewals are planned at Crag Hall on the Saltburn to Boulby branch and at Eaglescliffe in 2004/05. Other major track renewals are planned in the Yarm area and at Marske in 2005/06.

### Structures

The route includes some major bridges including the large and unique High Level Bridge over the River Tyne at Newcastle. A rolling programme of major strengthening works is ongoing with the final phase likely to be completed by 2007. The present weight restriction precluding the operation of heavy vehicles in certain combinations will remain.

Our plan also includes works to renew or strengthen bridges between Newcastle and Carlisle, and Darlington and Saltburn in 2004/05. Felling station footbridge near Newcastle is planned for renewal in 2005/06. Major repairs are also planned to Sunderland South Tunnel in 2006/07.

Strengthening and preventative maintenance works are planned for Monkwearmouth bridge in Sunderland together with major repairs to an underbridge near Yarm and strengthening a pier on Yarm viaduct in 2005/06.

We are continuing with the risk assessment of embankments and a programme of embankment stabilisation is being developed with repairs and maintenance planned to embankments on the freight only route between Norton South Junction and Ferryhill South Junction (Stillington branch) and between Hartlepool and Sunderland in 2004/05, and near Wetherall on the Newcastle and Carlisle route in 2005/06. This latter route is particularly susceptible to stability problems because of profile problems and drainage relating to the way the route was constructed with extremely tight clearances.

### Signalling

In order to maintain safety and current network capabilities we are continuing with our programme of local signalling projects. Our renewals plan for 2004-2007 includes the renewal of signalling equipment in signal boxes at Greatham, Clarence Road at Hartlepool on the Durham Coast route and at Tees Yard between Thornaby and Middlesbrough.

Major renewal to the signalling equipment in the Tees area will start in 2005/06 and will carry on until 2009.

We are also planning to carry out level crossing renewals at Haydon Bridge, and Low Row on the Newcastle to Carlisle line during 2005/06.

### Electrification and plant

This route is where the early vintage of switch heaters is to be found. In order to maintain train performance, the majority of the region's switch heater renewal will be concentrated in the north-east together with standby generator renewal.

### Telecoms

The continuing programme of public emergency telephone system renewals at AHB level crossings between Carlisle, Newcastle and Middlesbrough that are nearing the end of their working life is progressing with renewal of all systems on the route to be completed by 2007. This programme will maintain public safety and reduce the potential for train delays.

A programme has been put in place to renew the remaining selective telephone concentrator systems in this route area by 2007.

### Other operational property

Work will continue to refurbish signal boxes to maintain and improve the working environment for staff.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

We aim to deliver reliable and high performing rural and suburban services to meet the quality of service expected by our customers. To achieve this, there are a number of groups specifically targeted to focus on performance; one of which is the autumn preparedness team that is set up to mitigate against the effects of the Autumn on train performance. They are responsible for planning the use of the Sandite machines (fitted with both water jets and Sandite) and organising mobile teams of Network Rail employees and contractors to go out on the track clearing leaves in times of adverse weather. There is also an ongoing vegetation management programme running from November to February to cut back lineside vegetation before the autumn period in order to minimise train delays. These action plans target certain high-risk areas such as the Newcastle to Carlisle route.

Our area delivery groups are continuing to work up and carry out their annual programmes of numerous small value targeted performance improvement schemes across the route. This programme includes upgrading and renewing fencing and clearing vegetation to reduce the risk of route crime and train delay and so improve performance.

## Enhancements

Work continues to complete a few remaining details on the Sunderland Direct project. As regards safety schemes, work is in hand to improve road traffic behaviour at two level crossings on the Newcastle - Sunderland route.

## Land implications

There are no major land issues on the route except at Sunderland station where some may emerge as discussions continue with the city council and others over the potential redevelopment of the station area.

## Other committed enhancements

We are undertaking work at Shildon funded by the National Railway Museum to reconfigure the railway in association with their new museum adjacent to the station.

## Route development

We are working with others to consider a number of developments on the route. If they progress, they will be funded by third parties. They include:

- Jarrow Branch (Pelaw (Gateshead) to Jarrow) - potential transfer of ownership to Nexus (Tyne and Wear PTE) for incorporation into the Metro system, with retained access for current freight traffic;
- Hartlepool - developments in and around the station being led by Hartlepool Borough Council;
- Metro Centre station - potential improvements; and
- Sunderland station - potential redevelopment.

## Emerging issues

In most parts, the route can readily accommodate the current levels of traffic. There are some problems associated with the number of at-grade junctions west of Middlesbrough where various freight sidings and lines diverge.

Elsewhere the route has a large degree of first generation “absolute block” signalling, which does not lend itself easily to any increase in traffic and would require some work were train frequency to increase on a permanent basis. This is particularly the case in the Hartlepool area and between Newcastle and Carlisle, where long held aspirations to increase passenger frequency are constrained.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and Enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

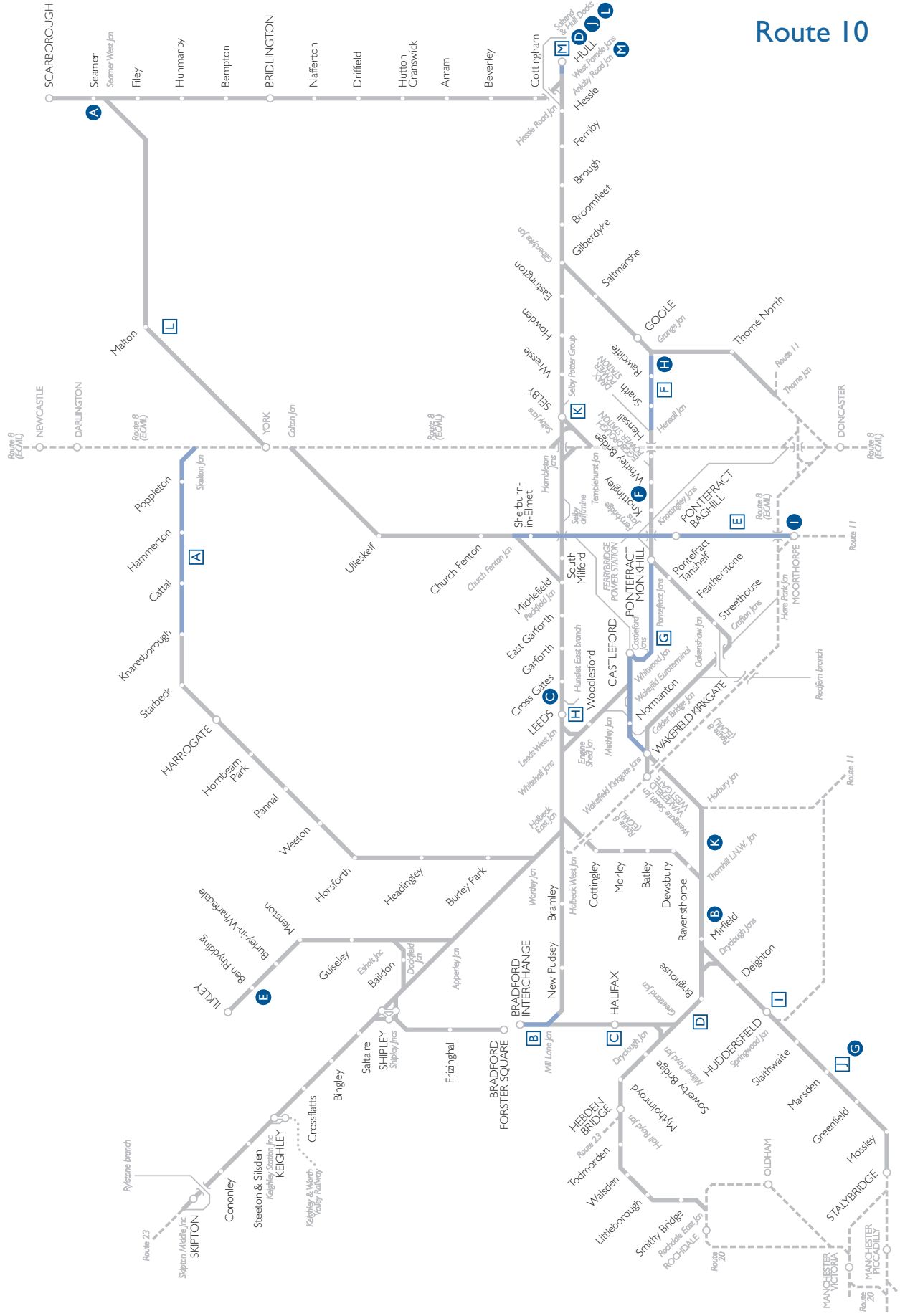
### Route 9 Capacity and operational constraints

<b>A</b>	Carlisle - Newcastle - Carlisle area: S&C and junctions
<b>B</b>	Carlisle - Newcastle - Petteril Bridge Junction: junction and line curvature
<b>C</b>	Carlisle - Newcastle: Witchester Tunnel clearance
<b>D</b>	Blaydon - Newcastle: line curvature and S&C
<b>E</b>	Middlesbrough - Billingham: S&C and line curvature
<b>F</b>	Newcastle - Middlesbrough: line curvature at Hartlepool
<b>G</b>	Newcastle - Middlesbrough: line curvature at Dawdon Junction
<b>H</b>	Sunderland: S&C and condition of Monkwearmouth bridge
<b>I</b>	Bishop Auckland - Darlington: S&C at Shildon
<b>J</b>	Bishop Auckland - Darlington: S&C at Heighington
<b>K</b>	Bishop Auckland - Darlington: S&C and condition of track at Hopetown
<b>L</b>	Darlington - Eaglescliffe: curvature and condition of track at Dinsdale
<b>M</b>	Northallerton - Middlesbrough: curvature at Northallerton East Junction
<b>N</b>	Northallerton - Middlesbrough: Low Gates level crossing
<b>O</b>	Northallerton - Middlesbrough: curvature and S&C
<b>P</b>	Middlesbrough - Whitby: Marton lane level crossing
<b>Q</b>	Middlesbrough - Whitby: Nunthorpe S&C and token exchange
<b>R</b>	Middlesbrough - Whitby: Morton Carr level crossing
<b>S</b>	Middlesbrough - Whitby: Battersby S&C and token exchange
<b>T</b>	Middlesbrough - Whitby: Guisborough Road level crossing
<b>U</b>	Middlesbrough - Whitby: Glaisdale S&C and token exchange
<b>V</b>	Middlesbrough - Whitby: Sleights level crossing
<b>W</b>	Middlesbrough - Whitby: Ruswarp level crossing
<b>X</b>	Middlesbrough - Whitby: Grosmont Junction

### Route 9 Planned Projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 Track renewals including Crag Hall S&C renewal near Saltburn	R	R
<b>B</b>	2004/05 Track renewals including Eaglescliffe S&C renewal	R	R
<b>C</b>	2004/05 & 2006/07 Structures programme including LEN3/323 High Level Bridge, Newcastle, strengthening	R	R
<b>D</b>	2004/05 & 2005/06 Structures programme including NEC 1/20 underbridge renewal near Newcastle	R	R
<b>E</b>	2005/06 Structures programme including LEN3/260 Monkwearmouth Bridge, Sunderland, strengthening	R	R
<b>F</b>	2004/05 Signalling renewals programme including Greatham near Hartlepool Interlocking	R	R
<b>G</b>	2004/05 & 2005/06 Signalling renewals programme including Tees Yard near Middlesbrough Interlocking	R	R
<b>H</b>	2005/06 Structures programme including Felling Station (near Newcastle) footbridge renewal	R	R

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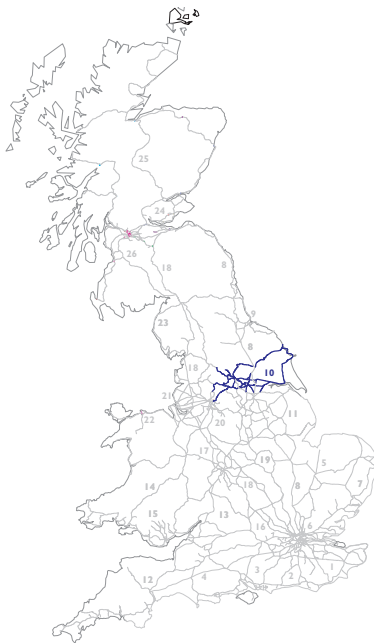


# Route 10



# Route 10: North Trans-Pennine, North and West Yorkshire

## Route description



### Physical description

The North Trans-Pennine (NTP) route forms the primary corridor across the Pennines connecting the main conurbations of Liverpool, Manchester, Bradford and Leeds; and linking them with Hull, York, Scarborough and the North East. The route mirrors an extensive but, in parts, heavily congested road network.

The principal components of the route are:

- the core route between Manchester and Leeds, which parallels the heavily congested M62 corridor and operates against a background of aspirations for modal shift for both passenger and freight; and
- the key passenger and freight network in and around Leeds, the Calder Valley, (via both Halifax and Brighouse), the Wolds Coast in east Yorkshire (from Hull to Scarborough), and the route from Leeds to Skipton.

Most sections of route have two-tracks, although part of the Wolds Coast line is single track. Generally speeds are 90mph east of Leeds, with the majority of track at 75mph on other sections of the route. There are limited sections of three or four-tracks. The route from Leeds to Skipton, Bradford Forster Square and Ilkley is electrified.

On this route 40% of the area is controlled by three PSBs and 60% by mechanical signal boxes.

Broadly, half the route is classified secondary, a third rural and a sixth freight only.

## Market served

The route carries mixed traffic, providing transport services to local communities, as well as connecting key city destinations.

## Growth

Local services in West and South Yorkshire, particularly in and out of Leeds, have seen a large increase in patronage over the last 5-10 years. It is anticipated that this trend will continue. Demand on services along the Middlesbrough/Scarborough/Hull to Manchester and Liverpool corridor is also forecast to continue to increase.

Little overall growth in freight is expected on this route, although the pattern of freight flows is expected to alter.

## Current use

### Current traffic

The train operating companies who provide services over this route are Arriva Trains Northern, Virgin Cross Country, Great North Eastern Railways, First North Western, Hull Trains, Central Trains, Midland Mainline, TransPennine Express, EWS, Freightliner, and GB Railfreight.

The core TransPennine operation between Leeds and Manchester has 4tph. Three of these extend east of Leeds, one per hour to Hull, one to Middlesbrough (via York) and one per hour on alternate hours to Scarborough and Newcastle. This corridor also carries a number of local services including an hourly service from Leeds to Huddersfield, another from Wakefield to Manchester via Huddersfield and another from Huddersfield to Halifax.

There are 4tph from Leeds to Bradford Interchange. Some of these originate from Scarborough, York and Selby and continue beyond Bradford via Halifax, to Manchester via Rochdale or Blackpool via Burnley.

Also based on Leeds is a half-hourly service to Knaresborough via Harrogate (extended hourly to York), 6tph to Leeds north west destinations (Bradford Forster Square, Skipton and Ilkley), and a half-hourly service to Castleford extended on one half-hour to Knottingley and on the alternate half-hour to Sheffield via Barnsley.

Away from Leeds, routes to Hull include trains from South Yorkshire (generally half-hourly) supplemented on some hours with long distance trains from King's Cross, and the Wolds Coast line to Bridlington and Scarborough.

The route includes the Aire Valley power stations and the Selby coalfield. Many local movements take place between the coalfield concentration point at Gascoigne Wood (just west of Selby) and the various power stations. Other notable freight flows include those to and from Wakefield Europort and Stourton Freightliner terminal, near Leeds. A considerable amount of traffic also traverses the route to/from the Settle - Carlisle line and to/from the West via the Trans-Pennine routes. The port of Hull is also gradually emerging again as a significant user of rail.

<b>Route 10 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	49,280	6,618	55,899
Train tonne km per year (millions)	2,153	2,201	4,353
Average no of train km per track km per day			62
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Leeds - Apperley Junction			230
Huddersfield - Mirfield			220
Church Fenton - Colton Junction			210
Leeds - Micklefield			210
ShIPLEY - Bradford			170

## Projected use

It is likely that in the longer term, increased demand will be met through longer passenger trains. First Keolis, the new TransPennine passenger train franchise operator, is proposing to operate new trains and lengthen the trains operating on services along the Middlesbrough/Scarborough/Hull to Manchester and Liverpool corridor.

It is anticipated that the pattern of freight flows in the area will alter as a result of the closure of the Selby coalfield, planned for later in 2004. This will lead to increased mileages operated by coal trains as imported coal for the Aire Valley power stations replaces that mined locally. The east coast ports will play an increasing role in this movement.

## Strategic framework for the route

We will be working with the SRA to produce a Route Utilisation Strategy (programmed for Spring 2005) and Regional Planning Assessment (programmed for Winter 2005) for the route.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 10</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Bridlington - Scarborough		36min
Leeds - Bradford		18min
Bradford - Hebden Bridge		23min
Manchester Piccadilly - Leeds via Huddersfield		53min
Scarborough - York		46min
Hull - Leeds		58min
Leeds - Skipton		34min
Leeds - Harrogate		31min
Leeds - Barnsley		47min
Leeds - Ilkley		27min
Leeds - Castleford		17min
Leeds - York		23min
Newcastle - Manchester Piccadilly		2hr 32min
Middlesbrough - Manchester Piccadilly		2hr 25min
<b>Linespeed (km of track)</b>		
Up to 35mph		95
40-75mph		1121
80-105mph		218
110-125mph		24
<b>Gauge (km of route)</b>		
W6A		353
W7		19
W8		355
W9		26
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		140
20.4 tonnes - 24.1 tonnes (RA 7-9)		1299
24.2 tonnes - 25.4 tonnes (RA 10)		19
<b>Total km of track</b>		<b>1458</b>
<b>Total km of route</b>		<b>752</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 10 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	15	27	15
Structures	10	8	5
Signalling	7	23	15
Electrification	0	0	0
Plant & machinery	2	1	0
Telecoms	1	1	2
Network Rail managed stations (Leeds)	1	1	1
Stations	-	0	0
Depots	-	0	0
Lineside	-	-	-
<b>Total renewals</b>	<b>36</b>	<b>60</b>	<b>39</b>
<b>Committed and planned enhancements</b>			
Other	1	1	1
<b>Total committed and planned enhancements</b>	<b>1</b>	<b>1</b>	<b>1</b>

<b>Route 10 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	38	49	14
Sleeper renewal (km per year)	30	44	17
Ballast renewal (km per year)	25	48	18
S&C renewal (units per year)	-	2	-

## Engineering access

In order to improve the performance of our assets and to allow our maintainers to carry out their tasks efficiently, we are looking at extending our maintenance opportunities. This will require some adjustment/retimetabling of late evening passenger and freight trains, and possible rerouting of some of the night services to Manchester Airport in the weeks concerned.

On the NTP route, extended engineering access time of 12-16hrs is required on a 12-weekly basis, dependant upon the location and complexity of the layout. This will enable us to complete cyclical S&C maintenance at major junctions and crossovers.

Between Leeds, Bradford, Halifax and Hebden Bridge (Calder Valley), six 36hr possessions are required to undertake plain line track renewals activities in 2004/05.

Between Heaton Lodge Junction near Mirfield, Huddersfield, Marsden and Diggle, six 36hr possessions are required to undertake plain line track renewals activities, four 48hr possessions are required to undertake major tunnel repairs at Standedge, twelve 16hr possessions are required to undertake minor structures maintenance in Standedge Tunnel. This programme of works in Standedge Tunnel is expected to continue until 2005/06.

A Sunday/Monday overnight possession is required each week to permit the compliance with track patrolling standards through Standedge and Morley Tunnels.

Between York and Diggle/Hebden Bridge a six-weekly cycle of midweek night engineering access patterns is required on all the main plain line track sections. This engineering access is to consist of four possessions of 6hrs on consecutive days, blocking all lines. In order to deliver an acceptable level of train services between York and Manchester Airport, the engineering activities either side of Leeds are to be coordinated so that services are only affected by one engineering operation per night. It is expected that pressures of engineering work will require the duration of these possessions to be extended towards 7hrs from timetable year 2005 onwards.

With the heavy use of the routes around Leeds and Wakefield, it is essential that we gain improved access for maintenance works. In order to complete cyclical S&C maintenance at major junctions and crossovers, extended possession time of 12-16hrs - dependent on location and complexity of layout – is proposed for inclusion within our 2005/06 plans. These possessions will range from every 26 weeks, for those locations where midweek and standard weekend access is at a premium (e.g. Milford Junction) to every 12 weeks, where midweek and standard weekend opportunities allow maintenance works to be completed on a regular basis without disruption to services.

There is a requirement for track renewal possessions in the region of 28-36hrs to deliver works at the most efficient cost on the line between Huddersfield and Barnsley (via Penistone) and Armley (Leeds) to Skipton.

The section of route between Armley Junction and Hellifield is currently restricted to Saturday/Sunday access for double line possessions. Due to the increased use of the route in recent years, 2005/06 will see a midweek double-line possession of 6hrs in duration every 12 weeks. This will allow essential maintenance of S&C and defect removal.

Between Leeds and Micklefield four 20hr possessions are required for maintenance on structures.

Between Micklefield and Hull, six 36hr possessions are required for delivery of plain line track renewal activities.

Between Micklefield and Gascoigne Wood structures work on Lumby dock overbridge will require two 36hr possessions in 2005.

The main items of renewal work identified as needing more extended possessions are:

- renewal of Seamer West Junction (near Scarborough) in 2004/05;
- completion of the reconstruction of two underbridges between New Pudsey and Bradford Interchange in 2004/05;
- bridge strengthening at Hesse Junction (near Hull);
- Standedge Tunnel repairs in 2004/05 and 2005/06; and
- embankment stabilisation at Ben Rhydding between Leeds and Ilkley.

Between Diggle and Manchester there is a need to improve midweek night cyclical access to 7hrs, four nights per week every six weeks.

## Maintenance and renewal

### Track

Track components on this route predominantly date from the 1970s and 1980s. Plain line renewals are planned which will improve track geometry and performance and reduce the need for temporary speed restrictions. Junction renewals are planned at Seamer in 2004/05 with reballasting at Moorthorpe in 2005/06.

The renewal of the hydraulic buffer stops at Bradford Interchange with more appropriate modern design is planned for 2004/05.

### Structures

The route between Leeds and Manchester includes very long tunnels at Standedge and Morley, which give rise to heavy maintenance requirements. Over the next three years, renewals planned include a bridge on the route between Leeds and Manchester at Mirfield, and major repairs to two bridges between Leeds and Bradford Interchange to remove a freight speed restriction. Major preventative maintenance work on Goole swing bridge and repairs to an underbridge near Hull are planned in 2004/05. Repairs to Dutch River bridge near Goole are planned in 2005/06.

We are continuing with the risk assessment of embankments and a programme of bank stabilisation is being developed. During 2004/5 and 2005/06 major earthworks are planned to stabilise the embankment at Ben Rhydding between Leeds and Ilkley, which will remove a severe speed restriction.

### Signalling

In order to maintain current network capability and functionality our renewal plans in 2004-2007 include renewal of older signalling equipment that is nearing the end of its life at Knottingley, and Healey Mills.

Level crossing renewals are planned along the Drax branch between 2004 and 2006, and in 2006/07 we plan to renew the level crossing at Smithy Bridge near Rochdale.

### Electrification and plant

The major renewals in this area are Neville Hill depot standby generator and shore supplies (to enable train auxiliary systems to run whilst their engines are shut down). Goole swing bridge will see major repairs in order to maintain train performance.

We plan to renew the signal supply power point at Todmorden in 2004/05.

### Telecoms

The continuing programme of public emergency telephone system renewals at AHB level crossings that are nearing the end of their working life between Leeds, Harrogate and York is progressing with renewal of all systems on the route to be completed by 2007. This programme will maintain public safety and reduce the potential for train delays.

A programme has been put in place to renew the remaining selective telephone concentrator systems in this route area by 2006.

## Network Rail managed stations

### *Leeds City*

The main activity in the past year has been the development in conjunction with West Yorkshire Passenger Transport Executive on the station forecourt of the new bus and taxi Interchange. This facility will be operational by Easter 2004. It will integrate the station with much of the east to west bus traffic across the city and will be a major benefit by improving the interchange arrangements.

### Other stations

Hull station will see major works to renew the three sections of the barrel roof and concourse roof area together with minor platform repairs proposed in 2004/05 and 2005/06. This will complement the new bus/rail interchange scheme which will include development of the station frontage to improve customer services and station access, starting in 2004.

### Depots

The renewal of the depot roof and heating systems at Neville Hill depot (Leeds) will be completed in 2004/05. Hull Botanic Gardens light maintenance depot roof renewal is planned in 2005/06.

### Other operational property

Work will continue to refurbish signal boxes to maintain and improve the working environment of our key operational employees.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

Autumn preparedness and vegetation management programmes target certain high-risk areas such as the Leeds - Skipton and Ilkley route, Leeds - York route via Harrogate and the York - Scarborough line.

Train operators have also been actively encouraged to implement autumn timetables. This involves certain services being retimed (e.g. between Scarborough and York) to allow extra time for journeys and to allow for different braking patterns in times of heavy leaf fall.

Repairs to the jacking system at Goole swing bridge were designed to improve train performance.

Our area delivery groups are continuing to work up and carry out their annual programmes of numerous targeted performance improvement schemes across the route. This programme includes upgrading and renewing fencing and vegetation clearance to reduce the risk of route crime and train delay and improve performance.

## Enhancements

Work continues to complete the final closing out elements of the Leeds First project, which involves a new track layout, signalling and rebuilding of the station. Also at Leeds we are undertaking minor works in platform 1 to accommodate longer trains.



In Neville Hill depot at Leeds we have recently completed a scheme to reengineer the carriage washing plant.

## Land implications

There are no immediate major land issues on this route. We have recently completed a major review of its land holdings in the Leeds area. This will enable us to better respond to developments in and around the city. The West Yorkshire PTE has extensive plans to develop existing stations and possibly open new ones. The potential land issues are being led by the PTE. We are involved in these efforts and have taken the plans into account in developing our land use strategies.

## Other committed enhancements

Work is underway by West Yorkshire PTE to build a new station at Glasshoughton near Castleford. The PTE is also undertaking a number of other minor station improvements at various locations in its area.

At Hull there is a new bus rail interchange facility planned funded by the local authority and a developer. Work to develop the station frontage to improve customer service and access will start in 2004 and will be completed in 2007. Work continues by West Yorkshire PTE to extend platform lengths at some of the stations on the Leeds-Doncaster line to enable them to accommodate the four-car class 333 electric trains and with the local authority in Goole in association with developments in the station area.

## Route development

The following schemes are currently under development:

- Hull Trains - works associated with introduction of new rolling stock;
- Leeds Supertram - we are working with the PTE to ensure works to the rail network to accommodate the Supertram project are taken forward;
- Goole - freight connection for Yorkshire Forward into new factory complex;
- Low Moor (between Bradford Interchange and Halifax) - potential new station for West Yorkshire PTE;
- West Yorkshire PTE - programme of station and ticket office improvements and car park extensions;
- Selby - car park extension by district and county councils; and
- Harrogate - premature renewal of footbridge over railway by Harrogate Borough Council as part of a major programme of cycleways in the town.

## Emerging issues

There are no fundamental capacity issues on the route. Following earlier studies into the possibility of increasing capacity on the east/west axis between Leeds and Manchester, it has been concluded that this cannot be justified at the current time. The new TransPennine Express passenger franchise is therefore built on making best use of the infrastructure as currently configured.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 10 Capacity and operational constraints

<b>A</b>	Leeds - York via Harrogate: single-line and signalling system east of Harrogate
<b>B</b>	Leeds - Hebden Bridge: S&C and curvature at Bradford Interchange
<b>C</b>	Leeds - Hebden Bridge: S&C and curvature at Halifax
<b>D</b>	Halifax - Huddersfield: S&C and curvature
<b>E</b>	Church Fenton - Moorthorpe: Gradients, S&C and curvature
<b>F</b>	Castleford - Goole: single-line and automatic level crossing
<b>G</b>	Wakefield - Pontefract: level crossings and track geometry
<b>H</b>	Leeds - Manchester via Huddersfield: S&C at Leeds
<b>I</b>	Leeds - Manchester via Huddersfield: S&C at Huddersfield
<b>J</b>	Leeds - Manchester via Huddersfield: curvature on approach to Standedge tunnel
<b>K</b>	Leeds - Hull: curvature at Selby and Swing Bridge
<b>L</b>	York - Scarborough: curvature at Kirkham Gorge
<b>M</b>	Leeds - Hull: curvature at Hull

### Route 10 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 S&C renewal at Seamer	R	
<b>B</b>	2004/05 Repairs to Overbridge MVNZ/199 at Mirfield	R	
<b>C</b>	2004/05 Neville Hill depot repairs	R	
<b>D</b>	2004/05 - 2005/06 Hull station roof repairs	R	
<b>E</b>	2004/05 & 2005/06 Embankment stabilisation at Ben Rhydding	R	
<b>F</b>	2004/05-2006/07 Knottingley interlocking renewal	R	
<b>G</b>	2004/05 & 2006/07 Repairs to Standedge Tunnel near Marsden	R	

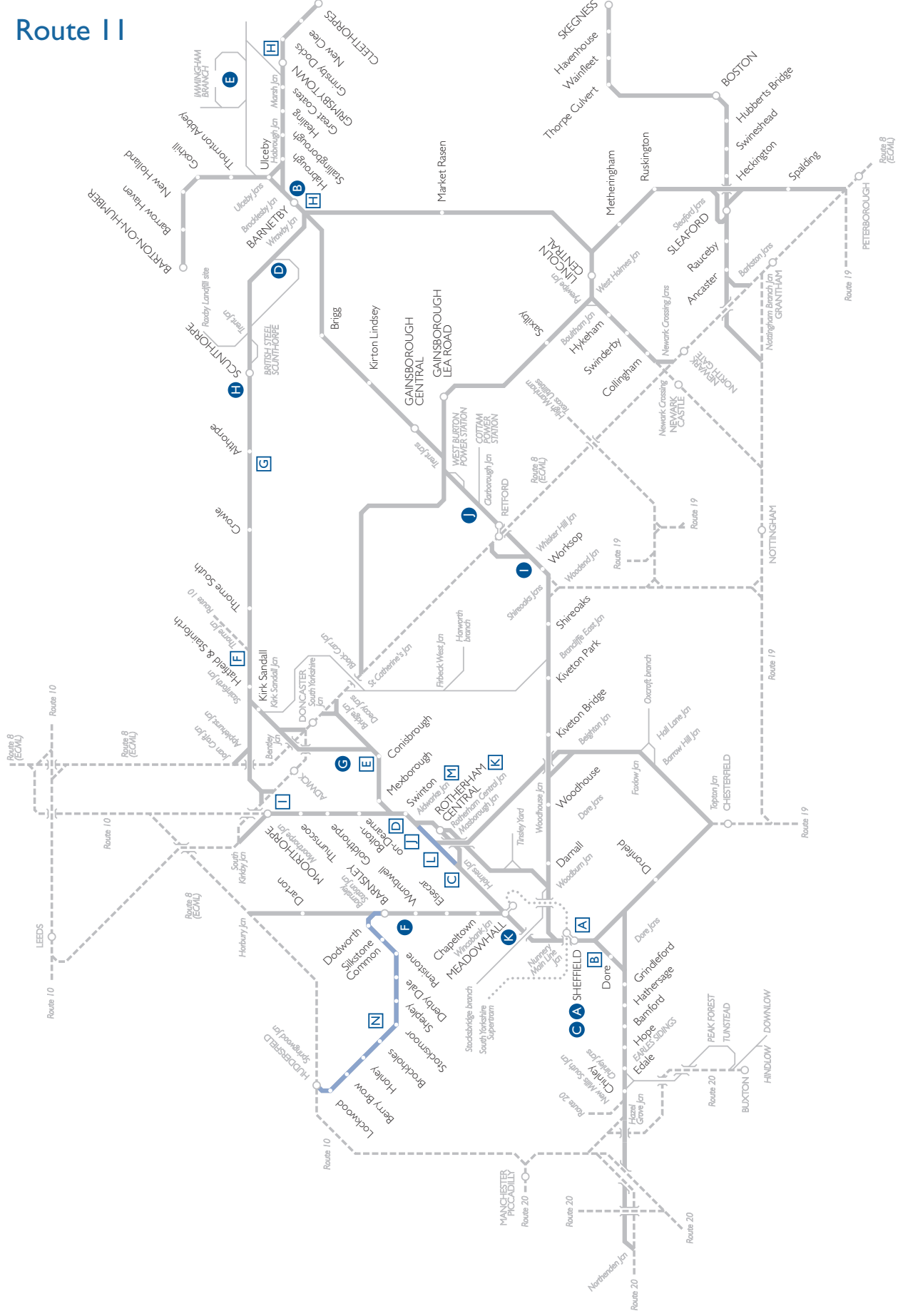
## Network Rail

### Route 10 Planned projects

	Project description	Type of work	Dev. Level
<b>H</b>	2005/06 Preventative maintenance to TJG2/13D Dutch River Bridge Viaduct	R	
<b>I</b>	2005/06 S&C renewal at Moorthorpe	R	
<b>J</b>	2005/06 Hull Botanic Gardens Depot roof renewal	R	
<b>K</b>	2004/05 & 2005/06 Healey Mills	R	
<b>L</b>	2004/05 & 2005/06 Hull Station development	E	4
<b>M</b>	2004/05 Strengthening of an underbridge at Anlaby Road, Hull	R	

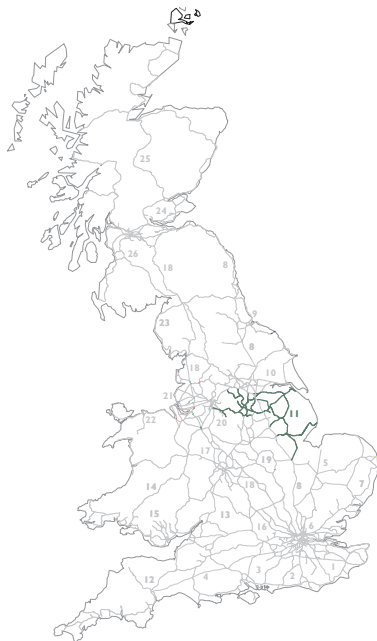
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# Route 11



# Route 11: South Trans-Pennine, South Yorkshire and Lincolnshire

## Route description



### Physical description

The principal components of the route are:

- the core route which traverses the Pennines through the Hope Valley, between Stockport and Sheffield, and extends through Doncaster to the east coast towns of Grimsby and Cleethorpes;
- the Sheffield to Barnetby route via Worksop and the line from Thorne Junction to Gilberdyke, which gives a link to Hull from South Yorkshire. It provides links to rural communities and carries a significant volume of freight trains, especially to and from Humber ports; and
- the more rural lines of Lincolnshire running from Nottingham to Lincoln and to Skegness as well as the 'Great Eastern/Great Northern Joint Line' from Doncaster to Peterborough via Gainsborough, Lincoln, Sleaford and Spalding.

Linespeeds of no more than 60mph predominate. Signalling is mainly controlled from traditional manually operated signal boxes. Whilst the majority of the route is double track there are single-track sections between Gainsborough Central and Barnetby via Brigg, and on the Grantham to Skegness route near Boston.

Broadly, the route is classified as about a half as secondary, a quarter as freight only, and the remainder split between primary and rural.

## Market served

The core route links Sheffield to Stockport and Manchester and extends through Doncaster to the Humber ports. As well as serving these locations, the route provides links to rural communities in Lincolnshire and carries a significant volume of freight traffic from the Nottinghamshire coalfields and the Humber ports to the power stations in West Yorkshire.

## Growth

We are expecting passenger growth to continue over the coming years. Local commuting demand will grow as employment in South Yorkshire increases, whilst demand for leisure and business travel will increase as the economy steadily grows.

## Current use

The TOCs who provide services over this route are Arriva Trains Northern, First North Western, Central Trains, TransPennine Express, EWS, Freightliner, Virgin Cross Country, and Midland Mainline.

Sheffield is intersected by a number of long distance flows. Cross country express services run on a generally half-hourly frequency between the south and south-west via Birmingham and the North East and Scotland. Sheffield is also the terminus of trains from London St. Pancras, some of which continue to Leeds. An hourly long distance service runs from the north-west via the Hope Valley and Sheffield, via Nottingham to East Anglia. Finally, a further hourly long distance service runs from Manchester Airport via the Hope Valley through Sheffield and Doncaster to Cleethorpes.

Sheffield is also the origin and destination of a number of local services, mostly PTE supported including those to Worksop/Lincoln, Leeds via Barnsley, Leeds via Moorthorpe, Huddersfield via Barnsley and to Doncaster, Hull/Scunthorpe.

Services in Lincolnshire include an hourly service to/from the Midlands, via Nottingham to Skegness and Grimsby and a 90-minute frequency service to Lincoln via Newark. An infrequent service runs on the line between Doncaster and Peterborough via Gainsborough (Lea Road), Lincoln and Sleaford, although this is enhanced to a regular hourly pattern south of Spalding.

A two hourly local shuttle service runs between Cleethorpes and Barton-on-Humber.

Freight dominates activity on South Humberside as previously stated, although it is also a major activity around Sheffield, with a number of flows running through that area. Outside these routes, there is little freight activity. There is a daily flow of freight traffic to/from Boston docks.

Route 11	Current use		
	Passenger	Freight	Total
Train km per day	30,668	11,640	42,309
Train tonne km per year (millions)	1,230	4,342	5,572
Average no of train km per track km per day			45
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Sheffield - Meadowhall			300
Aldwarke Junction - Swinton			260
Sheffield - Dore			220
Meadowhall - Rotherham			220
Stainforth Junction - Thorne Junction			170

## Projected use

No changes to passenger services are currently envisaged. A gradual increase in freight train mileage from 2004 is expected to arise from new coal flows from Nottinghamshire and the start of coal imports from Immingham Docks to Drax and other coal fired power stations offset by the demise of coal from the Selby coalfield complex. The same tonnage of coal is expected to enter the power stations but the freight train services are travelling longer distances to serve them.

First Keolis assumed responsibility for the inter-urban services between the north-west and Cleethorpes in February 2004. While growth on these services is not as marked as on the north Trans-Pennine route via Leeds (Route 10), the new franchisee is planning to enhance capacity as necessary through new and longer trains.

Midland Main Line has long-term aspirations to extend its London St. Pancras to Sheffield service, on a more regular basis, through to Leeds.

## Strategic framework for the route

We will be working with the SRA to produce a Route Utilisation Strategy (programmed for Spring 2005) and Regional Planning Assessment (programmed for Winter 2005) for the route.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 11</b>		<b>Current route capability</b>	
<b>Journey times</b>			<b>1 April 2004</b>
Sheffield - Doncaster			21min
Doncaster - Goole			18min
Sheffield - Worksop			21min
Sheffield - Manchester Piccadilly			49min
Manchester Airport - Cleethorpes			2hr 33min
Sheffield - Leeds via Barnsley & Wakefield Westgate			1hr 18min
Sheffield - Leeds via Moorthorpe & Wakefield Westgate			1hr 10min
Nottingham - Lincoln			45min
<b>Linespeed (km of track)</b>			
Up to 35mph			152
40-75mph			1289
80-105mph			230
110-125mph			-
<b>Gauge (km of route)</b>			
W6A			904
W7			624
W8			553
W9			3
W10			-
<b>Axle weight (km of track)</b>			
Up to 20.3 tonnes (RA 1-6)			-
20.4 tonnes - 24.1 tonnes (RA 7-9)			1659
24.2 tonnes - 25.4 tonnes (RA 10)			11
<b>Total km of track</b>			<b>1671</b>
<b>Total km of route</b>			<b>904</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 11 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	24	33	28
Structures	11	2	8
Signalling	14	10	13
Electrification	-	-	-
Plant & machinery	0	0	0
Telecoms	2	1	2
Stations	12	7	4
Depots	2	2	1
Lineside	1	0	1
<b>Total renewals</b>	<b>65</b>	<b>55</b>	<b>56</b>
<b>Committed and planned enhancements</b>			
Sheffield Station Masterplan Project	5	3	-
Allington Chord	6	6	0
Other	2	-	-
<b>Total committed and planned enhancements</b>	<b>13</b>	<b>9</b>	<b>0</b>

<b>Route 11 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	24	49	35
Sleeper renewal (km per year)	24	33	39
Ballast renewal (km per year)	23	35	29
S&C renewal (units per year)	18	25	28

## Engineering access

In common with other routes on the network we are developing our proposals for cyclic access for improved maintenance, and these are described below.

On the South Trans-Pennine route from Manchester to Cleethorpes via Sheffield, Doncaster and Scunthorpe, extended possessions of 12-16hrs, dependent on location and the complexity of layout, are proposed for inclusion within our plans for 2004/05. This will enable us to complete cyclic S&C maintenance at major junctions and crossovers. These possessions will range from 12 weekly in occurrence for those locations where midweek and standard weekend access is at a premium (e.g. Nunnery Main Line Junction near Sheffield), to 26 weekly where midweek and standard weekend opportunities allow maintenance works to be completed on a regular basis without disruption to services.

At Sheffield station we are continuing to develop plans for improved access so that inspections, work arising and defect removal work can take place.

The line between Nunnery Main Line Junction and Moorthorpe Junction is subject to a 6hr midweek cyclic possession regime to enable the completion of defect removal, tamping and general permanent way maintenance. The frequency of these possessions varies from every 6 weeks to every 12 weeks between each major junction.



On the routes between Doncaster and Immingham we require cyclic double line possessions every 6 weeks basis. The timing of these possessions will be scheduled at the least disruptive time for affected operators, in accordance with the track access conditions decision criteria. The opportunity to be able to use an improved Brigg line will greatly help in achieving this goal.

The route between Brocklesby and Cleethorpes is likely to require six 33hr possessions for the completion of track renewal activities.

The Tapton to Masborough via Barrow Hill route requires midweek access to cater for the removal of defects and track geometry concerns.

The South Yorkshire joint line from Worksop to Doncaster/Kirk Sandal (between Doncaster and Thorne) currently has no midweek availability and is heavily used by freight traffic. In order to maintain the route to the required standard, and in order not to detract from the allocation of resource available to the ECML, a series of 8hr possessions, every eight weeks, is required.

The main items of renewal work identified as requiring more than 54hr possessions include:

- the completion of major bridge reconstruction works on the South Yorkshire joint line, which will require a continuous shutdown for three weeks in 2004/05;
- Christmas 2004/New Year 2005 Wrawby S&C renewal;
- two 77hr possessions for Moorthorpe S&C renewal;
- a combination of 54hr and 74hr possessions over nine weekends for Immingham area S&C renewals;
- Scunthorpe S&C and signalling renewal;
- renewal of life expired signalling equipment at Thrumpton, Stallingborough, Boston and Sheffield Brightside; and
- Sheffield Masterplan requiring possession of one platform at a time continuously throughout 2004/05.

There is a need to improve midweek nights cyclic access from 5hr 30min to 7hrs, four nights per week every six weeks on the route between Dore, Chinley and Manchester. Discussions with the SRA and the operators are being progressed. Renewals will continue to be planned in the first quarter of the calendar year. There may be requirements for one off longer possessions for work between Dore and Chinley for the Dore IOS scheme in 2005 or 2006, subject to funding.

## Maintenance and renewal

Track maintenance, structures and embankment maintenance and renewals are planned to meet the gradual increase in freight tonnage from 2004 attributed to new coal flows from Nottinghamshire and coal imports from Immingham Docks to West Yorkshire (Aire Valley) power stations.

### Track

The majority of the track assets date back to the 1970s. Major S&C renewal is planned at Wrawby Junction near Barnetby and at Sheffield where the first phase of a series of renewals are planned for 2004/05. We have identified key junctions where renewals are necessary within this route area and development work is being done to link junction renewal with signalling renewals. Key areas identified include the Scunthorpe and Immingham area planned from 2005/06 to 2006/07, Sheffield between 2004/05 and 2007/08 and Lincoln in 2006/07.

We are currently planning to carry out a mix of track renewal, rerailling, resleepering and reballasting schemes across the route to maintain performance. This will replace worn components, improve track geometry and reduce the risk of having to impose speed restrictions.

On the routes to/from Immingham we are also working to improve track geometry and reduce the number of speed restrictions.

Targeted renewal of S&C is planned at Buxton, Hindlow to Briggs Sidings, Peak Forest South Junction in 2004/05, New Mills South Junction in 2005/06 and Great Rocks, Peak Forest, Grindleford and Earles Sidings near Manchester in 2006/07. This work varies from complete renewals of all elements with reballasting to partial renewal or refurbishment.

### Structures

Various locations across the route have been identified for attention including major superstructure repairs to a viaduct between Sheffield and Bamsley in 2004/05 and to a bridge between Hexthorpe Junction and Bentley Junction (Doncaster) in 2004/05, with further steelwork repairs and waterproofing in 2006/07. Steelwork repairs are also planned in 2006/07 to two viaduct structures between Doncaster and Worksop.

We are continuing with the risk assessment of embankments and a programme of bank stabilisation is being developed in 2004/05 to stabilise embankments at Old Denaby between Mexborough and Doncaster. Stabilisation works are planned at Fossdyke on the Spalding to Doncaster route in 2006/07.

In 2004/05 we are planning to strengthen and refurbish three steel underbridges between Hathersage and Bamford to maintain current route capability.

### Signalling

Signalling work includes renewal of the signalling equipment in the Lincoln area in 2005-2007. This work will be done in conjunction with track renewal work and will see the layout remodelled to improve network capability.

In order to maintain safety and network capability we are planning to renew elements of signalling equipment at Scunthorpe, Stallingborough, Boston, Brightside near Sheffield and Thrumpton, between Worksop and Retford, over the period between 2004 and 2007.

Level crossing renewals are planned between 2004 and 2007 on the Cottam power station branch (near Retford) and at Stallingborough, where the signalbox will also be renewed. Level crossing renewals are also planned in the Spalding area in 2004/05 and at Thrumpton between 2005 and 2006.

On the Sheffield to Manchester route, we will be completing the renewal at Edale signal box and are planning renewals of the interlocking at New Mills South Junction in 2004/05. We are also planning to improve the local signalling controls in Grindleford signal box in 2004/05.

### Electrification and plant

We plan to renew the signalling power supplies at Hope in 2004/05 and Chinley in 2004/05 to reduce performance risk from electricity supply failure.

### Telecoms

The continuing programme of public emergency telephone system renewals at level crossings that are nearing the end of their working life is progressing at Sheffield signal box in 2007 and other secondary route signal box locations in north Lincolnshire in 2005/06 and south Lincolnshire in 2005/06 and 2006/07.

The planned renewal of the remaining non-standard "Protowire" type telephone concentrators has been scheduled for completion by 2007.

### Stations

The Sheffield masterplan enhancement scheme is planned to commence in May 2004 and is planned for completion in early 2006. It will be partly funded by us as it encompasses renewals work that we would otherwise have undertaken. The scheme includes canopy renewal to platforms 1-5 and platform rebuilding on all platforms with improvements to platform gauging and stepping distances. Lighting improvements and new waiting facilities on platform 6 will also be included.

### Other operational property

Work will continue to refurbish signal boxes to maintain and improve the working environment for staff.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The key performance issue on this route is accommodating the current traffic levels and the mix of long distance high speed passenger, stopping local passenger services and heavy freight services. In times of perturbation performance suffers because of this mix of traffic. Further, at times of perturbed working there is a tendency for trains, particular the long distance cross country passenger services, to lose further time rather than recover it in the Sheffield area and other heavily congested areas as they lose their paths. Without the provision of additional infrastructure, particularly between Dore, Sheffield and Doncaster, the ability for the timetable to handle the impact of delays remains constrained. There are currently no plans to this end and therefore efforts will continue to concentrate on train operating in this area to ensure best use is made of the infrastructure both in the planned timetable and during times of perturbation.

In 2004/05 we will be embarking on renewing the lineside fence between New Mills South Junction and Hazel Grove near Manchester to reduce route crime and animal trespass.

The renewal of the swing bridge at Keadby completed in March 2004 will help improve reliability and reduce the risk of train delay on the Doncaster to Cleethorpes route.

Our area delivery groups are continuing to work up and carry out their annual programmes of numerous targeted performance improvement schemes across the route. This programme includes upgrading and renewing fencing and vegetation clearance to reduce the risk of route crime and train delay and improve performance.

## Land implications

We are in discussions with others in respect of potential developments of land holdings in the Tinsley area. This could lead to the development of new rail-served heavy industrial units on part of the under-used railway yard here.

## Other committed enhancements

We have started work on the SRA funded scheme to build a new chord at Allington near Grantham. This will enable east/west trains from the Midlands to Skegness to call at Grantham without the need to traverse the ECML. This will improve connections for the Skegness to Nottingham services and provide performance benefits on the ECML (Route 8).

At Sheffield station, work will shortly commence on the PTE funded station facilities element of the 'Sheffield masterplan' project. This will radically improve the environment on the station itself including the renewal of the station canopies, improved platform alignment to ease access to/from the trains, and enhanced passenger facilities including waiting rooms and toilets. The work is due for completion by 2006.

## Route development

We are working with other parties in considering a number of schemes they may wish to promote and fund. These include:

- Boston station - reconfiguration of sidings in association with adjacent land development for a new retail facility;
- Tinsley yard - review with EWS and others over future of this lightly used facility;
- Treeton Junction - potential reconnection of access to Tinsley yard from the east in connection with the above;
- Brigg line - working with the SRA with a view to the potential upgrading of the route between Gainsborough and Wrawby via Brigg to carry greater freight flows to relieve the line via Scunthorpe as traffic from Immingham increases;
- Dore - potential scheme funded by SRA to improve track capacity;
- CCTV security at stations - for South Yorkshire PTE;
- Cleethorpes - upgrade of maintenance depot in association with introduction of new trains for the new TransPennine Express franchise;
- Shireoaks Station - car park upgrade;
- Finningley Airport (between Doncaster and **Error! Not a valid link.** Lea Road) - possible new station in association with development of adjacent airport site; and
- Lincoln - potential new freight operation from Terrace sidings.

## Emerging issues

This route presents a large range of operating issues. In the west, around Sheffield, the level of passenger train activity presents the major challenge. The infrastructure works at or near capacity and presents a constraint to the timetabling of services through the area, many of which run to or from the far ends of the country. This means that in times of perturbation any lateness in longer distance trains tends to be exacerbated either in the Sheffield area itself or at other busy locations elsewhere on their route (e.g. Leeds, Birmingham and Manchester) where they are likely to lose their path. Without the provision of additional infrastructure particularly between Dore and Sheffield the timetable remains constrained. With changes in the Cross Country passenger service pattern from April 2004 the opportunity has been taken to review the timetable and seek to make it more robust within the constraints that exist.

The other area of high activity is in South Humberside, where the railway between Immingham and Scunthorpe is one of the most highly trafficked (in terms of tonne-kms) in the country. It carries raw materials and manufactured items to/from the steelworks at Scunthorpe and beyond. Much of this is signalled by first generation absolute block type signalling. On South Humberside, the key is making the infrastructure more robust to reduce speed restrictions and failures. Work is in hand to address this including the possible diversion of some traffic onto the lightly used route via Brigg.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route II Capacity and operational constraints

<b>A</b>	Sheffield - Manchester: S&C at Sheffield
<b>B</b>	Totley Tunnel East - Dore Station Junction: curvature
<b>C</b>	Sheffield - Doncaster: curvature at Holmes Junction
<b>D</b>	Sheffield - Doncaster: curvature and S&C at Swinton
<b>E</b>	Sheffield - Doncaster: clearance at Conisbrough Tunnel
<b>F</b>	Doncaster - Cleethorpes: S&C at Thorne Junction
<b>G</b>	Doncaster - Cleethorpes: Keadby drawbridge
<b>H</b>	Doncaster - Cleethorpes - Wrawby Junction S&C: curvature at Grimsby Town and Grimsby Docks
<b>I</b>	Moorthorpe Junction: curvature
<b>J</b>	Holmes Junction - Aldwarke: track alignment at Kilnhurst
<b>K</b>	Holmes Junction - Rotherham Central: curvature
<b>L</b>	Holmes Junction - Aldwarke: track alignment
<b>M</b>	Holmes Junction - Aldwarke: track alignment at Aldwarke Junction
<b>N</b>	Huddersfield - Bamsley: S&C

### Route II Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 & 2005/06 Sheffield Station Masterplan, which involves the redevelopment of the station including canopy renewal and platform rebuilding	E	5
<b>B</b>	2004/05 Wrawby Junction near Barnetby S&C renewal	R	
<b>C</b>	2004/05 Sheffield S&C renewal	R	
<b>D</b>	2005/06 Foreign Ore Junction S&C renewal near Scunthorpe	R	
<b>E</b>	2005/06 S&C renewals in the Immingham area	R	

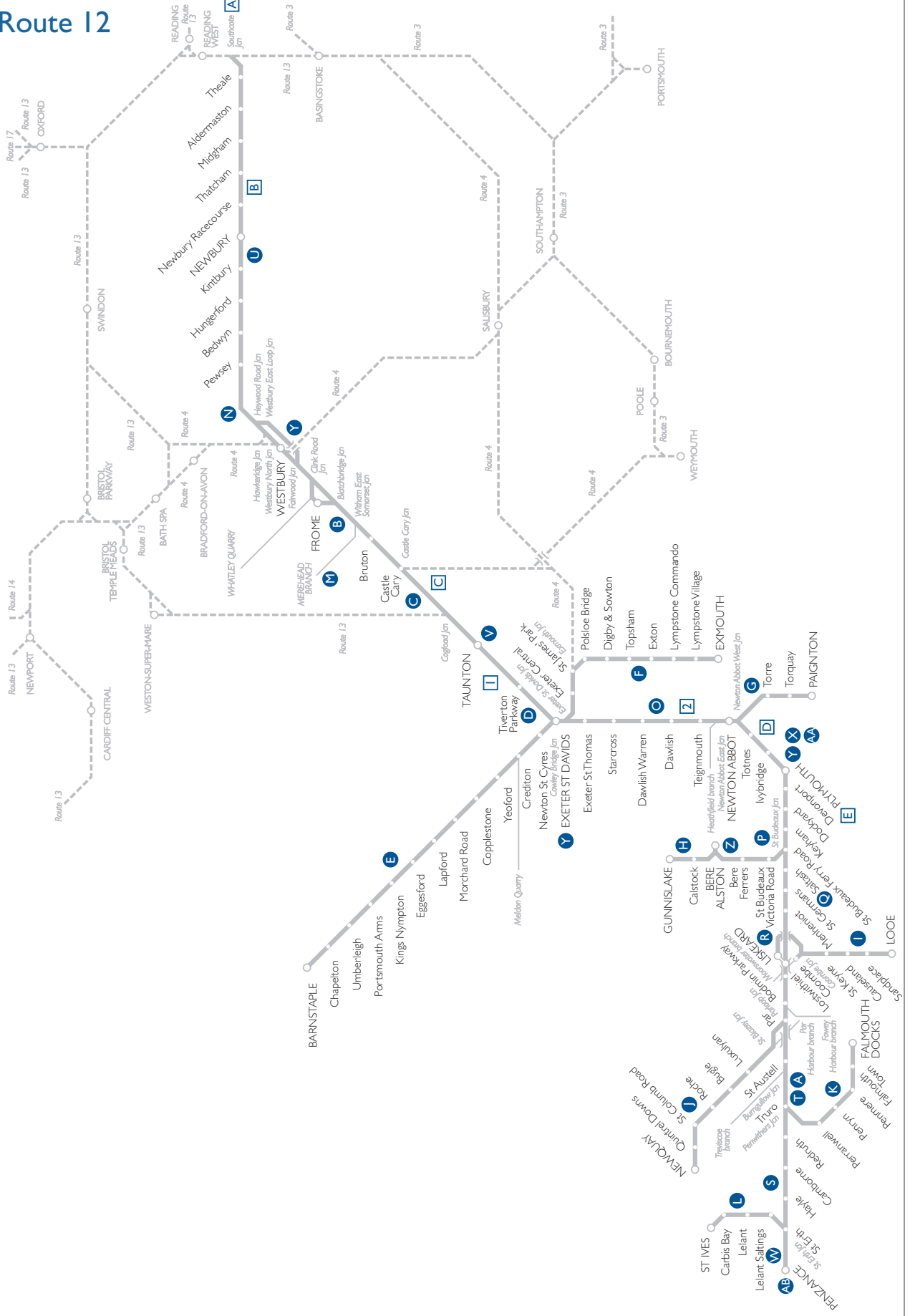
## Network Rail

### Route II Planned projects

	Project description	Type of work	Dev. Level
<b>F</b>	2004/05 Repairs to SHB/63 Swaithes Viaduct near Bamsley	R	
<b>G</b>	2004/05 Strengthening to underbridge HJB/I between Conisborough and Hatfield and Stainforth	R	
<b>H</b>	2004/05 & 2005/06 Scunthorpe interlocking renewal	R	
<b>I</b>	2004/05 - 2006/07 Thrumpton near Retford interlocking renewal	R	
<b>J</b>	2004/05 - 2005/06 Level crossing renewals on the Cottam Power Station Branch	R	
<b>K</b>	2004/05 - 2005/06 Signalling renewals at Sheffield Brightside	R	

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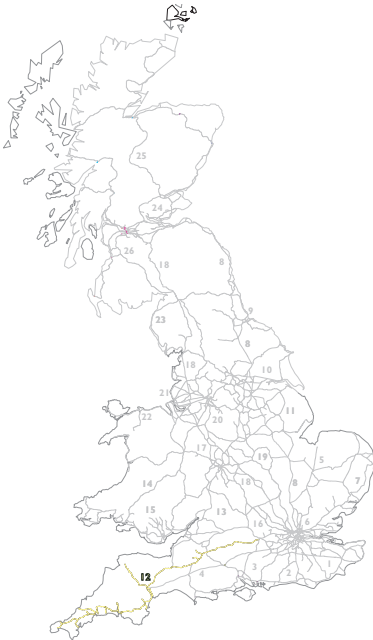
# Route 12





# Route 12: Reading to Penzance

## Route description



### Physical description

The principal components of the route are:

- the 300-mile long route from Reading to Penzance which links the Great Western Main Line directly (through Berkshire and Wiltshire) with the West of England via Taunton, Exeter and Truro. Nearly all of the main-line section of the route is two-track, which has a higher-speed character to the east of Exeter where gradients and curvature permit speeds up to 110mph. West of Exeter, the terrain dictates greater curvature and gradients, and speeds are therefore slower, mostly ranging between 40-75mph; and
- eight shorter branch lines in the west, all of which (except Newton Abbot to Paignton) are single-track. Speeds mostly range between 40-70mph;
  - freight branches to Whatley, Merehead, Heathfield, Plymouth Cattewater, Fowey, Par Harbour and Drinnick Mill; and
  - the privately-owned Meldon Quarry freight line, which connects into the Barnstaple branch at Coleford Junction, near Crediton in Devon.

Most of the route between Reading and Plymouth was upgraded in the 1980s to modern multiple-aspect signalling controlled from panel signal boxes at Westbury and Exeter, between 1960s installations at Reading and Plymouth. In Cornwall the main line is controlled from seven mechanical signal boxes, largely in their original condition, with a further three boxes on the branches to Barnstaple Newquay. The maintenance workload on the route reflects the major earthworks at the Dawlish sea wall, and the structure of the Royal Albert Bridge linking Devon and Cornwall.

Broadly, just under half of the route is primary, one quarter each secondary and rural, and the remainder freight only.

## Market served

Passenger traffic predominates on most of the route. London commuter services are provided from Bedwyn and the local stations east thereof, but the character of the route between Newbury and Exeter is largely rural with Taunton as the only significant centre of population. Holiday traffic is a significant element of the overall passenger market and dictates significant seasonal strengthening of services, mainly on Saturdays. Local services around Exeter, to Exmouth, Paignton and Barnstaple carry some commuter traffic, and also link Exeter Central station with Exeter St. Davids main-line station. In addition to serving all of the Devon and Cornwall branch lines, the local operator Wessex Trains provides stopping main line services between Bristol, Exeter, Plymouth and Penzance. Stopping services between Bristol and Weymouth use the Reading-Penzance main line between Westbury and Castle Cary. Most of the West of England branch lines have self-contained services which connect at the main-line junction with long-distance services.

Freight movements on the route are localised in their nature with very little through traffic between the Home Counties and the far west. Significant quantities of aggregates move eastwards from the Mendips to various terminals in London and the south-east. China clay extracted in Cornwall is loaded to rail for short-haul journeys for local export by sea, and some longer-distance movements also occur.

## Growth

We are expecting passenger growth to continue over the coming years. In the longer distance market, continuing economic growth will increase demand for both business and leisure travel, with growing road congestion adding to rail's competitiveness. We expect growth in commuting into Newbury and Reading to continue in line with the local economy.

Growth is expected in freight traffic over the coming years, in particular in construction traffic, which is one of the major commodities on the route.

## Current use

### Current traffic

The train operating companies who provide services over this route include First Great Western, Thames Trains, Wessex Trains, Virgin Cross Country, South West Trains, Arriva Trains Wales, EWS, and Freightliner. The majority of passenger train services on the main Reading to Penzance section are long-distance services making limited stops, whether from London or various originating points north of Manchester and Sheffield. The hourly London Paddington to Plymouth services operated by First Great Western come together with the hourly Midlands and north to Plymouth services operated by Virgin Cross Country at Cogload Junction (east of Taunton), to make traffic volumes greatest between there and Plymouth. Both these operators run a number of services beyond Plymouth to Penzance serving the main Cornish stations, and the Newquay branch sees through long distance services (of both operators) in the summer season. Plymouth is the major traffic centre west of Exeter, and represents the principal operational base for both the long distance operators. Journey times between London and key destinations such as Taunton, Exeter and Plymouth are affected by the need for long-distance services to make calls at small stations such as Pewsey and Castle Cary in the absence of any intermediate category of train service provision. A number of London Waterloo to Exeter St. Davids (via Salisbury) services operated by South West Trains have in recent years been extended to run westwards beyond Exeter, to Paignton and Plymouth.

On the section of route between Reading and Taunton the key passenger services are First Great Western's hourly Paddington to Plymouth and Penzance high-speed non-stop services, and Thames Trains' Paddington and Reading to Newbury and Bedwyn stopping train services. Thames Trains operate a more intensive service during morning and evening commuter peaks, usually from one of two dedicated bay-platforms at Reading station. The Reading to Westbury section of the route is also heavily utilised by long and heavy freight trains conveying aggregates from the Mendips. Capacity is constrained by 5min headways between Southcote Junction and Fairwood Junction and Clink Road Junction and Castle Cary. Between Castle Cary and Cogload Junction the headway is eight minutes.

Between Taunton and Plymouth First Great Western's hourly West of England services and Virgin Cross Country provide the majority of the long haul service. Wessex Trains operate a stopping local service on the main line and on most of the branch lines with some longer distance trains from destinations off the route such as Cardiff and Gloucester. Capacity is constrained by a variety of headways such as four minutes east of Newton Abbot and eight minutes between Totnes and Tavistock Junction. Pressure on capacity is increased by occasional South West Trains services from London Waterloo which, after reversal at Exeter St. Davids, run through to Paignton or Plymouth.

Between Plymouth and Penzance passenger train services are mostly operated by First Great Western and Wessex Trains with a limited Virgin Cross Country presence. All branch passenger services in Devon and Cornwall are operated by Wessex Trains, with the Exmouth branch being the most intensively utilised. Freight traffic generated in Cornwall is predominantly china clay. Capacity is constrained by a number of short single-line sections, including the Royal Albert bridge.

At the eastern end of the route the broadly hourly commuter services provided by Thames Trains are operated with 2-car or 3-car formations, and where growth is expected to be absorbed by longer train formations rather than frequency increases. Any growth in longer distance demand from London will tend to be constrained by the availability of paths and platforms at Paddington station, alongside core GWML and Heathrow Express services.

<b>Route 12 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	33,225	5,855	39,079
Train tonne km per year	3,178	1,621	4,800
Average no of train km per track km per day			54
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Exeter - Newton Abbot			140
Taunton - Exeter			120
Reading - Newbury			120
Newton Abbot - Plymouth			100
Exeter St James Park - Exeter St Davids			90

## Projected use

A key influence on future usage will be the new Greater Western franchise, proposed by the SRA to commence in 2006.

Where services are provided currently by three or four different train operators, particularly west of Exeter, the merging of existing operations may lead to more regular stopping patterns and even intervals. Similarly, closer integration of local services between Reading and Bedwyn with main line services could optimise the use of scarce main line paths out of London Paddington.

## Strategic framework for the route

The route strategy is likely to be strongly influenced by the introduction of the SRA's proposed new Greater Western franchise in 2006 inasmuch as this may lead to more integrated service provision with fewer disparate rolling-stock types.

We are working with the SRA to produce a Route Utilisation Strategy (the Great Western RUS began in early 2004).

The Southwest and Thames Valley RPAs will cover this route and both are due in winter 2005.

The Looe Valley line and the St Ives branch are proposed as pilot routes to test a range of the initiatives in the SRA's strategy for Community Railways, which is currently out for consultation.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

Route 12		Current route capability	
<b>Journey times</b>		1 April 2004	
Reading - Exeter		1 hr 38min	
Exeter - Plymouth		55min	
Plymouth - Penzance		1 hr 47min	
<b>Linespeed (km of track)</b>			
Up to 35mph		70	
40-75mph		497	
80-105mph		464	
110-125mph		151	
<b>Gauge (km of route)</b>			
W6A		771	
W7		433	
W8		155	
W9		-	
W10		-	
<b>Axle weight (km of track)</b>			
Up to 20.3 tonnes (RA 1-6)		270	
20.4 tonnes - 24.1 tonnes (RA 7-9)		911	
24.2 tonnes - 25.4 tonnes (RA 10)		-	
<b>Total km of track</b>		1181	
<b>Total km of route</b>		771	

Route 12		Baseline route capability changes			
	Year of change	Current value	New value	Reason for change	
<b>Linespeeds (km of track)</b>					
40-75mph	2004/5	497	508	See note 1	
<b>Axle weight (km of track)</b>					
20.4 tonnes - 24.1 tonnes (RA 7-9)	2004/5	911	922	See note 1	
<b>Total km of track</b>	2004/5	1181	1192	See note 1	

Note 1: This change is as a result of doubling the single-line between Probus and Burngallow.

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 12 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	22	15	15
Structures	21	21	34
Signalling	10	6	8
Electrification	0	0	0
Plant & machinery	3	3	7
Telecoms	1	0	1
Stations	6	5	6
Depots	3	2	2
Lineside	2	3	4
<b>Total renewals</b>	<b>68</b>	<b>56</b>	<b>77</b>
<b>Committed and planned enhancements</b>			
Probus-Burngullow dualling	9	-	-
Region UPS Phase 1 Works	1	-	-
<b>Total committed and planned enhancements</b>	<b>11</b>	<b>-</b>	<b>-</b>

<b>Route 12 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	27	14	1
Sleeper renewal (km per year)	28	12	8
Ballast renewal (km per year)	21	15	-
S&C renewal (units per year)	11	-	8

## Engineering access

Engineering access on this route varies from being fairly restrictive on the main line to reasonably available on the branches. In many areas access is available on overnight possessions with consent from affected operators. Wherever possible, possessions are managed to ensure that a route is available to the West. The main considerations include no concurrent possessions from Southcote Junction to Exeter, or Bristol to Cogload Junction and Bathampton Junction to Bristol, or Bathampton Junction to Westbury. In addition there are restrictions on Friday night possessions throughout the summer to cater for the holiday market.

A different approach to heavy maintenance of the numerous West of England branches has been developed where workload requirements are such as to warrant extended midweek possessions and bus substitution by agreement with the operator Wessex Trains.

There is a requirement for a number of major possessions on this route in 2004/05 and 2005/06 and those already planned include the following:

- one 72hr possession in November 2004 to commission the reinstatement of double track between Probus and Burngullow;
- two 100hr possessions in September 2004 for structures work between Castle Cary and Cogload Junction (east of Taunton);

- one 100hr possession in March 2005 for structures renewals between Westbury and Cogload Junction;
- two 100hr possessions in June 2005 for structures renewals between Castle Cary and Cogload Junction;
- one 73hr possession in May 2005 for over-bridge works at Staffords Bridge (between Tiverton Parkway and Exeter St. Davids);
- five 103hr possessions (in October 2004, in February 2005 and in March 2005, and two in November 2005) for maintenance works on the Exeter to Barnstaple branch;
- two 53hr possessions (in September 2005) for structures works on the Exeter to Exmouth branch;
- three 103hr possessions (in November 2004, March 2005 and October 2005) for maintenance works on the Newton Abbot to Paignton branch;
- five 103hr possessions (in September and October 2004, in March 2005, and two in October 2005) for maintenance works on the Plymouth to Gunnislake branch;
- six 106hr possessions (two in October 2004, two in April 2005, and two in October 2005) for maintenance works on the Liskeard to Looe branch;
- six 106hr possessions (in October and November 2004, two in April 2005, and two in November 2005) for maintenance works on the Par to Newquay branch;
- eight 102hr possessions (two in April 2004, two in November 2004, two in May 2005, and two in December 2005) for maintenance works on the Truro to Falmouth branch;
- six 106hr possessions (two in November 2004, two in May 2005, and two in November 2005) for maintenance works on the St. Erth to St. Ives branch; and
- one 54hr possession in August 2005 for maintenance works on the freight-only branch from East Somerset Junction to Cranmore.

## Maintenance and renewal

### Track

The locations of the key areas of work are shown on the diagram and where they involve significant engineering possessions details are provided in the engineering access section.

### Structures

The key items are as follows:

- tiebar and brickwork repairs at Lavington viaduct (between Pewsey and Westbury) in 2005/06;
- reconstruction of the Chocolate Poodle underbridge (near Lavington) in 2004/05;
- repairs, painting and redecking at Staffords Bridge underbridge (between Exeter St. Davids and Tiverton Parkway) in 2004/05 and 2005/06;
- Dawlish sea cliff stabilisation and maintenance and improvement works in 2004/05 and 2005/06;
- to corroded steelwork at Keyham viaduct (west of Plymouth) in 2005/06;
- embankment renewal works at Markwell (east of St. Germans) in 2004/05;

- repairs to Liskeard Viaduct in 2005/06; and
- repairs at Angarrack Viaduct (east of Hayle) in 2005/06.

The recent and continuing trend towards wetter winters and drier summers can have an adverse effect on cuttings and embankments, leading to an increase in the risk of landslides and subsidence. A programme of site evaluation and an associated phased programme of works to reduce these risks continues. We plan to carry out mine workings stabilisation at Dowgas on the Cornish main line, in conjunction with the Probus to Burngullow enhancement scheme described below, and to undertake cutting renewals at Buckshead (east of Truro) in 2005/06.

### Signalling

There are no major signalling renewals planned in the next three years. Exeter signal box is currently due for renewal in 2012 and the mechanical boxes in the Cornwall area are due in 2009. We plan to design replacement signalling to be compatible with future technological improvements, including European Rail Traffic Management System. Life extension work (particularly cable renewals) will be required in the short term, where current technology will be utilised.

The key items are as follows:

- renewal of a group of level crossings at Hampstead, Hungerford, Midgam and Thatcham (on the section between Reading and Westbury) over the period 2004/05 to 2006/07;
- Somerset County Council plan to build a bridge over the railway at Silk Mill (to the west of Taunton station) adjacent to the level crossing, linked to a major planned housing construction programme for Taunton. In consequence, closure of the level crossing is anticipated in 2005; and
- Renewal of barriers and upgrade works to the level crossing installation at Long Rock (near Penzance) in 2006/07.

### Electrification and plant

We will continue our programme of renewals of hot axle box detectors, on the Reading to Penzance section. We plan to renew the wheel lathe at Plymouth Laira depot in 2006/07.

### Telecoms

There are a number of signal post telephone concentrators that are approaching the end of their operational life. Plymouth is planned for renewal in 2005/06 and Westbury and Exeter are planned for renewal in 2007/08.

### Stations

A programme of works to reduce platform stepping distances is being progressed including Saltash, Exeter St.Thomas and Starcross stations.

Following successful Rail Passenger Partnership bids coupled with funding from other parties, works are being undertaken to improve passenger facilities and interchange arrangements at Liskeard. Through ever strengthening working partnerships with local councils, external funding continues to be provided to undertake minor station improvements in Devon and Cornwall. At Bere Alston we are planning station repairs in 2004/05.

### Depots

Renewal of carriage washing equipment at Plymouth Laira and Penzance Long Rock depots is planned in 2005/06.

### Other operational property

We plan to continue routine maintenance and repair of other property, as well as continuing our programme of asbestos removal from lineside buildings.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The Great Western joint board meets at monthly intervals and comprises representatives of Network Rail, all TOCs using Great Western region infrastructure, the infrastructure maintenance contractors, SRA and ORR, and focuses particularly on performance issues at a strategic level.

Area delivery groups at Reading (for the Thames Valley) and at Bristol (for the West Country) contribute schemes at a local level. An example of an ADG initiative for the Reading to Penzance route is for improved fencing at specific locations in Devon and Cornwall to minimise the impact of livestock incursions.

## Other committed enhancements

A seven-mile section of the route, between Burngullow (to the west of St. Austell) and Probus (to the east of Truro) on the Cornish main line, was singled in the 1980s to avoid permanent way renewals and to minimise maintenance costs at a time when there was no projection of traffic growth. The growth that has occurred since then has placed increasing pressure on this "bottleneck" and redoubling of this long single-track section will remove a considerable operating constraint and improve performance and capacity so as to meet demands on this increasingly busy stretch of railway. The scheme is funded by the SRA and Cornwall County Council.

## Route development

Westbury is a key location for National Logistics Unit activity in relation to ballast train and other movements over a wide area. Expansion of this activity is planned during 2004/05, as a consequence of which passenger rolling-stock stabling facilities used by Wessex Trains will be relocated from the up side yard to a new location between Westbury station and Hawkeridge Junction on the line towards Trowbridge.

Cornwall County Council have an aspiration to see increased frequencies of passenger train operation between Truro and Falmouth. A scheme is being developed to increase the capacity of the single-line by the addition of an intermediate passing-loop, together with alterations to the arrangements at Penwithers Junction on the Cornish main line, west of Truro station, in order to permit a half-hourly frequency of operation. Additional rolling stock would be needed to sustain improved frequencies, and additional operating costs would be directly funded by Cornwall County Council. The pattern of train services might include additional running between Falmouth, Truro and Par in order to improve frequencies to and from St. Austell station.



## Emerging issues

As service provision to the west is by means of through trains from London Paddington, growth and flexibility on that corridor are constrained by the availability of GWML main line paths between London and Reading. Cross-country services from Birmingham and the north to Devon and Cornwall are usually formed of newly-introduced single 4-car or 5-car “Virgin Voyager” units, which generally replaced longer 8 coach “Intercity 125” units or loco-hauled trains at more regular hourly intervals, and thus future passenger growth is expected to be catered for by lengthened formations.

