Delivering a better railway for a better Britain

Network Specification 2016

Wessex

Network Specification: Wessex

This Network Specification describes the Wessex Route in its geographical context outlining train service provision to meet current and future markets and traffic flows for passenger and freight business. The specification outlines and identifies capability improvements set out in the Long Term Planning Process (LTPP) to meet future growth for the medium to long term.

Each Network Specification draws upon the supporting evidence and recommendations from the Route Studies. These strategies provide the strategic direction initially for a 10-year period within the overall context of the next 30 years. This specification also notes the demand projections and the service level conditional outputs articulated in the Market Studies, published in Autumn 2013 as part of the LTPP.

For the Wessex Route, the Wessex Route Study was published draft for consultation in November 2014 and publishes a high level rail industry strategy for growth to 2043.

There are also a number of other supporting documents that present specific strategies. The Strategic Freight Network (SFN) predicts freight growth to 2019 and 2030 and identifies a preferred freight network to transport this growt. The Network Route Utilisation Strategy (RUS) incorporates a number of national work streams. The Network RUS consists of :

- Scenarios and Long Distance Forecasts – published in June 2009. The document considers how demand for long distance rail services, both passenger and freight, might be impacted by four alternative future scenarios.
- Electrification Strategy – published in October 2009 presents a strategy for further electrification of the network. Work is ongoing to refresh the strategy in the light of committed Control Period 5 (CP5) electrification schemes and the 'Electric Spine' development project.
- Stations – published in August 2011. The RUS considers the pedestrian capacity of stations on the network. The strategy sets out a process for considering congestion at stations and proactively reviewing it across the network.
- Passenger Rolling Stock – published in September 2011. This RUS takes a long term view of future passenger rolling stock and infrastructure to establish whether there may be potential to plan the railway more efficiently.
- Passenger Rolling Stock Depots Planning Guidance – published in December 2011. This document has been produced as best practice guidance particularly focusing on the depot network interface.
- Alternative Solutions for Delivering Passenger Demand Efficiently – published in July 2013. This RUS has developed a strategy which presents a number of alternative solutions to carrying the future demand for rail passengers on some parts of the network more cost effectively.

The LTPP has commenced and four Market Studies covering Long Distance, Regional Urban and London and South East passenger markets, and the Freight market have been published.

The Market Studies look at the strategic goals of the transport sector as a whole and those circumstances where rail can contribute to those goals, before forecasting future passenger and freight demand over the next 30 years. The studies then articulate a series of service level conditional outputs to meet the strategic goals, accommodating the forecast demand. The Market Studies will inform a series of Route Studies disaggregated nationally by Network Rail's devolved Routes. The Route Studies will seek to accommodate the conditional outputs from the Market Studies onto the network, firstly by making best use of existing capacity and secondly through infrastructure intervention where there is an affordable and value for money business case for doing so.

The Route Studies will provide choices for funders and will be a key part of the evidence base for Control Period 6 (CP6) High Level Output Specifications (HLOS).

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The Airports Commission, led by Sir Howard Davies, is reviewing the case for airport expansion in the south east. Network Rail is assisting the commission by considering the rail surface access implications should any of the shortlisted options be developed.

The integration of each of these strategies is key to the development of each route as between them they cover the needs and requirements of both passengers and freight going forward.

The National Operating Strategy is managing, controlling and operating rail services on the network. The strategy will integrate traffic management and control systems to improve performance and potentially improve the Public Performance Measure by two per cent. It will result in cost savings by moving from over 800 signal boxes to 14 rail operating centres over a timescale of around 30 years. Network Rail plan that over 80 per cent of the network will be run by the new centres by 2029, with most of that delivered in Control Periods 5 and 6 (2014 - 2024). Network Rail has been working with the industry to develop the proposals, and is in discussion with senior industry leaders to develop the plan further.

This document refers to Strategic Route Specifications (SRSs) which cover specific sections of the route and are published as appendices to this Network Specification. They describe in greater detail the current and future requirements of each SRS to inform both internal and external stakeholders of our future strategy.

Route context

The Wessex Route is one of the busiest and most congested routes on the network. It serves a major commuter area as well as providing long distance services from the south and south west of England to London Waterloo. There is a large amount of leisure traffic to the coastal towns and ferry terminals along the south soast such as at Weymouth, Southampton, Portsmouth, Poole and Lymington. In addition, the route supports important cross-country links between the south coast and major conurbations in the north, west and midlands. The line from Exeter to Basingstoke plays an important diversionary role for passenger traffic when the Great Western Main Line is closed, and for freight traffic diverted via Romsey and Andover when the main line through Winchester is unavailable.

South West Main Line

The main line runs from London Waterloo to Woking, where it splits at Woking Junction into separate lines to Portsmouth Harbour and to Weymouth via Basingstoke and Southampton. These lines convey commuters into London as well as leisure travellers to destinations on the coast. Stagecoach South Western Trains (SSWT) are the lead operator on this route and operate the services into London Waterloo, various other operators use parts of the South West Main Line (SWML) which is also an important artery for freight operators.

