July 2011

West Coast Main Line

Route Utilisation Strategy

NetworkRail

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Foreword

The movement of passengers and freight between London, the West Midlands, North West England and Scotland is vital to the British economy. The West Coast Main Line links many of our largest cities including Liverpool, Birmingham, Manchester, Glasgow and London, and enables thousands of commuters to travel to work.

Usage of the line has increased dramatically in recent years. Significant investment in both infrastructure (particularly the West Coast Main Line Route Modernisation) and rolling stock has enabled more trains to run. Passenger services are more frequent and faster, and freight operators have been able to increase their services to meet the demands of their customers.

However, as this RUS shows, passenger and freight demand continues to grow and the West Coast Main Line is nearly full. It is therefore no coincidence that the West Coast Main Line corridor has been identified as warranting the next high speed line in Britain. Network Rail supports the development of

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High Speed Two, which would provide significant additional capacity on this corridor. It will help address the capacity constraints identified in this RUS, improve connectivity on the existing network, support national economic competitiveness and reduce carbon emissions by encouraging more people to shift from roads and air to rail.

This RUS concentrates on accommodating the expected growth in demand on the West Coast Main Line until 2024, in the years prior to the opening of the new line. In this period, significant growth is expected on both long distance and commuting services, fuelled by increasing congestion on the roads, changes in patterns of travel to work and a reduction in air travel.

It considers value for money investments on the existing route to accommodate the expected numbers of passengers and volumes of freight. To do this the RUS considers a number of options, many of which make better use of the existing network. These include running longer trains, more long distance trains in the off-peak, faster services between Birmingham and Manchester and some additional fast commuter services into London in the peak. It supports the need to develop capacity for our freight customers, particularly at the northern end of the route.

Network Rail has worked closely to develop solutions with the rest of the rail industry and wider stakeholders including passenger and freight operators, Passenger Focus, the Passenger Transport Executives, the Department for Transport and Transport Scotland. I would like to take this opportunity to thank all our industry colleagues who have worked on the RUS. We look forward to working with existing operators, governments and bidders for the new franchises to develop and refine integrated plans for the route.

Paul Plummer
Group Strategy Director

Executive Summary

Introduction

The West Coast Main Line Route Utilisation Strategy (RUS) is published following almost a decade of major investment to upgrade the route from London Euston to Scotland, culminating with the implementation of the December 2008 timetable. This resulted in a considerable increase in the number of long distance high speed services, freight paths and a significant reduction in journey times.

This is the last of the first generation of geographic RUSs that Network Rail is required to publish under the Network Licence to establish a strategy for the most effective and efficient use of the network. The RUS has been formulated in consultation with industry colleagues through a Stakeholder Management Group (SMG), and is timed to inform the next High Level Output Specification (HLOS) by feeding into the rail industry's Initial Industry Plan in 2011.

The London to Manchester market is forecast to be the fastest growing long distance London market with passenger demand predicted to increase by between 54 and 61 per cent.

Scope and planning context

The study considers the geographic route from London Euston to Carstairs South Junction (Carstairs South Junction to Glasgow Central having been considered in the Scotland RUS and the Scotland RUS Generation Two), together with branch lines and diverging routes as shown in **Chapter 2**.

The RUS recognises that the recent significant infrastructure upgrade, the December 2008 timetable pattern and the recent recession have all had an impact on the level of passenger demand to the extent that the market is still developing. In addition, the periodic review process has established a defined and funded strategy for the current control period to 2014. This includes investment in additional rolling stock and an ongoing delivery plan for capability changes, examples of which include capacity and performance schemes in the Stafford area and the electrification of additional routes in the North West.

Also, concurrent with the RUS workstream, there are a number of franchises being renewed prior to 2014, the first of which is the InterCity West Coast (ICWC) franchise which is scheduled to be renewed during 2012.

The RUS is therefore intended to address issues from a base year of 2012, considering gaps and options in detail through to 2024, then to comment on a higher level strategy for the period beyond, including the impact of the Government's preferred high speed network.

The RUS uses a reference specification, provided by the Department for Transport (DfT) outlining the minimum level of service expected to be provided by the ICWC franchise using the resources of the long distance rolling stock fleet. This specification has been used as a basis for assessing gaps and resultant options in the RUS.

Forecast changes in demand

Passenger

Two growth scenarios have been used in the RUS to mitigate against the uncertainty arising in longer-term forecasts. Growth is forecast to continue in both scenarios, with a considerable increase in the long distance market. The London to Manchester market is forecast to be the fastest growing long distance London market with passenger demand predicted to increase by between 54 and 61 per cent between 2009/10 and 2024.

For non-London long distance markets, flows to and from Scotland are forecast to grow the fastest with services between Birmingham and Scotland predicted to grow by between 34 and 107 per cent depending on the scenario being used to 2024. There is also strong growth forecast for the shorter distance commuter flows to London from the stations on the Northampton to London Euston corridor.

These forecasts represent 'background' growth, ie growth due to factors external to the rail industry such as population, economic growth, fuel prices and road congestion. They do not include further growth that may be stimulated by improvements in the quality of service offered to passengers.

Freight

Freight forecasts were produced for 2019 and 2030 as part of the Strategic Freight Network (SFN). Freight demand is forecast to grow on the route which is driven by expansion of the container market. A contributing factor to the growth in container traffic is the continuing development of freight facilities in the North West and the West Midlands. Coal flows are forecast to decrease as coal fired power stations close.

Gaps and options

The SMG identified seven generic gaps between the capabilities of the infrastructure in the baseline year of 2012, the services assumed to be operating on it and the forecast demand for passenger and freight services that would be required by the end of the RUS period. The generic gaps identified are:

- on-train capacity
- freight capacity/capability
- journey times
- regional links
- reactionary delay
- network availability
- station passenger handling capacity.

Options were generated against each gap. Those considered to address reactionary delay, network availability and station passenger handling capacity are considered below. The options leading to RUS recommendations to address on-train capacity, journey times, regional links and freight capacity and capability are summarised in the RUS strategy.

Reactionary delay

Analysis of the route since the implementation of the December 2008 timetable shows that, despite an initial period of poor performance, there has been a steady rise in performance and reliability. Stakeholders agreed that the levels of reactionary delay were not at a level requiring strategic intervention, but recommend that improvements in performance continue to be achieved with particular focus given to the long distance service groups between London, Birmingham, Manchester and Scotland.

Network Availability

Stakeholders advised that the levels of weekend access did not meet their requirements to operate a consistent level of service. It was agreed that the improvements detailed in Network Rail's Control Period 4 (CP4) Network Availability Plan are a step towards Seven Day Railway operation.

Station passenger handling capacity

Stakeholders identified two stations on the route where significant levels of platform and concourse crowding occur, although these generally relate to the layout of information, announcements and retail activity which are not issues that geographic RUSs would generally consider. The Network RUS: Stations Draft for Consultation, published in May 2011, considers a toolkit of options to address crowding issues at stations.

Committed interventions

2012 is the baseline year for this RUS, and an overview of the committed interventions is included here. The committed interventions deliver, either in full or in part, many of the baseline assumptions on which the analysis for the longer term has been based.

Franchising

The franchise for the Long Distance High Speed (LDHS) services to and from London is scheduled to be renewed in 2012. The franchise for the long distance services between Manchester Airport and Scotland also runs to 2012 with a potential extension of up to five years.

Infrastructure

There are no specific major infrastructure schemes recommended by this RUS, however there are numerous schemes over the route that are being undertaken to improve junction capacity and journey time improvements (via linespeed increases) as part of the normal development processes.

There are also schemes outlined in Network Rail's CP4 Delivery Plan which are key to helping address future demand. These include:

- platform lengthening for longer Class 390 trains
- West Coast Main Line (WCML) power supply upgrade
- Bletchley remodelling delivering 12-car length slow line platforms and a 775-metre bi-directional freight loop
- Stafford Area Improvement Project providing grade separation of the junction at Norton Bridge
- electrification of routes in the North West between Manchester and Liverpool, Manchester and Blackpool and between Liverpool and Wigan
- the Budget announcement of 23 March 2011 including funding for the Ordsall Chord and other associated infrastructure works in the Manchester area to be implemented by December 2016.

Passenger train services

The reference specification used for analysis in the RUS assumes that the three inter-peak London Euston to Lancaster trains are extended to Glasgow Central forming an hourly service between London and Scotland and that the North West electrification scheme will facilitate the provision of electric trains on the Manchester Airport to Scotland services.

Rolling stock

The RUS assumes that the additional Class 390 vehicles will have been delivered and be in service by 2012 and that the three-car Class 185 units are replaced with four-car Electric Multiple Units (EMUs) under the rolling stock cascade for the North West electrification. These four-car units have yet to be procured and may be specified as being capable of operating at 110mph. This would assist with timetabling north of Preston as it would reduce the speed differential between passenger services.

RUS strategy (2012–2024)

This period of the strategy centres on the gaps identified by the RUS and presents the interventions recommended to alleviate them.

Passenger train services

Despite the recent high levels of investment in infrastructure and increases in rolling stock during CP4, crowding is evident on some services and is forecast to grow significantly worse throughout the period to 2024.

Crowding issues are most acute for commuter and longer-distance services between Northampton, Milton Keynes Central and London Euston. Analysis shows there is a business case for an additional 44 vehicles to be provided (including 28 vehicles for train lengthening in both peaks) by 2024. The busiest existing trains with eight-car formation in the three-hour peaks should be lengthened to 12-car formations where operationally feasible to do so and this should be progressively introduced as rolling stock becomes available.

Crowding issues are most acute for commuter and interurban services between Northampton, Milton Keynes Central and London Euston.

The RUS has identified one timetable slot in the morning high-peak hour and two timetable slots in the evening three-hour peak (one in the high-peak and one in the second shoulder-peak) that could be utilised for additional services on this corridor. In the current timetable structure these services would have to be operated using 125mph Enhanced Permissible Speed rolling stock and be no more than eight cars in length due to platform constraints at London Euston. However, no suitable commuter rolling stock is currently or likely to be available that meets these criteria. There may be the opportunity to provide additional paths using 110mph rolling stock if the timetable on the corridor was restructured. This should be considered for implementation as part of future timetable developments.

By 2024, if implemented, these proposed interventions reduce the numbers of passengers expected to be standing during the morning and evening three-hour peaks by 3,500 which will still leave 5,300 passengers standing. Of these passengers, around 34 per cent are expected to stand for more than 20 minutes.

The recommendations of this RUS aims to provide as much capacity as possible in the medium term, however the RUS has been unable to fully address the peak crowding gap.

There is a significant peak capacity gap on Milton Keynes Central to East Croydon services between Watford Junction and Clapham Junction during the three-hour peak. The option to lengthen these services from four to eight-cars has been developed in the London and South East RUS and is recommended for implementation as soon as rolling stock becomes available.

The RUS notes that crowding on these services is exacerbated by an uneven interval timetable frequency and there is a high level of suppressed demand on the route which will require additional capacity. The RUS recommends that the service frequency is increased to two trains per hour during the peak hours. However, this can only be achieved following additional dual voltage rolling stock becoming available upon completion of the Thameslink programme and the associated timetable rewrite of services on the West London Line and south thereof.

The increase in Class 390 rolling stock in CP4 can accommodate the majority of the anticipated growth in demand for LDHS services, to or from London Euston for much of the RUS period. However, analysis shows that by 2024 there will be significantly more services than today that are at or near capacity.

As with all operations it is firstly recommended that the longest train sets are deployed to the busiest services. The strategy to alleviate the remaining crowding is focused on optimising the rolling stock to provide capacity for an additional hourly off-peak service between London Euston and the North West and two options are recommended for further development.

The first option reduces the number of stops in the London Euston to Glasgow Central services in the off-peak hours and uses capacity identified in the fleet to run an additional hourly service from London Euston to the North West with a calling pattern to suit demand and compensate for the loss of stops from the Glasgow Central service.

The second option increases the frequency of services between London Euston and Manchester Piccadilly to four trains per hour on an even frequency, providing significant additional capacity to the busiest LDHS services on the route. This option is better able to meet the capacity gap.

As well as addressing crowding, the business cases for the two options are strengthened significantly by the reduction in journey times between London Euston, Preston and Glasgow Central in the case of the first option and generalised journey times between London Euston and Manchester Piccadilly in the second.

Analysis conducted since the publication of the Draft for Consultation has demonstrated that the first option creates further conflicts in the timetable which cannot be resolved in the current timetable structure without significantly worsening anticipated journey times. The second cannot be accomodated without a timetable recast. It is therefore recommended that the options are considered by the Industry Timetable Working Group, led by Network Rail, which will be developing the future West Coast Main Line timetable, with the first iteration commencing in December 2013.

There is overcrowding on the LDHS services between Birmingham and Scotland at present and the existing crowding is forecast to become more severe during the period to 2024. The RUS recommends that in the short term the allocation of the rolling stock fleet should be optimised to operate the nine-car Class 390 rolling stock on the most crowded services between Birmingham New Street and Edinburgh Waverley, but notes that should this not be possible there is a case for lengthening a number of services on this route. As demand grows, an additional 16 vehicles will be required and it is proposed that consideration be given to procuring vehicles which will allow the Class 221 trains currently utilised to become capable of being electrically or diesel operated.

Analysis of the Manchester Airport to Edinburgh Waverley services highlights crowding issues throughout Fridays and at weekends. The RUS recommends that services are lengthened to six-car formations using eight additional vehicles. Future growth levels need to be carefully monitored and if predicted growth materialises in line with the higher demand forecasts used in this strategy then services will need to be lengthened to eight-car formations, using 16 vehicles. Development of the Manchester Airport to Scotland services to provide a consistent hourly timetable structure is also recommended.

To improve the journey time between Birmingham and Manchester, the slowest of the long distance interurban services between these cities could be diverted to run from Stafford to Manchester Piccadilly via Crewe and Wilmslow. This has a high value for money case but further analysis since publication of the Draft for Consultation has shown that the anticipated journey time savings cannot be realised within the existing timetable structure.

This option should be further considered in the timetable development process.

The introduction of the December 2008 timetable severed a number of regional links that were previously served by direct rail services. The RUS has considered the case for addressing these gaps, including extending the existing interurban service between London Euston and Crewe to Liverpool Lime Street via Runcorn by diverting the service away from the Stoke-on-Trent corridor. This option has a good business case but would remove all services from Stone. Therefore it cannot be implemented until further timetable and business case work has been undertaken to replace capacity on the Stoke-on-Trent corridor.

The RUS has also highlighted overcrowding issues on the Derby to Crewe service and recommends that the busiest services are lengthened to two vehicles.

Freight

The assessment of capacity to accommodate freight growth based on the Strategic Freight Network (SFN) 2019 and 2030 forecasts found that there is sufficient capacity for the additional timetable slots required (expressed as train paths per day).

The freight forecasts used make a number of assumptions regarding routeing, six-day operation and 640m train lengths. These assumptions are not currently funded but are based on establishing the market potential, whilst noting that the longer-term aspiration of freight operators is to run 775m trains. These assumptions are critical to the outcomes of the RUS freight capacity analysis.

North of Preston, analysis has shown that it will be possible to accommodate the majority of freight services running with heavier payloads than today alongside the options for changes to the passenger services contained in this strategy by altering the loops used (and additional looping). However, the majority of the loops along the route are not long enough to accommodate 640m trains and therefore interventions would be required to mitigate this as demand develops and train lengths increase.

The main constraining locations include the summits at Shap and Beattock in both directions. The extended running times for heavier trains can be partially or wholly offset by using more powerful traction which would reduce the amount of looping required. The type of traction used on freight services makes a considerable difference to freight journey times as a result of the steep topography on the route. This has a consequent effect on overall capacity as the speed differential between freight and passenger services widens. Conversion of freight services to electric traction would benefit both end to end journey times for freight and the amount of available capacity for both freight and passenger services.

However, for this to be a viable proposition consideration needs to be given to the linking of freight terminals to the electrified network, along with further infill electrification to allow electric operation from origin to destination as changing traction type en-route is costly both economically and in terms of overall journey times.

The established Network RUS: Electrification Strategy also considers the case for further electrification of the network and this RUS supports that strategy.

Critical to any infrastructure solution is the timetable structure that is assumed to be in operation. Therefore, further work is being undertaken to look at alternative scenarios to those outlined above. This includes the impact of running 775m freight trains and what the effects of new passenger services may be following the introduction of high speed services. This work is being led by the SFN and work completed in both the Draft for Consultation and this RUS has informed the analysis. Any interventions found to be necessary north of Preston will then be appraised to determine whether there is a value for money case to undertake any work.

Long term (beyond 2024)

As previously identified, the crowding issues worsen to 2024. Whilst there is the potential to run a small number of additional fast commuter services during the peak and extra LDHS services in the inter-peak, the WCML is then effectively full, particularly at the south end of the route. The lack of capacity will become even more acute beyond 2024 as demand continues to grow. The most effective and best value for money way to create additional capacity will be through building a new line.

The RUS, therefore, supports the development of the proposed new high speed line, initially between London and the West Midlands and then onwards to Manchester and beyond. The objectives included in the announcements about both the New Lines Programme and the high speed line explicitly include the creation of capacity on the WCML for both commuter and freight operations by switching the majority of LDHS services to the new infrastructure. The formal public consultation on the Government's proposed high speed strategy closes on 29 July 2011.

It is important that the opportunities available as a consequence of the capacity created by the preferred Government strategy for a high speed network are identified and continually reviewed as development of the new line progresses.

1. Background

1.1 Introduction to Route Utilisation Strategies

Following the Rail Review in 2004 and the Railways Act 2005, the Office of Rail Regulation (ORR) modified Network Rail's network licence in June 2005 to require the establishment and maintenance of Route Utilisation Strategies (RUSs) across the network. Simultaneously, the ORR published guidelines on RUSs and both of these documents were then updated and re-issued on 1 April 2009. A RUS is defined in Condition 1 of the network licence as, in respect of the network[1] or a part of the network, a strategy which will "promote the route utilisation objective".

The route utilisation objective is defined as:

> **"...the effective and efficient use and development of the capacity available on the network, consistent with the funding that is, or is likely to become, available during the period of the route utilisation strategy and with the licence holder's performance of the duty."**
>
> Extract from ORR Guidelines on Route Utilisation Strategies, April 2009

The ORR guidelines explain how Network Rail should consider the position of the railway funding authorities, their statements, key outputs and any options they would wish to see tested. The RUS should address:

> **"• network capacity and railway service performance**
> **• train and station capacity including crowding issues**
> **• the trade-offs between different uses of the network (eg between different types of passenger and freight services)**
> **• rolling stock issues including deployment, train capacity and capability, depot and stabling facilities**
> **• how maintenance and renewals work can be carried out while minimising disruption to the network**
> **• opportunities from using new technology**
> **• opportunities to improve safety."**
>
> Extract from ORR Guidelines on Route Utilisation Strategies, April 2009

The guidelines also set out principles for RUS scope, time period and processes to be followed and assumptions to be made. Network Rail has developed a RUS manual which consists of a consultation guide and a technical guide. These explain the processes used to comply with the licence condition and guidelines. These along with other documents relating to individual RUSs and the overall RUS programme, are available at **www.networkrail.co.uk.**

The ORR guidelines require options to be appraised. This is initially undertaken using the Department for Transport's (DfT) appraisal criteria, though bespoke analysis has been used where shown to be necessary. To support this appraisal work, RUSs seek to capture implications for all industry parties and wider societal implications in order to understand which options maximise net industry and societal benefit, rather than that of any individual organisation or affected group.

RUSs occupy a particular place in the planning activity for the rail industry. They utilise available input from processes such as the DfT's Regional Planning Assessments and for the period to 2014, the 2007 High Level Output Specification (HLOS). The recommendations of a RUS and the evidence of relationships and dependencies revealed in the work to produce them form an input to decisions made by industry funders and suppliers on issues such as franchise specifications and investment plans. In particular, RUSs form an essential building block of the Rail Industry's Initial Industry Plan, itself a precursor to the 2012 HLOS process which will define the level of expenditure available for rail in the next control period (Control Period 5 (CP5) 2014–2019).

Network Rail will take account of the recommendations from RUSs when carrying out its activities. In particular, they will be used to help inform the allocation of capacity on the network through application of the normal Network Code processes.

The ORR will take account of established RUSs when exercising its functions.

The RUS process is designed to be inclusive. Joint work is encouraged between industry parties, who share ownership of each RUS through its industry Stakeholder Management Group (SMG). Detailed analysis is undertaken in industry working groups. In order that passengers' interests are represented, the SMG includes representation from Passenger Focus and London Travelwatch.

1 The definition of network in Condition 1 of Network Rail's network licence includes, where the licence holder has any estate or interest in, or right over a station or light maintenance depot, such station or light maintenance depot.

There is also extensive informal consultation outside the rail industry by means of rail user group workshops and Wider Stakeholder Group briefings.

1.2 Document structure

This strategy has been developed based on input from stakeholders, from within and outside the rail industry, and comprehensive appraisal and analysis work.

Chapter 2 describes the geographic scope of the RUS, the time horizon and the planning context within which it is being developed.

Chapter 3 summarises the current capabilities and usage of the strategic routes within the RUS area, drawing on input from key industry stakeholders, and highlighting particular issues.

Chapter 4 discusses anticipated changes in supply and demand, including the schemes planned to enhance the routes and services covered by the study. This helps to identify the benefits which will result from these improvements, as well as the potential for synergy between committed or expected schemes and those developed by the RUS.

Chapter 5 identifies the gaps being considered by the RUS. These gaps are defined in terms of specific elements of supply and demand for the railway system. Options for bridging these gaps are listed, discussed and appraised in terms of their likely costs and benefits.

Chapter 6 covers the consultation process including its purpose and a summary of the responses and how these have been taken into account in the final document.

Chapter 7 draws together the conclusions into a strategy, taking account of those interventions that are already funded. The chapter describes the industry's strategy for meeting predicted demand during CP5 and beyond in the context of likely longer-term developments.

Chapter 8 describes the next steps in the process, including the consideration of this RUS by the ORR.

2. Scope and planning context

2.1 Introduction

This chapter describes the scope and planning context of the West Coast Main Line Route Utilisation Strategy (RUS). It outlines its purpose, geographical scope, stakeholders, and the time horizon which it will consider. It also describes the planning context in which it is set and its relationship to other studies.

2.2 Purpose

The strategies that emerge through the RUS process have a number of purposes. They inform:

- the optimisation of the output specification for rail infrastructure renewals and enhancements
- the identification of ways in which capacity could be utilised more efficiently, in the context of the railway and wider public transport
- the development of the Government's High Level Output Specification (HLOS) for the next control period, as applicable to the West Coast Main Line RUS area
- the development of a future service specification and timetable structure for the West Coast Main Line RUS area
- the establishment of an optimum engineering access strategy, taking into account industry efficient maintenance and the requirements of passenger and freight operators.

Specifically the West Coast Main Line RUS will therefore:

- propose options to achieve the most efficient and effective use and development of the existing rail network by analysing the demand for both passenger and freight services for the period beyond 2012 identifying cost-effective opportunities to improve the network where appropriate
- enable Network Rail to develop an informed renewals, maintenance and enhancements programme in line with the aspirations of the Department for Transport (DfT) and Transport Scotland (who fund approximately 68 miles of the RUS area in Scotland and also fund routes from Carstairs to Glasgow and Edinburgh over which West Coast Main Line (WCML) services operate) and the reasonable requirements of train operators and other key stakeholders
- enable Local Transport Plans and freight plans to reflect a realistic view of the future rail network and inform future passenger franchises that use the route
- consider and comment on the longer-term use of the route in the light of strategies for high speed rail services across the UK proposed by Network Rail's New Lines Programme and by High Speed Two (HS2) Limited.

2.3 Geographic scope

In geographical terms, the West Coast Main Line RUS will consider the area covered by Network Rail's Strategic Route N (West Coast Main Line) between London Euston and Carstairs South Junction. This is depicted in geographical and schematic format in **Figures 2.1** and **2.2** respectively. Further details of the routes covered by the strategy are provided in **Chapter 3**.

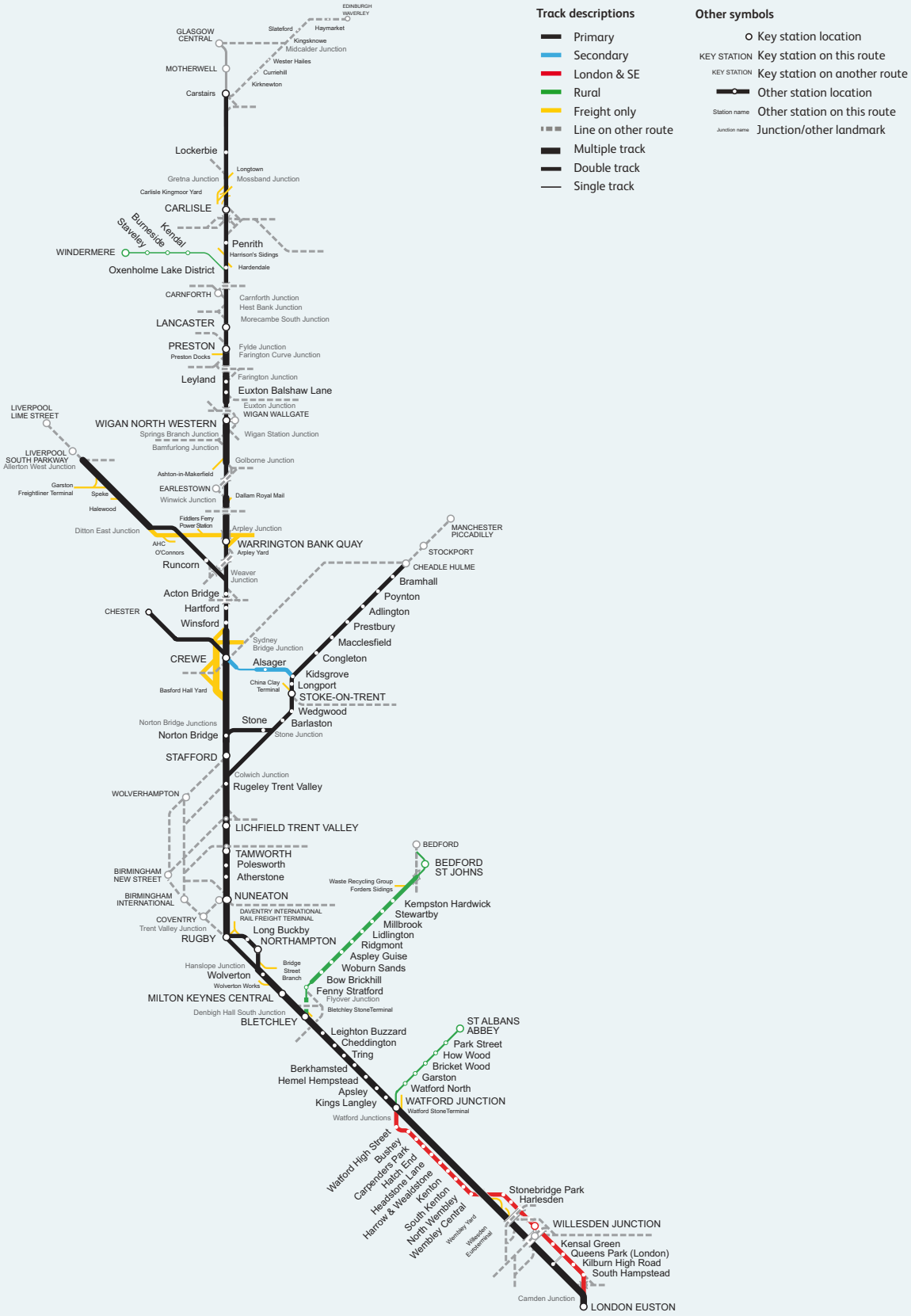
2.4 Scope of services

The RUS considers all passenger and freight services that spend all or part of their journey within the RUS area, to the extent necessary to achieve the route utilisation objective regardless of whether or not the physical infrastructure falls within the boundaries of the West Coast Main Line RUS area. The RUS includes appropriate analysis of those traffic generators outside the scope which have a significant effect on the pattern of demand within the scope area. For example, the RUS considers services from the WCML that operate into Manchester Piccadilly/Trafford Park and north from Carstairs South Junction to Glasgow Central and Edinburgh Waverley.

The WCML serves a significant number of freight and passenger markets and the RUS considers all of these markets across the RUS area. Passenger markets served include Long Distance High Speed and interurban journeys between the key urban centres both on and off the route with significant commuter flows into London, Birmingham, Manchester, Liverpool and Glasgow. Freight markets include domestic and deep sea intermodal traffic along with a considerable amount of bulk flows.

Figure 2.1 – geographic map of West Coast Main Line RUS area

Figure 2.2 – schematic map of West Coast Main Line RUS area



2.5 Linkages to other Route Utilisation Strategies

Network Rail has published a programme of RUSs which cover the rail network of mainland Britain. The West Coast Main Line RUS is the last of the original programme of geographic RUSs and interfaces with other parts of the network which have been covered in previous RUSs, including the East Midlands, West Midlands and Chilterns, Merseyside, Scotland, Cross London and Wales RUSs. The relationship between them is outlined below. The West Coast Main Line RUS also interfaces with all three of the second generation RUSs (see section 2.6).

The East Midlands RUS, established in April 2010, covers the lines on the Midland Main Line strategic route not assessed by the West Midlands and Chilterns or Yorkshire and Humber RUSs. This interacts with the West Coast Main Line RUS area at Nuneaton and between Stoke-on-Trent and Crewe and the two RUSs interface on the routes from Derby to Crewe and between the West Midlands and Stansted Airport via Nuneaton and Leicester.

The West Midlands and Chilterns RUS was published in May 2011 and considers freight and passenger flows principally across the West Midlands conurbation and along the Chilterns route between Birmingham Moor Street and London Marylebone. It draws together the conclusions from other RUSs in respect of long distance interurban services between the South West, South Coast, and North East, North West. The West Midlands and Chilterns RUS interacts with the West Coast Main Line RUS at Rugeley Trent Valley, Stafford, Nuneaton and Rugby. Both RUSs consider options on the Birmingham New Street to Stafford corridor via Wolverhampton.

The Cross London RUS established in October 2006 interacts with the West Coast Main Line RUS in the Willesden area. The two RUSs interface on the route to and from the West London Line between Willesden and Clapham Junction via Kensington Olympia. Since the publication of the Cross London RUS, there have been significant increases in demand for services operating over the West London Line and both the West Coast Main Line RUS and the second generation London and South East RUS considers this increase in demand.

The Wales RUS, established in January 2009, interfaces with the West Coast Main Line RUS on the lines from Crewe to the north Wales coast via Chester.

The Scotland RUS, established in May 2007, considers all passenger and freight services north of the Scottish border.

The North West RUS, established in the summer of 2007 covers an area which is crossed by the WCML. The two RUSs interface on various routes radiating from Greater Manchester and Merseyside and these interfaces are most evident at the stations and junctions between Crewe and Preston.

The Lancashire and Cumbria RUS, established in October 2009, covers the largely rural area north of Preston and like the North West RUS, is crossed by the WCML. The RUS referred several timetable connectivity issues to be considered by the West Coast Main Line RUS, at Oxenholme Lake District with the Windermere branch, and at Carlisle for connectivity with the Cumbrian coast, the Glasgow and South West route to Dumfries and Kilmarnock, and the Carlisle to Settle and Leeds line.

The West Coast Main Line RUS also considers input and analysis from the Freight RUS, established in May 2007, and the Strategic Freight Network, as well as emerging conclusions from the Network RUS strategies assessing national electrification issues, rolling stock and depots, station capacity and scenarios and long distance forecasts.

The Network RUS: Stations and the Network RUS: Passenger Rolling Stock considering stations and rolling stock on a national basis respectively and have been published as Drafts for Consultation in May 2011.

2.6 Generation Two Route Utilisation Strategies

The original programme of RUSs has now been completed with the publication of this RUS. Network Rail is obliged under its Network Licence to maintain established RUSs to enable each recommended strategy to remain valid and fit for purpose. A number of factors can affect RUS recommendations over time, including changed Government policy, economic circumstance and franchise change and remapping. The existing RUS programme commenced in December 2004 and in July 2007 the publication of the Government White Paper 'Delivering a Sustainable Railway' required Network Rail to consider a 30-year planning horizon in its development of RUSs. A number of the earlier RUS recommendations have therefore needed to be reassessed to consider this longer-term planning framework. Equally a number of assumptions made in early recommendations have changed in the light of the current economic climate. The publication of the HLOS and Network Rail's Control Period 4 (CP4) Delivery Plan in 2008/09 has also changed the way in which a number of recommendations will be delivered.

Network Rail is addressing these changes through a second generation of RUSs. These strategies will adopt a more strategic viewpoint than undertaken in the established RUSs and, through analysis of the changes that have occurred, will identify the strategic gaps that require further appraisal. The strategies will not seek to confine themselves to a particular geographic area and will also not reappraise the recommendations made in established RUSs where these remain valid.

This second generation of RUSs has identified three workstreams that will consider strategic gaps in London and the South East, the north of England and Scotland. The West Coast Main Line RUS interfaces with all three of these second generation RUSs.

The London and South East RUS, published as a draft for consultation in December 2010, considers central London economic growth until 2031 and the effect that this growth may have on demand across all corridors into London terminal stations. The London and South East RUS interacts with the West Coast Main Line RUS at London Euston. The London and South East RUS also considers demand to the West London Line (primarily from Clapham Junction and south thereof) and options to increase supply to match this demand from both directions.

The Northern RUS, published in May 2011, analyses the effects that the announced programme of electrification of additional routes in the North West will have on travel patterns into urban centres. The Northern RUS interfaces with the West Coast Main Line RUS in the Preston area and both RUSs consider services between Manchester Airport and Scotland.

The Scotland RUS Generation Two, published in June 2011, builds on the work of the established Scotland RUS taking cognisance of Scottish Ministers' priorities for transport across Scotland. The Scotland RUS Generation Two interfaces with the West Coast Main Line RUS at Carstairs South Junction and considers the implications of revised and additional services on the WCML in so far as they affect terminal capacity at Glasgow Central and Edinburgh Waverley.

2.7 Linkage to other studies and workstreams

In order to successfully fulfil its role in industry planning, the RUS should fit into a wider planning framework, relating not only to rail schemes but also extending to other major strategies and policies covering key issues such as housing, economic development, social inclusion and environmental awareness. For it to be an effective strategy it should be broadly aligned and consistent with these.

During the development of this RUS a number of changes have taken place in the way that local and regional planning is administered in the UK. Following the establishment of the Coalition Government in May 2010, the approach to public spending and local planning has been reviewed, with the aim of reviving and developing the UK economy. A key policy has been to free local government from central and regional control and devolve greater powers to councils and local communities. Associated with this has been the abolition of the former Regional Development Agencies (RDAs) and the formal documents which they produced, such as the Regional Spatial Strategies (RSS). The new guidance is for local authorities to take collective responsibility for determining the appropriate level of growth anticipated in their areas.

Following the abolition of the RDAs in May 2010, the RUS is no longer able to draw directly on their recommendations. In these circumstances the representation of local councils and governing bodies in the Wider Stakeholder Group has been essential for understanding the changes as they

have evolved. Whilst the key themes and outputs of the former regional documents are still considered to have some relevance for understanding the local planning context, the RUS has looked directly to the local authorities for guidance on key issues such as travel behaviour and anticipated housing growth in the regions they cover.

The following regional and local planning documents (some of which have now been formally withdrawn) have provided supporting information during the development of the RUS:

- Delivering a Sustainable Railway (White Paper, Department for Transport (DfT) 2007)
- The Eddington Transport Study (October 2006)
- Draft London Plan (October 2009)
- Regional Planning Assessments
- West Coast Main Line Strategy (Strategic Rail Authority June 2003, updated 2006)
- Towards a Sustainable Transport System – Supporting Economic Growth in a Low Carbon World (DfT October 2007)
- Regional Transport Strategies
- Local Transport Plans (see section opposite)
- Scotland's Railways: developed as part of the National (Scottish) Transport Strategy (December 2006)
- Scotland Strategic Transport Projects Review (Transport Scotland 2008–2009)
- Manchester Transport Innovation Funding Programme (Greater Manchester Passenger Transport Executive July 2008)
- London Mayor's Transport Strategy (May 2010)
- Network Rail's Northern Hub study (2010)
- Future of Air Transport 2003
- 2011 Draft UK Aviation Policy Framework
- Government's Policy Framework on Aviation
- Government White Paper Creating Growth Cutting Carbon - January 2011 (see opposite)
- High Speed Rail London to the West Midlands and Beyond: A Report to Government by High Speed Two Limited (January 2011).

Local Transport Plans

Passenger Transport Executives (PTEs), Integrated Transport Authorities (ITAs) and local authorities with a responsibility for public transport produce Local Transport Plans (LTPs) which cover all modes of transport. These set out interventions that they fund themselves, how the transport needs of their areas are supported by schemes funded by other parties and their vision for the future. These are normally formulated in consultation with rail industry members and rail schemes funded through LTPs form part of the rail industry planning framework. The most recent set of LTPs were published in April 2011.

Local Sustainable Transport Fund

In January 2011 the government published a White Paper 'Creating Growth Cutting Carbon' which aims to encourage greater use of public transport. A £560m Local Sustainable Transport Fund was created for local authorities to address the urgent challenges of building economic growth and tackling climate change, as well as delivering cleaner environments and improved safety. A commitment was also given to work with the transport industry to support the new strategy.

New Lines Programme and High Speed Two

In summer 2008 Network Rail commenced its New Lines Programme, examining the case for the development of new high speed lines in the UK. The first phase of the New Lines Programme, which was completed in August 2009, established the business case for a new high speed line connecting the main conurbations between London and Glasgow/Edinburgh currently served by the WCML. The second phase of the study examined the case for a new line to Leeds and the East Midlands and found that there was a case for such a line to be taken forward.

The previous Government's proposed strategy for high speed rail was established in a Command Paper presented to Parliament and published in March 2010. The Command Paper set out the case for a new core British high speed rail network. The core strategy comprises a 335-mile core Y-shaped high speed rail network between London and Birmingham/Manchester/Leeds capable of carrying trains at speeds of up to 250mph. The Command Paper stated that a London to the West Midlands route would be the first stage of the new high speed rail network. The current Government has publicly stated that it is in favour of a new high speed line.

An initial consultation process took place and an updated government paper was released in December 2010 when a revised route between London and Birmingham was announced, with up to 50 per cent of the route changed. It is also proposed to link the High Speed Two line to High Speed One, and with a link to serve Heathrow Airport directly.

An extensive public consultation process for High Speed Two commenced in March 2011 and this will continue until July 2011. As this RUS will have been published before the High Speed Two public consultation process has been completed it is not thought appropriate to comment further as additional changes to the proposals may result.

2.8 Time horizon

In 2003 the Strategic Rail Authority published its strategy for the WCML. Updated in 2006, this strategy culminated in the WCML Route Modernisation Programme which delivered a step change in capability and capacity on the route between 2003 and 2008. The December 2008 timetable provided faster journeys and significantly increased on-train capacity between London and key urban centres on the route. In 2010 the DfT announced the procurement of an additional 106 Class 390 vehicles to provide further on-train capacity.

As a result of the significant recent changes to both the infrastructure and services on the route, and the effect that this would have on changes to immediate travel patterns, the RUS has taken 2012 as the baseline year. By 2012 the demand profile for much of the long distance passenger services is expected to have stabilised and the additional Class 390 vehicles will be providing further capacity. The enhancement programme detailed in Network Rail's CP4 Delivery Plan is also included in the baseline.

The West Coast Main Line RUS takes a 30-year perspective to be consistent with the long-term vision adopted in recent UK Government transport planning strategy documents, notably the DfT's Rail White Paper and Rail Technical Strategy (2007). The RUS therefore covers the 12-year period from 2012 to 2024 in detail and then describes broad, high level strategic issues in the longer term. The outputs will form the rail industry's preferred strategy for Control Period 5 (2014–2019) and 6 (2019–2024).

2.9 Other industry processes

In March 2011, the ORR approved track access rights which will enable the incumbent InterCity West Coast franchisee to provide services. As part of its approval the ORR tasked Network Rail to lead an Industry Timetable Working Group. This group will lead an iterative review of the WCML timetable and the first stage is expected to inform the December 2013 timetable.

The franchise for the principal operator of long distance high speed services on the route (InterCity West Coast franchise) expires 31 March 2012. In May 2011, the Department for Transport issued a draft Invitation to Tender for the replacement franchise with a proposed commencement date of 9 December 2012. This allows a period of further consultation to take place.

3. Current capacity, demand and delivery

3.1 Introduction

This chapter describes the current function and capability of the rail network covered by the West Coast Main Line Route Utilisation Strategy (RUS). Information is provided about the current infrastructure, capacity and capability of the route along with details of how it performs and how it is maintained. Profiles are provided for transport bodies, rail industry funders and passenger and freight operators. Demand profiles by market sector for both passenger and freight services are also detailed.

The West Coast Main Line (WCML) connects London to Birmingham and the Midlands, Manchester and the North West and Scotland. The Route Modernisation Programme which was completed in 2008, included significant investment in infrastructure across the route.

The RUS baseline considers current passenger and freight demand, infrastructure capability and performance in order to form a reference point for the analysis that the RUS will undertake. Since the publication of the Draft for Consultation, the Office of Rail Regulation has tasked Network Rail to lead an interactive review of the WCML timetable with the first changes expected in the December 2013 timetable. The baseline for the RUS has therefore been brought forward to 2012.

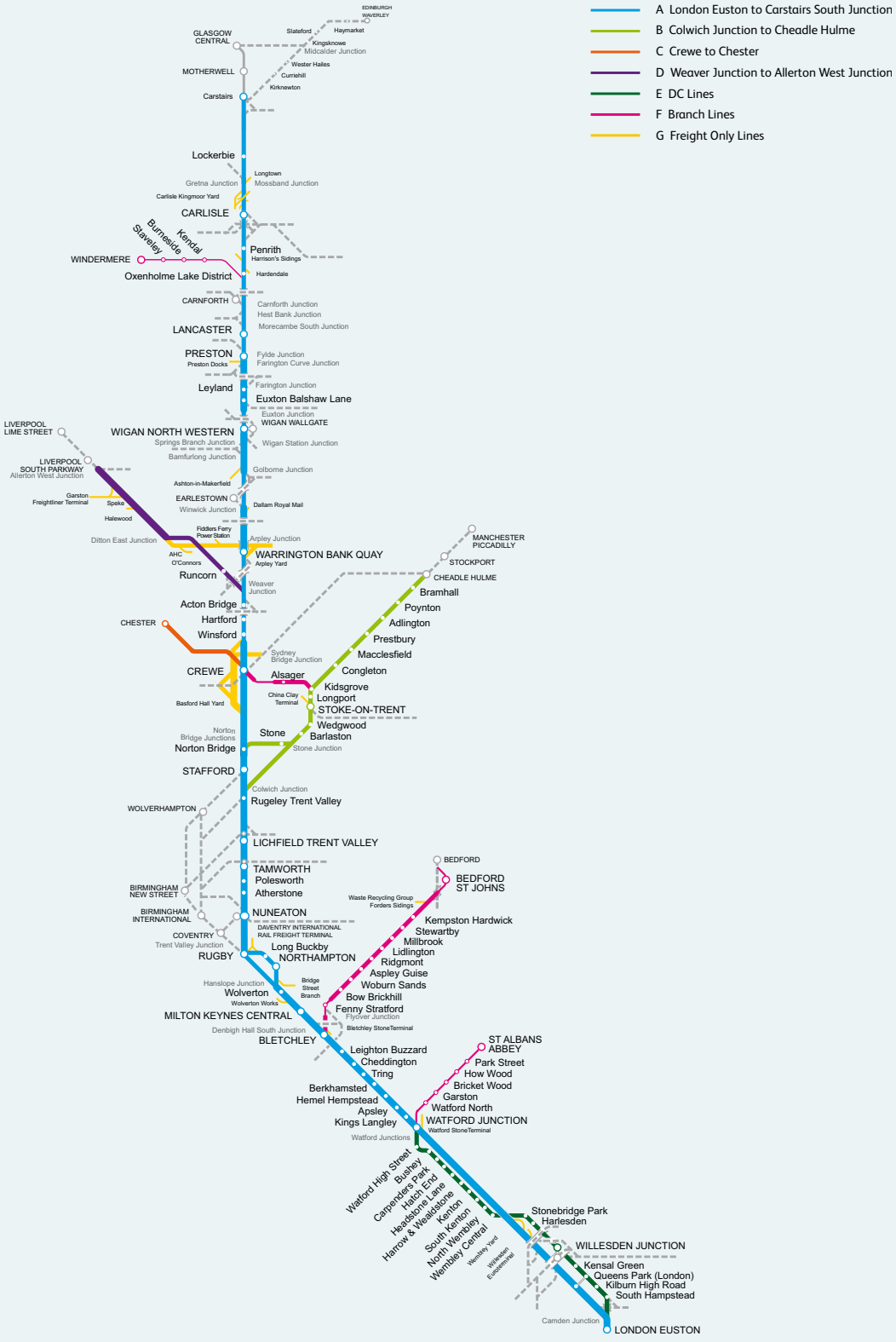
As part of the early development for the RUS a series of baseline exhibitions were held in May 2009 in Glasgow, Preston, Birmingham and Watford. This enabled stakeholders to review the results of the baseline exercise, and share their ideas and insights. This provided valuable input into the subsequent gap analysis and optioneering.

The RUS area is divided into a number of distinct route sections shown in **Table 3.1** and **Figure 3.1**.

Table 3.1 – West Coast Main Line RUS route sections

	Section name	Details
A	London Euston to Carstairs South Junction	London Euston – Carstairs South Junction via Rugeley Trent Valley and Stafford including the Northampton loop between Wolverton and Rugby – services to Scotland, the North West and the West Midlands.
B	Colwich Junction to Cheadle Hulme	Colwich Junction (near Rugeley Trent Valley) – Cheadle Hulme via Stoke-on-Trent and Norton Bridge Junction (near Stafford) to Stone – services to Manchester Piccadilly.
C	Crewe to Chester	Crewe to Chester.
D	Weaver Junction to Allerton West Junction	Weaver Junction (near Acton Bridge) – Allerton Junction (near Liverpool) – services to Liverpool Lime Street.
E	DC lines	Camden Junction – Watford Junction DC Lines – local services .
F	Branch lines	St Albans Abbey branch, Bletchley – Bedford branch, Crewe – Kidsgrove, Oxenholme Lake District – Windermere.
G	Freight only lines	Harlesden Junction – Sudbury Junction – Wembley Central Junction, Crewe Independent Lines, Manchester Independent Lines, Liverpool Independent Lines, Arpley Junction – Ditton East Junction, Bamfurlong Junction – Springs Branch Junction, Skew Bridge Junction – Preston North Junction, Carnforth South Junction – Carnforth North Junction, Carlisle Goods Lines, Caldew Junction – Kingmoor Junction – Floriston Junction – Mossband Junction.
H	Freight terminals	Willesden Brent Sidings, Wembley European Freight Operating Centre, Willesden Euroterminal, Willesden Princess Royal Distribution Centre (PRDC), Watford Yard, Bletchley Stone Depot, Wolverton Works, Northampton Castle Yard, Daventry International Freight Terminal, Rugby Up Yard, New Bilton, Stafford Royal Mail Terminal, Stoke Marcroft, Basford Hall, Crewe Carriage Shed, Crewe Down Holding Sidings, Warrington Arpley, Warrington Walton Old Yard, Dallam Royal Mail Terminal (RMT), Wigan Springs Branch, Preston Docks, Shap, Hardendale, Harrisons, Carlisle Upperby, Carlisle Kingmoor Yard, Longtown.

Figure 3.1 – West Coast Main Line RUS route sections



3.2 West Coast Main Line RUS rail network – infrastructure capability

Infrastructure capability, combined with the characteristics of rolling stock, determines the amount of capacity available on the railway. The RUS considers the following infrastructure capabilities:

- linespeed (**Figure 3.2**)
- planning headways – a measure of how close trains can travel together (**Figure 3.3**)
- loading gauge – which defines the size of vehicles and loads of wagons that can be carried (**Figure 3.4** and **3.5**)
- route availability – which defines the axle weight of vehicles that can be operated (**Figure 3.6**)
- electrification (**Figure 3.7**)
- loops – where trains can overtake one another (**Figure 3.8**).

The RUS also considers the speed of the key junctions along the route; if the junction speed is lower than the prevailing linespeed this causes the train to slow down impacting on the capacity of the route.

Linespeed

Figure 3.2 shows the linespeeds across the RUS area, and demonstrates that there is a wide mix of linespeeds depending on the route section. The main route infrastructure allows for two different maximum linespeeds for passenger services, depending on the technology fitted to the trains operating over it. Permissible speed (PS) is the normal maximum speed available to any rolling stock capable of attaining the speed. Enhanced Permissible Speed (EPS) allows trains equipped with tilt technology to travel at higher speeds specifically round curves, but also on sections of straight track due to the higher speed capability of this type of rolling stock.

The linespeeds between London Euston and Carstairs South Junction (section A), were upgraded as part of the WCML Route Modernisation Programme, and long sections of the fast lines allow for up to 125mph running in tilt mode (EPS). The slow lines south of Northampton were also upgraded with the majority supporting 100mph speeds, north of Northampton linespeeds on the slow lines are 75mph or slower. Notably slow linespeeds on this section include the Northampton, Preston and Carlisle station areas.

Between Colwich Junction and Cheadle Hulme (section B), linespeeds range between 50mph and 100mph with short sections of 125mph EPS running. The linespeed between Norton Bridge Junction and Stone is low, which is partly due to the tight curve through Stone station. Other notably low speeds include a section south of Stoke-on-Trent station and at Cheadle Hulme.

Between Crewe and Chester (section C) the linespeeds are predominantly between 80mph and 90mph, with slower speeds on the approaches to both Crewe and Chester stations.

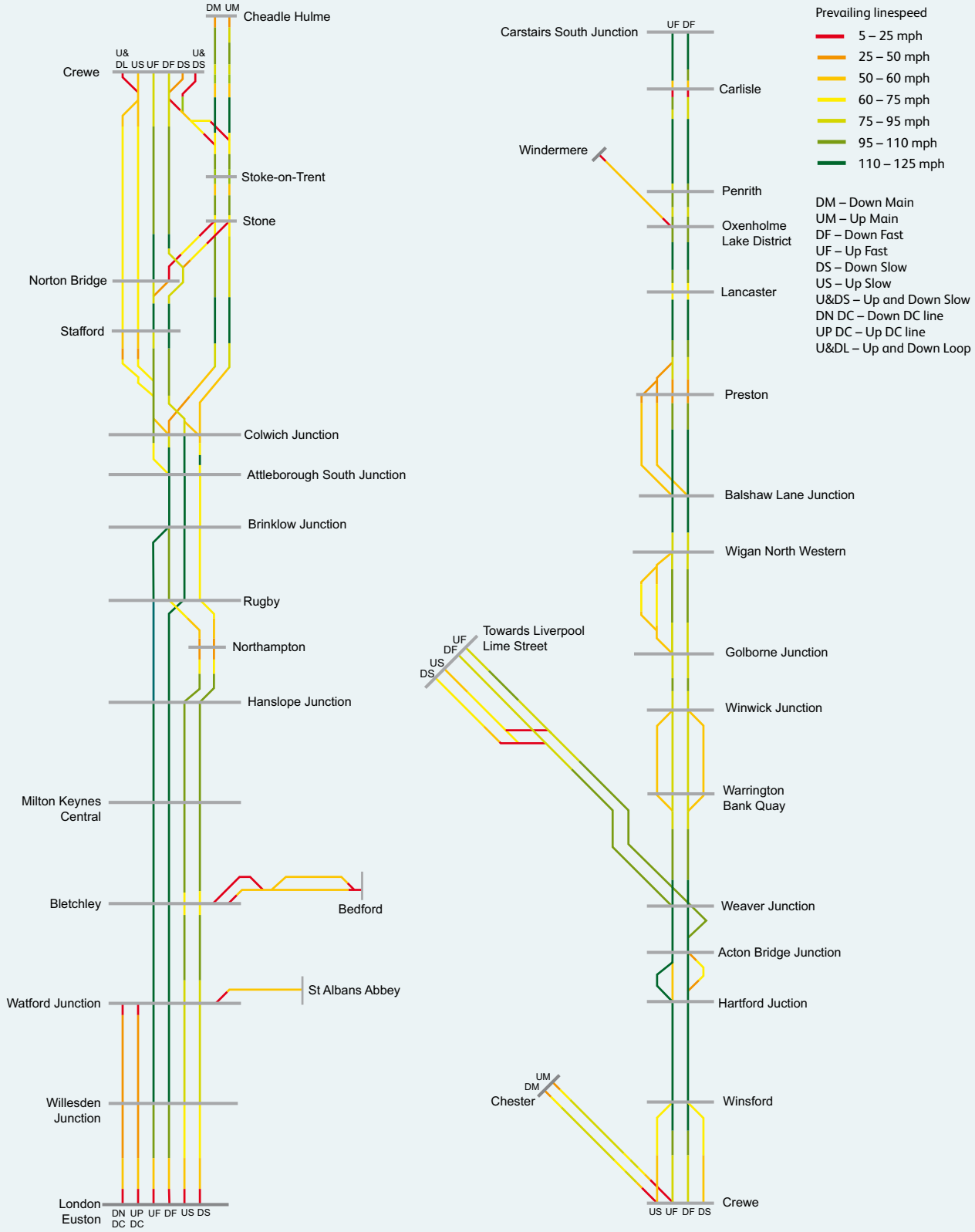
On section D, between Weaver Junction and Runcorn the linespeed is largely 100mph (EPS), with the section between Runcorn and Allerton West Junction ranging between 80mph and 90mph. The slow lines between Ditton East Junction and Allerton West Junction have speeds between 60mph and 75mph.