The flat junction at Southcote, near Reading, limits flexibility. The Southampton to West Coast freight upgrade project, which we are jointly developing with the SRA, includes an option for an additional track and a revised junction layout at Southcote. This scheme and its status are described in more detail in section 3.

Between Newton Abbot and Plymouth, steep gradients and long signal sections limit capacity. We support the SRA’s long-term proposals to reduce signalling headways between Totnes and Plymouth as a solution to this issue.

Between Plymouth and Penzance, several single-track sections, especially Probus (near Truro) to Bumgullow (near St. Austell) and the Royal Albert Bridge at Saltash restrict timetable flexibility. The scheme to redouble the track between Probus and Bumgullow is described above. Other single-track sections in the west of England which give rise to pinchpoints have been identified within the IOS programme, but are not currently being pursued.

The route is exposed in times of stormy weather, particularly at Dawlish, where the track runs adjacent to the sea. On the main line north of Exeter St. Davids there are frequent occurrences of flooding. Works continue to reduce these risks to our infrastructure.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 12 Capacity and operational constraints

<b>A</b>	Reading - Westbury: flat junction at Southcote limits flexibility
<b>B</b>	Reading - Westbury: mixed use railway for passenger and heavy freight trains of varying speeds between Southcote Junction and Bedwyn
<b>C</b>	Castle Cary - Cogload Junction: 8min headway restricts capacity
<b>D</b>	Newton Abbot - Plymouth: capacity limited by steep gradients and long signalling sections. 6min headway to Totnes and 8min headway to Tavistock Junction
<b>E</b>	Plymouth - Penzance: timetable flexibility restricted due to single-line sections, including the Royal Albert bridge at Saltash, at Largin Viaduct (east of Bodmin Parkway), from Burmgullow to Probus (between St. Austell and Truro) and from Marazion to Penzance

### Route 12 Other issues on the route

<b>1</b>	Taunton - Exeter: Cowley Bridge area (north of Exeter) is subject to serious flooding
<b>2</b>	Exeter - Newton Abbot: the route is exposed to stormy weather where the track runs adjacent to the sea, especially between Dawlish and Teignmouth

### Route 12 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 Redoubling of Burmgullow to Probus section	E	6
<b>B</b>	2004/05 Structures renewals between Westbury and Cogload junction	R	
<b>C</b>	2005/06 Structures renewals between Castle Cary and Cogload junction	R	

## Network Rail

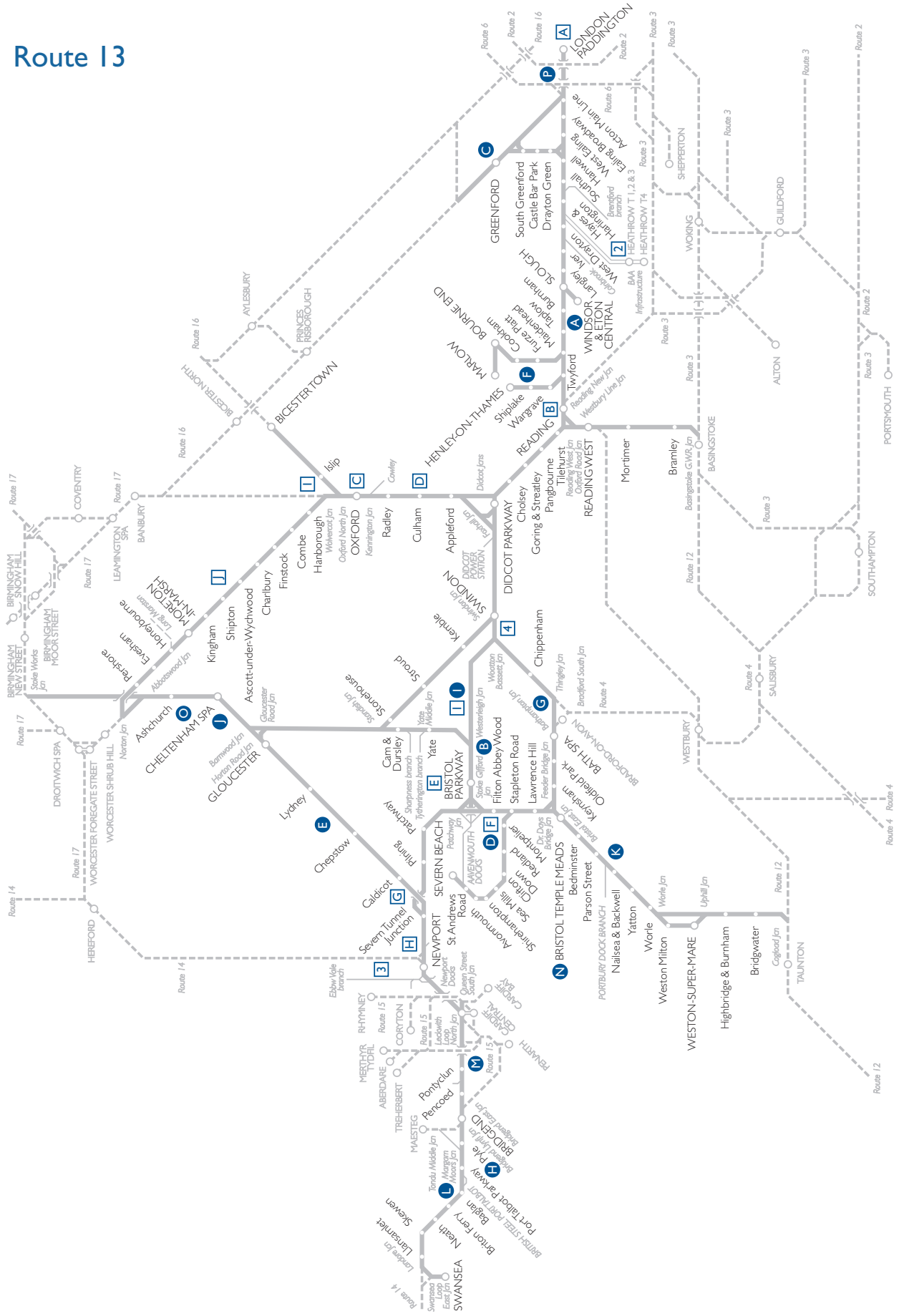
### Route 12 Planned projects

	Project description	Type of work	Dev. Level
<b>D</b>	2005/06 Bridgeworks at Staffords Bridge	R	
<b>E</b>	2004/05-2005/06 Heavy maintenance works on the Exeter to Barnstaple branch	R	
<b>F</b>	2005/06 Heavy maintenance works on the Exeter to Exmouth branch	R	
<b>G</b>	2004/05-2005/06 Heavy maintenance works on the Newton Abbot to Paignton branch	R	
<b>H</b>	2004/05-2005/06 Heavy maintenance works on the Plymouth to Gunnislake branch	R	
<b>I</b>	2004/05-2005/06 Heavy maintenance works on the Liskeard to Looe branch	R	
<b>J</b>	2004/05-2005/06 Heavy maintenance works on the Par to Newquay branch	R	
<b>K</b>	2004/05-2005/06 Heavy maintenance works on the Truro to Falmouth branch	R	
<b>L</b>	2004/05-2005/06 Heavy maintenance works on the St. Erth to St. Ives branch	R	
<b>M</b>	2005/06 Heavy maintenance works on the East Somerset Junction to Cranmore branch	R	
<b>N</b>	2004-2006 Structural works between Pewsey and Westbury	R	
<b>O</b>	2004/05/06 Sea-cliff stabilisation works at Dawlish	R	
<b>P</b>	2005/06 Steelwork repairs at Keyham viaduct	R	
<b>Q</b>	2004/05 Embankment renewal works at Markwell	R	
<b>R</b>	2005/06 Repairs to Liskeard viaduct	R	
<b>S</b>	2005/06 Repairs to Angarrack viaduct	R	
<b>T</b>	2005/06 Cutting repairs at Buckshead	R	
<b>U</b>	2004-2007 Level crossing renewals between Reading and Westbury	R	
<b>V</b>	2005/06 Closure of Silk Mill Level Crossing	E	
<b>W</b>	2006/07 Level crossing upgrade at long Rock	R	
<b>X</b>	2006/07 Renewal of wheel lathe at Laira depot	R	

### Route 12 Planned projects

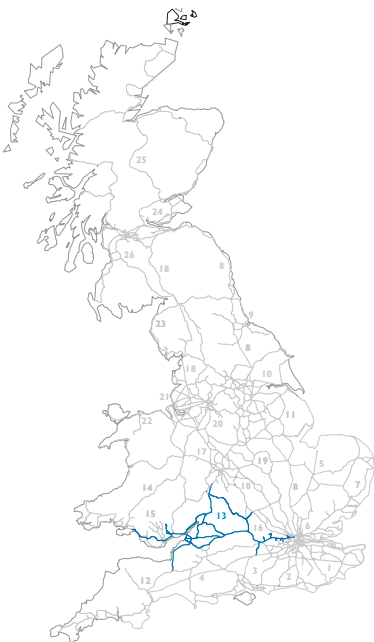
	Project description	Type of work	Dev. Level
Y	2005/06/07 Renewal of signal post telephone concentrators at Westbury, Exeter and Plymouth panel signal boxes	R	
Z	2004/05 Station repairs at Bere Alston	R	
AA	2005/06 Renewal of carriage washing equipment at Laira depot	R	
AB	2005/06 Renewal of carriage washing equipment at Long Rock depot	R	

# Route 13



# Route 13: Great Western Main Line

## Route description



### Physical description

The principal components of the route are:

- the Great Western main line (GWML), which consists of the route from London to Bristol and Swansea. The route between Paddington and Didcot, and Severn Tunnel Junction and Cardiff is four-track railway; other sections are two-track. Linespeed between London - Bristol Parkway and London - Chippenham is 125mph and elsewhere it is 75-100mph. The relief line linespeeds between Paddington and Didcot vary between 60-100mph;
- other route sections which include:
  - the four Thames Valley branch lines (to Greenford, Windsor and Eton Central, Marlow and Henley on Thames);
  - Reading to Basingstoke;
  - Didcot to Wolvercot Junction (just north of Oxford);
  - Oxford to Bicester Town;
  - Oxford (Wolvercot Junction) to Norton Junction (near Worcester) known as the Cotswold Line;
  - Swindon to Standish Junction (near Gloucester);
  - Gloucester to Severn Tunnel Junction; and
  - Bant Green (at the southern outskirts of Birmingham) to Taunton (Cogload Junction) via Gloucester.

These sections are mainly two-track with the exception of the following stretches of single track, namely Swindon to Kemble, and Worle Junction to Uphill Junction via Weston-super-Mare, Oxford (North Junction) to Bicester Town, and Bristol (Narrowways Hill Junction) to Severn Beach. The Cotswold Line is mainly single track, with stretches of double track and passing loops at stations. Linespeeds vary between 50-100mph; and

- freight branches to Brentford, Colnbrook, Oxford (Cowley), Ebbw Vale, Sharpness Docks, Tytherington and Bristol Portbury Docks and the section of route between Stoke Gifford (West) and Avonmouth.

The four-track section between Paddington and Airport Junction, leading on to the double-track branch to Heathrow Airport, owned by British Airports Authority (BAA), is 25kV AC electrified.

Most of the route west of Slough is controlled from ten panel signal boxes dating mostly from the 1960s, and the first of these due to be renewed, by 2005/06, is Port Talbot (East) panel. An eleventh box (Slough "New") controlling the London end of GWML replaced Old Oak Common PSB in the early-1990s, to facilitate construction of the North Pole Eurostar depot and electrification in connection with construction of the Heathrow Airport branch. Much of the permanent way on GWML dates from the late 1960s and early 1970s having been installed prior to the introduction of 125mph running between London and Bristol (via Bath) and Bristol Parkway (via Hullavington). The overall structures and maintenance workload on GWML is influenced by the requirements of the four-mile long Severn Tunnel, and its associated pumping station at Sudbrook, on the Monmouthshire side of the River Severn. Increased attention is being given to finding a long-term solution to the tendency for flooding of the tunnel at Chipping Sodbury, between Swindon and Bristol Parkway, in view of the extreme disruption caused by closure and diversion of traffic.

Broadly, almost two thirds of the route is primary, and about a sixth each is secondary and freight only, with a small portion of London and south-east and rural.

## Market served

Lines on this route serve a wide range of markets, including commuter flows into London, Reading and Bristol, and business and leisure travel.

## Growth

Growth is forecast to continue, particularly in the Thames Valley corridor between London and Oxford. Further expected growth in the freight market on the Southampton-West Coast axis will increase pressure on capacity between Reading and Didcot and between Didcot, Oxford and on to Banbury via the Cherwell Valley. Freight growth (in power station coal traffic) has also been experienced between Avonmouth and Didcot via Bristol Parkway, and volumes are expected to grow further over the critical 2-track section of GWML between Didcot and Wootton Bassett Junction.

## Current use

### Current traffic

The train operating companies who provide services over this route are First Great Western, Thames Trains, Heathrow Express, South West Trains, Wessex Trains, Arriva Trains Wales, Central Trains and Virgin Cross Country. Freight operators over the route include EWS, Freightliner and Direct Rail Services.

The majority of the route is served by fast, long-distance services radiating from London, generally provided by 8-coach InterCity 125 multiple-unit formations with certain off-peak or contra-peak services provided by 5-coach Adelante trains. A number of these services run through to destinations beyond the defined GWML to Hereford, West Wales and Devon and Cornwall. On the cross-country components of the route, those lines radiating from Birmingham New Street to the south coast and to the south-west of England, services are mostly provided by 4-coach or 5-coach Virgin Voyager trains. Thames Valley branch line services are largely self-contained, and generally connect into secondary outer London suburban services, which use the relief lines between London and Didcot. On the Stroud Valley line between Swindon and Gloucester an increasing number of services are now operated as through trains from London, rather than as local shuttles. Following the 2003 national recast of Virgin Cross Country services, Gloucester is now mainly served by Central Trains on an hourly semi-fast Birmingham to Cardiff (via Chepstow) axis, and by local Wessex Trains services running between Bristol, Cheltenham and Worcester. Stopping services between Gloucester and Cardiff are operated by Arriva Trains Wales.

In the passenger market, recent frequency increases of core First Great Western services (from London Paddington to Bristol Temple Meads via Bath, and to Cardiff via Bristol Parkway) both from hourly to half-hourly throughout much of the day, taken together with the 4tph frequency of Heathrow Express service, have consumed almost all of the main-line capacity between London and Reading, which is further constrained by platform limitations at Paddington. Similarly, the recent doubling-up to half-hourly frequency of core cross country services between Birmingham and Reading and Birmingham and Bristol has further constrained available network capacity for additional services.

<b>Route 13 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	95,124	18,542	113,666
Train tonne km per year	8,659	5,517	14,176
Average no of train km per track km per day			88
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Paddington - Heathrow Airport Junction			690
Heathrow Airport Junction - Reading			490
Reading - Didcot			360
Newport - Cardiff			280
Didcot - Oxford			240

## Projected use

In the short-term there is very little scope for further enhancements of train service frequencies but in the medium-term longer trains and timetable changes resulting from the merger in franchises will cater for growth in passenger numbers. In the longer-term it may be necessary to establish whether additional infrastructure is required.

The route was the subject of a major upgrade in the mid 1970s, and as a result the majority of track and signalling assets are gradually approaching the end of their design life. We are therefore planning to undertake targeted renewals in the short and medium term, to maintain and improve performance levels. At the same time a limited number of key capacity improvement schemes are at an early stage of joint development with the SRA and these are addressed below.

Prior to this, and as outlined throughout this section of the route plan, the London end of this route is operating at near capacity for large parts of the day. The SRA is sponsoring a plan to improve timetable integration between the Thames Trains and First Great Western franchises, which will commence in December 2004, prior to creating a Greater Western franchise to come into operation in 2006. We are assisting in the analysis of the performance benefits of the proposals, including mainline services operated with 125mph rolling stock thus allowing the introduction of a fully integrated timetable on all the core routes with improved track capacity utilisation as well as enabling some growth in seating capacity in the Thames Valley. The first route to gain a capacity increase, in terms of seats offered, is likely to be the Cotswold route between Oxford, Worcester and Great Malvern if 5-car Adelante trains are substituted for 3-car class 166 Thames Turbo trains.

Proposals are being developed by Heathrow Express to introduce stopping trains from Paddington to Heathrow, at half-hourly intervals. These would utilise relief line paths between Paddington and Airport Junction, immediately west of Hayes station, relinquished by a corresponding number of inner suburban stopping services between Paddington and Slough which will be withdrawn. This would increase frequencies on the branch line from Airport Junction to Heathrow from 4-6tph. Introduction will depend on delivery and acceptance of new electric multiple unit stock.

### **Strategic framework for the route**

We are working with the SRA on the RUS for GWML, which started in early 2004. The findings of earlier studies will be selectively assessed and evaluated to assist this process.

The South West and Thames valley RPAs will cover this route and are due in Winter 2005.



## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 13</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Paddington - Reading		25min
Swindon - Bristol Temple Meads		40min
Bristol Temple Meads - Cardiff		43min
Swindon - Severn Tunnel Junction (via Gloucester)		1 hr 44min
Birmingham - Reading		1 hr 27min
Birmingham - Bristol		1 hr 24min
Worcester Shrub Hill - Oxford (Thames Turbo)		1 hr 9min
<b>Linespeed (km of track)</b>		
Up to 35mph		84
40-75mph		615
80-105mph		701
110-125mph		712
<b>Gauge (km of route)</b>		
W6A		1041
W7		805
W8		797
W9		38
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		81
20.4 tonnes - 24.1 tonnes (RA 7-9)		2031
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>2113</b>
<b>Total km of route</b>		<b>1041</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 13 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	104	175	130
Structures	29	29	26
Signalling	23	52	56
Electrification	-	-	-
Plant & machinery	2	2	5
Telecoms	3	2	2
Network Rail managed stations (London Paddington)	3	1	7
Stations	5	2	0
Depots	4	1	0
Lineside	0	-	-
<b>Total renewals</b>	<b>174</b>	<b>264</b>	<b>227</b>
<b>Committed and planned enhancements</b>			
Old Oak Common - wheel lathe installation	4	0	-
Paddington long-term vehicular access	4	3	2
Paddington MacMillan House retail	2	-	-
Other	0	0	0
<b>Total committed and planned enhancements</b>	<b>10</b>	<b>3</b>	<b>3</b>

<b>Route 13 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	78	111	112
Sleeper renewal (km per year)	67	139	110
Ballast renewal (km per year)	90	149	143
S&C renewal (units per year)	51	70	60

## Engineering access

Engineering access on this route varies from being fairly restrictive on the mainline to reasonably available on the branches. In the four-track areas at the London end of the route overnight two-track maintenance possessions are taken for up to 8hrs every night. The remainder of the route relies upon a cyclical maintenance strategy, which involves weeknight diversions on some of the key sections.

The vast majority of renewals and enhancement work is undertaken at weekends and the track possession plan is constructed on a region wide basis to ensure that on most weekends at least one route is available from London to Bristol and South Wales. This possession strategy also needs to intertwine with other key routes throughout the rest of the country.

Over the next three years there will be a large number of renewals undertaken on the Great Western Main Line and this will inevitably result in an increase in the number of possessions. Detailed planning for 2005/06 has been completed and outline planning is already underway with our customers for 2006/07 and 2007/08.

There is a requirement for a number of major possessions on this route in 2004/05 and 2005/06 and those already planned include the following:

- over Christmas 2004 a 4-day complete closure of the line at Paddington for S&C renewals;
- in late June 2004 a 14-day blockade of the line between Bristol Temple Meads and Bristol Parkway for the remodelling and enhancement of Filton Junction, after an initial 52hr possession during Easter 2004. A greatly reduced passenger service will operate between Bristol and South Wales during this period, featuring an hourly joint Wessex Trains/Arriva Trains Wales Cardiff-Bristol service and an hourly Virgin Cross Country service;
- during August 2004 a 12-day closure of the line between Wootton Bassett Junction (west of Swindon) and Bristol Parkway to undertake flood alleviation works at Chipping Sodbury. In addition track renewals at Callow Hill and at Hullavington will be carried out during this blockade;
- during August 2004 a 3-day blockade between Langley and Maidenhead for extensive S&C renewals to the east and west of Slough station;
- in December 2004/January 2005 a midweek closure of the line between Swindon and Bristol Parkway to undertake S&C renewals at Westerleigh Junction. This possession will also block the main line from Bristol to Gloucester, Cheltenham and Birmingham;
- two 53hr possessions in March 2005 for S&C renewals between Slough West and Ruscombe (east of Twyford);
- one 52 hr possession in March 2005 is planned for signalling commissioning between Old Oak Common West and Northolt Junction, and Drayton Green Junction and Greenford;
- two 15-day blockades (in April and May 2005) are planned for tunnel repairs, one for each of the Patchway tunnels (to the west of Bristol Parkway, on the line to South Wales), which will necessitate single-line working and diversions via Gloucester;
- one 55hr possession in April 2005 is planned for S&C renewals between Clifton Down (on the Severn Beach branch) and Holesmouth Junction;
- one 52hr possession in May 2005 for S&C renewals between Royal Oak and Ladbrooke Grove, on the 6-track section outside London Paddington station, which will require restricted services over a reduced number of lines;
- two 52hr possessions in May 2005 for plain line track renewals between Swindon and Westerleigh Junction (to the east of Bristol Parkway) and between Swindon and Chippenham, which will necessitate diversions via Gloucester and via Newbury respectively;
- one 75hr possession in May 2005 for structures renewals between Oxford and Aynho Junction (south of Banbury);
- one 60hr possession in May 2005 for S&C renewals on the relief lines between Slough (West) and Reading (East), necessitating traffic to be confined to the main lines;
- five 53hr possessions in July and August 2005 for plain line and S&C track renewals between Gloucester and Severn Tunnel Junction, which will necessitate diversions via Bristol Parkway;
- one 53hr possession in August 2005 for plain line and S&C track renewals between Swindon and Standish Junction (south of Gloucester); and
- six 52hr possessions over the period September-November 2005 for plain line track renewals between Bath and Bristol.

## Maintenance and renewal

### Track

A major track upgrade was undertaken in the mid 1970s to facilitate the introduction of High Speed Trains. Signalling infrastructure, plain line and S&C renewal requirements form the base line for the current route strategy as well as the basis for the Great Western upgrade study completed last year. In order to efficiently address both asset and operational issues, our strategy is for targeted renewals based on asset conditional risk analysis as well as operational importance.

The plain line track renewals programme has been prioritised and planned and will ensure that up to 150 TSRs will be avoided in the coming year. Track renewal can involve three main elements: rail, sleepers and ballast; depending on the nature of each site the planned renewal will incorporate one or more of these elements.

Significant volumes of S&C works are being planned for Newport during the period of 2004-2006. This is aimed at improving the track quality, reducing the risk of more TSRs as well as maintaining the operational flexibility of the layout.

The locations of the key areas of work are shown on the diagram and where they involve significant engineering possessions details are provided in the engineering access section.

### Structures

The route has a large number of structures, and where possible, renewals will be designed so that the alignment and span width do not hinder plans for additional tracks and linespeed improvements in the future. Various locations across the route have been identified for attention including:

- steelwork repainting at Waltham Siding Road overbridge (west of Maidenhead) in 2004/05;
- drainage and cutting repairs at Sonning (east of Reading) in 2004/05;
- continuing steelwork and timbers repairs at Shiplake in 2004/05;
- repairs to steelwork and girders at Challow in 2004/05;
- continuing repairs including waterproofing and repointing at Box Tunnel in 2004/05;
- repairs to the lining of Sapperton Long Tunnel in 2004/05;
- strengthening of the Blaise overbridge at Henbury (between Bristol Parkway and Avonmouth) in 2004/05;
- brickwork and masonry repairs to the Severn Tunnel over the period 2004/05 to 2006/07;
- repointing work on the river Usk viaduct (east of Newport station) in 2004/05; and
- masonry and steelwork repairs to the Water Street underbridge (between Pyle and Port Talbot) in 2005/06.

### Earthworks

The recent and continuing trend towards wetter winters and drier summers can have an adverse affect on cuttings and embankments, leading to an increase in the risk of landslides and subsidence and a programme of site evaluation and an associated phased programme of works to reduce these risks continues.

Various locations across the route have been identified for attention, including:

- cutting renewal at Moreton (east of Didcot) in 2005/06;
- embankment renewal at Marston (Acom Bridge) and Marston West (east of Swindon) in 2005/06;
- drainage repairs at Hay Lane (west of Swindon) in 2004/05;
- embankment renewal at Christian Malford (west of Swindon, on the South Wales line) in 2004/05 and 2005/06;
- flood alleviation works at Chipping Sodbury (west of Swindon, on the South Wales line) in 2004/05;
- embankment renewal at Westerleigh and Coalpit Heath (east of Bristol Parkway) in 2005/06;
- drainage works in Patchway cutting (west of Bristol Parkway, on the South Wales line) in 2004/05 and 2005/06;
- cutting renewal at Severn Tunnel East in 2004/05;
- cutting renewal to continue at Churchdown (south of Cheltenham) in 2004/05; and
- cutting renewal at Flax Bourton (between Bristol Parson Street Junction and Nailsea) to continue in 2004/05 and 2005/06.

### Signalling

We are currently engaged in developing a long-term signalling renewal strategy for the region.

Our asset strategy is to design any replacement systems to be compatible with future technological improvements such as ERTMS and to ensure interoperability standards are met. However, some life extension work will be required in the short term, where current technology will be used.

The first panel signal box due for renewal on this route is the eastern part of Port Talbot in South Wales. We are currently finalising the scope of the project and implementation is scheduled to take place in 2005/06. Over the following 10 years all major panel boxes on this route will need renewal.

The signal box at Greenford is due for rewiring in 2004-2006, which will have to be carried out and the box retained, as it is not possible for its functionality to be taken on by the adjacent Slough New IECC, which is at full capacity. Reinstatement works at Ladbroke Grove (including track) will continue into 2004/05 and 2005/06.

Key items due for renewal are as follows:

- Reading panel box is currently due for renewal in 2012. We have highlighted the opportunity to develop jointly with the SRA a scheme to renew and increase the flexibility of the network through the Reading area by improving the signalling system. These options will be developed as part of the Southampton to West Coast freight upgrade project;
- St. Georges level crossing near Cardiff will have its signalling rewired and upgraded in 2004/05 and 2005/06;
- plans are being developed for the resignalling of the Newport and Cardiff panel boxes from 2005/06 onwards as well as cable renewal in the next three years;
- a three-year programme of signalling cable renewals will be undertaken in the Bristol panel box area between 2004/05 and 2006/07;
- upgrade works to the Avonmouth level crossing in 2004/05;

- renewal of location cases and level crossing barriers machinery at Awre (between Gloucester and Severn Tunnel Junction) by 2006/07; and
- upgrade works to the Morris Hill level crossing (north of Cheltenham Spa station) in 2005/06 and 2006/07.

### Electrification and plant

We will continue our programme of renewals of hot axle box detectors, standby generators and point heaters, and a phased programme of power distribution renewals.

We will be working with BAA to understand the electrification and plant issues necessary for the construction of the new rail facility to serve Heathrow Terminal 5. Infrastructure control of the Heathrow branch is expected to transfer to BAA.

Key items due for renewal are as follows:

- at Sudbrook pumping station a programme of renewal work is planned to commence in 2006/07 and run for four years. This will involve work on the lift shafts, pumps, wiring and ventilation;
- a programme of uninterruptible power supply (UPS) installation is planned at Reading in 2005/06, and in South Wales to reduce the number of SPADs; and
- renewals of 650v cables at Landore (Swansea), at Standish Junction and at Ruscombe (between Slough and Reading) are underway and planned to continue in 2004/05.

### Telecoms

A programme of signal post telephone (SPT) concentrators renewals continues along much of the route for the next four years, at panel boxes at Slough, Swindon, Gloucester, Bristol, Newport, Cardiff and Port Talbot. A number of fixed telecoms network synergy schemes are also being implemented in conjunction with the SPT concentrator and resignalling schemes to support the asset renewal and deliver efficiencies.

### Network Rail managed stations

#### *Paddington*

Work on the new long-term vehicular access project over the station throat began in 2003. This project will deliver improved vehicular access to the station and for taxis in particular. Importantly it also delivers the connection between the highway and the access to span 4, the part of the station, which is to be redeveloped.

Westminster City Council and English Heritage have both now resolved to grant (subject to usual conditions and completion of a legal agreement for certain matters) consent for the span 4 redevelopment comprising the remodelling of platforms 9-14 to provide one extra and one longer platform which together create a 27% increase in capacity, a new road access deck and new North Eastern concourse to serve both the LUL Hammersmith and City Line and the main line station with commercial air rights above.

Timely delivery of the span 4 redevelopment which incorporates a new arrangement for taxis will simplify the programming, reduce the level of disruption and reduce the cost of Crossrail which itself requires the part of the station now used by taxis to facilitate its construction. Delivery of span 4 is itself dependant upon the availability of funding.

### Other stations

A programme of repairs and renewals to stations in the Thames Valley, Bristol and South Wales areas will be undertaken over the next three years.

### Depots

The route has three major train-care depots in the Old Oak Common area. The near continuous demand for access and egress to and from these depots places a constraint on the availability of possessions, to allow our maintenance contractors to access the railway for essential heavy maintenance. The key activities include:

- a programme of depot repairs and renewals at Old Oak Common 2004/05;
- renewal of the carriage washing plant at Old Oak Common/Kensal Green in 2004/05;
- drainage and water supply repairs at Cardiff Canton depot in 2004/05;
- upgrade and renewals works at St. Phillips Marsh depot (in Bristol) in 2004/05 and 2005/06;
- working with Heathrow Express to develop a scheme to expand their Old Oak Common facility for the introduction of additional trainsets in 2005; and
- installing a new wheel lathe at Old Oak Common in 2004/05.

### Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The Great Western joint board meets at three-monthly intervals and comprises representatives of Network Rail, all TOCs using Great Western region infrastructure, infrastructure maintenance companies, SRA and ORR, and focuses particularly on performance issues at a strategic level.

Area delivery groups at Reading (for the Thames Valley), Bristol (for the West Country) and Cardiff (for South Wales and Marches) contribute schemes at a local level. A specific example of an ADG initiative for Great Western Main Line is installation of bridge monitoring equipment at two locations on the cross-country section north of Cheltenham, and the probable fitment of anti collision beams at these locations.

### Land implications

We have identified a number of land requirements in connection with major SRA led upgrade programmes. Depending on how the schemes are developed land may be required at Paddington and Reading.

## Other committed enhancements

Design is now at an advanced stage for installation of a double-lead junction at Filton, between Bristol Parkway and Bristol Temple Meads, where Cross Country services interact with Wessex Trains services between Cardiff and Bristol/Portsmouth, and which is scheduled for completion by December 2004. This scheme incorporates a significant renewals element. In advance of the work being undertaken in the Filton Junction area a small signalling scheme is planned for Holesmouth Junction. This will provide a diversionary route via Clifton Down whilst the main works are undertaken.

## Route development

The Southampton to West Coast freight upgrade, described in section 3, would impact upon Great Western Main Line between Reading, Didcot and Oxford.

We continue to work with BAA regarding extension of their branch from Airport Junction to Heathrow Airport to the projected terminal 5, for which we are currently the infrastructure controller.

Following the successful construction of the new Swindon platform 4 and its beneficial effect on GWML performance, a further scheme to improve performance is under consideration for up direction services. This would involve S&C upgrade to the west of Swindon station to allow redesignation of the up goods line to become the up main line, exploiting the better alignment of this track with the existing up platform, which would yield a faster approach to the station, and reduced delays to up freight services. These would then normally use the existing up main line, with reduced conflicts and elimination of the delays associated with the present 25mph entry speed to the up goods loop.

At Bristol Parkway station, consideration will be given to the provision of additional platform capacity through adaptation of the existing up platform and adjacent goods loop, in order to reduce delays caused by performance perturbations on the London-South Wales and Birmingham-Bristol corridors where these share the route between Westerleigh Junction and Stoke Gifford West Junction, to the west of Bristol Parkway station.

Freight services from Newport (Park Junction) to Ebbw Vale ceased in 2002, after closure of the Corus steelworks at Ebbw Vale. The Welsh Assembly Government has an aspiration to upgrade this route in order that a new stopping passenger train service could be operated between Cardiff and Ebbw Vale, serving a number of new stations on the branch. We are assisting with the feasibility study.

Rhondda Cynon Taff local authority propose that a new station be built on the South Wales section of the GWML, at Llanharan between Pencoed and Pontyclun stations, which would be served by stopping trains from Cardiff to Maesteg and/or Swansea. The business case for this new station is under discussion between the local authority and SRA.

On the cross-country route sections we are continuing to work with the SRA to evaluate whether minor enhancement schemes (linked to imminent permanent way renewals) are viable at locations where earlier IOS initiatives are not now being pursued.



## Emerging issues

The key strategic issue facing the route is the utilisation of the existing infrastructure to meet as much growth as is practical. The merger of the Great Western and Thames franchises, with associated efficiencies in the use of capacity, is expected to address this issue. The immediate strategy is to work with the SRA to encourage operators to run longer train formations, or to alter stopping patterns to optimise use of scarce capacity. We are also talking to SRA regarding possible alterations to the mix of rolling-stock types (90mph and 125mph sets currently share main line paths) in furtherance of this aim.

The route has several points at which capacity is constrained with a consequent impact on day-to-day operations and performance. Key issues are shown below.

### Paddington - Reading

In the longer-term our analysis suggests that route capacity on GWML could be unlocked with a significant increase in terminal capacity at London Paddington, whether through additional platforms being created as a result of alterations to span 4 or more radically by means of Crossrail implementation giving new underground platforms for inner suburban services, freeing up surface-level platforms for outer-suburban and long-distance operations. Equally, major works to create grade-separation west of Reading are likely to be needed to permit growth of passenger train frequencies on the east-west axis through Reading, and of freight on the Southampton-West Coast Main Line axis through Reading West.

At Paddington station the 14 platforms are operating at capacity at the busiest periods of the day. Details of the scheme to redevelop the north-west side of the station (platforms 9-14) providing additional platform capacity, a new station entrance, improved passenger circulation as well as a new road vehicle access deck are outlined in the Network Rail managed stations section.

Platform capacity on the main lines at Reading is a constraint to future growth and day-to-day operational flexibility. Further growth in paths is unlikely to be feasible without further enhancement in the Reading station area. The Southampton to West Coast route upgrade project would influence the ability to achieve redevelopment of the station as a consequence of the signalling renewals associated immediately west of Reading station.

At Reading increased north-south passenger and freight flows through the flat junctions where the layout is based on east-west flows, cause a timetabling conflict at Reading West Junction. The Southampton to West Coast freight upgrade project includes a flyover in this area.

### Bristol area

The layout at Bristol Parkway is restrictive for optimal timetabling and day-to-day operational flexibility. We are developing an incremental strategy with the SRA (building on the findings of the earlier IOS for this location). The principle is to establish whether additional platform capacity, which would exploit existing signalling arrangements, could be created prior to full resignalling in the longer term.

Long signal sections, slower linespeed and operational restrictions through the Severn Tunnel limit the throughput of trains to and from South Wales when compared with the layout either side of the tunnel.

### South Wales area

Intensive platform reoccupations at Newport, together with speed restrictions at the west end of the station on a curved alignment, impact upon route performance. In conjunction with planned permanent way renewals, a rationalisation scheme is being evaluated which would include the provision of a fourth platform face.

### Cross country route sections

At Bromsgrove, train operators are seeking improved performance to support greater passenger use of the station where strong growth has been experienced in response to increased service frequencies, but where main line pathing and regulation of fast passenger and trunk freight train movements is under pressure.

Consideration is also being given to upgrade of goods lines north of Oxford station to assist pathing opportunities at a location where through long-distance passenger services and freight services have increased in frequency.

### Station proposals

Reading and Basingstoke Borough Councils have aspirations to develop new stations at Green Park and Chineham on the line between Reading and Basingstoke. The councils have commissioned a transport study to look at the impact of new large business and residential developments close to the M4 motorway. We have had initial discussions on the proposals with the SRA.

### Performance issues

The operational and capacity issues listed above all have an adverse impact on performance particularly at key nodes such as Paddington, Reading, Bristol and Cardiff. Recovery from late running and perturbations to planned services is restricted by a lack of capacity and operational flexibility at key stations and junctions. To solve this in the short term we are working closely with our customers to develop robust and deliverable regulation and contingency plans. In addition to short-term actions we are working on a number of other medium and long-term operational and performance improvement schemes.

The relief line linespeeds between Heathrow Airport Junction and Reading are at a current maximum of 75mph. With a greater use of a two-track timetable, to allow increased overnight maintenance access and weekend renewal possessions on the main line, an evaluation is being made to see if a cost effective solution is possible for the raising of the linespeeds to 90mph. This would result in a slight increase in capacity and improved operational flexibility especially during times of disruption.

On the London to Bristol and South Wales route the key performance issue is the increase in the number and severity of TSRs in recent years, the impact of which has been exacerbated by increasing congestion. This will be addressed by the major programme of renewals being undertaken over the next few years.

The propensity for Chipping Sodbury tunnel to flood during wet weather continues to cause a performance problem. Flood monitoring equipment has been installed in the tunnel. We are currently developing a possible permanent solution to be implemented in Summer 2004.

The existing signalling in the Bridgend to Port Talbot area is reaching the end of its life and renewal is planned for 2005/06. At the same time we are proposing that rationalisation and a limited number of worthwhile track and signalling enhancements are undertaken to improve performance and operational flexibility in this busy two-track section.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 13 Capacity and operational constraints

<b>A</b>	Paddington station: restricted platform capacity
<b>B</b>	Reading station: flat junctions and restricted platform capacity
<b>C</b>	Oxford station: restricted platform capacity
<b>D</b>	Didcot - Oxford - Cherwell Valley corridor: two-track section capacity limitations
<b>E</b>	Bristol Parkway station: platform capacity and flexibility
<b>F</b>	Filton Junction: single-lead junction to Severn Tunnel route
<b>G</b>	Severn Tunnel: signalling headways limit capacity
<b>H</b>	Newport station: west end layout speed restrictions
<b>I</b>	Chipping Sodbury Tunnel: widespread disruption when flooded
<b>J</b>	Oxford - Worcester: single-track sections limit capacity and flexibility

### Route 13 Other issues on the route

<b>1</b>	Oxford: passenger upgrade of up goods loop
<b>2</b>	Future extension to Heathrow terminal 5
<b>3</b>	New passenger services between Cardiff and Ebbw Vale
<b>4</b>	Speed improvements at Swindon, up direction

### Route 13 Planned projects

Project description		Type of work	Dev. Level
<b>A</b>	2004/05 S&C renewals between Slough and Twyford	R	
<b>B</b>	2004/05 S&C renewals at Westerleigh Junction	R	
<b>C</b>	2004/05 Signalling renewals in Greenford area	R	
<b>D</b>	2004/05 Redoubling of Filton Junction	E	6

### Route 13 Planned projects

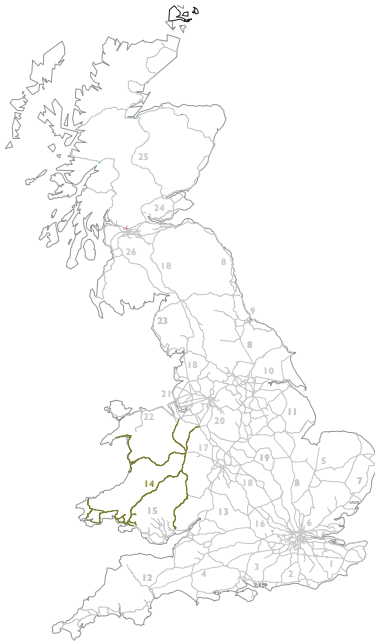
<b>E</b>	2005/06 Plain line and S&C renewals between Gloucester and Severn Tunnel Junction	R
<b>F</b>	2004/05 Structural repairs to Shiplake viaduct	R
<b>G</b>	2004/05 Waterproofing and repointing at Box Tunnel	R
<b>H</b>	2005/06 Structural repairs to Water Street underbridge	R
<b>I</b>	2004/05/06 Embankment renewals at Christian Malford	R
<b>J</b>	2004/05 Cutting renewal at Churchdown	R
<b>K</b>	2004/05/06 Cutting renewal at Flax Bourton	R
<b>L</b>	2005/06 Renewal of Port. Talbot (east) panel signal box	R
<b>M</b>	2004/05/06 Rewiring at St. Georges level crossing	R
<b>N</b>	2004/05/06 Cable renewals at Bristol Temple Meads PSB	R
<b>O</b>	2005/06/07 Upgrade works to Morris Hill level crossing	R
<b>P</b>	2004/05 Depot repairs at Old Oak Common	R



# Route 14: South and Central Wales and Borders

## Route description

### Physical description



The route comprises a number of lines radiating from Shrewsbury across the English border counties and into mid-Wales, together with the extension into rural west Wales of the London-Swansea section of Great Western main line.

The principal components of the route are:

- the Newport to Crewe and Shrewsbury to Wrexham sections of the route, which are controlled from Newport panel signal box, built in the 1960s, and 24 mechanical signal boxes, many dating from the nineteenth century and still in original condition. The route is double track with the exception of the single track Wrexham to Chester section and speeds are up to 90mph;
- the Cambrian Lines, which are controlled by a radio electronic token block (RETB) system at Machynlleth, dating from the 1980s. The route is single track with speeds of up to 80mph between Shrewsbury and Aberystwyth, and 55mph to Pwllheli;
- the lines west of Swansea, controlled from a panel signal box at Port Talbot, plus six mechanical signal boxes. The route is double track between Llandeilo Junction and Clarbston Road; the remainder is single track. Speeds are up to 75mph; and
- the Heart of Wales line from Craven Arms to Llanelli, which is controlled from one signal box at Pantyffynnon, which supervises the operation of five remote passing loops between Llandeilo and Knighton, by means of a driver-operated token system dating from the 1980s. The route is single track with speeds of up to 60mph.

Broadly, just under half of the route is rural, two-fifths secondary, and the remainder freight only.

### Market served

Traffic patterns vary considerably between the sections, with considerable long-distance flows between the West Midlands and mid-Wales over the Cambrian Lines which reflect through service provision, and similarly in west Wales where extensive interchange occurs at Swansea onto the primary network. There are long-distance flows on services between Cardiff and Manchester as well as shorter-distance flows to the primary network at Newport and at Crewe. The Cambrian Coast section feeds into and out of the Cambrian main line at Machynlleth, and conveys schools traffic to Harlech. The Heart of Wales Line is served by four trains per day through sparsely populated areas of Shropshire, Powys and Carmarthenshire.

## Growth

We expect passenger growth to continue over the coming years as further economic growth encourages additional demand for rail journeys.

Growth is expected in freight traffic over the coming years, with particular growth expected in domestic automotive.

## Current use

### Current traffic

All passenger services are provided by Arriva Trains Wales, except in west Wales where one First Great Western return train per day from London Paddington extends beyond Swansea to Carmarthen, and a summer Saturday service operates between London Paddington and Pembroke Dock. EWS freight services operate between Newport and Crewe, between Shrewsbury and Wrexham (for Shotton) and as far west as the oil refinery near Milford Haven. Freightliner services operate over the Newport to Crewe section. No freight services operate on either the Cambrian lines or the Heart of Wales line except between Pontarddulais and Llanelli.

West of Shrewsbury, the Cambrian Lines serve a largely rural catchment, and nearly all services run through from Birmingham New Street to Aberystwyth, with an element of through running to and from the Cambrian Coast section between Dovey Junction and Pwllheli, where summer traffic levels still make strengthening of trains necessary. Route performance is influenced by this through running from the West Coast Main Line, and restricted turn-round times at Birmingham New Street station, with practically fixed half-hourly slots between Birmingham and Wolverhampton which enable Arriva Trains Wales and Central Trains to offer a coordinated semi-fast service between Birmingham and Shrewsbury.

An exceptional feature of the Cambrian Lines is the very large number of level crossings of various types, which in some cases impose permanent speed restrictions. These, together with a restricted number of passing-loops on a single-track route constrain route capacity between Shrewsbury and Aberystwyth and the two-hourly frequencies currently provided represent practically full utilisation.

West of Swansea, our forecasts indicate that the change in passenger volumes is unlikely to lead to an increase number of passenger trains. The M4 motorway running west from Cardiff has, over the years, been extended and upgrading of the A48 and A40 trunk roads west of Port Talbot has made through rail journey times between south-east and west Wales less favourable relative to road. The majority of train services are provided by 2-car or single vehicle units timed to connect with London services at Swansea. The capacity of the current infrastructure is not fully utilised by existing train services, and route performance is influenced by tight connective margins with long-distance services at Swansea. Boat-train services to and from Fishguard Harbour, which connect with Stena Line sailings to Rosslare, have been losing foot-passenger volumes, and the operation of through boat-trains by First Great Western ceased in May 2003, with replacement by local Arriva Trains Wales connecting services between Swansea and Fishguard Harbour. Heart of Wales Line services generally run between Swansea and Shrewsbury, calling at all of the stations and halts. Very occasionally the route has been used as a diversionary route for freight services if a main-line closure east of Port Talbot is necessary.

<b>Route 14 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	19,929	3,489	23,419
Train tonne km per year (millions)	1,036	750	1,787
Average no of train km per track km per day			30
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Newport - Shrewsbury			60
Shrewsbury - Crewe			50
Swansea - Whitland			50
Machynlleth - Dovey Junction			30
Wrexham - Shrewsbury			30

## Projected use

No plans for increased frequencies currently exist for any sections of this route, and no further changes on the Newport-Crewe axis are anticipated after the slight alterations made in October 2003, which have left core hourly Cardiff-Manchester services in place, plus the two-hourly Shrewsbury-Crewe stopping trains, and through Holyhead-Cardiff and Liverpool - Cardiff services.

The former MoD complex at Moreton on Lugg (north of Hereford) closed some years ago, but a new flow of aggregates traffic from the site may commence in 2004, utilising an existing (but currently disused) siding connection. In west Wales the single track beyond Clarboston Road to Haverfordwest and Milford Haven limits timetable flexibility. However the prevalence of double track on most of the rest of the section leaves reasonable growth capacity should this be required, although between Swansea and Llanelli a five mile single track section (between Cockett and Duffryn) limits timetable flexibility for West Wales services connecting with London services at Swansea. The current tight reoccupations of this single-track section are caused by the need to connect with up and down London services which turn round at Swansea station, and the service is thus vulnerable to knock-on effects in the event of main-line disruption. This is not an issue for freight which is routed away from Swansea over the Swansea District freight only line, via Llangyfelach, which leaves the GWML at Briton Ferry.

The Heart of Wales line has considerable under-utilised capacity, with no expectation of frequency increases being required.

## Strategic framework for the route

We will be working with the SRA to produce a Planning Assessment for Wales, which is programmed for spring 2005.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 14</b>		<b>Current route capability</b>	
<b>Journey times</b>		<b>1 April 2004</b>	
Hereford - Shrewsbury (non-stop)			44min
Hereford - Shrewsbury (calling all stations)			55min
Shrewsbury - Crewe (non-stop)			31min
Shrewsbury - Crewe (calling all stations)			50min
Shrewsbury - Aberystwyth			1 hr 45min
Swansea - Llanelli			15min
Llanelli - Craven Arms			2hr 55min
<b>Linespeed (km of track)</b>			
Up to 35mph			142
40-75mph			863
80-105mph			335
110-125mph			-
<b>Gauge (km of route)</b>			
W6A			982
W7			339
W8			252
W9			-
W10			-
<b>Axle weight (km of track)</b>			
Up to 20.3 tonnes	(RA 1-6)		433
20.4 tonnes - 24.1 tonnes	(RA 7-9)		907
24.2 tonnes - 25.4 tonnes	(RA 10)		-
<b>Total km of track</b>			<b>1340</b>
<b>Total km of route</b>			<b>982</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 14</b>		<b>Forecast expenditure</b>		
<b>£m in 2003/04 prices</b>		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
<b>Renewals</b>				
Track		6	13	9
Structures		10	11	10
Signalling		0	0	1
Electrification		-	-	-
Plant & machinery		0	0	0
Telecoms		0	-	-
Stations		1	2	1
Depots		0	0	0
Lineside		0	-	-
<b>Total renewals</b>		<b>18</b>	<b>26</b>	<b>22</b>



Route 14	Forecast activity volumes		
	2004/05	2005/06	2006/07
Rail renewal (km per year)	5	13	2
Sleeper renewal (km per year)	9	5	10
Ballast renewal (km per year)	4	6	2
S&C renewal (units per year)	-	15	4

## Engineering access

For engineering access purposes the Newport-Crewe route divides broadly into three sections. On the southernmost and middle sections, between Newport (Maindee West Junction) and Hereford and between Hereford (Shelwick Junction) and Shrewsbury (Sutton Bridge Junction), midweek nights access can be granted (either a 6hr 2 line block, or a 7hr single-line block with single-line working) provided that this does not conflict with periods when the route is required to handle traffic diverted from the West Coast/Cross Country route between Crewe, Wolverhampton, Birmingham and Gloucester. On the northernmost section, between Shrewsbury (Crewe Bank) and Crewe (Gresty Lane), possessions require individual arrangements.

Between Shrewsbury (Crewe Junction) and Chester (Saltney Junction), midweek nights access can be granted.

On the Cambrian lines, midweek nights access can be granted, based around start-up times of empty stock workings from Machynlleth depot. Around the Shrewsbury station area, possessions require individual arrangements. Investigations and trials took place during 2002/03 to assess whether long-standing restrictions on the use of locomotives to haul engineering trains across the Barmouth viaduct could be eased, to permit materials to be brought in by rail for use on sea defence works on the most exposed sections of the coastal section of the Cambrian line north of Barmouth. These were successful, and this will in future enable engineering works to be undertaken more cost-effectively.

The west Wales section divides broadly into two sub-sections. Between Swansea and Llanelli, midweek nights access can be granted provided that this does not conflict with periods when the Swansea District line (between Briton Ferry and Llandeilo Junction via Llangyfelach) is under occupation. Beyond Llanelli, midweek nights access can be granted (with single-line working on the double-track section to Clarboston Road), provided that the nighttime Fishguard boat-train can still be passed.

On the Heart of Wales section (north of Morlais Junction through to Craven Arms), ample midweek nights access can be granted.

Major planned possessions are:

- a one week possession in April 2004 between Newtown and Machynlleth for structures work at Caersws;
- a 57hr possession in October 2004 between Knighton and Llanwrtyd for structures works at Builth Road and at Knucklas; and
- a six day possession in April 2005 for structures works between Shrewsbury (Sutton Bridge Junction) and Welshpool.

## Maintenance and renewal

### Track

For S&C we plan to incorporate marginal incremental improvements, where justified, to improve junction crossing speeds on the secondary routes.

We are planning steel sleeper renewals and rerailing between Crewe Gresty Lane and Crewe South in 2004/05, and renewal of four S&C units at Crewe Gresty Lane in 2005/06.

The locations of the key areas of work are shown on the diagram and where they involve significant engineering possessions details are provided in the engineering access section.

At present there are no major track renewals planned on the Cambrian Lines, nor between Shrewsbury and Chester, or on the Heart of Wales line.

### Structures

The key items are as follows:

- on the Newport-Crewe route, repairs and strengthening at St. Julians Viaduct (north of Newport) in 2004/05;
- steelwork repairs and repainting at Berrington underbridge (between Leominster and Ludlow) in 2004/05;
- reconstruction of the Felhampton underbridge (south of Church Stretton) in 2005/06;
- reconstruction of the underbridge at Whitchurch (Salop) and provide anti-collision measures in 2004/05;
- on the Cambrian Lines reconstruction of overbridges at Redhill (west of Shrewsbury) and at Black Bridge (east of Welshpool) in 2005/06;
- on the Cambrian Lines timber repairs to Caersws viaduct in 2004/05;
- on the Central Wales Line reline and stabilise brickwork in Rhosferig Tunnel (between Builth Road and Cilmeri) in 2004/05;
- on the Swansea District line steelworks repairs to Morrision Viaduct into 2004/05, and blast cleaning and painting at Llangyfelach Aqueduct in 2005/06; and
- steelwork repairs to the River Cleddau bascule bridge (at Haverfordwest) and repainting in 2004/05.

The recent and continuing trend towards wetter winters and drier summers can have an adverse effect on cuttings and embankments, leading to an increase in the risk of landslides and subsidence. A programme of site evaluation and an associated phased programme of works to reduce these risks continues.

Work will continue on strengthening sea defences at Tywyn in 2004/05 and 2006/07. Rock stabilisation works at Friog (on the Cambrian Coast line, between Llwyngwrl and Fairbourne) will continue into 2004/05.

## Signalling

Between Newport and Crewe, rewiring is planned over the next three years at the signal boxes at Church Stretton and Dorrington. Rather than rewire and retain these two boxes a scheme to concentrate activities from three separate boxes at Marshbrook will be developed, consideration being given to consolidation of the three adjacent signal box areas taking level crossing supervision duties into account if manning cost reductions outweigh additional costs associated with the works necessary to achieve transfer of control.

On the Cambrian section, between Welshpool and Machynlleth, the three user worked crossings in central Powys that became manned in 2002 are being considered for closure by means of new road construction, which would obviate the need for the level crossing. The Cambrian lines are to be used as a trial site for the development and application of Regional ERTMS. Introduction of this system would facilitate modest journey time reductions at crossing loops as a result of elimination of slow-speed trailable points and amended operating procedures for token exchange.

The key items are as follows:

- rewiring at Hereford signal box in 2005/06;
- level crossing improvement works at Craven Arms in 2006/07;
- renewal of control equipment at Green Lane level crossing near Saltney Junction and complete the renewal works at Rossett level crossing in 2004/05; and
- renewal of level crossings at Sarnau and St. Clears in west Wales by 2006/07.

## Telecoms

We plan to continue our continuing programme of signal post telephone concentrator replacement.

The Cambrian line is to be used for the ERTMS trial by signalling which fixed telecoms network and GSM-R will support. We will be carrying out life extension works in 2005/06 and 2006/07 for the telecoms bearer for the existing RETB system in conjunction with the signalling led renewals strategy.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The Great Western joint board meets at monthly intervals and comprises representatives of Network Rail, all TOCs using Great Western region infrastructure, SRA and ORR, and focuses particularly on performance issues at a strategic level.

The Area Delivery Group at Cardiff (for South Wales and Marches) contributes schemes at a local level.

## Land implications

The former freight only line from Gobowen (on the Shrewsbury to Chester section) through the town centre of Oswestry to Llanddu Junction, for Blodwell Quarry, about eight miles of single track line in total, has been disused since the early 1990s. Although internally cleared for disposal, and offered for sale by Railtrack in 1999 to the Cambrian Railways Trust for possible heritage use, the sale did not proceed. Discussions are underway with Shropshire County Council regarding their plans for use of part of the track bed for cycle path construction, with a view to lease or sale. Any disposal would exclude that portion of the branch at Gobowen station and yard still in use for freight purposes. It is envisaged that the cycle-path construction planned by the council, as part of the National Cycle Network, would be compatible with possible future rail use of the route, whether revived freight aggregates traffic, or passenger heritage operational use, should funding for these become available.

## Route development

There have been a number of station upgrades initiated in 2003/04, largely funded by local authorities and sometimes in conjunction with RPP funding from the SRA, across the route, notable examples being the development of bus interchange facilities at Haverfordwest (in conjunction with Pembrokeshire CC) and disabled access, new car parking and major station improvement works at Newtown (in conjunction with Powys County Council). A customer information system was installed at Shrewsbury and on the Cambrian Lines by Wales and Borders TOC, with the support of an RPP bid. Construction of disabled access arrangements to platforms at Llandrindod Wells and Knighton on the Heart of Wales line was also initiated and will continue into 2004/05, again in conjunction with Powys County Council. Bus interchange arrangements at Llandrindod Wells will be upgraded in conjunction with the footbridge works. Works to improve passenger amenities at Barmouth and Towyn stations, on the Cambrian Coast section, will also be initiated in 2004/05 in partnership with Gwynedd County Council.

In terms of track and signalling, development of regional ERTMS using the Cambrian Lines as the national trial site for feasibility may offer the opportunity to incorporate additional passing loops for frequency improvements, subject to suitable funding. Increased frequencies on the Cambrian Lines would tend to place more pressure on the station layout at Shrewsbury station, and discussion with Shropshire County Council is underway regarding the feasibility of bringing the very lightly used platform 3 into unrestricted use. The council has also initiated a feasibility study into a possible new "Shrewsbury Parkway" station to the east of Shrewsbury, on the Wolverhampton line, and pathing alterations as a consequence of such a new station, if progressed, would tend to have a direct knock-on effect on platforming arrangements at Shrewsbury station.

Any significant increase in freight volumes on the two-track Newport-Crewe section would tend to place pressure on the capacity of the route, at busier times of day, and extensive studies (under the IOS programme funded by SRA) identified a number of possible schemes which might become necessary if real growth were to materialise. Such schemes would be dependent on scarce resources to modify electro-mechanical signalling systems.

## Emerging issues

Overall route capacity between Newport and Crewe is influenced by a number of locations where headways are uneven between certain pairs of signal boxes, and if freight volumes were to increase significantly this constraint (which was considered in some detail within the IOS programme) would be a priority for attention.

Station and platform arrangements at Shrewsbury, the busiest station on the route, will be reviewed as a consequence of the takeover of the passenger franchise by Arriva Trains Wales, with a view towards revised regular interval inter connecting services throughout Wales.

An independent feasibility study for Powys County Council has considered the socio-economic case for running additional trains between Birmingham, Shrewsbury and Aberystwyth, and concluded that a new passing loop at Dovey Junction would need to be constructed to assist towards catering for the increased frequencies sought by stakeholders. Discussions between the local authorities, the Welsh Assembly Government and the SRA are underway regarding funding of the desired additional train services, before any design work on infrastructure commences. Reducing the number of level crossings on the route, particularly in central Powys, is seen as a prerequisite to mitigate overall risk levels prior to engaging in third party funded infrastructure development to cater for increased frequencies.

Certain user worked crossings became manned during 2002, and efforts have been focussed on developing the means of closing these crossings to tackle safety concerns, in conjunction with Powys County Council. A jointly funded closure package is in prospect, reflecting an improvement to road safety levels benefiting the county as the highways authority, and a contribution from us in recognition of manning costs eliminated once closure is effected.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 14 Planned projects

<b>M</b>	2006/07 Renewal of level crossing equipment at Samau and at St. Clears	R
<b>N</b>	2005/06/07 Life extension of RETB telecoms equipment at Machynlleth	R
<b>O</b>	2004/05 Structures works at Knucklas and at Bulfith Road	R

### Route 14 Capacity and operational constraints

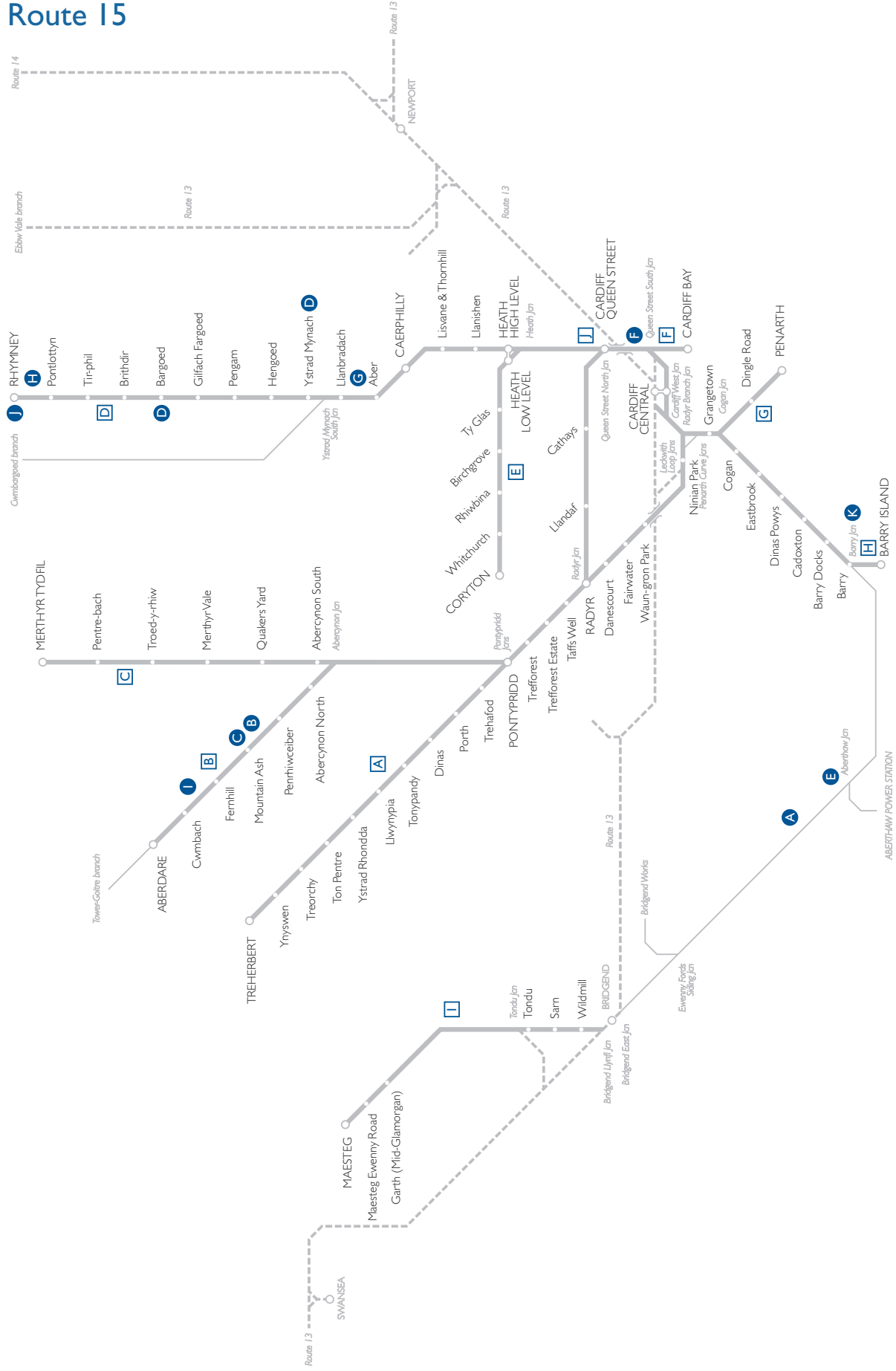
<b>A</b>	Swansea (Cockett) - Llanelli (Duffryn): single-track section
<b>B</b>	Swansea Loop East Junction: single lead junction with GWML
<b>C</b>	Signalling headway between Abergavenny and Pontrilas
<b>D</b>	Signalling headway between Marshbrook and Dorrington
<b>E</b>	Signalling headway between Prees and Wrenbury
<b>F</b>	Single-track sections throughout Cambrian Lines
<b>G</b>	Single-track section between Wrexham and Chester (Saltney Junction)

### Route 14 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 Repairs to St. Julians viaduct	R	
<b>B</b>	2004/05 Steelwork repairs and repainting at Berrington	R	
<b>C</b>	2005/06 Reconstruction of Felhampton underbridge	R	
<b>D</b>	2004/05 Reconstruction of Whitchurch underbridge	R	
<b>E</b>	2005/06 Reconstruction of Redhill bridge and Black Bridge	R	
<b>F</b>	2004/05 Timber repairs at Caersws viaduct	R	
<b>G</b>	2004/05 Repairs to Rhosferig Tunnel	R	
<b>H</b>	2004/05/06 steelwork repairs at Morrison viaduct and at Llanyfelach aqueduct, Swansea District Line	R	
<b>I</b>	2004/05 Steelwork repairs at Cleddau bridge	R	
<b>J</b>	2004/05 Strengthening sea defences, Friog and Tywyn	R	
<b>K</b>	2005/06 Rewiring at Hereford signal box	R	
<b>L</b>	2006/07 Level crossing improvements at Craven Arms	R	

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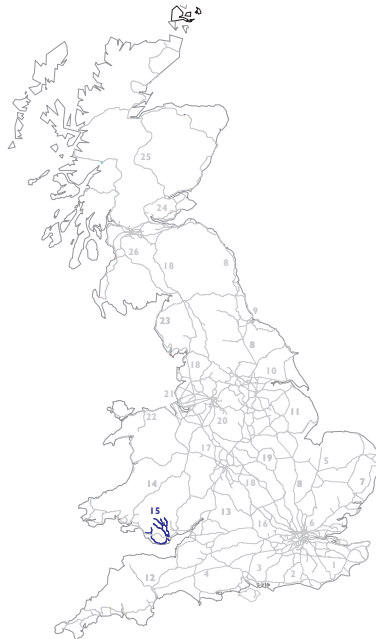
# Route 15





# Route 15: South Wales Valleys

## Route description



### Physical description

The principal components of the route are:

- the routes radiating from Cardiff northwards up the Taff, Rhondda, Cnon and Rhymney valleys to Merthyr Tydfil, Treherbert, Aberdare and Rhymney respectively, and Coryton, and southwards to Barry, Penarth and Cardiff Bay;
- the branch from Bridgend to Maesteg; and
- the line from Barry to Bridgend via Aberthaw, known as the Vale of Glamorgan line.

The northern extremities of the Valleys routes are single track, with double track south of Porth, Abercynon and Bargoed. The Cardiff Bay branch, the Coryton branch, Cogan Junction-Penarth and Barry-Barry Island are also single track. Linespeeds are between 40-50mph, with sections of 70mph at the southern end of the Valleys on the approaches to Cardiff Queen Street. Bridgend to Maesteg is single track with linespeeds between 30mph and 50mph.

The route is controlled from two panel signal boxes, built in the 1960s (Cardiff and Port Talbot), eight mechanical signal-boxes and a new signalling centre at Radyr.

Broadly, three fifths of the route is secondary, a third freight only, and the remainder rural.

### Market served

The Cardiff Valleys route is essentially an urban passenger network with strong commuter flows to Cardiff. There is interest from the local authorities, backed by the Welsh Assembly Government, in providing greater capacity and reduced journey times, to offer improved frequencies as an attractive alternative to road, particularly in the congested A470 corridor between Pontypridd and Cardiff. The location of the National Assembly for Wales in Cardiff Bay may add further impetus to creating improved public transport links in this area.

### Growth

An underlying growth trend in passenger volumes reflects improved service frequencies and externally funded investment in infrastructure upgrade, improved station facilities and improved bus-rail integration. Local commuting demand will grow as employment in Cardiff increases, whilst demand for leisure and business travel will increase as the economy steadily grows.

## Current use

### Current traffic

Passenger services are provided wholly by Arriva Trains Wales, branded locally as “Valley Lines”. Freight traffic is operated by EWS to the coal-fired power station at Aberthaw, some of which originates from Tower Colliery, on the freight line north of Aberdare.

Local heavy industry in the Cardiff Valleys has declined in the past twenty years, consequently the freight traffic which dominated movements has virtually disappeared, making possible the expansion of passenger services on routes where demand for travel to Cardiff has grown in line with increased job/leisure opportunities in the capital, and employment loss in the valleys themselves. Frequencies have been increased, with the aim of being able to promote “turn up and go” frequencies (taken to be 4tph) on the core route sections between Cardiff and Pontypridd and Bargoed, and the basic unit of movement has been the 2-car diesel multiple unit, with strengthening to 4-cars where required. Growth in passenger numbers generally has made necessary the continuation of provision of loco-hauled peak-hour services, specifically between Cardiff and Rhymney, in contrast to the prevalent use of lightweight Pacer-type rolling stock.

Whereas the bulk of Valley Lines services are self-contained to the network radiating from Cardiff Queen Street, Maesteg services run over the Great Western main line from Cardiff to Bridgend and are subject to any performance perturbations experienced on that route. All new infrastructure constructed in recent years has been to a specification capable of handling 4-car length trains but older enhancements (reopening of the Aberdare, Maesteg and City lines in the late 1980s) were to a 2-car length standard, which now constrains optimal provision of seats by the train operator.

<b>Route 15 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	9,252	853	10,105
Train tonne km per year (millions)	256	245	501
Average no of train km per track km per day			51
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Cardiff Queen St - Cardiff Central			240
Cardiff Central - Cogan Junction			180
Cardiff Queen St - Heath Junction			120
Cardiff Queen St - Pontypridd			120
Cogan Junction - Barry			110

### Projected use

Some further lengthening of train formations in the short-term is anticipated prior to progression of externally-funded infrastructure enhancement schemes in the medium term and longer term.

## Strategic framework for the route

We will be working with the SRA to produce a Planning Assessment for Wales, which is programmed for spring 2005.

Until early 2003 strategy formulation in the former Mid Glamorgan and South Glamorgan County areas was the responsibility of South Wales Integrated Fast Transit (SWIFT), a coalition of the six unitary authorities around Cardiff (Bridgend, Vale of Glamorgan, Cardiff City, Rhondda Cynon Taff, Merthyr and Caerphilly), Cardiff Buses and Railtrack then Network Rail, for collective funding bids to the Welsh Assembly Government for transport grant for capital works in the designated SWIFT area. This coalition has since been formally disbanded, but we continue to deal with individual client local authorities for particular third party funded enhancement scheme as well as Welsh Assembly Government. We attend rail group meetings of the newly formed South East Wales Transport Alliance (SEWTA), which has in effect superseded SWIFT.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 15</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Treherbert - Cardiff Queen Street		53min
Aberdare - Cardiff Queen Street		49min
Bargoed - Cardiff Queen Street		42min
Coryton - Cardiff Queen Street		14min
Penarth - Cardiff Queen Street		16min
Barry Island - Cardiff Queen Street		31min
Bridgend - Maesteg		24min
<b>Linespeed (km of track)</b>		
Up to 35mph		50
40-75mph		257
80-105mph		35
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		251
W7		48
W8		48
W9		-
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes	(RA 1-6)	218
20.4 tonnes - 24.1 tonnes	(RA 7-9)	124
24.2 tonnes - 25.4 tonnes	(RA 10)	-
<b>Total km of track</b>		<b>342</b>
<b>Total km of route</b>		<b>251</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 15 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	5	2	-
Structures	1	1	1
Signalling	1	1	1
Electrification	-	-	-
Plant & machinery	-	-	-
Telecoms	-	-	-
Network Rail managed stations	-	-	-
Stations	0	1	-
Depots	-	-	-
Lineside	0	-	-
<b>Total renewals</b>	<b>7</b>	<b>5</b>	<b>1</b>
<b>Committed and planned enhancements</b>			
Vale of Glamorgan upgrade	16	1	-
Energlyn new station	2	-	-
Aberdare Line platform extensions	0	2	-
<b>Total committed and planned enhancements</b>	<b>18</b>	<b>3</b>	<b>-</b>
<b>Route 15 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	7	6	-
Sleeper renewal (km per year)	2	-	-
Ballast renewal (km per year)	2	-	-
S&C renewal (units per year)	5	-	-

## Engineering access

For engineering access purposes the Cardiff Valleys route divides broadly into two sections, north and south of the Great Western Main Line at Cardiff Central. On the northern sections, from Cardiff up the Rhymney, Taff, Cynon and Rhondda valleys, midweek nights access can generally be granted. The main route from Cardiff Queen Street to Radyr (via Llandaff) will not be closed at the same time as the City Line (via Fairwater) between Penarth Curve North and Radyr, which offers a diversionary capability. On that part of the southern Cardiff Valleys route between Cardiff, Barry and Bridgend (via the Vale of Glamorgan line) closure is not permitted when diversions from the GWML between Cardiff and Bridgend via Pontyclun are planned, although midweek nights access can also generally be granted on the branches to Cardiff Bay, Penarth and Barry Island, as well as on the detached Bridgend to Maesteg section. In any event access to Aberthaw Power Station, on the Vale of Glamorgan line, must be maintained either from the east or the west.

Major planned possessions are:

- a 54hr possession between Cadoxton and Aberthaw in April 2004 for S&C renewal at Barry Junction;

- a major possession (provisionally in December 2004) for signalling commissioning between Barry and Bridgend as part of the route upgrade for installation of additional signalling capacity; and
- a 54hr possession in July 2005 for signalling commissioning between Barry and Bridgend after rewiring work at Aberthaw signal box.

## Maintenance and renewal

### Track

In recent years a significant length of the route was relayed using steel sleepers, converting and replacing jointed track with CWR.

We are planning to renew five units of S&C in 2004/05. Condition led plain line track work will be undertaken across the route. The locations of the key areas of work are shown on the diagram and where they involve significant engineering possessions details are provided in the engineering access section.

### Structures

The recent and continuing trend towards wetter winters and drier summers can have an adverse effect on cuttings and embankments, leading to an increase in the risk of landslides and subsidence and a programme of site evaluation and an associated phased programme of works to reduce these risks continues.

We plan to reconstruct the overbridge north of Mountain Ash in 2004/05.

### Signalling

The panel signal box at Port Talbot, which controls the Bridgend area, is scheduled to be renewed by 2006/07. On the Rhymney Valley route, rewiring is planned at Ystrad Mynach and Bargoed signal boxes, within the next three years. On the section between Barry and Bridgend, we plan to rewire Aberthaw by 2006/07.

### Telecoms

We have planned to renew the signal post telephone concentrator at Port Talbot during 2004/05 and 2005/06 and the fixed telecoms network synergy scheme is also being implemented in conjunction with the SPT concentrator and resigalling scheme to support the asset renewal and deliver efficiencies.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The Great Western Joint Board meets at monthly intervals and comprises representatives of Network Rail, all TOCs using Great Western region infrastructure, SRA and ORR, and focuses particularly on performance issues at a strategic level.

The area delivery group at Cardiff (for South Wales and Marches) contributes schemes at a local level. Performance on the Valley Lines is overseen by a Network Rail control centre located at Cardiff Central.

## Land implications

At Cardiff Queen Street, we are working with the Welsh Assembly Government and Cardiff County Council who plan to promote a Transport and Works Act Order in connection with the capacity upgrade. The installation of a third track off the Rhymney Valley line over the Newport Road (immediately north of Cardiff Queen Street station) would necessitate the acquisition of land immediately east of Cardiff Queen Street North Junction, as well as the erection of an additional bridge deck to carry the third track into the existing platforms at Queen Street station.

## Other committed enhancements

Under a funding agreement of December 2003 between ourselves and the Welsh Assembly Government for upgrade of the Barry to Bridgend route, additional hourly passenger train services will run between Cardiff, Barry and Bridgend via the Vale of Glamorgan line, serving two additional stations at Rhoose and at Llantwit Major. The works will include track upgrade, installation of additional signalling capacity between Aberthaw and Bridgend, and restoration of a former bay platform at the east end of Bridgend station. Commencement of the new services is planned for May 2005. In strategic terms this route will also offer an enhanced diversionary capability to the Cardiff to Bridgend section of the GWML between London Paddington and Swansea.