There are currently 20 domestic platforms at London Waterloo, including Platform 20 in the former London Waterloo International terminal which was opened for domestic use in Control Period 4 (CP4). The remaining four platforms in the former international terminal will be brought into full passenger use during CP5 as part of the Waterloo Capacity Programme. This will provide five additional platforms in total in addition to the current 19. There are eight lines from London Waterloo as far as Clapham Junction and four from Clapham Junction down to Worting Junction near Basingstoke. The rest of the route is predominantly two track, excluding some single line at Moreton and some short four track sections, for example west of Southampton and at Allbrook. At Brockenhurst there is a connecting branch line to Lymington Pier.

Main line services to Weymouth, Bournemouth and Portsmouth Harbour operate every 30 minutes from London Waterloo throughout the day and services to Guildford and Basingstoke are more frequent.

Portsmouth Harbour, Southampton Central and Lymington Pier stations connect with ferry services to the Isle of Wight.

Freight traffic operates on most of the SWML, significantly in the section between Basingstoke and Southampton.

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Main Suburban Lines

The main suburban lines are two track railway, which include branches to Epsom, Chessington South, Kingston, Hampton Court and Guildford (via Cobham). The branch lines are electrified. These branches connect into the SWML at Hampton Court Junction, New Malden and at Raynes Park. They are heavily used by commuters travelling to and from London in the peak periods. All services from these locations are operated by SSWT. Most of these lines offer a half hourly service frequency in and out of London Waterloo.

The route is characterised by a large number of stations. The area is densely populated and as a result contains a succession of small stations. The high number of stations along the route means journey times are relatively slow considering the distance in miles. There are some freight movements from the aggregates terminal at Tolworth.

Inner Windsor Lines

The Windsor suburban lines, which encompass the lines to Shepperton, Staines (via Hounslow or Richmond), and Kingston (via Richmond) are two track railway. There are a high number of level crossings on these lines. Services operate to and from London Waterloo and are heavily used by commuters in the peak periods. The services on these lines are operated by SSWT.

As with the main suburban lines , the area is densely populated and as a result contains a succession of small stations. The high number of stations along the route again means journey times are relatively slow considering the distance in miles.

Richmond station operates through services by SSWT but is also a terminating station for the London Underground Limited district line and London Overground Rail Operations Limited (LOROL) services to Stratford. The Hounslow Loop forms part of the freight diversionary route to the West Coast Main Line (WCML).

Outer Windsor Lines

The outer Windsor lines, comprising lines to Windsor and Eton Riverside, Reading, Frimley and Weybridge via Chertsey, are two track railway. Services operate into London and see a high number of commuters in the peak periods. The Chertsey line is an important diversionary route for freight services accessing the WCML. There are a high number of level crossings and stations on these lines. The journey time is relatively slow as services stop at most stations.

Services from Reading, Windsor and Eton Riverside and Weybridge via Chertsey to London Waterloo are half hourly and operated by SSWT, services from Frimley run to Ascot and are not direct to London Waterloo. A service runs from Aldershot to London Waterloo via Frimley in the high peak.

Solent

The line from Cosham Junction to Fareham splits into separate lines to Eastleigh and St Denys, which connects the SWML stations of Portsmouth with Eastleigh and Southampton and beyond to Cardiff as well as from Brighton and Gatwick to Southampton. This line is mainly two track railway apart from the Botley line, between Fareham and Eastleigh, which has single line sections. The section is electrified.

Various operators use this route, including Southern, First Great Western (FGW) and SSWT. Passenger trains on this route are both fast non-stopping services and slower stopping services.

Freight is also seen on these lines. Aggregates are conveyed to Botley and Fareham from the Eastleigh direction and also from St Denys through to Cosham Junction and on to Chichester.

Island Line

The Island Line sits independently from the rest of the network on the Isle of Wight. The line runs from Ryde Pier Head station, where it connects with the ferry from Portsmouth Harbour, along the North east coast of the Island to Shanklin. Only passenger trains run on this line. Services are operated by Island Line Trains.

West of England and Test Valley

The corridor from Worting Junction to Exmouth Junction (near Exeter) via Salisbury and Yeovil Junction linking Exeter with London Waterloo is known as the West of England Line. The section is made up of both double and single track railway and is not electrified. SSWT operate two trains an hour to Salisbury from London Waterloo one of which continues, providing an hourly service to Exeter St Davids.

The line from Salisbury to Romsey, where it splits into separate lines to Redbridge and Eastleigh, is known as the Test Valley Line. It is mainly two track railway with the exception of the Chandlers Ford

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Line, that runs from Romsey to Eastleigh, which has single sections. None of the Test Valley Line is electrified.