On the DC Lines, (section E), between Camden Junction and Watford Junction the linespeed is largely between 30mph and 45mph, with some sections between 50mph and 60mph, the areas around London Euston and Watford Junction have lower linespeeds.

The branch lines (section F) include the Watford Junction to St Albans Abbey route where the linespeed is between 50mph and 60mph except for lower speeds on the approach to Watford Junction. On the Bedford to Bletchley route linespeed is predominantly between 50mph and 60mph with slower speeds at the Bletchley and Bedford ends. The linespeed on the route between Kidsgrove and Crewe is 70mph over the double line section and 60mph on the single line section between Oxenholme Lake District and Windermere, which is further constrained by level crossings.

The freight only lines (section G), generally have a lower linespeed then the other lines in the RUS area. The freight only lines between Harlesden Junction and Wembley Central Junction have a prevailing linespeed of 20mph. In the Crewe area the independent lines have a prevailing linespeed of 10mph. In the North West, the lines between Arpley Junction (near Warrington) and Ditton East Junction (near Ditton) and between Bamfurlong Junction (near Wigan) and Springs Branch Junction (near Wigan) have a prevailing linespeed of 20mph. The section between Skew Bridge Junction (near Preston) and Preston North Junction has a prevailing linespeed of 35mph. At Carnforth the freight only line has a prevailing linespeed of 15mph whilst the lines in the Carlisle area have a linespeed of 25mph. Linespeeds through Carlisle Kingmoor Yard are as low as 5mph.

Figure 3.2 – linespeed



Planning headways

The planning headway is a measure of the distance between signals plus an allowance for conditions on the line of route such as the gradient of the route and number of stations, which dictates how closely trains can travel to each other running at the prevailing linespeed. The diagram in **Figure 3.3** shows the planning headways across the RUS area.

The main line between London Euston and Carstairs South Junction has three-minute headways on the fast lines south of Crewe. On the slow line the headways are four minutes south of Rugby, and five minutes between Rugby and Crewe. North of Crewe the headways are four minutes.

Between Norton Bridge and Cheadle Hulme the headways are three minutes, while the section between Colwich Junction and Norton Bridge has headways of five minutes while on the Crewe and Chester line the headways are predominantly five minutes.

On the Direct Current (DC) lines the headways vary along the length of the route section, with three minute headways south of Willesden. North of Willesden the headways vary between four and six minutes.

The Bedford to Bletchley line is controlled by one signal box at Marston Vale and has a planning headway of approximately seven minutes.

There are no headways on the St Albans Abbey Line, or the Oxenholme Lake District to Windermere Branch as there is limited signalling, therefore there can only be one train on the branch at any one time.

Loading gauge

The loading gauge defines the size of vehicles and loads of wagons that can be carried on the network. **Figure 3.4** shows the gauge capability of the West Coast Main Line RUS area and **Figure 3.5** shows gauge envelopes. The types of container which can be conveyed on trains are dependant on both the wagons used and the loading gauge of the overall end-to-end route. In some cases, by using lower deck height wagons larger containers can be carried on lower gauge routes.

W8

This gauge allows 8'6" high by 2,500mm wide containers to be carried on a standard container wagon.

W9

Allows 9'6" high containers to be carried on some lower deck height wagons. It also allows wider 'swap body' containers to be conveyed as it covers loads up to 2,600mm wide.

W10

Allows 9'6" high containers (2,500mm wide) to be carried on a standard container wagon. An increasing number of containers arriving at UK Ports are this size.

W12

Allows a 9'6 high container to be carried on a standard container wagon, including refrigerated containers up to 2,600mm wide.

The WCML is considered a main artery for intermodal container traffic and is gauge cleared to W9 and W10. Smaller, standard 8'6" high containers operating at W8 gauge are also widely used. The current policy is to provide for W12 when structures are progressively renewed on gauge-critical routes.

The London Euston to Carstairs South Junction route is cleared to allow for W9 and W10 container traffic as is the section between Colwich Junction and Cheadle Hulme, including Norton Bridge to Stone and the Weaver Junction to Allerton West Junction section. The Crewe Independent lines and the Crewe to Kidsgrove sections are also cleared to W9 and W10.

The freight only line between Arpley Junction and Ditton East Junction is cleared to W9, while the Bedford to Bletchley route is cleared to W8. The Crewe to Chester line and the DC lines are cleared to convey W6 traffic.

Figure 3.3 – planning headways

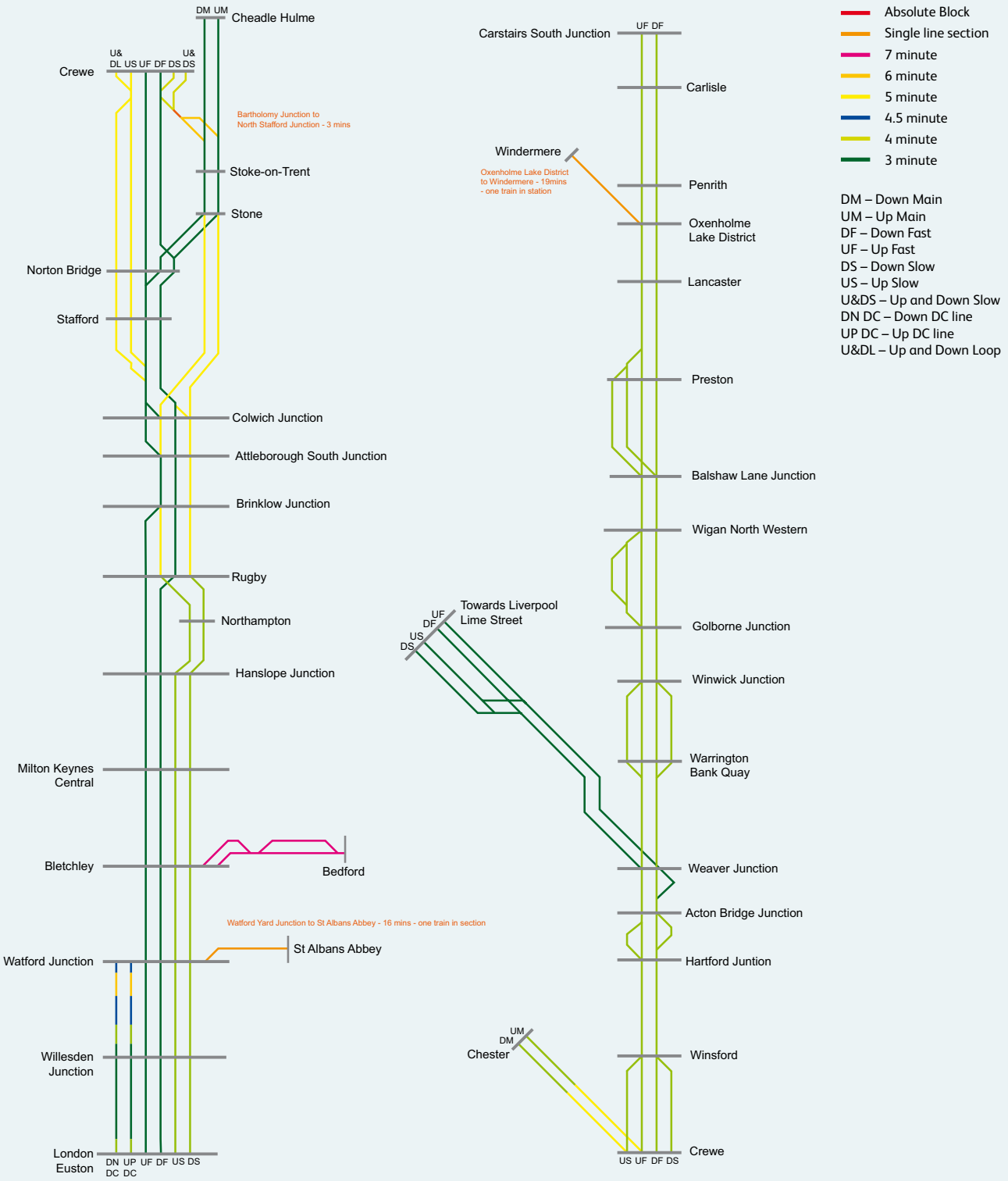


Figure 3.4 – loading gauge

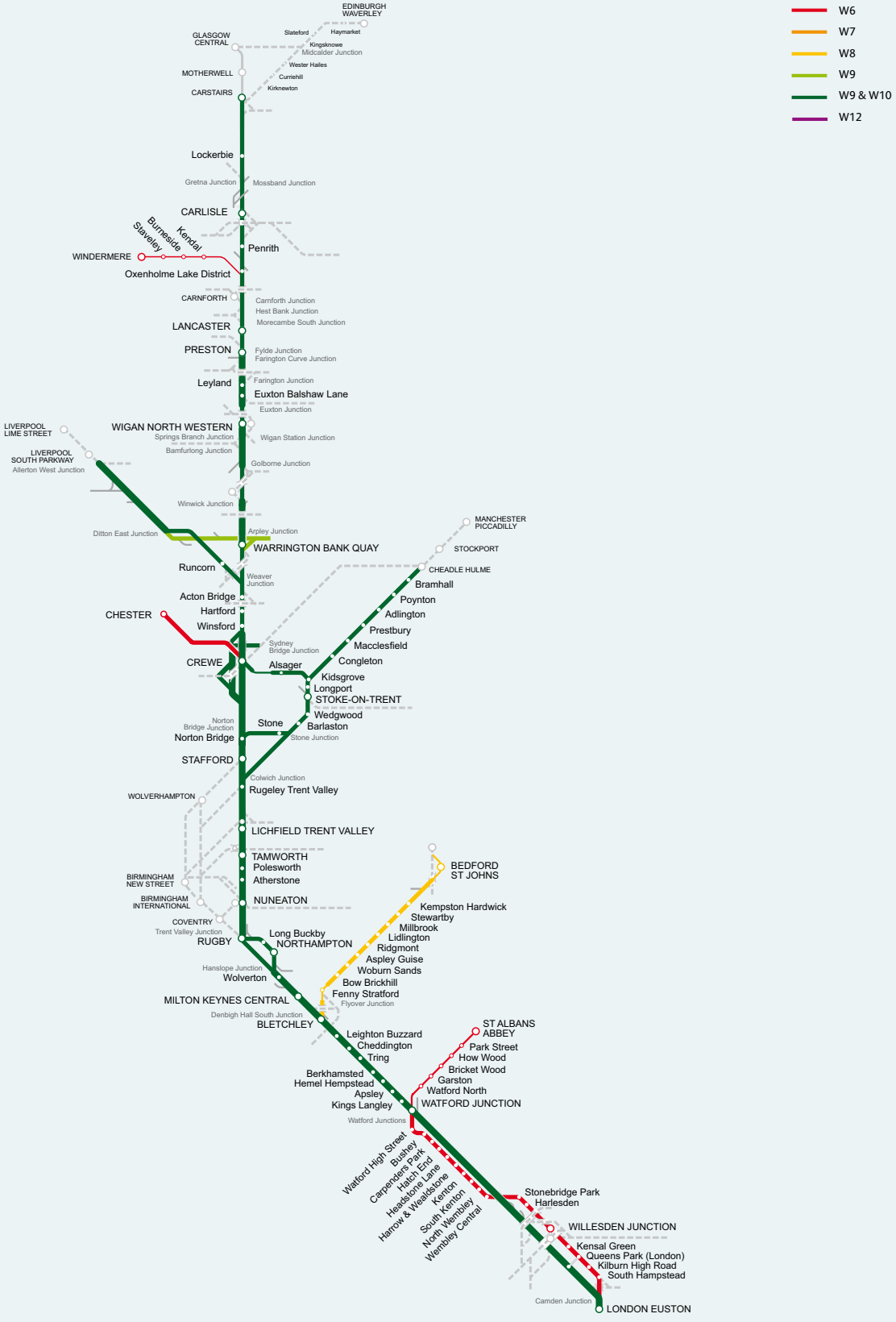
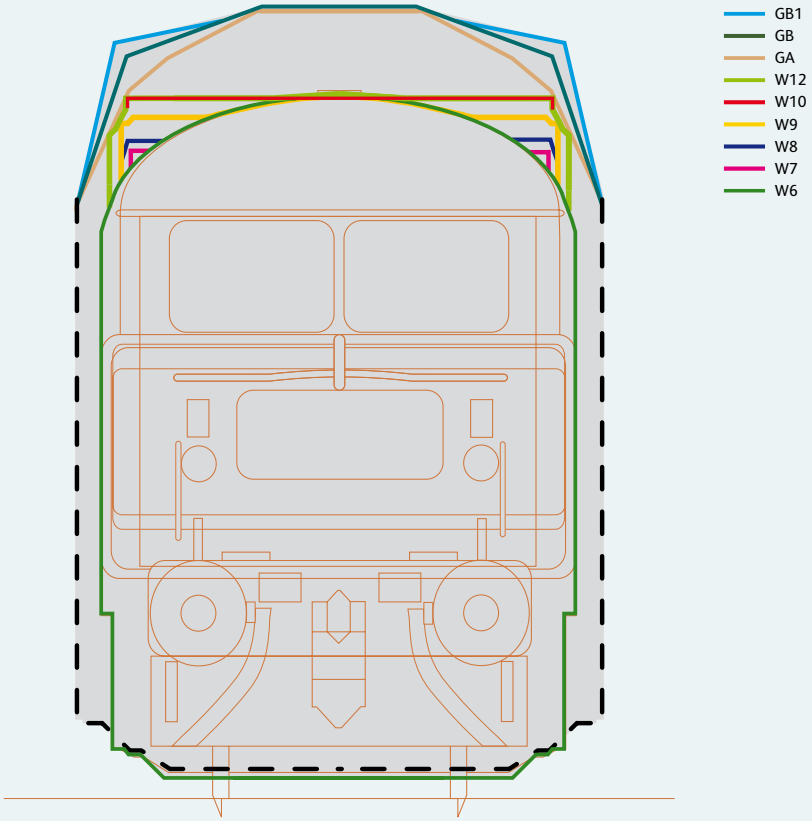


Figure 3.5 – loading gauge envelopes



Route Availability

Route Availability (RA) defines the axle weight of vehicles that can be operated. **Figure 3.6** shows the Route Availability of the RUS area. The majority of the route is cleared to RA8 apart from the section between Gretna Junction and Carstairs South Junction which is cleared to RA10.

Electrification

Figure 3.7 shows which sections of the route are currently electrified. The majority of the route is electrified using the alternating current (AC) 25Kv overhead system, and includes the sections between London Euston and Carstairs Junction, Colwich Junction to Cheadle Hulme and Weaver Junction to Allerton West Junction. The St Albans Abbey branch and the Crewe independent lines are also AC overhead electrified. The DC lines between London Euston and Watford Junction are direct current (DC) third rail electrified, with the section between Harrow and Kilburn High Road being DC third and fourth rail electrified. The Bletchley to Bedford Line, Crewe to Chester Line, the Oxenholme Lake District to Windermere branch and the freight only line between Arpley Junction and Ditton East Junction are not electrified. It should be noted that only some freight terminals are electrified.

Loop lengths

Loops are used to allow faster trains to pass slower services. They are particularly important on sections of two track railway with a mix of traffic types. **Figure 3.8** shows the location of loops in the RUS area, while **Table 3.2** shows the length of loops and the entry and exit speeds. Entry and exit speeds affect the usefulness of the loop. The diagram shows that across the RUS area there are seven loops that are 775-metres or longer. Between Lancaster and Carlisle, a key section of two-track railway in the RUS area, there is only one loop that is 775-metres, which is at Eden Valley, number 28 on the map.

Figure 3.6 – Route Availability

Figure 3.7 – electrification

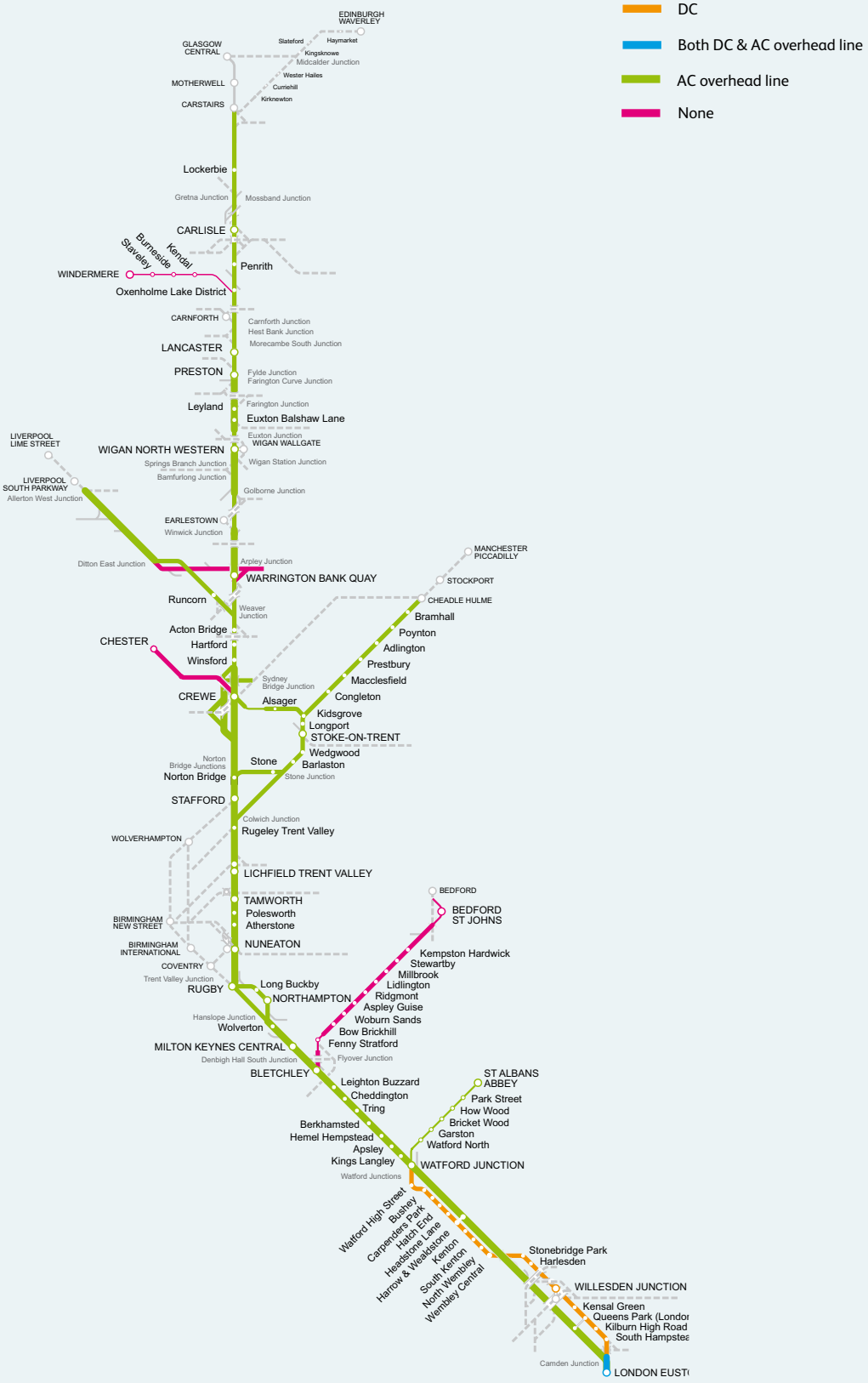


Figure 3.8 – loop lengths

Table 3.2 – loop lengths

Map no.	Description	Length (metres)	Greater than 775m?	Greater than 540m?	Entry speed	Exit speed
1	Kilburn Up and Down Goods loop	666m	N	Y	15mph	15mph
2	Watford Up Goods loop	794m	Y	Y	15mph	15mph
3	Northampton Down Goods loop	823m	Y	Y	15mph	15mph
4	Crewe Up and Down Goods loop	361m	N	N	20mph	20mph
5	Warrington Bank Quay Up Goods	282m	N	N	15mph	30mph
6	Warrington Bank Quay Down Passenger loop	192m	N	N	15mph	30mph
7	Wigan Down and Up Passenger loop	825m	Y	Y	25mph	10mph
8	Preston Down and Up Goods loop	314m	N	N	15mph	15mph
9	Preston Up and Down Goods loop	384m	N	N	15mph	15mph
10	Kidsgrove Up and Down Goods loop	531m	N	N	15mph	15mph
11	Up and Down Potteries loop	430m Dn	N	N	20mph	20mph
		360m Up	N	N	20mph	20mph
12	Oxheys loop	1152m	Y	Y	20mph	20mph
13	Barton and Broughton Down Passenger loop	1033m	Y	Y	25mph	40mph
14	Oubeck Down Goods loop	447m	N	N	15mph	15mph
15	Oubeck Up Goods loop	466m	N	N	15mph	10mph
16	Lancaster Up Passenger loop No. 1	423m	N	N	40mph	10mph
17	Lancaster Down Passenger loop No. 2	363m	N	N	40mph	40mph
18	Carnforth no.1 Up and Down Goods	435m	N	N	15mph	15mph
19	Carnforth no.2 Up and Down Goods	435m	N	N	15mph	15mph
20	Carnforth Up Passenger loop	512m	N	N	15mph	15mph
21	Oxenholme Up Goods loop	460m	N	N	15mph	10mph
22	Oxenholme Down Goods loop	410m	N	N	15mph	15mph
23	Grayrigg Up Goods loop	440m	N	N	10mph	10mph
24	Grayrigg Down Goods loop	430m	N	N	30mph	15mph
25	Tebay Up and Down Goods loop	565m	N	Y	20mph	20mph
26	Shap Up Goods loop	450m	N	N	25mph	15mph
27	Harrisons Down Goods loop	405m	N	N	30mph	10mph
28	Eden Valley Up Goods loop	900m	Y	Y	15mph	25mph
29	Plumpton Up Goods loop	473m	N	N	30mph	40mph
30	Upperby Down Goods loop	402m	N	N	25mph	15mph
31	Caldew Up Passenger loop	879m	Y	Y	30mph	20mph
32	Quintinshill Up Passenger loop	579m	N	Y	40mph	40mph
33	Quintinshill Down Passenger loop	566m	N	Y	40mph	30mph
34	Lockerbie Up Passenger loop	645m	N	Y	40mph	40mph
35	Lockerbie Down Passenger loop	535m	N	N	40mph	40mph

Table 3.2 continued – loop lengths

Map no.	Description	Length (metres)	Greater than 775m?	Greater than 540m?	Entry speed	Exit speed
36	Beattock Up Passenger loop	645m	N	Y	40mph	40mph
37	Beattock Down Passenger loop	550m	N	Y	40mph	40mph
38	Beattock Summit Up Passenger loop	580m	N	Y	20mph	20mph
39	Beattock Summit Down Passenger loop	580m	N	Y	40mph	40mph
40	Abington Up Passenger loop	720m	N	Y	40mph	40mph
41	Abington Down Passenger loop	625m	N	Y	40mph	40mph
42	Sideway Junction Down Passenger loop	465m	N	N	10mph	10mph
43	Longport Up Goods loop	279m	N	N	30mph	30mph
44	Macclesfield Up and Down Platform loop	268m	N	N	15mph	25mph

3.3 Rolling stock, depots and stabling

There is a range of rolling stock in use across the West Coast Main Line RUS area with the various characteristics shown in **Tables 3.3** and **3.4**.

The Class 390 and 221 trains which operate long distance high speed services are tilt enabled to run at EPS speeds. A mix of rolling stock speeds on a route reduces the capacity as faster stock will catch up with slower trains.

Table 3.3 – Passenger rolling stock

Train type	Operating formation (vehicles)	Diesel or electric	Top speed	Route sections operated on
Class 390	9 or 11	Electric	140mph (EPS)	A, B, D
Class 378	4	Electric	75mph	E
Class 377	4	Electric	100mph	A
Class 350	4	Electric	100mph	A, B, C, F
Class 323	3	Electric	90mph	B
Class 321	4	Electric	100mph	F
Mark 2 1972 tube stock	7	Electric		E
Class 90 with Mark 3	8	Electric	110mph	A
Class 90 with Mark 2+3	16	Electric	100mph	A
Class 221	5	Diesel	125mph (EPS)	A, B, C
Class 220	4 or 5	Diesel	125mph	A, B
Class 180	5	Diesel	125mph	A
Class 185	3	Diesel	100mph	A
Class 175	2 or 3	Diesel	100mph	C
Class 158	2	Diesel	90mph	C
Class 156	2	Diesel	75mph	A
Class 153	1	Diesel	75mph	F

Table 3.3 continued – passenger rolling stock				
Train type	Operating formation (vehicles)	Diesel or electric	Top speed	Route sections operated on
Class 150	2	Diesel	75mph	A
Class 142	2	Diesel	75mph	A, B
Class 43 with 7 Mark 3	7	Diesel	125mph	B

Table 3.4 – Freight rolling stock			
Train type	Diesel or electric	Top speed	Route sections operated on
Class 325	Electric	100mph	A, B, G, H
Class 92	Electric	90mph	A, B, D, F, G, H
Class 90	Electric	75 to 110mph	A, B, D, F, G, H
Class 86	Electric	75 to 110mph	A, B, D, F, G, H
Class 73	Electro diesel	80 to 90mph	A, H
Class 70	Diesel	75mph	A, B, C, D, F, G, H
Class 67	Diesel	125mph	A, B, C, D, F, G, H
Class 66	Diesel	75mph	A, B, C, D, F, G, H
Class 60	Diesel	60mph	A, B, C, D, F, G, H
Class 59	Diesel	60 to 75mph	A, D, G, H
Class 57	Diesel	75 to 95mph	A, B, C, D, F, G, H
Class 56	Diesel	80mph	A, D, G, H
Class 47	Diesel	75 to 95mph	A, B, C, D, F, G, H
Class 37	Diesel	80 to 90mph	A, B, C, D, F, G, H
Class 31	Diesel	80 to 90mph	A, B, C, D, F, G, H
Class 20	Diesel	60 to 75mph	A, B, C, D, F, G, H

In the RUS area there is one major depot, at Northampton, for servicing of the Class 350 and Class 321 fleets. There are also stabling and light maintenance activities at Willesden for the Class 378 fleet and the overnight sleeper fleet and at Bletchley and Camden for the Class 350 fleet. Some maintenance of the Class 221 and 175 fleets is undertaken at Crewe London North Western Railway depot. Class 150, 153, 156, and 158 are also maintained at Chester depot.

There are other depots outside of the RUS area which are key to the maintenance of the rolling stock that operates on the WCML. These are located at Longsight (Manchester), Oxley (Wolverhampton), Edge Hill (Liverpool), Polmadie (Glasgow) and Central Rivers (near Burton-on-Trent). Investment in these depots, with the exception of Central Rivers which maintains Class 221 stock, has been undertaken to accommodate 11-car Class 390 trains.

A strategic solution to the future provision of adequate depot and stabling facilities is a network-wide issue and will therefore be considered as part of the Network RUS. The Network RUS: Passenger Rolling Stock has been published as a Draft for Consultation in May 2011. The Network RUS: Passenger Rolling Stock Depot Planning Guidance document will be published in summer 2011.

3.4 Stations and car parks

Stations are only considered by a RUS in terms of station capacity, the ability of passengers to safely and efficiently interchange with other services and the impact of station facilities on crowding and passenger flow. This is a network-wide issue and has being examined in detail in the Network RUS: Stations workstream recently published as a Draft for Consultation. Station facilities are considered by other processes. An example of this is the Better Stations report released by the Department for Transport (DfT) in 2009 which examined appropriate levels of facilities for different sized stations. Station facility improvements are being taken forward through other industry mechanisms including the National Stations Improvement Programme and the Access for All programme with specific schemes affecting the West Coast Main Line RUS area outlined in **Chapter 4**.

The availability of car parking facilities at stations can be a major factor in influencing the travel decisions of passengers. Limited car parking could be suppressing growth. To help address this issue a national car park programme has been undertaken and is nearing completion, with over £90 million invested in improving car parks at key stations on the route. The programme includes car parks at Preston, Runcorn, Rugby, Wigan North Western and Stafford.

3.5 Route capacity

Capacity usage on the route is derived from: the number of services and how closely they are timetabled together, the mix of the services (speed, stopping patterns, and traffic type) and infrastructure capability in terms of headways and margins at junctions and stations. To assess the capacity usage a qualitative assessment was made using the December 2008 timetable. This identified the key capacity constraints on the route and the reason for these constraints. **Figure 3.9** shows the qualitative assessment of capacity on the route. This assessment also identifies the impact of the traffic on the timetable on the rest of the route and the flexibility for recovery from perturbation.

London Euston to Carstairs South Junction

There are a number of constraints which limit capacity on this section, resulting in high levels of capacity utilisation which allow minimal growth. These constraints determine the timetable that can be operated over the entire route.

There are also large sections of the route where growth may be difficult to accommodate without affecting performance. The sections between London Euston and Wolverton, Norton Bridge and Weaver Junction, and Euxton Junction to south of Carlisle Station all fall into this category. There is also limited capacity for growth between Long Buckby and Rugby.

There is reasonable capacity for growth on the route where current traffic is not constraining the timetable, between Rugby and Stafford (with the exception of the Brinklow Junction to Attleborough South Junction section) between Weaver Junction and Euxton Junction and between Gretna Junction and Carstairs Junction. Specific constraints on the London Euston to Carstairs Junction route include:

London Euston and the station throat: This is a peak-hour constraint caused by some platform lengths being shorter than others, occupation times, and platform end conflicts. Some services such as the overnight sleeper services from Scotland can only use certain platforms due to their length.

Watford Junction bay platform: The bay platform at Watford Junction is only long enough to accommodate eight-car trains, limiting the length of peak time services.

Brinklow Junction to Attleborough South Junction: This section has only three tracks for around seven miles and the constraint is caused by the mix of services using it.

Stafford area: Stafford North Junction and Stafford South Junction both operate at maximum capacity, caused by the mix of services and crossing moves at flat junctions.

Norton Bridge: Norton Bridge Junction limits capacity as trains to Manchester cross the junction.

Shugborough Tunnel: There are only two tracks through the 710 metre tunnel.

Crewe station area: Large number of crossing moves to the north and south of the station limiting passenger and freight capacity and increasing journey times where services need to cross the main line.

Winsford to Hartford: Five miles of two track railway limits the capacity on this section of route.

Wigan North Western to Euxton Balshaw Lane Junction: Eight mile two track section.

Euxton Junction to Preston: Capacity is restricted by crossing moves and the mix of services on this section.

Preston to Carstairs South Junction: Predominantly two-track railway, along with the sinuous and steeply graded topography means that the differential speeds between faster passenger and slower freight services constrain capacity. There are also limited passing loops, with the existing ones being restrictive in length.

Lancaster station: Station layout is restrictive due to the signalling capability being unbalanced in the down and up directions with three platforms signalled in the southbound direction and only one in the northbound direction.

Carlisle station area: Capacity limited by restrictive layout and low linespeed.

Carstairs: Capacity is constrained at Carstairs due to the station being located close to the junction and the speed restrictions in place.

Linespeeds on slow lines: numerous sections of the slow lines are restricted to a maximum speed of 75mph. Existing rolling stock can run at higher speeds than the current infrastructure allows.

Colwich Junction to Cheadle Hulme

Between Colwich Junction and Stone Junction, Norton Bridge and Stone Junction and Stone Junction and Stoke-on-Trent there is reasonable capacity for growth. However, the number of level crossings constrains the ability to increase linespeeds.

On this route section there are high levels of capacity utilisation between Stoke-on-Trent and Cheadle Hulme resulting in minimal or no capacity for growth on this section. The section acts as a key timetable constraint. Specific constraints on the section include:

Stoke-on-Trent to Cheadle Hulme: The different types of passenger services and the mix of calling patterns cause high capacity utilisation.

Cheadle Hulme: The lines from Stoke-on-Trent converge with the lines from Crewe and there is a short two-track section between Cheadle Hulme and Adswood Road.

Crewe to Chester

The qualitative assessment suggests that there is reasonable capacity for growth on this route. There are no specific constraints on this section though it is noted the section is not electrified. Therefore, the London Euston to Chester/North Wales service currently has to be operated by diesel trains.

Weaver Junction to Allerton West Junction

Analysis suggests that there is reasonable capacity for growth on this route section. There are no specific constraints on this section although it is worth noting that capacity becomes more constrained between Allerton West Junction and Liverpool Lime Street due to the increased mix of services on this section of route. The layout at Liverpool Lime Street may also act as a constraint to capacity.

DC lines

Analysis suggests that any additional growth may be difficult to accommodate between Queens Park and Harrow and Wealdstone. Between London Euston and Queens Park and between Harrow and Wealdstone and Watford Junction there is some capacity for growth. Specific constraints on this section include:

Queens Park to Harrow and Wealdstone: This section of the DC lines is shared with London Underground Limited Bakerloo Line services, the number of services operating mean that there is little spare capacity.

Branch lines

The line between Watford Junction and St Albans Abbey and the branch between Oxenholme Lake District and Windermere both have no capacity for growth as the lines are single track throughout and only one train can operate on the lines at any one time. The Bedford to Bletchley line and the line between Crewe and Kidsgrove both have reasonable capacity for growth. Specific constraints include:

Watford Junction to St Albans Abbey: This section is a single line branch with limited signalling. Only one train can run on the branch at any one time which limits the service frequency to one train every 45 minutes.

Bedford to Bletchley: There are short single track sections at each end of the line, along with low linespeeds and two-aspect signalling throughout the route.

Alsager to Crewe: There is a short single line section which limits capacity.

Oxenholme Lake District to Windermere: This 10-mile single track line with no passing loops has high capacity utilisation.

Freight only lines

The Crewe Independent lines are constrained by slow linespeeds of 15mph.

Between Carlisle station and Floriston, freight services can be routed via Carlisle Kingmoor Yard. The line through this area is restricted to sections of 25mph, 10mph and 5mph which generates a 20-minute time penalty for through services routed through the yard.

Figure 3.9 – route capacity (all day)

- Reasonable capacity for growth. Current traffic is not constraining timetabling elsewhere. Flexibility in the timetable for recovery from perturbation.
- Growth may be difficult to accommodate without affecting performance. Current traffic is constraining timetabling elsewhere. Sufficient flexibility in current timetable for recovery from perturbation.
- In terms of train planning, minimal or no capacity for growth. Key timetable constraint that determines the timetable elsewhere on the route. Minimal scope for service recovery from perturbation.

3.6 Performance

There are two key metrics that measure performance on the rail network (Passenger Performance Measure (PPM) and Freight Performance Measure). The PPM combines the figures for punctuality and reliability into a single performance measure. It covers all trains throughout the day run by all franchised train operating companies (TOCs) and measures punctuality at final destination. There are two PPM measures:

- ten minutes late for long distance high speed operators
- five minutes late for all other operators.

Performance on the WCML, although initially disappointing after the implementation of the December 2008 timetable, has since improved, with high punctuality figures being achieved by many of the train operators on the route.

Freight performance is not measured in the same way but is expressed in minutes delay per 100 train kilometres. Similar to the performance experienced by the passenger operators, improvements during the last 12 months for the two main operators saw 11.8 per cent and 30.9 per cent improvements. Further improvements are required during Control Period 4 (CP4).

3.7 Network Availability

When the 2008 timetable was being developed a fundamental review of network availability was undertaken. Following extensive discussions between the DfT, train operators and Network Rail a new possessions regime was developed. Known as Efficient Engineering Access (EEA), this saw the introduction of seven day railway principles to the route south of Weaver Junction.

A strategy is being developed to apply seven day railway principles across the whole route. This strategy has been developed with cross-industry input to deliver the following objectives as stated in the 'Network Rail CP4 Delivery Plan: Network Availability':

- to enable customers to operate the full working timetable every day, without route closures routinely requiring diversion and/or bus substitution
- to offer customers the opportunity, where they have identified potential demand, to operate new train services during hours where train paths are not currently offered, particularly at weekends and earlier and later services during weekdays.

The strategy has developed a set of protocols which will reduce disruption caused to passengers and the freight haulage industry by engineering works. A small number of routes, which carry over 60 per cent of all weekend passengers, have been identified for special attention. The principles of the passenger route categorisation are:

- passengers will not be transferred onto buses
- diversions away from a train's normal route will not increase passengers planned journey times by more than 30 per cent
- the only exception to this is when the demands of rail improvement work make achieving this aim impractical.

For freight flows the principle is that when closing a route for maintenance or renewals activity Network Rail will maintain the ability to deliver key traffic flows by means of a preferred or 'fit for purpose' alternative route. In this context, fit for purpose means:

- of the correct gauge and route availability
- able to deliver acceptable journey times
- with sufficient capacity to accommodate the diverted traffic.

3.8 Transport bodies and funders

Department for Transport

The DfT is the Government department responsible for the English transport network. The department is accountable to the Secretary of State for Transport. The DfT is responsible for letting rail franchises and specifying major rail projects.

Transport Scotland

Transport Scotland (TS) was created in January 2006 as the national transport agency of Scotland. It is an Executive Agency of the Scottish Government and is accountable to Scottish Ministers. TS funds the Scottish rail network including 68 miles of the WCML. It is headed by a chief executive who is directly accountable to the Cabinet Secretary for Finance and Sustainable Growth. TS is responsible for letting the ScotRail franchise and specifying major rail projects in Scotland.

Welsh Government

The Welsh Government exercises overall planning responsibility, including transport strategy, for Wales. The Wales railway network is spread across 22 authorities in Wales, and four English shire counties with peripheral elements spreading into Merseyside and Chester.

Transport for London

Transport for London (TfL) is the integrated body responsible for London's transport system. TfL is responsible for letting the London Overground concession for the services on the DC lines and for operating the Bakerloo Line service. TfL is also responsible for exercising the Mayor's responsibilities for national rail in London.

Centro

Centro, the West Midlands Integrated Transport Authority, promotes and develops public transport across the West Midlands. Centro invests in a number of activities designed to improve and enhance regional transport, working towards a fully integrated public transport system offering safe and secure travel.

Transport for Greater Manchester

The Transport for Greater Manchester Committee is the body responsible for setting local public transport policy and for deciding how money is spent on supporting and improving Greater Manchester's public transport network. The Committee's decisions are implemented by the Transport for Greater Manchester executive.

Merseytravel

Merseytravel is the operating name of the Merseyside Passenger Transport Authority and Executive. Merseytravel has wider powers than most other integrated transport authorities and specifies the franchise for the Merseyside area rather than the DfT. It co-ordinates public transport through partnership initiatives, with the aim of delivering a fully integrated and environmentally friendly public transport network.

3.9 Train operating companies

There are a number of current TOCs on the WCML and these are outlined below.

Virgin Trains

Virgin Trains operates long distance passenger services between London Euston the West Midlands, the North West, North Wales and Glasgow and Edinburgh. The franchisee operates a fleet of Class 390 electric trains and a number of Class 221 diesel trains. The franchise was awarded in March 1997 and runs until March 2012. The future franchise specification was published in May 2011 and the new franchise is scheduled to commence in December 2012.

London Midland

London Midland operates services from London Euston to Tring, Milton Keynes Central and Northampton along with local services in the West Midlands. It operates interurban services, from Birmingham New Street to Liverpool Lime Street and from London Euston to Crewe. London Midland also operates the branches from Watford Junction to St Albans Abbey and from Bedford to Bletchley. The franchise was awarded in November 2007 and, subject to achievement of performance targets, runs until September 2015.

Northern Rail

Northern Rail operates services on the WCML between Euxton Junction (near Preston) and Carnforth. These include services from Preston to Manchester, Liverpool Lime Street, Blackpool North and Morecambe. Northern Rail also operates services from both Carlisle and Lancaster to Leeds and from Lancaster to Barrow-in-Furness. The current Northern Rail franchise was formed in December 2004 with the merger of the First North Western and Arriva Trains Northern franchises and, having achieved a two-year extension, runs until September 2013.

First TransPennine Express

First TransPennine Express operates interurban services with limited stops across the northern section of the RUS area. Key services over the WCML include Manchester Airport to Scotland services as well as services from Manchester to Blackpool North and Barrow-in-Furness and First TransPennine Express operates all services between Oxenholme Lake District and Windermere. The current franchise was awarded in February 2004 and runs until January 2012, with the option for a five-year extension.

Arriva Trains Wales

Arriva Trains Wales operates services from Chester to Crewe and from Wales to Manchester Piccadilly via both Stockport and Warrington Bank Quay. The franchise is due to run until December 2018.

East Midlands Trains

The East Midlands Trains franchise commenced in November 2007 and, subject to achievement of performance targets, runs to March 2015. East Midlands Trains operates the services between Derby and Crewe via Stoke-on-Trent.

CrossCountry

CrossCountry operates long distance services radiating from Birmingham New Street; key flows on the West Coast Main Line include the South West and South Coast to Manchester Piccadilly services via Stoke-on-Trent. The current franchise runs from November 2007 to April 2016.

Southern

Southern provides an hourly service linking East Croydon (via Clapham Junction) to Watford Junction and Milton Keynes Central. The franchise runs to July 2015 with the option for extension to 2017.

London Overground Rail Operations Limited

London Overground Rail Operations Limited (LOROL) operates the services on the DC Lines between London Euston and Watford Junction. The concession is let by TfL and runs for seven years from 2007.

London Underground Limited

Bakerloo Line services operate on the DC lines between Queens Park and Harrow and Wealdstone.

ScotRail

The ScotRail franchise is operated by FirstGroup and the franchise provides the Caledonian overnight sleeper services between London Euston and Edinburgh, Glasgow, Inverness, Aberdeen and Fort William, as well as local services between Gretna and Carlisle. The franchise is let by Transport Scotland and runs to the end of 2014.

Other passenger operators

In addition to the franchised operators listed above, West Coast Railway Company Ltd operates to various charter destinations over the route and there is access to maintenance and stabling facilities at Crewe. DB Schenker is also an operator of charter train services, including the operation of the Northern Belle which is based out of Crewe carriage sidings.

A number of open access operators aspire to run services over the route and have applied to the Office of Rail Regulation seeking track access rights to operate services.

Community Rail Partnerships

A number of Community Rail Partnerships operate within the West Coast Main Line RUS area. Those that are members of the Association of Community Rail Partnerships are listed below:

- Abbey Line Community Rail Partnership (Watford Junction – St Albans Abbey)
- Marston Vale Community Rail Partnership (Bletchley – Bedford)
- North Staffordshire Community Rail Partnership (Crewe – Stoke-on-Trent – Derby)
- Lakes Line Community Rail Partnership (Oxenholme Lake District – Windermere)
- East Lancashire Community Rail Partnership
- West of Lancashire Community Rail Partnership
- Leeds to Morecambe Community Rail Partnership
- South Fylde Community Rail Partnership
- Ribble Valley Community Rail Partnership
- Cumbrian Coast Community Rail Partnership
- Furness Line Community Rail Partnership.

3.10 Passenger services by market

Passenger services on the WCML are provided by a number of different operators as mentioned under section 3.9. For presentation purposes the services are segregated geographically as follows:

- London
- West Midlands
- North West

The rest of this section explains in detail the existing passenger service operations.

London: passenger services

The London market is made up of a number of service flows: These are shown in **Figure 3.10**.

Figure 3.10 – London passenger services

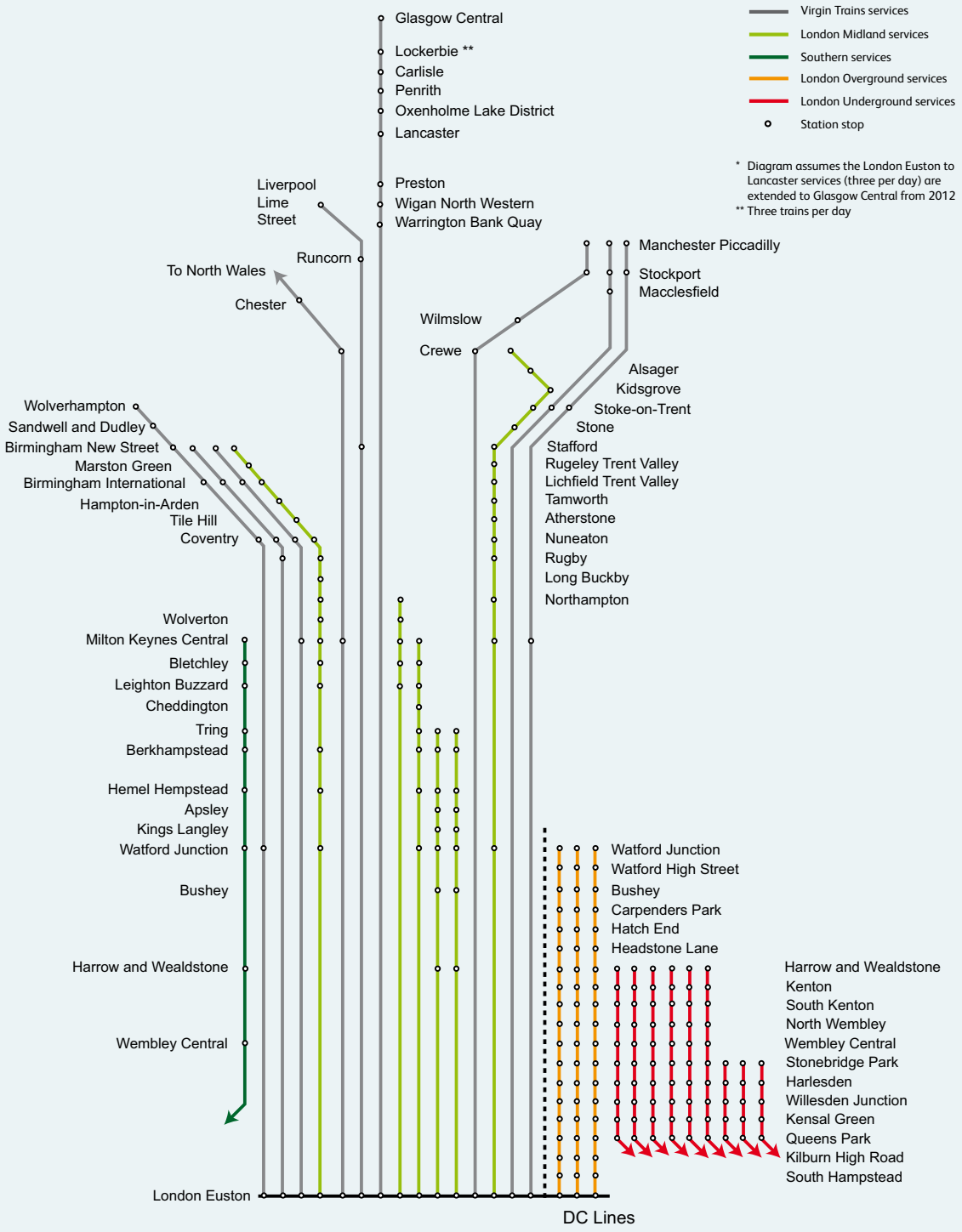


Table 3.5 shows the departure pattern from London Euston in May 2010 in a typical off-peak hour and the service frequencies are listed in **Table 3.6**.

Table 3.5 – departures from London Euston in a typical off-peak hour

Departure time	Destination	Line	Operator
xx.00	Manchester Piccadilly	Fast	Virgin Trains
xx.03	Birmingham New Street	Fast	Virgin Trains
xx.04	Tring	Slow	London Midland
xx.07	Liverpool Lime Street	Fast	Virgin Trains
xx.10	Chester/North Wales	Fast	Virgin Trains
xx.13	Northampton	Fast	London Midland
xx.17	Watford Junction	DC	London Overground Rail Operations Limited
xx.20	Manchester Piccadilly	Fast	Virgin Trains
xx.23	Wolverhampton	Fast	Virgin Trains
xx.24	Milton Keynes Central	Slow	London Midland
xx.30	Glasgow Central	Fast	Virgin Trains
xx.34	Tring	Slow	London Midland
xx.37	Watford Junction	DC	London Overground Rail Operations Limited
xx.40	Manchester Piccadilly	Fast	Virgin Trains
xx.43	Birmingham New Street	Fast	Virgin Trains
xx.46	Crewe	Fast	London Midland
xx.54	Birmingham New Street	Slow	London Midland
xx.57	Watford Junction	DC	London Overground Rail Operations Limited

Virgin Trains operates long distance high speed services between London Euston and Glasgow Central, Manchester Piccadilly (two services via Stoke-on-Trent and one service via Crewe), the West Midlands (Coventry, Birmingham New Street and Wolverhampton), Liverpool Lime Street and Chester (with six trains per day extended to North Wales, four to Holyhead and two to Bangor).

Some services have additional stops in the peak hours to serve stations on the Trent Valley section of the route between Rugby and Stafford. These are listed below:

- two of the London Euston to Glasgow Central services stop additionally at Tamworth and Lichfield Trent Valley in the evening peak
- two of the Manchester Piccadilly to London Euston services stop additionally at Nuneaton in the morning peak
- one of the Liverpool Lime Street to London Euston services stops additionally at Lichfield Trent Valley and Tamworth in the morning peak
- two of the London Euston to Holyhead services stop additionally at Nuneaton in the evening peak.

London Midland operates semi-fast services from London Euston to Tring, Milton Keynes Central, Northampton, Birmingham New Street and Crewe. These service groups combine to give three trains an hour from London Euston to Northampton and four trains an hour from London Euston to Milton Keynes Central.

Southern operates an hourly service between East Croydon and Milton Keynes Central via Kensington Olympia although in certain hours the service begins at Clapham Junction, and only operates as far as Watford Junction.

London Overground Rail Operations Limited operates services on the DC lines between Watford Junction and London Euston. London Underground Limited services also operate on the DC lines between Harrow and Wealdstone and Queens Park and then into Central London via the Bakerloo Line. Two branches feed the southern end of the WCML, the St Albans Abbey line which joins the WCML at Watford Junction and the Bedford to Bletchley line which joins the WCML at Bletchley.

Scotrail operates overnight sleeper services between London Euston and Scotland.

Table 3.6 – London passenger service frequency

Train operator	Service	Frequency
Virgin Trains	London Euston to West Midlands	three tph
	London Euston to Manchester Piccadilly	three tph
	London Euston to Liverpool Lime Street	one tph
	London Euston to Glasgow Central	one tph
	London Euston to Chester/ North Wales	one tph
London Midland	London Euston to Birmingham New Street	one tph
	London Euston to Northampton	one tph
	London Euston to Milton Keynes Central	one tph
	London Euston to Tring	two tph
	London Euston to Crewe*	one tph
Southern	East Croydon to Milton Keynes	one tph
LOROL	London Euston to Watford Junction	three tph
LUL	Queens Park to Harrow and Wealdstone	Up to six tph
ScotRail	London Euston to Inverness/Aberdeen/Edinburgh Waverley/ Fort William	one tpd
	London Euston to Glasgow Central/Edinburgh Waverley	one tpd

*The London Euston to Crewe service operates on an hourly basis between 06:24 and 15:46, with one train running at 18:29.

West Midlands: passenger services

The West Midlands market is served by a number of service flows shown in **Figure 3.11**. The service frequencies are listed in **Table 3.7**.

Virgin Trains operates a fast limited stop service from Birmingham New Street to Glasgow Central and Edinburgh Waverley in alternate hours. CrossCountry operates services from the South West and the South Coast to Manchester Piccadilly.