## Route development

We are working with Cardiff County Council and the Welsh Assembly Government in support of the preparation by the local authority of a Transport and Works Act Order application for upgrade at Cardiff Queen Street station, following design works carried out in 2000-2002. The upgrade involves additional tracks, platforms and bridgeworks, together with resignalling of the Cardiff Queen Street area, from Cardiff Queen Street Junction South and Cardiff Bay through Cardiff Queen Street to an interface (south of Llandaff) with Radyr Signalling Centre on the Taff Vale line and with Heath Junction signal box, on the Rhymney Valley line.

We are undertaking feasibility work to evaluate a new station at Energlyn, for the Caerphilly County Borough Council and Welsh Assembly Government, on the Rhymney Valley section between Aber and Llanbradach.

We are also undertaking further feasibility work to evaluate a capacity upgrade of the upper part of the Rhymney Valley route, for Caerphilly County Borough Council and Welsh Assembly Government, by means of enhanced signalling at Bargoed and extending double track towards Brithdir to cater for a possible 2tph requirement over the single-line between there and Rhymney.

We are undertaking design development work for platform lengthening on the Cynon Valley line, for Rhondda Cynon Taff County Borough Council and Welsh Assembly Government, for accommodating 4-car length trains at Abercynon North, Penrhiwceiber, Fernhill, Cwmbach and Aberdare stations. Mountain Ash was reconstructed to 4-car length, and a passing loop added, in 2001.

We are undertaking feasibility work for a new private-siding connection to be installed at Abercwmboi (between Fernhill and Cwmbach stations, on the Aberdare line) for the removal of waste material. Another new private siding connection for the Rhymney “Capital Valley Business Park”, at Rhymney station, is under consideration.

## Emerging issues

The pinchpoint at Cardiff Queen Street, the flat Queen Street North Junction, is now the fundamental constraint on overall Valleys network capacity. At peak hours, the 11/12tph in either direction now operating through this junction fully consume available capacity and timetabling flexibility and capacity is also constrained by single-line sections at the extremities of each section of the route.

The completion in 2001 of a Rhymney Valley route upgrade feasibility and design study (to identify the means of catering for 12tph capacity northwards from Queen Street, then reducing to 10tph beyond Heath Junction and 6tph beyond Energlyn and 2tph beyond Bargoed) led to a decision by the funders not to progress the full upgrade scheme at the costs then indicated by the study. This decision reduced the urgency to increase capacity at the Queen Street pinchpoint, but Welsh Assembly Government has not yet identified the preferred means of dealing with the Cardiff Bay section, dualling of which was identified as an essential part of the Queen Street upgrade. Light rail conversion and associated options have been considered in detail. Design work for double-tracking has therefore yet to commence.

Capacity is further constrained by the signalling and track layout between Cardiff Queen Street and Heath Junction and also between Cardiff Queen Street and Cardiff Central/Cardiff Bay. During 2003/04 design work, externally funded through Cardiff County Council, continued for the upgrade of the Cardiff Queen Street pinchpoint (Cardiff Central Corridor Project) to cater for increased frequencies by means of additional track, platforms, and resignalling, and to embrace reinstatement of double track on the Cardiff Bay line. It is expected that Cardiff County Council will promote the requisite Transport and Works Act Order application, supported by Welsh Assembly Government. The aim of the external funders of this work is broadly to double the volume capability to 24tph through Cardiff Queen Street, to give up to 12tph on each of the northern corridors (Taff and Rhymney) and 16tph southwards to Penarth/Barry/City Line/Vale of Glamorgan and 8tph to Cardiff Bay. These figures assume no change to capacity at or beyond Cardiff Central, at Valley Lines platforms 6 and 7, prior to Great Western main line resignalling.

Firm commitments from Welsh Assembly Government and the SRA regarding funding will be necessary before the infrastructure enhancement schemes can go ahead.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 15 Planned projects

(K) 2004/05 Renewal of Barry Junction S&C

R

### Route 15 Capacity and operational constraints

<b>A</b>	Single-track section between Porth and Treherbert
<b>B</b>	Single-track section between Abercynon and Aberdare
<b>C</b>	Single-track section between Abercynon and Merthyr Tydfil
<b>D</b>	Single-track section between Bargoed and Rhymney
<b>E</b>	Single-track section between Heath Junction and Coryton
<b>F</b>	Single-track section between Cardiff Queen Street and Cardiff Bay
<b>G</b>	Single track section between Cogan Junction and Penarth
<b>H</b>	Single-track section between Barry and Barry Island
<b>I</b>	Single-track section between Bridgend, Tondy and Maesteg
<b>J</b>	Capacity constraint at Cardiff Queen Street station

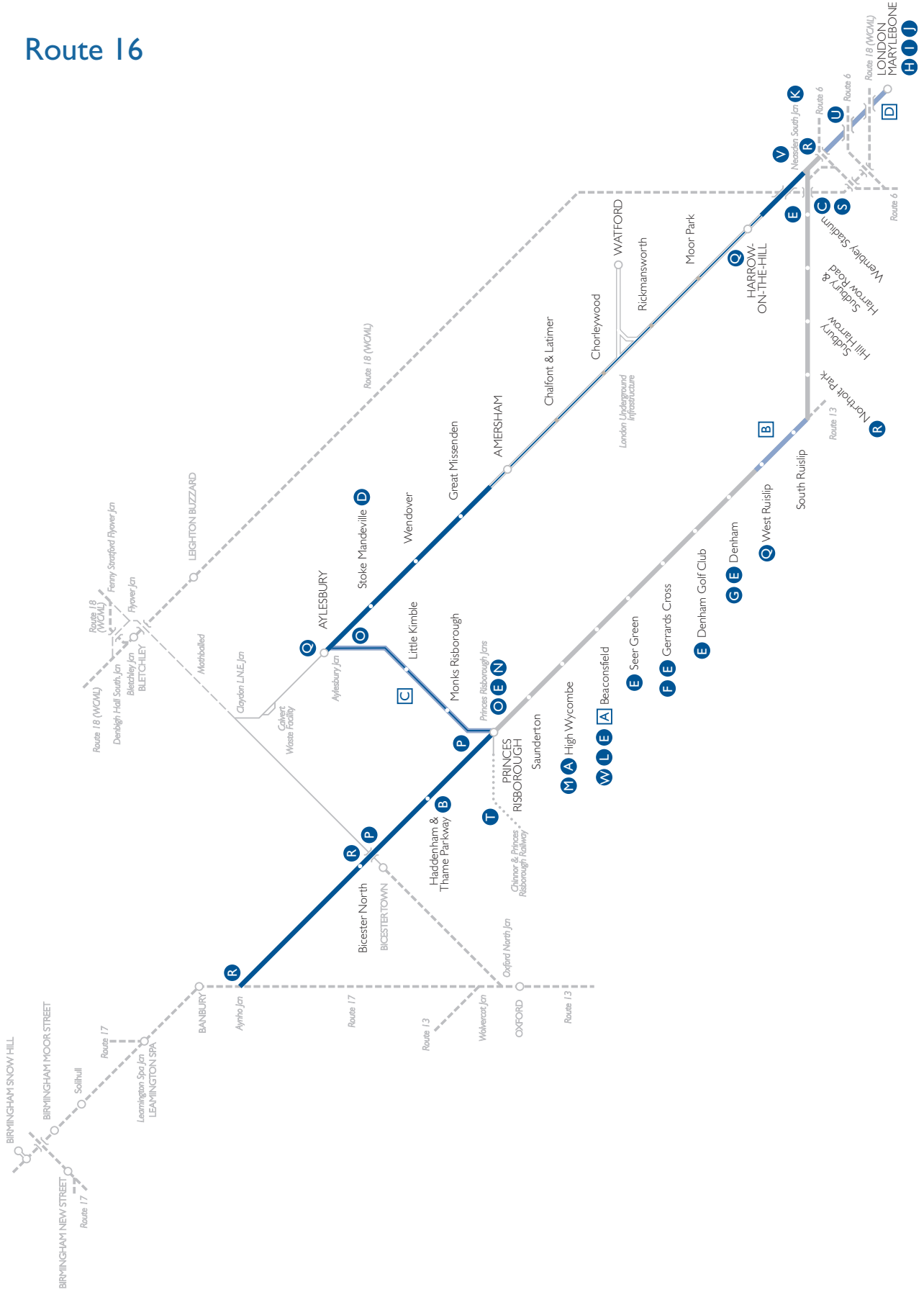
### Route 15 Planned projects

Project description		Type of work	Dev. Level
<b>A</b>	2004/05 Barry - Bridgend route upgrade	E	6
<b>B</b>	Cynon Valley platforms lengthening	E	5
<b>C</b>	2004/05 Mountain Ash overbridge reconstruction	R	
<b>D</b>	2005/06 Rewiring Bargoed and Ystrad Mynach signal boxes	R	
<b>E</b>	2006/07 Rewiring at Aberthaw signal box	R	
<b>F</b>	Cardiff Queen Street "Central Corridor" capacity upgrade	E	4
<b>G</b>	Possible new station at Energlyn	E	3
<b>H</b>	Capacity enhancement in upper Rhymney Valley	E	2
<b>I</b>	Possible new private siding connection at Abercwmboi	E	1
<b>J</b>	Possible new private siding connection at Rhymney	E	1



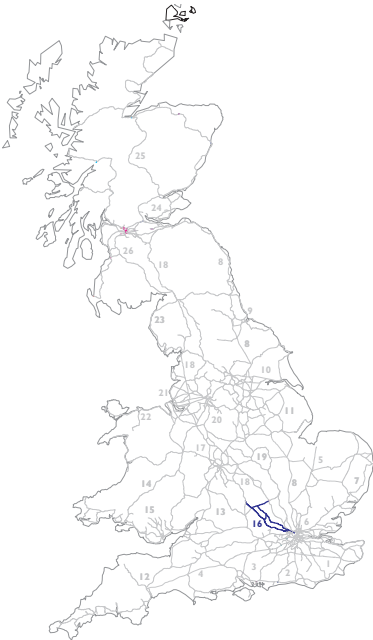
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# Route 16



# Route 16: Chilterns

## Route description



### Physical description

The Chilterns route consists of two main lines radiating from London Marylebone towards Aylesbury, Claydon and Banbury, with associated branches and freight lines. Because of traffic patterns, the plan for Route 17 (West Midlands) has a significant impact on Route 16, and should be read in conjunction with it.

The route commences at London Marylebone, from where double-track extends to Neasden South Junction, where it divides:

- one branch runs via High Wycombe, Princes Risborough and Bicester to Aynho Junction (just south of Banbury) and is two-track throughout;
- one branch runs via Amersham to Aylesbury (and on to Claydon - see below). This route runs parallel to the LUL Metropolitan and Jubilee Lines as far as Harrow-on-the-Hill. Over this section, there are six tracks, paired by use, but only the westernmost two are in Network Rail ownership, and are used exclusively by main line trains. From just south of Harrow-on-the-Hill station extending as far as Amersham, (where LUL trains terminate) all tracks become LUL property. There is shared running between main line and underground trains on the four-tracks between Rickmansworth and Amersham. Beyond Amersham, the main line trains reenter Network Rail infrastructure;

The Princes Risborough - Aylesbury branch links the above two and is single-track throughout. There are also two single-track freight branches:

- Bicester Town via Claydon LNE Junction to Bletchley; and
- Aylesbury to Claydon LNE Junction.

The route between Claydon LNE Junction and Bletchley is out of use.

The Network Rail sections of the route are not electrified.

Most of the route outside the inner London sections has a general ruling linespeed of 75mph, with the Princes Risborough to Aylesbury single-line section 40mph, and the recently-upgraded section north of Bicester 90-100mph.

The route has increased in importance since the 1970s, when partial closure was proposed and singling of the section north of Princes Risborough was carried out. Growing levels of commuter traffic, and more recently the longer distance market to the West Midlands, has resulted in high levels of investment since the 1980s, with signalling and rolling stock being renewed shortly before privatisation. Since Chiltern Railways took over the franchise, there has been further significant investment in infrastructure, including redoubling of the singled Princes Risborough - Aynho Junction section, new stations and passenger facilities at stations.

Broadly, three quarters of the route is classified as London and south-east and a quarter as freight only.

## Market served

The basic off-peak service pattern in Winter 2003 consists of stopping services from Marylebone to High Wycombe and Aylesbury (via both Amersham and Princes Risborough) at 30min or 60min intervals, hourly semi-fast services to Banbury (some of which terminate at Bicester North) and an hourly service to Birmingham Snow Hill. This basic pattern is enhanced at peak times with additional trains and altered stopping patterns.

There is significant suburban traffic into London from locations along the line of route, and a growing commuter market from as far north as Solihull, helped by a high level of performance reliability. It was largely to serve this market that Chiltern Railways funded and constructed Warwick Parkway station.

The West Midlands services have also experienced considerable improvement and growth, and are increasingly regarded by passengers as a viable alternative to the West Coast Main Line, particularly during periods of disruption caused by the route modernisation. Although journey times are longer than the West Coast Main Line, fares are generally cheaper.

The line has been used as a strategic diversionary route for freight traffic during West Coast blockades.

Freight flows include five trains per day operated by EWS and Freightliner to the disposal site at Calvert, operating via both Bicester and Aylesbury. A new freight flow is expected to start in 2004, with up to two trains per day conveying fill and construction materials from Acton to the site of the new Tesco development at Gerrards Cross. Conditions have been applied to the timing of these trains to ensure that they do not adversely affect peak hour performance of the passenger services.

## Growth

The route has experienced significant passenger growth since 1994 and this is expected to continue. Peak demand will be driven by growth in employment in central London, whilst continuing economic growth will increase demand for travel in the off peak market.

## Current use

### Current traffic

The operators on this route are Chiltern Railways, Freightliner and EWS, with London Underground using the section over which shared running operates between Harrow and Amersham. The majority of the Chiltern Railways fleet, the class 165 Diesel Multiple Units (DMUs) date from the late 1980s and are now planned for full mid-life refurbishment. Since privatisation, Chiltern has invested in additional rolling stock in the shape of the class 168 "Clubman" DMUs, introduced in 1996, which are progressively being lengthened from 3 to 4-cars.

<b>Route 16 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	15,178	301	15,479
Train tonne km per year (millions)	742	107	849
Average no of train km per track km per day			87
Top five busiest route sections			No of trains per day
London Marylebone - Neasden South Junction			240
Neasden South Junction - High Wycombe			180
High Wycombe - Princes Risborough			130
Princes Risborough - Aynho Junction			90
Amersham - Aylesbury			70

## Projected use

The mix of traffic and service patterns are expected to remain basically unchanged, with the exception of the Birmingham services, where there are plans to increase certain train lengths from four to seven or 8-cars to cater for the growth in passenger numbers, and a programme of platform lengthening is being implemented to accommodate the longer trains. Chiltern Railways also has aspirations for an increase of frequency on the route to Banbury and Birmingham once capacity constraints are eliminated.

Freight traffic patterns are expected to remain largely unchanged for the foreseeable future, although, as noted above, a new flow between Acton and Gerrards Cross is expected to start in 2004. The CTRL spoil traffic to Calvert will diminish as construction of the link approaches completion, but it is understood that other opportunities to use the vacated train paths are being actively explored by the operator.

## Strategic framework for the route

The SRA does not intend to issue a Route Utilisation Strategy specifically for Route 16. However, the route may be affected by the outcomes of the Cross London Routes RUS (due in Autumn 2004), and the West Midlands Area RUS (due in Spring 2004).

The SRA's Thames Valley Regional Planning Assessment covers this route and is expected in Winter 2005.

The SRA's Freight Strategy (issued in May 2001) identified the route as a diversionary route, particularly during West Coast blockades. To enable this, the route was cleared to W9 loading gauge during 2002 to allow the passage of high containers between Aynho and Northolt. It also had dispensation for RA10 (High Axle Loads).

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 16</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Marylebone - Aylesbury		53min
Marylebone - Princes Risborough		40min
Marylebone - Banbury		1 hr 6min
Princes Risborough - Aylesbury		17min
<b>Linespeed (km of track)</b>		
Up to 35mph		49
40-75mph		281
80-105mph		8
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		216
W7		200
W8		194
W9		-
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		-
20.4 tonnes - 24.1 tonnes (RA 7-9)		338
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>338</b>
<b>Total km of route</b>		<b>216</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 16 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	12	11	-
Structures	5	7	8
Signalling	1	2	6
Electrification	0	0	0
Plant & machinery	0	0	0
Telecoms	0	0	0
Network Rail managed stations	-	-	-
Stations	2	2	-
Depots	-	-	-
Lineside	-	-	-
<b>Total renewals</b>	<b>21</b>	<b>22</b>	<b>14</b>
<b>Committed and planned enhancements</b>			
Chiltern Evergreen 2			75
Others	0	-	-
<b>Total committed and planned enhancements</b>	<b>0</b>	<b>-</b>	<b>75</b>

<b>Route 16 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	30	30	16
Sleeper renewal (km per year)	22	4	3
Ballast renewal (km per year)	20	5	6
S&C renewal (units per year)	-	7	9

## Engineering access

Engineering access is available through a regular pattern of 8hrs on Saturday nights and 5hrs on Sunday nights, as well as possession opportunities in week-nights (given the absence of freight traffic). Opportunities exist for some longer weekend possessions, though these are limited as there is no diversionary route for Chiltern Railways services other than Ruislip - Paddington, which has limited capacity and cannot serve the Amersham route. The main possession issue is organising the longer blocks of access for such activities as S&C and track renewals. However, a number of long possessions are planned for 2004/05 for various track and bridge renewal programmes.

Possession planning on Route 16 is carefully integrated with the Birmingham to Didcot and West Coast Main Lines, to enable the increasing use of the route as an alternative for passengers from London to the West Midlands and for WCML freight.

## Maintenance and renewal

### Track

The age of the permanent way varies considerably with 35% being pre-1970.

Most, but by no means all, of the oldest track is situated on the freight-only sections, and much of the more recent (1995 onwards) is on the recently redoubled sections between Princes Risborough and Aynho Junction.

In 2004/05 we will carry out rerailing, resleepering and reballasting at Wendover, Great Missenden and Wembley Park, plain line renewals between Princes Risborough and Aylesbury, and long weekend blockades for plain line renewals between Harrow and Aylesbury.

In 2005/06 we will carry out plain line renewals at Great Missenden and Saunderton, and S&C renewals at West Ruislip and Neasden.

### Structures

A particular problem on the route concerns the embankments and earthworks, which are prone to slippage. The region's structures programme contains significant amounts of expenditure on the Chiltern Route.

In 2004/05 we are planning bridgework between Bicester and Aynho, and Bridgeguard 3 works at Wycombe Marsh. Embankment and cutting stabilisation works are also ongoing specifically at Marsh Lane.

In 2005/06 we will carry out Bridgeguard 3 works at Neasden Lane, and embankment work at Northolt, Blackthorn and Piddington.

### Signalling

The route is centrally controlled from an IECC commissioned in the late 1980s. Additional lineside equipment has been provided under the redoubling projects between 1994 and 2002. Despite reasonable overall reliability, track circuit failures contribute significantly to delays and consideration is being given to replacement by axle counters at certain locations. The Cherwell Valley resignalling scheme (on Route 17) will take place during the term of this plan and will provide capacity benefits to this route.

### Telecoms

We are planning to complete life extension work for the CSR system in the Marylebone area due to take place in 2004/05, 2005/06 and 2006/07 to maintain the operational performance of the system.

### Stations

Refurbishment work will take place in the next two years at the following locations: Gerrards Cross; Denham; London Marylebone; West Ruislip; Wendover; and Aylesbury stations.

### Depots

Work to improve servicing facilities at Aylesbury Depot is nearly completed.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.



The track and signalling assets on this route perform well, contributing to Chiltern Railways' usually good PPM figures. Redoubling of the last stretch of single track on the Marylebone - Banbury route (between Bicester and Aynho) improved performance, and the Cherwell Valley resignalling (on Route 17) will make it more likely that traffic will arrive on the route at its right time.

We are committed to an improvement in the management of rail stressing, to avoid the need to impose speed restrictions in hot weather. Further improvements to rail alignment and tamping is also being addressed.

Maintenance activity is being coordinated with operational control in the same control room, prior to full reintegration of maintenance with operations, and lightning protection work is being undertaken to safeguard the lines controlled by Marylebone signalbox from disruption to the signalling supply.

## Enhancements

No enhancements are planned as part of the maintenance and renewal programmes. However, Chiltern Railways is funding a significant number of enhancements as described later and in Section 3.

## Land implications

We are planning to improve disabled access facilities at a number of stations. Included in the programme for 2004/05 are an additional lift at Gerrards Cross, lifts at Denham and a ramp at Stoke Mandeville.

## Other committed enhancements

### New depot at Wembley

A major new servicing and maintenance facility located near Wembley Stadium station is to open in late 2005, providing additional capacity to accommodate an expansion of Chiltern Railways fleet.

## Route development

Chiltern Railways have a programme of works, several of which have been referred to earlier in this document. These include:

- High Wycombe station redevelopment: the reconstruction of High Wycombe station to provide better passenger facilities and improved operational flexibility is at an early stage of planning and development;
- platform extensions (south): extensions to 7-car length at Wembley Stadium; Denham; Denham Golf Club; Gerrards Cross; Seer Green & Jordans; Beaconsfield; and Princes Risborough;
- Project Evergreen phase 2: a composite programme of works including the provision of two new platforms at Marylebone station, signalling alterations at Neasden South Junction for higher speed and greater flexibility and signalling headway improvements between Beaconsfield and High Wycombe. Completion is planned for 2006;
- improved access at Haddenham and Thame Parkway: an additional footpath to improve access between the main road and the southbound platform is to be provided; and

- CIS, CCTV and clocks: a programme of improving these facilities at various stations on the route will continue during 2004/05.

## Emerging issues

In the short to medium-term, longer trains (up to eight 23 metre cars) could be run to accommodate passenger growth. Platform extensions to 8-car length have already been completed at Bicester North and Haddenham and Thame Parkway, as well as in the West Midlands, to allow the introduction of longer trains on Birmingham services. Chiltern Railways is currently developing a similar programme for trains up to 7-cars at stations on the southern end of the route.

If growth continues, and if funding is available, it might be appropriate to consider whether further infrastructure improvements were appropriate. Capacity is presently restricted by minimum signalling headways of between 7-11min between Gerrards Cross and High Wycombe, while timetabling is affected by the lack of passing facilities to allow faster trains to overtake slower services on both main lines. Platform capacity at Marylebone is near the limit for current traffic levels, and the 40mph speed restriction at Neasden South Junction is seen as a restricting factor in timetabling trains into and out of the terminal. These issues are being actively addressed by Chiltern Railways under a programme of improvements, collectively known as the Evergreen 2 project.

Capacity on the single-line between Princes Risborough and Aylesbury, although adequate for the present level of traffic, may act as a constraint to future growth.

Chiltern Railways has made a number of long-term aspirations for enhancement of the route, including:

- creation of a major transport interchange at West Hampstead providing easy and safe access between the Chiltern: Thameslink; North London; Jubilee; and Metropolitan Line rail services, local buses and taxis;
- extension of services from Aylesbury - Bletchley and Bedford;
- reopening of the Princes Risborough - Oxford branch;
- a new parkway station near Aylesbury;
- further expansion and improvement of car parks;
- increased service frequencies, principally on the West Midlands route;
- platform extensions on the Aylesbury route; and
- reinstatement of the fast lines at Beaconsfield to permit stopping trains to be overtaken by faster services.

There are capacity restrictions between Banbury, Leamington and Birmingham on Route 17 that constrain Chiltern Railways' ability to increase frequencies on the Birmingham route. Proposals to deal with these are being developed by the SRA and ourselves under the Cherwell Valley resignalling and Saltley signalling renewal projects, which are due to be implemented between 2004 and 2008.

Automatic Train Protection (ATP) was installed on the route in the early 1990s as part of British Rail's trials following the Hidden report. The route is also equipped with CSR. Upgrades to both systems are planned, but the form these improvements will take is still being considered. The effect of European Train Control System (ETCS) on route capacity would have to be carefully considered if it were selected as a replacement for the present SELCAB ATP equipment, in the light of the growing demand trend.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 16 Capacity and operational constraints

<b>A</b>	Beaconsfield station: no through fast lines
<b>B</b>	Ruislip: stopping patterns create pathing conflicts
<b>C</b>	Aylesbury - Princes Risborough: single track section
<b>D</b>	Marylebone: throat capacity constraint

### Route 16 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2006/07 Redevelopment of High Wycombe station	E	1
<b>B</b>	2004/05 New passenger access at Haddenham and Thame	E	2
<b>C</b>	2005/06 New maintenance depot at Wembley Stadium	E	2
<b>D</b>	2004/05 New passenger access ramp at Stoke Mandeville	E	2
<b>E</b>	2005/06 Platform extensions to accommodate 7-car trains at Wembley Stadium, Denham, Denham Golf Club, Gerrards Cross, Seer Green and Jordans, Beaconsfield and Princes Risborough	E	1
<b>F</b>	2004/05 New passenger lift at Gerrards Cross	E	2
<b>G</b>	2005/06 New passenger lifts at Denham	E	1
<b>H</b>	2006/07 Two additional platforms at Marylebone (Evergreen 2)	E	2
<b>I</b>	2006/07 Up siding at Marylebone reinstated (Evergreen 2)	E	2
<b>J</b>	2005/06 Closure of Marylebone maintenance depot (Evergreen 2)	E	2

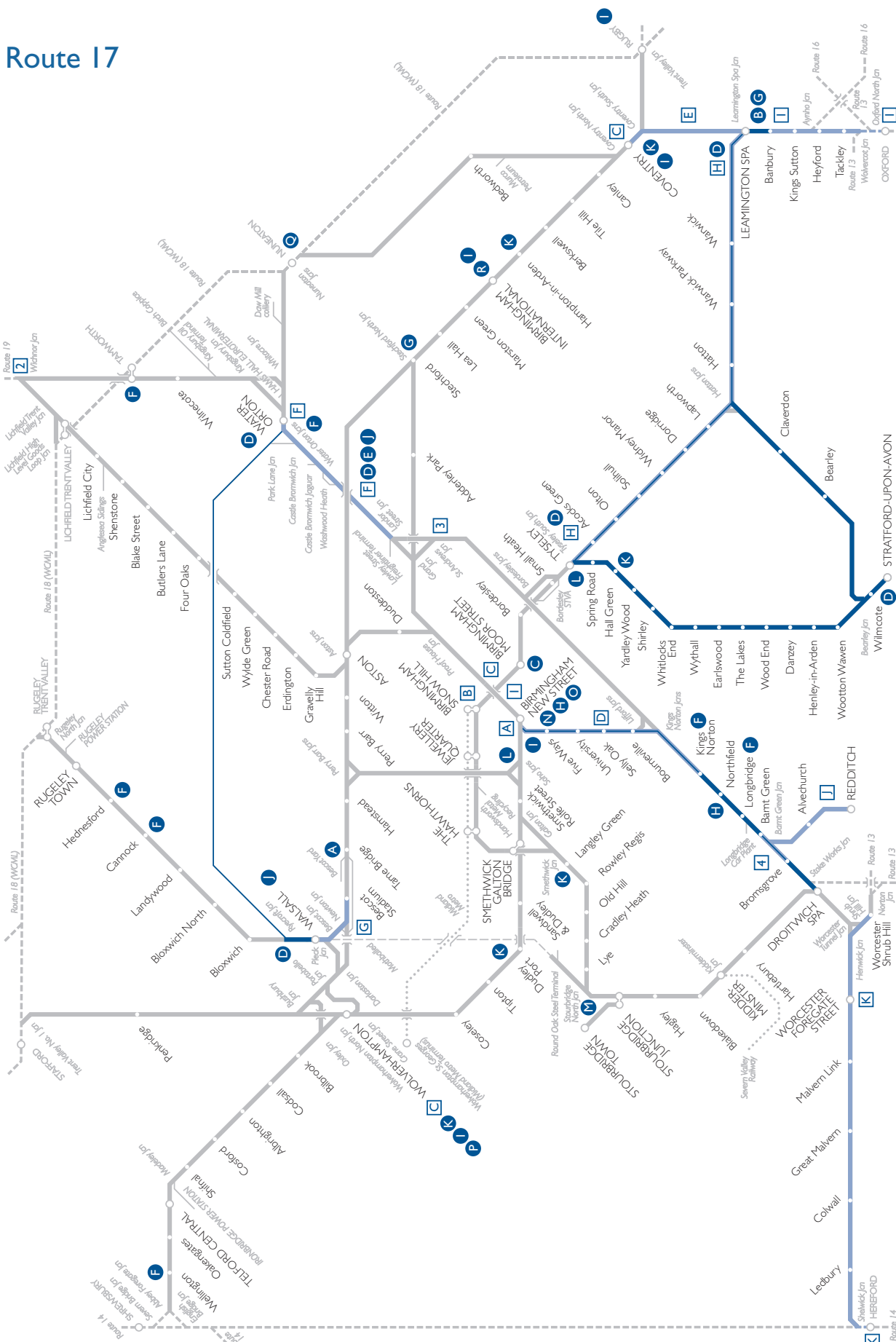
## Network Rail

## 2004 Route Plans

### Route 16 Planned projects

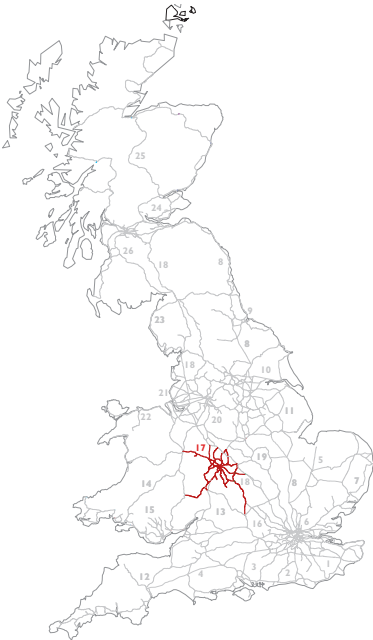
	Project description	Type of work	Dev. Level
<b>K</b>	2006/07 Signalling alterations at Neasden Junction (Evergreen 2)	E	2
<b>L</b>	2006/07 Linespeed increase 40-75mph in Beaconsfield area (Evergreen 2)	E	2
<b>M</b>	2006/07 Additional signals at High Wycombe (Evergreen 2)	E	2
<b>N</b>	2006/07 Signalling alterations at Princes Risborough (Evergreen 2)	E	2
<b>O</b>	2006/07 Additional signal section between Princes Risborough and Aylesbury (Evergreen 2)	E	2
<b>P</b>	2006/07 Additional signals and bi-directional working between Princes Risborough and Bicester North (Evergreen 2)	E	2
<b>Q</b>	2004/05, 2005/06 Region's track renewal programme including renewals of ballast, rail and sleepers between Harrow and Aylesbury, and significant S&C renewals at West Ruislip	R	3
<b>R</b>	2004/05, 2005/06 Region's AMP structures programme including reconstruction, infills, repair and embankment works at Northolt and between Bicester and Aynho. As part of the Bridgeguard 3 Programme, works are planned at Neasden Lane	R	3
<b>S</b>	2005/06 Access improvements and crowd control measures at Wembley Stadium	E	2
<b>T</b>	2004/05 Sale of Chinnor and Thame branches	E	2
<b>U</b>	2006/07 Transport interchange at West Hampstead	E	1
<b>V</b>	2006/07 Platform extensions on Aylesbury route	E	1
<b>W</b>	2006/07 Reinstatement of fast lines at Beaconsfield	E	1

# Route 17



# Route 17: West Midlands

## Route Description



### Physical Description

The West Midlands route lies at the heart of the national rail network and is a key hub for cross-country, interurban and suburban services based on Birmingham New Street. The route is bounded to the east by the West Coast Main Line, the west by Shrewsbury and Hereford and the south by Oxford and Worcester. The train operators serving the route have consolidated timetables to offer high frequencies of journeys to main centres, such that on weekdays a half-hourly service is enjoyed to and from London, the Thames Valley, the north-east, the north-west, the south-west and most West Midlands regional centres.

The four primary elements which comprise the West Midlands route are described below:

- West Coast Main Line - Birmingham loop, comprising:
  - from Rugby, through Coventry, Birmingham New Street station and Wolverhampton, rejoining the WCML at Stafford - It is electrified and predominantly two-track. Linespeeds have been increased to 125mph between Wolverhampton and Stafford, following infrastructure upgrades to support Virgin's new timetable. Between Coventry and Wolverhampton linespeeds are between 75-100mph. It is intensively used with a mix of high-speed intercity, regional and local services and some freight; and
  - from Stechford - Bushbury Junction (the Grand Junction Line) and Perry Barr - Soho provide two-track electrified alternative routes between Birmingham and Wolverhampton;
- Cross-country and inter-urban routes

These sections are essentially two-track but with some four-track sections, and some single-track between Coventry - Leamington, and Worcester - Hereford. The routes are:

- Birmingham - Cheltenham;
- Birmingham - Tamworth - Derby;
- Birmingham - Oxford;
- Birmingham - Worcester/Hereford;
- Wolverhampton - Shrewsbury; and
- Birmingham - Nuneaton - Leicester.

The route between Birmingham and Barnt Green is electrified.

Linespeeds vary between 75-100 mph on the fast lines, down to 50mph on the slow lines.

Between Oxford and Banbury, the linespeeds are up to 110mph.

The route between Birmingham and Derby has been upgraded to 125mph running.

- West Midlands local routes

The local routes form two main networks, centred on Birmingham New Street and Snow Hill. Lines on this section predominantly two-tracks but there are some single-track sections.

Linespeeds are normally 50-75mph, with lower restrictions at junctions and through some stations.

The lines from Bescot Junction to Walsall, Aston to Lichfield Trent Valley and Barnt Green to Redditch are electrified; and

- Freight routes

There are a number of freight routes and branch lines within the West Midlands area, carrying significant volumes of long distance freight. EWS operate a number of freight terminals in the region, including Washwood Heath Yard, Bescot, Walsall, Wolverhampton and Brierley Hill. Freightliner operates the Lawley Street terminal, with Associated British Ports (ABP) operating Hams Hall. Freight lines include the Sutton Park Line, St. Andrews Junction to Landor Street (Freightliner terminal), and lines serving a number of private sidings and terminals on the route, including Longbridge, Hams Hall and Round Oak. Some branch lines are single-track with linespeeds varying up to 75mph.

The predominantly two-track sections on the majority of this route accommodate varying speeds and stopping patterns of traffic, including the conflicting speeds of Virgin Cross Country trains, Central Trains' Centro services and freight movements. This imposes constraints on the timetable, limiting introduction of further services.

The primary asset condition issue on this route is the state of the signalling equipment as the majority of it is at or near life-expiry. Saltley PSB is nearing the end of its operational life and as a consequence, the reliability of the infrastructure is increasingly difficult to maintain. A number of 1960s signalling installations, such as Wolverhampton, Walsall, Coventry, Oxford and Gloucester PSBs are approaching their renewal date. The age of track on the route is variable, with an age profile heavily weighted towards the 1960s and 1970s. This means that large mileages of track renewal will need to be done in the next 10 years to maintain a steady state. Condition of track on freight-only routes is also an area for attention, with the resultant challenge of containing the number of TSRs. The electrification on the route dates either from the 1960s (and is being overhauled along some stretches) or from the 1990s, with many years of service left. Structures are of mixed age, presenting various challenges to maintain in a serviceable condition.

The classification of the route is mostly an even split between primary and secondary, but with a small; proportion of freight only and rural.

## Market served

Birmingham is at the heart of the cross-country rail network and thus serves a number of long distance travel markets. It also serves as one end of significant long distance flows to and from London, via both the West Coast Main Line and the Chilterns Route (see Route 16). The principal routes into the area replicate and compete with the national motorway network. Additionally, Birmingham has a major regional airport, which is projected to accommodate an increase from 9-32m passengers per year by the year 2030, with an associated target of greater public transport share.

The West Midlands route plays a key role in the transport system of the region as a whole – seven million people live within a 50 mile radius of the centre of Birmingham, with rail services from most centres penetrating right to the heart of the city. A busy suburban rail network, supported by the West Midlands Passenger Transport Executive, Centro, serves the business, commuter and leisure markets. Centro has published a '20-year strategy', which nominates certain corridors and modes as high volume, of which Centro have aspirations to increase to a 10min service. Where this has been introduced (as on the Cross-city line) it has had a dramatic effect on ridership.

Major freight flows include traffic from the West Coast Main Line, along the Thames Valley line from Oxford (which forms part of the freight route from Southampton to join the West Coast Main Line in the West Midlands) and significant coal and steel flows.

## Growth

Our analysis suggests that we should expect continued growth for both passenger and freight services. In addition, recent and planned service upgrades will induce additional demand. We believe that without increases in seat capacity, severe overcrowding will result and restrict passenger growth accordingly. This has been borne out by the experience of a year of operation of the enhanced cross country service, with a revision of timetables needed to provide sufficient seating capacity on the core routes to the Midlands. Recent passenger surveys at Birmingham New Street support this trend with numbers up by over 40% over the last three years. This reflects the significant increases in office and retail floor space in central Birmingham. Clearly, if this level of forecast growth is to be accommodated, consideration may need to be given to further train or infrastructure enhancement at a later date, if funding is available.

The West Midlands strategy is heavily influenced by the SRA's West Coast Strategy, in particular the introduction of 125mph services between Birmingham and London Euston from Winter 2004. This is complemented by services to the north-west, including a core 30min frequency between Birmingham and Manchester, and hourly services to Liverpool and Preston complementing accelerated Cross-country services to Scotland. This has acted as the catalyst for a major recast of services in the West Midlands from Winter 2004, including local services.

Although approaching capacity, freight growth is expected especially in automotive and intermodal traffic.

## Current use

### Current traffic

The main operators on this route are Central Trains, Chiltern Railways, Virgin West Coast, Virgin Cross Country, Silverlink, Arrive Trains Wales, Wessex Trains, First Great Western, Thames Trains, EWS, GB Railfreight, Freightliner and Freightliner Heavy Haul.

<b>Route 17 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	62,344	11,172	73,516
Train tonne km per year (millions)	4,527	3,306	7,564
Average no of train km per track km per day			86
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Birmingham New Street - Galton Junction			350
Kings Norton - Longbridge			300
Galton Junction - Wolverhampton			270
Birmingham New Street - Kings Norton			260
Birmingham New Street - Aston			240

### Projected use

This route has already experienced a significant increase in services - an increase of 32% in train kms since 1999. The route will see a further increase passenger tonne kms (20,679m) in 2004/05, the principal driver being the introduction of the West Coast Winter 2004 timetable. The timetable change will be accommodating new services such as Birmingham - Preston and Birmingham - Northampton, as well as a 30min frequency to Manchester. Also as part of the WC strategy, Central Trains - which currently operate between Nottingham and Coventry - will start and terminate services at Nuneaton. From 2004 until 2008 there will also be significant traffic through the West Midlands diverted off the WCML as a consequence of work on the West Coast scheme.

We are currently engaged, with rail industry partners, in a detailed timetable review of the Snow Hill lines timetable. The aim is to establish whether certain service changes and increases (including a 10min frequency service Birmingham to Stourbridge and 2tph off-peak Birmingham - London Marylebone) can be introduced in 2004, whilst maintaining or improving performance.

Beyond these projected and proposed increases in train services, the West Midlands rail network is largely at, or very close to, capacity. Thereafter, to accommodate further growth, we would expect capacity requirements to be met by train lengthening/changing service or calling patterns.

The prediction for freight growth in the Midlands Region, shows an upturn of growth year on year to 2012. The trend includes increases in imported coal from locations such as Hunterston, Immingham and Avonmouth and container traffic from deep sea ports such as Felixstowe and Southampton.



## Strategic framework for the route

The West Midlands is at the hub of the national rail network and thus forms the cornerstone of the Long Distance Statement (LDS) as set out in the SRA's Network Utilisation Study (NUS). Work has started on the RUS for the West Midlands due for consultation in Summer 2004, taking account of the West Coast Strategy published in June 2003, and we are actively participating in this study. The West Midlands Regional Planning Assessment is due in Autumn 2004.

In 2000 the SRA led a study of West Midlands rail capacity. This was followed up of further detailed capacity analysis, which we carried out to remits agreed with the SRA. This work involved demand modelling for freight and passenger traffic, and evaluation of options to accommodate demand growth. Certain of the recommendations are still under evaluation, particularly the enhancements associated with the early signalling renewal schemes.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 17</b>		<b>Route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Birmingham - Wolverhampton		15min
Birmingham - Coventry		20min
Birmingham - Cheltenham		38min
Birmingham - Oxford		1 hr 3min
Birmingham - Derby		39min
Birmingham - Leicester		46min
Birmingham - Stratford-upon-Avon		51min
Birmingham - Walsall		18min
Birmingham - Lichfield Trent Valley		29min
Birmingham - Redditch		33min
Birmingham - Hereford		1 hr 31min
<b>Linespeeds (km of track)</b>		
Up to 35mph		34
40-75mph		1011
80-105mph		482
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		764
W7		577
W8		519
W9		157
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		-
20.4 tonnes - 24.1 tonnes (RA 7-9)		1528
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>1528</b>
<b>Total km of route</b>		<b>764</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 17 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	45	63	55
Structures	8	11	15
Signalling	17	28	36
Electrification	2	3	3
Plant & machinery	2	1	0
Telecoms	4	0	1
Network Rail managed stations (Birmingham New Street)	1	1	1
Stations	8	2	-
Depots	2	1	1
Lineside	0	0	-
<b>Total renewals</b>	<b>88</b>	<b>110</b>	<b>112</b>
<b>Committed and planned enhancements</b>			
Bescot Yard Sidings	4	0	0
Frankley Extension to Cross City Line	0	0	22
Others	2	0	0
<b>Total committed and planned enhancements</b>	<b>6</b>	<b>1</b>	<b>22</b>
<b>Route 17 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	48	76	51
Sleeper renewal (km per year)	33	73	53
Ballast renewal (km per year)	28	78	90
S&C renewal (units per year)	45	53	65

The West Midlands area contains in microcosm the whole range of type and vintage of infrastructure. From 2003, the area has joined the number of routes with 125mph capability, due to high-speed works resulting from the Cross-Country Route Modernisation Project (CCRM). The recently-opened Rail Traffic Control Centre at Saltley, Birmingham is currently in use as an operational control centre for the Midlands Region. At the other end of the spectrum, there remains bullhead rail and manual signalling. A large proportion of the route falls in the middle of the range PSBs nearing life expiry, and a substantial mileage of track in the programme for renewal.

## Engineering access

The routes through the West Midlands form an integral part of the diversion strategy of the West Coast Main Line, both with regards to routes between Rugby and Stafford, and - specially for freight traffic - between the north-west, and London and the south coast. Consequently the possession plan for this route is linked with wider possession strategies and the plans of other Regions.

Most of the route is two-track railway, leading to a choice for engineering access of diversions or single-line working. However, the West Midlands has a reasonable availability for diversionary routing over much of its network, especially for traffic from the centre to beyond the route boundaries. Consequently, over a number of years a possession policy has been developed which is moving away from the use of single-line working, and instead focuses on a policy of rotating possessions around routes and using diversionary alternatives in turn. This has the benefit of greater traffic throughput, more robust timetabling and performance, and much improved site safety and productivity. Although it needs the cooperation of all operators on each route, the optimum position would be one where 7hr midweek maintenance possessions could be taken on a one in 6-week rotation, fully using diversionary routes. This would give the advantage of having two sets of opportunities to remedy '13-week defects'.

Generally, in addition to the rotating sequence of midweek possessions, there is a weekly opportunity for 8hr Saturday night possessions.

For some parts of the Route, there is no diversionary alternative. Where a diversionary route exists, it may be different in capability, or have a unique need for access, so the 8hr Saturday night possession may be the only opportunity for a maintenance possession. An example of the former is Wolverhampton - Stafford, where the diversion is not electrified. An example of the latter is the major train-care depot at Tyseley.

For individual locations the nature of the traffic may lead to even more restrictive possession opportunities. For example, between Coventry and Birmingham International, access can be difficult due to a lack of diversionary routes and issues arising from the NEC.

For renewal works, longer possessions will be required. Again, the benefit of the diversionary routes is that for many locations these longer blocks can be planned to give minimal disruption to traffic. However, for some locations, the multi-regional nature of some of the traffic flows restricts the opportunities for such long possessions even more than for the overnight ones with the need to maintain availability of much longer continuous routes.

## Maintenance and renewal

### Track

Track in the West Midlands is of mixed age, with over 50% over 25 years old. In the last two or three years, the inter-city routes from Birmingham to Stafford, Rugby, Derby and Oxford have had additional track renewal programmes under the WCRM and CCRM projects, as well as the local renewal programme. TWS combined volume of renewal is now starting to make inroads into the age profile.

The routes around the West Midlands handle a high tonnage of traffic. Demands are increasing: linespeed; volume and tonnage of traffic; and axle weight (for example increasing tonnages of coal are hauled in wagons with a higher axle weight than previously).

The following items will take place in the next two years:

In 2004/05 we are planning plain line track renewal, including reballasting, resleepering and rerailing at Tamworth; Cannock; Wellington; Albrighton; Bedworth; Hall Green; and Olton. S&C renewal work is to be undertaken at Birmingham New Street; Kings Norton; Daw Mill; Longbridge; and Washwood Heath. We are also planning a substantial mileage of rerailing across the route.

In 2005/06 we are planning reballasting at Elford; Hednesford; Stourbridge; and Whitnash, and plain line track renewal including resleepering and rerailing at Branston; Kingsbury; Cofton Hackett; Wilnecote; Hams Hall; Somerton; Claydon; Hednesford; Cross-city North; and Cosford. S&C renewal work will be undertaken at Kings Norton; Aynho Junction; Water Orton; and Bloxwich.

### Structures

The route has a large number of brick-built Victorian structures, many of which were well engineered and have a long life expectancy. A programme of repointing and repairs is ongoing. This includes strength improvement on a subway at Tile Hill and an under bridge at Wolverhampton Station.

Bridgeguard 3 works for a large proportion of the works. Embankment and cutting stabilisation works are ongoing between Knightcote Bank (Leamington) and Fenny Compton.

In 2004/05 we will undertake embankment work at Harbury and Knightcote, and structures work at Beards Bridge and Hillfield Road.

In 2005/06 and 2006/07, as part of the Bridgeguard 3 programme, work will be undertaken at Station Road, Stechford and Park Street, Birmingham. As part of the embankments programme, further phases of work will be undertaken at Harbury and Knightcote.

### Signalling

The signalling equipment of the West Midlands is a mix of mechanical signal boxes (e.g. on the Shirley to Stratford line), PSBs with life expired or approaching life expired route relay interlockings (e.g. Saltley) and more modern SSI installations (e.g. Aston). We are preparing plans for renewal of large parts of the signalling equipment in the West Midlands, and transferring signalling control to a centralised location. It is anticipated that this will represent a significant renewal activity throughout the next 10 years.

As much of the route is controlled by ageing 1960s installations, renewal is due or (in the case of Saltley PSB) overdue. Over the next eight years more than 75% of the total route mileage will need resignalling.

The following West Midlands routes are expected to be renewed with starting dates as shown:

- 2005-2006 - Codsall-Madeley, Tyseley, and Oxley;
- 2006-2007 - Cherwell Valley (Phase 2), and Stourbridge-Hartlebury;
- 2007-2008 - Leamington Corridor, Water Orton, and Sutton Park;
- 2008-2009 - Walsall; and
- later stages - Wolverhampton, Hartlebury-Worcester and Birmingham New Street.

The Cherwell Valley resignalling scheme is due for completion in May 2004. It is anticipated that control of elements of the resignalled West Midlands routes will migrate to the Rail Traffic Control Centre at Saltley.

The proposed reinstatement of Kingswinford signal box, destroyed by fire in November 2001, will utilise all remaining capacity in the signalling interlocking system at Stourbridge junction. The proposed signalling renewals between Stourbridge to Hartlebury will see replacement of the current absolute block signalling with the introduction of new technology.

### Electrification and plant

The electrified sections of this route date either from the 1960s or the Cross-city electrification of the early 1990s. The 1960s equipment is robust but suffers occasional component failures such as pulleys seizing, and delamination of current wires leading to dewirements or failure. The WCRM project includes an extensive ongoing programme of overhead line renewal on the Rugby-Birmingham corridor, which ranges from renewal of OLE contact wire alone, through to complete renewal of masts, insulators, registration structures and contact/catenary wires. The project will also be enhancing the existing 'classic booster' technology on the Rugby-Birmingham-Stafford line. The Cross-city equipment is still fairly new and needs little or no renewal, though we are proposing switching equipment to be installed to isolate Cross-city north and south routes from New Street in the event of emergency current isolation.

We will continue our programme of routine maintenance, which includes structures painting, renewals of hot axle box detectors, point heaters and a phased programme of power distribution renewals.

Uninterruptible power supplies to protect the signalling system from voltage surges and failures, are being introduced across the route, with much of Saltley PSB control area to be covered in 2004. The benefit includes a substantial reduction in disruption to services, and a reduction in the number of events of signals reverting to danger in front of trains (Category 'B' SPADs).

The following items will take place in the next two years:

For 2004/05 we have planned across the route, retensioning conductors on electrified sections, renewal of signalling standby power supplies, and a rolling programme of point heater installation. We are also planning to renew electrification protection relays between Kings Norton and Barnt Green, and at Birmingham New Street renew the tunnel lighting and the standby generator.

In 2005/06 we plan to carry out modifications to the overhead electrification on the Cross-city line, and across the route, renew electrification protection relays and install signalling power supply 415v changeover panels.

### Telecoms

The Cherwell Valley resignalling project is currently underway and is delivering telecoms cable and transmission infrastructure between Leamington Spa and Banbury including FTN synergy works.

We are also working with Virgin Trains to renew CIS and PA on their managed stations at Rugby, Coventry, Birmingham International and Wolverhampton, as the current assets are life expired and obsolete. The planned renewals will take place over the next two years 2004/05 and 2005/06.

We have planned to renew the selective SPT concentrators and SPTs at Walsall and Saltley during 2004/05 and 2005/06 and FTN synergy works to support the asset renewal and deliver efficiencies. The West Coast Project is also renewing SPT concentrators at Coventry and Wolverhampton on this route due for completion in 2004.

There are some planned renewals of voice recorders in some signal boxes in the West Midlands area during 2006/07, which will maintain the capability to recall operational communications in the event of an incident.

## Network Rail managed stations

### *Birmingham New Street*

Over the last three years Birmingham New Street station has experienced a 43% increase in passenger numbers in the peak periods - up to 40,000 people pass through the station in the peak 3hrs. The new Bull Ring centre, which opened in September 2003, has accelerated this increase. Passenger congestion continues to impact upon key circulation areas of the station. As our first priority must always be for the safety of passengers and staff, in extremely busy periods we may be forced to restrict access to the station to maintain passenger safety. This action is only taken when absolutely necessary and we will work to minimise disruption to rail travellers. In the latter part of 2003 temporary partial station closures had to be implemented on a number of occasions to maintain station safety.

An expansion of the main passenger concourse is scheduled for completion in the summer of 2004 giving a modest increase in concourse area within which passengers can be accommodated at times when it is necessary to restrict access to platforms.

During 2003/04 the design study for the comprehensive passenger capacity enhancement of the station was completed. The construction programme, which would take five years to complete, would create a 21st century station environment with increased platform, concourse and access capacity, passenger departure lounges and step free access to all areas. In particular, it would provide sufficient passenger capacity to accommodate all future passenger growth scenarios.

SRA funding for a further study which examines 'do minimum' enhancements has also been made available. A new initiative is underway, led by Birmingham City Council, and is exploring local funding and commercial development options for a more significant station facility.

### Other stations

In 2004/05 we plan to be reglase canopies at Stratford-upon-Avon station, carry out refurbishment works at Dudley Port; Coventry; Leamington Spa; Tamworth (high level); Langley Green; and Olton stations and various stations on the North Warwickshire line. We will also build an additional platform and renew the footbridge at Wolverhampton.

In 2005/06 we plan to carry out renewals and canopy works at Lea Hall station, as well as refurbishment work at Hampton-in-Arden; University; Wolverhampton; Hall Green; Shirley; and Stourbridge Junction stations.

Subject to planning permission, we plan to increase the number of parking spaces at Coventry station in the next two years.

### Depots

At Tyseley depot, the fuelling equipment will be renewed in 2004 to conform to modern technical and environmental standards. A programme of repairs to roofs, brickwork, electrical equipment, and carriage roads at Tyseley is also underway.

We are currently completing repairs to the concrete underpinning of the carriage wash plant at Soho to enable the facility to continue to operate for the next few years. We are also undertaking a feasibility study into provision of a new carriage wash plant with new foundations. Building this would require advance provision of a diversionary entrance to Soho depot so it is not anticipated that the new plant would be available before 2005/06.

### Other operational property

A programme of local signalbox repairs is underway, where we are spending money on an improved environment for signalling staff e.g. at Stourbridge Junction.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The key issue on this route is accommodating the increased traffic levels experienced over the last five years. The mix of high-speed passenger, stopping local passenger and heavy freight services is a constant challenge particularly on the predominantly two-track nature of the route. This is exacerbated by the effect of any disruption on or off the route, and the tendency is for trains to lose further time, rather than recover it, once they have lost their path. The linespeed increases to 125mph helps delayed passenger services to recover some delay, but has increased the differential between fast and slow trains, to the detriment of this route section's overall capacity if not followed by an acceleration of other traffic.

The 'Middle England Joint Board' has been introduced, to complement the line of route Joint Boards such as West Coast. Central Trains were instrumental in initiating this, which enables the area to be reviewed as an operational entity.

A good case study of the effect of the workability of the timetable is the restructuring of the West Midlands timetable after 'Operation Princess' by joint work with Virgin and Central on Cross Country and Cross-city services. Before 18 January 2003 the timetable performed badly, but on that date a number of measures were introduced which stabilised the service, and significantly reduced delays and overcrowding. The main changes involved train lengthening, increased turnback allowances and more realistic station dwell allowances.

An example of the performance benefits derived through resignalling is the work done for the Cherwell Valley business case. This addressed both the change brought about by changed infrastructure, but more importantly on the timetable performance benefit of four-aspect signalling. This showed a saving of 16,000min per year and will deliver a significant benefit on an important mixed traffic corridor. The effects should be felt nationally in reduced reactionary delay.

Birmingham New Street station and approaches will be operating at full capacity with the introduction of the Winter 2004 timetable, but already operates in a very different way than in recent years, in that station dwell times for long distance trains are much shorter, and shunt and light locomotive moves are much reduced. A number of long-distance cross-country services that previously operated through Birmingham New Street station, are now split into two separate services (e.g. Liverpool - Stansted). This has the performance benefit of restricting the spread of reactionary delay.

Snow Hill station also suffers capacity problems at certain times, especially at times of service disruption. The previous ability to use permissive signalling is now only permitted as a contingency measure, and is very limited. Combined with a more intensive service since the Jewellery line opened, a restricted number of platforms, and restricted headways between Snow Hill and Moor Street, the ability to increase the number of trains is currently limited. Future resignalling could improve this by easing headways, opening Old Moor Street and reintroducing platform 4 at Snow Hill to heavy rail. Timetabling solutions to balance northbound and southbound services would also ease the throughput of the station.

We have relocated 'real-time' control of maintenance into the same room as operational control, prior to the full integration of maintenance and operations. The reopening of a new platform at Wolverhampton should also realise substantial performance savings.

## Enhancements

The SRA's West Coast strategy includes the delivery of the following projects by 2005:

- new bay platforms at Birmingham New Street (4c and 13a);
- new through platform at Wolverhampton;
- interim capacity improvements at Nuneaton;
- a new crossover at Birmingham International; and
- replacement of Canley, Tile Hill and Berkswell level crossings with a road bridge, a footbridge, and a scheme to widen the existing underpass respectively.

The CCRM (Cross Country Route Modernisation) programme is now in the stage of project close out. It consisted of network enhancements along three core rail routes (Oxford - Birmingham, Wolverhampton - Stafford and Birmingham - Sheffield) to increase linespeeds and track capacity. The £200m project has allowed Virgin Cross Country to reduce journey times on their core routes. The main elements of the programme, as far as they affect the West Midlands were delivered for the Winter 2002 timetable change, with final elements of linespeed increases on the Birmingham-Derby corridor, delivered in Autumn 2003.

The Southampton-WCML freight enhancement project is delivering its first Midlands region enhancement in the form of Phase I of Cherwell Valley resignalling due for commissioning in May 2004. This will deliver capacity improvement, with headway improving from the current 7min to 4min, which will bring substantial benefits for performance recovery. The project has been a success in developing a workable scheme in a very short timescale, and building on previous alliancing results with the Evergreen one-track doubling between Aynho and Bicester on the Chiltern route. It delivers a four-aspect track circuit block system between Leamington and Banbury, with the area controlled from the existing signal box building at Leamington.

Chiltern Railways are actively funding enhancements to the infrastructure, and have lengthened platforms at Dorridge, Warwick, and Solihull, as well as the sympathetic restoration of Moor Street (Phase I) passenger facilities. In addition, new sidings, and stabling facilities at Stourbridge Junction and a turnback facility at Kidderminster have been commissioned. A new siding road at Banbury has been created on the up side of the station.

We are working with EWS to implement a freight facility improvement scheme at Bescot Yard. The additional facilities will include two new sidings capable of handling 775 metre-long trains and equipped with two intermediate crossovers, associated rearrangement of overhead line equipment, rationalisation of switching and signalling arrangements, and removal of redundant equipment. Work on site commenced in October 2003 and completion is planned for late 2004.

## Land implications

There is a strategic freight site on this route at the former cement terminal in Handsworth, Birmingham. A proposal is currently being developed to turn this site into a scrap metal loading point.



## Route development

The importance of the West Midlands is underlined by the fact that two major projects, West Coast Route Modernisation and Cross Country Route Modernisation, are delivering enhanced infrastructure to support new fleets of trains. In October 2002, the strategic importance of this route was enhanced by a complete relaunch of the regional inter-city network, under Virgin Trains' Operation Princess. With Birmingham New Street as the hub, this development incorporated the introduction of a brand new fleet of trains, upgraded infrastructure, 80% more services and acceleration to times (up to) 20% faster than previously, with trains operating up to 125mph.

At the centre of our West Midlands route plan, is the safety and performance-driven requirement to renew 75% of the route's signalling system. Signalling renewal to maintain current network capability and functionality remains our primary requirement. A secondary objective is to incorporate enhancements to capability, driven particularly by the SRA. There are three benefits to this approach:

- reduced call on scarce industry resources;
- reduced train service disruption for implementation; and
- likely lower cost for enhancement than if implemented as a stand-alone project.

Together with SRA we have identified a number of relatively minor enhancements that could be implemented in conjunction with planned signalling renewals in the West Midlands. A number of these relate to Saltley PSB, Coventry PSB and the Stourbridge to Hartlebury route. SRA has funded development of these enhancements and is currently examining the business case for each.

Separately, we have worked with the SRA to establish the process to be applied in agreeing enhancement scope alterations to Network Rail signalling renewals to facilitate this sensible approach. Options for capacity improvement of the route between Leamington Spa and Coventry are currently being developed. This includes track doubling of the north and south ends of the route section. If infrastructure change is undertaken at the Coventry end it is likely to be delivered in conjunction with Coventry PSB signalling renewal. As part of Saltley signalling renewal options are being developed for a new layout between Water Orton and Landor Street. This development is likely to lead to a significant rationalisation of the infrastructure whilst providing improved functionality.

Early enhancements currently being considered include reduced signalling headways from Stourbridge to Kidderminster and Tyseley to Hatton, together with a higher speed crossover at Tyseley.

We are working on a jointly lead project (Chiltern Railways and SRA) to reopen the terminal platforms at Birmingham Moor Street Station (Phases 2&3). This will integrate the reopened section of the station with the existing through station and upgrade passenger facilities and access.

Feasibility work on the Round Oak - Bescot reopening has taken place, along with development of the Centro sponsored Midland Metro Line 1 extension from Wednesbury to Brierley Hill, as we believe there are benefits to be gained from accommodating parallel light and heavy rail on the same corridor. We have been working with SRA and Centro to examine the option for parallel running of Metro and heavy rail on the formation of this disused route. This has included identifying the level of capacity provided by a single-track with passing loops at Dudley Tunnel and Great Bridge. We are working with SRA to establish whether this will provide sufficient capacity to meet foreseeable freight requirements. Our primary objective is to establish that future reopening of the freight route - albeit as a single-track with some sections of double-track - be safeguarded. We are, therefore, supportive of the Metro proposal, in principle, subject to final feasibility work and agreement of commercial and engineering details. We hope to be able to actively support the Metro extension, once the future freight route reopening is protected.

Midland Metro is also extending its alignment from Snow Hill station into Birmingham city centre. We support this scheme, having agreed with Centro that platform 4 of Snow Hill can be released back to heavy rail use in the future. Beyond this, such is the traffic pattern on the network, we believe there is little local opportunity for the type of further light rail expansion on heavy rail corridors that has been seen in other conurbations.

We are actively involved in a joint scheme with Sandwell Metropolitan Borough Council, which proposes a new underbridge to replace Tipton Owen Level Crossing. This scheme is currently out to tender and will aid traffic management in the Tipton area.

Within Birmingham, we are actively involved in Centro's proposals to reinstate the former branch line to Frankley for heavy rail services, and in the development of a second access to Snow Hill station to connect the heavy rail service, the Midland Metro and the proposed new coach station.

The Southampton - WCML project has also completed feasibility work to a SRA remit to clear the route to W10 gauge. This would enable passage of 9'6" containers from the south coast to the Midlands, North West and Scotland, though the most significant engineering challenges exist on other routes. It is anticipated that, subject to funding, the works on this route could be completed in 2005. A fuller description is included in the enhancement section of this volume.

We will continue to work with Centro on enhancements to the network to benefit local users. One such enhancement would be the development of new 'park and ride' sites to improve accessibility to the rail network, and alleviate the road network. Another Centro led scheme being looked at is provision of a region-wide CIS/Security project, involving the fitting of centrally controlled CIS systems, PA and CCTV cameras at all Centro area stations. This scheme, is at a very early stage known as Confident Traveller.

A number of potential freight developments may take place on the route in the next few years, including:

- Darlaston: a proposal by a third-party to install a new connection and sidings off the Grand Junction lines between Portbello and Darlaston, possibly handling up to six trains per week;
- Newby Foundry: this site at Wednesbury (on the mothballed Round Oak to Walsall line) is a potential railhead for aggregates from the East Midlands, to satisfy construction demand which outstrips local quarry production. The proposal is to reopen the line from Walsall to Wednesbury initially as a freight siding, but could form an important part of reopening the route throughout; and
- Albion: the former Gulf Oil site has been acquired by a third party and may reopen to freight in conjunction with a possible signalling scheme to improve access to the site.

The following proposals are currently under consideration by the SRA:

- Stratford-upon-Avon: operational flexibility - Ability for passenger trains to arrive and depart from the second platform (This may be included in a resignalling scheme); and
- Stourbridge Junction: capacity - To allow a total of 6tph between Birmingham Snow Hill and Stourbridge Junction; provision for a minimum of 4tph, to arrive and turnback in the current platform 3, after creation of a new platform 4 for through traffic.

A scheme to construct a connection to a large freight terminal at Donnington, near Telford, is undergoing Transport and Works Act procedures - the application was made during July 2003.

Further proposals for station development on this route include:

- Stratford-upon-Avon Station: potential redevelopment of cattle market area to provide car park extension, bus interchange and taxi rank;
- Henley-in-Arden: part of station yard to be developed as car parking spaces;
- Tipton: possible replacement of level crossing with bridge, and relocation and improvement of station access and car park;
- Stourbridge Junction: improved access to potential car park extension promoted by Centro;
- Sutton Coldfield, Four Oaks, Solihull and Dorridge: potential car parking improvements promoted by Centro;
- Dudley Port: potential improved interchange and car parking in connection with Midland Metro Brierley Hill extension;
- Wolverhampton Interchange: creation of a transport interchange facility at Wolverhampton; and
- Witton, Birmingham: sale of land for redevelopment.

There are also aspirations to create an integrated operational control centre, in line with the national strategy of integration of control activity and following the successful launch of the new centre at Waterloo.

## Emerging Issues

A cross-industry approach is needed to address the issues of forecast growth against an infrastructure running at capacity. Once the Winter 2004 timetable is in force, Birmingham New Street and Snow Hill stations will be operating at, or close to, capacity given current levels of performance.

There are a number of initiatives that could be put in place to increase numbers of seats. There is a hierarchy of solutions, most of which are subject to sufficient funds/rolling stock being made available.

- timetable changes: the West Midlands Route Utilisation Strategy (RUS) work, West Coast strategy and Snow Hill lines timetable work will specify the basic West Midlands timetable structure, but the quantum of services that can be operated in the peaks cannot be substantially changed without more infrastructure;
- train lengthening: there are still valuable paths into and out of New Street station being used by one or two vehicle trains, which sub-optimises the overall effectiveness of the network. On many routes, the number of available seats can be increased by lengthening trains. On the Cross-city line, for example, a small proportion of services operate as 6-car units, and an increase in this proportion would deliver many more passenger seats without any infrastructure changes or performance effects. On other routes, relatively modest expenditure on platform lengthening can release capacity for longer trains and substantial extra numbers of seats. This applies to local, inter-urban and cross-country services; and
- infrastructure changes: we are working with the SRA on West Midlands capacity recommendations, to identify whether the infrastructure changes necessary to improve capacity and performance are affordable.

There is little traffic segregation on the nine major radial rail corridors. The mix of traffic types, with varying speed, acceleration and stopping patterns, is a major reason for the capacity constraints on the predominantly two-track corridors. The following routes into Birmingham are operating close to capacity, few opportunities for additional services.

- Birmingham - Coventry: this route will be operating at capacity after full implementation of the West Coast Winter 2004 West Coast timetable. Demand for additional local and interurban services is expected to be high, particularly to/from Birmingham International for the Airport and NEC;
- Birmingham - Wolverhampton: Centro have aspirations for new stations, greater stops at interchange points and increased frequencies. There is also pressure for additional long-distance paths, and the mix of intercity and interurban traffic with the stopping local trains adds difficulty to operation;
- Birmingham - Leamington - the long two-track section from Leamington - Tyseley is a constraint to growth in freight, local commuter and longer distance services. The number of intermediate stations means that operating 100mph Virgin trains through the local service is a challenge; and
- Birmingham - Bromsgrove: the Lickey Incline (from Bromsgrove to Barnt Green) restricts growth, particularly for heavy freight trains. The route section between Barnt Green and Kings Norton has a restricted layout with significant conflicts at Kings Norton, and Cross-city services cross over at Longbridge four times per hour.

Congestion is also evident at the hub of the network, in particular New Street, Snow Hill and the Landor Street/Washwood Heath areas. Consequently there is also an effect on service resilience in times of disruption, with little reserve capacity to aid service recovery.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 17 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004 Freight facility improvements at Bescot yard	E	6
<b>B</b>	2004/05 Cherwell Valley signalling renewal and Resignalling works on the route between Leamington Spa and Banbury, in order to improve performance and increase capacity	E, R	6
<b>C</b>	2004/05 Chiltern Franchise: reopening of Old Moor Street Station including refurbishment of old station building in order to create more platforms and increase capacity	E	4
<b>D</b>	2004/05 - 2005/06 West Midlands enhancements built in within signalling renewals: SRA enhancement proposals affecting the following route sections, Water Orton Corridor, Sutton Park Line (Route 43), Tyseley to Stratford and Leamington Corridor	E, R	2
<b>E</b>	2005/06 Saitley signalling renewal life extension and resignalling works to maintain and improve safety and to improve performance through the elimination of obsolete equipment	R	
<b>F</b>	2004/05, 2005/06 Region's track renewal programme (including renewals of ballast, rail and sleepers at Tamworth, Cannock, Wellington and Hednesford and significant S&C renewals at Kings Norton, Longbridge and Water Orton)	R, M	
<b>G</b>	2004/05, 2005/06 Region's AMP structures programme (including reconstruction, infills, repair and embankment works at Harbury, and Knightcote (in the Leamington Spa area). As part of the Bridgeguard 3 Programme, works are planned at Stechford, Birmingham)	R, M	
<b>H</b>	2004/05, 2005/06 Renewal of tunnel lighting and generator at Birmingham New Street and renewal of electrification protection relays between Kings Norton and Barnt Green	R	
<b>I</b>	2006/07 Replacement of retail comms at Rugby, Coventry, Birmingham International and Wolverhampton	R	

### Route 17 Capacity and operational constraints

<b>A</b>	Birmingham New Street: platform and junction capacity
<b>B</b>	Birmingham Snow Hill: restricted platforms, and limited headway
<b>C</b>	Coventry - Birmingham - Wolverhampton: two-track sections with intensive and mixed traffic
<b>D</b>	Five Ways - Kings Norton: stopping patterns and signalling headways
<b>E</b>	Coventry - Leamington Spa: single-line capacity constraint
<b>F</b>	Landor St - Water Orton: track layout and convergence of freight traffic
<b>G</b>	Walsall - Bescot: track layout and convergence of freight traffic
<b>H</b>	Tyseley - Leamington Spa: stopping patterns and signalling headways
<b>I</b>	Banbury - Oxford: signalling headways and traffic mix
<b>J</b>	Barnt Green - Redditch: single-line section
<b>K</b>	Worcester - Hereford: single-line sections and long headway

### Route 17 Other issues on the route

<b>1</b>	Birmingham New Street: passenger capacity at peak times
<b>2</b>	Burton-on-Trent station: 50mph speed restriction
<b>3</b>	St. Andrews Curve - 15mph speed restriction
<b>4</b>	Lickey Incline: restricts tonnage and speed of freight trains

**Route 17 Planned projects**

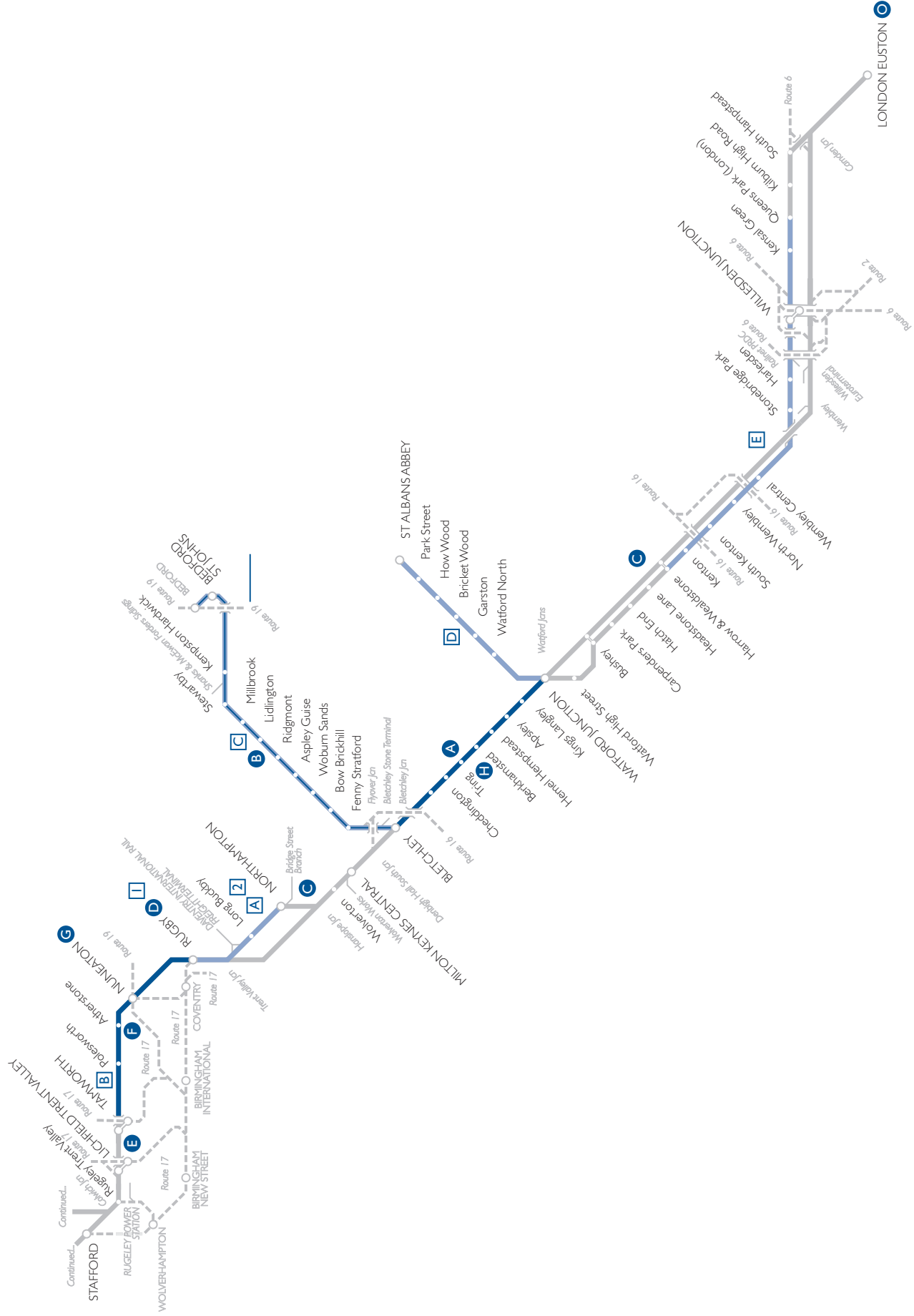
	Project description	Type of work	Dev. Level
<b>J</b>	2004/05, 2005/06 Telecoms: renewal of Walsall and Salfley PSB Concentrators and SPT Renewals at locations across the route	R	
<b>K</b>	2004/05, 2005/06 Region's Station AMP Programme: refurbishment works at Wolverhampton, Dudley Port, Langley Green, Hampton-in-Arden and Hall Green, with car park extensions planned at Coventry station	R	
<b>L</b>	2004/05, 2005/06 Region's Depot AMP Programme: renewal of fuelling equipment at Tyseley and repairs to carriage wash plant at Soho depot	R	
<b>M</b>	2004/05 Kingswinford Junction Signal Box Long-term Solution	R	
<b>N</b>	2004/05 West Coast Route Modernisation: linespeed improvements and journey time reductions	E	6
<b>O</b>	2004/05 West Coast Route Modernisation: new bay platforms at Birmingham New Street	E	4
<b>P</b>	2004/05 West Coast Route Modernisation: new through platform at Wolverhampton	E	6
<b>Q</b>	2004/05 West Coast Route Modernisation: interim capacity improvements at Nuneaton	E	6
<b>R</b>	2004/05 West Coast Route Modernisation: new crossover at Birmingham International	E	4

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# Route 18







# Route 18: West Coast Main Line

## Route description



### Physical description

The West Coast Main Line (WCML) runs from Euston to Carstairs via Crewe for approximately 600km, with diverging routes at Rugby for Birmingham, Colwich Junction/Norton Bridge to Cheadle Hulme (Manchester), and at Weaver Junction to Allerton (Liverpool). This core route is four-track from London to Rugby (including the Northampton Loop), beyond which there is a mixture of two, three and four-track sections. Existing linespeeds vary but are predominantly 100-110mph on the fast lines and 60-90mph on the slow lines. The route is electrified at 25kV overhead. The route is generally signalled by a mixture of three and four-aspect colour light signalling controlled from a number of signal/power boxes employing relay interlocking and track circuits. Some areas have been resignalled using SSI technology. The remaining signalling control areas are of varying age with many due for replacement in the next few years.