FGW operate an hourly Portsmouth to Cardiff service through this section and SSWT run an hourly service through Chandlers Ford.

Various passenger and freight train operators use this route and it is significant as a diversionary route when parts of the SWML are unavailable between Southampton and Worting Junction.

Alton Line

This is the branch from Alton to Pirbright Junction, near Brookwood where the section connects with the SWML. This section is two track railway from Pirbright Junction to Farnham where the line continues single to Alton, excluding a loop at Bentley station. The line is electrified. The Frimley single diverts from this line at Ash Vale and the line to Guildford diverts at Aldershot.

SSWT operate a half hourly service to and from London Waterloo. The line is also used for freight services to the Holybourne oil terminal.

North Downs Line

This is the line between Redhill and Reading via Guildford. This section is two track railway throughout except at Guildford where the line briefly joins the 'Portsmouth Direct Line'. The line is 750kV DC electrified between Redhill and Reigate ; between Shalford Junction and Aldershot South Junction; and between Wokingham Junction and Reading. The rest of the line is currently non-electrified.

FGW operate a two trains per hour service from Reading with one terminating at Redhill and another one proceeding on to Gatwick Airport.

Key passenger markets and traffic flows

The predominant passenger operator on this route is SSWT. Other passenger operators are Southern (Govia Thameslink Railway from September 2015), FGW, LOROL and CrossCountry. DB Schenker, Freightliner Limited, Freightliner Heavy Haul Limited and First GBRf are the major freight operators.

The majority of passenger services on the route serve London. All main routes into London are now at or near capacity and no further train paths can be accommodated without further infrastructure interventions.

Outside London, FGW operates services from Reading to Gatwick Airport (via Guildford), and from Cardiff Central/Bristol Temple Meads to Salisbury, Southampton Central, Portsmouth Harbour and Brighton. CrossCountry runs services from Bournemouth/ Southampton Central to Manchester Piccadilly, Newcastle and Edinburgh Waverley. Southern run services from Southampton Central to Brighton and London Victoria, and LOROL run services from Clapham Junction to Willesden Junction and Stratford.

The Wessex Route Study has shown that predicted growth to 2043 on main line routes will reach 40 per cent with an additional 20 per cent overlaid to address current issues with overcrowding. Similarly predicted growth to 2043 on the Main Suburban services is expected to reach 40 per cent and 37 per cent on the Windsor Lines.

As well as the significant portion of main line demand, destinations away from London also attract considerable demand. This is focused on the major towns and cities, including Guildford, Reading, Basingstoke, Southampton, Bournemouth, Portsmouth, Salisbury and Exeter. Substantial all year demand is experienced on cross-country services from the South Coast to destinations such as Bristol, Cardiff, Reading, Birmingham and Manchester.

In the summer months, appreciable seasonal demand is experienced on the line to Weymouth, and also on the Isle of Wight line.

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Key freight markets and traffic flows

The route conveys a significant volume of freight traffic, especially intermodal and automotive flows from the Port of Southampton, as well as petroleum, aggregates and Ministry of Defence (MoD) flows. In addition, Eastleigh Yard provides an important facility for Network Rail infrastructure trains.

The freight services on the route mainly operate from the Eastleigh and Southampton areas to Scotland, the north east and north west, the midlands, the west and London. Quarried aggregates from Somerset operate via Westbury to destinations on the route and there are aggregates terminals at Tolworth, Woking, Fareham, Eastleigh, Botley and Wool. There is also some oil traffic between Holybourne and Fawley, and MoD traffic to and from terminals across the route.

The rail industry's accepted freight forecasts were published in the Freight Market Study in 2013. The Market Study is part of the LTPP and these forecasts were developed in collaboration with a Working Group which included freight operators and stakeholders. The Market Study has been established by the Office of Rail and Road. The base year is 2011-12 and forecasts are available for 2023, 2033 and 2043 which in summary show:

- Substantial growth in intermodal freight from ports and, in the longer term, between domestic intermodal terminals (many of which do not currently exist but are expected to be developed in future)
- A decline in coal traffic over the long term, partly offset by a growth in biomass as coal forms a smaller part of the UK's power generation mix
- Modest growth in other commodities, in particular aggregates for the construction industry.

The Freight Market Study forecast freight growth is unconstrained by rail capacity and the extent of future new terminal developments. The unconstrained forecasts form the conditional outputs which are being assessed in the Route Studies to present choices for funders for CP6 and beyond.

Proposed infrastructure investment in Control Period 5 (2014-2019)

With the support of train operators on the Wessex route, a number of schemes have been developed as potential specified schemes, for implementation in the control period. These are listed in detail in the individual Route Specification documents that follow. Notable schemes include: Increased Capacity into London Waterloo and Reading to London Waterloo 10-car capability.