The key interurban flow from the West Midlands, in addition to those outlined in the London services section, is the Birmingham New Street – Liverpool Lime Street services operated by London Midland.

Other long distance and interurban flows from the West Midlands are considered in the West Midlands, and Chilterns RUS.

Commuter journeys are made using the WCML services between Coventry, Birmingham New Street and Wolverhampton. These commuter journey opportunities supplement the dedicated West Midlands local commuter network, considered in the West Midlands and Chilterns RUS. There are also opportunities at these stations to interchange with long distance and interurban services.

Table 3.7 – West Midlands to West Coast Main Line service frequency

Train operator	Service	Frequency
Virgin Trains	Birmingham New Street to Glasgow Central/Edinburgh Waverley	one tph
London Midland	Birmingham New Street to Liverpool Lime Street	two tph
CrossCountry	South West or South Coast to Manchester Piccadilly	two tph

North West market: passenger services

The North West market is served by a number of service flows. These are shown in the diagram in **Figure 3.12** and service frequencies are listed in **Table 3.8**.

The service between Manchester Airport and Edinburgh Waverley and Glasgow Central operates on an hourly basis in most hours, with seven trains a day to Edinburgh Waverley and four trains a day to Glasgow Central.

There are also a number of interurban services operated by First TransPennine Express, from Manchester Airport or Preston – Blackpool North, Barrow-in-Furness and Windermere. Other interurban services in the North West fall outside of the West Coast Main Line RUS area and have been considered by the Northern RUS, published in May 2011 and further by the Northern Hub project.

Northern Rail operates local commuter services on the route, between Liverpool Lime Street and Blackpool North via Preston and between Manchester Victoria and Blackpool North. All other commuter services in the North West fall outside of the West Coast Main Line RUS area and are considered in the Northern RUS and the Northern Hub project.

Figure 3.11 – Birmingham passenger services

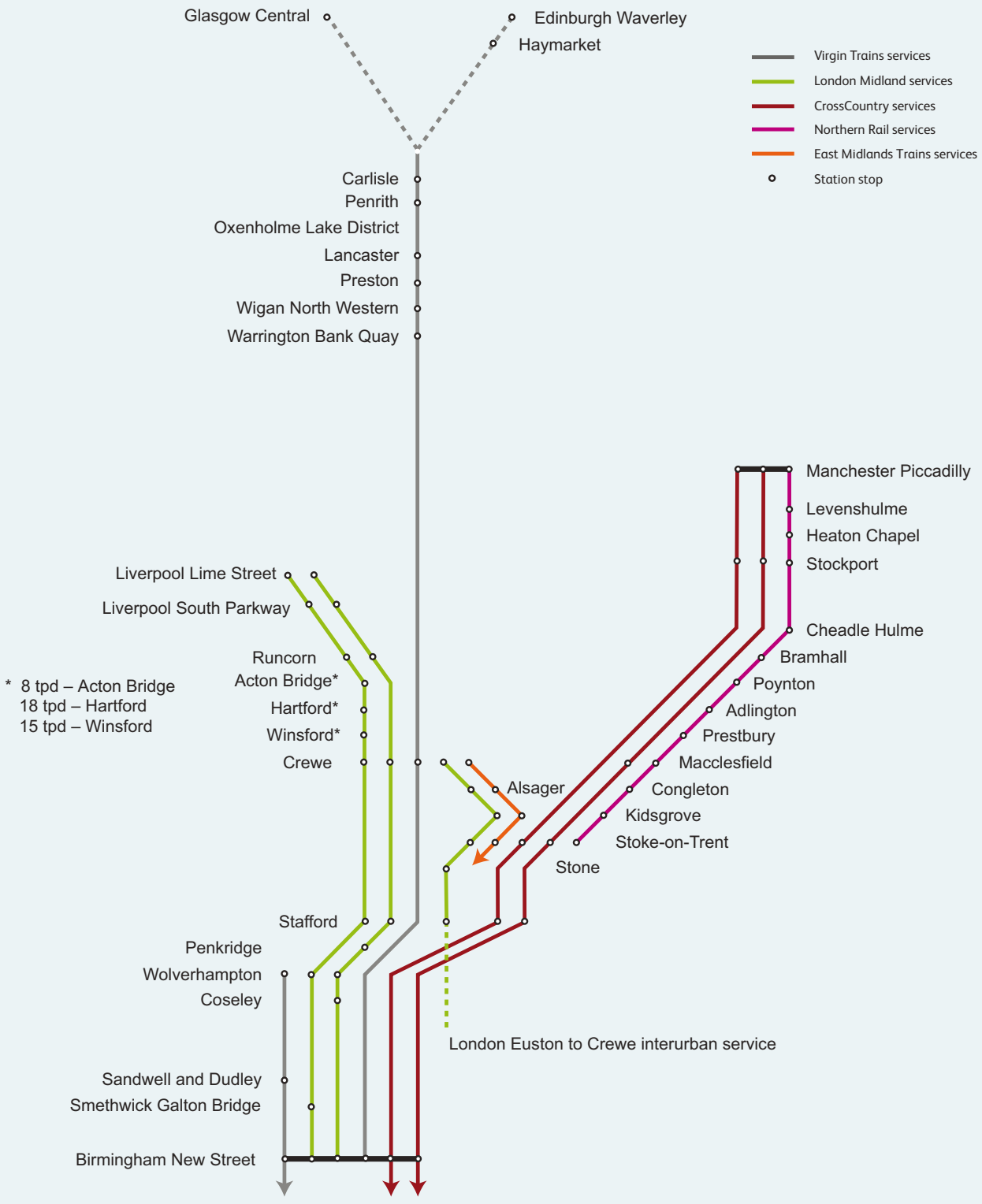


Figure 3.12 – North West passenger services

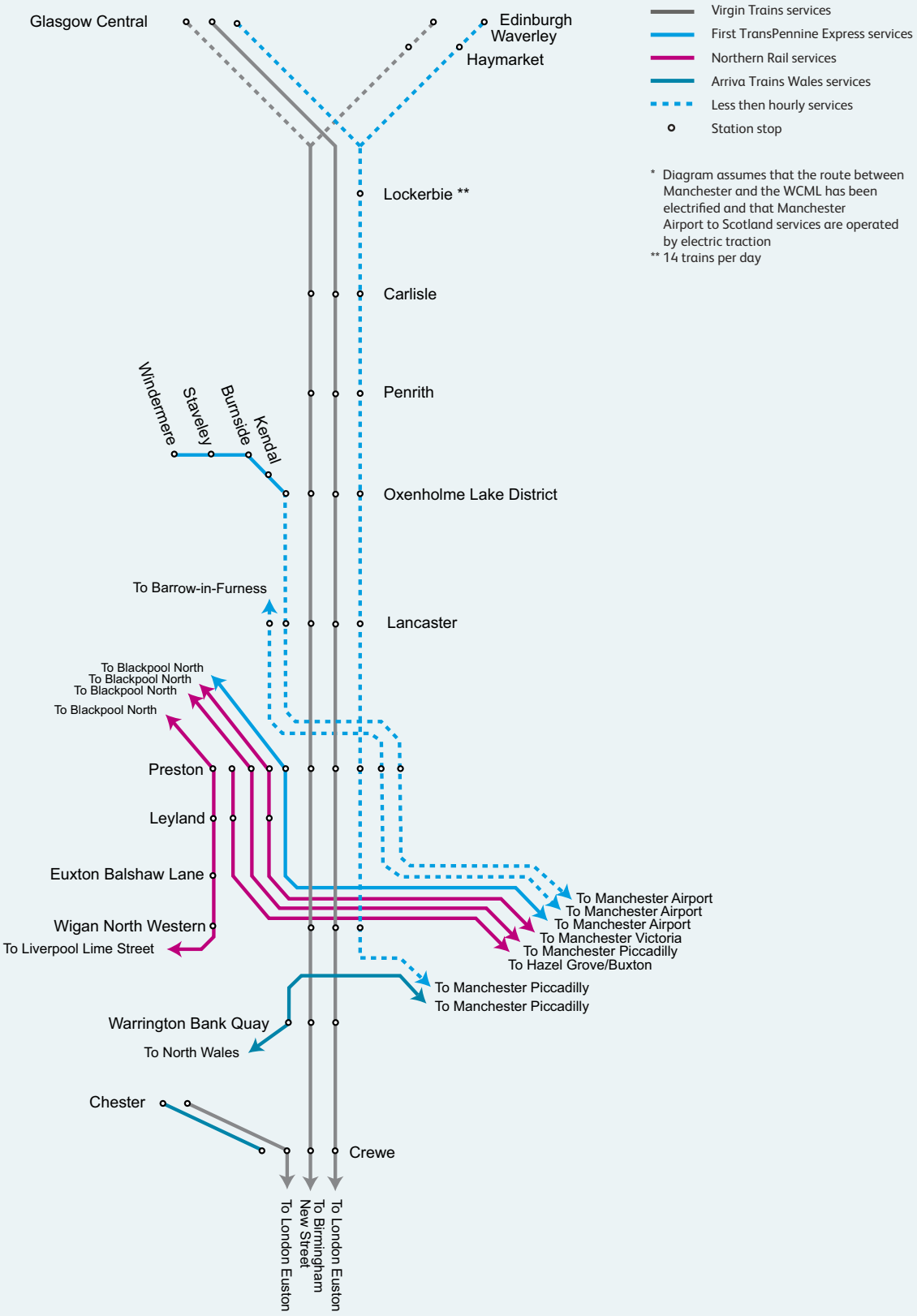


Table 3.8 – North West service frequency		
Train operator	**Service**	**Frequency**
First TransPennine Express	Manchester Airport to Scotland	one tph (most hours)
	Manchester Airport to Blackpool North	one tph
	Lancaster to Windermere	five tpd*
	Lancaster to Barrow-in-Furness	ten tpd*
Northern Rail	Stoke-on-Trent to Manchester Piccadilly	one tph
	Manchester Victoria to Blackpool North	one tph
	Liverpool Lime Street to Blackpool North	one tph
	Buxton/ Hazel Grove to Preston/Blackpool North	one tph
	Manchester Piccadilly to Preston/Blackpool North	one tph
Arriva Trains Wales	Crewe to Chester	one tph
	Llandudno to Manchester Piccadilly	one tph
	Cardiff to Manchester Piccadilly	one tph

*The majority of these trains are through trains to/from Manchester and Manchester Airport. Some are to/from Preston.

3.11 Passenger market profile

Overall market

The WCML connects London with the West Midlands, North Wales, the North West, and parts of Scotland. In addition, several sections of the WCML form part of the suburban railway systems in London, Birmingham, Manchester, Liverpool and Glasgow. In 2009/10 the WCML handled around 75 million passenger journeys.

Total annual journeys by route section on the WCML in 2009/10 are shown in **Figure 3.13**. The corridor between London Euston and Rugby has the highest number of total annual passenger journeys on the route. This is driven by the short distance and interurban[1] train services that serve both local and commuter markets, as well as the long distance services that serve the leisure and business markets into London Euston.

Demand for rail travel on the route ranges from commuter demand into London Euston, which is served by short distance services or longer-distance interurban rail services, and business and leisure demand served by long distance high speed services (LDHS) on the route.

Overall the London, West Midlands and North West markets have grown strongly, albeit with significant variation from year to year and between sub-sections of these markets. This has been driven by both the background UK trend of increasing rail demand growth and a major improvement in passenger services following the WCML Route Modernisation Programme culminating in the introduction of the December 2008 timetable. This saw a significant increase in services between key cities on the WCML, as well as improvements in performance and a reduction in engineering disruptions experienced on the route. The remainder of this section considers the current passenger demand for each of these markets in greater detail.

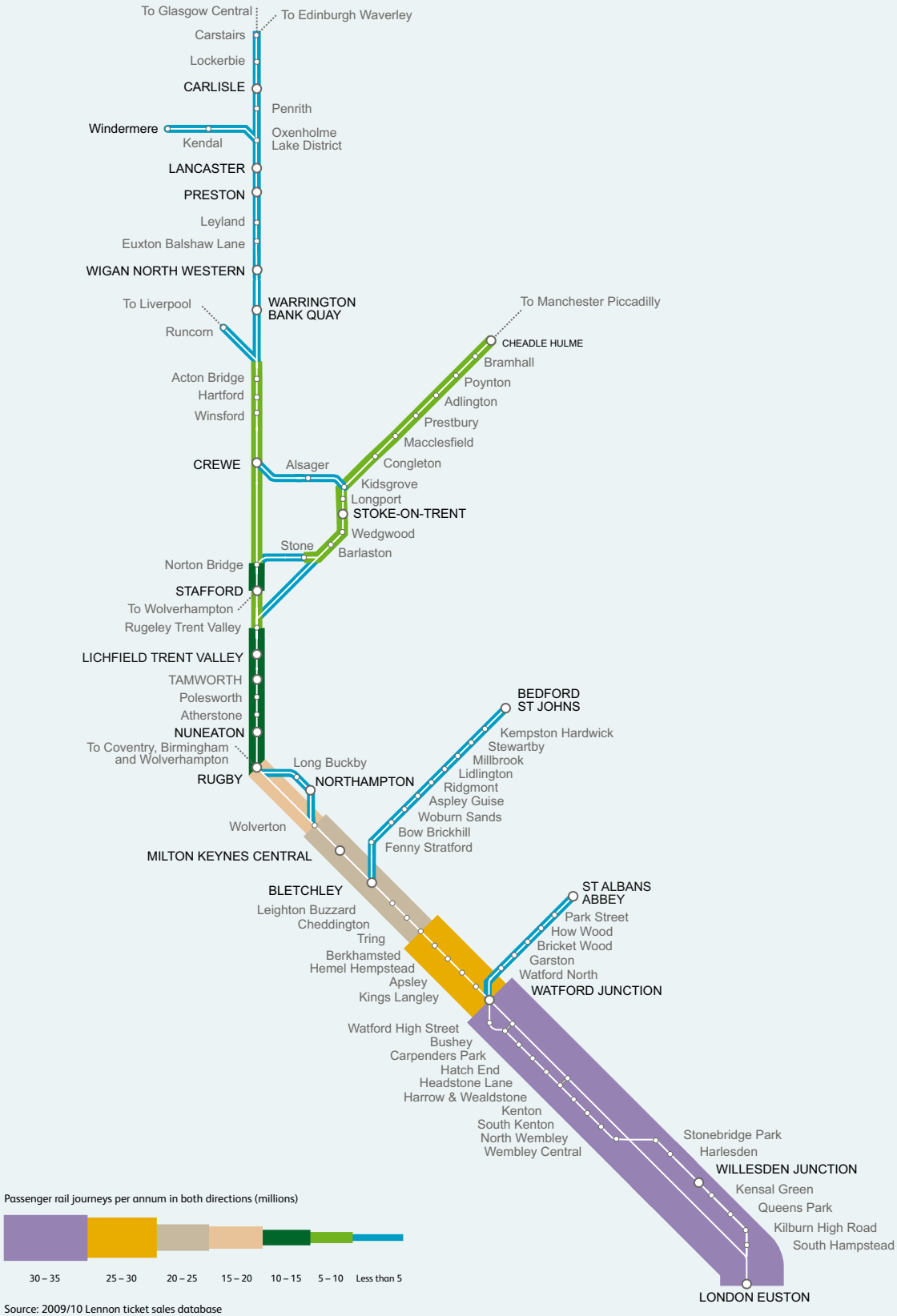
London: passenger demand

In 2009/10 over 31.8 million journeys started from or ended at London Euston. Of these, over 11 million journeys were made on the top ten long distance flows to/from London Euston (more than 50 miles). These are shown in **Table 3.9**. Demand was greatest between London and Manchester followed closely by London and Birmingham, which together account for over 15 per cent of the total demand to/from London Euston.

Historic average annual growth rates have varied considerably between these flows, from just over two per cent for travel between London and Glasgow, to around five per cent between London and the major English regional centres such as Manchester. The fastest growing markets have benefitted from the underlying national trend of increases in demand for long distance rail as well as a series of supply-side factors such as improvements to journey times, frequency and performance following the WCML upgrade programme, a reduction in the number of weekend engineering closures, and a decline in the competitive position of the domestic airline industry.

1 This relates to the slower inter-regional services that serve both major urban centres and smaller intermediate stations

Figure 3.13 – passenger demand



Source: 2009/10 Lennon ticket sales database

Table 3.9 – top 10 long distance flows (>50miles) to/from London Euston, in 2009/10			
Flows	Passenger journeys (000's) in 2009/10	Growth between 1999/2000 and 2009/10	Average annual growth rate
Manchester Piccadilly	2,700	70 %	5.4 %
Birmingham New Street	2,320	58 %	4.7 %
Liverpool Lime Street	1,240	41 %	3.5 %
Northampton	1,160	31 %	2.8 %
Coventry	980	58 %	4.7 %
Birmingham International	800	27 %	2.4 %
Rugby	550	88 %	6.5 %
Stockport	530	56 %	4.6 %
Preston	510	26 %	2.3 %
Glasgow Central	510	23 %	2.1 %

Source: 2009/10 LENNON ticket sales database

Short distance journeys to or from London Euston (less than 50 miles) are driven by peak commuting demand as well as off-peak leisure and business demand which have both seen strong growth over the last 10 years. Over 10 million journeys were made in 2009/10 on the top 10 short distance flows to/from London Euston as shown in **Table 3.10**. Demand was highest between London and Milton Keynes which accounted for almost 10 per cent of the overall demand to or from London Euston.

Due to inconsistencies in ticket sales data it has not been possible to present the long term historical change in passenger numbers on the key short-distance markets, however aggregate growth across all these markets is estimated at between two and three per cent per annum over the last 10 years. This has largely been driven by growth in central London employment.

Table 3.10 – top ten short distance flows to/from London Euston (<50 miles), in 2009/10		
Rank	Flows	Passenger journeys (thousand) in 2009/10
1	Milton Keynes Central	3,000
2	Watford Junction	1,650
3	Hemel Hempstead	1,120
4	Berkhamsted	1,070
5	Leighton Buzzard	970
6	Queens Park	690
7	Harrow & Wealdstone	580
8	Wembley Central	500
9	Tring	460
10	Kilburn High Road	440

Source: 2009/10 LENNON ticket sales database. It includes estimates of rail journeys made on London travel cards and Oyster pay as you go tickets.

London: passenger loadings

In order to understand whether there is sufficient capacity on the WCML to meet current passenger demand, the most recently available train loads were analysed. This data was supplied by Train Operating Companies, and several of these asked that details of individual trains were not shown when presenting the information.

The average number of daily LDHS services to/from London Euston with standing passengers in 2009/10 is shown in **Figure 3.14**. Experience suggests that Friday is the busiest day in terms of passenger demand for these services. The analysis therefore differentiates between crowding on services averaged across Monday to Thursday and those on Friday. It should be noted that the build-up of demand in response to the December 2008 timetable improvements, and the ending of disruptive engineering works as part of the West Coast Route Modernisation Programme will not be fully reflected in the data.

Figure 3.14 illustrates the number of services that currently have more passengers than seats, and the number of services that have at least eight passengers to every 10 seats (namely an 80 per cent load factor). This 80 per cent factor has been used as a second overcrowding statistic for several reasons:

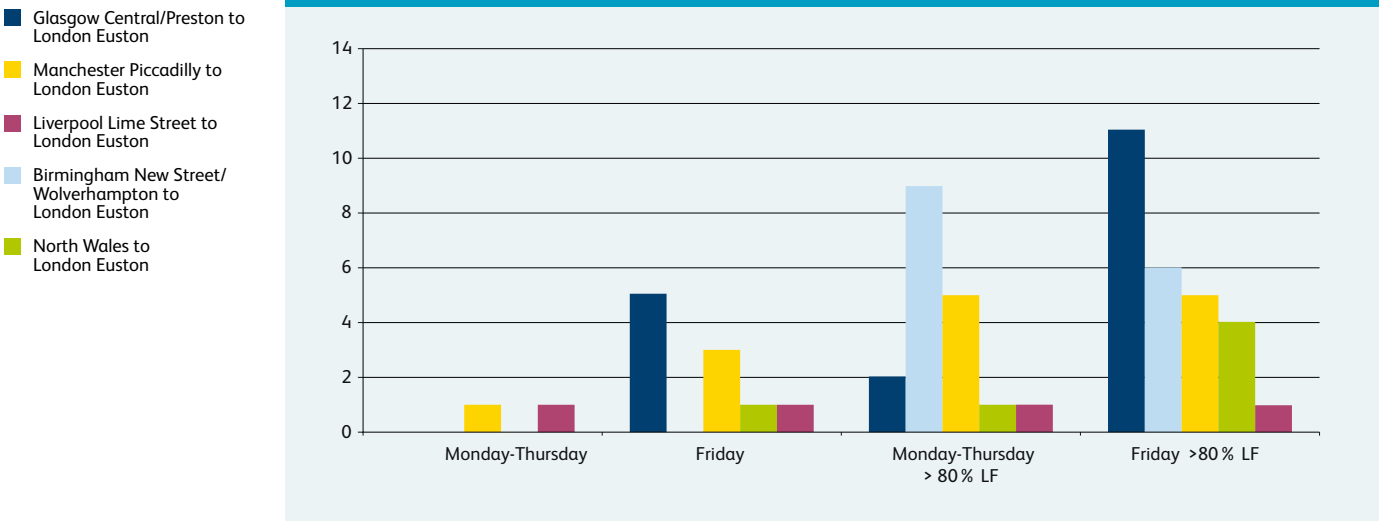
- the use of data which has been averaged across a standard weekday hides the observed variations which are prevalent on WCML LDHS services, and it is understood that an 80 per cent average annual load factor is a reasonable proxy for a 100 per cent loaded train at naturally busy times of the year such as school holidays
- providing an effective service for walk-up passengers, on flexible tickets, requires average load factors to be kept at less than 100 per cent. This is important both commercially (these tickets contribute a significant proportion of industry revenue) and in terms of rail's role in supporting the economy (because passengers on business journeys often require flexibility in their travel time)
- industry research suggests that long distance passengers, in particular business travellers derive disutility from crowding at a level that is less than 100 per cent seat occupancy, as an absence of available space prevents the travel time being used productively. Based on the current mix of passengers, an 80 per cent load factor has been used as a proxy for when this is likely to occur.

Trains where 100 per cent and 80 per cent load factors occur for less than 20 minutes in duration have been excluded. This is consistent with the DfT policy on standing.

The most overcrowded trains are those which operate immediately before or after peak time travel restrictions apply, as tickets are generally less expensive outside of these restricted times.

The remaining services on the WCML to/from London Euston are currently operated by London Midland and LOROL, which serve both commuter and longer distance markets. Services between Milton Keynes Central and the West London Line are operated by Southern. Average weekday loadings for the year 2009/10 on services provided by all three operators demonstrate that crowding is prevalent during the peaks.

Figure 3.14 - average number of daily Long Distance High Speed services to/from London Euston with standing passengers in 2009/10



Source: Virgin trains, average passenger count data, 2009/10
Note, LF = load factor (passenger to seat ratio)

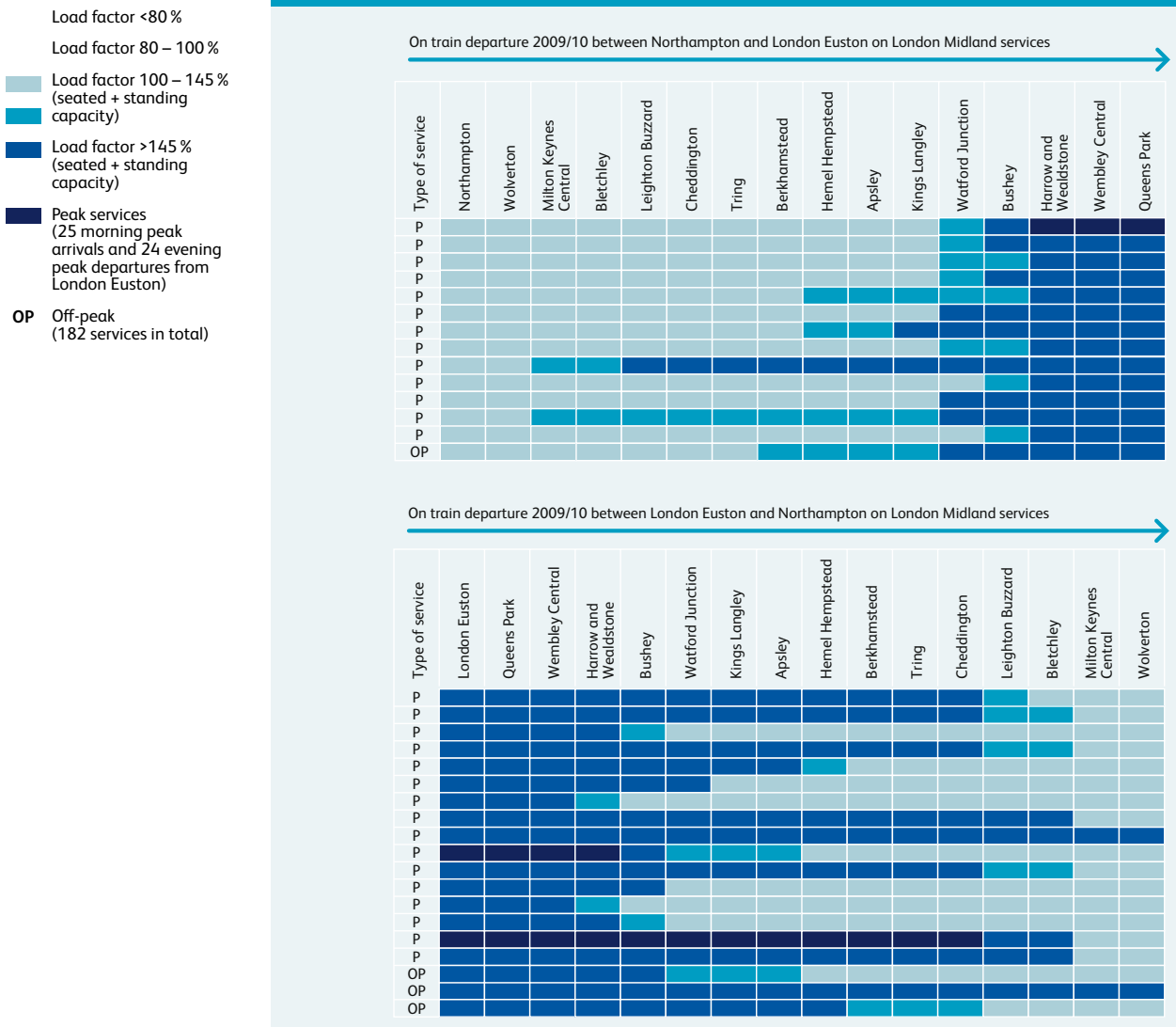
Passengers commuting on London Midland services from stations between Northampton and London Euston inclusive experience high levels of crowding especially during the commuter peaks at London Euston. This is illustrated in **Figure 3.15**.

Around 60 per cent of all peak services (07:00 – 09:59 arrivals and 16:00 – 18:59 departures from London Euston) on this corridor currently have passengers exceeding seated capacity, from which over 10 per cent carry passengers above the total train capacity (seated + theoretical standing capacity) used in the High Level Output Specification (HLOS[2]) analysis.

Crowding on the remaining corridors is less prevalent, except for the morning and evening peak services operating into and out of Birmingham New Street. Demand for commuting into the West Midlands conurbation is considered in detail in the West Midlands and Chilterns RUS published in May 2011 and available at **www.networkrail.co.uk.**

The average loadings in the three-hour morning peak for LOROL services are shown in **Figure 3.16**. It illustrates that as expected, capacity is more constrained in the southbound direction from Watford Junction, with 55 per cent of the services running with more passengers than available seats in the morning three-hour peak.

Figure 3.15 - 2009/10 load factors on London Midland services from stations along the Northampton to London Euston corridor in each direction throughout the day

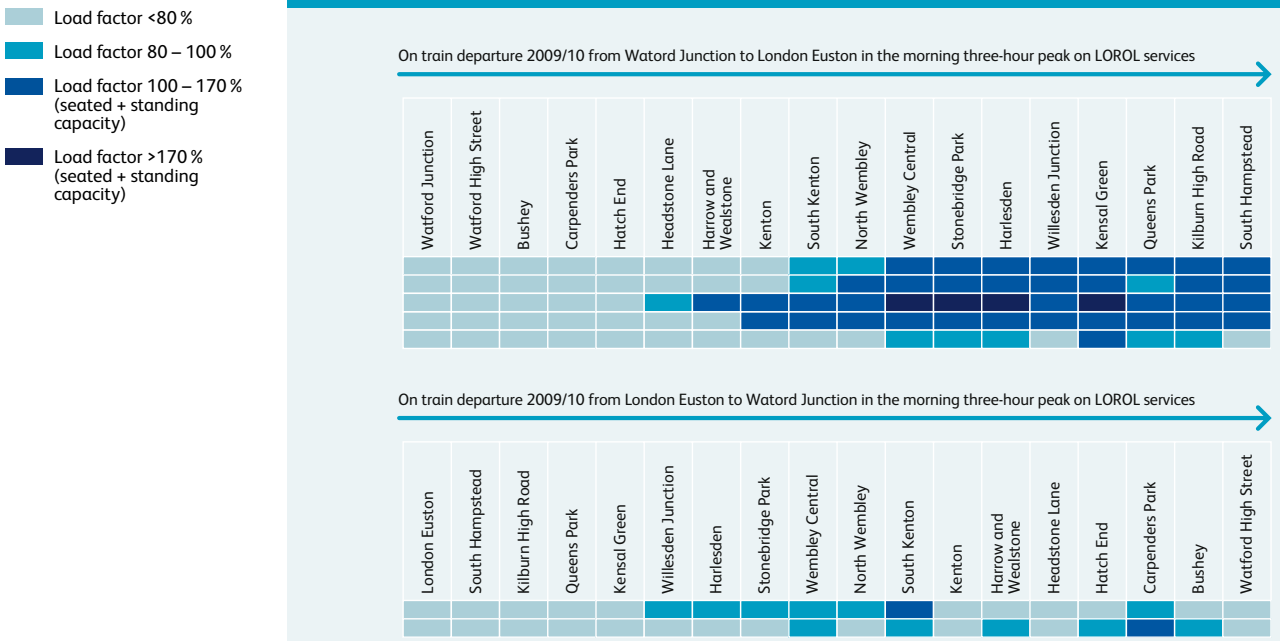


Source: London Midland average passenger count data, 2009/10
Note, only services with load factors higher than 100 per cent at some point on the route have been presented. Not all services call at every station shown on the route.

2 HLOS refers to the High Level Output Specification consisting of various targets (including reliability, capacity and safety) which the collective rail industry is required to achieve during CP4 or within the passenger franchise duration.

However, given the nature of the service and the configuration of the rolling stock (designed with longitudinal seating and increased standing space similar to London Underground services), total passenger capacity is only exceeded when load factors surpass 170 per cent.

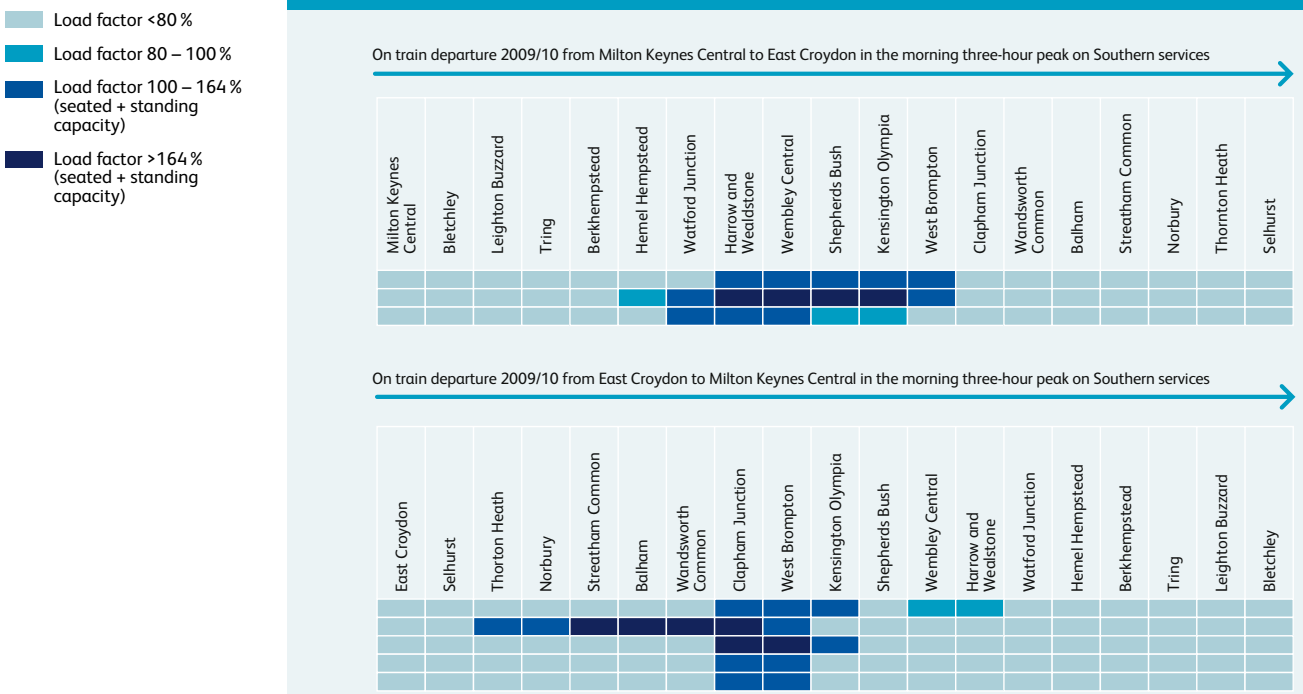
Figure 3.16 - 2009/10 load factors for LOROL services departing from stations along the Watford Junction to London Euston corridor in each direction during the morning three-hour peak



Source: LOROL average passenger count data, 2009/10
Note: there are nine services in each direction in the three-hour peak
Note: only services with load factors exceeding 100 per cent at some point on the route have been presented.

The current average weekday loadings in the three-hour morning peak for Southern services on the WCML are shown in **Figure 3.17**. This provides passengers with a direct hourly service between stations on the WCML and the West London Line. All of the morning three-hour peak services on this corridor are currently carrying passengers above seated capacity at some point. In the southbound direction, passengers currently stand between Watford Junction and Clapham Junction. In the northbound direction services are mainly crowded between Clapham Junction and Shepherds Bush. There are currently three services in total with passengers above the total theoretical maximum capacity of the train. One reason for this is the large gap in services during the three-hour peak of almost 75 minutes

Figure 3.17 - 2009/10 load factors on Southern services departing from stations along the Milton Keynes Central to East Croydon corridor in each direction during the morning three hour peak



Source: Southern average passenger count data, 2009/10
Note, only services with load factors higher than 100 per cent at some point on the route have been presented. Not all services call at every station shown on the route.

In summary:

- a significant number of LDHS services are at or near capacity, despite the increase in capacity provision following the December 2008 timetable change
- longer distance and commuter services operated by London Midland between Northampton, London Euston and stations in between are extremely busy, with 60 per cent of peak services carrying passengers above seated capacity, from which many stand for more than 20 minutes
- suburban commuter services operated by LOROL are crowded in the high-peak hour, albeit within the tolerance of the new rolling stock and for periods of less than 20 minutes
- very high crowding occurs on peak services between the WCML and the West London Line.

West Midlands: passenger demand

In 2009/10, around 73 million passenger journeys were made to, from or within the West Midlands and Chilterns RUS area. Passenger demand and capacity for this area is discussed in greater detail within the West Midlands and Chilterns RUS[3] published in May 2011. The top 10 non-London flows between stations in the West Coast Main Line RUS area and the West Midlands in 2009/10, along with the growth in passenger demand on these flows over the last 10 years is shown in **Table 3.11**.

The top ten non-London flows between the West Midlands and the WCML account for over 2.2 million passenger journeys per year. These flows have experienced significant growth over the last 10 years, with passenger demand between Birmingham and many WCML stations growing at over five per cent per annum in this time period. This has been driven by several service enhancements, including an improved timetable, faster rail journey times, rail performance improvements, as well as an underlying increase in travel arising from growth in housing and retail developments in the Birmingham conurbation.

3 West Midlands and Chilterns RUS, available on the Network Rail website at www.networkrail.co.uk

Table 3.11 – top 10 non-London flows between stations in the West Coast Main Line RUS area and the West Midlands in 2009/10

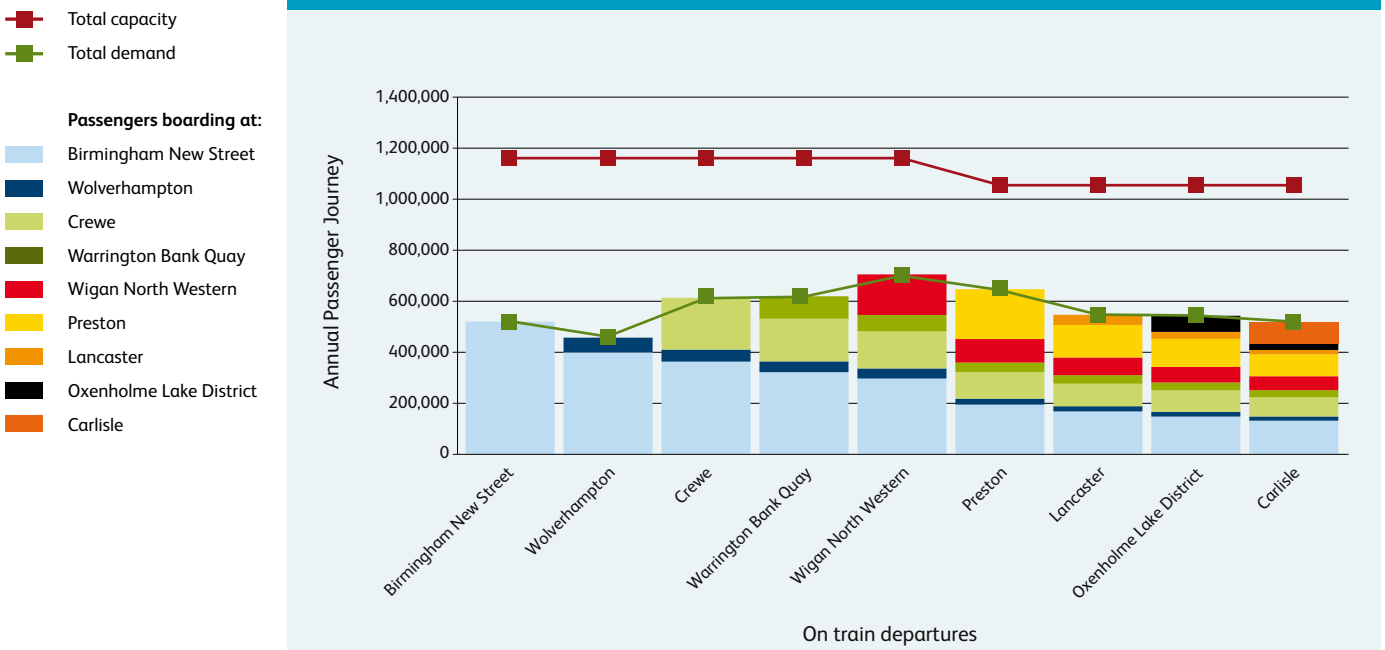
Passenger flow	Passenger journeys (thousand) in 2009/10	Growth between 1999/2000 and 2009/10	Average annual growth rate
Birmingham – Manchester	330	105 %	7.4 %
Birmingham – Stafford	310	56 %	4.6 %
Birmingham – Stoke-on-Trent	240	115 %	7.9 %
Coventry – Rugby	220	33 %	2.9 %
Stafford – Wolverhampton	220	20 %	1.8 %
Birmingham – Rugby	210	66 %	5.2 %
Milton Keynes – Northampton	210	25 %	2.2 %
Birmingham – Northampton	200	97 %	7.0 %
Birmingham – Milton Keynes	150	78 %	5.9 %
Birmingham – Liverpool	140	67 %	5.3 %

Source: 2009/10 LENNON ticket sales database. Includes estimates of rail journeys made on concessionary rail tickets ie Passenger Transport Executive (PTE) tickets. Note, the above analysis excludes journeys between stations in the West Midlands region that fall outside the West Coast Main Line RUS area ie between Birmingham New Street and Coventry.

West Midlands market: passenger loadings

The main long distance service between the West Midlands and the WCML (excluding those to or from London Euston) is currently provided by the InterCity West Coast franchise. It operates between Birmingham New Street and Edinburgh Waverley in one hour and Glasgow Central in the alternate hour. A total of 2.8 million annual passenger journeys were made on this service in 2009/10. The total annual on train departures by origin and destination stations (northbound only), are shown in **Figure 3.18**. Over 500,000 journeys were made from Birmingham New Street on this service, from which 70 per cent travel north of Crewe and 25 per cent continue to Edinburgh Waverley or Glasgow Central. Demand peaks at Wigan North Western, with over 700,000 passengers on train departure. The analysis therefore suggests that although the service is consistently busy, there are high levels of boarding and alighting passengers along the route. Demand to or from Edinburgh Waverley on this service is higher than that to or from Glasgow Central (58 per cent and 42 per cent respectively). Although on average there is currently sufficient capacity, there are times during the day when demand exceeds the seated capacity available. This is particularly true during peak times at Birmingham New Street and during the weekends on the entire service where experience suggests that demand for travel exceeds weekday demand.

Figure 3.18 - annual passenger demand and capacity between Birmingham New Street and Glasgow Central/Edinburgh Waverley in the northbound direction in 2009/10



Source: 2009/10 LENNON ticket sales databases.
Note, 58 per cent of journeys departing Carlisle are towards Edinburgh Waverley, with the remaining 42 per cent towards Glasgow Central. Demand in the southbound direction is expected to be similar to that in the northbound direction. Data from LENNON ticket sales database aggregates the demand data for Oxenholme Lake District and Penrith stations.

North West market: passenger demand

The North West passenger market covers the area north of the West Midlands to Carlisle, covering a number of large employment and population centres. **Table 3.12** shows the top 10 non-London flows between stations in the West Coast Main Line RUS area and the North West in terms of number of annual passenger journeys in 2009/10. It also shows the growth in passenger demand on these flows over the 10-year period to 2009/10. A large number of these flows are served by the InterCity West Coast franchise that has seen considerable improvement in service frequency and performance following the implementation of the December 2008 timetable. This has resulted in a significant growth in demand for stations served by the franchise, with many flows experiencing doubling of demand. In addition, increased road congestion and car parking costs (especially in Manchester city centre) and the structural changes in travel and employment markets, resulting in more people now working in Manchester city centre who have limited alternatives for commuting, have all increased rail's market share.

Table 3.12 – top 10 non-London flows to/from the North West on the West Coast Main Line in 2009/10

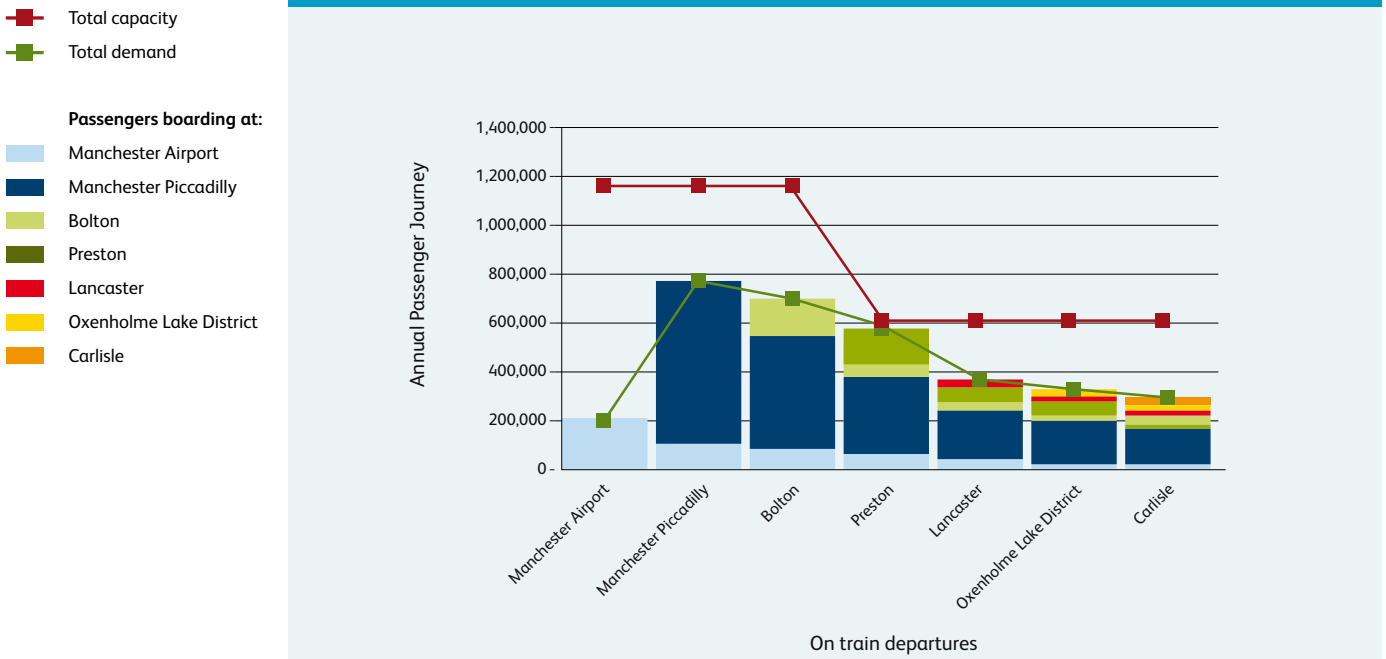
Passenger flow	Passenger journeys (thousand) in 2009/10	Growth between 1999/2000 and 2009/10	Average annual growth rate
Manchester – Liverpool	890	79 %	6.0 %
Manchester – Preston	470	136 %	8.9 %
Manchester – Macclesfield	460	138 %	9.1 %
Manchester – Stoke-on-Trent	390	125 %	8.5 %
Manchester – Birmingham	330	105 %	7.4 %
Manchester – Wilmslow	310	100 %	7.2 %
Manchester – Crewe	310	79 %	6.0 %
Stoke-on-Trent – Birmingham	240	115 %	7.9 %
Lancaster – Preston	210	58 %	4.7 %
Liverpool – Birmingham	140	67 %	5.3 %

Source: 2009/10 LENNON ticket sales database. Includes estimates of rail journeys made on concessionary rail tickets ie Passenger Transport Executive (PTE) tickets. Note: the above analysis excludes journeys between stations in the North West region that fall outside the West Coast Main Line RUS area ie between Manchester and Bolton.

North West market: passenger train loadings

The capacity for short distance and interurban operators in the North West is analysed by the recently published Northern RUS. The main non-London long distance service between the North West and the West Coast Main Line is currently provided by First TransPennine Express. It provides a generally hourly service between Manchester Airport and Scotland (Edinburgh Waverley in one hour and Glasgow Central in the alternate hour). **Figure 3.19** shows the total annual on train departures by origin and destination stations on the Manchester Airport to Scotland service (northbound only). Over 700,000 journeys are made annually from Manchester on this service, from which 50 per cent travel north of Preston and 22 per cent continue to either Edinburgh or Glasgow. Demand is highest at Manchester Piccadilly and falls as the service progresses. This suggests that the service attracts a large number of commuter and short-distance travellers to or from Manchester. The loadings indicate that overall there is sufficient capacity between Preston and Scotland based on the average loadings for weekdays.

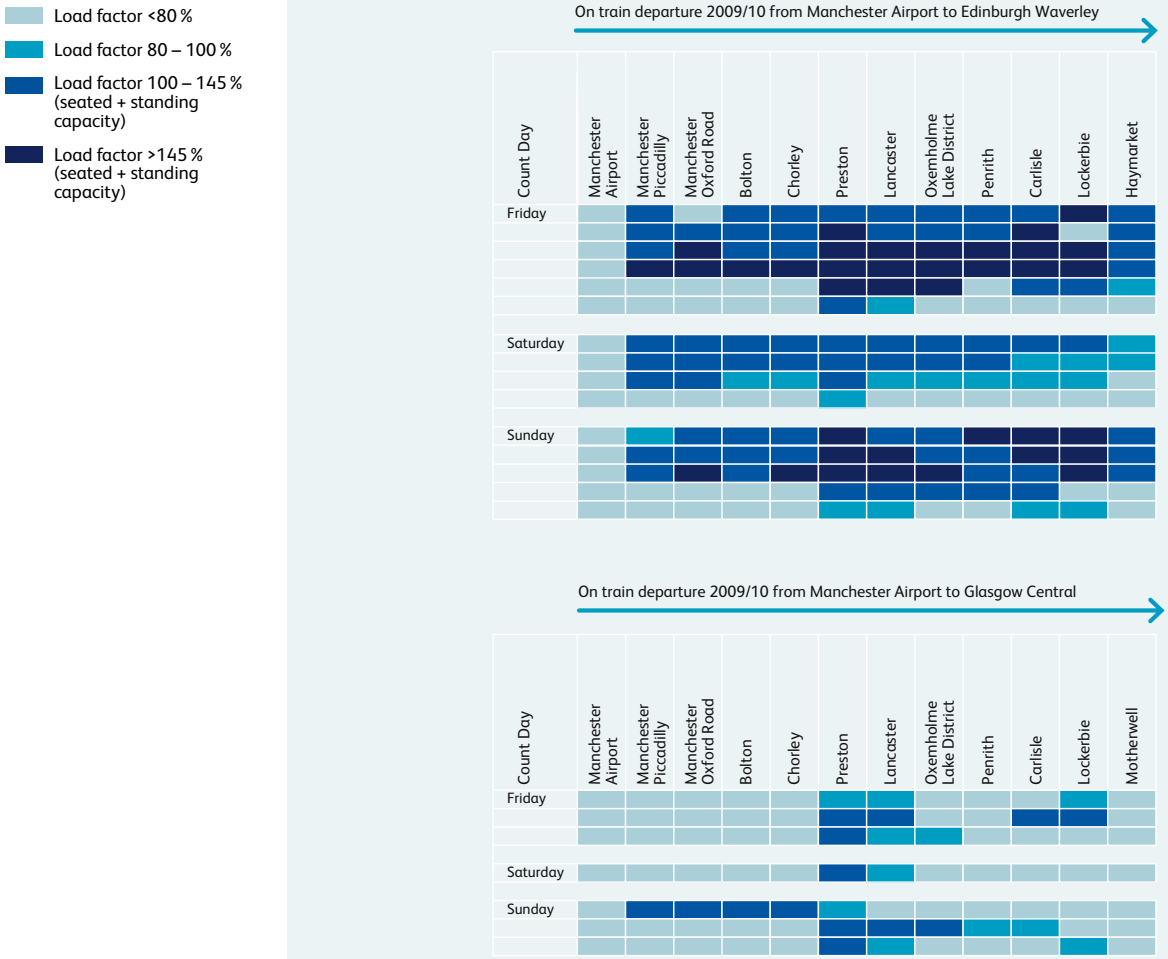
Figure 3.19 - annual passenger demand and capacity between Manchester Airport and Glasgow Central/Edinburgh Waverley in the northbound direction in 2009/10



Source: 2009/10 LENNON ticket sales database.
Note, 72 per cent of journeys departing Carlisle are towards Edinburgh Waverley, with the remaining 28 per cent towards Glasgow Central. Demand in the southbound direction is expected to be similar to that in the northbound direction. Data from LENNON ticket sales database aggregates the demand data for Oxenholme Lake District and Penrith stations.

Further analysis conducted since the publication of the Draft for Consultation has found that services are significantly busier on Fridays and weekends, with many carrying passengers above seated capacity, particularly on the service between Manchester Airport and Edinburgh Waverley. This is shown in **Figure 3.20**. The data confirms that most of the services operating between Manchester Airport and Edinburgh Waverley are crowded on Fridays and Sundays. Services between Manchester Airport and Glasgow Central are less busy, albeit some carry passengers above seated capacity. Passenger demand in the southbound direction is expected to be similar to that in the northbound direction.

Figure 3.20 - 2009/10 load factors on services from Manchester Airport to Scotland on Fridays and weekends



Source: First TransPennine Express passenger count data, 2009/10
Note, only services with load factors higher than 100 per cent at some point on the route have been presented. Not all services call at every station shown on the route, only one service per day between Manchester Airport and Glasgow Central currently calls at Motherwell Station. This is only in the northbound direction.

3.12 Freight operators

There are currently five freight train operators on the route. As the freight market is an open one there is always potential for new operators to enter the market.