The route also includes the following branches:

- the DC electric lines from Camden Junction to Watford Junction which are double track, equipped for Driver Only Operation (DOO), and controlled by 3-aspect signalling (2-aspect between Hatch End and Bushey) from Willesden Suburban Power Box employing SSI technology and conventional track circuits with automatic train stop. They are electrified using a 750-volt DC system between Euston and Watford Junction, (with fourth rail in place between Kilburn High Road and Harrow & Wealdstone to enable the operation of LUL trains);
- the single-track branch from Watford to St. Albans Abbey which is electrified at 25kV overhead with a linespeed of 50mph. This route has restrictive signalling allowing only one train on the route at any one time;
- Bletchley to Bedford (excl), which is mainly double track with a single track section and is not electrified. The line is controlled by semaphore signalling, currently the subject of a signalling renewal. It has a maximum speed for passenger trains of 40mph, with various lower speeds, which has applied since 1989 due mainly to track condition; and
- Kidsgrove to Crewe which is also mainly double track with a single-track section, recently electrified at 25kV overhead. It has a maximum speed of 70mph.

Broadly, five sixths of the route is classified as Primary, and about a tenth freight only, the remainder split between the other categories.

## Markets served

The WCML is the busiest mixed traffic route in the UK and is one of the busiest in Europe. It is critical to the business of many passenger and freight train operating companies. For example, 40% of all UK rail freight uses the route at some stage in its journey.

The West Coast corridor is of strategic importance in both a European and a national context and has been designated as a priority Trans-European Network (TEN) project. It is a TEN High Speed route. It is the principal rail freight corridor linking the European mainland (via the Channel Tunnel), London and South East England with the West Midlands, North West England and Scotland. Key freight depots at Willesden, Wembley, Daventry, Birmingham, Manchester and Glasgow are predicted to generate increasing volumes of freight traffic over the route for at least the next ten years, some of which is Channel Tunnel and deep-sea business. Freightliner, EWS, DRS and GB Railfreight all operate freight services on the WCML. The DC and branch lines primarily cater for commuting and general local travel. The Bedford – Bletchley line is used by six freight trains daily in and out of Forders sidings, as well as by an hourly passenger service.

## Growth

There is considerable passenger and freight demand on the WCML and over some of the route this exceeds current supply. Some of the train operators using the route have aspirations to increase their service frequency and train length to satisfy this demand (particularly on commuter flows), as well as to achieve journey time reductions (for example between London and Manchester) to stimulate more demand. There is growing demand for freight traffic on the route, including high-speed parcels and logistics services, although the impact of the recent loss of Royal Mail services is being assessed.

The volume of passenger and freight train movements on the route is already at or nearing full network capacity, a situation exacerbated by the mix of differential speeds, stopping patterns and, in some areas, by the lack of passing places and by crossing moves at flat junctions. The timetable to apply from September 2004 will consume all the available capacity on the route until December 2008, at which point major capacity enhancement schemes at Rugby and down the Trent Valley will be commissioned. Until that time, no further growth will be possible. Critical capacity constraints have been detailed in Section 1, and will be more closely examined in the “key route issues and solutions” section.

The last major modernisation of the southern end of the route was electrification from London to Birmingham, Crewe, Manchester and Liverpool in the 1960s. Electrification was extended north of Crewe to Glasgow in 1974 and to Edinburgh in 1991. Financial constraints meant that work carried out since has been limited and the assets have deteriorated steadily to the point where significant remedial work is required. Prior to the WCRM project, the majority of the route's signalling dated from the modernisation schemes of the 1960s and 1970s.

## Current utilisation

### Current traffic

Virgin West Coast operates long distance passenger services over the route from London Euston and serving the West Midlands, Manchester, Liverpool, Holyhead, Preston and Glasgow. Silverlink Train Services operates over the route between London, Watford, Milton Keynes Central, Northampton, Rugby and Birmingham. It also operates the Bedford to Bletchley and the Watford to St Albans Abbey services. Silverlink Metro operates on the DC lines, providing an 'all stations' local service and LUL Bakerloo Line services also utilise them between Queens Park and Harrow & Wealdstone. South Central provides a service that links Brighton /Gatwick Airport with a WCML interchange at Watford Junction.

Central Trains, First North Western, Arriva Trains Wales, Arriva Trains Northern, Transpennine Express and ScotRail operate services that call at various stations on the route. Virgin Cross-Country's long distance services radiate around the country from Birmingham, and use the WCML en route to Manchester, Glasgow and Edinburgh. Since September 2002 with the introduction of the Voyager/Super Voyager fleet, service frequency has been significantly enhanced to provide a clock face timetable between the main conurbations on and off the route. ScotRail operates overnight services between London and Scotland.

All current freight operating companies operate over some part of the route, some over almost its full length.

<b>Route 18 Current utilisation</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	90,645	29,300	119,945
Train tonne km per year (millions)	10,781	7,465	18,246
Average no of train km per track km per day			89
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
London Euston - Milton Keynes			430
Queens Park - Harrow (DC lines)			360
Milton Keynes - Hanslope Junction			320
Stafford - Crewe			250
Euxton Junction - Preston			240

### Projected use

The SRA's strategy for the WCML sets out its expectation for the future use of the route and we expect all new franchises to be let in a way which accords with this strategy.

#### West Coast Timetable

The first significant alteration occurs in September 2004, with linespeed increased to 125mph for tilting services between London, Crewe and Manchester. The Euston to Manchester service increases in frequency by 1tph all day and the Euston - Birmingham service increases by 1/2tph at peak times. There are also additional trains from Euston to North Wales and other destinations. The September 2004 outputs are set out in the strategy and a timetable reflecting them was formally tabled to the train operators at the timetable conference in February 2004.

The current postal services operated by EWS are currently under review following a recent decision by Royal Mail not to renew existing contracts. We expect that a smaller number of equivalent services will operate as an alternative.

The SRA's new franchise policy for the North West of the route transferred Transpennine Express services to a new First/Keolis franchise earlier this year, and the remaining services will transfer to a new Northern franchise. There have been 2-year extensions to 2006 for the Central Trains and Silverlink Trains franchises. Services operating into Wales have been transferred to a new Arriva Wales franchise.

## Strategic framework for the route

### SRA's West Coast Main Line Strategy and the interim review conclusions

Following Railtrack's entry into Railway Administration in October 2001, the SRA concluded that it was not possible to satisfy all of the commitments which had been given under the PUG2 agreement with Virgin (West Coast Trains) on any realistically affordable infrastructure. Consequently, they immediately put together a joint industry working group whose objective was to agree revised output objectives for the route.

This approach led to the publication of the SRA strategy for the WCML in June 2003. It followed 18 months of industry consultation and reflected a broad consensus on a mix of outputs which are realistically deliverable. The strategy was again consulted on by the Regulator as part of his review of track access charges. The Regulator's final conclusion was that the outputs specified in the SRA's strategy should be taken as broadly constituting the reasonable requirements of customers on the route.

As set out in the strategy document, it is intended to timetable enhanced permissible speeds between Euston and Manchester from September 2004. Acceleration to Liverpool and Preston will follow in June 2005, with further acceleration to Glasgow in December 2005. Most of the works required for the major capacity schemes at Rugby and along the Trent Valley will be completed by December 2008. At this point we will have effected the physical segregation of express passenger from other flows and provided competent electrified diversionary routes south of Preston, which will assist both cost-effective engineering access in the future and the growth of the weekend leisure travel market.

Up to 31 March 2004, we have spent £4.5 billion on the West Coast modernisation programme. This is the first major work to the route since the early 1960s, and apart from tilt authorisation / speed supervision work (TASS) the great majority is renewals. An overall view of the scale of work done to date can be gained from the following:

- 472 track kilometres of rail renewed;
- 645 track kilometres of sleepers renewed;
- 473 track kilometres of ballast renewed;
- 400 kilometres of tamping to prepare for 125 mph running;
- 774 OLE wire runs installed;
- 418 signalling locations/relocatable equipment buildings (REBs) installed;
- 1,345 signalling units installed;
- 119 TASS balises installed; and
- 640 kilometres of fibre optic cabling laid.

The Regulator has provided £2.8 billion for renewal and enhancement expenditure on this programme over the next control period. Although he accepted that the SRA's strategy document should form the basis of customer reasonable requirements for the route, he also concluded in paragraph 7.9 of his final conclusions that: "... requiring Network Rail to deliver all of the outputs of the project beyond September 2004 to the precise timescales and by the precise schemes set out in the SRA June 2003 document would not be consistent with acceptable levels of efficiency and economy in the provision of railway services..."

In paragraph 7.32 of the final conclusions, the Regulator said that he expected Network Rail to deliver the outputs in an "acceptably efficient and economical way", balancing the renewals required to sustain the September 2004 outputs, other network priorities and other enhancements. We are expected to maximise synergy between the enhancement and renewals programmes across the network as a whole, exploiting renewals opportunities to deliver low risk enhancements to network functionality.

## Rescheduling of outputs

In his final conclusions, the Regulator assumed that several elements of the programme would be rephased reflecting the above policy. This was set out in table 7.5 of his conclusions document and is reproduced below – with values uplifted from 2002/03 to 2003/04 prices.

<b>Route 18</b>	<b>ORR revised expenditure (pre-ORR efficiency)</b>					
<b>£m</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>Total</b>
<b>Network Rail</b>						
September 2003 cost submission	1,330	1,126	518	539	186	3,700
Bletchley resignalling	(30)	(50)	-	30	50	-
Macclesfield resignalling	(12)	(15)	-	12	15	-
<b>Sub-total</b>	<b>(42)</b>	<b>(66)</b>	<b>-</b>	<b>42</b>	<b>66</b>	<b>-</b>
Rugby	(20)	(41)	(61)	26	97	-
Trent Valley	(15)	-	(138)	(51)	205	-
Colwich - Stafford	-	-	(65)	(165)	(85)	(314)
Nuneaton Phase 2	(80)	20	59	-	-	-
<b>Total deferrals</b>	<b>(158)</b>	<b>(86)</b>	<b>(205)</b>	<b>(148)</b>	<b>283</b>	<b>(314)</b>
<b>ORR revised expenditure (pre-efficiency)</b>	<b>1,172</b>	<b>1,040</b>	<b>313</b>	<b>390</b>	<b>469</b>	<b>3,385</b>

We have reviewed the project in some detail since the interim review conclusions and has discussed this with the SRA to ensure that the company's plan takes account of its views. As a result of this review, we have modified our plans broadly into line with the Regulator's conclusions. There are, however, a number of modifications which have been made to ensure that these plans meet the reasonable requirements of our customers, and are deliverable in the most efficient and economical manner possible having regard to the expenditure allowances and outputs set out by the Regulator. The resulting (pre-efficiency) expenditure projections are shown in the table and the issues arising are discussed further below.

It is widely understood by our customers and other stakeholders that there will be considerable disruptive access through this summer as we complete works necessary to support the timetable introduction on 27 September 2004. Beyond this autumn, we expect the new timetable and the reduced journey times to enable a continuation of the recent improvements seen in performance and commercial attractiveness of weekday services. Weekends will continue to be disrupted throughout most of this control period as we continue to build Rugby, Nuneaton and Trent Valley Four Tracking schemes. As explained above, when the overall programme is complete there will be more flexibility to maintain the route without materially disrupting services.

<b>Route 18 Network Rail revised expenditure (pre-efficiency)</b>						
<b>£m</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>Total</b>
<b>Network Rail</b>						
September 2003 cost submission	1,330	1,126	518	539	186	3,700
Bletchley resignalling	(30)	(50)		30	50	-
Macclesfield resignalling	(12)	(15)	6	12	15	-
<b>Sub total</b>	<b>(42)</b>	<b>(66)</b>	<b>6</b>	<b>42</b>	<b>66</b>	<b>-</b>
Rugby	(1)	-	(4)	6	-	1
Trent Valley	20	85	(75)	(130)	11	(88)
Colwich - Stafford	-	-	(69)	(171)	(75)	(314)
Nuneaton Phase 2	(29)	19	40	-	-	31
<b>Total deferrals</b>	<b>(51)</b>	<b>39</b>	<b>(101)</b>	<b>(253)</b>	<b>(4)</b>	<b>(371)</b>
<b>Other costs</b>						
Transfer ESI expenditure	33	29	-	-	-	62
Programme risk	-	125	125	-	-	250
<b>Revised expenditure (pre-efficiency)</b>	<b>1,312</b>	<b>1,319</b>	<b>542</b>	<b>286</b>	<b>182</b>	<b>3,641</b>

### Bletchley resignalling

We support the assumed rephasing of the Bletchley resignalling and plans to implement the assumption made by the Regulator.

### Macclesfield resignalling

We support the assumed rephasing of the Macclesfield resignalling and plans to implement the assumption made by the Regulator.

### Rugby

We endorse the Regulator's assumed completion date of 31 March 2009, although we plan to complete the majority of the work by December 2008. This will greatly reduce the delivery and planning risks whilst enabling us to complete preliminary design "in house" so that fixed price competitive tenders can be sought.

We are currently developing the scheme and we are seeking stakeholder support for it. However, even on the basis of a simplified layout with reduced functionality we believe that it will be challenging to reduce the capital cost of the scheme to the level assumed by the Regulator.

### Trent Valley

We agree with the Regulator that deferral of this project would help us to achieve procurement efficiencies. The Regulator has assumed completion in March 2009. We have reviewed the project and has concluded that the optimum delivery strategy would accelerate some of the preparatory works and bring forward the end date slightly, thus bringing the enhancement and renewal dates into convergence. The main earthworks would start in the summer of 2005 and all the key works would be complete by August 2008 to enable timetable exploitation from December that year.

The reason for this approach is that the greatest item in the scope for this project is the moving of one million cubic meters of spoil. Good practice suggests that large earth moving should be done during the summer months, reducing the likelihood of cold and wet weather, which, by definition, makes earth moving both more difficult and more expensive. Accelerating these works also enables the more complex works to be undertaken more gradually to further reduce delivery risk.

The deferral from 2007 allows us to let specific earth moving contracts, which should attract a lower profit margin than the more industry specific railway work. It is our intention that we build access roads this coming summer to enable the big earth moving work to be undertaken in the summers of 2005 and 2006. The construction of the railway infrastructure will take place in 2007/08 with final commissioning in an August bank holiday blockade in 2008.

We believe that this proposal both accords with good engineering practice and will enable us to maximise the procurement efficiencies resulting from efficient contracting. Our planned expenditure profile in our business plan, therefore differs slightly from the assumed spend rate in the Regulator's Table 7.5.

### **Colwich - Stafford**

We endorse the removal of the Colwich - Stafford remodelling from the next control period. We have made an allowance of £32 million in this control period to undertake necessary renewals works and to begin the process of scheme development, including the application for planning consents. We will develop our detailed plans for this scheme and discuss these with our customers, the SRA and the ORR.

### **Nuneaton phase 2**

In the light of the Regulator's conclusions, we have reevaluated the optimum timing of this scheme. We have concluded that, as the design team is already assembled for phase 1, it is more efficient for it to complete the overall scheme design whilst assembled. The alternative would be to demobilise the team and then remobilise again. Accordingly, we have already authorised the funds to complete full scheme design.

Additionally, we have already programmed some possessions to undertake the first part of the phase 2 works in August 2004. As the materials are bought and the possessions are booked and agreed, it is most efficient to continue with this work and we are planning to do so.

The balance of the phase 2 scheme is included in our schedule with completion planned for March 2006. With a completed design later this year, we will be able to tender competitively for the balance of the phase 2 works and secure contracting efficiencies by so doing on the basis of our current schedule for completion by end of March 2006. We do not believe that anything further could be gained by any deferral beyond this date into 2007. Indeed, additional costs would be incurred by keeping the project team together for an extra year.

Our planned expenditure profile therefore assumes completion at the end of 2005/06 with the first part of phase 2 delivered in August 2004. This will enable us to achieve the procurement efficiencies whilst minimising the additional costs incurred by extending the project.

### **Electrical Supply Industry expenditure**

New power supply points along the route were previously included as operational expenditure as they were expected to be leased. However, these costs are now being included as renewals, which has resulted in a transfer from opex to renewals of £62 million.

### **Programme risk**

A specific provision for programme level risk has been identified as the detailed costing of individual projects has not been finalised. Further efficiency savings are being identified (see below) to offset this risk.



## Efficiencies

We are reorganising the programme to simplify processes, reduce interfaces and ensure that the company's functional heads are intimately involved in the definition of scope and the acceptance of completed work into operation and maintenance. The changes proposed will enable efficiencies to be achieved by achieving greater and faster clarity of scope, avoiding scope creep, enabling us to procure by competitive tendering and enabling greater control of handback and acceptance.

The table below shows how we plan to achieve the Regulator's efficiency target, although further work is still required to identify how we will achieve the full savings required. Detailed comments are given below for each line item.

<b>Route 18 Efficiencies</b>			
<b>£m</b>	<b>Pre-efficiency cost</b>	<b>Efficiencies identified</b>	<b>Post-efficiency cost</b>
<b>Identified efficiencies</b>			
Linespeed profile North of Crewe	52	16	36
Linespeed profile Rugby - Birmingham	8	6	2
Rugby Station	237	73	164
Trent Valley four-tracking	335	85	250
Stafford remodelling	93	60	32
Nuneaton remodelling	173	31	142
Crewe - Weaver	91	43	48
Plain Line track renewals	350	70	280
S&C Renewals	104	31	73
AT Distribution	190	30	160
Commercial	*	27	*
Management Costs	435	54	381
<b>Sub-total</b>		<b>526</b>	
Unidentified efficiencies		193	
<b>Total efficiencies</b>		<b>719</b>	

Note: \* Applied to a range of schemes.

These efficiencies will reduce the total pre-efficiency expenditure during CP3 from £3,641 million (see earlier table) to £2,922 million. With expenditure to date totalling £4,649 million, the total cost of the programme is expected to be £7,571 million linespeed profiles North of Crewe.

It is efficient to undertake speed enhancements when the associated renewals fall due over the next 10 years, unless the benefit is so great that it can fund the renewals acceleration. Following further internal review, we have concluded that certain of the enhancement works could indeed be deferred until the renewals fall due. These deferrals would save £16 million of enhancement monies in the current period. We are exploring ways of mitigating the short-term impact on journey times through a modified approach to the application of EPS in the lightly-used northern areas.

Having completed a preliminary evaluation, we have concluded that it is not possible to justify the three four-week blockades which had been suggested as a possible method for completing the works. Accordingly, we will undertake the work in a series of 54 hour weekend possessions through 2005. Many of these have already been sought in the 2005 Major Project Notice. We may approach the TOCs and FOCs to seek more. We are now reviewing the linespeed profile achievable by December 2005 based on the scope to be delivered and the access constraint.

### Linespeed profile between Rugby and Birmingham

Beyond Coventry, a permitted speed of 110mph will apply, given that capacity and other constraints make it impossible to exploit 125mph realistically beyond this point. Between Rugby and Coventry, we are exploring possible low cost options to achieve 125mph permitted speed, exploiting the long stretches of straight track on that route. We believe that this will enable us to achieve a saving of £6 million.

### Rugby Station

As previously stated, we are currently rescopeing our proposal in conjunction with our stakeholders to achieve a project scope which exploits the renewals need to achieve capacity and maintainability benefits at an affordable cost. We expect to establish a final scope in April.

The Regulator's proposed deferral and the rescopeing remove the technical acceptance and planning risks from the project. The deferral enables us to complete preliminary design before going out to competitive tender. We are targeting savings of £73 million as a result of this.

### Trent Valley four-tracking

The deferral will enable us competitively to procure the different works elements through competitive tendering. We are also value engineering solutions. We are targeting savings of £85 million as a result of this.

### Stafford remodelling

We expect to save £60 million by challenging planned testing and commissioning durations (at a cost of £750k per day), challenging standards and achieving a better commercial position by undertaking full outline design prior to issuing an invitation to tender.

### Nuneaton remodelling

We expect to achieve efficiencies of £31 million as a result of the deferral to April 2006.

### Crewe - Weaver Junction

On the basis of doing work only when triggered by a renewals opportunity, we are considering removing all scope from this scheme except for the condition based renewals of Crewe Coalyard and the provision of bi-directional signalling to enable more cost effective engineering access. We expect to save £43 million as a result of this.

### Plain Line track renewals

We expect that the West Coast unit rate for plain line track renewals will be reduced from £430 per yard to £370 per yard through use of the new national plain line contracts from May this year. In the north-west and in Scotland, the programme scope has been combined with that of the territory such that one contractor is delivering both, avoiding all the interfaces in possessions planning and resource utilisation which have hitherto inflated unit rates. We expect this to result in savings of £70 million over the control period.

### S&C renewals

The programme will use the national standard S&C contract from this summer. We will coordinate S&C renewals with their associated signalling renewals and will remove completely units which are no longer required. We expect to save £31 million over the control period.

### AT distribution

We have gone out to competitive tender on the open market for the AT distribution system on the basis of a fixed scope. This procurement strategy, together with better risk management, is expected to save £30 million.

### Commercial

In addition to the procurement efficiencies described elsewhere in this chapter, we are taking the following initiatives:

- we have budgeted for a 2% efficiency across all schemes in 2004/05 followed by a 4% efficiency in 2005/06 through negotiation of lower overheads and profit rates in contracts. This is expected to save £27 million;
- we are expanding the third party logistics contracts so that we can use its bulk buying power through NRS, thus reducing layers of overhead and profit. This approach begins in April 2004;
- we are strengthening and reinforcing our commercial contract management; and
- our longer term plan is to migrate into the national delivery mechanisms through the functional MP&I organisation. We will reconfigure the programme such that it is wholly compliant with the new company structure by 1 April 2006.

### Management costs

We expect to save 17% in 2004/5 and 31% in 2005/06 on all management costs numbers. This will be achieved by reconfiguring the programme to simplify processes, reduce interfaces and align the programme with the territory. This would save £54 million.

### Blockades

Subject to availability of suitable diversionary routes, we intend to maximise the use of full blockades as these enable substantial savings in unit rates. The blockade between Colwich and Cheadle Hulme, for instance, yielded savings of up 40% on certain rates.

## Summary

The renewals and enhancement post-efficiency expenditure projections for CP3 compared with the Regulator's final conclusions is summarised below. This shows that total expenditure projections for CP3 are in line with the final conclusions. The timing of expenditure also reflects significant elements of deferral in line with these conclusions. However, we are planning to spend slightly more than the Regulator allowed in the first three years in order to deliver the agreed outputs for CP3 in the most efficient way.

<b>Route 18</b>	<b>Network Rail expenditure (post-efficiency)</b>					
<b>£m 2003/04 prices</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>Total</b>
Network Rail Projections	1,300	948	432	172	70	2,922
ORR final conclusions <sup>1</sup>	1,196	940	285	246	265	2,932
<b>Difference</b>	<b>104</b>	<b>8</b>	<b>147</b>	<b>(74)</b>	<b>(195)</b>	<b>(10)</b>

Note <sup>1</sup>: The final conclusions have been uplifted to 2003/04 prices and include the transfer of expenditure of £62 million on new power supply points from opex to renewals.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the review of track access charges, including the effect of enhancements funded under this process.

<b>Route 18</b>	<b>Current route capability</b>	
<b>Journey times (direct trains) <sup>1</sup></b>		<b>1 April 2004</b>
London Euston - Glasgow Central		5hr 6min
London Euston - Birmingham New Street		1hr 37min
London Euston - Manchester Piccadilly		2hr 36min
London Euston - Liverpool		2hr 45min
London Euston - Holyhead		4hr 16min
<b>Linespeeds (km of track)</b>		
Up to 35mph		149
40-75mph		329
80-105mph <sup>2</sup>		312
110-125mph		1636
<b>Gauge (km of route)</b>		
W6A		1031
W7		1031
W8		876
W9 <sup>3</sup>		746
W10 or more		720
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		34
20.4 tonnes - 24.1 tonnes (RA 7-9)		2179
24.2 tonnes - 25.4 tonnes (RA 10)		213
<b>Total km of track</b>		<b>2426</b>
<b>Total km of route</b>		<b>1031</b>

<sup>1</sup> Journey times have been extended by a few minutes in the last year to allow for all the maintenance, renewal and upgrade work currently taking place on the route.

<sup>2</sup> Linespeeds were increased Wolverhampton - Stafford in the last year as part of the Cross-Country Upgrade.

<sup>3</sup> 30km of route between Colwich/ Norton Bridge - Cheadle Hulme was upgraded from W8 to W9 (SBIC) in 2002 as a diversionary route for W9 traffic during forthcoming WCML weekend closures. This section will be fully upgraded to W12 later this year.

The table below shows how the journey time capability of the route was expected to change over the control period under the SRA June 2003 Strategy and compares this with our planned position in 2008. We are currently evaluating whether a re-casting of the timetable following the completion of the four tracking works south of Crewe in December 2008 may allow the introduction of some fast non-stopping services which would enable some headline journey times below those anticipated by the original strategy. This could deliver journey times to Glasgow alternating between 4hr 20 min and 4hr 35 min.

<b>Route 18 Comparison of journey time outputs: June 2003 strategy and current position</b>					
Key Destination	June 2003 Strategy Position				Current view based on revised service patterns
	Now	Winter 04	2005	2007/8	2008
Birmingham (New St)	1hr 43min	1hr 28min	1hr 26min	1hr 23min	1hr 23min
Manchester	2hr 41min	2hr 08min / 2hr 15min	2hr 06min / 2hr 14min	2hr 02min / 2hr 10min	2hr 00min / 2hr 08min
Liverpool	2hr 53min	2hr 27min	2hr 24min	2hr 21min	2hr 13min
Preston	3hr 01min	2hr 35min	2hr 32min	2hr 26min	2hr 14min
Glasgow	5hr 35min	5hr 05min	4hr 53min	4hr 48min	4hr 35min

Notes:

<sup>1</sup> Standard regular pattern Mondays to Fridays journey times and to key West Coast destinations

<sup>2</sup> Current estimates of 2004 and the 2005 journey times are all, except for Glasgow, within 1-2 minutes of the journey times in the June 2003 Strategy. Journey times to Glasgow are within 5 minutes.

<sup>3</sup> The June 2003 Strategy also envisaged a (very) limited number of 'headline' faster trains to these key destinations, and these remain in the 2004 and 2005 plans.

<sup>4</sup> The current view of the 2008 timings includes further savings attributable to reduced number stops for Glasgow trains once the Stage 2 works are complete (subject to timetable validation).

## Delivering baseline outputs (overview)

The planned renewals and enhancement expenditure and associated track renewal volume, to deliver the outputs on this route are shown below for the three years to 2006/07.

<b>Route 18 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	383	292	159
Structures	83	73	35
Signalling	328	239	179
Electrification	222	202	90
Plant & machinery	28	19	13
Telecoms	70	24	7
Network Rail managed stations (London Euston)	2	1	7
Stations	5	7	2
Depots	0	1	0
Lineside	0	0	0
<b>Total renewals</b>	<b>1,121</b>	<b>856</b>	<b>490</b>
<b>Committed &amp; planned enhancements</b>			
WCRM Enhancements	252	181	116
Others	0	0	0
<b>Total committed &amp; planned enhancements</b>	<b>252</b>	<b>182</b>	<b>117</b>

Route 18	Forecast activity volumes		
	2004/05	2005/06	2006/07
Rail renewal (km per year)	179	131	75
Sleeper renewal (km per year)	149	142	54
Ballast renewal (km per year)	128	109	53
S&C renewal (units per year)	215	238	67

Due to the extensive nature of the WCRM programme, this section is divided into four geographical sections.

- line of route works;
- Euston - Crewe via the Trent Valley Line;
- Colwich - Cheadle Hulme (via Stoke on Trent);
- Crewe - Preston plus the branches towards Manchester and Liverpool; and
- Preston towards Glasgow and Edinburgh (Route 18 stops at Carstairs).

The first of the above sections is devoted to projects that cover all or most of the route. The other three cover the capacity, performance, asset condition and engineering access issues specific to that geographical area, as well as the proposed solutions and improvements. The details given focus mainly on the first three years of the control period.

## Delivering baseline outputs (line of route works)

### Linespeed increase

We are upgrading linespeed to a maximum 125mph for tilting passenger trains as far as is practicable along most of the route. In addition, the slow lines between London and Northampton will have a linespeed increase from a maximum of 90mph to a maximum of 100mph where practicable. A tilting mechanism is necessary to allow trains to run at the highest speeds around curves (of which the WCML has many) without causing discomfort to passengers as existing linespeeds have in most cases exploited conventional speeds on curves to practical limits. The work entails carrying out substantial track and S&C renewals and upgrades, as well as upgrading parts of the signalling system. Where track is realigned to support higher linespeeds, the overhead line electrification (OLE) will also require modification/adjustment.

We are improving the condition of the route's track to improve safety and performance and to allow higher linespeeds. This requires both conventional and high-output track renewals and enhanced maintenance.

### Engineering access

#### South of Preston

The strategy is to provide competent electrified diversionary routes so that it will be possible to run weekend services using normal traction on these diversionary routes, minimising the impact on journey times and thus enabling cost-effective 54hr possessions to be taken at the weekend to renew and maintain the main routes. This will free us from reliance on the expensive 8hr week night possessions on which we have historically depended. Provision of the work in the Springs Branch area (described later) will provide near four-track functionality between Preston and Wigan. Electrification of the Crewe - Kidsgrove line and clearance of Prestbury and Hibel Road tunnels on Route 20 mean that there are two competent electrified freight routes into Manchester.

The electrification between Crewe and Kidsgrove means that it is possible to take a possession from Colwich to Crewe. When the Trent Valley four-tracking is complete, the distance between the two pairs of tracks will be such that we can take possession of one pair whilst continuing to run trains over the other, avoiding the need to divert trains via the West Midlands.

The result of the above is that south of Preston, attractive diversionary routes will exist, which can be exploited by Virgin's Class 390 trains with only moderate loss of journey time. We will be able to exploit the opportunity to grow the weekend travel market, which has been heavily suppressed on the WCML due to the level of disruption caused in recent years by engineering works.

### North of Preston

The problem of engineering access in this area is acute because there is no competent diversionary route that does not import heavy time penalties.

Sleeper services are effectively the only traffic operating on the West Coast route on a Sunday night/Monday morning, and as such this time does offer potential opportunities for maintenance and renewals to be carried out. We will, therefore, establish arrangements to operate a series of cyclic diversions for these trains on Sunday nights/Monday mornings, with extension of journey times. This will help ensure that weekday night-time maintenance can be minimised and better overnight capacity achieved at times when the demand - particularly for freight traffic - is more significant.

## Performance

On completion of the WCRM programme we will have substantially renewed 40 year old infrastructure to the south of Preston and Virgin will have completely replaced trains of a similar age. Consequently, the equipment reliability can be expected to improve significantly. In addition, the final completion of the capacity schemes, including Trent Valley four-tracking, will segregate the high speed passenger from the slow traffic south of Crewe, providing much greater timetable resilience. Finally, the migration of the timetable into one based upon the concept of repeated pattern standard paths means that the timetable should become more structurally robust. Until the completion of the capacity schemes in 2008/09, the upgraded timetable to apply from September 2004 consumes all the available capacity on the route. There will therefore be a significant performance risk for this period, during which fast and slow traffic will have to share tracks and will conflict at junctions. Further market growth is precluded until the new capacity is provided at the end of the control period.

These three components should lead to a material improvement in performance from the end of the WCRM programme. We are working closely with the SRA and our customers to manage any transitional impact of the project on performance.

## Power supply

To enable the route to deliver the required train service outputs, it is proposed to change the power-to-weight ratio of many freight and passenger services on the route.

The power supply system along the length of the route is not adequate to support the growth of traffic foreseen by the strategy over the next 10 years. Consequently, we are migrating to an auto-transformer system between Kenton and Carstairs. This will enable the provision of sufficient power to cater for the predicted growth in movements and will also make the power supply much more reliable than it has been in recent years. Finally, it will enable electrically-hauled freight trains to accelerate more rapidly on the northern section of the route, thus boosting capacity in the two-track section north of Lancaster.

Electrical and plant works include both increases in the quantum and linespeed of electrically hauled trains. This involves both provision of new equipment and renewal of existing equipment. Where required to support the proposed increase in linespeed, the overhead line system (OLE) will be renewed, replaced or modified as necessary. Targeted condition-led renewal of certain components will also be undertaken leading to improvements in reliability. In most locations we will be able to accommodate the required feeder stations and transformers, however it will be necessary to acquire land for this equipment at some locations. The existing Supervisory Control and Data Acquisition (SCADA) system has already been renewed or modified between Euston and Glasgow. The existing electrical control rooms at Rugby and Crewe have been refurbished with the control from Willesden now migrated to Rugby. The targeted condition led renewal of certain ancillary items, such as points heating, will also be undertaken.

A digital train radio system, which will eventually replace the existing National Radio Network, is being fitted on this route by the network-wide GSM-R project. We have been installing Base Transmitter Stations (BTSs) along the Euston - Manchester section of route, as part of this project but with an additional data facility to allow for the future installation of ERTMS. This scheme, which is nearly complete, has involved land procurement in some areas where the BTS masts could not be contained within railway property. The GSM-R project is more fully described elsewhere.

## Delivering baseline outputs (Euston - Crewe via Trent Valley)

### Euston - Rugby overview

The key constraint on this section is caused by differential speeds and stopping patterns on both the fast and slow lines. The slow lines and the Northampton Loop are subject to capacity constraints. A number of schemes will address these issues as well as contribute to higher linespeeds to support 125mph on the fast lines and 100mph on the slows:

- in order to improve capacity and linespeeds we have already renewed and reconfigured the track and signalling between Euston and Willesden. We have also installed and commissioned high-speed crossovers at Ledburn (between Cheddington and Leighton Buzzard). During the blockade to commission the new Ledburn Junction further high speed crossovers have been installed at Bourne End (north of Hemel Hempstead), which will be commissioned during 2004;
- we will upgrade most of the route from Wembley to Rugby to improve capacity and support higher linespeeds, primarily by track renewal/remodelling and resignalling;
- at Tring, we will be providing new facilities to enable trains starting and terminating at Tring to turn back without obstructing the through lines; and
- we will be lengthening platforms so that almost all main line stations between London Euston and Northampton can accommodate 12-car trains. This is to compensate for the loss of access to the fast lines for Silverlink Trains.

### Rugby - Crewe (exclusive) overview

- we plan to remodel and resignal the lines between Tamworth and Colwich Junction. The driver for the scheme is asset condition but we will take the opportunity to increase linespeeds, including speeds through crossovers, and to carry out preparatory works for the four-tracking; and



- we will remodel Nuneaton, including the installation of a new flyover (using an existing structure) to enable trains between Birmingham and Leicester to cross the Trent Valley line without conflicting crossing moves, thus increasing capacity and improving safety. The proposals also include a new island platform at the east side of the station, allowing the trains using the flyover to call at the station without conflicting with the WCML, and alterations to the S&C layout to facilitate higher linespeeds through the station.

Following this first stage, there will be no physical connection between Route 19 and the WCML to/from the Tamworth direction. During 2005 there will be further remodelling work at the south end of Nuneaton station as a result of which the junction between the WCML and Route 19 will be restored and reopened. The scheme will be complete by the end of March 2006.

### Engineering access (Euston - Crewe via Trent Valley)

We have a general policy of maintaining two-track access between Camden and Hanslope whilst also carrying out ongoing track and OLE maintenance and renewal. Thus a 34hr block is taken of two running lines from mid-evening Saturday until early Monday morning. A similar arrangement applies to the line between Stafford and Crewe throughout the period from May to December 2004. There are regular arrangements throughout the 2004/05 timetable period whereby only two running lines are available through Rugby station at weekends. Access is as far as possible maintained between Euston and Crewe northwards by use of the alternative routes via Trent Valley or via Birmingham and via the main line or via Stoke-on-Trent.

Consultation has confirmed that the laudable aim of maintaining continuity of service during engineering work does not always meet passenger or freight customer needs. A well-planned "blockade" approach to engineering work with complete but relatively short closures of the line and well-publicised diversions and train/bus substitution is a strategy endorsed by the SRA. Undertaking the following works in the form of temporary route closures will accelerate delivery of the improvements compared with more traditional working methods over a much longer period of time:

- we are currently taking extended (12hr) Saturday night possessions of the AC electrified lines between Watford Junction and Camden, until 22 May 2004, in order to undertake 40,000 yards of track renewals as well as OLE and S&C renewals. Access is maintained at Watford and between Wembley/Willesden and the North London Line via the City Lines and between Wembley/Willesden and the West London Line via the Relief lines;
- the Trent Valley line between Rugby and Stafford is crucial to mid-week freight movements, so works are being carried out during 52hr all-line possessions every weekend until 22 May 2004, and again in 30hr possessions on Saturdays/Sundays in October and November 2004. Subject to stakeholder agreement, we envisage a further series of 52hr possessions from January to March 2005. Access is maintained for Birmingham/ Leicester services from Nuneaton South to Nuneaton North except during early morning works and standard maintenance works, 23.05 Sat-09.30 Sun. These possessions will enable us to carry out 37,500 metres of track renewals, with resleepering, rerailing and ballast treatment;
- at Rugby itself and in the Trent Valley, works will continue for a number of years after the enhanced service timetable starts in September 2004. At Rugby we are ensuring that the construction methodology maintains two lines open to traffic in all four directions during the construction. We will make use of extended weekends during Bank Holidays; the normal Christmas shut down at 2004, and possibly also the nine-day blockade noted below;

- at Easter 2004, lines will be blocked between Watford and Bletchley from Friday 9 April 2004 - 14 April 2004 to allow track renewals and other works. There will also be shorter all line closures at varying locations in this area on Saturday nights and Sunday mornings from 2 May 2004 - 26 September 2004;
- the line will be blocked between Watford Junction and Lichfield Trent Valley/Coventry for nine days from Saturday 29 May 2004 - Monday 7 June 2004 coinciding with the Spring Bank Holiday 2004. This will allow us to achieve substantial track and signalling renewal works including commissioning of the new track layout and signalling at Bourne End Junction (replacing the low-speed double junctions north and south of Hemel Hempstead station), the transfer of the new Bourne End, Tring and Ledburn layouts to the control of Rugby SCC, commissioning of the route and signalling associated with the new flyover at Nuneaton, installing new junctions outside the Rugby station area on the Northampton, Trent Valley and Birmingham lines, recoveries of redundant S&C following renewals at Tring and other locations, and the reconfiguration of the OLE at Rugby to minimise disruption for the remainder of the works. Details of the exact blocking points and road transport arrangements are still under consultation with the affected train operators;
- we will be carrying out plain line track renewals at weekends between Hanslope Junction and Rugby from 23 May - 6 December 2004, mainly on Sundays. Trains will be diverted via Northampton;
- we plan to take a blockade of the Bletchley - Bedford line from late July until early September 2004 to allow completion and commissioning of new signalling;
- during the late August Bank Holiday period in 2004, we envisage a 9-day blockade of the route throughout between Bourne End (north of Hemel Hempstead) and Lichfield to allow track and OLE renewals, signalling and structures works;
- during October - December 2004 we plan to renew the S&C at Stafford South, which will result in a number of weekend blocks of access to Stafford station from the London/Birmingham direction. Additionally, over the Christmas period in 2004 there will be a 100hr blockade Colwich- Stafford-Crewe; and
- from 12 December 2004 - 27 March 2005 the main line will be completely blocked for 9hrs on Sunday mornings between Norton Bridge and Crewe to allow repairs to various structures and OLE headspans.

We have carefully planned these blockades to minimise disruption to passengers, ensuring where possible stations remain open, using diversionary routes and/or alternative high quality bus/coach services, including until end-May a Manchester to St Pancras service to give a good rail link to the North West during the blockades. We are considering extending the St Pancras service until September 2004 at least during the blockades. Freight services will also continue to operate, with diversionary routes in place and additional gauging and electrification work underway to provide alternative routes. Consideration has been given to renewals planned for beyond 2006 to be advanced so as to take advantage of these closure periods and minimise future disruption. We aim to complete all works that require mid-week all-line possessions before the introduction of the enhanced services in Autumn 2004, except for the normal Christmas shut downs. There is an unavoidable difficulty in adequately balancing the needs of engineering access against the provision of an acceptable level of train service. The details quoted are in all cases our best view at the present time of what will be required, but may be subject to change in the light of emerging technical issues or stakeholder consultation.

## Maintenance and renewal (Euston - Crewe via Trent Valley)

### Track

As described under “line of route works” above, we are carrying out substantial track renewals works that will facilitate increased linespeeds over most of the WCML. Other items of work in this area include drainage works between Wolverhampton and Stafford, 20 S&C units and nine miles of formation, ballast and sleepers at various locations on the route, including Willesden Low Level, Queens Park, Harlesden, Doxey, and Northampton and on the DC lines we are planning S&C renewals in the Willesden Low Level area along with rerailling to improve track geometry.

### Structures

The installation of vent shafts has been chosen as the solution to improving aerodynamics to allow the new Pendolino trains to operate at 125mph through two tunnels. We have installed vent shafts at Stowe Hill Tunnel, on the fast lines south of Rugby, and we plan to do the same at Northchurch Tunnels between Berkhamsted and Tring. There is a scheme to replace Banbury Lane Level Crossing with a road bridge.

The Rugby scheme as currently envisaged necessitates structural work at 10 structures, including demolitions and some significant items such as the reconstruction of a flyover bridge on a new alignment, a new viaduct, and a retaining wall. Additionally, a bridge spanning the railway tracks is planned to accommodate station facilities.

As part of the Nuneaton scheme we will be altering the existing structure to enable trains between Birmingham/Coventry to Leicester to cross over the Trent Valley line without crossing moves, thus increasing capacity and improving safety.

In order to accommodate four-tracks in the Trent Valley, structural work will be required at approximately thirty locations, ranging from the widening of a three-span river bridge to the widening of culverts, and includes a new subway to replace Cumberford Level Crossing, and a new road overbridge to replace Hademore Level Crossing. We have received the necessary TWA approvals required to enable the schemes to proceed.

We will also upgrade six bridges in this area to reduce the effect of resonance from the new rolling stock. Four of these structures will require substantial reconstruction.

We are replacing Comberford accommodation crossing with a footbridge and Alders foot crossing with a subway.

### Signalling

We have identified SPAD mitigation works for the DC lines and we are developing a scheme to carry out the required interlocking modifications to deliver these safety improvements.

We shall be commissioning a new SCC at Rugby which will initially control the route from Castlethorpe to Rugby via Weedon. Further stages will add Apsley to Linslade and Wolverton to Castlethorpe to control by Rugby SCC; the latter stage at Easter 2005.

Trials have recently demonstrated the risk for higher speed trains with modern braking systems can be mitigated by implementation of enhanced TPWS, known as TPWS+. Details appear in the TPWS+ project section, and we currently expect to fit over 100 signals on the WCML with TPWS+ by 2005.

The interlocking at Colwich Junction signal box is being renewed.

A resignalling project is in progress on the Bedford-Bletchley branch and is due for completion in September 2004. This will completely renew all existing mechanical signalling systems with colour-light signals, replace the manual boxes with one control centre, and provide 24hr availability for this line.

Work continues to the signalling along the route to facilitate 125mph (tilt mode) in line with the SRA objective to introduce reduced journey times from the Winter 2004 timetable.

We have resigalled the following route sections:

- Euston to Hatch End - Controlled from Wembley SCC;
- Colwich (excl) - Cheadle Hulme via Stoke on Trent - controlled from Stoke on Trent SCC; and
- commissioned new Ledburn Junction (old junction being removed) - controlled from Bletchley PSB.

The resignalling brings improvements to performance and capacity and enables higher linespeeds as well as facilitating remodelling of some areas.

We are developing a scheme to resignal and remodel the Stafford area in order to modernise the signalling equipment and provide greater operational flexibility, while reducing ongoing costs.

Although not part of the WCML, the signalling renewals between Leamington Spa and Banbury which, will be completed in 2004, will provide increased diversionary capacity for passenger and freight trains. Similarly, the West Midlands resignalling project, further details of which are contained in Route Plan 17 will have an effect on the West Coast Main Line.

### Electrification and plant

Work continues in upgrading the power supply and distribution system using auto transformer technology on the route from Kenton in the south to Crewe and Carstairs in the north. Much of the old contact wire has been renewed on the fast lines for the increased speeds and the removal of the auxiliary catenary and the strengthening of cantilever arms will provide higher system reliability. A number of new feeder stations have been constructed and are being progressively commissioned into service.

Investment over the next three years by the regions includes conductor rail renewals on the DC lines between Euston and Watford. Schemes to improve performance include switchgear renewals at various locations, slow line OLE renewals, OLE structure repainting, and renewal of air compressors and the control panel at Rugby auxiliary supply cabin. The renewal of the DOO mirrors on the DC lines has been completed.

### Telecoms

A number of telecoms cable, route and transmission schemes will be delivered in support of the various resignalling projects being delivered by the West Coast Project including:

- Rugby Alliance Remodelling;
- Nuneaton Remodelling;
- North Staffs Resignalling; and
- Bedford – Bletchley resignalling.

We are continuing to develop and implement the Intermediate Voice Radio System (IVRS) for use in areas where axle counters are installed.

There are also planned concentrator renewals at Lichfield Low Level, Colwich, Tamworth, Stafford No4, Stafford No5, Norton Bridge and Nuneaton during 2004 and Basford Hall during 2005/06.

A number of SPT walkways are being installed or upgraded along the route to provide train drivers with a safe walking route from train cab to the SPT.

### Network Rail managed station

#### *London Euston*

LUL are developing proposals to relieve the capacity and functionality problems of its station including mobility impaired persons' access. We continue to monitor customer crowding issues on the main-line concourse but expect that safe operations will be maintained through rather more modest alterations that previously anticipated.

### Other stations

The SRA strategy for the West Coast Main Line requires that stations between London and Rugby are to be extended to accommodate 12-car trains and these works are due to be completed for the Winter 2004 timetable, with the exception of Bletchley where the proposed remodelling scheme is not due for commissioning until 2005. In addition, it is only proposed make passive provision for 12-car trains at Queens Park, Wembley Central and Long Buckby.

We are investigating the possibility of extending the existing sidings and OLE to stable 12-car trains at Northampton, and we are considering providing improved facilities for train crew here. Some works have already been done to accommodate staff and to allow bus services to access the station during the blockade and future weekend possessions.

We continue with detailed design work on a new track layout at Rugby, which may necessitate some changes to the existing station. We are consulting the SRA as to the optimum affordable solution.

We plan to renew the passenger lifts at Stafford station during 2004/5, and also the footbridge at Norton Bridge station. At Crewe station we plan to carry out glazing repairs during 2004/05 with further works in 2006/07. We will be renewing the water supply to Crewe station and yard during 2006/07.

We will be providing an additional platform on the east side of Nuneaton station so that trains between Birmingham and Leicester using the proposed flyover can call at the station.

### Depots

We are currently waiting direction from the SRA regarding the stabling and maintenance arrangements for the additional rolling stock proposed to be delivered 2004/05 as part of the final strategy for the WCML. This will affect layout and signalling requirements depending on the outcome of their stabling and maintenance strategy for the entire Silverlink fleet.

## Performance (Euston - Crewe via Trent Valley)

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

We are aware that performance of the route has not been satisfactory for some time, although recently a favourable trend has emerged mainly as a result of the reduction in speed restrictions as renewals are completed, coupled with improved programme management. Our overall aim is that on completion of route modernisation a target of 90% of long distance trains will arrive within 10min of their scheduled time, whilst other services using the route will also enjoy an improved level of performance. Given that there will be renewals and enhancement works ongoing for some years yet, we envisage continuing progress towards these targets over the next few years, with full achievement planned for 2008.

We will be improving line capacity and performance by means of enhancement works to give better traffic segregation, and introducing more bi-directional signalling where diversionary routes are not available. Where suitable diversionary routes do exist, we are improving their capability.

Timetabling will be optimised to reduce the number of dependencies and to provide a resilient, standard pattern service to enable easier recovery from the effects of disruptive events.

The introduction of strengthened traction and signalling power supplies, coupled with the introduction of condition monitoring into equipment, will also play a part in improved resilience coupled with the joint contingency plans we are developing in partnership with train operators on the route.

The commissioning of the Nuneaton flyover in May 2004 will provide grade separation between the WCML and the Birmingham to Leicester line, removing a significant cause of delay during late running or service perturbation on either route.

### Land implications (Euston - Crewe via Trent Valley line)

Major additional land required for the West Coast Programme is limited mainly to the proposed widening of the Trent Valley section to four-tracks and works at Nuneaton. The four-tracking from Lichfield to Armitage was approved as part of Order 1 on 28 April 2003, whilst the section from Tamworth to Lichfield is in Order 2. The Secretary of State issued a 'minded to approve' letter on 6 February 2004, which implies that Order 2 will be formally made in March. Implementation of the GSM-R trainborne operational radio system has required purchase of various small sites from land-owners through agreement. The West Coast property team has acquired many relatively small sites and secured many accesses for use by contractors both on a temporary and permanent basis. The team continues to support the programme in the procurement of sites as and when they are needed - both for temporary requirements and for permanent uses such as the extension of platforms and provision of further technical equipment that cannot be located within the existing operational boundary.

### Route development (Euston - Crewe via Trent Valley line)

- we are reviewing proposals for revising the layout of the route in the Bletchley area. The drivers for change are 12-car platforms at Bletchley, route maintenance access and operational flexibility;
- at Rugby we are carrying out detailed design of the track layout to exploit the renewals opportunity to improve line and junction speeds and to reduce the number of conflicting moves, maintaining segregation between express passenger and other flows through the station. The new layout will aid maintenance by allowing the layout to be operated as two halves, so that at weekends all services can be run on one half, enabling the other to be maintained; and

- the DC Lines between Queens Park and Stonebridge Park are nearing capacity as a result of joint usage by LUL and Silverlink Trains. The platforms are long enough to accommodate 6-car trains, so passenger capacity of the Silverlink service could be doubled by lengthening trains, subject to the outcome of our current review of the DC power supply capacity. Silverlink services currently operate as 3-car and LUL as 7-car formation. The Croxley Green line was formally closed in December 2002.

From Rugby to Colwich (75km) the four-track sections are interspersed with a three-track section from Rugby to Attleborough and a two-track section from Tamworth to Armitage, which substantially reduces effective capacity. Flat crossing moves at Nuneaton and Colwich, together with a mixture of stopping patterns by trains, constrain flexibility and reduce capacity. The Colwich to Stafford section (9km) is partially a two-track section and is also constrained by slow line conflicts at Milford, Whitehouse and Trent Valley Junction at Stafford.

- we intend to provide four-tracks throughout the Trent Valley in order significantly to improve capacity over this section of line and maintain higher linespeeds by segregating traffic. This will be completed in 2008. The additional tracks will allow long-distance services to take full advantage of fast linespeeds of up to 125mph, whilst the "slow lines" will enable the predicted freight growth to be handled at speeds up to 100mph;
- the SRA has asked us to exploit the renewals opportunity to simplify the layout in the Stafford station area, in order to achieve higher linespeeds; fewer crossing moves and reduced ongoing maintenance costs; and
- we are reconsidering the need to retain the slow to fast line connection at Madeley Junction as this is infrequently used but has an ongoing performance and maintenance cost.

## Delivering baseline outputs (Crewe - Preston & branches)

### Crewe - Preston overview

Crewe is a major interchange for both passenger and freight traffic and has branches off the main line to Shrewsbury, Chester, Manchester and Stoke-on-Trent. Capacity of the main line is constrained by the high number of crossing moves to the north and south of the station, exacerbated by the order of the running lines changing from paired by use to paired by direction at the station. Also, the change in local service patterns from terminating to more through services has led to under-utilisation of bay platforms, whilst the through platforms can experience congestion, particularly during times of service perturbation. The Crewe station area was resignalled in the 1980s however the surrounding area is characterised by traditional signal boxes and outdated signalling infrastructure. Older manual signal boxes at Basford Hall, Crewe Coal Yard, Salop Goods, Gresty Lane and Winsford have an operational impact and can constrain capacity. However, we are taking a condition-led approach to resignalling in this area in order to maximise value for money. We have been asked by the SRA to consider taking the opportunity to install bi-directional signalling between Crewe and Weaver Junction to improve capacity during future maintenance and renewal.

The 82km route between Crewe and Preston alternates between double and four-track. Capacity usage is particularly high between Winsford and Weaver Junction, where trains diverge to Liverpool. The section is constrained by the mix of speed and crossing movements between Springs Branch and Fylde Junction, through Wigan and Preston. Significant constraints exist at Acton Grange, Euxton and Farrington Curve Junctions.

## Stafford (Colwich and Norton Bridge) - Cheadle Hulme overview

The route between Colwich and Cheadle Hulme becomes the main route between London Euston and Manchester. Assets on the route having come near to the end of their life, we have recently carried out substantial renewals of signalling, permanent way and certain earthworks.

We are taking advantage of the renewal works to remodel layouts to accommodate more trains on this route. On this stretch of line we also widened tunnels to allow tilting trains and larger-gauge (W12) freight traffic to operate.

We have electrified and provided gauge enhancements on the Kidsgrove to Crewe line, creating an important diversionary route for ongoing maintenance and renewals, and at times of service perturbation or mishap.

A new overbridge has been completed replacing a Level Crossing at Hixon. This has improved safety of the line and will also facilitate linespeed improvements and increased traffic flows.

## Weaver Junction - Allerton (Liverpool) overview

The 30km route to Liverpool contains both two and four-track sections. The main constraint is at the narrow throat and tunnels leading into Liverpool Lime Street station (on Route 20) where it is difficult and costly to increase linespeeds or to reduce conflicting moves.

## Engineering access (Crewe - Preston & branches - Manchester & Liverpool)

In discussion with train operators and the SRA it became apparent that, where suitable diversionary routes existed, opportunities existed for us to take total blockades lasting for several months in order to complete all works required on a route section. Our customers indicated that such an approach would be preferable to many years of piecemeal disruption. The area where suitable diversionary routes exist is the area bounded by the triangle Colwich - Crewe - Manchester. Accordingly, in collaboration with our customers, the following blockades have been agreed:

- there will be a number of weekend blockades between Weaver Junction (excl) and Golborne Junction or Euxton Junction during October - December 2004 to allow S&C renewals at Warrington, also on Sundays at the same time between Weaver Junction and Allerton to permit general renewals work;
- we shall be renewing the double junction at Ditton during December 2004, which will require all lines to be blocked on certain Sundays to early Monday morning, and a continuous 6-day blockade over the Christmas period 24-30 December 2004.

## Maintenance and renewal (Crewe - Preston & branches)

### Track

At Crewe, we are planning the complete or partial renewal of some S&C units in 2005/07.

Drainage and embankment stability issues exist on both the Stoke and the Wilmslow routes to Manchester. These will be addressed during the planned blockades.

There has been much track work to maintain or improve on the steady state for the route for the south part of the WCML. This does not include the slow, goods, loop and Crewe Independent lines and Weaver Junction to Liverpool Lime Street.



There has been a significant level of renewal in recent years on the Warrington Arpley to Ditton line and we are planning major track renewal work at Fiddlers Ferry in 2005/06.

### Structures

We will upgrade three bridges in North West region to reduce the effect of resonance from the new rolling stock.

### Signalling

Crewe and Basford Hall Junction signalling assets are not yet in need of renewal and so this area will not be resignalled in the short term, but during 2004/05 we shall be developing proposals in more detail. In the medium term, when Crewe is resignalled, it is our intention to incorporate a wider area of control within one new signalling centre to improve operations and performance. There is an ongoing programme to complete necessary renewals in these areas by 2006.

The assets associated with Crewe Coal Yard and Winsford signal boxes will require renewal in the next few years, and we are examining land availability in the area to create a secure, extendable site for a large signalling centre.

On the Weaver to Liverpool line the signalling assets vary in condition, from the new expandable signal box being installed at Ditton with a system that is designed to accommodate 110mph operation, to the signal box at Halton Junction at which the assets are deteriorating and will require renewal within 2-4 years. We are currently reviewing options for the resignalling of the line between Weaver Junction and Ditton, which includes Halton Junction, and the SRA has asked us to consider bi-directional signalling on the Crewe - Weaver Junction - Ditton bottleneck.

The work has been divided into various schemes, which will in many cases take the opportunity to remodel for capacity improvements:

- major resignalling works have been completed and commissioned between Colwich/Norton Bridge and Congleton;
- resignalling of Sydney Bridge Junction (between Crewe and Sandbach) and replacement of the current S&C units with a more reliable layout;
- resignalling/remodelling between Crewe Coal Yard and Weaver Junction; and
- resignalling/remodelling between Weaver Junction and Ditton.

The signalling assets on the route north of Weaver are in better condition than those further south, and it is not anticipated that they will require renewal before 2009-2013. However, significant signal repositioning is being carried out to permit higher speeds. During 2006/07 we are looking to address the problem of silver migration in Westpac interlocking, and this may lead to work being required at Warrington and Preston power boxes. We have also identified a probable need to extend the operational life of the most heavily used signalling control panels, and this could lead to work during 2006/07.

We are planning a rewiring and interlocking renewal at Arpley Junction signal box during 2004/05 and 2005/06, also a rewiring of Monks Siding signal box (near Fiddlers Ferry) in 2006/07. We intend to renew three barrier level crossings on the Arpley to Ditton line during 2005/06 and 2006/07, due to life expired existing equipment and an associated difficult spares supply situation. For similar reasons, we plan also to renew subsequently the barrier level crossings at Alsager and Radway Green.

### Electrification and plant

We will be upgrading the power supply and distribution system to auto transformer technology throughout this section of the WCML. We will be enhancing the existing classic booster technology on the lines to Manchester and Liverpool, as well as carrying out significant OLE renewals. The main feeder cable at Speke we will renew during 2005-2007, the main electrical supply transformer at Crewe in 2006/07 and switchgear at Prestbury in 2006/07. Insulator renewal at overlaps to minimise dewirements in the Stoke-on-Trent area and northwards to Weaver Junction we will carry out between 2004 and 2007.

We will renew the Crewe high voltage cable ring during 2004/05, replacing all inter-sub-station connections and thus meeting requirements for us to take over energy charging. We will also renew the signal power supply points at North Road, Ditton Junction, Speke and Basford Hall in 2005/06.

### Telecoms

A number of telecoms cable, route and transmission schemes will be delivered in support of the various resignalling projects being delivered by the West Coast Project including:

- North Staffs Resignalling;
- Crewe Coal Yard - Weaver Junction;
- Weaver Junction - Ditton;
- Stockport Renewals; and
- Sandbach - Wilmslow.

We are continuing to develop and implement the Intermediate Voice Radio System (IVRS) for use in areas where axle counters are installed.

Provision of a back up telecommunications links, between remote control systems and Manchester Piccadilly signalling centre, is aimed at reducing delays as a result of disruption to communication circuits.

A number of SPT walkways are being installed or upgraded along the route to provide train drivers with a safe walking route from train cab to the SPT.

### Other stations

Reconstruction of one platform at Alsager is planned for 2005/06.

A partnership scheme is under way at Macclesfield with Virgin and Macclesfield Borough Council to improve the parking and the access to the station.

In order to develop capability for interchange and multimodal integration, a scheme is being developed for an interchange station at Garston/Allerton, linking the Northern Lines with the West Coast Main Line route. This major Merseytravel initiative, funded under their Local Transport Plan, includes the relocation of Garston station to provide a more convenient interchange between rail and bus, as well as provision for potential Merseytram services.

“Crewe Gateway” is a station enhancement programme being developed by the County Council and Virgin Trains, and we are assisting, where required, in the development process.

At Crewe we plan to carry out glazing repairs in 2004/5 and again in 2006/07. During 2006/07 we also plan to renew the water supply to Crewe station and yard.

## Depots

The use of Crewe Diesel Depot has much reduced and its future use is being reviewed.

## Enhancements (Crewe - Preston & branches)

Enhancements described in this section form part of the baseline outputs for which we are funded under the interim review of track access charges.

At Springs Branch Junction (just south of Wigan) we will install a new connecting bi-directional line from the Liverpool route to Wigan South Junction to segregate local and long distance services, thus improving capacity and performance. We are carrying out a feasibility study into the possibility of bi-directional facilities on the double track section between Wigan North Western and Balshaw Lane Junction to improve capacity during maintenance. We will double the Euxton Junction connection to the Chorley line to improve capacity and safety.

## Land implications (Crewe - Preston & branches)

Land implications on this section are expected to be minimal, beyond the routine process of procuring small temporary or permanent sites/accesses for use by contractors to facilitate the maintenance and renewal of the railway. However, the work at Euxton Junction will require a TWA due to the fact that it involves land and rights, particularly on the public highway.

## Route development (Crewe – Preston)

On behalf of the SRA we have continued to undertake feasibility for gauge enhancement to W10/W12 from the West Midlands to terminals in the North West at Trafford Park, Garston and Seaforth. Work to enable enhanced gauge clearance on the route through Macclesfield and Stoke has been undertaken during the Summer 2003 for use as a diversionary route for freight traffic.

## Emerging issues (Crewe – Preston)

There is a proposal to develop the site at the former Parkside Colliery (near Newton-le-Willows) into a strategic intermodal terminal, currently subject to Regulatory consultation under Condition 26 of our network licence.

As part of the South East Manchester Multi Modal Studies Recommendations a system of local dual carriageways is being designed and built over the next seven years. This will result in new bridges (principally over bridges) for the Manchester to Crewe and Cheadle Hulme to Colwich Junction parts of the route. In addition there are Highway Agency proposals arising out of the MIDMAN study for widening of the M6 to four-lane dual between Junctions 11-19. This will have implications for some West Coast structures.

We are holding discussions over the development of a multidisciplinary strategy for the renewals at Crewe Basford Hall and the associated freight layout and independent lines. If possible, this will seek to cover present and known future requirements.

## Delivering baseline outputs (Preston - Carstairs)

The route north of Preston is characterised by mixed traffic running on a two-track railway and is constrained by slow trains running over steep gradients such as Shap summit. This section of route has PSBs at Warrington, Preston, Carlisle and Motherwell as well as manually operated ground frames on some sections of the railway. There is a high volume of freight traffic on this section during night hours; indeed, capacity on this route section is utilised more fully at night than during the day.

We will undertake track and OLE works to increase the linespeed to 125mph where beneficial between Preston and the outskirts of Glasgow. We will also reinforce power supplies from Carlisle and Glasgow, allowing the heavier freight trains to travel at higher speeds. This work will improve both journey times and capacity over this section of the route.

We are carrying out a review of the layout at Lancaster, with a view to reducing maintenance costs by removing surplus S&C and to increasing linespeeds. The SRA has also asked us for data on the cost and value of retaining the Hest Bank to Bare Lane curve.

Capacity and operational flexibility in the Carlisle area is constrained by the two-track section between Carlisle Station and Caldew Junction. The section from Carlisle North to Carstairs is also two-track. Sections of the route within Scotland are operating at above 75% of current capacity, with the mix of passenger and freight movements constraining the availability of paths, particularly between Law Junction to Carstairs where headways are longer and there is a lack of passing loops. We have developed some options to resolve these capacity constraints and have discussed these with the Scottish Executive and the SRA.

## Engineering access (Preston - Carstairs)

There will be a need for a continuous all line block between Gretna Junction and Carstairs Junction throughout the Christmas and New Year period 2004/05 to enable renewal work to telecomms equipment and structures.

## Maintenance and renewal (Preston - Carstairs)

### Track

The condition of the track and S&C on the Preston to Glasgow route is varied. Many of the assets will not require renewal for another decade, however, some heavy maintenance may be necessary. Therefore, as part of the WCRM project, we will be carrying out a mixture of heavy maintenance and renewals on this route, to maximise asset efficiency and performance. Where S&C units are renewed the design will aim to incorporate higher linespeeds on crossings and entry and exits of passing loops and make passive provision for the extension of passing loops to accommodate 775m length trains.

The route within Scotland continues to receive attention to its track infrastructure, and there is a programme of track renewals in place to install new sleepers, new rail and new S&C components at various locations. This work is connected to the condition of the assets, but also caters for the higher linespeeds required as part of the route upgrade.

### Structures

We will strengthen five bridges on the route in Scotland and three in North West region to reduce the effect of resonance from the new rolling stock. Six of these structures will require substantial reconstruction.

Our continuous programme of structural maintenance and renewal work continues.

### Signalling

We are planning to upgrade the level crossings at Cove and Floriston from Automatic Half Barrier (AHB) to Miniature Controlled Barrier (MCB3), as part of the route upgrade to cater for the increased linespeeds.

### Electrification and plant

We will be upgrading the power supply and distribution system to auto transformer technology on the route between Kenton and Preston and Carstairs.

### Telecoms

The telephone concentrator at Motherwell Signalling Centre is planned for renewal due to its age and condition, to improve the reliability of the signal post and level crossing telephone system connected to the signalling centre. The project is also delivering an FTN synergy scheme to gain efficiencies in cost and schedule.

A number of SPT walkways are being installed or upgraded along the route to provide train drivers with a safe walking route from train cab to the SPT.

## Performance (Preston - Carstairs)

We are adopting a unified approach to performance on the total West Coast route. See relevant section under Euston - Crewe. Clearly, with the more limited signalling renewals planned for this part of the route due to better asset condition, the benefits to be derived from new equipment will be correspondingly less significant in the short-term.

In order to improve performance and safety, we continue to work with our train operators, Local Authorities, Local Police and BTP. The solutions we are implementing range from education programmes to fencing improvements, which reduce route crime (trespass and vandalism) in urban areas and the incidence of animals straying onto the line in rural areas.

In order to reduce delays to trains from interruptions to the signalling system caused by short-term power outages, ongoing power supply strengthening works at signalling relay rooms have been implemented, including installation of Uninterruptible Power Supply (UPS) equipment.

## Enhancements (Preston - Carstairs)

In order to support capacity and performance, a new TDM diverse routing scheme is planned for the interlockings at Warrington, Preston and Carlisle.

A programme of enhanced maintenance has been implemented to reduce train delay caused by point failures at key junction locations.

## Land implications (Preston - Carstairs)

Land implications on this section are expected to be minimal, beyond the routine process of procuring small temporary or permanent sites/accesses for use by contractors to facilitate the maintenance and renewal of the railway.

## Route development (Preston - Carstairs)

We are carrying out a review of the layout at Lancaster, both to reduce costs by removal of surplus S&C and to provide improved linespeeds.

We are discussing implementation proposals with Dumfries and Galloway Council who received a £750k PTF grant from the Scottish Executive to install a disabled access bridge at Lockerbie.

SRA has recently asked us to review the functionality at Carstairs, with a view to simplifying the layouts and increasing linespeeds, in order to improve journey time and reliability and reduce long-term costs.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 18 Capacity and operational constraints

<b>A</b>	Northampton - Rugby section: retention of three-aspect signalling limits diversionary route capacity resulting in high performance risk when service has to be diverted on to the Northampton Loop
<b>B</b>	Trent Valley Line: restrictions due to two-track section Tamworth - Rugeley
<b>C</b>	Bletchley - Bedford: short single-line sections at each end of route. Track condition inhibits freight growth
<b>D</b>	St Albans Abbey Branch: single-line with no signalling only allows one train at a time on the section, limiting service frequency to 45mins
<b>E</b>	Harrow & Wealdstone - Queens Park: volume of traffic limits capacity on DC lines due to LUL and Silverlink shared running
<b>F</b>	Preston - Carstairs: mixed traffic on two-track lines and slow trains over steep gradients such as Shap and Beattock summits severely limit capacity
<b>G</b>	Wigan - Euxton: a mix of speed and crossing movements in this section severely limits capacity through Wigan and Euxton Junction
<b>H</b>	Winsford - Weaver Junction: high usage of available capacity between Winsford and Weaver Junction where trains diverge to Liverpool
<b>I</b>	Crewe Station: large number of crossing moves north and south of Crewe Station and existing signalling infrastructure limits capacity
<b>J</b>	Carlisle: blanket 20mph speed restriction and two-track section north of Carlisle station limit capacity and operational flexibility

### Route 18 Other issues on the route

<b>1</b>	Rugby: low speed restrictions
<b>2</b>	Northampton: 20mph speed restrictions. Route used by Virgin West Coast Trains during diversions. Operationally a two x two-track railway (max 75mph via Northampton)
<b>3</b>	Crewe - Basford West: Regional investment site
<b>4</b>	Potential intermodal freight development at Ditton

### Route 18 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	Watford - Bletchley: resigalling; remodelling of junctions; reconfiguration of Hemel Hempstead and Bourne End to support higher linespeeds; additional tumbback facilities at Bourne End and Tring	R, E	5
<b>B</b>	Bedford - Bletchley resigalling	R, E	5
<b>C</b>	London - Northampton: platform extensions to allow 12-car trains	E	5
<b>D</b>	Improvements at Rugby: to permit 125mph operation and renewal of flyover	E	1
<b>E</b>	Remodelling and resigalling between Tamworth and Colwich	R, E	3
<b>F</b>	Four-tracking through the Trent Valley	E	2
<b>G</b>	Remodelling and grade separating at Nuneaton	E	4
<b>H</b>	New vent shafts in Northchurch tunnel, permitting 125mph	E	6
<b>I</b>	Norton Bridge - Crewe: major track renewals and resigalling	R	4
<b>J</b>	Crewe - Preston: track and OLE renewals. Doubling Euxton Junction	R, E	2, 3
<b>K</b>	Widening tunnels (gauge enhancement to W12) between Colwich and Cheadle Hulme; renewals and remodelling and station improvements at Stockport; major signalling renewal	R, E	4, 5
<b>L</b>	Track renewals north of Preston	R	

**Route 18 Planned projects**

	Project description	Type of work	Dev. Level
<b>M</b>	Level crossing upgrades at Cleghorn (near Carstairs), Floriston (near Carlisle) and Cove (near Carlisle)	E	4
<b>N</b>	OLE renewal Gretna - Motherwell	R, E	4
<b>O</b>	Euston Station: renewal of customer information system/ preparation of planning application to increase station passenger capacity	R, E	4
<b>P</b>	Parkside: potential strategic intermodal terminal	E	1
<b>Q</b>	South Liverpool Parkway (Allerton Interchange)	E	2
<b>R</b>	Signalling renewals - most of route south of Tamworth, Longsight, Stockport Crewe (excl.) - Wilmslow, Crewe (excl.) - Liverpool (excl.), Glasgow Central	R, E	3, 4
<b>S</b>	Major track renewals including enhancements for higher speed running	R, E	3, 4
<b>T</b>	Linespeed increases - upgrade to a maximum 125mph	E	3, 4
<b>U</b>	Route Clearance for Class 390 trains	E	5, 6
<b>V</b>	Traction power supplies: installation of AT system over much of route, upgrade of existing BT system elsewhere, various other renewals and upgrades	R, E	2
<b>W</b>	Resignalling/remodelling Crewe Coal Yard to Weaver Junction	E	1
<b>X</b>	Reinterlocking at Colwich	R	
<b>Y</b>	TDM Diverse Routing at Warrington, Preston and Carlisle	E	1
<b>Z</b>	Platform Extensions at Acton Bridge and Winsford	E	4



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# Route 19



# Route 19: Midland Main Line and East Midlands

## Route description



### Physical description

This route is the Midland Main Line from St Pancras to Chesterfield, along with the local routes radiating out from Derby, Nottingham and Leicester as far as the East Coast Main Line and West Coast Main Line.

This route serves a large community in the northern Home Counties and East Midlands, and carries significant volumes of long distance and local train services. The four primary elements which comprise the route described below.

- Midland Main Line (MML) - This is mainly a four-track railway with some critical two and three-track sections. Linespeed on the main lines is generally 100-110mph, while on the slow lines from London - Bedford it is 90mph. Elsewhere linespeeds on the slow lines are 50-60mph. The south end of the route; from Bedford to St. Pancras is electrified and forms part of the Thameslink network.
- East Midlands local routes - These East Midlands local routes are predominantly two-track, with single-track sections at some of the junctions. Linespeeds vary, but 90mph is maximum. The route is signalled using a mixture of multiple aspect signals controlled from Leicester, Nuneaton, Derby, Trent and West Hampstead signal boxes (PSBs), with mechanical controlled signalling from 17 signal and level crossing boxes; Cross Country and inter-urban routes.
- Cross country and inter-urban routes - Route sections between Derby and Birmingham are essentially two-track. Linespeeds have recently been increased from 100mph to a maximum of 125mph as a result of the Cross Country Route Modernisation (CCRM) project; and
- Freight - Routes listed below. Linespeeds are predominantly 40-75mph. These routes are supplemented by numerous facilities, including branch lines, which are predominantly single track. A number of private sidings exist alongside the routes.
  - Kettering - Manton Junction;
  - Sheet Stores - Stenson Junction;
  - Pye Bridge - Kirkby Lane End Junction; and
  - Knighton Junction - Leicester Burton Junction.

The classification of the route is broadly half primary, and about a quarter each secondary and freight only, and a small portion of rural.

## Market served

The route serves a number of different markets, including commuters, long distance travel and freight traffic. The London to Bedford section serves the commuters as well as long distance passenger and freight traffic. The Bedford - Kettering - Leicester section again serves long distance passengers and freight services, with commuting levels on the increase. The East Midlands routes are a mix of long distance and local passenger services. They also carry a significant volume of freight, especially to and from the Humber ports, and between the East Midlands and the south-east. Some freight only lines provide diversionary routes for passenger services. The cross-country routes have been enhanced following the launch of Virgin Trains 'Operation Princess' in 2002, leading to an increase to service frequency.

## Growth

Passenger volumes on this route have increased in the past six years, partly due to the buoyant economies in London and the Midlands. This also reflects the 46% increase in train kilometres since 1999. The SRA has identified within the Route Utilisation Strategy (RUS), that off peak growth is higher than peak growth. Demand for freight traffic is limited by the ability of the route to carry higher-gauge trains. Although the route is approaching capacity for freight traffic, some freight traffic growth is expected at terminals on the route. Construction materials traffic for use in the south-east in particular is expected to increase, although this will be largely offset by decreases in coal traffic at the north end of the route. The Felixstowe to Nuneaton scheme (F2N), for which enhancements on this route are currently unfunded, may in the future provide an opportunity for freight growth.

## Current use

### Current traffic

The main operators who run on this route include: Central Trains, Midland Mainline, Thameslink Rail, Virgin Cross Country, EWS and GB Railfreight.