A significant scheme is to lengthen Platforms 1 to 4 at Waterloo and open Platforms 21 to 24 for domestic use, which is expected to be delivered in CP5 through the Waterloo Capacity Programme. This will provide 10-car capability for suburban services at Waterloo Platforms 1 to 4, delivering a complete 10-car suburban network and facilitating more main line capacity for the future through the segregation of the Windsor lines platforms into the former international terminal.

The London and South East RUS recognised a gap on the Windsor Line service following the CP4 train lengthening plan. Reading to Waterloo services will not be 10-car length at the end of CP4. Infrastructure investment in longer platforms and upgraded power supply will provide 10-car capability for Reading trains, which coupled with extending the remaining 8-car trains on the Windsor Lines and Weybridge Lines will provide significant on train capacity.

In addition to the schemes above some key renewals are planned for CP5. These include planned works as part of the National Operating Strategy to consolidate signalling control to Basingstoke Rail Operating Centre, and the re-signalling of Feltham. The route will also consider an Electric Spine from Southampton through to Reading and investigate the benefits for DC to AC conversion.

The SFN steering group has identified growth in the deep sea container market which will require an increase in capacity on the route between Southampton and the WCML. The scheme is currently in development and will consider capacity solutions as well as diversionary options.

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Longer-term Strategy

Work to investigate main line capacity has been addressed in the Wessex Route Study and options for infrastructure interventions in CP6 and CP7+ have been developed.

Freight forecasts, especially for intermodal traffic, indicate continuing growth beyond CP5 for which further measures will be needed to accommodate the anticipated demand.

The European Rail Traffic Management System (ERTMS) forms part of an industrywide programme entitled the Digital Railway designed to benefit Great Britain's economy by accelerating the digital enablement of the railway. The scope of the Digital Railway is being developed in CP5 but will include train operation, capacity allocation, passenger experience, infrastructure management and stations/interchanges management. The output of the programme will be a business case to Government, presented through the Initial Industry Plan (IIP) in September 2016.

Electrification Strategy

There is currently an electrification programme being delivered in Great Britain which includes the Great Western and Midland Main Lines together with a number of local 'infill' schemes. The Department for Transport, in its High Level Output Specification July 2012, indicated that there would be a 'rolling programme' of electrification into the future to provide electric traction to a significant proportion of the national network.

Expansion of the electrified network will bring many benefits, including faster journey times for passenger and freight trains. Where journey time savings are sufficiently significant (and sufficient capacity is available) there is the potential to run additional services on electrified routes. The simpler design of electric trains means greater reliability, lower maintenance costs and a requirement for fewer spare vehicles. Operators also benefit from lower lease costs for electric trains, and lower variable track access charges given the reduced weight of electric vehicles and consequent reduction in track wear and tear. Average carbon dioxide emissions per vehicle mile are less for electric trains compared to those that use diesel, which can improve station air quality for both passengers and staff.

Network Rail, on behalf of the rail industry, will be publishing in2015, a 'refreshed' Network RUS for Electrification to outline the priorities for future electrification. The strategy will prioritise routes for further development based primarily on the density of diesel-operated traffic which could be converted to electric operation through the provision of electrification. The RUS also considers options which do not perform as well in terms of the conversion ratio, but may be worthy of further investigation in light of other factors, for example whether an option would allow more efficient usage of the existing electrified network by reducing diesel traffic on the existing electrified network or by providing a diversionary route; or where there are synergies with rolling stock replacement, or other enhancement schemes.

Schemes identified for potential further development as part of the Electrification Strategy are:

- A package of options comprising:
  - Basingstoke to Exeter
  - Westbury and Redbridge to Eastleigh
- The North Downs Line between Wokingham and Reigate

Freight operators may not be able to effectively utilise any additional electrification without the ability to access terminals they serve. This might involve electrifying all or part of a terminal, modifying the terminal layout to enable the use of electric traction, or facilities for bi-mode locomotives to change to/from diesel and electric power. Given that many terminals are privately owned, joint development with terminal owners and freight operators of options for electrifying terminal connections would be beneficial to enable greater usage of electric traction. This also includes any terminals, sidings and maintenance facilities that are required by freight operators to transfer an existing service from diesel to electric traction.

The selection of routes for further development includes all options currently expected to have the strongest business cases from a national perspective. Other schemes are being developed in conjunction with regional bodies, and as demand and service patterns continue to evolve in the longer term electrification may present an appropriate solution for other routes. For routes for which it is unlikely that a case can be made for conventional electrification, there could be an opportunity for alternative solutions to be considered in place of diesel traction, for example battery train operation.