DB Schenker Rail (UK)

DB Schenker Rail (UK) was established in 2008 with the acquisition by Deutsche Bahn AG of the former freight operating company English, Welsh and Scottish Railways Ltd (EWS). DB Schenker Rail (UK) is part of the Region West of DB Schenker. It is the largest freight operator in the UK and provides a wide range of rail freight services combined with logistics solutions.

Freightliner Group

Freightliner Group has two divisions: Freightliner Limited and Freightliner Heavy Haul Limited. Freightliner Limited is the largest rail haulier of containerised traffic, predominantly for the deep sea market. Freightliner Heavy Haul Limited is a significant conveyor of bulk goods, predominantly coal, construction materials and waste. It also operates infrastructure services.

GB Railfreight

GB Railfreight, which was purchased by Eurotunnel in 2010, is the third largest British rail freight operator. GB Railfreight is a significant operator of deep sea container trains and rail infrastructure services. They also run a number of services for bulk market customers including coal and gypsum.

Direct Rail Services Limited

Direct Rail Services Limited operates traffic for the power industry in Great Britain. In recent years the company has expanded to run services for the domestic intermodal and short sea intermodal markets. Key traffic flows for domestic container products are to Daventry, Grangemouth, Aberdeen, and the North West.

Colas Rail

Colas Rail is a relative new entrant to the UK rail market and provides rail freight haulage for all market sectors throughout the UK and Europe. Key flows on the WCML are timber from Carlisle to Chirk.

3.13 Freight market profile

Background

Rail freight plays an important role in Britain's economy, directly contributing £870 million to the economy. Since 1995, rail freight has seen freight volumes increasing by 50 per cent and now has a modal share of 11 per cent of all surface freight transport. The rail freight market is dependant on the general performance of the economy, with certain flows such as aggregates being particularly sensitive.

Traditionally rail freight has been associated with the transport of heavy bulk goods and construction materials. These areas continue to be important markets but rail freight's role is becoming much broader to take in consumer goods, mail and cars. The highest rate of growth is in consumer goods and this is expected to continue. Between 2004 and 2010 this market grew by 46 per cent. The consumer goods market, particularly supermarket traffic and mail, are much more time sensitive than traditional bulk goods flows. Rail freight is also targeting growth in new and less developed markets, including waste, and cars.

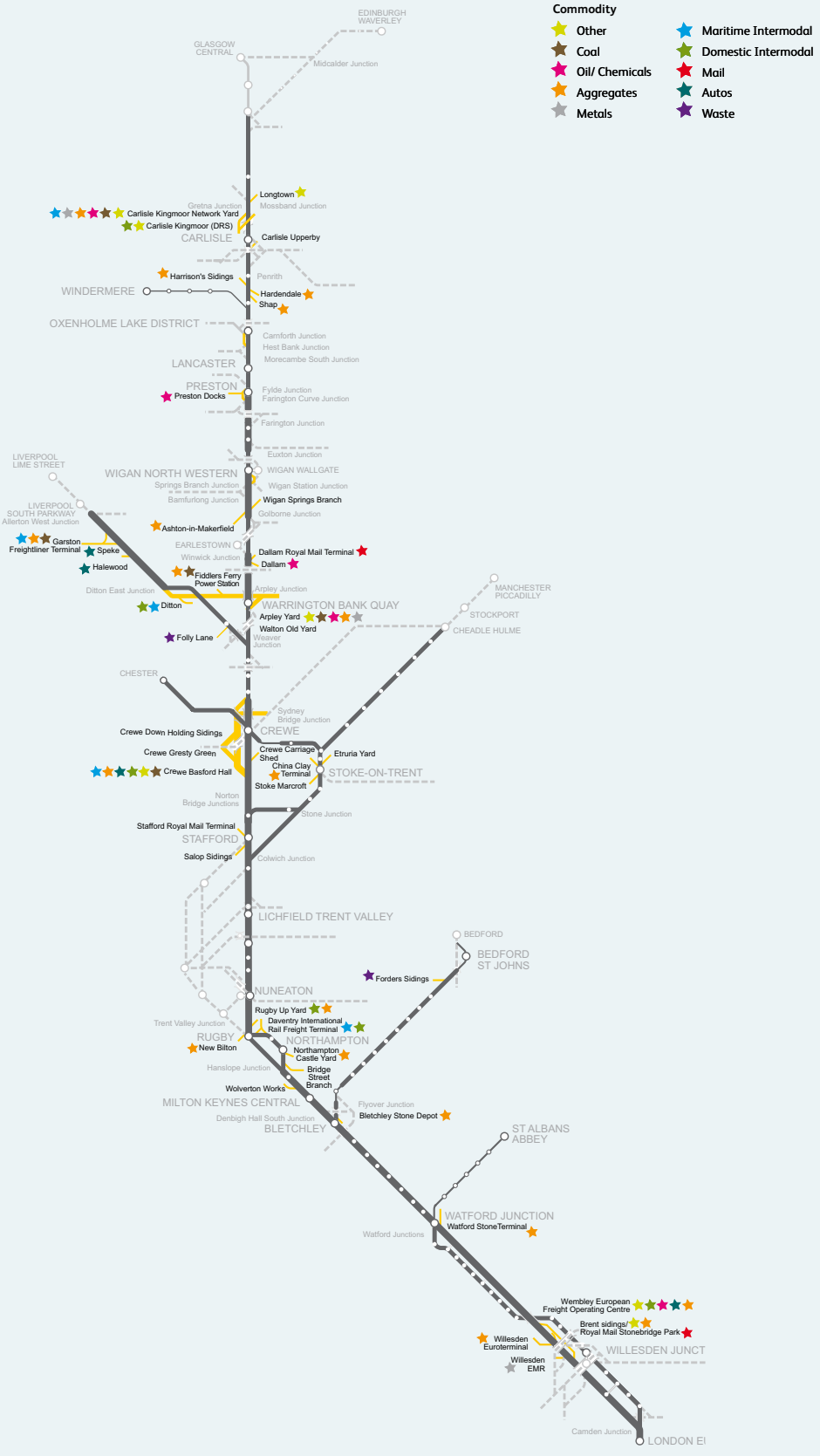
The DfT's July 2007 White Paper 'Delivering a Sustainable Railway' proposed the development of a Strategic Freight Network in England and Wales as part of its high level strategy to address the growing demands on the network for moving passengers and freight. As part of this work £200 million was identified to spend on freight capacity schemes in CP4 and details of these can be found in **Chapter 4**. This work also revisited the growth rates from the Freight RUS and produced updated forecasts for 2019 and 2030.

There are a number of freight terminals in the RUS area as well as a number of key terminal destinations off the core RUS area in the West Midlands and the North West. Freight terminals by commodity are shown in **Figure 3.20**. With the growth in rail freight there is demand for new and expanded terminals. In the West Coast Main Line RUS area terminals at Daventry and Ditton both have plans to expand in order to increase the number of trains they can accommodate.

National Delivery Service

The National Delivery Service (NDS) of Network Rail operates freight services to supply infrastructure materials throughout the country to meet the needs of engineering and construction projects. There are locations at both Crewe Basford Hall and Carlisle Kingmoor Yards which are key nodes for the traffic that service the many requirements of the NDS. Although not directly on the WCML route, the operation at Bescot in the West Midlands provides services to and from the WCML to service the needs of the NDS.

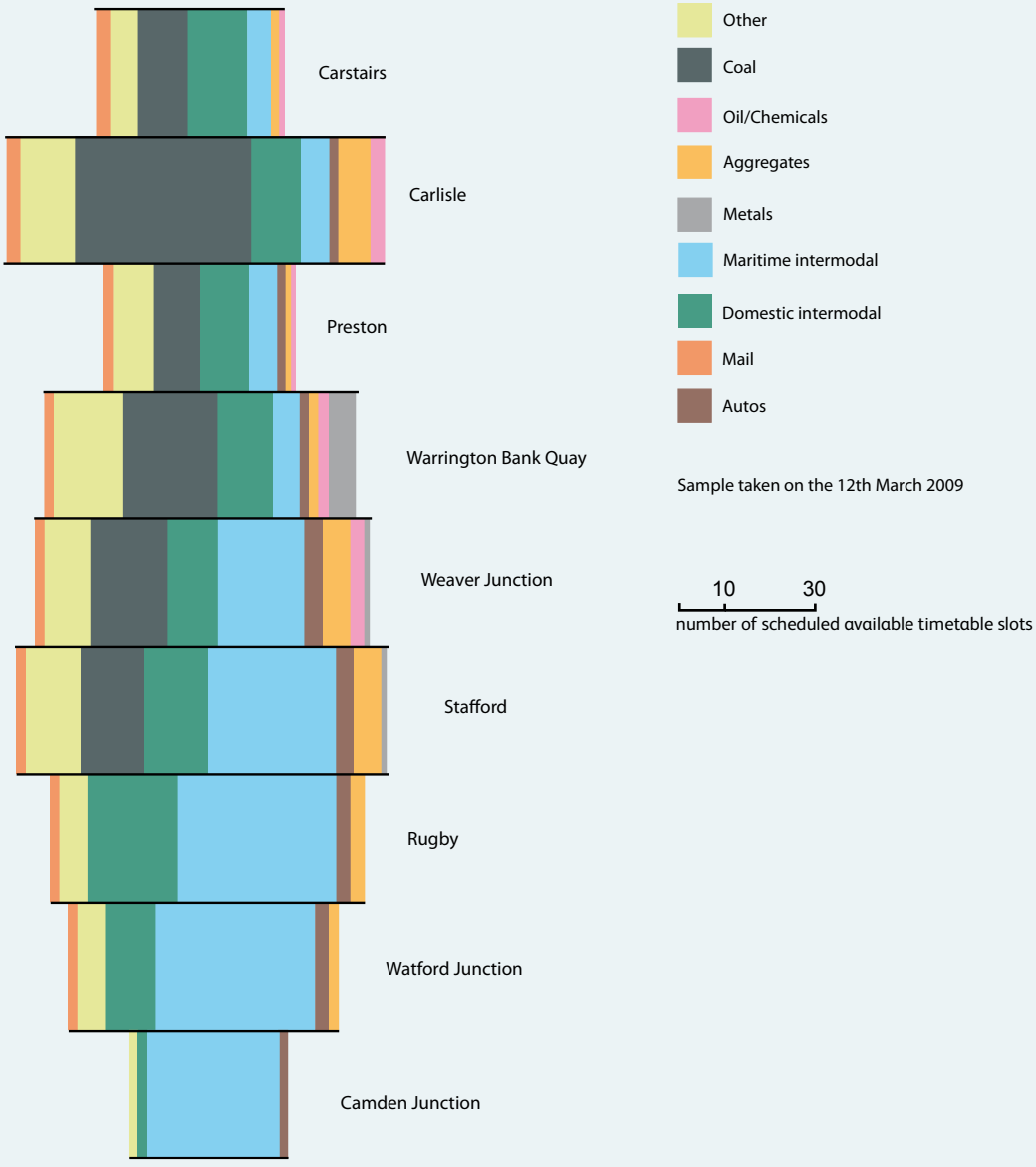
Figure 3.21 – Freight terminals by commodity



Major flows

In the area covered by the West Coast Main Line RUS the key flows are intermodal, including both maritime intermodal from the ports and domestic intermodal from inland terminals for internal distribution. There are also a number of flows within the RUS area which originate in Europe and use the Channel Tunnel to access the United Kingdom (UK). On the north of the route there are some coal flows, but since the WCML Route Modernisation Programme day time flows are mainly routed via the Settle and Carlisle route. There are also numerous smaller flows on the route ranging from timber to mineral water. **Figure 3.2.2** shows the proportion of timetable slots by commodity that are available for freight operators, which may or may not be used, through key locations on the WCML. The figure shows how the different commodity flows are accommodated on the WCML and shows that there are more bulk flows at the north end of the route, with more intermodal-type traffic at the south. Any change in the make up of the commodity flows will therefore have different impacts across the route.

Figure 3.22 – proportion of timetabled slots by commodity through key locations



Maritime intermodal

Maritime intermodal flows are container flows to and from ports. The main import locations into the UK are Southampton and the East Coast ports. The major flow over the RUS area from Southampton is to the Midlands terminals at Rugby, Birch Coppice, Hams Hall, Lawley Street and Daventry, and to the North West terminals at Garston, Trafford Park and Ditton, and to further destinations in the North East and Scotland. The flows from Felixstowe to the Midlands and North West terminals operate via the North London Line joining the WCML at Willesden Junction or via Peterborough joining the WCML at Nuneaton.

Channel Tunnel intermodal

Channel Tunnel intermodal traffic consists of traffic from Spain, Italy, France, Belgium, Germany and other European Union (EU) countries. This traffic operates to single destinations in the UK such as Trafford Park, Daventry, Hams Hall and other terminals. Despite the problems this traffic has experienced over recent years, it is expected that the level of train services to and from the EU will increase. Traffic is limited to a current maximum of W9 loading gauge due to constraints in southern England. However, it is expected that freight will start to use High Speed One in 2011 and this will bring the prospect of larger loading gauge traffic into the UK for onward movement via the WCML.

Domestic intermodal

Domestic intermodal traffic is the movement of containerised consumer goods within the UK. Daventry International Rail Freight Terminal is the national hub of Anglo-Scottish intermodal traffic. Key flows include time sensitive supermarket traffic which operates between Daventry and Mossend and Grangemouth and Coatbridge.

Royal Mail

There are two Royal Mail trains a day between Willesden and Shieldmuir in Scotland. These flows are operated by 100mph rolling stock and are very time sensitive.

Bulk flows

There are a number of bulk flows across the RUS area. Bulk flows include coal, aggregates and china clay.

Coal flows are expected to respond to future generator demand, based on coal imports and closures of plants reflecting the decreased role of coal in the UK energy mix. Most coal flows from Scotland to power stations in England are routed from Gretna to Carlisle and then diverted off the route and onto the Settle and Carlisle line. There are also flows between Liverpool Docks and Fiddlers Ferry, Ratcliffe and Ironbridge power stations.

Aggregate flows are highly dependant on the health of the construction industry and demand tends to be project driven. Aggregate flows traverse the route and operate to terminals at Northampton, Bletchley, Watford and Willesden. At the north end of the route aggregates are conveyed from the Shap quarries to Teeside, Manchester and Sheffield.

There are china clay trains operating over the route, some of these originate in the South West, while there is also a china clay flow through the Channel Tunnel from mainland Europe, with destinations of Stoke-on-Trent and Irvine in Scotland.

Other flows

There are a number of other flows across the RUS area, these include automotive flows from Halewood (Liverpool) to Southampton and Wembley, scrap metal from Mossend (Glasgow) to Liverpool, timber from Carlisle to Chirk and, as of 2012, waste flows to Folly Lane (Runcorn).

4. Anticipated changes in supply and demand

This chapter outlines the planned changes to supply within the rail network and the forecast future changes to demand over the period of the West Coast Main Line Route Utilisation Strategy.

The changes in supply are identified as either committed changes, which include planned changes to train services or infrastructure, and proposed or uncommitted changes. These changes do not include those determined through this Route Utilisation Strategy (RUS).

The chapter goes on to outline the methodology and results of the RUS passenger and freight demand forecasting process.

4.1 Committed schemes

Where significant renewal and enhancement schemes are committed, they form part of the RUS baseline. A committed scheme is one that has confirmed funding beyond Governance with Railway Investment Projects (GRIP) stage 4 – Single Option Development. Any interventions proposed by the RUS are assessed against this baseline rather than current infrastructure.

Policy context

The 2008 Periodic Review set Network Rail's outputs, financial framework and access charges for the period 1 April 2009 to 31 March 2014 (referred to as Control Period 4 (CP4)). This is the first periodic review since the passing of the Railways Act 2005 which introduced the new process whereby the Secretary of State issues the High Level Output Specification (HLOS) and a Statement of Funds Available (SoFA).

The HLOS specified various targets (including reliability, capacity and safety) which the collective rail industry is required to achieve during CP4 or within the passenger franchise duration. The CP4 Delivery Plan outlines the committed outputs Network Rail has been funded to deliver in CP4 which includes those required to meet the HLOS targets.

Further details on the 2007 White Paper and HLOS metrics can be found at the Department for Transport (DfT) website. Further details on Network Rail committed CP4 outputs can be found at **www.networkrail.co.uk.**

The franchise for the principal operator of long distance high speed services on the route (InterCity West Coast Franchise) expires in March 2012. In May 2011, the DfT issued a Draft Invitation to Tender for the replacement franchise to commence on 9th December 2012. This allows a period of further consultation to take place. The Office of Rail Regulation (ORR) announced (in March 2011) the track access rights on the West Coast Main Line (WCML) for the commencement of the replacement franchise and tasked Network Rail with leading an Industry Timetable Working Group to recast the timetable on the route on an iterative basis commencing with the December 2013 timetable.

Control Period 4 Delivery Plan outputs

The West Coast Main Line RUS is aligned with the delivery of the key outputs specified within the Network Rail CP4 Delivery Plan. It recognises that some issues raised during the gap identification stage of the RUS are addressed and resolved by the committed CP4 enhancements schemes and associated operational plans. The key elements of the Delivery Plan which need to be considered as part of the baseline for the RUS include the following:

- additional rolling stock
- WCML power supply upgrade
- Bletchley remodelling
- Development of Stafford area improvements
- North West Electrification
- Manchester Ordsall curve
- National Stations Improvement Programme (NSIP)
- Access for All
- safety
- Strategic Freight Network
- network availability/seven day railway
- joint performance improvement plans.

Additional rolling stock

Following the publication of the White Paper 'Delivering a Sustainable Railway' in July 2007, the Government published a rolling stock plan, setting out in more detail how rolling stock would be used to deliver increased capacity. This plan proposed the introduction of new rolling stock where required, as well as the redeployment of existing rolling stock which is displaced. The plan did not set out detailed lists of rolling stock fleets or a planned schedule for their introduction on specific routes.

The HLOS peak demand requirement for London Euston is expected to result in additional electric multiple unit rolling stock being allocated to London Midland. The operational plan produced by London Midland has considered where additional capacity is required within the RUS area in CP4 and has allocated additional vehicles to achieve this. The planned additional vehicles (eight in total for the WCML services) have not formed part of the baseline for this RUS, as they are expected to be delivered after the RUS baseline of 2012.

Under the rolling stock cascade for the North West electrification, three-car class 185 units are planned to be replaced with four-car Electric Multiple Units (EMUs). The exact type of rolling stock is as yet undecided; however, it is expected to provide an increase in standard class capacity of between 20 to 30 per cent. These four-car units have yet to be procured and may be specified as being capable of operating at 110mph. This would assist with timetabling north of Preston as it would reduce the speed differential between passenger services.

In 2010, the DfT announced a review of the rolling stock strategy and further details of the plan are being updated and finalised. In March 2011 the DfT announced the procurement of new InterCity Express (IEP) rolling stock onto the rail network. However the announcement confirmed that there are no current plans for any IEP rolling stock to be utilised on the WCML.

In June 2011, the Government announced the next stage in a plan to procure approximately 1,200 new rail carriages, which will be used on the busy Thameslink route. This will allow the existing Thameslink carriages to be redeployed to other parts of the country.

Whilst the RUS is based on the assumption that the additional vehicles will be delivered it is important to note that any refinement to the plan would directly affect the assumptions and conclusions of any option analysis presented in **Chapter 5**.

The redeployment of rolling stock will have a key effect on the future utilisation of WCML route.

Additional Class 390 vehicles

The lengthening of the Class 390 vehicle fleet is progressing with a further 106 vehicles currently being built.

Four new 11-car train sets are planned to enter service in 2011/12, and 31 existing nine-car sets will each have two standard vehicles inserted, to create 35 11-car trains. This constitutes an increase of over 50 per cent in standard class seating on the 31 sets lengthened. 21 sets will remain as nine-car formations. All the new vehicles are planned to be in full service by December 2012, and the analysis presented in **Chapter 5** is based on this assumption.

Platform extensions for additional Class 390 vehicles

In order for the lengthened sets to operate, platform work is required at the following 10 stations on the West Coast Main Line RUS route. The stations involved are: Lancaster, Preston, Warrington Bank Quay, Macclesfield, Stoke-on-Trent, Lichfield Trent Valley, Rugby, Northampton, Watford Junction, and London Euston. Platform extension work is also taking place at stations on other RUS areas. These are at Wilmslow and Wolverhampton stations.

At stations where platforms cannot be physically extended, selective door operation will be used. This arrangement is only planned for station platforms which are not normally used for the Class 390 fleet (ie as a back up in case the normal platforms are not available).

West Coast Main Line power supply upgrade

This project involves power supply renewals and an upgrade of the traction power supply across the busier parts of the WCML route. The work includes:

- modifications and alterations at various electricity supply industry connection points
- provision of new 25kV conductors
- other renewals and improvements to the system.

The work is due to be completed during CP4 and Control Period Five (CP5). The power supply upgrade is a key project to help provide for the planned future growth of traffic on the WCML route.

Bletchley remodelling

This project delivers specific capacity enhancements that contribute to the delivery of the DfT's HLOS programme. The primary objectives of the project are:

- renewal of life expired signalling and track assets
- transfer of signalling control from Bletchley to Rugby signalling control centre
- provision of 12-car capability on platforms four and five
- provision of a bi-directional freight loop to accommodate 775 metre train lengths
- a new, higher speed Bletchley South Junction at Drayton Road
- capability for extending Bedford to Bletchley services to Milton Keynes Central.

This project is due to be delivered by June 2013.

Development of Stafford area improvements

Significant enhancements are being developed and will be delivered as part of the Stafford area improvement project. These include a new grade separated junction at Norton Bridge, a new freight loop at Stafford, speed enhancements at Trent Valley Junction (near Stafford station) and speed improvements on the slow lines between Doxey Junction and Crewe.

The new grade separated junction at Norton Bridge will allow services travelling between Stafford and Stone to cross the fast lines of the WCML without conflicting with other services.

The enhancements in the Stafford station area need to be delivered in conjunction with planned renewals in the area. The re-signalling project is due to be completed by December 2015 with the full scheme completed by December 2017.

This work will create space for additional passenger and freight train paths through the Stafford area, reduce congestion on the line and make services more reliable and punctual whilst improving frequency and journey times for passengers.

North West electrification

In 2009, the Government announced plans for significant electrification in the North West. There are plans to electrify the Liverpool to Manchester line (via Earlestown) by 2013, Liverpool to WCML (via Newton-le-Willows) by 2014, Liverpool to Wigan North Western also by 2014. Preston to Blackpool North by 2016 and Manchester Victoria to Preston (via Bolton) also by 2016.

These proposals will create opportunities for new electric services to be introduced which will improve capacity and connectivity, as well as providing new electrified routes. This will also provide new diversionary route options in times of perturbation and planned engineering work.

Ordsall Chord

In March 2011 the government announced funding to build a new chord line in central Manchester in the Ordsall area. This line will allow through running between Manchester Piccadilly and Manchester Victoria. Although not directly on the core WCML route this scheme will release valuable capacity at Manchester Piccadilly station, as some services are routed via Manchester Victoria station and the new chord.

National Stations Improvement Programme

The National Stations Improvement Programme (NSIP) is a DfT funded cross-industry programme designed to enhance approximately 150 medium sized stations across routes in England and Wales. It is a committed spending requirement in Network Rail's CP4 Delivery Plan and forms an agreed commitment to deliver station improvements for passengers. The primary objective of the programme is to make noticeable and lasting improvement to the environment at selected stations. The programme is being developed through local delivery groups which are required to invest NSIP funding in the most cost effective way.

Within the RUS area the stations that have currently been identified for NSIP funding in tranche one are presented in **Table 4.1**. The second of the two tranches is currently being finalised with industry consultation.

Table 4.1 – tranche one National Stations Improvement Programme stations		
2011	2012	2013
Tamworth	Carlisle	Runcorn
Chester	Preston	Wigan North Western
	Milton Keynes Central	Hemel Hempstead
	Berkhamsted	
	Watford Junction	

Access for All

The Access for All programme is a 10-year initiative launched by the DfT in 2006 to make more than 200 smaller stations across the country accessible for all. The programme aims to address the issues faced by mobility impaired passengers using railway stations. Central to the strategy is the commitment of £35 million nationally every year to 2015 to help enable the provision of an accessible route to and between platforms at priority stations. This generally involves the provision of lifts or ramps, as well as associated works, and refurbishment along the defined route. The stations currently included within the West Coast Main Line RUS area are shown in **Table 4.2**.

Table 4.2 – Access For All Programme stations		
2011	2012	2013
Cheadle Hulme	Wembley Central	Berkhamsted
		Carlisle
		Hemel Hempstead
		Leighton Buzzard

Network Rail is actively promoting improvements at stations with its 'Action Stations' initiative and the ten point plan for what is believed should guide the shape of stations for the next twenty years.

Making the whole travel journey experience more pleasurable is important for the customer with such initiatives as: better interchange facilities at stations, improved disabled facilities, larger car parking facilities and provision of better customer and ticket information.

Safety

The health and safety of all staff, passengers, colleagues and partners is at the forefront of all activities on the railways. Opportunities to improve safety are always encouraged. The number one safety risk on the railway is incidents at level crossings. Work continues to review safety at footpath level crossings and user worked crossings, and there is a National User Worked Crossing closure programme currently underway working to reduce and eliminate crossing risks.

Strategic Freight Network

In July 2007 the Government published its White Paper 'Delivering a Sustainable Railway' which outlined its plans for the growth and development of the railway in the context of a long-term strategy for the next 30 years. This White Paper presented a proposal to develop a Strategic Freight Network (SFN), which is envisaged as a network of core and diversionary routes which are designed to enable the efficient operation of more and longer freight trains and resolve conflicts between freight and passenger services. This reflects support for further growth of rail freight as a sustainable distribution system.

£200 million has been allocated nationally for the development of the SFN during CP4. This funding supplements those schemes already identified for funding through the Productivity Transport Innovation Fund enhancements scheme announced by DfT in October 2007. These schemes are:

- **Felixstowe to Nuneaton loading gauge enhancement (via Peterborough):** loading gauge improvements to provide an alternative W10 gauge route (enabling the movement of 9ft 6in containers on standard deck flat wagons) from the Port of Felixstowe to the Midlands, avoiding the busy routes via London. Work started along the route in July 2009 and was successfully completed in April 2011.
- **Southampton to West Coast loading gauge enhancement:** a scheme to construct a W10 gauge cleared route from Southampton to the WCML via Basingstoke, Reading, Didcot Parkway and Leamington Spa. Gauge clearance was completed in March 2011
- **Nuneaton North Chord:** This scheme is constructing a mile of new railway linking the Arley Lines at Nuneaton to the WCML. The new single line chord will create a grade separated route so as to allow trains using the existing flyover from Nuneaton South Junction to directly access the WCML on the slow line for flows going northwards. This allows freight trains to cross the WCML without disrupting the four main running lines. This will particularly benefit the Felixstowe to Manchester/Scotland freight services. The Transport and Works Act was granted by the Secretary of State in July 2010 and construction work commenced in April 2011. Completion is scheduled for Summer 2012.

The SFN funding allows for additional gauge clearance and capacity improvements across the network, to meet industry growth forecasts and prevent this additional freight traffic being forced onto the congested road network. Additionally the following SFN schemes will have an impact on the services to/from the West Midlands and Chilterns RUS area:

- improved capacity between Ipswich and Peterborough on the Felixstowe to Nuneaton route
- Water Orton to Yorkshire loading gauge enhancement
- other infill gauge and infrastructure improvements across the network.

The SFN includes a specific fund for infill gauge schemes to progress towards the SFN vision of extensive W12 gauge clearance. The freight industry has expressed an aspiration for W12 gauge clearance for sections of the network which could be used to transport short sea traffic. As a result, the Freight RUS set a policy to clear sections of a route to W12 when a structure is being rebuilt.

The SFN also identifies preferred options to meet forecast growth in freight volume. A funding provision of £5 million is included for studies to develop identified schemes for delivery in CP5 (between 2014 and 2019). A shortlist of potential schemes, including possible further capacity enhancements between Southampton and the WCML, has been agreed by the SFN Steering Group, and the initial studies are currently underway.

Train lengthening opportunities are also being assessed through the SFN, with the Southampton to the West Midlands route as a candidate scheme currently being developed, permitting growth without increasing capacity utilisation. In order to facilitate this, infrastructure changes may be necessary.

Network Availability

The ORR has allocated £160 million nationally to assist in the development of Network Availability. The programme will increase current levels of network availability helping keep passengers on trains rather than rail replacement buses during engineering works. This is part of the wider aim to develop a railway that reduces disruption to customers (passengers and freight) and better meets their needs, whilst delivering efficient and effective maintenance, renewals and enhancements.

The funding for Network Availability will be spent on both infrastructure enhancements to facilitate the increase in rail operations such as crossovers and bi-directional signalling, as well as changing Network Rail's working methods. It is anticipated that all operators within the RUS area will benefit from the ongoing introduction of national pilot initiatives which focus on new methods of working and new technology.

Examples of Schemes

Bushey station – authorised scheme

One of the initiatives taking place, which will deliver Network Availability benefits in the West Coast Main Line RUS area is the proposal to reinstate the Down Fast Line platform at Bushey station (just south of Watford Junction). This will allow northbound trains to call at the station when the slow lines are blocked and provide a better service for customers as they will not have to travel northwards to Watford Junction to return southwards to alight at Bushey. This scheme is due for completion by late 2011.

Enhancing renewals – potential scheme

Schemes have been identified along the WCML where point end renewals can be enhanced by reconfiguring junction layout both in terms of asset type and spatially to enable a reduced maintenance regime to be implemented. The revised maintenance regime will be shorter and more efficient.

Other potential schemes include:

- freight diversionary route provision
- gauge enhancement works
- platform reinstatements
- closed circuit television monitoring equipment of overhead line electrification equipment.

The need to increase service provision at weekends is recognised and efforts to review engineering practices and diversionary route capability constraints have formed a key aspect of development. Network Rail measures Network Availability using the new possession disruption indices which were developed by the ORR for CP4. The metrics are highly sensitive to the location, number and duration of engineering possessions, and have an increased focus on understanding and reducing the level of engineering access that is used.

The track renewals strategy within the RUS area will deliver a long-term improvement to Network Availability, and successful pilot studies for midweek night renewals are being introduced to those parts of the network where this aligns with operators' requirements. The overall Network Availability strategy pivots around a number of national initiatives such as faster isolations, changes to working practices, and a modular approach to infrastructure renewals that will enable most renewals to be undertaken within a single line possession of no more than eight hours. There is now also a reasonably strong case to use single line working on a number of routes on the network, subject to robust planning.

Joint Performance Improvement Plans

There are various initiatives taking place within the railway industry to improve performance and Network Availability. There are Joint Performance Improvement Plans in place with various train operators which encourages working in partnership. Specific work on the WCML includes:

- improvement to Anglo Scottish service performance
- right time railway at Manchester Piccadilly initiative
- continuation of delay containment measures such as improved asset reliability, reduced response times to incidents and greater ability to rectify failures more quickly
- completion of delivery plan improvements – numerous small schemes that help to deliver performance benefits
- enhanced overhead line inspection regimes – substantial investment in improved inspection, monitoring and asset improvement works
- axle counter reliability improvements – modification and process improvements to key signalling equipment
- risk mitigation plans – various mitigation measures introduced to reduce performance risks
- various working groups to understand issues at particular locations.

The overall aim is to deliver the best possible performance to customers and stakeholders, and to deliver the requirements of Network Rail's CP4 Delivery Plan.

4.2 Other committed enhancement schemes

The following other committed enhancements within the West Coast Main Line RUS area, have also been taken into consideration during the appraisal work.

Resignalling programme

A signalling renewals programme is planned for parts of the West Coast Main Line RUS area and the RUS considers the renewed network as the baseline infrastructure. **Table 4.3** shows the current proposals for the resignalling schemes within the RUS area. As part of their development, the projects are assessing any possible enhancements that could be provided as part of the renewal schemes.

Table 4.3 – CP4 resignalling programme

Location	Planned completion date
Northampton re-control	2012
Watford area	2014
Crewe, Carlisle, Warrington and Preston signal boxes – life extension works	2013

London Euston

In addition to the platform alteration work mentioned earlier, there will be work undertaken on the platform concourse. A third escalator will be installed between the national rail station and the entry to the London Underground station. This will help to reduce the overcrowding around the underground station entrance, particularly during peak times. The work is planned to be completed by December 2011.

Wembley Central

At Wembley Central station the two slow line platforms (Platforms 5 and 6) are being extended to provide additional capacity so that eight-car length trains can stop at the station. Currently only four-car length trains can stop. This will assist in allowing longer trains to run on event days at Wembley Stadium to help with crowd dispersal.

4.3 Uncommitted schemes

This section provides information on uncommitted schemes which, if implemented, would have a significant impact within the RUS area. The RUS also recognises those renewal and enhancement projects that are in the early stages of development and therefore classified as uncommitted. These schemes have not been included within the baseline. The RUS does not assume that these projects will go ahead, but where an output from an uncommitted scheme may deliver a resolution to an identified gap, the RUS may recommend the same intervention if it proves to be the optimum way forward from the optioneering process.

High speed line

Following the 2008 Network Rail study which concluded that a new high speed line to the West Midlands and beyond was the most effective way to provide capacity for an overcrowded and full future WCML, the Government formed High Speed Two (HS2) Limited to continue to consider the case for high speed rail services to/from London.

The company has now reported a preference for a Y-shaped network from London to the West Midlands before diverging with a route to Manchester and a second route travelling through the East Midlands and on to Leeds. An updated report was issued in December 2010 with a revised route as far as Birmingham announced.

The Government is supportive of the proposed new high speed network strategy and launched extensive public consultation on the scheme between London and Birmingham in early 2011. The consultation is due to conclude on 29 July 2011.

Although not yet a committed scheme in terms of identified funding, a new high speed line is Government policy and the RUS is cognisant of the implications that this policy would have for the route.

Subject to the result of the public consultation exercise, the first stage of the proposed high speed line between London and the West Midlands would be delivered in 2026.

The Northern Hub

There are proposals for significant infrastructure investment in the Manchester area which will improve service frequencies and connectivity across the whole of the north of England.

The first phase of the Northern Hub, the Ordsall Chord and associated infrastructure, has now been funded by Government and is now a committed scheme. Further details can be found on the Network Rail website at **www.networkrail.co.uk**.

East-West Rail

The East-West Rail consortium wishes to reintroduce passenger services from Oxford and Aylesbury to Bletchley and Milton Keynes. The primary objective of this initiative is to improve east-west connectivity between Oxford and Cambridge. The purpose of the reopened railway is to provide a local transport link supporting growth and development. It is seen as a means of easing traffic congestion problems in Oxford, Bletchley and Milton Keynes.

It could be used as a freight route for access to/from Daventry and the south coast and used as a diversionary route during engineering works or other blockades between Oxford and Coventry/Nuneaton. Services could continue eastwards on the Bletchley to Bedford line and onwards towards Peterborough and East Anglia, and westwards linking with Reading. This is seen as a long-term strategic route, supporting inter-regional passenger services and creating an alternative freight route between the south of England and the Midlands, the north, and Scotland. The consortium is planning a CP5 HLOS submission bid to the DfT.

Coventry to Nuneaton rail upgrade

There are plans to enhance the transport links between Nuneaton, Bedworth and Coventry. This line runs through an area of proposed major growth in the West Midlands and there are a number of potential locations along the route that could see significant housing growth. This has implications particularly at the Nuneaton end of the line with Platforms 1 and 2 at Nuneaton already well utilised for both passenger and freight services. The scheme was accepted in to the DfT's Development Pool in February 2011, with the promoters best and final funding bids to be submitted by September 2011. A final decision on funding will be made by the end of 2011.

Resignalling projects

The resignalling projects planned during CP5 are shown in **Table 4.4**. As part of the development process of these schemes, consideration will be given to possible enhancements, that could be delivered as part of the renewals projects, subject to business case and availability of funding.

Table 4.4 – CP5 Resignalling projects

Location	Date of scheduled renewal
Stafford area	2015
Macclesfield area	2016
Allerton and Speke	2016
Carlisle area	2019
Motherwell area	2019

Rail freight terminals

Major expansion of Daventry International Rail Freight Terminal (in phases) to provide more storage and distribution facilities and rail infrastructure is proposed. There are numerous other rail freight terminal expansions planned outside of the RUS area to improve freight capacity, which will have an effect on the WCML route. For example new intermodal freight terminals are proposed at Stretton (between Wolverhampton and Stafford) and Parkside (Newton-le-Willows) which could result in a significant flow of freight traffic into the West Midlands area along the WCML from either direction.

There is a proposal for a new multi-modal freight terminal at Port Salford which gained planning permission in 2009. The site will be connected to the Manchester to Liverpool railway line which joins the WCML at Newton-le-Willows enabling freight services to access the terminal. It will be the only inland water served distribution park in the United Kingdom.

Ports expansion

There are planned expansions at various ports throughout the country which will have an effect on the WCML. These include developments at Avonmouth, Liverpool, Felixstowe, Bathside Bay, Thames Gateway and Southampton. This will have a significant effect on freight services, particularly intermodal growth.

Halton Curve

There are aspirations to reinstate passenger services on the Halton Curve. This curve links the WCML at Runcorn (Halton Junction) with the Warrington Bank Quay to Chester line at Frodsham. Reinstating the curve would allow new direct rail services to be introduced which would link Liverpool Lime Street and Runcorn to Chester. This would improve connectivity in the region and allow the possible extension of rail services to Wrexham and North Wales.

Ditton expansion

Expansion of the Ditton Freight interchange with the creation of new reception sidings linked into the major distribution site 3MG (Mersey Multimodal Gateway Logistics Park) at Ditton, will allow up to 16 trains per day to be accepted. Completion is planned for 2014.

St Albans Abbey line

Hertfordshire County Council and DfT are developing proposals to enable light rail operation on the six and a half mile St Albans Abbey line from Watford Junction to St Albans Abbey. The objective of these proposals is to increase the frequency of service on this Community Rail route.

Croxley rail link

This is a proposal to reopen the disused Croxley branch line in the Watford area in Hertfordshire, which will provide through Metropolitan line underground services between London and Watford Junction station via Croxley Green. This would provide direct access to the underground network and North West London for passengers on the WCML without the need to travel to London Euston. The scheme was accepted in to the DfT's Development Pool in February 2011, with the promoters best and final funding bids submitted by September 2011. A final decision on funding will be made by the end of 2011.

Station commercial project facility

Stations of any size on the route could bid for and benefit from a new £100million pound fund for station improvements, which has been developed by the DfT in partnership with Network Rail, the Association of Train Operating Companies (ATOC) and the ORR. This initiative is used to fund proposals for station improvements that reduce the public subsidy for rail by generating a financial return.

Depots and stabling

Nationally a strategy is being developed in order to accommodate additional vehicles as part of the Government's HLOS. This may affect depots across the RUS area which may need to be enhanced or have additional facilities provided.

It is recognised that the current capacity and facilities available at depots maintaining Class 390 trains needs improving to accommodate the increased train lengths involved. There is a current initiative to address this issue in readiness for the deployment of the new 106 Class 390 vehicles.

Other depot issues are also being considered as part of the Network RUS: Passenger Rolling Stock Depots Planning Guidance Document, to be published in 2011.

4.4 Future demand

The remainder of this chapter considers the likely short and medium-term changes in passenger and freight demand affecting the RUS area.

4.4.1 Passenger demand forecasts

This section outlines the methodology and results of the West Coast Main Line RUS passenger demand forecasting process. The forecasts run to 2024/25 and inform the analysis of service and infrastructure gaps on the rail network and the appraisal of options to address them.

Strategic context

The West Coast Main Line RUS commenced during a time of great uncertainty about the prospects for the key passengers markets on the WCML. The economy was still recovering from one of the most severe recessions[1] in recent history, the step-change December 2008 timetable was still in its infancy, and the legacy of a decade of regular weekend closures to deliver the WCML upgrade programme was still unclear.

Since then growth has been considerable:

- the underlying trend for growth in long distance travel has continued, albeit at a lower rate due to the recession, and the WCML upgrade programme is bearing fruit in terms of the number of people who choose to travel by rail
- the London-centric commuter markets, which stagnated as the London economy suffered during the banking crisis and subsequent recession, has returned to the long-term underlying growth trend
- regional interurban passenger numbers are continuing to grow as rail becomes an increasingly competitive mode of travel.

The WCML passenger market is therefore one with a stable underlying long-term growth trend, albeit some developing market sectors are growing at a much faster rate than this, whereas others experience vulnerabilities to short-term fluctuations in economic performance. The forecasting approach detailed below has been designed to account for these issues.

It should be emphasised that all the forecasts presented here are forecasts of 'background' or 'exogenous' growth, that is, growth due to factors external to the rail industry such as population, economic growth, fuel prices and road congestion. They do not include further growth that may be stimulated by improvements in the quality of service offered to passengers. This is particularly significant for long distance services and for shorter distance off-peak services, which face the strongest competition from other modes of transport.

Forecasting approach

The West Coast Main Line RUS covers the area between London Euston and Carstairs South Junction and considers travel both within as well as between the WCML and many regions across the UK. The geographical RUS process has already undertaken forecasts for most of these regions. The forecasts for the WCML have therefore been derived from recently published RUSs.

The forecast for short distance (less than 50 miles) passenger flows are taken from the relevant geographical RUSs, with the exception of flows contained completely within the WCML (for example passenger flows to or from London Euston). In this case, the forecasts are derived from Network Rail's New Lines Programme, Strategic Business Case report which was published in August 2009.

The forecast for all long distance passenger flows (over 50 miles) are based on the Network RUS: Scenarios and Long Distance Forecasts document. This is illustrated in **Figure 4.1**.

Short distance methodology

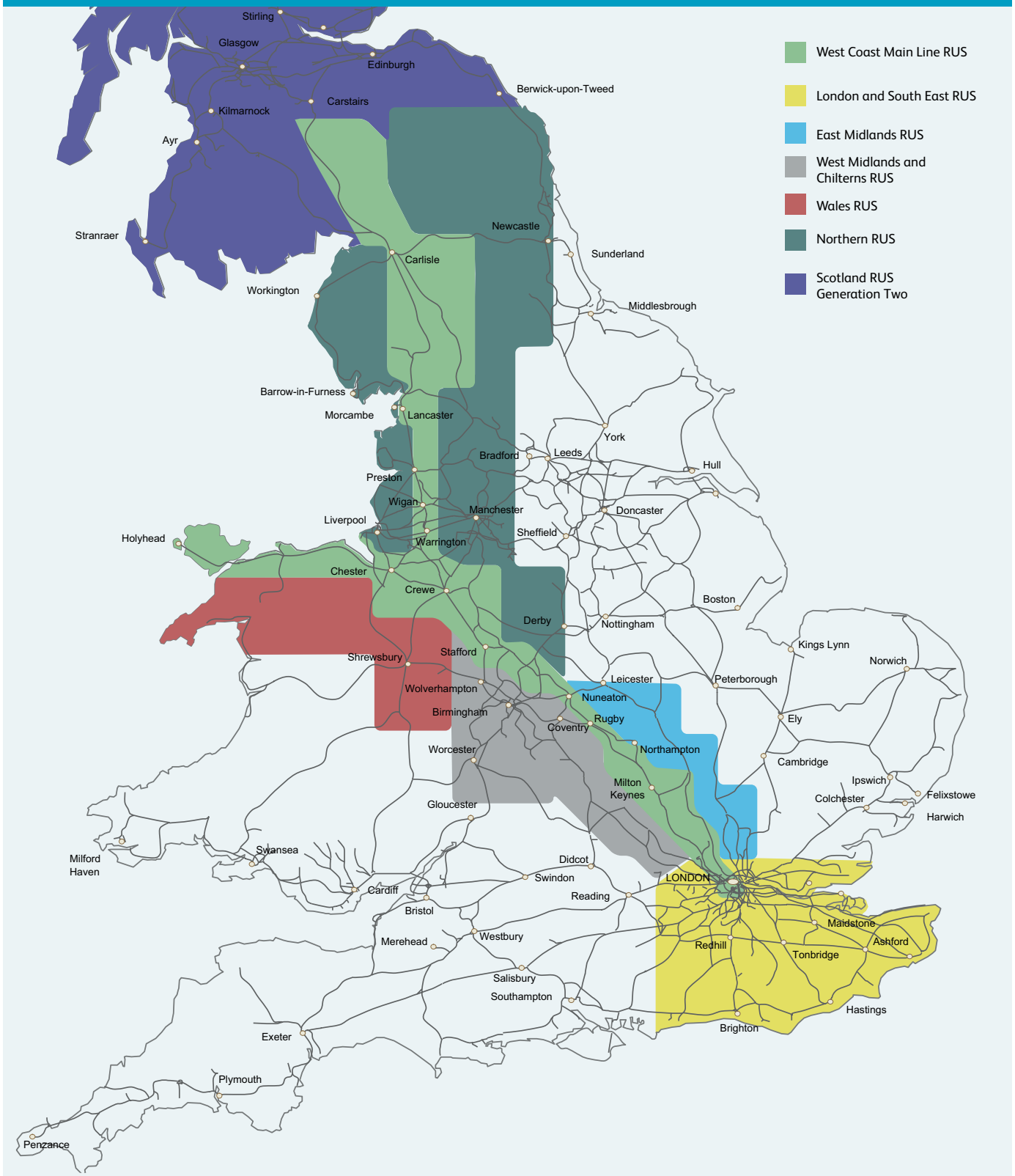
The forecasts for short distance passenger flows have been derived from recently published relevant documents as shown in **Figure 4.1**. These generally use the industry standard forecasting approach from the Passenger Demand Forecasting Handbook (PDFH).

PDFH uses an elasticity based approach to estimate how changes in demand drivers (such as the UK demographics, economic growth, and the characteristics of competing modes) will affect passenger demand. These forecasts have been produced using either widely available forecast models (such as Planet, Network Modelling Framework or London Transportation Studies(LTS)), or are bespoke models based on the principles from PDFH. The forecast in demand drivers have been sourced from either the Oxford Economics Forecast Update for Passenger Demand Forecasting Council (PDFC) Members or from TEMPRO (DfT's demographic forecasting data).

More details on the forecasting method for the New Lines Programme and other RUSs can be found at **www.networkrail.co.uk.**

1 The UK economy has seen Gross Domestic Product (GDP) contract for six consecutive quarters during 2008 and 2009, starting from the first quarter of 2008/09 (April – June 2008). The economy returned to growth in the third quarter of 2009/10 (October – December 2009).

Figure 4.1 – origins of the demand forecasts used in the West Coast Main Line RUS

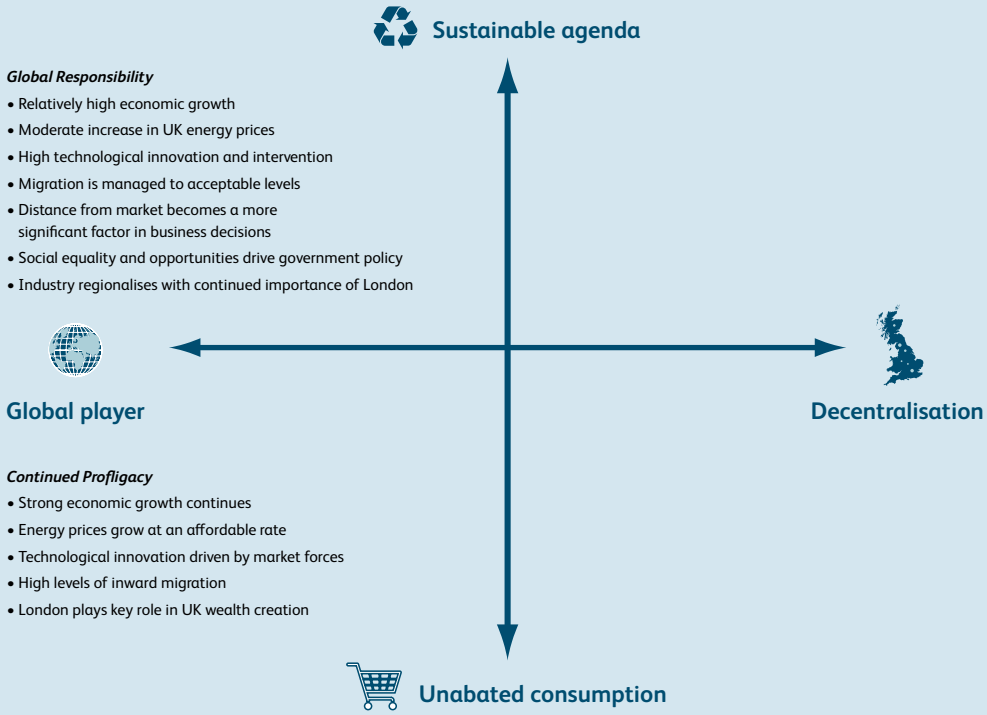


Long distance methodology

Demand forecasts on long distance passenger flows (over 50 miles) are based on the Network RUS: Scenarios and Long Distance Forecasts. This has been updated to include the impact of the December 2008 timetable change, as the base data predates this. A scenario based approach is used to understand how drivers of demand might change under alternative future positions. It also incorporates consideration of factors affecting long distance market size and market share. **Chapters 7** and **8** of the Network RUS: Scenarios and Long Distance Forecasts document describe the demand drivers and methodology in detail.

The demand drivers for the two chosen scenarios are outlined in **Figure 4.2**. These scenarios have been used to provide the alternative views of future passenger demand on the West Coast Main Line RUS as they represent the most likely outcomes[2], based on current understanding.

Figure 4.2 - Drivers of long distance demand by scenario



Passenger growth under the global responsibility scenario is generally higher for non-London long distance travel. This is driven by the assumption that regional centres will develop at a faster rate than the traditional London and the South East centres. Growth is further compounded by future government policies under this scenario, which encourage the use of public transport.

This trend is reversed under the continued profligacy scenario, which assumes a continued dominance of London in the UK economy, thus instigating high levels of growth to/from London. The assumptions in this scenario most closely reflect the pre-recession economic conditions and planning policies.

Growth by key passenger markets: London

The forecast growth in all day passenger demand for key markets to/from London Euston on the WCML is shown in **Figure 4.3**. The demand forecast for long distance flows range between 30 and 61 per cent on the WCML for the 15 years to 2024. The market for travel between London Euston and Manchester Piccadilly is expected to grow at the fastest rate, with passenger demand expected to increase by between 54 per cent and 61 per cent depending on the growth scenario. This is equivalent to an annual growth rate of 2.9 per cent and 3.2 per cent respectively. Factors that have been working in favour of rail, such as growing population, structural changes in employment markets and road congestion will continue to drive growth.

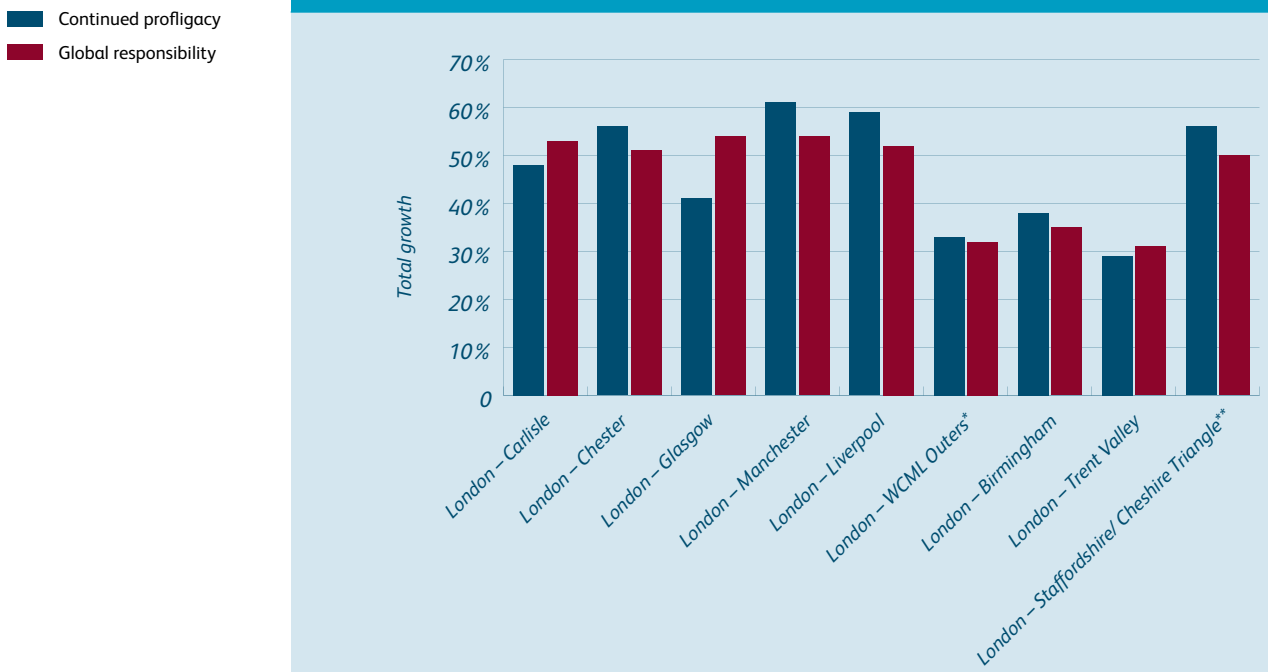
2 The continued profligacy and global responsibility scenarios assume higher economic growth in the UK driven by increasing globalisation of trade and efficiency gains

Policy changes are unlikely to significantly impact developed markets where rail already has a high market share. This suggests that background growth is predominantly likely to be driven by exogenous factors such as economic performance. This explains the lower growth forecasts between London and Birmingham (just over two per cent per annum). Where there is a lack of maturity in the market on the other hand, policy changes that encourage the use of public transport (such as the ones under the global responsibility scenario) will enable rail to significantly increase its market share.