<b>Route 19 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	66,919	11,093	78,012
Train tonne km per year (millions)	5.503	3,818	9,322
Average no of train km per track km per day			70
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Kentish Town - Luton			450
Leicester - Trent Junction			330
Luton - Bedford			310
Farringdon - Kentish Town			260
Clay Cross Junction - Chesterfield			250

## Projected use

As part of the SRA's West Coast strategy, the existing Nottingham to Coventry services will start and terminate at Nuneaton, resulting in the removal of one service operating from and to Nottingham.

Other anticipated changes for the route include the withdrawal of the St. Pancras to Manchester service which has been running during the blockades of the West Coast Main Line. The service has led to a detrimental performance affect on this route, hence the service is being reduced between May and September 2004, and from September will cease when the CTRL blockade starts. Additionally, Midland Mainline is planning to introduce the Meridian stock (Class 222s) in 2004 on the MML. This may include some train lengthening as a result of new build and cascading of stock.

It is expected that the pattern of freight movements will change. We are anticipating increases in imported coal from locations such as Hunterston, Immingham and Avonmouth, aggregates e.g. construction traffic from East Midlands quarries and the Peak District to the south-east of England and the West Midlands, and container traffic from deep sea ports such as Felixstowe, Southampton and Tilbury.

## Strategic framework for the route

In March 2004, the SRA published their RUS for the MML. This is the first RUS produced, selected for several reasons including the need for SRA to balance the demand and capacity on Thameslink peak services in advance of any implementation of the Thameslink 2000 scheme, which if implemented would provide additional network capacity. The proposals outlined within the RUS have been consulted with key stakeholders with our contribution. The RUS has focused on what can be achieved with existing infrastructure. The changes that SRA proposes should be made to capacity utilisation are set out below:

### London - Bedford

The key overcrowding issues can be managed by:

- reviewing Thameslink rolling stock provision to enable more trains in the peak hours to be 8-cars in length;
- a timetable that provides for up to 16 Thameslink trains in the peak hours; and
- substitution of Midland Mainline TOC peak hour services by Thameslink (possibly to be taken forward in the successor franchise to Midland Mainline).

It is also considering proposals for new stations along this route section (e.g. at Cricklewood and Elstow). However, these proposals are not committed within the RUS at this stage.

Performance improvements can be achieved through:

- timetable restructuring, associated with changes to Rules of the Plan; and
- reduction in slow off peak services between St Albans and Luton.

### Bedford - Leicester

The analysis has shown that for much of this section of route that four Midland Mainline TOC trains per hour, enhanced in the peak, two freight paths off peak meet demand for the foreseeable future. It concludes that various proposed enhancement works, including additional tracks between Bedford, Wellingborough and Kettering, and a freight loop at Market Harborough, will not be required in the near future. Options are being considered for a new station at Corby, but this is not a committed project and does not form a part of the RUS timetable.

### East Midlands

The SRA is working with us and the local PTEs to assess the feasibility of a new service from Sheffield to Leeds via Barnsley, along with proposals to increase the frequency between Nottingham and Sheffield (extending the service to Leeds). Work is well underway progressing a new station in the East Midlands (close to Kegworth and Junction 24 of the M1), to be called East Midlands Parkway. It will be a new four-platform station with a 500-space car park, to be constructed by Midland Mainline TOC. There are also aspirations for a new station at Ilkeston, although funding is not currently available for this scheme.

The RUS identified that overcrowding is only a problem for a few peak hour services within the East Midlands local services and suggests train lengthening as an appropriate solution, subject to funding.

The RUS analysis suggested that performance on this section of route can be improved through:

- removal of the cross platform connections at Leicester;
- better regularity of Nottingham - Leicester services with improved spacing of fewer trains; and
- a detailed review of platform usage at Nottingham.

### Freight

Within the Peterborough freight flows, one path per hour off peak from Nuneaton to Peterborough has been reserved for freight traffic intended for the Felixstowe - West Midlands/North West freight route.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 19</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Sheffield - St. Pancras (via Derby)		2hr 10min
Sheffield - St Pancras (via Erewash)		1 hr 59min
Derby - St Pancras		1 hr 32min
Leicester - St Pancras		1 hr 7min
Nottingham - St Pancras		1 hr 38min
Bedford – Farringdon *		47min
Peterborough - Birmingham *		1 hr 45min
Peterborough - Nuneaton *		1 hr 15min
Nottingham - Skegness *		1 hr 45min
Peterborough - Gainsborough *		1 hr 48min
Nottingham - Barmetby *		1 hr 34min
Nottingham - Worksop *		1 hr 3min
Derby - Crewe *		1 hr 9min
<b>Linespeeds (km of track)</b>		
Up to 35 mph		84
40-75mph		771
80-105mph		577
110-125 mph		512
<b>Gauge (km of route)</b>		
W6A		875
W7		555
W8		259
W9		-
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		-
20.4 tonnes - 24.1 tonnes (RA 7-9)		1943
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>1943</b>
<b>Total km of route</b>		<b>875</b>

\* Locations starting or finishing off route.

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 19 Forecast expenditure</b>				
£m in 2003/04 prices		2004/05	2005/06	2006/07
<b>Renewals</b>				
Track		41	41	71
Structures		10	7	14
Signalling		29	29	43
Electrification		1	1	3
Plant & machinery		2	2	3
Telecoms		2	1	3
Stations		10	2	-
Depots		0	1	2
Lineside		0	0	-
<b>Total renewals</b>		<b>96</b>	<b>85</b>	<b>139</b>
<b>Committed and planned enhancements</b>				
CTRL Blockade		102	9	-
Castle Donnington		1	-	-
Other		1	0	-
<b>Total committed and planned enhancements</b>		<b>104</b>	<b>9</b>	<b>-</b>

<b>Route 19 Forecast activity volumes</b>				
		2004/05	2005/06	2006/07
Rail renewal (km per year)		55	35	38
Sleeper renewal (km per year)		46	39	55
Ballast renewal (km per year)		58	59	73
S&C renewal (units per year)		34	27	31

## Engineering access

Despite the busy nature of the route, overall engineering access is reasonable, with many sections of the route having three or more tracks. Where only two-tracks are available diversionary opportunities exist, with the exception of Kettering - Wellingborough. Wherever possible diversionary routes are used to allow access to the track, which means red zone working can be avoided.

We have developed and agreed with train operators the engineering access required for various renewals and enhancement works over the next three years at weekends, evenings and in blockades. For maintenance, the plan includes:

- a 12hr complete block once a year over each section of route;
- a 7hr midweek double line block at all locations every six weeks, or where possible, a 6hr block and 2hrs of single-line working, would address routine maintenance and tamping; and
- a standard 4-5hr midweek double line block for Green Zone patrolling and minor servicing. This would cover 20-40% of the route per night.



In addition, for renewal activities, the plan includes:

- as part of the West Coast Watford to Lichfield Trent Valley blockade (15 May 2004 - 12 June 2004) we are closing the line between Croft Sidings and Daw Mill. This will enable us to carry out track renewals between Nuneaton and Whitacre and will require a 9-day closure of the route. In addition, S&C and plain line track renewals will be undertaken at Melton Mowbray, plus outstanding structures work at Manton Tunnel;
- a 4-week closure of the Corby to Manton Junction section will take place in summer 2004 to enable a heavy programme of structures and track renewals works, the main components being maintenance of Harringworth Viaduct and Corby Tunnel. During the blockade, freight services to and from Corby will be routed via Market Harborough;
- LCR will be closing the Thameslink core route between Dock Junction North, near Kentish Town station, and King's Cross Thameslink station for 25 weeks from 11 September 2004 – 7 March 2005; and
- during this time, Thameslink Rail services from Bedford/Luton/St.Albans will terminate in the newly-constructed temporary St. Pancras Interim Station, to the north-east of the existing station, and Thameslink services from the south will terminate at King's Cross Thameslink Station. There will be no Thameslink services to and from Moorgate during this period (For further details please refer to the Enhancements and major projects Section 3).

## Maintenance and renewal

On 31 January 2004, we took direct responsibility for the maintenance of the infrastructure for the East Midlands contract area. Key strategic assets, which have the potential to cause significant delay, referred to as 'golden assets', have been identified. Improved maintenance programmes and renewal regimes have been implemented to ensure that these assets operate to their maximum capability. The primary asset condition issue on this route is the state of the signalling equipment as a proportion of it is life-expired.

### Track

Track in the East Midlands is of mixed age, with the majority over 15 years old. A significant proportion of track is jointed and towards the end of its life, which means that large mileages of track renewals will be needed in the next 10 years. However, installation of CWR has increased significantly over the last 20 years. In recent years, renewals associated with the CCRM project have been undertaken between Chesterfield and Birmingham, which has enabled linespeed increases at certain locations.

Certain sections of route are heavily engineered and handle a high tonnage of traffic. Demands are further increasing and the track renewals programme reflects this.

In 2004/05 we plan to replace S&C with plain line at Langton, which includes rerailling, reballasting and resleepering. We also plan renewal work of S&C at Derby North Junction, Stenson Junction, Kettering, Croft Sidings, Glen Para Junction and Beeston Junction.

In 2005/06 we plan to replace S&C with plain line at Sandridge and Radwell which includes rerailling, reballasting and resleepering. We also plan to do reballasting works at Market Harborough and S&C renewal work at Toton, Derby South Junction, Knighton Junction, Trent South Junction and Loughborough.

## Structures

Various locations across the route have been identified for attention including an ongoing programme of repointing and repairs. Bridgeguard 3 works account for a large portion of planned works. Embankment and cutting stabilisation works are also ongoing on this route.

The following items are those identified as key within the structure plan for the next three years:

- in 2004/05 work will be undertaken at Corby Tunnel and Haringworth Viaduct, embankments at Elstree Cutting and at Silkstream Junction, Hendon, and Bridgeguard 3 work at Love Lane overbridge (Trent Junction to Clay Cross); and
- in 2005/06 and 2006/07 Belsize Tunnel, and Bridgeguard 3 work at Carrington Street overbridge, Nottingham.

## Signalling

To maintain current network capability and functionality, signalling renewals remain our primary requirement. Over the next 10 years, we plan to renew 62% of the signalling equipment on this route, as measured by signalling equivalent units.

The priority on this route is to address the immediate renewal needs of Hinckley, Croft and Narborough signal boxes and Trent PSB which are nearing the end of their lifespan and are increasingly difficult to maintain. The renewal of Trent PSB, although predominantly centred on the MML section, dominates the whole of the East Midlands strategy. The PSB renewal will also include the replacement of Sleights East, Pinxton, Netherfield Junction and Rectory Junction signal boxes on this route. To complement basic renewal needs, the opportunity exists to provide incremental enhancements. In the longer-term there is potential for integrating Derby PSB at the future East Midlands Control Centre. There are seven signalling projects identified within the route, as follows:

<b>Route 19 Signalling works</b>		<b>Forecast completion dates</b>
Phase 0 - Hinckley, Croft and Narborough		May 2005
Phase 1 - North Erewash		June 2007
Phase 2 - South Erewash		November 2008
Phase 3 - Nottingham Station		November 2009
Phase 4 - Leicester (interlocking only)		2012
Phase 5 - West Hampstead		2013
Phase 6 - Derby		2011

Also on this route, renewals are planned at Staythorpe, Fiskerton and Rolleston signal boxes, along with renewals at level crossings in the Nottingham and Leicester areas.

## Electrification and plant

There are no significant electrification or plant considerations on this route due to the assets being in generally good condition. However, minor renewals are planned at a small number of locations e.g. Sundon and Sandridge Road. Overhead line equipment (OLE) dates from the 1980s. Renewals are planned between Bedford and St Pancras, which will maintain reliability of the asset. We will continue our programme of routine maintenance, which includes renewals of hot axle box detectors, wheelchex, point heaters and a phased programme of power distribution renewals.

### Telecoms

The telephone concentrators and SPTs in the Derby and Trent areas are due for renewal. These renewals will be carried out in conjunction with East Midlands resignalling and will also include FTN synergy works. Leicester telephone concentrator is also due for renewals in 2006/07 and 2007/08.

There are some planned renewals of voice recorders in some signal boxes in the East Midlands area during 2006/07, which will maintain the capability to recall operational communications in the event of an incident.

Life extension work is also planned to the cab secure radio at West Hampstead to maintain performance of the operational communication system between the train driver and signaller.

### Stations

In 2004/05, work is planned to renew the platforms at Beeston and Attenborough stations. This will involve resurfacing, regauging, replacing coping slopes and repointing riser walls. The footbridges at Derby and Nottingham stations are also scheduled for renewal that year.

A scheme to assess the risks associated with the platforms under the road bridge is to be undertaken at Loughborough Station. As part of the Hinckley, Croft and Narborough resignalling project the Birmingham bound platform at Narborough is programmed to be extended.

### Depots

Works are planned at Derby Etches Park depot in 2005/06, along with carriage washer renewals and relocation at Nottingham Eastcroft depot.

### Other operational property

We will continue to undertake testing and inspections of all lineside buildings as appropriate. It is proposed to undertake a programme of work to renew life-expired roof coverings at various lineside buildings along the route in 2004/05.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The key performance issue on this route is accommodating the current traffic levels, which have increased significantly since 1999. This is exacerbated by the mix of high-speed passenger, stopping local passenger and heavy freight services. In times of perturbation performance suffers because of this mix of traffic and there is a tendency for trains to lose further time rather than recover it once they have lost their path. Without the provision of additional infrastructure the timetable remains constrained. This will ultimately limit the introduction of further services. Any removal of infrastructure has already proved itself to be detrimental to the operation of the route - for example the loss of two platforms at St Pancras (as a result of the Channel Tunnel Rail Link project) has demonstrated that we no longer have a performance buffer at the station and any deviation from the station platform plan leads to increasing delays to other services.

Performance can also be a problem around Leicester station, due mainly to congestion. Part of the congestion issue can be attributed to the cross-platform interchange policy, whereby a turbostar unit is timetabled to occupy one of the four platforms at Leicester waiting to be overtaken by a HST unit. As part of the MML RUS the SRA proposes to address this issue, which should assist improved train performance.

Area Delivery Groups (ADGs) have identified a number of initiatives to improve performance. Several initiatives have already been very successful in targeting areas of delay including the provision of CCTV at three key high-risk trespass sites (Peartree - Derbyshire, Humberstone Road and Twiterns Crossing - Leicestershire), Safety Open Days around the region and Football Fun Days, all trying to raise awareness of railway crime and to combat trespass and vandalism on the route. Other initiatives include accelerated minor renewal schemes, and improving cable faults by doubling the provision of track circuit leads at key locations.

In order to help improve train safety and performance, in collaboration with a number of partners including Serco, Midland Mainline TOC and the HSE, bi-directional working has been introduced within the Leicester PSB area.

## Enhancements

The last four years have seen changes to the route capability, complemented by investment in station facilities to accommodate localised market demand. Further enhancement schemes are planned and are detailed below. However, some of these schemes are more fully described within Section 3.

### Channel Tunnel Rail Link (CTRL) - Stage 2

The CTRL Act of 1996 placed an obligation on Union Railways North (URN), the client for the CTRL Section 2 works, to construct the shell of a new station, "St. Pancras Midland Road", on the Thameslink route under St. Pancras station and to make provision for trains on this route to access and egress the tunnel within which this station will be located from both the existing MML route and the East Coast Main Line.

This would fulfill the dual purpose of providing an interchange integral to the King's Cross/St Pancras complex between both international and domestic long distance train operators and Thameslink services and of providing passive provision for the proposed "Thameslink 2000" service levels to operate.

The implementation of the Channel Tunnel Rail Link (Section 2) commenced during the summer of 2001 and is anticipated to be complete by December 2006. The lines to all four platforms within the newly developed St Pancras Station will be electrified to ensure that, in times of perturbation and for planned engineering access, Thameslink retains access to the station. As part of the scheme the aggregates sidings (formerly at King's Cross) have been established on the former Churchyard site sidings. This will be served by up to three trains per day.

Direct access to Selhurst depot for maintenance of Thameslink trains is to be severed for services north of London. Negotiations are underway to construct a light maintenance depot on the site formerly known as Bedford Ballast Pit, now referred to as Cauldwell Depot. Enabling works have already taken place with full implementation due this year.

## Land implications

The following sites are identified as strategic freight sites on this route: Humberstone, Leicester; Crescent Road, Luton; Wirksworth Goods Yard; Bestwood Sidings, Nottingham; land at the rear of yard at Syston; and Finedon Road Sidings and Nielsons Sidings at Wellingborough. It is not currently proposed to develop these sites, with two exceptions:

- Wirksworth Goods yard where transfer of ownership has taken place to a Heritage Railway Society. This transfer does not affect the status of the site or access to it; and
- Luton Crescent Road site has been claimed by Freightliner to operate an aggregate service from the Mendips.

## Other committed enhancements

To meet HMRI requirements, driver only operation CCTV (DOO) is being fitted between Bedford and Moorgate due to the stations being self-dispatch only. The DOO unit allows drivers the ability to visually confirm that the doors are closed and that no one is trapped within the doors.

Midland Mainline TOC have committed to introduce Meridian class 222 trains to replace their current class 170 stock by the end of 2005.

## Route development

Signalling renewal to maintain current network capability and functionality remains our primary requirement. However, together with the SRA we have established that there may be enhancement possibilities that would improve performance in the Nottinghamshire area. Enhancement options to improve performance and capacity being considered include:

- as part of the strategy for this route an East Midlands Region Signalling Control Strategy has been developed. After extensive optioneering we plan to develop a proposal to construct a new signalling centre to accommodate the resignalled Trent and Derby areas only, leaving Leicester and West Hampstead PSB areas as separate signalling centres; and
- a new junction at Ratcliffe; and
- to upgrade the 'high level goods line' to passenger status
- capacity improvements at Trent East Junction and at Nottingham station are also under consideration.

Thameslink have requested a review and potential upgrade to the linespeed at Elstree and at Ampthill (down slow only). We are currently developing proposals to increase the linespeed at Elstree from 75-90mph and are in dialogue with Thameslink to ascertain the scope of work for a linespeed improvement at Ampthill.

### Felixstowe - Nuneaton

The Felixstowe - Nuneaton (F2N) project has looked at facilitating the movement of 9'6" high containers between the port of Felixstowe and the West Coast Main Line. Certain minor gauging works have taken place at Saxby Road and Oakham as part of this project but further works remain a SRA medium to longer-term aspiration, due to current funding constraints.

## Emerging issues

Overcrowding within the Bedford to St Pancras corridor in the peak has been apparent for some time and Thameslink is keen to increase service levels to cope with increased demand. Nottingham station has also been identified as another key pinch point, suffering from train capacity constraints, which will be addressed as part of the Trent resignalling scheme. The Wigston - Syston corridor, south of Leicester, is another key capacity location. The mix of services on this predominantly three-track section of route makes the current timetable complex, which impacts on performance. The RUS timetabling work is seeking to address this issue without the need for providing additional infrastructure. Outputs from the MML RUS are planned mainly for December 2005 timetable inclusion; however, there are some elements from the strategy, which can be introduced earlier (refer to Strategic Framework for the Route section).

A number of the proposals will require further detailed analysis before timetable inclusion to ensure that they do not adversely affect train performance. Initiatives such as the provision of additional Thameslink services in the peak and the provision of a new train service operating between Nottingham and Leeds, via Sheffield will require careful consideration, based on the current train capacity problems in these areas.

The capacity utilisation index for much of this route is 70% or more, which suggests that the mix of trains is such that performance problems can be expected on some parts of the route it is significantly higher. Between London and Leicester the index is greater than 90%.

The analysis confirms our conclusions that significant segments of the route operate close to maximum capacity, due to the current mix of traffic types.

We are currently reviewing our engineering train depot strategy as a result of the increased track renewals programme. It is feasible that the usage of Toton depot will increase. Leicestershire quarries may also be required to provide additional supplies on rail ballast to cater for the high levels of track renewals.

Midland Mainline TOC are also reviewing their depot strategy and are in the process of negotiating a new facility within the existing Etches Park depot in Derby, operated by Maintrain. The proposed scheme will supplement the existing facilities, providing additional fuelling, CET discharge and sidings to accommodate the new class 222 Meridian units (due into service in 2004). Future aspirations for the depot include the provision of a new train shed to be operated by Bombardier. Whilst the new depot is under construction these units will be maintained off-route at Central Rivers, (Route 17, West Midlands) again a Bombardier owned depot.

The Thameslink 2000 proposals include significant infrastructure enhancements and service changes affecting locations on this route. The current status of the project is described in detail within Section 3.

There is a proposal to increase the station car parking provision at Loughborough Station, on land currently leased to EWS. Central Trains, as part of their two-year franchise extension, are taking the initiative to convene further talks with the key stakeholders to progress this forward.

The South Nottinghamshire Rail Network is a group led by the local councils, but involving us, the TOCs, the SRA and others. It is developing a number of revised proposals to improve rail services east of the Nottingham Corridor. A business case for a new park and rail station at Bingham is under development, including a proposal for additional train services and rolling stock provision. The study is also working on a proposal for a new station to be built at Ilkeston, however, initial results indicate further work on the business case is required before the SRA can support it.

The Nottingham Station Masterplan is a group led by the city council, but involving us, the TOCs the SRA and others and is developing proposals to improve Nottingham Station and the surrounding area. These proposals include the provision of a new multi-storey car park, improved station facilities including a streamlined interchange with the city's tram project, Nottingham Express Transit, and a new central concourse.

There is a proposal to reinstate the rail connection at Castle Donington to provide a new freight distribution centre. The work is under development by a third party, however, progression of the scheme has been ongoing for some time.

The proposed reinstatement of the Matlock to Buxton railway has been an ongoing project for several years. The final feasibility report is expected to be issued in the near future. Early indications suggest that the route would not be utilised by freight traffic, due to the lack of demand from the freight operating companies.

Midland Mainline agreed with SRA during their franchise extension negotiations to construct a new station, between Trent Junction and Loughborough. Due to the land owner's objections to the scheme Midland Mainline with encouragement from SRA applied for Transport and Works powers. A full enquiry is awaited before implementation can commence.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 19 Capacity and operational constraints

<b>A</b>	Nottingham Station: capacity constraint
<b>B</b>	Leicester Station: capacity constraint
<b>C</b>	Wellingborough - Leicester: capacity constraint
<b>D</b>	Dore Junction - Sheffield: capacity constraint
<b>E</b>	Carlton Road - Luton: capacity constraint
<b>F</b>	Croft - Hinckley: signalling headways restrict capacity
<b>G</b>	Croft Sidings: capacity restricted by need to block main line when propelling
<b>H</b>	Matlock - Ambergate: single-line section
<b>I</b>	Bulwell - Kirkby in Ashfield: single-line section

### Route 19 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 CTRL remodelling works at London St Pancras to accommodate Eurostar trains	E	5
<b>B</b>	2005/06 Nottingham Master Plan, which involves the redevelopment of the station area into a modern interchange	E	
<b>C</b>	2004/05 East Midlands Parkway station	E	5/6
<b>D</b>	2004/05 Assessment of access on platforms at Loughborough station	R	
<b>E</b>	2005/06 Ilkeston: proposed new station sponsored by Nottingham City Council	E	1/2
<b>F</b>	2004/05, 2005/06 East Midlands Signalling Renewal Phase 1 (North Erewash)	R	

### Network Rail

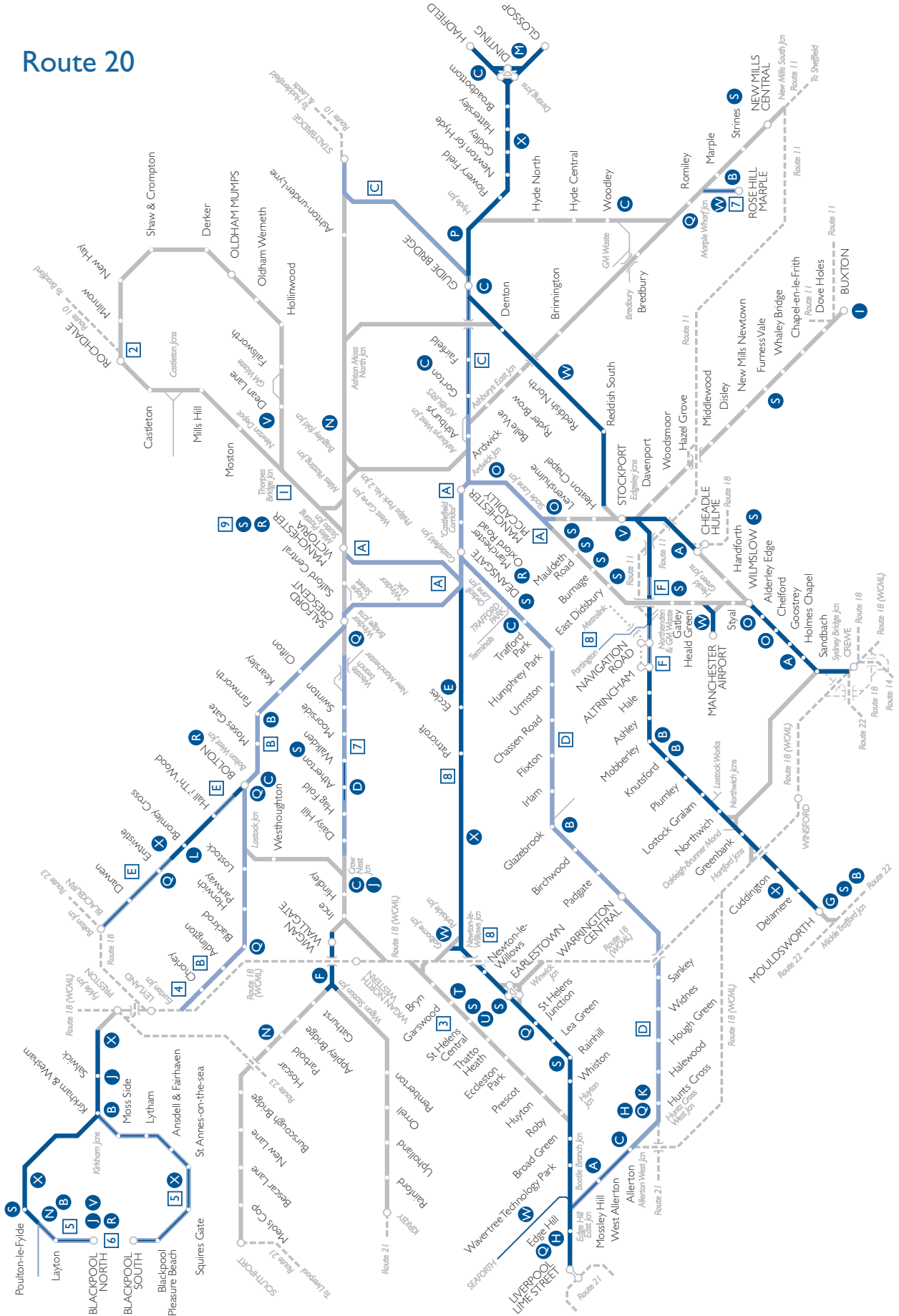
### Route 19 Planned projects

	Project description	Type of work	Dev. Level
<b>G</b>	2004/05, 2005/06 East Midlands Signalling Renewal Phase 2 (South Erewash)	R	
<b>H</b>	2004/05 East Midlands Signalling Control Centre	R	
<b>I</b>	2004/05 DOO (Bedford - Moorgate): upgrade of Driver Only Operated equipment on all platforms between Bedford and Moorgate	R	
<b>J</b>	2004/05, 2005/06, 2006/07 East Midlands Signalling Renewal Phase 3 (Nottingham development works)	R	
<b>K</b>	2004/05 Repair and rebuild works on the platforms at Beeston and Attenborough stations	R	
<b>L</b>	2004/05 Footbridge renewals at Nottingham and Derby stations	R	
<b>M</b>	2004/05 Region's Track Renewal Programme (including renewals of ballast, rail and sleepers and significant S&C renewals at Derby North Junction, Stenson Junction, Croft Sidings and Glen Parva Junction)	R	
<b>N</b>	2004/05 Region's AMP Structures Programme (including Corby Tunnel, Elstree Cutting and Silkstream Junction, Hendon)	R	
<b>O</b>	2005/06 Region's Depot Programme including works planned at Derby Etches Park and Nottingham Eastcroft depots	R	
<b>P</b>	2004/05 Midland Mainline Franchise: introduction of Class 222 (Meridian) trains operated by Midland Mainline TOC	E	4/5



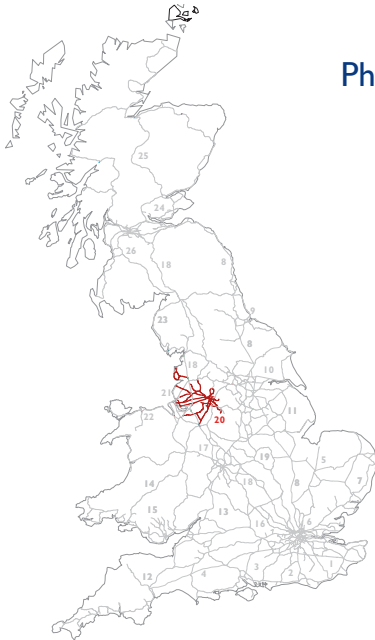
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# Route 20



# Route 20: North West Urban

## Route description



### Physical description

This route covers the Liverpool and Manchester conurbations in North West England together with neighbouring parts of Cheshire, Derbyshire, Warrington, Halton and Lancashire. It also includes resorts at Blackpool, Southport and Buxton.

The West Coast line from Crewe into Manchester has a minimum of four-tracks from south of Stockport, with a maximum speed of 100mph. Elsewhere there are predominantly two-tracks, though some single-track sections exist. Maximum speed linespeeds are typically between 60mph and 75mph. Manchester – Crewe, both via Stockport and via Manchester Airport, Manchester - Glossop and Hadfield, and Stockport - Hazel Grove sections are electrified.

Broadly, over half the route is classified as secondary, a quarter as rural and the remainder split between primary and freight only.

## Market served

The route comprises the northern end of the long distance national rail markets into both Manchester and Liverpool, key interurban services through the Manchester hub, as well as services to Manchester Airport from the North East, North West and North Wales. It includes commuter routes by the City Lines into Liverpool, by local radial routes into Manchester and the railways on the Fylde.

Although some lines have no freight services, overall this is a mixed-use railway with some substantial flows of freight on long distance routes to Manchester Trafford Park, to Seaforth and on the North and South Transpennine routes.

In the Liverpool to Manchester corridor there are motorway and major road alternatives to all routes, but these are congested and regular queuing occurs at key locations during peak periods.

## Growth

We expect passenger growth to continue over the coming years as further economic growth encourages additional demand for rail, with a further boost for growth with the completion of WCRM.

Demand for use by freight is expected to increase on the core routes, in particular with regards to domestic automotive and intermodal traffic.

## Current use

### Current traffic

The train operating companies that provide services on the route are Virgin West Coast, Virgin Cross Country, Transpennine Express, Central Trains, First North Western, Arriva Trains Northern, Arriva Trains Wales and Midland Mainline. EWS and Freightliner run freight services.

Capacity on the route is used by traffic with complex service patterns. It is limited by the number of flat junctions and the existing mix of fast and stopping trains means that it is almost fully utilised in a number of key sections, e.g. from Slade Lane into and through Piccadilly, at Ordsall Lane, between the Manchester to Liverpool via Warrington line and in the peak between Salford Crescent and Euxton Junction.

Manchester Victoria station working is constrained by the number of turn round moves that can take place and also by restrictions governing levels of permissive working.

<b>Route 20 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	52,298	3,131	55,429
Train tonne km per year (millions)	2,188	842	3,030
Average no of train km per track km per day			75
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Manchester Piccadilly - Slade Lane Junction			610
Stockport - Slade Lane Junction			400
Manchester Piccadilly - Deansgate			330
Manchester Piccadilly - Ashburys			280
Slade Lane - Manchester Airport			250

### Projected use

This route comprises a major rail network hub, which is expected to experience growth on the long distance passenger routes following the West Coast route modernisation project. The remainder of the route is expected to see some growth in line with the regional economy, which could be accommodated by lengthening trains where the platforms are of a suitable length.

## Strategic framework for the route

The services into Manchester will be examined in a RUS, which is expected in the spring of 2005.

The SRA's North West RPA is expected in the summer of 2004.

The Greater Manchester Passenger Transport Authority (GMPTA) has committed to work closely with the SRA on the Capacity Utilisation Policy and other related areas, to ensure that the social and economic importance of the local rail network is fully understood.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 20 Current route capability</b>	
<b>Journey times</b>	<b>1 April 2004</b>
Manchester Piccadilly - Blackpool North	1 hr 19min
Manchester Victoria - Southport (via Atherton)	1 hr 11min
Bradford - Manchester Victoria	1 hr 30min
Buxton - Manchester Piccadilly	52min
Glossop - Manchester Piccadilly	31min
New Mills Central - Manchester Piccadilly (via Bredbury)	31min
<b>Linespeed (km of track)</b>	
Up to 35mph	122
40-75mph	941
80-105mph	240
110-125mph	0
<b>Gauge (km of route)</b>	
W6A	647
W7	437
W8	306
W9	213
W10 or more	-
<b>Axle weight (km of track)</b>	
Up to 20.3 tonnes (RA 1-6)	0
20.4 tonnes - 24.1 tonnes (RA 7-9)	1303
24.2 tonnes - 25.4 tonnes (RA 10)	0
<b>Total km of track</b>	<b>1303</b>
<b>Total km of route</b>	<b>647</b>

<b>Route 20 Baseline route capability changes</b>				
	Year of change	Current value	New value	Reason for change
<b>Linespeeds (km of track)</b>				
40-75mph	2005	941	909	See note 1
<b>Gauge (km of route)</b>				
W6A	2005	647	628	See note 1
W7		647	628	See note 1
W10 or more	2005	213	277	See note 2
<b>Axle weight (km of track)</b>				
20.4 tonnes - 24.1 tonnes	2005	1303	1271	See note 1
<b>Total km of track</b>	<b>2005</b>	<b>1303</b>	<b>1271</b>	<b>See note 1</b>

Note 1: This change is as a result of the transfer of the Oldham loop to Metrolink

Note 2: This change is as a result of WCRM

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 20</b>	<b>Forecast expenditure</b>		
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	16	20	24
Structures	6	3	9
Signalling	10	5	1
Electrification	1	3	3
Plant & machinery	1	1	1
Telecoms	1	0	1
Network Rail managed stations (Manchester Piccadilly, Liverpool Lime Street)	3	1	1
Stations	5	4	7
Depots	0	1	2
Lineside	0	0	0
<b>Total renewals</b>	<b>42</b>	<b>41</b>	<b>50</b>
<b>Committed and planned enhancements</b>			
All managed stations commercial investment	0	1	1
Liverpool Lime Street takeover	1	-	-
Liverpool South Parkway (Allerton Interchange)	6	6	-
St Helens Central revitalisation	4	-	-
<b>Total committed and planned enhancements</b>	<b>11</b>	<b>7</b>	<b>1</b>

<b>Route 20</b>	<b>Forecast activity volumes</b>		
	2004/05	2005/06	2006/07
Rail renewal (km per year)	12	20	24
Sleeper renewal (km per year)	14	13	20
Ballast renewal (km per year)	15	17	27
S&C renewal (units per year)	10	19	11

## Engineering access

Access for this route is more complicated than for other North West routes as many of the lines form part of the integrated possessions strategy for the West Coast Main Line and the Transpennine routes. Planning access for this route therefore must be undertaken in conjunction with those routes whilst maintaining the availability of a route to Manchester Airport.

Access for the line from Manchester to Liverpool via Warrington Central has to be planned in association with the Chat Moss route, as these are both alternative diversionary routes. Similarly access to the line from Stockport to Mickle Trafford via Northwich is coordinated with the Ordsall Lane to Earlestown and Chester route, so that end-to-end traffic flows for North Wales can be maintained.

Closing Salford Crescent for maintenance work is problematic because of the wide impact on freight and passenger services. Christmas offers the best chance to do pre-planned work of any significance but this is very costly. If access is required between Windsor Bridge North and Euxton, the Atherton Line needs to be made available for diversions. That line presently has weight restrictions for locomotive hauled services (see structures section).

As the Blackpool line is an important link for empty units going to the depot at Blackpool, it is difficult to obtain complete blocks for mid week nights, though single-line working is usually acceptable and short Sunday night/Monday morning double line blocks have been agreed.

Access for maintenance is required on a regular basis. Generally this needs to be for up to 8hrs during the week on either a one-week in six or a one-week in 12 basis and for longer durations once or twice per year at weekends. Renewals will require occasional weekend access and will need some bus replacement or service diversion. We intend to continue the regime of Sunday blocks at appropriate times of the year. Preston to Blackpool Sunday daytime closures will normally be confined to the months of January and February, to coincide with times of least demand for services.

We have completed significant renewals as part of the West Coast Route Modernisation in all-line blockades in 2003 and 2004. An ongoing all-line blockade between Crewe Sydney Bridge Junction and Cheadle Hulme is underway to late May 2004 for substantial track, formation and embankment renewals over the salt flats. Long distance services are being diverted and local services will be replaced by high quality coach/bus services. An all line blockade is planned at Stockport from June to September 2004 for the forthcoming project work.

## Maintenance and renewal

### West Coast Route Modernisation

In addition to work already carried out, for instance the resignalling at Longsight, there is further work on this route as part of the project.

We plan to continue with major renewals at Stockport in 2004/05 on a like-for-like basis balancing expected life expiry with functionality. This will include the signalling in the Stockport area. Specific items include integration of the new platform at Stockport, deep dig sites at Greek Street and at Heaton Norris, and viaduct strengthening works. Some 46 S&C could be renewed.

An all-line blockade between Crewe Sydney Bridge Junction and Cheadle Hulme commenced in January 2004 and lasts until 22 May 2004. The blockade will allow far more efficiency in renewals than can be achieved during normal possessions. We are carrying out substantial track renewals including formation work, renewal of the formations and embankments across the salt flats, OLE, S&C and structural works. Long distance services will be diverted via Stoke or Warrington and local services will be replaced by high quality coach/bus services. Following the blockade, we plan to continue with major renewals, including life extension works to the existing signalling infrastructure. Specific planned work is 34km of plain line track renewals, 5km reballast clean, track realignment works between Sydney Bridge and Sandbach, 8km of formation works, life extension works to existing S&C, upgrade of 12 booster transformers to 300Amps, and 8.7km of new drainage and 10.5km of drainage refurbishment.

We are planning renewals at Lime Street and Allerton as part of the West Coast Route Modernisation. At Lime Street we will be undertaking life extension works to the assets including renewal of cable routes, work to the signal box and relay room, overhead line equipment, and to route availability and platform off indicators. It is planned to carry out the work in 2004/05 and 2005/06. At Allerton we are planning to renew the interlocking, convert some points to motor operation and also undertake life extension works for condition-led renewals in 2004/05 and 2005/06.

## Non West Coast

The overall intention of the programme of work is to maintain the existing availability of the route. Individual activities are prioritised by national network classifications and asset condition. Where practicable and desirable life extension works are undertaken. An important element is the improvement of monitoring systems to aid fault detection and rectification. Selected individual work locations are listed in the table below.

## Track

This is a very complex collection of lines with varying levels of freight and passenger traffic; 58% of the track is over 25 years old. Ongoing track renewals will remain a key activity to maintain the condition on busy, core routes. If sections for renewal are composed of jointed track they will be considered for replacement by CWR on steel sleepers. Renewals are also being evaluated in the next few years on the Salford Crescent to Crow Nest Junction, Wigan to Southport, and Preston to Blackpool routes.

We are planning trackwork at various locations including major work at Mobberley, Marple South and Carleton in 2004/05, and Mickle Trafford, Kirkham, Glazebrook, Farnworth and Knutsford in 2005/06. These will include steel sleeper relay and rerailling, but activity varies by site from full a relay including reballasting, to reballasting and traxcavating.

## Structures

We are continuing with a programme of strengthening work with three underbridge structures on the Atherton line receiving attention in 2004/05.

Following a bridgeguard 3 assessment we are planning reconstruct Bridge 140 West Egerton Street near Eccles in 2004/05.

We are in the second year of a 5-year programme to examine all the earthworks in the region, to establish their overall condition.

## Signalling

On this route 40% of the area is controlled by five main PSBs, 30% by lesser power boxes and 20% by mechanical signalling.

We are planning an update of electronic systems to replace those approaching obsolescence. Development work is planned for 2004/05 with implementation in 2005/06 and 2006/07.

In addition, we are developing proposals to extend the operational life of the main control panels that receive the most wear and tear. This could lead to works in 2006/07.

The Wigan Wallgate signal box area is planned for renewal entailing replacing the current mechanical signalling with a control panel and relay interlocking. Colour light signals to current standards will improve safety and reduce the signal passed at danger risk. The commissioning is planned for 2004/05 and at the same time the double junction will be renewed with new switch and crossing units.

In 2004/05 other planned work includes selective core renewals and rewires in West Cheshire at Mickle Trafford and at Mouldsworth where we will rewire the signalbox and renew the interlocking in line with the rationalisation of the former double junction. We are also providing event monitoring equipment at Edge Hill and Hunts Cross to assist in incident investigation and faultfinding.

Other works planned are shown later, in the table of planned works.



### Electrification and plant

The renewals strategy is to continue with the expenditure on grid supplies, supervisory control and data acquisition systems (SCADA) to control supply of power to traction power stations and on overhead contact systems.

We are planning the renewal of the K11 type (bulk oil filled) switchgear at Slade Lane in 2004/05, Cheadle Hulme and Wilmslow in 2005/06 and Ardwick and Chelford in 2006/2007.

For the overhead wire system we have developed programmes of work to address the known weaknesses. These include:

- painting the welded rod structures at to extend their operational life in 2006/07;
- renewal of insulators at overlaps to prevent dewirements in Manchester;
- renewal of termination pullies in 2006/07; and
- renewal of structure number plates and warning notices at overhead masts in 2004/05.

In addition, we plan to carry out life extension works to overhead line on the Manchester to Glossop line in 2006/07.

We have an ongoing programme until 2006/07 to installing remote monitoring devices at key locations where the equipment is compatible for point heaters, signal supply points, track drainage pumps and uninterrupted power supplies. An example is the principal supply point at Slade Lane.

There is a programme of condition led renewals for signal supply power points where procurement of spares for bespoke equipment is problematic.

### Telecoms

There is a considerable amount of CIS and PA equipment approaching the end of its operational life causing maintenance and spares procurement problems, which will be the focus for delivery during 2004/05.

The telecoms programme also includes provision to commence renewal of the selected signalbox voice recorders during 2004/05 and 2005/06, which will maintain the capability to recall operational communications in the event of an incident.

### Network Rail managed stations

#### *Liverpool Lime Street*

The operation of this station was transferred to Network Rail in November 2003. Initial work is underway in connection with a series of passenger improvements aimed at bringing the station more into line with the standards developed at our other managed stations. In addition we continue to work with Merseytravel and Liverpool Vision in pursuit of improved public realm within and immediately adjacent to the station.

#### *Manchester Piccadilly*

The considerable passenger and public benefits delivered through the completion of the redevelopment of Manchester Piccadilly have received substantial recognition through in excess of 20 separate national and local awards for excellence.

### Other stations

At Garswood we are planning to replace the present building with a modern one including a new ticket office, waiting and toilet facilities together in 2004/05. At Parbold we are working with Lancashire County Council to implement a scheme to refurbish the ticket office and waiting area.

At St. Helens Central, a major scheme scheduled for implementation in 2004/05 will see the revitalisation of the station, provision of more car parking, and an improvement in the links to the town centre. The scheme, led by Merseytravel in partnership with St Helens MBC, includes a new station building with high quality glazing, a new footbridge and lifts to provide full mobility impaired access.

Other works for stations in 2004/05 includes the reconstruction of the other platform at St Helens Central; the platform riser wall and platform resurfacing at Rainhill; repairs to the station canopies at Wilmslow; and major repairs to the steel supporting columns for the southern platform at Deansgate.

In 2005/06, we plan to renew the lighting under Manchester Victoria trainshed and carry out platform repairs at Earlestown.

In 2006/07 we plan to resurface the platform and the car park at Strines, undertake platform repairs to Mouldsworth; resurface both platforms at Furness Vale; repair a footbridge at Manchester Victoria; and refurbish lifts at Atherton and Poulton. We are also planning the major reconstructions of both platforms at East Didsbury, Gatley, Mauldeth Road and Burnage stations. The work at Burnage will also include the access ramps.

We plan to reconstruct Levenshulme platforms in 2007/08.

In conjunction with the GMPTE, we are planning the renewal of roof B at Manchester Victoria in 2004/05 and 2005/06, followed by renewal of the covering of roof C in 2007/08.

### Depots

At Newton Heath depot in 2004/05 we will be replacing the mains water supply pipe and undertaking feasibility work and outline design for the renewal of the parlour shed roof, which could then be undertaken in 2005/06. In 2006/07 we will be undertaking a site drainage survey and remedial works together with general resurfacing and other renewal work. We plan to renew the carriage washing plant in 2005/06.

We are planning the renewal of the carriage washing plant at Blackpool in 2005/06. In 2006/07 we will undertake a site drainage survey.

At Stockport depot we are planning repairs to the boundary wall in 2004/05 and other renewal works including the replacement of the water main in 2005/06.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

A significant proportion of the traffic on the route has an off-route origin but delays arising on this route propagate directly onto the WCML and Transpennine routes, so reducing delays here is vital. To tackle this we have a number of programmes and specific actions planned.

The region has invested in additional autumn trackside equipment on the lines serving Hadfield and Glossop, Oldham, Rochdale, Buxton, Wilmslow and Knutsford.

A testing and replacement programme for signalling power cables on the routes between Macclesfield and Stoke, Combrook and Glazebrook, Romiley to New Mills, Ashburys to Romiley and Ashburys to Newton will be completed by April 2004.

Work is in process to take preventative action to reduce incidents of bridge strikes at some of the most vulnerable bridges on the route. This includes bridge painting, vegetation clearance, road lowering schemes, and impact monitoring systems.

Route crime remains a major issue in the majority of city centre areas with resulting delays to trains. Particular problem areas include the approaches to Blackpool, between Bolton and Rochdale via Manchester Victoria, along the Manchester and Liverpool Line via Warrington Central, Northwich to Hartford and at Edge Hill, St Helens Central and Warrington Central. To combat this problem we are funding two BTP Officers to target these key crime locations and are deploying a high visibility police van with CCTV recording and detaining facilities. We have issued digital cameras to officers to help speed up the restoration of services after incidents. We have also undertaken local education campaigns targeting schools and youth groups in all areas, with specific workshops, most recently undertaken at Gorton.

Our specialised contractor will continue with work to manage the trackside vegetation and consequent performance problems with autumn leaf-fall by creating a 6m strip cleared of vegetation. This has already proved successful in helping to reduce leaf-fall related delays. In 2004/05 work is planned between Stockport and Guide Bridge, around Earlestown and Golbourne and on the branches to Manchester Airport, Seaforth Docks and Rose Hill.

Our refencing strategy is to bring the full route sections up to full standard to reduce route crime and animal trespass. We will be continuing in 2004/05 with major refencing work between Preston and Blackpool North and South, Ordsall Lane Junction to Edge Hill Junction, Guide Bridge to Glossop and Hadfield, Bolton to Blackburn and from Stockport to Mickle Trafford Junction. We have provided enhanced anti-vandal fencing at high-risk locations in the Manchester area.

## Enhancements

In addition, to the WCRM work described earlier, there are outside party (including GMPTE and MPTE) funded enhancements at various stages of development, which are being considered for this route.

## Land implications

Given the potential requirements for land to accommodate new infrastructure in the Manchester Rail Hub any considerations for disposal of land will have to be carefully examined in order not to preclude future operational use.

We will continue to examine opportunities at Manchester Victoria for the use of redundant office space in the station along with surplus land in the Fish Dock area.

Consultants have been appointed to progress a masterplan for the former Manchester Exchange station area. As well as creating a large brownfield development site, provision will be made for the future expansion of capacity at Victoria station, dependent on future rail services in the city. Additionally, we would expect any redevelopment scheme to also improve linkages between the site and Victoria station itself.

## Other committed changes

The severance and transfer of the Oldham Loop to the Metrolink network is expected to take place in 2005. This Greater Manchester Passenger Transport Executive (GMPTE) led and funded scheme will require the removal of the connections to heavy rail and associated remodelling of Thorpes Bridge and Rochdale junctions.

Specific work is likely to include an underbridge and tunnel at Thorpes Bridge and a flyover for the trams at Rochdale, which will need the relocation of Rochdale signal box. Detailed design started in 2003 and we are developing the possession regime which will be required to carry out the necessary work. In planning the handover of the Oldham Loop to Metrolink services, we are working to ensure that the remaining heavy rail infrastructure is robust. We are committed to this scheme and legal agreements are expected to be in place shortly.

## Route development

### Stations

We are examining the feasibility of the revitalisation of Newton-le-Willows station on behalf of Merseytravel. This scheme could include 300 parking spaces, integrated park and ride and bus/rail interchange, together with improved access and links to surrounding areas, could progress to implementation.

We have also undertaken initial feasibility work for a potential new station at Carr Mill on behalf of the MPTTE.

We have assisted Lancashire County Council in the production of a detailed design for improvements to Chorley station, including modifications to the ticket office, new seating and traffic management.

In partnership with a developer we are assessing a potential scheme at Blackburn for subway improvements an access ramp and a new car park.

The GMPTE has specific aspirations for improvements to stations including Bolton and Salford Central.

We are developing a retail telecoms renewal scheme at Stockport as part of a two-year renewal programme for Virgin Stations.

### Depots

Transpennine Express is developing plans for a depot in the Manchester area and we are investigating a site at Ardwick for them.

### Freight

The SRA has undertaken studies into gauge enhancements to W10 for core routes to Trafford Park freight terminal, Seaforth Docks to Hull via Diggle, and Heaton Norris to Stalybridge.

## Emerging issues

The major capacity constraint is in the Manchester area and relates to the volume and mix of traffic between Stockport and Manchester Piccadilly. This section of railway has a large number of conflicting moves. The main problems are at the key junctions at Stockport (Edgeley) for Sheffield/Buxton and Altrincham/Chester, at Slade Lane for Manchester Airport/Styal line, and at Ardwick for Transpennine services. This last junction can cause significant problems as trains crossing to platforms 13 & 14 delay other trains moving in and out of the terminal platforms at Manchester Piccadilly. The infrastructure in this area is now life expired and requires renewal. Details of the Manchester hub, a key network constraint, were included in the 2002 Railtrack Network Management Statement. The Manchester hub study considered the possibility of increasing capacity to cater for additional services. The solutions identified included major infrastructure options, train rerouting and timetable alterations. All the infrastructure enhancements that the hub study identified would have required substantial external funding.

The GMPTA and the GMPTE are developing a Rail Investment Plan to look at how they, with the ten district councils and rail industry partners, can bring about improvements for passengers in the short to medium term. This could include a programme of improvements to local stations encompassing safety and security, passenger information, CCTV, better lighting, improved parking and improvements to the environment around stations.

There are a number of aspirations for further transfers of lines from heavy rail to tram. These include lines in Greater Manchester, East Lancashire and on the Fylde. Proposals being examined include an extension to the Fylde Coast tram system, an element of which may involve joint or parallel running with the heavy rail network between Blackpool North and Poulton. This proposal could have a material effect on our operation. Other aspirations, including the Atherton line and for Rose Hill, might have a serious impact for engineering access for other lines on this route.

Traffic on the route to Manchester Airport from the north is growing rapidly. This is currently a two-track section, leading to a station with two terminating platforms. Access to the route is constrained by the capacity of the Crewe-Manchester route, the mix of traffic on the Styal Line and the junctions at Wilmslow, Heald Green and Slade Lane. Options to increase capacity at the airport terminus include platform lengthening to accommodate 10-coach trains or for an additional bay platform. For the medium to long-term there is an option of through platforms associated with a Manchester Airport Western Link rail line to connect with the Stockport to Chester line via Northwich. Passive provision for a third platform has been made in the Ground Transport Interchange, which is under construction.

We have been discussing with rail industry and regional partners the potential to deliver integrated freight facilities for the North West. As a result we are aware that there are proposals for development of major new intermodal freight terminals at Carrington, Ditton, Parkside and Barton, three of which are on this route. All of these terminals would have implications for the existing rail network.

There are aspirations for a new station at Chorley Royal Ordnance Factory, the siting of which would have implications for signalling and line capacity.

In the medium to long-term the development of rail services associated with the continued development of Manchester and Liverpool John Lennon Airports will have implications for this route.

If freight from the new Kirkby terminal increases substantially then the localised resleeper approach that has been adopted on the Wigan to Rainford line will be reexamined, as a more substantial renewal may be required to support the extra traffic. This could require enhancement funding.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 20 Capacity and operational constraints

<b>A</b>	Manchester Hub: capacity constraint
<b>B</b>	Salford Crescent: Euxton Junction capacity constraint
<b>C</b>	Ardwick Stalybridge: busy two-track section with a mix of traffic, flat junctions and limited overtaking
<b>D</b>	Piccadilly - Hunts Cross: busy two-track section with mix of traffic, flat junctions and limited overtaking
<b>E</b>	Bolton - Blackburn: single-line sections
<b>F</b>	Stockport - Altrincham: single-line sections

### Route 20 Other issues on the route

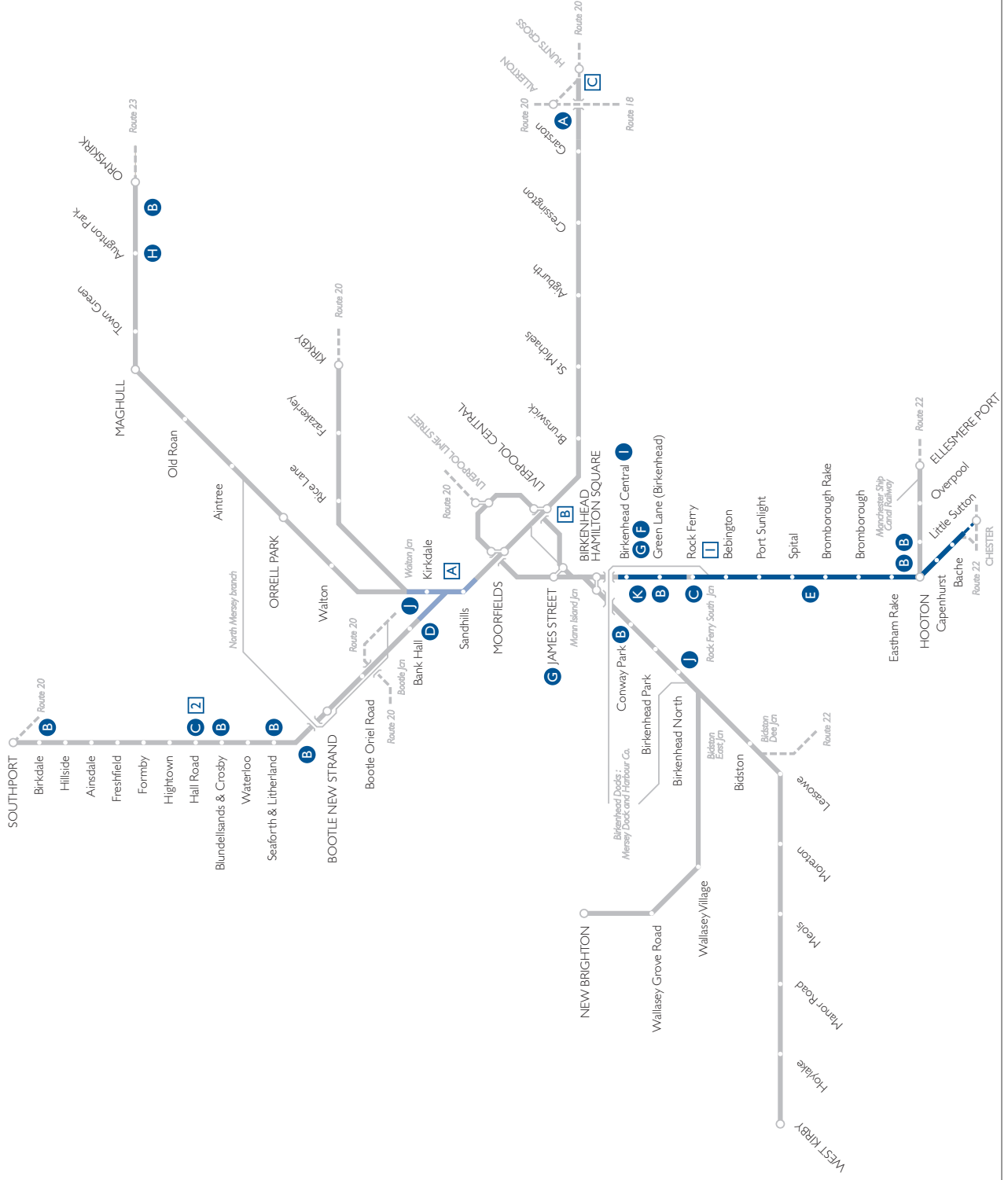
<b>1</b>	Thorpes Bridge Metrolink issues
<b>2</b>	Rochdale Metrolink issues
<b>3</b>	Carr Mill: potential new station
<b>4</b>	Chorley ROF: siting of new station
<b>5</b>	Fylde Coast tram proposals
<b>6</b>	Blackpool North station development
<b>7</b>	GMPTE tram proposals
<b>8</b>	Strategically important freight terminal proposal
<b>9</b>	Manchester Victoria- former Manchester Exchange development

### Route 20 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 West Coast Route Modernisation works	R	
<b>B</b>	Track renewals 2004/05 & 2005/06	R	
<b>C</b>	S&C renewals 2004/05 Dinting East Junction, Woodley Junction, Crow Nest Junction and Wigan Wallgate 2005/06 Allerton Depot, Guide Bridge West Junction, Gorton, Trafford Park Junction and Burnden Junction	R	
<b>D</b>	2004/05 Atherton line strengthening of underbridges	R	
<b>E</b>	2004/05 Reconstruction of bridge (Bridgeguard 3) near Eccles	R	
<b>F</b>	2004/05 Wigan Wallgate track, points and signalling work	R	
<b>G</b>	2004/05 Signalling renewals at Mickle Trafford and Mouldsworth	R	
<b>H</b>	2004/05 Installation of event monitoring equipment at Edge Hill and Hunts Cross	R	
<b>I</b>	2006/07 Buxton signal box renewal.	R	
<b>J</b>	Interlocking renewal at Crow Nest Junction 2004/05, Blackpool North and Salwick 2005/06	R	
<b>K</b>	2005/06 Replacment of Hunts Cross train describer.	R	
<b>L</b>	2005/06 Improvement of train detection at Bromley Cross	R	
<b>M</b>	2004/05 Conversion to power operation of points at Dinting	R	
<b>N</b>	2004/05 Renewal of Western Region Type level crossings at Dean Lane, Carleton and Clayton Bridge (see route 23)	R	
<b>O</b>	Renewal of oil filled switch gear 2004/05 Slade Lane 2005/06 Wilmslow 2006/07 Ardwick and Chelford	R	
<b>P</b>	2006/07 Overhead line life extension works on the Manchester to Glossop line	R	

<b>Route 20 Planned projects</b>			
	<b>Project description</b>	<b>Type of work</b>	<b>Dev. Level</b>
Ⓞ	Renewal of signal supply points 2004/05 Bolton, Blackrod, Romiley, Hunts Cross 2005/06 Edge Hill 2006/07 Entwistle: St Helens Junction, Windsor Bridge	R	
Ⓡ	Station retail telecomms renewals 2004/05 Bolton, Salford Crescent and Oxford Road 2005/06 Blackpool North 2006/07 Manchester Victoria	R	
Ⓢ	Stations renewal work 2004/05 St Helens Central, Rainhill, Wilmslow, and Deansgate 2005/06 Manchester Victoria (trainshed lighting) and Earlestown 2006/07 Furness Vale, Manchester Victoria, Atherton, Poulton, East Didsbury, Gatley, Levenshulme, Mauldeth Road and Burnage, Strines and Mouldsworth	R	
Ⓣ	2004/05 Garswood ticket office	R	
Ⓤ	2004/05 St Helens Central revitalisation works for MPTE	E	5
Ⓥ	Renewals at depots Newton Heath 2004/05,2005/06,2006/07 Blackpool 2004/05,2005/06 Stockport 2004/05, 2005/06	R	
Ⓦ	2004/05 Trackside vegetation management	R	
Ⓧ	2004/05 Trackside refencing work	R	

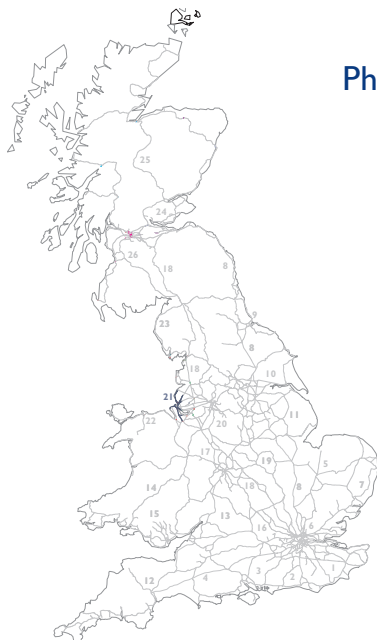
# Route 21





# Route 21: Merseyrail

## Route description



### Physical description

This route is the third rail electrified Merseyrail system located on Merseyside and in north Cheshire comprising the Wirral and Northern Lines including the loop line and the stock interchange line. It also covers the non-electrified North Mersey Branch and lines to Birkenhead docks.

The route is a high utilisation 60mph two-track railway with the exception of the 30mph single-line underground loop. This loop line under the Mersey has four underground stations. Parts of the Northern Line through Central Liverpool are also in tunnels. With the exception of Canning Street, all junctions are flat.

The route is classified broadly as secondary with some freight only.

## Market served

These lines form a high-capacity suburban passenger railway, which plays a central role on Merseyside enabling the local population to commute to work quickly, efficiently and with minimal environmental impact as part of the area's integrated public transport network. It also attracts considerable numbers of users off-peak, supporting the area's main shopping and tourist markets. Cars are transported on a small part of the route, via Ellesmere, Port but otherwise there is minimal freight traffic.

## Growth

We are expecting passenger growth to continue over the coming years. Local commuting demand will grow as employment on Merseyside increases, whilst demand for leisure and business travel will increase as the economy steadily grows.

Little rail freight is carried and this expected to remain the case.

## Current use

### Current traffic

The sole TOC is Merseyrail Electrics.

The Merseyside direct current (DC) network has the greatest frequency of suburban services outside London and performance is the key issue for this route. The present rolling stock is being refurbished and is expected to run for another 10 years.

The central sections of the route average up to 12tph. The high frequency of the service combined with the flat junctions means that the network is operating close to capacity at a number of locations.

<b>Route 21 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	15,926	35	15,961
Train tonne km per year (millions)	742	11	753
Average no of train km per track km per day			113
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Birkenhead - Liverpool loop			400
Liverpool Central - Sandhills Junction			380
Birkenhead - Birkenhead North			230
Sandhills Junction - Walton Junction			230
Birkenhead - Hooton			170

### Projected use

Discussions with Merseytravel suggest that the present timetable and level of services will be maintained.

## Strategic framework for the route

The route is unlikely to form part of any future route utilisation strategy given the self-contained nature of the route and the already high frequency of passenger services.

Merseytravel have a unique relationship with the TOC as they not only specify the timetable but also have direct responsibility for letting the concession to run the train service.

The North West RPA will cover this route and is due in Summer 2004.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 21</b>		<b>Current route capability</b>	
<b>Journey times</b>			<b>1 April 2004</b>
Liverpool Central - Chester			38min
Liverpool Central - Southport			42min
Liverpool Central - West Kirkby			29min
Liverpool Central - Hunt's Cross			17min
<b>Linespeed (km of track)</b>			
Up to 35mph			35
40-75mph			215
80-105mph			-
110-125mph			-
<b>Gauge (km of route)</b>			
W6A			129
W7			14
W8			14
W9			2
W10			-
<b>Axle weight (km of track)</b>			
Up to 20.3 tonnes (RA 1-6)			8
20.4 tonnes - 24.1 tonnes (RA 7-9)			242
24.2 tonnes - 25.4 tonnes (RA 10)			-
<b>Total km of track</b>			<b>250</b>
<b>Total km of route</b>			<b>129</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 21 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	8	11	3
Structures	1	1	0
Signalling	0	-	-
Electrification	3	2	2
Plant & machinery	2	0	0
Telecoms	1	1	0
Stations	1	1	1
Depots	0	1	1
Lineside	-	-	-
<b>Total renewals</b>	<b>16</b>	<b>16</b>	<b>8</b>
<b>Committed and planned enhancements</b>			
Bidston/Fazakerley/Newton-Le-Willows/Sandhills/Car Mill/Bootle Oriol Road refurbishment for MPTE	6	11	-
Bootle Oriol Road Refurbishment	2	-	-
<b>Total committed and planned enhancements</b>	<b>8</b>	<b>11</b>	<b>-</b>

<b>Route 21 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	12	14	8
Sleeper renewal (km per year)	5	8	1
Ballast renewal (km per year)	5	8	1
S&C renewal (units per year)	2	2	1

## Engineering access

Night possessions for regular maintenance work are regularly available, and although the available duration is limited by late evening and early morning trains, this is not normally a problem. The extent of the tunnels does constrain the amount of work that can be carried out at those locations within that possession regime. To alleviate this problem, cyclical access patterns for possessions of up to 8hrs are being discussed.

With the very successful renewals undertaken in blockade on the Southport line in past years the need for access for renewals on this line has been reduced.

The critical requirement on this route is for weekend access for renewal work and junction maintenance. Programmes are being agreed with Merseytravel and the train operator to address this issue.

## Maintenance and renewal

We are continuing to invest in this route particularly in track and electrical renewals to maintain the capability. The activities are on a prioritised and condition basis.

## Track

The route is a mixture of jointed rail on timber sleepers, CWR on concrete sleepers, and concrete slab track on the loop. Our approach is to continue to replace jointed track, when condition requires it, by CWR using concrete sleepers on the third rail network. Within the route, renewals are done on a priority basis determined by track geometry and track condition.

Much of the track is 40-50 years old and will need renewing in the short to medium-term. Delays in this part of the network are critical because of the relatively short routes and high service intensity.

The sharp curvature on the loop line demands a strategy of high frequency replacement of side worn rail and the regular replacement of loose pandrol housings.

We are planning trackwork at various locations including at Hooton, Little Sutton and Seaforth in 2004/05, and at Green Lane, Seaforth and Litherland, Birkdale, Ormskirk and Blundellsands in 2005/06.

We have a plan for the targeted renewal of S&C across the route. This varies from complete renewals of all elements with reballasting to partial renewal or refurbishment. Where appropriate we also review the design speed.

## Structures

The number and length of tunnels in sandstone on this route has implications for the inspection and maintenance regime. Although a dewatering programme has proved effective in managing water ingress, monitoring will continue.

## Signalling

The majority of signalling on the DC electrified network is controlled from Merseyrail IECC. The upgrade of the computer systems was completed in 2003/04. The replacement of obsolete equipment, in addition to reducing performance risk, was intended to improve the operation of ARS and timetable interfaces.

## Electrification and plant

From 2004/05 until 2006/07 we will continue with a program of 11kV traction power supply cable renewals. The need for this has been demonstrated by disruption caused by recent failures on this network caused by cable design and manufacture.

We will give priority to DC switchgear with asbestos arc-chutes or with insufficient capability to withstand faults.

We are planning the renewal of Bank Hall substation building and switchgear in 2004/05; the renewal of impedance relays Rock Ferry to Chester in 2005/06; and renewal of both supply transformers at Shore Road in 2006/07.

In 2004/05 we will be renewing the submersible pumps at Shore Road and Georges Dock.

From 2004/5 until 2006/07 we will be renewing the tunnel lighting and control equipment.

## Telecoms

We will be carrying out life extension works to the existing Merseyrail CSR to maintain performance of the operational communication system between the train driver and signaller during 2004/05.

## Stations

Our plans include the reconstruction of both platforms at Aughton Park in 2004/05, and refurbishing lift two at Birkenhead Central in 2005/06.

Facilities for passengers will be upgraded at seventeen stations across Merseyside by Autumn 2004 in a project funded by the SRA and delivered by us. The improvements will vary from station to station but include new waiting rooms, toilets, shelters, CCTV and customer information systems.

## Depots

We have plans for significant renewals and repairs at Birkenhead North Depot and Kirkdale.

At Birkenhead North we are planning renewal of lighting in the high bay workshop and the replacement of the boiler in 2004/05. In 2006/07 we plan to carry out renewals to the general fabric of the buildings.

In 2005/06 we are planning to carry out resurfacing works to access road and general renewal works at Kirkdale and for 2006/07 we are evaluating general repairs to the accommodation block and renewal of roof sheet cladding.

Hall Road is presently mothballed and represents an ongoing maintenance liability and target for railway crime. Given that the new franchisee has indicated that they have no requirement for the depot its future is now being reviewed with a view to disposal.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

Since the Merseyrail electrics network is self-contained performance problems on the route do not affect other routes. With the intense train service in the central sections the knock-on delays arising from disruption can be considerable, so avoidance of delays and robust recovery plans following incidents are therefore of key importance. We have taken a number measures to reduce delay.

Train delays caused by route crime remain a major issue in the majority of city centre areas. We are working with schools and youth groups to prevent further incidents and with BTP to target crime hotspots.

A new CCTV van will be able to focus on specific areas of the Merseyrail network, based on Network Rail led intelligence. We are also working closely with Merseyrail, and as well as regularly attending their route crime group meetings; we share crucial information at the education sub-group meetings in the north-west.

Our specialised contractor will continue with work to manage the trackside vegetation and consequent performance problems with autumn leaf-fall. This has already proved successful in helping to reduce leaf-fall related delays. The work planned between Rock Ferry and Birkenhead in 2004/05 will complete the creation of a 6m-wide strip vegetation free strip across this route.

## Land implications

We are reviewing our land holdings in the light of the continuing operational requirements.

## Other committed enhancements

Merseytravel is continuing to invest in stations enhancements and the provision of interchanges to fulfil their transport plan. A multi modal integration scheme is being developed for an interchange station at Garston/Allerton, linking the Northern Lines with the West Coast Main Line route. This major Merseytravel initiative, funded under their Local Transport Plan, includes relocation of Garston station to provide a more convenient interchange between rail and bus, as well as provision for potential Merseytram services. The parkway is seen as key to improving links to Liverpool Airport. Planning consent has now been obtained.

## Route development

There are a number of Merseytravel schemes that are presently progressing towards committed status.

We have completed feasibility studies for Merseytravel for revitalisation at a number of stations including Sandhills, Fazakerley and Bidston. The details of the specifications were included in our 2003 Business Plan. In addition, a study has been completed for Merseytravel for a major revitalisation programme for the underground stations. Merseytravel have cited other aspirations for the stations on this route including implementation of car park extensions at Birkdale, Maghull and Aintree, and better access for Formby.

Merseytravel have confirmed which schemes in their work bank they wish to implement and contractual discussions are underway with us over how best to progress.

The area surrounding Liverpool Central station might be the subject of a redevelopment scheme which could have implications for the station itself. Any resulting changes to the station are expected to be wholly externally funded.

The following IOS proposals are currently under consideration by the SRA:

- James Street operational flexibility: to provide tumbback facilities, allowing access into the city by rail, during times of disruption.
- Olive Mount chord: reopening of the former chord to freight trains (from the Bootle branch on to Chat Moss and West Coast rail lines).

## Emerging issues

Any subsequent deployment of new rolling stock will need to take account of the power capability of the route, the power requirements and characteristics of the units and the operation of the proposed timetable.

It is possible that the rail freight might return to Birkenhead Docks. If freight customers and commodities do emerge the arrangements for handling freight on the docks branch line will need to be reviewed together with access and routing onto to the Wirral lines or the Wrexham - Bidston line.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 21 Planned projects

<b>I</b>	2005/06	Lift two refurbishment Birkenhead Central	R
<b>J</b>	2004/05,2005/06,2006/07	Renewals at Birkenhead and Kirkdale depots	R
<b>K</b>	2004/05	Vegetation management	M

### Route 21 Capacity and operational constraints

- A** Sandhills - Walton: flat junction
- B** Liverpool Central: platform capacity
- C** Hunts Cross West Junction: crossing moves

### Route 21 Other issues on the route

- 1** Birkenhead Docks branch: access for freight
- 2** Potential redevelopment of Hall Road depot

### Route 21 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05,2005/06 South Liverpool Parkway	E	2
<b>B</b>	2004/05, 2005/06 Major track renewals	R	
<b>C</b>	S&C renewals 2004/05 Hall Road 2005/06 Rock Ferry and Birkenhead	R	
<b>D</b>	2004/05 Renewal of Bank Hall substation building and switchgear	R	
<b>E</b>	2005/06 Renewal of impedance relays Rock Ferry to Chester	R	
<b>F</b>	2006/07 Renewal of both supply transformers at Shore Road in 2006/07	R	
<b>G</b>	2004/5 Renewing submersible pumps at Shore Road and Georges Dock	R	
<b>H</b>	2004/05 Reconstruction of platforms at Aughton Park	R	

## Network Rail

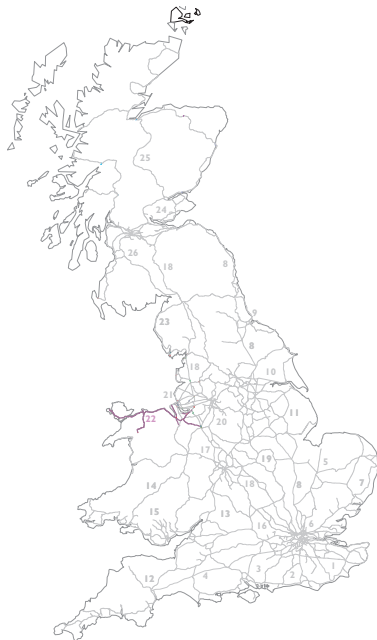


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# Route 22: North Wales and Borders

## Route description



### Physical description

The route covers the North Wales Main Line (NWML), a strategically important Trans-European Network (TENS) route. It provides an important link between North Wales and the north-west of England, as well as to London via the West Coast Main Line. It also includes the North Wales branch lines to Wrexham and Bidston, and to Llandudno and Blaenau Ffestiniog.

This route is two-track railway except for the single-line Blaenau Ffestiniog branch. Linespeeds range from typically 40mph or 50mph on branch lines up to 90mph on the NWML. It is non electrified.

The route is classified broadly as two thirds secondary, a quarter rural and some freight only.

## Market served

Holyhead station acts as a railhead for the terminal used by the ferries that link the communities and businesses in Ireland with those in Wales and England. The port of Liverpool provides an alternative sea route for Irish Sea passengers and freight.

The M56 is the road alternative to the Manchester to Chester rail routes and suffers from heavy congestion at peak hours. In North Wales the A55 provides the direct competition. Liverpool and Manchester to Ireland traffic also has direct competition from low cost airlines.