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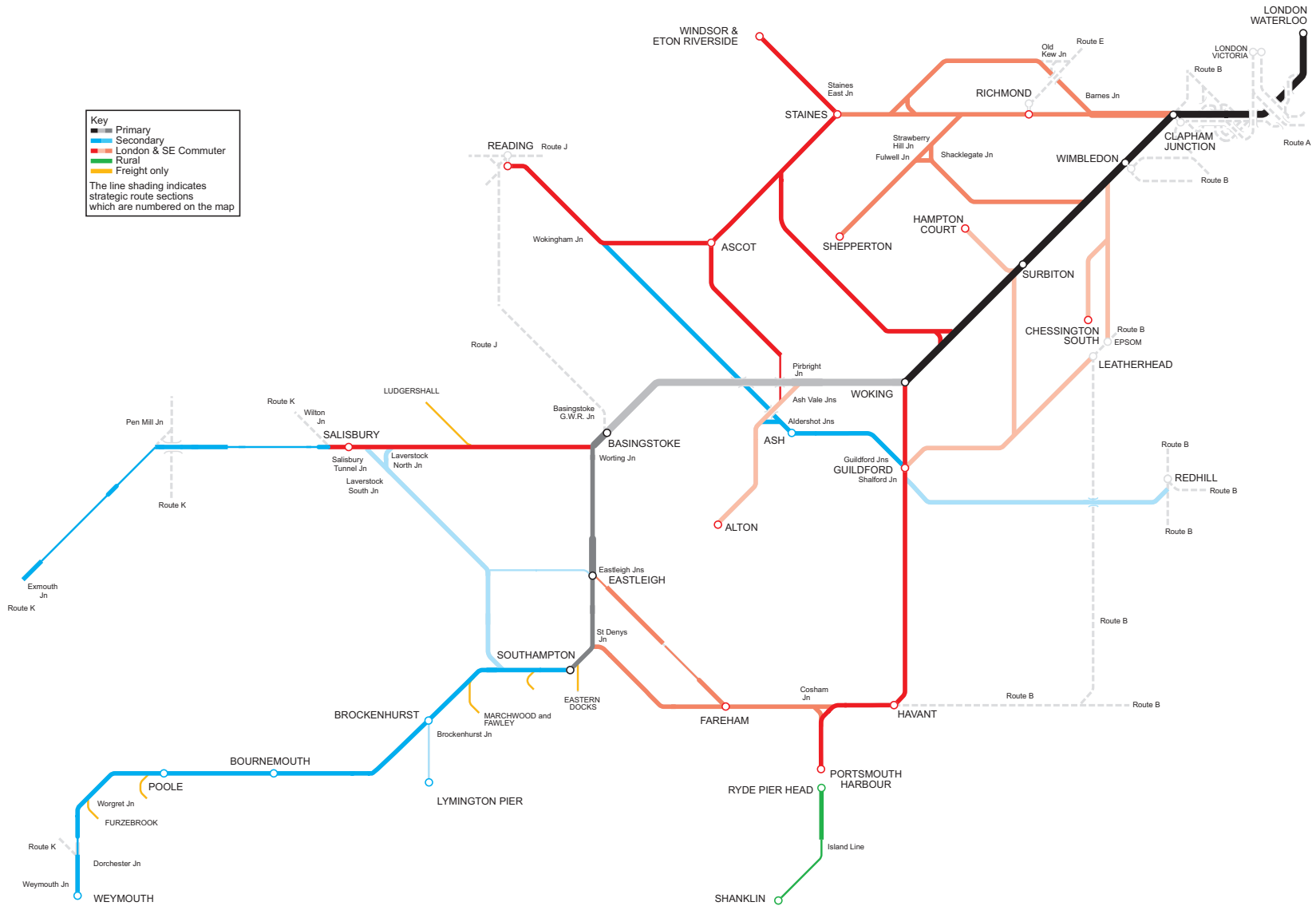