The growth forecast therefore varies more markedly between the two scenarios for markets that are still developing and have a relatively low rail market share. The highest variance in passenger growth forecast from **Figure 4.3** is between London Euston and Glasgow Central , at 41 per cent under the continued profligacy scenario and 54 per cent under the global responsibility scenario. This is equivalent to an annual growth rate of 2.3 per cent and 2.9 per cent per annum respectively. This is mainly because drivers of demand under the global responsibility scenario encourage greater rail travel in a developing market and so result in higher growth forecasts.

Short distance demand into London Euston from the WCML outer stations is expected to grow at around 30 per cent over the next 15 years (averaging at 1.9 per cent per annum) as shown in **Figure 4.3**. This is predominantly driven by growth in London employment, which using the forecast from the draft London Plan October 2009 is expected to grow by approximately one per cent per annum for central London from 2007 to 2031. There is also significant growth expected in the Milton Keynes region as part of the Milton Keynes South Midlands sub-regional strategy, which increases the forecast for the London - 'WCML outers' zone.

Figure 4.3 - Forecast growth in rail passenger journeys on key London flows on the WCML between 2009/10 and 2024/25



* WCML Outers consist of Hemel Hempstead, Milton Keynes Central, Northampton and Rugby stations
** Staffordshire/Cheshire Triangle consists of Crewe, Hartford, Macclesfield, Stafford, Stoke-on-Trent and Uttoxeter stations.
Note, Trent Valley stations refer to Nuneaton, Atherstone, Polesworth, Tamworth, Lichfield Trent Valley and Rugeley Trent Valley stations

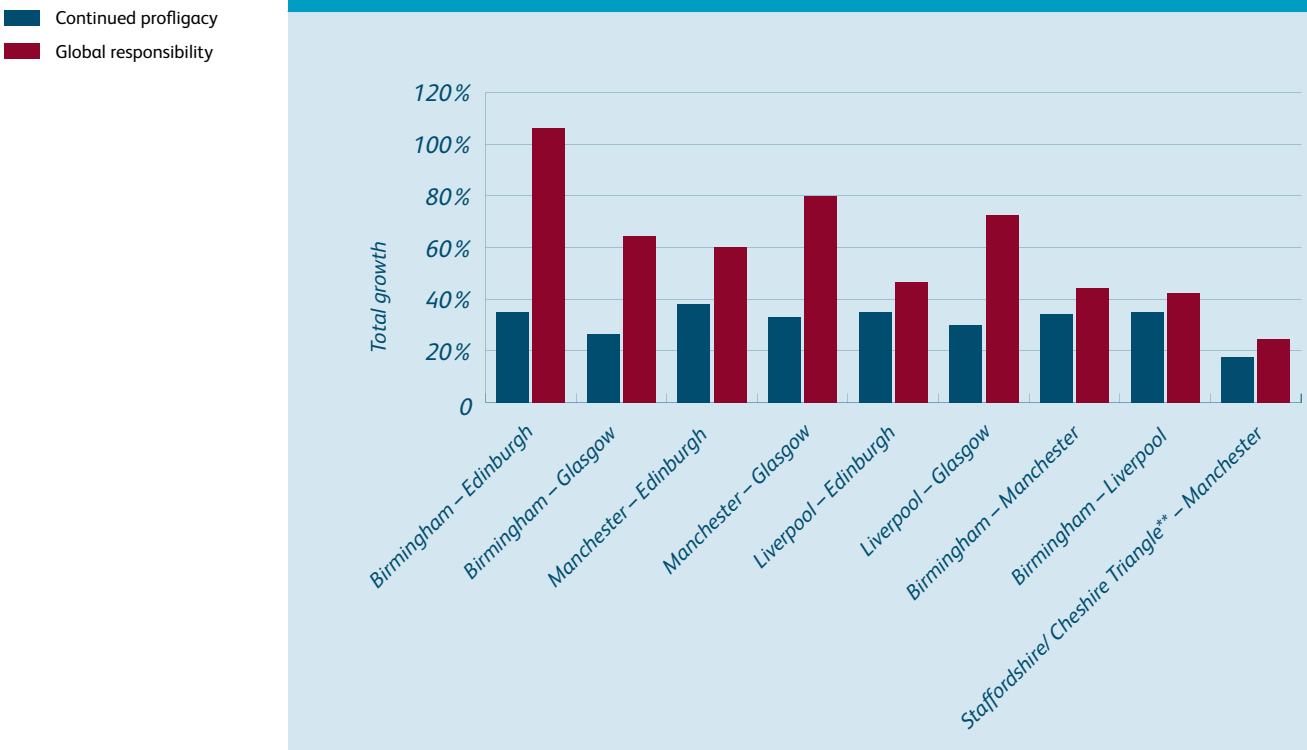
West Midlands and the North West

The forecast growth in all day passenger demand for key non-London markets between the WCML and the West Midlands and the North West is shown in **Figure 4.4**. All flows in **Figure 4.4** show that the growth forecast under the continued profligacy scenario is lower than the global responsibility scenario. This is because the latter scenario assumes greater regional importance in the future and so estimates higher demand for rail travel between regional centres.

As explained earlier in this section, the growth forecast varies more markedly between the two scenarios for markets that are still developing and have a relatively low rail market share. This is because where rail travel is highly competitive with other modes of transport, there is less opportunity to gain further market share through changes in policy. The developing rail market between Liverpool and Scotland is forecast to grow between 30 and 72 per cent to 2024 under the continued profligacy and global responsibility scenarios respectively. Passenger growth between Manchester and Scotland is slightly higher at 34 and 79 per cent respectively and rises substantially for travel between Birmingham and Scotland to 34 and 107 per cent respectively. This is equivalent to an annual growth rate of between 1.6 per cent and 2.1 per cent under the continued profligacy scenario, and between 2.7 per cent and 5.0 per cent under the global responsibility scenario.

The difference in demand for relatively developed markets on non-London flows between the two scenarios is less prominent. Growth in travel between Birmingham and Manchester and Birmingham and Liverpool is expected to average at 2.0 per cent per annum under the continued profligacy scenario and 2.5 percent per annum under the global responsibility scenario.

Figure 4.4 - forecast growth in rail passenger journeys on key non-London flows on the WCML between 2009/10 and 2024/25



Note, Staffordshire/ Cheshire Triangle consist of Crewe, Hartford, Macclesfield, Stafford, Stoke-on-Trent and Uttoxeter station

4.4.2 Future passenger train loadings

In order to understand whether there is sufficient capacity on the WCML to meet future demand, passenger loadings (as shown in **Chapter 3**) were grown to 2024 levels using the demand forecasts. As before, this analysis has been segregated by regions into London, West Midlands and the North West.

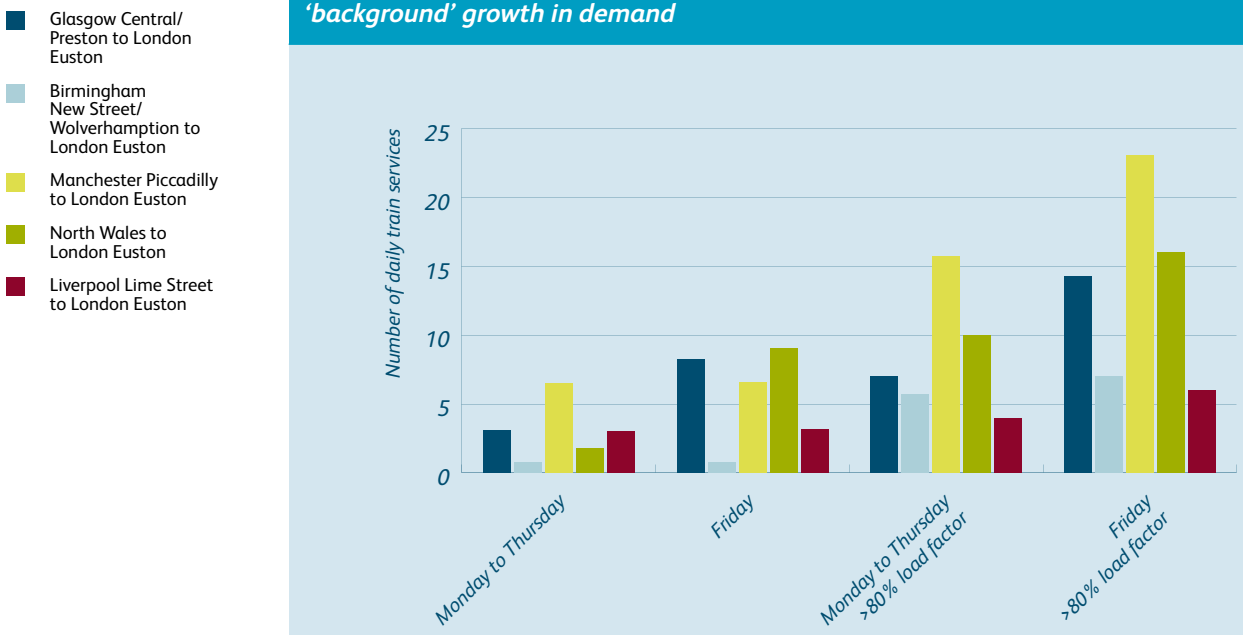
Forecast 2024 levels of crowding: London

In order to illustrate the effect of growth on loadings of LDHS services operating to or from London Euston, the train loadings from 2009/10 (presented in **Chapter 3**) were increased in line with predicted growth as described above. The resulting loadings are shown in **Figure 4.5**. These figures take into account the additional 106 Class 390 vehicles that have been procured and are expected to enter service in the near future; it has been assumed that they are used on the busiest services.

As in **Chapter 3**, two measures of crowding on LDHS services are shown: where the numbers of passengers carried exceed the number of seats, and where there are more than eight passengers carried for every 10 seats. As described in **Chapter 3**, the latter measure is significant as average loadings hide the day-to-day and seasonal variations in loadings; and because providing an effective service for passengers on flexible tickets requires average loadings to be kept below 100 per cent.

Trains where 100 per cent and 80 per cent load factors occur for less than 20 minutes in duration have been excluded. This is consistent with the DfT policy on standing.

Figure 4.5 - average number of 2024/2025 Long Distance High Speed services operating to/from London Euston with passengers standing, based on future capacity and 'background' growth in demand



Source: Virgin Trains average passenger count data, 2009/10 and Network Rail West Coast Main Line RUS passenger demand forecast
Note, 2024 future capacity includes optimisation of additional 106 Class 390 vehicles.

It can be seen that, even with capacity provided by the additional Class 390 vehicles, significantly more trains are expected to have standing passengers, or loadings in excess of 80 per cent, than in 2009/10.

Services on the corridor between London Euston and North Wales are currently provided by five-car Class 221 units. By 2024, some of these services are expected to carry standing passengers. In the southbound direction, passengers are expected to stand for only short periods of time (between Chester and Crewe). However, passengers are forecast to stand for longer than 20 minutes in the northbound direction. This is particularly true of services departing London Euston in the three-hour evening peak. The services provided between London Euston and Preston/Glasgow Central and London Euston and Manchester Piccadilly are expected to have the next highest number of standing passengers, or load factors greater than 80 per cent. These services are more likely to carry standing passengers for more than 20 minutes.

However, **Figure 4.5** does not give a fully representative picture of loadings in 2024. As noted previously, the growth forecasts used in the RUS only include growth due to external factors; they do not include growth that operators would expect to stimulate through future improvements to service quality. Also, this analysis does not take account of the fact that, in practice, passengers will be unwilling to stand for long distances; nor of the fact that, in practice, operators would be likely to change pricing and/or restrictions in response to such levels of demand. Increasing pressure on demand would be likely to result not so much in passengers standing (as might be more the case on commuter services), but in increased fares, wider restrictions on travel, and fewer passengers travelling.

Crowding is forecast on short distance services to/from London Euston and to/from the West London Line by 2024. As described in **Chapter 3**, these services are currently operated by London Midland, LOROL and Southern.

Passengers commuting on London Midland services from stations between Northampton and London Euston inclusive are expected to experience severe levels of crowding especially during the commuter peaks at London Euston. This is illustrated in **Figure 4.6**.

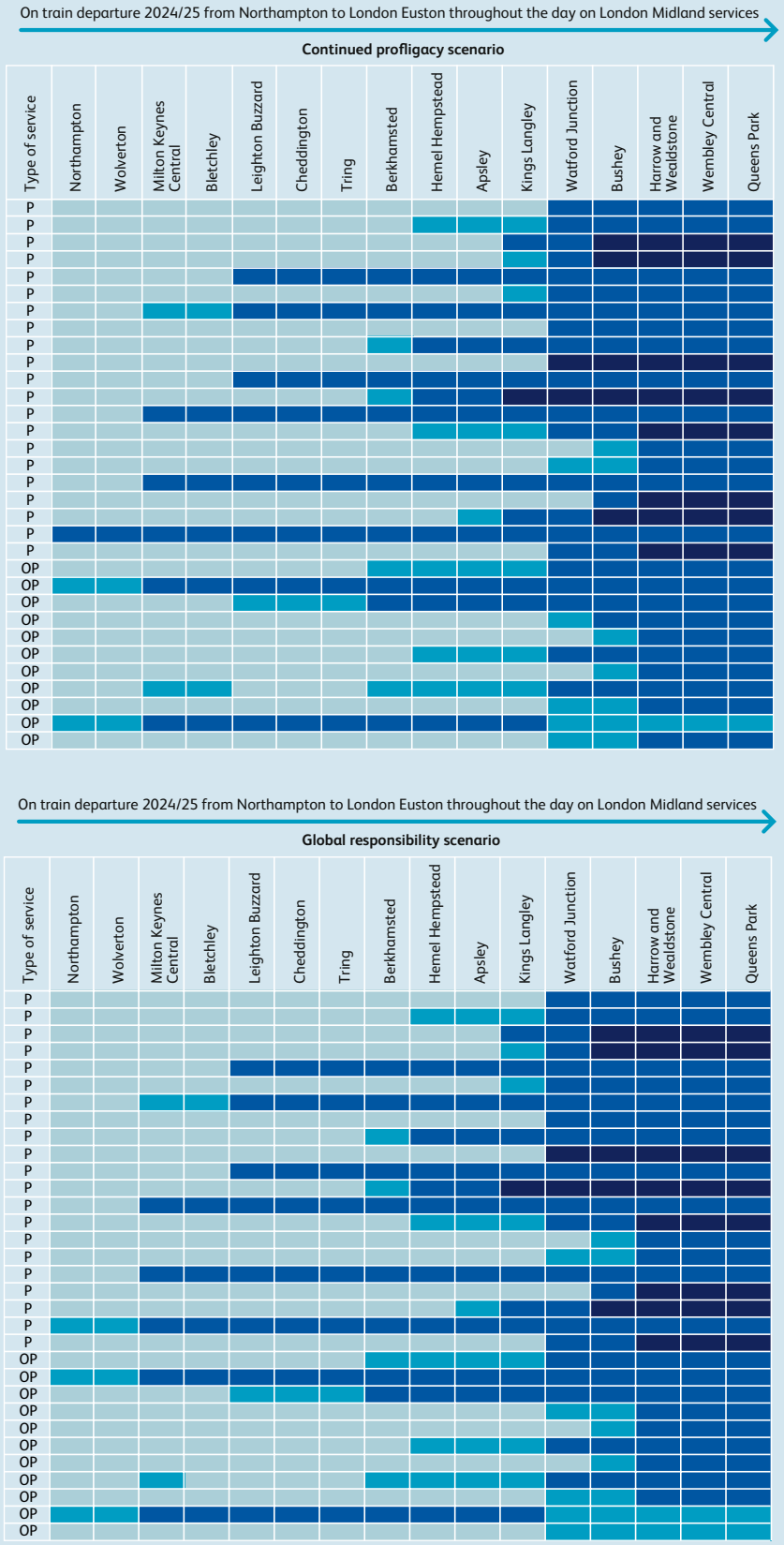
Around 85 per cent of all peak services (07:00-09:59 arrivals and 16:00-18:59 departures) on this corridor are expected to have passengers exceeding seated capacity, from which over half are expected to carry passengers above the total train capacity (145 passengers per 100 seats).

By 2024, crowding is also expected to spread into the off-peaks, with 15 per cent of services during this time expected to carry standing passengers.

Crowding on the remaining corridors is less prevalent, except for the morning and evening peak services operating into and out of Birmingham New Street. Demand for commuting into the West Midlands conurbation is considered in detail in the West Midlands and Chilterns RUS published in May 2011 and available at **www.networkrail.co.uk.**

Figure 4.6 - forecast load factors on London Midland services from stations along the Northampton to London Euston corridor in each direction throughout the day in 2024

- Load factor <80 %
- Load factor 80 – 100 %
- Load factor 100 – 145 % (seated + standing capacity)
- Load factor >145 % (seated + standing capacity)
- **P** Peak services (25 morning peak arrivals and 24 evening peak departures from Lodon Euston)
- **OP** Off-peak (182 services in total)



Source: London Midland average passenger count data, 2009/10 and West Coast Main Line RUS passenger demand forecast
Note, only services with standing passengers at some point on the route have been presented. Not all services call at every station shown on the route.

Figure 4.6 continued - forecast load factors on London Midland services from stations along the Northampton to London Euston corridor in each direction throughout the day in 2024

Load factor <80 %

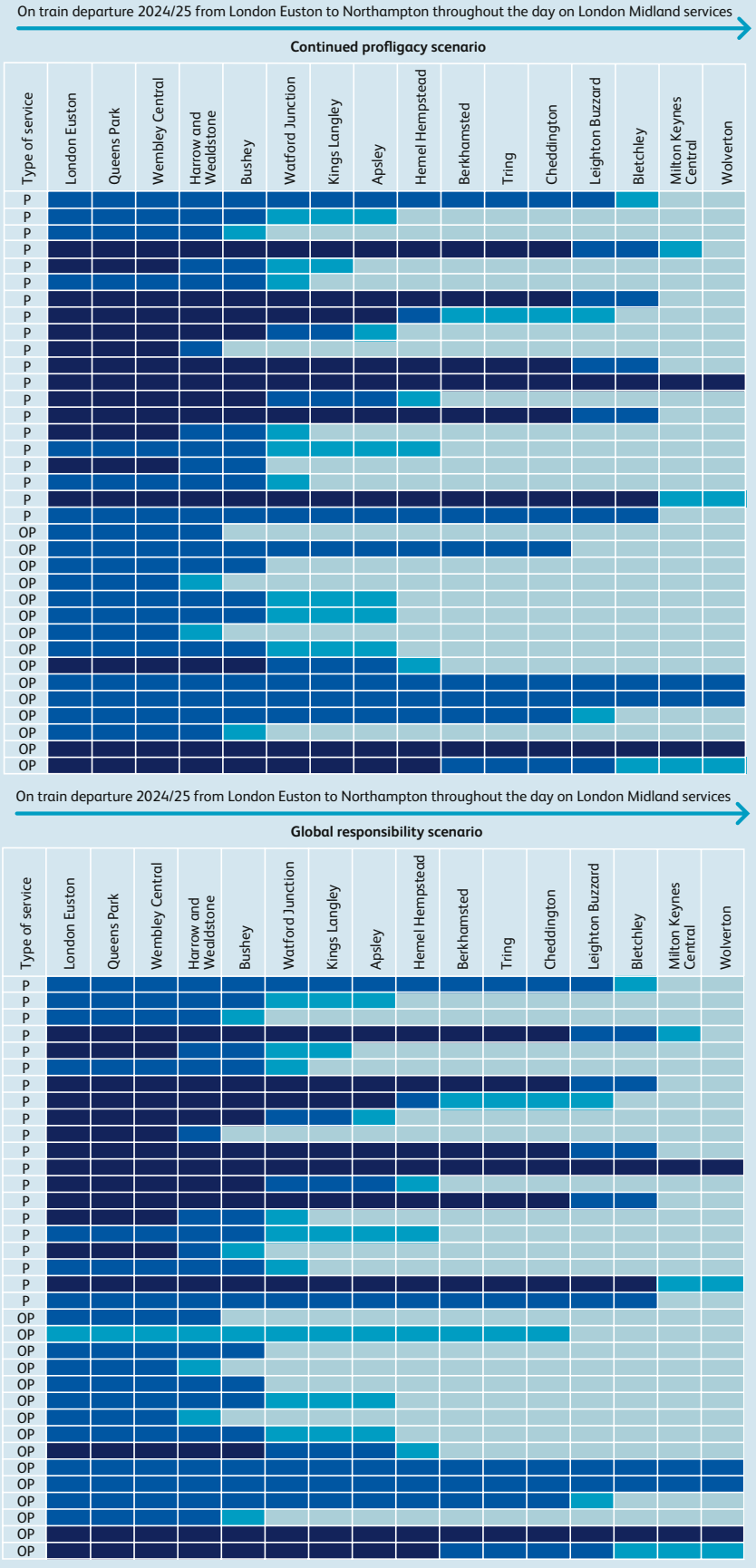
Load factor 80 – 100 %

Load factor 100 – 145 % (seated + standing capacity)

Load factor >145 % (seated + standing capacity)

P Peak services (25 morning peak arrivals and 24 evening peak departures from Lodon Euston)

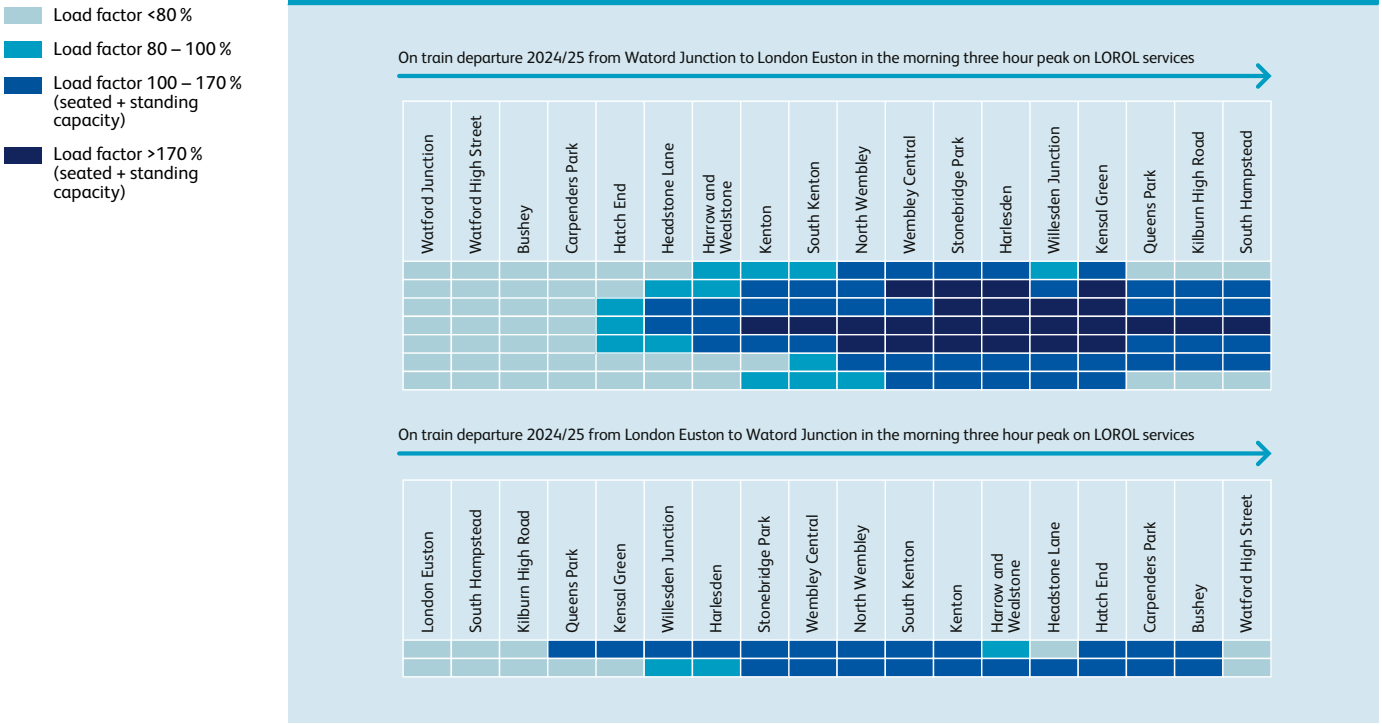
OP Off-peak (182 services in total)



Source: London Midland average passenger count data, 2009/10 and West Coast Main Line RUS passenger demand forecast
Note, only services with standing passengers at some point on the route have been presented. Not all services call at every station shown on the route.

The recent introduction of four-car Class 378 units on LOROL services, with large amounts of standing space (similar layout to London Underground rolling stock), significantly increased the total capacity on this corridor. **Figure 4.7** shows that four southbound services in the morning three hour peak are expected to have passenger loadings of greater that 170 per cent by 2024, albeit these passengers are expected to stand for less that 20 minutes given the nature of the service (high number of boarding and alighting passengers over short distances).

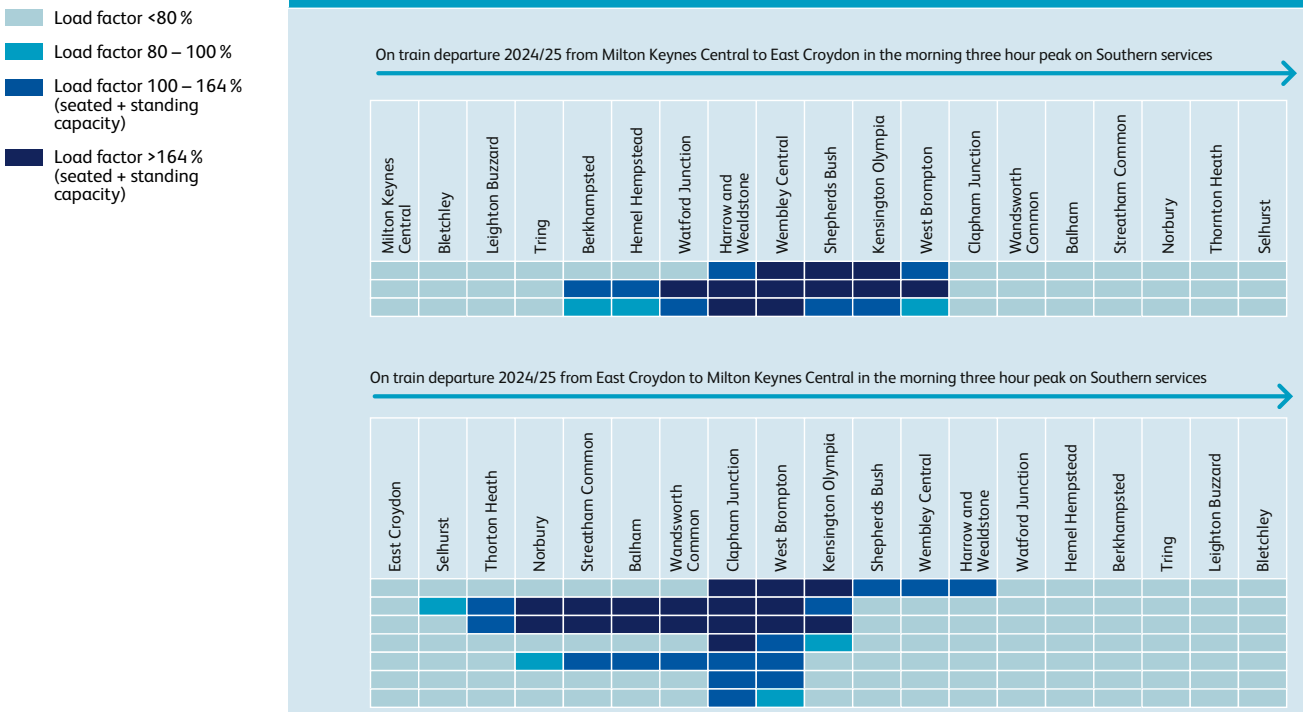
Figure 4.7 - forecast load factors on LOROL services between Watford Junction and London Euston during the three-hour morning peak in 2024



Source: LOROL average passenger count data, 2009/10 and West Coast Main Line RUS passenger demand forecast
Note, only services with passengers standing at some point on the route have been presented.

The expected levels of crowding on services provided on the WCML by Southern is shown in **Figure 4.8**. It shows that all services operating in the morning three-hour peak are expected to get severely crowded by 2024, with services in the high-peak hour reaching loadings of greater than 200 per cent. This suggests that many passengers will be potentially unable to board the train.

Figure 4.8 - forecast load factors on trains departing from stations along the Milton Keynes Central to East Croydon corridor in each direction during the morning three-hour peak in 2024



Source: Southern average passenger count data, 2009/10 and West Coast Main Line RUS passenger demand forecast
Note, only services with passengers standing at some point on the route have been presented. Not all services call at every station shown on the route.

In summary:

- an increasing number of LDHS services are expected to be at or near capacity, despite the increase in capacity following the introduction of 106 additional vehicles into the fleet
- services currently provided by London Midland between Northampton, London Euston and stations in between, are expected to become severely overcrowded, with 85 per cent of peak services expected to carry standing passengers. Many of these passengers are likely to be standing for more than 20 minutes and in excess of the maximum theoretical capacity of the vehicles
- extremely busy suburban commuter services operate on the DC lines, albeit within the tolerance of the new rolling stock
- severely crowded peak services operate between the WCML and the West London Line, with many passengers potentially unable to board the train.

Forecast 2024 levels of crowding: West Midlands

The expected average annual capacity and demand between Birmingham and Scotland is shown in **Figure 4.9**. Based on average weekday count data, it suggests that there is sufficient capacity on the route to cater for future demand over the day as a whole. However, average future demand closely matches available capacity between Warrington Bank Quay and Scotland. This suggests that it is highly probable that many individual trains during the day will carry passengers over seated capacity.

Figure 4.9 - future annual passenger demand and capacity between Birmingham New Street and Glasgow Central/Edinburgh Waverley in the northbound direction

Source: 2009/10 LENNON ticket sales database and West Coast Main Line RUS forecast
Note, 58 per cent of journeys departing Carlisle are towards Edinburgh Waverley, with the remaining 42 per cent towards Glasgow Central. Demand in the southbound direction is expected to be similar to that in the northbound direction. Data from LENNON ticket sales database aggregates the demand data for Oxenholme Lake District and Penrith stations.

Forecast 2024 levels of crowding: North West

The expected average annual capacity and demand for the Manchester Airport to Glasgow Central/ Edinburgh Waverley services in 2024 is shown in **Figure 4.10**. Based on average weekday count data, it suggests that there is sufficient capacity on the route to cater for demand in 2024 once the three-car Class 185s have been replaced by four-car electric multiple units (EMUs). The RUS assumes that this results in an increase in seated capacity of between 20 and 30 per cent per train.

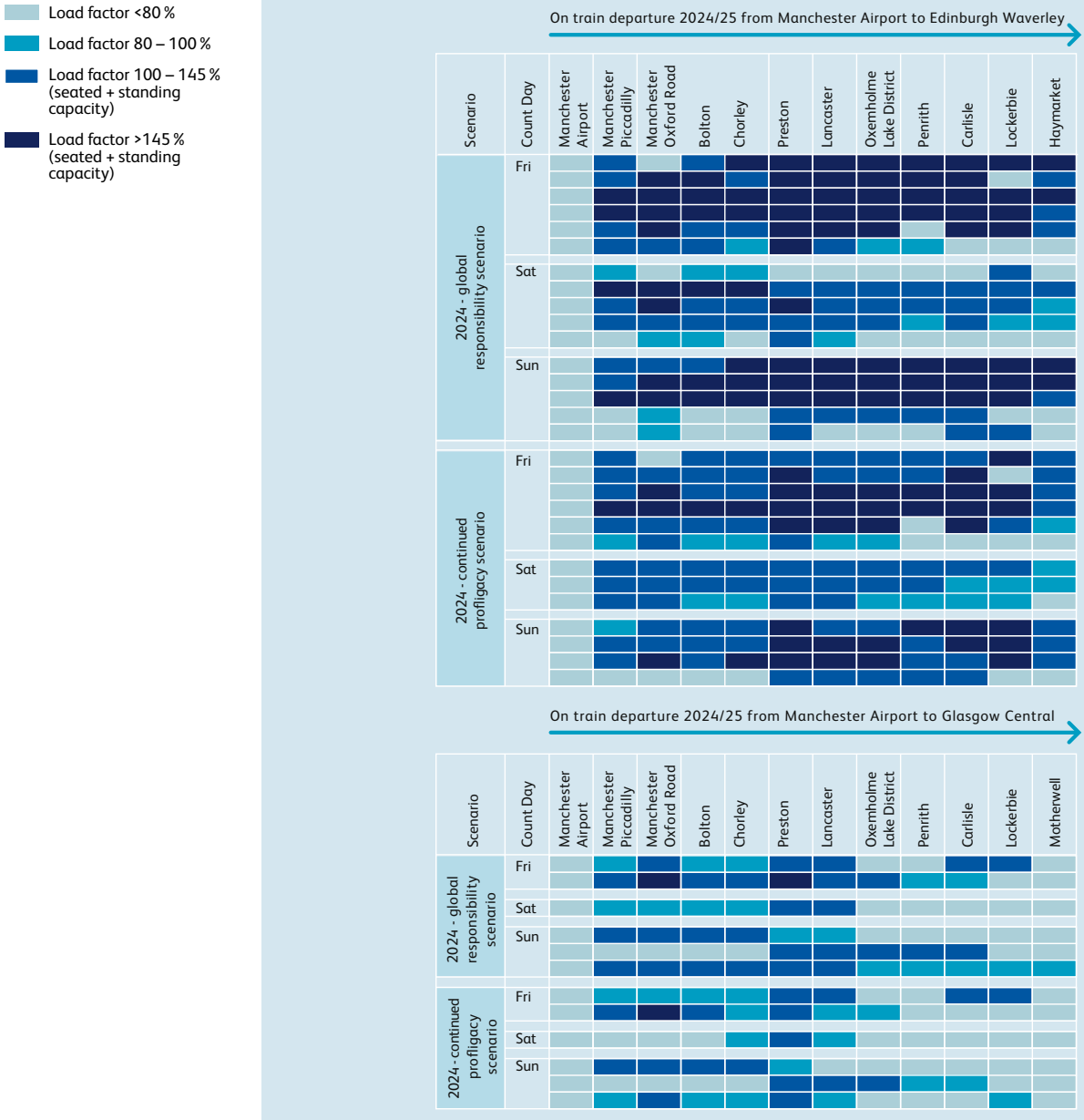
Crowding will however become more severe for services operated in the peaks to/from Manchester Piccadilly, with passengers standing from as far as Preston. This is considered in more detail by the Northern RUS published in May 2011.

Figure 4.10 - Current and future annual passenger demand and capacity between Manchester Airport and Glasgow Central/Edinburgh Waverley in the northbound direction

Source: 2009/10 LENNON ticket sales database and West Coast Main Line RUS forecast
Note, 72 per cent of journeys departing Carlisle are towards Edinburgh Waverley, with the remaining 28 per cent towards Glasgow Central. Demand in the southbound direction is expected to be similar to that in the northbound direction. Data from LENNON ticket sales database aggregates the demand data for Oxenholme Lake District and Penrith stations.

Analysis of count data on Fridays and weekends for these services suggests that significant additional capacity would be required to accommodate growth between Manchester Airport and Edinburgh Waverley, as shown in **Figure 4.11**. These services will need to be operated by six-car EMUs under the continued profligacy scenario and as much as eight-car EMUs under the global responsibility scenario in order to bring load factors back in line with the total train capacity and/or to avoid passengers standing for longer than 20 minutes.

Figure 4.11 - 2024/25 load factors on services from Manchester Airport to Edinburgh Waverley on Fridays and weekends



Source: First TransPennine Express average passenger count data, 2009/10 and West Coast Main Line RUS forecast
Note, only services with load factors higher than 100 per cent at some point on the route have been presented.
Not all services call at every station shown on the route. One service per day from Manchester Airport to Glasgow Central calls at Motherwell.

The analysis regarding future loading on the WCML has found various gaps between future capacity and demand on the route. This has been used to identify options, which are reported in **Chapter 5**.

4.4.3 Forecast freight demand

Freight demand forecasts were developed nationally to 2019 and 2030 for the SFN. The forecasts were developed using the Great Britain Freight Model to assess the aggregate level of demand. The Great Britain Freight Model is designed to forecast freight moved within Great Britain, including freight to/from the ports and the Channel Tunnel. It covers different modes such as rail and road and produces a matrix of all forecast freight flows. This provides a 'top down' view based on economic modelling.

As with the method adopted in the Freight RUS, this perspective was complemented by a 'bottom up' view of the markets provided by a review of the forecasts by the industry. The forecast change in demand by commodity type is shown in **Table 4.5**

Table 4.5 – forecast changes in freight demand by commodity to 2030

	Million tonnes			Billion tonne km		
	2006	2030	Average annual growth	2006	2030	Average annual growth
Solid fuels	51	41	-1 %	8	5	-2 %
Construction	21	32	2 %	4	5	1 %
Metals and ore	18	19	0 %	3	3	0 %
Ports non bulk	12	50	6 %	4	17	6 %
Domestic non bulk	2	25	11 %	1	12	11 %
Other	12	12	1 %	3	3	1 %
Total	116	179	2 %	23	45	3 %

The changes in origin to destination freight demand were mapped across the network. **Figures 4.12** and **4.13** show the forecast level of freight paths (the number of timetable slots available for freight services) per day by line of route required for both 2019 and 2030. As a sensitivity, an exercise was undertaken within the RUS freight sub group, using commodity tonnage forecasts to validate the numbers of paths required. This exercise supported the forecasts.

The majority of the increase in demand is forecast to occur in the non-bulk sector. Deep sea container growth is forecast to continue over the period. The completion of the W10 gauge clearance schemes between Southampton and the WCML, and the Haven Ports to the East Coast Main Line (ECML) in CP4 will further assist the competitive nature of rail in this market. The route from Felixstowe to Peterborough being cleared to W10, allows access to the ECML. Since publication of the Draft for Consultation, W10 gauge clearance of the ECML between Doncaster and Carstairs via Newcastle and the Edinburgh South Suburban line is now funded. This will provide an alternative route for intermodal services between the East Coast ports and Scotland. The domestic non bulk sector is forecast to grow most rapidly, but this is from a low base. This will mean a significant increase in traffic to freight-handling facilities.

It is likely that much of the growth for freight will be routed from the south along the WCML and to terminals, including Daventry. The bulk sector is forecast to grow, albeit at a slower rate than the non-bulk sector. The demand for coal traffic is in line with the future UK energy policy and carbon emission levels affecting the demand for coal in the medium term.

The RUS notes that the freight forecasts also assume freight services will be operating six days per week and include more efficient, longer trains of up to 640-metre length, which will convey more volume per train and so reduce the demand for train timetable slots. It should be noted that the aspirations of freight operators is to eventually run trains at 775-metre length services, while recognising that infrastructure interventions will be necessary during future Control Periods.

Figure 4.12 - forecast number of daily freight paths in each direction in 2019

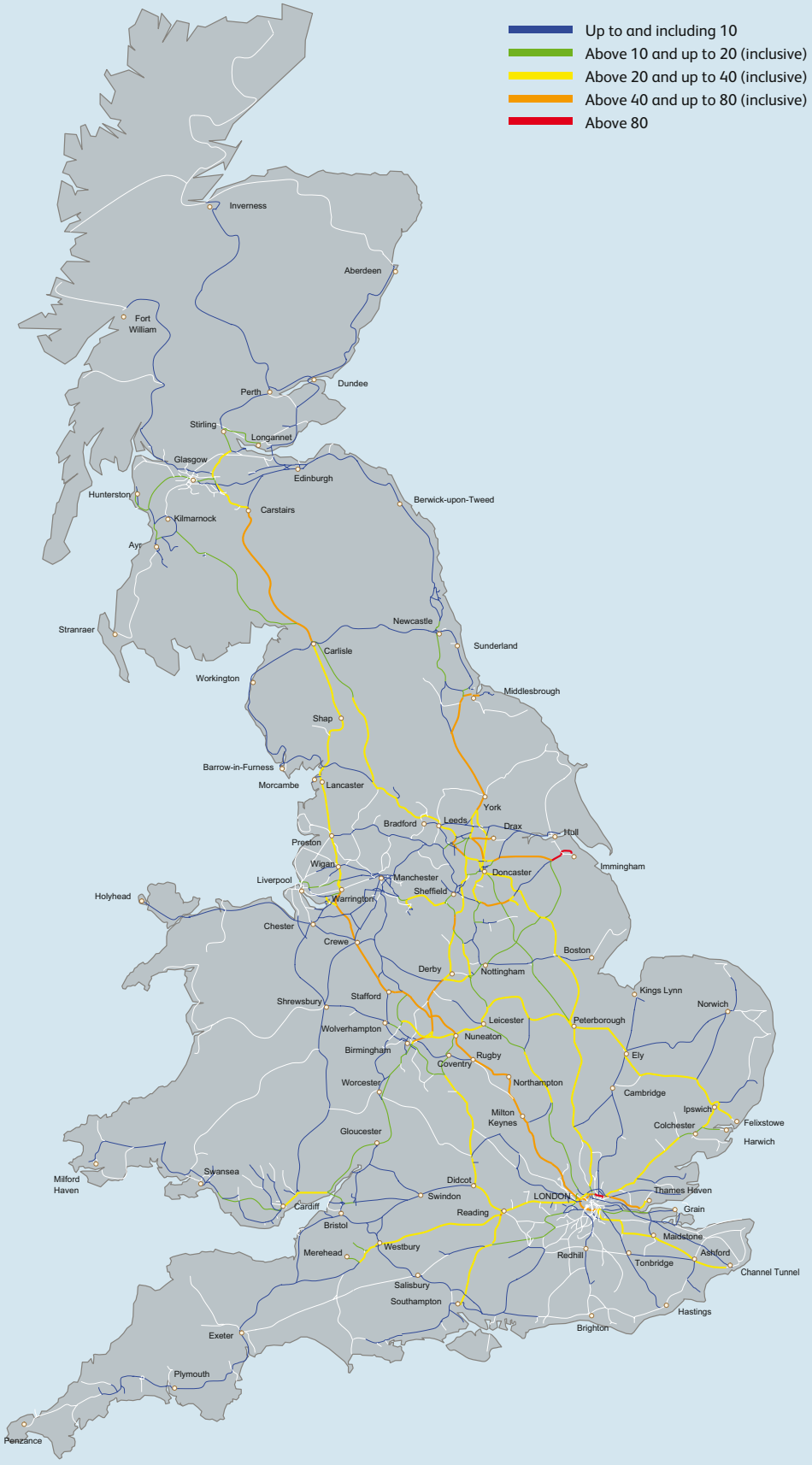
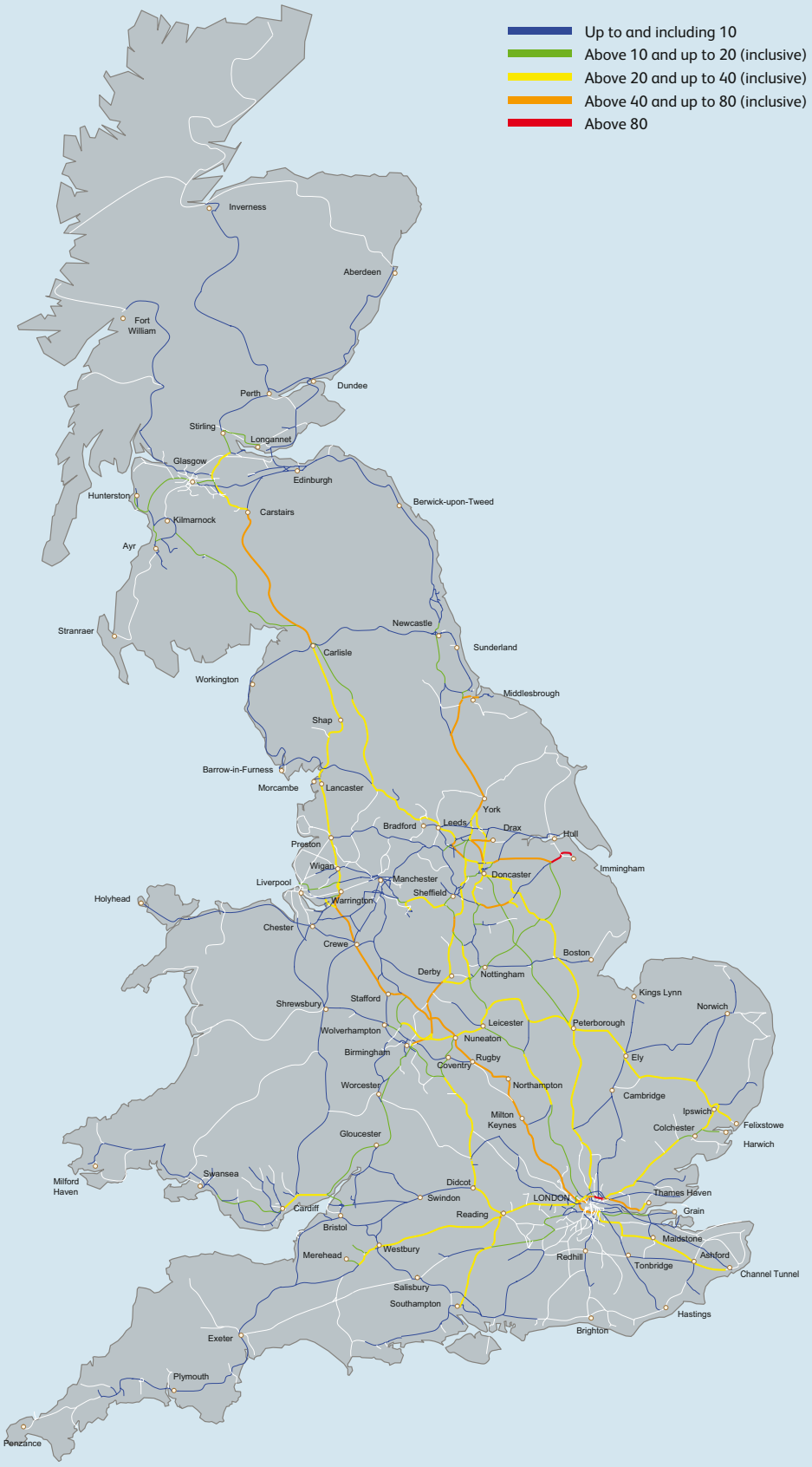


Figure 4.13 – forecast number of daily freight paths in each direction in 2030



5. Gaps and options

Introduction

Previous chapters have presented the baseline data (the current capability and requirements of the network), committed schemes and forecasts of future demand. This chapter builds on this by detailing the process of gap identification, the options to address these gaps, and their appraisal.

Gaps

A Route Utilisation Strategy (RUS) gap is defined as the difference between what the system can currently supply, in terms of infrastructure and train service, and what is likely to be demanded of the system, both now and in the future for passenger and freight services at suitable levels of performance. A gap also needs to be considered as consistent with the funding that is, or is reasonably likely to become available during the period of the RUS.

Process

In line with other established RUSs the process adopted by the West Coast Main Line RUS has been to identify where issues exist on the current railway and where they are expected to occur in the future. This has been undertaken through the baseline study (with wider stakeholder input) and by comparing this with the current and forecast demand. This has identified potential gaps between what the railway system delivers now and what it is required to deliver over the timeframe of the RUS.

The gaps identified in this RUS can be summarised into seven generic categories and are shown in **Table 5.1**.

Table 5.1: generic RUS gaps

Gap reference	Gap
OC	On-train capacity
FC	Freight capacity/capability
JT	Journey time
RL	Regional links
RD	Reactionary delay
NA	Network availability
SC	Station passenger handling capacity

Each generic gap type is explained along with the specific gaps identified on the West Coast Main Line RUS area.

OC: On-train capacity

On-train capacity gaps are where the current or forecast passenger demand exceeds the train capacity to the extent that it is not possible to meet the Department for Transport (DfT) standard of seats being available to prevent standing in excess of 20 minutes. Where the journey is less than 20 minutes, crowding is measured against the total capacity of the train, which includes standing room as well as seating.

Chapter 3 identifies that a large number of services to/from London Euston, especially during the peaks, are currently crowded, with many carrying passengers above the accepted standing allowance used in the High Level Output Specification (HLOS)[1] analysis. This crowding is expected to get significantly worse by 2024 as reported in **Chapter 4**. An increasing number of Long Distance High Speed (LDHS) services are expected to be at or near capacity despite the introduction of 106 additional Class 390 vehicles into the fleet. Commuter and longer distance services between Northampton, London and stations in between are expected to become severely overcrowded, with 85 per cent of peak services currently operated by London Midland expected to carry standing passengers by 2024. The remaining commuter services into London are also expected to become extremely busy, particularly in the peaks, with many passengers potentially unable to board the train.

In addition, expected growth detailed in **Chapter 4** suggests that overcrowding will also occur on many of the non-London interurban services between the West Coast Main Line (WCML) and the West Midlands during the week. Significant crowding is also expected on non-London interurban services between the WCML and the North West during Fridays and at weekends.

1 HLOS refers to the High Level Output Specification consisting of various targets (including reliability, capacity and safety) which the collective rail industry is required to achieve during Control Period 4 (CP4) or within the passenger franchise duration.

The following gaps have been evaluated later in this chapter:

Gap Reference	Gap
OC1	Suburban on-train crowding to/from London Euston
OC2	Peak on-train crowding on the Watford Junction to West London Line services
OC3	Long distance on-train crowding to/from London Euston
OC4	On-train crowding on Sundays between Rugby and Crewe
OC5	On-train crowding between Birmingham, the North West and Scotland
OC6	Friday to Sunday on-train crowding between Manchester Airport and Scotland

FC: Freight capacity/capability

Freight capacity/capability gaps occur where the ability to run the volume of services required or the characteristics of trains required cannot be accomodated.

Freight industry growth is expressed in terms of paths (timetable slots) per day using the 2019 and 2030 Strategic Freight Network (SFN) freight forecasts. These forecasts were developed using individual commodity tonnage assessment followed by an evaluation of how many timetable slots would then be required to convey that volume. The assessment made a number of assumptions regarding efficiencies, unconstrained routeing and a view on predicted terminal strategy. The forecasts and analysis assume longer and heavier 640m trains and six-day working, which is currently unfunded. During the consultation period stakeholders expressed concerns about the ability of the route north of Preston to accommodate predicted freight growth. Further analysis has been completed since the publication of the Draft for Consultation and this analysis is presented under new gap **FC5** – Insufficient capacity north of Preston.

The following gaps have been evaluated later in this chapter:

Gap Reference	Gap
FC1	Insufficient freight capacity, specifically in the Stafford area, at Carlisle and at Daventry
FC2	Insufficient W12 gauge cleared routes
FC3	Insufficient diversionary W10 cleared routes West Coast Main Line to Liverpool
FC4	Insufficient capacity accessing the West Coast Main Line at Nuneaton from the Coventry corridor
FC5	Insufficient capacity north of Preston

JT: Journey time

Gaps in the journey time category refer to excessively high travel times between key locations. The RUS process considers other interventions, such as timetable solutions, before infrastructure enhancements. Therefore, the strategy considers alternatives to infrastructure solutions to reduce journey time, including altering stopping patterns and examining the possibility to reduce extra time allowances in the timetable. The RUS suggests that all opportunities to raise linespeeds and reduce journey times are capitalised on as signalling, track and switches and crossings renewals are undertaken.