For smaller communities, the routes provide an important public transport link. The line between Wrexham and Bidston is an important route for freight and in particular steel from South Wales.

There is steel traffic to Shotton via Wrexham and some freight traffic to and from Ellesmere Port.

## Growth

Our analysis indicates that passenger growth is expected following the introduction of the extra Virgin West Coast trains. No further additional services are expected from the underlying growth. The predicted passenger demand can be accommodated through existing infrastructure by lengthening of trains where necessary.

Considerable quantities of stone are taken from Penmaermawr to Crewe for railway infrastructure renewals. There is only limited other freight traffic with limited forecasted growth expected.

The capacity of the current railway infrastructure is adequate for today's level of service, and expected growth.

## Current use

### Current traffic

The operators are Virgin West Coast, Arriva Trains Wales, Merseyrail, EWS, Freightliner and Direct Rail Services.

The main coastal rail route is highly utilised in the hours when the Virgin West Coast trains run but not outside those times.

The Conwy Valley line is single track with limited passing places and when the train is in the valley this restricts access for other services.

<b>Route 22 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	12,195	690	12,885
Train tonne km per year (millions)	650	158	808
Average no of train km per track km per day			38
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Chester - Mickle Trafford Junction			80
Crewe - Chester			70
Chester - Llandudno Junction			70
Llandudno Junction - Bangor			50
Helsby - Frodsham Junction			50

### Projected use

The Virgin West Coast service steps up from three trains a day to five trains a day between Crewe and Llandudno Junction with four trains for Holyhead and one for Llandudno, from the September 2004 timetable.

## Strategic framework for the route

No route specific issues emerged from a regional capacity utilisation workshop and there are no plans for a Route Utilisation Strategy. Some of the services which run to Manchester via the Chat Moss and Northwich routes will feature in a Manchester RUS.

The SRA's Planning Assessment for Wales is expected in Spring 2005.

The Welsh Assembly and North Wales local authorities wish to see improved rail links from North Wales.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 22</b>		<b>Current route capability</b>	
<b>Journey times</b>			<b>1 April 2004</b>
Manchester - Llandudno			2hr 10min
Crewe - Chester			22min
Chester - Holyhead			1hr 43min
Crewe - Holyhead			2hr 1min
Bidston - Wrexham Central			57min
Llandudno - Blaenau Ffestiniog			1hr 10min
<b>Linespeed (km of track)</b>			
Up to 35mph			49
40-75mph			279
80-105mph			278
110-125mph			-
<b>Gauge (km of route)</b>			
W6A			368
W7			246
W8			205
W9			2
W10			-
<b>Axle weight (km of track)</b>			
Up to 20.3 tonnes (RA 1-6)			28
20.4 tonnes - 24.1 tonnes (RA 7-9)			578
24.2 tonnes - 25.4 tonnes (RA 10)			-
<b>Total km of track</b>			<b>607</b>
<b>Total km of route</b>			<b>368</b>

## Delivering baseline outputs

With the forthcoming additional Virgin services to Holyhead, a review has been undertaken to facilitate production of a robust timetable for the route. Analysis indicates that there is adequate to capacity to accommodate predicted traffic flows.

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 22 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	1	2	4
Structures	1	1	2
Signalling	5	3	1
Electrification	-	-	-
Plant & machinery	0	0	-
Telecoms	0	0	1
Stations	0	1	1
Depots	-	0	-
Lineside	0	0	0
<b>Total renewals</b>	<b>8</b>	<b>7</b>	<b>8</b>
<b>Total committed and planned enhancements</b>	<b>0</b>	<b>-</b>	<b>-</b>

<b>Route 22 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	2	2	8
Sleeper renewal (km per year)	1	1	4
Ballast renewal (km per year)	1	2	4
S&C renewal (units per year)	-	-	3

## Engineering access

Most renewal work is planned at weekends, which can cause some disruption to services due to the lack of diversionary routes. The volume of work and length of sections requires up to three disruptive possessions a year.

There is a need for better mid-week night time access, particularly on the long sections between Chester and Holyhead. Currently if a possession is taken between Crewe and Chester, or there is already a single-line possession west of Chester, a further single-line possession cannot be obtained. This means if short notice access is required planned work may be cancelled.

We are working on proposals to enable access to a minimum of two locations on the route at a time without causing disruption to timetabled trains.

## Maintenance and renewal

### Track

Much of the track on the main lines is CWR on a variety of sleepers; with almost 60% more than 25 years old. The track on the branches includes jointed rail on timber sleepers. From Chester to Crewe and to Acton Grange most renewals in the last 10 years have been reballast only. On the main line east of Bangor significant renewals have taken place to remove the large quantity of timber sleepered jointed track but there are a number of locations on the NWML where old design fastenings prevent linespeed increases.

West of Bangor and on the other lines little renewals work is taking place.

On the faster lines, when renewals are due, we aim to replace jointed track on the route with CWR. From Bangor to Holyhead there is a significant amount of older jointed track, gradually being replaced as priority dictates. For the slower Blaenau Ffestiniog and Bidston-Wrexham branch lines the approach will be resleepering and rerailling as necessary. Any increase in tonnages on those lines would need a review of the maintenance and renewals regime, and could require enhancement funding.

We are planning major track work at various locations including Britannia Bridge and Mostyn in 2004/05, and Rhosneigr and Abergele in 2005/06. The renewals range from steel sleeper relay and rerailling to sleeper renewals or reballasting.

### Structures

There is a large amount of coastal railway on the North Wales Main Line, which is vulnerable to failure due to washout of sea defences. We have therefore developed a 10-year coastal sea defence strategy designed to take into account predicted climate and sea level changes. There are also significant lengths of embankments, cuttings and tunnels on the coastal line with attendant asset maintenance issues.

There are also ongoing scour and flooding issues in the Conwy Valley. The Conwy Valley rail line from Blaenau Ffestiniog to Llandudno Junction is prone to flooding and washout of the formation. In February 2004 over the 10-mile stretch between Tal-y-Cafn and Betws-y-Coed there were 20 places where the embankment was totally washed away, closing the line to traffic. We are working to reinstate the railway and reopen it to traffic.

We are in the second year of a five-year programme to examine all the earthworks in the region, to establish their overall condition.

### Signalling

On this route 20% of the area is controlled by two main PSBs, 10% by lesser power boxes and 70% by mechanical signalling.

Following on from work which commenced in 2003/04, in 2004/05 we plan to abolish Mold and Sandycroft signal boxes, resignalling the area presently under their control and transferring it to Chester PSB. In 2004/05 the planned work also includes a rewire at Mickle Trafford and the renewal of the train describer at Chester.

We are planning to renew the interlocking at Holyhead and rewire and renew the interlocking at Abergele and Deganwy in 2005/06, and are making provision for the replacement of western region barrier type level crossings at Gaerwen in 2005/06 and Valley in 2006/07.

### Electrification and plant

We have a programme of point heater renewals at Chester and Ellesmere Port in 2004/05 in the third rail areas to avoid non-compliant point heaters energising track circuits and causing failures. and a three-year programme over the network for renewing point heaters to avoid delays caused by frozen points.

We also have a programme of condition led renewals for signal supply power points where procurement of spares for bespoke equipment is problematic. We will be renewing the supplies at Chester in 2004/05 and at Llandudno Junction in 2005/06.

### Telecoms

Advance planning and design will take place for delivery of GSM-R radio sites and the supporting fibre based fixed telecommunications network.

Telecoms renewals have been focused in the past towards operational renewals and consequently some retail equipment is approaching the end of its operational life and is difficult to maintain. For 2004/05 the focus of telecoms renewals will be retail assets i.e. CIS, public address and clock systems on a closely targeted basis. This will include work at Chester station.

These retail renewals also include CIS work at Llandudno Junction, Bangor, Colwyn Bay and Rhyl in 2005/06.

The telecoms programme also includes provision to commence renewal of the signalbox voice recorder at Chester in 2004/05.

### Other stations

We have an ongoing programme of works for station platform and roof/canopy repairs. We are planning the renewal of part of the station entrance canopies at Chester station in 2004/05 and are looking at future refurbishment of the train shed roof.

In 2005/06 we are planning to carry out platform repairs at Abergele and Pensarn station, resurfacing the platforms at Penmaenmawr, and repairs to Bangor station canopies.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

The route has the potential to export delay onto the West Coast Main Line at Crewe and Warrington and into the Manchester hub via the inter-urban and long distance services.

Some delays and their duration arise from the physical geography. Severe weather can result in disruption to services on the coastal route, and several lower-lying sections of the route, including between Crewe and Chester and along the Conwy Valley, are susceptible to flooding.

Recent drainage work has addressed flooding problems between Crewe and Chester but there remains an issue with floodwater originating off the rail network, for which we are seeking the cooperation of adjoining landowners.



Llandudno Junction to Blaenau Ffestiniog continues to be vulnerable to scour and flooding. It is likely we will need to close the line on a precautionary basis during extreme rainfall, which typically occurs biannually.

We have taken action to reduce delay. The recent installation of axle counters on the coast has substantially addressed problem of salt spray causing track circuit failures.

Our strategy is to continue to tackle delay by pursuing further vegetation cut backs. Our specialised contractor will continue with work to manage the trackside vegetation, and consequent performance problems with autumn leaf-fall by creating a 6m strip cleared of vegetation. This has already proved successful in helping to reduce leaf-fall related delays. In 2004/05 work is planned between Crewe and Chester, from Rhyl to Holyhead and also from Llandudno to Llandudno Junction.

In addition, our refencing strategy is to bring the full route sections up to full standard to reduce route crime and animal trespass. We are planning major work in 2004/05 from Crewe to Holyhead and from Chester to Acton Grange Junction.

Route crime remains an issue around Rhyl and Prestatyn. In response we have undertaken a major local education campaign targeted at young people and are starting to work with a local youth and community group that covers the areas where we have our biggest problems. Independently, the North Wales Post has launched a safer stations campaign in the area, highlighting the problems we are facing as an industry.

## Enhancements

As part of the West Coast Upgrade we will be undertaking scoping work to implement gauge clearance works for the Pendolino trains on the route between Crewe and Holyhead, and from Llandudno Junction and Llandudno in 2004/05. The aim is to have the route physically cleared by Summer 2005.

## Route development

A partnership scheme is being developed to improve Chester station with Cheshire County Council, Chester City Council, the North West Development Agency and the Railway Heritage Trust.

## Emerging issues

The possible introduction of slate waste freight traffic onto the single-line route to Blaenau Ffestiniog would require significant levels of track renewal and work for Conwy Valley structures. Work identified includes waterproofing and minor masonry strengthening and also repairs to Gethin Viaduct and several lesser arch underbridges. The resumption of slate traffic might also require improved facilities at Llandudno Junction. Timetable robustness could, for example, be improved by using Platform 4 or the old Quay Siding to avoid fouling the normal running lines. The assumption is that the freight trains would run at times when passenger trains did not, i.e. that no further capacity is required.

In addition, Yns Mon Council, supported by Welsh Development Agency and Stena, have a scheme to improve access from the A55 to the port and town of Holyhead. The scheme has had input from us and industry partners, and is wholly externally funded. It could involve the use of existing sidings as the road route, and the transfer to a new site of the existing depot facilities for which a planning application could be made soon. The target date for completion is 2005/06.

There are further aspirations for 100mph running on the NWML but this would require significant external funding and is not committed to.

Any aspirations for further trains would require additional infrastructure to address capacity constraints, specific work depending on the revised service pattern:

- the long signalling block sections on Anglesey and the bunching of services to connect with Irish Sea ships constrain capacity. This would not easily be solved by timetabling;
- the layout of Chester East Junction would need reviewing in the light of a revised service pattern; and
- the only passing loop on the Conwy Valley single-line is at Llanwrst and is not well sited if any aspirations to run an hourly service are to be realised.

We are in discussions with Gwynedd County Council who wish to construct a car park in part of the former goods yard at Bangor station. Virgin Trains are very supportive of this. The scheme would allow provision of a bus interchange. The target date for the start of a scheme is 2004/05.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 22 Capacity and operational constraints

- |          |   |
|----------|---|
| <b>A</b> | Holyhead - Llanfairpwll: long signalling blocks |
| <b>B</b> | Conwy Valley: single-line                       |
| <b>C</b> | Chester East Junction: capacity constraint      |

### Route 22 Other issues on the route

- |          |                                   |
|----------|-----------------------------------|
| <b>1</b> | Sea defence issues: various sites |
| <b>2</b> | River Conwy flooding issues       |
| <b>3</b> | Route crime hotspot               |
| <b>4</b> | Holyhead A55 road scheme          |
| <b>5</b> | Chester Gateway initiative        |

### Route 22 Planned projects

Project description		Type of work	Dev. Level
<b>A</b>	2004/05, 2005/06 Clearance of Crewe to Holyhead and Llandudno Junction to for Class 390 Pendolino trains	E	5
<b>B</b>	2004/05,2005/06 Major track works	R	
<b>C</b>	2004/05 Abolition of Mold and Sandycroft signal boxes	R	
<b>D</b>	2004/05 Signalling rewiring at Mickle Trafford	R	
<b>E</b>	2004/05 Renewal of Chester train describer	R	
<b>F</b>	2005/06 Renew signalling interlockings	R	
<b>G</b>	2006/07 Replace western region type crossings at Gaerwen and Valley	R	

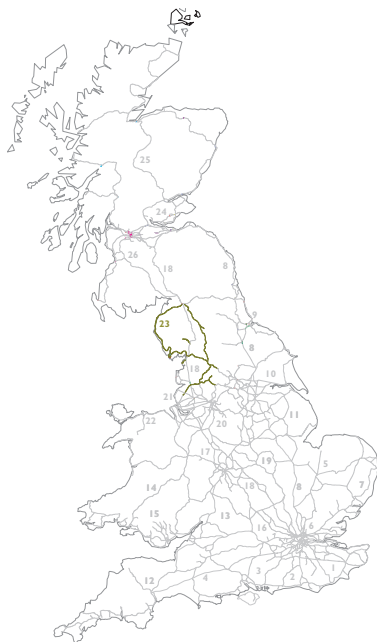
### Route 22 Planned projects

<b>H</b>	2004/05 Point heater renewals at Chester and Ellesmere Port	R
<b>I</b>	Signal supply point renewals 2004/05 Chester 2005/06 Llandudno Junction	R
<b>J</b>	Renewal of retail telecomms equipment 2004/05 Chester 2005/06 Llandudno Junction, Bangor, Colwyn Bay and Rhyl	R
<b>K</b>	Station canopy repairs 2004/05 Chester 2005/06 Bangor	R
<b>L</b>	2005/06 Station platform repairs at Abergele and Pensarn and at Penmaenmawr	R
<b>M</b>	2004/05 Vegetation management	R
<b>N</b>	2004/05 Refencing strategy work	M



# Route 23: North West Rural

## Route description



### Physical description

This comprises almost all the railway in North West England north and west of a line from Preston to Hebden Bridge with the exception of the WCML. It includes:

- the 'Settle and Carlisle' line from Skipton to Carlisle;
- the 'Cumbrian Coast' line from Camforth to Carlisle via Sellafield and Workington;
- the 'Roses' line from Preston to Hall Royde Junction (near Hebden Bridge) via Burnley;
- Blackburn to Hellifield via Clitheroe;
- Camforth to Settle Junction via Wennington; and
- various branch lines such as Preston to Blackpool.

The principal lines predominantly have two-tracks though there are single-track sections. On the branches it is mainly single track. The linespeeds vary from predominantly 70mph on the Preston-Gannow Junction section to mainly 60mph elsewhere. Generally the permitted speeds are 40-50mph on the branch lines. None of the route is electrified.

The route is classified broadly as three quarters secondary, one quarter rural.

## Market served

The route carries important freight traffic, with the heaviest flows being Scottish coal for Yorkshire and the East Midlands concentrated on the Settle and Carlisle Line and for west coast diversions via Blackburn and Clitheroe. Other flows include between the WCML and Hebden Bridge, between Carlisle and Workington docks and between Barrow and Sellafield although there is also some freight on the south coastal route between Camforth and Sellafield.

The Settle and Carlisle passenger trains serve the local dales communities and additional summer visitors. The Cumbrian Coast line supports local travel markets, and commuter traffic into the main towns and Sellafield, however it is circuitous compared to road, which affects its competitiveness. There are direct trains from Windermere and Barrow to Manchester Airport. Passenger traffic on the Windermere branch is mainly seasonal.

The lines out of Preston serve local communities and Transpennine travel via the Roses line.

## Growth

There is some underlying passenger growth especially in summer however no increase in the number of passenger trains is expected.

Freight may see some further growth in coal traffic and aggregates on the Settle and Carlisle line, Clitheroe, and the Roses line from expansion in commodity flows, and from a rerouting of existing traffic from the East or West coast main lines.

## Current use

### Current traffic

Train operators using this route are Trans Pennine Express, First North Western, Arriva Trains Northern, Direct Rail Services, EWS, Advenza, and Freightliner.

With the sections of single-line and long block sections there is little available extra capacity at several locations but this is not foreseen to become an issue for normal traffic, since no requirement for extra trains is currently expected. However, there could be periods when additional West Coast diversionary traffic (from Preston to Carlisle via Hellifield) will load that part of the route to full capacity.

<b>Route 23</b>			
<b>Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	10,902	2,282	13,183
Train tonne km per year (millions)	347	696	1,044
Average no of train km per track km per day			23
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Blackburn - Daisyfield Junction			90
Preston - Blackburn			60
Daisyfield Junction - Rose Grove			60
Bare Lane - Morecambe			40
Hellifield - Settle Junction			40

### Projected use

The projected use is expected to remain as now with the only risk of significant change coming from diversions resulting from the future possession strategies from the WCML.

Analysis indicates that the underlying passenger demand can be accommodated within existing services for the foreseeable future. In the summer, anticipated demand to Windermere can be met without additional infrastructure but by lengthening trains if necessary.

The Settle and Carlisle line has seen the recent introduction of long distance palletised freight services.

Some additional freight traffic is anticipated to and from terminals on this route.

## Strategic framework for the route

The services from Windermere and Barrow to Manchester Airport will be considered in the SRA's Manchester capacity utilisation strategy in 2004/05, which could lead to a restructuring of those services.

The North West Regional Planning Assessment is due in Summer 2004.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 23</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Windermere - Oxenholme		20min
Carlisle - Workington		48min
Workington - Whitehaven		18min
Whitehaven - Barrow		1 hr 25min
Barrow - Carnforth (express)		45min
Leeds - Carlisle		2hr 40min
Lancaster - Heysham Port		27min
<b>Linespeed (km of track)</b>		
Up to 35mph		21
40-75mph		938
80-105mph		-
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		514
W7		374
W8		21
W9		-
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		-
20.4 tonnes - 24.1 tonnes (RA 7-9)		959
24.2 tonnes - 25.4 tonnes (RA 10)		-
<b>Total km of track</b>		<b>959</b>
<b>Total km of route</b>		<b>514</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 23 Forecast expenditure</b>				
£m in 2003/04 prices		2004/05	2005/06	2006/07
<b>Renewals</b>				
Track		7	12	13
Structures		5	3	11
Signalling		2	7	6
Electrification		-	-	-
Plant & machinery		0	0	0
Telecoms		-	-	-
Stations		0	0	1
Depots		-	0	0
Lineside		0	0	0
<b>Total renewals</b>		<b>15</b>	<b>22</b>	<b>31</b>
<b>Committed and planned enhancements</b>				
Bayley Lane Level Crossing		1	0	0
<b>Total committed and planned enhancements</b>		<b>1</b>	<b>0</b>	<b>0</b>

<b>Route 23 Forecast activity volumes</b>				
		2004/05	2005/06	2006/07
Rail renewal (km per year)		6	21	21
Sleeper renewal (km per year)		8	19	17
Ballast renewal (km per year)		8	19	17
S&C renewal (units per year)		9	7	10

## Engineering access

Engineering access for the Settle and Carlisle route and the Roses line has to be considered in accordance with the West Coast and East Coast main lines for which it is an alternative route. This means that nighttime possession opportunities are reduced as it is in frequent use.

For regular maintenance work on the coastal route the normally available access opportunities are generally reasonable. Although Carnforth to Barrow is open continuously, the line going north to Dalston closes for 6hrs on midweek nights and beyond Dalston a night freight service currently only operates on some weekdays, allowing ready access on the others.

We are anticipating works to Leven viaduct spread over two years, probably 2006/07 and 2007/08. This will require a complete closure for 16 weeks in each year. A five-day blockade in early 2004 will be used for reconstruction work on Harrington viaduct between Workington and Whitehaven. Discussions continue with affected freight and passenger operators on both these schemes to formulate possible alternative arrangements.

The Windermere branch closes at night, and requests for extended planned midweek possessions can usually be accommodated. As this line has recently been completely relaid the requirement for engineering access is low.



Overall renewal and maintenance work will require occasional weekend access, which will result in some bus replacement or service diversion. Generally this needs to be on a 6-weekly or 12-weekly basis for up to 8hrs during the week and once or twice per year at weekends for a longer duration. We will continue to look for opportunities to undertake work in blockades, where appropriate.

## Maintenance and renewal

The strategy is to monitor closely the condition of the assets (which have some significant issues) and work to maintain capability. We have been undertaking work under our 10-year coastal defence strategy and we are in the second year of a programme to examine all the earthworks to identify their overall condition.

### Track

On the Settle to Carlisle route high levels of freight traffic continue to cause heavy wear. Renewal work is targeted where remaining timber sleepered jointed track coincides with poor ballast conditions.

We plan to undertake major track work in 2004/05 at various locations including: Flimby, Accrington, Gargrave to Hellifield, between Helm Tunnel and Ormside, and between Cumwhinton and Petheril Bridge.

In 2005/06 we are planning further work between Cumwhinton and Petheril Bridge, between Helm Tunnel and Ormside, and at Settle Junction. On the Cumbrian coastal route we are planning to undertake steel sleeper relay and rerailling work at Park South, Eskmeals, Bootle, Derwent (near Workington) and Flimby.

We have a plan for the targeted renewal of S&C across the route. This varies from complete renewals of all elements with reballasting to partial renewal or refurbishment. Where appropriate we also review the design speed. These are identified in the planned projects table.

### Structures

Large parts of the route are characterised by major tunnels and bridges of historical significance, which require a substantial amount of ongoing maintenance and renewal work. The Settle and Carlisle line in particular has a large number of tunnels and very substantial stone viaducts, including the one at Ribbleshead together with numerous cuttings and embankments. The coastal route has three major coastal viaducts, two spanning the Kent and Leven estuaries and another at Harrington, together with substantial sea defences.

The coastal viaducts are in a hostile environment. Heavy maintenance work was carried out to Kent viaduct in the early 1990s. Maintenance of Leven viaduct will continue to remain a major issue and we are looking to develop possible solutions for the reconstruction of the superstructure in future years. We are now on site to reconstruct the 10-span Harrington Viaduct.

The coastal part of the route is protected by sea defences which vary from large vertical sea walls to earth bunds. Recent significant sea defence work has been carried out at Nethertown, Parton and Harrington and Siddick as part of a 10-year sea defence strategy. We will continue with our commitment to renew the sea defences with work in 2004/05 at sites between Parton and Harrington.

We have a continuing issue of ground movement at Holme tunnel between Gannow Junction and Todmorden following significant structural deformation that occurred in 1986. Real time monitoring and investigation work is ongoing, and it is likely we will have to implement major permanent works towards the end of the current decade.

We are in the second year of a five-year programme to examine all of the earthworks on the region to identify their overall condition. Any potential problem site can then be managed using the site investigation, instrumentation and monitoring system (SIIMs). SIIMs is used to identify the detailed condition of the earthwork and failure mechanism at a site and allows cost effective and targeted smaller solutions to be implemented when required, an approach which helps to minimise the impact on the operational railway. SIIMs systems are already being used to monitor a number of sites on the network.

### Signalling

On this route 25% of the area is controlled by two main PSBs, 5% by lesser power boxes and 70% by mechanical signalling.

The plans for this route include the rewire and renewal of the interlockings at Bootle in 2005/06 and Sellafield in 2005/06, the renewal of the interlocking at Maryport in 2005/06 and rewiring Park South in 2006/07.

In addition there are work programmes for level crossings to ensure continued safe operation. This includes renewals of barriers, lights and control equipment at seven crossings. We are making provision at seven further locations for the replacement of western region barrier type level crossings as they are approaching the end of their operational life and spares are hard to obtain. Finally we intend to install event monitoring equipment at five other level crossings to aid incident investigation and fault finding, as detailed later in the table of works.

### Electrification and plant

We will renew the signal power supply points at Blackburn in 2004/05.

### Depots

We are planning renewal works at the Barrow depot over the next two years, including resurfacing and a drainage survey with remedial works.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

Our strategy on the Settle and Carlisle line is to carry out extensive work to stabilise structures and embankments. This reduces the need to impose precautionary speed restrictions during adverse weather.

At times a combination of seasonal tides and severe weather can result in disruption to services on the coastal route between Barrow and Carlisle.

Although the physical geography of Cumbria can increase the time required to get to incidents and institute mitigation measures we are taking various actions to improve response times and to reduce delays.

Delays on the Windermere and Barrow to Manchester Airport services have the potential to export delays onto other routes.

Our specialised contractor will continue with work to manage the trackside vegetation and consequent performance problems with autumn leaf-fall. This has already proved successful in helping to reduce delays. In 2004/05 work is planned between Wennington and Carnforth, and the remaining section from Barrow to Carlisle will be considered for programming in 2005/06 which would complete the creation of a 6m wide vegetation free strip across this route.

Route crime remains an issue between Blackburn and Colne. We have undertaken a major local education campaign targeted at schools and youth groups, and we are working in partnership with BTP to target crime hotspots such as Burnley, where in a recent clampdown BTP made over 30 arrests and referrals of offenders. Further safety days and school presentations to reinforce the railway safety message have been organised to build on successful community workshops already held.

## Enhancements

As part of the West Coast Route Modernisation works we will be undertaking scoping work to implement gauge clearance works for the Pendolino trains on the route between Farington Junction and Carlisle via Hellifield. The aim is to have the route physically cleared as an "other diversionary route" by Summer 2005.

## Emerging issues

Growth in freight on the Settle and Carlisle line may be constrained by the long signal block sections. This is a particular problem on the 14-mile section between Settle Junction and Blea Moor, where this issue is exacerbated by the lack of passing loops.

The aspiration of train operators and local authorities for a higher train frequency on the 10-mile single-line Windermere Branch is constrained by capacity. The current service pattern allows for only one train to be on the branch at any one time, with an approximate fifty minute round trip. Further services would require enhanced infrastructure.

Levens viaduct presents a major ongoing commitment for maintenance resources and for access to undertake work. This may have implications for the possessions regime that will be required to provide adequate engineering access.

In Barrow and in West Cumbria the local authority strategy is to encourage the diversification of employment. The area will see strategic regional investment over the next ten years, which could bring investment for passenger facilities and interchanges.

There is a Lancashire County Council venture using Rail Passenger Partnership funding with support from Burnley Borough Council to improve Burnley Central station. Work could include demolition of part of the canopy and buildings, a new ticket office, bus turning area and taxi rank.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 23 Capacity and operational constraints

- A** Dent - Horton in Ribblesdale: 14 mile block section with no ability to recess slower trains
- B** Windermere: single-line section, one train on the line at a time

### Route 23 Other issues on the route

- I** Sea defence issues
- J** Major viaduct requiring significant maintenance

### Route 23 Planned projects

Project description	Type of work	Dev. Level
<b>A</b> Pendolino gauge clearance works from Farington Junction to Carlisle via Hellifield	E	5
<b>B</b> 2004/05,2005/06 Major track renewals	R	
<b>C</b> S&C renewals 2004/05 Camforth, Millom and Cherry Tree 2005/06 Howe and Co Sidings in 2005/06	R	
<b>D</b> 2004/05 Strengthen/reconstruct Harrington Viaduct	R	
<b>E</b> 2004/05 Sea defences work at sites between Pariton and Harrington	R	
<b>F</b> 2004/05 Holme Tunnel site monitoring	R	

### Route 23 Planned projects

<b>G</b> Level crossing renewals 2004/05 Houghton AHB, Low Mill (near Dalston) and Maryport 2005/06 Silverdale AHB 2006/07 Black Dyke AHB and Green Road (Millom) AOCL.	R
<b>H</b> Replacement of seven western region barrier-type level crossings 2004/05 Hospital Crossing, (Bamber Bridge) 2005/06 Brierfield, Low Moor (near Whalley), Midge Hall and Maryport 2006/07 Mintholme (near Bamber Bridge) and Towneley	R
<b>I</b> 2004/05 Installation of monitoring equipment at Havenigg, Portsmouth, Park House Farm, Rosewain and Silverdale	R
<b>J</b> 2004/05 Renewal of signal supply power point at Blackburn	R
<b>K</b> 2005/06, 2006/07 Barrow depot, general renewal works	R
<b>L</b> 2004/05, 2005/06 Vegetation management	R

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# Route 24



# Route 24: East of Scotland

## Route description



### Physical description

The East of Scotland route includes the main arteries between Scotland's principal cities of Glasgow, Edinburgh, Perth, Dundee and Aberdeen. It also includes the suburban networks around Edinburgh and the north-west of Glasgow and the link between Edinburgh and the east of Scotland to the West Coast Main Line at Carstairs.

The route is signalled with a mixture of semaphore and colour light equipment. The route is primarily double track, but there are a number of single-track sections that constrain capacity. The most significant of these is the 3km of single track between Usan and Montrose on the Dundee to Aberdeen section of the route. Other significant single-track sections are those from Ladybank to Hilton Junction (Perth), portions of the Bathgate branch and from Portobello to Newcraighall.

The double-track Edinburgh South Suburban Line provides an avoiding route to the congested Waverley to Haymarket section and provides a key link for freight traffic between the East Coast Main Line and central Scotland. There are also a number of single-track freight branches that form part of the route. Of these, the Dunfermline to Longannet freight branch is the most heavily trafficked.

Broadly, two thirds of the route is classified as secondary, the remainder split between primary and freight only.

## Market served

The route serves two principal markets. These are the fast, frequent inter-urban services between its major population centres and the suburban networks around Edinburgh and the north-west of Glasgow.

## Growth

There has been significant growth in train services and passengers in recent years on this route. We expect passenger growth to continue over the coming years as further economic growth encourages additional demand for rail journeys. No overall growth is expected in freight traffic in the coming years.

## Current use

### Current traffic

The principal passenger train operator on the route is ScotRail Railways. Cross-border services are also operated by GNER and Virgin Cross Country beyond Edinburgh to Dundee and Aberdeen and Inverness via Perth. GNER also operates through services from London Kings Cross to Glasgow Central over the Edinburgh to Carstairs section of the route.

High-speed inter-urban services are provided between the major cities listed above. These operate on a minimum hourly frequency. Since 1999, services on the key Edinburgh to Glasgow corridor have operated at a 15min frequency.

Passenger traffic on the Edinburgh suburban network is predominantly commuter based, with off-peak leisure flows into Edinburgh. The growing and dynamic economy in the east of central Scotland and the establishment of the Scottish Parliament in Edinburgh, have resulted in a significant growth in demand which has resulted in peak hour overcrowding on many services.

The principal freight operator on the route is EWS. DRS also provide services to Grangemouth and have recently introduced additional services to Aberdeen. Freightliner Heavy Haul provide services to Aberdeen and Inverness via Perth. The greatest volume of freight traffic is carried on the sections between Falkirk and Inverkeithing via Falkirk Grahamston, Haymarket and Inverkeithing and on the Edinburgh South Suburban Line to and from the freight yard at Millerhill.

<b>Route 24</b>		<b>Current use</b>		
		<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day		44,045	4,364	48,409
Train tonne km per year (millions)		2,681	1,081	3,762
Average no of train km per track km per day				69
<b>Top five busiest route sections</b>				<b>No of trains per day</b>
Edinburgh - Haymarket				460
Glasgow Queen St - Cowlares				310
Cowlares - Greenhill Upper Junction				200
Haymarket - Polmont				190
Haymarket - Inverkeithing				180

### Projected use

A number of peak time ScotRail services from Edinburgh to Glasgow Queen Street; Dunblane; Bathgate, and the Fife Circle are planned to extend to 5 & 6-car operation. GNER are also lengthening their existing Aberdeen and Inverness services to 9-cars.

## Strategic framework for the route

We have undertaken some initial capacity utilisation work on Scotland's key routes with the SRA and the Scottish Executive. There are no Route Utilisation Strategies currently proposed within Scotland, but the SRA intends to produce a Planning Assessment for Scotland that will address the projected utilisation of the network. This is due in Spring 2005.



## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 24</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Edinburgh - Glasgow Queen Street		48min
Edinburgh - Aberdeen		2hr 23min
Glasgow Queen Street - Aberdeen		2hr 27min
Edinburgh - Inverness		3hr 10min
Edinburgh - Glenrothes via Dunfermline		57min
Bathgate - Edinburgh		28min
Edinburgh - Newcraighall		12min
Edinburgh - North Berwick		25min
<b>Linespeed (km of track)</b>		
Up to 35mph		97
40-75mph		386
80-105mph		697
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		55
W7		125
W8		342
W9		101
W10		8
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		13
20.4 tonnes - 24.1 tonnes (RA 7-9)		120
24.2 tonnes - 25.4 tonnes (RA 10)		1047
<b>Total km of track</b>		<b>1181</b>
<b>Total km of route</b>		<b>630</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 24 Forecast expenditure</b>			
£m in 2003/04 prices	2004/05	2005/06	2006/07
<b>Renewals</b>			
Track	14	12	30
Structures	21	23	20
Signalling	4	3	3
Electrification	0	0	1
Plant & machinery	1	0	1
Telecoms	1	1	0
Network Rail managed stations (Edinburgh Waverley)	1	1	3
Stations	1	1	2
Depots	1	0	0
Lineside	1	0	0
<b>Total renewals</b>	<b>45</b>	<b>42</b>	<b>61</b>
<b>Total committed and planned enhancements</b>	<b>0</b>	<b>0</b>	<b>0</b>

<b>Route 24 Forecast activity volumes</b>			
	2004/05	2005/06	2006/07
Rail renewal (km per year)	8	12	36
Sleeper renewal (km per year)	6	11	28
Ballast renewal (km per year)	8	17	41
S&C renewal (units per year)	8	5	18

## Engineering access

The introduction of new weekend and early morning passenger services, combined with the increasing volumes of coal and other freight carried has reduced the engineering access times that were historically available. "No trains" periods on the individual sections of the route are normally sufficient to undertake most cyclical maintenance and renewal works and recent investment in modern high output machinery is resulting in improved productivity.

A number of renewals items, however, can only be undertaken during extended, disruptive possessions. Any closures required are fully consulted with our customers to minimise disruption to services, and we generally try to programme these where possible for weekends or at certain holiday periods when passenger traffic is lower.

We are currently consulting with stakeholders to agree the framework for the implementation of our "Better Access" pilot scheme which we hope to trial on the Fife Circle and main Edinburgh to Glasgow lines commencing December 2004/January 2005. We are proposing to amend Rules of the Route on one or two occasions per week such that "no trains" periods are extended, with late night services over the affected section of route terminating earlier than currently, and service provision being met by diversion/replacement bus services. This would facilitate greater productivity allowing enhanced maintenance activity and greater volumes of preparatory and follow up works associated with significant programmed items. By extending "no trains" periods to coincide with times of least demand on a route, we would be able to offer the opportunity of enhanced access on a corresponding number of occasions per week, providing greater access opportunities for operators at times of enhanced demand or for traincrew training purposes.

The following major possessions are planned:

- Christmas 2004, a 54hr possession, Stonehaven - Newtonhill: to effect structure repairs to Glenury Viaduct;
- New Year 2005, an eight-day blockade Cowlairs West Junction to Queen Street High Level Station, for slab track, plain line and S&C renewals work;
- January 2005, two 54hr possessions from Haymarket Central - Newbridge Junctions (South Lines) for S&C renewals at Haymarket West. To coincide with these works, two 29hr possessions are planned at Linlithgow and Philipstoun to undertake a range of works comprising resleeper, reballasting and rerailling;
- May 2005, a five-day possession from Hilton Junction - Auchterarder for bridgeworks to the Earn Viaduct;
- June 2005, two 51hr possessions from Carstairs East - Slateford Junction to carry out heavy maintenance of track at Slateford, also culverts and structures;
- June 2005, two 51hr possessions from Carstairs East - Haymarket East to carry out plain line and S&C renewals, also culverts and structures;
- August 2005, one eight-day blockade from Dalmeny - North Queensferry for structure repairs to the Forth Bridge and Jamestown Viaduct;
- a blockade from 28 August 2005 - 05 September 2005 between Grangemouth Junction and Oil Terminal level crossing for bridgeworks at Laurieston Road; and
- October 2005, a 54hr possession from Aberdour - Inverkeithing East Junction for bridge work, reballasting and track work at Hillend.

## Maintenance and renewal

### Track

The track on this route varies from high speed, high intensity two-track to single-track on the more lightly trafficked sections. Overall track condition is good, but maintaining it at this level is dependent on progressing the required renewals.

The plain line track on the route on the high-speed inter-urban lines is predominantly formed of CWR, with the majority being installed between the 1960s and early 1980s. On the other lines there are still pockets of jointed track. We are undertaking renewal work at a number of sites during the next three years. These will address general asset condition, rail wear and sleeper degradation. The key sites are shown on the diagram.

We plan to renew S&C in 2004/05 at Haymarket West Junction and in Glasgow Queen Street High Level tunnel. This programme will continue in 2005/06 with renewal at Polmont Junction. During 2006/07 we plan to renew S&C at Haymarket Central Junction. During 2007/08 we plan to renew S&C at Linlithgow, Larbert, Newbridge and Carmuir East Junctions.

Work commenced during 2003/04 to alter the rail fastenings used to attach the rails to the longitudinal waybeams on the Forth Bridge to improve reliability. This will continue as planned during 2004/05.

## Structures

There are two major structures on this route, the Forth Bridge and the Tay Bridge. We have a long-term strategy in place for the Forth Bridge. This mainly comprises the replacement of sub-standard members and an ongoing painting programme. A rolling programme of works was commenced in 2003/04. The Tay Bridge works completed during 2003/04 restored the capability of the bridge to allow the passage of RA8 rail traffic. Ongoing works to renew sub standard members and a rolling programme of painting will continue to 2006/07 and beyond.

Significant works are also planned at a number of other locations across the route. Work is currently underway to identify the optimum technical solutions for implementation during 2005/06 and 2006/07 on structures at Ratho. Steelwork renewals are programmed for 2005/06 at Jamestown Viaduct. These will be undertaken during the same period as the disruptive possessions required for the Forth Bridge works. Other significant works are listed in the project table later.

Under the Bridgeguard 3 programme, major repairs to key structures at Glasgow Cathedral Street, Lamerlaws and Greenhill are currently being progressed through the design and development stage. Physical works are planned for 2005/06.

Inspection and assessment has identified the need for remedial work to two tunnels on this route. At Dundee Dock Street tunnel steel strengthening and relining and buttress repairs which were planned for 2004/05 and 2005/06 have been rescheduled while confirmation of local redevelopment plans which may have a material impact on the scope of the works required are identified.

Initial repair works are planned on coastal defences at Burntisland and Longannet during 2004/05. More significant reconstruction works are planned for 2005/06.

At Craigton, on the Edinburgh to Glasgow main line, significant remediation works to stabilise a 15m high vertical rock cutting with tension nets and sprayed concrete are planned for 2004/05.

A recent survey identified a high-risk earthworks site at Blackhills near Stonehaven. Major remedial works comprising a combination of soil regrading, scaling and removal of vegetation from rock faces, bolting and netting and embankment strengthening, will be continued during 2004/05.

## Signalling

The assets on this route are predominantly multiple aspect colour light dating from the 1970s to the 1990s. There are remaining pockets of semaphore signalling in the Larbert to Stirling, Cupar to Tay Bridge South and Dundee to Aberdeen sections. These represent some of the most intensively used areas of semaphore signalling on the national rail network.

The general asset condition is fair to good. A number of the geographic interlockings are showing signs of wiring degradation, some have already been rewired and we have a prioritised programme to renew the remainder.

At Linlithgow, Newbridge and Polmont relay rooms wiring degradation has been detected and we have implemented a programme of renewals to address this problem. The track circuits between Greenhill Upper and Polmont are being replaced, which will improve reliability on a key section of the route.

At Winchburgh Junction we propose to redesign the signalling cable system to improve reliability by installing an interconnector cable, which will allow alternative feeding arrangements to be implemented. At Newbridge and Winchburgh Junctions the point machines have solid core tail cables, which suffer from degradation and are prone to failure. We are developing a programme to replace these cables with flexible cables, which will also improve reliability. At Larbert Junction we are coordinating our plans to rewire the signalling installation with the proposal to remodel the junction layout during 2006/07. We plan to interface RT60 S&C components with HW-type electro-mechanical point machines on a simplified layout to improve reliability at this busy junction location.

The signal lighting circuits at Cupar and Leuchars do not comply with current standards and we are developing a programme of works to address this problem. The condition of the signalling in the Montrose area is poor and we are developing a plan to renew these assets starting in 2007/08, which might include rationalising the number of signal boxes at this location.

The lineside equipment cubicles and housings at various locations along the route are suffering from degradation and we plan to renew these.

On the Grangemouth freight branch, we are developing a project to upgrade the signal lamp circuits in the semaphore signals to comply with modern standards.

During 2004/05 we plan to refurbish the 650-volt lineside cable routes on the Edinburgh - Glasgow line due to the condition of the cables.

### **Electrification and plant**

The general condition of these assets on this route is good, the majority having been renewed during the 1990s. Recent point heaters renewals have resulted in improved reliability. This programme of works will continue with planned renewals at Greenloaning, Blackford, Niddrie South and West Junctions and Laurencekirk in 2004/05, and at Townhill Junction, Millerhill South and Central junctions and Millerhill diesel depot during 2006/07.

At Kirkcaldy, during 2004/05, we plan to replace the standby diesel generator set for the signalling power supplies with refurbished equipment recovered from another location. This will allow us to eliminate equipment dating from 1979 that is now approaching the end of its operational life.

During 2003/04 design and development work to renew the 11kv power cables on the Forth Bridge was completed and we plan to undertake renewals during 2004/05. These works are required due to the condition of the cables, and will maintain the reliability of the electricity supplies on the bridge.

### **Telecoms**

A programme of telephone concentrator renewals to replace obsolete equipment will continue throughout 2004/05 and 2005/06, notably at Edinburgh Waverley.

### **Network Rail managed stations**

#### *Edinburgh Waverley*

Work has continued over the past year with the Scottish Executive, SRA and Edinburgh City Council to assess the realistic options for the future of Edinburgh Waverley station to respond to train service and station user capacity increases, the need for transport integration improvements, and additional uses for this extremely important historic station within the World Heritage site. It is expected that decisions on future improvements at this station will be made in 2004/05.

The optioneering work has identified an initial phase that could deliver train service capacity and passenger access improvements to the station by 2007. This phased approach would integrate with all options under consideration.

### Other stations

We are developing a long-term strategy for Perth station that will include community involvement and partnership-working as part of our responsibility to manage heritage issues and balance statutory requirements with a desire to provide modern station facilities and appropriate commercial uses. The station complex is significantly under-utilised and has category "B" listed status. In the meantime, we will continue to progress a programme of fabric repairs and renewals.

We plan to undertake a package of works at Aberdeen station including roof canopy and building repairs. At Dundee we plan to renew the passenger lifts during 2006/07.

As part of our ongoing signal box regeneration programme, we undertook major works on this route during 2003/04 at Carmuir East; Cupar; Errol; Camoustie; Laurencekirk; Stirling Middle; and Stirling North. We will continue this programme in 2004/05 at Auchterarder; Barnhill; and Montrose South signal boxes.

### Depots

Renewal and repair work is planned for 2004/05 at Perth depot and a significant package of targeted repairs and renewals to Haymarket depot will commence in 2004/05.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

Long distance high speed and slower local stopping passenger services jointly operate over a number of sections of the route. This mix of traffic can lead to performance problems during times of perturbation, particularly at junction locations where lines converge and diverge. Enhanced maintenance regimes for strategic points and signalling equipment are being implemented to address this issue.

Congestion can occur on the section of the route from Inverkeithing - Thornton (via Dunfermline) due to the heavy volumes of coal traffic in the Townhill and Dunfermline areas. These delays are mitigated by careful regulating of services.

We will continue to address performance issues on the route to ensure that train service delays are minimised as far as practically possible. Particular initiatives that will be promoted on this route are the implementation of enhanced maintenance programmes at critical junctions, completion of major rerailing programmes and the doubling up of track circuit tail cables at key locations.

We continue to review the condition of our lineside fencing to reduce the incidence of route crime, and where necessary the fencing will be renewed or enhanced. We are continuing to develop partnership initiatives with industry stakeholders, local authorities, police and BTP to identify "hot spots", produce action plans and undertake route crime education programmes.

## Enhancements

We have worked with the project funders, City of Edinburgh Council and New Edinburgh Limited, to deliver the new station at Edinburgh Park, some three miles west of Haymarket Station on the main Edinburgh to Glasgow line. The station opened in December 2003.

The sections of the route from Edinburgh - Dunblane, Inverkeithing - Thornton (via Cowdenbeath) and Newbridge - Bathgate have limited platform lengths, which restrict the number of passengers that can be carried at peak times. The project to extend platform lengths to 6-car length is currently being implemented under the SRA's IOS programme. Implementation is timed to coincide with the delivery of additional rolling stock ordered to strengthen peak hour services on these routes.

Linked to the delivery of ScotRail's additional rolling stock is their project to redevelop the Eastfield Depot site near Glasgow Queen Street Station. This will provide the necessary additional fleet maintenance facilities required to support the additional units.

## Route development

In addition to maintenance and renewal, we will continue to work in partnership with various stakeholders to progress enhancement initiatives on the route. Some of the most significant of these are detailed below.

The most significant capacity constraint on the route is the western approach to Edinburgh Waverley station. We are currently working with the Scottish Executive, the SRA and other stakeholders to develop plans for the upgrading of this major hub that, if implemented, would provide more track and platform capacity to accommodate the additional service aspirations of our stakeholders.

We continue to work with Clackmannanshire Council, the Scottish Executive, the SRA and other stakeholders who are promoting the reopening of the disused line between Stirling and Longannet. The project would provide for an hourly passenger service between Stirling and Alloa and the reopening of the route throughout for freight traffic, primarily to Longannet Power Station. This new freight route would release additional capacity on the main Edinburgh - Glasgow line and across the Forth Bridge that could be utilised for additional passenger services, and would also allow the operation of longer and heavier freight trains. The parliamentary bill seeking powers to construct the new infrastructure is currently being progressed through the Scottish Parliament.

The proposed rail link to Edinburgh Airport forms an important component of the Scottish Executive's long-term plans for public transport in Central Scotland. Following the award of funding from the Scottish Executive, in April 2003, we have been working with the promoters to develop the outline specification for this project. The current proposal comprises the diversion of the existing Edinburgh - Glasgow main line via the airport, entailing the construction of a tunnel below the main runway. It is currently intended that a Bill seeking powers to construct the new route will be deposited with the Scottish Parliament in 2005.

We are also liaising on the Edinburgh Tram proposals. These include the creation of a comprehensive multi-modal interchange at Haymarket station. The proposals are currently being considered by the Scottish Parliament.

## Emerging issues

The Edinburgh to Glasgow via Falkirk route is operating at its maximum practical capacity on a number of sections. Utilisation of the very limited number of additional paths available would have a significant adverse impact on service performance. Investment in additional track and signalling would be necessary to increase the effective capacity on this route.

The single-line section between Montrose and Usan constrains the construction of the current timetable, and can cause performance problems and thus undermine the resilience of the network to perturbations in the timetable. The solution of providing a two-track formation at this location would, however, involve considerable expenditure.

There are limited access slots available onto and off the freight branches in the Edinburgh and Fife areas at peak periods. The application of rigorous timetable planning and train regulation disciplines is therefore needed to prevent performance problems.

We are working with the opencast coal mining industry and other stakeholders, to develop a coal-loading terminal on the Methil Branch in Fife, to service the Earl's Seat opencast mining development.

We continue to support and work with City of Edinburgh, Midlothian and Scottish Borders councils in their proposal to reopen the former Waverley route to provide a new passenger service from Edinburgh to Galashiels and Tweedbank. The new infrastructure being provided would adjoin the existing network at Newcraighall.

The Markinch station transport interchange project will improve public transport links in the Glenrothes and Leven area of Fife. This project is in accord with the Government's targets aimed at reducing private car journeys and emissions, as well as encouraging modal shift from road to rail. We continue to work with Fife Council as they develop this initiative.

There is a proposal by Aberdeenshire Council, Aberdeen City Council, and the Scottish Executive to introduce a more frequent regular interval service between Aberdeen and Inverness, together with the introduction of an Aberdeen Crossrail local commuter service from Inverurie - Stonehaven. Implementation of these proposals would require infrastructure enhancements, including the provision of additional passing loops and the possible reinstatement of some sections of double-track north of Aberdeen



## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 24 Capacity and operational constraints

<b>A</b>	Ladybank - Hilton Junction: single-line section
<b>B</b>	Perth - Barnhill: single-line section
<b>C</b>	Usan - Montrose: single-line section
<b>D</b>	Edinburgh Waverley - Haymarket: limited track and platform capacity
<b>E</b>	Haymarket - Inverkeithing: three aspect signalling
<b>F</b>	Cawburn Junction - Bathgate passenger station: single-line section
<b>G</b>	Glasgow Queen Street - Greenhill Upper Junction: line close to capacity

### Route 24 Other issues on the route

<b>1</b>	Inverkeithing - Kirkcaldy: limited platform lengths
<b>2</b>	Inverkeithing - Thornton (via Cowdenbeath): limited platform lengths
<b>3</b>	Forth Bridge: limited freight tonnage permitted
<b>4</b>	Bathgate Branch: limited platform lengths
<b>5</b>	Edinburgh - Dunblane: limited platform lengths
<b>6</b>	Bishopbriggs - Glasgow Queen Street: limited platform capacity

### Route 24 Planned projects

Project description	Type of work	Dev. Level
<b>A</b> 2004/05 Renewal of S&C at Haymarket West Junction and at Glasgow Queen Street High Level Station	R	
<b>B</b> 2005/06 Renewal of S&C at Polmont Junction	R	

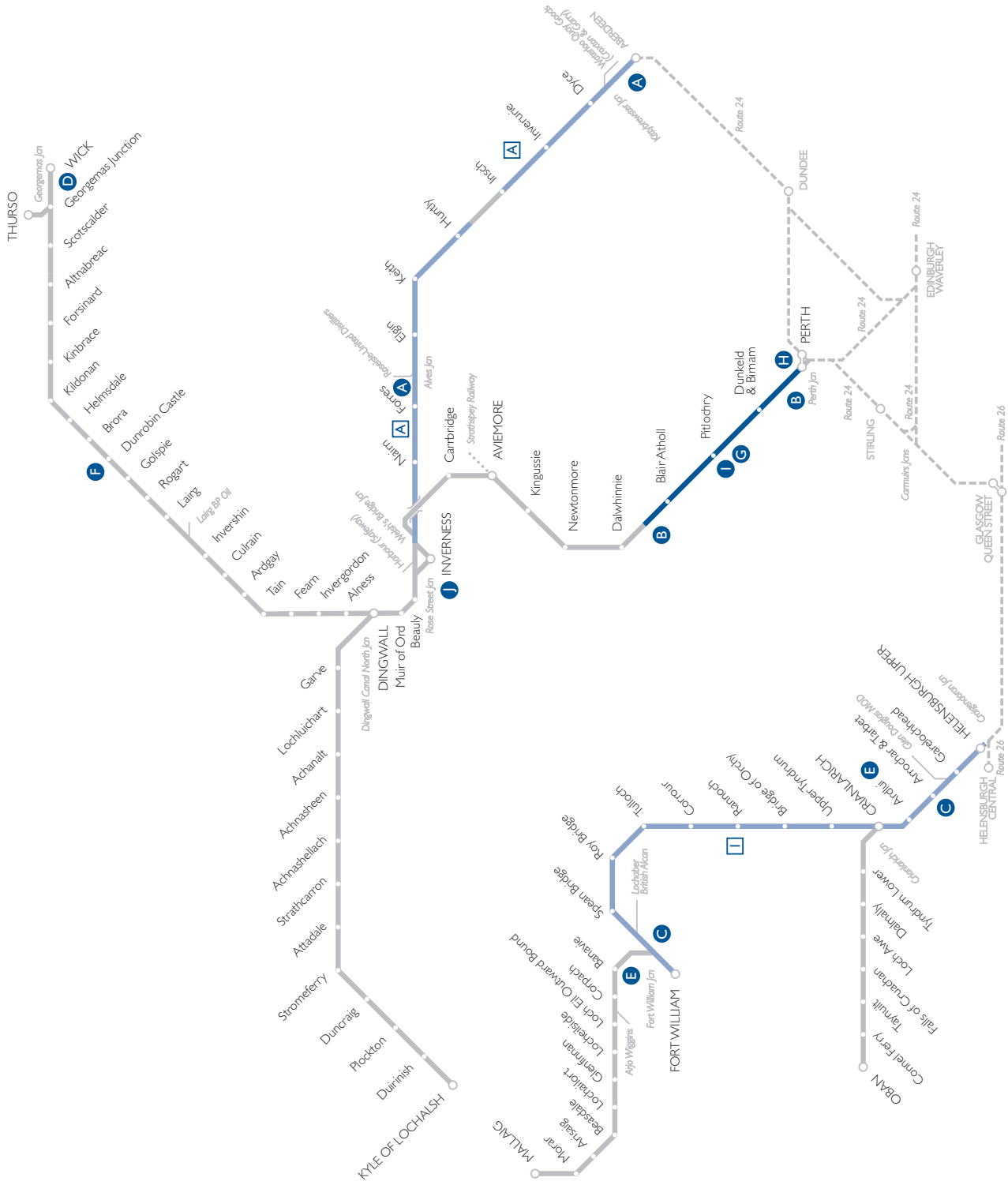
### Route 24 Planned projects

<b>C</b> 2006/07 Renewal of S&C at Grangemouth Junction and at Haymarket Central Junction	R
<b>D</b> 2007/08 Renewal of S&C at Newbridge Junction, Linlithgow, Carmuiris East Junction and Larbert	R
<b>E</b> 2004/05 Rerail, resleeper and rebalast works at key locations including Carmuiris West, Linlithgow, Philipstoun, Cowdenbeath, Dundee, and Kinnaber	R
<b>F</b> 2004/05 Renewal of slab track in Glasgow Queen Street High Level Tunnel	R
<b>G</b> 2004/05 - 2005/06 Forth Bridge: continuation of the Long-term Maintenance Strategy. This includes shot blasting, corrosion treatment, and painting and small part steelwork repairs	R
<b>H</b> 2006/07 Tay Bridge a programme of painting and renewal of sub-standard structural members will continue	R
<b>I</b> 2004/05 UB 90/63 Burntisland viaduct, continuation of steelwork renewals	R
<b>J</b> 2005/6 - 2006/07 Bridge steelwork renewals at Jamestown Viaduct, Den of Cowie, Glen Ury Viaduct, Earn Viaduct, Barbush and Ratho	R
<b>K</b> 2005/06 - 2006/07 Major bridge repairs including deck replacement at Lammerlaws and Cathedral Street	R
<b>L</b> 2005/06 Infill of two-spans and strengthening works at Greenhill	R
<b>M</b> 2004/05 - 2006/07 Repair and renewals work to the sea defences at Burntisland and Longannet	R
<b>N</b> 2004/05 Remedial works to stabilise vertical rock cutting at Craighton	R
<b>O</b> 2004/05 Remedial works to stabilise earthworks at Blackhills	R
<b>P</b> 2004/05 - 2005/06 Larbert Junction signal box rewiring	R
<b>Q</b> 2004/05 & 2006/07 Protection works to 650 volt signalling cables in the Polmont area	R
<b>R</b> 2006/07 Renewal of axle counters in Haymarket tunnel	R
<b>S</b> 2006/07 Upgrade of Cornton level crossing to AHB	R

<b>Route 24</b>		<b>Planned projects</b>	
<b>T</b>	2006/07	Montrose area signalling renewals	R
<b>U</b>	2004/05	Renewal of 11kv power cables on the Forth Bridge	R
<b>V</b>	2004/05 - 2006/07	Renewal of points heaters at Greenloaning, Blackford, Millerhill, Niddrie, Townhill Junction and Laurencekirk	R
<b>W</b>	2004/05 - 2006/07	Renewal of telephone concentrators at various locations including Edinburgh Waverley	R
<b>X</b>	2004/05 - 2006/07	Station repairs and renewals at Perth, Dundee and Aberdeen	R
<b>Y</b>	2004/05	Signal box regeneration works at Auchterarder, Barnhill, Blackford and Montrose South	R
<b>Z</b>	2004/05 - 2006/07	Repairs and renewals at Perth and Haymarket depots	R
<b>AA</b>	2004/05	Fife Circle platform extension works	E 5
<b>AB</b>	2004/05	Bathgate Branch platform extension works	E 5
<b>AC</b>	2004/05	Edinburgh - Dunblane platform extension works	E 4
<b>AD</b>	2004/05	Edinburgh Waverley station redevelopment: further feasibility work in connection with the redevelopment project	E 1
<b>AE</b>	2004/05	Edinburgh Airport Rail Link: further feasibility work in developing this project	E 1
<b>AF</b>	2004/05	Stirling - Alloa - Kincardine: further work in developing this project	E 4
<b>AG</b>	2004/05	Raithes Farm; further feasibility work in developing this project	E 2
<b>AH</b>	2004/05	Waverley Route: further feasibility work in developing this project	E 2

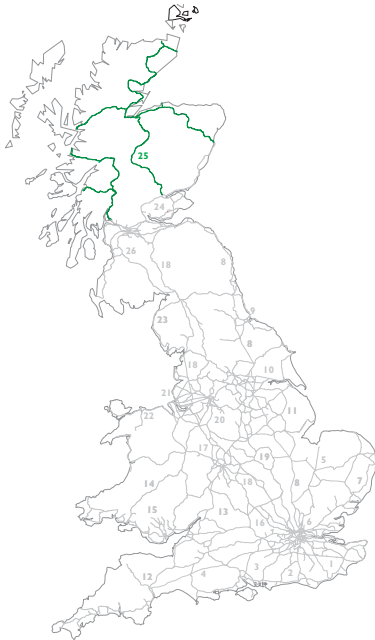
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# Route 25



# Route 25: Highlands

## Route description



### Physical description

The Highlands Route comprises four discrete sets of lines. Three of these, are centred around the Highland capital of Inverness.

- the “Far North” from Inverness to the towns of Wick and Thurso, as well as the branch to Kyle of Lochalsh in the west;
- Inverness - Aberdeen via Nairn, Elgin and Inverurie;
- Inverness - Perth via Aviemore, Blair Atholl and Pitlochry; and
- from Craighendran, where it connects with the Strathclyde and south-west Route the West Highland Line runs to the major West Highland towns of Oban, Fort William and Mallaig.

The route comprises a significant track mileage, the majority of which is over remote and inhospitable terrain. Most of this is single track, with the exception of a short stretch on the Inverness to Aberdeen section and three stretches on the Perth to Inverness section. The majority of the route is lightly trafficked.

Broadly, two thirds of the route is classified as rural, one third as secondary.

## Market served

The route serves a large number of rural communities, providing access to the social and commercial facilities of Inverness and the other towns itemised above. Tourism plays a major strategic role in the development of the Highland economy, and these scenic rail lines are well patronised in the summer months by domestic and foreign tourists. The major towns on the route also serve as significant transport interchanges. At each of these there is a significant volume of interchange between buses and shipping services to the Scottish island communities.

## Growth

We expect passenger growth to continue over the coming years as further economic growth encourages additional demand for rail journeys.

There is scope for further freight traffic to be carried on the route and growth is expected in domestic intermodal traffic in particular.

## Current use

### Current traffic

The majority of passenger services on this route are operated by ScotRail. GNER operates a daily services between Inverness and London Kings Cross via the ECML. ScotRail also operates an overnight sleeper service from London Euston to Fort William and Inverness which forms part of the Caledonian sleeper network. A summer only steam tourist service is operated by The West Coast Railway Company between Fort William and Mallaig.

Freight services are operated by principally by EWS, with Freightliner providing a service for cement products from the cement works at Dunbar to Inverness via Perth. The route has seen a recent reduction in freight traffic on the Fort William to Craigendoran section. However, there has been an increase in freight traffic between Inverness and Thurso. The section of the route from Inverness to Perth continues to see healthy levels of freight and the freight industry has plans to increase rail borne freight between Inverness and the central belt of Scotland. Current peak utilisation is within the practical capacity available on all parts of the route.

<b>Route 25 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	11,194	1,708	12,902
Train tonne km per year (millions)	570	239	809
Average no of train km per track km per day			19
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Aberdeen - Dyce			40
Dyce - Inverness			20
Perth - Inverness			20
Inverness - Dingwall			20
Georgemas Junction - Thurso			10

### Projected use

From December 2004 the following additional passenger services will run:

- Kingussie - Inverness: one additional service every week day and one additional service on Sunday mornings;
- Inverness - Kingussie: one additional service every week day; and
- Inverness - Tain: five additional services in both directions every week day.

### Strategic framework for the route

There are no Route Utilisation Strategies currently proposed within Scotland, but the SRA intends to produce a Planning Assessment for Scotland that will address the projected utilisation of the network. This is due in Spring 2005.

## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 25</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Aberdeen - Inverness		2hr 10min
Inverness - Perth		1 hr 59min
Inverness - Thurso		3hr 24min
Inverness - Wick		3hr 52min
Inverness - Kyle of Lochalsh		2hr 24min
Glasgow Queen Street - Oban		2hr 59min
Glasgow Queen Street - Fort William		3hr 42min
Fort William - Mallaig		1 hr 20min
<b>Linespeed (km of track)</b>		
Up to 35mph		12
40-75mph		900
80-105mph		232
110-125mph		-
<b>Gauge (km of route)</b>		
W6A		1041
W7		1030
W8		915
W9		-
W10		-
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		633
20.4 tonnes - 24.1 tonnes (RA 7-9)		252
24.2 tonnes - 25.4 tonnes (RA 10)		259
<b>Total km of track</b>		<b>1145</b>
<b>Total km of route</b>		<b>1059</b>

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 25</b>		<b>Forecast expenditure</b>		
<b>£m in 2003/04 prices</b>		<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>
<b>Renewals</b>				
Track		4	4	14
Structures		10	6	3
Signalling		1	0	1
Electrification		-	-	-
Plant & machinery		1	1	1
Telecoms		1	1	2
Stations		1	3	2
Depots		1	2	1
Lineside		-	-	0
<b>Total renewals</b>		<b>19</b>	<b>17</b>	<b>25</b>

Route 25	Forecast activity volumes		
	2004/05	2005/06	2006/07
Rail renewal (km per year)	6	8	21
Sleeper renewal (km per year)	6	8	21
Ballast renewal (km per year)	5	8	21
S&C renewal (units per year)			

## Engineering access

Possession opportunities are generally good, especially at weekends, due to the relatively low passenger and freight traffic levels. Seasonal traffic, for example the Fort William to Mallaig Steam service, Royal Scotsman and Charter trains can reduce these opportunities, but this is currently not having a significant adverse impact. "No trains" periods on the individual sections of the route are normally sufficient to undertake most cyclical maintenance and renewal works and recent investment in modern high output machinery is resulting in improved productivity.

A number of structures between Craigendoran and Fort William are becoming due for renewal, and an increasing level of extended, disruptive possessions will be required to undertake this work. Any closures required are fully consulted with our customers to minimise disruption to services, and we generally try to programme these where possible for weekends or at certain holiday periods when passenger carryings are lower.

We are currently consulting with stakeholders to agree the framework for the implementation of our "Better Access" pilot scheme which we hope to trial on other Scottish routes commencing December 2004/January 2005. We are proposing to amend Rules of the Route on one or two occasions per week such that "no trains" periods are extended, with late night services over the affected section of route terminating earlier than currently, and service provision being met by diversion and/or replacement bus services. This would facilitate greater productivity allowing enhanced maintenance activity and greater volumes of preparatory and follow up works associated with significant programmed items. By extending "no trains" periods to coincide with times of least demand on a route, we would be able to offer the opportunity of enhanced access on a corresponding number of occasions per week, providing greater access opportunities for operators at times of increased demand, or for traincrew training purposes. Should the pilot schemes be agreed and prove to be successful we will consider introducing the initiative on this route.

The following major possessions are planned:

- November 2004, one five-day possession on the WHL to undertake structure repairs at 'Schoolhouse' Arrochar and on viaducts at Garelochhead, Crianlarich and Auchtertyre;
- February 2005, one five-day possession between Fort William and Corpach to effect structure repairs at Banavie Swing Bridge and Borrowdale Tunnel; and
- May 2005, one 54hr possession between Insh and Huntley on the Aberdeen to Inverness line to effect bridgeworks at Daies, and at Gartly, reballasting, resleepering and rerailing works along with footbridge repairs.



## Maintenance and renewal

### Track

The plain line track on the Far North and West Highland lines is predominantly bullhead rail on timber sleepers, with some sections dating from the 1930s. Due to the low traffic density on this route we recycle materials where possible to extend the life of the assets. Any further increase in freight tonnages on these lines is likely to require an increase in the level of renewals activity. On the Mallaig branch monitoring of rail side wear is undertaken because of the seasonal steam tourist train service that operates on this section of the route.

The plain line track on the Inverness to Aberdeen and Perth lines is predominantly CWR, with the majority having an age profile from the late 1960s to early 1970s. The current strategy for renewal of the remaining jointed track sections is to prioritise these based on condition and usage.

An ongoing programme of assessment and inspection has been implemented to identify and prioritise locations that require works to improve trackside drainage and reduce the risk of flooding and consequential damage to the track formation.

We are planning renewals at a number of sites during the next three years. These address general asset condition, rail wear and sleeper degradation. Key sites at Kinloss and Perth to Stanley Junction have works planned for 2004/05, 2005/06 and 2006/07.

### Structures

A number of structures across the route have been identified for repair or renewal, key locations being Arrochar, Banavie, Garelohead, Auchtertyre and Larich. The scope of works previously reported for Highwayman's Road, located between Helensburgh Upper and Garelohead, and planned for 2003/04 and 2004/05 is being reassessed with a revised programme of works to be put in place.

Borrowdale Tunnel on the Mallaig line is programmed to have extensive relining works undertaken during 2004/05.

A recently commissioned survey has identified a number of high-risk earthworks sites. Major remedial works comprising a combination of soil regrading, scaling and vegetation removal from rock faces, bolting and netting and embankment strengthening as appropriate, are programmed at Blackhills and Inverurie. At Dalcapone programmed works have been deferred whilst we continue to monitor the earthworks for further deterioration. At Loch Treig Side, remediation works comprising erection of rock debris fences at high-risk locations over a length of three miles are currently being progressed.

An ongoing programme of assessment and inspection has been implemented to identify and prioritise locations which require works to improve trackside drainage and reduce the risk of flooding and consequential damage to the track formation. At Rhaoine (located between Lairg and Rogart) and Dunrobin Station on the Far North Line works will be undertaken to install crest drainage. At some locations gabion walls are also being installed to provide slope strengthening.

## Signalling

### *The Far North and West Highland Lines*

These lines are controlled with RETB radio signalling with small pockets of colour light and mechanical signalling. The condition of the lineside assets is generally good with an age profile range of 1960s to 1980s. However, the computer based RETB system is nearing the end of its life and a life extension programme is being developed in line with the telecoms components of the system to sustain the system until 2012.

We plan to undertake a package of renewal works on the mechanical semaphore rock screen signals on the Pass of Brander. This includes the provision of improved staff access, renewal of the degraded parts of the stone screen and overhaul of the balance lever stanchions.

### *Inverness - Aberdeen*

The majority of the Inverness to Aberdeen route is signalled with semaphore signalling ranging in age from the 1930s to the 1970s. The condition of the assets is generally good and we have recently installed AWS on the route, which has enhanced safety. This is the last Scottish route section where the lineside pole route remains in use as part of the signalling system (Forres to Inverurie, with gaps where lineside cabling has been utilised). The pole route is generally in good condition with some renewals planned during 2004/05. There are a number of AHB level crossings on this section of the route, where equipment age is now becoming a concern and a programme of prioritised renewals will be implemented to address this issue.

### *Inverness - Perth*

The Inverness to Perth route is signalled with a mixture of semaphore and colour light signalling dating from the 1930s to the 1980s, although we are responsible for a Highland Railway signal at Dunkeld which is a designated artefact and remains in daily use. The area controlled from Aviemore signal box has an extensive system of obsolete signalling equipment and remedial work is now required due to the condition of these assets. We are progressing the approval of new equipment to upgrade this installation.

The lineside signalling cable route between Inverness and Perth is suffering from degradation and we are replacing sections of the route on a prioritised basis via the maintenance programme. At Inverness we plan to install new lightning protection equipment at this location to upgrade the protection for the 1980s vintage SSI interlocking.

On the Perth to Stanley Junction section of the route we are developing a programme to rationalise and renew the lineside equipment to meet current requirements.

We have recently completed rewiring works to improve the reliability of the Tokenless Block instruments at Kingussie and Pitlochry. This work has released components which will be utilised as strategic spares for similar equipment in Scotland and will also improve reliability.

## Electrification and plant

The asset condition on this route is good, the majority of the assets having been renewed during the 1990s.

We are undertaking major work on the electro-mechanical drive systems on the Caledonian Canal swing bridge at Banavie. Repair works to the bearing mechanism will be completed during 2004/05.

During 2003/04 we completed the installation of a diesel generator set and UPS system at Banavie RETB signalling centre, which is part of a prioritised strategy to strengthen signalling power supplies.

### Telecoms

We are planning to carry out life extension works in 2004/05, 2005/06 and 2006/07 to the telecoms bearer for the existing West Highlands and Far North RETB systems, which is nearing the end of its life. This work will be completed in conjunction with the signalling led renewals strategy.

### Stations

We are developing a programme to carry out renewals works on the platforms at two West Highland Line stations in 2005/06.

### Depots

We will be undertaking a package of fabric repair works at Inverness Depot during 2004/05 and 2005/06.

### Other operational property

We are responsible for providing the village of Blair Atholl with its public water supply. This requirement stems from a legal agreement entered into by our predecessors in 1911. The system now needs to be upgraded and we are currently working in partnership with Scottish Water to develop an appropriate long-term solution for implementation in 2005/06.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

We will continue to address performance issues on the route to ensure that train service delays are minimised as far as practically possible. Particular initiatives that will be promoted on this route are enhanced maintenance and inspection regimes of drainage and culverts, improved lineside access facilities and a programme of reliability modifications to the West Highland and Far North Line RETB systems.

We have undertaken a review of lineside fencing to reduce the incidence of route crime and livestock gaining access to railway infrastructure.

## Route development

The Raiths Farm property development project proposal involves the closure of Aberdeen Guild Street freight terminal, the creation of a new freight terminal north of Dyce Station, adjacent to Aberdeen airport, and enhancement works to Craiginches yard to the south of Aberdeen. Craiginches is leased by EWS to Freightliner. We continue to work with the outside parties on this development.

## Emerging issues

There are large numbers of Automatic Open Level Crossings Locally Monitored (AOCL) and user worked level crossings on the route. For locations where road user indiscipline has been identified as a potential safety risk, plans are being developed to address safety concerns by the prioritised installation of improved signage and road surface improvements.

The historic level of maintenance and renewal activity undertaken has been appropriate to the lightly trafficked status of the route. However, an increasing volume of structures renewal activity is forecast in response to an increased incidence of weather related problems and the age profile of these assets.

We are working with local authority stakeholders, our freight customers, the SRA and the Scottish Executive to develop the gauge and axle load capability of the route to provide the potential for further freight growth.

We have worked with the Highland Rail Partnership, Forest Enterprise and EWS to open a lineside timber loading point at Kinbrace on the Inverness to Georgemas route. Timber is loaded directly onto trains during the night on the main running line, when there is no other scheduled traffic, thereby avoiding the costs of providing dedicated siding facilities.