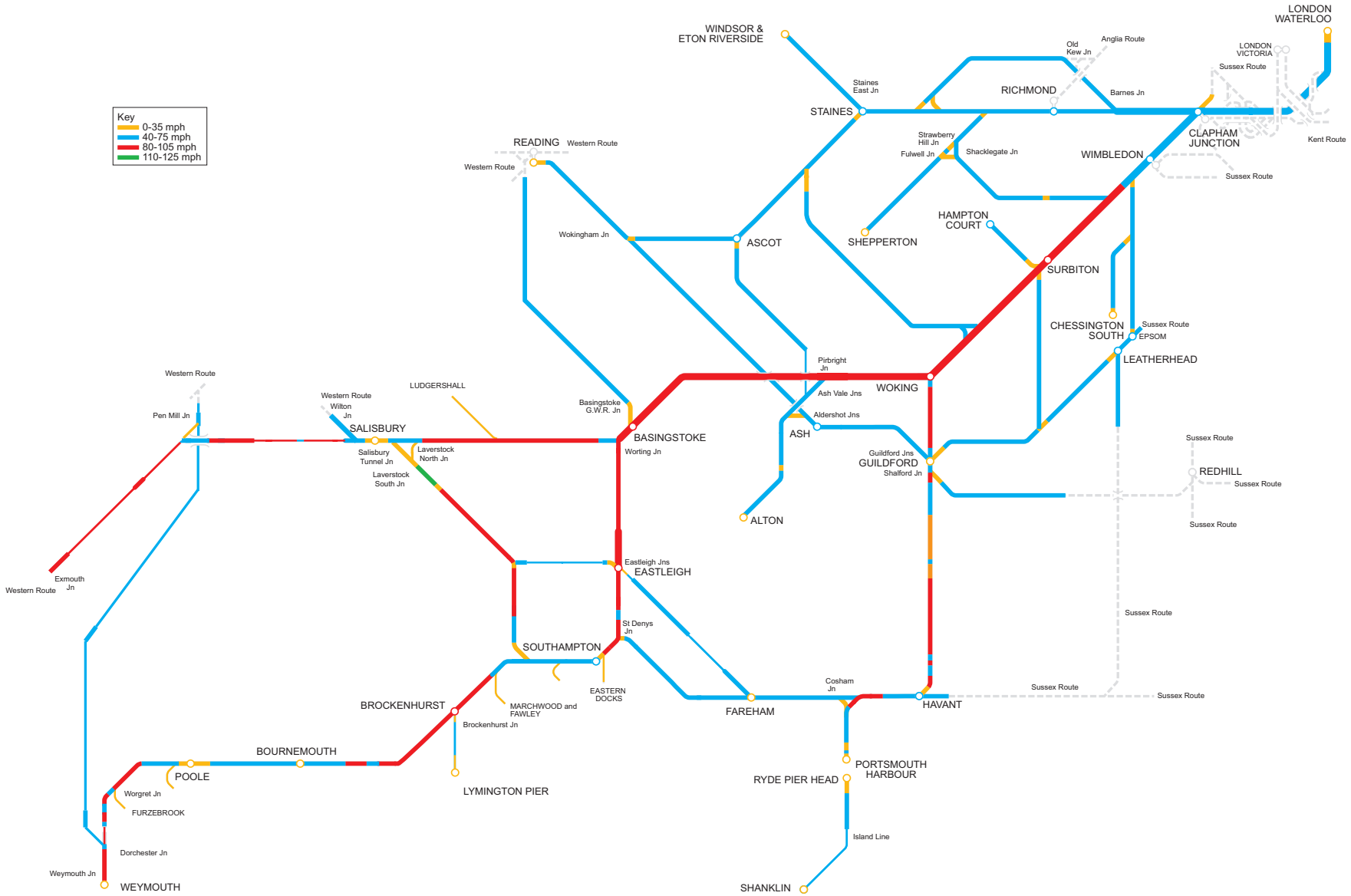
Route map