The following gaps have been evaluated later in this chapter:

Gap Reference	Gap
JT1	Inadequate journey times between London and Scotland
JT2	Inadequate journey times between London and Manchester
JT3	Inadequate journey times between London and the North West and Nuneaton/Lichfield/Tamworth
JT4	Inadequate journey times between Birmingham and Manchester
JT5	Inadequate journey times between London and Rugby

RL: Regional links

Regional links gaps refer to funder and stakeholder aspirations for improved connectivity both within the West Coast Main Line RUS area as well as to key locations beyond the geographic scope of the RUS.

Several regional links gaps were a result of the implementation of the December 2008 timetable, when calling patterns were changed to speed up long distance journey times. The following gaps have been appraised:

Gap Reference	Gap
RL1	Irregular service between London and Crewe via the Trent Valley[2] during the peak in the northbound direction
RL2	Lack of direct services between Winsford/Hartford and Warrington
RL3	Lack of direct services between Manchester Airport and towns in the Potteries[3]
RL4	Lack of direct services between Watford and the North West of the RUS area
RL5	Lack of direct services between Milton Keynes and the North West of the RUS area
RL6	Lack of direct services between Northampton and the North West of the RUS area
RL7	Lack of direct services between Rugby and the North West of the RUS area
RL8	Irregular services or no direct services between the North West (Manchester and Liverpool respectively) and Scotland
RL9	Poor frequency of services (when compared to other cities of a similar size and population) between London and Liverpool
RL10	Poor frequency of direct services between Lockerbie and Glasgow/Edinburgh
RL11	Sub-optimal connectivity at Carlisle between the WCML and the Cumbrian coast (between Carlisle and Barrow-in-Furness via Workington), Newcastle, Leeds and the Glasgow and South Western route to Dumfries and Kilmarnock
RL12	Gap in the morning high-peak hour for fast services between Birmingham New Street and Milton Keynes Central
RL13	Poor frequency of direct services between Motherwell and London

The development of options to address these gaps results in a package of measures relating to amended or additional services. These have been grouped into timetable options.

RD: Reactionary delay

Reactionary delay occurs as a result of an incident causing primary delay elsewhere on the network, together with infrastructure or service characteristics which constrain the ability to recover and minimise the impact.

An analysis of performance for freight and passenger operators since the implementation of the December 2008 timetable shows that despite an initial period of poor performance, there has been a steady improvement in performance and reliability.

Several attempts were made to identify any strategic issues where the levels of reactionary delay require development of an intervention. The findings show that the level of reactionary delay does not warrant any interventions at this time. Following the WCML Route Modernisation Programme in 2008, many of the major constraints on the route were removed and the RUS has therefore not evaluated any proposals.

During the analysis, although still not at a strategic level, Lancaster station did feature as one of the worst performing locations on the route, incurring reactionary station delay. This is a consequence of restrictive functionality at the station for terminating trains and/or where simultaneous operational moves are needed for accommodating trains in platforms. Although no specific intervention has been developed by the RUS, the issue should be considered when the area becomes due for resignalling.

Although performance levels are improving, the RUS notes that this is an intensively utilised route and the industry strives towards continuous improvements. It is important that future renewals on the route maximise any opportunities to provide incremental improvements to performance.

2 Trent Valley stations refer to Nuneaton, Atherstone, Polesworth, Tamworth, Lichfield Trent Valley and Rugeley Trent Valley stations on the WCML.

3 'Towns in the Potteries' refer to all stations between Stone and Longport in the WCML RUS area.

NA: Network Availability

The train service on offer during the evening and weekends, and the predicted demand for travel at such times, is considered under this gap.

Following the implementation of the December 2008 and December 2009 timetables, the WCML route saw the introduction of Seven Day Railway principles from London Euston to just south of Warrington Bank Quay. This considered a number of initiatives to increase access to the network for train operators. In line with Network Rail's Control Period 4 (CP4) Network Availability Plan, the remainder of the route will be included and further initiatives are being developed within the industry to help reach the level of network availability required at the end of CP4. The key objectives are described in **Chapter 4**. As there are already initiatives in place to address this gap, no further interventions have been proposed.

The provision of suitable alternative diversionary routes is critical for mitigating disruption caused by reduced access to the network. The funded scheme to electrify additional routes in the North West will provide an alternative route for freight and passenger services when the route between Crewe and Preston/Liverpool Lime Street is unavailable, subject to capacity being available. For freight operators it is important that diversionary routes provide the same level of gauge clearance as the scheduled route. Since publication of the Draft for Consultation, W10 gauge clearance of the East Coast Main Line between Doncaster and Carstairs via Newcastle and the Edinburgh South Suburban line is now funded. This will provide an alternative route for intermodal services between the East Coast ports and Scotland.

The Stakeholder Management Group (SMG) noted that there were a number of diversionary opportunities particularly at the southern end of the route but that north of Preston opportunities were more limited particularly for services operated by electric traction. Installation of bi-directional signalling should therefore be considered when the route is being re-signalled.

SC: Station passenger handling capacity

Station capacity gaps are those instances where the existing or future passenger demand cannot be accommodated at stations.

One of the outputs from the Network RUS: Stations is the provision of guidance on crowding and interchange of stations. The Draft for Consultation was published in May 2011 and is available on the Network Rail website **www.networkrail.co.uk.**

The SMG advised that Crewe and Preston stations required further consideration to understand if they are able to cater for the volumes of future demand.

However, it was decided that these issues relate to the layout of information, announcements and retail standards which are not generally considered by geographical RUSs. Therefore no interventions have been considered.

Other RUSs

The West Coast Main Line RUS is looking primarily at gaps identified within the RUS area, whilst other gaps are being dealt with in their respective RUSs. However, there are instances where identified gaps cross RUS boundaries. The cross-boundary issues considered by this RUS, in conjunction with other RUSs are:

- capacity – the West Coast Main Line RUS covers a large geographical area and its services operate over many regions. Capacity to and from major urban centres on services along the WCML will be closely aligned with other RUSs, including:
  - the West Midlands and Chilterns RUS for capacity within the West Midlands rail network and specifically at Birmingham New Street, and journey times between Birmingham New Street and Manchester Piccadilly
  - the Northern RUS for capacity at Manchester Piccadilly and Liverpool Lime Street
  - the Scotland RUS Generation Two for capacity on the routes from Carstairs South Junction into Glasgow Central and Edinburgh Waverley as well as at these key stations
  - the London and the South East RUS for capacity at London Euston and services to and from the West London Line
- freight capacity and capability work building on the analysis done in the Freight RUS/SFN
- the Network RUS: Stations is considering station capacity issues across the whole of Great Britain.
- the Network RUS: Passenger Rolling Stock published as a Draft for Consultation in June 2011.

Option definition

In order to address the identified gaps detailed analysis has been carried out based on a standard toolkit of solutions. The option toolkit includes a range of interventions, from the operation of longer trains within current infrastructure, retimetabling to improve capacity, to platform extensions and the construction of additional infrastructure. Using the toolkit, options are developed into proposed interventions to identify the next steps in the analysis. The toolkit works in such a way that the lowest cost interventions are considered initially, and only if these options are not able to meet the gap are more expensive interventions considered. These interventions were reviewed and agreed by the SMG prior to commencement of the detailed assessment.

Approach

The Draft for Consultation made a number of assumptions to inform the appraisal process. These assumptions were focused on the potential journey time improvements that were considered possible based on the proposed interventions. In a number of cases the Draft for Consultation stated that the RUS would undertake further work to validate assumptions made, and calculate the journey time savings that could be available for the options assessed against the baseline timetable. This work has now been concluded and has been incorporated into the updated appraisals in order to more accurately calculate the costs and benefits of the options.

Methodology

Each of the options has been assessed for operational and/or economic impact where applicable. Where a specific option has been identified, high level timetable analysis has been undertaken to assess whether an option is operationally feasible. Where an option is considered to be feasible an economic appraisal has been carried out which compares the revenue implications and the socio-economic benefits of changes due to the proposed intervention against operating costs and any capital costs needed to implement the option.

The appraisal of options has been undertaken in line with the DfT's Transport Analysis Guidance (WebTAG) and the Passenger Demand Forecasting Handbook (PDFH)[4]. Where appropriate, benefit cost ratios (BCRs) have been calculated and reported as this is the main indicator of a scheme's value for money used by the DfT. A BCR of between 1.5 and 2.0 indicates medium value for money and a BCR of 2.0 or higher indicates high value for money. An option with a BCR of less than 1.5 is deemed to be low or poor value for money and generally will not be recommended.

The DfT released updates to its WebTAG in April 2011. The appraisals undertaken for the RUS do not include these changes as they were introduced after the completion of the option appraisal process. The most significant change, in terms of its effects on the appraisal results in this document, is the change in the treatment of indirect tax in the BCR calculation. This change is expected to increase the BCR for most schemes. However, the effect is generally greatest for schemes that are medium or high value for money under the pre-April 2011 guidance and there is generally little effect on the BCR of schemes that are low or poor value for money. The change is therefore very unlikely to affect any recommendations in the RUS. The effects of the changes to WebTAG will be included in future appraisals for any options that are taken forward for further development.

The appraisals have been carried out over 10-year, 30-year or 60-year periods. A 10-year appraisal period is assumed where only operating costs[5] are incurred. If the option requires the procurement of extra rolling stock or incurs infrastructure expenditure, the appraisal period rises to 30 years and 60 years respectively. All options have been appraised under the two growth scenarios of global responsibility and continued profligacy detailed in **Chapter 4**. The results under both scenarios are only presented in this section if they result in materially different recommendations.

It is important to understand the difference between value for money, which includes economic benefits such as value of time and crowding benefits, versus affordability which is concerned with the public financial burden of an option. Given the prevailing economic climate at the time of the publication of this document, an option recommended on a value for money basis may be deemed unaffordable by the DfT and/or Transport Scotland.

As part of option appraisal each gap is initially considered in isolation and options are developed to address each gap. Gaps and options are then grouped together wherever possible and analysed to determine their likely benefits and costs. Those that are expected to generate the best business case are appraised and are summarised in the next section.

Option analysis

The rest of this chapter presents the option appraisals that have been carried out, detailing the scope, the process undertaken and the recommendations arising from the analysis. This analysis is presented based on the generic gaps outlined earlier in the chapter.

4 The Passenger Demand Forecasting Handbook is an industry standard framework for modelling growth, using demand drivers such as UK demographics, economic growth, and the characteristics of competing modes to predict the change in passenger demand.

5 Operating costs are those associated with employment of train crew and/or the mileages costs associated with maintenance, track access and fuel/electric current for traction resulting from the option

1. On-train capacity

Gap OC1: Suburban on-train crowding to/from London Euston

Capacity on suburban services on the WCML to/from London Euston is currently provided by London Overground Rail Operations Limited (LOROL) on the Direct Current (DC) lines between Watford Junction and London Euston and by London Midland, on the Northampton – Milton Keynes Central – Watford Junction – London Euston route.

The recent introduction of four-car Class 378 sets (which have higher total capacity due to their London Underground type seating configuration) on LOROL services has provided significant additional capacity. Passengers are forecast to exceed seated capacity by an average of 25 per cent for the three-hour morning peak between Harrow & Wealdstone and London Euston by 2024. However, this is expected to increase to an average of 82 per cent for the high-peak hour, which is above the total train capacity of 170 per cent. However, given the nature of the service (high number of short distance journeys), most passengers are expected to stand for less than 20 minutes which is within DfT crowding standards. It is recommended that Transport for London monitors the levels of crowding on these services and develops options to reduce this as and when it becomes necessary.

The services on the corridor south of Northampton (Northampton – Milton Keynes Central – Watford Junction – London Euston, currently operated by London Midland) are forecast to be crowded throughout the day. On average, around 85 per cent of the three-hour peak services are expected to carry standing passengers by 2024, from which over half are expected to be standing for longer than 20 minutes. Services are also expected to get crowded outside of peak periods, with around 15 per cent of all services during this time expected to carry standing passengers.

Options considered to address the capacity gap on the corridor south of Northampton are:

Gap	Option Reference	Option
OC1	OC1.1	Lengthen the existing busiest morning and evening peak services on the Northampton – Milton Keynes Central – Watford Junction – London Euston corridor
	OC1.2	Introduce additional morning and evening peak services on the Northampton – Milton Keynes Central – Watford Junction – London Euston corridor
	OC1.3	Lengthen the busiest inter-peak trains on the Northampton – Milton Keynes Central – Watford Junction – London Euston corridor

Analysis suggests that based on existing capacity, by 2024 around 8,800 passengers will stand on these services to/from London Euston in the morning and evening three-hour peaks. Over half of these passengers are expected to stand for more than 20 minutes.

Lengthening of the existing busiest services on this corridor in the three-hour peak to 12-cars, the maximum length the infrastructure on the corridor can accommodate, is considered under Option **OC1.1**. There is a good business case to lengthen a total of 11 services in the morning and evening three-hour peaks using 28 additional vehicles (some vehicles will be used more than once in the three-hour peak and will be used in both morning and evening peaks). This reduces the total number of passengers expected to stand in 2024 to around 6,300 during the two peaks combined. This is because although services are busiest during the high-peak hours, only two services can be lengthened during each high-peak hour as the other crowded services are already running at maximum length.

The demand for travel in the morning is more concentrated around the high-peak hour, whereas it is more spread out in the evening, with the peak in demand spread between the hours of 17:00 and 19:00. Option **OC1.2** considers the introduction of one additional morning high-peak hour fast service between Northampton and London Euston and two additional evening three-hour peak services between London Euston and Northampton, using 16 additional vehicles. The lengths of these services are limited to a maximum of eight-cars due to platform constraints at London Euston. Timetable analysis shows that these services can only be accommodated if operated by rolling stock with 125mph capability (in the current timetable structure). It may be possible to operate these additional services at 110mph, by reconfiguring some other existing services to also operate at this higher speed, and altering the service structure and stopping patterns. This would have to be subject to further capacity analysis and appraisal if the incumbent franchisee and the DfT choose to take it forward. This option is expected to reduce the total number of passengers standing in the three-hour morning and evening peaks by 1,000 passengers to 5,300 in total. However, around 35 per cent of passengers are still expected to stand for more than 20 minutes.

The detailed appraisals for these two options are outlined in the option tables. The effect on crowding of the interventions proposed in options **OC1.1** and **OC1.2** combined are shown in **Figure 5.1**.

Assessment of option OC1.1 – lengthen the existing busiest morning and evening peak services on the Northampton – Milton Keynes Central – Watford Junction – London Euston corridor	
Gap being addressed	Suburban on-train crowding to/from London Euston.
Concept	Lengthen the busiest trains that are not already operating in 12-car formations between Northampton and London Euston through the provision of 28 additional vehicles (20 if the eight vehicles specified in the High Level Output Specification are delivered in CP4 as described in **Chapter 4**).
Operational analysis	Although a number of services operate at 12-car lengths in the three-hour peaks already, there are still some that operate at eight-car length and so can be lengthened. Exceptions to this are the services which start at Watford Junction, which are limited to eight-car due to the length of the bay platform at Watford Junction. 28 additional vehicles are required to lengthen 11 services on this corridor in total (some vehicles will be used more than once in the three-hour peak and will be used in both peaks). This includes the lengthening of one existing morning peak hour Watford Junction to London Euston service from eight-car to 12-cars, avoiding the constraint of the bay platform at Watford Junction by starting the train from Tring. Timetable analysis has suggested that this service can be accommodated in the existing timetable structure. London Midland are currently planning to introduce an additional London Euston to Crewe service in the first evening shoulder-peak hour in 2012, which will be operated using a four-car unit. The crowding relief is unlikely to be significant, partly because this service is introduced before the beginning of the worst crowding and partly because of the new demand that is expected to be generated due to the significant improvement in connectivity from London Euston to stations along the Trent Valley.
Infrastructure required	Alterations to depots and sidings might be necessary to accommodate the lengthened rolling stock.
Passenger impact	Increased capacity and reduced crowding on suburban services on the WCML to/from London Euston. This will reduce the expected number of standing passengers by 2,500 for the two peaks combined from 8,800 to 6,300.
Freight impact	Timetable analysis suggests that there is no freight impact arising from this option.
Financial and economic analysis	The main costs relate to rolling stock leasing and mileage-related costs. The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	57.3
Revenue	-40.8
Other Government impacts	8.2
Total costs	**24.7**
Benefits (present value)	
Rail users benefits	45.3
Non users benefits	18.9
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	**64.1**
NPV	**39.4**
Quantified BCR	**2.6**

Link to other options/ gap	**OC1.2** - introduce additional morning and evening peak services on the Northampton – Milton Keynes – Watford Junction – Euston corridor. **OC1.3** - lengthen the busiest inter-peak trains on the Northampton – Milton Keynes – Watford Junction – Euston corridor.
Conclusion	This option is good value for money and it is recommended for implementation as soon as rolling stock becomes available.

Option **OC1.1** provides additional capacity and is good value for money, however it does not solve the crowding problem. Option **OC1.2** looks at introducing additional peak services in order to further increase capacity.

Assessment of option OC1.2 – introduce additional morning and evening peak services on the Northampton – Milton Keynes Central – Watford Junction – London Euston corridor	
Gap being addressed	Suburban on-train crowding to/from London Euston.
Concept	Introduction of one additional morning and one additional evening high-peak hour non-stop service between Northampton and London Euston and one additional evening peak service between 18:00 and 19:00 calling at London Euston, Milton Keynes Central and Northampton. The evening peak timetable slots are targeted at relieving the crowding that occurs between 17:00 and 19:00 when the most overcrowded services are already at their maximum length. This requires 16 additional vehicles.
Operational analysis	The Draft for Consultation recognised that the current planning of the train service pattern generally segregates 125mph Enhanced Permissible Speed services (which have a less frequent station calling pattern) to run on the fast lines with 100mph services (which have a more frequent local calling pattern) to run on the slow lines. There are currently two limited-stop 100mph trains per hour using the fast lines, which means that capacity is not maximised on the fast lines due to the mixture of speeds. During the consultation period, timetable analysis was undertaken to confirm whether any additional timetable slots could be accomodated on the fast lines to/from London Euston. The work identified an additional hourly timetable slot, which is currently used as a 'firebreak path' (slots in the timetable which allow for performance recovery in times of perturbation). This slot requires 125mph Enhanced Permissible Speed rolling stock, which can only be eight-cars in length due to platform constraints at London Euston based on current platform working. Due to track capacity constraints on the route, this additional slot can only accommodate limited station stops. The RUS considered the impact of running 100mph and 110mph rolling stock instead of 125mph rolling stock in the identified slot as a sensitivity to this option. This was proved to be operationally possible but increased the journey time for adjacent long distance services into London Euston and economic analysis suggested that the disbenefit to passengers on these services significantly outweighed the total benefits of this option. Therefore this option is only recommendable with rolling stock capable of running at 125mph at Enhanced Permissible Speeds on the fast lines under the current timetable structure. There is currently no suitable commuter rolling stock available that meets this criterion. The RUS notes that there may be the opportunity to provide additional paths using 110mph rolling stock if the timetable on the corridor was restructured. This should be considered for implementation as part of future timetable developments. The use of the 'firebreak path' may have an impact on performance in times of perturbation and therefore this should be understood before the implementation of this recommendation.
Infrastructure required	Alterations to depots and sidings might be necessary to accommodate the additional rolling stock.
Passenger impact	Increased capacity and reduced crowding on suburban services on the WCML to/from London Euston. This will reduce the expected number of standing passengers by 1,000 for the two peaks combined from 6,300 (after the implementation of option **OC1.1** - lengthen the existing busiest morning and evening peak services on the Northampton - Milton Keynes Central - Watford Junction - London Euston corridor) to 5,300. This option will result in improved journey times between Northampton and London Euston.
Freight impact	Timetable analysis suggests that there is no freight impact arising from this option.

Assessment of option OC1.2 – introduce additional morning and evening peak services on the Northampton – Milton Keynes Central – Watford Junction – London Euston corridor

Financial and economic analysis

The main costs relate to rolling stock leasing, staff and mileage-related costs. The table that follows combines the costs and benefits of both this option and option **OC1.1** (lengthen the existing busiest morning and evening peak services on the Northampton - Milton Keynes Central - Watford Junction - London Euston corridor).

30-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	103.8
Revenue	-73.2
Other Government impacts	14.6
Total costs	**45.3**
Benefits (present value)	
Rail users benefits	68.6
Non users benefits	33.8
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	**102.4**
NPV	**57.2**
Quantified BCR	**2.3**

Note: The incremental BCR (costs and benefits generated assuming that option **OC1.1** (lengthen the existing busiest morning and evening peak services on the Northampton - Milton Keynes Central - Watford Junction - London Euston corridor) has already been implemented) for one additional morning and one evening high-peak hour service is 2.2, which represents high value for money. The incremental BCR for a further additional evening shoulder-peak hour service between 18:00 and 19:00 hours is 1.5, which represents medium value for money.

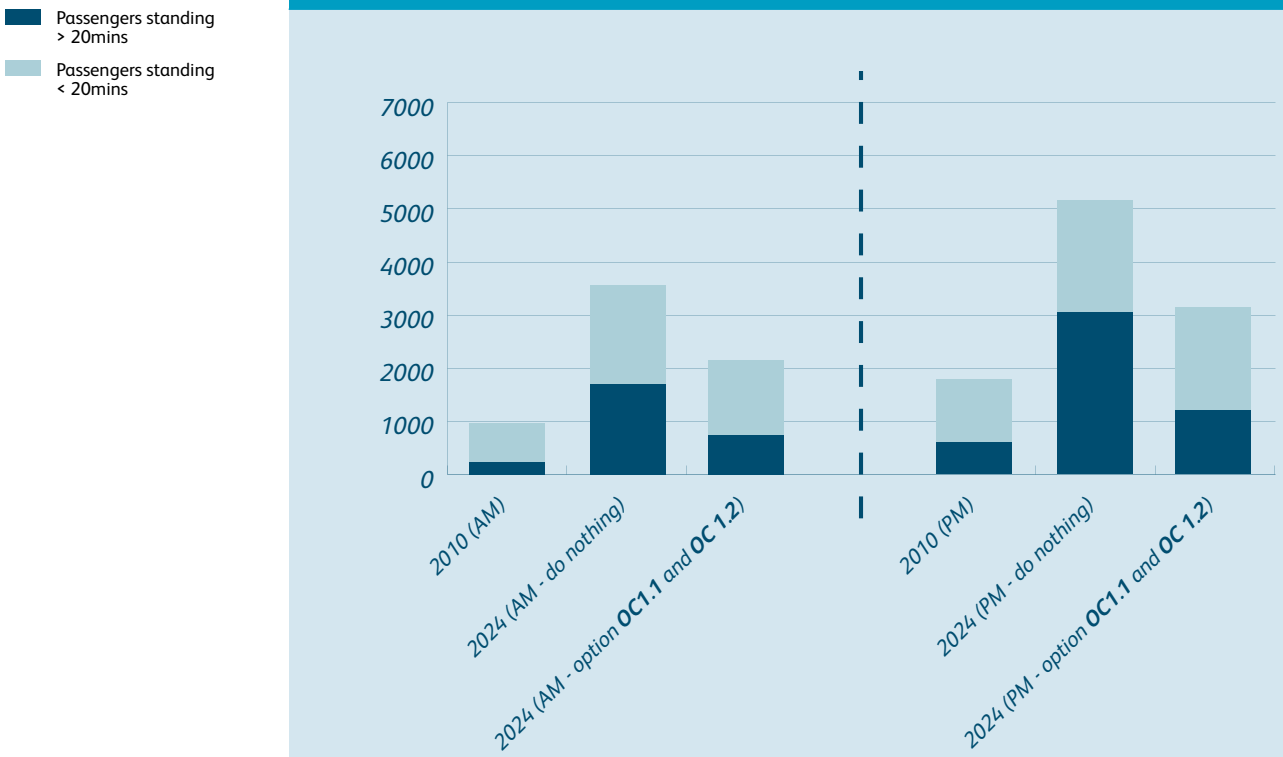
Link to other options/ gaps

OC1.1 - lengthen the existing busiest morning and evening peak services on the Northampton – Milton Keynes Central – Watford Junction – London Euston corridor.

Conclusion

This option is high value for money and it is recommended for consideration in future timetable development, subject to the availability of suitable rolling stock. The option of providing these additional paths with lower speed capable rolling stock by restructuring the timetable should be considered as part of future timetable developments.

Figure 5.1 - current and future standing passengers in the three-hour peaks on London Midland services



Note, overall a higher number of passengers are expected to stand in the evening three-hour peak as there are fewer fast commuter services during this time which are expected to get extremely busy. In addition, more leisure passengers are also expected to use evening three-hour peak services. However, more passengers are expected to stand in the morning high-peak hour compared to the evening high-peak hour.

Although the implementation of the two options will reduce the numbers of passengers standing during the morning and evening three-hour peaks by 3,500, around 5,300 passengers are still expected to be standing on these services by 2024.

Due to capacity constraints on the route as well as at London Euston, the most cost effective method of providing extra capacity on this corridor in the long term is through the provision of a new line. This aligns with the findings from the 2008 Network Rail commissioned study looking at the most efficient way of providing additional capacity on the WCML, as well as the Government's High Speed 2 report, which suggests a new high speed line is built between London, the West Midlands and beyond.

Analysis has identified that services are also expected to be busy during the inter-peak by 2024.

Option **OC1.3** lengthens the busiest inter-peak services by employing the peak period rolling stock which is not used at this time. These services are currently operated at four-car or eight-car lengths and it is recommended that the operator lengthens inter-peak services as demand dictates utilising existing spare peak resources.

Gap OC2: Peak on-train crowding on the Watford Junction to West London Line services

Chapter 3 demonstrates that there is a current peak capacity gap on Milton Keynes Central to East Croydon services between Watford Junction and Clapham Junction on the West London Line in the three-hour peak. The service is currently operated by Southern using four-car Class 377 electric units. This crowding is expected to increase significantly in the future, with an average of 69 per cent of passengers exceeding seated capacity between these stations in the morning three-hour peak by 2024, rising to an average of 131 per cent of passengers exceeding seated capacity in the high-peak hour.

Options considered to address this gap are:

Gap	Option Reference	Option
OC2	**OC2.1**	Lengthen West London Line services from four to eight-car trains
	OC2.2	Additional peak hourly services on the West London Line

Option **OC2.1** is to lengthen West London Line services from four to eight-car trains and has been developed in the London and South East RUS, published as a Draft for Consultation in December 2010. It is recommended for implementation as soon as rolling stock becomes available.

Assessment of option OC2.1 – lengthen West London Line services from four to eight-car trains[6]	
Gap being addressed	Peak on-train crowding on the Waford Junction to West London Line services.
Concept	Lengthen the morning and evening three-hour peak services from the current four-cars to eight-cars using nine additional four-car units.
Operational analysis	Operational analysis has shown that the only constraint in lengthening services to eight-cars is the inability to use platform 2a at Milton Keynes Central as it is not long enough to accommodate eight-car trains. Analysis has shown that this is resolvable by alterations to the platforming of services at Milton Keynes Central.
Infrastructure required	Platform extensions at Wembley Central (CP4 committed scheme), Clapham Junction, Imperial Wharf, West Brompton and Shepherds Bush.
Passenger impact	Increased capacity and reduced crowding on these services. The additional units may be used to strengthen services throughout the day if crowding levels are higher than anticipated throughout the day.
Freight impact	No impact anticipated.

Assessment of option OC2.1 – lengthen West London Line services from four to eight-car trains[6]		
Financial and economic analysis	The main costs relate to infrastructure, rolling stock leasing and mileage-related costs. The capital costs include platform lengthening at all stations other than Milton Keynes Central, for which an operational solution is assumed, and Wembley Central, which is already a CP4 committed scheme. The following table outlines the appraisal results:	
	60-year appraisal	**£million (2002 PV)**
	Costs (present value)	
	Investment cost	22.4
	Operating cost	72.1
	Revenue	-26.5
	Total costs	**68.0**
	Benefits (present value)	
	Rail users benefits	105.7
	Non users benefits	50.7
	Current TOCs revenue	0.0
	Current TOCs/NR opex	0.0
	Other Government impacts	-5.2
	Total quantified benefits	**151.2**
	NPV	**83.2**
	Quantified BCR	**2.2**
	Note: The appraisal assumes that the crowding experienced in the morning three-hour peak matches that in the evening three-hour peak.	
Link to other options/ gaps	**OC2.2** - Additional peak hourly services on the West London Line.	
Conclusion	This option is high value for money and it is recommended for implementation as soon as rolling stock becomes available.	

The RUS also notes that crowding on these services is exacerbated by an uneven interval pattern of services in the peak. There is currently an hourly service through most of the day, with the exception of the morning three-hour peak, which has a 73 minute gap. There is wide consensus within the industry that there is a high level of suppressed demand for services on the route which will require provision of additional capacity. This is considered under option **OC2.2**.

6 This appraisal has been completed using the updated DfT WebTAG appraisal guidance as it was undertaken as part of the London and South East RUS.

Assessment of Option OC2.2 – additional peak hour services on the West London Line	
Gap being addressed	Peak on-train crowding on the Watford Junction to West London Line services.
Concept	This option would increase the present service from the Watford Junction route to the West London Line to a train every 30 minutes, during peak times.
Operational analysis	The main consideration is the compatibility between timings on the WCML and those on the West London Line, with further issues including the operational viability of terminating trains at Watford Junction and/or Milton Keynes Central. Timetable development has now identified that a two trains per hour peak service between the two routes is viable, but that this requires additional dual-voltage rolling stock and a timetable recast. As a result this service is not deliverable at the present time, but can be expected to be achievable following the completion of work on the Thameslink Programme, when additional dual voltage vehicles will be freed up and a recast of all services south of London (including services that go onto the West London Line) will become necessary.
Infrastructure required	None required.
Passenger impact	The Watford Junction to Kensington Olympia route currently has long intervals between services, for example a gap in departures from Wembley Central between 07:49 and 09:05 which leads to severe overcrowding. This option would reduce the gap to 30 minutes which would significantly reduce crowding.
Freight impact	Minor amendments to one freight service in the morning peak may be required.
Financial and economic analysis	No economic analysis has been undertaken at this stage. However, given the likely suppressed existing demand there is likely to be good case for this service in the event of the rolling stock being available.
Link to other options/gaps	**OC2.1** – lengthen West London Line services from four to eight-car trains.
Conclusion	The RUS recommends detailed investigation of this option as sufficient dual voltage rolling stock becomes available upon the completion of work on the Thameslink Programme.

Gap OC3: long distance on train crowding to/from London Euston

Crowding is expected on some LDHS services in the future despite the recent high levels of investment in the route and the introduction of additional Class 390 vehicles during CP4 allowing 35 sets to operate at 11-car length. Analysis suggests that an increasing number of these services will be at or approaching capacity by 2024.

Of the five corridors described in **Chapter 4** (London to Birmingham/Wolverhampton, London to Manchester, London to Liverpool, London to Glasgow/Preston and London to North Wales), services between London Euston and Manchester Piccadilly and London Euston and Glasgow Central are expected to be the most crowded. It has been assumed that most of the new 11-car rolling stock will operate on the London Euston – Birmingham New Street corridor, providing an approximately 50 per cent increase in standard class capacity. If rolling stock is utilised elsewhere, this corridor is expected to experience severe crowding.

Crowding between London Euston and the North West is outlined under options **OC3.1** and **OC3.2**. Crowding between London Euston and Manchester Piccadilly is outlined under option **OC3.3** and finally, the crowding between London Euston and Chester/North Wales is outlined under option **OC3.4**.

Options appraised to address this gap are:

Gap	Option Reference	Option
OC3	**OC3.1**	Lengthening of LDHS services to/from London Euston (Class 390)
	OC3.2	Introduction of additional hourly inter-peak service from London Euston to the North West
	OC3.3	Introduction of additional hourly inter-peak service from London Euston to Manchester
	OC3.4	Lengthening of LDHS services between London Euston and Chester/ North Wales (Class 221)

Note, for clarity, the option numbering has changed slightly since the Draft for Consultation document

Option **OC3.1** (lengthening of LDHS services to/from London Euston) was not pursued as it was anticipated that this would have a poor value for money business case. This is because the committed additional Class 390 vehicles will be used to lengthen the train diagrams with the greatest concentration of crowding; and lengthening of the remaining nine-car sets would be expected to give diminishing returns relative to the cost of operating the extra vehicles all day. Moreover, it would not entirely solve crowding on the LDHS services, as some of the 11-car services are expected to be at or near capacity.

An alternative option to lengthening was investigated. This option proposes to provide an additional hourly LDHS inter-peak service to/from London Euston. This alleviates overcrowding, and helps meet some of the other journey time and connectivity gaps identified by stakeholders. It is expected that this additional service can be accommodated by optimising the rolling stock diagrams to maximise efficiencies within the baseline fleet. Option **OC3.2** assesses the introduction of an additional inter-peak service between London Euston and the North West. The RUS assumes a two-hourly stopping pattern as follows:

First hour: London Euston, Milton Keynes Central, Nuneaton, Warrington Bank Quay, Wigan North Western and Preston

Second hour: London Euston, Milton Keynes Central, Rugby, Tamworth, Crewe, Warrington Bank Quay, Wigan North Western and Preston

The service is assumed to have a North West destination depending on an assessment of how the key markets are likely to develop. This option will help to reduce crowding by providing additional journey opportunities for passengers along the route. This option also improves connectivity between Milton Keynes Central, Rugby, Nuneaton and the North West. This option is being jointly appraised with option **JT1.2** (faster journey times London to Scotland). As the additional service facilitates the improvements to journey times, it was felt that it was appropriate to appraise the options as a package.

Another option considered to deploy the fleet more effectively was to increase the service frequency between London Euston and Manchester Piccadilly in the inter-peak to four trains per hour on an even pattern (option **OC3.3**). This would provide additional on-train capacity as well as improved journey times between these two locations. In addition, all of the London Euston to Manchester Piccadilly services during this time can be operated by nine-car units. This will release the 11-car Class 390 trains to be utilised on other busy LDHS services to/from London Euston. The stopping pattern of this additional service has been assumed to be London Euston – Stockport – Manchester Piccadilly to offer the best possible journey time. This is expected to reduce overcrowding on LDHS services to/from London Euston and facilitate faster journey times between London and Manchester. This option has been appraised as option **JT2.1** (faster journey times between London Euston and Manchester Piccadilly).

Chapter 4 demonstrates that some of the services on the London Euston to North Wales corridor will have passengers standing by 2024. These services are currently operated by five-car Class 221 units and are not going to benefit from the additional rolling stock procured for the franchise. This overcrowding is less severe in the southbound direction as passengers are expected to stand for less than 20 minutes (between Chester and Crewe). However, the overcrowding in the northbound direction is expected to result in passengers standing for over 20 minutes (between London Euston and Crewe). The option to lengthen these services (option **OC3.4**) was considered but it was anticipated that this will not have a value for money business case as the expected level of crowding does not justify the high level of operating and leasing costs associated with the additional vehicles. It is anticipated that option **OC3.2** to provide an additional hourly service in the inter-peak between London Euston and the North West will alleviate crowding on services to/from London Euston as it will provide passengers with the opportunity to choose an alternative service. Network Rail is currently considering the business case to extend electrification from Crewe to Chester. Were this scheme to be implemented, longer Class 390 trains could be utilised on the busiest services.

Crowding on peak services arriving at or departing from London Euston may be managed by altering the service pattern in the future to provide passengers with greater opportunities to travel. The recent Office of Rail Regulation (ORR) decision on Track Access applications tasked Network Rail to lead an Industry Timetable Working Group. This group will lead an iterative review of the WCML timetable; the first stage is expected to inform the December 2013 timetable. This may present an opportunity to provide additional services throughout the day.

Ultimately, the provision of the high speed line, should relieve both track and rolling stock capacity, to enable additional services to operate.

Gap OC4: On-train crowding on Sundays between Rugby and Crewe

On Sundays the service between London Euston and Crewe operates as a two-hourly service north of Rugby. Analysis shows that there is some crowding already on these services and this will become more severe by 2024.

Options considered to address this gap are:

Gap	Option Reference	Option
OC4	OC4.1	Lengthen Sunday services between Rugby and Crewe
	OC4.2	Introduce additional Sunday service between Rugby and Crewe

Option **OC4.1** considers lengthening Sunday services between Rugby and Crewe from four-cars to eight-cars to provide additional capacity on the busiest services, utilising existing spare rolling stock. This is likely to have a low value for money business case as the level of crowding is unlikely to generate sufficient benefits to justify the additional mileage-related costs of the additional four-car unit.

Option **OC4.2** looks at introducing an additional service, using existing spare rolling stock, on Sunday afternoon to eradicate the overcrowding expected during this time. This option will include both mileage-related costs and additional staff costs. However, it will provide additional benefits as the service frequency increase would also deliver improved regional connectivity. Since the publication of the Draft for Consultation the incumbent train operator has secured the rights to commence operating an hourly service from April 2012.

Gap OC5: On-train crowding between Birmingham, the North West and Scotland

The expected growth on the Birmingham New Street to Glasgow Central/Edinburgh Waverley services will result in substantial overcrowding, especially on services operating to or from Edinburgh Waverley. As shown in **Chapter 3**, there are high numbers of passengers making relatively short journeys throughout the route.

Options considered to address this gap are:

Gap	Option Reference	Option
OC5	OC5.1	Lengthening the busiest services on the Birmingham to Scotland services
	OC5.2	Reallocating the train fleet to better match capacity to demand
	OC3.2	Introduction of additional hourly inter-peak service from London Euston to the North West

Under option **OC5.1** there is a high value for money business case for the theoretical lengthening of a total of 11 services by a maximum of 16 additional vehicles, with most services between Birmingham New Street and Edinburgh Waverley requiring lengthening to a maximum of seven-cars. There will continue to be some passengers standing on the service, but this is expected to be within total train capacity and compliant with the DfT guidelines of standing for less than 20-minutes (ie between Birmingham New Street and Wolverhampton or Wigan North Western and Preston).

Under option **OC5.2** the number of additional vehicles required may be reduced by reallocating Class 390 trains to operate the busiest Birmingham New Street to Edinburgh Waverley services and deploying Class 221 trains to other less busy services. The level to which this can be achieved will be determined by the actual service level and pattern agreed for the incumbent franchisee.

Option **OC3.2**, if introduced, would provide additional journey opportunities between Warrington Bank Quay, Wigan North Western, Preston and the North West. This would alleviate crowding on one of the busiest sections of this route.

It is recommended that option **OC3.2** be explored further as part of **JT1.2** (faster journey times London to Scotland) It is also recommended that the incumbent train operator develop option **OC5.2** (reallocating the train fleet to better match capacity to demand) further if growth emerges as expected in the future on this corridor. Finally, if it is possible to obtain additional rolling stock,

it is recommended that the business case for option **OC5.1** (lengthening the busiest service on the Birmingham to Scotland services) is refined to reflect practical workings, in terms of both train diagrams and rolling stock formation.

Gap OC6: Friday to Sunday crowding between Manchester Airport and Scotland

Manchester Airport to Scotland services alternate between Edinburgh Waverley and Glasgow Central every hour during most hours of the day and these services are expected to have been lengthened to four-cars following electrification of the routes between Manchester and Preston. Analysis in **Chapter 4** shows that four-cars will be sufficient to accommodate forecast demand for services between Manchester Airport and Glasgow Central on Monday to Thursday (apart from peak demand at Manchester Piccadilly which is being considered by the Northern RUS). However, services between Manchester Airport and Edinburgh Waverley are expected to be severely overcrowded by 2024 on Fridays and at weekends.

Options considered to address this gap are:

Gap	Option Reference	Option
OC6	**OC6.1**	Lengthening the busiest Manchester Airport to Edinburgh Waverley services (Friday to Sunday)

Option **OC6.1** has been tested under the two growth scenarios, continued profligacy and global responsibility (as detailed in **Chapter 4**). The results for both have been presented as they have markedly different outcomes. In the continued profligacy scenario analysis suggests that most services would require lengthening from four-car to six-car in order to significantly reduce crowding. Under the global responsibility scenario, which forecasts a higher growth rate on this corridor, these services would need to be lengthened from four-car to eight-car. There is a good value for money case under both these scenarios for strengthening these services.

Assessment of option OC6.1 - lengthening the busiest Manchester Airport to Edinburgh Waverley services (Friday to Sunday)	
Gap being addressed	Friday to Sunday crowding between Manchester and Scotland.
Concept	Lengthen the busiest services between Manchester Airport and Edinburgh Waverley by either two or four-cars, depending on the growth scenario, requiring a total of eight or 16 vehicles respectively.
Operational analysis	Analysis suggests that these services can be accommodated on the entire route (either via Wigan or via Bolton) as eight-car units apart from at Manchester Oxford Road and Salford Crescent because the length of the platforms at these stations are limited to 6-cars. It is expected that lengthening these platforms will require very significant track and signalling alterations and the benefits from this option are unlikely to support this level of infrastructure spend. Selective Door Operation (SDO) has been considered as an alternative option, but is operationally difficult due to the high passenger loads on these services during the peak hours. In this appraisal the disbenefits of not calling at these stops has been included where it is assumed the trains will be lengthened to eight-cars.
Infrastructure required	If the service is to stop at Manchester Oxford Road or Salford Crescent platform lengthening or an appropriate SDO solution will need to be considered.

Assessment of option OC6.1 - lengthening the busiest Manchester Airport to Edinburgh Waverley services (Friday to Sunday)

Passenger impact	Reduced crowding between Manchester Airport and Edinburgh Waverley on Fridays and at weekends.		
Freight impact	No freight impact.		
Financial and economic analysis	The main costs relate to additional units and mileage. The appraisal assumes that the Manchester Airport to Edinburgh Waverley services will be operated by six-car units under the continued profligacy scenario, whereas they will be operated by eight-car units under the global responsibility scenario.		
	30-year appraisal	**Continued Profligacy - £million (2002 PV)**	**Global Responsibility £million (2002 PV)**
	Costs (present value)		
	Investment cost	0	0
	Operating cost	27.3	54.5
	Revenue	-29.8	-44.6
	Other Government impacts	6.0	8.9
	Total costs	**3.4**	**18.8**
	Benefits (present value)		
	Rail users benefits	27.4	41.5
	Non users benefits	9.3	13.9
	Current TOCs revenue	0	0
	Current TOCs/NR opex	0	0
	Total quantified benefits	**36.7**	**55.4**
	NPV	**33.3**	**36.6**
	Quantified BCR	**>5.0**	**2.9**
	A sensitivity analysis was undertaken assuming that the services between Manchester Airport and Edinburgh Waverley are lengthened to 8-cars using 16 additional vehicles under the continued profligacy scenario as it is recognised that if the rolling stock is cascaded in four-car formation and not reconfigured, then six-car operation would not be possible. This reduced the BCR to 1.5 which is deemed to be medium value for money. The business case only includes the costs and benefits of these additional vehicles on Fridays and weekends. In practice these vehicles are likely to also be operated Monday to Thursday, or at worst require stabling at a depot when not utilised. It is expected that the cost of operating these vehicles on the network on Mondays to Thursdays will be less then the revenue and benefits generated.		
Link to other options/ gaps			
Conclusion	It is recommended that all Manchester Airport to Edinburgh Waverley services are lengthened to up to eight-cars in length on Fridays and weekends as demand develops.		

2. Freight capacity and capability

The assessment of capacity to accommodate freight growth based on the SFN 2019 and 2030 forecasts found that there is sufficient capacity for the additional timetable slots required (expressed as train paths per day). The assessment assumed that the efficiencies anticipated are delivered, and that there are no significant effects on freight capacity, caused by more passenger trains or amended timetables, such as those recommended in this RUS.

When assessing freight on the route, the RUS has used the SFN assumptions discussed in **Chapter 3** which entail the following:

- six-day working
- 640m train lengths conveying more volume.

These assumptions are based on establishing the market potential, whilst noting that the longer-term aspiration of freight operators is to run 775m trains. These efficiencies reduce the number of additional timetable slots required. The SFN assumptions adopted are fundamental to this outcome and this also assumes that the committed CP4 interventions on the route detailed in **Chapter 4** will be implemented. If the assumptions of longer trains and six-day working, which are not currently funded industry outputs, do not materialise then these findings will have to be reviewed as more paths may be required than outlined in the SFN forecasts.

However, some areas of the route were raised by stakeholders as being constraints on the network and are outlined below in gaps **FC1** to **FC4**. The section of route north of Preston is a two track railway and covers some steep topography. Stakeholders were particularly concerned about the capability of this section of route to be able to accommodate the SFN growth forecast along with the possible changes to passenger services that may emerge over the RUS period. It was therefore subject to further analysis for the final RUS. The results of this work are reported below under **FC5**: Capacity north of Preston.

Gap FC1: Insufficient freight capacity, specifically in the Stafford area and at Carlisle

The assessment of available access identifies sufficient capacity for freight as outlined in the freight capacity and capability section. Delivery of the Stafford area capacity enhancement schemes are necessary for freight growth in this area and are assumed as being committed in the baseline.

In addition, the very slow linespeeds throughout Carlisle Kingmoor Yard constrain capacity as services have to reduce speed to approach the junction. This issue will be exacerbated as freight trains become longer and therefore take longer to clear the junction. It is recommended that improvements are considered in Control Period 5.

Gap FC2: Insufficient routes gauge cleared to W12

W12 gauge clearance is the aspiration of the SFN for the WCML. It is Network Rail's policy to introduce W12 gauge clearance where possible when any structure is renewed or built on the route. The RUS supports this principle.

Gap FC3: Insufficient diversionary W10 cleared routes West Coast Main Line to Liverpool

The scheme to deliver the electrification of the Chat Moss route between Manchester and Liverpool via Earlestown is specified to deliver a diversionary route into the Liverpool area as part of the baseline. It is anticipated that this project will be delivered in two sections, between Manchester and the WCML by December 2013 with the western section from the WCML into Liverpool by December 2014. Any new structures built will be to the W12 gauge requirement.

Gap FC4: Insufficient capacity accessing Nuneaton from the Coventry corridor

The three track section between Brinklow Junction and Attleborough South Junction, just north of Rugby, is considered to be a constraint on timetable development of the route. Four tracking this section would be expensive and is not likely to have a business case. Another option considered was to operate northbound freight services via Coventry and Nuneaton. However, this could potentially move the constraint to Coventry where diverted services would have to cross an intensive southbound passenger service. Accessing the northbound slow line at Nuneaton is a constraint as the Coventry to Nuneaton passenger service has a long turnround in the bi–directional Platforms 1 or 2 at Nuneaton which could conflict with these rerouted freight services. As it is anticipated that the amount of freight growth can be accommodated on the core route this option is not recommended.

Gap FC5: Capacity north of Preston

Operational analysis has been undertaken to assess the extent of the impact of freight growth both on the current timetable and of the options examined in the RUS regarding alterations to passenger services. An off-peak hour from the December 2010 timetable containing the highest number of freight services was analysed. The SFN assumptions of 640m freight trains and six-day terminal operation used in the RUS process mean that no additional daytime paths are required, but existing services are both longer and heavier.

Other assumptions used for this work include:

- Class 4 intermodal services to run at 1600 tonnes
- Class 6 (excluding coal) services to run at 2000 tonnes
- traction type to be tested as an operational sensitivity.

Based on these assumptions, it is possible to accommodate the majority of services running with heavier payloads than today by altering the loops used (and additional looping). However, the majority of the loops along the route are not long enough for 640m trains and therefore interventions would be required to mitigate this as demand develops and the train lengths increase.

The main constraining locations include the climbs to Shap and Beattock summits[7]. The extended running times for heavier trains can be partially or wholly offset by using more powerful traction which would reduce the amount of looping required.

The amendments required as a result of options to change the passenger services examined in this RUS have a negligible impact on these findings. It is possible to rearrange the location at which trains are looped if the option to accelerate London to Glasgow services is implemented.

The type of traction used on freight services makes a considerable difference to freight journey times as a result of the steep topography on the route. This has a consequent effect on overall capacity as the speed differential between freight and passenger services widens. Conversion of freight services to electric traction would benefit both end to end journey times for freight and the amount of available capacity for both freight and passenger services. However, for this to be a viable proposition in the future the RUS recommends that consideration is given to the linking of freight terminals to the electrified network, along with further infill electrification to allow electric operation from origin to destination, as changing traction type en-route is costly both economically and in terms of overall journey times. The established Network RUS: Electrification Strategy considers the case for further electrification of the network and this RUS supports that strategy.

This work was undertaken on the scenarios and assumptions outlined above which has resulted in the listed interventions being identified. However, it is recognised that the type of interventions required to provide additional capacity may vary depending on what timetable, traction type and train length are assumed. For this reason, further work is being undertaken on the route north of Preston to look at alternative scenarios to those outlined above, including the introduction of additional Anglo Scottish passenger services on the route upon completion of the high speed line, Manchester Airport to Scotland services potentially being operated by 110mph rolling stock and the impact of running 775m freight trains. This study has been initiated by the SFN and work completed in the RUS has formed an input to be expanded upon. Any interventions found to be necessary north of Preston will then be appraised to determine whether there is a value for money case to undertake any work.

3. Journey time

Gaps JT1 and JT2: Inadequate journey times between London and Scotland and London and Manchester

A number of stakeholders (including funders) believe that journey times between London and Scotland and London and Manchester are too slow relative to the requirements of the market. Given the current economic climate, funding for infrastructure schemes is likely to be limited, therefore the options considered for decreasing journey times relate to the removal of station stops from the service pattern or increasing the service in frequency, thus providing an improvement in generalised journey time[8].

Options considered for addressing this gap are:

Gap	Option Reference	Option
JT1	JT1.1	Faster journey times between London Euston and Glasgow Central – 248 minutes
	JT1.2	Faster journey times between London Euston and Glasgow Central – 254 minutes
JT2	JT2.1	Faster journey times between London Euston and Manchester Piccadilly

7 Hills in Cumbria and South Lanarkshire resulting in the railway over this section being at a steep incline.

8 Generalised journey time represents the total journey time experienced by rail passengers, including the in-vehicle time and penalties for wait time, calculated by considering frequency of service and interchange requirements.

Following the introduction of the additional Class 390 vehicles on the WCML it is possible to optimise the fleet requirements of the InterCity West Coast franchise. This will potentially enable the introduction of one additional inter-peak hourly service, which will provide the opportunity to address the journey time and crowding gaps identified on the WCML on the LDHS services. Three possible options have been developed which can utilise this spare rolling stock.

The first option assessed under option **JT1.1** is the removal of all calls apart from Preston in the inter-peak London Euston to Glasgow Central services, thereby reducing the London Euston to Glasgow Central journey time by 23 minutes to 248 minutes. The lost connectivity to Warrington Bank Quay and Wigan North Western would be replaced with a new inter-peak service between London Euston and a North West location (beyond Preston). This service could additionally call at a number of intermediate stations, including Watford Junction, Milton Keynes Central, Rugby, Nuneaton, Tamworth, Lichfield and Crewe. These service changes would provide greater journey opportunities and redistribute passengers for the intermediate stops and therefore reduce crowding which would help meet gap **OC3** (long distance on train crowding to/from London Euston). This option would provide faster services between London and Glasgow, and provide additional connectivity between Watford Junction, Milton Keynes Central, Rugby, the Trent Valley and the North West.

The option was appraised in the Draft for Consultation and was found to have the weakest case of the three options considered to address the gap **JT1** (inadequate journey times between London and the North West) and **OC3** (long distance on-train crowding to/from London Euston). This is because the journey time of the additional inter-peak service was unattractive and the disbenefit to passengers from the loss of connectivity at stations between Preston and Glasgow was high. This analysis has therefore not been updated for the RUS as options **JT1.2** (faster journey times between London and the North West) and **JT2.1** (faster journey times between London Euston and Manchester Piccadilly) are superior in terms of the economic benefits they generate.

The second option assessed as **JT1.2** is the removal of stops at Warrington Bank Quay and Wigan North Western and alternately Lancaster or Carlisle from the inter-peak London Euston – Glasgow Central services, thereby reducing the London – Glasgow journey time by 17 minutes to 254 minutes. Oxenholme Lake Distict and Penrith would be served at the same frequency from London as now. The lost connectivity to Warrington Bank Quay and Wigan North Western would be replaced with a new inter-peak service to or from London, **OC3.2** (introduction of additional hourly inter-peak service from London Euston to the North West) which would provide greater journey opportunities and reduce crowding.