There is a proposal by Aberdeenshire Council, Aberdeen City Council, and the Scottish Executive to introduce a regular interval inter-city service between Aberdeen and Inverness, together with the introduction of the Aberdeen Crossrail local commuter service from Inverurie - Stonehaven. Implementation of these proposals would require infrastructure enhancements, including additional passing loops and possible reinstatement of double track, to increase the capacity of the route.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 25 Capacity and operational constraints

- A** Aberdeen - Inverness: single-line close to capacity

### Route 25 Other issues on the route

- I** Craigmadoran - Fort William: limited loop lengths for freight

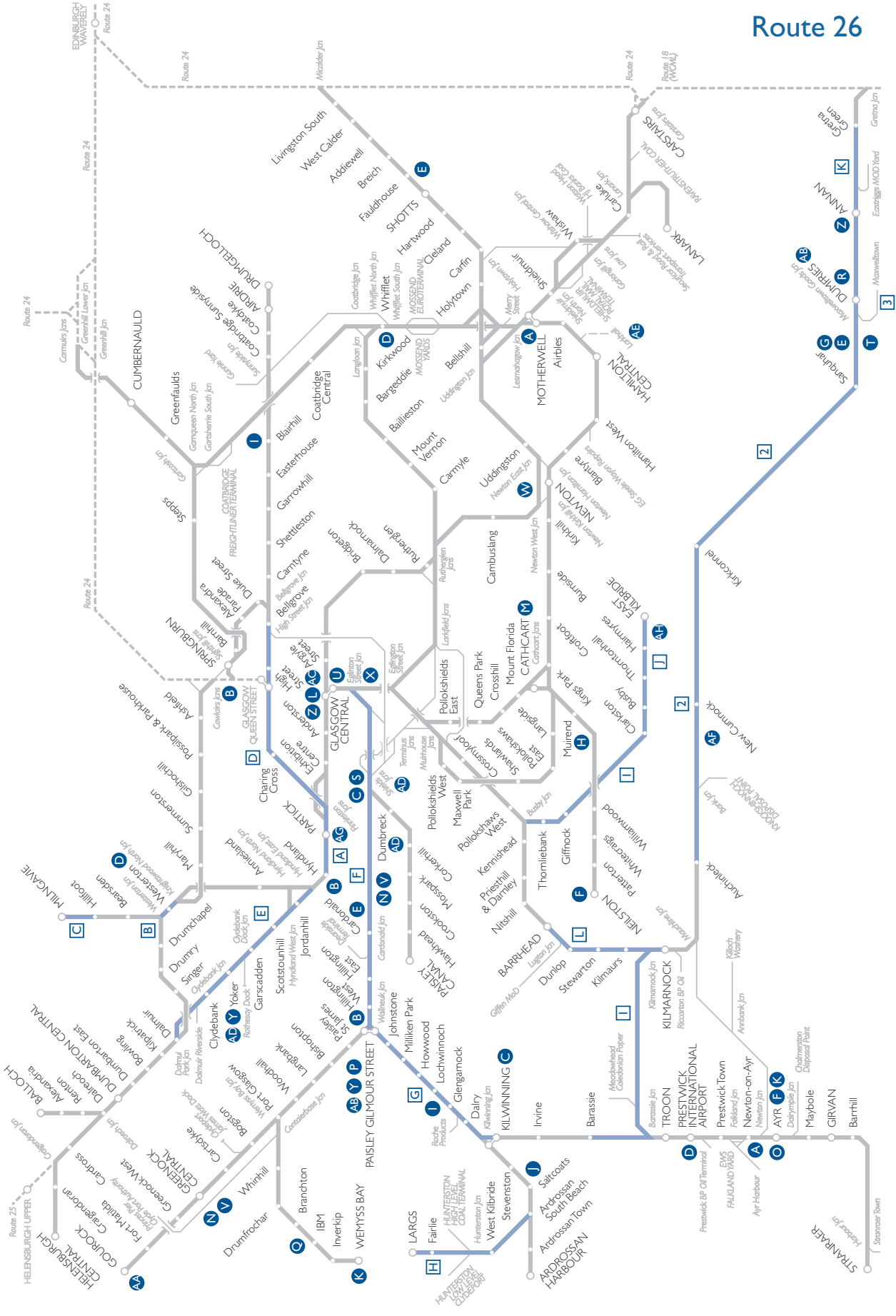
### Route 25 Planned projects

Project description	Type of work	Dev. Level
<b>A</b> 2004/05 - 2006/07 Track renewals include key sites at Kinloss, Findhorn and Aberdeen North	R	
<b>B</b> 2004/05 - 2006/07 Resleeper/rrailing at key sites between Perth and Stanley Junction and Dalraoch	R	
<b>C</b> 2004/5 - 2006/07 Resleeper/rrailing on the West Highland line, key sites at Fort William, Spean Bridge and Arrochar	R	
<b>D</b> 2004/5 - 2006/07 Resleeper/rrailing on the Far North line, key sites at Wick and Georgemas Junction	R	
<b>E</b> 2004/05 Major works at Auchtertyre, Garelohead and Larich viaducts, Schoolhouse-Arrochar, and Banavie Swing Bridge	R	
<b>F</b> 2004/05 Continuation of drainage works at Dunrobin Station and Rhaoine,	R	
<b>G</b> 2004/05 - 2005/06 Earthworks at Dalcapone	R	
<b>H</b> 2004/05 Renewal of signalling cables Perth - Stanley Junction	R	

## Network Rail

### Route 25 Planned projects

- I** 2006/07 - 2007/08 Refurbishment to Pitlochry signal box R
- J** 2004/05 - 2006/07 Inverness Depot package of repairs works R



# Route 26

# Route 26: Strathclyde and South West Scotland

## Route description



### Physical description

The Strathclyde and South West Scotland route predominantly comprises the local Glasgow suburban rail network. This is the largest suburban passenger railway network in the UK outside London. This network is principally double track and linespeeds vary between 40-90mph. Signalling equipment is predominantly colour-light operated from the major signalling centres at Motherwell, Paisley, Glasgow Central, Yoker and Cowliars. 58% of the network is electrified using the 25kV overhead system. The network broadly mirrors the boundaries of the Strathclyde Passenger Transport (SPT) area of responsibility, running through the 12 constituent local authority areas in whole or in part.

The route also includes the South West Scotland lines between Ayr and Stranraer, which is predominantly single track and between Kilmarnock and Gretna Junction which is predominantly double track. These lines are connected by the single-line sections between Kilmarnock and Barassie and Mauchline and Newton on Ayr. Signalling equipment is a mixture of colour light and semaphore equipment, controlled from a number of locations.

Broadly, three quarters of the route is classified as secondary, the rest is a mix of primary, rural and freight only.

## Market served

The Glasgow suburban services operate in a mature market where quality of service and reliability are key to retaining and growing the market share carried by the rail network. Reliable performance delivery is therefore of paramount importance to our customers and their passengers.

The south-western routes have an important role for the communities they serve particularly where good interchanges exist with other transport modes. There is a significant volume of ferry generated passenger traffic to and from Stranraer and Anglo-Scottish passenger traffic to Carlisle and Newcastle. The Kilmarnock - Gretna Junction section has a major role in coal traffic from Ayrshire opencast sites, and the deep water terminal at Hunterston, to English power stations.

The route also serves as the north-western terminus for long distance passenger traffic coming from the West Coast Main line via Carlisle and Carstairs, or the East Coast Main Line via Edinburgh and Carstairs.

## Growth

Sustained and steady growth has been experienced on the Glasgow suburban services over the past ten years. The Scottish Executive's recently completed Scottish Strategic Rail Study has forecast that this growth should continue at a rate of approximately 40% over the next 20 years. Local commuting demand will be driven by employment growth in Glasgow, whilst continuing economic growth and growing road congestion will increase demand for both business and leisure travel to destinations further afield.

## Current use

### Current traffic

Local passenger services are operated by ScotRail on behalf of SPT in the Glasgow suburban area using a mix of electric and diesel trains. Cross-border daytime services into Glasgow Central are provided by Virgin West Coast, Virgin Cross Country and GNER. ScotRail also operate the South Western services and overnight sleeper services from Glasgow and Fort William to London Euston.

EWS, Freightliner, and DRS provide freight services over the route, with the recent addition of haulage services operated by Advenza, who commenced operations in March 2004. Traffic carried is a mix of wagonload, bulk cargoes and intermodal, with both diesel and electric traction being used.

<b>Route 26 Current use</b>			
	<b>Passenger</b>	<b>Freight</b>	<b>Total</b>
Train km per day	45,417	7,672	53,089
Train tonne km per year (millions)	2,612	2,393	5,005
Average no of train km per track km per day			64
<b>Top five busiest route sections</b>			<b>No of trains per day</b>
Glasgow Central - Shields Junction			360
Glasgow Central - Pollokshields			350
Partick - Hyndland			320
Shields Junction - Paisley Gilmour Station			290
Newton - Rutherglen			250

### Projected use

Over the period of this plan a number of peak time ScotRail services from Glasgow Central to East Kilbride are planned to extend to 6-car operation and the phased introduction of services to Larkhall will commence with an additional two trains per hour, in both directions, between Hamilton and Anderston.

## Strategic framework for the route

We have undertaken some initial capacity utilisation work on Scotland's key routes with the SRA and the Scottish Executive. There are no Route Utilisation Studies currently proposed within Scotland under the SRA's Capacity Utilisation Policy exercise. The SRA intends to produce a Planning Assessment for Scotland that will address the projected utilisation of the network. This is due in Spring 2005.



## Route baseline outputs

This section shows the current capability of the route and baseline capability changes for which we are funded by the interim review of track access charges, including the effect of enhancements funded to implementation under this process.

<b>Route 26</b>		<b>Current route capability</b>
<b>Journey times</b>		<b>1 April 2004</b>
Drumgelloch - Helensburgh		1 hr 12min
Glasgow Queen Street - Helensburgh		38min
Dalmuir - Lanark		1 hr 13min
Glasgow Central Low Level - Lanark		44min
Glasgow Central - Neilston		22min
Glasgow Queen St - Maryhill		13min
Glasgow Queen St - Cumbernauld		23min
Glasgow Central - Paisley		10min
Glasgow Central - Ayr		46min
Glasgow Central - Ardrossan South Beach		41min
Glasgow Central - Kilmarnock		36min
Glasgow Central - Shotts		35min
Glasgow Central - East Kilbride		24min
Glasgow Central - Paisley Canal		17min
Stranraer - Carlisle		3hr 29min
Stranraer - Glasgow		2hr 8min
Glasgow Central - Carlisle		2hr 20min
<b>Linespeed (km of track)</b>		
Up to 35mph		114
40-75mph		1074
80-105mph		274
110-125mph		
<b>Gauge (km of route)</b>		
W6A		848
W7		797
W8		561
W9		156
W10		65
<b>Axle weight (km of track)</b>		
Up to 20.3 tonnes (RA 1-6)		120
20.4 tonnes - 24.1 tonnes (RA 7-9)		292
24.2 tonnes - 25.4 tonnes (RA 10)		1050
<b>Total km of track</b>		<b>1461</b>
<b>Total km of route</b>		<b>846</b>

<b>Route 26</b>		<b>Baseline route capability changes</b>			
		Year of change	Current value	New value	Reason for change
<b>Linespeeds (km of track)</b>					
Up to 35mph		2005	114	115	See note 1
40-75mph		2005	1074	1080	See note 1
<b>Gauge (km of route)</b>					
W6A		2005	848	855	See note 1
<b>Axle weight (km of track)</b>					
Up to 20.3 tonnes (RA 1-6)		2005	120	127	See note 1
<b>Total km of track</b>		<b>2005</b>	<b>1461</b>	<b>1468</b>	<b>See note 1</b>

Note 1: This change is as a result of the new infrastructure provided under the Larkhall - Milngavie project.

## Delivering baseline outputs

The planned renewals and enhancement expenditure for the three years to 2006/07, and associated track renewal volumes, to deliver the outputs on this route are shown below.

<b>Route 26</b>		<b>Forecast expenditure</b>		
<b>£m in 2003/04 prices</b>		2004/05	2005/06	2006/07
<b>Renewals</b>				
Track		7	14	23
Structures		8	7	9
Signalling		13	23	32
Electrification		2	7	10
Plant & machinery		2	1	1
Telecoms		2	2	3
Network Rail managed stations (Glasgow Central)		1	1	1
Stations		4	4	2
Depots		1	0	1
Lineside		0	0	0
<b>Total renewals</b>		<b>40</b>	<b>60</b>	<b>82</b>
<b>Committed and planned enhancements</b>				
Gartcosh New Station		2	-	-
Larkhall - Milngavie		18	12	-
Other		0	0	0
<b>Total committed and planned enhancements</b>		<b>20</b>	<b>12</b>	<b>0</b>
<b>Route 26</b>		<b>Forecast activity volumes</b>		
		2004/05	2005/06	2006/07
Rail renewal (km per year)		9	18	26
Sleeper renewal (km per year)		7	15	20
Ballast renewal (km per year)		9	28	28
S&C renewal (units per year)		-	-	14

## Engineering access

“No trains” periods on the individual sections of the route are normally sufficient to undertake most cyclical maintenance and renewal works and recent investment in modern high output machinery is resulting in improved productivity. However, because of the complexity of parts of the route, there are occasions when it is necessary to use line closures in order to undertake track and structures repairs and renewals. Any closures required are fully consulted with our customers to minimise disruption to services, and we generally try to programme these where possible for weekends or at certain holiday periods when passenger carryings are lower.

We are currently consulting with stakeholders to agree the framework for the implementation of our “Better Access” pilot scheme which we hope to trial on the Cathcart Circle lines commencing December 2004/January 2005. We are proposing to amend Rules of the Route on one or two occasions per week such that “no trains” periods are extended, with late night services over the affected section of route terminating earlier than currently, and service provision being met by diversion and/or replacement bus services. This would facilitate greater productivity allowing enhanced maintenance activity and greater volumes of preparatory and follow up works associated with significant programmed items. By extending “no trains” periods to coincide with times of least demand on a route, we would be able to offer the opportunity of enhanced access on a corresponding number of occasions per week, providing greater access opportunities for operators at times of higher demand or for train crew training purposes.

The following major possessions are planned:

- in April 2004, a two-week blockade to renew Lesmahagow Junction at Motherwell and undertake a package of works including rerailing, resleepering and S&C heavy maintenance at six sites between Motherwell and Law Junction;
- in May 2004, one 55hr possession between Dumfries and Kirkconnel to undertake bridge and track renewals at three worksites.
- in June 2004, two 54hr possessions on subsequent weekends, to effect underbridge repairs at worksites between Thornhill and Kirkconnel/Mauchline. Significant reballasting at Cumnock, has been programmed for the same period;
- In consultation with key stakeholders we are currently examining proposals to revise, possibly to a four-day blockade, and reschedule a series of five 29hr possessions required at Montfode for bridgeworks associated with the A78 Ardrossan, Saltcoats and Stevenson bypass. Completion of works is planned to take place during two 54hr possession over Christmas/New Year 2004/05;
- at Christmas 2004, one 53hr possession between Motherwell and Carstairs to undertake track renewals, and another between Dalmuir and Hyndland Est Junction, to undertake reballast, resleeper and rerailing works at Yoker;
- in May 2005, two 55hr possessions between Cove Level Crossing to Law Junction and between Carstairs North Junction - Motherwell, and one 51hr possession between Law Junction and Motherwell to carry out resleepering, plain line, S&C and through alignment works along with signalling and structural works;
- in June 2005, one 51hr possession between Law Junction and Lesmahagow Junction for works as above;
- in July 2005, one 28hr possession between Newton West Junction and Eglinton Street Junction to carry out tunnel repairs;

- in July 2005, one 54hr possession between Muirhouse North and Central Junctions, between Cathcart West and Muirhouse North Junctions and between Neilston and Cathcart West Junction to undertake bridgeworks;
- in September 2005, one 54hr possession between Crossmyloof and Muirhouse South Junction, and between Muirhouse South and Central Junctions to undertake bridgeworks; and
- in October 2005, two 54hr possessions between Law Junction and Wishaw to undertake bridgeworks.

## Maintenance and renewal

The south-west lines have been traditionally maintained as two discrete lightly trafficked secondary routes. The recent significant growth in freight traffic on the Kilmarnock - Gretna Junction section has resulted in a number of significant asset renewal issues. This is particularly the case with the structures on this section.

### Track

The majority of the plain line track on the Strathclyde component of the route is CWR with small pockets of jointed track on the branches and secondary sub-routes. Due to the large renewals programmes of previous years, the plain line age profile on the majority of the route is relatively young. The Glasgow to Ayr sub-route section sees high passenger and freight traffic levels, and we plan to renew further parts of this route in future years.

The plain line sections of the South West component of the route are predominantly CWR and range from the 1970s and 1980s on the Ayr to Stranraer section, through to sections of the Kilmarnock to Gretna Junction sub-route section that were renewed in 2001/02 and 2002/03. The jointed track that remains on this route dates from the 1940s to 1950s and is now showing signs of usage related degradation. We are developing plans to renew these assets in the next five years. The S&C sites on this route are 1960s to 1970s vintage and we are prioritising our renewals for future years based on the tonnage levels at specific sites.

We are planning renewals at a number of sites during the next three years to address general asset condition, rail wear and sleeper degradation. The most significant sites are shown on the diagram. On the Argyle Line we plan further minor renewals to the slab track in the tunnels over the next three years.

On the Hamilton Circle section we are developing a prioritised renewals programme for renewing the remaining sections of jointed track due to condition of the track components. On the G&SW section of the route ballast condition on the southbound line is now a concern, and we are developing a programme to deliver increased quantities of tamping and ballast cleaning to address this problem.

At Kennishead Viaduct on the Glasgow to Barrhead sub-route section the timber waybeams that support the track on the structure were replaced with conventional ballasted track during 2003/04. These works were part of a package of renewals associated with the structure.

S&C units across the route date predominantly from the 1960s and 1970s, and we are implementing a programme of prioritised renewals in future years. Limited availability of new components over the period is likely to drive a life extension strategy for certain S&C sites. During 2004/05 we plan to renew S&C at Lesmahagow Junction and at Newton on Ayr. In 2006/07 we plan to renew S&C at Paisley Wallneuk Junction, Hyndland and Cowlairs West Junction. In 2007/08, we plan to renew S&C at Shields Junction and Kilwinning.

## Structures

The majority of structures were constructed at the time the route was built, with some subsequent upgrading and replacement being undertaken. The key issue on the G&SW section of the route is the sustained heavy tonnages of cross-border coal traffic, which has degraded a number of underbridge structures. Three short span masonry arch underbridges have been identified as showing signs of deformation under load. During 2003/04 design and development work was progressed, and superstructure renewal at these locations will be undertaken during 2004/05. These works should restore the route to RA10 capability.

On the Neilston branch, steelwork repairs to the Merrylee Road underbridge, near Cathcart West Junction, are programmed for 2004/05. Two other structures on this route require substantial renewals and design and development work will be progressed during 2004/05 to achieve renewals during 2005/05 and 2006/07.

Coastal defence repair reconstruction works in the Saltcoats area will be developed during 2004/05 for implementation in 2005/06.

An ongoing programme of assessment and inspection has been implemented to identify and prioritise locations, which require works to improve trackside drainage and reduce the risk of flooding and consequential damage to the track formation.

A recently commissioned survey using stereo oblique aerial photography has identified a number of high-risk earthworks sites on the route, which will be monitored for deterioration.

## Signalling

On the Strathclyde component of the route, signalling assets are generally multiple aspect colour light signals controlled from the five major signalling centres, although two mechanical interlockings remain at Barrhead and Lugton. The age profile of the signalling centres ranges from 1960 to the 1990s and their condition is generally good. Any pockets of degradation identified will be addressed in forthcoming renewals programmes. Approximately 34km of network was resignalled to eliminate degraded signalling wiring in the Mossend area during 2003/04.

As part of our maintenance and renewal plans, we plan to renew the signalling interlocking and associated equipment at Glasgow Central during the period 2004/05 to 2007/08, and at Cathcart during the period 2006/07 to 2008/09, to eliminate equipment that is nearing the end of its life. In 2004/05 we plan to commence development of a programme of signalling renewals between Shields Junction, Paisley and Gourock. There is an opportunity to integrate these renewals with the proposed Glasgow Airport Rail Link project works to achieve economies of scale.

The majority of the South West component of the route is signalled with semaphore signals, which have an age profile ranging from the 1930s through to the 1950s. This equipment is generally in fair condition, although there are some pockets where renewals are required. There is colour light signalling at Dumfries, 1950s interlocking with some spot renewals from the 1990s, and Kilmarnock, 1970s interlocking and lineside equipment. The condition of these assets is fair; however, the interlocking at Annan is showing early signs of wiring degradation and we are monitoring this site. The Ayr - Stranraer section utilises electric key token and electric tablet block with semaphore signalling between Stranraer Harbour and Girvan. This equipment is now of a considerable age and spare parts are now hard to source. The condition of the lineside signalling equipment and associated structures between Ayr and Stranraer is being monitored for further signs of degradation.

At Holywood we continue to operate and maintain the last set of mechanically operated level crossing gates in Scotland. Whilst these do not require renewal at the present time, we continue to explore alternative options that would eliminate this equipment. Spares released by recent renewals at Longannet will support the life extension of obsolete point machines at Dumfries until 2006/07 when we plan to renew the existing equipment with HW type electro-mechanical machines. This will reduce the incidence of equipment failure and will improve reliability.

### Electrification and plant

The OLE on the Strathclyde component of the route is a mixture of equipment. The age profile is between 1958-1974, with a small amount of more recent installations. There are approximately 708 single-track kilometres of OLE across the route and, with the exception of the Mk2 equipment, the asset condition is good. This route is the only one on the network that utilises the Mk2 range of equipment and a strategy is being developed for the renewal/major overhaul of this equipment. Approximately 97 single-track kilometres are affected.

We will undertake feasibility studies to evaluate the benefits of improving system functionality by installing two additional neutral sections on the Hamilton Circle line at Newton and Haughead Junction during 2004/05 and 2005/06.

Renewal of the OLE equipment between Shields Junction and Gourock is currently being progressed through design and development for implementation over the period 2005/06 - 2007/08.

A recent survey to determine the condition and life expectancy of the Mark I contact wire in Glasgow Central station, and on its approaches, generated a programme of renewals commencing in 2003/04, and continuing into 2004/05, which will see 5km of equipment replaced. Further survey works will be undertaken during 2004/05 to assess the condition and life expectancy of the contact wire on the North Electric, South Electric and Ayrshire routes, and enable the formulation of a prioritised renewals programme. During 2004/05 Mk I return conductor equipment on the North Electric and Newton routes will be surveyed and a prioritised renewals strategy will be progressed to address an increased number of instances of stranding.

Implementation of a rolling programme to renew life-expired motorised switches at strategic locations across the route will commence in 2004/05 and continue through to 2008/09. A prioritised programme to renew life-expired standby signalling protection regulators at various locations across the route will be developed for implementation during the period 2004/05 - 2007/08.

We plan to renew some points heater installations which date from the 1980s and are now life expired. Renewal of installations at Terminus Junction, and Busby Junction will be completed during 2004/05. The remaining non-standard points heater installations on this route will be monitored, and future replacements will be programmed as dictated by the condition of the equipment.

During 2003/04 we completed the planned renewal of the standby signalling power system at Wemyss Bay which eliminated obsolete equipment and improved reliability. We also completed the renewal of the uninterruptible power supply (UPS) equipment at Cathcart Electrical Control Centre, which controls all the 25kV OLE network in Scotland and parts of the north of England. At various locations on the route, including Glasgow Central, installation of air conditioning systems to reduce further instances of wiring degradation in our signalling relay rooms was completed.

During 2004/05 we plan to effect mid life upgrades by refurbishing the pumping installations at eight locations.

During 2004/05 we plan to renew the standby generator at Thornhill, replacing the existing life expired equipment. We also plan to provide a standby diesel generator set at Barrhill during 2004/05, as part of our strategy to strengthen signalling power supplies at prioritised locations.

### Telecoms

A major part of the route is provided with radio equipment to permit the operation of DOO that will have some life extension works carried out during 2004/05. This area is to be used for an operational trial of the GSM-R system also commencing in 2005.

Work has continued during the past year to develop and commence implementation of the renewal strategy for all DOO CCTV assets on the route, which will be undertaken at 78 locations between 2004/05 and 2007/08. This will provide each location with a robust system for train despatch that will improve passenger safety and operational performance.

We plan to commence a programme of concentrator renewals during 2005/06, key locations are listed in the project tables.

### Stations

A programme of repair works commenced at Gourock station in 2003/04 and will continue during 2004/05. This comprises works to the canopies, platform surfaces, staff accommodation and sea wall defences. The programme addresses the immediate safety critical works and will restore the station and its environs to an acceptable standard for our customers. We are also working with Inverclyde Council on the development of their proposals to create a comprehensive transport interchange to establish whether there are any synergies that can be realised between the two initiatives.

At Dumfries and Paisley Gilmour Street stations we plan to commence a programme of canopy reglazing and roofing renewals works during 2005/06.

We plan to undertake repairs to the platforms at Clydebank, Crosshill, Fauldhouse and Fort Matilda during 2004/05, 2005/06 and 2006/07 to restore the condition of the assets and achieve compliance with current standards.

Following the completion of major overhaul work on some of the escalators at Glasgow Central Low Level in 2003/04, similar work is planned at Argyle Street station in 2004/05 and 2006/07 to extend the life of equipment. Following completion of this work, further work will be undertaken at Glasgow Central Low Level in 2005/06.

### Other operational property

The large signalling centre buildings at various locations including the Electrical Control Centre at Cathcart have been identified for repair and renewal works beyond 2005/06 and we are developing a programme of works to address this.

### Depots

During 2004/05 we plan to renew the roof and windows of the office facilities at Corkerhill. During 2006/07 we plan to undertake a package of renewal works at Shields depot to the maintenance shed heating and lighting equipment, and at Yoker we plan to refurbish the office accommodation facilities.

## Performance

Our plans for improving performance across the network are discussed in the Technical Plan. In the Route Plans we discuss some specific local initiatives to improve performance. We also note that the introduction of Local Output Commitments will provide specific targets and plans for individual TOCs, rather than for each Strategic Route.

We will continue to address performance issues on the route to ensure that train service delays are minimised as far as practically possible. Particular initiatives that will be promoted on this route are a programme of enhanced maintenance at critical junctions, doubling up of tail cables at key locations and improved inspection and maintenance regimes for track drainage.

We have undertaken a review of lineside fencing to reduce the incidence of route crime. A risk-based approach has been adopted to determine the prioritisation of programme items. We will continue to develop partnership initiatives with our industry stakeholders, local councils, Strathclyde Police and BTP to identify "hot spots" and appropriate corrective actions. There have been some incidences of livestock entering the railway boundary on the Ayr - Stranraer section of the route, and this is being addressed through a programme of fencing renewal or enhancement.

## Enhancements

The proposed reopening of the Hamilton - Larkhall Branch forms a key part of the Scottish Executive and Strathclyde Passenger Transport's (SPT) enhancement plans for the Scottish rail network. The associated reopening of the Maryhill to Anniesland Branch will create additional capacity in the Westerton area for the proposed additional services to Milngavie. This project has now been approved, and site works commenced in February 2004. Completion is currently forecast for late 2005.

Platform lengths on the East Kilbride Branch restrict the number of passengers that can be carried at peak times, due to the inability to operate six-coach trains. Implementation of a project to lengthen platforms has now been approved under the SRA's IOS programme. Site works commenced in February 2004 and should be complete by August 2004.

## Land implications

We are currently liaising with Glasgow City Council and the Scottish Executive on their proposals to extend the M74 motorway from its current termination at Cambuslang through to the M8 motorway to the west of the Kingston Bridge in the centre of Glasgow. There are a number of operational implications and a number of locations where Network Rail-owned land is being compulsorily acquired.

## Route development

Detailed feasibility work has been undertaken to identify the options for improving the Barrhead to Kilmarnock portion of the route, where the single-line inhibits the ability to run a half-hourly service in both directions. The initial feasibility study on this section of line was funded by the SPT and this has underpinned more recent studies undertaken under the SRA's IOS programme. There is currently no planned implementation date for this project.

Pre-feasibility work is being carried out under the sponsorship of the SRA to consider the options available to improve operational flexibility in the Mauchline Junction area. This particularly relates to facilities to reduce the network impact of the increasing number of freight trains that are required to reverse in this area to head south. The pre-feasibility stage is scheduled to be completed in May 2004.



We are continuing to work with the opencast coal mining industry, the Scottish Executive and other stakeholders to develop rail services to new coal loading terminals which are planned for parts of the route. These include terminals at Greenburn (near New Cumnock) scheduled to open in May 2004 and Powhamal (near Auchinleck). This last terminal is the subject of a Scottish Executive Rail Freight Grant valued at £9.75m, awarded to Scottish Coal Limited, to reopen approximately 10km of closed railway line and reconnect it to our network. It is estimated that this reopening will transfer over 4.8 million lorry kilometres from road to rail each year.

We are continuing to work with EWS, BP Oil, the Scottish Executive and the SRA to promote the reopening of the mothballed freight branch from Dumfries to Maxwelltown. This project involves reinstating approximately 4km of disused branch line for oil traffic from Grangemouth. The reopening project will facilitate a reduction in lorry journeys on the Scottish road network, which is in accord with meeting Government targets to transfer freight from road to rail.

We are currently working with SPT to progress plans to redevelop Partick Station. We are also working with Scottish Enterprise Lanarkshire, North Lanarkshire Council and SPT to develop plans to open a new station to serve the regeneration site and village at Gartcosh.

We are currently developing a project to replace the signalling interlocking covering the Glasgow Central Station area and its immediate approaches. This project is being developed to maintain the current level of capacity while retaining the opportunity to introduce additional enhancements at a later date.

## Emerging issues

A number of train lengthening initiatives are currently being considered to address the predicted passenger growth on the Route. There are, however, a number of existing key capacity bottlenecks that will need to be addressed before any further significant service expansion opportunities can be realised over the majority of the network. A number of sections of the Strathclyde and South West network have been identified as capacity constraints to further traffic growth. The most significant of these are:

- Bellgrove - Dalmuir and Milngavie
- Shields Junction - Kilwinning; and
- several single-line sections: such as Barassie - Kilmarnock; and Gretna - Annan.

In these areas, pathing additional trains would generally require infrastructure upgrades and research has been undertaken to ascertain the likely future demand for this. The Central Scotland Capacity Review Study undertaken by us on behalf of the SRA and supported by the Scottish Executive has identified a range of potential infrastructure enhancements that would provide additional capacity and capability.

Currently there is spare capacity on the Stranraer - Ayr and Barassie - Kilmarnock sections. However, the section between Mauchline Junction and Gretna Junction is operating at capacity for long periods of each day. This is principally as a result of the long signal sections that restrict the headways between trains.

The proposal to operate a dedicated 4tph shuttle service from Glasgow Airport - Glasgow Central High Level would necessitate capacity improvements between Paisley Gilmour Street and Glasgow Central. The infrastructure enhancements required would also benefit other services utilising the corridor.

We have had to temporarily downgrade the Kilmarnock to Gretna Junction section of the route from RA10-RA8 carrying capacity due to a deterioration in the condition of a number of masonry arch underbridge structures. This has been caused by the damaging effects of sustained continuous volumes of coal traffic using the route for the last five years. This is being addressed through the introduction of an enhanced inspection and monitoring regime and a programme of physical works to restore the route to its former capability.

Concerns have been previously expressed about capacity at Glasgow Central High Level station. The current level of services can be accommodated with the existing infrastructure. However, it is unlikely that aspirations for new services and longer trains would be met on the existing infrastructure.

## Planned projects summary and diagram key

The tables below shows issues and projects on the diagram, distinguishing between renewals (R) and enhancements (E).

Large items of maintenance (M) may be shown, but routine maintenance is not.

### Route 26 Capacity and operational constraints

<b>A</b>	Finnieston - Hyndland: double track at capacity
<b>B</b>	Westerton Junction - Knightswood North: short stretch of bi-directional track between junctions
<b>C</b>	Milingavie branch: single-line section
<b>D</b>	Bellgrove - Finnieston: signalling headways and limited track capacity
<b>E</b>	Dalmuir - Hyndland East Junction via Yoker: signalling headways
<b>F</b>	Cook Street Junction - Paisley Gilmour Street: double-track at capacity
<b>G</b>	Paisley Gilmour Street - Kilwinning: signalling headways
<b>H</b>	Ardrossan - Largs: single-line passenger section
<b>I</b>	Barassie - Kilmarnock: single-line section
<b>J</b>	Busby - East Kilbride: single-line with limited crossing facility
<b>K</b>	Gretna - Annan: single-line section
<b>L</b>	Barrhead - Kilmarnock: single-line section

### Route 26 Other issues on the route

<b>1</b>	East Kilbride Branch: limited platform lengths
<b>2</b>	Auchinleck - Annan: high freight usage
<b>3</b>	Dumfries - Maxwelltown: proposed reopening of freight line

### Route 26 Planned projects

	Project description	Type of work	Dev. Level
<b>A</b>	2004/05 S&C renewals at Lesmahagow Junction and Newton on Ayr	R	

## Network Rail

### Route 26 Planned projects

	Project description	Type of work	Dev. Level
<b>B</b>	2006/07 S&C renewals at Wallineuck Junction, Hyndland and Cowlairs West Junction	R	
<b>C</b>	2007/08 S&C renewals at Shields Junction and Kilwinning	R	
<b>D</b>	2004/05 Track renewals at eight sites, including Prestwick, Westerton and Burnhouse	R	
<b>E</b>	2005/06 Continuation of the track renewals programme at ten sites, including Cardonald, Starryshaw and Closeburn.	R	
<b>F</b>	2006/07 Continuation of track renewals programme at fifteen sites, including Neilston, Patterton and Patna.	R	
<b>G</b>	2004/05 Superstructure renewals at three locations on the G&SW; Closeburn; Railway Cottages and Leven Road	R	
<b>H</b>	2004/05 Steelwork repairs to Merrylee Road bridge	R	
<b>I</b>	2004/05 - 2006/07 Bridge renewals at two locations Longford Viaduct and Summer Lea	R	
<b>J</b>	2004/05 At Saltcoats; repair and renewal works to the sea defences where the railway runs along the sea wall	R	
<b>K</b>	2004/05 Repair and renewal works to cuttings at Patna and Wemyss Bay	R	
<b>L</b>	2004/05 - 2007/08 Renewal of Glasgow Central signalling interlocking and associated lineside power equipment	R	
<b>M</b>	2005/06 - 2008/09 Renewal of Cathcart signalling interlocking and associate lineside power equipment	R	
<b>N</b>	2005/6 - 2008/09 Signalling renewals between Shields and Gourrock	R	
<b>O</b>	2005/06 Rewire of interlocking at Ayr	R	
<b>P</b>	2006/07 - 2007/08 Renewal of FDM at Paisley	R	
<b>Q</b>	2004/05 Dunrod: Renewal of the Time Division Multiplex System and associated equipment	R	
<b>R</b>	2006/07 Renewal of three points motors at Dumfries	R	
<b>S</b>	2004/05 - 2005/06 Lineside power equipment renewals at Shields Junction	R	
<b>T</b>	2004/05 Renewal of standby generator at Thomhill	R	

## 2004 Route Plans

**Route 26 Planned projects**

	Project description	Type of work	Dev. Level
<b>U</b>	2004/05 Continuation of Mki OLE contact wire renewals in Glasgow Central Station and approaches	R	
<b>V</b>	2004/05 - 2007/08 OLE contact wire renewals between Shields Junction and Gourrock	R	
<b>W</b>	2004/05 - 2005/06 Renewal of Mki OLE return conductor equipment in the Newton area	R	
<b>X</b>	2006/07 - 2007/08 Renewal of the HV switchgear at Eglinton Street	R	
<b>Y</b>	2005/06 Concentrator renewals at Yoker and Paisley	R	
<b>Z</b>	2006/07 Concentrator renewals at Glasgow Central and Annan	R	
<b>AA</b>	2004/05 Major reconstruction and repair works to Gourrock station	R	
<b>AB</b>	2005/06 Paisley Gilmour Street and Dumfries reglazing and reroofing works	R	
<b>AC</b>	2004/05 & 2006/07 Major escalator overhaul work at Glasgow Central and Argyle Street stations	R	
<b>AD</b>	2004/05 & 2006/07 Depot fabric repairs at Cokerhill, Shields and Yoker depots	R	
<b>AE</b>	2004/05 Larkhall - Milingavie construction of new infrastructure	E	5
<b>AF</b>	2004/05 Greenburn coal loading terminal construction of infrastructure	E	5
<b>AG</b>	2004/05 Partick station redevelopment feasibility work	E	3
<b>AH</b>	2004/05 East Kilbride branch platform extension works	E	5

# Section 3

## Enhancements and major projects

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## Introduction

Network Rail is focused primarily on the operation, maintenance and renewal of the network. While in future most major enhancements will be delivered by third parties, either directly or by way of an SPV, we have an important role in helping to facilitate these schemes. We also undertake smaller enhancements to meet the reasonable requirements of our customers. We currently undertake the following types of enhancements projects:

- construction or completion of committed “legacy” projects;
- schemes arising from the Safety and Environment Plan;
- schemes sponsored by SRA, particularly where the opportunity for the enhancement is as a result of a planned signalling renewal; and
- schemes sponsored and funded by other parties, principally PTEs, local authorities and train operators.

As part of the interim review settlement, we have been funded to deliver specific safety enhancement schemes, including the S&E plan, European Rail Traffic Management System (ERTMS) development and Train Protection Warning System - Plus. (TPWS+) In addition, we have been funded to deliver West Coast enhancements and a number of “transition” projects, which include implementation of the Southern Region New Trains Programme (SRNTP), some further development of Thameslink 2000 and the CTRL Blockade works in the St Pancras area.

Other enhancements schemes that are funded outside the interim review include:

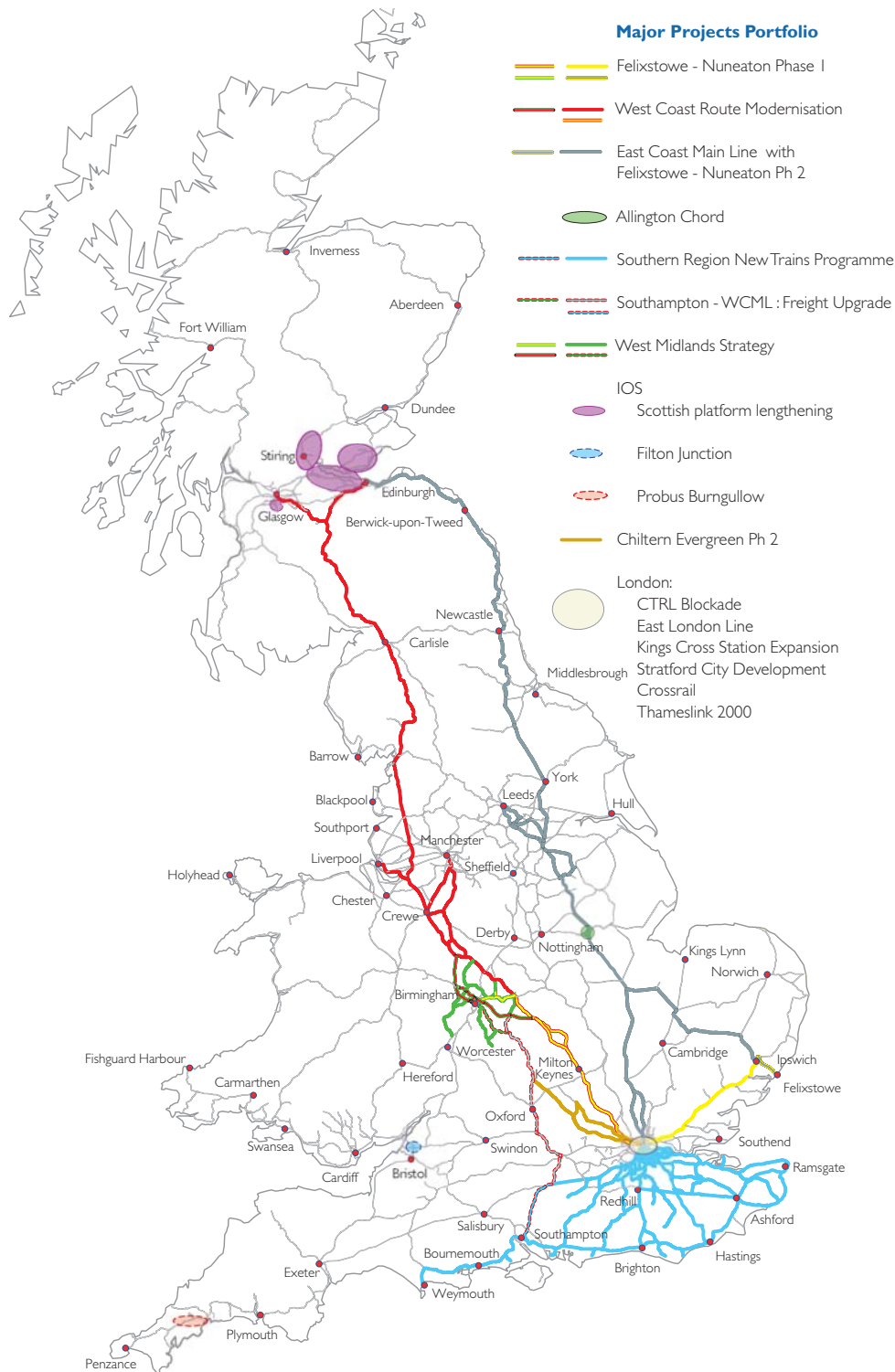
- SRA sponsored schemes – for these schemes we will be generally reimbursed for actual expenditure in cash on a period basis, although there are also incentives to deliver these projects efficiently and economically;
- Special Purpose Vehicles – the exact process by which Network Rail will be reimbursed for costs associated with these projects will be discussed with the ORR;
- non-SRA sponsored schemes – Network Rail expects that it will generally be remunerated for these on a “pay as you go” basis. The expenditure shown against this category refers, in some cases, just to the interface cost (where the third party is paying directly), and in others to the actual scheme cost (where we are paying for the work and then being subsequently reimbursed); and
- schemes funded by Network Rail or by Network Rail in a joint venture with a third party – mainly station retail schemes and property where there is a sound business case to support these self-funded schemes.

The table below sets out the projections for committed and planned enhancement activities.

<b>Figure 3.1 Total committed and planned enhancement expenditure</b>					
<b>£ m 2003/04 prices</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>
Funded by interim review:					
Safety schemes	178	159	133	123	115
WCRM	252	181	116	51	8
Transition projects	636	88	20	-	-
SRA funded	88	22	0	-	-
SPV schemes	-	0	76	5	4
Non SRA funded	96	49	29	-	-
Network Rail (or joint venture funded)	59	53	54	52	62
<b>Total</b>	<b>1,308</b>	<b>551</b>	<b>429</b>	<b>231</b>	<b>188</b>

We have included further analysis in the following sections of the individual schemes that are included in these enhancement categories. This includes identification of schemes where we are committed to implementation of the project and those where we are only funded to plan the project. For the major projects, we have included a summary of the project in this chapter as many of these projects cross more than one route. We have shown the location of the major projects below.

**Figure 3.2 Map showing location of major projects**



In addition, we have identified at the end of this section a number of key potential schemes that are currently unplanned. This includes the scheme to provide a new concourse at Kings Cross and work to increase capacity at certain major stations which we believe will be required to accommodate forecast passenger growth.

# Our major projects portfolio

## Interim review funded schemes

These are schemes for which the Regulator allowed funding in the interim review final conclusions, either to implement schemes through to completion (shown as "committed" in the table below), or to carry out development to an agreed level but with no commitment or funding to progress beyond that point (shown as "planned" below).

**Figure 3.3 Enhancements funded by interim review**

£m 2003/04 prices	Route(s) <sup>2</sup>	Estimated cost <sup>1,3</sup>	Expected year of completion
<b>Committed</b>			
S&E Plan and other specific safety driven schemes	NW	617	2008/09 and beyond
WCRM	17,18,20,24,26	608	2008/09 and beyond
Southern Region New Trains programme	1,2,3,13	594	2005/06
CTRL Blockade Works	2,19	118	2005/06
Paddington Long Term Vehicular Access	13	9	2006/07
Sunderland Tyne and Wear Metro Extension	10	6	2005/06
Other		21	2008/09 and beyond
<b>Planned</b>			
ERTMS	NW	214	2008/09 and beyond
Thameslink 2000 development	1,2,19	32	2004/05
<b>Total</b>		<b>2,220</b>	

<sup>1</sup> This is the estimated future cost for the enhancement element of the scheme.

<sup>2</sup> NW = network wide

<sup>3</sup> Only schemes with a value of £5 million or over are shown

## Committed

### Safety and Environment Plan and other safety-driven schemes

There are three significant projects within the programmes of safety schemes that are described below.

#### *Pollution prevention*

This national programme of works relates to securing compliance with recent environmental legislation concerning oil disposal primarily at light maintenance depots (LMDs). We have prepared and issued remedial work schedules for each LMD depot.

In the last year we have:

- achieved compliance with "sensitive sites" regulations at five locations in Great Western, Southern, East Anglia, London North Eastern and Midlands regions;
- prepared and issued a national tank and pipeline testing contract; and
- commenced design and build works with Midland region on Derby Etches Park and Birmingham Tyseley depots.



We plan to continue this work with the following programme:

- emergency works where contamination is occurring;
- works to improve existing asset condition and to address risks highlighted in the surveys. This will partially address the concerns of the depot facility operators (DFOs);
- work to address the obligatory Oil Storage Regulations requirements on the 38 English depots, will be implemented ahead of the September 2005 deadline;
- remaining work to oil storage related assets at English depots, and all oil storage work at Scottish and Welsh depots will follow on during late 2005 and up to 2008 as agreement with the TOCs/DFOs is reached, subject to the introduction of regulations in those countries. This would bring all oil storage assets up to the required standards;
- prioritised works to drainage systems to mitigate contravention of the Ground Water Regulations and to meet the required standards, commencing in 2006 through to the end of 2008 and as agreement with the TOCs/DFOs is reached; and
- advance implementation work to Birmingham Tyseley depot will be completed.

#### *Contaminated Land*

This programme is also driven by the need to comply with environmental legislation relating to containment of contaminated land. Highlights in the last year include:

- investigations of Ayr, Edinburgh Haymarket and Largs stations, and of depots at Nottingham Eastcroft, Shipley EWS, Bow Midland East, Edinburgh Haymarket, Reading, Swansea, Bristol St. Phillips Marsh, Littlehampton and Cardiff Canton have been concluded. Scopes of work are now being prepared for these sites;
- temporary effluent treatment plants are in operation at Ipswich Station, Manchester Longsight depot and Manchester Newton Heath depot;
- we have designed permanent effluent treatment plants for Manchester Longsight and Manchester Newton Heath, which will save on operational costs for temporary plants. Installation is due to be completed by July 2004;
- we are continuing with the implementation of works to clean up at Plymouth Laira depot. We have concluded phase 2 of our work successfully and are now commencing phase 3 design;
- substantial completion of fencing to a 25 hectare former asbestos tip at Gartsherrie has been achieved; and
- remedial designs have been produced and we have started the implementation for cleaning up land at Cambridge RES depot and Bletchley depot.

We shall continue this progress by completing the following schemes:

- effluent treatment plants at Manchester Newton Heath and Manchester Longsight;
- containment/catchment system at Cambridge RES; and
- ballast removal at Bletchley.

We shall start the following schemes:

- effluent treatment plant at Ipswich;
- containment/catchment system at Bletchley;

- pump and treat works at Edinburgh Haymarket, Ayr, Plymouth Laira Phase 3, Newcastle Heaton, Leeds Holbeck, Nottingham Eastcroft and Swansea Landore; and
- feasibility (final trials), at Bow Midland, Cardiff Canton, Lincoln, Shrewsbury, Pantyffynnon and Coatbridge Gartsherrie.

#### *National Telecoms Programme*

This programme will substantially replace the existing operational communications network infrastructure with a new fixed telecoms network (FTN) and a Global System Mobile – Radio system (GSM-R). The programme is currently undergoing a major change to the roll out schedule and a significant change to the organisation structure. The two independent projects will combine organisation into one central team, with three delivery teams located in designated areas and responsible for radio and transmission installations.

The project will complete a section of route in Scotland that is part of the Single Manning Agreement (which allows driver-only operation) by December 2004 to allow a pilot trial to be undertaken for the GSM-R system during 2005.

The project has completed in excess of 85% of all radio site surveys, and has obtained Permitted Development Rights for 732 (36%) sites that will allow construction to commence, of which five have been completed on a national basis that were part of the Dorset Coast resignalling. The building for the master switching centre for the radio equipment has commenced and is slightly ahead of schedule with a completion date of April 2004. Of the 16,000km of transmission route to be completed 4,305km has been surveyed, 588km of copper and 705km of fibre have been installed.

Advance works are being carried out on 22 synergy schemes where there are obvious efficiency benefits in completing works as part of planned signalling and telecoms renewals, ahead of the national agreed programme.

The projects have received a number of commendations regarding safety controls, procedures and management of contractors.

#### **Train Protection Warning System – Plus (TPWS+)**

Network Rail and train operators were mandated to fit TPWS by 31 December 2003 by the Railway Safety Regulations 1999. Network Rail was responsible for fitment of TPWS to the track and train operators were responsible for the fitment of equipment to their trains. Network Rail also fitted TPWS equipment to engineering trains that it owns. This obligation was met to time and budget.

By early 2003 we had a good understanding of the technical issues, costs and safety benefits arising from TPWS. It became apparent that there was a very low safety benefit to be gained from fitting TPWS in some of the remaining situations. This was particularly the case for fitting TPWS to speed restrictions at diverging junctions where the approaching speed of trains is controlled by the signalling system. We had extensive discussions with HMRI about these fitments, and applied to HMRI for an exemption from the Railway Safety Regulations for fitting TPWS in these circumstances. We proposed that, if the exemption was granted, resources would be freed to deliver work with a greater safety benefit. This work could include implementation of TPWS+, which is designed to protect trains that are travelling at faster than 75mph. This is achieved by fitting an additional overspeed loop at an existing TPWS installation. HMRI undertook a consultation exercise with industry parties that established a consensus for granting the exemption application, and to bring forward the implementation of TPWS+.

Five TPWS+ prototype installations had been installed in late 2001 on the East Coast Main Line (ECML), and a further 20 pilot sites went into operation in May 2003. These sites allowed the TPWS+ design to be finalised to give protection at speeds up to 100mph. During late 2003, 3,000 candidate signals were identified at junctions with approach speeds greater than 75mph. Of these, 1,700 were shown to benefit from TPWS+ protection, and these were assessed using the signal assessment tool to calculate a risk ranking score for each signal. The costs and benefits of fitting TPWS+ were considered to identify the quantity of signals that could be justified for TPWS+ fitment using the ALARP methodology that is required by the Network Rail safety case. This set the number of the signals to be fitted, and the highest scoring signals in the risk ranking were listed. An additional 30% of signals were added to the lists, and the individual signals were considered at workshops held in the regions that were attended by train operators representatives and Network Rail operations staff. The workshops adjusted the list of signals to take account of risk factors that could not be calculated by the signal assessment tool. A final list of 424 signals has now been agreed nationally, and this list and the methodology to establish it, is being ratified with HMRI. We will tender the design work for the fitments shortly, and expect fitments to be commissioned by mid-2005.

### West Coast Route Modernisation

On assuming responsibility for the sponsorship of network enhancement projects following Railtrack's entry into Railway Administration in October 2001, the SRA subsequently endorsed the conclusion that it was not possible to satisfy all of the commitments which had been given under the Passenger Upgrade 2 (PUG2) agreement on any realistically affordable infrastructure. Consequently, it immediately put together a joint industry working-group to agree revised output objectives for the route.

This approach led to the publication of the SRA strategy for the WCML in June 2003. It followed 18 months of industry consultation and reflected a broad consensus on a mix of outputs which are realistically deliverable. The strategy was again consulted on by the Regulator as part of the interim review. The Regulator's final conclusion was that the outputs specified in the SRA's strategy should be taken as constituting the reasonable requirements of customers on the route.

The Regulator has allowed £2.8 billion for completion of the programme in the next control period. He has also required us to finalise the scope of the programme on the basis of value for money criteria taking into account other network priorities and within the overall funding provided for WCRM.

Full details of our current proposals can be found in Route 18.

### Southern Region New Trains Programme (SRNTP)

Under the Railway Safety Regulations 1999, all Mark 1 slam-door vehicles (of which there are around 1,750) are required to be withdrawn from service by the end of December 2004. More than 2,000 new vehicles have been ordered to replace the Mark 1 fleet and to provide capacity for future growth. Around a third of the present operational fleet running in Southern region will be replaced over the next two years – an unprecedented scale of fleet replacement. At the time of writing around 540 new vehicles are in revenue service and 260 Mark 1 vehicles have been removed.

The new trains have a higher electrical draw than the Mark 1 stock, as they are heavier and have more on-board systems, such as CCTV, sliding doors, air conditioning and computer equipment. This creates the need for significant enhancements to the power supply to meet these higher electrical demands.

Scoping and system design of the power supply has now been completed. The works will include approximately 100 new and upgraded substations, track paralleling (TP) huts and switching stations. There will be around 375-route km of new or upgraded high voltage cables laid and increased capacity provided at 24 grid points. Upgrading of electrical track equipment and impedance bonds will also be undertaken.

A number of works have already been completed which include:

- high voltage cables installed in the inner London area (17 km);
- new conductor rail installed between Alton and Farnham (17 km);
- upgrades to the uninterrupted power supply at six substations between Tonbridge and Hastings;
- installation of new substations at Farnham, Littlehampton, Hove and Brighton; and
- long lead equipment has been ordered for 75% of the substations for delivery to site from March 2004 onwards.

Comprehensive delivery plans are being developed, with the sites most critical for new train introduction scheduled for completion between April and July 2004 and the remainder following between September and December. Works to provide resilience to the enhanced power supply network will continue until Spring 2005.

Significant elements of the work can be carried out without possessions or in train-free periods. However, some disruptive possessions will be required at relatively short notice. We are working closely with the SRA and the affected train operating companies and passenger groups to minimise the disruption to passenger services.

It will also be necessary to lengthen station platforms at locations where selective door operation is not considered to be an acceptable long-term solution. Following a period of consultation with the SRA, HSE and TOCs the scope of this workstream is nearing agreement. Work is required at a total of 30 stations although in many cases this does not need to be completed before new trains are introduced.

Our primary focus is on delivery of 24 priority sites in the Kent and Wessex areas by December 2004. We continue to work closely with the SRA to produce a sustainable programme for the remainder of the platforms.

In addition, there is a comprehensive development programme to upgrade depot and stabling facilities, including the provision of new controlled emission toilet equipment, new or upgraded carriage washing machines, improved security arrangements and modifications to buffer stops.

### **CTRL blockade works**

Following the successful September 2003 opening of the CTRL Phase 1, including infrastructure work on the traditional network at Shortlands, Fawkham Junction and Ashford, work is now underway on phase 2 of the project. Our main involvement is where CTRL interfaces with the rest of the network.

The cross-London tunnel section of the Thameslink route is planned for closure from September 2004 to March 2005 to permit the construction of a new Thameslink station "box" at St Pancras. The new station is part of the Thameslink 2000 project and is proposed to be built by Union Railways.

A series of infrastructure modifications are necessary to allow the temporary closure of the Thameslink route. These are already being implemented and include a new train maintenance depot at Bedford and track and signalling improvements at Belsize and Clerkenwell tunnels.

These measures will allow the overall number of passenger seats on Midland Mainline and Thameslink to be maintained during the peak periods. Southbound trains will terminate at St Pancras and Thameslink Brighton/Sutton northbound trains at Kings Cross Thameslink.

## Planned Schemes

### ERTMS

The European Union's Technical Specifications Interoperability (TSIs) for ERTMS (European Rail Traffic Management System) and ETCS (European Train Control System) define the requirements for train-signalling control for the Trans-European Network (TEN). This series of specifications defines the functionality and interfaces between infrastructure and rolling stock sub-systems.

The rail industry, including Network Rail, expects ERTMS to be the technology of choice for re-signalling schemes by the end of this decade. Although initial applications have been demonstrated in Switzerland and Germany, a successful application of ERTMS to our network has yet to be proven.

We shall continue to work with the National ERTMS Programme Team (NEP) which is under the strategic direction of the SRA. The industry has agreed to focus on developing the application, within the next five years, through an early deployment on the Cambrian Lines in mid-Wales. A linked series of testing and validation projects will provide further support to de-risk the future national ERTMS implementation.

ORR supports our proposals for a series of programme development activities and projects to take forward the UK ERTMS application.

In future years Network Rail and the NEP team will also consider the requirement for a further phase of application testing and deployment to refine the business case for national implementation.

### Automatic Track Warning System (ATWS)

The Automatic Track Warning System (ATWS) issues a warning to track workers of approaching trains. ATWS is used in so called "red zones" where track workers carry out inspection or maintenance work when trains are running, and is used within strict operating procedures to ensure that track workers can work safely. Red Zone working avoids closing lines and disrupting train services.

Portable ATWS, that is provided for a shift or a few days at a particular location, is used by our contractors to a limited extent. Network Rail has also installed Semi-Permanent ATWS at Leighton Buzzard on the West Coast Main Line and at Hatfield on the East Coast Main Line to facilitate easier access for track workers. At these installations the equipment has been installed and will be left in place for long term use. It may also be possible to develop ATWS in fixed form that is integrated into the signalling systems.

We are assessing the benefits and costs of ATWS. The results of the assessment will determine the extent to which we will invest in Portable ATWS, establish if further sites should be provided with Semi-Permanent ATWS, and determine if Fixed ATWS should be developed.

### Thameslink 2000 further development

Thameslink 2000 is identified as a priority project in the SRA's Strategic Plan. However, we have currently only been funded through the interim review settlement for development work during 2004/05.

It should be noted that the CTRL Blockade Works (the signalling, track and station alterations to allow a revised Thameslink train service to operate during the September 2004 to March 2005 CTRL Blockade) are continuing and are unaffected by the situation regarding non-receipt of TWA powers. Work since January 2003 has been focused on the following key areas:

- seeking resolution of the 'deficiencies' associated with the replacement buildings at Blackfriars and Borough High Street that were identified by the Office of the Deputy Prime Minister;

- evaluation of the feasibility of incorporating the masterplan proposals into a schedule of work for London Bridge Station;
- validation of a 3-aspect signalling design through the inner core area; and
- development of a new, robust cost plan for Thameslink 2000.

This work will enable a submission of supplementary TWA documentation to be made in June 2004 with a target date for commencement of implementation of 2007.

## SRA funded schemes

These are schemes where the SRA is funding us to carry out works for them – either to implementation and completion in the case of schemes marked as “committed” below or, in the case of schemes marked as “planned” below, to an agreed level of development (which may be as simple as carrying out what-if train-planning modelling).

For several schemes the “committed” or “planned” status may only be representative of some portion of the total, with the remainder having some lesser level of commitment. In many cases at least some portion of such a scheme will be being held in abeyance at its current level of development, possibly awaiting funding commitment, the right timing – usually relating to the timing of signalling renewals being due – or the right strategic fit.

**Figure 3.4 Enhancements funded by SRA**

£m prices	Route(s) <sup>2</sup>	Estimated cost <sup>1,3</sup>	Expected year of completion
<b>Committed</b>			
Felixstowe – Nuneaton capacity and gauge enhancements phase 1	6,7,18	18	2004/05
Allington Chord	8,11,19	12	2006/07
MFAS	NW	14	2004/05
Incremental Output Statement track and signalling programme (IOS) (first 5 schemes)	13, 24,26	34	2005/06
Southampton – West Coast Main Line: Freight Upgrade (Cherwell Valley)	17	7	2004/05
RPP Scheme – Probus Burngullow	12	9	2004/05
Other		5	2004/05
<b>Planned</b>			
East Coast Main Line improvement project	8,10,11	9	2004/05
Felixstowe – Nuneaton capacity and gauge enhancements phase 2	5,7,8,19		
CTRL Domestic Services (CTRL DS)	1		
Felixstowe – Nuneaton capacity and gauge enhancements phase 2	5,6,7,8,18		
Incremental Output Statement track and signalling programme (IOS) (subsequent 9 schemes)	NW		
Southampton – West Coast Main Line: freight upgrade (gauge)	3,13,17		
<b>Total</b>		<b>108</b>	

<sup>1</sup> This is the estimated future cost for the enhancement element of the scheme.

<sup>2</sup> NW = network wide

<sup>3</sup> Only schemes with a value of £5 million or over are shown

### Committed

#### Felixstowe to Nuneaton capacity and gauge enhancements

Implementation of the initial phase of the SRA funded Felixstowe to Nuneaton project will be completed by November 2004. This will enable 9'6" high containers to be carried on standard freight wagons to and from the ports of Felixstowe and Tilbury to the West Coast Main Line in London and onwards to the Midlands, North West and Scotland. This phase will also specifically gauge clear lines to

the potential future port developments at Bathside Bay, Harwich and Shellhaven as well as the route from Nuneaton to the inland container terminals at Hams Hall and Lawley Street in the Birmingham conurbation.

However, the issues surrounding route capacity remain. Demand for freight paths from Felixstowe continues to grow and consequently the need to address the conflicts between container traffic and passenger schemes in the London area such as Crossrail and the North London Line metro remain.

Whilst the SRA are still not in a position to fund works on the whole cross-country phase of the Felixstowe – Nuneaton scheme it should be noted that the SRA has provided funding for gauge clearance development studies between Ipswich and Peterborough as part of a scheme to provide a 9'6" high container route to Yorkshire via the East Coast Main Line.

### **Allington Chord**

Allington Chord is the key "early" scheme in the ECML improvement project. It enables Skegness services to be separated from the ECML by way of a new 30 mph double line chord provided at Allington Junction to allow trains to and from Skegness to access Grantham without having to traverse the ECML. In addition the existing connecting line at Barkston will be removed, Barkston East signalbox abolished and an underbridge renewed providing operational, safety and maintenance savings.

Completion is planned for the December timetable change in 2005. Funding for this enabling scheme is provided for the enhancement element by the SRA and renewal by Network Rail.

### **Modern facilities at stations**

This project entails implementation of modern facilities at stations (MFAS), including CCTV, toilets, CIS, public address systems, waiting rooms and shelters. Funded works will address the first 68 stations, across three regions (NW, Midlands, East Anglia), as selected by the SRA.

The programme is being delivered for a fixed price and centrally controlled with regional delivery. One national principal contractor has been appointed with a number of other supply contracts, including manufacture of modular designed units.

Design work, pilots and prototypes have been completed. The implementation works have recently commenced for the 68 stations with 16 station site starts in January 2004 in North West region. Works will commence shortly in the other regions.

### **Incremental Output Statement track & signalling programme**

This programme involves the development and implementation of small to medium scale infrastructure schemes, funded directly by the SRA, to deliver improvements to capacity, operational flexibility, journey times and safety. Design development work is primarily managed centrally, with physical works managed by regional project teams.

Five schemes are currently in their implementation phase, for completion during 2004:

*Filton Junction* - providing a second track through the junction plus additional platform and loop work to create additional train paths, improve reliability of the network in this area whilst also mitigating one of the top five SPAD Category 1 risk sites in the UK. It is mentioned further in Route 13.

*Edinburgh to Bathgate route, Fife Circle route, East Kilbride to Glasgow Central route and Edinburgh to Dunblane route* - platform extensions at 25 locations to accommodate longer trains, currently on order by ScotRail. These are mentioned further in Routes 24 and 26.



In addition to the five schemes currently in their implementation phase, nine more schemes are sufficiently developed that, if funding were made available, they could be developed to the single option stage with a view to implementation in 2005-2006.

#### **Southampton-West Coast Main Line: freight upgrade**

Southampton – West Coast Main Line is a two stage programme of projects aimed at, firstly, increasing the gauge on this corridor to allow larger 9'6" containers to be carried, and secondly, to allow more and longer freight trains to run. This is targeted at protecting and then building rail's market share of deep-sea container traffic. The initiative will support the proposed development of Dibden Bay by Associated British Ports.

The programme includes capacity improvement works on the Cherwell Valley, between Leamington Spa and Banbury, which is scheduled for completion in May 2004. This will provide double the available signalling capacity and is timed to be complete to enable additional services to be operated on this route during the West Coast Main Line blockades in 2004.

Completion of the development work for the gauge enhancement work is scheduled for May 2004. Implementation planning is progressing, based on a target completion date of October 2007. This is subject to a funding agreement.

#### **Rail Passenger Partnership (RPP) Scheme**

The Probus - Burngallow scheme entails the redoubling of seven miles of railway on the Cornish main line to Penzance, and is mentioned further in Route 12.

### **Planned**

#### **East Coast Main Line improvement project**

The SRA has produced its Consultation Draft Route Strategy for the ECML for the utilisation and development of the route from Kings Cross to Leeds and Edinburgh for the period 2005 to 2013.

The strategy seeks to reconcile the present and future demands of long distance, cross-country, suburban and freight services using capacity utilisation principles. The priority is to address the current, significant, problems of operational performance, and secondly to provide for growing demand in order to improve the value of the route.

For an investment of around £300 million in infrastructure enhancements over the next 10 years it has been identified as possible to implement the performance improvement schemes giving best value, provide sufficient capacity to serve growing long distance and commuter traffic and provide efficient engineering access. These investments are subject to an affordability review.

In order to take forward these infrastructure enhancements Network Rail and the SRA have formed an integrated project team, the East Coast Main Line Improvement Project (ECMLIP), that have been developing these specific projects under the Enhancement Facilitation Agreement.

The project is developing a staged programme of targeted incremental investments which will, subject to funding being available, improve performance and provide the capacity to deal with growth over the next ten years.

### Channel Tunnel Rail Link Domestic Services (CTRL DS)

This is a scheme to run domestic services from St Pancras over the CTRL and then on to a number of destinations in Kent. The scheme is discussed in more depth in Route 1.

## Schemes being developed with the SRA as SPV

These are schemes where the SRA has determined that the best route for implementation is to use a Special Purpose Vehicle (SPV). This SPV will then carry out appropriate portions of the scheme – for example design, build, fund and transfer (DBFT) whereby the design and construction will be undertaken and financed by an enhancement contractor, and then the completed assets would be transferred to Network Rail on payment of a transfer payment. Network Rail would be remunerated through increased access charges for the capital costs and the increased operation, maintenance and renewal (OMR) costs. The SRA funds the development of the scheme to a point where invitations to tender for the SPV can be issued and acceptance criteria for the completed scheme agreed. We have a role throughout the project, especially in terms of possessions, asset protection and finally bringing into use.

**Figure 3.5 Enhancements Funded by SRA**

£m 2003/04 prices	Route(s)	Estimated cost <sup>1,3</sup>	Expected year of completion
<b>Planned</b>			
East London Line	2,6	6	2008/09 and beyond
Other		4	
<b>Total</b>		<b>85</b>	

<sup>1</sup> This is the estimated future cost for the enhancement element of the scheme.

<sup>2</sup> NW = network wide

<sup>3</sup> Only schemes with a value of £5 million or over are shown

### Planned

#### East London Line

We continue to support the development of the SRA sponsored East London Line Project. Project development continues and the SRA and Network Rail are working together to identify the impact of the project on our stewardship of the network as well as developing the core project proposition. Key activities presently being addressed include timetable feasibility for the SRA's train service aspiration of 4 trains per hour to Crystal Palace, Clapham Junction, New Cross, and West Croydon to the south giving a total of 16 trains per hour through the core section from Surrey Quays to Dalston, with 8 trains per hour continuing over an upgraded NLL infrastructure to Highbury and Islington. We, TfL and the SRA jointly intend to issue an Official Journal of European Union (OJEU) notice this year with construction commencing in 2006/07. The project is proposed to be procured as an SPV. Upon completion the works will be transferred to Network Rail, which will become the network operator for the transferred infrastructure. Completion is anticipated in 2010 when transfer of the asset to Network Rail will take place.

## Non-SRA funded schemes

These are schemes where third parties fund our involvement in an enhancement scheme. That party can be funding us to carry out the works, but often the majority of the work is away from the operational railway, so that they carry out the bulk of the work themselves and fund us for our asset protection duties. Consequently, our involvement in a large scheme can be quite small. Alternatively the third party can fund an SPV in a similar manner to the SRA, which is the case with Laing Rail and Chiltern Evergreen. The table below reflects this distinction in that it reflects our enhancement spend only. For most schemes where our involvement is asset protection, which counts as operational spend, we will have negligible enhancement spend, and the scheme would not appear in the table. We still discuss later, the more significant of these.

**Figure 3.6 Non-SRA funded enhancements**

£m 2003/04 prices	Route(s)	Estimated cost <sup>1,3</sup>	Expected year of completion
<b>Committed</b>			
Chiltern Evergreen	16	75	2006/07
Liverpool South Parkway - Allerton Interchange	20,21	17	2005/06
Larkhall - Milngavie	26	30	2005/06
MPTE Station refurbishments	20,21	17	2005/06
Vale of Glamorgan	13	16	2005/06
Other		38	
<b>Planned</b>			
Frankley Extension of Cross City Line	17	22	2006/07
Holborough Cement Works	1	7	2006/07
Other		30	
<b>Total</b>		<b>172</b>	

<sup>1</sup> This is the estimated future cost for the enhancement element of the scheme.

<sup>2</sup> NW = network wide

<sup>3</sup> Only schemes with a value of £5 million or over are shown

### Committed

#### Chiltern Evergreen 2

The Evergreen 2 project, a core part of the 20 year franchise of M40 Trains, is currently being developed by Laing Rail (acting on behalf of the funders M40 Trains). A DBFT model has been proposed by Laing Rail, and being discussed with the SRA and Network Rail.

The project addresses infrastructure bottlenecks between Bicester North and London Marylebone with the objective of improving capacity and providing more robust train performance. The scheme's main components are:

- additional signals between Bicester and High Wycombe (27 miles), between Princes Risborough and Aylesbury, and around Neasden Junction;
- two additional platforms at Marylebone; and
- removal of a speed restriction at Beaconsfield by alteration of the alignment of the permanent way.

The enhanced timetable outputs required are set out in the franchise agreement as a number of stops at key stations on the Chiltern line in certain time bands (morning and evening peak, off-peak and Saturdays between 0700 and 2100, and Sundays between 1200 and 2100). A sample timetable was developed for the franchise agreement, and this timetable has been used for the operational modelling of the project. The total increase in train service proposed under the project is approximately 15%, compared to the current Summer 2003 timetable.

#### **LUL and CTRL interface works – Kings Cross station**

Network Rail asset protection work continues at Kings Cross station to manage the impact of the extensive redevelopment of the underground station and adjacent construction of the St Pancras Channel Tunnel Rail Link terminus. This is ensuring the effect from these major construction projects causes the minimum disruption and inconvenience to our passengers and stakeholders. Work on both projects is currently planned to continue until 2007. The London Underground works involving the construction of the new northern ticket hall are currently under review by the DfT.

### **Planned**

#### **Stratford City development**

A proposed 13 million square feet development called "Stratford City" on the former Stratford Rail Lands site, directly to the north of the existing regional station and the town centre, is being promoted by Chelsfield plc, Stanhope plc, and London & Continental Railways plc. An outline planning application for Stratford City has been submitted to London Borough of Newham and includes proposals for a new northern passenger concourse and ticket office at the regional station and also links to the new Stratford International station and Stratford City development.

We are working with the SRA to review proposals for Stratford regional station. This embraces plans for two new platforms for Docklands Light Railway (DLR), enhancements to the Jubilee Line services, Crossrail links and the proposals for the Olympic bid and Lower Lea Valley regeneration.

London has submitted a bid to host the 2012 Olympic games utilising facilities centred on the lower Lea Valley in East London. The bid envisages the construction of major sporting facilities close to Stratford domestic station as part of a major drive to secure redevelopment of the area.

Following the submission of the initial questionnaire, the International Olympic Committee will now consider which cities it wishes to consider further and a shortlist will be produced in May 2004 whereupon full applications are required by November 2004. Transport is a critical element of the bid and the SRA are co-ordinating rail industry input into the bid and assessing requirements.

Major elements of the transport proposals include enhancement to services on the North London Line, operation of longer distance services into the Olympic zone and achieving greater utilisation of station facilities in and around the Stratford area. If London is successful in its bid, major passenger flows will focus on the Stratford area and it is essential that enhanced services are able to operate within strict performance criteria.

The SRA will shortly be contracting with Network Rail to review service proposals currently being developed and assess system reliability issues.

## Crossrail

Proposals for the construction of an east - west London rail link and the introduction of associated rail services are currently under development by Cross London Rail Link (CLRL Ltd), a joint SRA/Transport for London company. The Crossrail 1 scheme is designed to reduce overcrowding on the London Underground Central Line in addition to creating new journey opportunities and offering faster journey times. Proposals put forward by the promoters are currently being externally assessed.

CLRL is expecting the current review to be completed and a recommendation made to Government during early 2004. Subject to approval being given, further public consultation will take place prior to a hybrid bill being laid before Parliament in November 2004. The published projected timescales assume that construction will commence in 2007 with completion scheduled between 2013 and 2014.

As currently stated, Crossrail 1 proposals envisage services operating from Kingston and Heathrow in the west to Shenfield and Ebbsfleet in the east. To facilitate this, a central London tunnel will be constructed allowing the operation of up to 24 trains per hour in each direction between Paddington and Whitechapel.

Crossrail 1 proposals will significantly interface with our network both during construction and eventual operation. The actual degree of interface will be dependent on the final service proposals put forward by the scheme promoters. The current most notable points of interface during construction will be Pudding Mill Lane (west of Stratford), Custom House on the North London Line, Farringdon Station and the Paddington Station area.

Operationally, Crossrail 1 proposals will have a major impact on a number of our routes including the north Kent line, Great Eastern lines into Liverpool Street and the London end of the Great Western Main Line.

Ongoing discussions with CLRL are taking place to identify and manage both construction and future operational interface issues in the event that the scheme progresses further.

## Eurostar ECS evaluation

Section 2 of the Channel Tunnel Rail Link (CTRL) is programmed to open in 2007 whereupon Eurostar services will start to operate out of St Pancras.

In Britain, the Eurostar fleet is currently maintained at North Pole depot and empty coaching stock transfers take place along the West London Line into Waterloo station. London & Continental Railways (LCR) has yet to finalise the future maintenance and servicing strategy of the Intercapital Eurostar fleet. One option under investigation is to keep maintenance at North Pole depot and transfer some or all of the units between North Pole and St Pancras over the North London Line via Willesden Junction High Level and Kentish Town West.

LCR is developing plans with the DfT to build a new maintenance depot at Temple Mills on the CTRL route, which could reduce the maintenance work at North Pole and the demand for the North London Line paths from St Pancras. We are supporting the option study by carrying out an operational planning study to assess the capacity of the existing network to accept the Eurostar empty carriage stock workings.

## Network Rail (or joint venture) funded schemes

These are schemes, not funded by the interim review, but Network Rail is either funding itself or is funding through a joint venture with a third party, on the basis that there is a sound business case for the potential income generated to support these investments. Almost all these are schemes are property related investments, such as developing retail outlets at managed stations.

## Uncommitted schemes

These are a number of potential schemes for which no enhancement work is currently funded, but where work may be required to address specific issues including:

- planned signalling renewal schemes where we have identified an opportunity for cost effective enhancements to be added, but where development of these enhancements has not yet been pursued – for example, the West Midlands Strategy;
- schemes that have previously been developed to some level, but have since been put on hold awaiting funding, the appropriate timing or strategic fit – for example further stages of Southampton – WCML freight and further IOS schemes; and
- schemes where we have identified an issue, the solution for which may be an enhancement scheme, but where a firm way forward has not been agreed with the other parties involved, for example Kings Cross Station expansion below.

While we have not sought in this section to list all potential enhancements that could be considered, we have identified the major potential enhancements below. No funding has been provided for these projects and therefore no expenditure has been included in this plan.

## Capacity issues at managed stations

Many managed stations are reaching a point of utilisation by passengers in the peak where intervention is required to prevent passenger crowding exceeding levels agreed with the HMRI. The intervention would usually take the form of closing off platforms and / or the concourse in a manner similar to that exercised by LUL to avoid overcrowding at London Underground stations. The situation is more acute at some stations than at others. For example, Birmingham New Street station is particularly at risk of this situation developing, as mentioned in Route 17, and as mentioned in Route 3 we are discussing with SWT short term solutions for London Waterloo. The long term solution for all of the stations is likely to involve a substantial enhancement scheme, for which there is currently no funding.

## West Midlands strategy

The West Midlands Route Plan (Route 17) describes the area's significant capacity, performance and asset condition challenges, with a heavy mixed traffic usage on predominantly two track routes. There has been little change in terms of signalling equipment or capacity improvement for many years, reflected in the high capacity utilisation index on much of the route. However, passenger growth is strong, partly as a result of service upgrades (e.g. Cross Country or West Coast Route Modernisation) and partly from the continued expansion of central Birmingham employment. Since 2000 we have worked closely with SRA to identify the enhancement options to accommodate passenger and freight growth and undertake feasibility on individual schemes.

Signalling asset condition is critical to the strategy for the West Midlands hub, with plans to renew, over the next ten years, the signalling of approximately 75% of the route's length. Signalling renewals to maintain current network capability and functionality remain our primary objective. However, in many cases there is an opportunity to incorporate signalling or track layout modifications, with three advantages compared with separate renewal and enhancement projects:

- reduced call on scarce technical resources;
- reduced train service disruption during implementation; and
- potential cost saving for the enhancement element.