Wessex

Capability maps

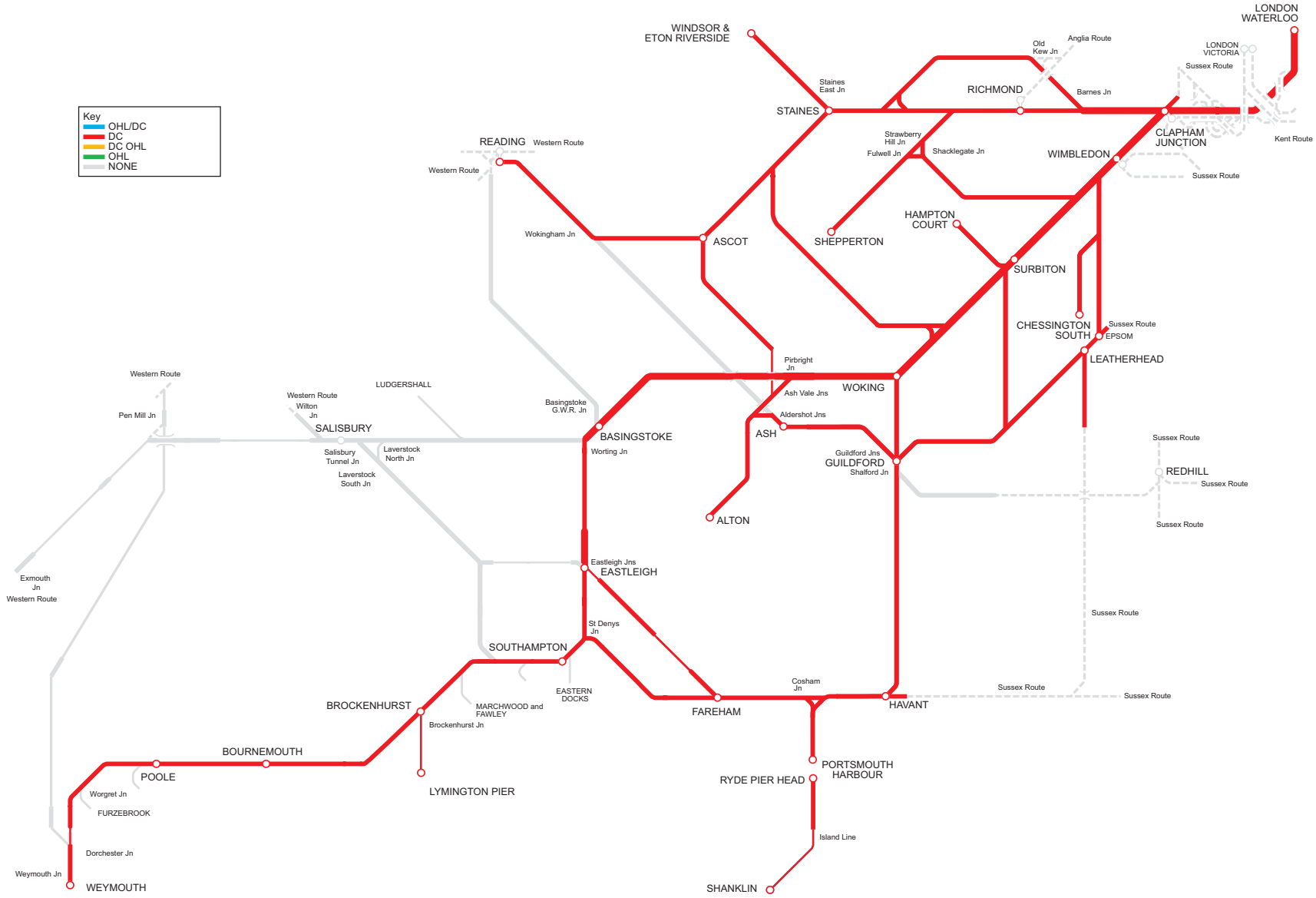
Linespeed



Wessex

Capability maps

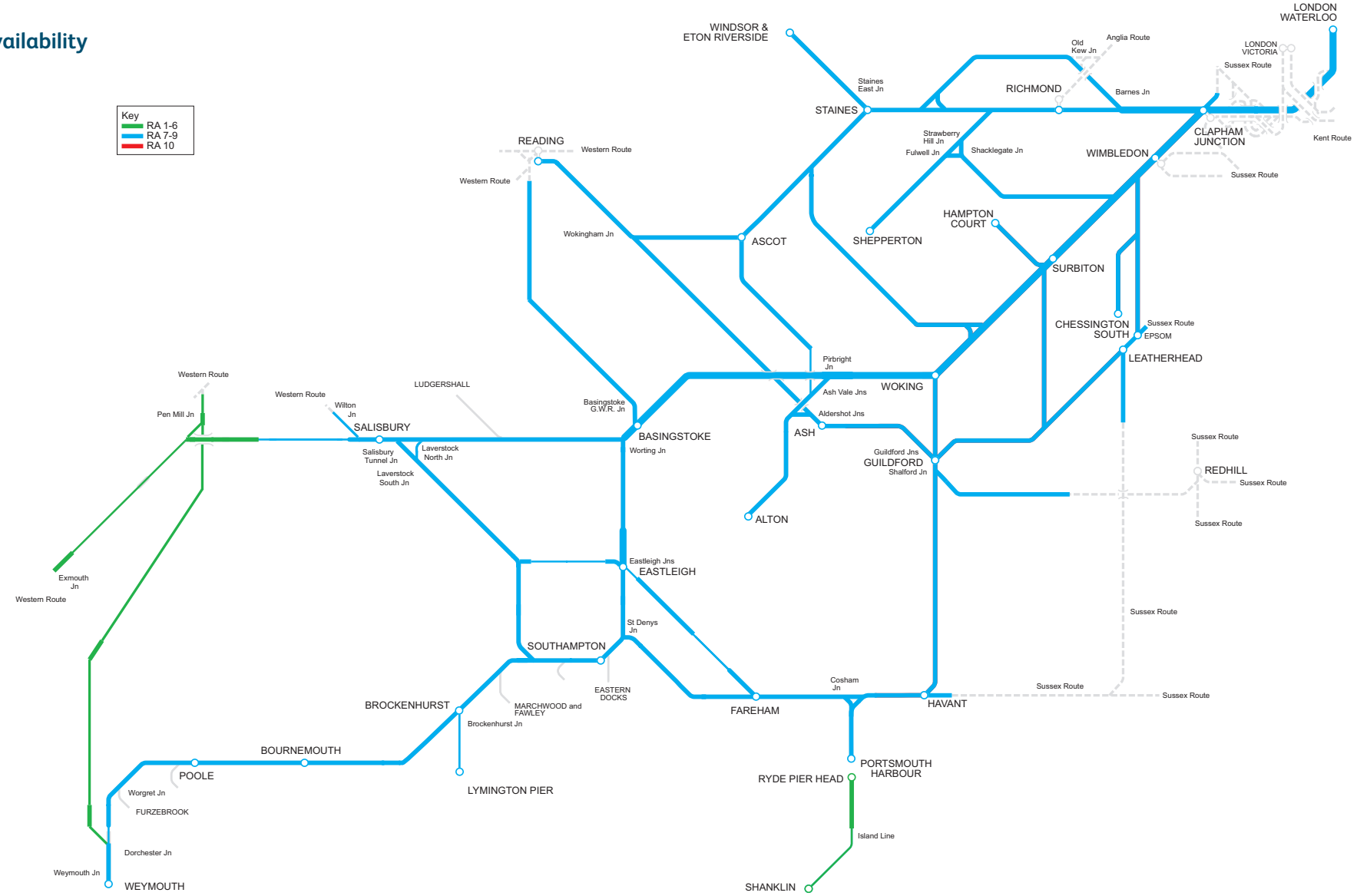
Electrification



Wessex

Capability maps