The third option assessed as **JT2.1** is to increase the inter-peak London Euston to Manchester Piccadilly service frequency from three to four trains per hour on an even frequency, with the new service calling only at Stockport offering a fast 1 hour 58 minute journey time to Manchester Piccadilly. Increasing the London Euston to Manchester Piccadilly service frequency means that the 11-car train units on this corridor can be replaced by nine-car units. This will release the 11-car units to address overcrowding elsewhere on the LDHS services. This has been outlined under option **OC3.3** (Introduction of additional hourly inter-peak service from London Euston to Manchester).

Analysis of the business case for options **JT1.2** and **JT2.1** in the Draft for Consultation using conceptual journey times (assuming conflict-free timetable slots can be identified) showed that both options had a high value for money business case. However based on the current timetable neither option is currently recommendable. In the case of option **JT1.2** (faster journey times between London Euston and Glasgow Central) this is because of the unattractive journey times arising from the lack of conflict-free timetable slots, particularly in the southbound direction, for the additional hourly inter-peak service from the North West. This causes the business case to drop to low value for money, even after including the benefits to passengers from reduced crowding and including the additional passengers that would transfer to rail from air due to improved journey time (modal shift). In the case of option **JT2.1** (faster journey times between London Euston and Manchester Piccadilly), an even frequency four trains per hour service would require the timetable to be restructured.

More expensive incremental capacity improvements have not been considered in detail as Network Rail, High Speed Two Limited and the DfT have already examined capacity options and concluded that a new line is the best value for money strategy.

The table for option **JT1.2** (improved journey times between London Euston and Glasgow Central) contains the detailed appraisal.

Assessment of option JT1.2 – faster journey times between London Euston and Glasgow Central – 254 minutes

Gap being addressed

Inadequate journey times between London and Scotland and provide additional capacity between London and the North West on long distance services.

Concept

Provide a faster London Euston to Glasgow Central service by altering the calling pattern of the existing hourly service by removing calls at Warrington Bank Quay and Wigan North Western, and Lancaster in one hour and Carlisle in the alternate hour with calls at Oxenholme Lake District and Penrith maintained at the existing frequency. Based on the current timetable, this results in a journey time of between 255 minutes and 264 minutes (saving between 16 and 7 minutes in total).

To provide additional capacity between London and the North West (beyond Preston) and to compensate for the loss of frequency at Warrington Bank Quay and Wigan North Western, run additional hourly services to a northern destination (**OC3.2**). Liverpool was tested as an alternative destination in the Draft for Consultation but had a weaker business case as passengers at Warrington Bank Quay and Wigan North Western would not be compensated for the loss of service frequency.

Destinations may include Blackpool, Lancaster or other North West destinations beyond Preston, dependent on the value of the market.

This service has been tested with a two hourly stopping pattern outlined below:

- First hour: London Euston, Milton Keynes Central, Nuneaton, Warrington Bank Quay, Wigan North Western and Preston
- Second hour: London Euston, Milton Keynes Central, Rugby, Tamworth, Crewe, Warrington Bank Quay, Wigan North Western and Preston

Operational analysis

Timetable analysis shows that journey times between London and Glasgow vary due to a number of factors such as stopping patterns. The journey times are between 255 and 258 minutes in the northbound direction and 258 and 264 minutes in the southbound direction based on the current timetable.

	Northbound	Southbound
with Lancaster stop	258 minutes	264 minutes
with Carlisle stop	255 minutes	258 minutes

Timetable analysis shows that journey times for the tested stopping patterns for **OC3.2** (additional hourly service from London Euston to the North West) based on the current timetable between London Euston and Preston are:

	Northbound	Southbound
First hour	145 minutes	150 minutes
Second hour	148 minutes	157 minutes

The differences in the journey times arise from conflicts within the current timetable. This compares with estimated journey times of 136 minutes if a conflict free timetable could be identified, as outlined in the Draft for Consultation.

Note, an alternative stopping pattern for the additional service from London Euston to the North West was considered calling at additional intermediate locations. However the resultant journey time was unattractive.

Infrastructure required

The appraisal assumes that the Stafford Area Improvement scheme, where the current junction at Norton Bridge is grade separated, has been implemented. This is a Control Period 5 (CP5) scheme, expected to be delivered by 2017.

Passenger impact

Passenger impacts are:

- improved journey times between London, Preston and Glasgow
- overcrowding is reduced as a consequence of redistributing London – North West passengers over twice as many trains
- increased service frequency for stations between London and Milton Keynes Central, Rugby, Nuneaton and Preston
- passengers travelling between Glasgow Central and Carlisle, Lancaster, Warrington Bank Quay and Wigan North Western will have reduced opportunities to travel directly between these stations
- increased journey times for passengers travelling between Warrington Bank Quay and Wigan North Western to London Euston
- improved connectivity between Milton Keynes Central, Rugby, Nuneaton and the North West.

Assessment of option JT1.2 – faster journey times between London Euston and Glasgow Central – 254 minutes		
Freight impact	There are a number of freight conflicts when overlaying these services on the current timetable. However, the Stafford Area improvement scheme will facilitate this option as it will provide an opportunity to identify less constrained timetable slots. Changing the pattern of passenger services north of Preston may impact freight timetable slots.	
Financial and economic analysis	The main costs relate to mileage and train crew. The following table outlines the appraisal results:	
	10-year appraisal period	**Hourly north west including modal shift and crowding benefits £million (2002 PV)**
	Costs (present value)	
	Investment cost	0
	Operating cost	69.5
	Revenue	-29.4
	Other Government impacts	4.4
	Total costs	**44.5**
	Benefits (present value)	
	Rail users benefits	23.9
	Non users benefits	10.0
	Current TOCs revenue	0
	Current TOCs/NR opex	0
	Total quantified benefits	**33.9**
	NPV	**-10.6**
	Quantified BCR	**0.8**
	The market between London and Glasgow is dominated by domestic air competition. In this market rail demand is expected to be more responsive to journey time improvements. The Draft for Consultation produced a sensitivity analysis using a higher journey time elasticity on rail flows between London and Glasgow to estimate the potential additional demand that could be expected in this situation. During the consultation period additional research was undertaken to further understand the impact of rail journey time changes between city pairs which have air competition. This showed that there was a strong relationship between the degree of air competition on the route and the level of unexplained rail demand growth. Linear regression analysis was undertaken to estimate the likely journey time elasticity and the resultant additional passengers have been included in this appraisal. Based on the current timetable this option does not provide value for money even after including the crowding and modal shift benefits. However, if the journey times assumed in the Draft for Consultation (254 minutes between London Euston and Glasgow Central and 136 minutes between London Euston and Preston) were achieved, the business case improves considerably, with a BCR of greater than 2.0. Note: The additional service between London Euston and the North West can be operated within the baseline fleet. The DfT have advised that the leasing costs for operating this service should not be considered as all additional vehicles have already been procured and are committed.	

Assessment of option JT1.2 – faster journey times between London Euston and Glasgow Central – 254 minutes	
Link to other options/ gaps	**OC3.2:** Introduction of additional hourly inter-peak service from London Euston to the North West. **JT1.1:** Faster journey times between London Euston and Glasgow Central – 248 minutes. **JT2.1:** Faster journey times between London Euston and Manchester Piccadilly. **Gap JT3:** Inadequate journey times between London/the North West and Nuneaton/ Lichfield/Tamworth. **Gap JT5:** Inadequate journey times between London and Rugby. **Gap RL5:** Lack of direct services between Milton Keynes and the North West. **Gap RL7:** Lack of direct services between Rugby and the North West.
Conclusion	This option alleviates crowding and facilitates faster journey times between London Euston and Preston/Glasgow Central. Based on the current timetable this option does not provide value for money despite including the crowding and modal shift benefits. This is because of the unattractive times arising from the lack of a conflict-free path for the additional hourly inter-peak service to the North West. However if a conflict-free timetable slot could be identified the option has a high value for money business case and therefore should be examined further. The recent ORR decision on Track Access applications tasked Network Rail to lead an Industry Timetable Working Group. This group will lead an iterative review of the WCML timetable; the first stage is expected to inform the December 2013 timetable. This may present an opportunity to identify a conflict-free timetable slot in order to achieve the journey times assumed in the Draft for Consultation. This option is therefore recommended for further consideration, along with option **JT2.1** (faster journey times between London Euston and Manchester Piccadilly).

The alternative option to utilise the spare resource identified following an effective deployment of the fleet is to provide an additional hourly inter-peak service between London Euston and Manchester Piccadilly. The appraisal for this is detailed in the option table for option **JT2.1** (faster journey times between London Euston and Manchester Piccadilly).

Assessment of option JT2.1 – faster journey times between London Euston and Manchester Piccadilly	
Gaps being addressed	Faster journey times between London and Manchester and long distance on-train crowding to/from London Euston.
Concept	Provide additional on-train capacity by running an additional hourly inter-peak service from London Euston to Manchester Piccadilly to create an even 15 minute frequency. The new service would ideally achieve a total journey time of 118 minutes, by only calling at Stockport and Manchester Piccadilly.
Operational analysis	Following the introduction of an additional hourly inter-peak service, all London Euston to Manchester Piccadilly services during this time could be operated using nine-car Class 390 units. This would release the 11-car Class 390 units to be utilised on other busy LDHS services to or from London Euston. Timetable analysis shows that this cannot be accommodated based on the current timetable, but may be possible following a timetable recast. Analysis also suggests that it would be difficult to accommodate this additional service at Manchester Piccadilly and on the busy section between Stockport and Manchester Piccadilly based on the current infrastructure. However, some of the conflicts at Manchester Piccadilly may be eased upon the implementation of the Ordsall Chord.
Infrastructure required	The appraisal assumes that the Stafford Area Improvement Scheme, where the current junction at Norton Bridge will be grade separated, has been implemented. This is a CP5 scheme, expected to be delivered by 2017. The implementation of the Ordsall Chord in December 2016 will improve the operability of both the platforming and approaches to Manchester Piccadilly station.

Assessment of option JT2.1 – faster journey times between London Euston and Manchester Piccadilly	
Passenger impact	Passenger impacts are: • reduced crowding on LDHS service to or from London Euston • faster journey times between London Euston and Manchester Piccadilly.
Freight impact	Freight operations would need to be considered if the timetable was recast.
Financial and economic analysis	This option would require a timetable recast to achieve a four trains per hour even frequency. The recent Office of Rail Regulation (ORR) decision on Track Access applications tasked Network Rail to lead an Industry timetable Working Group. This group will lead an iterative review of the West Coast Main Line timetable; the first stage is expected to inform the December 2013 timetable. This may present an opportunity to identify a timetable slot which will achieve the journey times assumed in the Draft for Consultation (118 minutes between London and Manchester) and allow an even interval pattern for the fourth train per hour. The Draft for Consultation produced a sensitivity analysis based on the potential additional demand that could be expected from the improved journey time between Manchester and London as a result of modal shift using higher journey time elasticity on these rail flows. During the consultation period additional research was undertaken to further understand the impact of rail journey time changes between city pairs which have air competition. This showed that there was a strong relationship between the degree of air competition on the route and the level of unexplained rail demand growth. Linear regression analysis was undertaken to estimate the likely journey time elasticity and the resultant additional passengers have been included in this appraisal. The option continues to have a BCR of greater than 2.0 if the conceptual journey times can be achieved. This offers a high value for money business case.
Link to other options/ gaps	**JT1.1:** Faster journey times between London Euston and Glasgow Central – 248 minutes. **JT1.2:** Faster journey times between London Euston and Glasgow Central – 254 minutes. **OC3.3:** Introduction of additional hourly inter-peak service from London Euston to Manchester Piccadilly.
Conclusion	This option alleviates crowding and facilitates faster journey times between London Euston and Manchester Piccadilly, but would require a timetable recast to achieve the even frequency of services. If a conflict free timetable slot could be identified the option has a high value for money business case and should be examined further. The December 2013 timetable may present an opportunity to identify a timetable which will meet the required criteria. This option is therefore recommended for further consideration, along with option **JT1.2** (faster journey times between London Euston and Glasgow Central).

Gap JT3: Inadequate journey times between London/the North West and Nuneaton/Lichfield/Tamworth

With the implementation of the December 2008 timetable, a number of station calls in various services were withdrawn in order to speed up end-to-end journey times. An alternative semi-fast interurban service between London Euston to Crewe was introduced, calling at most intermediate stations north of Northampton. Although this maintained a degree of connectivity, it also increased journey times to/from a number of stations (except during peak hours where station calls were maintained on LDHS services to/from London Euston).

Options considered to address this gap are:

Gap	Option Reference	Option
JT3	JT3.1	Divert the London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe
	OC3.2	Introduction of additional hourly inter-peak service from London Euston to the North West

Option **JT3.1** considers reducing the journey time on the existing London Euston to Crewe interurban services by rerouteing them to the main line from Stafford direct to Crewe, not calling at Stone, Stoke-on-Trent, Kidsgrove and Alsager. Then extending the service group to the North West rather then terminating at Crewe. This is detailed in option **JT3.1** and illustrated in **Figure 5.2**.

Assessment of option JT3.1 – divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe	
Gap being addressed	Faster journey times between London/North West and Nuneaton/Lichfield/Tamworth.
Concept	This option has two stages: Stage one diverts the existing London Euston to Crewe interurban service from Stafford direct to Crewe via the WCML, not calling at Stone, Stoke-on-Trent, Kidsgrove and Alsager giving a journey time saving. Stage two extends the service to Liverpool Lime Street via Runcorn to optimise fleet utilisation. This is illustrated in **Figure 5.2**.
Operational analysis	Timetable analysis undertaken during the consultation period has identified potential timetable slots within the current timetable structure, including capacity at Liverpool Lime Street. However, due to some conflicts there has been a reduction in the journey time savings compared to those assumed in the Draft for Consultation. Timetable analysis shows that diverting the service on to the mainline gives a journey time saving of 20 minutes.
Infrastructure required	The appraisal assumes that the Stafford Area Improvement Scheme, where the current junction at Norton Bridge is grade separated, has been implemented. This is currently a CP5 scheme, expected to be delivered by 2017.
Passenger impact	Passenger impacts are: • faster journeys from Trent Valley stations between Rugby and Stafford to the North West • direct services between the North West and stations south of Crewe ie between Liverpool Lime Street and Milton Keynes Central/Watford Junction • provides an additional direct hourly service between London Euston and Liverpool Lime Street • disbenefit to passengers travelling between local stations around Stoke-on-Trent • removes all services from Stone.
Freight impact	There are a number of freight conflicts which should be considered as part of the timetable development when grade separation at Norton Bridge is implemented.

Assessment of option JT3.1 – divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe	
Financial and economic analysis	The main costs relate to mileage. There are no additional rolling stock or train crew requirements as the diversion away from Stoke-on-Trent offsets the additional costs of extending the service. However, there is a subsequent reduction in connectivity at stations around Stoke-on-Trent and therefore the option is developed further and appraised as a combination package. This is shown as **JT4.2:** (North West) package. The following table shows the combined appraisal result for Option **JT3.1** stage 1 and stage 2:

10-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	5.1
Revenue	-3.7
Other Government impacts	0.6
Total Costs	**2.0**
Benefits (present value)	
Rail users benefits	3.2
Non users benefits	1.7
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	**4.9**
NPV	**2.9**
Quantified BCR	**2.4**

	Note: As a sensitivity the economic appraisal considered routeing stage two to Liverpool Lime Street via Warrington Bank Quay (rather than Runcorn). This reduced the business case to low value for money and so was discounted from the timetable analysis. This is due to the higher costs associated with this option as it incurs additional rolling stock and crew costs.
Link to other options/ gaps	**JT4.2:** North West Package. **RL3.1:** Lengthen and extend existing Derby to Crewe service to Manchester Airport. **RL2.1:** Divert one of the two existing Birmingham New street to Liverpool Lime street services to Preston.
Conclusion	This option has a good value for money business case but cannot be recommended in isolation due to the disbenefits to the passengers around the Stoke-on-Trent area, in particular passengers at Stone who would lose all services if this option was implemented. The alternative option of running the service on its existing routeing via the Stoke-on-Trent loop and extending it to Liverpool Lime Street may be possible subject to finding a suitable timetable slot and business case analysis in the future. It is recommended that this option is developed further as part of the combination option presented in **JT4.2** (North West Package), which aims to replace the lost connectivity on the Stoke-on-Trent corridor.

The second option to address this journey time gap considers an additional hourly LDHS service between London and the North West calling at stations including Nuneaton outlined in option **OC3.2** (introduction of additional hourly inter-peak service from London Euston to the North West). This option has a poor value for money business case in the current timetable structure, but would have a good value for money case if the journey time assumed in the Draft for Consultation for accelerated London to Glasgow services was achieved. If this option was implemented, it would provide the journey time and connectivity benefits between Nuneaton and the North West. This option can be implemented in conjunction with option **JT3.1** (introduction of additional hourly inter-peak service from London Euston to the North West) subject to business case analysis.

Gap JT4: Inadequate journey times between Birmingham and Manchester

There is a stakeholder aspiration to improve connectivity and journey times between Birmingham and Manchester. This corridor is served by two LDHS services an hour, one originating in Bournemouth and the other in Bristol. These two services have different journey times from Birmingham New Street to Manchester Piccadilly due to constraints on the corridor via Stoke-on-Trent. The Bristol service has a journey time of 89 minutes northbound and 92 minutes southbound while the Bournemouth service has a journey time of 102 minutes northbound and 91 minutes southbound. The preferred option (in terms of providing maximum financial and economic benefits) requires alteration to one of the existing Birmingham to Manchester LDHS services. This is detailed in option **JT4.1** and illustrated in **Figure 5.2**.

Assessment of option JT4.1 – reroute existing LDHS service between Birmingham and Manchester to operate via Crewe	
Gap being addressed	Faster journey times between Birmingham and Manchester.
Concept	Improve journey times between Birmingham and Manchester by diverting one of the two existing LDHS services between Birmingham New Street and Manchester Piccadilly (the service from Bournemouth) from the Stoke-on-Trent route to operate via Wilmslow. This is illustrated in **Figure 5.2**.
Operational analysis	Timetable analysis shows that diverting the Bournemouth to Manchester Piccadilly service to operate via Wilmslow will reduce the journey time in the northbound direction between Birmingham and Manchester to 84 minutes, saving 18 minutes. The analysis shows that diverting via Wilmslow results in a number of conflicts with the current timetable, which particularly affect the southbound timetable slot. This results in the southbound slot achieving no journey time savings. The analysis also shows that the service cannot call at Stafford due to timetable constraints and requires that the service must be operated by 125mph rolling stock with Enhanced Permissible Speed capability. It is noted that journey time savings may be possible from the existing service without the need for diversion if pathing time or similar allowances could be removed. This should be considered as the WCML timetable goes through the iterative process of timetable change. However, the diversion is expected to provide greater journey time savings.
Infrastructure required	The appraisal assumes that the Stafford Area Improvement Scheme, where the current junction at Norton Bridge is grade separated, has been implemented. This is a CP5 scheme, expected to be delivered by 2017.
Passenger impact	Faster journey times between Birmingham and Manchester, however, there is a loss of connectivity for passengers around the Stoke-on-Trent area.
Freight impact	The majority of conflicts are resolvable. However, this should be further examined during the timetable change process.

Assessment of option JT4.1 – reroute existing LDHS service between Birmingham and Manchester to operate via Crewe		
Financial and economic analysis	The table outlines the appraisal results	
	10-year appraisal	**£million (2002 PV)**
	Costs (present value)	
	Investment cost	0.0
	Operating cost	0.0
	Revenue	3.4
	Other Government impacts	-0.6
	Total costs	**2.8**
	Benefits (present value)	
	Rail users benefits	-6.8
	Non users benefits	-1.9
	Current TOCs revenue	0.0
	Current TOCs/NR opex	0.0
	Total quantified benefits	**-8.7**
	NPV	**-11.5**
	Quantified BCR	**Financially and economically negative**
Link to other options/ gaps	**JT3.1:** Divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe **JT4.2:** North West Package	
Conclusion	This option facilitates faster journey times between Birmingham New Street and Manchester Piccadilly. The theoretical journey time saving cannot be realised on the current timetable due to conflicts, particularly in the southbound direction. Due to the journey time savings not being as significant as assumed in the Draft for Consultation, the disbenefits to passengers resulting from the loss of connectivity around the Stoke-on-Trent area outweigh the overall benefits. This option does not provide value for money and so is not recommendable under the current DfT appraisal criteria. However if an improved timetable slot could be identified the option is expected to have a high value for money business case and should be examined further as shown in the Draft for Consultation. The recent ORR decision on Track Access applications tasked Network Rail to lead an Industry Timetable Working Group. This group will lead an iterative review of the West Coast Timetable; the first stage is expected to inform the December 2013 timetable. This may present an opportunity to identify a timetable slot to achieve the journey times assumed in the Draft for Consultation. If this is possible, this option is recommended for further development as part of option **JT4.2** (North West Package) as the implementation of this option would reduce connectivity on the Stoke-on-Trent corridor, which **JT4.2** (North West Package) aims to address.	

The proposal in option **JT3.1** to reroute the London Euston to Crewe interurban service via the WCML between Stafford and Crewe, creates a gap in the level of service between the Stoke-on-Trent area and the West Midlands. It also removes all services from Stone station. A combined option which captures the journey time benefits of option **JT3.1** while seeking to reduce the disbenefits to passengers in the Stoke-on-Trent area has therefore been appraised. This option also incorporates option **RL3.1** the extension of the Derby to Crewe services to Wilmslow and Manchester Airport in order to provide a direct service from the East Midlands and towns in the Stoke-on-Trent area to Manchester Airport. In the Draft for Consultation, this North West Package included option **JT4.1** (reroute the existing long distance high speed service between Birmingham and Manchester to operate via Crewe and Wilmslow) as it had a positive business case based on estimated journey times and reduced connectivity to the Stoke-on-Trent corridor which the North West package addressed. However, as described in the assessment of this option, the estimated journey time savings cannot be realised in the current timetable structure and so this option no longer provides a high value for money business case.

Therefore, the diversion of the LDHS service between Birmingham and Manchester has been removed from the North West Package for the purpose of the assessment below. The new combined option is described under **JT4.2** - North West Package.

Assessment of option JT4.2 – North West Package	
Gap being addressed	Reduced capacity between Birmingham New Street, Stafford, Stoke-on-Trent and Macclesfield (created through option **JT3.1** – divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe) Connectivity between Stoke-on-Trent and Manchester Airport (option **RL3.1**).
Concept	Divert the existing London Euston to Crewe interurban service via the WCML, and extend to Liverpool Lime Street, in order to improve connectivity and reduce journey times from the Trent Valley stations to the North West (option **JT3.1**). Provide an additional hourly service between Birmingham and Stoke-on-Trent by extending the Walsall – Birmingham New Street – Wolverhampton service to Manchester Piccadilly or Crewe in order to address the connectivity gap created by option **JT3.1**. Lengthen and extend the existing Derby to Crewe service to Manchester Airport in order to improve connectivity between the Stoke-on-Trent region and the airport (option **RL3.1**). This is illustrated in **Figure 5.2**.
Operational analysis	Timetable analysis undertaken during the consultation period has identified potential timetable slots within the current timetable, including the capacity at Liverpool Lime Street to enable the London Euston to Crewe interurban service to be extended. However, due to some conflicts in the current timetable there has been a reduction in the journey time savings achievable compared to those assumed in the Draft for Consultation. Timetable analysis shows that diverting the service on to the mainline gives a journey time saving of 20 minutes. Although this option provides high value for money, it reduces the connectivity on the Stoke-on-Trent corridor and removes all services from Stone station so is not recommended unless this connectivity can be replaced. During the consultation period timetable analysis was undertaken to assess the feasibility of the options presented in the Draft for Consultation to provide an additional hourly service between Birmingham and Stoke-on-Trent by extending the current Manchester Piccadilly to Stoke-on-Trent service on to Birmingham New Street. The analysis found that due to constraints in the current timetable this was not a feasible solution. Therefore, an alterative solution involving the extension of the Walsall – Birmingham New Street– Wolverhampton service to Manchester Piccadilly or Crewe was considered. The analysis found that it was possible to path this service in the current timetable subject to the implementation of the Stafford Area Improvement Scheme where the current junction at Norton Bridge is grade separated. Timetable analysis undertaken during the consultation period for the option to extend the existing Derby to Crewe service to Manchester Airport (option **RL3.1**) has identified potential timetable slots within the current timetable.
Infrastructure required	The appraisal assumes that the Stafford Area Improvement Scheme where the current junction at Norton Bridge is grade separated has been implemented. This is a CP5 scheme, expected to be delivered by 2017.

Assessment of option JT4.2 – North West Package	
Passenger impact	Passenger impacts are: • faster journeys from Trent Valley stations between Rugby and Stafford to the North West • direct services between the North West and stations south of Crewe such as between Liverpool Lime Street and Milton Keynes Central/Watford Junction • provides an additional direct hourly service between London Euston and Liverpool Lime Street • disbenefit to passengers travelling between local stations around Stoke-on-Trent are reduced as a result of the extension of the Walsall – Birmingham New Street – Wolverhampton service to either Crewe or Manchester Piccadilly • improved connectivity for passengers between Manchester Airport and all stations on the Derby-Crewe line • improved on train capacity for passengers on the Derby – Crewe line • direct service between Stone and Birmingham New Street.
Freight impact	A number of potential conflicts with freight services arise in this package of options. Whilst the majority of these conflicts can be resolved, there is opportunity to resolve the remainder during the timetable changes associated with the implementation of the Stafford Area Improvement Scheme.
Financial and economic analysis	The following table outlines the appraisal results for the North West package

30-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	91.1
Revenue	-23.2
Other Government impacts	4.0
Total Costs	**71.8**
Benefits (present value)	
Rail users benefits	41.0
Non users benefits	11.7
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	**52.6**
NPV	**-19.2**
Quantified BCR	**0.7**

Extending the Walsall – Birmingham New Street – Wolverhampton service to Crewe instead of Manchester Piccadilly has a marginally positive impact to the business case as although the costs are considerably lower, the benefits have also reduced significantly as the additional service to Manchester Piccadilly has higher benefits to passengers than the service to Crewe.

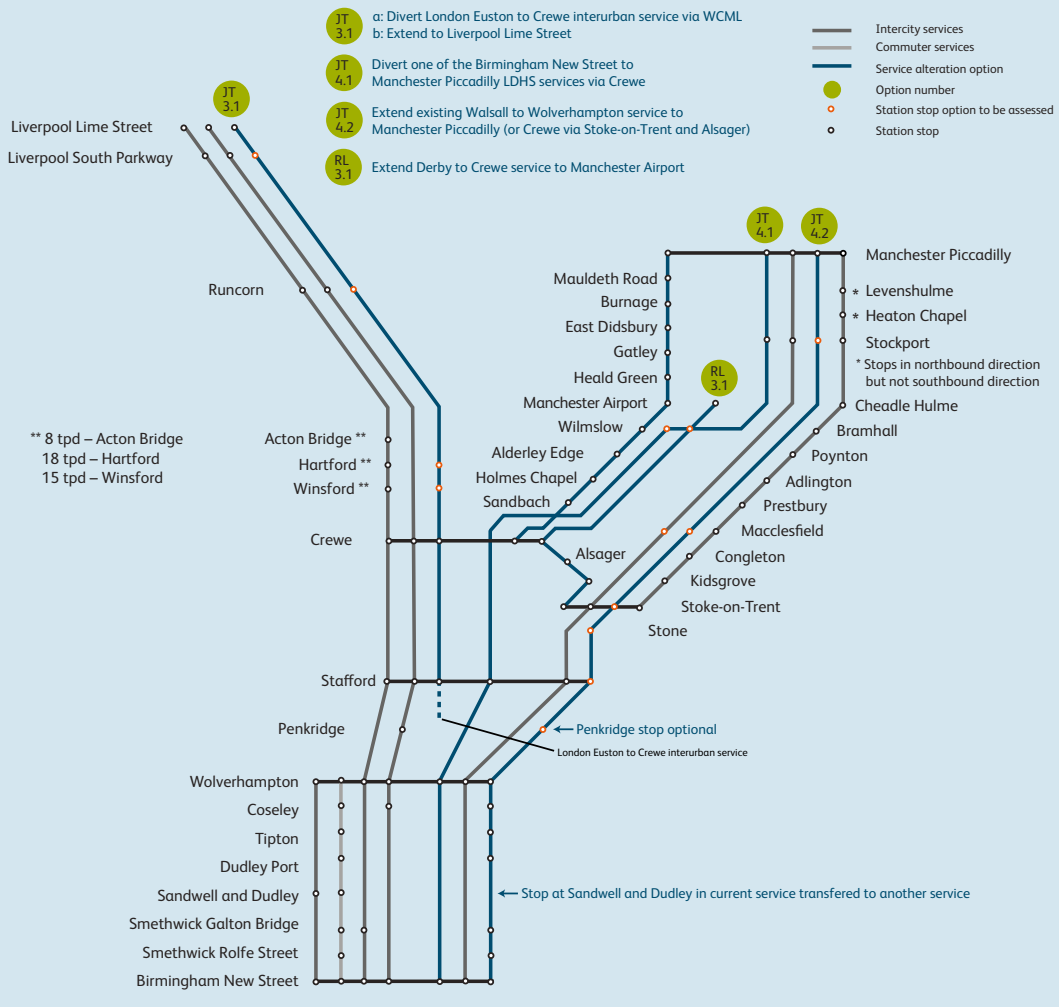
Note, including Option **JT4.1** (reroute existing LDHS service between Birmingham and Manchester to operate via Crewe) reduces this case further due to the unattractive journey time savings in the southbound direction based on the current timetable.

Link to other options/ gaps	**JT3.1:** Divert the existing London Euston to Crewe Interurban service to operate via the WCML between Stafford and Crewe. **RL3.1:** Extend existing Derby to Crewe service to Manchester Airport.

Assessment of option JT4.2 – North West Package

Conclusion	This option does not have a value for money business case as the cost of operating the extended Walsall to Birmingham New Street – Wolverhampton service far outweighs the journey time and connectivity benefits provided by the North West package under the current timetable structure. The option can therefore not be recommended under the current DfT appraisal criteria. Therefore, the extension of the London Euston to Crewe service to Liverpool Lime Street cannot be recommended as no value for money way has been identified to replace the connectiivity at Stone station and the rest of the Stoke-on-Trent corridor. It is recommended that the Industry Timetable Working Group considers how the connectivity could be replaced on this corridor which would then enable the London Euston to Crewe service to be diverted and extended. Also, if an improved timetable slot could be identified for Option **JT4.1** (reroute existing long distance high speed service between Birmingham and Manchester to operate via Crewe), it would be included in the North West package. The anticipated journey time savings would be sufficient to change the business case for the North West package to high value for money as shown in the Draft for Consultation. The recent ORR decision on Track Access applications tasked Network Rail to lead an Industry Timetable Working Group. This group will lead an iterative review of the WCML timetable; the first stage is expected to inform the December 2013 timetable. This may present an opportunity to identify a timetable slot to achieve the journey times assumed in the Draft for Consultation. This option is therefore recommended for further consideration in that process.

Figure 5.2 – illustration of options JT3.1, JT4.1, JT4.2 and RL3.1



Gap JT5: Inadequate journey times between London and Rugby

Following the implementation of the December 2008 timetable Rugby is served by an hourly fast service between Birmingham and London Euston, giving an average journey time of 50 minutes. Rugby is also served by the Birmingham New Street to London Euston interurban service and by the Crewe to London Euston interurban service giving journey times of around 1 hour and 20 minutes. Stakeholders feel that additional faster journeys between Rugby and London Euston would be desirable.

A number of options were considered to assess this gap from which the most viable options are:

Gap	Option Reference	Option
JT5	JT5.1	Additional stop at Rugby in existing LDHS service
	OC3.2	Introduction of additional hourly inter-peak service from London Euston to the North West

Option **JT5.1** considers calling the existing London Euston to Glasgow Central service additionally at Rugby. The analysis shows that the disbenefits to long distance passengers far outweigh the benefits to passengers at Rugby resulting in a net disbenefit and poor value for money business case and so this option is not recommended.

Option **OC3.2** introduces an additional inter-peak service between London Euston and the North West and is appraised as part of option **JT1.2** (improved journey times between London Euston and Glasgow Central). This option results in Rugby receiving an additional two hourly fast service to/from London Euston. Based on the current timetable, this option does not provide value for money and is not recommended for implementation as a conflict free timetable slot could not be identified, particularly in the southbound direction. However, as explained under option **JT1.2**, if the journey times for the additional hourly LDHS service between London and the North West can be improved, making the conceptual journey times from the Draft for Consultation achievable, this option would have a high value for money business case. It is recommended that this option is considered as part of the Industry Timetable Working Group.

Ultimately, the provision of a high speed line between London, Birmingham and the north towards the end of the RUS period, will provide significant amounts of extra capacity on the fast lines to be utilised by commuter services on the south end of the WCML.

4. Regional links

Gap RL1: Irregular service between London and Crewe via the Trent Valley during the peak in the northbound direction

Following the implementation of the December 2008 timetable, the new interurban service between London Euston and Crewe provides the Trent Valley local stations with an improved level of connectivity. However, this service is not currently operated in the evening peak, resulting in a large gap in service for passengers wishing to travel to one of the smaller stations from the south. Stakeholders feel that this is constraining growth at these stations. Nuneaton, Tamworth and Lichfield Trent Valley continue to receive a direct service from London Euston in the peaks as a number of the LDHS services call here.

The following three options have been considered:

Gap	Option Reference	Option
RL1	RL1.1	Additional stop at Trent Valley stations in existing LDHS service
	RL1.2	Provide an additional interurban service from London Euston to Stafford in the evening peak
	RL1.3	Extend two existing evening peak London Euston to Northampton service to Stafford

Option **RL1.1** considers calling the existing LDHS service between London Euston and Chester additionally at the smaller stations during the evening three-hour peak. The option results in an increase in journey times for the LDHS services which is expected to substantially outweigh the benefits to passengers at the smaller stations between Rugby and Rugeley Trent Valley. Since this option is not expected to offer value for money, it is not recommendable under the DfT appraisal criteria.

Option **RL1.2** in the Draft for Consultation considered providing an additional interurban service from London Euston to Stafford in the evening peak. Since the publication of the Draft for Consultation, the incumbent train operator has secured the rights for an additional service in the first shoulder-peak hour from Euston to Crewe from 2012.

Option **RL1.3** extends the existing London Euston to Northampton services northwards calling at local stations in the Trent Valley. Since the publication of the Draft for Consultation the incumbent train operator has secured the rights to operate two such services in the evening peak from 2012, in addition to the new service identified under option **RL1.2** (provide an additional interurban service from London Euston to Stafford in the evening peak).

Gap RL2: Lack of direct services between Winsford/Hartford and Warrington Bank Quay

Warrington Bank Quay station provides access to employment opportunities in Warrington for the residents of Winsford and Hartford. Currently there are no direct services between these locations, resulting in a total journey time of over one hour. Stakeholders feel that this is suppressing demand at these stations.

Options considered to address this gap are:

Gap	Option Reference	Option
RL2	**JT3.1 (sensitivity)**	Divert the existing London Euston to Crewe interurban service to operate via the West Coast Main Line between Stafford and Crewe and extend to Preston
	RL2.1	Divert one of the two existing Birmingham New Street to Liverpool services to Preston

Option **JT3.1** considered, as a sensitivity, extending the diverted interurban service between London Euston and Crewe to Preston, calling at Winsford, Hartford, Acton Bridge, Warrington Bank Quay and Wigan North Western instead of to Liverpool Lime Street via Runcorn. This is expected to provide a low value for money business case due to the high operating costs associated with this option. This option is therefore not recommended.

The alternative of diverting one of the two existing Birmingham New Street to Liverpool Lime Street trains per hour to Preston if the London Euston to Crewe interurban service is extended to Liverpool Lime Street via Runcorn was considered in option **RL2.1**. This option had a low value for money business case as the disbenefits to passengers travelling between Birmingham New Street and Liverpool Lime Street outweighed the benefits to passengers travelling between Birmingham New Street and Preston and is therefore not recommended.

Gap RL3: Lack of direct services between Manchester Airport and towns in the Potteries

Stakeholders expressed a desire to connect stations in the Potteries area with Manchester Airport. A number of options were existing to close this gap, which all involve extending estisting services to Manchester Airport. The table for option **RL3.1** outlines the best option in terms of a value for money business case. This extends the existing Derby to Crewe service to Manchester Airport. This service is currently provided by a one-car Class 153 unit. Analysis of passenger count data for the three months to December 2010 suggests that many of the services (especially around peak times at Derby) are expected to become overcrowded by 2024, with many passengers standing for over 20 minutes. Option **RL3.1** (lengthen and extend the existing Derby to Crewe service to Manchester Airport) is therefore undertaken in two stages, with stage one looking to lengthen six of the busiest services between Derby and Crewe using two additional vehicles. Stage two then considers extending this service to Manchester Airport.

Assessment of option RL3.1 – lengthen and extend the existing Derby to Crewe service to Manchester Airport	
Gap being addressed	Lack of direct services between Manchester Airport and towns in the Potteries.
Concept	Stage one considers using two additional vehicles to lengthen six of the busiest existing Derby to Crewe services. Stage two then extends this service to Manchester Airport. This is illustrated in **Figure 5.2**.
Operational analysis	Timetable analysis suggests that this option can be achieved in the current timetable. If only stage one is implemented then it is possible to split or join the additional vehicles at Crewe, thus reducing the overall operating cost as it means that two-car units will not need to be operated throughout the day. However it is not possible to undertake the splitting/joining operation if the service is extended to Manchester Airport thus resulting in fewer vehicles being available to use for lengthening. Both stages one and two are assumed to be implemented by 2018 with rolling stock being available.
Infrastructure required	None.
Passenger impact	Passenger impacts are: • additional on-train capacity for passengers as the busiest services are lengthened from one to two cars • provides an hourly service between the East Midlands, towns in the Potteries and Manchester Airport • provides two trains per hour between Crewe and Manchester Airport.
Freight impact	Potential impact on freight capacity between Crewe and Manchester Airport, which could be minimised with alterations to timings.
Financial and economic analysis	**Stage one appraisal:** The main costs relate to the leasing of rolling stock, and subsequent operating costs. This option lengthens six of the busiest services between Derby and Crewe using two additional vehicles. The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	4.6
Revenue	-1.9
Other Government impacts	0.4
Total Costs	**3.1**
Benefits (present value)	
Rail users benefits	3.4
Non users benefits	1.5
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	**4.9**
NPV	**1.8**
Quantified BCR	**1.6**

Assessment of option RL3.1 – lengthen and extend the existing Derby to Crewe service to Manchester Airport

Financial and economic analysis – continued

It is assumed that it is possible to split/join vehicles at Crewe, which reduces the operating costs as the lengthened services will not need to be operated as two-car units throughout the day. If option **JT3.1** (divert the existing London Euston to Crewe interurban service to operate via the West Coast Main Line between Stafford and Crewe) can be implemented, then the business case for lengthening rises to high value for money. This is because the lengthened Derby to Crewe service partially compensates the passengers between Stoke-on-Trent and Crewe who would have reduced overall capacity.

Stage two appraisal (combined with stage one):

The main costs relate to the leasing of rolling stock, and subsequent operating costs for lengthening of three of the busiest services using one additional vehicle. The extension to Manchester Airport incurs leasing costs of one additional vehicle, subsequent operating costs and crew costs. The extension to Manchester Airport makes it impractical to split/join the lengthened services at Crewe.

The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	17.3
Revenue	-6.0
Other Government impacts	1.1
Total Costs	**12.4**
Benefits (present value)	
Rail users benefits	11.2
Non users benefits	2.5
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	13.7
NPV	**1.4**
Quantified BCR	**1.1**

Note, the appraisal for stage two includes the crowding benefits from lengthening three of the busiest Derby to Crewe services by one vehicle.
A sensitivity analysis was undertaken, extending the existing Manchester Piccadilly to Crewe via Manchester Airport service to Stoke-on-Trent. This had a weaker business case as the extension of the Derby to Crewe service doubles the service frequency between Crewe and Manchester Airport.

Link to other options/ gaps

JT3.1: Divert the existing London Euston to Crewe interurban service to operate via the WCML between Stafford and Crewe.
JT4.1: Reroute existing LDHS service between Birmingham and Manchester to operate via Crewe.
JT4.2: North West Package.

Assessment of option RL3.1 – lengthen and extend the existing Derby to Crewe service to Manchester Airport	
Conclusion	Stage one provides a medium value for money business case to lengthen six Derby – Crewe services using two vehicles. It is recommended that this is implemented by 2018 or as soon as rolling stock becomes available. Stage two provides a low value for money business case to extend this service to Manchester Airport and so cannot be recommended under the DfT appraisal criteria. However, it is recommended that this option is developed further as a package under option **JT4.2** (North West Package) if the option to divert the London – Crewe interurban service is progressed as it replaces some of the lost connectivity to passengers on the Stoke-on-Trent corridor.

Gap RL4: Lack of direct services between Watford Junction and the North West

Analysis suggests that the options of a new standalone long distance service calling at Watford Junction (tested in the Draft for Consultation under option **JT1.1** (faster journey times between London Euston and Glasgow Central)) or additional calls at Watford Junction in the existing London Euston to Glasgow Central service have poor business cases. There is insufficient capacity to stop additionally at this station given the frequency of trains (generally three minutes apart). This means that stopping a service here would increase the journey time for long distance passengers and for passengers on subsequent trains whose services would also be impacted. This would be to a level which the business case cannot support. Changes in infrastructure at Watford Junction or to the frequency or calling pattern of services may provide a window of opportunity in the future for an additional service to call here.

However, this gap would be partially met by option **JT3.1** if it could be implemented. This considers speeding up the existing London Euston to Crewe interurban service and extending it to Liverpool Lime Street, providing a direct connection between Watford Junction and Liverpool Lime Street.

Gap RL5: Lack of direct services between Milton Keynes and the North West

The December 2008 timetable change reduced the number of services travelling between London Euston and the North West that stopped at Milton Keynes Central. Two options have been considered to solve this gap. The first option looked at putting an additional stop in the London Euston to Glasgow Central service. This had a poor value for money business case due to the high disbenefits to LDHS passengers.

The second option (**OC3.2**) looked at stopping the additional service between London Euston and the North West at Milton Keynes Central. This is the preferred option to solve this connectivity gap assuming a timetable slot can be identified and should be considered in the timetable development process.

Gap RL6: Lack of direct services between Northampton and the North West

Stakeholders raised the lack of direct services between Northampton and the North West as a gap. Two options were considered to address this gap. The first option was to divert the London Euston to Glasgow Central service via the Northampton loop. This was not recommendable as it would increase the journey time between London Euston and Glasgow Central, resulting in significant disbenefits to long distance passengers.

If the option in **JT3.1** to extend the London Euston to Crewe service to Liverpool is taken forward it will provide a direct link from Northampton to Liverpool Lime Street.

Gap RL7: Lack of direct services between Rugby and the North West

The December 2008 timetable change reduced the number of services between London Euston and the North West that called at Rugby. Three options have been considered to solve this gap. The first option looked at putting an additional stop in the London Euston to Glasgow Central service. This did not have a value for money business case due to the high dis-benefits to LDHS passengers.

The second option looked at stopping the additional inter-peak service between London Euston and the North West outlined in option **JT1.2** (faster journey times to Glasgow) at Rugby on a two-hourly basis. This is the preferred option to solve this connectivity gap and so should be considered in the timetable development process. If the option in **JT3.1** to extend the London Euston to Crewe service to Liverpool Lime Street is taken forward it will provide a direct link from Rugby to Liverpool Lime Street.

Gap RL8: irregular or no direct service between the North West (Manchester and Liverpool respectively) and Scotland

Stakeholders believe that the current level of service between the North West and Scotland is inadequate. The following options were developed to address this gap:

Gap	Option Reference	Option
RL8	**RL8.1**	Additional services between Manchester Airport and Glasgow Central
	RL8.2	Introduction of a new direct service between Liverpool Lime Street and Edinburgh Waverley

There are currently three hours during the day where the otherwise hourly Manchester Airport to Glasgow Central/Edinburgh Waverley service does not run. This is partly due to the lack of available rolling stock and also the current timetable structure. The option to provide additional services is considered in the table for option **RL8.1**.

Assessment of option RL8.1 – additional services between Manchester Airport and Glasgow Central

Gap being addressed	Irregular or no direct service between the North West (Manchester and Liverpool respectively) and Scotland.
Concept	Provide two additional Manchester Airport to Glasgow Central services per day in each direction, and re-time the existing services to provide an hourly pattern.
Operational analysis	High level timetable analysis suggests this is possible as the service already operates for the rest of the day.
Infrastructure required	None.
Passenger impact	Provides an improved regular hourly service between Manchester Airport and Glasgow Central/Edinburgh Waverley which may lead to an increased abstraction from air travel because of the increased frequency. The option also increases passenger capacity en route.
Freight impact	Detailed timetable analysis has not been undertaken, but high level analysis suggests this is possible. The consequent timetable must incorporate both passenger and freight services north of Preston and these additional services will be assumed in the SFN north of Preston study.
Financial and economic analysis	The main costs relate to rolling stock (one additional four-car unit), crew and mileage. The following table outlines the appraisal results:

30-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	23.6
Revenue	-9.7
Other Government impacts	1.8
Total Costs	**15.7**
Benefits (present value)	
Rail users benefits	21.6
Non users benefits	7.1
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	**28.6**
NPV	**12.9**
Quantified BCR	**1.8**

Assessment of option RL8.1 – additional services between Manchester Airport and Glasgow Central	
Financial and economic analysis	Note: The additional services are assumed to operate with electric multiple units (which are known to generate better journey times due to their improved acceleration/deceleration speeds) following the electrification of the routes between Manchester and the WCML by 2015. Providing a more frequent service between Manchester and Scotland is expected to promote a modal shift from air to rail. It is anticipated that including this will further improve the business case.
Link to other options/ gaps	**RL8.2:** Introduction of a new direct service between Liverpool Lime Street and Edinburgh Waverley.
Conclusion	This option provides a medium value for money business case and is recommended for implementation as soon as rolling stock becomes available.

Option **RL8.1** is further modified to provide a direct service between Liverpool and Edinburgh by attaching and detaching a Liverpool Lime Street to Edinburgh Waverley service at Preston with the Manchester Airport to Edinburgh Waverley service. This provides a direct service between Liverpool and Scotland and is detailed in the option table for **RL8.2**.

Assessment of option RL8.2 – introduction of a new direct service between Liverpool Lime Street and Edinburgh Waverley	
Gap being addressed	Irregular or no direct services between the North West (Manchester and Liverpool respectively) and Scotland.
Concept	Attach and detach Liverpool Lime Street to Edinburgh Waverley and Manchester Airport to Edinburgh Waverley services at Wigan North Western or Preston to provide a direct two-hourly Liverpool to Edinburgh service.
Operational analysis	The Draft for Consultation assumed that following the North West electrification of additional routes in the North West there will be an additional Liverpool Lime Street to Preston service, which could be joined with the hourly Manchester to Scotland service at Preston to provide a direct hourly service between Liverpool and Scotland. The appraisal presented in the Draft for Consultation excluded the cost of running the Liverpool Lime Street to Preston portion of the new service. However, during consultation it was clarified that the Liverpool Lime Street to Preston portion was an uncommitted scheme and so the appraisal needed to be updated to include the costs and benefits of this. A detailed timetable exercise has not been undertaken and this option may result in some structural changes to the timetable at Preston.
Infrastructure required	None.
Passenger impact	Provides a direct service between Liverpool Lime Street and Edinburgh Waverley.
Freight impact	Detailed timetable analysis has not been undertaken, but high level analysis suggests this is possible with limited impact to freight services.

Assessment of option RL8.2 – introduction of a new direct service between Liverpool Lime Street and Edinburgh Waverley

Financial and economic analysis

The main costs relate to rolling stock (four units), crew and mileage. Providing a direct service between Liverpool Lime Street and Edinburgh Waverley is considered as a step change in service provision, therefore a gravity model[9] has been used to determine the number of passenger journeys that would be generated.

30-year appraisal	**£million (2002 PV)**
Costs (present value)	
Investment cost	0.0
Operating cost	85.0
Revenue	-41.2
Other Government impacts	7.6
Total costs	**51.3**
Benefits (present value)	
Rail users benefits	26.0
Non users benefits	29.2
Current TOCs revenue	0.0
Current TOCs/NR opex	0.0
Total quantified benefits	**55.2**
NPV	**3.8**
Quantified BCR	**1.1**

The business case has reduced from high value for money (BCR 1.9) in the Draft for Consultation to low value for money (BCR 1.1), once the cost of operating the Liverpool Lime Street to Preston portion is included. A sensitivity test was carried out which considered modifying the Liverpool Lime Street to Blackpool North hourly service to run every two hours. The alternate hour would then become a Liverpool Lime Street to Edinburgh Waverley service by attaching/detaching at Wigan North Western or Preston with the Manchester Airport to Edinburgh Waverley service. Although this improved the business case to BCR 1.4, it continues to provide low value for money.

Link to other options/ gaps

RL8.1: Additional services between Manchester Airport and Glasgow.

Conclusion

This option has a low value for money case despite the inclusion of additional passengers suggested by the gravity model in the appraisal. Under DfT appraisal criteria, this option cannot be recommended. However, the outcome of this appraisal is highly sensitive to both the expected level of passenger demand between Liverpool and Scotland and the cost of providing the Liverpool Lime Street-Preston portion. It is recommended that the incumbent franchisee and the DfT consider this option in the future if any new information is made available that could impact either the demand or cost of this option.

9 The gravity model forecasts the number of trips between two places, taking into account their population size and their distance. It is based on the fact that larger places attract people and commoditities more than smaller places and places closer together have a greater attraction.

Gap RL9: Poor frequency of services (when compared to other similar cities) between London and Liverpool

It was considered by stakeholders that the frequency of services between London and Liverpool was poor compared to other cities of a similar size. Option **JT1.1** presented in the Draft for Consultation (faster journey times between London and Glasgow, and the provision of an additional inter-peak service between London Euston and the North West) considered Liverpool Lime Street as a destination for the additional hourly service. This had a weaker case than other North West destinations as passengers for Wigan North Western and Preston were not compensated for the loss of service frequency.

If option **JT3.1** to extend the London Euston to Crewe service to Liverpool Lime Street is taken forward it will provide an additional hourly service between London Euston and Liverpool Lime Street.

Gap RL10: Poor frequency of direct services between Lockerbie and Glasgow/Edinburgh

There is a desire for a suitable commuting service in both directions from Lockerbie to Glasgow Central and Edinburgh Waverley, along with an appropriate off-peak service frequency to allow return trips for the leisure market.

The following options have been developed to address this gap:

Gap	Option Reference	Option
RL10	RL10.1	Extension of an existing Carstairs – Glasgow Central service to start from Lockerbie
	RL10.2	Insert a call at Lockerbie in the off-peak long distance services between Birmingham New Street and Glasgow Central/Edinburgh Waverley and Manchester Airport and Glasgow Central/Edinburgh Waverley

The first option (**RL10.1**) provides a commuting service and is the extension of an existing Carstairs to Glasgow Central service to start back from Lockerbie. This would also allow interchange with an Edinburgh Waverley bound service at Carstairs. Ultimately the service alterations required would not generate the level of additional passenger demand required to make a business case for the operational costs and the signalling alterations necessary to permit regular turnback of trains at Lockerbie and the option is not recommended.

Option **RL10.2** considers increasing the number of stops in the off-peak long distance service between Birmingham New Street and Glasgow Central/ Edinburgh Waverley and Manchester Airport and Scotland. However, the increased journey time represents a significant risk to the value of longer distance flows, due to the need to retime services through the busy approaches to Glasgow Central or Edinburgh Waverley and without an extensive timetable assessment this option cannot be recommended. In the future the opportunity to call at Lockerbie should be considered during timetable development processes.

Gap RL11: Sub-optimal connectivity at Carlisle between the West Coast Main Line, the Cumbrian coast, Newcastle, Leeds and the Glasgow and South Western route to Dumfries, Kilmarnock and on to Glasgow

The Lancashire and Cumbria RUS established in October 2008 considered connectivity at Carlisle. However, during the period of analysis, the December 2008 timetable was still in development and the impacts unknown. The gap was therefore referred to the West Coast Main Line RUS for consideration.

The WCML timetable was considered in terms of structure and the conflicts it is designed to overcome. Given the long distance nature of the routes involved, any move to centralise timetable structure around Carlisle to optimise connections at this station would have major impacts at hub locations such as at Newcastle, Leeds, Glasgow and along the WCML route itself. The potential damage to freight capacity, connections at other stations and to terminal capacity on the routes suggests the timetable should not be amended to specifically allow better connections at Carlisle. However, it is recommended that future timetable development of these local services considers connections into and out of the WCML timetable and between the different routes.