In the context of industry funding constraints the focus in our recent development work with SRA has been on the enhancement and modification options for the early signalling renewals projects: Coventry PSB, Salfrey PSB and Stourbridge – Hartlebury. These include relatively minor track layout alterations and reductions in signalling headways. Recent work with the SRA has included development of a process to enable scope integration of modifications with the base Network Rail renewal at GRIP stage 2 to facilitate delivery of modifications, together with an early scope freeze to minimise risk of delay to the critical renewal.

### Kings Cross station expansion

Network Rail and the DfT are continuing the development work on the proposals to expand passenger capacity at Kings Cross Station by replacing the existing temporary southern concourse to the front of the station. This is being done in close collaboration with London & Continental Stations and Properties (LCS&P), the company responsible for developing the railway lands identified as surplus by the DfT.

Funding for a new concourse at Kings Cross station has not currently been agreed and we are exploring funding options with the SRA, ORR and the DfT.

We remain committed to reaching a long-term solution to replace the existing southern concourse and the replacement concourse, which would ideally be located on the west side of the station above the new LUL northern ticket hall.

The timing of any construction work on the concourse will depend on funding and the construction programmes for the CTRL and the London Underground works, which are already underway and due to complete in 2007. The new concourse is planned to be an integrated part of the masterplan for the refurbishment of Kings Cross main line station complementing the Kings Cross Central regeneration scheme, being developed by LCR and its partners, Exel and Argent St George.

### Thameslink 2000 – remaining development, design and implementation

The scheme is sponsored by the SRA and is being designed to enhance and expand the existing Thameslink network throughout London, the east and south east England, as well as creating a substantial increase in train service capacity, benefiting peak hour commuters in particular.

Whilst involving works throughout the area described, the primary focus is on removing bottlenecks and improving station capability between London Bridge, Blackfriars and a new station to be constructed as part of the St Pancras CTRL terminus.



The principal works are likely to be as follows:

- major remodelling of London Bridge, Farringdon and Blackfriars stations;
- new viaduct across Borough Market to eliminate an existing bottleneck at Metropolitan Junction;
- major signalling alterations to control the new track layouts and permit the increased level of train services; and
- outer areas - platform extensions at over 40 stations, clearance for new rolling stock and alterations to electric traction power supply network.

In addition, a new station box at St Pancras Midland Road (replacing the existing Kings Cross Thameslink station) and tunnels connecting to the ECML are being constructed by Union Railways as part of the CTRL scheme.

The Thameslink 2000 scheme is designed to connect locations such as Bedford, Peterborough, Cambridge and Kings Lynn in the north, to Ashford, Eastbourne, Brighton and Littlehampton in the south. Whilst designed primarily to improve network capability for passenger services, the opportunity has been taken to ensure, where practicable, that the new works also provide for potential future freight needs.

#### **TWA powers/ development strategy**

Non-receipt of Transport and Works Act (TWA) powers by the planned date (1 January 2003) and a letter from the ODPM requesting the resolution of a number of 'deficiencies' with the original proposals has resulted in a revised strategy being produced jointly by the SRA and Network Rail.

A short term funding strategy is now in place for the continuation of design development through to 2005 as described earlier. However, the long term funding strategy to cover the completion of design development and the implementation stage is still being developed with the SRA taking the lead.

#### **Southampton – West Coast (capacity)**

As well as the Cherwell Valley works mentioned above other schemes to enhance capacity are likely to be identified and developed. One such is being developed for the Reading station area. Potentially, it includes a flyover at the western end of the station to allow more north-south traffic to cross the Great Western Main Line without conflict. The proposal would also include the redesign of the station itself and provision of additional platforms. Implementation would be scheduled for a time when it could be integrated with a committed signalling renewal scheme.

#### **IOS (subsequent schemes)**

The five schemes referred to above are being implemented. Work has been suspended on all other schemes short-listed from the original programme, including the nine mentioned earlier to be at a more advanced stage of development. Work may resume on these schemes should funding become available.



# Section 4

## Further information

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## Capacity bottlenecks

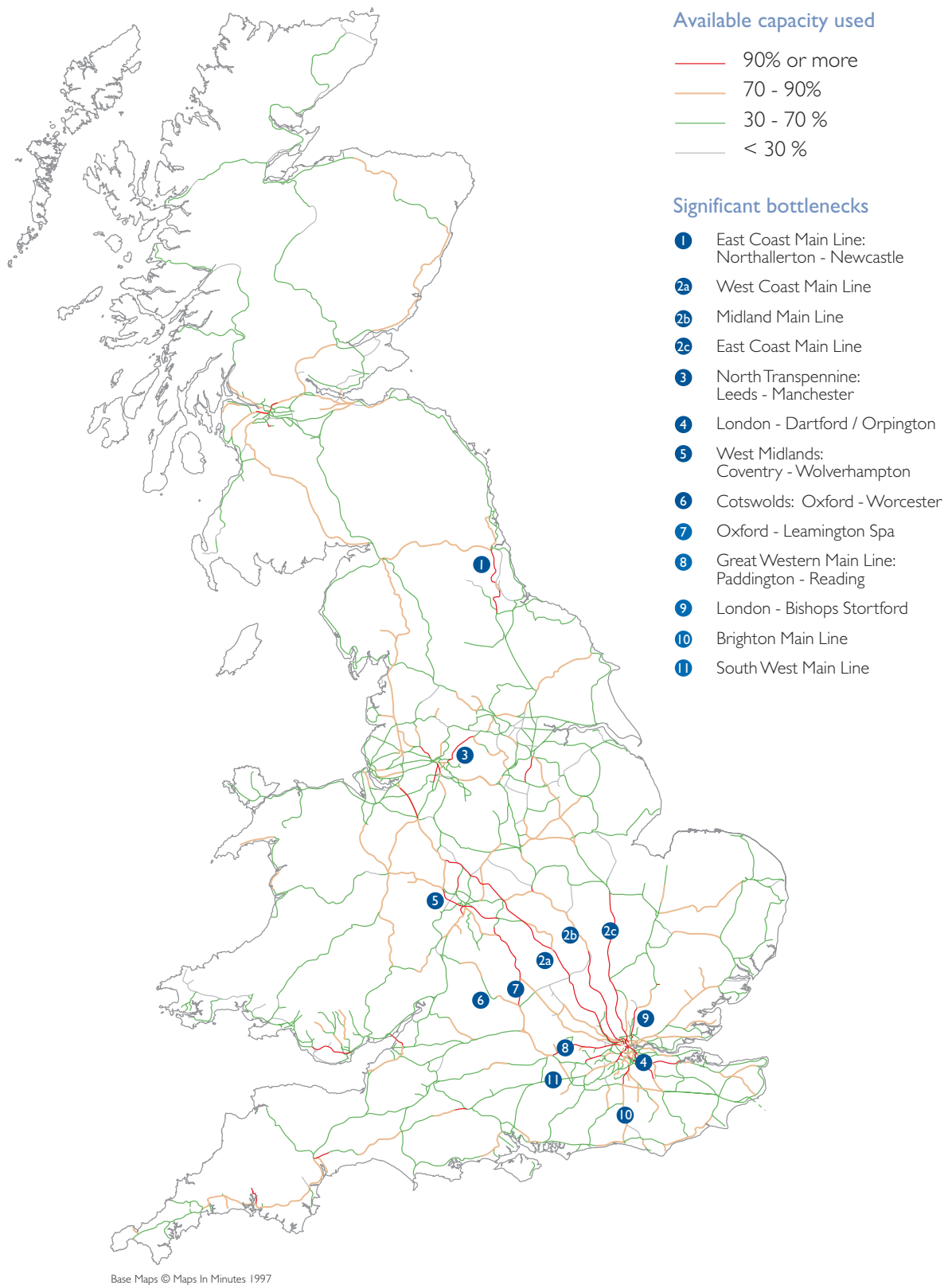
The Technical Plan discusses our approach to understanding capacity. Such an understanding is key to understanding where bottlenecks in the system occur.

Figure 4.1 shows peak level utilisation. Each route is split into sections. The splits occur where there is a change of capacity caused by a change in the number of tracks or headway, or a significant change in traffic level. The capacity used in the peak hour for train movements, in the direction of peak flow, is calculated by summing the capacity used by each passenger and freight train. This is equal to the planning headway, plus the differential in time taken to traverse the section between that train and the following train, if the latter is a faster train. The capacity used is expressed as a number of minutes per hour, and this is converted into a percentage of an hour. On four track sections, the capacity of the busier line is shown.

The map is a guide to the relative utilisation of different parts of the network, since actual utilisation depends on the exact ordering of trains and the length of the sections chosen. This high-level analysis therefore helps to point us toward areas that need to be explored further.

The Technical Plan discusses our hierarchical approach to capacity analysis. Our initial analysis concentrates on timetable solutions to overcome capacity constraints. Only in those cases where a timetable solution does not provide sufficient capacity to meet our customers' needs and where performance would be compromised, are physical route enhancements considered. These solutions are currently developed only where an external funding source is identified.

**Figure 4.1** Map showing capacity utilisation in Autumn 2003



**Figure 4.2 Significant Bottlenecks with potential solutions under discussion with the SRA**

Map ref	Location / Problem	Possible Solutions	Action
1	ECML: The high levels of utilisation are caused by the current traffic pattern, with significant variations in journey times between passenger and freight trains.	Analysis suggests that a number of solutions are possible including changes to the timetable and a series schemes to improve performance and capacity.	The SRA is proposing to publish its Route Strategy for consultation in spring 2004 with the final document published later in the summer.
2	WCML, MML, ECML: At their southern end these three main lines will be running at high levels of utilisation (even after the upgrade in the case of WCML) because of continued growth of passenger and freight trains.	See text below.	See text below.
2a	WCML: See 2	Short / Medium Term: Increasing route capacity through route upgrade and timetable specification.	We are implementing the West Coast Main Line Route Modernisation, which will provide an increase in capacity.
2b	MML: See 2	Short / Medium Term: Significant changes to the timetable structure to improve use of current capacity. Minor infrastructure upgrades could also create additional capacity between Bedford and Leicester.	The route is covered in the pilot RUS study we have undertaken with the SRA.
2c	ECML: See 2	Short / Medium Term: Analysis suggests that a number of solutions are possible including changes to the timetable and a series schemes to improve performance and capacity.	The SRA is proposing to publish its Route Strategy for consultation in spring 2004 with the final document published later in the summer.
	WCML, MML, ECML	Long Term: A new high-speed route could relieve each of these lines by providing additional capacity, and by allowing a greater segregation of traffic of differing speeds.	The SRA is studying this option for possible long term implementation.

Ref	Location / Problem	Possible Solutions	Action
3	<p>TransPennine:</p> <p>The mix of freight and passenger trains consumes much of the available capacity on the routes across the Pennines. At Manchester, conflicts occur between East-West services on the North Trans-Pennine route, and services entering Manchester from the south. Refranchising is not expected to deliver increased services and any growth is predicted to be met by lengthening trains. The capacity at the throat of Manchester Piccadilly station is insufficient to support additional traffic.</p> <p>There remain, however, aspirations external to the rail industry for more services.</p>	<p>Possible solutions include timetable changes, and development of alternative routes allowing diversion of some freight trains. Options for changes to the infrastructure in the Manchester area were presented in Railtrack's 2000 NMS. These included the provision of the Ordsall chord in Manchester, to enable North Trans-Pennine trains to avoid conflicting with trains entering Manchester from the south.</p>	<p>This work was developed in the Greater Manchester Strategic Rail Study whose partners included the SRA, Network Rail, GMPTE, Manchester International Airport and the Highways Agency. The study identified a range of measures that could be provided but these are not committed.</p> <p>The Manchester hub is to be the subject of a SRA RUS study in 2004/05 to look at how existing capacity is best used.</p>
4	<p>London – Dartford / Orpington:</p> <p>Bottlenecks in the Charing Cross – London Bridge area and around a number of other two track sections and flat junctions reduces overall capacity and operational flexibility over these routes.</p>	<p>There are a number of short and long term solutions ranging from changing the timetable to optimise the use of existing infrastructure, to major infrastructure enhancements at key locations, such as those proposed as part of the Thameslink 2000 scheme, to increase the overall capacity of the line.</p>	<p>A revised timetable is being developed in conjunction with the SRA as part of the Integrated Kent Franchise process. In addition to introducing domestic services running on the CTRL, this aims to simplify some of the crossing movements at critical parts of the network, allowing the potential for capacity improvements through optimised network utilisation and improved reliability of service provision. Concerning Thameslink 2000 we await a decision from the Office of the Deputy Prime Minister on the scope and timescale for the project.</p>
5	<p>Coventry – Wolverhampton:</p> <p>The mix of traffic along this double track route consumes all available capacity and constrains growth.</p>	<p>A significant revision of the timetable structure would provide some relief. Options for train lengthening exist and have the potential for increases in passenger capacity on most services.</p> <p>Provision of an additional platform at Wolverhampton and two new bay platforms at Birmingham New Street.</p>	<p>A revised timetable structure is to be introduced in Winter 2004 as part of the implementation of the West Coast Strategy.</p> <p>We are implementing the new platforms at Wolverhampton and Birmingham New Street with a target date of September 2004.</p> <p>We are currently developing the further bay platform at New Street with an objective of implementation during 2005.</p>

Ref	Location / Problem	Possible Solutions	Action
6	Oxford – Worcester: This section is largely single track, which constrains the implementation of a robust even interval timetable.	Re-specifying the timetable could achieve a slightly more robust timetable. A mixture of extending double track sections and providing additional intermediate signals would further increase robustness and capacity on this route.	A revised timetable is being considered by the SRA as part of an RUS study . The introduction of longer trains will provide additional capacity.
7	Oxford – Leamington Spa: The signalling on the section of route between Banbury and Leamington Spa limits the number of trains that can use this section of line.	Resignal the route between Leamington Spa and Banbury to enable an increased number of trains to be operated.	We are developing the first phase of this scheme and the SRA has set a target for implementation of May 2004.
8	Paddington – Reading: The current pattern of services constrains the ability to run additional trains to cater for forecast growth.	Re-timetabling of trains, together with remodelling at Reading would allow an increase in the throughput of trains.	Timetable changes to improve capacity are being developed as part of a RUS study and the integration of the Thames and Great Western franchises. The SRA, Network Rail and Reading Borough Council are considering plans to renew Reading station.
9	London – Bishops Stortford: The mix of fast and stopping trains on this predominantly double track route, constrains development of services, including the aspiration for an all-day 15-minute service to Stansted Airport.	Additional services could be accommodated through a range of options from changes in the timetable to providing additional track and signalling, especially on the Lea Valley section of the route and additional platforms at Liverpool Street station.	The timetable will be reviewed as part of the SRA's RUS work. An improvement in capacity is likely to be driven by the decision to build a second runway at Stansted Airport.
10	Brighton Main Line: There are several points on the Brighton Main Line where capacity is constrained, preventing the operation of additional trains. Capacity at Victoria station presents a particular constraint which is complicated by the close relationship between the mainline and underground stations.	There are a number of possible solutions ranging from changing the timetable to optimise the use of existing infrastructure, combining timetable changes with limited infrastructure changes, to major infrastructure enhancements at key locations to increase the overall capacity of the line.	A revised timetable is being developed and station capacity review undertaken in conjunction with the SRA as part of the RUS process. This will aim to simplify some of the crossing movements at constrained parts of the network, therefore improving performance and allowing the potential for additional capacity through optimised network utilisation.
11	South West Main Line: The route out of Waterloo is running at capacity at peak times, and additional capacity to address current overcrowding and forecast growth cannot be provided.	Options to provide additional capacity to address overcrowding include train lengthening and the Crossrail proposals linking south-west and north-east London.	Longer train operation is the likely and preferred solution to the capacity issue, particularly on the South West Suburban area. Crossrail may address some of the overcrowding issues from the SW London area in the longer term.



## Passenger & freight train operators

The list below shows passenger and freight train operators.

<b>Figure 1.1 Franchised passenger train operators</b>	
Owning / holding group	Franchise
SRA	South Eastern Trains
First Group Plc	First Great Eastern (FGE)
	First North Western (FNW)
	First Great Western (FGW)
	Thames Trains (transfers from Go Ahead Group on 1 April 04)
First Group / Keolis	TransPennine Express
GB Railways Plc	Anglia Railways
Go Ahead Group / Go-Via	Thames Trains (transfers to First Group on 1 April 04)
	Thameslink
	South Central
M40 Trains John Laing Plc	Chiltern Railways
Arriva	Arriva Trains Northern (ATN)
	Arriva Trains Wales (ATW)
National Express Group	Central Trains
	Silverlink
	ScotRail Railways
	Midland Mainline
	Gatwick Express
	Wessex
	West Anglia Great Northern (WAGN)
	c2c
	Sea Containers
SERCO/NS	Merseyrail
Stagecoach Plc	South West Trains (SWT)
	Island Line
Virgin Rail Group Ltd	Virgin Cross Country
	Virgin West Coast

<b>Figure 1.2 Other passenger operators</b>	
London Underground Ltd	
Hull Trains Ltd	
Eurostar Ltd	
Heathrow Express Ltd	
NEXUS	
Grand Central (Potential future operator)	

<b>Figure 1.3 Freight operators</b>	
Advenza Freight Ltd	
Direct Rail Services Ltd	
English Welsh & Scottish Railway Holdings Ltd	
English Welsh & Scottish International	
Freightliner Ltd	
Freightliner Heavy Haul Ltd	
GB Railfreight Ltd	
Jarvis Fastline Ltd	

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Achnasheen	25
Achnashellach	25
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Acle	7
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Acton Central	6
Acton Main Line	13
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Addlestone	3
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Adlington	20
Adwick	8 (Northern)
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Aintree	21
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Beverley	10
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Brighton	2
Brimsdown	5
Brinnington	20
Bristol Parkway	13
Bristol Temple Meads	13
Brithdir	15
British Steel Redcar	9
Briton Ferry	13
Brixton	1
Broad Green	20
Broadbottom	20
Broadstairs	1
Brockenhurst	3
Brockholes	11
Brockley	2
Brockley Whins	9
Bromborough	21
Bromborough Rake	21
Bromley Cross	20
Bromley North	1
Bromley South	1
Bromsgrove	17
Brondesbury	6
Brondesbury Park	6
Brookmans Park	8 (Southern)
Brookwood	3
Broome	14
Broomfleet	10
Brora	25
Brough	10
Broughty Ferry	24
Broxbourne	5
Bruce Grove	5
Brundall	7
Brundall Gardens	7

Station Name	Route No
Brunstane	24
Brunswick	21
Bruton	12
Bryn	20
Buckenham	7
Buckley	22
Bucknell	14
Bugle	12
Builth Road	14
Bulwell	19
Bures	7
Burgess Hill	2
Burley Park	10
Burley-in-Wharfedale	10
Burnage	20
Burneside	23
Burnham	13
Burnham-on-Crouch	7
Burnley Barracks	23
Burnley Central	23
Burnley Manchester Road	23
Burnside	26
Burmtisland	24
Burscough Bridge	20
Burscough Junction	23
Bursledon	3
Burton Joyce	19
Burton-on-Trent	19
Bury St Edmunds	5
Busby	26
Bush Hill Park	5
Bushey	18 (Southern)
Butlers Lane	17
Buxted	2
Buxton	20
Byfleet & New Haw	3
Bynea	14
Cadoxton	15
Caergwrle	22
Caerphilly	15
Caersws	14
Caldicot	13
Caledonian Road & Barnsbury	6
Calstock	12
Cam & Dursley	13
Camberley	3
Camborne	12
Cambridge	5
Cambridge Heath	5
Cambuslang	26
Camden Road	6
Camelon	24
Canley	17

Station Name	Route No
Canning Town	6
Cannock	17
Canonbury	6
Canterbury East	1
Canterbury West	1
Cantley	7
Capenhurst	21
Carbis Bay	12
Cardenden	24
Cardiff Bay	15
Cardiff Central	15
Cardiff Queen Street	15
Cardonald	26
Cardross	26
Carfin	26
Cark & Cartmel	23
Carlisle	18 (Northern)
Carlton	19
Carluke	26
Carmarthen	14
Carmyle	26
Camforth	23
Carnoustie	24
Camtyne	26
Carpenders Park	18 (Southern)
Cambridge	25
Carshalton	2
Carshalton Beeches	2
Carstairs	26
Cartsdyke	26
Castle Bar Park	13
Castle Cary	12
Castleford	10
Castleton	20
Castleton Moor	9
Caterham	2
Catford	1
Catford Bridge	1
Cathays	15
Cathcart	26
Cattal	10
Causeland	12
Cefn-y-Bedd	22
Chadwell Heath	7
Chafford Hundred	6
Chalfont & Latimer	16
Chalkwell	6
Chapel-en-le-Frith	20
Chapelton	12
Chapelton	12
Chapelton	11
Chappel & Wakes Colne	7
Charing	1
Charing Cross	26
Charlbury	13

Station Name	Route No
Charlton	1
Chartham	1
Chassen Road	20
Chatham	1
Chathill	8 (Northern)
Cheadle Hulme	20
Cheam	2
Cheddington	18 (Southern)
Chelford	20
Chelmsford	7
Chelsfield	1
Cheltenham Spa	13
Chepstow	13
Cherry Tree	23
Chertsey	3
Cheshunt	5
Chessington North	3
Chessington South	3
Chester	22
Chester Road	17
Chesterfield	19
Chester-le-Street	8 (Northern)
Chestfield & Swalecliffe	1
Chetnole	4
Chichester	2
Chilham	1
Chilworth	3
Chingford	5
Chinley	11
Chippenham	13
Chipstead	2
Chirk	14
Chislehurst	1
Chiswick	3
Cholsey	13
Chorley	20
Chorleywood	16
Christchurch	3
Christ's Hospital	2
Church & Oswaldtwistle	23
Church Fenton	10
Church Stretton	14
Cilmeri	14
City Thameslink	2
Clacton	7
Clandon	3
Clapham	23
Clapham High Street	2
Clapham Junction	3
Clapton	5
Clarbeston Road	14
Clarkston	26
Claverdon	17
Claygate	3

Station Name	Route No
Cleethorpes	11
Cleland	26
Clifton	20
Clifton Down	13
Clitheroe	23
Clock House	1
Clunderwen	14
Clydebank	26
Coatbridge Central	26
Coatbridge Sunnyside	26
Coatdyke	26
Cobham & Stoke D'abernon	3
Codsall	17
Cogan	15
Colchester	7
Colchester Town	7
Collingham	11
Collington	2
Colne	23
Colwall	17
Colwyn Bay	22
Combe	13
Commondale	9
Congleton	18 (Northern)
Conisbrough	11
Connel Ferry	25
Cononley	10
Conway Park	21
Conwy	22
Cooden Beach	2
Cookham	13
Cooksbridge	2
Coombe	12
Copplestone	12
Corbridge	9
Corkerhill	26
Corkickle	23
Corpach	25
Corrour	25
Coryton	15
Coseley	17
Cosford	17
Cosham	3
Cottingham	10
Cottingley	10
Coulsdon South	2
Coventry	17
Cowden	2
Cowdenbeath	24
Cradley Heath	17
Craigendoran	26
Cramlington	8 (Northern)
Craven Arms	14
Crawley	2

Station Name	Route No
Crayford	1
Crediton	12
Cressing	7
Cressington	21
Creswell	19
Crewe	18 (Northern)
Crewkerne	4
Crews Hill	8 (Southern)
Crianlarich	25
Criccieth	14
Cricklewood	19
Croftfoot	26
Crofton Park	1
Cromer	7
Cromford	19
Crookston	26
Cross Gates	10
Crossflatts	10
Crosshill	26
Crossmyloof	26
Croston	23
Crouch Hill	6
Crowborough	2
Crowhurst	1
Crowle	11
Crowthorne	3
Croy	24
Crystal Palace	2
Cuddington	20
Cuffley	8 (Southern)
Culham	13
Culrain	25
Cumbernauld	26
Cupar	24
Curriehill	24
Custom House	6
Cuxton	1
Cwmbach	15
Cwmbran	14
Cynghordy	14
Dagenham Dock	6
Daisy Hill	20
Dalgety Bay	24
Dalmally	25
Dalmarnock	26
Dalmeny	24
Dalmuir	26
Dalreoch	26
Dalry	26
Dalston	23
Dalston Kingsland	6
Dalton	23
Dalwhinnie	25
Danby	9

Station Name	Route No
Danescourt	15
Danzey	17
Darlington	8 (Northern)
Damall	11
Darsham	7
Dartford	1
Darton	11
Darwen	20
Datchet	3
Davenport	20
Dawlish	12
Dawlish Warren	12
Deal	1
Dean	4
Dean Lane	20
Deansgate	20
Deganwy	22
Deighton	10
Delamere	20
Denby Dale	11
Denham	16
Denham Golf Club	16
Denmark Hill	1
Dent	23
Denton	20
Deptford	1
Derby	19
Derby Road	7
Derker	20
Devonport	12
Dewsbury	10
Didcot Parkway	13
Digby & Sowton	12
Dilton Marsh	4
Dinas	15
Dinas Powys	15
Dingle Road	15
Dingwall	25
Dinsdale	9
Dinting	20
Disley	20
Diss	7
Dockyard	12
Dodworth	11
Dolau	14
Doleham	1
Dolgarrog	22
Dolwyddelan	22
Doncaster	8 (Northern)
Doncaster	8 (Southern)
Dorchester South	3
Dorchester West	4
Dore	11
Dorking	2

Station Name	Route No
Dorking (Deepdene)	3
Dorking West	3
Dormans	2
Dorridge	17
Dove Holes	20
Dover Priory	1
Dovercourt	7
Dovey Junction	14
Downham Market	5
Drayton Green	13
Drayton Park	8 (Southern)
Drem	8 (Northern)
Driffield	10
Drigg	23
Droitwich Spa	17
Dronfield	11
Drumchapel	26
Drumfrochar	26
Drumgelloch	26
Drumry	26
Duddeston	17
Dudley Port	17
Duffield	19
Duirinish	25
Duke Street	26
Dullingham	5
Dumbarton Central	26
Dumbarton East	26
Dumbreck	26
Dumfries	26
Dumpton Park	1
Dunbar	8 (Northern)
Dunblane	24
Dunbridge	4
Duncraig	25
Dundee	24
Dunfermline Queen Margaret	24
Dunfermline Town	24
Dunkeld & Birmam	25
Dunlop	26
Dunrobin Castle	25
Dunston	9
Dunton Green	1
Durham	8 (Northern)
Durrington-on-Sea	2
Dyce	25
Dyffryn Ardudwy	14
Eaglescliffe	9
Ealing Broadway	13
Earlestown	20
Earley	3
Earlsfield	3
Earlswood	2



Station Name	Route No
Earlswood	17
East Boldon	9
East Croydon	2
East Didsbury	20
East Dulwich	2
East Farleigh	1
East Garforth	10
East Grinstead	2
East Kilbride	26
East Malling	1
East Tilbury	6
East Worthing	2
Eastbourne	2
Eastbrook	15
Easterhouse	26
Eastham Rake	21
Eastleigh	3
Eastrington	10
Eccles	20
Eccles Road	5
Eccleston Park	20
Edale	11
Eden Park	1
Edenbridge	1
Edenbridge Town	2
Edge Hill	20
Edinburgh	24
Edmonton Green	5
Effingham Junction	3
Eggesford	12
Egham	3
Egton	9
Elephant & Castle	2
Elgin	25
Ellesmere Port	21
Elmers End	1
Elmstead Woods	1
Elmswell	5
Elsecar	11
Elsenham	5
Elstree & Borehamwood	19
Eltham	1
Elton & Orston	19
Ely	5
Emerson Park	7
Emsworth	2
Enfield Chase	8 (Southern)
Enfield Lock	5
Enfield Town	5
Entwistle	20
Epsom	2
Epsom Downs	2
Erdington	17
Eridge	2

Station Name	Route No
Erith	1
Esher	3
Essex Road	8 (Southern)
Etchingham	1
Etruria	18 (Northern)
Euxton Balshaw Lane	18 (Northern)
Evesham	13
Ewell East	2
Ewell West	3
Ewenny Road	15
Exeter Central	12
Exeter St Davids	12
Exeter St Thomas	12
Exhibition Centre	26
Exmouth	12
Exton	12
Eynsford	1
Failsworth	20
Fairbourne	14
Fairfield	20
Fairlie	26
Fairwater	15
Falconwood	1
Falkirk Grahamston	24
Falkirk High	24
Falls of Cruachan	25
Falmer	2
Falmouth Docks	12
Falmouth Town	12
Fambridge	7
Fareham	3
Farnborough	3
Farnborough North	3
Farncombe	3
Farnham	3
Farningham Road	1
Farnworth	20
Farringdon	2
Fauldhouse	26
Faversham	1
Faygate	2
Fazakerley	21
Fearn	25
Featherstone	10
Felixstowe	7
Feltham	3
Feniton	4
Fenny Stratford	18 (Southern)
Fernhill	15
Ferriby	10
Ferryside	14
Ffairfach	14
Filey	10
Filton Abbey Wood	13

Station Name	Route No
Finchley Road & Frognal	6
Finsbury Park	8 (Southern)
Finstock	13
Fishbourne	2
Fishersgate	2
Fishguard Harbour	14
Fiskerton	19
Fitzwilliam	8 (Northern)
Five Ways	17
Fleet	3
Flimby	23
Flint	22
Flitwick	19
Flixton	20
Flowery Field	20
Folkestone Central	1
Folkestone Harbour	1
Folkestone West	1
Ford	2
Forest Gate	7
Forest Hill	2
Formby	21
Forres	25
Forsinard	25
Fort Matilda	26
Fort William	25
Four Oaks	17
Foxfield	23
Foxton	5
Frant	1
Fratton	3
Freshfield	21
Freshford	4
Frimley	3
Frinton	7
Frizinghall	10
Frodsham	22
Frome	12
Fulwell	3
Furness Vale	20
Furze Platt	13
Gainsborough Central	11
Gainsborough Lea Road	11
Garelochhead	25
Garforth	10
Gargrave	23
Garrowhill	26
Garscadden	26
Garsdale	23
Garston	18 (Southern)
Garston	21
Garswood	20
Garth	14
Garth (Mid-Glamorgan)	15

Station Name	Route No
Garve	25
Gathurst	20
Gatley	20
Gatwick Airport	2
Georgemas Junction	25
Gerrards Cross	16
Gidea Park	7
Giffnock	26
Giggleswick	23
Gilberdyke	10
Gilfach Fargoed	15
Gillingham	1
Gillingham	4
Gilshochill	26
Gipsy Hill	2
Girvan	26
Glaisdale	9
Glan Conwy	22
Glasgow Central	26
Glasgow Queen Street	24
Glazebrook	20
Gleneagles	24
Glenfinnan	25
Glengarnock	26
Glenrothes with Thornton	24
Glossop	20
Gloucester	13
Glynde	2
Gobowen	14
Godalming	3
Godley	20
Godstone	1
Goldthorpe	11
Golf Street	24
Golspie	25
Gomshall	3
Goodmayes	7
Goole	10
Goostrey	20
Gordon Hill	8 (Southern)
Goring & Streatley	13
Goring-by-Sea	2
Gorton	20
Gospel Oak	6
Gourock	26
Gowerton	14
Goxhill	11
Grange Park	8 (Southern)
Grange-over-Sands	23
Grangetown	15
Grantham	8 (Southern)
Grateley	4
Gravelly Hill	17
Gravesend	1

Station Name	Route No
Grays	6
Great Ayton	9
Great Bentley	7
Great Chesterford	5
Great Coates	11
Great Malvern	17
Great Missenden	16
Great Yarmouth	7
Green Lane (Birkenhead)	21
Green Road	23
Greenbank	20
Greenfaulds	26
Greenfield	10
Greenford	13
Greenhithe	1
Greenock Central	26
Greenock West	26
Greenwich	1
Gretna Green	26
Grimsby Docks	11
Grimsby Town	11
Grindleford	11
Grosmont	9
Grove Park	1
Guide Bridge	20
Guildford	3
Guisseley	10
Gunnersbury	6
Gunnislake	12
Gunton	7
Gwersyllt	22
Gypsy Lane	9
Habrough	11
Hackbridge	2
Hackney Central	6
Hackney Downs	5
Hackney Wick	6
Haddenham & Thame Parkway	16
Haddiscoe	7
Hadfield	20
Hadley Wood	8 (Southern)
Hag Fold	20
Hagley	17
Hairmyres	26
Hale	20
Halesworth	7
Halewood	20
Halifax	10
Hall Green	17
Hall i' th' Wood	20
Hall Road	21
Halling	1
Haltwhistle	9

Station Name	Route No
Ham Street	1
Hamble	3
Hamilton Central	26
Hamilton West	26
Hammerton	10
Hampden Park	2
Hampstead Heath	6
Hampton	3
Hampton Court	3
Hampton Wick	3
Hampton-in-Arden	17
Hamstead	17
Hamworthy	3
Hanborough	13
Handforth	20
Hanwell	13
Hapton	23
Harlech	14
Harlesden	18 (Southern)
Harling Road	5
Harlington	19
Harlow Mill	5
Harlow Town	5
Harold Wood	7
Harpenden	19
Harrietsham	1
Harringay	8 (Southern)
Harringay Green Lanes	6
Harrington	23
Harrogate	10
Harrow & Wealdstone	18 (Southern)
Harrow-on-the-Hill	16
Hartford	18 (Northern)
Hartlebury	17
Hartlepool	9
Hartwood	26
Harwich International	7
Harwich Town	7
Haslemere	3
Hassocks	2
Hastings	1
Hatch End	18 (Southern)
Hatfield	8 (Southern)
Hatfield & Stainforth	11
Hatfield Peverel	7
Hathersage	11
Hattersley	20
Hatton	17
Havant	3
Havenhouse	11
Haverfordwest	14
Hawarden	22
Hawarden Bridge	22
Hawkhead	26

Station Name	Route No
Haydon Bridge	9
Haydons Road	2
Hayes	1
Hayes & Harlington	13
Hayle	12
Haymarket	24
Haywards Heath	2
Hazel Grove	20
Headcorn	1
Headingly	10
Headstone Lane	18 (Southern)
Heald Green	20
Healing	11
Heath High Level	15
Heath Low Level	15
Heaton Chapel	20
Hebden Bridge	10
Heckington	11
Hedge End	3
Hednesford	17
Heighington	9
Helensburgh Central	26
Helensburgh Upper	25
Hellifield	23
Helmsdale	25
Helsby	22
Hemel Hempstead	18 (Southern)
Hendon	19
Hengoed	15
Henley-in-Arden	17
Henley-on-Thames	13
Hensall	10
Hereford	14
Heme Bay	1
Herne Hill	1
Hersham	3
Hertford East	5
Hertford North	8 (Southern)
Hessle	10
Heswall	22
Hever	2
Heworth	9
Hexham	9
Heyford	17
Heysham Port	23
High Brooms	1
High Street	26
High Wycombe	16
Higham	1
Highams Park	5
Highbridge & Burnham	13
Highbury & Islington	6
Hightown	21
Hildenborough	1

Station Name	Route No
Hillfoot	26
Hillington East	26
Hillington West	26
Hillside	21
Hilsea	3
Hinchley Wood	3
Hinckley	19
Hindley	20
Hinton Admiral	3
Hitchin	8 (Southern)
Hither Green	1
Hockley	7
Hollingbourne	1
Hollinwood	20
Holmes Chapel	20
Holmwood	2
Holton Heath	3
Holyhead	22
Holytown	26
Homerton	6
Honeybourne	13
Honiton	4
Honley	11
Honor Oak Park	2
Hook	3
Hooton	21
Hope	11
Hope	22
Hopton Heath	14
Horley	2
Hombeam Park	10
Homsey	8 (Southern)
Horsforth	10
Horsham	2
Horsley	3
Horton-in-Ribblesdale	23
Horwich Parkway	20
Hoscar	20
Hough Green	20
Hounslow	3
Hove	2
Hoveton & Wroxham	7
How Wood	18 (Southern)
Howden	10
Howwood	26
Hoylake	21
Hubberts Bridge	11
Hucknall	19
Huddersfield	10
Hull	10
Humphrey Park	20
Huncoat	23
Hungerford	12
Hunmanby	10

Station Name	Route No
Huntingdon	8 (Southern)
Huntly	25
Hunts Cross	20
Hurst Green	2
Hutton Cranswick	10
Huyton	20
Hyde Central	20
Hyde North	20
Hykeham	11
Hyndland	26
Hythe	7
IBM	26
Ifield	2
Ilford	7
Ilkley	10
Ince	20
Ince & Elton	22
Ingatstone	7
Insch	25
Invergordon	25
Invergowrie	24
Inverkeithing	24
Inverkip	26
Inverness	25
Invershin	25
Inverurie	25
Ipswich	7
Irlam	20
Irvine	26
Isleworth	3
Islip	13
Iver	13
Ivybridge	12
James Street	21
Jewellery Quarter	17
Johnston	14
Johnstone	26
Jordanhill	26
Kearmsey	1
Kearsley	20
Keighley	10
Keith	25
Kelvedon	7
Kemble	13
Kempston Hardwick	18 (Southern)
Kempton Park	3
Kemsing	1
Kemsley	1
Kendal	23
Kenley	2
Kennett	5
Kennishead	26
Kensal Green	18 (Southern)
Kensal Rise	6

Station Name	Route No
Kensington Olympia	2
Kent House	1
Kentish Town	19
Kentish Town West	6
Kenton	18 (Southern)
Kents Bank	23
Kettering	19
Kew Bridge	3
Kew Gardens	6
Keyham	12
Keynsham	13
Kidbrooke	1
Kidderminster	17
Kidsgrove	18 (Northern)
Kidwelly	14
Kilburn High Road	18 (Southern)
Kildale	9
Kildonan	25
Kilgetty	14
Kilmarnock	26
Kilmaurs	26
Kilpatrick	26
Kilwinning	26
Kinbrace	25
Kingham	13
Kinghorn	24
Kings Cross Thameslink	2
Kings Langley	18 (Southern)
Kings Lynn	5
Kings Norton	17
Kings Nympton	12
Kings Park	26
Kings Sutton	17
Kingsknowe	24
Kingston	3
Kingswood	2
Kingussie	25
Kintbury	12
Kirby Cross	7
Kirk Sandall	11
Kirkby	21
Kirkby Stephen	23
Kirkby-in-Ashfield	19
Kirkby-in-Furness	23
Kirkcaldy	24
Kirkconnel	26
Kirkdale	21
Kirkham & Wesham	20
Kirkhill	26
Kirknewton	24
Kirkwood	26
Kirton Lindsey	11
Kiveton Bridge	11
Kiveton Park	11

Station Name	Route No
Knareborough	10
Knebworth	8 (Southern)
Knighton	14
Knockholt	1
Knottingly	10
Knucklas	14
Knutsford	20
Kyle of Lochalsh	25
Ladybank	24
Ladywell	1
Laindon	6
Lairg	25
Lake	3
Lakenheath	5
Lamphey	14
Lanark	26
Lancaster	18 (Northern)
Lancing	2
Landywood	17
Langbank	26
Langho	23
Langley	13
Langley Green	17
Langley Mill	19
Langside	26
Langwathby	23
Langwith Whaley Thorns	19
Lapford	12
Lapworth	17
Larbert	24
Largs	26
Lawrence Hill	13
Layton	20
Lazonby & Kirkoswald	23
Lea Green	20
Lea Hall	17
Leagrave	19
Lealholm	9
Leamington Spa	17
Leasowe	21
Leatherhead	2
Ledbury	17
Lee	1
Leeds	10
Leicester	19
Leigh	2
Leigh-on-Sea	6
Leighton Buzzard	18 (Southern)
Lelant	12
Lelant Saltings	12
Lenham	1
Lenzie	24
Leominster	14
Letchworth	5

Station Name	Route No
Leuchars	24
Levenshulme	20
Lewes	2
Lewisham	1
Leyland	18 (Northern)
Leyton Midland Road	6
Leytonstone High Road	6
Lichfield City	17
Lichfield Trent Valley	18 (Southern)
Lidlington	18 (Southern)
Limehouse	6
Lincoln Central	11
Lingfield	2
Lingwood	7
Linlithgow	24
Liphook	3
Liskeard	12
Liss	3
Lisvane & Thornhill	15
Little Kimble	16
Little Sutton	21
Littleborough	10
Littlehampton	2
Littlehaven	2
Littleport	5
Liverpool Central	21
Liverpool Lime Street	20
Livingston North	24
Livingston South	26
Llanaber	14
Llanbedr	14
Llanbister Road	14
Llanbradach	15
Llandaf	15
Llandanwg	14
Llandecwyn	14
Llandeilo	14
Llandovery	14
Llandrindod	14
Llandudno	22
Llandudno Junction	22
Llandybie	14
Llanelli	14
Llanfairfechan	22
Llanfairpwll	22
Llangadog	14
Llangammarch	14
Llangennech	14
Llangynllo	14
Llanishen	15
Llanrwst	22
Llansamlet	13
Llanwrda	14
Llanwrtyd	14

Station Name	Route No
Llwyngwrl	14
Llwynypia	15
Loch Awe	25
Loch Eil Outward Bound	25
Lochailort	25
Locheilside	25
Lochgelly	24
Lochluichart	25
Lochwinnoch	26
Lockerbie	18 (Northern)
Lockwood	11
London Blackfriars	2
London Bridge	2
London Cannon Street	1
London Charing Cross	1
London Euston	18 (Southern)
London Fenchurch Street	6
London Fields	5
London Kings Cross	8 (Southern)
London Liverpool Street	7
London Marylebone	16
London Paddington	13
London Road (Brighton)	2
London Road (Guildford)	3
London St Pancras	19
London Victoria	1
London Waterloo	3
Long Buckby	18 (Southern)
Long Eaton	19
Long Preston	23
Longbeck	9
Longbridge	17
Longcross	3
Longfield	1
Longniddry	8 (Northern)
Longport	18 (Northern)
Longton	19
Looe	12
Lostock	20
Lostock Gralam	20
Lostock Hall	23
Lostwithiel	12
Loughborough	19
Loughborough Junction	2
Lowdham	19
Lower Sydenham	1
Lowestoft	7
Ludlow	14
Luton	19
Luton Airport Parkway	19
Luxulyan	12
Lydney	13
Lye	17
Lymington Pier	3

Station Name	Route No
Lymington Town	3
Lympstone Commando	12
Lympstone Village	12
Lytham	20
Macclesfield	18 (Northern)
Machynlleth	14
Maesteg	15
Maghull	21
Maiden Newton	4
Maidenhead	13
Maidstone Barracks	1
Maidstone East	1
Maidstone West	1
Malden Manor	3
Mallaig	25
Malton	10
Malvern Link	17
Manchester Airport	20
Manchester Oxford Road	20
Manchester Piccadilly	20
Manchester Victoria	20
Manea	5
Manningtree	7
Manor Park	7
Manor Road	21
Manorbier	14
Manors	8 (Northern)
Mansfield	19
Mansfield Woodhouse	19
March	5
Marden	1
Margate	1
Market Harborough	19
Market Rasen	11
Markinch	24
Marks Tey	7
Marlow	13
Marple	20
Marsden	10
Marske	9
Marston Green	17
Martin Mill	1
Martins Heron	3
Marton	9
Maryhill	26
Maryland	7
Maryport	23
Matlock	19
Matlock Bath	19
Mauldeth Road	20
Maxwell Park	26
Maybole	26
Maze Hill	2
Meadowhall	11

Station Name	Route No
Meldreth	5
Melksham	4
Melton	7
Melton Mowbray	19
Menheniot	12
Menston	10
Meols	21
Meols Cop	20
Meopham	1
Merstham	2
Merthyr Tydfil	15
Merthyr Vale	15
Metheringham	11
Metro Centre	9
Mexborough	11
Micheldever	3
Micklefield	10
Middlesbrough	9
Middlewood	20
Midgham	12
Milford	3
Milford Haven	14
Mill Hill	23
Mill Hill Broadway	19
Millbrook	3
Millbrook	18 (Southern)
Milliken Park	26
Millom	23
Mills Hill	20
Milngavie	26
Milnrow	20
Milton Keynes Central	18 (Southern)
Minffordd	14
Minster	1
Mirfield	10
Mistley	7
Mitcham Junction	2
Mobberley	20
Monifieth	24
Monks Risborough	16
Montpelier	13
Montrose	24
Moor Park	16
Moorfields	21
Moorgate	8 (Southern)
Moorside	20
Moorthorpe	11
Morar	25
Morchard Road	12
Morden South	2
Morecambe	23
Moreton	3
Moreton	21
Moreton-in-Marsh	13

Station Name	Route No
Morfa Mawddach	14
Morley	10
Morpeth	8 (Northern)
Mortimer	13
Mortlake	3
Moses Gate	20
Moss Side	20
Mossley	10
Mossley Hill	20
Mosspark	26
Moston	20
Motherwell	26
Motspur Park	3
Mottingham	1
Mouldsworth	20
Moulsecoomb	2
Mount Florida	26
Mount Vernon	26
Mountain Ash	15
Muir of Ord	25
Muirend	26
Musselburgh	8 (Northern)
Mytholmroyd	10
Nafferton	10
Nailsea & Backwell	13
Naim	25
Nantwich	14
Narbeth	14
Narborough	19
Navigation Road	20
Neath	13
Needham Market	7
Neilston	26
Nelson	23
Neston	22
Netherfield	19
Nethertown	23
Netley	3
New Barnet	8 (Southern)
New Beckenham	1
New Brighton	21
New Clee	11
New Cross	1
New Cross Gate	2
New Cumnock	26
New Eltham	1
New Hay	20
New Holland	11
New Hythe	1
New Lane	20
New Malden	3
New Mills Central	20
New Mills Newtown	20
New Milton	3



Station Name	Route No
New Pudsey	10
New Southgate	8 (Southern)
Newark Castle	19
Newark North Gate	8 (Southern)
Newbury	12
Newbury Racecourse	12
Newcastle	8 (Northern)
Newcraighall	24
Newhaven Harbour	2
Newhaven Town	2
Newington	1
Newmarket	5
Newport	5
Newport	13
Newquay	12
Newstead	19
Newton	26
Newton Abbot	12
Newton Aycliffe	9
Newton for Hyde	20
Newton St Cyres	12
Newton-le-Willows	20
Newtonmore	25
Newton-on-Ayr	26
Newtown	14
Ninian Park	15
Nitshill	26
Norbiton	3
Norbury	2
Normans Bay	2
Normanton	10
North Berwick	8 (Northern)
North Camp	3
North Dulwich	2
North Llanrwst	22
North Queensferry	24
North Road	9
North Sheen	3
North Walsham	7
North Wembley	18 (Southern)
North Woolwich	6
Northallerton	8 (Northern)
Northampton	18 (Southern)
Northfield	17
Northfleet	1
Northolt Park	16
Northumberland Park	5
Northwich	20
Norton Bridge	18 (Northern)
Norwich	7
Norwood Junction	2
Nottingham	19
Nuneaton	18 (Southern)
Nunhead	1

Station Name	Route No
Nunthorpe	9
Nutbourne	2
Nutfield	1
Oakengates	17
Oakham	19
Oakleigh Park	8 (Southern)
Oban	25
Ockendon	6
Ockley	2
Old Hill	17
Old Roan	21
Old Street	8 (Southern)
Oldfield Park	13
Oldham Mumps	20
Oldham Werneth	20
Olton	17
Ore	1
Ormskirk	21
Orpington	1
Orrell	20
Orrell Park	21
Otford	1
Oulton Broad North	7
Oulton Broad South	7
Outwood	8 (Northern)
Overpool	21
Overton	4
Oxenholme Lake District	18 (Northern)
Oxford	13
Oxshott	3
Oxted	2
Paddock Wood	1
Padgate	20
Paignton	12
Paisley Canal	26
Paisley Gilmour Street	26
Paisley St James	26
Palmers Green	8 (Southern)
Pangbourne	13
Pannal	10
Pantyyffynnon	14
Par	12
Parbold	20
Park Street	18 (Southern)
Parkstone	3
Parson Street	13
Partick	26
Parton	23
Patchway	13
Patricroft	20
Patterton	26
Peartree	19
Peckham Rye	1
Pegswood	8 (Northern)

Station Name	Route No
Pemberton	20
Pembrey & Burry Port	14
Pembroke	14
Pembroke Dock	14
Penally	14
Penarth	15
Pencoed	13
Pengam	15
Penge East	1
Penge West	2
Penhelig	14
Penistone	11
Penkridge	17
Penmaenmawr	22
Penmere	12
Penrhiwceiber	15
Penrhyndeudraeth	14
Penrith	18 (Northern)
Penryn	12
Pensam	14
Penshurst	1
Pentre-Bach	15
Pen-y-Bont	14
Penychain	14
Penyffordd	22
Penzance	12
Perranwell	12
Perry Barr	17
Pershore	13
Perth	25
Peterborough	8 (Southern)
Petersfield	3
Petts Wood	1
Pevensey & Westham	2
Pevensey Bay	2
Pewsey	12
Pilning	13
Pinhoe	4
Pitlochry	25
Pitsea	6
Pleasington	23
Plockton	25
Pluckley	1
Plumley	20
Plumpton	2
Plumstead	1
Plymouth	12
Pokesdown	3
Polegate	2
Polesworth	18 (Southern)
Pollokshaws East	26
Pollokshaws West	26
Pollokshields East	26
Pollokshields West	26

Station Name	Route No
Polmont	24
Polsloe Bridge	12
Ponders End	5
Pontarddulais	14
Pontefract Baghill	10
Pontefract Monkhill	10
Pontefract Tanshelf	10
Pontlottyn	15
Pontyclun	13
Pont-y-Pant	22
Pontypool & New Inn	14
Pontypridd	15
Poole	3
Poppleton	10
Port Glasgow	26
Port Sunlight	21
Port Talbot Parkway	13
Portchester	3
Porth	15
Porthmadog	14
Portlethen	24
Portslade	2
Portsmouth & Southsea	3
Portsmouth Arms	12
Portsmouth Harbour	3
Possilpark & Parkhouse	26
Potters Bar	8 (Southern)
Poulton-le-Fylde	20
Poynton	18 (Northern)
Prees	14
Prescot	20
Prestatyn	22
Prestbury	18 (Northern)
Preston	18 (Northern)
Preston Park	2
Prestonpans	8 (Northern)
Prestwick International Airport	26
Prestwick Town	26
Priesthill & Darnley	26
Princes Risborough	16
Prittlewell	7
Prudhoe	9
Pulborough	2
Purfleet	6
Purley	2
Purley Oaks	2
Putney	3
Pwllheli	14
Pyle	13
Quakers Yard	15
Queens Park	26
Queens Park (London)	18 (Southern)
Queens Road Peckham	2

Station Name	Route No
Queensborough	1
Queenstown Road	3
Quintrel Downs	12
Radcliffe	19
Radlett	19
Radley	13
Radyr	15
Rainford	20
Rainham	1
Rainham	6
Rainhill	20
Ramsgate	1
Ramsgreave & Wilpshire	23
Rannoch	25
Rauceby	11
Ravenglass	23
Ravensbourne	1
Ravensthorpe	10
Rawcliffe	10
Rayleigh	7
Raynes Park	3
Reading	13
Reading West	13
Rectory Road	5
Redbridge	3
Redcar Central	9
Redcar East	9
Reddish North	20
Reddish South	20
Redditch	17
Redhill	2
Redland	13
Redruth	12
Reedham	2
Reedham	7
Reigate	3
Renton	26
Retford	8 (Southern)
Rhiwbina	15
Rhosneigr	22
Rhyl	22
Rhymney	15
Ribblehead	23
Rice Lane	21
Richmond	3
Rickmansworth	16
Riddlesdown	2
Ridgmont	18 (Southern)
Riding Mill	9
Rishton	23
Robertsbridge	1
Roby	20
Rochdale	20
Roche	12

Station Name	Route No
Rochester	1
Rochford	7
Rock Ferry	21
Rogart	25
Rolleston	19
Roman Bridge	22
Romford	7
Romiley	20
Romsey	4
Roose	23
Rose Grove	23
Rose Hill Marple	20
Rosyth	24
Rotherham Central	11
Roughton Road	7
Rowlands Castle	3
Rowley Regis	17
Roy Bridge	25
Roydon	5
Royston	5
Ruabon	14
Rufford	23
Rugby	18 (Southern)
Rugeley Town	17
Rugeley Trent Valley	18 (Northern)
Rugeley Trent Valley	18 (Southern)
Runcorn	18 (Northern)
Runcorn East	22
Ruskington	11
Ruswarp	9
Rutherglen	26
Ryde Esplanade	3
Ryde Pier Head	3
Ryde St Johns Road	3
Ryder Brow	20
Rye	1
Rye House	5
Salford Central	20
Salford Crescent	20
Salfords	2
Salhouse	7
Salisbury	4
Saltaire	10
Saltash	12
Saltburn	9
Saltcoats	26
Saltmarshe	10
Salwick	20
Sandal & Agbrigg	8 (Northern)
Sandbach	20
Sanderstead	2
Sandhills	21
Sandhurst	3
Sandling	1

Station Name	Route No
Sandown	3
Sandplace	12
Sandwell & Dudley	17
Sandwich	1
Sandy	8 (Southern)
Sankey	20
Sanquhar	26
Sam	15
Saundersfoot	14
Saunderton	16
Sawbridgeworth	5
Saxilby	11
Saxmundham	7
Scarborough	10
Scotscalder	25
Scotstounhill	26
Scunthorpe	11
Sea Mills	13
Seaburn	9
Seaford	2
Seaforth & Litherland	21
Seaham	9
Seamer	10
Seascale	23
Seaton Carew	9
Seer Green	16
Selby	10
Selhurst	2
Sellafield	23
Selling	1
Selly Oak	17
Settle	23
Seven Kings	7
Seven Sisters	5
Sevenoaks	1
Severn Beach	13
Severn Tunnel Junction	13
Shalford	3
Shanklin	3
Shaw & Crompton	20
Shawford	3
Shawlands	26
Sheerness-on-Sea	1
Sheffield	11
Shelford	5
Shenfield	7
Shenstone	17
Shepherds Well	1
Shepley	11
Shepperton	3
Shepreth	5
Sherbome	4
Sherburn-in-Elmet	10
Sheringham	7

Station Name	Route No
Shettleston	26
Shieldmuir	26
Shifnal	17
Sildon	9
Shiplake	13
Shipley	10
Shippea Hill	5
Shipton	13
Shirebrook	19
Shirehampton	13
Shireoaks	11
Shirley	17
Shoeburyness	6
Sholing	3
Shoreham	1
Shoreham-by-Sea	2
Shortlands	1
Shotton	22
Shotts	26
Shrewsbury	14
Sidcup	1
Sileby	19
Silecroft	23
Silkstone Common	11
Silver Street	5
Silverdale	23
Silvertown & London City Airport	6
Singer	26
Sittingbourne	1
Skegness	11
Skewen	13
Skipton	10
Slade Green	1
Slaithwaite	10
Slateford	24
Sleaford	11
Sleights	9
Slough	13
Small Heath	17
Smallbrook Junction	3
Smethwick Galton Bridge	17
Smethwick Rolfe Street	17
Smitham	2
Smithy Bridge	10
Snaith	10
Snodland	1
Snowdown	2
Sole Street	2
Solihull	17
Somerleyton	7
South Acton	6
South Bank	9
South Bermondsey	2

Station Name	Route No
South Croydon	2
South Elmsall	8 (Northern)
South Greenford	13
South Gyle	24
South Hampstead	18 (Southern)
South Kenton	18 (Southern)
South Merton	2
South Milford	10
South Ruislip	16
South Tottenham	6
South Wigston	19
Southall	13
Southampton	3
Southampton Airport Parkway	3
Southbourne	2
Southbury	5
Southeast	2
Southend Central	6
Southend East	6
Southend Victoria	7
Southminster	7
Southport	21
Southwick	2
Sowerby Bridge	10
Spalding	11
Spean Bridge	25
Spital	21
Spondon	19
Spooner Row	5
Spring Road	17
Springburn	26
Springfield	24
Squires Gate	20
St Albans	19
St Albans Abbey	18 (Southern)
St Andrews Road	13
St Annes-on-the-Sea	20
St Austell	12
St Bees	23
St Budeaux Ferry Road	12
St Budeaux Victoria Road	12
St Columb Road	12
St Denys	3
St Erth	12
St Germans	12
St Helens Central	20
St Helens Junction	20
St Helier	2
St Ives	12
St James' Park	12
St James Street	5
St Johns	1
St Keyne	12

Station Name	Route No
St Leonards Warrior Square	2
St Margarets	3
St Margarets	5
St Mary Cray	1
St Michaels	21
St Neots	8 (Southern)
Stafford	18 (Northern)
Stafford	18 (Southern)
Staines	3
Stallingborough	11
Stalybridge	10
Stamford	19
Stamford Hill	5
Stanford-le-Hope	6
Stanlow & Thornton	22
Stansted Airport	5
Stansted Mountfitchet	5
Staplehurst	1
Stapleton Road	13
Starbeck	10
Starcross	12
Staveley	23
Stechford	17
Steeton & Silsden	10
Stepps	26
Stevenage	8 (Southern)
Stevenston	26
Stewartby	18 (Southern)
Stewarton	26
Stirling	24
Stockport	20
Stocksfield	9
Stocksmoor	11
Stockton	9
Stoke Mandeville	16
Stoke Newington	5
Stoke-on-Trent	18 (Northern)
Stone	18 (Northern)
Stone Crossing	1
Stonebridge Park	18 (Southern)
Stonegate	1
Stonehaven	24
Stonehouse	13
Stoneleigh	3
Stourbridge Junction	17
Stourbridge Town	17
Stowmarket	7
Stranraer	26
Stratford	7
Stratford-upon-Avon	17
Strathcarron	25
Strawberry Hill	3
Streatham	2
Streatham Common	2

Station Name	Route No
Streatham Hill	2
Streethouse	10
Strines	20
Stromeferry	25
Strood	1
Stroud	13
Sturry	1
Styal	20
Sudbury	7
Sudbury & Harrow Road	16
Sudbury Hill Harrow	16
Sugar Loaf	14
Summerston	26
Sunbury	3
Sunderland	9
Sundridge Park	1
Sunningdale	3
Sunnymeads	3
Surbiton	3
Sutton	2
Sutton Coldfield	17
Sutton Common	2
Sutton Parkway	19
Swale	1
Swanley	1
Swanscombe	1
Swansea	13
Swanwick	3
Sway	3
Swaythling	3
Swinderby	11
Swindon	13
Swineshead	11
Swinton	11
Swinton	20
Sydenham	2
Sydenham Hill	1
Syon Lane	3
Syston	19
Tackley	17
Tadworth	2
Taffs Well	15
Tain	25
Talsarnau	14
Talybont	14
Tal-y-Cafn	22
Tame Bridge	17
Tamworth	18 (Southern)
Taplow	13
Tattenham Corner	2
Taunton	12
Taynult	25
Teddington	3
Tees-Side Airport	9

Station Name	Route No
Teignmouth	12
Telford Central	17
Templecombe	4
Tenby	14
Teynham	1
Thames Ditton	3
Thatcham	12
Thatto Heath	20
The Hawthorns	17
The Lakes	17
Theale	12
Theobalds Grove	5
Thetford	5
Thirsk	8 (Northern)
Thornaby	9
Thorne North	10
Thorne South	11
Thornford	4
Thornliebank	26
Thomton Abbey	11
Thomton Heath	2
Thomtonhall	26
Thorpe Bay	6
Thorpe Culvert	11
Thorpe-le-Soken	7
Three Bridges	2
Three Oaks	1
Thurgarton	19
Thurnscoe	11
Thurso	25
Thurston	5
Tilbury Town	6
Tile Hill	17
Tilehurst	13
Tipton	17
Tir-Phil	15
Tisbury	4
Tiverton Parkway	12
Todmorden	10
Tolworth	3
Ton Pentre	15
Tonbridge	1
Tondu	15
Tonfanau	14
Tonypany	15
Tooting	2
Topsham	12
Torquay	12
Torre	12
Totnes	12
Tottenham Hale	5
Totton	3
Town Green	21
Trafford Park	20

Station Name	Route No
Trefforest	15
Trefforest Estate	15
Trehafod	15
Treherbert	15
Treorchy	15
Trimley	7
Tring	18 (Southern)
Troed-Y-Rhiw	15
Troon	26
Trowbridge	4
Truro	12
Tulloch	25
Tulse Hill	2
Tunbridge Wells	1
Turkey Street	5
Tutbury & Hatton	19
Twickenham	3
Twyford	13
Ty Croes	22
Ty Glas	15
Tygwyn	14
Tyndrum Lower	25
Tyseley	17
Tywyn	14
Uckfield	2
Uddingston	26
Ulceby	11
Ulleskelf	10
Ulverston	23
Umberleigh	12
University	17
Uphall	24
Upholland	20
Upminster	6
Upper Halliford	3
Upper Holloway	6
Upper Tyndrum	25
Upper Warlingham	2
Upton	22
Upwey	3
Urmston	20
Uttoxeter	19
Valley	22
Vauxhall	3
Virginia Water	3
Waddon	2
Wadhurst	1
Wainfleet	11
Wakefield Kirkgate	10
Wakefield Westgate	8 (Northern)
Walkden	20
Wallasey Grove Road	21
Wallasey Village	21
Wallington	2

Station Name	Route No
Wallyford	8 (Northern)
Walmer	1
Walsall	17
Walsden	10
Waltham Cross	5
Walthamstow Central	5
Walthamstow Queens Road	6
Walton	21
Walton-on-Thames	3
Walton-on-Naze	7
Wanborough	3
Wandsworth Common	2
Wandsworth Road	2
Wandsworth Town	3
Wanstead Park	6
Warblington	2
Ware	5
Wareham	3
Wargrave	13
Warminster	4
Warnham	2
Warrington Bank Quay	18 (Northern)
Warrington Central	20
Warwick	17
Warwick Parkway	17
Water Orton	17
Waterbeach	5
Wateringbury	1
Waterloo	21
Waterloo East	1
Watford	16
Watford High Street	18 (Southern)
Watford Junction	18 (Southern)
Watford North	18 (Southern)
Watlington	5
Watton-at-Stone	8 (Southern)
Waun-gron Park	15
Wavertree Technology Park	20
Wedgwood	18 (Northern)
Weeley	7
Weeton	10
Welham Green	8 (Southern)
Welling	1
Wellingborough	19
Wellington	17
Welshpool	14
Welwyn North	8 (Southern)
Welywn Garden City	8 (Southern)
Wem	14
Wembley Central	18 (Southern)
Wembley Stadium	16
Wemyss Bay	26
Wendover	16
Wennington	23

Station Name	Route No
West Allerton	20
West Brompton	2
West Byfleet	3
West Calder	26
West Croydon	2
West Drayton	13
West Dulwich	1
West Ealing	13
West Ham	6
West Hampstead	6
West Hampstead	
Thameslink	19
West Horndon	6
West Kilbride	26
West Kirby	21
West Malling	1
West Norwood	2
West Ruislip	16
West Runton	7
West St Leonards	1
West Sutton	2
West Wickham	1
West Worthing	2
Westbury	12
Westcliff	6
Westcombe Park	1
Westenhanger	1
Wester Hailes	24
Westerfield	7
Westerton	26
Westgate-on-Sea	2
Westhoughton	20
Weston Milton	13
Weston-super-Mare	13
Wetheral	9
Weybridge	3
Weymouth	3
Whaley Bridge	20
Whalley	23
Whatstandwell	19
Whifflet	26
Whimble	4
Whinhill	26
Whiston	20
Whitby	9
Whitchurch	4
Whitchurch	14
Whitchurch	15
White Hart Lane	5
White Notley	7
Whitecraigs	26
Whitehaven	23
Whitland	14
Whitley Bridge	10

Station Name	Route No
Whitlocks End	17
Whitstable	1
Whittlesea	5
Whittlesford	5
Whitton	3
Whitwell	19
Whyteleafe	2
Whyteleafe South	2
Wick	25
Wickford	7
Wickham Market	7
Widdrington	8 (Northern)
Widnes	20
Widney Manor	17
Wigan North Western	18 (Northern)
Wigan Wallgate	20
Wigton	23
Wildmill	15
Willesden Junction	6
Willesden Junction	18 (Southern)
Williamwood	26
Willington	19
Wilmcote	17
Wilmslow	20
Wilnecote	17
Wimbledon	3
Wimbledon Chase	2
Winchelsea	1
Winchester	3
Winchfield	3
Winchmore Hill	8 (Southern)
Windermere	23
Windsor & Eton Central	13
Windsor & Eton Riverside	3
Winnersh	3
Winnersh Triangle	3
Winsford	18 (Northern)
Wishaw	26
Witham	7
Witley	3
Witton	17
Wivelsfield	2
Wivenhoe	7
Woburn Sands	18 (Southern)
Woking	3
Wokingham	3
Woldingham	2
Wolverhampton	17
Wolverton	18 (Southern)
Wombwell	11
Wood End	17
Wood Street	5
Woodbridge	7
Woodgrange Park	6



Station Name	Route No
Woodhall	26
Woodham Ferrers	7
Woodhouse	11
Woodlesford	10
Woodley	20
Woodmansterne	2
Woodsmoor	20
Wool	3
Woolston	3
Woolwich Arsenal	1
Woolwich Dockyard	1
Wootton Waven	17
Worcester Foregate Street	17
Worcester Park	3
Worcester Shrub Hill	17
Workington	23
Worksop	11
Worle	13
Worplesdon	3
Worstead	7
Worthing	2
Wrabness	7
Wraysbury	3
Wrenbury	14
Wressle	10
Wrexham Central	22
Wrexham General	14
Wye	1
Wylam	9
Wylde Green	17
Wymondham	5
Wythall	17
Yalding	1
Yardley Wood	17
Yarm	9
Yate	13
Yatton	13
Yeoford	12
Yeovil Junction	4
Yeovil Pen Mill	4
Yetminster	4
Ynyswen	15
Yoker	26
York	8 (Northern)
Yorton	14
Ystrad Mynach	15
Ystrad Rhondda	15

# Glossary

ABCL	Automatic Barrier Crossing (Locally Monitored)
ABP	Associated British Ports plc
AC	Alternating Current
ADG	Area Delivery Group
AHB	Automatic Half Barrier
AMP	Asset Maintenance Plan
AMW	Asset Management Workstream
AOCL	Automatic Open Crossing Locally Monitored
ARS	Automatic Route Setting
ASTER	Audio frequency jointless track circuit
ATN	Arriva Trains Northern
ATP	Automatic Train Protection
ATR	Automatic Train Reporting
ATW	Arriva Trains Wales
AWS	Automatic Warning System
BAA	British Airports Authority
CBI	Computer Based Interlocking
CET	Controlled Emission Toilet
CIS	Customer Information System
CLC	Cheshire Lines Committee
CSR	Cab Secure Radio
CTRL	Channel Tunnel Rail Link
CTRL (DS)	Channel Tunnel Rail Link Domestic Services
CUP	Capacity Utilisation Policy
CWR	Continuously Welded Rail
DC	Direct Current
DDA	Disability Discrimination Act
DFO	Depot Facility Operator
DLR	Docklands Light Railway
DMU	Diesel Multiple Unit
DOO	Driver Only Operation
DRS	Direct Rail Services
ECML	East Coast Main Line
ERTMS	European Rail Traffic Management System
ETCS	European Train Control System
EWS	English Welsh and Scottish Railway

F2N	Felixstowe to Nuneaton
FDM	Frequency Division Multiplexer
FGE	First Great Eastern
FGW	First Great Western
FNW	First North Western
FOC	Freight Operating Company
FTN	Fixed Telecoms Network
G&SW	Glasgow and South Western
GBRf	Great Britain Rail Freight Limited
GMPTe	Greater Manchester Passenger Transport Executive
GNER	Great North Eastern Railway
GSM-R	Global System for Mobiles - Railway (European Radio System for Railways)
GSP	Ground Switch Panel
GWESPA	Great Western Earthworks & Structures Partnering Agreement
GWML	Great Western Main Line
HABD	Hot Axlebox Detector
HEX	Heathrow Express
HIT	Humberside International Terminal
HSE	Health and Safety Executive
HST	High Speed Train
ICC	International Convention Centre in Birmingham
IECC	Intergrated Electronic Control Centre
IOS	Incremental Output Statement
IPU	Intergrated Planning Unit
LCR	London & Continental Railways
LDTSS	Long Distance Train Service Specification
LLPA	Long Line Public Address
LMD	Light Maintenance Depot
LNW	London North West
LUL	London Underground Limited
MCB	Manually Controlled Barrier (Level Crossing)
MFAS	Modern Facilities at Stations
MML	Midland Main Line
MPTE	Merseytravel Passenger Transport Executive
NEXUS	Trading name for the Tyne & Wear Passenger Transport Executive
NLU	National Logistics Unit
NMS	Network Management Centre
NNUS	National Network Utilisation Strategy

NRN	National Radio Network
NTP	North Trans-Pennine
NWML	North Wales Main Line
OHL/ OLE/ OHLE	Overhead Line Electrification Equipment
PETS	Public Emergency Telephone System
PIPS	Packaging and Investment Planning System
PLC	Public Limited Company
PPM	Public Performance Measure
PSB	Power Signal Box
PSR	Public Service Requirement
PSR	Permanent Speed Restriction
PSU	Power Supply Upgrade (Southern)
PTE	Passenger Transport Executive
PTG	Passenger Transport Grant
PUG1	Passenger Upgrade No 1 - Agreement with the Franchising Director over WCML
PUG2	Passenger Upgrade No 2 - Agreement between Railtrack and Virgin Trains over WCML
RA	Route Availability
RCF	Rolling Contact Fatigue
RDO	Reserved Domestic Operator
REED	A type of track circuit
RETB	Radio Electronic Token Block
ROF	Royal Ordnance Factory
RPA	Regional Planning Assessment
RPF	Rail Performance Fund
RPP	Rail Passenger Partnership
RRI	Route Relay Interlocking
RUS	Route Utilisation Strategy
S&C	Settle and Carlisle line
S&C	Switches & Crossings
SCADA	Supervisory Control and Data Acquisition
SDO	Selective Door Opening
SECC	Scottish Exhibition Conference Centre (Glasgow)
SEEDA	South East England Development Agency
SEMMMS	South East Manchester Multimodal Study
SFO	Station Facility Operator
SLW	Single Line Working
SNRN	South Nottinghamshire Rail Network
SOAP	Stereo Oblique Aerial Photography

SPAD	Signal Passed at Danger
SPT	Signal Post Telephone
SPT	Strathclyde Passenger Transport
SPTE	Strathclyde Passenger Transport Executive
SRA	Strategic Rail Authority
SRNTP	Southern Region New Trains Programme
SSI	Solid State Interlocking
SWT	South West Trains
SYPT	South Yorkshire Passenger Transport Executive
T-COD	Track Circuit Operating Device
TD	Train Descriptor
TDM	Time Division Multiplexer
TEN	Trans European Network
TfL	Transport for London
TICA	Track Infrastructure Condition Assessment
TIGER	Transport Integration in the Gwent Economic Region
TOC	Train Operating Company
TPE	Transpennine Express
TP Hut	Track Paralleling Hut
tph	Trains per hour
TPWS	Train Protection Warning System
TSC	Train Service Code
TSR	Temporary Speed Restriction
TT	Thames Trains
TWA	Transport and Works Act
UPS	Uninterruptible Power Supply
VCC	Virgin Cross Country
VoG	Vale of Glamorgan
VXC	Virgin Cross Country
WAG	Welsh Assembly Government
WAGN	West Anglia Great Northern Railway
WARM	West Anglia Route Modernisation
WCML	West Coast Mail Line
WCRM	West Coast Route Modernisation
WCRTCC	West Coast Rail Traffic Control Centre
WCTCC	West Coast Traffic Control Centre
WMAMMS	West Midlands Area Multi-Modal Study
WYPT	West Yorkshire Passenger Transport Executive

# Project development phases

Investment projects are managed in discrete phases, shown below. These reflect the significant business and technical milestones in the project's development and delivery.

**Figure 4.3 Project Development (phases 1-5)**

Phase 1 Output Definition	<p>Establishes the scope of the investment in terms of the incremental network capability required by the investment's "client". This is described in terms such as journey time, capacity, loading gauge etc. It may also require the scoping of asset renewal.</p> <p>The key product from Output Definition is the Development Remit, supported by a high-level business case.</p>
Phase 2 Pre-feasibility	<p>Ensures that asset condition, safety or standards requirements are identified and included in the scope of the investment.</p> <p>Ensures that investment is aligned with organisational strategy and contributes to targets.</p> <p>Identifies the constraints on the network that prevent the delivery of the client's outputs and defines the incremental capability that must be delivered by the investment.</p> <p>Provides confirmation that the outputs can be economically delivered by addressing the identified constraints.</p> <p>The key product from Pre-Feasibility is the functional specification, supported by a revised high-level business case, project safety strategy and strategic risk review.</p>
Phase 3 Option Selection	<p>Develops options for addressing the identified constraints and delivering the required incremental network capability.</p> <p>Assesses the options and selects the most appropriate one, together with confirmation that the outputs can be economically delivered.</p> <p>The key products from Option Selection are the Option Selection Report and Project Design Specification, supported by preliminary business cases for each identified option.</p>
Phase 4 Single Option Development	<p>Develops the selected single option to the point of engineering scope freeze and in sufficient detail to allow finalisation of the business case and scheduling of implementation resources.</p> <p>The key product from Single Option Refinement is the Reference Design, supported by an outline business case for the option and proposals for obtaining necessary approvals, consents and possessions.</p>
Phase 5 Detailed Design	<p>Produces a complete and robust engineering design that allows risks, costs, timescales, resources and benefits to be fully understood prior to commitment to implement.</p> <p>The key product from Design is the Completed Design, supported by a finalised business case, the project safety case, necessary approvals and consents. All possessions are booked and resourced, acceptance and maintenance criteria are established and an implementation plan is in place.</p>

**Figure 4.4 Project Implementation (phases 6-8)**

<b>Phase 6 Construction, Test and Commission</b>	<p>Delivers the asset change / renewal to the appropriate specification and provides confirmation that the asset and system work in accordance with their design and that they deliver the incremental network capability.</p> <p>The key products from Construction, Test &amp; Commission are the changed asset and test certificates.</p>
<b>Phase 7 Scheme Handback</b>	<p>Transfers asset responsibility, from the project contractor back to the operator and maintainer. It also brings the asset into beneficial use.</p> <p>The key products from Scheme Handback are Works Acceptance and Handback certificates.</p>
<b>Phase 8 Project Close Out</b>	<p>Ensures that the project is closed out in an orderly manner with updated asset management information, capitalised assets, settled contractual accounts and any contingencies and warranties are put in place. Logging up and other funding arrangements finalised and assumed business benefits are captured in the Business Plan.</p> <p>The key products from Project Close Out are the Project Completion Report, Safety Completion Certificate, Lessons Learned Report and Post Implementation Review.</p>

## Contact details

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