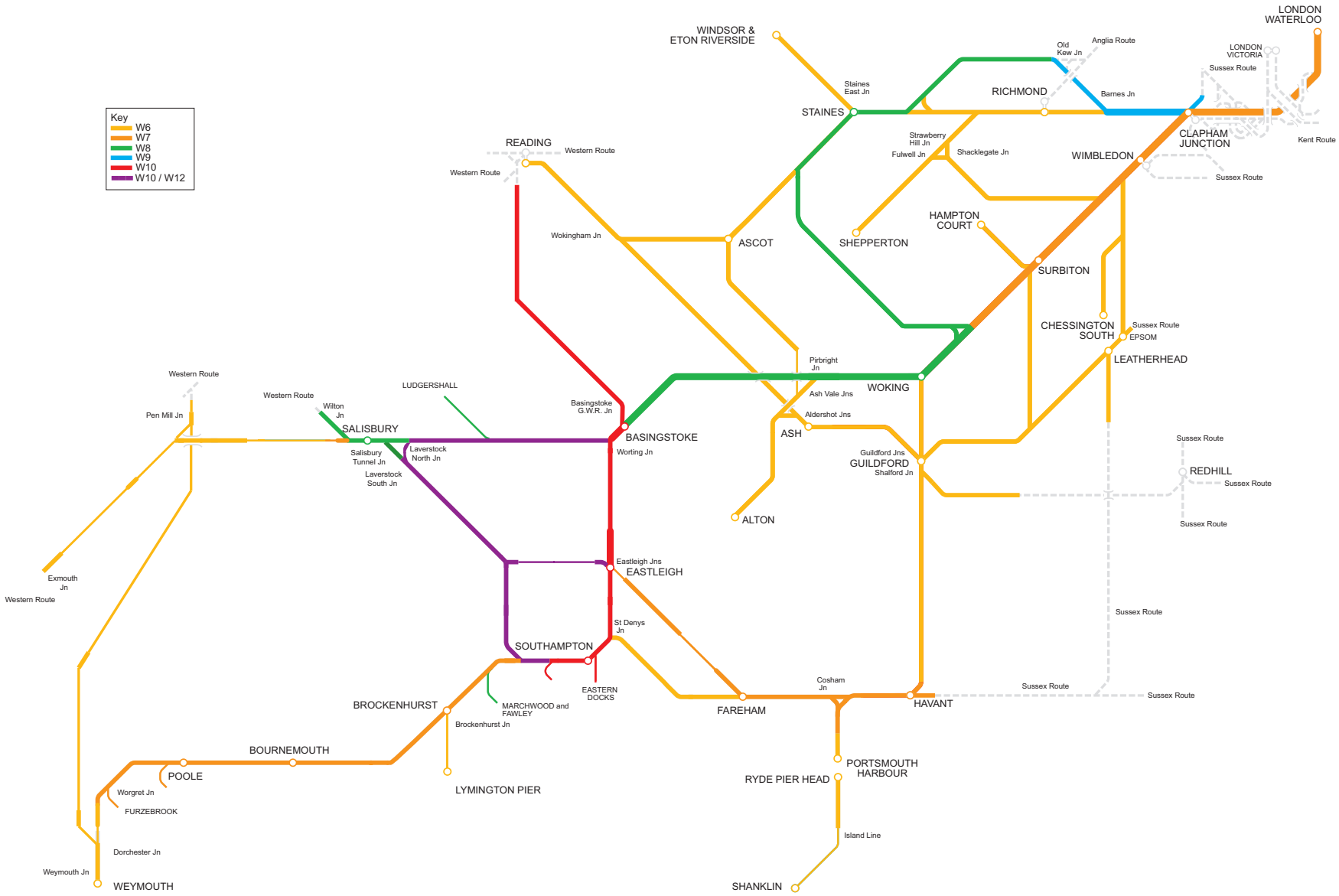
Route Availability



Wessex

Capability maps

Gauge



Network Rail Limited
1 Eversholt Street
London NW1 2DN

Tel: 020 7557 8000

www.networkrail.co.uk