Gap RL12: Gap in morning high-peak hour fast services between Birmingham New Street and Milton Keynes Central

Many stakeholders consider that there is suppressed demand resulting from the lack of a fast service in the morning high-peak hour from Birmingham New Street to Milton Keynes Central. Given that both these centres are expected to see significant growth, future demand for commuters is expected to rise.

Adding stops into various services was considered, with the only operationally deliverable solution being an additional stop in the 07:30 service from Birmingham New Street to London Euston. The service is already heavily loaded with passengers travelling to London Euston, and the introduction of a Milton Keynes Central stop would result in considerable crowding south thereof. A set down only stop has a negative business case due to the increased journey time for passengers travelling from Birmingham New Street to London Euston so this option is not recommended.

Failure to provide a suitable fast commuter service between Birmingham and Milton Keynes in the high-peak hour is thought to be unacceptable by some stakeholders and the RUS recommends that future timetable development considers this gap. Ultimately, the provision of a new high speed line between London, the West Midlands and the north towards the end of the RUS period will enable significant amounts of extra capacity on the fast lines to be utilised by services on the south end of the WCML.

RL13: Poor frequency of direct services between Motherwell and London Euston

The May 2011 timetable replaces the majority of the Glasgow Central to London King's Cross services with Glasgow Central to Plymouth services via Edinburgh and Leeds. This reduces the opportunities to travel between Motherwell and the south via the WCML. The following three options have been considered:

Gap	Option Reference	Option
RL13	RL13.1	Swap Penrith stops for Motherwell in the existing London Euston to Glasgow Central services
	RL13.2	Insert stops at Motherwell on the Manchester Airport to Glasgow Central service after the electrification of routes in the North West
	RL13.3	Insert a stop at Motherwell in the extended London Euston to Lancaster services to Glasgow Central

Option **RL13.1** considers reinstating this connectivity by swapping Penrith stops for Motherwell in the existing London Euston to Glasgow Central services. However, the disbenefits to Penrith passengers outweigh the benefits to Motherwell passengers. This option can therefore not be recommended.

Following electrification of additional routes in the North West, an opportunity arises when new electric rolling stock, which runs faster, may create sufficient journey time reduction which could be used to insert stops at Motherwell in the Manchester Airport to Glasgow Central service. Option **RL13.2** considers this as one possible means of improving connectivity between Motherwell and the south. Further work needs to be undertaken when deciding the final timetable for this service after electrification. This should include an analysis of journey time benefits to passengers on the Manchester Airport to Glasgow Central service versus connectivity benefits to passengers at Motherwell.

The ORR decision on access rights for the new franchisee presents an opportunity to extend the current London Euston to Lancaster services to Glasgow Central. Option **RL13.3** considers inserting a stop at Motherwell in these extended services. The actual stopping patterns on these services north of Lancaster should be subject to consideration by the franchisee taking into account all service groups that serve Motherwell station. It is important to holistically consider the stopping pattern between Preston and Scotland to find the best overall solution.

Inserting stops at Motherwell potentially has an impact on junction occupation times at the north end of Motherwell station and as a consequence may disbenefit local Scotrail services.

Conclusion

The findings of the RUS option analysis work presented in this chapter have been combined with the impact of committed schemes to bring together a strategy for the WCML route to 2024. It also includes the input from the consultation responses and the further work undertaken in the consultation period. The strategy is detailed in **Chapter 7**.

6. Consultation process

6.1 The Draft for Consultation

This section outlines the key outputs from the Draft for Consultation that have informed the development of this strategy.

The West Coast Main Line Route Utilisation Strategy (RUS) Draft for Consultation was published in December 2010, along with a press release announcing its publication. The document outlined seven generic gaps between the present capability of the rail routes throughout the West Coast Main Line RUS area (in terms of capacity and performance) and the current and predicted demand for both passenger and freight traffic up to 2024. A set of options was proposed to address these gaps.

In line with the Government White Paper 'Delivering a Sustainable Railway' the RUS also looked in more general terms towards a 30-year horizon.

The Draft for Consultation was distributed to a wide range of stakeholders and a period of twelve weeks was given to allow stakeholders to respond. The consultation period ended on 11 March 2011.

During the consultation period, stakeholders were invited, either collectively or individually, to briefing sessions in Glasgow, Preston and London at which specific issues were raised and discussed.

At the same time, Passenger Focus ran a number of workshops, supported by Network Rail, seeking views from stakeholders on the Draft for Consultation document.

This section highlights various comments made and explains how stakeholder responses have helped to shape the development of the strategy.

6.2 Consultation responses

A total of 183 consultation responses were received and these are broken down as follows:

Government and local authorities	43
Train Operators, and the Association of Train Operators (ATOC)	12
Trade Unions, Government agencies and Members of Parliament	13
Ports, Airports and other transport groups	5
Wider business community	6
Rail user groups and Community Rail Partnerships	34
Members of the public	70

Copies of the various responses can be found on the Network Rail website at **www.networkrail.co.uk.**

6.3 Key themes in the consultation responses

6.3.1 Range of responses

The responses which Network Rail received were well-considered and in a number of cases comprehensive. As a result, it is difficult to provide an individual précis of each one. Instead some of the key and recurring themes are summarised below.

6.3.2 General themes

There was a mixed reaction from respondees, with some positive comments along with a number of concerns. The general approach, the gaps identified, the options identified and recommended and the overall direction of the RUS were broadly supported. For clarity, the emerging themes from the responses have been amalgamated under the gaps presented in the Draft for Consultation.

6.3.3 Gaps and options

On-train capacity

There was a range of responses to the RUS recommendations to address the on-train capacity gaps. Some of these were in terms of general approach while others looked at specific issues. The majority of respondents agreed with the options proposed to address this gap. There were some, however, who felt that a better use of network capacity would be to lengthen existing trains rather than running additional services.

Concerns were expressed that the overcrowding issues on the West London Line, particularly south of Watford Junction, had not been adequately addressed. There was, however, broad support for lengthening the existing services from four-car to eight-car formations and the proposal to run an additional service. Respondees expressed an aspiration for direct services to be provided to destinations south of East Croydon, where the current service terminates.

Stakeholders also queried the RUS assumption that the Manchester Airport to Scotland services would not suffer from overcrowding following the implementation of the North West electrification scheme and the operation of the services with four-car units, particularly at weekends. The analysis undertaken in the consultation period has shown that there are crowding issues on Fridays and weekends and the RUS recommends lengthening. The results are detailed in option **OC6.1** in **Chapter 5**.

Some stakeholders believed that the housing and economic growth predicted in the Northampton and Milton Keynes areas has not been adequately addressed. However, there was a lot of support for increasing the number of vehicles on the existing services between Northampton, Milton Keynes Central and London Euston.

Freight capacity/capability

Significant concern was expressed regarding capacity north of Preston. With more and altered passenger train services proposed to run to Scotland as a result of the recommendations made in the Draft for Consultation, freight operators in particular suggested that interventions may be required to accommodate future freight growth. Analysis of the effects of the recommendations contained in the Draft for Consultation has been undertaken since its publication and the initial findings are reported in **Chapter 5**. The RUS notes that capacity north of Preston is a key strategic issue for the route and supports the further work being led by the Strategic Freight Network looking at potential infrastructure solutions in a number of timetabling scenarios.

Journey time

There was tension between respondees who wanted faster journey times and those that wanted improved connectivity.

Journey time improvements were sought in many areas, including:

- London to Scotland services
- Manchester to Scotland services
- Birmingham to Manchester services.

Concern was also expressed that the RUS should have more focus on improving the reliability and punctuality of services.

A number of respondees commented on specific journey time increases such as from Rugby to Milton Keynes Central which had occurred as a result of the introduction of the December 2008 timetable as many trains calling at Rugby are now routed via Northampton.

Comments were made that to speed up journey times to and from Scotland the junction layout at Carstairs needed to be substantially improved. Carstairs South Junction, (where the West Coast Main Line (WCML) diverges between Glasgow and Edinburgh) is an operating constraint and the current track layout through the Carstairs area has been in use since the 1980s when the route to Edinburgh was electrified. The track system components are now coming to the end of their service life and the process of replacement affords the opportunity to improve the track components to upgrade the layout of the junction to best support the current and future operational requirements. The signalling system will also require updating to support the revised track layout, which may provide enhanced flexibility. These renewals are planned during Control Period 5 which will provide an opportunity to review the junction layout with a view to making improvements such as increasing linespeeds and reducing journey times.

Regional links

There was strong support for the proposals made in the Draft for Consultation that encouraged the development of regional links and improved connectivity.

Improving the connectivity between Stoke-on-Trent and Manchester Airport was strongly supported.

Some respondees felt that the recommendations in the Draft for Consultation did not help to grow local markets and improve connectivity. It was too focused on fast trains to and from London and did not help to improve the frequency of services calling at intermediate stations. It was suggested that the balance could be changed with more emphasis placed on improving local services and helping to develop tourist areas and improving services to support regeneration.

It was also suggested that new passenger railway lines could be developed including the possible reopening of the Northampton to Bedford route and more emphasis given to the development of the current disused route between Oxford and Bletchley (East – West Rail link).

Several stakeholders requested that train services should be restored to Barlaston station. On a similar theme correspondence was received regarding the future of other unserved stations at Norton Bridge, Wedgwood and Polesworth.

Concerns were expressed about the small number of services that call at Lockerbie station and the few Long Distance High Speed services that serve Motherwell station. The Stakeholder Management Group agreed that connectivity from Motherwell to the south should be considered as a new gap, particularly in the light of the May 2011 timetable which sees the replacement of through services from Motherwell to London King's Cross with new services to Birmingham New Street and the south west, via Edinburgh Waverley. Since publication of the Draft for Consultation a number of options have been considered to improve connectivity to Motherwell and these are discussed in **Chapter 5**.

Comments were made opposing the reduction of train services to Stoke-on-Trent in the Draft for Consultation.

Some stakeholders suggested that running four trains an hour from Manchester to London in the inter-peak may have a negative effect on local services in the Manchester area.

Connections from Watford Junction and Milton Keynes Central to the North West are poor and support was expressed for the options proposed in the Draft for Consultation to address this.

Reactionary delay

Comments were made on the length of time it can take for services to cross the WCML at Crewe due to crossing moves at the station (eg Cardiff Central to Manchester Piccadilly services having to transverse the whole layout). One train operator noted that journey times for services between Shrewsbury and Manchester that cross the route may become longer if further services are introduced onto the WCML.

With regard to the infrastructure layout at Crewe station and the constraints identified, a further review was undertaken following the publication of the Draft for Consultation to see if new platforms could be built on the Independent lines. It is important that any new platforms introduced are built to modern standards with suitable passenger access to and from the main station. The likely costs to construct new platforms and passenger access outweigh the benefits gained and this intervention has a poor business case. It is suggested that this option is further reviewed when the signalling equipment in the Crewe area is due to be renewed – currently planned in Control Period 6.

Improvements to the operational flexibility at Lancaster station were considered important to improve performance on the north end of the WCML.

Network Availability

Comments were made that there needs to be more diversionary routes available during times of disruption to reduce bus replacement services. Suggestions included running more train services on Sundays as some smaller stations have infrequent services.

Station passenger handling capacity

Many respondees commented on the need for adequate and affordable car parking facilities at stations. Many car parks are full by 08:30 which creates additonal on-street parking in the surrounding areas of the station.

Numerous comments were made suggesting that better facilities need to be introduced at stations including better customer information systems and toilets. Improvements were also suggested to enhance station facilities to help with the mobility of disabled passengers.

6.3.4 General comments

There was recognition that affordability, business cases and securing funding will be a key issue for moving any recommended schemes forward.

Concerns were expressed that the impact of the proposed High Speed Two (HS2) railway line on the existing WCML were not understood or well defined together with the opportunities and consequences it may create. The RUS notes that since the publication of the Draft for Consultation, HS2 limited has issued a consultation on its preferred strategy for a Y-shaped high speed network between London, the West Midlands and Manchester and Leeds. The RUS fully supports Government policy for the new line, agreeing that the WCML is effectively at capacity, particularly at the southern end, and recognising the capacity benefits for both passenger and freight services that can be realised on the existing WCML by the provision of the new line.

The balance between first class and standard class accommodation should be reviewed to ensure that the best use of capacity is made. It was thought by some stakeholders that services were not flexible enough to cater for fluctuating markets, eg additional services were required at Christmas time to cater for extra shoppers travelling.

Comments were made that the prices of train tickets and the time restrictions imposed were significantly affecting demand and causing some of the overcrowding issues, particularly on Fridays.

There was widespread support for further extension of the electrification programme in the North West (eg Crewe to Chester line and the Windermere branch).

A number of respondees suggested that the demand analysis did not take account of the effects of modal shift from air to rail as a result of faster journey times. Bespoke analysis has been carried out on modal shift during the consultation period and the results of the analysis are reflected in **Chapter 5**.

A number of stakeholders noted that since the publication of the Draft for Consultation, direct services between Wrexham, Shrewsbury and London were no longer available since the Wrexham Shropshire and Marylebone Railway ceased trading. This particular issue was assessed in the West Midlands and Chilterns RUS, published in May 2011. It concluded that while there is no direct train service, there is good connectivity between Shropshire and London.

6.3.5 Further Analysis

Further analysis was carried out on numerous workstreams since the publication of the Draft for Consultation. This resulted in some alterations to both the business cases for certain options and the overall recommendations. These have been reflected in the commentary in **Chapter 5**.

Since the publication of the Draft for Consultation further data on passenger loadings has become available from some train operators. This revised data has been used where appropriate to calculate business cases and the results are shown in **Chapter 5**.

We are grateful to all those who responded to the Draft for Consultation. The volume and range of responses from right across the spectrum of those with an interest in the RUS area has been impressive. It is hoped that, within the terms of reference, it has been possible to take account of concerns.

7. Strategy

7.1 Introduction

The West Coast Main Line (WCML) is the busiest mixed use route in the country, connecting major cities and freight terminals in Great Britain. Continued and sustained growth is expected in the key passenger and freight markets.

The more recent success of the WCML is a result of the major programme of investment on the route, culminating in the implementation of the December 2008 timetable. Under the new timetable, the frequency of Long Distance High Speed (LDHS) services between many of the core cities on the route has increased, end-to-end journey times have decreased, weekend engineering works have reduced in frequency, and punctuality has increased during the period since introduction.

Modern fleets of Class 390 and 350 electric trains and Class 221 diesel trains have replaced older, slower and/or less reliable fleets, offering more capacity. The suburban services between Watford Junction and London Euston have recently been extended from three to four-car Class 378 trains.

The baseline for this RUS is 2012, the third year of Control Period 4 (CP4) and the period under examination begins with an assumed service specification for December 2012. This specification is the minimum level of service provision the Department for Transport (DfT) envisages, utilising the capacity levels assumed in the baseline which are provided by the committed increase in rolling stock. This reference specification builds on today's timetable by assuming that three LDHS services that currently run between London Euston and Lancaster are extended onwards to Glasgow Central, with two return services provided.

Included in the baseline assumptions (and outlined in **Chapter 4**) is the electrification of additional routes in the North West as announced by the Government in 2009. The associated rolling stock provision is expected to result in four-car electric trains replacing three-car diesel trains on the Manchester Airport to Glasgow Central/Edinburgh Waverley services, increasing capacity on this route by around 20 to 30 per cent depending on the exact type and internal layout design of the rolling stock provided. These four-car units have yet to be procured and may be specified as being capable of operating at 110mph. This would also help with timetabling north of Preston as it would reduce the speed differential between passenger services.

The availability of additional rolling stock is key to the conclusions on capacity detailed in previous chapters and a fundamental prerequisite to a number of the recommendations presented within this strategy.

The RUS demonstrates that historical and planned future investment in rolling stock means the requirement for further on-train capacity on some parts of the route is less immediate than typically presented in RUSs. Despite this, in the absence of further strategic interventions, overcrowding is anticipated on certain key route sections by 2024. These include short and longer-distance commuter services to and from London Euston, LDHS services to and from London Euston and long distance services between Birmingham New Street/Manchester Piccadilly and Glasgow Central/ Edinburgh Waverley.

Beyond 2024, the RUS strategy takes cognisance of the Government's proposed strategy to develop a national high speed network which is expected to provide substantial capacity for LDHS services, thus releasing significant capacity on the existing WCML for the remaining passenger and freight services.

This chapter comments on the effects of other on-going industry processes, including the impending refranchising on the WCML, before setting out the standard RUS principles for recommending interventions to address identified gaps and then outlines the assumptions underpinning the strategy for generic groups of gaps, before going on to describe the RUS strategy.

7.2 Parallel industry processes

There are a number of other industry processes that are currently on-going which affect the WCML and are being developed in parallel to the RUS.

The current InterCity West Coast franchise was originally scheduled to be renewed in April 2012, and will have a major influence on the future direction of route strategy. A revised position on the franchise renewal process was issued in May 2011 with the replacement franchise planned to start on 9 December 2012. The four shortlisted bidders were announced in March 2011 and the successful bidder will be announced in 2012. The Government is expected to seek the best value for money from bidders and the best possible return on the recent investment in the route, without constraining the ability of bidders to innovate and invest.

In addition, applications for track access rights to operate services on the WCML from various passenger and freight operators were received in late 2010 by the Office of Rail Regulation (ORR). The ORR announced its decision in March 2011, approving the extensions of the London Euston to Lancaster services to Glasgow Central, additional services between Northampton and Crewe and a small number of additional passenger train paths between London Euston and Northampton.

The ORR noted that there is little spare capacity for further services in the current timetable structure. As part of this announcement, the ORR have asked for an Industry Timetable Working Group to be formed, led by Network Rail, with the objective of undertaking an iterative update of the WCML timetable over a number of years, with the first update forming the December 2013 timetable.

Therefore, the timetable that will be operating from December 2013, and in subsequent years, is subject to development and this chapter notes that some options cannot be delivered in today's timetable but should be considered as part of this timetable development process. The baseline year for analysis in this final RUS has been changed since publication of the Draft for Consultation from 2014 to 2012 to reflect the fact that the timetable will change in December 2013.

7.3 Principles

Dealing with passenger and freight growth

The general principle adopted in RUSs is to consider simpler and lower cost interventions before turning to more complex and expensive solutions. In the first instance, optimising the use of existing infrastructure is examined. Timetabling solutions are always sought in the first case, subject to there being no unacceptable performance impact on the network and this has been examined in this RUS so that the best available use of capacity can be made. The next step is to consider the progressive lengthening of trains to the maximum practical size where there are, or are expected to be, high levels of demand.

Where timetabling and lengthening options are not practical, RUSs then look towards targeted infrastructure enhancement. Again, the range of options is considered in order, from simpler schemes such as platform extensions, through to more far-reaching measures such as signalling and power supply upgrades, capability works for longer freight trains or increased loading gauge for intermodal traffic and more comprehensive investment in a particular line of route. In some cases, the provision of additional services may offer a solution to peak and inter-peak overcrowding, which offers connectivity benefits that would not be achieved by simple train lengthening.

Rolling stock

As described at the beginning of this chapter, several of the fleets operated by current franchises have been replaced in recent years and there is a committed procurement process underway to supply an additional 106 Class 390 vehicles for the long distance fleet. The size of the fleet of the main commuter and interurban operator into London Euston is also expected to be increased.

In 2011, the Government reviewed its rolling stock strategy and the Inter City Express (IEP) rolling stock programme has been revised. However, there are no current plans to introduce IEP rolling stock on the WCML.

The RUS considers that based on the current service structure, additional rolling stock on the route between Northampton and London Euston would be most efficient if it matched the route capability on the fast lines, operating at 125mph Enhanced Permissible Speed (EPS), which would minimise the network capacity that the stock will use. However, solutions with existing rolling stock capable of running at 110mph may be more practical in the shorter term if a timetabling solution can be found.

In the North West, the Manchester Airport to Glasgow Central/Edinburgh Waverley fleet will be replaced by four-car Electric Multiple Units. This will help to develop faster journey times as the accelerating and braking capabilities of new electric rolling stock are superior to the displaced diesel rolling stock. Although the final deployment arrangements are yet to be confirmed, this assumption has been included in the RUS study. As mentioned previously, if the procured units are capable of running at 110mph it will also help with the timetabling of services north of Preston as it would reduce the speed differential between passenger services.

Connectivity

A number of stakeholders have aspirations for improved connectivity in and between the many cities and towns in the RUS study area and with cities elsewhere in Great Britian. This would benefit commuting, business and leisure travellers, and subsequently the economy. Improvements to rail journey times, service frequency and the availability of direct services would all contribute to achieving improvements in connectivity for the route. Such improvements can be delivered by making changes to stopping patterns, running additional services, or a combination of these interventions. It should be noted that where additional stops are proposed on a service, journey times are likely to increase.

Performance

As with many other parts of the country, issues affecting performance on the rail network in the West Coast Main Line RUS area are complex, given the length of the route, the number of major conurbations served and the mix of services with varying speeds and stopping patterns.

Reactionary delay occurs as a result of an incident causing primary delay elsewhere on the network, together with infrastructure or service characteristics which constrain the ability to recover and minimise the impact. Locations with conflicting train moves, two track sections or complex flat junctions can result in the escalation of the levels of reactionary delay.

Despite an initial period of poor performance following the introduction of the December 2008 timetable, there has been a steady rise in performance and reliability to the point where improving levels of punctuality were achieved on the route in the year to April 2011. Examination of the levels of reactionary delay on the route found that the levels are too low to warrant any strategic intervention.

Network Availability

The industry recognises that there is a benefit in moving towards a timetable in which increasing demand at weekends is provided for by a broadly similar timetable to the Monday to Friday passenger service. Freight operators aspire to match the continuity of service offered by the road network.

Network Rail is leading the Seven Day Railway initiative, the overall vision of which is to deliver the working timetable in full, alongside cyclic maintenance, renewal and enhancement requirements. This will entail a need to provide more flexible operational layouts at the time renewals are carried out, together with changes in working arrangements. The latter is likely to include introduction of quicker and simpler procedures for managing possessions, combined with altered ways of working to allow greater adjacent line open or single line working train operations, which is likely to be facilitated by the installation of bi-directional signalling when renewal opportunities arise.

In many cases in the RUS area, key towns and cities can be accessed by more than one route, enabling a reasonable continuation of service at times of engineering work or perturbation, albeit with some journey time extension. A key issue, particularly for freight, is that comparable capability exists on diversionary routes, notably in relation to loading gauge clearance and route availability. Work in this area continues to be developed as part of the Strategic Freight Network (SFN) workstream. It will also be important to make sure that arrangements to accommodate long distance services on alternative routes in times of disruption or infrastructure works do not disproportionately affect users of local passenger services, which make up a significant proportion of operations in the RUS area on diversionary routes.

Since publication of the Draft for Consultation, W10 gauge clearance of the East Coast Main Line between Doncaster and Carstairs via Newcastle and the Edinburgh South Suburban line has now been funded. This will provide an alternative route for intermodal services between the East Coast ports and Scotland.

The Stakeholder Management Group (SMG) noted that there were a number of diversionary opportunities, particularly at the south end of the route. North of Preston opportunities are more limited, especially for services operated by electric traction. Installation of bi-directional signalling should therefore be considered when the route is being resignalled.

Electrification

The RUS notes the consideration given in the Network RUS: Electrification Strategy to future electrification schemes across the national rail network.

Recent decisions by the Government to approve electrification schemes, both in the North West and on the Great Western Main Line between London Paddington, Bristol and Cardiff Central, have recognised the importance of developing electrification on the rail network.

Electrification creates opportunities for new diversionary routes and the replacement of diesel units on existing services with faster and more environmentally friendly electric units.

The Network RUS: Electrification Strategy outlined a number of possible electrification infill schemes within the West Coast Main Line RUS area. The key routes defined included:

- Crewe to Chester (21 miles) – would allow electric operation of the London to Chester services throughout, potentially allowing the Class 221 fleet to be utilised elsewhere

- Birmingham/Walsall to Nuneaton (31 miles)
- Walsall to Rugeley Trent Valley (15 miles) - would provide WCML diversions when the Stafford to Wolverhampton line is not available. This has been considered by the West Midlands and Chilterns RUS
- Oxenholme Lake District to Windermere (10 miles)
- Lancaster to Morecambe/Heysham (6 miles)
- Coventry to Nuneaton (9 miles) – would provide an electrified diversionary route as an alternative to the three-track section between Brinklow Junction and Attleborough South Junction.

Electrification also helps to improve maintenance accessibility, potentially enabling operators to avoid the need for rail replacement bus services and providing passengers with a journey free of disruption. The RUS therefore supports the principle of further expansion of the electrified network subject to business case and funding availability.

Power supply

The announced expansion of electrified routes in the North West and the associated deployment of additional electric fleets confirm that there will be an increase in power supply demand. Upgrades to the power supply in the area are being developed by Network Rail as part of the electrification scheme.

7.4 Committed interventions

Background

There are number of committed train service, rolling stock and infrastructure interventions that are assumed in the baseline for this RUS. Successful implementation of these initiatives has a fundamental impact on the future of the route.

Franchising

The new InterCity West Coast Franchise will commence in 2012, with track access rights having been confirmed in March 2011 by ORR.

The long distance services between Manchester Airport and Glasgow Central/Edinburgh Waverley are part of the First TransPennine franchise, which runs to 2012, with a potential extension of up to five years.

Train services

The reference case specification assumed for the baseline is the December 2010 timetable with three London Euston to Lancaster services extended to Glasgow Central resulting in an hourly service between London Euston and Glasgow Central.

Rolling stock

The Class 390 fleet will be further increased by 106 vehicles by 2012, creating four new 11-car trains and lengthening 31 existing sets, resulting in 35 of the total 56 sets being 11-cars in length. This increases the quantity of standard class seating on services operated by the 11-car sets by approximately 50 per cent.

There is also the possibility of an increase in the size of the Class 350 interurban fleet which is currently under discussion between the DfT and the train operator.

It is understood that passenger services in the North West that run via the WCML will become operated by Electric Multiple Units. Therefore the RUS assumes that Manchester Airport to Glasgow Central/Edinburgh Waverley services will be operated by four-car electric trains.

Infrastructure

The following infrastructure schemes are committed to go ahead on the route or in the surrounding area in CP4 and CP5:

- platform lengthening for Class 390 vehicles to accommodate 11-car sets at 10 stations as outlined in **Chapter 4**
- WCML power supply upgrade
- Bletchley remodelling: platform lengthening to accommodate 12-car sets, and a 775m bi-directional freight loop
- Stafford area capacity and performance schemes, including the grade separation of Norton Bridge Junction, will be developed in CP4 and delivered in CP5. This will provide some additional capacity for both passenger and freight service growth
- electrification of the routes in the North West as outlined in the Government announcement of 2009 to be phased over CP4 and CP5
- the Budget announcement of 23 March 2011 included funding for the Ordsall Chord and other associated infrastructure works in the Manchester area to be implemented by December 2016. This will free up capacity at Manchester Piccadilly as it will remove a number of crossing moves outside the station that are currently undertaken by north cross-Pennine trains. It will also result in a reduction in the total number of trains that terminate at Manchester Piccadilly.

7.5 RUS strategy 2012–2024

Background

This part of the strategy represents the majority of the interventions outlined in **Chapter 5**, based on the RUS baseline assumptions in 2012, including committed schemes, the reference specification and rolling stock assumptions as previously detailed. It aims to inform the strategy for CP5 and CP6.

Passenger train services

Some of the worst overcrowding on the WCML is expected to occur on the commuter and longer distance services between Northampton, Milton Keynes Central and London Euston during peak hours. As time progresses this crowding is expected to become more severe, extending into the period between the morning and evening peaks.

There are currently some services that operate at 12-car lengths in the three-hour peak, which is the maximum operable length. However, there are still some services operating in eight-car formation that could be lengthened. There is a high value for money business case to lengthen a total of 11 services in the morning and evening three-hour peaks, requiring 28 additional vehicles. This includes the lengthening and extension of one morning-peak hour Watford Junction to London Euston service to start back from Tring in 12-car formation. This option is recommended for implementation as soon as rolling stock becomes available. Although helpful in reducing crowding, this option still leaves a large number of passengers standing for more than 20 minutes by 2024.

RUS analysis undertaken since the Draft for Consultation was published has identified one timetable path in the morning high-peak hour and two timetable paths in the evening three-hour peak (one in the high-peak hour and one in the second shoulder-peak hour) that could be utilised. However, these services would have to be operated using 125mph Enhanced Permissible Speed (EPS) rolling stock and be no more than eight-cars in length due to platform constraints at London Euston. However, rolling stock matching this criteria is currently unavailable. There may be the opportunity to provide these additional services using 110mph rolling stock if the timetable on the corridor was restructured. This should be considered for implementation as part of future timetable developments.

There is a high value for money business case to implement both the train lengthening and additional services described above. However, due to the severe overcrowding on this corridor and the growth expected over the RUS period, this still leaves around 5,300 passengers who are forecast to be standing in the morning and evening three-hour peaks by 2024. Around 34 per cent of these are forecast to stand for more than 20 minutes. There will also be inter-peak crowding by 2024 and it is recommended that the overcrowded services are lengthened by utilising the peak rolling stock. No further solutions to overcrowding have been found during the analysis and whilst these recommendations aim to provide as much capacity as possible in the interim, the RUS has been unable to fully address the peak crowding gap.

Substantial overcrowding also occurs between Watford Junction and the West London Line (WLL) towards Clapham Junction due to there being insufficient capacity during the high-peak hour. There is a high value for money business case to lengthen the current four-car services to eight-car formation and provide the necessary infrastructure as soon as rolling stock becomes available in the morning and evening three-hour peaks. There is currently an hourly service throughout the day on the route, with the exception of the morning three-hour peak, which has a 73 minute gap. It is recommended that an additional hourly service is introduced to address this gap in services and improve connectivity.

Timetable development has identified that a two trains per hour peak service between the two routes is viable, but that this requires additional dual-voltage rolling stock and a timetable recast of either route, most likely the WLL. As a result, this service is not deliverable at the present time, but can be expected to be achievable following the completion of work on the Thameslink Programme, when additional dual-voltage vehicles will become available and a recast of all services south of London (including services that go on to the WLL) will become necessary.

The increase in Class 390 rolling stock in CP4 can relieve the majority of the anticipated crowding on LDHS services to and from London Euston. The RUS recommends that the Class 390 11-car sets scheduled to come into service in 2012 are deployed to services with the heaviest crowding.

In order to alleviate the remaining crowding, the RUS considered lengthening the residual Class 390 sets from nine to 11-cars. However, this was not expected to be good value for money, as the committed additional Class 390 vehicles will be used to lengthen the train diagrams with the greatest concentration of crowding. Lengthening of the remaining nine-car sets would be expected to give diminishing returns relative to the cost of operating the extra vehicles all day. Moreover, it would not entirely solve crowding on the LDHS services, as some of the eleven-car services are expected to be at or near capacity.

The RUS therefore examined the option of operating an additional hourly service to the North West in the inter-peak. As described in more detail in **Chapter 5**, the RUS considered accelerating the London Euston to Glasgow Central service by removing stops and then running an additional train which would pick up the calls removed from the previous train and run at least as far as Preston. Alternately, the option of increasing the frequency of services between London Euston and Manchester Piccadilly to four trains per hour was considered.

Both of these options have high value for money business cases when assuming the journey time savings outlined in the Draft for Consultation. However, the journey time savings for the first option cannot be gained in the current timetable structure and increasing the frequency of the London Euston to Manchester Piccadilly services to four trains per hour on an even pattern cannot be accommodated without a timetable recast.

As neither of these options can be recommended based on the current timetable structure, it is recommended that they are considered in the Industry Timetable Working Group which will be developing the 2013 WCML timetable.

Overcrowding on many of the LDHS services between Birmingham New Street and Glasgow Central/ Edinburgh Waverley is forecast to worsen by 2024. Some nine-car Class 390 sets could be deployed on the Birmingham to Glasgow Central/Edinburgh Waverley services currently operated by Class 221 vehicles. In turn the Class 221 trains could then be used to provide the less busy services into and out of London Euston. In the event that it is not possible to match these Class 390 trains to the most crowded services, analysis suggests that there is a theoretical high value for money business case for 16 additional vehicles to lengthen the existing rolling stock used on these services to alleviate crowding.

The services are currently operated using diesel traction, which is inefficient given that the entire route is electrified and if the solution to provide additional vehicles is adopted, then consideration should be given to providing vehicles that are either electric traction or capable of bi-mode (diesel and electric) operation.

The Manchester Airport to Glasgow Central/ Edinburgh Waverley services will be converted to electric traction and run via Wigan after the first phase of electrification in 2014. The conversion to four-car EMUs is expected to solve much of the off-peak overcrowding on this corridor and peak hour services have been examined in more detail in the Northern RUS. However, crowding is expected on these services on Fridays and at weekends. There is a business case to lengthen these services to up to eight-car formation and this is recommended.

Current Manchester Airport to Glasgow Central/ Edinburgh Waverley services do not operate to a strict hourly pattern. Once rolling stock becomes available, the RUS recommends that the service frequency is increased to provide an hourly pattern.

A sub-option to provide direct Liverpool Lime Street to Glasgow Central/Edinburgh Waverley services through splitting and joining trains at Preston has also been examined. The business case for this is highly sensitive to both the operating costs and the forecast level of passenger journeys. Although this option cannot be recommended currently as it offers low value for money, it is recommended that this option is reviewed as more information on demand and relevant costs becomes available to potential funders.

The Draft for Consultation identified a number of options to address regional connectivity across the route. These included accelerating the Bournemouth to Manchester Piccadilly service by diverting it away from the Stoke-on-Trent route, extending the London Euston to Crewe interurban service to Liverpool Lime Street by diverting it away from Stoke-on-Trent and extending the Derby to Crewe service to Manchester Airport.

Work completed since the Draft for Consultation was published shows that though accelerating the Bournemouth to Manchester Piccadilly service in this way has a high value for money business case when assuming the theoretical journey time savings identified in the Draft for Consultation, these savings cannot be realised in the current timetable structure. This results in the business case falling to low value for money. However, improving the journey times by rail between major cities is a priority for the DfT and should be considered by the Industry Timetable Working Group. This may be by diverting the Bournemouth to Manchester Piccadilly service away from Stoke-on-Trent to operate via Crewe as examined in this RUS, or through the opportunity to restructure the timetable, especially once the benefits of the Stafford scheme are realised, which may enable the journey time to be improved on the current routeing.

The option to extend the London Euston to Crewe service to Liverpool Lime Street by diverting it away from Stoke-on-Trent has a good business case; however, it would remove the only service that calls at Stone station. Though analysis was undertaken to find a value for money way of replacing the connectivity to Stone, the RUS could not find a positive business case to extend another service to serve the Stoke-on-Trent corridor. Therefore, the option of extending the London Euston service to Liverpool Lime Street by diverting it away from Stoke-on-Trent should be considered in the Industry Timetable Working Group, as by restructuring the timetable and potentially reducing journey times between Birmingham and Manchester, it may be

possible to find a value for money way of replacing the capacity on the Stoke-on-Trent corridor.

The extension of the London Euston to Crewe service to Liverpool Lime Street would solve a number of other connectivity gaps that were identified in the RUS, such as connectivity between Rugby, Northampton and Watford Junction and the North West. It may be possible to extend the London Euston to Crewe interurban service to Liverpool Lime Street without diverting it away from the Stoke-on-Trent loop; however, this option would require further development and business case analysis due to the additional rolling stock and train crew requirements to operate this option.

Rail links between towns in the Potteries and Manchester Airport are poor and the RUS has examined the case for extending the Derby to Crewe service to Manchester Airport. In the Draft for Consultation this option was recommended within a package of interventions that was ultimately viable based on the theoretical journey time savings that could be achieved on the Bournemouth to Manchester Piccadilly service. However, now that this journey time reduction, and consequently the package it supported, has not been found to be achievable within the current timetable structure, the option of extending the Derby to Crewe service must be considered on its own merits. This option has a low value for money business case and is therefore not recommendable; however, there is currently some overcrowding on the busiest of the Derby to Crewe services and it is recommended that these are lengthened to two-car formation when rolling stock becomes available. The Northern Hub project is also reviewing connectivity between the East Midlands and the North West.

As a result of the timetable change in May 2011 which replaced services between Glasgow Central and London King's Cross with new services between Glasgow Central and Birmingham New Street via Edinburgh Waverley and Leeds, the RUS Stakeholder Management Group agreed that connectivity from Motherwell to the South constituted a new gap. A number of options were considered to address this gap and the ORR's decision on access rights for the new InterCity West Coast Franchise presents an opportunity for the current London Euston to Lancaster services to be extended to Glasgow Central and Motherwell could be inserted as a stop into these services. In order to permit a robust strategy on the route between Preston and Glasgow Central/Edinburgh Waverley and develop the best overall solution for passengers, it is important to holistically consider the stopping pattern for all services operating on this section.

The actual stopping pattern of Anglo Scottish services should be subject to additional investigation by the franchise holder.

Freight services

The assessment of capacity to accommodate freight growth based on the SFN 2019 and 2030 forecasts found that there is sufficient capacity for the additional timetable slots required (expressed as train paths per day). The work undertaken was based on the SFN assumptions outlined in **Chapter 3** which comprise of six-day working and 640m trains which convey more volume. It is noted that the longer-term aspiration of freight operators is to operate 775m trains.

These efficiencies reduce the number of additional timetable slots required. The SFN assumptions adopted are fundamental to this outcome and this also assumes that the committed CP4 interventions on the route detailed in Chapter 4 will be implemented. If the assumptions of longer trains and six-day working, which are currently unfunded industry outputs, do not materialise, then these findings will have to be reviewed as more timetable paths may be required than outlined in the SFN forecasts.

North of Preston, it is possible to accommodate the majority of services running with heavier payloads than today by reconfiguring loops and providing additional loops. As the majority of the loops along the route are not long enough to accommodate 640m trains, interventions would be required as demand develops and the train lengths increase. Work undertaken since the Draft for Consultation suggests that as freight growth materialises and the recommendations for revisions to passenger services are implemented, additional infrastructure in the form of looping facilities will be required in both directions north and south of Carlisle.

The type of traction used on freight services makes a considerable difference to freight journey times due to the steep topography of the route. This has a consequent effect on overall capacity as the speed differential between freight and passenger services widens. Conversion of freight services to electric traction would benefit both end to end journey times for freight and the amount of available capacity for both freight and passenger services. However, for this to be a viable proposition, consideration needs to be given to the linking of freight terminals to the electrified network, along with further infill electrification to allow electric operation from origin to destination, as changing traction type en-route is costly both economically and in terms of overall journey times. The established Network RUS: Electrification Strategy identifies the case for further electrification of the network and this RUS supports that strategy.

It is recognised that the exact type of interventions required to provide additional capacity may vary depending on what timetable, traction type and train length are assumed. For this reason, further work is being undertaken on the route north of Preston to look at alternative scenarios to those outlined above, including considering the impact of running 775m freight trains and possible changes to passenger services after the introduction of high speed services via High Speed Two (HS2). This study has been initiated by the SFN workstream and work completed in the Draft for Consultation and this RUS has formed an input to be expanded upon. Any interventions found to be necessary north of Preston will then be appraised to determine whether there is a value for money case to undertake any work.

The highest levels of freight growth are expected in the domestic intermodal sector and the terminal at Daventry is expected to grow significantly throughout the RUS period. The emerging domestic intermodal services are also likely to require more tightly defined timetable slots, as demand for more highly time-sensitive traffic increases. This will place further pressure on constrained sections of the route and may prompt the development of interventions.

The RUS also notes that the provision of W12 loading gauge on the route is an SFN aspiration.

Infrastructure

Although no infrastructure enhancements have been recommended to accelerate services following the major investment in the WCML Route Modernisation Programme, opportunities to reduce point-to-point journey times should be exploited when track and signalling renewals are due and where funding can be made available. For freight services, it is recognised that as train lengths increase, loops north of Preston will need lengthening and the ongoing SFN-initiated study into capacity north of Preston will be appraising any infrastructure schemes that are found to be necessary to see whether they have good business cases.

In addition, the very slow linespeeds throughout Carlisle Kingmoor Yard constrain capacity as services have to reduce speed to approach the junction. This issue will be exacerbated as freight trains become longer and therefore take longer to clear the junction. It is recommended that improvements are considered in CP5, in association with the aforementioned SFN study.

7.6 Long-term strategy (2024 and beyond)

The medium-term strategy demonstrates that crowding issues are prevalent on both commuter and LDHS passenger services over the RUS period. Beyond the already committed interventions, there is little scope to run additional or longer trains at the times they are most needed. Even if these opportunities are taken, by the mid-2020s there will be unacceptable levels of crowding on an increasing number of trains (where passengers are standing in very crowded conditions and/or standing for more than twenty minutes). The forecasts suggest that this overcrowding will be evident on commuter services first. The pressure on long distance capacity will be felt later in the RUS period (as the capacity from the additional Class 390 vehicles will absorb growth in the shorter term).

Beyond 2024, passenger demand is expected to continue to grow strongly, driven by the same trends that have driven growth over the last 15 years, such as the continued growth of Central London employment, regeneration of city centres, the development of city-region economies, road congestion and rising fuel prices.

The WCML is expected to be 'full' by this time, and will become increasingly constrained in its ability to support the economy (through commuter and business travel) and to generate revenue for the industry. The most effective and best value for money way to create additional capacity will be through building a new line.

In 2008 Network Rail commissioned a study to consider the case for a new rail line in the UK. The study examined the various routes into London and established that the WCML would require earlier strategic intervention to provide capacity. The study proposed the construction of a new high speed line serving London, the West Midlands, the North West and Glasgow/Edinburgh. Further work reported the benefit of high speed services between London, Yorkshire and the North East.

Later in 2008, the Government formed High Speed Two Limited to consider the case for high speed rail services from London. The company recommended a Y-shaped network from London to the West Midlands before diverging with a route to Manchester and beyond.

The proposed new line would operate long distance services and would release significant capacity on the classic network which can be utilised by both passenger and freight services. This would relieve the substantial overcrowding that is forecast on commuter services, as well as relieving the pressure on long distance capacity.

Both the construction and operational phases of phase one and eventual Y-shaped schemes would have fundamental implications for the existing WCML and adjacent parts of the network. The opportunities that are created by the new strategy for high speed rail will need to be considered, and where required, evaluated, as part of the overall development process.

Stakeholder aspirations include:

- enhanced passenger services on the existing WCML once the HS2 route is open to provide faster commuting journeys at the southern end of the route and enhanced frequencies between the major towns and cities along the WCML
- the possibility of extending westbound Crossrail services that are currently proposed to terminate at Westbourne Park onto the WCML via a short stretch of new line in the Old Oak Common area, potentially taking over some or all of the shorter distance commuter services (ie as far as Tring and Milton Keynes Central). This concept would enable direct services from the Milton Keynes corridor to the City of London and Canary Wharf
- extra capacity created for additional freight services on the residual WCML.

The Government is supportive of the proposed new high speed network strategy and launched extensive public consultation in early 2011, closing on 29 July 2011. As HS2 is currently in the process of formal public consultation, it is not appropriate to examine in detail the possible service structure that may be put in place upon its implementation as numerous options are being discussed and debated. The original scheme that was proposed has already evolved and further changes to the proposal may occur following the completion of this consultation process.

8. Next steps

8.1 Introduction

The West Coast Main Line Route Utilisation Strategy will become established 60 days after publication unless the Office of Rail Regulation (ORR) issues a notice of objection within this period.

8.2 Planning for Control Period 5

The planning cycle for the next control period (2014-2019) is underway. This RUS will form an input into the Initial Industry Plan (IIP) which is to be formulated by the rail industry and published in September 2011. The purpose of the IIP is to inform funders and the ORR of the possible range of outputs and costs for the railway in Control Period 5 (CP5) and the longer term.

8.3 Industry Timetable Working Group

In March 2011 ORR approved track access rights to enable the InterCity West Coast franchisee to operate services on the West Coast Main Line (WCML) when the new franchise commences in 2012. The ORR noted that there is little spare capacity for further services in the current timetable structure. As part of the announcement, the ORR have asked for an Industry Timetable Working Group to be formed, led by Network Rail, with the objective of undertaking an iterative update of the WCML timetable over a number of years with the first update forming the December 2013 timetable. Previous chapters of the RUS have noted that a number of options to address gaps cannot be delivered in today's timetable but should be considered as part of this timetable development process.

8.4 Strategic Freight Network

The Strategic Freight Network workstream assessing capacity north of Preston will continue through the summer of 2011. Any value for money interventions that are found to be necessary will be considered as part of the IIP.

8.5 Route based planning documents

The outputs of this RUS will also inform the route based planning documents which will be published in September 2011 in conjunction with the IIP. These route based documents are updated annually and are available at **www.networkrail.co.uk.**

8.6 Ongoing access to the network

The RUS will also help to inform the allocation of capacity on the network through application of the normal Network Code processes.

8.7 Review

Network Rail is obliged to maintain a RUS once it is established. This requires a review using the same principles and methods used to develop the RUS:

- where circumstances have changed
- when so directed by ORR
- when (for whatever reason) the conclusion(s) may no longer be valid.

Glossary

Term	Meaning
AC	Alternating current – eg 25kv (25,000 volts overhead electrification lines).
ATOC	Association of Train Operating Companies.
ATW	Arriva Trains Wales – a train operating company.
BCR	Benefit Cost ratio – a tool used in financial appraisal of options to assess its economic benefit.
Bi-directional working	Signalling that allows trains to run in both directions on one line.
Bi-mode train	A train that can operate both electric and diesel traction.
Control Period 4 (CP4)	Network Rail is funded in five yearly periods. Control Period 4 is the funding period between 2009-2014.
Control Period 5 (CP5)	Network Rail is funded in five yearly periods. Control Period 5 is the funding period between 2014-2019.
Control Period 6 (CP6)	Network Rail is funded in five yearly periods. Control Period 6 is the funding period between 2019-2024.
DaSTS	'Delivering a Sustainable Transport System' - A formal consultation document published by the DfT in November 2008 setting out their long-term transport priorities.
DBS	Deutsche Bahn Schenker, a freight operating company.
DC	Direct current. Associated with 750volt DC lines.
DfT	Department for Transport.
DMU	Diesel Multiple Unit.
Down	The direction i.e. Down direction, Down peak, Down line, Down train, this generally (but not always) refers to the direction that leads away from London.
DRS	Direct Rail Services – a freight operating company.
Dwell time	The time a train is stationary at a station.
ECML	East Coast Main Line.
Efficient Engineering Access (EEA)	A railway term that relates to the time on the railway network when no trains operate. This provides the means by which maintenance, renewals and enhancement works are undertaken.
EPS	Enhanced Permissible Speed – this allows trains equipped with tilt technology to travel at higher speeds specifically round curves, and also on sections of straight track due to the higher speed capability of this type of rolling stock. Currently EPS capability is only found on the West Coast Main line route in the United Kingdom.
EMU	Electric Multiple Unit.
EU	European Union.
FOC	Freight Operating Company.
FTA	Freight Transport Association.

Term	Meaning
GBFM	Great Britain Freight Model - The GBFM is designed to forecast freight moved within Great Britain, including freight to and from the ports and the Channel Tunnel. It covers different modes such as rail and road and produces a matrix of all forecast freight flows. This provides a 'top down' view based on economic modelling.
GBRf	GB Railfreight – a Freight Operating Company.
GDP	Gross domestic product.
Generalised journey time	A measure of total travel time which can include: in vehicle time, service frequency and interchange.
Gravity Model	The gravity model is a modelling tool that forecasts the number of trips between two places, taking into account their population size and their distance. It is based on the fact that larger places attract people, ideas, and commodities more than smaller places and places closer together have a greater attraction.
GRIP	Governence of Railway Investment Projects.
High-peak	Between 08.00 and 09.00 and 16.00 and 17.00.
HLOS	High Level Output Specification.
HS2 Ltd	High Speed Two Ltd - A company formed by the Government in 2008 to consider the case for possible high speed rail services in the United Kingdom.
ITA	Integrated Transport Authority.
Intermodal trains	Freight trains which convey traffic which could be moved by road, rail or sea (eg container trains).
Inter-peak	Between the morning and evening peaks (10.01 to 15.59).
JPIP	Joint Performance Improvement Plans.
Junction margin	The minimum interval possible between trains operating over the same junction in conflicting directions.
LDHS	Long Distance High Speed.
LENNON	An industry database recording ticket sales.
Loading gauge	Loading gauge is the profile for a particular rail route within which all vehicles or loads must remain to ensure that sufficient clearance is available at all structures.
LOROL	London Overground Rail Operations Limited – a train operating company.
MOIRA	An industry standard passenger demand forecasting model that uses many of the principles published in the Passenger Demand Forecasting Handbook.
MAA	The Moving Annual Average (MAA) measures the Public Performance Measure (PPM) each four weekly period over the course of a year.
MPH	Miles per hour.
N/A	Not applicable.
Northern Hub	Network Rail's capacity study for Manchester and the north.
NPV	Net Present Value.
NRDF	Network Rail Discretionary Fund – a source of funding for enhancement projects to be developed and delivered.
NSIP	National Stations Improvement Programme - a DfT funded cross-industry programme designed to enhance approximately 150 medium sized stations across routes in England and Wales.
Off-peak	Before 07:00 and after 10:00 and before 16:00 and after 19:00.
ORR	Office of Rail Regulation.

Glossary

Term	Meaning
PDFH	Passenger Demand Forecasting Handbook. An industry document that summarises the effects of service quality, fares and external factors on rail demand such as behaviours and trends.
Peak	Morning peak between 07.00 and 10.00 and evening peak between 16.00 and 19.00.
PLANET	A demand forecasting model developed by the former SRA.
Planning headway	The minimum interval possible between trains on a particular section of track.
Possession	Where part of the infrastructure is closed to services to carry out maintenance, renewal or enhancement works.
PPM	Public Performance Measure – this measures the performance of individual trains against their planned timetable.
Permissible speed	Highest permissible speed on a line of route for trains without EPS.
PTE	Passenger Transport Executive.
PV	Present value.
RA	Route Availability – the system that determines which types of locomotives and rolling stock can travel on any particular route.
Railsys	A computer model used for timetable modelling.
RFG	Railfreight Group.
RFOA	Railfreight Operators Association.
Route Availability (RA)	This determines which types of locomotive and rolling stock can travel over any particular route. The main criteria for establishing RA usually concerns the strength of underline bridges in relation to axle load and speed. eg – A locomotive of RA8 is not permitted on a route of RA6.
RPA	Regional Planning Assessment.
RSS	Regional Spacial Strategy.
RPI	The retail price index measure of UK inflation.
RUS	Route Utilisation Strategy.
S&C	Switches and Crossings – track components which allow trains to change from one line to another.
Seated Load factor	The amount of seats occupied on a train service expressed as a percentage of total seats available.
Selective door operation	A means of ensuring that only certain doors open when a train has stopped in a station, leaving closed any doors which overhang short platforms. Not all rolling stock is fitted with this facility.
SFN	Strategic Freight Network.
Single line working	Carrying out engineering work on one line while trains operate on adjacent lines.
Shoulder-peak	Between the hours of: 07:00 – 07:59 hrs 09:00 – 09:59 hrs 16:00 – 16:59 hrs 18:00 – 18:59 hrs
SMG	Stakeholder Management Group.
SoFA	Statement of Funds Available.

Term	*Meaning*
SRA	Strategic Rail Authority (former rail body).
Strategic Routes	Network Rail is structured for planning purposes around 17 routes, which are aligned closely to the traffic flows in the planning and operational areas to enable direct use of route plans for delivery.
TfL	Transport for London.
TOC	Train Operating Company.
tpd	Trains per day.
TPE	First TransPennine Express (TPE) – a train operating company.
tph	Trains per hour.
Train path	A slot in a timetable for running an individual train.
Two aspect signalling	A signalling system that displays only two colour light signals (eg red and green signals only).
Up	Where referred to as a direction i.e. Up direction, Up peak, Up line, Up train, this generally but not always refers to the direction that leads towards London.
W8	This gauge allows 8'6" high by 2,500mm wide containers to be carried on a standard container wagon.
W9	Allows 9'6" high containers to be carried on some lower deck height wagons. It also allows wider "swap body" containers to be conveyed as it covers loads up to 2,600mm wide.
W10	The loading gauge which enables 9' 6" containers to be conveyed on conventional wagons.
W12	Allows a 9'6 high container to be carried on a standard container wagon, including refrigerated containers up to 2,600mm wide. This is the recommended height for renewed structures.
WCML	West Coast Main Line.
WSG	Wider Stakeholder Group.

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